FSC National Risk Assessment

For the conterminous United States of America

DEVELOPED ACCORDING TO PROCEDURE FSC-PRO-60-002 V 3-0

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International contact	Name: Amy Clark Eagle Email address: a.eagle@us.fsc.org
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Body responsible for NRA maintenance	FSC US – Amy Clark Eagle, Director of Science & Certification, a.eagle@us.fsc.org

Contents

Risk designations in finalized risk assessments for the conterminous United States

NOTE 1: *The US NRA covers the conterminous United States, which excludes Alaska and Hawaii and the US territories (i.e. portions of the United States that are not within the limits of any state and have not been admitted as states), for all types of forests.*

NOTE 2: *Annexes D, E and F include additional content associated with Categories 2, 3 and 4 (respectively). For Category 2, the annex includes the same assessment text as in the template below, but in a non-table format and additionally include some supplementary context and guidance information. For Categories 3 and 4, the annex includes more detailed assessments than the condensed versions in the template below, but also in a non-table format with supplementary context and guidance information. For each Category, the supplementary context and guidance information is intended to help readers better understand the rationale behind the risk designation decisions. For all Categories with annexes, the content found in the main body of the risk assessment, not the annexes, is definitive.*

Indicator	**Risk designation** (including functional scale when relevant)
Controlled wood category 1: Illegally harvested wood	
1.1	Low Risk
1.2	Low Risk
1.3	Low Risk
1.4	Low Risk
1.5	Low Risk
1.6	Low Risk
1.7	Low Risk
1.8	Low Risk
1.9	Low Risk
1.10	Low Risk
1.11	Low Risk
1.12	Low Risk
1.13	Low Risk
1.14	Low Risk
1.15	Low Risk
1.16	Low Risk
1.17	Low Risk
1.18	Low Risk
1.19	Low Risk
1.20	Low Risk
1.21	Low Risk
Controlled wood category 2: Wood harvested in violation of traditional and human rights	
2.1	Low Risk
2.2	Low Risk
2.3	Low Risk

Controlled wood category 3: Wood from forests where high conservation values are threatened by management activities	
3.0	Low Risk
3.1	Specified Risk for identified portions of Critical Biodiversity Areas; Specified Risk for documented ranges of identified HCV 1 species; Low Risk for the remainder of the assessment area
3.2	Low Risk
3.3	Specified Risk for lands in the FSC US Pacific Coast and Rocky Mountain Regions identified as having a higher probability of presence of Old Growth forest and that are not effectively protected; Specified Risk for identified portions of FSC US Regions with identified priority forest types; Low Risk for the remainder of the assessment area
3.4	Low Risk
3.5	Low Risk
3.6	Low Risk
Controlled wood category 4: Wood from forests being converted to plantations or non-forest use	
4.1	Specified Risk for counties in the FSC US Pacific Coast and Southeast Regions with higher rates of both population growth and new residential building permits issued; Low Risk for the remainder of the assessment area
Controlled wood category 5: Wood from forests in which genetically modified trees are planted	
5.1	Low Risk

Background information

FSC US began development of a National Risk Assessment in 2012 by assembling a working group. However, this was done prior to the finalization of FSC-PRO-60-002 V3-0. FSC US, with input from the working group, developed and publicly consulted a first draft of an NRA for Categories 3 and 4 in early 2015, which was not approved by PSU prior to the consultation. At PSU's request, the working group's efforts were put on hold in mid-2015 while the Controlled Wood standard (FSC-STD-40-005 V3-0) was finalized. After the Controlled Wood standard was completed, it was not possible to re-assemble the Working Group, and therefore subsequent drafts were developed by the chamber-balanced FSC US Board's Policy and Standards Committee (PSC; see below), with the assistance of a chamber-balanced Technical Advisory Group. Due to changes in the FSC US Board of Directors, changes also occurred in the PSC, but chamber balance was maintained at all times by giving each chamber an equal weight in decision-making, regardless of the number of chamber members on the committee. A second draft was approved by PSU in late 2017 for a public consultation which ended in early 2018. The final Board-approved draft was submitted to PSU in June 2018.

This document incorporates the final CNRA's for Categories 1 and 5 and draft CNRA for Category 2, developed on behalf of FSC International by independent contractors. Additionally, it incorporates stakeholder comments from both public consultations, following discussion by the working group and technical advisory group.

The original US Controlled Wood Working Group had some changes in membership during the time it was active. Individuals who were participants for the entirety of the time are indicated with an asterisk ('*') and the others served only part of the time.

- Andrew Goldberg* – Dogwood Alliance – Environmental Chamber

- Brad Holt* – Boise Inc. – Economic Chamber
- Christopher Davidson – International Paper – Economic Chamber
- Daniel Hall* – Environmental Consultant – Environmental Chamber
- Jeff Stringer* – The University of Kentucky – Social Chamber
- Jim Sitts* – Columbia Forest Products – Economic Chamber
- John Fisher – The Nature Conservancy – Environmental Chamber
- Michael Debonis* – The Forest Guild/Green Mountain Club – Social Chamber
- Greg Meade – The Nature Conservancy – Environmental Chamber
- Sophie Beckham – International Paper – Economic Chamber

The Initial Policy and Standards Committee members in 2016 were:

- Danna Smith – Dogwood Alliance – Environmental Chamber
- John McNulty – Seven Islands Land Company – Economic Chamber
- Luke Dillinger – Domtar Paper Company – Economic Chamber
- Paul Vanderford – Sustainable Northwest – Social Chamber
- Rolf Skar – Greenpeace USA – Environmental Chamber
- Sophie Beckham – International Paper – Economic Chamber

The Final Policy and Standards Committee members in 2018 were:

- Jason Grant – Sierra Club – Environmental Chamber
- John Fenderson – Individual Member – Social Chamber
- John McNulty – Seven Islands Land Company – Economic Chamber
- Luke Dillinger – Domtar Paper Company – Economic Chamber
- Paul Vanderford – Sustainable Northwest – Social Chamber
- Rolf Skar – Greenpeace USA – Environmental Chamber
- Tim Beyer – Minnesota Department of Natural Resources – Economic Chamber

The Technical Advisory Group members were:

- Annika Terrana – World Wildlife Fund – Environmental Chamber
- Bobby Ammerman – The University of Kentucky – Social Chamber
- Ross Congo – International Paper – Economic Chamber

The first public consultation was held from January 12 to March 13, 2015. FSC US and the working group reviewed stakeholder comments following the consultation. The major issues that were raised included:

- **CNRA:** The CNRA presents some challenges, and there is frustration that was consulted separately from the rest of the NRA.
    - The second draft of the NRA incorporates the results of the CNRAs for Categories 1, 2, and 5
- **Supplier agreements**: There is a lot of discontent around this idea. What are reasonable alternatives, and what is the consequence of making supplier agreements an option and not a requirement for direct purchases?
    - In the second draft of the NRA supplier agreements are no longer required.
- **Independent Landowners & Anti-trust concerns:** We need to be cognizant of concerns around anti-trust that have been brought up as part of the first consultation.
    - FSC US is working to actively engage affected (non-certified) landowners as part of the public consultation of the second draft of the NRA
    - Supplier agreements are no longer required, and these were at the core of anti-trust concerns
    - An alternative approach to risk mitigation is included that avoids wood exclusion by ensuring that a certificate holder will have options of mitigation actions which to choose, with each certification holder making their own decision based upon their organizational situation

- Information about sub-suppliers is not required for control measure implementation

- **System Complexity:** The complexity of the first draft of the NRA led to a lot of confusion, and small mills do not have the capacity to implement a complex system. There is concern that the costs are much greater than the benefits.
  - Efforts have been made to greatly simplify the second draft of the NRA, both in the structure of the document and also by ensuring that elements addressed in the new Controlled Wood standard (FSC-STD-40-005 V3-0) are not duplicated in the NRA.
  - The FSC International template has been used
  - The scale of risk designations has been changed to make it easier for certificate holders to determine whether they need to address risk without acquiring additional ecological or occurrence information
- **HCV Classification & Risk Designations:** We need to review on a high level the use of the HCV classification systems that are built into the NRA. These need to be aligned with known classification systems. Which risk designations, HCV and Conversion, have a large impact in the system and are any worth removing? Worth adding?
  - HCV 1 species identification are now based upon data and information publicly available from NatureServe. NatureServe is well respected within the environmental community and other communities due to the high standards and scientific rigor used in their data collection and analysis processes.
  - Critical Biodiversity Areas as distinct spatial areas are identified as HCV 1, with recognition that there are important habitats that occur within them that drive the high biodiversity of the area, but strict definition of those habitats is no longer essential.
  - Identified HCV have been more thoroughly assessed for protections and for threats from forest management activities, with some conclusions of 'Low Risk' as a result
  - The 'quantity and quality' and 'maintain across the landscape' clauses associated with control measures have been removed
- **Conversion:** Should Conversion be moved to *specified risk* given that the DDS around it essentially is specified risk? Additionally, how do we address plantations given the very complex FSC definition of "P10" plantations?
  - As is clearly articulated by FSC, the consideration of risk of materials from areas of conversion is required, even if the conversion is not due to forest management activities
  - The second draft of the NRA maintains the distinction between natural forest, semi-natural forest and plantations, but directs users to the FSC US Plantation guidance for assistance and clarifies that just because a stand is planted, it is not necessarily a plantation.
- **DDS:** Is the DDS an asset, or does it just confound the structure? It was originally included to simplify the conversion framework, but may not have achieved this purpose.
  - As a DDS is now required as a part of conforming to the Controlled Wood standard (FSC-STD-40-005 V3-0), it is not included as a required element of the second draft of the NRA.
- **Supplier Training:** There is broad perspective that this is a much more stringent requirement than I believe we intended. How can we streamline this process and ensure it does not come across as overly burdensome or punitive?
  - While provision of educational materials to suppliers is still a control measure, supplier training is not
  - It is the stated intent of FSC US to provide educational materials for topics associated with specified risk that may be used by certificate holders

The second public consultation was held from December 15, 2017 to February 28, 2018. FSC US reviewed the comments with the Working Group. The major comment themes include:

- **Scale of specified risk areas:** Many commenters felt that the areas of specified risk were too broad. The areas of specified risk need to be reassessed to ensure that they are as fine-scale as possible without being site specific.
    - Re-evaluated the identified risk areas and available data. The geographic area of specified risk was refined when enough information was available.
- **HCV 1 individual species identification & risk assessment:** A more appropriate methodology for HCV1 species is needed. Environmental and social chamber commenters felt that the methodology for identification of HCV 1 species used wasn't thorough enough and that many more species should have been included in the assessment. The economic chamber expressed concern about the inclusion of the Ivory-billed Woodpecker, which hasn't been conclusively documented in over 20 years. Economic commenters also felt that the legislative process is already effectively protecting those species most at risk.
    - Ensured that available guidance for assessing HCV1 species was being followed. Consulted with experts to determine an appropriate approach for identifying HCV1 species.
    - Expanded the HCV1 species assessment to include species that are G1 and S2 in at least one state. This resulted in 3 additional species, only one that was forest dependent.
    - Added one additional criterion to the HCV1 species filtering process to limit the results to species that had been identified within the last two decades. This resulted in one species no longer meeting the criteria (Ivory-billed Woodpecker).
    - Further refined the species ranges when information was available.
- **Best Management Practices:** There is a misalignment between identified threats from poor BMP implementation for HCV1 Critical Biodiversity Areas and the low risk designation for HCV4 Critical Ecosystem Services.
    - Consulted with experts and reviewed additional information sources related to the effectiveness of BMP implementation within the CBAs. These threats being assessed are to biodiversity and look at a very fine scale.
    - The HCV4 assessment focuses on forests that provide ecosystem services to local communities and as such threats are assessed at a broad scale. Though not perfect everywhere in protecting these ecosystem services, there is evidence of widespread success throughout the assessment area in effective protection through BMP implementation. However, the effectiveness of BMPs in protecting biodiversity is not fully understood.
- **Old Growth:** A better methodology is needed to determine where old growth is threatened. Economic chamber commenters felt that old growth is adequately protected on public lands. Commenters also noted that the threat expressed in the draft (that there are not enough younger stands being managed to become future Old-Growth) is not a valid threat, as it is not a threat to existing HCVs. Environmental comments expressed support for a specified risk designation and concern that threats directly from harvests of Old-Growth forests were not identified.
    - Worked with experts to review additional information sources and to re-evaluate the threats assessment and the specified risk area extent.
    - Worked with a GIS consultant to implement a new, coarse-scale filtering process for where old growth forests are most likely to occur.
- **Conversion:** There are many sources of evidence that forest area in the United States is stable or increasing, both at national and regional scales. The specified risk area is too coarse and the drivers of conversion need to be refined. Forest management isn't a driver of conversion and companies don't have any control over population growth.

- Includes additional information sources and analysis related to the drivers of conversion and considered both population growth and residential development in the definition of specified risk areas.
- Shifted the scale of risk from entire states to counties.
- Recognized that forest area is stable at very coarse scales, but also provided evidence that forest conversion continues to be a concern at finer scales.

- **Statements required in the Control Measures & blanket requirement for provision of educational materials:** Concerns were raised regarding the requirement for a statement to suppliers that was included in the Control Measures. There was a perceived misalignment with using a risk mitigation approach while still requiring a statement with an eliminate or no risk message. This could lead to a major reputational risk for a company. Additionally, commenters questioned the validity of requiring educational materials even when there was no evidence that they would be effective in mitigating risk.
  - This Control Measure is no longer included in the final draft NRA.
  - If provision of educational materials is identified as an effective mitigation action, it will be addressed at the Controlled Wood Regional Meetings.

List of experts involved in the risk assessment and their contact details

Sophie Beckham	Economic Chamber	COC certificate holder; FSC US Board member and therefore knowledgeable of most aspects of FSC	International Paper sophie.beckham@ipaper.com	Categories 3 & 4
Brad Holt	Economic Chamber	COC certificate holder and forest management expert	Boise Inc. bradholt@boiseinc.com	Categories 3 & 4
Jim Sitts	Economic Chamber	FM and COC certificate holder	Columbia Forest Products jsitts@columbiaforestproducts.com	Categories 3 & 4
Ross Congo	Economic Chamber	Former auditor; COC certificate holder; CW NRA Technical Advisory Group member	International Paper ross.Congo@ipaper.com	Categories 3 & 4
Andrew Goldberg	Environmental Chamber	Activist and legal expert	Rainforest Alliance (formerly Dogwood Alliance) agoldberg@ra.org	Categories 3 & 4
Daniel Hall	Environmental Chamber	Activist and environmental consultant	Environmental Consultant (formerly Forest Ethics) daniel@guide-env.com	Categories 3 & 4
Greg Meade	Environmental Chamber	Expert on forest management	The Nature Conservancy gmeade@tnc.org	Categories 3 & 4

Annika Terrana	Environmental Chamber	Expert on forest biodiversity conservation and FSC certification; CW NRA Technical Advisory Group member	World Wildlife Fund US annika.Terrana@wwfus.org	Categories 3 & 4
Jeff Stringer	Social Chamber	Forestry professor and expert on FM and COC certification	The University of Kentucky jeffrey.stringer@uky.edu	Categories 3 & 4
Mike Debonis	Social Chamber	Knowledgeable on issues affecting forest and natural resource professionals	Green Mountain Club (formerly Forest Guild) mdebonis@greenmountainclub.org	Categories 3 & 4
Bobby Ammerman	Social Chamber	Expert on COC certification and COC smallholders; CW NRA Technical Advisory Group member	The University of Kentucky bammerma@uky.edu	Categories 3 & 4
Mike Dockry	Non-member	Forestry professor and expert on Indigenous Peoples' rights associated with the US forest sector; registered member of the Citizen Potawatomi Nation	U.S. Forest Service mdockry@fs.fed.us	Category 2
Marisa Riggi	Non-member	Knowledgeable of rare ecosystems and landscapes in the Northeast US	Northeast Wilderness Trust marisa@newildernesstrust.org	Category 3
Karin Heiman	Non-member	Knowledgeable of rare ecosystems and landscapes in the Southeast US	Southeast Regional Land Conservancy karinh@serlc.org	Category 3
Dave Werntz	Non-member	Knowledgeable of rare ecosystems and landscapes in the Northwest US	Conservation Northwest dwerntz@conservationnw.org	Category 3
David Whitehouse	Non-member	Knowledgeable of rare ecosystems and landscapes in the Southeast US	The Conservation Fund dwhitehouse@conservationfund.org	Category 3
David Kirk	Non-member	Knowledgeable of rare ecosystems and	Wilderness Land Trust david@wildernesslandtrust.org	Category 3

		landscapes in the Western US		
Tina Hall	Environmental Chamber	Expert on forest management and FSC certification	The Nature Conservancy (Michigan) chall@tnc.org	Category 3
John McNulty	Economic Chamber	FM certificate holder and expert on forest management	Seven Islands Land Company jmcnulty@sevenislands.com	Category 3
John Gunn	Environmental Chamber	Expert on FSC certification, forest management, and forest ecology	University of New Hampshire, Department of Natural Resources & Environment John.Gunn@unh.edu	Category 3
Troy Ettel	Environmental Chamber	Expert on Longleaf Pine ecosystems and other rare ecosystems and species in the Southeast US	The Nature Conservancy tettel@tnc.org	Category 3
Amanda Mahaffey	Social Chamber	Expert on Bottomland Hardwood Forests ecology and management	Forest Stewards Guild amanda@forestguild.org	Category 3
Carl Nordman	Non-member	Expert on Southeast US ecology, and rare ecosystems and species	NatureServe carl_nordman@natureserve.org	Category 3
Allen Pursell	Environmental Chamber	Expert on critical biodiversity areas in Indiana	The Nature Conservancy (Indiana) apursell@tnc.org	Category 3
Chuck Byrd	Environmental Chamber	Expert on critical biodiversity areas in Alabama	The Nature Conservancy (Alabama) chuck_byrd@tnc.org	Category 3
Dominick Dellasala	Non-member	Expert on biodiversity issues in the U.S.	Geos Institute	Category 3
James Strittholt	Non-member	Expert on biodiversity issues in the U.S.	Conservation Biology Institute	Category 3
Greg Meade	Environmental Chamber	Expert on critical biodiversity areas in the Appalachian and Southeast regions	The Nature Conservancy	Category 3
Christopher Reeves	Non-member	Expert on forest ecosystems and forest management in the Appalachian region	IKEA (formerly University of Kentucky Extension) christopher.reeves@ikea.com	Category 3
Mike Aust	Non-member	Expert on bottomland hardwoods in the Southeast region	Virginia Tech waust@vt.edu	Category 3

David Stahle	Non-member	Expert on bottomland hardwoods in the Southeast region	University of Arkansas dstahle@uark.edu	Category 3
Jeff Marcus	Non-member	Expert on biodiversity issues in North Carolina	The Nature Conservancy (North Carolina) jmarcus@tnc.org	Category 3
Bob Kellison	Non-member	Expert on bottomland hardwoods in the Southeast region	Professor Emeritus, NC State University	Category 3
Michael Schafale	Non-member	Expert on bottomland hardwoods in the Southeast region	North Carolina Natural Heritage Program michael.schafale@ncdcr.gov	Category 3
Marshall Pecore	Non-member	Forest manager for an FSC certified tribe	Menominee Tribal Enterprises marshallp@mtewood.com	Categories 2 & 3
Marc Gauthier	Non-member	Policy specialist for an affiliation of tribes	Upper Columbia United Tribes marc@ucut-nsn.org	Categories 2 & 3
Jeff Lindsey	Non-member	Forest manager for an FSC certified tribe	Hoopa Valley Tribal Council jlindsey@hoopa-nsn.gov	Categories 2 & 3
Paul Koll	Non-member	Forest manager with extensive experience working with tribes	paul.koll@mohican-nsn.gov	Categories 2 & 3
Karen Brenner	Non-member	Consulting forester with extensive experience working with tribes	brenner@imaxmail.net	Categories 2 & 3

National Risk Assessment maintenance

The FSC US National Office is responsible for maintaining the Controlled Wood National Risk Assessment. It is our intention that the National Risk Assessment is a living document that will be updated to incorporate new information as it becomes available. Updates will be made as needed, based on the importance of the information and will be completed with chamber-balanced consultation. Outside of these updates, we will follow the procedures for review and revision as specified in FSC-PRO-60-002 v3 and other FSC normative documents.

Revisions to the NRA will be closely tied to the effectiveness verification as described in the control measures for Category 3 and Category 4. As new information is gained through the Controlled Wood Regional Meetings and effectiveness assessments are completed by FSC US, these will inform the need for NRA revisions and what those revisions will entail.

Complaints and disputes regarding the approved National Risk Assessment

Stakeholder input and complaints related to a certificate holder's DDS will be addressed using the process described in FSC-STD-40-005. If a dispute is related to a lack of conformity to an FSC standard, the issue should be brought to the certification body and follow the formal FSC Dispute Resolution System.

If the dispute is around Controlled Wood risk designations and control measure outcomes, a complainant should contact the FSC US Director of Science & Certification, who will then address the issue in consultation with the FSC US Board of Directors. These complaints should be in written format and may be sent either electronically via email, or in hardcopy.

List of key stakeholders for consultation

FSC US maintains a list of stakeholders to keep involved on all policy and standards developments in the United States, including public consultations. This Policy and Standards Forum, with over 200 stakeholders, is comprised of economic, environmental and social interests ranging from certificate holders, certification bodies, forest managers, environmental groups, academics, and other self-selected interested parties. A full list of stakeholders on the Forum can be provided upon request.

Risk assessments

Controlled wood category 1: Illegally harvested wood

NOTE: *The US NRA covers the conterminous United States, which excludes Alaska and Hawaii and the US territories (i.e. portions of the United States that are not within the limits of any state and have not been admitted as states), for all types of forests.*

Overview

The Category 1 risk assessment was completed by a consultant on behalf of FSC International. It was approved following a public consultation and then formally published as part of a Centralized National Risk Assessment (CNRA) for the entire United States (including Categories 1 and 5). The following content for Category 1 remains exactly the same as it was in the CNRA.

Sources of legal timber in the conterminous United States

Forest classification type	Permit/license type	Main license requirements (forest management plan, harvest plan or similar?)	Clarification
Public lands	Timber sale contract	Harvest in accordance with contract, which conforms to the timber sale plans of the land management agency, which in turn conform to the agency's land management plans, and all in accord with governing statutes and regulations.*	The exact planning requirements vary by jurisdiction and managing agency. Also, some jurisdictions and agencies have different requirements for minor and subsistence harvests. These may require permits or notice.
Private lands, in states with forest practices laws	Permission of landowner plus state permit or notice given to state	Harvest with permission of land owner; in accordance with forest practices laws and any other laws that might apply (e.g., fire prevention); after any necessary planning submitted, permit obtained, or notice given to state.*	States with forest practice laws are mostly in the western US. Requirements vary. In California, there must be a plan prepared by a licensed forester submitted and approved by the state. In Oregon, there is no plan or permit required, only a requirement for giving notice to the state.
Private lands, in states without full forest practices acts but with some regulation	Permission of landowner, perhaps with state notice or a permit	Harvest with permission of landowner, in accordance with any laws that might apply (e.g., fire prevention laws, seed tree laws,	Examples: New Hampshire requires notice for tax purposes and sometimes the posting of a tax bond, requires a

		wetlands protection laws); sometimes after notice given to state.*	permit for activities in wetlands, has penalties for timber trespass and deceptive forestry practices, limits clear-cutting around highways, streams, and water bodies, and regulates the disposal of slash. Virginia has four basic legal requirements: don't cause water pollution, give the state notice before logging, leave seed trees in pine stands (or replant or submit to the state a conservation plan for such stands), and suppress fires.
Private lands, states with no special forest harvest legislation	Permission of landowner	No specific requirements; often voluntary best management practices for water quality (BMPs).*	Example: Alabama has voluntary BMPs. The state collects severance taxes from sawmills and log yards, which can pass on the expense to loggers or landowners.

*Harvests on all categories of land are subject to some federal regulations. For example, the Endangered Species Act prevents disturbance or harm to threatened or endangered species. The Clean Water Act regulates movement of soil (dredging and filling) in wetland areas. Also, businesses are subject to tax, employment, workplace safety, and other laws. Safety laws in particular may be specific to logging.

Category 1 Risk assessment

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
Legal rights to harvest			
1.1 Land tenure and management rights	**Applicable laws and regulations** Public lands are managed by associated agencies at either the federal or state level. Most federally owned land available for commercial timber is managed by the US Forest Service (Dept. of Agriculture). The property clause of the US Constitution is in Article 4, Section 3. The guarantees of due process and just compensation are in Amendments 5 and 14. Generally, the federal statutes concerning federal lands are codified in Title 16 (conservation) and Title 43 (public lands) of the US Code (USC). The provisions concerning military reservations are in Title 10.	Alberto Goetzl, S. C., Paul Ellefson, P. U., Philip Guillery, T. F., & Gary Dodge, P. C. (2008). Assessment of Lawful Harvesting & Sustainability of US Hardwood Exports. Seneca Creek Associates, LLC [http://www.americanhardwood.org/fileadmin/docs/Seneca_Creek_Study/Seneca_Creek_Study_- _Full_Version.pdf]. The websites of the various agencies provide statistics on their land ownership. Ross W. Gorte, Carol Hardy Vincent, Laura A.	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* Land records in the United States are highly reliable. Banks routinely issue mortgages based on them.

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	Many federal agency regulations concerning federal lands are in Title 36 (parks, forests, and public property) and Title 43 (Public lands: Interior) of the Code of Federal Regulations (CFR), although other titles have applicable rules. For example, presidential "executive orders" reserving lands would be codified in Title 3 of the CFR, and Title 50 contains rules of the Fish and Wildlife Service. The internal rules of procedure of agencies are not all codified in the CFR. Important sources of information on US Forest Service procedures and standards are the Forest Service Manual and the Forest Service Handbook. The organization of state and local land management agencies varies, e.g. in Alabama, the state Forestry Commission manages a few thousand hectares of state forests. One state forest includes a wildlife area managed in conjunction with the state's Department of Conservation and Natural Resources. For privately owned lands, state and local laws and institutions largely govern tenure. State laws govern the sale or transfer of rights to land, the rights of property owners and occupants, and the recording of interests and rights to land. Most states do not have a "Torrens" system where title results from registration. Rather, land rights transfer from person to person based on the issuance of deeds, mortgages, and other granting instruments, and recording of these instruments provides possible purchasers with notice of claims to the land. Private companies called title insurers will search the records and issue limited guarantees stating that a particular seller has rights to convey. State (and in some cases federal) courts will resolve disputes over tenure rights. It is possible (but unusual) to gain rights to land through "adverse possession." If a person exercises a right to land in an open manner, hostile to the rights of the owner, continuously, for a period of time set in statute (typically whatever the state's statute of limitations is for trespass), that person gains rights to the land. These rights could be outright ownership or something less, such as an easement (sometimes called a prescriptive easement). This is why an inspection of the land, along with inspection of the land records, is necessary to verify title. Adverse possession applies only to privately owned lands;	Hanson & Marc R. Rosenblum (2012). Federal Land Ownership: Overview and Data - Report R42346. Congressional Research Service [fas.org/sgp/crs/misc/R42346.pdf]. United States Department of Agriculture Forest Service (2011) National Report on Sustainable Forests - 2010 FS-979. [http://www.fs.fed.us/research/sustain/national-report.php.] Onsrud, Harlan J. (1989) "The Land Tenure System of the United States," Forum: Zeitschrift des Bundes der Offentlich Bestellten Vermessungsingenieure, Jan. 1989. [http://www.spatial.maine.edu/~onsrud/pubs/landtenure07.pdnsrud].	Large property transactions routinely proceed when the records show clear title. In its report to the Montreal Process Working Group on the Conservation and Management of Temperate and Boreal Forests, in scoring an indicator relating to land tenure, the US government concluded that, "All forest land owners, public and private, exercise their forest tenure rights to achieve their forest land management goals .... [A]although complex, clear title is usually sufficient [to allow forest management] in the United States. In cases where disagreements about land rights occur, courts provide a means to settle those conflicts." US Department of Agriculture. 2011. National Report on Sustainable Forests—2010, p 111. Compliance with business and tax registration is probably high, but no figures seem readily available. Governments have strong incentive to enforce registration, as it leads to tax revenue. Large businesses, occupying a good deal of commercial or industrial space, are easy for compliance officials to find. With smaller businesses and businesses that cross over from neighboring jurisdictions to do limited tasks, the risk of non-compliance is slightly higher. "There can be high confidence that

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	a person cannot claim adverse possession against the government. State laws also control business organization (e.g., incorporation or creation of other legal persons capable of holding property rights). Licensing to conduct business may be under state or local control or both, depending on the state and the kind of business. Some states require additional specific professional licenses or registration for those in the business of logging or those in the business of giving forest management advice. The federal government requires individuals and businesses earning income or paying employees to register for tax purposes. Governments at all levels hold the power of eminent domain (i.e., the power to acquire title to private lands without the owner's consent), but the U.S. Constitution requires that owners receive due process of law (governments must bring a lawsuit to acquire land if the owner is unwilling to sell it) and just compensation. State and local laws govern the classification and management of lands held by state and local governments (about 18 million hectares of potential timberlands). Typically, state or local land management agencies, such as forestry commissions or parks departments, manage these lands. The US Constitution gives the federal Congress power to "dispose of and make all needful Rules and Regulations respecting the Territory or other property of the United States." The Congress has delegated federal land management authority to several agencies (the next cell in this row lists the major ones). Each agency, and in some cases each individual park or reserve, is subject to statutes (written by Congress) and regulations (written by agencies) that govern management. In addition, Congress has established some "systems" with management restrictions (e.g., the Wilderness system, the Wild and Scenic Rivers system, the National Trails system). These systems include lands from multiple agencies, and in some cases non- federal lands. Congress has also given the President authority to designate lands as national monuments, to protect features of historic or scientific interest. **Legal Authority** Local governments keep land tenure records. In some states, the		rights of timber ownership are well-established and respected. Approximately 92% of hardwood lands. The vast majority of private landowners own small family forests that average less than 10 hectares in size. Numerous legal processes are available to landowners to resolve disputes involving proper title and/or the unauthorized taking or sale of timber property." Seneca Creek Report 2008, p ii. "Comparisons of international governance indicators, such as those compiled by the World Bank, strongly indicate that the US is perceived as a country with a high regard for the rule of law, an effective environmental, labor and public welfare regulatory environment, and a low level of corruption." Seneca Creek Report 2008, p iii. Of the World Bank Governance Indicators that measure government effectiveness, regulatory quality and rule of law, the US ranks in the top 10% of all countries. Indicators measuring the Rule of Law are perhaps the most relevant in terms of a risk assessment for illegal behavior in the U.S. The U.S. ranks just below the 92nd percentile amongst 212 countries, meaning that the rule of law is believed by independent observers around the

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	courts keep the records. In some, the recorder is an administrative office of a local government. Local or state governments handle business registration, and state governments handle creation of corporations and other legal persons. A business incorporated in one state but operating in several states may have to register as a “foreign” corporation and designate a local agent in each state. In some states, businesses must also register with the state taxing authority. The federal Internal Revenue Service issues employer identification numbers, required of most businesses, used for tracking tax-related payments and obligations. The Social Security Administration issues social security numbers to individuals, used for tracking individual income and tax payments. The organization of state and local land management agencies varies. E.g. in Alabama, the state Forestry Commission manages a few thousand hectares of state forests. One state forest includes a wildlife area managed in conjunction with the state’s Department of Conservation and Natural Resources. The Division of State Parks in that department manages the state parks. For federal lands, the five largest land management agencies in terms of total area managed are: • The Bureau of Land Management, managing the “public lands” (100 million hectares, mostly not forested land, but including the commercially valuable forests of the O & C lands in western Oregon) • The US Forest Service, managing the national forests and grasslands and some special reserved lands; by far the largest seller of legal timber from federal lands (78 million hectares, including non-forest lands and lands reserved from commercial harvest) • The US Fish and Wildlife Service, managing the national wildlife refuges (35 million hectares, with the largest of its holdings in Alaska) • The National Park Service, managing national parks, monuments, historic sites, etc. (32 million hectares, also with the majority of its holdings in Alaska) • The Department of Defense, managing military reservations (7 million hectares)		world to be respected by its citizens and business enterprises" Seneca Creek Report 2008, p 43. Note that these three quotes only relate to hardwood. Based on the available information, the risk is assessed as low.

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	In addition, other agencies have notable rural land holdings, including: • The Department of Energy, managing nuclear weapons production facilities and surrounding buffer zones • The Bureau of Reclamation, managing lands under and adjacent to water development facilities such as dams • The Tennessee Valley Authority, managing lands incidental to energy production, river development, and recreation in the mid-South. The Bureau of Indian Affairs oversees about 23 million hectares of federal land held in trust for Native American tribes. **Legally required documents or records** The most reliable way to determine land ownership is through search of the local property records, coupled with physical survey and inspection of the property for signs of actively used easements or incursions. The tenure rights to land are typically conveyed through deeds and similar documents. The local governments record copies of these documents. In some cases, as with conservation easements, the documents will convey management rights but not possession or full ownership. Local governments will also have records of who has been paying the property taxes for private lands, although the payer is not always the owner. Private owners can convey management rights by lease or contract. In the case of long-term rights that might not be apparent from inspection of the land, a rights holder would be wise to record the document in the property records to provide notice to any potential land purchasers, but generally this is not a legal requirement. State and federal ownership should be apparent from the land records, though it may be from the lack of records of any ownership transfer away from the government. Federal, state, and local laws classify publically owned lands and designate management authority. The laws often identify the land through a legal description (metes and bounds, or by reference to a standard land survey), so these laws can be sources of ownership documentation. However, governments sometimes create reservations that include private “inholdings,” and it is still possible on some federal		

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	lands to gain a private patent following discovery of a commercially valuable mineral deposit, so in the end the texts of the laws can't be relied upon completely as indicators of ownership. Managing agencies usually have accurate maps of their lands indicating boundaries and inholdings, and sometimes laws incorporate these maps by reference, but usually the maps do not carry legal weight. Businesses will often have a business license from the local government. Businesses with offices in urban areas will often have a certificate of occupancy or occupation permit attesting to compliance with zoning laws, although that certificate may be held by the landlord if the business is renting office or industrial space. Corporations and other legal persons may have a certificate of incorporation or other paperwork from the state attesting to their valid organization. Most businesses must have an employer identification number issued by the federal Internal Revenue Service. Sole proprietors may have a social security number, issued by the federal Social Security Administration, instead.		
1.2 Concession licenses	**Applicable laws and regulations** For US Forest Service: FSH 2409.18, Ch. 50 § 53 State lands have similar regulations based at the state level. One statutory authorization for Forest Service timber sales is 16 U.S. Code § 472a. The basic regulations are in 36 CFR part 223, subpart B. The internal procedures can be found in the Forest Service Manual. FSM 2400, covers timber resource management, including commercial timber sales (Chapter 2430) and timber sale contract administration (Chapter 2450). The basic rules for Bureau of Land Management timber sales are 43 CFR Chapter II, subchapter E, parts 5000 to 5510. The statutory provisions allowing forest management and timber sales on lands held by the Bureau of Indian Affairs are in 25 USC §§ 406, 407, and 466. The rules are in 25 CFR part 163. The US Fish and Wildlife Service can issue a permit for timber harvest	**Laws** FSH 2409.18, Chapter 50, Section 53 - http://www.fs.fed.us/forestmanagement/products/contracts.shtml 16 U.S. Code § 472a - Timber sales on National Forest System lands - http://www.law.cornell.edu/uscode/text/16/472a. 36 CFR Part 223, Subpart B - Timber Sale Contracts - http://www.law.cornell.edu/cfr/text/3 6/part-223/subpart-B. Forest Service Manual FSM 2400 - http://www.fs.fed.us/cgi-bin/Directives/get_dirs/fsm?2400 43 CFR Chapter II, subchapter E, parts 5000	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* Most timber harvest in the United States occurs on private land (fee simple), where Concession Licenses are not required. Public forests in the US are managed either at the state / local level, or by the US Forest Service or the Federal Bureau of Land Management (which conducts its own timber management and

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	on national wildlife refuges if that is compatible with the refuge's purpose. See 50 CFR § 29.1. On refuges in Alaska, subsistence (i.e., non-commercial) harvests are allowable, and some require a special use permit from the refuge manager. 50 CFR § 36.15. The general authorization for sales of land interests for timber production or sales of forest products from military lands is 10 USC §2665. The Department of Defense and the individual services have regulations concerning timber sales. The federal government has laws that debar or suspend persons with a history of bad actions from participating in federal contracts, and the government maintains lists of such persons. The Forest Service's rules for debarment because of actions relating to timber sales are in 36 CFR part 223, subpart C. Other agencies can debar persons for violations of their laws, and these listings may have government-wide effect, stopping new contracts and grants. The US General Services Administration keeps a government-wide list of debarred persons, the Excluded Parties List System. A new website, sam.gov, provides access. On private lands, the general laws for contracts and property transactions govern most transfers of rights to manage and harvest. These are largely state laws. A private landowner will typically enter into a contract with a logger allowing the logger to harvest timber. Private lands may be leased long-term for timber production, but it's actually more common for private landowners to lease their lands for hunting and recreation, reserving for themselves the right to sell or harvest timber. Another form of long-term management control over land is the conservation easement. These are becoming more common in the United States. The private owner grants a third party (typically a government or a non-governmental conservation organization) the right to block uses of the land. The easement may require the land to be kept in a natural state, or it may allow some commercial use if it is consistent with the purpose of the easement. For example, an easement to protect the views of land around an historic village might allow farming or forestry to continue but would prohibit construction of modern roads or structures. Conservation easements are transfers of	to 5510 - http://www.law.cornell.edu/cfr/text/43/chapter-II/subchapter-E. 25 USC §§ 406, 407, and 466 - http://www.law.cornell.edu/uscode/text/25/chapter-12 and http://www.law.cornell.edu/uscode/text/25/466. 25 CFR part 163 - http://www.law.cornell.edu/cfr/text/2 5/part-163. 50 CFR § 29.1 - http://www.law.cornell.edu/cfr/text/5 0/29.1. 50 CFR § 36.15 - http://www.law.cornell.edu/cfr/text/5 0/36.15. 10 USC §2665 - http://www.law.cornell.edu/uscode/text/10/2665. 36 CFR part 223, subpart C - http://www.law.cornell.edu/cfr/text/36/part-223/subpart-C. **References** The US General Services Administration keeps a government- wide list of debarred persons, the Excluded Parties List System, available on this website: https://www.sam.gov John A. Gray (2002). Forest Concession Policies and Revenue Systems: Country Experiences and Policy Changes for Sustainable Tropical Forestry. World Bank Technical Paper No. 522. [http://elibrary.worldbank.org/doi/pdf/10.1596/0-8213-5170-2] at p.8.	timber sales programs). In many cases a harvesting permit, which acts like a concession license is required. In the United States, the term "concession" is usually understood to mean transfer of a long-term license to manage and enjoy the fruits of a resource. In that sense, the federal government rarely issues concessions for timber production. That goes also for state and private ownership. A study of worldwide concession practices for the World Bank found that, "Few, if any, concession- type forest tenures remain in the United States." John A. Gray, 2002, Forest Concession Policies and Revenue Systems: Country Experiences and Policy Changes for Sustainable Tropical Forestry, at p. 8. Instead, the typical practice is for the landowner to retain management authority over the forest and grant short-term permission to harvest timber. On public lands, this means that the managing agency holds timber sales. Each agency has its own laws and rules for conducting sales. On public lands (mainly those managed at the federal level by the US Forest Service) a Timber Sale Contract is required that specifies environmental compliance and a fee based on an evaluation of the timber value. State natural resource agencies have similar requirements.

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	rights that bind subsequent owners of the land, and as such the easements are usually recorded in the land records. In return for the easement, the land owner may get a purchase payment, may enjoy lower property taxes due to the reduced market value of land subject to the easement, or may get a one-time deduction for income tax purposes reflecting the value of a donated easement. **Legal Authority** For federal lands, see the federal land management agencies in the box above. For state and local lands, the legal authority is the state or local land management agency. Below is a list of the main forestry agencies in the fifty states. In many states, universities have forestry extension programs, and in some states these have a role in management of state lands. US Forest Service Alabama Forestry Commission Alaska Division of Forestry Arizona State Land Department Arkansas Forestry Commission California Department of Forestry and Fire Protection Colorado State Forest Service Delaware Department of Agriculture Forest Service Florida Division of Forestry Georgia Forestry Commission Hawaii Division of Forestry and Wildlife Idaho Department of Lands Illinois Division of Forest Resources Indiana Division of Forestry Iowa Dept. of Natural Resources - Forestry Division Kansas Forest Service Kentucky Division of Forestry Louisiana Department of Agriculture and Forestry - Office of Forestry Maine Forest Service Maryland Forest Service Massachusetts Division of Forests & Parks - Bureau of Forestry	Alberto Goetzl, S. C., Paul Ellefson, P. U., Philip Guillery, T. F., & Gary Dodge, P. C. (2008). Assessment of Lawful Harvesting & Sustainability of US Hardwood Exports. Seneca Creek Associates, LLC. [http://www.americanhardwood.org/fileadmin/docs/Seneca_Creek_Study/Seneca_Creek_Study_- _Full_Version.pdf]. Government Accountability Project. Undated. 'Field Guide to Timber Theft: Understanding Timber Sales, the Contract, and the Law'. [http://www.bark-out.org/sites/default/files/bark-docs/Field_Guide_toTimber_Theft.p df'] State Forestry Commission South Carolina 'Don't Be A Victim Of Timber Transaction Crime Information For Forest Landowners in South Carolina' - http://www.state.sc.us/forest/timber val.htm. South Carolina Forestry Association, SCFA - http://www.scforestry.org/.	On public lands, the process of contracting tends to be highly transparent. Opportunities to purchase timber are announced publicly, the bidding process is subject to public scrutiny, and the contracts themselves are public records. Even in anecdotal reports, there does not seem to be much evidence of corruption by public officials in the award of timber sales. A separate issue is the possibility of collusion among bidders. There is no available evidence of this. A third issue is the possibility of people evading the debarment laws. There is no available evidence of this. On private lands, the transaction is rooted in contract. Fraud is a concern. A buyer could misrepresent its logging skills or its intent to follow forest practice laws. A buyer or seller could mislead the other about the value of the standing timber. A buyer could use threats or intimidation to induce a landowner to sell timber. Of these, the greatest risk seems to be the logger or buyer fraudulently misleading the landowner about the value of the timber. Some state forestry agency websites and publications warn about this problem. See, e.g., http://www.state.sc.us/forest/timberval.htm. This site estimates the loss from timber theft and fraud (two

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	Michigan Dept. of Natural Resources - Forest Resources Division Minnesota Dept. of Natural Resources - Division of Forestry Mississippi Forestry Commission Missouri Department of Conservation Montana Dept. of Natural Resources and Conservation - Forestry Division Nebraska Forest Service Nevada Division of Forestry New Hampshire Division of Forests & Lands New Jersey Division of Parks & Forestry New Mexico Forestry Division New York Division of Lands & Forests North Carolina Division of Forest Resources North Dakota Forest Service Ohio Department of Natural Resources - Forestry Oklahoma Forestry Services Oregon Department of Forestry Pennsylvania Bureau of Forestry Rhode Island Division of Forest Environment South Carolina Forestry Commission South Dakota Division of Resource Conservation & Forestry Tennessee Division of Forestry Texas Forest Service Utah Division of Forestry, Fire, and State Lands Vermont Department of Forestry, Parks & Recreation Virginia Department of Forestry Washington Department of Natural Resources West Virginia Division of Forestry Wisconsin Department of Natural Resources Forestry Program Wyoming State Forestry Division **Legally required documents or records** A written **Timber Sale Contract** (US Forest Service) - A Forest Service contract usually requires advance payment and the posting of a performance bond. There should be documentation of deposit of		different crimes) in South Carolina at $10 million annually. The annual "delivered value" of timber in the state is over $783 million (http://www.scforestry.org/), so the estimated loss is about 1.3% (assuming that the estimated loss is also in terms of "delivered value"). On the whole, the risk of illegality in entering into contracts, public or private, is real, but is considered low.

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	funds or establishment of a surety by a third party. Other agencies and states will have their own requirements, but government sales contracts are probably universally captured in writing, and the payment and bonding requirements will probably be similar to those of the US Forest Service. On private lands, timber sale contracts are usually written documents, but some landowners and loggers have been known to work based on oral understandings. Conservation easements and long-term leases must be in writing to be enforceable.		
1.3 Management and harvesting planning	**Applicable laws and regulations** National Forest Management Policy Act of 1976 (US Forest Service lands) Bureau of Land Management: BLM planning is governed by the Federal Land Policy and Management Act. Federal business practices law. Business & forest practices laws (for all states) US Forest Service *Planning requirements in statute* - National renewable resource assessment: 16 USC § 1601 - Renewable resource program: 16 USC § 1602 - Inventory: 16 USC § 1603 - Land and resource management plans: 16 USC § 1604. *Planning requirements in the Code of Federal Regulations* - Planning generally: 36 CFR pt. 219 - Environmental impact assessment: 36 CFR pt. 220. - Timber management planning: 36 CFR pt. 221. *Planning requirements in the Forest Service Manual* - National resource planning: FSM 1910. - Land and resource management planning: FSM 1920. - Timber management planning: FSM 2410. Bureau of Land Management	**Laws** US Forest Service *Planning requirements in statute* - National renewable resource assessment: 16 USC § 1601, http://www.law.cornell.edu/uscode/text/16/1601. - Renewable resource program: 16 USC § 1602, http://www.law.cornell.edu/uscode/text/16/1602. - Inventory: 16 USC § 1603, http://www.law.cornell.edu/uscode/text/16/1603. - Land and resource management plans: 16 USC § 1604, http://www.law.cornell.edu/uscode/text/16/1604. *Planning requirements in the Code of Federal Regulations* - Planning generally: 36 CFR pt. 219, http://www.law.cornell.edu/cfr/text/3 6/part-219. - Environmental impact assessment: 36 CFR pt. 220 http://www.law.cornell.edu/cfr/text/3	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* Federal lands US Forest Service: The Forest Service does inventory and plans on many scales, from national to the individual timber sale. On the national level, the Forest and Rangelands Renewable Resources Planning Act requires the Forest Service to prepare a national assessment of the demand and supply of renewable resources in the country and a renewable resource program, which includes goals for Forest Service outputs of timber. The nine regions of the Forest Service prepare regional guides addressing regional planning issues. Then, under the National Forest

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	Planning requirements in statute - Inventory: 43 USC § 1711 - Land use planning: 43 USC § 1712. - O & C Lands Act (management directives for the O & C lands) 43 U.S. Code Chapter 28. - Resource management planning: 43 CFR part 1600, subpart 1610. - Annual timber plans: 43 CFR § 5410.0-6. <u>Bureau of Indian Affairs</u> - Statutory provisions on forest management: 25 USC Chapter 33. - Rules regarding forest management, including management planning: 25 CFR part 163. Federal environmental impact assessment (all federal agencies) - National Environmental Policy Act EIA requirement: 42 USC § 4332. - EIA regulations: 40 CFR parts 1500 to 1508. <u>State forestry law generally (not just planning laws)</u> Defenders of Wildlife. 2000. State Forestry Laws. www.defenders.org/publications/state_forestry_laws.pdf. Not all states have forest practices laws requiring management and harvesting planning - 34% did not in 2004 and an additional 12% only when certain conditions exist). However, most states with significant state forests will have planning requirements in the law. A few examples are listed in the box in this row dealing with sources of information. <u>Private lands</u> - The state of California requires private lands to submit a detailed timber harvest plan or a longer term non-industrial timber management plan before the state will grant a harvest permit. A registered professional forester must prepare these plans. - The state of Oregon requires a harvest plan for harvests needing a waiver from forest practices rules, harvests near certain streams or wetlands, and harvests affecting endangered species. - Some states require landowners to submit a timber management plan before the state will classify land as timber land or forest land, reducing the property tax rate. Most states, though, do not require	6/part-220. - Timber management planning: 36 CFR pt. 221, http://www.law.cornell.edu/cfr/text/36/part-221. *Planning requirements in the Forest Service Manual* - National resource planning: FSM 1910, http://www.fs.fed.us/im/directives/fsm/1900/1910.txt. - Land and resource management planning: FSM 1920, http://www.fs.fed.us/im/directives/fsm/1900/1920.doc. - Timber management planning: FSM 2410, http://www.fs.fed.us/im/directives/fsm/2400/2410.doc. <u>Bureau of Land Management</u> *Planning requirements in statute* - Inventory: 43 USC § 1711, http://www.law.cornell.edu/uscode/text/43/1711. - Land use planning: 43 USC § 1712, http://www.law.cornell.edu/uscode/text/43/1712. - O & C Lands Act (management directives for the O & C lands) 43 U.S. Code Chapter 28, http://www.law.cornell.edu/uscode/text/43/chapter-28/subchapter-V. *Planning requirements in the Code of Federal Regulations* - Resource management planning: 43 CFR part 1600, subpart 1610, http://www.law.cornell.edu/cfr/text/4 3/part-1600/subpart-1610. - Annual timber plans: 43 CFR § 5410.0-6,	Management Act, each of the over 100 units of the Forest Service prepares a land and resource management plan, which, among other things, identifies areas open to harvest. The law requires the Forest Service to involve the public in planning, and for each plan the Forest Service must prepare an environmental impact statement satisfying the requirements of the National Environmental Policy Act. The Forest Service then draws up separate timber management plans. These cover smaller areas and shorter timeframes than the land and resource management plans. These plans are also subject to environmental assessment. Bureau of Land Management: BLM planning is governed by the Federal Land Policy and Management Act. It too requires comprehensive management plans, but it has far less detailed planning requirements than the Forest Service laws. On BLM's most productive forest lands, the O & C lands, the O & C Lands Act sets the goals of management, but it does not have detailed planning requirements. Bureau of Indian Affairs: If the Native American tribe is interested and engaged in forest management, the BIA acts to support them, but BIA imposes some basic standards. For example, BIA rules require the tribe

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	management plans from private owners. - Some voluntary programs require private planning in order to become eligible for government benefits or assistance. Under the national Forest Stewardship Program, the US Forest Service in cooperation with state forest agencies will help non-industrial private forest owners write forest stewardship management plans, but participation in the program is voluntary. Under conservation programs in the federal Farm Bill, administered by the federal Natural Resources Conservation Service, landowners who adopt management plans and put certain sensitive lands under conservation management are eligible for financial incentives. *Sample state forest planning law* - Michigan: Part 525, Sustainable Forestry on State Forestlands, of the Natural Resources and Environmental Protection Act, section 52503 (codified at Michigan Compiled Laws §324.52503. *Sample state laws regarding private land planning* - California's Z'berg-Nejedly Forest Practices Act of 1973 requires private timber harvest or management planning. California Public Resources Code §§ 4581 to 4592 (timber harvesting) and §§ 4593 to 4594.7 (non-industrial timber management plans). - Oregon: Oregon Administrative Rules 629-605-0100 and 629- 605-0170 - The state of Washington: Revised Code of Washington Chapter 84.34; see particularly § 84.34.041(4). **Legal Authority** For public (federal) forests: US Forest Service For the federal and state lands and state regulation of private lands, see the agencies listed in the box above in this column. However, most of the state agencies listed do not require management plans from private lands. State revenue departments and local government revenue and assessor offices administer property tax requirements. **Legally required documents or records** Timber Sale Contract (US Forest Service)	http://www.law.cornell.edu/cfr/text/43/5410.0-6. <u>Bureau of Indian Affairs</u> - Statutory provisions on forest management: 25 USC Chapter 33, http://www.law.cornell.edu/uscode/text/25/chapter-33. - Rules regarding forest management, including management planning: 25 CFR part 163, http://www.law.cornell.edu/cfr/text/25/part-163. <u>Federal environmental impact assessment (all federal agencies)</u> National Environmental Policy Act EIA requirement: 42 USC § 4332, http://www.law.cornell.edu/uscode/text/42/4332. EIA regulations: 40 CFR parts 1500 to 1508, http://www.law.cornell.edu/cfr/text/4 0/chapter-V. <u>State forestry law generally (not just planning laws)</u> - Defenders of Wildlife. 2000. State Forestry Laws. www.defenders.org/publications/state_forestry_laws.pdf. *Sample state forest planning law* Michigan: Part 525, Sustainable Forestry on State Forestlands, of the Natural Resources and Environmental Protection Act, section 52503 (codified at Michigan Compiled Laws §324.52503, http://www.legislature.mi.gov/(S(bjn2yd45nya4kxjuhc5t4vrn))/mileg.aspx?page=shortlinkdisplay&docname =mcl-324-52503).	to prepare appropriate management and operating plans. State permits generally have a minimum threshold for acreage / board feet of harvest before they are required. They are also often required in ecologically sensitive areas. For federal lands, the planning process is transparent and participatory, so flaws in planning regularly come to light but seldom go uncorrected. The agencies allow stakeholders to pursue informal administrative challenges to planning decisions and timber sale approvals. In addition, the courts have ruled that people who enjoy the federal lands for recreation or scenic value have the right to sue the managing agencies for failure to comply with planning or EIA laws. A 2014 study in the Journal of Forestry reported that the US Forest Service was taken to court 1125 times between 1989 and 2008 over land management issues. The Service won a bit more than half the cases, lost about a quarter and settled the remainder out of court. Miner, Amanda M.A., Robert W. Malmsheimer, and Denise M. Keele. 2014. Twenty Years of Forest Service Land Management Litigation. J. Forestry. Vol 112, Issue 1. pp. 32-40. State planning is similarly

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	All federal land management plans are public documents. (It is possible that plans for military bases might have portions redacted for national security purposes.) Under the environmental assessment laws, the federal agencies must publish a notice of their intent to begin planning, publish a draft plan, take public comment, revise the plan, and publish a final plan. Every US state has some form of freedom of information or open records law. Most management plans for state and local forests are probably public documents. Whether private management plans, if submitted to the government, are public documents, depends on state laws. Many freedom of information act laws have provision for protecting confidential business information in documents held by the government. In Maine, for example, management plans are apparently not public documents.	*Sample state laws regarding private land planning* - California: California Public Resources Code §§ 4581 to 4592, http://www.leginfo.ca.gov/cgi-bin/displaycode?section=prc&group =04001-05000&file=4581-4592, (timber harvesting) and §§ 4593 to 4594.7, http://www.leginfo.ca.gov/cgi-bin/displaycode?section=prc&group =04001-05000&file=4593-4594.7, (non-industrial timber management plans). - Oregon: Oregon Administrative Rules 629-605-0100 and 629-605- 0170, http://arcweb.sos.state.or.us/pages/rules/oars_600/oar_629/629_605.ht ml. - Washington State: Revised Code of Washington Chapter 84.34; see particularly § 84.34.041(4), http://app.leg.wa.gov/rcw/default.aspx?cite=84.34. **References** Paul V. Ellefson, Michael A. Kilgore, Calder M. Hibbard and James E. Granskog (2004). 'Regulation of forestry practices on private land in the United States: Assessment of state agency responsibilities and program effectiveness'. STAFF PAPER SERIES NUMBER 176, Department of Forest Resources, College of Natural Resources and Agricultural Experiment Station, University of Minnesota. [http://www.forestry.umn.edu/prod/groups/cfans/@pub/@cfans/@forestry/documents/asset/cfans_asset_18 4634.pdf.] Darren Fishell (posted 16 February 2012).	transparent. In some cases, citizens have challenged the adequacy of state plans, however the author has not found reports of widespread or systematic violation of planning rules. Planning requirements for private lands are limited. The author has not been able to find indications of regular violations of these requirements. Based on the available information, the risk for this category has been assessed as low.

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
		'Georgetown selectmen to investigate potential Tree Growth Tax Fraud'. Bangor Daily News. [http://bangordailynews.com/2012/02/16/news/midcoast/georgetown-selectmen-to-investigate-potential-tree-growth-tax-fraud/.] Miner, Amanda M.A., Robert W. Malmsheimer, and Denise M. Keele. 2014. Twenty Years of Forest Service Land Management Litigation. J. Forestry. Vol 112, Issue 1.	
1.4 Harvesting permits	**Applicable laws and regulations** For US Forest Service: FSH 2409.18, Ch. 50 § 53 On Forest Service and BLM lands, the timber sale contract serves the purpose of a permit. The timber sale contract procedural rules for the Forest Service are in the Forest Service Handbook 2409.18, chapter 50, The Forest Service and the Bureau of Land Management also grant permits for small removals of forest products, but these must have minor impact on the resources and total value of under $1000. West of the 100th meridian, they may not include sawlogs. Forest Service Handbook 2409.18, part 54. The Forest Service may grant permits for harvests for "administrative uses." These include for research purposes, disaster relief, or property improvement (removal of a diseased or infested tree, for example). These ordinarily should involve small volumes of wood; the preferred method for allowing harvest of merchantable timber is through a timber sale. See Forest Service Handbook 2409.18, chapter 80. Based on a small sample of state laws, the states appear to follow the federal practice. That is, they do not require a permit separate from the timber sale contract. On private lands, the required permit will vary from state to state, and in some states, from locality to locality. Western states tend to have more detailed and prescriptive forestry laws. For example, California requires:	**Federal laws - Forest Service and BLM lands** - The timber sale contract procedural rules for the Forest Service: Forest Service Handbook 2409.18, chapter 50, http://www.fs.fed.us/im/directives/fsh/2409.18/wo_2409.18_50.doc. - The BLM's rules: 43 CFR pt 5400, http://www.law.cornell.edu/cfr/text/4 3/part-5400, BLM Manual § 5400, http://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.94852.File.dat/5400_Sales_of_Forest _Products.pdf, and BLM Handbook 5400-2 to 5480-1, http://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.94852.File.dat/5400_Sales_of_Forest _Products.pdf - Permits for small removals of forest products: Forest Service Handbook 2409.18, part 54, http://www.fs.fed.us/im/directives/fsh/2409.18/wo_2409.18_50.doc. - Permits for harvests for "administrative uses": Forest Service Handbook 2409.18,	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* State permits generally have a minimum threshold for acreage / board feet of harvest before they are required. They are also often required in ecologically sensitive areas. Corruption associated with timber sales and harvest permits in the US is generally not an issue. The US also has a relatively good Corruption Perception Index (73), as measured by Transparency International. Timber is real property and, in many states, is treated similarly as theft of other kinds of property. Additionally, some states have statutes that are specific to timber theft and trespass.

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	• The logger to have a license, Cal. Pub. Res Code §§ 4570– 4578. • The landowner or logger to file (1) a timber harvest plan (which the state has 30 days to reject); (2) a notice of the beginning of harvest; (3) a notice of completion of harvest; and (4) a report five years after the harvest on the results of reforesting the site. Cal. Pub Res. Code §§ 4581–4592. Alaska requires submission of a detailed operations plan. If the state does not act on the plan in thirty days, logging may proceed. Alaska statutes § 41.17.090. The state of Virginia is typical of the more restrained approach to regulation found in the southeast. The state does not require a permit but requires notice from the buyer of the timber before the logging is completed. Code of Virginia §10.1-1181.2(H). The state of New Hampshire has requirements aimed at ensuring that the state and local government collect all revenues due. At a logging site, the logger or landowner should publically post a timber tax certificate obtained from the state Department of Revenue, and a notice of intent to cut either signed by a state assessment official or displaying a number, date and time assigned by a municipal official. See Univ. of New Hampshire Cooperative Extension. 2014. Guide to New Hampshire Timber Harvesting Laws, at p.7. **Legal Authority** US Forest Service (federal lands) State forestry agencies (private / state / county land). For the federal and state lands, the legal authority is the land management agency issuing the timber sale contract. For private lands, the legal authority is usually the state forestry agency, but as the New Hampshire example shows, it can be the state revenue agency or even a local government agency or official. **Legally required documents or records** Timber Sale Contract (US Forest Service). For federal and state lands, the key document will be the timber sale contract. For private lands, it will vary from state to state. Where states require notice, the landowner or operation would be wise to keep evidence of sending the notice. This might be a copy of the notice and perhaps	chapter 80, http://www.fs.fed.us/im/directives/fsh/2409.18/2409.18_80.doc. **State laws** - California: Cal. Pub. Res Code §§ 4570–4578, http://codes.lp.findlaw.com/cacode/PRC/1/d4/2/8/6; Cal. Pub Res. Code §§ 4581–4592, http://codes.lp.findlaw.com/cacode/PRC/1/d4/2/8/7. - Alaska: Alaska statutes § 41.17.090, http://codes.lp.findlaw.com/akstatutes/41/41.17./01./41.17.090. - Virginia: Code of Virginia §10.1- 1181.2(H), http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+10.1- 1181.2 - New Hampshire: See University of New Hampshire Cooperative Extension (2014) "Guide to New Hampshire Timber Harvesting Laws", at p.7. http://www.nhdfl.org/library/pdf/Forest%20Protection/Guide%20to%20NH%20Timber%20Harvesting%20La ws%20rvs2012.pdf **References** Transparency International Corruption Perception Index - http://www.transparency.org/cpi2013/results University of New Hampshire Cooperative Extension (2014). 'Guide to New Hampshire Timber Harvesting Laws'. [http://www.nhdfl.org/library/pdf/Forest%20Protection/Guide%20to%20NH%20Timber%20Harvesting%20L aws%20rvs2012.pdf.] USA Today (18 May 2003), “Thieves steal hundreds of millions of dollars worth of trees,” http://usatoday30.usatoday.com/news/nation/	There a few potential risks in this category, some of these might equally well fall under “tenure,” “taxes,” or another category. (1) Harvest off public lands without contract or permit, for commercial purposes. It is easy to find anecdotal reports of small-scale tree theft from public lands. Especially when a slow economy puts rural people out of work, thieves “poach” or “rustle” individual trees for their wood. From the 1980s into the 2000s, in states of Washington and Oregon, old growth western red cedar (*Thuja plicata*) was valuable enough to poach. See, e.g. USA Today article, 18 May 2003. This article lumps individual tree timber theft with theft of firewood and other kinds of illegal activity, but it estimates that as many as one in ten trees cut on national forests is cut illegally. A current problem is theft of the valuable burl or figured wood found at the base of some coastal redwoods (*Sequoia sempervirens*). This happens on state and national parklands as well as on lands managed for timber. There are also reports of thefts of firewood, Christmas trees, and other non-timber forest products. (2) Harvest off public lands in excess of what is permitted in the contract or permit. A newspaper opinion piece by a former federal prosecutor Jeffrey Kent, lists a variety of forest

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	proof of mailing. In some states, like New Hampshire, the landowner or logger must post an acknowledgement that the notice was received. In states where some form of plan or post-activity report is required, the landowner or logger should have copies of these.	2003-05-18-timber- theft_x.htm. Fox News (13 June 2014), "Redwood burl poaching spreads from national parks to national forests". [http://www.foxnews.com/us/2014/06/13/redwood-burl-poaching-spreads-from-national-park-to- national-forests/.] Jeffrey Kent (1 January 2012), "Guest Viewpoint: The timber racket: A culture of corruption and political payoffs harms the land and ourselves". Eugene, Oregon, Register-Guard Newspaper, reprinted at [http://olympicforest.org/wp-content/uploads/2014/03/227.pdf. Shawn Baker (2003). 'An Analysis of Timber Trespass and Theft Issues in the Southern Appalachian Region' Thesis submitted to the Faculty of the Virginia Polytechnic Institute and State University. [http://scholar.lib.vt.edu/theses/available/etd-05212003-153313/unrestricted/timb_theft_thesis.pdf]. United States Department of Agriculture Forest Service (2011) National Report on Sustainable Forests - 2010 FS-979. [http://www.fs.fed.us/research/sustain/national-report.php.] Linda S. Morris (20 September 2014)." New law to crack down on timber theft" The Telegraph. [http://www.macon.com/2014/09/20/3318417_new-law-to-crack-down- on-timber.html]. NYS Legislative Commission on Rural Resources (2008). "Timber Theft in New York: A Legislative Briefing". [http://www.nysenate.gov/files/pdfs/timber08a	offenses he prosecuted in the 1980s and '90s, including cutting beyond the boundary of a timber sale. The article does not give a sense of how common this practice is now. Other sources suggest that firewood gatherers have been known to use a personal use permit to cover commercial collection. Of concern generally is that "pressure on Federal budgets ... may have reduced U.S. law enforcement capacity, but no empirical studies are available." US Department of Agriculture. 2011. National Report on Sustainable Forests— 2010. (3) Harvest off public lands in violation of environmental, labor, or similar conditions in the permit: covered below under environmental and labor issues. (4) Harvests off public lands while defrauding about volumes, species, or quality: covered below under taxes and fees and under classification of species, quantities, and quality. (5) Harvests off private land without permission of the owner: timber theft and trespass. This is a chronic, but low-level problem. An article reporting on a new law in the state of Georgia to boost timber theft enforcement reports that the neighboring states of Alabama and South Carolina each investigate 100

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
		ppdixCfix.pdf]. Virginia Department of Forestry 2007 Locality Value and Volume - http://www.dof.virginia.gov/harvest/data/2007_Value- Volume_County.htm.	to 150 reports of timber theft each year. The New York State Legislative Commission on Rural Resources produced a report on timber theft in 2008 recommending stronger laws and enforcement. A 2003 masters thesis from Virginia Polytechnic Institute and State University surveyed land owners, attorneys, and law enforcement officers in twenty counties in a four-state region of the southern Appalachian Mountains and estimated the losses from theft and trespass at $300,000 per year. This is not a standard statistical region, so any comparisons with total harvest would be inexact. However harvest figures from the seven Virginia counties in the study were valued at over $24,000,000 in 2007, according to the Virginia Department of Forestry. If the other thirteen counties have anything near that harvest rate, the loss to illegal activity is well below one percent of the total harvest value. Note, though, that the illegal activity probably focuses on high-value hardwood species, such as black cherry (Prunus sylvatica) and black walnut (Juglans nigra) and may account for a somewhat higher proportion of that harvest than these numbers suggest. The Seneca Creek report states that the most commonly reported incidents of timber theft and trespass

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
			involve poorly marked or disputed boundary lines. The experience of states with the most detailed information allows an estimate that on the order of 800 to 1,000 significant timber theft cases occur annually in the hardwood region, involving an estimated 20,000 to 25,000 cubic meters (including both softwood and hardwood). Even if half or more were hardwood trees, stolen timber would represent a very small portion of total US hardwood production – very likely less than 1%.
Taxes and fees			
1.5 Payment of royalties and harvesting fees	**Applicable laws and regulations** <u>Federal and state tax policies</u> On public lands, the timber sale contract will set the fees for commercial timber. The two most common types are scaled sales (the timber is measured or scaled after it has been cut) and tree measurement or lump-sum sales (the timber in the standing trees is estimated, and the payment specified in the contract is based on that estimate.) See Government Accountability Project (undated) cited above, at p. 11. US Forest Service contracts require an up-front payment, plus a performance bond to assure completion of any tasks required in the contract, such as road maintenance or disposal of logging wastes. On private lands, state and local laws will cover harvesting taxes and fees. As with other kinds of laws, the laws of the fifty states show variation, but there are some basic patterns. Most states charge an annual tax based on the value of real property. These “ad valorem” taxes tend to drive landowners to develop the land if the market value (and hence annual tax) rises. To combat this trend, some states will tax land based on its current value as forest land or based on a flat rate per unit of area, as long as the land remains in	Taxes as they apply to timber in the US: http://www.fs.fed.us/spf/coop/library/timbertax.pdf The website http://www.timbertax.org/, sponsored by the US Forest Service and private associations representing landowners, has general information on taxation of forestry in the US, with links to state and federal laws. (For a table of state timber tax approaches, see http://www.timbertax.org/statetaxes/quickreference/.) Title V Taxation - Chapter 79 - Forest Conservation and Taxation, Section 79:1 - http://www.gencourt.state.nh.us/rsa/html/v/79/79-mrg.htm. See the sources of information on timber sale contracts for more detailed information on contract types, payments, and bonds.	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* Royalties and harvesting fees are generally only applicable to public lands, which are administered at either the county, state, or federal level. All states and federal agencies that hold land have well developed programs for regulating timber and timber harvest. Stumpage fees are very applicable to private timber harvest. There is no doubt that some timber contract holders have cheated the

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	forest. To get these lower rates of taxation, the landowner may have to accept conditions that are linked to harvest, such as preparation of a management plan, payment of a yield tax when the timber is harvested, or even granting of a conservation easement limiting development of the land. Also, the landowner might be liable for back taxes based on market value if the land is ever converted to non-forest use. States may also levy taxes on the harvested timber itself. Eleven states have a yield tax based on the value of the timber, and twelve states have a severance tax, which is based on the volume of timber regardless of its market value. That means that the majority of states have no special harvest tax. New Hampshire presents an example of a yield tax. It levies a tax of ten percent of the stumpage value of timber harvested. New Hampshire Statutes, Chapter 79. This tax is payable to the town in which the harvested land sits. If the person harvesting the timber does not own the property, the town may require a payment bond before the timber is harvested. **Legal Authority** For public lands, US Forest Service. For the public lands, the land management agency generally collects the amounts due under timber contracts. For private lands, the property, yield, and severance taxes are usually collected by local governments or by the state agency concerned with revenue. **Legally required documents or records** Timber Sale Contract (US Forest Service) For public lands, the timber contracts will show the amounts or rates due. For sales based on estimates of the timber volume, the documents inviting bids should indicate the volume. For sales based on scaled volumes after harvest, there should be paperwork from whoever has done the scaling, which might be a government official or a third party such as a independent scaler or the mill purchasing the raw logs. The government land management agency should have copies. The logger and the government should have records of	Darren Fishell (posted 16 February 2012). 'Georgetown selectmen to investigate potential Tree Growth Tax Fraud'. Bangor Daily News. [http://bangordailynews.com/2012/02/16/news/midcoast/georgetown-selectmen-to-investigate-potential-tree-growth-tax-fraud/.]	government out of timber payments, in some cases for millions of dollars. See the Jeffrey Kent opinion piece cited above and the Government Accountability Program guide to timber contracts cited above. One avenue of fraud has been collusion between loggers and scalers to under- report the volume or quality of timber harvested. Because of this, the US Forest Service has been moving away from scaled sales to lump-sum scales. The BLM tends to offer only lump-sum sales. Kent declares that the problem is not corruption, but capture of the government agencies by the industries they regulate. There are no payments under the table. Lawful, transparent, but troublingly large contributions to political action committees and candidates keep legislators from instituting more burdensome controls and practices on industry. A culture in the agencies that views the industry as a partner in managing the land keeps the agency officials from acting as true watchdogs. Kent's experience was in the 1980s and '90s. A drop-off of press reports about this kind of contract cheating suggests that after a flurry of bad publicity and Congressional oversight in the 1990s, the Forest Service may have brought the problem under control.

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	payments made and bonds or sureties posted. On private lands, the local or state revenue agency will have records of the assessed values of land, the reported volumes of timber harvested, and the tax rates applied. They should also have records of the amounts of taxes paid.		Studies or documentation of evasion of severance or yield taxes on private harvests has not been found. One news report questions the inclusion of land subject to a conservation easement in a property tax classification intended for lands with forests capable of commercial production. True chain of custody marking of trees and tracking of volumes from harvest through milling to bulk sales should make it relatively easy to document tax or contract fraud based on misreporting of harvests.
1.6 Value added taxes and other sales taxes	**Applicable laws and regulations** The United States does not have a federal value added tax. None of the states currently have a value added tax, although Hawaii has a general excise tax on businesses, which each business can elect to pass on to customers by charging a "quasi sales tax". The majority of US states and some local governments have sales taxes, levied on sales of goods and sometimes services, but there is usually an exemption for goods sold as raw materials for future processing and goods sold to buyers from out of state. States with sales taxes typically have use taxes, which apply to goods brought in from out of state for which no comparable sales tax has been paid. In most cases, because logs are being sold for further processing, their sale is not taxable. Note that many states and local governments levy an annual ad valorem tax on personal property (i.e., property other than real estate) used in business. The business typically must file an annual property inventory stating the original purchase dates, prices and current depreciated values of its personal property and then make a payment representing some percentage of the total property value.	New York sales tax requirements (example): http://www.tax.ny.gov/pubs_and_bulls/tg_bulletins/st/record-keeping_requirements_for_sales_tax_vendors.htm The web site http://www.salestaxinstitute.com/resources/rates is provided by a private company that keeps track of sales tax rates by state. Note, though, that these taxes may not apply to services, and there may be special rates for some items. For example, a state might have a lower tax or even no tax for food, non-luxury clothing, or prescription drugs, or it might have a separate tax rate that applies to motor vehicles. States and local governments very often have information pages explaining the tax obligations of businesses. For example, the page outlining personal property taxes for	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* Sales taxes are levied at the state level, with the tax rate varying by state from 0% to 7.5%. Ordinarily, harvest and sale of timber is not going to trigger sales or use tax obligations.

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	Legal Authority State departments of revenue Sellers collect sales taxes from buyers, and state and local revenue agencies in turn collect sales taxes from sellers. State agencies generally collect use taxes from buyers. Business personal property taxes are usually paid to the revenue departments of local or state governments. **Legally required documents or records** Differs by state Sellers will have records of sales taxes collected from buyers and paid to the government. Governments will have records of payments collected and forwarded by sellers, although tax filings are usually not public documents. A conscientious buyer will have records of purchases made where a use tax is due, and records of tax forms indicating declaration and payment of use taxes. Governments will have records of use tax filings, which are often simply a few lines on the annual income tax forms, but these filings will not be public records. Businesses will have property inventories and records of filing and paying personal property taxes. Governments will have records of filings and payments, which may not be public records.	businesses in Fairfax County Virginia is http://www.fairfaxcounty.gov/dta/business_personalproperty.htm. Penelope Lemov (18 May 2011). "States Look to Collect Internet Sales Taxes". Governing the States and Localities. [http://www.governing.com/columns /public-finance/states-collect- internet-sales-taxes.html].	
1.7 Income and profit taxes	**Applicable laws and regulations** Tax policies Internal Revenue Code U.S. federal tax law is complex. The statutes take up all of title 26 of the U.S. Code. The regulations take up all of title 26 of the Code of Federal Regulations. On top of these, there are formal rules and guidance from the Internal Revenue Service (IRS) and rulings of the courts on tax law. State laws tend to follow federal law in the definition of income, treatment of deductions from income, and so forth. Corporations with publicly traded stock are subject to regulation from the federal Securities and Exchange Commission, which requires annual public disclosures of basic financial information, including	For access to the statutes, regulations, and agency guidance, the IRS maintains a gateway webpage: http://www.irs.gov/Tax-Professionals/Tax-Code,- Regulations-and-Official-Guidance and http://www.irs.gov/Forms-&-Pubs For an overview of federal tax obligations associated with timber, see http://www.timbertax.org/getstarted/ and the links on that page. Alberto Goetzl, S. C., Paul Ellefson, P. U., Philip Guillery, T. F., & Gary Dodge, P. C. (2008). Assessment of Lawful Harvesting &	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* Income and profit taxes are levied at the federal level, and administered by the Internal Revenue Service (IRS). Most states also leverage addition income and profit taxes,

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	income, assets, and liabilities. **Legal Authority** Internal Revenue Service (federal agency) At the state and local levels, the revenue agencies have various names. The Internal Revenue Service offers the following page linking to business taxation web pages of the states: http://www.irs.gov/Businesses/Small-Businesses-&-Self-Employed/State-Links-1. **Legally required documents or records** IRS Form 1040: Income taxes IRS Form 1099: Capital Gains taxes Income taxation is tied closely to recordkeeping. An individual or business should have full records of income, expenses, and associated tax filings for the past three years. For investments and depreciable assets, the records must go back longer, often to the acquisition of the investment or asset. Taxing authorities will have copies of income tax returns that individuals and businesses have filed, but these are generally not public documents.	Sustainability of US Hardwood Exports. Seneca Creek Associates, LLC [http://www.americanhardwood.org/fileadmin/docs/Seneca_Creek_Study/Seneca_Creek_Study_- _Full_Version.pdf]. Summary of the disclosure regulations and areas of possible reform: U.S. Securities and Exchange Commission (2013). "Report on Review of Disclosure Requirements in Regulation S-K as Required by Section 108 of the Jumpstart Our Business Startups Act". [http://www.sec.gov/news/studies/2013/reg-sk-disclosure-requirements-review.pdf]. IRS Oversight Board (2012). "2012 Taxpayer Attitude Survey". [http://www.treasury.gov/IRSOB/reports/Documents/IRSOB_TAS%202012_FINAL.pdf].	generally at a much lower rate than the federal level. Every individual and every business organized to make profit is subject to annual federal taxation on net income. All but four states have annual corporate income taxes, and all but seven have annual individual income taxes. In timber sales, this means the landowner selling the timber and the logger cutting and selling the logs will have recordkeeping, reporting, and taxpaying obligations. Tax filing tends to be annual, however businesses and individuals may have to make quarterly payments of their own estimated taxes. Employers may have to forward withheld amounts from employee salaries as often as every two weeks. There is also a tax due upon inheritance, called the estate tax. At the risk of oversimplification, before property passes through inheritance, the estate of the deceased may have to pay estate taxes. If a large part of the value of the estate is in land, the estate may have to sell land or timber to raise money to pay the taxes. The timing of inheritance tax obligations seldom coincides with the ideal rotation age, so this can disrupt management plans. A financial advisor can help a sophisticated landowner anticipate and avoid

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
			inheritance taxes by structuring ownership through corporations or trusts. It is often the smaller landholdings, associated with family farms and woodlots, that are caught up in inheritance tax problems. The US has an income tax that includes special provisions for certain kinds of timber income and expenses. For example, expenses for reforestation and conservation practices are treated favorably (with limits). The federal government also imposes an estate tax that can affect forest properties upon transfer to estate beneficiaries. In turn, the states have various forms of taxation that include income tax, estate and gift tax, property tax and severance or yield taxes. In many states, property taxes are adjusted so that forest properties are valued for current use while some states apply a tax at harvest in lieu of (and sometimes in addition to) annual assessments. Compliance rates to both federal and state tax requirements in general are very high -- at least 84% for compliance to federal income taxes according to government studies. There are no data to suggest that failure to pay assessed taxes on hardwood timber income or property occurs to any significant extent in the US. IRS surveys show a very high proportion of taxpayers believe that

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			cheating on taxes is unacceptable and that people who do cheat should be held accountable. Nonetheless, that result suggests that a small percentage of people do try to evade taxes to some degree. Businesses will often hire an outside service to handle payroll-associated taxes and will often hire professional assistance to fill out income tax forms. The use of outside professionals, such as certified public accountants, lowers the risk of noncompliance. Some businesses, particularly large ones or ones whose stock is traded on public stock markets, will hire independent auditors to review records and payments. This also lowers the risk of noncompliance. The risk is probably highest among small businesses and individuals. The IRS randomly audits a small percentage of tax returns, and this promotes compliance. If a business or individual knew that its tax filings would be audited or even might be audited as part of a forest certification program, that would almost certainly either raise compliance or discourage bad actors from seeking certification. Overall, based on the available information, the risk for this category has been assessed as low.
Timber harvesting activities			

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
1.8 Timber harvesting regulations	**Applicable laws and regulations** Requirements for timber harvesting on US Forest Service lands: - 16 USC § 1604 - sets up the land and resource management planning system and requires permits, contracts, and resource use generally to be consistent with these plans. - CFR Title 36 - more specific regulations. o Timber management plans must call for sustained yield, a non- declining flow of timber (i.e., the harvest level must be relatively constant from year to year), and multiple use (protecting the value of the land for fish, wildlife, water, recreation, and grazing if the land is so used). 36 CFR § 221.3, o All management activities must be consistent with the larger land and resource management plans, 36 CFR § 219.15(b), o Land and resource management plans must provide for ecological, social, and economic sustainability as detailed in 36 CFR § 219.8, o Must maintain a diversity of plant and animal communities, 36 CFR § 219.9. o Must allow for multiple use, 36 CFR § 219.10, o Timber contracts must reflect the requirements of "applicable land and resource management plans and environmental quality standards," 36 CFR § 223.30, - The parallel planning system for the Bureau of Land Management is rooted in 43 U.S.C. § 1712, - The BLM planning and programming regulations are in 43 CFR part 1600. Note that 43 CFR § 1610.3-2, requires plans to be consistent with federal, state, and local programs and policies. - On the BLM's most productive timber lands, the O & C lands, 43 U.S.C. § 1181a, provides a general policy of sustainable harvests and protection of water and recreation. On state and local lands, forest practice requirements are also rooted in management planning. E.g. the Oregon rules on state forest planning, which require identification of lands that require special practices because of riparian habitat, scenic value, and so forth. Oregon Administrative Rules 629 Division 35, Timber sale contracts may incorporate requirements in forest practice and other environmental rules, OAR 629-029-0135(3). The state has over ninety pages of forest practice laws (Oregon Revised Statutes §§ 527.610 to 527.770, 527.990 (1) and 527.992) and rules (OAR 629 Divisions 600 to 670) that apply to harvests on state, local, and private lands. The Oregon Department of Forestry	**Laws** *Federal - US Forest Service lands* - 16 USC § 1604, http://www.law.cornell.edu/uscode/text/16/1604 - CFR Title 36 § 221.3, http://www.law.cornell.edu/cfr/text/3 6/221.3. - 36 CFR § 219.15(b), http://www.law.cornell.edu/cfr/text/3 6/219.15. - 36 CFR § 219.8, http://www.law.cornell.edu/cfr/text/3 6/219.8; - 36 CFR § 219.9, http://www.law.cornell.edu/cfr/text/3 6/219.9; - 36 CFR § 219.10, http://www.law.cornell.edu/cfr/text/3 6/219.10. - 36 CFR § 223.30, http://www.law.cornell.edu/cfr/text/3 6/223.30. *Federal -Bureau of Land Management* - 43 U.S.C. § 1712, http://www.law.cornell.edu/uscode/text/43/1712. - 43 CFR part 1600, http://www.law.cornell.edu/cfr/text/4 3/part-1600. - 43 CFR § 1610.3-2, http://www.law.cornell.edu/cfr/text/4 3/1610.3-2, - 43 U.S.C. § 1181a, http://www.law.cornell.edu/uscode/text/43/1181a, provides a general policy of sustainable harvests and protection of water and recreation. *State and local lands*	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* Statics show that it is not a common case to see harvesting volume above the allowed and only few cases are known on road construction not following the legislation. Thus a low risk. A recent study in Oregon looked at compliance with forest practice requirements regarding leaving behind snags, live trees, and downed logs for the benefit of wildlife. It found compliance rates of 97% ± 6%, and it noted that sites frequently exceeded the legal minimums. A 2012 Washington state study of compliance with requirements for activities affecting riparian areas found rates of compliance ranging from 43% (commercial thinning rules in stream buffer zones, sample of seven sites) to 100% (management of debris in non-fish-bearing streams, 19 sites). It concluded that while most of the observed violations were minor, compliance continues to be "a challenge." Walter Obermeyer and Alice Shelly. 2012.

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	offers a collection of the laws in a single document. On private lands, state and local laws may control forest practices. The states show three broad approaches to timber harvest regulation. Some states have detailed forest practice laws that prescribe things like stream buffers and rules for skidding and yarding logs. The Oregon laws mentioned above are an example. This regulatory approach is most common in western states. Some states have a few simple forest practice rules, perhaps combined with voluntary or mandatory "best management practices" to protect water and soils. Virginia, for example, has a law requiring landowners to retain seed trees to promote regeneration of pines, Code of Virginia §10.1-1164. In addition, Virginia limits the power of local governments to restrict forest activities beyond the requirements of following best management practices (BMPs), Code of Virginia § 10.1-1126.1. Like most southern states, Virginia has BMP guidelines to prevent water quality problems from silviculture, but these are voluntary except where the logging may affect the Chesapeake Bay (see the discussion of BMPs and Virginia laws under the coverage of environmental quality regulation, below). If an operation is causing pollution, the state forester has the power to order it to stop. Code of Virginia § 10.1-1181.2. Some states have no forest practice laws. A few states defer to local regulation of forest practices. Many states require loggers to take steps to suppress sparks from equipment and to have basic fire-fighting equipment such as shovels and axes on site. For example, the Virginia law regarding spark suppression is Code of Virginia § 10.1-1145. Oregon's much more extensive fire prevention rules are at OAR 629 division 43. Forest Principles (UNCED) (Rio de Janeiro, Brazil, June 1992). International Tropical Timber Agreement (Geneva, Switzerland, 1994). Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)/Federal Environmental Pesticide Control Act (FEPCA) (1947, 1972). Federal Plant Pest Act (1957). Forest practices acts - Not all states have Forest Practices Acts and many have voluntary BMPS.	Oregon: - Oregon Administrative Rules 629 Division 35, http://arcweb.sos.state.or.us/pages/rules/oars_600/oar_629/629_035.ht ml. - OAR 629-029-0135(3), http://arcweb.sos.state.or.us/pages/rules/oars_600/oar_629/629_029.ht ml. - Oregon Revised Statutes §§ 527.610 to 527.770, 527.990 (1) and 527.992) and rules (OAR 629 Divisions 600 to 670) that apply to harvests on state, local, and private lands. - The Oregon Department of Forestry offers a collection of the laws in a single document: http://www.oregon.gov/odf/privateforests/docs/fparulebk.pdf. - OAR 629 division 43, http://arcweb.sos.state.or.us/pages/rules/oars_600/oar_629/629_043.ht ml. Virginia: - Code of Virginia §10.1-1164, http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+10.1-1164. - Code of Virginia § 10.1-1126.1, http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+10.1-1126.1. - Code of Virginia § 10.1-1181.2, https://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+10.1-1181.2. - Code of Virginia § 10.1-1145, http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+10.1-1145. **References** The websites of state forestry agencies often contain descriptions or links to applicable forest practice requirements and laws. States	In fiscal year 2012–2013, the Alabama Forestry Commission inspected 258 completed logging jobs for compliance with best management practice guidelines (which are voluntary in Alabama) and reported 97.75% compliance with only two significant violations. A study of BMP compliance in South Carolina found overall 92% compliance with harvest and non-harvest BMPs. The lowest rates of compliance were associated with prescribed burning (60% compliance) and stream crossings (81% compliance). BMPs in South Carolina are voluntary guidelines. Guy Sabin. 2012. Compliance and Implementation Monitoring of Forestry Best Management Practices in South Carolina 2011-2012. South Carolina Forestry Commission. It's difficult to assess risk based on a few reports such as these, but generally it is known that there is good compliance with legal requirements. Caution should be taken where the requirements were expensive or required expert skills to implement, or where enforcement pressure was low. Low enforcement pressure can result from infrequent inspections, but it can also result from a forgiving attitude of inspectors, which in the US is more common in enforcement of environmental standards against

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	Pollution Prevention Act (1990). Federal Insecticide Act (1910). Plant Quarantine Act (1912). Fire practices laws (for all states) On the federal lands, the federal government sets the timber harvesting rules, and federal land managers tend to meet or exceed the substance of state forest practices rules, although the federal government is not bound to follow state procedures. **Legal Authority** Regulated at the state level Mandatory BMPs (Best Management Practices) Not all states are mandatory with many southern states being voluntary. More information needed. In general, the federal authorities will be the land management agencies, and the state authorities will be the state forestry agencies, boards, and commissions. State cooperative extension services, chartered to help private landowners improve management practices, will have a role in educating landowners about requirements and giving them advice about compliance. **Legally required documents or records** Timber sale contracts may include forest practice requirements or contain references to the applicable laws. If state or federal foresters have inspected a logging site, there may be paperwork records of the inspection.	often publish manuals or educational material for landowners explaining forest practice obligations. For example: Virginia, http://www.dof.virginia.gov/print/mgt /Timber-Sales.pdf, and Vermont, http://www.vtfpr.org/regulate/documents/timber_harvest09_web.pdf. Defenders of Wildlife. 2000. State Forestry Laws. www.defenders.org/publications/state_forestry_laws.pdf. Guy Sabin (2012). "Compliance and Implementation Monitoring of Forestry Best Management Practices in South Carolina 2011- 2012". South Carolina Forestry Commission, Columbia, SC. [http://www.state.sc.us/forest/bmp12.pdf]. Jennifer Weikel, Rod Krahmer, and Jim Cathcart (2014). "Compliance with Leave Tree and Downed Wood Forest Practices Act Regulations - Oregon Department of Forestry Forest Practices Monitoring Section Technical Report #20". Oregon Department of Forestry. [http://www.oregon.gov/odf/PRIVATE_FORESTS/docs/Leave%20Tree%20Downed%20Wood%20Report%20Final%20April%202014.pdf]. Walter Obermeyer and Alice Shelly (2012). "Forest Practices Compliance Monitoring Report 2010/2011". Washington State Department of Natural Resources. [http://www.dnr.wa.gov/Publications/fp_cm_biennial_report_10-11.pdf]. Alabama Forestry Commission compliance figures: http://www.forestry.alabama.gov/bmpmon.asp	agricultural operations than it is in enforcement against manufacturing operations. There may also be regional variations. In the state of Washington study, compliance rates appear to be higher in the eastern part of the state than in the west. Some of the reports track compliance trends, and it appears that compliance with standards tends to improve, perhaps as landowners and loggers become more familiar with what is necessary to comply. In the end, the risk needs to be evaluated locally. If there are no enforceable standards, there is obviously no risk. Risk may be moderate for complex standards, for poorly enforced standards, or for new standards.

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
		x?bv=2&s=1http://www.forestry.alabama.gov/bmpmon.aspx?bv=2&s=1	
1.9 Protected sites and species	**Applicable laws and regulations** National Trails System. 16 USC §§ 1241–1251, The National Historic Preservation Act, 16 USC §§ 470–470x6 The Migratory Bird Treaty Act prohibits the hunting, killing, capturing, or sale of most native birds without a permit. 16 USC §§ 703–712. This Act does not appear to affect forest practices in a significant way. The Bald and Golden Eagle Protection Act protects bald and golden eagles and their nests. 16 U.S.C. 668-668d. The US Fish and Wildlife Service has published non-binding guidelines for avoiding harm to bald eagles and has stated that penalties against persons who unintentionally harm eagles will be mitigated if the persons were following the guidelines. The guidelines for forestry call for buffers of approximately 100 meters in radius around nests, extended to 200 meters during the breeding season. US Fish and Wildlife Service. 2007. National Bald Eagle Management Guidelines. The Endangered Species Act, 16 USC §§ 1531–1544, , is potentially the most important species protection law for forest management. - Section 9 of the Act, 16 USC § 1538, makes it unlawful to "take" a species listed as threatened or endangered, and the definition of "take" includes harassing or harming a protected species, 16 USC § 1532(19). Special overlays that Congress might have designated on an ad hoc basis. For example, some lands in the Mount Hood National Forest are also in the Columbia Gorge National Scenic Area and are subject to the management directives in the Columbia Gorge National Scenic Area Act, 16 USC §§ 544–544p, Administrative set-asides. These should be clearly apparent in the management plans. To take the US Forest Service as an example, their land and resource management plans must designate areas that are not suitable for timber production, 36 CFR 219.11. These include lands where slope or soil conditions make sustainable timber management impossible, and lands designated administratively for other uses (e.g., for scientific and educational use as research natural	**Laws** <u>Federal</u> - Wilderness Act. 16 USC § 1132, http://www.law.cornell.edu/uscode/text/16/1132 - National Wild and Scenic Rivers Act and System. 16 USC § 1274, http://www.law.cornell.edu/uscode/text/16/1274. - National Trails System. 16 USC §§ 1241–1251, http://www.law.cornell.edu/uscode/text/16/chapter-27. - The National Historic Preservation Act, 16 USC §§ 470–470x6, http://www.law.cornell.edu/uscode/text/16/chapter-1A/subchapter-II. - Columbia Gorge National Scenic Area Act, 16 USC §§ 544–544p, http://www.law.cornell.edu/uscode/text/16/chapter-2/subchapter-II. - Administrative set-asides - e.g. designated areas that are not suitable for timber production, 36 CFR 219.11, http://www.law.cornell.edu/cfr/text/3 6/219.11 or for scientific and educational use as research natural areas, http://www.fs.fed.us/rmrs/research- natural-areas/. - Migratory Bird Treaty Act. 16 USC §§ 703–712, http://www.law.cornell.edu/uscode/text/16/chapter-7/subchapter-II. - The Bald and Golden Eagle Protection Act. 16 U.S.C. 668-668d, http://www.law.cornell.edu/uscode/text/16/chapter-5A/subchapter-II. - National Bald Eagle Management Guidelines. http://www.fws.gov/southdakotafield	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* The US has a broad and comprehensive legal structure surrounding species protection and the protection of socially and ecologically important sites, administered at both the federal and state level. The quick way to find protected areas on a piece of public land is to look at the official management plan prepared by the responsible agency. Due to the transparency of planning and the active participation of interested members of the public, it is highly likely that the plan accurately identifies protected sites. The long way is to start first with the statute or executive order that assigned the land to a particular management agency. That may assign the land to a class of protected areas (e.g., national park, national monument, national historic landmark, etc.), may specify how it is to be managed or protected, and may specify areas within the land

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	areas. Note that federal and state rules protecting wetlands may limit silvicultural activities in those areas. These laws are rooted in water pollution laws, and are discussed below with the other pollution laws. State: Each individual state will be different, but many states have analogues of the federal programs, such as state parks and state wild and scenic rivers, that set state lands in categories with no or limited opportunity for timber management. Again, the quick way to discover these is to consult the current plan that the state land management agency has prepared. Private: - Private lands may be subject to local zoning requirements, and requirements to protect scenic values. Also, private lands may lie within federal wild and scenic river corridors. In that case, the federal government typically seeks an agreement with state and local governments over restrictions in land use in the area, but leaves the authority to control land use in state and local hands. If private lands are used in ways that are consistent with state and local laws but inconsistent with the river's designation, the federal government as a last resort can condemn the private property, but this is a costly and rarely used tool. - Private lands may also be subject to conservation easements that limit uses. - As noted above under taxation, states may offer lower tax rates to lands that owners pledge to keep land as open space. In some states, those programs conceivably could limit the type of forest operations that the owner could perform on the land. Some state forest practice laws create de facto protected areas by requiring buffer strips around streams or roadways. State and private landowners also face the prohibition against taking listed species, except that the "take" prohibition does not apply to listed plants on private land, as these are considered the owner's property. State and private owners do not have the requirement to consult with the listing agency before acting, however they may	office/NationalBaldEagleManagement Guidelines.pdf. - The Endangered Species Act, 16 USC §§ 1531–1544, http://www.law.cornell.edu/uscode/text/16/chapter-35, **References** The state or regional offices of The Nature Conservancy, an NGO, often can provide GIS information on areas critical to conservation. The Endangered Species Act listing agencies have range maps and maps of areas that are "critical habitat" for listed species. (For some endangered, collectable species, these are not public information!) Activity in these areas has the potential to take listed species or even jeopardize the continued existence of the species.	subject to special protections. The risks of non-compliance on public lands are generally low. The planning processes are open and transparent, with strong public participation. Conservation groups have shown a willingness to take agencies to court over protected area and Endangered Species Act issues. The Endangered Species Act has a citizen suit provision, 16 USC §1540(g), allowing any citizen to sue anyone, including the federal government, seeking an injunction to enforce the Act. As a result, the agencies are generally careful to follow the law on these matters. Where there are high instances of these privately initiated actions, there may be a higher level of risk. Private lands may have more risk. Zoning violations are going to occur, but they are going to be hard to disguise, and people will risk local enforcement actions. Damage to historic or archeological sites, especially if previously undiscovered, will be hard to detect, even for certification auditors. Damage to protected species may also be hard to detect, unless the auditor sees nests or individuals of the species near the site. However, violators of the Endangered Species Act face civil and criminal prosecution if caught, which is a strong deterrent. Overall, the risk on private lands is

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	voluntarily agree to a conservation plan and get permission to take a small number of the protected individuals if they follow the plan. Some states have state versions of the federal Endangered Species Act. The state and federal lists of protected species often overlap, but one list may have species that the other government has not yet reviewed for listing, and states may list species that are rare in the listing state but common elsewhere in the country. (Actually, the federal list also can limit listings to specific regions of the country, if the populations listed are biologically distinct.) Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere (Washington, DC, 1940). Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar, Iran, 2 Feb 1971). Convention Concerning the Protection of the World Cultural and Natural Heritage; (Paris, France, 16 Nov 1972). International Plant Protection Convention (IPPC) (1979 Revised Text) (Rome, Italy, 1979). Endangered Species Act (1973, 1978, 1979, 1982). Forest landowners and managers cannot cause injury or death by direct harm or through habitat modification to a species listed as threatened or endangered. Clean Water Act (CWA): control activities in forested wetlands and requires states to have programs to control non-point source pollution, usually accomplished through Best Management Practices (BMPs). Clean Air Act (CAA): states must have programs to protect air quality and visibility, including controls on prescribed burning and the use of ozone-depleting chemicals. Federal Insecticide, Fungicide and Rodenticide Act (FIFRA): regulates chemical use in forest stands, whether for insect control or for vegetation management. Resource Conservation & Recovery Act (RCRA) (1976, 1984). Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, commonly known as "Superfund") (1980, 1986). Withdrawn, Kyoto Protocol to the United Nations Framework Convention on Climate Change (Kyoto, Japan, 1997). Convention on Biological Diversity (UNCED) (Rio de Janeiro, Brazil, 5 Jun 1992). Framework Convention on Climate Change, (UNCED) (Rio de Janeiro,		still low, but attention should be paid to areas known to be important to listed species, such as forests in the Pacific Northwest with salmon spawning streams, or forests in the Southeast with red-cockaded woodpeckers.

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	Brazil, 1992). Rio Declaration on Environment and Development (UNCED) (Rio de Janeiro, Brazil, 1992). Convention on the Conservation of Migratory Species of Wild Animals (Bonn, Germany, 23 Jun 1979). **Legal Authority** US Fish and Wildlife Service (ESA) National Marine Fisheries (ESA for anadramous fish, principally in the northwest US). State level laws are administered by state natural resource departments. The US Congress plays a major role in making protected area designations, for example, of national parks and additions to the national wilderness system. The President, under the Antiquities Act, can set aside federal land as national monuments by executive order. The federal and state land management agencies play a major role in administrative declarations of areas off-limits to commercial forestry. (Note that the laws often vest these powers in the hands of the Secretary of the cabinet department that contains the agency. Thus, the Secretary of Agriculture has powers to administer the national forests, which are assigned to the US Forest Service, and the Secretary of the Interior has powers to administer the national parks, national wildlife refuges, and the otherwise unreserved public lands, assigned to the National Park Service, the US Fish and Wildlife Service, and the Bureau of Land Management.) The National Park Service administers the National Register of Historic Places under the National Historic Preservation Act. Each state has designated a State Historic Preservation Office to inventory historic and archeological sites in the state, conduct planning, and propose sites for addition to the national listing. The U.S. Fish and Wildlife Service and the National Marine Fisheries Service (NOAA Fisheries) administer the federal Endangered Species Act. State wildlife agencies generally administer the state acts. **Legally required documents or records**		

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	Land management agencies tend to have good maps of designated protected areas. These should be included in their land management plans. Federal agencies should have records of their consultation with the listing agencies over possible effects on listed species. If there is a possible effect, there should be a written biological opinion from the listing agency. If the management agency has permission to take some of the listed species, it should have an incidental take statement. A state or private owner that claims permission to take a listed species should have an approved conservation plan and an incidental take permit.		
1.10 Environmental requirements	**Applicable laws and regulations** EIA: - Federal agencies: National Environmental Policy Act (NEPA. Citations to the statute and its regulations are above under planning). Before taking on any action, unless the action falls under a predetermined "categorical exclusion" (a set of activities that never have significant effects), the agency has to determine if the action could have a significant environmental effect. This takes the form of an environmental assessment (EA). If there is no effect foreseen, the agency makes a formal finding of no significant impact (FONSI). If there is a possible significant effect that the agency can't prevent by modifying the project, the agency must prepare a full environmental impact statement (EIS) with an extensive process of public involvement. NEPA applies not only to projects that a federal agencies itself undertakes, but also to projects that it funds or approves. So, if a state or private person undertakes a project that requires a federal permit, that may trigger NEPA review. - Some states have state environmental impact assessment laws (collectively called little NEPAs or SEPAs). These apply to state and sometimes private actions. Environmental quality: - Forest management can trigger requirements under several types of	**Laws** <u>Federal</u> - National Environmental Policy Act EIA requirement: 42 USC § 4332, http://www.law.cornell.edu/uscode/text/42/4332. EIA regulations: 40 CFR parts 1500 to 1508, http://www.law.cornell.edu/cfr/text/4 0/chapter-V. - Federal Water Pollution Control Act, also called the Clean Water Act, 33 USC §§ 1251–1387, http://www.law.cornell.edu/uscode/text/33/chapter-26. T - Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). 7 USC §§ 121–136y, http://www.law.cornell.edu/uscode/text/7/chapter-6. - Clean Air Act, 42 USC §§ 7410– 7671q, http://www.law.cornell.edu/uscode/text/42/chapter-85. - Resource Conservation and Recovery Act, 42 USC §§ 6921– 6939g,	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* Environmental permits (NEPA) are required for projects on federal lands or those that apply federal funding. Water quality is regulated on both public and private lands via the Clean Water Act. There are also a host of environmental laws that regulate aspects of timber harvest at the state level. Certain federal statutes govern federal land management directly (about 20% of US timberland but less than 1% of US hardwood supply). The most significant of these are: the National Forest

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	environmental laws. In rough order of importance, they are water quality, pesticide, air quality, solid waste, and hazardous waste remediation laws. In all these cases, it really does not matter who owns the land. The environmental laws apply to federal and state land management agencies in the same way that they apply to businesses and individuals. - Federal Water Pollution Control Act, also called the Clean Water Act, 33 USC §§ 1251–1387. The application of the Act to forest operations has been controversial, but basically two aspects of the Act are likely to apply. Forest management leads to non-point pollution, which is pollution that is not coming from a discrete outfall, vehicle or other source. The Act addresses non- point pollution through voluntary best management practices (BMPs), with a fallback to stricter controls if there is actual deterioration of water quality below water quality standards. Forest management in wetlands can lead to movement of soil, which is considered dredging and filling of the wetlands, requiring a Clean Water Act § 404, 33 USC § 1344, permit. “Normal” silvicultural operations are exempt from § 404, but “normal” is narrowly defined. To qualify for the exemption, the operator must follow BMPs, and several other conditions must be met (e.g., no endangered species present, no wild or scenic rivers affected, no permanent change of wetlands to uplands). - Most states have parallel water quality laws. In fact, the federal government encourages states to develop laws that are at least as strict as the federal standards. If states do, the federal government can delegate to them the power to write permits and take the lead in enforcement. Some states stick with voluntary BMPs; some make part or all of the BMPs mandatory parts of the forest practice rules. Virginia is an example of a hybrid: it makes BMPs voluntary in most of the state, but mandatory in areas close to the Chesapeake Bay. See the Virginia handbook on BMPs. - Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). 7 USC §§ 121–136y. The three basic requirements that apply to forest management are that (1) people can only sell and apply pesticides that have been approved by the federal government, (2) people can only use a pesticide in a manner consistent with the instructions on its label, and (3) people cannot obtain or apply especially dangerous	http://www.law.cornell.edu/uscode/text/42/chapter-82/subchapter-III. - Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §§ 9601–9675, http://www.law.cornell.edu/uscode/text/42/chapter-103 <u>States</u> - California: 17 Calif. Code of Regulations §§ 95801–96022, http://www.arb.ca.gov/regact/2010/capandtrade10/copusforest.pdf and https://govt.westlaw.com/calregs/Browse/Home/California/CaliforniaCodeofRegulations?guid=I34B7E5A0E67711E2960E9FD1BEAA332C&originationContext=documenttoc&transitionType=Default&contextData=%28sc.Default%29. - Oregon: Oregon Revised Statutes (ORS) §§ 526.695–.775, ORS §§ 526.780–.783 - https://www.oregonlegislature.gov/bills_laws/lawsstatutes/2013ors526.h tml. References This page has a link to a 2007 citizen’s guide to federal EIA: https://ceq.doe.gov/publications/citizens_guide_to_nepa.html General landowner guides from states - New Hampshire: University of New Hampshire Cooperative Extension (2014) "Guide to New Hampshire Timber Harvesting Laws". [http://www.nhdfl.org/library/pdf/Forest%20Protection/Guide%20to%20NH%20Timber%20Harvesting%20L	Management Act (NFMA), Federal Land Policy and Management Act (FLMPA), the Wilderness Act, and the National Environmental Policy Act (NEPA). The latter mandates that federal agencies assess the environmental impacts of their activities on government-owned forest land. As result, all federal timber management activities require some form of environmental assessment or impact analysis. Hardwood management is mainly impacted in the national forests of the eastern US that contain significant inventory of hardwood species. Planning and harvest activities on federal forest lands are frequently delayed, altered or cancelled pending completion of administrative or judicial reviews as a result of stakeholder group challenges. The risk of violation of federal EIA requirements is fairly low. The process is transparent. Citizens have a well-established right to sue to enforce the federal EIA laws, and that keeps agencies accountable. Where there are high instances of these privately initiated actions, there may be a higher level of risk. The risk of violation of clean water and other environmental standards depends first on whether they are standards or just guidelines. Where they are standards, the risk on

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	pesticides unless they are licensed applicators. Plants that have been genetically modified to resist pests are considered plant-pesticides, subject to FIFRA regulation. - States can enact their own pesticide laws if they do not interfere with the regulatory scheme of FIFRA. For example, states may set rules limiting aerial spraying near streams or property lines, or requiring pre-spray notice to neighbors. See, e.g., the standards discussed in this news story: Rob Davis, In Oregon, helicopters spray weed killers near people under West Coast's weakest protections. - Clean Air Act, 42 USC §§ 7410–7671q - A clean air concern with forest management is often the smoke from prescribed burns. There are also concerns about pollution from vehicles. Also, states are beginning to write laws concerning carbon offsets from forests. As with water pollution control, the federal government encourages states to develop their own laws and agencies, and delegates authority to them if the state system is at least as strict as the federal system. - Forests as carbon sinks: California has developed an accounting protocol for forest projects, for use in its cap-and- trade system, 17 Calif. Code of Regulations §§ 95801–96022. Oregon's Forest Resource Trust, created through Oregon Revised Statutes (ORS) §§ 526.695–.775, can subsidize forestation of non-forest and under-stocked private lands in return for the carbon rights. ORS §§ 526.780–.783 allow the state forester to buy and resell carbon offsets from private landowners, acting as a broker. - Hazardous wastes: subtitle C of the Resource Conservation and Recovery Act, 42 USC §§ 6921–6939g. States may have their own versions and delegated authority. - Contamination of soil and groundwater from past use of hazardous substances: Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §§ 9601–9675 - makes the land owner, site operator, and people who generated waste, arranged for its disposal at the site, or transported the waste all potentially liable for cleaning up the site. Some states have similar state liability and clean-up laws, which may give the state power to come in and abate hazards and collect the cost from responsible parties. **Legal Authority**	aws%20rvs2012.pdf] - Kentucky: Mountain Association for Community Economic Development. Undated. "The Kentucky Forest Landowner's Handbook". [http://www.maced.org/foi/landowne rs-handbook.htm]. - Virginia : Virginia Department of Forestry, (2011). "Virginia's Forestry Best Management Practices for Water Quality Technical Manual (5th ed.)". [http://www.dof.virginia.gov/print/wat er/BMP/Technical/BMP-Technical- Guide.pdf]. - Oregon: Oregon Forest Resources Institute. Undated. "Oregon's Forest Protection Laws (revised 2d ed.)". [http://oregonforests.org/sites/defaul t/files/publications/pdf/OR_For_Prot ect_Laws_2011.pdf]. Rob Davis (23 October 2014). "In Oregon, helicopters spray weed killers near people under West Coast's weakest protections". [http://www.oregonlive.com/environ ment/index.ssf/2014/10/in_oregon_ helicopters_spray_we.html].	private lands is much the same as the risk of violation of forest practice rules generally. In fact, the discussion above of risk of violation of forest practice rules drew on studies that looked largely at rules to protect water quality. So there is some risk, especially where rules are complex and compliance is expensive.

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	Environmental Protection Agency (NEPA) For EIA requirements, the land management agency will have responsibility for conducting the assessment. The federal Council on Environmental Quality (CEQ) writes the rules for federal assessments and oversees implementation. The federal Environmental Protection Agency (EPA) incidentally reviews every agency's environmental impact statements. For environmental requirements, the lead federal agency is the EPA. Every state has its own state environmental agency. In many states, the forestry agency is responsible for overseeing voluntary BMPs on private forest lands. The responsibility for dredge and fill regulation (§ 404) is shared between the US Army Corps of Engineers and the EPA. Very few states have been delegated responsibility for the § 404 program, and then only for certain classes of wetlands, but some states run parallel wetland programs without delegation (meaning a project may require separate federal and state approvals). Note that like the Endangered Species Act, the Clean Water, Clean Air, and Resource Conservation and Recovery Acts have citizen suit provisions allowing citizens to go to court to enforce the acts against individual polluters or the government. **Legally required documents or records** <u>Environmental Impact Statement (for NEPA)</u> A federal environmental impact assessment, if there is no categorical exclusion, usually produces an EA and then either a FONSI or a notice of intent to prepare an EIS. (For an obviously significant proposed action, such as a long-term land and resource management plan, the agency may skip the EA and go right to the EIS.) The agency should invite public comments on the scope of the environmental review, prepare a draft EIS, collect public comments on the draft, publish a final EIS, and then a issue a record of decision (ROD) on what action to take. Agencies can "tier" assessments. For example, a timber management plan, which might by itself involve significant impacts, can get by with just an EA if all the impacts were already discussed in the earlier land and resource management plan EIS. The timber plan EA tiers on the		

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	management plan EIS. States should have guidelines for BMPs. They may have different BMPs for different regions, forest types, or stream types. In the case of public lands, the timber contracts may incorporate the BMPs by reference. This sometimes is done in private timber sale contracts, too. For operations in wetlands, the situation can get complex. Here, for example, is a link to guidance on compliance from North Carolina, a state that runs a wetlands regulation program in parallel with the federal program: http://ncforestservice.gov/publications/WQ0107/BMP_chapter06. pdf.		
1.11 Health and safety	**Applicable laws and regulations** National Environmental Policy Act (1969, 1975, 1982). Occupational Health and Safety Act (OSH Act), 29 USC §§ 651– 678 Federal Water Pollution Control Act/Clean Water Act (1972, 1977). OHSA 1910.266, Logging-specific regulations - 29 CFR 29 CFR part 1910 - general safety regulations, applying to all workplaces, covering things like protective equipment, storage of hazardous materials, welding, hand-held power tools, and so forth. 29 CFR 1910.1200 - The regulations for reporting to workers what toxic chemicals are onsite, applicable to all workplaces. These do not apply to pesticides bearing federally approved labels under the federal pesticide law (FIFRA), but safe handling of these pesticides is covered under FIFRA, as discussed below. The FIFRA Agricultural Worker Protection Standard 40 CFR part 170 - applies to all pesticide use in forests as well as farms. It requires worker safety training, access to information, use of protective equipment, emergency preparedness, and so forth. 7 USC § 136i - FIFRA requires people who apply especially toxic ("restricted use") pesticides to be certified or to work under supervision of a certified applicator. The federal government can certify applicators or it can delegate certification authority to a state that submits a satisfactory certification plan.	**Laws** Federal -Occupational Health and Safety Act (OSH Act), 29 USC §§ 651– 678. - 29 CFR § 1910.266, http://www.law.cornell.edu/cfr/text/2 9/1910.266. - 29 CFR part 1910, http://www.law.cornell.edu/cfr/text/2 9/part-1910. - 29 CFR 1910.1200, http://www.law.cornell.edu/cfr/text/2 9/1910.1200. - OHSA 1910.266, Logging-specific regulations - https://www.OHSA.gov/pls/OHSAweb/owadisp.show_document?p_table=STANDARDS&p_id=9862. - FIFRA Agricultural Worker Protection Standard. 40 CFR part 170, http://www.law.cornell.edu/cfr/text/4 0/part-170. - FIFRA requires people who apply especially toxic ("restricted use") pesticides to be certified or to work under supervision of a certified applicator. 7 USC § 136i,	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* Logging is one of the more hazardous occupations in the United States. Health and safety is closely regulated by OHSA, which has specific provisions for logging. OHSA standards: Based on a search of OHSA's online database for inspections in standard industrial class (SIC) 2411 (logging), OHSA conducted 378 logging site inspections in 2013. Some were in response to reported accidents or complaints of violations, but most were planned inspections. A cursory search of the resulting list of inspections makes it appear that

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	State: - The OSH Act allows the federal government to delegate authority to administer workplace safety regulation to a state if a state has a program at least as strict as the federal program. About half the states have delegated authority. - All states have workers compensation programs that pay benefits to employees injured on the job. Most employers are required to pay premiums to cover their employees. The federal government has a program that covers federal government employees. Legal Authority The federal agency concerned with worker safety is the Occupational Safety and Health Administration (OHSA), in the Department of Labor. This OHSA web page provides contact information and links to state occupational safety and health agencies: https://www.OHSA.gov/dcsp/osp/. The federal Environmental Protection Agency administers FIFRA. Where EPA has delegated certification authority to a state, it is usually a state agriculture agency that is in charge of certification. State cooperative extension services may also play a role in training and testing applicators. **Legally required documents or records** OHSA requires employers to keep records of serious job-related injuries. See https://www.OHSA.gov/recordkeeping/. If there are hazardous chemicals other than pesticides at a worksite, there should be Material Safety Data Sheets for each chemical. If there are pesticides, the pesticide label should be available. Official pesticide labels can be several pages long and contain information about the lawful purposes of use (what pests, what crops or trees to protect) and the lawful manner of use. Certified pesticide applicators should have documentation of their certification, and should keep records of their use of restricted- use pesticides.	http://www.law.cornell.edu/uscode/text/7/136i. References OHSA logging website: https://www.OHSA.gov/SLTC/loggin g/ A US Department of Labor page with links to state workers compensation programs: http://www.dol.gov/owcp/dfec/regs/compliance/wc.htm. Index page for information on the FIFRA Agricultural Worker Protection Standard: http://www.epa.gov/pesticides/health/worker.htm US Environmental Protection Agency Worker Protection Standard Compliance Monitoring Program, Accomplishments and Violations Reports: http://www.epa.gov/compliance/monitoring/programs/fifra/wps.html. OHSA's information page on logging: https://www.OHSA.gov/SLTC/loggin g/index.html. OHSA's "eTool" for learning about logging site requirements: https://www.OHSA.gov/SLTC/etools /logging/index.html. OHSA's user's guide and tutorial on logging workplace safety and health requirements: https://www.OHSA.gov/SLTC/etools /logging/userguide.html. OHSA maintains an online database of past inspections, https://www.OHSA.gov/oshstats/ind ex.html, and users can pull up inspection data for a particular establishment, https://www.OHSA.gov/pls/imis/esta	inspectors found violations at more than half the sites. Although enough raw data is available to understand the severity and frequency of violations, the scope of this project did not allow for analysis of the data, and no summary of compliance in the logging industry was found. FIFRA agricultural worker protection: In 2013, EPA and the states inspected 3663 sites. These covered all agricultural users, and it's not clear if they included any forest operations. In those inspections, the inspectors issued warnings to 332 sites, administrative fines to 58 sites, took 40 to court (includes sites that contested the administrative enforcement), and took other action, such as issuing administrative orders to comply, at 267 sites. It is not clear how many of these infractions were minor and how many major, but the warnings almost certainly cover minor infractions, the court cases are probably more serious infractions, and the administrative fines and orders could cover either kind of situation. It's possible that some sites had multiple inspections, and that inspections were designed to focus on sites of types most likely to have infractions. Still, only about one site in ten had a violation serious enough to merit something more than a warning. See EPA's web page on monitoring compliance with

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		blishment.html, or a particular industry class, https://www.OHSA.gov/pls/imis/indu stry.html.	the standard. It is not currently clear from these statistics how many forest sites were inspected, or were found to be in breach of the requirements. This information does show that the compliance monitoring and enforcement of the legal requirements is carried out seriously by the authorities.
1.12 Legal employment	**Applicable laws and regulations** Fair Labor Standards Act: regulates minimum wage, medium age, overtime pay. Other laws administered by Department of Labor Civil Rights Act of 1964: outlawed hiring discrimination based on race, gender, religion, or national origin. More details, actual citations and examples from large timber producing states. In general, you will find both federal and state rule regarding legal employment. Employee tax payments and workers compensation: These laws have been covered above in other categories. The discussion of taxes covered the need to get an employer identification number, to withhold and forward employee tax payments, and to make employer payments to fund social benefit programs. The discussion of health and safety mentioned participation in workers compensation insurance programs. Unemployment Insurance: In the same vein as workers compensation insurance, states require employers to pay into a state unemployment insurance fund. The state programs are set up in compliance with federal law, but are run under state laws by state officials. Minimum age laws: Laws set minimum ages for employment generally, maximum hours for younger employees, and minimum ages for particularly dangerous jobs, including logging. Minimum wage laws: Federal laws set minimum wages, and state and local laws may set minimum wages. If they differ, the higher minimum	**Laws** Federal -Minimum Age Laws: Federal Department of Labor's pages on youth employment, http://www.youthrules.dol.gov/know- the-limits/agriculture/index.htm and http://www.dol.gov/dol/topic/youthla bor/agerequirements.htm#lawregs. - Minimum wage laws: The federal Department of Labor maintains a reference page on federal and state minimum wage laws: http://www.dol.gov/whd/minwage/a merica.htm. - Citizenship or lawful residency: Section 274A of the federal Immigration and Nationality Act, 8 U.S.C. 1324a, http://www.law.cornell.edu/uscode/t ext/8/1324a. . The applicable regulations are in 8 CFR Part 274a, http://www.law.cornell.edu/cfr/text/8/ part-274a/subpart-A. - Discrimination: This federal website lists the key federal statutes: http://www.eeoc.gov/laws/statutes/i ndex.cfm. This companion site lists the implementing regulations and ongoing rulemakings:	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* Most employment in the US is considered "at will," and can be terminated by either party or changed without prior notice. A written contract is not necessary; all employers are still subject to labor laws. Detailed records of accidents, injuries, and corrective measures must be maintained. The Fair Labor Standards Act (FLSA) establishes minimum wage, overtime pay, recordkeeping, and child labor standards affecting full-time and part-time workers in the private sector and in federal, state, and local governments. The US Department of Labor rigorously enforces labor and

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	applies. The general minimum wage may not apply to all jobs — for example, they might not apply to jobs where the employee normally receives a significant income from tips. The laws tend to set weekly hour thresholds of around 40 hours, and the pay for work beyond those hours must be at an increased rate. Citizenship or lawful residency: Section 274A of the federal Immigration and Nationality Act, 8 U.S.C. 1324a, , makes it illegal to employ someone who is not a citizen, lawful permanent resident, or specially permitted immigrant. The applicable regulations are in 8 CFR Part 274a. Discrimination: Federal laws prohibit discrimination based on race, color, religion, sex (including pregnancy), national origin, disability, genetic information, or age (over 40). Most laws apply only to businesses with a minimum number of employees, such as 15 or 20. **Legal Authority** Department of Labor (DOL) The federal Internal Revenue Service and the state revenue departments enforce the tax laws. Unemployment insurance and workers compensation insurance are generally managed by state agencies. The Wage and Hour Division of the Department of Labor oversees minimum wage and age laws at the federal level. The US Citizenship and Immigration Services oversee compliance with the requirement that employers verify citizenship or lawful residency. The federal Equal Employment Opportunity Commission oversees compliance with federal anti-discrimination laws. **Legally required documents or records** I-9 form required to demonstrate eligibility to work in the US W-4 form required to file for mandatory income taxes. As noted above, for taxes and other payments to the government, the employer should have business records and receipts. The employer should obtain a filled-out IRS W-4 form from each employee, so the employer can determine how much salary needs to be withheld to	http://www.eeoc.gov/laws/regulations/index.cfm. State - Unemployment Insurance: The state programs are set up in compliance with federal law, but are run under state laws by state officials. For information on laws, see this federal Department of Labor website: http://workforcesecurity.doleta.gov/unemploy/laws.asp. - An index of state adverse possession laws: http://statelaws.findlaw.com/propert y-and-real-estate-laws/adverse-possession.html - The Bureau of Land Management's web page on subsistence use in Alaska: http://www.blm.gov/ak/st/en/prog/subsistence.html. References Annette Bernhardt et al. (2009). "Broken Laws, Unprotected Workers: Violations of Employment and Labor Laws in America's Cities". National Emplaoyment Law Project. [http://www.nelp.org/BrokenLaws]. Hector Chichoni (2011). "I-9 Compliance Crackdowns". Society for Human Resource Management. [http://www.shrm.org/publications/hrmagazine/editorialcontent/2011/0211/pages/0211chichoni.aspx] See the enforcement options listed at https://www.ice.gov/factsheets/i9- inspection. Jeffrey S Passel, D'Vera Cohn, Jens Manuel Krogstad and Ana Gonzalez-Barrera (2014). "As Growth Stalls, Unauthorized Immigrant Population Becomes More Settled". Pew	worker safety laws usually in cooperation with corresponding state agencies. Worker's compensation liability insurance requirements are regulated at the state level. Most states require worker's comp insurance. Timber harvesters (i.e. loggers) are registered or certified in nearly all states within the hardwood-producing region either through public or private programs (such as the Master Logger Program). Only New York and New Jersey have not yet established any kind of registration or certification program for timber harvesters. The licensing or registration of professional foresters occurs in 14 states within the hardwood-producing region. A compendium of federal laws also governs fair labor, worker safety and health. For example, the Occupational Safety and Health Act (OHSA) protects forest workers by prescribing that specific safety measures be taken and safety equipment used while engaged in commercial forestry activity. The risk of non-compliance for tax laws was discussed above. Compliance is probably the rule, but there will be a small number of people trying to evade the law. Evidence of things like use of outside

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	cover expected taxes. The employer should be giving employees and tax authorities annual W-2 forms reporting wages paid and withheld for the year. People retaining certain independent consultants must give the consultant and government a 1099 form reporting compensation for services. Some states may require work permits or recordkeeping for youths under a given age. For example, Oregon requires employers hiring minors to obtain an annual employment certificate from the state and to keep records of how they verified the youth's age. See this state FAQ page on youth employment: http://www.oregon.gov/boli/TA/pages/t_faq_taminors.aspx. Employers must fill out and retain an I-9 form from the federal government verifying the legal status of each new employee. http://www.uscis.gov/i-9-central.	Research Hispanic Trends Project. [http://www.pewhispanic.org/2014/0 9/03/as-growth-stalls-unauthorized-immigrant-population-becomes- more-settled/#]. Timothy Sutto (2012). "Out In Left Field: CA Needs H2-A Ag-Worker Overhaul". Immigration Compliance Group. [http://www.immigrationcomplianceg roup.com/immigration-compliance-blog/tag/california-agriculture/]. US Citizenship and Immigration Service - E-Verify is an Internet- based system that allows businesses to determine the eligibility of their employees to work in the United States. E-Verify is fast, free and easy to use – and it's the best way employers can ensure a legal workforce: http://www.uscis.gov/e-verify.	bookkeeping or accounting services and external auditors will indicate a lower risk of non- compliance. For wage and hour laws, a 2009 study of urban workers in traditionally low-paying occupations found about a quarter of workers reported experiencing violations of wage and hour laws. Results varied by industry, and in residential construction, the sector in the study most like logging, compliance was better than average with closer to an eighth of the workers reporting violations. Compliance was worse in smaller businesses. This suggests that there may be some risk of noncompliance in logging operations, particularly in smaller operations. For citizenship or lawful residency laws, a 2011 article published on the website of the Society for Human Resource Management flatly stated that "most U.S. employers are not fully compliant." The article then described many of the detailed things that can go wrong leading to technical non- compliance, such as failure to make sure the employee has filled out the I-9 form legibly, failure to make sure the form is signed, failure to get the form filled out on the first day of hire, failure to properly review proof of status documents and make sure the information matches that on the I-9

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
			form, and so forth. The enforcement policy of the US Immigration and Customs Enforcement agency seems to reflect that most violations are technical in nature and do not merit more than a formal notice of non-compliance, advising the employer to make corrections. However, the situation might be more severe in the logging sector. The Pew Research Center estimates that about 10.4 million adults in the US are unauthorized immigrants. Many of these people have come to the US looking for work, and agricultural and low-skill trades offer opportunities. A 2012 post in an immigration blog estimated that half the agricultural workers in the state of California were undocumented. The 'Broken Laws" study above noted that employers willing to hire undocumented workers can offer lower wages with less fear that their employees will make complaints to authorities about labor law compliance. The federal government allows employers to participate in an electronic system to verify that a potential employee is allowed to work. The system is called eVerify. If an employer has taken the effort to qualify to use the system, and uses it regularly, it may be a "best management practice" indicating a lower risk of non-compliance.

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Third parties' rights			
1.13 Customary rights	**Applicable laws and regulations** Customary rights are usually not important in US land tenure systems. By and large, the US states either have recognized long-standing customary rights and incorporated them into the system of formal rights, or they have extinguished them. There are a few limited exceptions. One is the law of adverse possession, described above under land tenure. It is important only for private lands. Another possible source of claims of customary rights is through treaties with Native American tribes, discussed below under indigenous peoples rights. In the state of Alaska, the federal Alaska Native Claims Settlement Act of 1971 settled most native claims to land. However, on some federal lands, Native Americans and rural residents have rights to use the land for subsistence purposes. These rights are recognized in the Alaska National Interest Lands Conservation Act. See 16 USC §§ 3111–3126. Rivers that have historically supported navigation are subject to a public right of way and use, but forests seldom grow in rivers. Historically, though, this aspect of law has been important in allowing rivers to be used to transport logs. In fact, one test of navigability has been whether the river can float a log. Paths that have been used continuously by humans "since time immemorial" may be subject to public rights of way. Again, this is not a widespread issue in forest land ownership. **Legal Authority** It is usually up to the courts to make findings of customary rights. On federal lands in Alaska, the federal land management agencies oversee exercises of subsistence rights. **Legally required documents or records** By the time most adverse possession rights are reduced to paper, they have become formal rights. The only way to discover possible instances of adverse possession is to inspect the property and locate	**Laws** - Alaska National Interest Lands Conservation Act. See 16 USC §§ 3111–3126, http://www.law.cornell.edu/uscode/text/16/chapter-51/subchapter-II **References** An index of state adverse possession laws: http://statelaws.findlaw.com/propert y-and-real-estate-laws/adverse- possession.html The Bureau of Land Management's web page on subsistence use in Alaska: http://www.blm.gov/ak/st/en/prog/subsistence.html.	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* The risk of violating a right held through adverse possession is low. If the right is being held openly and exclusively, the potential violator should be able to discover it through inspection of the land. Overall, customary rights being are not important in forest management, with the possible exception of Native American treaty rights. On balance the risk for this category is assessed as low.

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	its boundaries in a survey. Documents relating to tribal claims include the treaties and court interpretations, discussed below under indigenous people's rights.		
1.14 Free prior and informed consent	**Applicable laws and regulations** N/A. There is no general law requiring the free and prior informed consent of indigenous peoples to actions affecting their lands. If indigenous people own the land or hold some rights to it, or if it is held in trust for them, they will have legal rights to control or affect the use of the land. Otherwise, their consent will not be required by law. There are also general requirements within US contract law that parties enter into contracts willingly, but these are not FPIC requirements in the traditional sense. Legal Authority The Bureau of Indian Affairs oversees lands held in trust by the federal government for Native Americans. Legally required documents or records The federal statutes concerning Native Americans are in Title 25 of the USC and the regulations are in Title 25 of the CFR.	N/A	N/A
1.15 Indigenous peoples rights	**Applicable laws and regulations** The Indian Self Determination and Education Assistance Act of 1975 Varied treaties with American Indian Nations, Tribes, and Bands in the United States. National Historic Preservation Act, including in relation to American Indian sites (1966) Cultural protection acts (for all states) Natural communities conservation acts (for all states) Tribes are considered Sovereign Nations (a rough legal equivalent to a US State) and have their own judicial systems. **Legal Authority** State and federal judicial systems.	This state of Washington website explains Stevens treaty tribal hunting and fishing rights: http://wdfw.wa.gov/hunting/tribal/treaty_history.html The US Forest Service has a tribal relations office: http://www.fs.fed.us/spf/tribalrelatio ns/. The US Institute for Environmental Conflict Resolution, a federal agency promoting consensual settlement of disputes, has a branch devoted to Native American issues, https://www.udall.gov/OurPrograms/Institute/ServiceAreaNativeAmerica n.aspx, and may have information on the frequency or	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* The legal relationship between the federal government and the Native American tribes is multifaceted. Officially, the two deal with each other as sovereigns, and treaties signed between the federal

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	Generally, each federally recognized tribe has its own government. The BIA Division of Forestry and Wild land Fire Management oversees tribal forestry endeavors. http://www.bia.gov/WhoWeAre/BIA/OTS/DFWFM/index.htm. **Legally required documents or records** N/A	number of such conflicts. United Nations General Assembly (2012). "Report of the Special Rapporteur on the rights of indigenous peoples, James Anaya - Addendum - The situation of indigenous peoples in the United States of America". [http://www.ohchr.org/Documents/HRBodies/HRCouncil/RegularSession/Session21/A-HRC-21-47- Add1_en.pdf]	government and the tribes outline tribal rights. Tribal members, though, are US citizens. Sometimes the federal government treats the tribes as coequal to the states. For example, the federal government delegates to some tribes the power to take the lead in enforcing environmental or workplace safety and health laws on tribal lands. Tribes have their own police forces and courts, and in some cases their own forestry or wildlife agencies. And sometimes the federal government treats the tribes as beneficiaries of federal trusts, as is often the case with tribal lands nominally owned by the federal government. The situation becomes a bit different in the state of Alaska, where special laws apply. The Alaska Native Claims Settlement Act extinguished informal claims to land, chartered special corporations to hold native interests in land, and granted 40 million acres of land to those corporations. Alaskan tribal members own shares in these corporations, elect their boards, and enjoy dividends from them. In this way, the native peoples exercise ownership rights. As noted above under customary rights, native people also have rights to subsistence use of certain federal lands. Outside of Alaska, the Bureau

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
			of Indian Affairs oversees reservations set aside for particular tribes. Some of the land on these reservations is allotted to individuals and some to the tribe as a whole. The BIA and tribal government may conduct forest management on these lands. There are about 18 million acres of forested lands on these reservations. The treaties that the federal government negotiated with the tribes in the 19th century sometimes guaranteed tribes rights outside of the lands reserved for them. In particular the so-called “Stevens treaties,” negotiated by Territorial Governor Isaac Stevens with tribes in the Pacific Northwest, typically included language like this: The right of taking fish, at all usual and accustomed grounds and stations, is further secured to said Indians in common with all other citizens of the Territory, and of erecting temporary houses for the purpose of curing them, together with the privileges of hunting, gathering roots and berries, and pasturing their horses on open and unclaimed lands. The tribes, states, and federal government have often been in court arguing over the meaning of this language. It is now well-settled that members of certain Northwest tribes have rights to fish and hunt outside their reservations, subject to tribal

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
			regulation but only subject to state and federal regulation if necessary to preserve a species. The national forests are considered “open and unclaimed lands.” The national parks are not. The Indian Self Determination and Education Assistance Act of 1975 greatly increased indigenous people's control of their own rights. The UN Report of the Special Rapporteur on the rights of indigenous peoples, Addendum on the United States, lists 168 concerns that native peoples expressed to the special rapporteur about their human rights, treaty rights, and other legal rights during a 12-day fact finding mission. Some of these were intra-tribal. Many had nothing to do with natural resources. But some, like the Sioux claims to federal land in the Black Hills, involve forested lands. The Black Hills claim offers one illustration of the nature of these issues. In 1980 the US Supreme Court affirmed a $106 million judgment against the federal government for taking Native American land in the Black Hills of South Dakota. The Sioux Nation rejected the judgment, however. They did not want compensation. They wanted the land. If there were a timber sale on that federal land today, the legal position

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
			would be clear: the land belongs to the federal government and the federal government can sell the trees. There is no violation of law. Nevertheless, talks between the federal government and the tribes on the future of the land are ongoing. There are disagreements and controversies over Native American rights, and there are concerns that the country could do more to meet the letter and spirit of the non-legally binding Declaration of the Rights of Indigenous Peoples. But there does not seem to be a great deal of clearly illegal activity regarding Native Americans and forests.
Trade and transport			
1.16 Classification of species, quantities, qualities	**Applicable laws and regulations** US state laws on the cutting of timber and required payment of taxes. The general laws against defrauding the United States are in 18 U.S. Code Chapter 47, The BLM regulation prohibiting timber theft and fraud: 43 CFR § 5462.2, The federal False Claims Act, 31 USC § 3729–3733 - allows the government to collect treble damages in a civil suit for making false claims on the government, and allows private citizens to prosecute such cases if the government fails to. Every state has laws against fraud. **Legal Authority** Regulated through state laws Criminal cases for fraud will be prosecuted on the federal level by U.S. Attorneys or other US Department of Justice attorneys, and on the state level by District Attorneys or their equivalents (the titles of the state prosecuting officials vary, but District Attorney is the most common title).	**Laws** Federal - The general laws against defrauding the United States: 18 U.S. Code Chapter 47, http://www.law.cornell.edu/uscode/text/18/part-I/chapter-47. - The BLM regulation prohibiting timber theft and fraud: 43 CFR § 5462.2, http://www.law.cornell.edu/cfr/text/43/5462.2. - The federal False Claims Act: 31 USC § 3729–3733, http://www.law.cornell.edu/uscode/text/31/subtitle-III/chapter- 37/subchapter-III, allows the government to collect treble damages in a civil suit for making false claims on the government, and allows private citizens to prosecute such cases if the government fails to.	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* US state laws provide regulations for the cutting of timber and required payment of taxes. These requirements include a report showing the kinds, quantities and value of the harvested timber, and this information is required to be reported to the state/county. The sources of information above paint a disturbing picture, but for the

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	Civil cases can be brought be the party claiming the loss, or in the case of federal False Claims Act cases, by any citizen. **Legally required documents or records** State and counties require documents, such as load tickets or reports providing this information. Generally, in fraud cases the key documents will be any contracts covering the sale of the timber, and any records about the volume, species, and quality of the timber sold.	**References** Government Accountability Project. Undated." Field Guide to Timber Theft: Understanding Timber Sales, the Contract, and the Law". [http://www.bark-out.org/sites/default/files/bark-docs/Field_Guide_toTimber_Theft.p df]. Jeffrey Kent (2012). "Guest Viewpoint: The timber racket: A culture of corruption and political payoffs harms the land and ourselves". Eugene, Oregon, Register-Guard Newspaper. Reprinted at [http://olympicforest.org/wp-content/uploads/2014/03/227.pdf]. Public Employees for Environmental Responsibility (1996). "Unindicted Co-conspirator: Timber Theft and the US Forest Service". PEER White Paper. [http://www.peer.org/assets/docs/whitepapers/1996_unindicted_co-conspirator.pdf]. Public Employees for Environmental Responsibility (1997). "Bureau of Mismanagement: Timber Sale Maladministration". [http://www.peer.org/assets/docs/whitepapers/1996_unindicted_co-conspirator.pdf]. Sourht Carolina Forestry Commission(2010). "Don't Be A Victim Of Timber Transaction Crime Information For Forest Landowners in South Carolina". [http://www.state.sc.us/forest/timber val.htm]. Massachusetts Woodland Steward (2000). "Under-Your-Nose Timber Scams".	federal lands, the sources discuss fraud in the 1980s and '90s. The lack of more recent reports and the apparent closure of the Government Accountability Project's Forest Program give hope that the problems identified have been addressed. On private lands, the problem is probably ongoing, especially for smaller and less sophisticated landowners. It would seem prudent for buyers and sellers to take steps to prevent and detect fraud, such as having a third party verify timber cruises and scaling, and investigating the reputation of the firms involved in timber transactions.

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
		[http://daviesand.com/Services/Timber_Sales/Timber_Scams/index.ht ml].	
1.17 Trade and transport	**Applicable laws and regulations** The US does not impose any form of export tax on exported goods, including US hardwood exports. The only significant export prohibition for wood products affects unprocessed logs harvested from state and federal lands west of the 100th meridian. Trade and transport laws only applying to international trade are discussed below under "Customs regulations." The Lacey Act, 16 USC § 3372, , makes it a federal offence to (1) import, export, transport, sell, receive, acquire, or purchase any plant taken in violation of tribal or federal law; (2) to import, export, transport, sell, receive, acquire, or purchase in interstate or foreign commerce any plant— (i) taken, possessed, transported, or sold in violation of any law or regulation of any State, or any foreign law, that protects plants or that regulates— (I) the theft of plants; (II) the taking of plants from a park, forest reserve, or other officially protected area; (III) the taking of plants from an officially designated area; or (IV) the taking of plants without, or contrary to, required authorization; (ii) taken, possessed, transported, or sold without the payment of appropriate royalties, taxes, or stumpage fees required for the plant by any law or regulation of any State or any foreign law; or (iii) taken, possessed, transported, or sold in violation of any limitation under any law or regulation of any State, or under any foreign law, governing the export or transhipment of plants. The states have varying requirements concerning timber transport, including rules aimed at discouraging timber theft or mislabelling in transport. Every state also has laws governing vehicle registration and safe operation, which may include special laws for logging and log transport vehicles. For example, there may be limits on vehicle length or requirements about securing loads that apply specifically to log trucks. Oregon Revised Statutes (ORS) § 164.813 requires written permission from the landowner to transport larger volumes of certain special forest	**Laws** <u>Federal</u> - The Lacey Act, 16 USC § 3372, http://www.law.cornell.edu/uscode/text/16/3372 <u>State</u> - Oregon: Oregon Revised Statutes (ORS) § 164.813, ORS § 164.825 - https://www.oregonlegislature.gov/bills_laws/lawsstatutes/2013ors164.h tml. ORS Chapter 532 - https://www.oregonlegislature.gov/bills_laws/lawsstatutes/2013ors532.h tml. - Vermont: 13 Vermont Statutes Annotated, Chapter 77 § 3609, http://www.leg.state.vt.us/statutes/fullchapter.cfm?Title=13&Chapter=07 7. - Virginia: Code of Virginia §§ Title 59.1, Chapter 8. https://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+TOC590 10000008000000000000	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* International and interstate commerce is regulated through requirements within the Lacey Act. US state laws provide regulations for transport such as wood load tickets. "The Lacey Act now makes it unlawful to import, export, transport, sell, receive, acquire, or purchase in interstate or foreign commerce any plant, with some limited exceptions, taken in violation of the laws of a U.S. State or any foreign law that protects plants." There are other federal laws regulating interstate commerce. No indication was found that timber transport crimes are a serious concern of land owners or government. On balance, this category has been assessed as low risk.

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	products including firewood. ORS § 164.825 makes it unlawful to cut or transport more than five coniferous trees without written permission from the landowner. The laws specify what information the written permission must contain. ORS Chapter 532 deals with branding of forest products, in other words, the placing of marks identifying the source or owner of the products. Branding of forest products being shipped by road, rail, or water is mandatory in the western part of the state and voluntary in the eastern part. (The most commercially valuable forests are in the western part of the state.) The state maintains a registry of brands. Vermont Statutes Annotated, Chapter 77 § 3609, - Vermont requires a transporter to have a bill of sale or other written evidence of ownership. Vermont does not register brands, but does have penalties for defacing or stealing marked logs. 13 Code of Virginia §§ Title 59.1, Chapter 8 - Virginia does not appear to require permits or permission to transport timber, but Virginia has a voluntary branding system intended for logs moved by water. Timber owners register their brands with the clerk of the state circuit court in their county. **Legal Authority** Regulated through Lacey Act and via state laws. State transport laws are probably going to be enforced largely by state and local police, in cooperation with forestry authorities. In states that have timber branding programs, the responsible offices will vary. In Virginia, for example, the clerks of the circuit courts keep the branding records. In Oregon, the Department of Forestry approves brands and keeps the records. Violations of the federal Lacey Act can be policed by state and local officials, and also by the enforcement arms of the federal land management agencies, wildlife agencies, or the Federal Bureau of Investigation. Civil and criminal prosecutions of the Act will most often be brought by the prosecutors in the federal Department of Justice. **Legally required documents or records** State and counties require documents, such as load tickets or reports providing this information.		

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	Documentation will vary by state. In Oregon and Vermont, for example, there will be written permission statements or bills of sale from landowners.		
1.18 Offshore trading and transfer pricing	**Applicable laws and regulations** Transfer pricing is of concern to tax officials, as it lets companies shift profits to other jurisdictions. Because federal income tax rates are higher than state rates, the greatest concern is international transactions, but a company could also seek to reduce its state tax burden by shifting apparent profits within the US, from a high-tax state to a low- or no-tax state, or its local tax burden by shifting apparent profits to a low-tax local jurisdiction. The basic federal statutory provision dealing with transfer pricing is 26 U.S. Code § 482. However, several other tax law provisions may be relevant. The regulations implementing § 482 are extensive. The outline of the regulations is presented in 26 CFR § 1.482-0. **Legal Authority** The federal Internal Revenue Service implements and enforces US tax laws. State and local revenue agencies implement state and local laws. **Legally required documents or records** Tax returns and financial records will be the primary evidence of profits made and taxes paid. Independent audits of financial records or tax returns may shed light on possible transfer payment issues. Through the “APA” Program, a company in doubt about the transfer pricing laws can seek formal guidance from the IRS before the company files its taxes. In that case, there should be a written agreement signed with the IRS explaining how the laws apply to the company’s transactions.	**Laws** - 26 U.S. Code § 482, http://www.law.cornell.edu/uscode/text/26/482. - Several other tax law provisions may be relevant. See the list at http://www.ustransferpricing.com/la ws.html. - The regulations implementing § 482 are extensive. The outline of the regulations is presented in 26 CFR § 1.482-0, http://www.law.cornell.edu/cfr/text/2 6/1.482-0. **References** Internal Revenue Service IRS (2014). "IRS Transfer Pricing Audit Roadmap". [http://www.irs.gov/pub/irs-utl/FinalTrfPrcRoadMap.pdf]. KPMG (2013). "Global Transfer Pricing Review - TAX - United States". [http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications /global-transfer-pricing- review/Documents/united-states- v2.pdf]. KPMG (2011). "United States: State tax implications of transfer pricing issues". [http://www.us.kpmg.com/microsite/taxnewsflash/tp/2011/TNFTP11_49 US.html]. Web site of state transfer pricing links: http://www.transferpricing.com/usst ate.htm Internal Revenue Service IRS (1999). "Report on the Application and Administration of	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* The international tax standard, developed by OECD and supported by the UN and the G20, provides for full exchange of information on request in all tax matters without regard to a domestic tax interest requirement or bank secrecy for tax purposes. Currently all 30 OECD member countries, including USA have endorsed and agreed to implement the international tax standard. Furthermore, all offshore financial centers accept the standard. USA has exchange of information relationships with 84 jurisdictions through 61 DTCs and 31 TIEAs. There is extensive regulation through the Internal Revenue Service (IRS) via the Internal Revenue code. The risk of transfer pricing is limited

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
		Section 482". [http://www.irs.gov/pub/irs-pdf/p3218.pdf]. Kelly Phillis Erb. (2012). "IRS brings “A-Team” to crush Transfer Pricing Abuse". Forbes. [http://www.forbes.com/sites/kellyph illipserb/2012/03/27/irs-brings-a- team-to-crush-transfer-pricing- abuse/]. OECD United States - OECD Anti- Bribery Convention. This page contains all information relating to implementation of the OECD Anti-Bribery Convention in the United States: http://www.oecd.org/daf/anti-bribery/unitedstates-oecdanti-briberyconvention.htm. International Transfer Pricing Journal: http://www.ibfd.org/IBFD-Products/International-Transfer- Pricing-Journal-All-Articles (find 'United States') Exchange of Tax Information Portal - United States: http://www.eoi-tax.org/jurisdictions/US#agreements	to multi- jurisdiction firms. This will eliminate from concern government land owners, small non-industrial land owners, and most small to medium enterprises involved in logging and processing. Only the larger firms are likely to have international or multi-state arms that would support the kinds of transactions needed for transfer pricing. In a 1999 report to Congress, the IRS estimated the potential federal tax revenue gap from transfer pricing to be $2.8 billion per year, of which it was detecting 61% through audits. IRS. 1999. Report on the Application and Administration of Section 482. Since then, the IRS has had some high- profile settlements with large multi-national corporations and has stepped up its enforcement efforts. Kelly Phillis Erb. 2012. According to that article, most of the abuse is thought to be in the high-tech and pharmaceutical sectors. The risk of illegal transfer pricing is low in most US forest operations, but when dealing with large companies with extensive international operations, some evidence of compliance, such as the report of a government or third-party auditor, would be reassuring.
1.19 Custom	**Applicable laws and regulations** Lacey Act Customs regulations	**Laws** - The Lacey Act, 16 USC § 3372, http://www.law.cornell.edu/uscode/t	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases*

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
regulations	The Lacey Act, discussed above, prohibits the export of plants (including material from plants) that have been illegally harvested, transported, or sold. 16 USC §§ 620-620h - Federal government has a prohibition against export of unprocessed logs harvested from federal and non-federal public lands in the western US. It also prohibits "substitution," meaning companies can't buy public lands timber and ship unprocessed logs from their own lands overseas. The regulations implementing these bans are in 36 CFR part 223, subparts D and F. These regulations include requirements for marking of all logs reserved for domestic processing. They also include requirements for reporting the acquisition and processing of logs. The federal Bureau of Industry and Security, in the Department of Commerce, requires a license for the export of unprocessed western red cedar (Thuja plicata), because the wood is considered to be in short supply. 15 CFR § 754.4. **Legal Authority** US Customs and Border Protection, in the Department of Homeland Security, has primary responsibility for implementing and enforcing export laws. It coordinates with its sister investigative agency, Immigration and Customs Enforcement. Offices in the federal land management agencies and the Commerce Department also play a supporting role. The US Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) issues phytosanitation certificates for unprocessed plant products. The US does not require these for exports, but some countries require them to allow import. In the process, APHIS may become aware of unlawful exports of unprocessed logs. **Legally required documents or records** Customs declaration forms. There should be paperwork on the acquisition and processing of logs from federal land. The logs themselves, upon inspection, should bear "highway yellow" colored marks.	ext/16/3372 - 16 USC §§ 620-620h, http://www.law.cornell.edu/uscode/text/16/chapter-4. - The regulations implementing these bans are in 36 CFR part 223, subparts D, http://www.law.cornell.edu/cfr/text/3 6/part-223/subpart-D, and F, http://www.law.cornell.edu/cfr/text/3 6/part-223/subpart-F. - 15 CFR § 754.4, http://www.law.cornell.edu/cfr/text/1 5/754.4. **References** Customs & Border Patrol Import Guidelines (http://www.cbp.gov/linkhandler/cgov/newsroom/publications/trade/iius.ctt/iius.pdf)	*where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* No reports of rates of compliance with the export bans or controls were found. The emphasis with the Lacey Act has been on timber imports. No discussion of its effects on exports was found. As long timber theft and trespass occur, there will be a risk of violating the Lacey Act with exports. Some of the exports are illegal. But there is no reliable estimate of the risk. On balance, the risk for this category has been assessed as low.

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	There should be written licenses if western red cedar is exported.		
1.20 CITES	**Applicable laws and regulations** Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (Washington DC, 1973). Amendment to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Art.XI) (Bonn, Germany, 23 Jun 1979). The federal statute implementing CITES trade controls is Endangered Species Act § 8A, 16 U.S.C. 1537a. The implementing regulations are in 50 CFR part 23. **Legal Authority** US Fish & Wildlife Service, Customs & Border Patrol, other federal enforcement agencies. The official implementing agencies for CITES in the US are the Division of Management Authority and the Division of Scientific Authority within the International Affairs Program of the US Fish and Wildlife Service. US Customs and Border Protection is generally charged with enforcing import and export laws. **Legally required documents or records** CITES permit	**Laws** - The federal statute implementing CITES trade controls is Endangered Species Act § 8A, 16 U.S.C. 1537a, http://www.law.cornell.edu/uscode/text/16/1537a. - The implementing regulations are in 50 CFR part 23, http://www.law.cornell.edu/cfr/text/5 0/part-23.	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* No North American tree with commercial timber value is listed in the CITES Appendices. The risk of US timber exports violating CITES is therefore low.
Diligence/due care procedures			
1.21 Legislation requiring due diligence/ due care procedures	**Applicable laws and regulations** The Lacey Act amendment 2008, (the Food, Conservation, and Energy Act of 2008 expanded its protection to a broader range of plants and plant products (Section 8204. Prevention of Illegal Logging Practices). The Lacey Act now makes it unlawful to import, export, transport, sell, receive, acquire, or purchase in interstate or foreign commerce any plant, with some limited exceptions, taken in violation of the laws of a U.S. State or any foreign law that protects plants. **Legal Authority**	**Laws** Federal - Amendments to the Lacey Act from H.R.2419, Sec. 8204 - http://www.aphis.usda.gov/plant_health/lacey_act/downloads/backgrou nd--redlinedLaceyamndmnt-- forests--may08.pdf - Federal Register: Interim Final Rule Common Food Crop and Common Cultivar Definitions. https://www.google.com.au/url?sa=t	**Low risk** *Low risk Threshold 1 applies: Identified laws are upheld. Cases where law/regulations are violated are efficiently followed up via preventive actions taken by the authorities and/or by the relevant entities.* DECLARATION - Compliance with the declaration requirement is necessary to successfully import a

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
	United States Department of Agriculture Animal and Plant Health Inspection Service (APHIS) **Legally required documents or records** PPQ FORM 505: Plant and Plant Product Declaration Form (PDF; 319 Kb) PPQ FORM 505B: Plant and Plant Product Declaration Supplemental Form (PDF; 274 Kb) Schedule of Enforcement of the Plant and Plant Product Declaration (PDF; 83 Kb) Lacey Act Sample Form (PDF; 348 Kb)	&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0CCUQFjAB&url=http%3A%2F%2Fwww.aphis.usda.gov%2Fplant_health%2Flacey_act%2Fdownloads%2FAPHIS- 2009-0018.pdf&ei=Wfq0VJHCHoSW8QWn_IHYBw&usg=AFQjCNE2QbyiWnYN1QGi6dg8YuWlD77Ebg&sig2=IkAvWwxXUZaGaHUCXvGmAQ&bvm=bv.83339334,d.dGc - Federal Register: Advance Notice of Proposed Rulemaking, June 30, 2011 - http://www.aphis.usda.gov/plant_health/lacey_act/downloads/APHIS- 2010-0129-0001.pdf - Federal Register: Implementation of Revised Lacey Act Provisions, February 28, 2011 (PDF: 146KB) - http://www.aphis.usda.gov/plant_health/lacey_act/downloads/APHIS- 2008-0119-0259.pdf - Federal Register: Common Food Crops and Common Cultivars Definitions, August 4, 2010 (PDF; 55 Kb) - http://www.aphis.usda.gov/plant_health/lacey_act/downloads/Proposed CC-Definition.pdf - Federal Register: Implementation of Revised Lacey Act Provisions, September 2, 2009 (PDF; 60 Kb) - http://www.aphis.usda.gov/plant_health/lacey_act/downloads/2008- 0119.pdf - Federal Register: Implementation of Revised Lacey Act Provisions, February 3, 2009 (PDF; 61 Kb) - http://www.aphis.usda.gov/plant_health/lacey_act/downloads/FederalR egister02-	timber product. It is currently unknown how well are people actually completing the declarations DUE CARE - No comprehensive data on compliance levels available. High profile Gibson Guitar Case - Even before the case was settled, the 2009 investigations of Gibson had a significant impact on sourcing practices within the music industry. Instrument makers essentially stopped buying Malagasy rosewood and ebony, which had been illegal to harvest in Madagascar since 2006, as a result of these visible enforcement actions. In addition, the spotlight the case placed on the illegal Malagasy rosewood and ebony trade also led to crackdowns in China on Chinese importers of this material. The Amendments increasingly are leading companies to focus on monitoring their own supply chains and to adopt compliance programs to help ensure that their plant products come from legal sources. Given the high profile nature of the Gibson Guitar Case, as well as the trade declaration requirement being mandatory, it is likely that there is a good level of knowledge of the Lacey Act requirements. Given the requirements are not proactive in the same way as those in Europe, it is also likely that levels of compliance

Indicator	Applicable laws and regulations, legal Authority, & legally required documents or records	Sources of Information	Risk designation and determination
		03-2009.pdf - Federal Register: Implementation of Revised Lacey Act Provisions, October 8, 2008 (PDF; 59 Kb) - http://www.aphis.usda.gov/plant_health/lacey_act/downloads/FederalRegisterNoticeLaceyActImplementationPlan.pdf References - Environmental Investigation Agency EIA (2012). "Lacey Act has teeth: US gets serious about illegal logging - EIA". [http://eia- global.org/blog/lacey-act-has-teeth-us-gets-serious-about-illegal- logging]. - Marcus Asner and Katherine Ghilain (2014). "The 2008 Lacey Act Amendments and the Fight Against Illegal Logging" Arnold & Porter LLP, Bloomberg Law - http://www.bna.com/the-2008-lacey- act-amendments-and-the-fight- against-illegal-logging/ - Pervaze A. Sheikh (2012). "The Lacey Act: Compliance Issues Related to Importing Plants and Plant Products". Congressional Research Service. http://www.law.umaryland.edu/marshall/crsreports/crsdocuments/R42119_07242012.pdf	are reasonably high for timber produced in the USA. On balance, the risk for this category has been assessed as low.

Category 1 Control measures

Indicator	Control measures (M – mandatory / R – recommended)
1.1 Land tenure and management rights	Not Applicable
1.2 Concession licenses	
1.3 Management and harvesting planning	
1.4 Harvesting permits	
1.5 Payment of royalties and harvesting fees	
1.6 Value added taxes and other sales taxes	
1.7 Income and profit taxes	
1.8 Timber harvesting regulations	

Indicator	Control measures (M – mandatory / R – recommended)
1.9 Protected sites and species	
1.10 Environmental requirements	
1.11 Health and safety	
1.12 Legal employment	
1.13 Customary rights	
1.14 Free prior and informed consent	
1.15 Indigenous peoples rights	
1.16 Classification of species, quantities, qualities	
1.17 Trade and transport	
1.18 Offshore trading and transfer pricing	
1.19 Custom regulations	
1.20 CITES	
1.21 Legislation requiring due diligence/due care procedures	

Controlled wood category 2: Wood harvested in violation of traditional and human rights

NOTE 1: *The US NRA covers the conterminous United States, which excludes Alaska and Hawaii and the US territories (i.e. portions of the United States that are not within the limits of any state and have not been admitted as states), for all types of forests.*

NOTE 2: *Annex D includes the same assessment information as below, but in a non-table format and additionally includes some supplementary context and guidance information, which is intended to help readers better understand the rationale behind the risk designation decisions. For any category with an associated annex, the content found in the main body of the risk assessment, not the annex, is definitive.*

Overview

A draft Centralized National Risk Assessment (CNRA) for the entire United States was completed for Category 2 by a consultant on behalf of FSC International. A public consultation was completed on the CNRA in 2015, but it was not approved, nor formally published. FSC US staff subsequently completed an evaluation of the draft CNRA content and additional assessments (including consultation with an expert on Indicator 2.3), which were presented to the working group for their review. The content from the draft CNRA has been combined with the additional assessments completed, and they are presented together below.

Risk assessment summary

Indicator	Sources of Information	Functional scale	Risk designation and determination
2.1. The forest sector is not associated with violent armed conflict, including that which threatens national or regional security and/or linked to military control.	See detailed analysis below.	Entire Assessment Area	**Low risk** All low risk thresholds (1, 2, 3, 4 and 5) are met and there is no other evidence of specified risk. None of the specified risk thresholds are met.
2.2. Labour rights are respected including rights as specified in ILO Fundamental Principles and Rights at work.	See detailed analysis below.	Entire Assessment Area	**Low risk** Low risk thresholds 10 and 12 apply. None of the specified risk thresholds are met.
2.3. The rights of Indigenous and Traditional Peoples are upheld.	See detailed analysis below.	Entire Assessment Area	**Low risk** Low risk thresholds 17, 19 and 21 apply. None of the specified risk thresholds are met.

Context

The following summary is intended to help contextualize information from other sources associated with each of the specific risk assessment indicators. Internet searches were performed to look for data on level of corruption, governance, lawlessness, fragility of the State, freedom of journalism, freedom of speech, peace, human rights, armed or violent conflicts by or in the country, etc.

The United States scores well or very well on global indices and indicators related to: governance, regulatory enforcement, failed and fragile states, corruption, freedom in the world, freedom of the press and freedom of the net [1,4,9,12,13,14,16]. On one index of the state of peace, the United States scores 'medium' due to more recent violence (e.g., the Boston Marathon bombings), a high degree of militarization and a high incarceration rate [15]. The United States is not included on lists of countries with: fragile situations and impunity concerns (specific to journalism) [2,3]. 'Watchdog' organizations do not identify concerns with illegal logging or timber conflicts in the US [6,7,8,10], but are mixed on concerns about human rights. Some watchdog groups do not identify any concerns with human rights [6,7], while others identify concerns with criminal justice, immigration, national security, drug policy, child labor on US farms, discrimination against workers with family responsibilities, and excessive force in domestic law enforcement [5,11].

Category 2 Risk assessment

Indicator	Sources of Information	Risk assessment	Functional scale	Risk designation and determination
2.1	17-24	There is no UN Security Council ban on timber exports from the United States [17,18,19]. The United States is not covered by any other international ban on timber export [17,18,19]. There are no individuals or entities involved in the forest sector in The United States that are facing UN sanctions [17,18,19]. There is no evidence of conflict timber concerns within the United States [18,20,21,22,23,24].	Entire assessment area	Low risk The following low risk thresholds apply: Threshold 1 (The area under assessment is not a source of conflict timber), Threshold 2 (The country is not covered by a UN security ban on exporting timber), Threshold 3 (The country is not covered by any other international ban on timber export), Threshold 4 (Operators in the area under assessment are not involved in conflict timber supply/trade), and Threshold 5 (Other available evidence

Indicator	Sources of Information	Risk assessment	Functional scale	Risk designation and determination
				does not challenge a 'low risk' designation)
2.2	25-70	*General Social Rights* The Declaration on Fundamental Principles and Rights at Work reads as follows [25]: "All ILO Members, even if they have not ratified the Conventions in question, have an obligation arising from the very fact of membership in the Organization to respect, to promote and to realize, in good faith and in accordance with the Constitution, the principles concerning the fundamental rights which are the subject of those Conventions, namely: a) freedom of association and the effective recognition of the right to collective bargaining; b) the elimination of all forms of forced or compulsory labour; c) the effective abolition of child labour; and d) the elimination of discrimination in respect of employment and occupation." This indicator specifically addresses whether the country being assessed upholds the ILO Fundamental Principles and Rights at Work – which may be demonstrated by ratification of the 8 relevant ILO Core conventions, or using other evidence. Therefore, the fact that the United States has not ratified all 8 of the Conventions does not automatically infer that the country is not in compliance with the indicator. The United States has extensive legislation protecting the social rights of individuals and workers. The following pieces of the US legal framework uphold the ILO Fundamental Principles and Rights of Work in the United States: • The First Amendment to the United States Constitution, adopted in 1791, provides that "Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press, or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances". In practice, this means that the Constitution protects employees' rights of association, thereby prohibiting their discharge for union activity. • Freedom of association in the US is protected by the 1935 National Labor Relations Act (NLRA; 29 USC §151-169), with primary responsibility for enforcement by the National Labor Relations Board (NLRB). Additionally, the US Code (29 USC §171(a)) states that, "it is the policy of the United States that, "sound and stable industrial peace and the advancement of the general welfare, health, and safety of the Nation and of the best interests of employers and employees	Entire assessment area	Low risk The following low risk thresholds apply: Threshold 10 (Applicable legislation for the area under assessment covers all ILO Fundamental Principles and Rights at Work, AND the risk assessment for the relevant indicators of Category 1 confirms enforcement of applicable legislation ('low risk')) and Threshold 12 (Other available evidence do not challenge a 'low risk' designation)

Indicator	Sources of Information	Risk assessment	Functional scale	Risk designation and determination
		can most satisfactorily be secured by the settlement of issues between employers and employees through the processes of conference and collective bargaining between employers and the representatives of their employees" • Forced and compulsory labor is prohibited by the 13th Amendment to the United States Constitution, and is codified in 18 USC § 1589. The amendment specifically outlaws slavery and involuntary servitude, except as punishment for a person duly convicted of a crime • The Trafficking Victims Protection Act (most recently reauthorized in 2013) authorizes measures to combat human trafficking. Additionally, federal legislation requires every employer to pay each employee a minimum wage (29 U.S.C.§ 206) and overtime pay (29 U.S.C.§ 207). • The Fair Labor Standards Act of 1938 (29 USC § 201-262) restricts the employment of children under the age of 16 with the exception of children working on farms owned by their parents, and forbids the employment of people younger than 18 in jobs deemed too dangerous (including logging). • Discrimination with respect to employment is prohibited in the United States by Section VII of the Civil Rights Act of 1964 (Public Law 88-352), and is overseen by the U.S. Equal Employment Opportunity Commission. There are several additional and complementary pieces of legislation, such as: the Equal Pay Act of 1963 (EPA), which protects men and women who perform substantially equal work in the same establishment from sex-based wage discrimination; the Age Discrimination in Employment Act of 1967 (ADEA), which protects individuals who are 40 years of age or older; Title I and Title V of the Americans with Disabilities Act of 1990, as amended (ADA), which prohibit employment discrimination against qualified individuals with disabilities in the private sector, and in state and local governments; Sections 501 and 505 of the Rehabilitation Act of 1973, which prohibit discrimination against qualified individuals with disabilities who work in the federal government; All indicators In the Category 1 (legality) assessment were designated as 'low risk' at a national scale, indicating that the relevant legislation is enforced. *Freedom of Association & Collective Bargaining* Even though the US has not ratified either of the associated Core Conventions, it has been a member of the ILO since 1980 (and previous to that was a member from 1934 to 1977). As a member, the US has obligations under the ILO Constitution, including a commitment under the Declaration on Fundamental Principles and Rights at Work. [26] Additionally, the US is subject to annual ILO review and reporting processes and also complaint processes (through the Committee on Freedom of Association, CFA). A		

Indicator	Sources of Information	Risk assessment	Functional scale	Risk designation and determination
		report by the International Organisation of Employers (IOE) notes that "Most CFA case examinations of U.S. law have resulted in conclusions and recommendations that the law or practice subject of the complaint is consistent with the principles of freedom of association" and that "there has never been a wholesale criticism of the NLRA or NLRB by the CFA or the ILO" [27]. There are 42 closed complaints cases listed in the US member profile [26]. All of this provides strong evidence that the United States respects, promotes and realizes, in good faith, workers' rights to "freedom of association and the effective recognition of the right to collective bargaining." Some sources question whether the United States is truly respecting workers' rights to freedom of association and the effective recognition of the right to collective bargaining. Concerns include the exemption of a small number of worker categories (such as agricultural workers) from the NLRA [28,29,30,31], the ability of employers to hire replacement workers for those on strike [31], the perceived ability of employers to pressure employees against organizing in the workplace [31], the predominance of enterprise-level bargaining [33], the perceived lack of fair election processes [30], and the perceived lack of adequate enforcement [31]. • While the NLRA is an important piece of legislation that protects workers' rights, it is not the only source of protection for workers in the US. The Member profile for the United States lists 80 separate pieces of national legislation associated with 'Freedom of association, collective bargaining and industrial relations' [26]. As noted above, the constitution itself protects the rights of all workers to associate and the US Code establishes in federal policy the respect of the country for collective bargaining – both of these cover all workers, regardless of whether they are covered by the NLRA. Additionally, in the 2003-2005 US Annual Reports to the ILO, the Government writes, "No Government's authorization is required to establish a workers' organization, or to conclude collective agreements. The exercise of freedom of association and the right to collective bargaining is recognized at enterprise, sector/industry, national (and international) levels for the following categories of workers: (i) medical professionals; (ii) teachers; (iii) agricultural workers; (iv) workers engaged in domestic work; (v) workers in export processing zones (EPZs) or enterprises/industries with EPZs status; (vi) migrant workers; (vii) workers of all ages; and (viii) workers in the informal economy." [28] • US labor relations are different than those in other parts of the world. A predominance of enterprise-level bargaining reflects these differences, but does not indicate that collective bargaining is not respected, just that it is done differently. Employers have rights in the US that are different from other countries, including being allowed to actively communicate with employees during collective bargaining, but again this does not indicate that collective bargaining is not respected. While employers are allowed to hire replacement workers so that they may		

Indicator	Sources of Information	Risk assessment	Functional scale	Risk designation and determination
		remain in business during strikes, they are required by law to bargain in good faith to resolve those strikes. [34] • Concerns about election processes do not take into account (and were published prior to) recent changes in union election procedures that are universally considered to favor unions [35,36]. It also fails to consider that, according to election statistics, unions are successful in approximately 70% of the elections that are held [37]. • There is a very robust system for enforcement of these rights. On the federal level, they are guaranteed by the NLRA, which protects the rights of employees and employers, "to encourage collective bargaining, and to curtail certain private sector labor and management practices, which can harm the general welfare of workers, businesses and the U.S. economy." [38] The Act also established the National Labor Relations Board (NLRB), which has primary responsibility for enforcement of the NLRA. Each year, approximately 20,000 charges are filed with the NLRB alleging unfair labor practices, and each one is investigated by regional field examiners and attorneys. More than half of these are withdrawn or dismissed, and of those that receive full investigation, a little over 1,000 each year result in formal complaints detailing the alleged violations. After a decision by a judge, the remaining cases are litigated and reviewed by the NLRB itself each year [39]. The US Annual Reports to the ILO summarize the millions of dollars that have been repaid to workers as a result of these enforcement actions [28]. This represents a heavily utilized and strong enforcement system. In its 2017 report, the International Trade Union confederation (ITUC) categorizes the US as a Status 4 (Systemic violations of rights) in its annual index [32]. The categorization is based upon surveys of national unions and review of legislation and then comparison of these results with 97 indicators derived from the ILO Conventions and jurisprudence that represent violations of workers' rights. The primary concerns highlighted in the 2017 report were lack of consultation with unions regarding labor law and policy, and limits on certain types of strike actions. • This index is based on the opinion of the unions, not metrics, and the views of employees and employers are not included. • Other global indices and indicators that address labor rights recognize the US as being above the median [69,70] • The status categorization within this index is built upon indicators that are drawn from the ILO Conventions, but as noted by ILO itself, ratification of and conformance with the Conventions is not required for respect of the Fundamental Principles and Rights [25], and it is the Fundamental Principles and Rights that are the focus of Indicator 2.2 for this risk assessment. Therefore, lack of		

Indicator	Sources of Information	Risk assessment	Functional scale	Risk designation and determination
		complete alignment with the Conventions and a lower status in this index does not *per se* indicate that the US does not respect the basic rights of association and collective bargaining. • The issues highlighted in the report (e.g., consultation with unions regarding labor law and policy, and limits on certain types of strike actions) provide no information regarding whether the US respects the basic rights of association and collective bargaining. • Therefore, it is still possible for the US to respect the Fundamental Principles and Rights, while being categorized with a lower status in this index. It is possible to conclude from the information presented that while the US has not ratified and may not conform with all specifics in the associated Core Conventions, it respects the fundamental rights of freedom of association and the effective recognition of the right to collective bargaining. <u>*Compulsory or Forced Labor*</u> The US ratified Core Convention 105 (Abolition of Forced Labour Convention) in 1991 and the ILO web site indicates the status as 'In Force' [26]. The US has not yet ratified Convention 29 (Forced Labour Convention), but as noted above has legislation that addresses fundamental rights associated with compulsory or forced labor. There are also numerous additional policies, reports, action plans and executive orders that provide evidence of the country's efforts to ensure these rights, particularly as they relate to human trafficking [28]. The United States is consistently categorized as Tier 1 (the highest tier reflecting a country's efforts to address human trafficking problems) in the U.S. Department of State's Trafficking in Persons annual report [40]. The Global Slavery Index's 2016 assessment identifies the United States as a country with one of the lowest estimated prevalence of modern slavery and as a country with one of the strongest responses to modern slavery [41]. Some sources identify the situation of migrant workers in the agricultural sector as an area of concern [42,43,44]. The agricultural sector is important for this assessment, as it includes both farmworkers and forest workers. • One of the sources is an ILO report on forced labor [42]. The report is 57 pages in length and the United States is mentioned in a single paragraph within a section on the Agricultural, forestry and fishing sector. The US is identified as an example of a country with a high population of migrant and seasonal farmworkers. The report acknowledges that a high share of migrant workers is		

Indicator	Sources of Information	Risk assessment	Functional scale	Risk designation and determination
		reflected in the number of cases of forced labour in the sector as a whole (globally), but does not indicate that the US is of specific concern. • One of the sources identified is Anti-Slavery International, the world's oldest international human rights organization [Source 43]. While this organization has awarded organizations that are fighting forced labor in the United States agricultural sector, it does not identify the United States as a country in which they focus their anti-slavery efforts and a search of 'United States' at the web site does not bring up any reports or other articles about specific concerns in the US or the US in general. Additionally, Anti-Slavery International recognizes the US Department of State's Trafficking in Persons Report (see above) as a valid global index of human trafficking and efforts to eliminate it. • One of the sources is an article written for an online topical research digest hosted by the University of Denver [44]. The article notes a high occurrence of forced labor in the US, but does not provide any data or specific references as evidence. It states that the high occurrence is due to the absence of labor standards and regulations in the industry, and to the increasing number of undocumented immigrant farm workers that have no legal protection. The article recognizes the importance of the Trafficking Victims Protection Act and some limitations, but was written prior to reauthorizations of the act that increased the protections that it provides. However, the article does not recognize the Migrant and Seasonal Agricultural Worker Protection Act which is the principle federal employment law for farmworkers in the US [45]. • Perhaps most pertinently, these sources focus almost entirely on farmworkers, which are one component of the agricultural sector. However, forest workers are a separate component of the agricultural sector, but are not specifically addressed in these sources. While the 2017 Trafficking of Persons report [40] does identify forced labor in the forestry sectors of Burma, Czechia, Guyana, Mongolia, Sweden, and Uganda, and the 2016 List of Goods Produced by Child Labor or Forced Labor [46] identifies forced labor for timber in Brazil, North Korea, and Peru, the US is not mentioned in association with forestry or timber in either report. While the US has not ratified both relevant Core Conventions, it is still possible to conclude that the US respects the fundamental right to the elimination of all forms of forced or compulsory labor, and in particular that there are no concerns identified in the forest sector. *Child Labor* The United States ratified Core Convention 182 (Worst Forms of Child Labor Convention) in 1999 and the ILO web site indicates the status as 'In Force' [26]. The US has not yet ratified Convention 138 (Minimum		

Indicator	Sources of Information	Risk assessment	Functional scale	Risk designation and determination
		Age Convention), but as noted above has legislation that addresses fundamental rights associated with child labor. Additionally, every state has legislation that further limits the hours and days per week that minors may work in non-farm employment and 34 states have similar limits for farm work [47]. And all states have compulsory education until at least 16 years of age [28]. The US Annual Reports to the ILO also detail statistics on the effective enforcement of the federal legislation, including hundreds of cases, thousands of children affected and millions of dollars paid in fines each year [28]. The United States does not feature in the ILO Child Labour Country Dashboard, which indicates a low risk for child labour in the United States [Source 53]. The 2016 List of Goods Produced by Child Labor or Forced Labor [46] does not associate any goods produced in the US with child labor. Some sources identify the situation of children in the agricultural sector as an area of concern [43,48,49,50,51,52]. The agricultural sector is important for this assessment, as it includes both farmworkers and forest workers. However, the focus of all of these sources are exemptions in the US legislation that allow children under the age of 16 to work on family farms, and does not in any way include children working in forests. The US Labor legislation clearly prohibits the employment of minors between 16 and 18 years of age in forestry service occupations and associated occupations as they are "occupations particularly hazardous or detrimental to [the minors'] health or well-being" [54]. No sources of information were identified that suggest that child labor in the forest sector is a concern. While the US has not ratified both relevant Core Conventions, it is still possible to conclude that the US respects the fundamental right to the effective abolition of child labor, particularly in the forest sector. *Discrimination* Even though the US has not ratified either of the associated Core Conventions, it has been a member of the ILO since 1980 (and previous to that was a member from 1934 to 1977). As a member, the US has obligations under the ILO Constitution, including a commitment under the Declaration on Fundamental Principles and Rights at Work. Additionally, the US is subject to annual ILO review and reporting processes. [26] As noted above, the US has a suite of federal laws that prohibit discrimination in the workplace, including discrimination based on race, color, religion, sex, national origin, gender, age, pregnancy, disability, gender identity, sexual orientation, and genetic information. The Equal Employment Opportunity Commission (EEOC) is responsible for enforcement of these laws. In 2015, the EEOC received 89,385 private sector charges of discrimination and achieved 92,641 resolutions, including more than $356.6 million in monetary benefits [59]. Some sources question whether the United States is truly respecting workers' rights to elimination of discrimination. Concerns include differences in unemployment rates between African Americans and		

Indicator	Sources of Information	Risk assessment	Functional scale	Risk designation and determination
		whites [55,56], wage gaps between races and genders [56,57], discrimination against workers with family responsibilities [49,56,58], slow progress on affirmative action, an increase in religious discrimination and age discrimination claims, and wage gaps and unemployment rate gaps for persons with and without disabilities [56]. • The US generally scores well or very well on global indices and reviews of gender equality in the workplace [60,61], on social progress [62], fundamental rights (including discrimination) [63], and discrimination in employment & vocational training [64] • Conclusions about racial, gender, religious, age and other discrimination cannot be drawn from simple statistics such as wage and unemployment gaps without delving deeper into the issues. FSC-GUI-60-008 (V1-0) states, "Concerning non-discriminatory employment and occupation practices, the working group clarified that differences in remuneration between workers are not considered discriminatory where they exist due to inherent requirements or specifics of the job, e.g. due to length of employment, experience, technical expertise and performance" [68]. There must be recognition or consideration of the many different factors that may contribute to employment differences where they do exist. For example, research results indicate that a majority of racial and gender wage gaps in the US can be explained by differences in education, labor force experience, occupation or industry and other factors that can be measured [67]. Therefore, while lack of a wage or unemployment gap could be used as evidence that discrimination does not exist, existence of a gap does not automatically infer that the US does not respect the fundamental right to the elimination of discrimination. • In recent years, the US has significantly improved protections for workers with family responsibilities, including the 2010 Patient Protection and Affordable Care Act that amended the Fair Labor Standards Act to require that employers provide break time for nursing mothers [65], and the Family and Medical Leave Act of 1993 that requires the provision of leave time for family reasons (i.e., maternity/paternity leave) and for medical reasons [66]. A number of the sources with concerns were published prior to implementation of these new laws. • No sources of information were identified that suggest that any form of discrimination related to race, religion, disability or age in the forest sector is a concern. It is possible to conclude from the information presented that while the US has not ratified and may not conform to all aspects of the associated Core Conventions, it respects the fundamental rights of the elimination of discrimination in respect of employment and occupation, particularly in the forest sector.		

Indicator	Sources of Information	Risk assessment	Functional scale	Risk designation and determination
2.3	71-143	*Historical Context* The federal government entered into more than 400 treaties with various Native American Nations from 1778 to 1871. After 1871, the United States instead used formal agreements between Native American Nations and the federal government as a replacement for treaties. Even though Congress ended treaty-making with tribes in 1871, the pre-existing treaties are still in effect and contain promises which bind the United States today. In total, almost 600 documents were signed between 1778 and 1911. In these treaties and other constructive arrangements between Native American Nations and the United States some lands were reserved for them and for their use. These are called reservations. Some provisions were included in the treaties for the Native American Nations to continue to use the land they ceded to the government by concluding the treaty. These usufructuary rights[1] outside the reservations were the rights of the Native Americans to hunt, fish, and gather forest products off the land or to get access to sacred sites. Because they retained these rights in their treaties, these are referred to as reserved rights. Many of these treaties and other arrangements have been violated by the United States and the current reservations do not always reflect the areas agreed upon as reservations in the treaties and other arrangements. [122,123,124,125,126] There is significant evidence of historical violations of legal and customary rights of Indigenous Peoples in the US, however, Indicator 2.3 requires an assessment of the current situation. *Current/Recent Context* According to the United States Census Bureau, approximately 5.2 million people in the U.S., or 1.7% of the total population, identified as Native American or Alaska Native alone or in combination with another ethnic identity in 2010. In addition, there are roughly half a million persons that identify entirely or partly as Native Hawaiians. [120] There are 567 federally recognized tribal entities in the United States, and many of these have federally recognized national homelands or 'reserves' [121]. Between 200-300 additional groups identify as historical Indigenous nations but have not been federally recognized, although some are in the recognition process and some have achieved recognition at the state level [122]. Indigenous peoples are present in all regions of the US. There are a number of pieces of legislation at the core of federal policy protecting Native American rights, including: the Indian Self-Determination and Education Assistance Act of 1975, by which tribes are able to assume the planning and administration of federal programs that are devised for their benefit; the American Indian Religious Freedom Act of 1978, which directs federal officials to consult with tribes about	Entire assessment area	Low risk The following low risk thresholds apply: **Threshold 17** (The presence of indigenous and/or traditional peoples is confirmed or likely within the area under assessment. The applicable legislation for the area under assessment covers the basic principles of ILO governing the identification and rights of indigenous and traditional peoples15 and UNDRIP AND risk assessment for relevant indicators of Category 1 confirms enforcement of applicable legislation ('low risk')), **Threshold 19** (There is no evidence of

[1] Usufructuary right: the right of enjoying a thing, the property of which is vested in another, and to draw from the same all the profit, utility and advantage which it may produce, provided it be without altering the substance of the thing.

Indicator	Sources of Information	Risk assessment	Functional scale	Risk designation and determination
		actions that may affect religious practices; and the Native American Graves Protection and Repatriation Act of 1990, which directs federal agencies and museums to return indigenous remains and sacred objects to appropriate indigenous groups. A combination of other laws, policies, executive orders and programs fill out the suite of protections by providing additional protections for indigenous religion and culture, and addressing Indian economic and natural resource development, education and civil rights. [127,138] The low risk designations for relevant indicators in the Category 1 assessment indicate that these laws are enforced. The Federal Government has several agencies dedicated specifically to indigenous affairs, the principal one being the Bureau of Indian Affairs (BIA) within the Department of the Interior. Under federal law, the United States holds in trust the underlying title to the Indian lands within reservations and other lands set aside by statute or treaty for the tribes. The Department is responsible for overseeing some 55 million surface acres and the subsurface mineral resources in some 57 million acres. [127] These lands have traditionally been managed by the BIA, but in recent years (see below), more tribes are taking on land management responsibilities themselves. There are many other indigenous-specific agencies and programs throughout the Government. The Government has recently made an increased effort to appoint indigenous individuals to high-level government positions dealing with indigenous affairs, including the position of Assistant Secretary for Indian Affairs, which heads the BIA and the Senior Policy Advisor for Native American Affairs, which was created to advise the President on issues related to indigenous peoples. [127] However, sources still express concerns regarding the rights of Native Americans in the US, including: violence against Native American women [127,128,129]; access to, control over, and protections of places of cultural and religious significance [122,127,130,131,132,133,134,135,138]; ability to achieve federal recognition [127,135]; management of and control over trust lands and other lands and waters for which rights are held or that affect tribal well-being [122,127,129,133,134,136,137,140]; use of consultation and Free, Prior and Informed Consent (FPIC) [122,130,131,138,139]; doctrine used by the US Federal court system [127,136,137]; and lack of ratification of and conformance with the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), and the ILO Convention 169 [122,127,132]. *Recent Federal Government Efforts* To address concerns such as those identified above, the US Federal government has made a number of recent changes to improve the effectiveness of the legislation and policy that address Native American rights. These efforts build on others in the last few decades that have been overall recognized as advancing indigenous self-determination and development with respect for cultural identity, and as being generally in line with the aspirations expressed by indigenous peoples [127].		conflict(s) of substantial magnitude pertaining to rights of indigenous and/or traditional peoples) and **Threshold 21** (Other available evidence do not challenge a 'low risk' designation)

Indicator	Sources of Information	Risk assessment	Functional scale	Risk designation and determination
		Perhaps most importantly, while the U.S. did not vote for UNDRIP when it was originally adopted in 2007, at the request of Tribes, individual Native Americans and others in the country, it reviewed its position, including extensive government-to-government consultation with tribal leaders, and in 2010 decided to support the Declaration [73]. At the same time that the US government announced its endorsement of the Declaration, it also provided a statement of how it would support UNDRIP, and recognized, as did many tribal leaders, that this would require the US government to continue to work with tribal governments [71,72,73]. The Declaration ensures that indigenous peoples' rights to cultural integrity, education, health, and political participation are protected. It provides for the recognition of indigenous peoples' rights to their lands and natural resources, and the observation of their treaty rights. It also requires countries to consult with indigenous peoples with the goal of obtaining their consent on matters with concern them (i.e., free, prior and informed consent or FPIC). Basically, it recognizes indigenous peoples' right to self-determination. [74] [**NOTE:** ILO Convention 169, which the United States has not ratified, similarly recognizes indigenous peoples' right to self-determination, while setting standards for national governments regarding indigenous peoples' economic, cultural and political rights, including maintenance of their own identifies, languages and religions, control over their own institutions and ways of life and economic development, and participation in decision-making on activities that may impact them. [75] Recent changes in legislation and policy that are shaping the US Government's relations with tribes and helping to ensure tribes' self-determination, as required by UNDRIP and ILO Convention 169 include the following (and tribes are actively exercising that self-determination as a result [83]): • Establishment of the White House Council on Native American Affairs to work on economic development, healthcare, tribal justice systems, education and the management of land and natural resources – chaired by the Secretary of the Interior, this group is tasked with making policy recommendations to the President, coordinating with Native organizations, coordinating tribal consultations and assisting in organizing the yearly White House Tribal Nations Conference. • Federal Recognition: The US government continues to recognize additional tribes (there are now 567 recognized tribes and many others in the review process). A new final rule was published in 2015 to amend the regulatory process in order to speed it up and make it more transparent. [76,77] • Restoration of Trust Lands: Self-governance and tribal sovereignty are linked with the right to manage tribal lands. The Obama administration placed over 500,000 acres of land into trust for tribal nations, reversing a historic trend of loss of tribal homelands. [80] • Economic Development: In 2016, the Indian Trust Asset Management Reform Act was signed into law (with great support from tribes), providing tribes with greater provisions to manage their own		

Indicator	Sources of Information	Risk assessment	Functional scale	Risk designation and determination
		trust asset (including the above trust lands) and therefore their own economic opportunities, such as surface leasing, forest management and appraisals without approval of the Secretary of the Interior. [78.79,83] And the 2010 Claims Resolution Act settled four tribal water rights issues, settled litigation that addressed mismanagement of trust assets, settled a lawsuit addressing alleged discrimination against Indian farmers in federal agricultural programs, and created a fund to address historic accounting and trust management issues. [73,81,82] • Tribal Court: The 2013 reauthorization of the Violence Against Women Act included new provisions that gave tribes the authority to prosecute in tribal courts individuals who commit acts of domestic violence on tribal lands, regardless of whether they are Indian or not [82,83]. And even before these additional authorities were added, The Tribal Law and Order Act of 2010 gave tribes greater authority to prosecute crimes [73,83]. • U.S. Courts: After many years of unsuccessful filing and outcomes for cases heard at the US Supreme Court, during the 2015 term, 26 Indian law case petitions were filed, 5 were heard by the Court and there were four wins and one loss [86]. And it appears that this increase in activity at the Supreme Court level continued for 2016 and into 2017 [117]. • Government-to-Government Consultation/FPIC: The President issued an Executive Memorandum in late 2009 that directed all federal agencies to develop a plan within 90 days to consult and coordinate with tribal governments, thereby enforcing President Clinton's Executive Order 13175 "Consultation and Coordination with Indian Tribal Governments [90]. This Memorandum resulted in new policies regarding consultation and coordination with Indian Tribes [90,91,92,115,116]. • Health: The Indian Health Care Improvement Act (reauthorized in 2010) modernizes tribal health care networks and helps to ensure every Native American receives the health care promised to them. [83,84] • Education: The 2015 reauthorization of the Elementary and Secondary Education Act (called the Every Student Succeeds Act) includes several new indigenous peoples-specific provisions. [73,85] • Religion: In 2012, the Departments of Defense, the Interior, Agriculture, and Energy and the Advisory Council on Historic Preservation entered into a Memorandum of Understanding (MOU) regarding 'Interagency Coordination and Collaboration for the Protection of Indian Sacred Sites.' The action plan for the MOU requires that the provisions of the MOU be implemented in consultation with Indian tribes. [101] Not only did the US endorse UNDRIP, but in 2016, as a member of the Organization of American States, the US adopted the American Declaration on the Rights of Indigenous Peoples (ADRIP). The ADRIP was finalized after almost 30 years of work with the indigenous peoples and 35 independent states of the		

Indicator	Sources of Information	Risk assessment	Functional scale	Risk designation and determination
		western hemisphere. It was developed with the guiding principle that no standard would be adopted that was lower than the standards contained in the UNDRIP. Some go beyond UNDRIP, including treaties, the rights of children, and the rights of peoples in voluntary isolation. [102,103,104] In his 2017 State of Indian Nations speech, National Congress of American Indians President, and Swinomish Indian Tribal Community member, Brian Cladoosby recognized that government-to-government relations with the US government were the best they had been since the formation of the US government. He also recognized many of the programs and policies detailed above that were being developed together by the US and tribal government and were being successfully implemented by the tribes. [83] *Resolution of Tribal Disputes* While there are examples of tribal disputes that are either ongoing or have not had successful resolution [127,129,133,134,135,136,137,138], these examples do not provide conclusive evidence that the system is broken and that that laws and regulations and/or other legally established processes do not exist that serve to resolve conflicts, because there are also an increasing number of more recent successes in resolving disputes through the court system, or through other means [81,93,94,95,96,97,98,99,100,109,127,129,133,141,142,143]. Further, the US government is allowing its agencies to use and seeing an increase in use of alternative dispute resolution programs [87], and is even providing expertise specifically for tribal concerns through the Native Dispute Resolution Network (a network of American Indian, Alaska Native, Native Hawaiian and non-Native Environmental Conflict Resolution professionals) [88]. Conflict resolution through negotiation is closer to traditional Native approaches than mediation and much closer than use of the court system [89]. The point is that there are established processes that serve to resolve treaty and other rights disputes. *Forest Management By and For Tribes* Ultimately, Indicator 2.3 is concerned with the current and near future situation related to indigenous peoples' rights specifically within the forest sector. A large part of self-determination is the right to manage your own assets and resources, including forest management and tribes in the assessment area are using forest management to further self-determination and tribal rights. [107,118,119] Indigenous peoples do not see a forest just as a source of economic resource, but as an integral element of their cultural being, and part of a Tribe's self-determination is making or being an integral part of making		

Indicator	Sources of Information	Risk assessment	Functional scale	Risk designation and determination
		the decisions on how the forest is managed so that these values are respected [105]. Many tribes in the assessment area are engaging in sustainable forestry management practices, which are seen as models for forest management elsewhere, as is evidenced by the high-level of active participation in the Inter-Tribal Timber Council which was established in 1976 [106,107,108,119]. In fact, 302 Tribes have forest lands and are engaged in forest management, and there has been an increase in Tribal Natural Resources Departments, those departments' active participation in forest management, and foresters on tribal staff, including a 84% increase in tribes taking over forest management from the Bureau of Indian Affairs (who managed the forests in trust for the tribes), and a 60% increase in tribal staffing from 1991 to 2011 [110; Expert: Mike Dockry]. Overall management of tribal lands has transformed from being completely dominated by Bureau of Indian Affairs (BIA) policies, which for forests emphasized timber production, to approaches that incorporate tribal visions and values for the land [110,119, Expert: Mike Dockry]. The legislation that regulates the management of trust lands was revised in 2012, providing tribes with much greater decision-making power over what happens with those lands [78,79,83,119]. Tribes are becoming much more active, not just in management of their own lands, but also the lands around their reservation and trust lands. The Tribal Forest Protection Act (2004) gives Tribes the ability to propose and implement management projects on US Forest Service and US Bureau of Land Management lands around their trust lands in order to protect their rights, lands and resources by reducing threats on these other lands [111]. Tribes are active partners in the Anchor Forest program which is an effort to provide forest land stewardship across ownership boundaries and among disparate interests [Source 112]. Tribes are active partners in most of the 22 Landscape Conservation Cooperatives, particularly on initiatives related to climate change resilience [113,114]. Additionally, recent changes to the US Forest Service consultation procedures and requirements have improved tribal participation in decision-making on National Forest lands – there are extensive requirements for government-to-government consultation prior to management of forests where tribes have rights and/or customary use [115,116,119]. *Consultation with Tribes and Experts* FSC US staff consulted with two FSC-certified tribes, two forest managers with extensive experience working with Tribes, and a representative of an affiliation of tribes. In these consultations, FSC US staff heard concern expressed by the representative of the affiliation of tribes regarding localized forest management activities on ancestral lands to which the tribe in question does not have legal rights. However, the certified tribes and the forest managers supported a low risk designation, recognizing that there may be isolated and infrequent events, but that there are not widespread violations of tribal rights within the forest sector. (Experts: Marshall Pecore, Marc Gauthier, Jeff Lindsey, Paul Koll, Karen Brenner)		

Indicator	Sources of Information	Risk assessment	Functional scale	Risk designation and determination

Category 2 Control measures

Indicator	Control measures (M – mandatory / R – recommended)
2.1	Not Applicable
2.2	Not Applicable
2.3	Not Applicable

Category 2 Information sources

No	Source of information	Relevant indicator(s) or CW category
1.	World Bank. Worldwide Governance Indicators. – WGIs report aggregate and individual governance indicators for 215 countries (most recently for 1996–2012), for six dimensions of governance: Voice and Accountability; Political Stability and Absence of Violence; Government Effectiveness; Regulatory Quality; Rule of Law; Control of Corruption. Retrieved from http://info.worldbank.org/governance/wgi/index.aspx#home	Context
2.	World Bank. Harmonized List of Fragile Situations FY11. Retrieved from http://siteresources.worldbank.org/EXTLICUS/Resources/511777-1269623894864/Fragile_Situations_List_FY11_%28Oct_19_2010%29.pdf	Context
3.	Committee to Protect Journalists. Impunity Index - CPJ's Impunity Index calculates the number of unsolved journalist murders as a percentage of each country's population. For this index, CPJ examined journalist murders that occurred between January 1, 2004, and December 31, 2013, and that remain unsolved. Only those nations with five or more unsolved cases are included on this index. 2014. Retrieved from http://cpj.org/reports/2014/04/impunity-index-getting-away-with-murder.php	Context
4.	Carleton University. Country Indicators for Foreign Policy: the Failed and Fragile States project of Carleton University examines state fragility using a combination of structural data and current event monitoring. Retrieved from https://carleton.ca/cifp/failed-fragile-states/	Context
5.	Human Rights Watch. Retrieved from http://www.hrw.org	Context
6.	US AID. Search on website for [country] + 'human rights' 'conflicts' 'conflict timber'. Retrieved from www.usaid.gov	Context
7.	Global Witness. Search on website for [country] +'human rights' 'conflicts' 'conflict timber'. Retrieved from www.globalwitness.org	Context
8.	World Wildlife Fund. Illegal logging. Retrieved from http://wwf.panda.org/about_our_earth/about_forests/deforestation/forest_illegal_logging/	Context
9.	Transparency International. Corruption Perceptions Index. Retrieved from http://cpi.transparency.org/cpi2013/results/	Context
10.	Chattam House. Illegal Logging Indicators Country Report Card. Retrieved from http://www.illegal-logging.info	Context

No	Source of information	Relevant indicator(s) or CW category
11.	Amnesty International. Annual Report: The state of the world's human rights -information on key human rights issues, including: freedom of expression; international justice; corporate accountability; the death penalty; and reproductive rights. Retrieved from https://www.amnesty.org/en/	Context
12.	Freedom House. Retrieved from http://www.freedomhouse.org/	Context
13.	Reporters without Borders: World Press Freedom Index. 2013. Retrieved from https://rsf.org/en/world-press-freedom-index-2013	Context
14.	Fund for Peace. Failed States Index of Highest Alert - the Fund for Peace is a US-based non-profit research and educational organization that works to prevent violent conflict and promote security. The Failed States Index is an annual ranking, first published in 2005, of 177 nations based on their levels of stability and capacity. In 2014 the FFP changed the name of the Failed State Index to the Fragile State Index. Retrieved from http://ffp.statesindex.org/rankings-2013-sortable	Context
15.	The Global Peace Index. Published by the Institute for Economics & Peace, This index is the world's leading measure of national peacefulness. It ranks 162 nations according to their absence of violence. It's made up of 23 indicators, ranging from a nation's level of military expenditure to its relations with neighboring countries and the level of respect for human rights. Source: The Guardian. Retrieved from http://www.visionofhumanity.org/#/page/indexes/global-peace-index	Context
16.	World Justice Project. Rule of Law Index 2016. Retrieved from http://data.worldjusticeproject.org/#groups/USA	Context
17.	United Nations. Compendium of United Nations Security Council Sanctions Lists http://www.un.org/sc/committees/list_compend.shtml	2.1
18.	US AID. Retrieved from www.usaid.gov	2.1
19.	Global Witness. Retrieved from www.globalwitness.org	2.1
20.	Human Rights Watch. Retrieved from http://www.hrw.org/	2.1
21.	Amnesty International Annual Report: The state of the world's human rights -information on key human rights issues, including: freedom of expression; international justice; corporate accountability; the death penalty; and reproductive rights. Retrieved from http://amnesty.org/en/annual-report/2013/	2.1
22.	World Bank. Worldwide Governance Indicators - the WGIs report aggregate and individual governance indicators for 213 economies (most recently for 1996–2010), for six dimensions of governance: Use indicator 'Political stability and Absence of violence' specific for indicator 2.1. Retrieved from http://info.worldbank.org/governance/wgi/index.aspx#home	2.1
23.	Greenpeace. Retrieved from www.greenpeace.org	2.1
24.	Center for International Forestry Research. Forests and conflict. Retrieved from http://www.cifor.org/publications/Corporate/FactSheet/forests_conflict.htm	2.1
25.	International Labour Organization. The Declaration on Fundamental Principles and Rights at Work, including the Global and Country Reports. 2010. Retrieved from http://www.ilo.org/declaration/thedeclaration/textdeclaration/lang--en/index.htm	2.2
26.	International Labour Organization. Member Profile: United States. Retrieved from http://www.ilo.org/gateway/faces/home/ctryHome?locale=EN&countryCode=USA&_adf.ctrl-state=nqv76qrog_9	2.2
27.	International Organisation of Employers. A Response by the International Organisation of Employers to the Human Rights Watch Report —"A Strange Case: Violations of Workers' Freedom of Association in the United States by European Multinational Corporations", A Special Edition of the International Labour and Social Policy Review. 2011. Retrieved from http://www.ioe-emp.org/fileadmin/ioe_documents/publications/Policy%20Areas/business_and_human_rights/EN/_2011-05-00__IOE_Response_to_Human_Rights_Watch_Report.pdf	2.2

No	Source of information	Relevant indicator(s) or CW category
28.	International Labour Organization. 2016 Annual Review Under the Follow-Up to the ILO 1998 Declaration Compilation of Baseline Tables. United States - Country baselines under the 1998 ILO Declaration Annual Review (2000-2016): Freedom of association and the effective recognition of the right to collective bargaining; The elimination of all forms of forced or compulsory labour; The effective abolition of child labour; and The elimination of discrimination in respect of employment and occupation. 2016. Retrieved from http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---declaration/documents/publication/wcms_565946.pdf	2.2
29.	US Human Rights Network. Shadow Report Submissions and Updates Including An Executive Summary Of All Attached Reports Compiled By The US Human Rights Network (On Behalf Of Member And Partner Organizations) To The United Nations Human Rights Committee. Originally submitted SEPTEMBER 13, 2013. Revised FEBRUARY 10, 2014. Retrieved from http://tbinternet.ohchr.org/Treaties/CCPR/Shared%20Documents/USA/INT_CCPR_CSS_USA_16502_E.pdf	2.2
30.	Union for Reform Judaism. Resolutions: Workers' Rights in the United States. 2005 Retrieved from https://urj.org/what-we-believe/resolutions/workers-rights-united-states	2.2
31.	Human Rights Watch. A Strange Case - Violations of Workers' Freedom of Association in the United States by European Multinational Corporations. 2010. Retrieved from http://www.hrw.org/sites/default/files/reports/bhr0910web_0.pdf	2.2
32.	International Trade Union Confederation. 2017 ITUC Global Rights Index, The World's Worst Countries for Workers. 2017. Retrieved from https://www.ituc-csi.org/IMG/pdf/survey_ra_2017_eng-1.pdf	2.2
33.	International Labour Organization. Freedom of association in practice: Lessons learned, Global Report under the follow-up to the ILO Declaration on Fundamental Principles and Rights at Work. 2008. Retrieved from http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/wcms_096122.pdf	2.2
34.	National Labor Relations Board. Bargaining in good faith with employees' union representative (Section 8(d) & 8(a)(5)). Retrieved from https://www.nlrb.gov/rights-we-protect/whats-law/employers/bargaining-good-faith-employees-union-representative-section	2.2
35.	Richardson, Gerald M. Articles & Updates: NLRB Changes Union Election Procedures. Evans & Dixon LLC. Retrieved from http://www.evans-dixon.com/article/1251/NLRB-Changes-Union-Election-Procedures.aspx	2.2
36.	FordHarrison, Ius Laboris USA. Publications: NLRB Adopts New Election Procedures. 2014. Retrieved from http://www.fordharrison.com/nlrb-adopts-new-election-procedures	2.2
37.	Dubé, Lawrence E. NLRB Conducted More Elections in 2015, But Percentage of Union Wins Held Steady, Bloomberg BNA. 2016. Retrieved from https://www.bna.com/nlrb-conducted-elections-n57982068022/	2.2
38.	National Labor Relations Board. National Labor Relations Act. Retrieved from https://www.nlrb.gov/resources/national-labor-relations-act	2.2
39.	National Labor Relations Board. Charges and Complaints Issued. Retrieved from https://www.nlrb.gov/news-outreach/graphs-data/charges-and-complaints/charges-and-complaints	2.2
40.	U.S. Department of State. 2017 Trafficking in Persons Report. Retrieved from https://www.state.gov/j/tip/rls/tiprpt/2017/index.htm	2.2
41.	The Global Slavery Index 2016. Retrieved from https://www.globalslaveryindex.org/findings/	2.2
42.	International Labour Organization. Profits and Poverty: The Economics of Forced Labour. 2014. Retrieved from http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---declaration/documents/publication/wcms_243391.pdf	2.2
43.	Anti-Slavery International. Retrieved from www.antislavery.org	2.2

No	Source of information	Relevant indicator(s) or CW category
44.	Buckley, C. Forced Labor in the United States: A Contemporary Problem in Need of a Contemporary Solution. In Topical Research Digest: Human Rights and Contemporary Slavery. Human Rights & Human Welfare. University of Denver. 2008. Retrieved from https://www.du.edu/korbel/hrhw/researchdigest/slavery/us.pdf	2.2
45.	Farmworker Justice. US Labor Law for Farmworkers. Retrieved from https://www.farmworkerjustice.org/advocacy-and-programs/us-labor-law-farmworkers	2.2
46.	Bureau of International Labor Affairs, United States Department of Labor. List of Goods Produced by Child Labor or Forced Labor. 2016. Retrieved from https://www.dol.gov/sites/default/files/documents/ilab/reports/child-labor/findings/TVPRA_Report2016.pdf	2.2
47.	US Department of Labor. State Labor Laws. Retrieved from https://www.dol.gov/whd/state/state.htm	2.2
48.	Global March Against Child Labour: Protecting Children in Agriculture and Right to Food; Death of Two 14-Year-Old Girls in an Illinois Field Underscores the Need for an Overhaul of US Child Labor Laws. Retrieved from http://www.globalmarch.org/content/protecting-children-agriculture-and-right-food; http://www.globalmarch.org/content/death-two-14-year-old-girls-illinois-field-underscores-need-overhaul-us-child-labor-laws-–	2.2
49.	Human Rights Watch. World Report 2014: United States. Retrieved from https://www.hrw.org/world-report/2014/country-chapters/united-states?page=2	2.2
50.	Verisk Maplecroft. Child Labor Index. Retrieved from https://maplecroft.com/about/news/child-labour-index.html	2.2
51.	United Nations Human Rights Committee. Concluding observations on the fourth periodic report of the United States of America. 2014. Retrieved from http://www.ushrnetwork.org/sites/ushrnetwork.org/files/iccpr_concluding_obs_2014.pdf	2.2
52.	Human Rights Watch. Take Action-End Child Labor in US Agriculture. Tobacco's hidden children. 2014. Retrieved from https://www.hrw.org/video-photos/interactive/2010/05/03/take-action-end-child-labor-us-agriculture; https://www.hrw.org/sites/default/files/reports/us0514_UploadNew.pdf	2.2
53.	International Labour Organization. International Programme on the Elimination of Child Labour (IPEC)'s Countries Dashboard. Retrieved from http://www.ilo.org/ipec/Regionsandcountries/lang--en/index.htm	2.2
54.	United States Department of Labor. Hazardous Jobs. Retrieved from https://www.dol.gov/general/topic/youthlabor/hazardousjobs	2.2
55.	International Labour Organization. World of Work: The Magazine of the ILO. No. 72, August 2011. Retrieved from http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/wcms_160434.pdf	2.2
56.	International Labour Organization. ILO Global Report, Equality at work: The continuing challenge. 2011. Retrieved from http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_154779.pdf	2.2
57.	International Labour Organization. ILO Global Report, Equality at work: Tackling the challenges. 2007. Retrieved from http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---webdev/documents/publication/wcms_082607.pdf	2.2
58.	Human Rights Watch. Submission to the Human Rights Committee During its Consideration of the Fourth Periodic Report of the United States. 2012. Retrieved from https://www.hrw.org/sites/default/files/related_material/HRW%20Submission%20to%20the%20HRC.pdf	2.2
59.	US Equal Employment Opportunity Commission. Enforcement. Retrieved from https://www.eeoc.gov/eeoc/enforcement/index.cfm	2.2
60.	World Economic Forum. The Global Gender Gap Report 2017. Retrieved from https://www.weforum.org/reports/the-global-gender-gap-report-2017	2.2
61.	International Labour Organization. ILO Maps and Charts: Which countries have the highest gender gap in the workplace? Retrieved from http://www.ilo.org/global/about-the-ilo/multimedia/maps-and-charts/enhanced/WCMS_556528/lang--en/index.htm	2.2

No	Source of information	Relevant indicator(s) or CW category
62.	Porter, Michael E., Stern, S, and Green, M. Social Progress Index 2017. Social Progress Imperative. Retrieved from http://www.socialprogressindex.com/assets/downloads/resources/en/English-2017-Social-Progress-Index-Findings-Report_embargo-d-until-June-21-2017.pdf	2.2
63.	World Justice Project. Rule of Law Index 2016. Retrieved from http://data.worldjusticeproject.org/#groups/USA	2.2
64.	Migrant Policy Group. Migrant Integration Policy Index 2015. Retrieved from http://www.migpolgroup.com/diversity-integration/migrant-integration-policy-index/	2.2
65.	United States Department of Labor. Section 7(r) of the Fair Labor Standards Act – Break Time for Nursing Mothers Provision. Retrieved from https://www.dol.gov/whd/nursingmothers/Sec7rFLSA_btnm.htm	2.2
66.	United States Department of Labor. Family and Medical Leave Act. Retrieved from https://www.dol.gov/whd/regs/compliance/1421.htm	2.2
67.	Patten, Eileen. Racial, gender wage gaps persist in U.S. despite some progress. Pew Research Center. 2016. Retrieved from http://www.pewresearch.org/fact-tank/2016/07/01/racial-gender-wage-gaps-persist-in-u-s-despite-some-progress/	2.2
68.	Forest Stewardship Council. Guideline for Standard Developers on the Generic Criteria and Indicators Based on ILO Core Conventions Principles, FSC-GUI-60-008 (V1-0). 2017. Retrieved from https://ic.fsc.org/en/what-is-fsc-certification/consultations/current-processes/report-on-compliance-with-the-ilo-core-conventions-principles	2.2
69.	Pennsylvania State University's Center for Global Worker's Rights. Labor Rights Indicators. 2015. Retrieved from http://labour-rights-indicators.la.psu.edu	2.2
70.	Maplecroft. Human Rights Risk Index 2016 – Q4. Retrieved from https://reliefweb.int/report/world/human-rights-risk-index-2016-q4	2.2
71.	Cultural Survival. Victory!: U.S. Endorses UN Declaration on the Rights of Indigenous Peoples. Retrieved from https://www.culturalsurvival.org/news/victory-us-endorses-un-declaration-rights-indigenous-peoples	2.3
72.	United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). Mattakeeset Tribe. Retrieved from http://mattakeesettribe.com/departments/undrip/	2.3
73.	Announcement of U.S. Support for the United Nations Declaration on the Rights of Indigenous Peoples, Initiatives to Promote the Government-to-Government Relationship & Improve the Lives of Indigenous Peoples, A statement of how the U.S. will support UNDRIP that accompanied the announcement of support, Advisory Council on Historic Preservation. 2012. Retrieved from http://www.achp.gov/docs/US%20Support%20for%20Declaration%2012-10.pdf	2.3
74.	United Nations. United Nations Declaration on the rights of Indigenous Peoples. 2008. Retrieved from http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf	2.3
75.	Indigenous Foundations. ILO Convention 169. Retrieved from http://indigenousfoundations.arts.ubc.ca/ilo_convention_169/	2.3
76.	National Congress of American Indians. New Federal Recognition Rule Announced at NCAI Conference. 2015. Retrieved from http://www.ncai.org/news/articles/2015/06/30/new-federal-recognition-rule-announced-at-ncai-conference	2.3
77.	Bureau of Indian Affairs. Highlights of the Final Federal Acknowledgement Rule (25 CFR 83). Retrieved from https://www.bia.gov/cs/groups/public/documents/text/idc1-030769.pdf	2.3
78.	National Congress of American Indians. President Signs Indian Trust Asset Management Reform Act into Law. 2016. Retrieved from http://www.ncai.org/news/articles/2016/06/22/president-signs-indian-trust-asset-management-reform-act-into-law	2.3

No	Source of information	Relevant indicator(s) or CW category
79.	National Congress of American Indians. Legislative Testimony: NCAI Support for H.R. 812 – The Indian Trust Asset Reform Act. 2015. Retrieved from http://www.ncai.org/attachments/Testimonial_BIzCvhdjJhHOyzjKQZoOUzymCzwCEonINdRAJKHFnPWVKTRmhfx_2015-04-09-NCAI-LtrHouseSubcmteIndianAffairs-SupportingHR812-Final.pdf	2.3
80.	U.S. Department of Interior. 10/12/2016 Press Release, Obama Administration Exceeds Ambitious Goal to Restore 500,000 Acres of Tribal Homelands. 2016. Retrieved from https://www.doi.gov/pressreleases/obama-administration-exceeds-ambitious-goal-restore-500000-acres-tribal-homelands	2.3
81.	Brownstein Hyatt Farber Schreck, LLP. Claims Resolution Act, a slide deck provided by the Native American Rights Fund. 2011. Retrieved from http://www.narf.org/nill/documents/water/2011/presentations/07-smith.pdf	2.3
82.	U.S. Department of State. Report of the United States of America, Submitted to the U.N. Commissioner for Human Rights in Conjunction with the Universal Periodic Review, provided by the U.S. Department of State. Retrieved from https://www.state.gov/documents/organization/237460.pdf	2.3
83.	Remarks of President Brian Cladoosby - 15th Annual State of Indian Nations Address, Washington D.C., February 13, 2017. Retrieved from http://www.ncai.org/NCAI_2017_State_of_Indian_Nations_Address_Final_-2-.pdf	2.3
84.	Indian Health Service. Indian Health Care Improvement Act. 2010. Retrieved from https://www.ihs.gov/ihcia/	2.3
85.	National Indian Education Association. The Every Student Succeeds Act (ESSA). Retrieved from http://www.niea.org/for-advocates/education-priorities/elementary-and-secondary-education-act-esea-and-every-students-succeeds-act-essa/	2.3
86.	Native American Rights Fund. Tribal Supreme Court Project Update, September 27, 2016. Retrieved from http://www.atnitribes.org/sites/default/files/ATNI%20Tribal%20Supreme%20Court%20Project%20Update.pdf	2.3
87.	Interagency Report Interagency Alternative Dispute Resolution Working Group. New Dispute Resolution Programs in the Federal Government, 2014 Update. Retrieved from https://www.adr.gov/2014-interagency-report.pdf	2.3
88.	Udall Foundation. U.S. Institute for Environmental Conflict Resolution, Native Dispute Resolution Network. Retrieved from https://www.udall.gov/OurPrograms/Institute/NativeDisputeResolutionNetwork.aspx	2.3
89.	Connors, T. Why Peacemaking Makes Sense in State Court Justice Systems. Judges' Journal, 55(4): 24-30. 2016. Retrieved from http://washtenawtrialcourt.org/Peacemaking/Why%20Peacemaking%20Makes.pdf	2.3
90.	National Congress of American Indians. Consultation with Tribal Nations: An Update on Implementation of Executive Order 13175. January 2012. Retrieved from http://www.ncai.org/attachments/Consultation_hxjBLgmqyYDiGehEwgXDsRIUKvwZZKjJOjwUnKjSQeoVaGOMvfl_Consultation_Report_-_Jan_2012_Update.pdf	2.3
91.	U.S. Environmental Protection Agency. Progress in Strengthening our Government-to-Government Relationship with Tribal Nations, The EPA Blog. 2017. Retrieved from https://blog.epa.gov/blog/2017/01/progress-in-strengthening-our-government-to-government-relationship-with-tribal-nations/	2.3
92.	U.S. Department of Agriculture Department Regulation: Tribal Consultation, Coordination, and Collaboration. Office of Tribal Relations. 2013. Retrieved from https://www.fs.fed.us/spf/tribalrelations/documents/policy/consultation/Final_DR.pdf	2.3
93.	Great Lakes Indian Fish & Wildlife Commission. Treaty Rights. Retrieved from http://www.glifwc.org/TreatyRights/	2.3
94.	Columbia River Inter-Tribal Fish Commission. Fisheries Timeline: Chronology of tribal fishing and fishing rights in the Columbia River. Retrieved from https://www.critfc.org/about-us/fisheries-timeline/	2.3

No	Source of information	Relevant indicator(s) or CW category
95.	The Harvard Project on American Indian Economic Development. Honoring Nations: 2000 Honoree – Treaty Rights/National Forest Memorandum of Understanding. Retrieved from http://hpaied.org/sites/default/files/publications/Treaty%20Rights%20National%20Forest%20Management%20MOU.pdf	2.3
96.	Michigan Department of Natural Resources. 2007 Inland Consent Decree. Retrieved from http://www.michigan.gov/documents/dnr/press.2007inlandconsentdecreeFAQs_209923_7.pdf	2.3
97.	Michigan Department of Natural Resources. 2000 Consent Decree. Retrieved from http://www.michigan.gov/dnr/0,4570,7-153-10364_36925-177786--,00.html	2.3
98.	National Congress of American Indians. Supreme Court Unanimously Holds Reservation Boundaries not Diminished in Favor of the Omaha Tribe in Nebraska v. Parker, March 22, 2016. Retrieved from http://www.ncai.org/news/articles/2016/03/22/supreme-court-unanimously-holds-reservation-boundaries-not-diminished-in-favor-of-the-omaha-tribe-in-nebraska-v-parker	2.3
99.	National Congress of American Indians. Standing Rock Claims Confirmed – Justice Demands Tribes Rights are Respected. 2017. Retrieved from http://www.ncai.org/news/articles/2017/06/14/standing-rock-claims-confirmed-justice-demands-tribes-rights-are-respected	2.3
100.	Columbia River Inter-Tribal Fish Commission. Snake River Fall Chinook Recovery: A tribal success story. 2012. Retrieved from http://www.critfc.org/wp-content/uploads/2012/10/success-stories-full-set-.pdf	2.3
101.	Departments of Defense, the Interior, Agriculture, and Energy, and the Advisory Council on Historic Preservation. Action Plan to Implement the Memorandum of Understanding Regarding Interagency Coordination and Collaboration for the Protection of Indian Sacred Sites. March 3, 2013. Retrieved from http://www.achp.gov/docs/SS%20MOU%20Action%20Plan%20%20March%205%202013.pdf	2.3
102.	Organization of American States. A 17-Year Wait Pays off for Indigenous Peoples. 2016. Retrieved from http://www.oas.org/en/media_center/press_release.asp?sCodigo=E-075/16	2.3
103.	United Nations. Message from the Chairperson on the occasion of the adoption of the American Declaration on the Rights of Indigenous Peoples. 2016. Retrieved from https://www.un.org/development/desa/indigenouspeoples/news/2016/07/message-from-the-chairperson-on-the-occasion-of-the-adoption-of-the-american-declaration-on-the-rights-of-indigenous-peoples/	2.3
104.	Native American Rights Fund. Organization of American States Adopts Historic American Declaration on the Rights of Indigenous Peoples. Retrieved from http://www.narf.org/2016/06/american-declaration-rights-indigenous-people/	2.3
105.	Saway, V.L. Indigenous Cultures and Forest Management. A paper submitted to the XII World Forestry Congress. 2003. Quebec City, Canada. Retrieved from http://www.fao.org/docrep/ARTICLE/WFC/XII/0841-A2.HTM	2.3
106.	National Congress of American Indians. Native Resources. Retrieved from http://www.ncai.org/policy-issues/land-natural-resources/native-resources	2.3
107.	Bureau of Indian Affiars. Forestry in Indian Country: Models of Sustainability for our Nation's Forests?, Evergreen Magazine ('The voice of American forestry and science-based forest policy'). Winter 2005. Retrieved from https://www.bia.gov/cs/groups/xnifc/documents/text/idc015961.pdf	2.3
108.	Intertribal Timber Council. Retrieved from http://www.itcnet.org	2.3
109.	US Supreme Court Decision: State of Minnesota v. Mille Lacs Band of Chippewa Indians, 526 U.S. 172, 175. 1999. Retrieved from https://supreme.justia.com/cases/federal/us/526/172/case.html	2.3

No	Source of information	Relevant indicator(s) or CW category
110.	Intertribal Timber Council. Indian Forest Management Assessment Team (IFMAT) – III Report. 2013. Retrieved from http://www.itcnet.org/issues_projects/issues_2/forest_management/assessment.html	2.3
111.	Intertribal Timber Council. Tribal Forest Protection Act (TFPA). Retrieved from http://www.itcnet.org/issues_projects/issues_2/tfpa/tfpareports.html	2.3
112.	The Anchor Forests Project. Retrieved from http://anchorforest.org	2.3
113.	Landscape Conservation Cooperative Network. Retrieved from https://lccnetwork.org	2.3
114.	National Congress of American Indians. Resolution: In Support of Landscape Conservation Cooperatives. Retrieved from http://www.ncai.org/resources/resolutions/in-support-of-landscape-conservation-cooperatives	2.3
115.	U.S. Forest Service Tribal Relations Strategic Framework for the Eastern Region. 2015.	2.3
116.	USDA Departmental Regulation 1350-002, Tribal Consultation, Coordination and Collaboration (DR 1350-002/2013)	2.3
117.	Tribal Supreme Court Project – Updates & Articles. Retrieved from http://sct.narf.org/articlesupdates.html	2.3
118.	Intertribal Timber Council. Forestry in Indian Country: Solving Federal Forestry's Rubik's Cube, Evergreen Magazine ('The voice of American forestry and science-based forest policy'). Spring 2014. Retrieved from http://www.itcnet.org/resources/publications.html	2.3
119.	Society of American Foresters. 2017. A Special Issue of the Journal of Forestry – Tribal Forest Management: Innovations for Sustainable Forest Management. Journal of Forestry, 115(1).	2.3
120.	Norris, T, Vines, P.L. and Hoeffel, E.M. 2012. The American Indian and Alaska Native Population: 2010. U.S. Census Bureau. C2010BR-10. Retrieved from https://www.census.gov/prod/cen2010/briefs/c2010br-10.pdf	2.3
121.	U.S. Dept of the Interior, Bureau of Indian Affairs. Retrieved from https://www.bia.gov/	2.3
122.	A Submission by The International Indian Treaty Council (IITC), Oglala Lakota Nation, Western Shoshone Defense Project and the Indigenous World Association (IWA) to the UN Committee on the Elimination of Racial Discrimination following Examination of the United States 7th, 8th and 9th Periodic Reports. July 8 2014. Retrieved fromhttp://tbinternet.ohchr.org/Treaties/CERD/Shared%20Documents/USA/INT_CERD_NGO_USA_17613_E.pdf	2.3
123.	Spirling, A. US Treaty-making with American Indians: Institutional Change and Relative Power, 1784-1911. Department of Government, Harvard University. 2011. Retrieved from https://www.princeton.edu/~pcglobal/conferences/methods/papers/Spirling.pdf	2.3
124.	Treaties with Native Americans. Retrieved from http://www.historyandtheheadlines.abc-clio.com/ContentPages/ContentPage.aspx?entryId=1678740¤tSection=1678598&productid=43	2.3
125.	Miller, R. Native America, Discovered and Conquered (a blog). Lewis & Clark Law School. Retrieved from http://lawlib.lclark.edu/blog/native_america/?page_id=8	2.3
126.	Milwaukee Public Museum. Indian Treaty Rights. Retrieved from http://www.mpm.edu/wirp/ICW-09.html	2.3
127.	Report of the Special Rapporteur on the rights of indigenous peoples, James Anaya – Addendum: The situation of indigenous peoples in the United States of America. 30 August 2012. Retrieved from https://documents-dds-ny.un.org/doc/UNDOC/GEN/G12/162/70/PDF/G1216270.pdf?OpenElement	2.3
128.	Amnesty International. Americas: Sacrificing Rights in the Name of Development: Indigenous Peoples Under Threat in the Americas. 2011. Retrieved from https://www.amnesty.org/en/documents/amr01/001/2011/en/	2.3
129.	International Work Group for Indigenous Affairs. Indigenous World 2014. Retrieved from https://www.iwgia.org/images/publications//0671_I2014eb.pdf	2.3

No	Source of information	Relevant indicator(s) or CW category
130.	Summary [of stakeholders' submissions] prepared by the Office of the High Commissioner for Human Rights in accordance with paragraph 15(c) of the annex to Human Rights Council resolution 5/1, Human Rights Council Working Group on the Universal Periodic Review, 2010. Retrieved from https://documents-dds-ny.un.org/doc/UNDOC/GEN/G10/169/65/PDF/G1016965.pdf?OpenElement	2.3
131.	UN Human Rights Committee. Concluding observations on the fourth periodic report of the United States of America (CCPR/C/USA/CO/4). 2014. Retrieved from http://tbinternet.ohchr.org/_layouts/treatybodyexternal/Download.aspx?symbolno=CCPR%2fC%2fUSA%2fCO%2f4&Lang=en	2.3
132.	UN Human Rights Committee. Concluding observations on the sixth periodic report of the United States of America (CERD/C/USA/CO/6). 2008. Retrived from http://tbinternet.ohchr.org/_layouts/treatybodyexternal/Download.aspx?symbolno=CERD%2fC%2fUSA%2fCO%2f6&Lang=en	2.3
133.	Intercontinental Cry. Indigenous Struggles 2013: Dispatches from the Fourth World. 2014. Retrieved from https://www.scribd.com/document/216154458/Indigenous-Struggles-2013	2.3
134.	Intercontinental Cry. Indigenous Struggles 2012: Dispatches from the Fourth World. 2012. Retrieved from http://intercontinentalcry.org/wp-content/uploads/2013/01/Indigenous-Struggles-2012.pdf	2.3
135.	Society for Threatened Peoples. Press Release: An enlargement of the Shasta Dam will destroy our livelihood. 2014. Retrieved from https://www.gfbv.de/en/news/an-enlargement-of-the-shasta-dam-will-destroy-our-livelihood-6908-1/	2.3
136.	Inter-American Commission on Human Rights. Report Number 99/99, Case 11.140: Mary and Carrie Dann. 1999. Retrieved from http://www.cidh.oas.org/Indigenas/U.S.11140eng.htm	2.3
137.	Onondaga Nation. Press Release: The Onondaga Nation Files Petition Against United Sates with Inter-American Commission on Human Rights. 2014. Retrieved from http://www.onondaganation.org/news/2014/the-onondaga-nation-files-petition-against-united-states-with-inter-american-commission-on-human-rights-41514/	2.3
138.	United Nations Human Rights Committee. 109th Session, Consideration of the fourth periodic report of the United States of America under Article 40 of the International Covenant on Civil and Political Rights. Indigenous Peoples Consolidated Alternative Report. 2013. Retrieved from http://tbinternet.ohchr.org/Treaties/CCPR/Shared%20Documents/USA/INT_CCPR_CSS_USA_19233_E.pdf	2.3
139.	Department of the Interior. Report of the Commission on Indian Trust Administration and Reform. 2013. Retrieved from https://www.doi.gov/sites/doi.gov/files/migrated/cobell/commission/upload/Report-of-the-Commission-on-Indian-Trust-Administration-and-Reform_FINAL_Approved-12-10-2013.pdf	2.3
140.	Portalewska, A. Restricting Fishing Rights, Undermining Tribal Sovereignty. Cultural Survival Quarterly Magazine. 2014. Retrieved from https://www.culturalsurvival.org/publications/cultural-survival-quarterly/restricting-fishing-rights-undermining-tribal-sovereignty#	2.3
141.	Berditschevski, Michelle. News Release: Good medicine once again prevailed in U.S. District Court…, Mount Shasta Bioregional Ecology Center. 2017. Retrieved from http://mountshastaecology.org/2017/02/08/new-favorable-ruling-on-medicine-lake-highlands-geothermal-legal-case/	2.3
142.	Callahan, Mary. Nearly 700 acres of Sonoma county coast protected under deal with landowners, Kashia Pomo. The Press Democrat. 2015. Retrieved from http://www.pressdemocrat.com/news/4615137-181/nearly-700-acres-of-sonoma?artslide=0	2.3
143.	McGreal, Chris. US should return stolen land to Indian tribes, says United Nations. The Guardian. 2012. Retrieved from https://www.theguardian.com/world/2012/may/04/us-stolen-land-indian-tribes-un	2.3
Experts	Mike Dockry, U.S. Forest Service & member of the Citizen Potawatomi Nation; Marshall Pecore, Menominee Tribal Enterprises; Marc Gauthier, Upper Columbia United Tribes; Jeff Lindsey, Hoopa Valley Tribal Council; Paul Koll, Forest Manager; Karen Brenner, Consulting Forester	2.3

Controlled wood category 3: Wood from forests in which high conservation values are threatened by management activities

NOTE 1: *The US NRA covers the conterminous United States, which excludes Alaska and Hawaii and the US territories (i.e. portions of the United States that are not within the limits of any state and have not been admitted as states), for all types of forests.*

NOTE 2: *The risk assessment information below is a condensed version of the more detailed assessments available in Annex E. Annex E is presented in a non-table format and includes some additional details, along with supplementary context and guidance information, which are intended to help readers better understand the rationale behind the identification of HCVs and risk designation decisions. For any category with an associated annex, the content found in the main body of the risk assessment, not the annex, is definitive.*

Overview

General Assessment Process

Identification of HCVs was based primarily on the on the definitions in the FSC-US Forest Management Standard and additional guidance in the 'FSC-US Draft HCVF Assessment Framework,' with significant consideration of definitions in the NRA Framework (FSC-PRO-60-002a) and guidance in the 'Common Guidance for the Identification of HCV.' While the FSC-US assessment framework was never formally finalized, it has been in regular use since 2010. Using the FSC-US standard definitions and FSC-US assessment framework results in some differences from other global frameworks – most significantly, Roadless Areas are included in HCV 3 (instead of HCV 2), because in the US, they are quite rare and other than those protected within Federal Wilderness Areas (or other protective designations), they are generally quite small (not landscape level forests).

When possible, data sets that were consistent for the entire assessment area were used, but when these were not available, regional data, literature reviews and/or consultation with experts were used. The members of the original National Risk Assessment Working Group (NRA WG) and the current working group are all included in the list of experts consulted.

It is also worth noting that while the WWF Global 200 Ecoregions in the US were not used as a primary source of information for identifying HCV, when the forest types associated with the HCV 1 Critical Biodiversity Areas, HCV 3 Old Growth and HCV 3 Priority Forest Types are considered together, they align well with the forested WWF Global 200 Ecoregions in the U.S.

Ecological Context (Natural and Semi-Natural Forests)

Forests dominate the northeastern, southeastern, great lakes, western, and mountain regions of the US. The forested areas are split nearly evenly by the central non-forested plains. [196] Prior to European colonization, about 46 percent of the total land area of the US was forested. During the 19th century, about one-third of the forestland was cleared, primarily for agriculture. Overall forest area in the US has been relatively stable since the early 1900s, although there have been changes in forest character and regional variation in forest growth and loss patterns. [196,197]

The *Northeastern forested region* includes forests that are primarily dominated by deciduous species. Conifers are found in these forests, but are not as dominant as deciduous trees. Forest composition in the northeastern forests is determined primarily by the climate, soils, altitude, and frequency of disturbance, all of which can vary greatly throughout this region of the US. [198] This area includes the FSC US Northeast Region.

Great Lakes forests are dominated by conifers in the north, with more hardwoods mixed in as the lakes extend south. [199] Glacial soils are found across the region in these forests and they are often poorly drained on conifer stands. Disturbance from fire, windthrow and insects or diseases are common in the great lakes. [200] This area includes the FSC US Lake States Region.

Southeastern forests contain both pines and hardwoods. The highland and lower Mississippi Alluvial Valley portions of the region contain most of the hardwood dominated forest, while pines dominate the Piedmont and Coastal Plains portions of the region. Loblolly and shortleaf pine are the mostly commonly found pine species in the Southern United States. Mixed stands are also common. [201] This area includes the FSC US Appalachian, Southeast, Mississippi Alluvial Valley, and Ozark-Ouachita Regions.

The *Western forests and mountain regions* are dominated by conifers. The climate can vary widely with fire playing an important role in forest development. The variable precipitation can result in both drought and floods. [202] This area includes the FSC US Pacific Coast and Rocky Mountain regions.

Management:
The four most commonly used silvicultural systems in the US are selection systems, shelterwood systems, seed-tree systems, and clearcutting. Factors that influence the choice of silvicultural system include the reproductive habits and requirements of the desired species, requirements of wildlife, potential hazards from insects, disease, or climate, and the use of fire in the ecosystem. These systems are described in more detail below. Selection systems are often used on mixed hardwood forests in the northeast and great lakes regions. Clearcuts and other even-aged managed systems are often used on conifer stands.

- Selection systems involve removing either individual trees or groups of trees at intervals to maintain an uneven-aged stand with continuous regeneration. Individual tree selection is the removal of individual trees to favor more shade-tolerant species. Group selection is used to maintain a higher proportion of less shade-tolerant species. [201,203]
- Shelterwood systems involve removing mature trees in a series of cuts, with regeneration occurring under the remaining partial forest canopy. The final harvest removes the standing mature trees, allowing the new stand to develop into an even-aged system. Since shelterwood systems provide continuous cover, it is used most for species or sites where shelter is needed for regeneration. [201,203]
- Seed-tree systems are commonly used in conifer stands and involve harvesting all trees in an area in a single cut, leaving only a small number of trees of the desired species distributed throughout the site for natural regeneration. [201,203]
- Clearcutting takes place when all trees in a stand are harvested in one cut to create a new, even-aged stand. Regeneration can happen in a variety of ways, including through direct seeding or planting, natural seeding, or sprouting of trees that were under the cut. [201,203]

All US States have developed forestry best management practices that are intended to ensure that management practices do not result in violations of the Federal Clean Water Act. Implementation methodology for these practices varies by state, but overall are recognized to have a positive affect on environmental values [see the HCV 4 section for more details].

Biodiversity and Protections:
During the last ice age, glaciers covered the northern third of the United States. These glaciers carved out the Great Lakes basins, shaped the topography and left behind glacial deposits that formed the Great Lakes and Northeastern regions' soils. The varying soils and topography drive the diversity of species composition on forests across this part of the US.

The historical geologic activity in the southeast United States created the Appalachian Mountains. Large portions of the region were, at times, covered by seawater. This history led to a great diversity in soil types that are able to support many different habitats. The southeast United States is one of the most biodiverse temperate areas in the world. In addition to the geologic history, the temperate climate, high annual rainfall, and latitudinal range also contribute to the high diversity of ecosystems. [204]

The western United States is geologically young, with mountain ranges created by tectonic activity. The glaciers that once covered the northern part of the region deposited sediment and helped to carve out some of the mountains. [205] Climate and topography heavily influence the diversity of ecosystems.

Habitat destruction is the leading cause of biodiversity loss in the United States, followed by non-native invasive species [206]. Other threats to biodiversity that are frequently mentioned are similar to those seen globally: climate change, pollution, and over-exploitation.

As detailed in Category 1, the US has a broad and comprehensive legal structure that addresses the protection of socially and ecologically important sites, administered at both the federal and state level. The risks of non-compliance with these laws on public lands is generally low. The risk on private lands is also low, but attention should be given to areas known to be important to listed species.

<u>Protective Designations</u>
FSC US used the Protected Areas Database of the United States (PAD-US) to assess whether or not land was under protection for Category 3 HCVs. This database is the official inventory of protected areas in the United States, published by the U.S. Geological Survey Gap Analysis Program (GAP). The database compiles public parks, designated areas, conservation easements, and Marine Protected Areas, and is continuously updated. The database includes conservation rankings for both GAP Status Codes 1-4 and International Union for the Conservation of Nature (IUCN) categories. [181] As is common practice, the following assessment considers an area as permanently protected if it has a GAP Status of 1 or 2 [185]:

- *Status 1:* An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a natural state within which disturbance events (of natural type, frequency, intensity, and legacy) are allowed to proceed without interference or are mimicked through management. Example: Federal Wilderness Area

- *Status 2:* An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a primarily natural state, but which may receive uses or management practices that degrade the quality of existing natural communities, including suppression of natural disturbance. Examples: National Park, National Wildlife Refuge, National Natural Landmark

PAD-US data is used to inform the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) World Database on Protected Areas (WDPA). [181] The WDPA is used to report on progress towards the Aichi Biodiversity Targets, by the United Nations to track progress towards Sustainable Development Goals, and for other international assessments and reports. [182] Other non-governmental organizations that partner to help develop PAD-US include The Nature Conservancy, The Trust for Public Lands, NatureServe, and the Commission for Environmental Cooperation. [183] These uses of the data indicate that this is a highly trusted source of information.

While there haven't been any studies that looked specifically at the effectiveness of protective designations in the US, there are studies that assess the network of protected lands in the US (as classified by the PAD-US) and whether they represent ecological systems accurately. The use of the PAD-US dataset in this way indicates that it is recognized and respected as a valid source for information about areas that are effectively protected. One of these studies even explicitly recognizes this by stating, "the protected areas network within the continental US is often viewed as one of our best conservation tools for securing vegetation communities and the species they support into the future." [184]

Additionally, most of the GAP Status 1 and 2 designations are written into federal law [185] and the US is typically rated well or very well on global indices and indicators for legality, governance and law enforcement (see Category 1 and Category 2 assessments).

One additional form of protected designation in the US are conservation easements. These are legal agreements between a landowner and another entity (the holder of the easement) by which the landowner agrees to sell or donate certain rights associated with their property so that it will continue to achieve conservation objectives. The easement holder holds these rights (and may legally enforce them) and is typically either a non-governmental conservation organization, or a governmental natural resources agency (federal, state or local). As they are legally binding agreements and the US is typically rated well or very well on global indices and indicators for legality, governance and law enforcement (see Category 1 and Category 2 assessments), conservation easements may be viewed as effective protection. There is a national database of conservation easements maintained by the US Natural Resources Conservation Service[1].

Category 3 Experts consulted

	Name	Organization	Area of expertise (category/sub-category)
1.	Sophie Beckham	International Paper	COC certificate holder; FSC US Board member and therefore knowledgeable of most aspects of FSC
2.	Brad Holt	Boise Inc.	COC certificate holder and forest management expert
3.	Jim Sitts	Columbia Forest Products	FM and COC certificate holder
4.	Ross Congo	International Paper	Former auditor; COC certificate holder; CW NRA Technical Advisory Group member

[1] https://www.conservationeasement.us/downloads/?created=true

5.	Andrew Goldberg	Dogwood Alliance (previously), Currently Rainforest Alliance	Activist and legal expert
6.	Daniel Hall	Environmental Consultant (formerly Forest Ethics)	Activist and environmental consultant
7.	Greg Meade	The Nature Conservancy	Expert on forest management
8.	Annika Terrana	World Wildlife Fund US	Expert on forest biodiversity conservation and FSC certification; CW NRA Technical Advisory Group member
9.	Jeff Stringer	The University of Kentucky	Forestry professor and expert on FM and COC certification
10.	Mike Debonis	Green Mountain Club (formerly Forest Guild)	Knowledgeable on issues affecting forest and natural resource professionals
11.	Bobby Ammerman	The University of Kentucky	Expert on COC certification and COC smallholders; CW NRA Technical Advisory Group member
12.	Marisa Riggi	Northeast Wilderness Trust	Knowledgeable of rare ecosystems and landscapes in the Northeast US
13.	Karin Heiman	Southeast Regional Land Conservancy	Knowledgeable of rare ecosystems and landscapes in the Southeast US
14.	Dave Werntz	Conservation Northwest	Knowledgeable of rare ecosystems and landscapes in the Northwest US
15.	David Whitehouse	The Conservation Fund	Knowledgeable of rare ecosystems and landscapes in the Southeast US
16.	David Kirk	Wilderness Land Trust	Knowledgeable of rare ecosystems and landscapes in the Western US
17.	Tina Hall	The Nature Conservancy (Michigan)	Expert on forest management and FSC certification
18.	John McNulty	Seven Islands Land Company	FM certificate holder and expert on forest management
19.	John Gunn	University of New Hampshire, Department of Natural Resources & Environment	Expert on FSC certification, forest management, and forest ecology
20.	Troy Ettel	The Nature Conservancy	Expert on Longleaf Pine ecosystems and other rare ecosystems and species in the Southeast US
21.	Amanda Mahaffey	Forest Stewards Guild	Expert on Bottomland Hardwood Forests ecology and management
22.	Carl Nordman	NatureServe	Expert on Southeast US ecology, and rare ecosystems and species
23.	Allen Pursell	The Nature Conservancy (Indiana)	Expert on critical biodiversity areas in Indiana
24.	Chuck Byrd	The Nature Conservancy (Alabama)	Expert on critical biodiversity areas in Alabama
25.	Dominick Dellasala	Geos Institute	Expert on biodiversity issues in the U.S.
26.	James Strittholt	Conservation Biology Institute	Expert on biodiversity issues in the U.S.
27.	Greg Meade	The Nature Conservancy	Expert on critical biodiversity areas in the Appalachian and Southeast regions
28.	Christopher Reeves	IKEA (formerly University of Kentucky Extension)	Expert on forest ecosystems and forest management in the Appalachian region

29.	Mike Aust	Virginia Tech	Expert on bottomland hardwoods in the Southeast region
30.	David Stahle	University of Arkansas	Expert on bottomland hardwoods in the Southeast region
31.	Jeff Marcus	The Nature Conservancy (North Carolina)	Expert on biodiversity issues in North Carolina
32.	Bob Kellison	Professor Emeritus, NC State University	Expert on bottomland hardwoods in the Southeast region
33.	Michael Schafale	North Carolina Natural Heritage Program	Expert on bottomland hardwoods in the Southeast region
34.	Marshall Pecore	Menominee Tribal Enterprises	Forest manager for an FSC certified tribe
35.	Marc Gauthier	Upper Columbia United Tribes	Policy specialist for an affiliation of tribes
36.	Jeff Lindsey	Hoopa Valley Tribal Council	Forest manager for an FSC certified tribe
37.	Paul Koll	Independent Forest Manager	Forest manager with extensive experience working with tribes
38.	Karen Brenner	Independent Consultant	Consulting forester with extensive experience working with tribes

Summary of Category 3 Risk Designations by FSC US Region

This table provides a summary of risk designation decisions by FSC US Region (see Annex B for a map of FSC US Regions).
A 'Specified' notation below indicates that there is specified risk designated within the region, but it is usually not the entire region. This table is for general reference only – the normative risk designations are provided below associated with the each indicator for each HCV.

	Category 3: High Conservation Values					
FSC US Region	**HCV 1: Species Diversity**	**HCV 2: Landscape-Level Forests**	**HCV 3: Rare Ecosystems**	**HCV 4: Critical Ecosystem Services**	**HCV 5: Community Needs**	**HCV 6: Cultural Values**
Pacific Coast	Specified[1]	Low	Specified[4]	Low	Low	Low
Rocky Mountains	Low	Low	Specified[5]	Low	Low	Low
Southwest	Low	Low	Low	Low	Low	Low
Non-Forested	Low	Low	Low	Low	Low	Low
Great Lakes	Low	Low	Low	Low	Low	Low
Northeast	Low	Low	Low	Low	Low	Low
Appalachian	Specified[2]	Low	Specified[6]	Low	Low	Low
Ozark-Ouachita	Low	Low	Low	Low	Low	Low
Mississippi Alluvial	Low	Low	Specified[7]	Low	Low	Low
Southeast	Specified[3]	Low	Specified[8]	Low	Low	Low

[1] Critical Biodiversity Area: Central California, Klamath-Siskiyou
Species: Lesser Slender Salamander

[2] Critical Biodiversity Area: Central Appalachians
Species: Cheoah Bald Salamander

[3] Critical Biodiversity Area: Southern Appalachian, Cape Fear Arch, Florida Panhandle, Central Florida
Species: Dusky Gopher Frog, Houston Toad, Patch-nosed Salamander

[4] Old Growth Forest

[5] Old Growth Forest

[6] Priority Forest Type: Mesophytic Cove Sites

[7] Priority Forest Type: Late Successional Bottomland Hardwoods

[8] Priority Forest Type: Late Successional Bottomland Hardwoods, Native Longleaf Pine Systems

NOTE: Static PDF maps of specified risk designations are available on the FSC US web site and a spatial data layer is available upon request.

Category 3 Risk assessment

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
3.0	See below	As identified below, data are available and sufficient for determination of HCV presence, distribution and threats	Geographical Scale: Entire assessment area (Conterminous United States)	Low Risk: *Low Risk **Thresholds 1 & 2** apply: Data available are sufficient for determining HCV presence within the area under assessment, and for assessing threats to HCVs caused by forest management activities*
3.1 HCV 1		Two types of HCV 1 were identified and are addressed below – Critical Biodiversity Areas (CBA) and individual species' ranges	Geographical Scale: Entire assessment area (Conterminous United States) Primary Functional Scales: Critical Biodiversity Area HCV 1 Species Range Secondary Functional Scales (not applied for all identified HCV): WWF Ecoregion GAP Status USFS Inventoried Roadless Areas FSC US Region	Specified Risk: *Specified risk **Threshold 8** (HCV 1 is identified and/or its occurrence is likely in the area under assessment and it is threatened by management activities) applies to the following:* • Portions of the Central California Critical Biodiversity Area (CBA) that are within the WWF Sierra Nevada ecoregion, but are not within either GAP Status 1 or 2

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
				areas or USFS Inventoried Roadless Areas • Klamath-Siskiyou CBA • Portions of the Central Appalachian CBA that are within the FSC US Appalachian Region, but are not within either GAP Status 1 or 2 areas or USFS Inventoried Roadless Areas • Portions of the Southern Appalachian CBA that are not within either GAP Status 1 or 2 areas or USFS Inventoried Roadless Areas • Cape Fear Arch CBA • Florida Panhandle CBA • Central Florida CBA • Lesser Slender Salamander species range • Cheoah Bald Salamander species range • Portions of the Dusky Gopher Frog

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
				species range that are not within Louisiana • Houston Toad species range • Patch-nosed Salamander species range <u>Low Risk</u>: *Low risk **Threshold 5** (There is no HCV 1 identified in the area under assessment and its occurrence is unlikely) applies to the following:* • Portions of the assessment area that are not within either a CBA or an HCV 1 Species Range *Low risk **Threshold 6** (There is low/negligible threat to HCV 1 caused by management activities in the area under assessment) applies to the following:* • Southern California CBA • Portions of the Central California CBA that are not within the WWF

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
				Sierra Nevada ecoregion • Chihuahuan Desert CBA • Southwest Non-forested CBAs • Central Texas CBA • Blue River CBA • Portions of the Central Appalachian CBA that are not within the FSC US Appalachian Region • Portions of the Southern Florida CBA that are not within GAP Status 1 or 2 areas • Sierra Buttes Salamander species range • Southern Mountain Yellow-legged Frog species range • California Condor species range • Island Scrub-jay species range • Robust Cottontail species range • Spring Pygmy Sunfish species range • Waccamaw Killifish species range • Portion of the Dusky Gopher Frog

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
				species range that is within Louisiana • Rim Rock Crowned Snake species range • Black-capped Petrel species range • Florida Bonneted Bat species range • Red Wolf species range • Black-spotted Newt species range *Low risk **Threshold 7** (HCV 1 is identified and/or its occurrence is likely in the area under assessment, but it is effectively protected from threats from forest management activities) applies to the following:* • Portions of the Central California CBA that are within the WWF Sierra Nevada ecoregion and are also within either GAP Status 1 or 2 areas or USFS Inventoried Roadless Areas • Portions of the Central Appalachian CBA that are within

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
				the FSC US Appalachian Region and are also within either GAP Status 1 or 2 areas or USFS Inventoried Roadless Areas • Portions of the Southern Appalachian CBA that are within either GAP Status 1 or 2 areas or USFS Inventoried Roadless Areas • Portions of the Southern Florida CBA that are within GAP Status 1 or 2 areas • Relictual Slender Salamander species range • Scott Bar Salamander species range

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
	2,3,5,6	**Critical Biodiversity Areas (CBA)** This portion of the assessment was informed by a dataset of rarity-weighted richness for critically imperiled and imperiled species in the United States, a species richness index originally published by NatureServe and The Nature Conservancy (TNC) in 2000 that identifies areas with high concentrations of rare species. [2] The study identifies concentrations of biodiversity, based on occurrence data from NatureServe, of almost 2,800 rare species in the US, including plants, mollusks, arthropods, fish, reptiles, amphibians, birds, and mammals. The index preferences species with limited ranges by applying an additional weighting to species that is inversely proportionate to the size of the species' range (rarity-weighted richness index). The spatial unit of analysis was a grid of hexagons, each about 160,000 acres in size. Rarer species (endemic species with very limited ranges) were given more weight, based on the number of hexagons in which a species occurs. Specifically, if a species occurs only in one hexagon then it gets full weight (i.e., it counts as 1.0 species), if it occurs in two hexagons it counts as half (i.e., 0.5 species) in each of those hexagons, if it occurs in three hexagons it counts as 1/3, etc. These weighted values are then summed for each hexagon to get the rarity-weighted richness index for that hexagon. This dataset was updated by NatureServe in 2013, and the revised data were used for identification of concentrations of biodiversity, termed 'Critical Biodiversity Areas' for the purposes of this risk assessment. A kernel density analysis was completed on the dataset, using a search radius of 100 km. A threshold was selected similar to that used by the original FSC US NRA Working Group (NRA WG) for their analysis of the original dataset. This threshold was selected to ensure known areas of high biodiversity were included. The resulting 16 areas from the more recent analysis may be viewed on a map available from the FSC US National Risk Assessment web page (https://us.fsc.org/en-us/certification/controlled-wood/fsc-us-controlled-wood-national-risk-assessment-us-nra). This study aligns well with the HCV 1 definition of concentrations of biological diversity, as it identifies places with an increased conservation significance. It also aligns in with the focus on endemic species, and rare, threatened or endangered (RTE) species. Other datasets were investigated for this assessment, including U.S. Fish & Wildlife Service's designated Critical Habitat for listed species [5], Aquatic Biodiversity Hot Spots as defined in NatureServe's Rivers of Life report [6],		

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		and priority areas and opportunity areas from State Wildlife Action Plans. However, these other datasets provide information at different scales and for different spatial areas and overall are not as closely aligned with the definition of HCV 1 as the dataset selected for use. The Rarity-Weighted Richness dataset from NatureServe provided the most consistent data across the entire assessment area at a scale deemed by the NRA WG to be most appropriate for the NRA's purpose. The following 16 HCV 1 CBA were identified through the process described above and then each CBA was assessed for threats from forest management activities to determine risk designations within the CBA:		
	7-9	Southern California CBA A portion of this CBA includes forested lands which are focused on the four National Forests (Los Padres, San Bernardino, Cleveland & Angeles) that border the greater Los Angeles metropolitan area. However, most of the CBA is non-forested [9] and therefore not likely to be threatened by forest	Low risk for the entire Southern California CBA.	Low (Threshold 6)

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		management activities. While logging is one of a number of historic practices that have led to deterioration of the national forests in this CBA, the current threats are primarily driven by intensive development and recreational pressures due to their proximity to Los Angeles [7]. The four major threats are fire and fuels (due to lack of forest management and fire suppression), invasive species, loss of open space to development, and unmanaged recreation [7, 8]. *Summary*: Most of the CBA is non-forested. Those portions that are forested are threatened by intensive development and recreational pressures, not from forest management activities. Therefore, there is a low risk of threats to the concentration of biodiversity from forest management activities. [9, 7]		
	10-18,91	Central California CBA The Sierran mixed conifer habitat occurs as a vegetation band ranging 770 to 1230 m (2500 to 4000 ft) in the north to 1230 to 3076 m (4000 to 10,000 ft) in the southern Sierra Nevada. It supports a large number of rare species. Mixed Conifer and Montane meadow habitats drive the high biodiversity. Mixed Conifer Stands in the Sierra Nevada are threatened by forest simplification due to forest management activities (affecting both within stand and between stand diversity), logging, grazing, and fire suppression. [10, 11] While a portion of the Sierra Nevada is protected [18], the priority habitats also occur in portions of the CBA that are not protected [12, 15]. Montane meadows are grassland habitats, both wet and dry, that occur in the higher elevations of the Sierra Nevada. Montane Meadows within the CBA are threatened by habitat loss to vineyards, orchards & development, fire suppression, invasive species, grazing, and road construction (resulting in channel incision) for forest management and other activities [10, 15, 16] The portion of the CBA in the Rocky Mountain region is non-forested [18] and therefore not likely to be threatened by forest management activities. The concentrations of biodiversity in the coastal areas of this CBA are primarily associated with non-forested coastal prairies [10], which are not likely to be threatened by forest management activities.	Specified risk for the portions of the Central California CBA that are in the WWF Sierra Nevada ecoregion and that are not effectively protected (as demonstrated by GAP Status 1 & 2 areas in the PAD-US[4] dataset and USFS Inventoried Roadless Areas[5]) Low risk for the remainder of the CBA	Specified (Threshold 8) Low (Thresholds 6&7)

[4] https://gapanalysis.usgs.gov/padus/data/download/

[5] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		Summary: Within the portions of the Central California CBA that are in the WWF Sierra Nevada ecoregion and that are not effectively protected (as demonstrated by GAP Status 1 & 2 areas in the PAD-US[2] dataset and USFS Inventoried Roadless Areas[3]), forest management activities are threatening the concentration of biodiversity associated with this CBA. Within the remainder of the CBA, there is a low risk of threats from forest management activities due to effective protections in place and/or lack of forested habitat with concentrations of biodiversity.		
	19-22	Klamath-Siskiyou CBA The biodiversity in the Klamath-Siskiyou ecoregion is driven by geologic, topographic, and climatic complexity. This diversity in the geophysical landscape promotes a diversity of forest and other ecosystem types that provide habitat for a very large number of terrestrial and aquatic species, including many invertebrate species. Forest-based biodiversity in the Klamath-Siskiyou is largely sustained in diverse mixed conifer stands adapted to low-mid fire severity and frequency. Structural changes within mixed conifer stands due to altered fire regimes and conversion to monodominant stands through forest management can affect the biodiversity values of these areas. Other threats include fire suppression, habitat loss (due to logging), mining, road building, and grazing. [19, 20, 22] *Summary*: Forest management activities are threatening the concentration of biodiversity associated with this CBA.	Specified risk for the entire Klamath-Siskiyou CBA	Specified (Threshold 8)
	207-211	Chihuahuan Desert CBA This CBA extends from western Texas into New Mexico and is mostly non-forested. However, a small forested area occurs mostly within the Lincoln National Forest of New Mexico, and is associated with the Sacramento Mountains area. The driver of biodiversity appears to be the diversity of habitats resulting from this area being a transition zone that includes both more northern and more southern species, and large elevation change that results in habitats from desert to sub-alpine. The Sacramento Mountains area is identified as a conservation priority due to the high concentration of biodiversity and forests provide habitat to a number of rare species,	Low risk for the entire Chihuahuan Desert CBA.	Low (Threshold 6)

[2] https://gapanalysis.usgs.gov/padus/data/download/

[3] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		including the Sacramento Mountain Salamander and Mexican Spotted Owl. Historically, threats included timber harvest, but evidence indicates that threat is lower and conservation efforts are now focused on restoration of the forests. The more significant threats are currently from stand-replacing fires – particularly for forest-dependent species like the Mexican spotted owl – and climate change. [207,208,211] *Summary*: Only a limited portion of the CBA occurs on forested land and the threats to the forest are not directly from forest management activities. Therefore, there is a low risk of threats from forest management activities.		
	91	Southwest Non-Forested CBAs There are four CBA that occur in northwest Nevada, southwest Utah, southern Arizona, and central Texas. These four areas have very little forested land. [9] *Summary*: These CBA are almost entirely non-forested and therefore unlikely to be threatened by forest management activities.	Low risk for the entirety of all four CBAs.	Low (Threshold 6)
	28	Central Texas CBA A limited portion of this CBA, which occurs in an area adjacent to and including the greater Austin metropolitan area, is forested. It represents a confluence of a number of biotic regions which result in a highly diverse landscape and therefore high biodiversity. Threats to the area include habitat destruction from development (mostly urban development), introduced species, loss of aquifers and springs (again primarily due to increased development and overuse of water resources), water pollution and agricultural effects. Therefore, between the small amount of forest and the threats being primarily associated with urban and agricultural development, it is unlikely that the concentration of biodiversity within the CBA is being threatened by forest management activities. [28] *Summary*: Only a limited portion of the Central Texas CBA occurs on forested land and the threats to the forest are not directly from forest management activities. Therefore, there is a low risk of threats from forest management activities.	Low risk for the entire Central Texas CBA.	Low (Threshold 6)
	212-216 Expert 23	Blue River CBA The Blue River runs through the heart of the CBA boundary. It is recognized as one of the cleanest rivers in Indiana and is home to a number of rare plant and animal species, including the Eastern Hellbender, several species of darters and freshwater mussels. The steep topography of the area	Low risk for the entire Blue River CBA.	Low (Threshold 6)

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		provides many riffles, creating habitat for fish and other aquatic life. [212, 213] Karst systems, made primarily of limestone, are abundant in the CBA. The associated caves and springs have been heavily surveyed and exhibit a high level of species diversity [212,214; Expert: Allen Pursell] Evidence indicates that threats to the aquatic habitats are related to development and associated pollution and sedimentation from agriculture. [214] No threats from forest management activities were identified. The information available on threats to the eastern hellbender support this assessment. [213] The karst systems are threatened by chemical pollution, soil runoff and failing septic systems, recreation, dumping, and development of the land above the systems. No threats from forest management activities were identified. [214, 215,216; Expert 23] *Summary*: Threats to the concentration of biodiversity are not from forest management activities. Therefore, there is a low risk of threats from forest management activities.		
	29-30,33-35, 217-222	<u>Central Appalachians CBA</u> This CBA corresponds with the higher elevation portions of WWF's 'Appalachian Mixed Mesophytic Forest' area, one of their Global 200 biodiversity areas. The region acted as a refuge for mesic species during drier eras and this in combination with the incredible topographic and soil diversity resulted in very high biodiversity, particularly within the diverse broadleaf forests and aquatic habitats. These types of areas occur predominantly with the FSC US Appalachian region (Annex B). Historically, timber harvests within these diverse forests have been a significant threat, as few are adapted for large-scale disturbance. Removal of overstory trees, both through clear-cut harvests and high-grading (where only the most valuable species were removed), resulted in changes to species composition and forest structure, and therefore the biodiversity adapted to them. Extensive fragmentation of intact forest landscapes has occurred. Over 95% of the Mixed Mesophytic Forest habitat has been converted or degraded, leaving a very small number of examples of old-growth and intact examples of these diverse forest types. Most of these remaining remnants	<u>Specified risk</u> for the portions of the Central Appalachians CBA that occur within the FSC US Appalachian region and that are not effectively protected (as demonstrated by GAP Status 1 & 2 areas in the PAD-US[8] dataset and USFS Inventoried Roadless Areas[9]). <u>Low risk</u> for the remainder of the CBA	Specified (Threshold 8) Low (Thresholds 6&7)

[8] https://gapanalysis.usgs.gov/padus/data/download/

[9] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		occur within protected areas, or in places inaccessible for forest management. Conservation now focuses on ensuring the protection of these areas, restoration of other examples, and reforming more intact landscape-level forests. Other threats in the region include climate change, air and water pollution from mining, new highways and utility rights-of-way, off road vehicle (ORV) recreation, and over populations of deer [34,35,217,218,219,220] In addition to threats associated with agriculture, development, and mining, the following threats to aquatic habitats were associated with forest management: Hydrologic alteration partially due to forestry practices and conversion from hardwood forests to non-native planted pine (which may include ditching as a practice in wetter areas), reduced water quality partially due to loss of near-stream forested habitat and sedimentation associated with forestry practices and lack of BMP implementation, severe erosion of river banks. Three states that intersect the CBA have implementation rates of forestry Best Management Practices (BMPs) that are below the national average. [30,33,35,218,222] *Summary*: Within portions of the Central Appalachians CBA that occur within the FSC US Appalachian region and that are not effectively protected (as demonstrated by GAP Status 1 & 2 areas in the PAD-US[6] dataset and USFS Inventoried Roadless Areas[7]), forest management activities are threatening the concentration of biodiversity associated with this CBA. Within the remainder of the CBA, there is a low risk of threats from forest management activities due to effective protections in place and/or lack of forested habitat with concentrations of biodiversity.		
	29,36-43,224-227, 254-255,257 Experts 20,22,24	Southern Appalachians CBA Biodiversity values in the southern Appalachians are largely driven by exceptional aquatic biodiversity, but also by glade and montane longleaf pine habitats. Alabama's Wildlife Action plan identifies the following as statewide conservation actions that are needed for aquatic habitats: minimize nonpoint-source pollution in waterways, including from silvicultural sources; minimize disturbance to riparian zones, including from forestry,	Specified risk for portions of the Southern Appalachians CBA that are not effectively protected (as demonstrated by GAP Status 1 & 2 areas in the PAD-US[12] dataset and	Specified (Threshold 8) Low (Threshold 7)

[6] https://gapanalysis.usgs.gov/padus/data/download/

[7] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

[12] https://gapanalysis.usgs.gov/padus/data/download/

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		and minimize or better manage use of fertilizers, herbicides and pesticides near aquatic habitats (and forest practices were identified as a source for this threat). Implementation of forestry Best Management Practices (BMPs) are specifically mentioned for the first two as tactics for achieving the actions. [224] Additionally, three of the watershed/river basin plans that overlap this CBA include threats or conservation actions related to sedimentation from forestry or silvicultural activities [254,255,257]. The Cahaba plan identifies silviculture activities as the number two priority regarding significant contributions of sediment [254]. Threats to glades include grazing, non-native species, quarrying, root-digging, plant and animal collecting, removal of large rocks for landscaping, urban development, plowing for fire breaks, use as logging decks (resulting in soil/vegetation disturbance and soil erosion), conversion to other land uses, and ORV damage [37, 39]. No threats from forest management activities were identified. [Source 224, Expert 24] Montane longleaf pine biodiversity values can be adversely affected by forest management activities via conversion of longleaf to other pine types, and the use management techniques, including herbicide application that have the potential to inhibit native understory communities. Other threats include fire-suppression, urban development, forest conversion, non-native species, climate change [40, 41, 42, Experts 20,22] *Summary*: Within portions of the Southern Appalachians CBA that occur within the FSC US Appalachian region and that are not effectively protected (as demonstrated by GAP Status 1 & 2 areas in the PAD-US[10] dataset and USFS Inventoried Roadless Areas[11]), forest management activities are threatening the concentration of biodiversity associated with this CBA. Within the remainder of the CBA, there is a low risk of threats from forest management activities due to effective protections in place.	USFS Inventoried Roadless Areas[13]). Low risk for the remainder of the CBA	
	21,39-42,44-48, 225-227 Experts 20,22	Cape Fear Arch CBA The geologic and hydrologic history of the Cape Fear Arch region have resulted in a diversity of wet and dry habitats. This diversity in addition to the sand and limestone deposits that have resulted in a very high diversity	Specified risk for the entire Cape Fear Arch CBA.	Specified (Threshold 8)

[10] https://gapanalysis.usgs.gov/padus/data/download/

[11] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

[13] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		of natural communities and associated plant and animal species, particularly in pocosin and longleaf pine habitats. When the canopy has been completely removed through timber harvest, pocosins often do not regenerate. An associated threat from forest management is the conversion of native pine to planted pine and resulting loss of biodiversity, particularly if associated with changes in hydrology due to ditching [39, 45, 46, 47]. Other threats to pocosin habitat include hydraulic alteration, conversion to agriculture, road construction, and sand quarrying, habitat fragmentation, introduction of non-native species, climate change and fire suppression [45, 46]. Longleaf pine biodiversity values can be adversely affected by forest management activities via conversion of longleaf to other pine types, and the use management techniques, including herbicide application that have the potential to inhibit native understory communities. Other threats include fire-suppression, urban development, fragmentation, non-native species, intensive pine straw raking, and climate change. [45, 41, 42, 40; Experts 20,22]. *Summary*: Forest management activities are threatening the concentration of biodiversity associated with this CBA.		
	40-42,50-57, 147,225-227 Experts 20,22	Florida Panhandle CBA The Florida Panhandle is reported to be one of the 5 richest biodiversity hotspots in North America. This concentration of biodiversity is driven by the river systems (particularly the Apalachicola River), longleaf pine savanna habitat and unique steephead ravines. Threats to Apalachicola Bay/River system are varied and include persistent drought resulting in reduced flow level, loss of floodplain and wetland habitat due to reduced flow levels, point and non-point source pollution (including sediments from forestry operations due to insufficient ground cover and inadequate buffers), unrestrained growth and development. [50, 51] The Apalachicola River and Bay Surface Water Improvement and Management Plan identifies implementation of silvicultural Best Management Practices (BMPs) as a significant component of one of its priority projects [256]. Longleaf Pine Savanna biodiversity values can be adversely affected by forest management activities via conversion of longleaf to other pine types, and the use management techniques, including herbicide application that have the potential to inhibit native understory communities. [Expert 20] Other threats to longleaf pine include fire-suppression, urban development, fragmentation, non-native species, and climate change. [41, 42, 40, 53] The Florida Wildlife Action	Specified risk for the entire Florida Panhandle CBA.	Specified (Threshold 8)

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		Plan [54] identified forestry practices as a threat to one of the longleaf pine habitat types that occurs in the CBA and regional experts have confirmed that conversion to other managed forest types continues to be a threat. [57; Experts 20,22]. Reported threats to steephead ravine habitat include altered hydrologic regimes, conversion to other land uses, fire suppression. Forestry practices were identified as a low source of stress to the habitat in the Florida Wildlife Action Plan. [54] *Summary*: Forest management activities are threatening the concentration of biodiversity associated with this CBA.		
	55,57-63	Central Florida CBA As in other areas of the southern US, native pine ecosystems are an important driver for biodiversity in this CBA. Pine flatwoods in Central Florida are associated with xeric uplands/sandhills that provide a range of biodiversity values. Reported threats to Pine flatwoods include conversion to agriculture and pine plantations, alteration of fire regimes, non-native species, hydrologic alteration, substrate disturbance (Wiregrass may not withstand disturbance associated with planting pine), invasion by melaleuca if logged and over drained, and recreational damage [59, 60, 61]. Forestry practices were identified as a high source of stress to the natural pineland habitat in the Florida Wildlife Action Plan, in association with the following stresses which all had high ranks for the habitat: Altered fire regime, Altered hydrologic regime, Habitat destruction or conversion, Altered community structure, Altered species composition/dominance, and Fragmentation of habitats, communities, ecosystems [59]. *Summary*: Forest management activities are threatening the concentration of biodiversity associated with this CBA.	Specified risk for the entire Central Florida CBA	Specified (Threshold 8)
	57,64-65	Southern Florida CBA This CBA consists primarily of the Everglades region and urban and suburban portions of the city of Miami. The Everglades are the largest subtropical wilderness in the United States - a highly biodiverse area in part due to the diversity of the landscape, including uplands that are primarily rockland communities, freshwater wetland communities, and microalgae communities. The Everglades portion of the CBA is protected as a National Park (see the Category 3 'Overview' for an assessment of the effectiveness of protection designations in the US) and the majority of the remainder of the CBA occurs primarily in urban and developed areas (agriculture and	Low risk for the entire Southern Florida CBA	Low (Thresholds 6&7)

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		other development) with very little extent of forested communities and therefore where normal forest management is unlikely to be occurring [57]. *Summary*: A large portion of the CBA is under effective protection and the remainder occurs on areas with very little forest and therefore where normal forest management activities are unlikely to occur. Therefore, there is a low risk of threats from forest management activities.		
	70 Experts 25,26	**Priority Species** Consistent data regarding status of individual species are virtually impossible to find for the entire assessment area. The most consistent source of information on species occurrences, imperilment and conservation needs in North America is the NatureServe dataset [70]. This dataset provides the framework for identification of HCV1 species for the NRA. The NRA WG identified the following criteria as part of their identification HCV 1 species: level of imperilment, rarity, vertebrate species, and forest habitat dependency. These criteria were applied by FSC US staff in a standardized manner (developed in consultation with the current Working Group and Experts 25,26) to filter out HCV 1 species from the NatureServe dataset: • Imperilment-Rarity-Vertebrate: 156 vertebrate species with a G1 conservation status rank (critically imperiled at a global scale) and either an S1 conservation status rank (critically imperiled at a state scale) in at least one state or an S2 conservation status rank (imperiled at a state scale) in at least one state were identified from the NatureServe dataset. Any species with an S4 or S5 conservation status rank (apparently secure or secure, respectfully, at a state scale) in any state were removed. • Forest Habitat Dependency: The above species were then filtered by the habitat associations provided by the NatureServe dataset – species were retained if the Terrestrial habitats included anything labeled as 'Forest' or 'Woodland' or if the Palustrine habitats included anything labeled as 'Forested Wetland' or 'Riparian.' The remaining species were further filtered through review of habitat information available in the associated NatureServe Species Account, or additional information sources as needed. This filtering process identified 20 species.		

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		• Finally, species were filtered by recency of confirmed occurrences – species were retained if there was a formal documented occurrence within the last 20 years. Following this filtering process, 19 species remained and are included in this assessment as HCV 1 species. Species that made it through the first filter (Imperilment-Rarity-Vertebrate), but not the second (Forest Habitat Dependency) could also potentially be considered HCV 1 species, but they would all be classified as 'Low Risk' as they are not forest dependent, and therefore unlikely to be threatened by forest management activities. These species are not specifically identified in the assessment below, but are included in Annex F. Following the above filtering process, NatureServe species accounts and other information sources were reviewed to determine known threats for the remaining species. Species for which identified threats did not include forest management activities or species for which there was one primary threat that was not related to forest management activities and all other threats were insignificant as a result were given 'Low Risk' designations. Species with documented threats from forest management activities and those for which it was not possible to determine threats where given 'Specified Risk' designations for specific spatial areas. For listed species, the current range as designated by the listing authority was used for the specified risk area. For other species, counties with known occurrences were used. The county scale was chosen to provide as a scale at which it would be relatively easy for a certificate holder to determine whether or not the area of specified risk intersected with their supply area and as a scale that would most likely capture the area in which forest management activities could be having an effect on the species in question.		
	70-72	Lesser Slender Salamander (*Batrachoseps minor*) The Lesser Slender Salamander has a restricted distribution in the southern Santa Lucia Range of north-central San Luis Obispo County, A, generally above 400m. Little is known about this species and specific threats have not yet been documented. However, the species depends on forest habitat and down woody debris is likely an important habitat element [70], which can be affected by forest management, and therefore the precautionary approach should be taken. *Summary*: Forest management activities could threaten this species' habitat.	Specified risk for the species range, as defined by the California Department of Fish & Wildlife [71].	Specified (Threshold 8)

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
	70-72,258	Relictual Slender Salamander (*Batrachoseps relictus*) The Relictual Slender Salamander's known historical range includes the vicinity of Breckenridge Mountain, in the southern Sierra Nevada of CA, including the lower Kern River Canyon and higher elevations on Breckenridge Mountain. The historical range spans only 15 kilometers, and the two known extant populations are less than 5 kilometers apart. The species occurs mainly in heavily forested areas in mixed pine-fir-incense cedar forests. Little is known about this species and specific threats have not yet been documented. However, the species depends on forest habitat and down woody debris is likely an important habitat element [70], which can be affected by forest management. The entire known range of this species occurs within an Inventoried Roadless Area within the Sequoia National Forest (see the HCV 3 Roadless Areas assessment for details on the effective protection that this designation provides) [258]. *Summary*: This species' habitat is effectively protected.	Low risk for the species range	Low (Threshold 7)
	70-73,174,229-230	Scott Bar Salamander (*Plethodon asupak*) The Scott Bar Salamander is known from a few locations in northern California: Walker Gulch, Muck-a-Muck Creek above Scott Bar, and Mill Creek. [21] While there is agreement that the species is associated with talus slopes within forested areas, there is conflicting evidence as to whether it is associated with late successional forest, and to what extent it is affected by forest management activities. The species occurs on both federal and private lands and 10% of its range is within Inventoried Roadless Areas, and 51% of its range is in a reserve designation that withdraws those lands from timber harvest, and another 19% occurs within retention areas where commercial timber management is also restricted. Only 30% of the species' range is within the General Matrix portions of national forests and on private lands where timber management might occur. However, as a listed species in the State of California, the surveys and protective actions are required as part of the Timber Harvest Plan (THP) review process prior to harvests on private lands. A petition was put forward in 2004 to list the species (along with the Siskiyou Mountains Salamander) under the Federal Endangered Species Act, but the listing was found to be unwarranted for both species, primarily due to the protections already in place. A new petition for listing the Siskiyou	Low risk for the species range	Low (Threshold 7)

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		Mountains Salamander was submitted in 2018 by the same organizations, providing rationale of changes in forest practice rules in the State of Oregon, but the Scott Bar Salamander was not included in the second petition. [72,73,229,230] *Summary*: This species' habitat is effectively protected.		
	70	Sierra Buttes Salamander (*Hydromantes sp. 3*) The Sierra Buttes Salamander is known from only one isolated small area in Sierra County, A. They have a very limited home ranges. There are no current threats identified, and the area in which the population exists is unlikely to be developed [70]. *Summary*: This species is considered critically imperiled due to its very limited distribution, but there are no known threats to the species' habitat, and therefore, there is a low risk of threats from forest management activities.	Low risk for the species' range.	Low (Threshold 6)
	70-72,74	Southern Mountain Yellow-legged Frog (*Rana muscosa*) The Southern Mountain Yellow-legged Frog occurs in the southern Sierra Nevada mountains of California and in the mountains in southern California. It is found on/in sunny riverbanks, meadow streams, isolated pools, and lake borders in the Sierra Nevada, along with cool rocky stream courses fed by springs and snow melt in southern California. Threats to the frog include non-native fish introductions, disease, introduction of contaminants, livestock grazing, human use in and along streams, hydrologic alterations, climate change and vulnerability to catastrophic events. [70, 72] No substantive threats from forest management activities identified. *Summary*: Threats to this species' habitat are from other sources, and therefore, there is a low risk of threats from forest management activities.	Low risk for the species' range	Low (Threshold 6)
	70,72,74-75	California Condor (*Gymnogyps californianus*) The California Condor's large range includes rocky, open-country scrubland, coniferous forests and oak savanna. It uses cliffs, rocky outcrops and large trees as nesting sites, but overall forest does not appear to be a limiting factor. Current and historical threats are primarily from toxins, with the current major threat being lead poisoning from ammunition [75, 74, 70, 72]. No substantive threats from forest management activities identified.	Low risk for the species' range	Low (Threshold 6)

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		Summary: Threats to this species and its habitat are from other sources, and therefore, there is a low risk of threats from forest management activities.		
	70,76	Island Scrub-jay (*Aphelocoma insularis*) The Island Scrub-jay is found on Santa Cruz Island in the Channel Islands, California. The breeding population is relatively stable. Habitat comments specify 'open' woodland areas. Changes in vegetation (e.g., due to grazing or lack of grazing) can threaten the food supply and the species' small range makes it vulnerable to localized disasters, disease and non-native species invasion [76, 70]. No substantive threats from forest management activities identified. *Summary*: Threats to this species and its habitat are from other sources, and therefore, there is a low risk of threats from forest management activities.	Low risk for the species' range	Low (Threshold 6)
	70,72,77	Robust Cottontail (*Sylvilagus robustus*) The Robust Cottontail has a small range in Texas, New Mexico and Mexico. It occurs at higher elevations and has disappeared from two of the four mountain ranges where it was known to occur. The species is likely sensitive to drought and climate change may therefore be a threat. Habitat destruction from urbanization, development, cattle grazing and brush clearing are reducing the available habitat [70, 72]. No substantive threats from forest management activities identified. *Summary*: Threats to this species' habitat are from other sources, and therefore, there is a low risk of threats from forest management activities.	Low risk for the species' range	Low (Threshold 6)
	70,72,82,139, 231-233	Cheoah Bald Salamander (*Plethodon cheoah*) The Cheoah Bald Salamander's range is not yet well defined, but it is believed to be limited a portion of the Appalachian Mountains at the very western extent of North Carolina within the elevational range of 975-1,524 meters, associated with the Cheoah Bald. The salamander is endemic to the mesic forests that occur on the bald and may be common in suitable habitat. It appears that much of the species' range may occur within the Nantahala National Forest and it is identified as a Federal Species of Concern. Clear cutting is a major threat to local populations. Some populations have been found in second growth forests, providing evidence	Specified risk for the species' range, defined as the entirety of Graham and Swain Counties, NC.	Specified (Threshold 8)

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		that they are able to re-populate after harvest, but literature suggests it takes decades and with so few populations known extant [70], that kind of disruption could have a significant effect on the species as a whole. The 1994 Amendment to the Nantahala National Forest Plan included new definitions of management areas that provide an indication of whether timber management will likely occur [231]. The Cheoah Bald area is located within management areas that at this time either do not allow timber management, or are identified as being likely unsuitable for timber management [232,233]. However, as the species' range is not yet fully delineated, it is not possible to know whether all or most of the range occurs within these management areas. *Summary*: Forest management activities could threaten this species' habitat.		
	70,72,83	Spring Pygmy Sunfish (*Elassoma alabamae*) The spring pygmy sunfish is known to exist in one spring complex in the Tennessee River watershed. Forested wetlands provide habitat and it relies on dense underwater vegetation for both shelter and hunting grounds. Identified threats are changes to hydrology and decreased water quality due to incompatible land management activities in the surrounding agricultural and pasture lands [83, 70, 72]. No substantive threats from forest management activities identified. *Summary*: Threats to this species' habitat are from other sources, and therefore, there is a low risk of threats from forest management activities.	Low risk for the species' range	Low (Threshold 6)
	70,72,82	Waccamaw Killifish (*Fundulus waccamensis*) Waccamaw Killifish range is limited to Lake Waccamaw and its tributaries in eastern North Carolina. Forested wetlands provide habitat. The fish is very common within its small range and this combined with the population size suggests that the population is either stable or declining at a very slow rate. No major threats are currently believed to exist. Greatest conservation concern is related to septic tank runoff causing eutrophication. It is also noted that upland deforestation and consequent siltation could negatively affect demersal eggs, however, deforestation is not considered to be a normal forest management activity. Therefore, it is not considered a meaningful risk to the Waccamaw Killfish habitat from forest management activities. Additionally, the species' habitat is indirectly protected by	Low risk for the species' range	Low (Threshold 6)

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		designation as critical habitat for another species under the U.S. Endangered Species Act. [70] *Summary*: Threats to this species' habitat are from other sources, and therefore, there is a low risk of threats from forest management activities.		
	70,72,84,176, 234-235	Dusky Gopher Frog (*Lithobates sevosus*) The Dusky Gopher Frog historically occurred on the Coastal Plain from eastern Louisiana to the Mobile River delta in Alabama. Now, it is only known from one site in Harrison County and a couple of sites in Jackson County, MS, although there are also active efforts to reintroduce into wetlands in Perry County. Critical habitat was designated in 2012 within four counties in Mississippi and one in Louisiana. Current populations are documented in two of the Mississippi Counties (Harrison and Jackson) and active efforts toward reintroduction are occurring in the third (Perry). The species has not been documented in Louisiana since 1967 and there is no evidence of active reintroduction efforts. Occurs in upland areas of sandy soils that were historically forested with longleaf pine and in the temporary wetland breeding sites that are embedded within the forested landscape. Major threats include population isolation, urbanization, disease, and a lack of suitable habitat. Habitat degradation is a significant factor, driven by multiple sources including, changes in forest type from longleaf pine to other forest types, forest degradation caused by grazing and the disruption of the natural fire regime, and land management practices that alter the soil horizon, forest litter, herbaceous community and the occurrence of down woody debris. Timber site prep and other forestry practices that alter temporary wetlands can damage breeding areas. [70, 72] *Summary*: This species' habitat has been threatened by forest management activities. However, the risk is limited to the species range identified outside of the State of Louisiana, because of the duration of time since the species was last documented in Louisiana.	Specified risk for the species range, as defined by the U.S. Fish & Wildlife Service [176] critical habitat designation, with the exception of the portion within Louisiana Low risk for the portion of the species range within the state of Louisiana	Specified (Threshold 8) Low (Threshold 6)
	70,72,85-86,177	Houston Toad (*Anaxyrus houstonensis*) The Houston Toad is native to the central coastal region of Texas. Populations have been found in nine counties, with the largest in Bastrop County. The species is restricted to areas with soft sandy soils, typically with pine forest. Breeding sites include shallow water of roadside ditches, temporary ponds in residential areas and pastures, and other seasonally	Specified risk for the species range, as defined by the U.S. Fish & Wildlife Service [177] critical habitat designation.	Specified (Threshold 8)

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		flooded low spots where water persists for at least 60 days. Habitat conversion poses the most serious threat. Some forestry practices, such as thinning and burning, may benefit the toad, while others, such as clear cutting, are harmful. Other threats include prolonged drought and the presence of fire ants. [70,86] *Summary*: Forest management activities have threatened this species' habitat.		
	70,72,87-88	Patch-nosed Salamander (*Urspelerpes brucei*) The known range of the Patch-nosed Salamander is a small, first order stream with riparian habitat located at the foot of the Blue Ridge escarpment in Stephens County, GA. Little is known about this species and specific threats have not yet been documented. However, any factor that would disrupt water flow, canopy cover, or leaf-littler layer would likely impact the species [70,72]. As all of these can potentially be affected by forest management, the precautionary approach should be taken. *Summary*: Forest management activities could threaten this species' habitat.	Specified risk for the species range, defined as the entirety of Stephens and Habersham Counties, GA and Oconee County, SC	Specified (Threshold 8)
	70,72.89	Rim Rock Crowned Snake (*Tantilla oolitica*) The Rim Rock Crowned Snake are known to occur in various locations in and around Miami and the Florida Keys and is associated with forest and woodland habitats. Little is known about its diet and life history. Occurs in highly populated areas of Florida where forest management is unlikely to be occurring. Primary threats are intensive development and other disturbances (e.g., alteration of natural hydrological and fire regimes). [70] No substantive threats from forest management activities identified. *Summary*: Threats to this species' habitat are from other sources, and therefore, there is a low risk of threats from forest management activities.	Low risk for the species' range	Low (Threshold 6)
	70,72,76	Black-capped Petrel (*Pterodroma hasitata*) The bird's primary habitat is open ocean and only U.S. observations are at sea off the southeastern states. Nesting sites are located outside of the United States and it uses forest and woodland habitats, but not while in the assessment area. Current threats to the Black-capped Petrel are primarily habitat loss in Caribbean countries. Species does not use forests within the	Low risk for the species' range	Low (Threshold 6)

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		assessment area, and therefore it is unlikely to be threatened by forest management activities within the assessment area [70]. *Summary*: This species does not use forests within the assessment area and is therefore there is a low risk of threats to its habitat from forest management activities within the assessment area.		
	70,72,74,89	Florida Bonneted Bat (*Eumops floridanus*) Florida Bonneted Bats are rare and only occur in a few counties in south Florida. They have been found foraging in a wide variety of forested and non-forested habitats, in both natural and man-made areas. Vulnerable to ongoing loss and degradation of habitat and extirpation of local roosting populations due to human activities, climate change, stochastic events such as hurricanes and effects of non-native species [89, 70, 72]. No substantive threats from forest management activities identified. *Summary*: Threats to this species' habitat are from other sources, and therefore, there is a low risk of threats from forest management activities.	Low risk for the species' range	Low (Threshold 6)
	70,72,74,82,90	Red Wolf (*Canis rufus*) Red wolf is currently only known to exist in a limited area of eastern North Carolina, occupying the peninsula between the Albemarle and Pamlico Sounds and is associated with forest, woodland, forested wetland and riparian habitats. The wolf is common within the reintroduction area, but the occurrence outside of this area is unknown. Historical decline was due in part to habitat loss, but it is considered a habitat generalist that can thrive in forested and non-forested habitats. Current threats are hybridization with coyotes (primary), climate change (only population is on a peninsula, 3 ft above sea level), human induced mortality, and habitat loss and fragmentation due to urbanization/development [70,72]. *Summary*: Threats to this species and its habitat are from other sources, and therefore, there is a low risk of threats from forest management activities.	Low risk for the species' range	Low (Threshold 6)

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
	70,72,236-238	Black-spotted Newt (*Notophthalmus meridionalis*) Black-spotted Newts are known from a small number of sites in Texas and Mexico. They breed temporary ponds, roadside ditches and pools of small streams, and adults are associated with deep, poorly drained, clayey sediments that form ephemeral ponds or wetlands following heavy rain. Much of the species' original habitat has been converted to agricultural lands or through urban development. Additionally, insecticide and herbicide use is identified as a significant threat. [70,72,236,237,238] No threats from forest management identified. *Summary*: Threats to this species' habitat are from other sources, and therefore, there is a low risk of threats from forest management activities.	Low risk for the species' range	Low (Threshold 6)
3.2 HCV 2	3,4,94,97-102, 178-180	*NOTE: As clarified in the Overview at the beginning of the Category 3 section, Roadless Areas are considered HCV 3 within the context of the assessment area, due to their rarity and typical small size.* During the period of time following European colonization of the US and prior to 1910, about a third of the forest was converted (primarily to agriculture) and most of the remaining had been harvested at least once. Active management that doesn't allow a forest to reach full maturity greatly reduces its biodiversity as does forest fragmentation. [178,179] These factors have resulted in HCV 2 forests being fairly limited in the assessment area, generally only occurring in areas that are less accessible for harvest or development and/or have greater protections that limit development and commercial harvesting. In its HCV 2 assessment for the original National Risk Assessment Working Group (NRA WG), The Nature Conservancy (TNC) considered a number of datasets, including TNC Matrix Forest Blocks [92] and the Northwest Forest Plan Land Use Allocation, but ultimately did not include them in the analysis of HCV 2 because they do not fit the full definition of HCV and due to their limited spatial extents [3]. However, TNC concluded that the Greenpeace/ WRI Intact Forest Landscapes dataset [91] is reasonably robust, given that it is relatively straightforward to identify intact forest using remote sensing. Additionally, the description of Intact Forest Landscapes (IFL) for the dataset [92] aligns very closely with definitions for HCV 2. Therefore, this dataset is used as a proxy for all HCV 2 in the assessment area, as it effectively describes all HCV 2 in the US.	Geographical Scale: Entire assessment area (Conterminous United States)	Low Risk: *Low Risk **Threshold 11** applies: HCV 2 is identified and/or its occurrence is likely in the area under assessment, but it is effectively protected from threats caused by management activities.*

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		The dataset's IFL only occur in three areas in the eastern conterminous US areas – within the Adirondack management area in upstate New York, within the Okefenokee National Wildlife Refuge in southeastern Georgia, and within the Everglades on the southern tip of Florida. The areas in New York and Georgia occur on land that is permanently protected (GAP Status 1 or 2; see the Category 3 'Overview' for an assessment of the effectiveness of protection designations in the US). Most of the Everglades area is permanently protected within a National Park. However, there is an IFL located just north of the National Park within the Big Cypress National Preserve (established in 1974). While the Big Cypress swamp area is not Gap Status 1 or 2, it is managed as part of a broader plan to protect the entire Everglades system, which includes managing the forest to protect the hydrology of the greater Everglades region and to improve or restore natural communities. In 2002, a National Park Service suitability assessment identified that about a third of the Preserve likely met criteria for Federal Wilderness Area protection – indicating that the management of this area has effectively protected the ecosystem [97,98,100,180] Therefore (with four decades of success as additional evidence), it is possible to conclude that this area is unlikely to be threatened by forest management activities. In the Western Conterminous US, IFL occur largely within permanently protected areas, but some also occur outside of the Gap Status 1 or 2 areas. Almost all of the IFL that are not permanently protected occur within Inventoried Roadless Areas on lands managed by the U.S. Forest Service which are legislatively protected from timber harvest [see the HCV 3 Roadless Areas section for an assessment of the effectiveness of this designation]. There is one significant exception in northwestern Wyoming – an area that is part of the Wind River Reservation and is located within the White Reservation Roadless Area, which has been effectively protected by the Tribe since 1934 (as is evidenced by its continued roadless status 80 years later). [99, 100] *Summary*: HCV 2 exist in the area under assessment, but they largely occur on effectively protected areas. The HCV 2 areas that are located outside of permanently protected areas are effectively protected from threats caused by forest management activities by a management plan or another		

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		designation that provides effective protection. Therefore, there is a low risk that these HCV 2 areas are threatened by forest management activities.		
3.3 HCV 3		Based upon the FSC US High Conservation Value Framework, three types of HCV 3 were identified and are addressed below – Old Growth forests, Roadless Areas, and Priority Forest Types. *NOTE: As clarified in the Overview at the beginning of the Category 3 section, Roadless Areas are considered HCV 3 within the context of the assessment area, due to their rarity and typical small size.*	Geographical Scale: Entire assessment area (Conterminous United States) Functional Scales (not applied for all identified HCV 3): FSC US Regions Likelihood of Old Growth Occurrence GAP Status USFS Inventoried Roadless Areas Conservation Easements WWF Ecoregions Elevation USFS Ecological Subregions Significant Landscapes for Longleaf Pine	Specified Risk: *Specified risk* ***Threshold 17*** *(HCV 3 is identified and/or its occurrence is likely in the area under assessment and it is threatened by forest management activities) applies to the following:* • Portions of the FSC US Pacific Coast and Rocky Mountain Regions that have a higher likelihood of Old Growth occurrence, but are not within either GAP Status 1 or 2 areas or USFS Inventoried Roadless Areas or areas with conservation easements • Portions of the FSC US Appalachian Region that are also within the WWF Global 200 Appalachian & Mixed Mesophytic Forests ecoregion and are above 300

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
				m elevation, but are not within either GAP Status 1 or 2 areas or USFS Inventoried Roadless Areas • The extent of the Bottomlands Hardwood distribution that occurs within the portions of the Southeast and Mississippi Alluvial Valley regions that are also within the USFS Outer Coastal Plain Mixed Forest and Lower Mississippi Riverine Forest Ecological Subregions (USFS Ecological Subregions of the USA[14]), but are not within either GAP Status 1 or 2 areas or USFS Inventoried Roadless Areas • Portions of counties that are identified in Figure 1 of the Range-wide

[14] https://databasin.org/datasets/662c543156c14313b87d9b99b7a78221

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
				Longleaf Conservation Plan [146 p.32] as having 10,000 or more acres of Longleaf Pine, but that are not within either GAP Status 1 or 2 areas or USFS Inventoried Roadless Areas <u>Low Risk</u>: *Low risk **Threshold 13** (There is no HCV 3 identified and its occurrence is unlikely in the area under assessment) applies to the following:* • Portions of the assessment area that are not within the defined HCV 3 areas *Low risk **Threshold 14** (There is low/negligible threat to HCV 3 caused by management activities in the area under assessment) applies to the following:* • Portions of the FSC US Pacific Coast and Rocky Mountain regions

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
				that have a lower likelihood of Old Growth occurrence • Portions of the assessment area that are outside of FSC US Pacific Coast and Rocky Mountain regions where Old Growth occurs, but are not within either GAP Status 1 or 2 areas or USFS Inventoried Roadless Areas or conservation easements • Roadless Areas that occur outside of either GAP Status 1 or 2 areas or USFS Inventoried Roadless areas • Native Spruce-Fir forests that occur outside of either GAP Status 1 or 2 areas or USFS Inventoried Roadless areas *Low risk **Threshold 15** (HCV 1 is identified and/or its occurrence is likely in the area under assessment, but it is effectively*

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
				protected from threats from forest management activities) applies to the following: • Portions of the FSC US Pacific Coast and Rocky Mountain Regions that have a higher likelihood of Old Growth occurrence and are within either GAP Status 1 or 2 areas or USFS Inventoried Roadless Areas or areas with conservation easements • Portions of the assessment area that are outside of FSC US Pacific Coast and Rocky Mountain regions where Old Growth occurs and that are within either GAP Status 1 or 2 areas or USFS Inventoried Roadless Areas or conservation easements • Roadless Areas that occur within either

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
				GAP Status 1 or 2 areas or USFS Inventoried Roadless areas • Portions of the FSC US Appalachian Region that are also within the WWF Global 200 Appalachian & Mixed Mesophytic Forests ecoregion and are above 300 m elevation and are within either GAP Status 1 or 2 areas or USFS Inventoried Roadless Areas
	3,104, 106-112 116-117, 121, 161,239-240 Experts 25,26	**Old Growth** Late successional (Old Growth) data layers considered in this assessment include: • Possible Old Growth on National Forest Land in the Southern Appalachians [105] • Late seral forest on private lands for the Klamath-Siskiyou ecoregion [108] • Coastal Temperate Rainforest - Remaining Late Seral Forest Fragments in Northwest North America [109] • Northern California (USA) U.S. Forest Service Late-Successional Reserves [110]	Specified risk for lands in the Pacific Coast and Rocky Mountain regions that are identified as having a higher likelihood of containing Old Growth and that are not effectively protected (as demonstrated by GAP Status 1 & 2 areas in the PAD-US[21] dataset, USFS Inventoried Roadless Areas[22], and conservation	Specified (Threshold 17) Low (Thresholds 13,14&15)

[21] https://gapanalysis.usgs.gov/padus/data/download/

[22] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		All of these datalayers have similar characteristics and can be treated as a group. They are all based on remote sensing data and demonstrate areas with an increased likelihood of late successional forest. However, they were not developed using consistent methodologies and do cover the entire assessment area, and therefore cannot be used to develop a complete picture of the assessment area. They are also not spatially explicit maps of late successional forest. The LANDFIRE data set [103] was also considered, but even with additional analysis completed by The Nature Conservancy [3], was found by the original FSC US NRA Working Group (NRA WG) to have too great a potential for false positives to be considered for this assessment. Based upon the above datalayers, the NRA WG concluded that old growth has a high enough likelihood of occurrence outside of protected areas in the Pacific Coast and Rocky Mountain regions (see Annex B for FSC regions) that they should be fully assessed as part of the NRA. Ultimately, FSC US staff, in consultation with experts [25,26] and the NRA WG developed an alternate methodology for identifying areas with a higher likelihood of containing Old-Growth for the Pacific Coast and Rocky Mountains Regions. The methodology was a step-wise filtering process that began with an above ground forest biomass data layer (developed by the U.S. Forest Service[15]). The first step was to apply ecoregion-specific thresholds (based upon a literature search), followed by removal of areas within perimeters of fires since 2000 (U.S. Geological Survey[16]), and then removal of areas with recent forest gain or forest loss (Global Forest Watch[17]). The final step was to remove areas with protective designations, inculding GAP Status 1 or 2 protections (PAD-US dataset[18]), Inventoried Roadless Areas (U.S. Forest Service[19]), and conservation easements with	easements in the Natural Resources Conservation Service[23] dataset). Low risk for the remainder of the assessment area	

[15] https://data.fs.usda.gov/geodata/rastergateway/biomass/index.php

[16] https://rmgsc.cr.usgs.gov/outgoing/GeoMAC/historic_fire_data/

[17] http://data.globalforestwatch.org/datasets/tree-cover-loss-hansenumdgoogleusgsnasa

[18] https://gapanalysis.usgs.gov/padus/data/download/

[19] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

[23] https://www.conservationeasement.us/downloads/?created=true

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		an environmental purpose (Natural Resources Conservation Service[20]). See the Category 3 'Overview' for an assessment of the effectiveness of protection designations in the US and see the 'Roadless Area' section below for an assessment of the effectiveness of the Roadless Rule. In the Eastern conterminous U.S. (FSC US Great Lakes, Northeast, Ozark-Ouachita, Appalachian, Southeast and Mississippi Alluvial Valley Regions), old growth forest (as defined by FSC US) are much more scarce and the remaining pockets of old growth are more often than not on public lands and generally are in some kind of protective designation or exist in areas that are inaccessible for forest management. [106; see the Category 3 'Overview' for an assessment of the effectiveness of protection designations in the US] In the western conterminous U.S. (FSC US Pacific Coast, Rocky Mountain and Southwest Regions), threats to old growth forests include a lack of managing younger forests with a goal of creating old growth forests, timber harvest, invasive species, pests, pathogens, forest fragmentation, fire suppression, catastrophic wildfires and climate change. [106, 111] In frequent-fire forests of the western US, logging is no longer the primary threat to old growth, instead threats also include land management policies that suppress fire and do not mimic the effects of fire through active management [106,112]. In the Southwest, fires suppression remains the greatest threat, along with invasive species, climate change and development [106]. While the Northwest Forest Plan has significantly reduced the loss of Old Growth to timber harvest on federal lands guided by the plan (all within the Pacific Coast Region), losses continue at lower rates. Additionally, losses on non-federal lands in the Northwest, particularly private lands, have continued at much higher rates than on federal lands. Supporting evidence of these conclusions and generally that Old Growth is still being lost to timber harvest in the Northwest can be found in status assessments for species that are dependent upon late successional forests. [104,116,117,121,161,239,240; Experts: 25,26] *Summary*: In the eastern US, the remaining old growth typically occurs either in protected areas, or in areas that are inaccessible for timber		

[20] https://www.conservationeasement.us/downloads/?created=true

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		harvest, and therefore are low risk for threats from forest management activities. In the Southwest, old growth threats are predominantly from other sources, and therefore there is a low risk of threats from forest management activities. In the Pacific Coast and Rocky Mountain Regions, old growth forests that are not protected are threatened by forest management activities.		
	3,91,101-102 115, 118-120 Experts 12-19	**Roadless Areas** There is no comprehensive, consistent data set available for roadless areas within the assessment area. The NRA WG worked with TNC to explore various options for identifying roadless areas. [3] A number of existing data sets, including the U.S. Census Bureau's TIGER road dataset, [113] and more novel analyses developed by TNC, were considered, but were assessed by the NRA WG to include too many occurrences of false positives, based upon the FSC US Forest Management Standard's definition of roadless area, which includes the absence of forest roads and skid trails. The NRA WG concluded that roadless areas were best represented in this assessment by official federal datasets of inventoried roadless areas on U.S. Forest Service (USFS) administered lands [114] and Wilderness Study Areas on Bureau of Land Management (BLM) administered lands. [115] These data sets are both vetted by agency staff and can be confidently assessed to represent roadless areas. To help confirm the NRA WG's conclusion, FSC US staff consulted with science and land management staff at a number of regional and state land conservancies throughout the assessment area. These experts were asked about the potential for roadless areas, as defined by the FSC US Forest Management Standard, to occur on forested private lands that are not permanently protected and not FSC forest management certified (i.e., places outside of public lands where these HCV would not already be protected). A spatial assessment of the 'forest zone' data layer that is packaged with Greenpeace's Intact Forest Landscapes data layers and the BLM's Wilderness Study Areas data layer indicates that very few of these areas occur within the identified forested zones [91, 121]. Therefore, it is unlikely that they will be threatened by forest management activities. Under federal law (Roadless Rule), timber harvest is not currently allowed within Inventoried Roadless Areas on National Forests [116]. In the first 10	Low risk for the entire assessment area.	Low (Thresholds 13,14&15)

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		years of the Roadless Rule, only 75 miles of roads were built within inventoried roadless areas, and only a miniscule fraction were logged (and those were mostly outside of the assessment area). In its Tenth Anniversary Assessment of the Roadless Rule, The Wilderness Society (TWS) concludes that the Roadless Rule has been effective in preventing new road building and stopping commercial logging within inventoried roadless areas. [117] Additionally, when the Rule has been challenged in court, it has been upheld [118]. Even though they do not have permanent legal protection, this evidence suggests that the Roadless Rule has been very successful in maintaining the roadless character of these areas, and in severely limiting timber harvest [117]. Therefore, they are unlikely to be threatened by forest management activities due to the effective implementation of the Roadless Rule and the effective protection it provides. Expert consultation suggests that in most regions of the assessment area, lands that meet the FSC US Forest Management Standard's roadless criteria are believed to either no longer exist or to be so rare as to be functionally unidentifiable. One expert noted that at least in northern forested regions, large land holdings are typically heavily managed and therefore heavily roaded. Another noted that while the roads and skid trails may not have been used recently, the evidence of them still exists and they will be used again in the future. For those rare roadless areas greater than 500 acres that do occur on forested private lands that are not permanently protected, it was noted that these would most likely occur in areas that are too inaccessible or of such low productivity that logging of these areas is unlikely a risk. [Expert #s 12,13,14,15,16,17,18,19] Therefore, while there may be a very small number of roadless areas that meet the FSC US Forest Management Standard criteria on private lands within the assessment area that are not permanently protected, it is unlikely that they are actively threatened by forest management activities. *Summary*: USFS Inventoried Roadless Areas provide effective protection for the roadless areas that occur within them. Outside of the Inventoried Roadless Areas, forested roadless areas are extremely rare and most likely occur either in effectively protected areas, in areas that are inaccessible for timber harvest, or in areas of such low productivity that timber harvest is unlikely to occur and therefore there is a low risk for threats from forest management activities.		

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
	123 NRA WG	**Priority Forest Types** Priority Forest Types were developed by the original Controlled Wood Working Group (NRA WG) using the FSC US Forest Management Standard as guidance in addition to the HCV Resource Network guidance and additional stakeholder input. [123] These Priority Forest Types are regionally defined (see Annex B for FSC regions). Potential Priority Forest Types in the Pacific Coast and Rocky Mountain regions that are by definition Old Growth (e.g. Old Growth Douglas Fir stands) and/or that prior to European settlement would have existed predominantly as late-successional forest due to their natural disturbance regime (e.g., Coastal temperate rainforest) are not included here as Priority Forest Types, but instead are addressed through the Old Growth assessment described above. While the following forest types were initially identified by the original Working Group using guidance associated with the FSC US Forest Management Standard as a framework, they were reviewed for potential gaps using the forested WWF Global 200 ecoregions in the U.S. as a framework, but no significant gaps were identified when these Priority Forest types were considered in conjunction with HCV 3 Old Growth and the forest types associated with the HCV 1 Critical Biodiversity Areas.		
	124-131,241-243 Experts 5,7,28	Mesophytic Cove Sites Mesophytic cove sites are highly diverse, closed-canopy hardwood forest occurring on mesic, sheltered sites (coves) at low- to moderate-elevation (300-1,100 m / 1000-3600 ft), and sometimes higher. They tend to occur in large patches (tens to hundreds of acres) on concave slopes that accumulate nutrients and moisture. These kinds of areas occur within the portion of the FSC US Appalachian region that is within the WWF Global 200 Appalachian & Mixed Mesophytic Forests ecoregion. They are characterized by high diversity and often great structural complexity. While the sheltered, mesic sites that support Cove Forests are not particularly rare, examples are very rare that retain structural components like the dense canopy and high species diversity (both in the overstory and understory) [Experts: 5,7,28]. The most significant current threats to this forest type are invasive species and conversion to other uses. However, threats also include timber harvesting (resulting in alterations to the	Specified risk for the portions of the Appalachian region that are within the WWF Global 200 Appalachian & Mixed Mesophytic Forests ecoregion, occur above 300 m elevation, and that are not effectively protected (as demonstrated by GAP Status 1 & 2 areas in the PAD-US[24] dataset and USFS Inventoried	Specified (Threshold 17) Low (Thresholds 13&15)

[24] https://gapanalysis.usgs.gov/padus/data/download/

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		structure and composition of the forest), conversion to other forest types (white pine), climate change, chronic deer herbivory, harvesting of herbs and pollution [124, 125, 127, 129]. While less severe disturbances, such as logging and fire, may not reduce herbaceous species richness or diversity as much as more severe disturbances like mining and agriculture, they may still affect herbaceous species composition or abundance and therefore the quality and functioning of the system. Overall, the magnitude of impact from activities that occur within these sites on the herbaceous species are directly proportional to severity of disturbance. [127] *Summary*: This priority forest type is threatened by forest management activities such as conversion to other forest types and the introduction of invasive species in areas where it is not effectively protected.	Roadless Areas[25]). Low risk for the remainder of the assessment area	
	124,130-134 Expert 5	Native Spruce-Fir Comprised of native Red Spruce and Frasier Fir, these habitats occur on Appalachian mountaintops, generally above 4,500 feet in elevation in West Virginia, Virginia, Tennessee and North Carolina. They are a rare boreal forest type that are isolated from other boreal forest types and provide necessary habitat to endemic high-elevation species. They differ from similar forests further north due to less frequent fires, being less continuously cold and much wetter (i.e., rain and fog tend to concentrate on the mountain tops), and inclusion of southern US associated species. Forests dominated by Fraser fir are significantly threatened by air pollution and invasive species (balsam woolly adelgid). Other threats include climate change, catastrophic fire, and development [132, 133]. Due to the rarity and threatened nature of this forest type, it is a conservation priority and typically occurs in areas that are managed for restoration of the ecological community and/or are protected. In North Carolina, an estimated 91% of the existing extent is in some kind of conservation ownership [134]. *Summary*: Due to the rarity and threatened nature of this priority forest type, it is a conservation priority and typically occurs in areas that are managed for restoration of the ecological community and/or are effectively protected and therefore there is a low risk of threats from forest management activities.	Low Risk for the entire assessment area	Low (Threshold 14 & 15):

[25] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
	135-144,244-245 Experts 21,29-33	Late Successional Bottomland Hardwoods Bottomland Hardwoods are floodplain forests that are periodically inundated or saturated. Hydrology drives the entire ecosystem and means that even small changes can result in very significant effects on the system. Bottomland hardwoods in the Coastal Plain and Mississippi Alluvial Valley have some similarities, but also differ in some significant ways. Much of the original bottomland hardwood in the US has been cleared for agriculture, particularly so in the Mississippi valley, and much of the forest has been mismanaged – leaving very few examples of intact late successional forest. [135, 139, 141, 143]. 'Bottomland Hardwoods' as a category includes a number of different species associations that vary depending primarily upon the extent of flooding (e.g., permanently flooded cypress swamps vs slightly drier, temporarily flooded forests dominated by oak), but also soil characteristics, detrital decomposition rates, soil and water pH, nutrient availability and turnover rates, flood depth and water velocity, light intensity, and disturbance. Bottomland hardwoods do not have very distinct seral stages defined by significant changes in species composition, but instead maintain most of the same species, with slight shifts in composition. Therefore, a late successional stand is not defined by the species, as much as by the structural composition (e.g., more stratification) and existence of large wood debris, including standing hollow trees – these changes occur at about 80 years in most Bottomland hardwood types and perhaps a little later in cypress swamps. While old Bottomland Hardwood stands are not particularly rare, the late successional stands, with characteristics as previously described, are quite rare, due to a history of selective clear-cutting and high-grading. Those that are a little drier (slightly higher up the banks are more rare than the permanently flooded cypress swamps, due to greater historical access for timber management and conversion to agriculture. However, even the wettest sites are now seeing increased harvest, due to increased demand for materials. [244,245; Experts: 29-33] For the purposes of this assessment, 'late successional' refers to bottomland hardwoods that are at least 80 years old and have the complex	Specified risk for the extent of the Bottomlands Hardwood distribution that occurs within the portions of the Southeast and Mississippi Alluvial Valley regions that are also within the USFS Outer Coastal Plain Mixed Forest and Lower Mississippi Riverine Forest Ecological Subregions (USFS Ecological Subregions of the USA[26]) and that are not effectively protected (as demonstrated by GAP Status 1 & 2 areas in the PAD-US[27] dataset and USFS Inventoried Roadless Areas[28]). Low Risk for the remainder of the assessment area	Specified (Threshold 17) Low (Thresholds 13&15)

[26] https://databasin.org/datasets/662c543156c14313b87d9b99b7a78221

[27] https://gapanalysis.usgs.gov/padus/data/download/

[28] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		structural characteristics associated with late successional stands, but are not necessarily old growth (as defined by the FSC US Forest Management Standard) . [141,142] Significant threats include development, changes to hydrology (droughts, water withdraws, ditching), incompatible forest management (results in changes to canopy age and structure, to hydrology and to available dead and down woody debris), pollution, fragmentation, climate change, invasive species (including spread that is exacerbated by logging activities),, and economic drivers that alter forest management goals (i.e., economic drivers that increase harvest rates and demands for materials, resulting in pressure to harvest in places/in ways that aren't appropriate). [135, 139] Changes to the vegetative cover in these systems can significantly affect hydrologic flow, and therefore change the entire system [137, 138, 139, 141, 143; Expert: 33]. Forest management occurring within bottomland hardwoods is not necessarily in itself a threat, but how the management is applied, particularly in the context of the local landscape, is the most significant concern [135, 136, 140, 144]. The professionals responsible for managing these forests are frequently trained with a focus on upland silviculture, but those same techniques can have ecologically damaging effects when applied in bottomland hardwood system, due to the different disturbance regimes, ecosystem dynamics and regeneration needs. [135] As with the overall characteristics of the system, there are also some differences in threats between the Coastal Plain and Mississippi Alluvial Valley. In the Mississippi Valley, the river-driven seasonal flooding allows management activities to occur in relatively dry conditions, and silvicultural treatments can generate positive ecological and economic impacts. In contrast, bottomland hardwood forests in the Coastal Plain may not have the same opportunities for dependable, seasonable dry periods and are more often treated under challenging (wet) conditions than those in the Mississippi Alluvial Valley; therefore, clearcut silviculture (resulting in significant change to the vegetative cover) is more commonly implemented to meet economic and ecological goals. In the Coastal Plains, the systems are still not fully understood and it is not always known which silvicultural techniques are most appropriate in which situations, nor how decisions about forest management activities interact with other natural and human-derived threats. Whereas in the Mississippi Alluvial Valley, the demand for		

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		forest products can promote silviculture that does not achieve forest conditions desired for biodiversity and ecological function (i.e., size, structure and composition of forest vegetation, availability of dead and down woody debris). There is some evidence (and research is ongoing) that the size and location of openings, which species are retained, harvest method (equipment and techniques), past disturbance of hydrology and availability of red maple/sweet gum seed in the surrounding landscape all can have an impact on successful development of stands with the desired species composition and habitat elements. Silviculture decisions should emphasize the geomorphic setting and hydrologic conditions of the site, while restoring or maintaining the species and structural diversity. [144 Experts: 21,29,31,33] The above discussion of threats is generalized to all Bottomland Hardwoods; however, the same threats apply to the subset of these forests which has been identified as HCV – Late Successional Bottomland Hardwoods. *Summary*: Not all Bottomland Hardwood forests are rare and therefore not all should qualify as HCV 3. For the purposes of this assessment, only those that are at least 80 years old and have the complex structural characteristics associated with late successional stands are considered to be HCV 3 (i.e., Late Successional Bottomland Hardwoods). This priority forest type is threatened by forest management activities, including changes to hydrology, incompatible forest management activities, fragmentation, and economic drivers that alter forest management goals.		
	40, 145-150, 225-227,246-248 Experts 20,22	Native Longleaf Pine Systems Once one of the most widespread forest types in the US, longleaf pine savannah has been reduced to 5% of its original range. In terms of proportion of original extent that remains, this makes this system one of the rarest in the world. They are associated with particularly high animal and plant diversity. [40, 42, 150] Characteristics of these fire-dependent systems include longleaf pine as the dominant tree, a conspicuous lack of midstory trees and shrubs, and a well-developed, diverse ground layer (dominated by bunch grasses and other flowering plants). At a landscape scale, naturally occurring longleaf systems typically exist as an uneven-aged mosaic of even-aged patches, which vary in size, shape, structure, composition and density depending upon the local conditions. This	Specified risk for the portions of counties that are identified in Figure 1 of the Range-wide Longleaf Conservation Plan [146 p.32] as having 10,000 or more acres of Longleaf Pine and that are not effectively protected (as demonstrated by GAP Status 1 & 2 areas in the	Specified (Threshold 17) Low (Thresholds 13&15)

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		variability helps to drive the high biodiversity associated with them, with most of that biodiversity in the ground layer. [40, 147, 148, 149, 150] Threats include altered stand structure (due to lack of fire), conversion to other forest types, conversion to other land uses (development), habitat disturbance, fragmentation, and modification of hydrological features threaten native longleaf pine systems. As a fiber-producing forest type, long-leaf cannot compete with loblolly or slash pine for short-term returns on . As a result, native longleaf is still being converted to other forest types [145,147,148,149,150, Experts: 20,22], and while these other forest types may provide an acceptable habitat for some species, their establishment is threatening the existing longleaf pine areas. The hydrology of a site is important for both establishment of longleaf pine systems, but also for the natural function of the wetlands (ephemeral and permanent) that typically occur within them. The hydrology of a site can be affected by both past and current silvicultural practices. [247,248]. Threats are different in different places, with lack of fire being the overall greatest concern, followed by conversion to other land uses (development) and incompatible forest management practices (conversion to other forest types). However, the interactions between these three threats compound the problems - it is much more difficult to implement fire as a management tool when near urban areas, and fire is suppressed in the typical management of loblolly or slash pine, so that even the ground layer plant diversity is lost. *Summary*: This priority forest type is threatened by forest management activities such as conversion to other forest types, habitat disturbance, and modification of hydrological features.	PAD-US[29] dataset and USFS Inventoried Roadless Areas[30]). Low risk for the remainder of the assessment area	
3.4 HCV 4	152-158,249-253	The only dataset that the NRA WG found for the HCV4 assessment was the USFS Forests to Faucets Dataset[31] [151]. This dataset highlights areas important to drinking water based on the number of people that depend for drinking water on a given watershed (i.e. HUC 12), weighted for distance upstream from the water intake. The NRA WG concluded that this datalayer	Geographical Scale: Entire assessment area (Conterminous United States)	Low Risk: *Low Risk **Threshold 20** applies: There is low/negligible threat to HCV 4 caused by*

[29] https://gapanalysis.usgs.gov/padus/data/download/

[30] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

[31] https://www.fs.fed.us/ecosystemservices/FS_Efforts/forests2faucets.shtml

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		shows the importance of watersheds in the US to drinking water provision, and therefore the existence of HCV 4 associated with drinking water throughout much of the assessment area, particularly in the Eastern US and along the Pacific Coast. While HCV 4 as defined in the FSC US HCV Assessment Framework includes much more than just drinking water (e.g., watershed protection, erosion control, flooding and landslide protection), there are not datasets available for consistent identification of all HCV 4 throughout the assessment area. Therefore, the following risk assessment will consider the entire assessment area to have the potential for occurrence of HCV 4. The importance of well managed forests for HCV 4 (i.e., drinking water, watershed protection, erosion control, landslides, etc.) has been well documented. For example, studies have indicated that the cost of water purification for populated areas is lower when the forests within the source watershed are well managed [156]. Conversely, when forest management is not implemented well in HCV 4 areas, the effects can typically be seen through increased sediment and/or other pollutants in the water, affecting overall water quality along with impacts to the other critical ecosystem services that these forested areas provide. Therefore, the following assessment of whether HCV 4 are threatened by forest management activities and/or whether they are effectively protected, focuses on forestry best management practices (BMPs) developed for compliance with federal regulations governing Non-Point Source pollution of US waters as a proxy for forest management practices that effectively protect HCV 4. The Clean Water Act (CWA), which is enforced by the US Environmental Protection Agency (EPA) establishes the basic structure for regulating discharges of pollutants (including sediment) into the waters of the United States and regulating quality standards for surface waters. Overall, EPA monitoring indicates that contaminants are not uncommon, they are rarely associated with forest management activities- of all of the different sources of pollution and contaminants listed by the EPA, forest management is at the very bottom of the list. However, it can still be a contributor. [152, 153, 155, 156]. Pesticides are a source of impairment, but when used as part of forest management activities: the maximum concentrations observed in water have been much lower than the maximum levels considered safe by EPA, the types typically used have not been identified in surface or		*management activities in the area under assessment.*

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		groundwater in significant concentrations; and they break down relatively rapidly in water [154]. Every state in the US has developed a set of forestry BMPs – some as early as the 1970s. BMPs are recognized by the CWA as being the best way to address nonpoint source pollution from land management activities, even though they do vary somewhat from state-to-state. However, in terms of HCV 4, states typically include BMPs that address wetlands (which would most likely include HCV 4 for flooding), steep slopes (which would most likely include HCV 4 for landslides and erosion control), and buffer zones adjacent to streams (which would most likely include HCV for erosion control). [154,158] Therefore, if BMPs effectively protect these kinds of areas from degradation (and resulting water quality effects), it would be possible to conclude that they would also effectively protect HCV 4. All states with substantial levels of timber harvest have invested in nonpoint source pollution programs that are based on BMPs. Peer reviewed research has found that when forestry BMPs are implemented, they protect water quality [154,158]. Indicator 4.19 of the National Report on Sustainable Forests indicates that the area and percent of forest land with significant soil degradation is low, suggesting that implemented BMPs are effective [157]. Other research, though somewhat limited, supports this conclusion [250,252,253], with recognition that the level of effectiveness may vary some with the varying specifications of BMPs [251]. Those states that have invested in BMP monitoring programs generally report high levels of compliance and/or few significant risks to water quality [154]. Following a survey that requested results of state monitoring of BMPs, the National Association of State Foresters estimated that implementation rates average 91% nationwide [156]. Additionally, evidence indicates that those implementation rates are increasing over time [158,249]. Effectiveness of BMPs is also likely increasing with time, as they receive periodic review and revision [249]. *Summary*: Management practices that threaten HCV 4 (as defined by the FSC US HCV Framework) would result in increased sediment and/or other pollutants in affected waters. Conversely, forest management practices that do not threaten water quality will also effectively maintain the provision of other ecosystem services by those same forests. Evidence of the effectiveness of forestry BMPs, combined with the reported levels of		

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		compliance, indicates that there is a high likelihood that HCV 4 are not being threatened by forest management practices throughout the assessment area due to the implementation of forestry BMPs associated with State nonpoint source pollution programs for compliance with the federal Clean Water Act.		
3.5 HCV 5	5,159-160, 162 Experts 34-38	Non-Tribal Communities The United States is an industrialized nation that likely does not contain non-tribal communities within the conterminous states that directly rely on sites or resources fundamental to satisfying basic needs. No evidence of HCV 5 related to non-tribal communities in the conterminous United States was found through a literature search on this topic. There is some evidence that they may occur in Alaska and Hawaii [160, 161], but these states are not included in the assessment area for the NRA. FSC US also surveyed US certification bodies with forest management clients to inquire if they have received any comments from communities or stakeholders that depend on forests for their livelihood during forest management public consultations – the response was negative from all surveyed certification bodies [159]. There is no reason to believe that HCV 5 would be more or less likely to occur on certified vs noncertified lands (the focus of the NRA), therefore, our survey of certification bodies provides a sampling of lands throughout the assessment area. Limited subsistence activities by individuals from non-tribal communities are believed to occur in the conterminous United States, but the question is really whether these activities meet the definitions for HCV 5. The US Forest Service has broadened its consideration of subsistence to include and emphasize both social and cultural subsistence [160,161] and other assessments of 'subsistence' use of Non-Timber Forest Products focus on how these products are sold and/or traded and become part of a market system on which people depend [161,162]. Neither of these is consistent with the HCV 5 definition above. It is important to note that HCV 5 does not include forest uses such as recreational hunting or commercial timber harvesting. In rural areas in heavily forested environments, there is evidence of subsistence need at the scale of the individual, but not whole communities, or significant portions of communities [5].	Geographical Scale: Entire assessment area (Conterminous United States)	Low Risk: *Low Risk **Threshold 24** applies: There is low/negligible threat to HCV 5 caused by management activities in the area under assessment.*

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		Though subsistence activities by individuals from non-tribal communities likely do occur in the conterminous United States, evidence suggests that they do not meet the definition of HCV 5 and therefore it can be concluded that HCV 5 related to non-tribal communities are unlikely to occur in the assessment area. Tribal Communities FSC US staff consulted with two FSC-certified tribes, two forest managers with extensive experience working with Tribes, and a representative of an affiliation of tribes. Federal treaties exist for lands within the assessment area that protect the rights of American Indians to hunt, fish, trap and gather on reservations and on treaty-specified lands off reservations. [160] While in many instances these activities do not constitute situations where all or a significant portion of the tribe is dependent upon the forest resources for basic subsistence related to food and firewood, in some instances they are essential for these purposes due to the poverty level within some tribes and lack of retirement income. Additionally, tribes that live within forested environments frequently gather materials from the forest that are essential for cultural or traditional activities or for medicinal use. Without these materials, the tribes would not be able to perform the activities and as a result, the community well-being would suffer. It is important to note that these hunting and gathering rights are protected and conducted on either tribally owned land or on lands with specific and enforced treaty rights (i.e. National Forest). [Experts: 34-38] As there are Native American communities throughout the forested portions of the United States that may be dependent upon places within the forest for basic necessities as described above, the following risk assessment considers the entire assessment area. In its consultations with experts, FSC US staff heard concern expressed by the representative of the affiliation of tribes regarding localized forest management activities on ancestral lands to which the tribe in question does not have legal rights. However, the certified tribe that responded regarding the risk designation and the forest managers supported a low risk designation, recognizing that there may be isolated and infrequent events, but that there is not a widespread threat to forests on which the tribes are dependent for materials used in cultural and traditional activities (which represent basic needs for tribal communities). [Experts: 35-38]		

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		Summary: For non-tribal communities, some subsistence activities likely occur in the conterminous United States, however, evidence suggests that they do not meet the definition of HCV 5. For Tribal communities, HCV 5 likely occur throughout the assessment area, but there is no evidence of widespread threats from forest management activities.		
3.6 HCV 6	159,163,164, 165,166,167, 168,169,170, 159, 163-173, 186-,195 Experts 35-38	<u>Cultural Values of Global or National Significance</u> HCV 6 in the US that are associated with cultural values of global or national significance, are generally identified through formal protection in National Monuments, National Natural Landscapes, National Parks, or in state or local designations and occur throughout the United States. There are national level and state level registries of sites and they occur throughout the assessment area. In the United States, globally and nationally significant cultural sites that occur in forested areas are effectively protected as UNESCO World Heritage Sites [163], National Monuments, National Natural Landmarks, or National Parks, [see the Category 3 'Overview' for an assessment of the effectiveness of protection designations in the US]. Those that are not within protective designations generally still fall under the protection of federal legislation [168; see Categories 1 and 2 for assessments of legality, governance and law enforcement in the US]. <u>Areas of Critical Importance for Traditional Cultures</u> Locations of sites sacred to Native American tribes are not generally publicly available, due to tribal requests for confidentiality. However, as there were Native American communities throughout the United States prior to European colonization, these sites most likely occur throughout the assessment area. A large number of these sites occur on federally-administered lands [173], however, some do occur on other public lands, such as state-administered lands, and private lands. Therefore, the following risk assessment considers the entire assessment area. FSC US staff also consulted with an FSC-certified tribe, two forest managers with extensive experience working with Tribes, and a representative of an affiliation of tribes. Many of the Native American tribes' sacred sites occur on federally-managed lands, and while there has been a history of conflict with the Federal Government over protection of these sites, in recent years there	<u>Geographical Scale</u>: Entire assessment area (Conterminous United States)	<u>Low Risk</u>: *Low Risk* ***Threshold 29*** *(HCV 6 is identified and/or its occurrence is likely in the area under assessment, but it is effectively protected from threats caused by management activities) applies to the following:* • Areas with cultural values of global and/or national significance *Low Risk* ***Threshold 29*** *and Low Risk* ***Threshold 28*** *(There is low/negligible threat to HCV 6 caused by management activities in the area under assessment) apply to the following:* • Areas of critical importance for traditional cultures

Indicator	Sources of Information	HCV occurrence and threat assessment	Geographical/Functional scale	Risk designation and determination
		have been positive changes in this relationship, with a 1996 Executive Order and a 2012 MOU between a number of federal agencies for coordination and collaboration for protection of Indian sacred sites [164, 165, 166, 167, 169, 170, 172, 173]. All states have state preservation offices and associated laws, many of which are modeled on the National Historic Preservation Act and the National Environmental Policy Act which require state officials to conduct government to government consultations with Native Americans regarding the effects of governmental undertakings and the impact they may have on cultural resources, and these provide an additional layer of protections, particularly for sites not on federal lands [168,186] FSC US staff conducted an extensive search of articles and information (including hundreds of news articles, press releases, law reviews, and congressional hearings) related to tribal disputes within the last 15 years over sacred sites and sacred places [e.g., 188,189,190,191,192]. Only three disputes related to forest management activities were identified, and in all cases, the courts ruled in favor of the tribes and protection of the sacred sites [193,194,195]. The remainder dealt with issues primarily related to oil, gas and mineral extraction, development, and recreation. In its consultations with experts, FSC US staff heard concern expressed by the representative of the affiliation of tribes regarding localized forest management activities on ancestral lands to which the tribe in question does not have legal rights. However, the certified tribe and the forest managers who were also consulted supported a low risk designation, recognizing that there may be isolated and infrequent events, but that there is not a widespread threat to tribal cultural and sacred sites. [Experts: 35-38] *Summary*: Almost all areas with cultural values of global and/or national significant cultural landscapes are under effective protection as National Monuments, National Natural Landscapes or Natural Parks. While concern has been raised by some tribes about forest management on lands the tribes do not own, but are nevertheless important to their cultural identity, evidence points to the cultural values of the tribes being respected when challenged in court. There is no evidence of widespread threats from forest management activities to areas of critical importance for the traditional cultures of Native Americans or local communities.		

Category 3 Control measures

Indicator	Control measures (M – mandatory / R – recommended)
3.0	Not Applicable
3.1 HCV 1	If an organization wishes to source from a specified risk area, addressing the specified risk through implementation of the following Control Measure is mandatory (CM 3.1). If an organization finds that this control measure is inadequate to mitigate risk found in its specific operations, and the conditions established by Clause 4.13 of the Controlled Wood standard (FSC-STD-40-005 V3-1) apply, the organization may replace the following mandatory control measure with more effective control measures. **CM 3.1:** The organization is required to implement both parts of this Control Measure (CM 3.1.a and CM 3.1.b) **CM 3.1.a:** The Organization implements either CM 3.1.a.i or CM 3.1.a.ii for FSC US Regions relevant to the Organization's supply area: **CM 3.1.a.i:** A representative of the Organization attends FSC US-coordinated Controlled Wood Regional Meetings when they occur. The meetings will include the following elements: • Collaborative dialogues including both certificate holders and stakeholders that result in identification of a focused set of actions for each specified risk issue in the region that if implemented by certificate holders will reduce the risk of sourcing materials from lands where the HCV(s) is being threatened by forest management activities and that, when appropriate, includes a range in the level of resource investment required for implementation • Sharing information , as requested by FSC US, to augment effectiveness verification of actions implemented as part of CM 3.1.b. NOTE: It is recognized that depending on the information requested, it may not be possible to share it at the Controlled Wood Regional Meeting, and in this situation the Organization shall share it as soon as possible following the meeting. NOTE: It is the intention of FSC US to strive for very diverse participation in the Controlled Wood Regional Meetings, including certificate holders, environmental organizations, social organizations, experts, academics, public agencies, and landowners who are not certificate holders. NOTE: If the collaborative dialogues do not successfully identify a focused set of mitigation actions for each specified risk issue, FSC US will implement a contingency plan as detailed below. NOTE: Following each Controlled Wood Regional Meeting, FSC US will produce a Report that includes: 1) A summary of information communicated in advance of, or at the meetings, regarding identified specified risk issues; 2) The outcomes of the collaborative dialogues; and 3) Details of information that has been requested of certificate holders to augment effectiveness verification. NOTE: The FSC US Board of Directors will review the outcomes of the Controlled Wood Regional Meeting collaborative dialogues (or contingency plan) for any significant risks to the system. It is the Board's intention to endorse these outcomes unless a risk is identified, in which case the Board will approve a revised set of actions that will be published in the Report with rationale for any changes. Compliance Verification: The Organization demonstrates to their certification body that a representative of the Organization attended the meeting(s) held for the region(s) in which the Organization sources materials and the Organization shared the requested information. **CM 3.1.a.ii:** The Organization reviews the Controlled Wood Regional Meeting Report(s) and associated information and provides the information requested in the Report. Compliance Verification: The Organization shall demonstrate to their certification body an understanding of all three elements of the Controlled Wood Regional Meeting Report and that the requested information was shared.

	CM 3.1.b: For each area of specified risk from which the Organization sources materials, the Organization implements one or more of the actions identified during the collaborative dialogue at the Controlled Wood Regional Meeting, as detailed in the Controlled Wood Regional Meeting Report. When options for action with differential levels of resource investment required for implementation are identified, the action(s) implemented shall be commensurate with the scale and intensity of the Organization's potential impact on the HCV. NOTE: The scale and intensity of the Organization's potential impact on the HCV will be informed by: 1) the volume of materials that are being sourced by the Organization from the specified risk area, 2) the spatial extent of the specified risk area from which the Organization is sourcing materials, and 3) the potential for harm caused by the forest management activities typically required to produce the type of materials sourced from the specified risk area by the Organization. Compliance Verification: The Organization demonstrates when and how the action(s) identified was implemented and why that action(s) was selected. Effectiveness Verification for Control Measure CM 3.1: The Organization shall provide input into the effectiveness verification process through its implementation of CM 3.1.b. An assessment of the effectiveness of actions implemented in reducing the risk of sourcing from lands where HCV are harmed by forest management activities shall be determined by FSC US, in consultation with stakeholders, by evaluating the outcomes from each of the three elements of the Controlled Wood Regional Meetings and comparing them with outcomes from previous meetings, in combination with other monitoring data shared by stakeholders. The results of this assessment will be incorporated into the Controlled Wood Regional Meeting Report and will be used to inform future revisions to the National Risk Assessment. NOTE: While effectiveness verification will be linked to the Controlled Wood Regional Meetings, which are expected to occur every 3 to 5 years, the Organization is still responsible for reviewing its Due Diligence System at least annually (as specified in FSC-STD-40-005 V3-1, Clause 1.6) to determine if any new information is available that would indicate revisions to the Organization's Due Diligence System are needed. **Contingency Plan for CM 3.1.a** In the event that the Controlled Wood Regional Meeting collaborative dialogues do not come to a successful resolution, the following will be implemented in sequential order until a resolution has been achieved. 1. A small group of certificate holder and stakeholder representatives from the region is formed to build on the information and perspectives shared during the dialogue at the regional meeting. The participants in the group are identified at the regional meeting at the point when it is apparent that it will not be possible find agreement on a set of mitigation actions by the end of the meeting. The participants must have demonstrated an ability to represent the perspective of the chamber with which they are most aligned, an ability to be open to other perspectives and new ideas and an ability to compromise. This group will be asked to complete the process within a short timeframe. 2. If the small group participants are not successfully identified at the regional meeting, FSC US will solicit participants representing a diversity of perspectives and formalize a group in consultation with the FSC US Board of Directors. (with the same constraints on participation as detailed above). Similar to #1 above, this group will be asked to build on the dialogue held at the regional meeting and develop a set of mitigation actions. 3. If the small group in #1 or #2 above is unable to find agreement on a set of mitigation actions within 6 weeks of the Controlled Wood Regional Meeting, FSC US Staff will build on the dialogue held at the regional meeting and the discussions of the small group, and develop a draft set of mitigation actions to be approved by the FSC US Board of Directors prior to being published in the regional meeting report.
3.2 HCV 2	Not Applicable
3.3 HCV 3	*Same as 3.1 (HCV 1)*
3.4 HCV 4	Not Applicable
3.5 HCV 5	Not Applicable

3.6 HCV 6	Not Applicable

Category 3 Information sources

No	Source of information	Relevant indicator
1	Brown, E., N. Dudley, A. Lindhe, D.R. Muhtaman, C. Stewart, and T. Synnott (eds.). Common guidance for the identification of High Conservation Values. HCV Resource Network. 2013. Retrieved from https://ic.fsc.org/en/what-is-fsc-certification/consultations/archive/hcv-common-guidance	3.1, 3.2, 3.3, 3.4, 3.5
2	Chaplin, S.J., Gerrard, R., Watson, H.M., & Flack, S.R. The geography of imperilment: Targeting conservation towards critical biodiversity areas. 2000. Retrieved from http://www.natureserve.org/biodiversity-science/publications/precious-heritage-status- biodiversity-united-states	3.1
3	Fargione, Joe, Platt, J., Schneebeck, C., McRae, B. Mapping High Conservation Value Forests in the United States: Methodology and Data Sources. 2015. Available upon request for Forest Stewardship Council US.	3.1, 3.2, 3.3
4	Potapov P., Yaroshenko A., Turubanova S., Dubinin M., Laestadius L., Thies C., Aksenov D., Egorov A., Yesipova Y., Glushkov I., Karpachevskiy M., Kostikova A., Manisha A., Tsybikova E., Zhuravleva I. 2008. Mapping the World's Intact Forest Landscapes by Remote Sensing. Ecology and Society, 13 (2). Retrieved from http://www.intactforests.org; 'IFL for year 2013' datalayer used in this assessment	3.1, 3.3
5	U.S. Fish & Wildlife Service. U.S. FWS Threatened & Endangered Species Active Critical Habitat Report. Retrieved from http://criticalhabitat.fws.gov/crithab/	3.1
6	The Nature Conservancy. Rivers of Life, Critical Watersheds for Protecting Freshwater Biodiversity. 1998. Retrieved from http://www.natureserve.org/sites/default/files/publications/files/riversoflife.pdf	3.1
7	Center for Biological Diversity. Introduction to the Four Southern California National Forests: Los Padres, Angeles, San Bernardino, Cleveland. Retrieved from http://www.biologicaldiversity.org/programs/public_lands/forests/southern_california_forests/pdfs/Intro-4-S-CA-National-Forests.pdf	3.1
8	U.S. Forest Service. Four Threats. 2006. Retrieved from https://www.fs.fed.us/projects/four-threats/	3.1
9	U.S. Geological Survey. GAP Land Cover Data Portal. Retrieved from http://gapanalysis.usgs.gov/gaplandcover/	3.1
10	Mooney, Harold and Erika Zavaleta, eds. Ecosystems of California: Threats & Responses. 2016. CA: The Regents of the University of California. 72 p.	3.1
11	World Wildlife Fund. Sierra Nevada Forests. Retrieved from http://www.worldwildlife.org/ecoregions/na0527	3.1
12	North, Malcolm, ed. Managing Sierra Nevada Forests. Gen. Tech. Rep. PSW-GTR-237. 2012. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 184 p.	3.1
13	North, Malcolm; Peter Stine, Kevin O'Hara, William Zielinski, and Scott Stephens. An Ecosystem Management Strategy for Sierra Mixed-Conifer Forests. Gen. Tech. Rep. PSW-GTR-220. 2009. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 49 p.	3.1
14	Sierra Forest Legacy. Montane Meadows. Retrieved from https://www.sierraforestlegacy.org/FC_FireForestEcology/TH_MontaneMeadows.php	3.1
15	Ratliff, R.D. Meadows in the Sierra Nevada of California: State of Knowledge Gen. Tech. Rep. PSW-GTR-84. 1985. Berkeley, CA: Pacific Southwest Forest and Range Experiment Station, U.S. Forest Service, U.S. Department of Agriculture; 52 p.	3.1
16	Viers, Joshua H., et al. 2013. Montane Meadows in the Sierra Nevada: Changing Hydroclimatic Conditions and Concepts for Vulnerability Assessment. Center for Watershed Sciences, University of California Davis. 63 p.	3.1
17	California Department of Fish and Game. California Wildlife Habitat Relationships System: Sierran Mixed Conifer. 2005. Retrieved from https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=67311&inline	3.1
18	US Geological Survey. US-Protected Areas Database. Retrieved from http://gapanalysis.usgs.gov/padus/	3.1

No	Source of information	Relevant indicator
19	California Department of Fish and Game. California Wildlife Habitat Relationships System: Klamath Mixed Conifer. 2005. Retrieved from https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=67316	3.1
20	Klamath-Siskiyou Wildlands Center. The Klamath-Siskiyou Ecoregion. Retrieved from http://kswild.org/ksregion	3.1
21	NatureServe. NatureServe Explorer Database. Retrieved from http://explorer.natureserve.org/	3.1
22	World Wildlife Fund. Klamath-Siskiyou. Retrieved from https://www.worldwildlife.org/ecoregions/na0516	3.1
28	Environmental Science Institute. Hotspot of Biodiversity: Unique and Endangered Animals of Central Texas, a 'Hot Science – Cool Talks' presentation given at the University of Texas at Austin by Dr. David Hills, Professor of Integrative Biology. 2000. Retrieved from http://www.esi.utexas.edu/talk/hotspot-biodiversity/	3.1
29	Southeast Aquatic Resources Partnership. Conserving Fish Habitat from Rivers to the Sea: The story of the Southeast Aquatic Resources Partnership. 2014. Retrieved from http://www.southeastaquatics.net/resources/sarps-special-reports/conserving-fish-habitat-from-rivers-to-the-sea-the-story-of-the-southeast-aquatic-resources-partnership-1/view	3.1
30	Southeast Aquatic Resources Partnership. Southeast Aquatic Habitat Plan. 2008. Retrieved from http://southeastaquatics.net/resources/pdfs/SAHP08.pdf	3.1
33	Southeast Aquatic Resources Partnership and The Nature Conservancy. Roanoke River Conservation Action Plan. 2005. Retrieved from http://southeastaquatics.net/resources/pdfs/RoanokePlan.pdf	3.1
34	World Wildlife Fund. The Global 200 – Appalachian mixed mesophytic forests. Retrieved from https://www.worldwildlife.org/ecoregions/na0402	3.1
35	Southeast Aquatic Resources Partnership and The Nature Conservancy. Conserving the Duck River: A plan for collaborative action. 2005. Retrieved from http://southeastaquatics.net/resources/pdfs/DuckRiverCAP-2005v2.1.pdf	3.1
36	Murdock, Nora A. and McMillian, P.A. Rare Animals and Plants of Southern Appalachian Wetlands. Retrieved from https://www.wcc.nrcs.usda.gov/ftpref/wntsc/strmRest/SEwetlands/appxB.pdf	3.1
37	Nelson, P.W., J.A. Fitzgerald, K. Larson, R. McCoy, A. Schotz, J. Taft, T. Witsell, B. Yahn. Central Hardwoods Joint Venture Glade Conservation Assessment For the Interior Highlands and Interior Low Plateaus Of the Central Hardwoods Region. 2013. Retrieved from http://www.chjv.org/pdf/CHJV_Glade_Assessment_30_May_2013_FINAL_PRINT_version.pdf	3.1
38	Middle Tennessee State University. Center for Cedar Glade Studies. Retrieved from http://www.mtsu.edu/glade-center/index.php	3.1
39	U.S. Department of the Interior Southeast Climate Science Center. Insular Ecosystems of the Southeastern United States: A Regional Synthesis to Support Biodiversity Conservation in a Changing Climate. 2016. Retrieved from https://pubs.usgs.gov/pp/1828/pp1828.pdf	3.1
40	The Longleaf Alliance. Retrieved from http://www.longleafalliance.org/	3.1, 3.3
41	Brockway, Dale G., Tomczak, K.W., Johnson, D.J., Everett, E. Restoration of Longleaf Pine Ecosystems. 2005. Retrieved from https://www.srs.fs.usda.gov/pubs/20672	3.1
42	Regional Working Group for America's Longleaf. Range-wide Longleaf Conservation Plan. 2009. Retrieved from http://www.americaslongleaf.org/resources/conservation-plan/	3.1
43	Oswalt, Christopher M., Cooper, J.A., Brockway, D.G., Brooks, H.W., Walker, J.L., Connor, K.F., Oswalt, S.N., & Conner, R.C. History and Current Condition of Longleaf Pine in the Southern United States. 2012. Retrieved from https://www.srs.fs.fed.us/pubs/gtr/gtr_srs166.pdf	3.1
44	Cape Fear Arch Conservation Collaboration. A Collaborative Voice for Nature. Retrieved from http://capefeararch.org/about/	3.1
45	North Carolina Wildlife Resources Commission. North Carolina Wildlife Action Plan. 2005. Retrieved from http://www.ncwildlife.org/portals/0/Conserving/documents/ActionPlan/WAP_complete.pdf	3.1

No	Source of information	Relevant indicator
46	Cape Fear Arch Conservation Collaboration. Cape Fear Arch Conservation Plan & Focal Areas Appendix. Retrieved from http://capefeararch.org/resources/	3.1
47	U.S. Forest Service. Southern Forests Futures Project – Technical Report. 2013. Retrieved from https://www.srs.fs.fed.us/pubs/gtr/gtr_srs178.pdf	3.1
48	North Carolina Wildlife Resources Commission. Pocosin. Retrieved from http://216.27.39.104/Portals/0/Conserving/documents/Coast/CP_Pocosin.pdf?ver=2011-08-15-161939-077	3.1
49	Blaustein, Richard J. Biodiversity Hotspot: The Florida Panhandle. BioScience, Vol. 58 No. 9, pp. 784-790. 2008. Retrieved from http://www.masternaturalist.ifas.ufl.edu/docs/newsletters/res/biocience_biodiversity.pdf	3.1
50	Apalachicola Riverkeeper. Retrieved from http://apalachicolariverkeeper.org	3.1
51	Southeast Aquatic Resources Partnership and The Nature Conservancy. Roanoke River Conservation Action Plan. 2005. Retrieved from http://southeastaquatics.net/resources/pdfs/RoanokePlan.pdf	3.1
52	World Wildlife Fund. The Global 200 – Appalachian mixed mesophytic forests. Retrieved from https://www.worldwildlife.org/ecoregions/na0402	3.1
53	Southeast Aquatic Resources Partnership and The Nature Conservancy. Conserving the Duck River: A plan for collaborative action. 2005. Retrieved from http://southeastaquatics.net/resources/pdfs/DuckRiverCAP-2005v2.1.pdf	3.1
54	Murdock, Nora A. and McMillian, P.A. Rare Animals and Plants of Southern Appalachian Wetlands. Retrieved from https://www.wcc.nrcs.usda.gov/ftpref/wntsc/strmRest/SEwetlands/appxB.pdf	3.1
55	Nelson, P.W., J.A. Fitzgerald, K. Larson, R. McCoy, A. Schotz, J. Taft, T. Witsell, B. Yahn. Central Hardwoods Joint Venture Glade Conservation Assessment For the Interior Highlands and Interior Low Plateaus Of the Central Hardwoods Region. 2013. Retrieved from http://www.chjv.org/pdf/CHJV_Glade_Assessment_30_May_2013_FINAL_PRINT_version.pdf	3.1
56	Middle Tennessee State University. Center for Cedar Glade Studies. Retrieved from http://www.mtsu.edu/glade-center/index.php	3.1
57	U.S. Department of the Interior Southeast Climate Science Center. Insular Ecosystems of the Southeastern United States: A Regional Synthesis to Support Biodiversity Conservation in a Changing Climate. 2016. Retrieved from https://pubs.usgs.gov/pp/1828/pp1828.pdf	3.1
58	The Longleaf Alliance. Retrieved from http://www.longleafalliance.org/	3.1
59	Brockway, Dale G., Tomczak, K.W., Johnson, D.J., Everett, E. Restoration of Longleaf Pine Ecosystems. 2005. Retrieved from https://www.srs.fs.usda.gov/pubs/20672	3.1
60	Regional Working Group for America's Longleaf. Range-wide Longleaf Conservation Plan. 2009. Retrieved from http://www.americaslongleaf.org/resources/conservation-plan/	3.1
61	Oswalt, Christopher M., Cooper, J.A., Brockway, D.G., Brooks, H.W., Walker, J.L., Connor, K.F., Oswalt, S.N., & Conner, R.C. History and Current Condition of Longleaf Pine in the Southern United States. 2012. Retrieved from https://www.srs.fs.fed.us/pubs/gtr/gtr_srs166.pdf	3.1
62	Cape Fear Arch Conservation Collaboration. A Collaborative Voice for Nature. Retrieved from http://capefeararch.org/about/	3.1
63	North Carolina Wildlife Resources Commission. North Carolina Wildlife Action Plan. 2005. Retrieved from http://www.ncwildlife.org/portals/0/Conserving/documents/ActionPlan/WAP_complete.pdf	3.1
64	Cape Fear Arch Conservation Collaboration. Cape Fear Arch Conservation Plan & Focal Areas Appendix. Retrieved from http://capefeararch.org/resources/	3.1
65	U.S. Forest Service. Southern Forests Futures Project – Technical Report. 2013. Retrieved from https://www.srs.fs.fed.us/pubs/gtr/gtr_srs178.pdf	3.1
66	North Carolina Wildlife Resources Commission. Pocosin. Retrieved from http://216.27.39.104/Portals/0/Conserving/documents/Coast/CP_Pocosin.pdf?ver=2011-08-15-161939-077	3.1

No	Source of information	Relevant indicator
67	Blaustein, Richard J. Biodiversity Hotspot: The Florida Panhandle. BioScience, Vol. 58 No. 9, pp. 784-790. 2008. Retrieved from http://www.masternaturalist.ifas.ufl.edu/docs/newsletters/res/biocience_biodiversity.pdf	3.1
68	Apalachicola Riverkeeper. Retrieved from http://apalachicolariverkeeper.org	3.1
69	Southeast Aquatic Resources Partnership and The Nature Conservancy. Roanoke River Conservation Action Plan. 2005. Retrieved from http://southeastaquatics.net/resources/pdfs/RoanokePlan.pdf	3.1
70	World Wildlife Fund. The Global 200 – Appalachian mixed mesophytic forests. Retrieved from https://www.worldwildlife.org/ecoregions/na0402	3.1
71	California Department of Fish and Wildlife. California Wildlife Habitat Relationships System. Retrieved from https://www.wildlife.ca.gov/data/cwhr	3.1
72	International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/	3.1
73	U.S. Fish & Wildlife Service, Yreka Fish and Wildlife Office. Local Species Information – Siskiyou Mountains (Plethodon stormi) and Scott Bar (Plethodon asupak) Salamanders. 2013. Retrieved from https://www.fws.gov/yreka/plethodonspecies.html	3.1
74	US Fish & Wildlife Service. Environmental Conservation Online System. Retrieved from https://ecos.fws.gov/ecp/	3.1
75	California Department of Fish and Wildlife. California Condor. Retrieved from https://www.wildlife.ca.gov/Conservation/Birds/California-Condor	3.1
76	National Audubon Society. Guide to North American Birds. Retrieved from https://www.audubon.org/bird-guide	3.1
77	Animal Diversity Web. Sylvilagus robustus – robust cottontail. 2012. Retrieved from http://animaldiversity.org/accounts/Sylvilagus_robustus/	3.1
82	North Carolina Natural Heritage Program. Species/Community Search. Retrieved from http://ncnhde.natureserve.org/content/map	3.1
83	Center for Biological Diversity. Spring Pygmy Sunfish. Retrieved from http://www.biologicaldiversity.org/species/fish/spring_pygmy_sunfish/index.html	3.1
84	MS Department of Wildlife, Fisheries, and Parks & MS Museum of Natural Science. Endangered Species of Mississippi, page 56. 2014. Retrieved from http://www.mdwfp.com/media/3231/endangered_species_of_mississippi.pdf	3.1
85	U.S. Fish & Wildlife Service. Houston Toad Recovery Plan. 1984. Retrieved from https://ecos.fws.gov/docs/recovery_plan/840917.pdf	3.1
86	U.S. Fish & Wildlife Service. Endangered Species Houston Toad. 2009. Retrieved from http://ifw2es.fws.gov/HoustonToad	3.1
87	Georgia DNR Wildlife Resources Division. Species Distribution Map Retrieved from http://gakrakow.github.io/range_maps2.html	3.1
88	Georgia DNR Wildlife Resources Division. Species Profile for Patch-nosed Salamander. 2011. Retrieved from http://georgiawildlife.com/sites/default/files/uploads/wildlife/nongame/pdf/accounts/amphibians/urspelerpes_brucei.pdf	3.1
89	Florida Fish and Wildlife Conservation Commission. Rim Rock crowned snake. Retrieved from http://myfwc.com/wildlifehabitats/imperiled/profiles/reptiles/rim-rock-crowned-snake	3.1
90	US Fish & Wildlife Service. Red Wolf Program Review. Retrieved from https://www.fws.gov/redwolf/evaluation.html	3.1
91	Intact Forest Landscapes. Intact Forest Landscapes Data Download, The IFL Mapping Team. Retrieved from http://www.intactforests.org/data.ifl.html	3.2, 3.3
92	The Nature Conservancy. TNC Tier 1 Matrix Forest Blocks. 2006. Retrieved from http://databasin.org/datasets/68c240fb9dc14fda8ccd965064fb3321	3.2
93	Conservation Biology Institute. Northwest Forest Plan (Pacific Northwest, USA) - Land Use Allocation. 2010. Retrieved from http://databasin.org/datasets/5570316b9f174178a652136bac47ae4c	3.2
94	Intact Forest Landscapes. Overview. Retrieved from http://intactforests.org/index.html	3.2
97	U.S. National Park Service. Big Cypress National Preserve, Florida. Retrieved from https://www.nps.gov/bicy/index.htm	3.2
98	Florida Fish and Wildlife Conservation Commission. A Management Plan for the Everglades Complex of Wildlife Management Areas 2015-2020. 2015. Retrieved from http://myfwc.com/media/4055870/EvergladesComplexManagementPlan.pdf	3.2

No	Source of information	Relevant indicator
99	Aragon, Don. The Wind River Indian Tribes. International Journal of Wilderness. 2007. Retrieved from http://www.wilderness.net/library/documents/IJWAug07_Aragon.pdf	3.2
100	US Geological Survey. US-Protected Areas Database. Retrieved from http://gapanalysis.usgs.gov/padus/	3.2
101	U.S. Forest Service. 2001 Roadless Rule. Retrieved from https://www.fs.usda.gov/roadmain/roadless/2001roadlessrule	3.2
102	Anderson, Michael. The Wilderness Society. The Roadless Rule: A Tenth Anniversary Assessment. Retrieved from https://wilderness.org/sites/default/files/Roadless-Rule-paper-10th-anniversary.pdf	3.2
103	LANDFIRE. Landscape Fire and Resource Management Planning Tools. Retrieved from https://www.landfire.gov/	3.3
104	Krankina, O.N., DellaSala, D.A., Leonard, J, and Yatskov, M. 2014. High-Biomass Forests of the Pacific Northwest: Who Manages Them and How Much is Protected? Environmental Management. 04 June 2014. 10 pp.	3.3
105	Southern Appalachian Man and the Biosphere. Possible Old Growth on National Forest Land in the Southern Appalachians. Retrieved from Southern Appalachians Assessment: Terrestrial Resources Technical Report. 1996; http://www.samab.org/site/publications/	3.3
106	National Commission on Science for Sustainable Forestry. Beyond Old Growth: Older Forests in a Changing World. 2008. Retrieved from http://andrewsforest.oregonstate.edu/sites/default/files/lter/pubs/pdf/pub4524.pdf	3.3
107	Conservation Biology Institute. Old Growth Forests in the Pacific Northwest, USA. 2010. Retrieved from https://databasin.org/galleries/90e11cbab3724db2aa801e67643d9151	3.3
108	Conservation Biology Institute. Late seral forest on private lands for the Klamath-Siskiyou ecoregion. 2010. Retrieved from https://databasin.org/datasets/806a5cf3afc04778a6aa34725a757857	3.3
109	Conservation Biology Institute. Coastal Temperate Rainforest – Remaining Late Seral Forest Fragments in Northwest North America. 2010. Retrieved from https://databasin.org/datasets/7f72a68ac6c343bda3ffff4bef3926de	3.3
110	Conservation Biology Institute. Northern California (USA) U.S. Forest Service Late-Successional Reserves (LSRs). 2010. Retrieved from https://databasin.org/datasets/e12f559cda4743b1b76cc8715bcd677a	3.3
111	Committee on Energy and Natural Resources, United States Senate. Old-Growth Forest in the Pacific Northwest, Hearing before the Subcommittee on Public Lands and Forests. 2008. Retrieved from https://www.gpo.gov/fdsys/pkg/CHRG-110shrg43391/html/CHRG-110shrg43391.htm	3.3
112	Vosick, Diane, Ostergren, D.M., and Murfitt, L. Old-growth policy. Ecology and Society. 2007. Retrieved from http://www.ecologyandsociety.org/vol12/iss2/art19/	3.3
113	United States Census Bureau. TIGER/Line Shapefiles and TIGER/Line Files. 2017. Retrieved from https://www.census.gov/geo/maps-data/data/tiger-line.html	3.3
114	U.S. Forest Service. 2001 Roadless Rule GIS Data. 2014. Retrieved from https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437	3.3
115	Conservation Biology Institute. Wilderness Study Area - USA, October 2012. 2013. Retrieved from http://databasin.org/datasets/eea0e495148b446594356982001c458c	3.3
116	Desimone, S.M. 2016. Periodic Status Review for the Marbled Murrelet in Washington. Washington Department of Fish and Wildlife, Wildlife Program. 36 pp.	3.3
117	Buchanan, J.B. 2016. Periodic Status Review for the Northern Spotted Owl in Washington. Washington Department of Fish and Wildlife, Wildlife Program. 30 pp.	3.3
118	EarthJustice. Timeline: The Roadless Rule. Retrieved from http://earthjustice.org/features/timeline-of-the-roadless-rule	3.3

No	Source of information	Relevant indicator
119	U.S. Bureau of Land Management. Wilderness Study Areas. Retrieved from https://www.blm.gov/nlcs_web/sites/id/st/en/prog/NLCS/wilderness_study_areas0.html	3.3
120	U.S. Bureau of Land Management. BLM Manual 6330 – Management of Wilderness Study Areas (Public). Retrieved from https://www.blm.gov/nlcs_web/sites/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.31915.File.dat/6330.pdf	3.3
121	U.S. National Park Service. Big Cypress National Preserve, Florida. Retrieved from https://www.nps.gov/bicy/index.htm	3.3
122	Florida Fish and Wildlife Conservation Commission. A Management Plan for the Everglades Complex of Wildlife Management Areas 2015-2020. 2015. Retrieved from http://myfwc.com/media/4055870/EvergladesComplexManagementPlan.pdf	3.3
123	Aragon, Don. The Wind River Indian Tribes. International Journal of Wilderness. 2007. Retrieved from http://www.wilderness.net/library/documents/IJWAug07_Aragon.pdf	3.3
124	US Geological Survey. US-Protected Areas Database. Retrieved from http://gapanalysis.usgs.gov/padus/	3.3
125	U.S. Forest Service. 2001 Roadless Rule. Retrieved from https://www.fs.usda.gov/roadmain/roadless/2001roadlessrule	3.3
126	Anderson, Michael. The Wilderness Society. The Roadless Rule: A Tenth Anniversary Assessment. Retrieved from https://wilderness.org/sites/default/files/Roadless-Rule-paper-10th-anniversary.pdf	3.3
127	LANDFIRE. Landscape Fire and Resource Management Planning Tools. Retrieved from https://www.landfire.gov/	3.3
128	Krankina, O.N., DellaSala, D.A., Leonard, J, and Yatskov, M. 2014. High-Biomass Forests of the Pacific Northwest: Who Manages Them and How Much is Protected? Environmental Management. 04 June 2014. 10 pp.	3.3
129	Southern Appalachian Man and the Biosphere. Possible Old Growth on National Forest Land in the Southern Appalachians. Retrieved from Southern Appalachians Assessment: Terrestrial Resources Technical Report. 1996; http://www.samab.org/site/publications/	3.3
130	National Commission on Science for Sustainable Forestry. Beyond Old Growth: Older Forests in a Changing World. 2008. Retrieved from http://andrewsforest.oregonstate.edu/sites/default/files/lter/pubs/pdf/pub4524.pdf	3.3
131	Conservation Biology Institute. Old Growth Forests in the Pacific Northwest, USA. 2010. Retrieved from https://databasin.org/galleries/90e11cbab3724db2aa801e67643d9151	3.3
132	Conservation Biology Institute. Late seral forest on private lands for the Klamath-Siskiyou ecoregion. 2010. Retrieved from https://databasin.org/datasets/806a5cf3afc04778a6aa34725a757857	3.3
133	Conservation Biology Institute. Coastal Temperate Rainforest – Remaining Late Seral Forest Fragments in Northwest North America. 2010. Retrieved from https://databasin.org/datasets/7f72a68ac6c343bda3ffff4bef3926de	3.3
134	Conservation Biology Institute. Northern California (USA) U.S. Forest Service Late-Successional Reserves (LSRs). 2010. Retrieved from https://databasin.org/datasets/e12f559cda4743b1b76cc8715bcd677a	3.3
135	Committee on Energy and Natural Resources, United States Senate. Old-Growth Forest in the Pacific Northwest, Hearing before the Subcommittee on Public Lands and Forests. 2008. Retrieved from https://www.gpo.gov/fdsys/pkg/CHRG-110shrg43391/html/CHRG-110shrg43391.htm	3.3
136	Vosick, Diane, Ostergren, D.M., and Murfitt, L. Old-growth policy. Ecology and Society. 2007. Retrieved from http://www.ecologyandsociety.org/vol12/iss2/art19/	3.3
137	United States Census Bureau. TIGER/Line Shapefiles and TIGER/Line Files. 2017. Retrieved from https://www.census.gov/geo/maps-data/data/tiger-line.html	3.3
138	U.S. Forest Service. 2001 Roadless Rule GIS Data. 2014. Retrieved from https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437	3.3

No	Source of information	Relevant indicator
139	Conservation Biology Institute. Wilderness Study Area - USA, October 2012. 2013. Retrieved from http://databasin.org/datasets/eea0e495148b446594356982001c458c	3.3
140	Desimone, S.M. 2016. Periodic Status Review for the Marbled Murrelet in Washington. Washington Department of Fish and Wildlife, Wildlife Program. 36 pp.	3.3
141	U.S. Forest Service. Bottomland Hardwoods, Web-Based Forest Management Guide. Retrieved from https://www.nrs.fs.fed.us/fmg/nfmg/bl_hardwood/mgt/unevenex.html	3.3
142	U.S. Department of Defense. Development of restoration trajectory metrics in reforested bottomland hardwood forests applying a rapid assessment approach. 2013. Retrieved from https://digitalcommons.unl.edu/usarmyresearch/182/	3.3
143	Ober, Holly K. The Importance of Bottomland Hardwood for Wildlife. University of Florida IFAS Extension. Retrieved from http://edis.ifas.ufl.edu/pdffiles/UW/UW31600.pdf	3.3
144	Lower Mississippi Valley Joint Venture: Forest Resource Conservation Working Group. Restoration, Management and Monitoring of Forest Resources in the Mississippi Alluvial Valley: Recommendations for Enhancing Wildlife Habitat. 2007. Retrieved from https://www.murraystate.edu/colorbox/biology/faculty/gagnon/Bottomland%20Forest%20Report%20LMVJV.Reduced.pdf	3.3
145	Brockway, Dale G., Outcalt, K.W., Tomczak, D.J., & Johnson, E.E. Restoration of Longleaf Pine Ecosystems, General Technical Report SRS-83. 2006. Retrieved from http://www.longleafalliance.org/what-we-do/education/publications/documents/general-longleaf-restoration/lla52.pdf	3.3
146	Regional Working Group for *America's Longleaf.* Range-wide Longleaf Conservation Plan. 2009. Retrieved from http://www.americaslongleaf.org/media/86/conservation_plan.pdf	3.3
147	Oswalt, Christopher M., et.al. History and Current Condition of Longleaf Pine in the Southern United States, General Technical Report SRS-166. 2012. Retrieved from https://www.srs.fs.fed.us/pubs/gtr/gtr_srs166.pdf	3.3
148	Louisiana Department of Wildlife and Fisheries. Eastern Longleaf Pine Savannah. 2005. Retrieved from http://www.wlf.louisiana.gov/sites/default/files/pdf/document/32872-eastern-longleaf-pine-savannah/eastern_longleaf_pine_savannah.pdf	3.3
149	Johnson, Rhett & Gjerstad, Dean. Landscape-Scale Restoration of the Longleaf Pine Ecosystem. 1998. Retrieved from http://www.longleafalliance.org/what-we-do/education/publications/documents/general-longleaf-restoration/lla132.pdf	3.3
150	The Nature Conservancy. Longleaf Pine: Restoring a National Treasure. Retrieved from https://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/longleaf-pine-forests-landing-page.xml	3.3
151	U.S. Forest Service. Forests to Faucets. Retrieved from https://www.fs.fed.us/ecosystemservices/FS_Efforts/forests2faucets.shtml	3.4
152	U.S. Environmental Protection Agency. Summary of the Clean Water Act – 33 U.S.C. §1251 et seq. (1972). Retrieved from https://www.epa.gov/laws-regulations/summary-clean-water-act	3.4
153	Centers for Disease Control and Prevention. Drinking Water FAQ. 2012. Retrieved from https://www.cdc.gov/healthywater/drinking/public/drinking-water-faq.html	3.4
154	Schilling, E.B. Technical Bulletin No. 0966: Compendium of Forestry Best Management Practices for Controlling Nonpoint Source Pollution in North America. 2009. National Council for Air and Stream Improvement. Retrieved from http://www.ncasi.org/Programs/Reports-and-Articles/Technical-Bulletins-and-Special-Reports/Technical-Bulletins/Index.aspx	3.4
155	Luntz, Taryn. U.S. Drinking Water Widely Contaminated. Scientific American. 2009. Retrieved from https://www.scientificamerican.com/article/tap-drinking-water-contaminants-pollutants/	3.4

No	Source of information	Relevant indicator
156	National Association of State Foresters. Protecting Water Quality through State Forestry Best Management Practices. Retrieved from http://stateforesters.org/sites/default/files/issues-and-policies-document-attachments/Protecting_Water_Quality_through_State_Forestry_BMPs_FINAL.pdf	3.4
157	U.S. Forest Service. National Report on Sustainable Forests – 2010. Retrieved from https://www.fs.fed.us/research/sustain/national-report.php	3.4
158	Cristan, R., Aust, W.M., Colding, M.C., Barrett, S.M., Munsell, J.F., and Schilling, E. Effectiveness of forestry best management practices in the United States: Literature review. 2016. Forest Ecology and Management 360: 133-151.	3.4
159	Cristan, R., Aust, W.M., Colding, M.C., Barrett, S.M., Munsell, J.F., and Schilling, E. Effectiveness of forestry best management practices in the United States: Literature review. 2016. Forest Ecology and Management 360: 133-151.	3.5, 3.6
160	Certification Bodies Consulted: Kara Wires, Rainforest Alliance; Jim Colla, Bureau Veritas; Brendan Grady, SCS Global Services	3.5
161	Emery, Marla R. Interrupting the telos: locating subsistence in contemporary US forests. U.S. Forest Service. 2005. Retrieved from https://www.fs.fed.us/ne/newtown_square/publications/other_publishers/OCR/ne_2005_emery001.pdf	3.5
162	Oregon Department of Fish & Wildlife. Status Review of the Marbled Murrelet (Brachyramphus marmoratus) in Oregon and Evaluation of Criteria to Reclassify the Species from Threatened to Endangered under the Oregon Endangered Species Act. 2018. 134 pp.	3.5
163	Alexander, Susan J. and Emery, M. Non-Timber Forest Products in the United States: Harvest and Issues. A paper submitted to the XII World Forestry Congress. Retrieved from http://www.fao.org/docrep/ARTICLE/WFC/XII/0337-A1.HTM	3.6
164	United Nations Educational, Scientific and Cultural Organization. Properties inscribed on the World Heritage List – United States. Retrieved from http://whc.unesco.org/en/statesparties/us	3.6
165	National Congress of American Indians. Religious Freedom & Sacred Places. Retrieved from http://www.ncai.org/policy-issues/community-and-culture/rel-freedom-and-sacred-places	3.6
166	Bureau of Indian Affairs. Forestry in Indian Country: Models of Sustainability for our Nation's Forests? Retrieved from https://www.bia.gov/cs/groups/xnifc/documents/text/idc015961.pdf	3.6
167	U.S. Forest Service. USDA Policy and Procedures Review and Recommendations: Indian Sacred Sites, 2012 Report to the Secretary of Agriculture. 2012. Retrieved from https://www.fs.fed.us/spf/tribalrelations/documents/sacredsites/SacredSitesFinalReportDec2012.pdf	3.6
168	U.S. Forest Service. At White House Conference, USDA Commits New Funds for Tribal Community Development. 2016. Retrieved from https://www.usda.gov/media/press-releases/2016/09/26/white-house-conference-usda-commits-new-funds-tribal-community	3.6
169	Phelan, Marilyn. A Synopsis of the Laws Protecting our Cultural Heritage. 1993. Retrieved from https://ttu-ir.tdl.org/ttu-ir/bitstream/handle/10601/63/phelan7.pdf?sequence=1	3.6
170	Champagne, Duane. The Challenge of Protecting Sacred Land. Indian Country Today. 2013. Retrieved from https://indiancountrymedianetwork.com/history/sacred-places/the-challenge-of-protecting-sacred-land/	3.6
171	Trope, Jack F. Protecting Native American Sacred Sites and Religious Freedom. Retrieved from https://www.jstor.org/stable/1409063?seq=1#page_scan_tab_contents	3.6
172	Emenhiser, JeDon. The G-O Road Controversy: American Indian Religion and Public Land. 2005. Retrieved from http://users.humboldt.edu/jemenhiser/emenLyng.html	3.6
173	US Departments of Defense, Interior, Agriculture and Energy and the Advisory Council on Historic Preservation. Progress Report on the Implementation of the Memorandum of Understanding Regarding Interagency Coordination and Collaboration for the Protection of Indian Sacred Sites. 2014. Retrieved from http://www.achp.gov/docs/SacredSitesWorkingGroup-2013ProgressReport.pdf	3.6
174	California Department of Fish and Wildlife. California's Wildlife. Retrieved from https://www.wildlife.ca.gov/Data/CWHR/Life-History-and-Range	3.1

No	Source of information	Relevant indicator
176	US Fish & Wildlife Service. Environmental Conservation Online System Species Profile for Dusky Gopher Frog. Retrieved from https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=D031	3.1
177	US Fish & Wildlife Service. Environmental Conservation Online System Species Profile for Houston toad. Retrieved from http://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=D004	3.1
178	Bronaugh, W. North American Forests in the Age of Man. American Forests Magazine. 2012. Retrieved from http://www.americanforests.org/magazine/article/north-american-forests-in-the-age-of-man/	3.2
179	U.S. Forest Resource Facts and Historical Trends. United States Department of Agriculture. 2014. Retrieved from https://www.fia.fs.fed.us/library/brochures/docs/2012/ForestFacts_1952-2012_English.pdf	3.2
180	US National Park Service. 2002-2003 Annual NPS Wilderness Report. 2003. Retrieved from https://www.wilderness.net/NWPS/documents/NPS/2002-2003_wilderness_report.pdf	3.2
181	U.S. Geological Survey. PAD-US – National Inventory of Protected Areas Fact Sheet. 2016. Retrieved from https://pubs.usgs.gov/fs/2013/3086/pdf/fs20133086.pdf	Overview
182	Protected Planet. World Database on Protected Areas. Retrieved from https://www.protectedplanet.net/c/world-database-on-protected-areas	Overview
183	U.S. Geological Survey. Protected Area Stewards. Retrieved from https://gapanalysis.usgs.gov/padus/partners/	Overview
184	Aycrigg, J.L., Davidson, A., Svancara, L.K., Gergely, K.J., McKerrow, A., Scott, J.M. Representation of Ecological Systems within the Protected Areas Network of the Continental United States. PLOS One. 2013. Retrieved from http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0054689	Overview
185	USGS GAP Analysis Program. Standards and Methods Manual for Data Stewards. 2013. Retrieved from https://gapanalysis.usgs.gov/wp-content/uploads/2013/10/PADUS_Standards_Oct2013_USGSreview.pdf	Overview
186	Cook, William J. Preserving Native American Places: A Guide to Federal Laws and Policies that Help Protect Cultural Resources and Sacred Sites. National Trust for Historic Preservation. Retrieved from https://forum.savingplaces.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=1ba03f3f-8a68-04b7-beb5-c5a59440b283	3.6
187	National Parks Service Archaeology Program. Archeology Law and Ethics. Retrieved from https://www.nps.gov/archeology/public/publicLaw.htm	3.6
188	National Association of Tribal Historic Preservation Officers. News – Protecting Sacred Places (2001-2008). Retrieved from http://www.nathpo.org/News/newswire-sacred.htm	3.6
189	National Indian Law Library. Sacred Places News Stories (2003-2017). Retrieved from https://www.narf.org/nill/bulletins/news/arnews.html	3.6
190	indianz.com. News > More: sacred sites (2016-2017). Retrieved from https://www.indianz.com/m11/more.cgi?tag=sacred+sites	3.6
191	Committee on Indian Affairs. Native American Sacred Places, Hearing Before the Committee on Indian Affairs, First Session, United States Senate. 2003. Retrieved from https://www.gpo.gov/fdsys/pkg/CHRG-108shrg87991/html/CHRG-108shrg87991.htm	3.6
192	Committee on Indian Affairs. Native American Sacred Places, Hearing Before the Committee on Indian Affairs, Second Session, United States Senate. 2002. Retrieved from https://archive.org/stream/gov.gpo.fdsys.CHRG-107shrg80363/CHRG-107shrg80363#page/n0/mode/2up	3.6
193	National Association of Tribal Historic Preservation Officers. Supreme Court declines tribal challenge. 2002. Retrieved from http://www.nathpo.org/News/Sacred_Sites/News-Sacred_Sites13.html	3.6
194	Corbin, Amy. Sacred Land Film Project. Medicine Wheel. 2010. Retrieved from http://sacredland.org/medicine-wheel-united-states/	3.6
195	Indian Country Today. Federal Court Finds in Favor of Karuk Tribe, Halts Forest Work. Retrieved from https://indiancountrymedianetwork.com/news/federal-court-finds-in-favor-of-karuk-tribe-halts-forest-work/	3.6
196	Smith, W.B., Miles, P.D., Vissage, J.S., & Pugh, S.A. Forest Resources of the United States, 2002. 2004. Retrieved from https://www.ncrs.fs.fed.us/pubs/gtr/gtr_nc241.pdf?q=forrest	Overview

No	Source of information	Relevant indicator
197	United States Department of Agriculture. U.S. Forest Resource Facts and Historical Trends. 2014. Retrieved from https://www.fia.fs.fed.us/library/brochures/docs/2012/ForestFacts_1952-2012_English.pdf	Overview
198	U.S. Global Change Research Program. Eastern Forests and Woodlands. Retrieved from http://www.globalchange.gov/browse/educators/wildlife-wildlands-toolkit/eco-regions/eastern-forests-woodlands	Overview
199	U.S. Global Change Research Program. Great Lakes. Retrieved from http://www.globalchange.gov/browse/educators/wildlife-wildlands-toolkit/eco-regions/great-lakes	Overview
200	World Wildlife Fund. Western Great Lakes forests. Retrieved from https://www.worldwildlife.org/ecoregions/na0416	Overview
201	Dey, D.C., Brissette, J.C., Schweitzer, C.J., & Guldin, J.M. Chapter 2, Silviculture of Forests in the Eastern United States, from Cumulative Watershed Effects of Fuel Management in the Eastern United States. 2012. United States Department of Agriculture Forest Service. Retrieved from https://www.srs.fs.fed.us/pubs/gtr/gtr_srs161/gtr_srs161_007.pdf	Overview
202	U.S. Global Change Research Program. Western Forests & Mountains. Retrieved from http://www.globalchange.gov/browse/educators/wildlife-wildlands-toolkit/eco-regions/western-forests-mountains	Overview
203	Burns, R.M. Silvicultural Systems for the Major Forest Types of the United States. 1983. United States Department of Agriculture Forest Service. Retrieved from https://permanent.access.gpo.gov/gpo26309/CAT84800484.pdf	Overview
204	Georgia Nature Blog: The Natural History of Georgia. The Biodiversity of the Southeastern United States. Retrieved from http://georgianatureblog.blogspot.com/2013/03/1-biodiversity-of-southeastern-united.html	Overview
205	Granshaw, F.D., Moore, A., Lewis, G. Chapter 1: Geologic History of the Western US: Reconstructing the Geologic Past. 2014. Retrieved from http://geology.teacherfriendlyguide.org/downloads/w/tfggw_1_geolhistory_lr.pdf	Overview
206	NatureServe. Precious Heritage: The status of biodiversity in the United States. 2000. Retrieved from http://www.natureserve.org/biodiversity-science/publications/precious-heritage-status-biodiversity-united-states	Overview
207	New Mexico Department of Game and Fish. State Wildlife Action Plan for New Mexico. 2016. Retrieved from http://www.wildlife.state.nm.us/download/conservation/swap/New-Mexico-State-Wildlife-Action-Plan-SWAP-Final-2017.pdf	3.1
208	The Nature Conservancy. Ecoregional Conservation Analysis of the Arizona-New Mexico Mountains. 1999. Retrieved from http://azconservation.org/dl/TNCAZ_Ecoregions_Assessment_AZ-NM_Mtns.pdf	3.1
209	Ganey, J.L., Apprill, D.L., Rawlinson, T.A., Kyle, S.C., Jonnes, R.S., and Ward Jr., J.P. Nesting habitat of Mexican spotted owls in the Sacramento Mountains, New Mexico. Journal of Wildlife Management. 77:1426–1435. 2013.	3.1
210	U.S. Forest Service. Lincoln National Forest. Retrieved from https://www.fs.usda.gov/main/lincoln/home	3.1
211	U.S. Fish & Wildlife Service, Southwest Region. Mexican Spotted Owl Recovery Plan, First Revision (Strix occidentalis lucida). 2012. Retrieved from https://ecos.fws.gov/docs/recovery_plan/MSO_Recovery_Plan_First_Revision_Dec2012.pdf	3.1
212	Hauswald, Cassie. Blue River Project. Retrieved from http://www.inindianawater.org/story/the-blue-river-project/	3.1
213	The Nature Conservancy. Indiana Hellbender Salamanders. Retrieved from https://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/indiana/placesweprotect/blue-river-project-office.xml	3.1
214	Hoen, Jessica – NRCS Salem IN. South Fork-Blue River Watershed Management Plan. 2017. Retrieved from https://www.in.gov/idem/nps/files/wmp_blue_river-south_fork_5-180.pdf	3.1
215	IKC Slide Show, Indiana Karst Conservancy (http://ikc.caves.org/slideshow)	3.1
216	Journey with Nature: Karst & Caves, The Nature Conservancy (https://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/indiana/journeywithnature/karst-caves.xml)	3.1

No	Source of information	Relevant indicator
217	Appalachian Mountains Joint Venture. Ecological Priorities. Retrieved from http://amjv.org/index.php/conservation/category/eco	3.1
218	Greater Appalachian Conservation Partnership. Introduction to the Appalachian Region. Retrieved from http://amjv.org/index.php/conservation/category/eco	3.1
219	EcoForesters. Threats to Our Forests. Retrieved from https://www.ecoforesters.org/forest-threats.html	3.1
220	The Nature Conservancy. Central Appalachian Mountains Conservation Challenges. Retrieved from https://www.nature.org/ourinitiatives/regions/northamerica/areas/centralappalachians/overview/index.htm	3.1
221	Highlands Biological Station. Biodiversity of the Southern Appalachians. Retrieved from http://highlandsbiological.org/nature-center/biodiversity-of-the-southern-appalachians/	3.1
222	Cristan, R., Aust, W.M., Colding, M.C., Barrett, S.M., Munsell, J.F., and Schilling, E. Effectiveness of forestry best management practices in the United States: Literature review. Forest Ecology and Management 360: 133-151. 2016.	3.1
224	Alabama Department of Conservation and Natural Resources. Alabama State Wildlife Action Plan. 2015. Retrieved from http://georgiaalabamalandtrust.org/wp-content/uploads/2017/08/AlabamaStateWildlifePlan2017.pdf	3.1
225	Longleaf Alliance. Proceedings of the Fourth Longleaf Alliance Regional Conference. Longleaf Alliance Report No. 6. 2003. Retrieved from http://www.auburn.edu/academic/forestry_wildlife/lpsdl/pdfs/4th_Combined.pdf	3.1, 3.3
226	The Longleaf Alliance. Herbicides. Retrieved from https://www.longleafalliance.org/what-we-do/restoration-management/herbicides	3.1, 3.3
227	Rachel E. Greene, Raymond B. Iglay, Kristine O. Evans, Darren A. Miller, T. Bently Wigley, Sam K. Riffell. 2016. A meta-analysis of biodiversity responses to management of southeastern pine forests—opportunities for open pine conservation. Forest Ecology and Management 360: 30–39	3.1
229	Federal Register. Vol. 73, No. 16, January 24, 2008, 12-Month Finding on a Petition to List the Siskiyou Mountains Salamander (Plethodon stormi) and Scott Bar Salamander (Plethodon asupak) as Threatened or Endangered. Retrieved from https://www.gpo.gov/fdsys/pkg/FR-2008-01-24/pdf/E8-918.pdf	3.1
230	DeGross, D.J. and Bury, R.B. Science Review for the Scott Bar Salamander (Plethodon asupak) and the Siskiyou Mountains Salamander (P. stormi): Biology, Taxonomy, Habitat, and Detection Probabilities/Occupancy. US Department of the Interior, US Geological Survey. Open-File Report 2007-1352. 2007. Retrieved from https://pubs.usgs.gov/of/2007/1352/pdf/OFR20071352.pdf	3.1
231	USDA Forest Service. Land and Resource Management Plan, Amendment 5. Nantahala and Pisgah National Forests. 1994. Retrieved from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm8_050373.pdf	3.1
232	USDA Forest Service. Nantahala National Forest Management Area Map. Nantahala and Pisgah National Forests. Retrieved from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm8_050374.pdf	3.1
233	USDA Forest Service. Summary of Management Areas. Nantahala and Pisgah National Forests. Retrieved from https://www.fs.usda.gov/detail/nfsnc/landmanagement/planning/?cid=stelprdb5194769	3.1
234	USDOI Fish & Wildlife Service. Dusky Gopher Frog (Rana sevosa) Recovery Plan. 2015. Retrieved from https://ecos.fws.gov/docs/recovery_plan/2015_07_16_Final%20RP_R_sevosa_08212015%20(1).pdf	3.1
235	USDA Forest Service. Land and Resource Management Plan. National Forests in Mississippi. 2014. Retrieved from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3814664.pdf	3.1
236	AmphibiaWeb. Notophthalmus meridionalis. Retrieved from https://amphibiaweb.org/species/4263	3.1
237	Herps of Texas. Black-spotted Newt. Retrieved from http://www.herpsoftexas.org/content/black-spotted-newt	3.1
238	Texas Parks and Wildlife Magazine. Wild Thing: Orange Bellies. 2016. Retrieved from https://tpwmagazine.com/archive/2016/aug/scout5_wildthing_newt/	3.1

No	Source of information	Relevant indicator
239	U.S. Fish & Wildlife Service. Status Review of the Northern Spotted Owl, Frequently Asked Questions. Retrieved from https://www.fws.gov/oregonfwo/Species/Data/NorthernSpottedOwl/Documents/FAQ90-dayPetition4-7-15.pdf	3.3
240	California Fish and Game Commission. Notice of Findings: Listing the northern spotted owl as a threatened species is warranted. 2017. Retrieved from http://www.fgc.ca.gov/CESA/index.aspx	3.3
241	Farmer, Sarah. Life on the Forest Floor: Woodland Herbs of Southern Appalachian Cove Forests. USDA Forest Service Southern Research Station, Compass Live. 2014. Retrieved from https://www.srs.fs.usda.gov/compass/2014/08/14/life-on-the-forest-floor-woodland-herbs-of-southern-appalachian-cove-forests/	3.3
242	Clebsch, E.E.C and Busing, R.T. 1989. Secondary Succession, Gap Dynamics, and Community Structure in a Southern Appalachian Cove Forest. Ecology. 70(3): 728-735.	3.3
243	Hull, B., Perry, A., Megalos, M., Gagnon, J., Davis, J., Persons, S., Goslee, K., Hamilton, R., and Groot, H. 2006. Appalachian Voices Forestry Handbook. Appalachian Voices. Boone, NC. 132 pp.	3.3
244	Hodges, J.D. 1997. Development and ecology of bottomland hardwood sites. Forest Ecology and Management. 90: 117-125.	3.3
245	Wharton, C.H., Kitchens, W.M., Pendleton, E.C., and Sipe, T.W. 1982. The Ecology of Bottomland Hardwood Swamps of the Southeast: A community profile. U.S. Fish and Wildlife Service, Biological Services Program, Washington, D.C. FWS/OBS-81/37. 133 pp.	3.3
246	National Resources Conservation Service. Longleaf Pine Initiative. Retrieved from https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/initiatives/?cid=nrcsdev11_023913	3.3
247	Williams, Lisa D., and Changwoo Ahn. 2015. Plant community development as affected by initial planting richness in created mesocosm wetlands. Ecological Engineering 75 : 33-40.	3.3
248	David H. Van Lear, W.D. Carroll, P.R. Kapeluck, Rhett Johnson. 2005. History and restoration of the longleaf pine-grassland ecosystem: Implications for species at risk. Forest Ecology and Management 211: 150–165.	3.3
249	Ice, G. History of innovative best management practice development and its role in addressing water quality limited waterbodies. J. Environ. Eng. 2004, 130, 684–689.	3.4
250	Barrett, Scott M.; Aust, W. Michael; Bolding, M. Chad; Lakel, William A.; Munsell, John F. 2016. Estimated Erosion, Ground Cover, and Best Management Practices Audit Details for Postharvest Evaluations of Biomass and Conventional Clearcut Harvests. Journal of Forestry. 114(1): 9-16.	3.4
251	Witt, Emma L.; Barton, Christopher D.; Stringer, Jeffrey W.; Kolka, Randall K.; Cherry, Mac A. 2016. Influence of Variable Streamside Management Zone Configurations on Water Quality after Forest Harvest. Journal of Forestry. 114(1): 41-51	3.4
252	Jeffery L. Vowell and Russel B. Frydenborg. 2004. A biological assessment of best management practice effectiveness during intensive silviculture and forest chemical application. Water, Air and Soil Pollution: Focus. 4(1): 297-307.	3.4
253	Vowell, J. 2001. Using stream bioassessment to monitor best management practice effectiveness. Forest Ecology and Management 143(1-3): 237-244	3.4
254	Cahaba River Basin Clean Water Partnership. Cahaba River Basin Management Plan. Retrieved from http://www.cleanwaterpartnership.org/docs/default-source/resources/cahaba-river-basin/cahababasinmgtplan.pdf?sfvrsn=f42694f3_4	3.1
255	Upper Coosa Basin Watershed Management Plan. July 2004. Retrieved from http://www.cleanwaterpartnership.org/docs/default-source/resources/coosa-river-basin/upper-coosa-mgt-plan(1).pdf?sfvrsn=e42c94f3_4	3.1
256	Northwest Florida Water Management District. Apalachicola River and Bay Surface Water Improvement and Management (SWIM) Plan. 2017. Retrieved from https://www.nwfwater.com/Water-Resources/Surface-Water-Improvement-and-Management/Apalachicola-River-and-Bay	3.1

No	Source of information	Relevant indicator
257	Clean Water Partnership. Tennesee River Basin Watershed Management Plan. May 2003. Retrieved from http://www.cleanwaterpartnership.org/docs/default-source/resources/tennessee-river-basin/tennesseeriverbasinmanagementplan.pdf?sfvrsn=be2f94f3_4	3.1
258	U.S. Forest Service. Sequoia National Forest Inventoried Roadless Areas Map. 2000. Retrieved from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_058780.pdf	3.1

Controlled wood category 4: Wood from forests being converted to plantations or non-forest use

NOTE 1: *The US NRA covers the conterminous United States, which excludes Alaska and Hawaii and the US territories (i.e. portions of the United States that are not within the limits of any state and have not been admitted as states), for all types of forests.*

NOTE 2: *The risk assessment information below is a condensed version of the more detailed assessments available in Annex G. Annex G is presented in a non-table format and includes some additional details, along with supplementary context and guidance information, which are intended to help readers better understand the rationale behind the identification of HCVs and risk designation decisions. For any category with an associated annex, the content found in the main body of the risk assessment, not the annex, is definitive.*

Overview

The following risk assessment for Category 4 begins with an assessment of applicable legislation to determine whether natural vegetation land use changes are prevented (or kept to a level that does not exceed the stated threshold) by US legislation or public policy. This is followed by an assessment of whether the spatial threshold was exceeded, which consisted of a data analysis using data sets that were consistent for as much of the assessment area as possible were used. The remainder of the assessment was based upon regional and finer-scale data, literature reviews and consultation with experts.

NOTE: Static PDF maps of specified risk designations are available on the FSC US web site and a spatial data layer is available upon request.

Category 4 Risk assessment

Indicator	Sources of Information	Indication of risk, evidence used	Geographical/ Functional scale	Risk designation and determination

4.1	1-5	**Assessment of Applicable Legislation:**
		Legislation relevant to the conversion of natural forests to plantations or non-forest use.
		• There is no separate legal framework that governs conversion of forest land in the US. Conversion, if addressed, is typically covered by
		• Federal Lands:
		  ○ Federal law requires the maintenance of forest within legislation for harvesting timber. National Forests (16 USC §§ 475) [1]
		  ○ The National Forest Management Act (NFMA) of 1976 § 6(g), directs the US Forest Service to develop planning regulations that provide for
			Geographic Scales:
			FSC US Region
			County
			
			Functional Scale:
			Forested zone (as identified by the IFL Mapping Team[1]):
				Specified risk
				Specified risk
				Threshold 7 (There are significant economic drivers for conversion. Data yield evidence that conversion is occurring on a widespread or systematic basis)

[1] Forest Zone Extent (http://www.intactforests.org/data.ifl.html)

Indicator	Sources of Information	Indication of risk, evidence used	Geographical/ Functional scale	Risk designation and determination
		preservation of biodiversity and restocking after harvest for lands that they administer (i.e., National Forests). [2] ○ The key law for Bureau of Land Management (BLM) timberlands, the O & C Lands Act, calls for management for permanent forest production, 43 USC §. [3] • Each state likely has similar requirements for the forested lands that they administer, but each state will be unique. • For private lands, the key laws will usually be state and local land use laws. These will vary greatly from state to state, and from municipality to municipality. Even in states that do not require local zoning ordinances, it is a planning tool that is used by essentially all major urban areas. • Forested wetlands on all ownership types are subject to Clean Water Act § 404 regulation, which is administered by state government in most states. While silvicultural activities must comply with the requirements of this legislation, they are exempt from the requirement to acquire a permit prior to implementation of activities. However, conversion of forests is not considered normal silvicultural activity and so is not exempt from § 404 permit requirements. *Summary:* There is not any national legislation related to conversion, most states regulate conversion of wetlands, but the most applicable legislation would be local zoning ordinances. However, local zoning ordinances vary greatly, and there is no possible way to evaluate them across the assessment area (there are 1800 local municipalities in Michigan alone). Therefore, while the risk assessment for relevant indicators in Category 1 does conclude that laws in the US are enforced, it is not possible to conclude from this assessment that applicable legislation prevents conversion to the outcome required by the indicator, and therefore an assessment of the rates and extent of conversion in the assessment area will be necessary.		applies to the portions of the following Southeast and Pacific Coast Region counties that are within the forested zone: OR: Columbia, Deschutes, Yamhill WA: Pierce, Snohomish, Thurston AL: Baldwin DE: Sussex FL: Clay, Collier, Flagler, Hernando, Hillsborough, Lake, Lee, Nassau, Orange, Osceola, Pasco, Polk, Santa Rosa, St. Johns, St. Lucie, Volusia GA: Barrow, Bryan, Cherokee, Clayton, Columbia, Effingham, Forsyth, Henry, Paulding NC: Brunswick, Cabarrus, Chatham, Currituck, Johnston,
	6-29	**Assessment of Rates, Extent and Drivers of Conversion:** *Ecoregion-Scale Assessment* The NRA WG agreed to use of the best available datasets for determining rates of conversion. The two datasets that are readily available and have sufficient sampling effort to provide rigor are The USDA Forest Inventory and Analysis (FIA) [6] and National Land Cover Dataset (NLCD) [14]. Analyses using these datasets were completed by both the National Council for Air and Stream Improvement (NCASI) and FSC US staff. Results from both found net forest loss in some ecoregions assessed, but not in others. However,		

Indicator	Sources of Information	Indication of risk, evidence used	Geographical/ Functional scale	Risk designation and determination
		estimates of error suggest that that the standard error will always be greater than the difference between the forest loss estimate and a zero-forest cover change – that is, the rates of forest cover change are so small as to be statistically insignificant, making it impossible to conclusively determine whether any of the forest loss estimates exceed the stated thresholds for this Category 4 indicator. These analyses clearly demonstrate that at an ecoregion scale, forest cover in the assessment area is relatively stable. However, there is evidence that forest conversion continues to be an issue at a sub-ecoregional scale [12,15,20,22]. *SubEcoregion-Scale Assessment* Forests have been converted to a variety of non-forest land uses, but the largest historic losses in the US are due to urban and agricultural expansion. However, the rate of forest loss in the US has slowed and some areas are beginning to gain forestland. [13,15] The U.S. Department of Agriculture has conducted a Natural Resources Inventory since 1982 that shows trends in land use on a state-by-state basis. Forestland cover changes depend on the state, and generally track other forestland change estimates. In every state, agricultural land diminished in that time frame, from a national total of 420 million acres in 1982 to 357 million acres by 2007. Concurrently, developed (urban) land increased by 40 million acres to 111 million acres. [13,17] These data indicate that conversion to agricultural lands is likely no longer a driver for conversion of forested lands. Additionally, while tree plantations are expected to continue to increase in extent in the US, this will most likely occur through afforestation (from agricultural lands), not conversion of existing forests [18]. This leaves urbanization as the strongest pressure for forest conversion, a conclusion that is supported by numerous sources. [7,9,10,11,12] Therefore, FSC US staff concluded in consultation with the NRA WG that population growth and the associated urban development present the best possible proxy for the risk of forest conversion in this risk assessment.		Mecklenburg, Pender, Wake SC: Berkeley, Horry, Jasper, Lancaster, York TX: Bastrop, Brazos, Liberty, Montgomery, Waller VA: Loudoun, New Kent Low risk The following low risk thresholds apply to non-forested portions of the above counties and all other counties in the assessment area: **Threshold 1** (Thresholds provided in the indicator are not exceeded) and **Threshold 3** (Other available evidence do not challenge a 'low risk' designation): It is unlikely that the thresholds are being exceeded and evidence suggests that urban development rates are lower.

		Evidence indicates that forestland is growing in the North Central (a broad area that includes the FSC US Great Lakes Region and the northern portion of the FSC US Non-Forested Region), Northeastern, and Rocky Mountain portions of the United States, while the Southeast and Pacific Coast regions are experiencing forest loss and concurrent rapid population growth. [7,24] Within the Southeastern United States, the highest rates of urban development are occurring in the Piedmont region from northern Georgia through North Carolina into Virginia. Forest loss is also occurring along the Atlantic Coast and in eastern Texas. [9,10,11,12] Despite the high rates of urban growth and development across the Southeast, this growth is not consistent across the region. [12] The Pacific Coast Region is also experiencing urban growth leading to conversion from forest to non-forest land use, though this growth appears to be concentrated on the western portions of Washington and Oregon. [8,16] The National Resources Inventory has indicated a decline in forest land in the three Pacific Coast states [13]. However, the most recent assessment of California's Forests and Rangelands indicates that in the most recent years assessed, wildfire disturbance was the most common disturbance in forests [30]. *Summary:* In the United States, there is no legal framework that consistently or comprehensively governs conversion of forestland to non-forestland or from forestland to plantation. Overall, the rate of deforestation in the US is very low. Urban development has been found to be a primary driver of conversion from forest to non-forest land uses. [7,9,10,11,12,25] Rates of urban development vary throughout the United States with higher rates in the Pacific Coast Region and portions of the Southeast Region [7,24]. These two regions are also the regions identified as experiencing more recent forestland loss. Therefore, the greatest risk of materials entering the supply chain from conversions will most likely be in these two regions; however, the risk is not consistent across the regions. Conversion is driven by population growth and the associated urban development. Therefore, population growth by county between 2015 and 2016 and residential building permits issued by Core Based Statistical Areas (CBSAs) over the same time period were used together as a proxy to identify counites where there is likely a greater risk of materials from conversions entering the FSC supply chain. [26,27] CBSAs consist of the county or counties associated with a core urbanized or urban area with a population of at least 10,000. These data were analyzed using a population growth threshold of 2% and a building permits issued threshold of 1500. These thresholds were selected based on analyses done by the US Census Bureau [28] and the US Department of Housing and Urban Development. [29] Additionally, non-forested portions of counties were removed (based upon the forest cover data layer available from the IFL Mapping Team[2]).		

Indicator	Sources of Information	Indication of risk, evidence used	Geographical/ Functional scale	Risk designation and determination
		Conclusion: Data indicate that conversion to agricultural lands is likely no longer a driver for conversion of forested lands. Additionally, while tree plantations are expected to continue to increase in extent in the US, this will most likely occur through afforestation (from agricultural lands), not conversion of existing forests. However, conversion resulting from urban development continues to be a threat to US forests. Within the forested portions of the counties identified, there is a risk greater than 'low' of forest materials being sourced from forests that are being converted to non-forest use. In non-forested regions of these counties, and the remainder of the assessment area, the risk is low.		

Category 4 Control measures

Indicator	Control measures (M – mandatory / R – recommended)
4.1	If an organization wishes to source from a specified risk area, addressing the specified risk through implementation of one of the following two Control Measures is mandatory (CM 4.1 or CM 4.2). If an organization finds that these control measures are inadequate to mitigate risk found in its specific operations, and the conditions established by Clause 4.13 of the Controlled Wood standard (FSC-STD-40-005 V3-1) apply, the organization may replace the following mandatory control measures with more effective control measures. **CM 4.1:** The organization is required to implement both parts of this Control Measure (CM 4.1.a and CM 4.1.b) **CM 4.1.a** The Organization develops and implements binding written agreements with suppliers that: i) mitigate the risk that material supplied originates from forest areas converted into plantation or non-forest use; or ii) assure that if some conversion has occurred, that material supplied originates from limited and legal sources of conversion (e.g., conversion that results in conservation benefits, publicly approved changes in zoning in urban areas, etc.) and does not come from sources where the conversion threatens High Conservation Values. **CM 4.1.b** The Organization implements CM 4.2.b. Effectiveness Verification for Control Measure CM 4.1: The Organization is responsible for demonstrating the effectiveness of its binding written agreements. FSC US will assess the effectiveness of actions implemented under 4.1.b, similar to as described below in 'Effectiveness Verification for Control Measure CM 4.2'. **CM 4.2**: The organization is required to implement both parts of this Control Measure (CM 4.2.a and CM 4.2.b) **CM 4.2.a:** The Organization implements either CM 4.2.a.i or CM 4.2.a.ii for FSC US Regions relevant to the Organization's supply area: **CM 4.2.a.i:** A representative of the Organization attends FSC US-coordinated Controlled Wood Regional Meetings when they occur. The meetings will include the following elements:

[2] Forest Zone Extent (http://www.intactforests.org/data.ifl.html)

- Collaborative dialogues including both certificate holders and stakeholders that result in identification of a focused set of actions that fit within the framework detailed below, and that, if deemed appropriate by Regional Meeting participants, includes a range in the level of resource investment required for implementation.

  Actions identified must help to achieve one of the following outcomes[3]:

  A. Convene partners to identify and protect priority forest areas
  B. Promote national policies and markets to help private landowners conserve forests
  C. Provide resources and tools to help communities expand and connect forests
  D. Participate in community growth planning to reduce ecological impacts and wildfire risks

- Sharing information, as requested by FSC US, to augment effectiveness verification of actions implemented as part of CM 4.2.b.

  NOTE: It is recognized that depending on the information requested, it may not be possible to share it at the Controlled Wood Regional Meeting, and in this situation the Organization shall share it as soon as possible following the meeting.

NOTE: It is the intention of FSC US to strive for very diverse participation in the Controlled Wood Regional Meetings, including certificate holders, environmental organizations, social organizations, experts, academics, public agencies, and landowners who are not certificate holders.

NOTE: If the collaborative dialogues do not successfully identify a focused set of mitigation actions, FSC US will implement a contingency plan as detailed below.

NOTE: Following each Controlled Wood Regional Meeting, FSC US will produce a Report that includes: 1) A summary of information communicated in advance of, or at the meetings, regarding forest conversion; 2) The outcomes of the collaborative dialogues; and 3) Details of information that has been requested of certificate holders to augment effectiveness verification.

NOTE: The FSC US Board of Directors will review the outcomes of the Controlled Wood Regional Meeting collaborative dialogues (or contingency plan) for any significant risks to the system. It is the Board's intention to endorse these outcomes unless a risk is identified, in which case the Board will approve a revised set of actions that will be published in the Report with rationale for any changes.

Compliance Verification: The Organization demonstrates to their certification body that a representative of the Organization attended the meeting(s) held for the region(s) in which the Organization sources materials and the Organization shared the requested information.

CM 4.2.a.ii: The Organization reviews Controlled Wood Regional Meeting Reports and associated information and provides the information requested in the Report.

Compliance Verification: The Organization demonstrates to their certification body an awareness of all three elements of the Controlled Wood Regional Meeting Report and that the requested information was shared.

CM 4.2.b: The Organization implements one or more of the actions identified during the collaborative dialogue at the Controlled Wood Regional Meeting, as detailed in the Controlled Wood Regional Meeting Report. When options for action with differential levels of resource investment required for implementation are identified, the action(s) implemented shall be commensurate with the scale and intensity of the Organization's potential impact on the forests in the region.

NOTE: The scale and intensity of the Organization's potential impact on the forests in the region will be informed by: 1) the volume of materials that are being sourced by the Organization from the specified risk area, and 2) the spatial extent of the specified risk area from which the Organization is sourcing materials.

[3] Drawn from the U.S. Forest Service Open Space Conservation Strategy (https://www.fs.fed.us/openspace/national_strategy.html)

	Compliance Verification: The Organization demonstrates when and how the action(s) identified was implemented and why that action(s) was selected. Effectiveness Verification for Control Measures CM 4.2: The Organization shall provide input into the effectiveness verification process through its implementation of CM 4.2.a.i. An assessment of the effectiveness of actions implemented in reducing the risk of sourcing from lands where natural or semi-natural forests are being converted to non-forest or plantations shall be determined by FSC US, in consultation with stakeholders, by evaluating the outcomes from each of the three elements of the Controlled Wood Regional Meetings and comparing them with outcomes from previous meetings, in combination with other monitoring data shared by stakeholders. The results of this assessment will be incorporated into the Controlled Wood Regional Meeting Report and will be used to inform future revisions to the National Risk Assessment. NOTE: While effectiveness verification will be linked to the Controlled Wood Regional Meetings, which are expected to occur every 3 to 5 years, the Organization is still responsible for reviewing its Due Diligence System at least annually (as specified in FSC-STD-40-005 V3-1, Clause 1.6) to determine if any revisions to the Due Diligence System are needed. **Contingency Plan for CM 4.2.a** In the event that the Controlled Wood Regional Meeting collaborative dialogues do not come to a successful resolution, the following will be implemented in sequential order until a resolution has been achieved. 1. A small group of certificate holder and stakeholder representatives from the region is formed to build on the information and perspectives shared during the dialogue at the regional meeting. The participants in the group are identified at the regional meeting at the point when it is apparent that it will not be possible find agreement on a set of mitigation actions by the end of the meeting. The participants must have demonstrated an ability to represent the perspective of the chamber with which they are most aligned, an ability to be open to other perspectives and new ideas and an ability to compromise. This group will be asked to complete the process within a short timeframe. 2. If the small group participants are not successfully identified at the regional meeting, FSC US will solicit participants representing a diversity of perspectives and formalize a group in consultation with the FSC US Board of Directors. (with the same constraints on participation as detailed above). Similar to #1 above, this group will be asked to build on the dialogue held at the regional meeting and develop a set of mitigation actions. 3. If the small group in #1 or #2 above is unable to find agreement on a set of mitigation actions within 6 weeks of the Controlled Wood Regional Meeting, FSC US Staff will build on the dialogue held at the regional meeting and the discussions of the small group, and develop a draft set of mitigation actions to be approved by the FSC US Board of Directors prior to being published in the regional meeting report.

Category 4 Information sources

No	Source of information	Relevant indicator
1	Legal Information Institute. 16 U.S. Code § 475 - Purposes for which national forests may be established and administered. Retrieved from http://www.law.cornell.edu/uscode/text/16/475	4.1
2	Legal Information Institute. 16 U.S. Code § 1604 - National Forest System land and resource management plans. Retrieved from http://www.law.cornell.edu/uscode/text/16/1604	4.1
3	Legal Information Institute. 43 U.S. Code § 2601 - Conservation management by Department of the Interior; permanent forest production; sale of timber; subdivision. Retrieved from https://www.law.cornell.edu/uscode/text/43/2601	4.1
4	U.S. Forest Service. Marijuana Grows and Restoration video. 2014. Retrieved from https://www.youtube.com/watch?v=IFNe_KZhPZw#t=15	4.1

No	Source of information	Relevant indicator
5	U.S. Department of Agriculture. National Report on Sustainable Forests—2010. 2011. Retrieved from http://www.fs.fed.us/research/sustain/national-report.php	4.1
7	Alig, Ralph J., Plantinga, A.J., Ahn, S., and Kline, J.D. Land Use Changes Involving Forestry in the United States: 1952 to 1997, With Projections to 2050. U.S. Forest Service, U.S. Department of Agriculture. 2003. Retrieved from http://www.uvm.edu/cosmolab/papers/Alig_2003_4051.pdf	4.1
8	Conservation Biology Institute. Conversion Potential, Pacific Northwest. 2014. Retrieved from https://databasin.org/datasets/0d87f5ae8be84a5ca153f42318d2c1f8	4.1
9	Wear, David N. and Greis, John G. Southern Forests Futures Project – Technical Report. U.S. Forest Service Southern Research Station. 2013. Retrieved from https://www.srs.fs.fed.us/pubs/gtr/gtr_srs178.pdf	4.1
10	Hanson, Craig, et.al. Southern Forests for the Future. World Resources Institute. 2010. Retrieved from http://www.wri.org/publication/southern-forests-future	4.1
11	Terando, Adam J., Costanza, J., Belyea, C., Dunn, R.R., McKerrow, A., Collazo, J.A. The Southern Megalopolis: Using the Past to Predict the Future of Urban Sprawl in the Southeast U.S. 2014. Retrieved from http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0102261	4.1
12	Alig, R., Stewart, S.I., Wear, D.N., Stein, S., Nowak, D.J. Conversions of forest land: trends, determinants, projections, and policy considerations in Pye, J.M, Rauscher, M.J., Sands, Y., Lee, D.C., and Beatty, J.S. 2010. Advances in threat assessment and their application to forest and rangeland management. PNW-GTR-802. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 109 p. Retrieved from https://www.fs.fed.us/pnw/pubs/gtr802/Vol1/pnw_gtr802vol1_alig.pdf	4.1
13	US Department of Agriculture. 2012 Natural Resources Inventory Summary Report. 2015. Retrieved from https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd396218.pdf	4.1
15	Nelson, Mark D., Flather, C.H., Riitters, K.H., Sieg, C., Garner, J.D. National Report on Sustainable Forests – 2015: Conservation of Biological Diversity. US Department of Agriculture, Forest Service, Pacific Northwest Research Station. 2015. Retrieved from https://www.nrs.fs.fed.us/pubs/50436	4.1
16	Bradley, Gordon, et al. Future of Washington's Forest and Forest Industries Study, Study 4: Forest Land Conversion in Washington State. 2007. Retrieved from http://www.ruraltech.org/projects/fwaf/final_report/pdfs/05_study4_landconv.pdf	4.1
17	U.S. Environmental Protection Agency. EPA's Report on the Environment: Land Use. 2009. Retrieved from https://cfpub.epa.gov/roe/indicator.cfm?i=51	4.1
18	Stanturf, J.A. and Zhang, D. Plantations Forests in the United States of America: Past, Present and Future, A paper submitted to the XII World Forestry Congress. 2003. Quebec City, Canada Retrieved from http://www.fao.org/docrep/article/wfc/xii/0325-b1.htm	4.1
20	Smail, Robert A.; Lewis, David J. 2009. Forest-land conversion, ecosystem services, and economic issues for policy: a review. PNW-GTR-797. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 40 p.	4.1
21	Belyea, Curtis M., Terando, A.J. Urban Growth Modeling for the SAMBI Designing Sustainable Landscapes Project. Biodiversity and Spatial Information Center, NC State University. 2013. Retrieved from http://www.basic.ncsu.edu/dsl/urb.html	4.1
22	Masek, J. G., et al. (2011), Recent rates of forest harvest and conversion in North America, J. Geophys. Res., 116, G00K03, doi:10.1029 /2010JG001471.	4.1
23	Van Deusen, Paul C.; Roesch, Francis A.; Wigley, T. Bently. 2013. Estimating forestland area change from inventory data. Journal of Forestry 111(2):126–131	4.1

No	Source of information	Relevant indicator
24	M. C. Hansen, P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, J. R. G. Townshend. High-Resolution Global Maps of 21st-Century Forest Cover Change. Science, 2013; 342 (6160): 850. Retrieved from http://science.sciencemag.org/content/342/6160/850.full	4.1
25	Stein, Susan M., Carr, Mary M., McRoberts, Ronald E., Mahal, Lisa G. Forests on the Edge: The Influence of Increased Housing Density on Forest Systems and Services. 2012. Retreieved from https://pdfs.semanticscholar.org/d313/f1ac4cc0e9686bfa0f63e226cdf9ebe630b5.pdf?_ga=2.265978191.1785220568.1525278333-91389044.1525278333	4.1
26	United States Census Bureau. County Population Totals and Components of Change: 2010-2016. 2017. Retrieved from https://www.census.gov/data/tables/2016/demo/popest/counties-total.html	4.1
27	U.S. Department of Housing and Urban Development. SOCDS Building Permits Database. State of the Cities Data Systems (SOCDS), Retrieved from https://socds.huduser.gov/permits/summary.odb	4.1
28	United States Census Bureau. Maricopa County Added Over 222 People Per Day in 2016, More Than Any Other County. 2017. Retrieved from https://www.census.gov/newsroom/press-releases/2017/cb17-44.html	4.1
29	U.S. Department of Housing and Urban Development. US Counties Building Permits. Building Permits Database. Retrieved from https://www.huduser.gov/portal/tmaps/BuildingPermits/BP.html	4.1
30	California Department of Forestry and Fire Protection, Fire and Resource Assessment Program. California's Forests and Rangelands: 2010 Assessment. Retrieved from http://frap.fire.ca.gov/data/assessment2010/pdfs/california_forest_assessment_nov22.pdf	

Controlled wood category 5: Wood from forests in which genetically modified trees are planted

NOTE: *The US NRA covers the conterminous United States, which excludes Alaska and Hawaii and the US territories (i.e. portions of the United States that are not within the limits of any state and have not been admitted as states), for all types of forests.*

Overview

The Category 5 risk assessment was originally completed by a consultant on behalf of FSC International. It was approved following a public consultation and then formally published as part of a Centralized National Risk Assessment (CNRA) for the entire United States (including Categories 1 and 5). The following content for Category 5 is based on the content that was in the CNRA, but includes additional and more recent information.

Risk assessment

Indicator	Sources of information	Functional scale	Risk designation and determination
5.1	Restrictions on Genetically Modified Organisms: United States: http://www.loc.gov/law/help/restrictions-on-gmos/usa.php Regulatory Information: http://www.isb.vt.edu/regulatory.aspx USDA Field Tests of GM Crops: http://www.isb.vt.edu/search-release-data.aspx Petition for Determination of Non-regulated Status for Freeze Tolerant Hybrid Eucalyptus Lines: http://www.aphis.usda.gov/brs/aphisdocs/11_01901p.pdf Coordinated Framework for the Regulation of Biotechnology: http://www.aphis.usda.gov/wps/portal/aphis/ourfocus/biotechnology/sa_library/!ut/p/a1/pZFNU4MwEIZ_iwePTNYUCByhVT5a1FGZFi5MinzEgYRC6qi_XqAevJTimNtOnn1351kUox2KOX1nBZVMcFoNdawn_oOLb2zAnuPc2uDd320eydrHgLUeiCaAtTavf-lYrko2AKAaGLyV7a6IGQB4-rx-OPMsuNS_RTGKUy4bWaKINiXrklRwmXGZVGzf0vbzGjqaiGOb5CI9dmO1Z0JmaclFJYrT_w87hDUpe0WRQdKMAlYVPdM0RcXmQqHEoIpJqIkJNqhKyGn4BX0jMOVnBCYERL0hcnZEn_D8x639GTdhb4dDbPVmB5cfEu3-r7ZPxW2wDIp-WSpLhfFcoN0voKnDMKyNhf7kfr3k9dborKtvYaJWdQ!!/?1dmy&urile=wcm%3apath%3a%2FAPHIS_Content_Library%2FSA_Our_Focus%2FSA_Biotechnology%2FSA_Regulations%2F	N/A	<u>Low risk</u> The following low risk thresholds apply: **Threshold 2** (There is no commercial use of GMO (tree) species in the area under assessment) and **Threshold 3** (Other available evidence does not challenge a 'low risk' designation). **Legislative Regulation of GMO Trees in the US** There is no ban against GM trees. GMO is regulated under general legislation covering general health, safety and environmental legislation. An environmental impact assessment is needed before approving GMO use. The definition of GMO by the USDA (US Department of Agriculture) takes a function-based approach, rather than focusing on the process of developing GMO. In the future this might mean that some products that the European Union/FSC would consider GMO, will not be registered as such under the US legislation and will not be regulated as such. The definition of GMO is tied to the traits and risks, and only to a little extend the GMO method. From personal communication with Prof. Steven Strauss, there has to his knowledge, been no such cases of a tree that would be considered a GMO by the European Union/FSC not being regulated as such in the US, but future cases can occur.

	News & Research Communications, Oregon State University: 17. December 2013: http://oregonstate.edu/ua/ncs/archives/2013/dec/significant-advance-reported-genetically-modified-poplar-trees USDA Requests Public Input on dEIS for Deregulation of Freeze-Tolerant GE Eucalyptus: https://www.aphis.usda.gov/aphis/ourfocus/biotechnology/brs-news-and-information/deis_eucalyptus Letter from ArborGen to USDA: https://www.aphis.usda.gov/biotechnology/downloads/reg_loi/arborgen_air_loblly_pine.pdf Response letter from USDA to ArborGen: https://www.aphis.usda.gov/biotechnology/downloads/reg_loi/brs_resp_arborgen_loblolly_pine.pdf Experts with whom we corresponded: 1) Prof. Steven Strauss, Oregon State University 2) Prof. Ross Whetten – North Carolina State University 3) Cathy O. Quinn – Director, Communications & Marketing at ArborGen Inc. 4) Adam Colette – Program Director at Dogwood Alliance		**Commercial Use of GMO Trees in the US** Currently there are no GMO trees for commercial timber use. Fruit (papaya/plum) trees can be found as GMO, as well as research plots. Currently an application for commercial timber use of freeze-tolerant GM eucalyptus is being evaluated for potential use in the US. In 2017, the USDA sought public input on a draft environmental impact statement and preliminary plant pest risk assessment as part of its review of the GM Eucalyptus. No further decisions have been made. If this petition will be approved there will be no requirements to register/regulate the MU using GMO trees, every GMO that has been deregulated has been analysed by FDA, USDA, and/or EPA and has thus been regulated prior to this. In 2012, ArborGen submitted a letter to the USDA requesting confirmation that genetically engineered loblolly pine (Pinus taeda) does not need to be regulated by the agency due to the method used to modify the species. The USDA responded in 2014, confirming that these GE species are not a regulated article. Further correspondences with experts (Experts 2,3,4) indicates that these species are not being used commercially in the United States. Currently there is no use of GMO trees for commercial use, but the US might be close to approving the use of such. If this happens it will not be possible to identify the use of that GMO to a certain MU, which is why there might be specified risk in the future. But as the situation is now in the US there are no commercial GMO timber trees. Low risk thresholds met: (2) There is no commercial use of GMO (tree) species in the area under assessment. AND (3) Other available evidence does not challenge´low risk´

			designation.

	GMO Context Question	Answer	Sources of Information (list sources if different types of information, such as reports, laws, regulations, articles, web pages news articles etc.).
1	Is there any legislation covering GMO (trees)?	Yes. GMO trees are not regulated under a specific GMO legislation, but regulated under general health, safety and environmental legislation governing conventional products. The agencies responsible for oversight of the products of agricultural modern biotechnology are the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA-APHIS), the U.S. Environmental Protection Agency (EPA), and the Department of Health and Human Services' Food and Drug Administration (FDA). Depending on its characteristics, a product may be subject to review by one or more of these agencies. The United States does not have any federal legislation that is specific to genetically modified organisms (GMOs). Rather, GMOs are regulated pursuant to health, safety, and environmental legislation governing conventional products. The US approach to regulating GMOs is premised on the assumption that regulation should focus on the nature of the products, rather than the process in which they were produced.	
2	Does applicable legislation for the area under assessment include a ban for commercial use of GMO (trees)?	No, but it does require a specific license approval and EIA that goes through a rigorous process.	
3	Is there evidence of unauthorized use of GM trees?	No. Case has been brought up in court, but none have been acknowledged and thus there is no evidence to state that there has been unauthorized use of GM trees. (On July 1, 2010, several environmental groups sued APHIS to block authorization of field trials of GE eucalyptus, alleging various violations of the National Environmental Policy Act and the Endangered Species Act. (They lost the case). On October 6, 2011, the Court ruled in USDA's favor on all counts, finding that APHIS' EA was fully sufficient).	

4	Is there any commercial use of GM trees in the country or region?	No	
5	Are there any trials of GM trees in the country or region?	Yes. Approval for field trial plots has been given since 1989. At Information System for biotechnology. -Virginia tec University (ISB VT) the approved research plots can be found (http://www.isb.vt.edu/search-release-data.aspx).	
6	Are licenses required for commercial use of GM trees?	Yes. There has to be authorization. Eucalyptus (Cold resistant, Male sterile) are being considered for approval. This could end up in court delaying the use of GMO. For commercial use an Environmental examination before authorizing is required (Environmental Impact Statement) for GM trees where plant pest components are being used in developing the new varieties, or the recipient organism itself is a plant pest, or there is reason to believe that any components used to develop the new varieties would make the tree become a plant pest.	
7	Are there any licenses issued for GM trees relevant for the area under assessment? (If so, in what regions, for what species and to which entities?)	No. Currently only research plots, but application for commercial use of eucalyptus are being evaluated.	
8	What GM 'species' are used?	Mostly Poplar and Eucalyptus for field trial. (Also other species are being field tested, e.g. Sweet gum, chestnut)	
9	Can it be clearly determined in which MUs the GM trees are used?	No. Currently the research plots has to be disclose to the level of the county, but not down to MU level. Once a license is given for commercial use no registration or tracking of GMO is required.	

Control measures

Indicator	Control measures (M – mandatory / R – recommended)
5.1	Not Applicable

Annex A Glossary

In some instances, the US Forest Management (FM) Standard definitions are included here as guidance. However, for the purposes of the National Risk Assessment, the primary definitions provided below are to be considered normative. Differences between these definitions and the FM certification definitions are due to the different purposes served at different scales.

Control Measure (CM): An action that the organization shall take in order to mitigate the risk of sourcing material from unacceptable sources. (Source: FSC-STD-40-005 V3-1)

NOTE Avoidance of unacceptable sources is always considered an acceptable Control Measure

Low Risk: A conclusion, following a risk assessment, that there is negligible risk that material from unacceptable sources can be sourced from a specific geographic area. (Source: FSC-PRO-60-002a V1-0)

Old Growth: Late-successional forests that were mature at the time of European settlement and the beginning of commercial timber harvesting in a given location, and whose late-successional structural elements and species composition have not been degraded by historic timber harvest. Late successional structures that define old growth usually include high canopy closure, multi-layered, multi-species, dominance by large overstory legacy (i.e. pre European settlement) trees, and a high incidence of large snags, trees with broken tops, and very large coarse woody debris.

- Type 1 Old-Growth: Old-Growth that qualifies as primary forest. That is, it has never been subject to commercial timber harvest.
- Type 2 Old-Growth: Old-Growth forest that has been subject to some level of commercial timber harvest, but still contains the structural elements of Old Growth and legacy trees.

FM Standard Definition: (1) the oldest seral stage in which a plant community is capable of existing on a site, given the frequency of natural disturbance events, or (2) a very old example of a stand dominated by long-lived early- or mid-seral species. The onset of old growth varies by forest community and region. Depending on the frequency and intensity of disturbances, and site conditions, old-growth forest will have different structures, species compositions, and age distributions, and functional capacities than younger forests. Old-growth stands and forests include: Type 1 Old Growth: three acres or more that have never been logged and that display old-growth characteristics. Type 2 Old Growth: 20 acres that have been logged, but which retain significant old-growth structure and functions.

Permanently Protected: For the purposes of this National Risk Assessment (NRA), these are lands where the management intent is equivalent to Status 1 or Status 2 of the GAP Status Codes, as defined in the data standards for the Protected Areas Database-US (http://gapanalysis.usgs.gov/padus/data/standards/).

Status 1: An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a natural state within which disturbance events (of natural type, frequency, intensity, and legacy) are allowed to proceed without interference or are mimicked through management. For example, federally designated wilderness areas and areas protected under State legislation with similar goals and restrictions.

Status 2: An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a primarily natural state, but which may receive uses or management practices that degrade the quality of existing natural communities, including suppression of natural disturbance. For example, National Parks, National Wildlife Refuges, Research Natural Areas, local conservation areas and private conservation land, but not National Forests, State-administered lands, historical/cultural areas, etc.

NOTE The USGS maintains a GAP Protected Areas Viewer application that presents those GAP Status 1-4 areas that have been inventoried: http://gapanalysis.usgs.gov/padus/viewer/

Plantation: Forest areas lacking most of the principal characteristics and key elements of native ecosystems as defined by FSC-approved national and regional standards of forest stewardship, which result from the human activities of either planting, sowing or intensive silvicultural treatments (source: FSC-STD-01-001).
The use of establishment or subsequent management practices in planted forest stands that perpetuate the stand-level absence of most principle characteristics and key elements of native forest ecosystems will result in a stand being classified as a plantation. The details addressing ecological conditions used in stand-level classification are outlined in related guidance. Except for highly extenuating circumstances the following are classified as plantations:

- cultivation of exotic species or recognized exotic sub-species;
- block plantings of cloned trees resulting in a major reduction of within-stand genetic diversity compared to what would be found in a natural stand of the same species;
- cultivation of any tree species in areas that were naturally non-forested ecosystems.

See Appendix G of the FSC US Forest Management Standard for: 1) guidance on the classification of plantations; 2) guidance on principle characteristics and key elements of native forest ecosystems; and 3) guidance on management practices related to plantations.

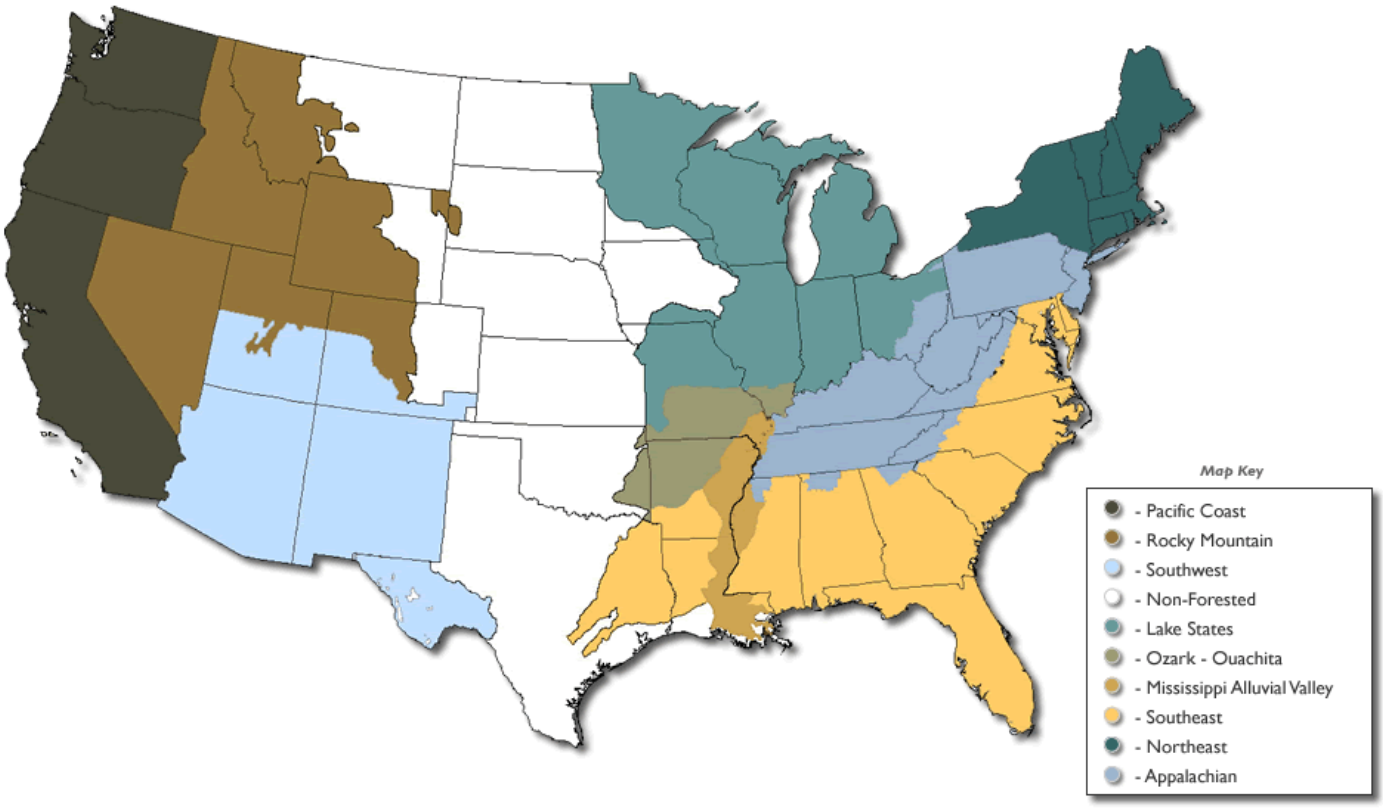
Primary Forest: Forest that has not historically been subject to commercial logging, and has historically been maintained in a forested condition. Forest that has encroached on lands not previously forested is not considered primary. Primary forest includes Type 1 Old-Growth.

NOTE Given natural disturbance and successional regimes, stands of any age or successional stage may qualify as primary forest. For example, a primary forest does not by definition need to contain an abundance of mature trees.

FM Standard Definition: A forest ecosystem with the principal characteristics and key elements of native ecosystems, such as complexity, structure, diversity, an abundance of mature trees, and that is relatively undisturbed by human activity. Human impacts in such forest areas have normally been limited to low levels of hunting, fishing, and very limited harvesting of forest products. Such ecosystems are also referred to as "mature," "old growth," or "virgin" forests. See also old growth.

Specified Risk: A conclusion, following a risk assessment, that there is a certain risk that material from unacceptable sources may be sourced or enter the supply chain from a specific geographic area. The nature and extent of this risk is specified for the purpose of defining efficient Control Measures. (Source: FSC-PRO-60-002a V1-0)

Annex B FSC US Regional Map



NOTE: A spatial data layer with boundaries for the above regions may be requested by contacting the FSC US office.

Annex C Risk Designations by FSC US Region

This annex provides a summary of risk designation decisions by FSC US Region (see Annex B for a map of FSC US Regions). A 'Specified' notation below indicates that there is specified risk designated within the region, but not the entire region. This table is for general reference only – the normative risk designations are provided in the main document.

FSC US Region	Category 1: Legality	Category 2: Traditional & Human Rights	Category 3: High Conservation Values						Category 4: Conversion	Category 5: Genetically Modified Organisms
			HCV 1: Species Diversity	HCV 2: Landscape-Level Forests	HCV 3: Rare Ecosystems	HCV 4: Critical Ecosystem Services	HCV 5: Community Needs	HCV 6: Cultural Values		
Pacific Coast	Low	Low	Specified[1]	Low	Specified[4]	Low	Low	Low	Specified[9]	Low
Rocky Mountains	Low	Low	Low	Low	Specified[5]	Low	Low	Low	Low	Low
Southwest	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Non-Forested	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Great Lakes	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Northeast	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Appalachian	Low	Low	Specified[2]	Low	Specified[6]	Low	Low	Low	Low	Low
Ozark-Ouachita	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
Mississippi Alluvial	Low	Low	Low	Low	Specified[7]	Low	Low	Low	Low	Low
Southeast	Low	Low	Specified[3]	Low	Specified[8]	Low	Low	Low	Specified[10]	Low

[1] Critical Biodiversity Area: Central California, Klamath-Siskiyou
Species: Lesser Slender Salamander

[2] Critical Biodiversity Area: Central Appalachians, Southern Appalachians
Species: Cheoah Bald Salamander

[3] Critical Biodiversity Area: Southern Appalachian, Cape Fear Arch, Florida Panhandle, Central Florida
Species: Dusky Gopher Frog, Houston Toad, Patch-nosed Salamander

[4] Old Growth Forest

[5] Old Growth Forest

[6] Priority Forest Type: Mesophytic Cove Sites

[7] Priority Forest Type: Late Successional Bottomland Hardwoods

[8] Priority Forest Type: Late Successional Bottomland Hardwoods, Native Longleaf Pine Systems

[9] Specific counties in Washington and Oregon

[10] Specific counties in Texas, Alabama, Florida, Georgia, South Carolina, North Carolina, Virginia and Delaware

Annex D Assessments for Category 2

This annex is intended to provide the Category 2 assessment in a more accessible format than the required National Risk Assessment template in the main document. Additionally, it includes available guidance that is not included in the main document which is intended to help readers better understand the rationale behind the risk designation decisions for Category 2 indicators. For any category with an associated annex, the content found in the main body of the risk assessment, not the annex, is definitive.

A draft Centralized National Risk Assessment (CNRA) for the entire United States was completed for Category 2 by a consultant on behalf of FSC International. A public consultation was completed on the CNRA in 2015, but it was not approved, nor formally published. FSC US staff subsequently completed an evaluation of the draft CNRA content and additional assessments (including consultation with an expert on Indicator 2.3), which were presented to the working group for their review. The content from the draft CNRA has been combined with the additional assessments completed, and they are presented together below.

Category 2 – Traditional and Human Rights

FSC considers materials that come from places where traditional and human rights are being violated due to management activities (harvesting, processing and trading) to be unacceptable materials. Therefore, the NRA assesses the risk of sourcing from these kinds of areas.

Global Context

The following summary is intended to help contextualize information from other sources associated with each of the specific risk assessment indicators. Internet searches were performed to look for data on level of corruption, governance, lawlessness, fragility of the State, freedom of journalism, freedom of speech, peace, human rights, armed or violent conflicts by or in the country, etc.

The United States scores well or very well on global indices and indicators related to: governance, regulatory enforcement, failed and fragile states, corruption, freedom in the world, freedom of the press and freedom of the net [Sources: 1,4,9,12,13,14,16]. On one index of the state of peace, the United States scores 'medium' due to more recent violence (e.g., the Boston Marathon bombings), a high degree of militarization and a high incarceration rate [Source: 15]. The United States is not included on lists of countries with: fragile situations and impunity concerns (specific to journalism) [Sources: 2,3]. 'Watchdog' organizations do not identify concerns with illegal logging or timber conflicts in the US [Sources: 6,7,8,10], but are mixed on concerns about human rights. Some watchdog groups do not identify any concerns with human rights [Sources: 6,7], while others identify concerns with criminal justice, immigration, national security, drug policy, child labor on US farms, discrimination against workers with family responsibilities, and excessive force in domestic law enforcement [Sources: 5,11].

Sources of Information:

1. World Bank: Worldwide Governance Indicators - the WGIs report aggregate and individual governance indicators for 215 countries (most recently for 1996–2012), for six dimensions of governance: Voice and Accountability; Political Stability and Absence of Violence; Government Effectiveness; Regulatory Quality; Rule of Law; Control of Corruption. Retrieved from http://info.worldbank.org/governance/wgi/index.aspx#home

2. World Bank Harmonized List of Fragile Situations. FY11. Retrieved from http://siteresources.worldbank.org/EXTLICUS/Resources/511777-1269623894864/Fragile_Situations_List_FY11_%28Oct_19_2010%29.pdf
3. Committee to Protect Journalists: Impunity Index - CPJ's Impunity Index calculates the number of unsolved journalist murders as a percentage of each country's population. For this index, CPJ examined journalist murders that occurred between January 1, 2004, and December 31, 2013, and that remain unsolved. Only those nations with five or more unsolved cases are included on this index. Retrieved from http://cpj.org/reports/2014/04/impunity-index-getting-away-with-murder.php
4. Carleton University: Country Indicators for Foreign Policy: the Failed and Fragile States project of Carleton University examines state fragility using a combination of structural data and current event monitoring. Retrieved from http://www4.carleton.ca/cifp/ffs.htm
5. Human Rights Watch. Retrieved from http://www.hrw.org
6. US AID - Search on website for [country] + 'human rights' 'conflicts' 'conflict timber.' Retrieved from http://www.usaid.gov
7. Global Witness - Search on website for [country] +'human rights' 'conflicts' 'conflict timber.' Retrieved from http://www.globalwitness.org
8. World Wildlife Fund. Illegal logging. Retrieved from http://wwf.panda.org/about_our_earth/about_forests/deforestation/forest_illegal_logging/
9. Transparency International. Corruption Perceptions Index. Retrieved from http://cpi.transparency.org/cpi2013/results/
10. Chattam House. Illegal Logging Indicators Country Report Card. http://www.illegal-logging.info
11. Amnesty International Annual Report: The state of the world's human rights -information on key human rights issues, including: freedom of expression; international justice; corporate accountability; the death penalty; and reproductive rights
12. Freedom House. Retrieved from http://www.freedomhouse.org/
13. Reporters without Borders: Press Freedom Index. 2013. Retrieved from http://en.rsf.org/spip.php?page=classement&id_rubrique=1054
14. Fund for Peace - Failed States Index of Highest Alert - the Fund for Peace is a US-based non-profit research and educational organization that works to prevent violent conflict and promote security. The Failed States Index is an annual ranking, first published in 2005, of 177 nations based on their levels of stability and capacity. In 2014 the FFP changed the name of the Failed State Index to the Fragile State Index. Retrieved from http://ffp.statesindex.org/rankings-2013-sortable
15. The Global Peace Index. Published by the Institute for Economics & Peace, This index is the world's leading measure of national peacefulness. It ranks 162 nations according to their absence of violence. It's made up of 23 indicators, ranging from a nation's level of military expenditure to its relations with neighboring countries and the level of respect for human rights. Source: The Guardian. Retrieved from http://www.visionofhumanity.org/#/page/indexes/global-peace-index
16. World Justice Project. Rule of Law Index 2016. Retrieved from http://data.worldjusticeproject.org/#groups/USA

INDICATOR 2.1: CONFLICT TIMBER

"The forest sector is not associated with violent armed conflict, including that which threatens national or regional security and/or linked to military control."

Context and Considerations (from FSC-PRO-60-002a)

- Is the country covered by a UN security ban on exporting timber?
- Is the country covered by any other international ban on timber export?
- Are there individuals or entities involved in the forest sector that are facing UN sanctions?
- Is the area a source of conflict timber?
- Is the conflict timber related to specific operators? If so, which operators or types of operators?

Assessment:

There is no UN Security Council ban on timber exports from the United States [Sources: 17,18,19]. The United States is not covered by any other international ban on timber export [Sources: 17,18,19]. There are no individuals or entities involved in the forest sector in The United States that are facing UN sanctions [Sources: 17,18,19]. There is no evidence of conflict timber concerns within the United States [Sources: 18,20,21,22,23,24].

Low Risk Thresholds that Apply:

(1) The area under assessment is not a source of conflict timber; AND
(2) The country is not covered by a UN security ban on exporting timber; AND
(3) The country is not covered by any other international ban on timber export; AND
(4) Operators in the area under assessment are not involved in conflict timber supply/trade; AND
(5) Other available evidence does not challenge a 'low risk' designation.

Indicator 2.1 Risk Designation: Low Risk for the entire assessment area

Sources of Information:

17. United Nations. Compendium of United Nations Security Council Sanctions Lists. Retrieved from http://www.un.org/sc/committees/list_compend.shtml
18. US AID. Retrieved from http://www.usaid.gov
19. Global Witness. Retrieved from http://www.globalwitness.org
20. Human Rights Watch. Retrieved from http://www.hrw.org/
21. Amnesty International Annual Report: The state of the world's human rights -information on key human rights issues, including: freedom of expression; international justice; corporate accountability; the death penalty; and reproductive rights. Retrieved from http://amnesty.org/en/annual-report/2013/
22. World Bank: Worldwide Governance Indicators - the WGIs report aggregate and individual governance indicators for 213 economies (most recently for 1996–2010), for six dimensions of governance: Use indicator 'Political stability and Absence of violence' specific for indicator 2.1. Retrieved from http://info.worldbank.org/governance/wgi/index.aspx#home
23. Greenpeace. Retrieved from http://www.greenpeace.org
24. Center for International Forestry Research. Forests and Conflict. Retrieved from http://www.cifor.org/publications/Corporate/FactSheet/forests_conflict.htm

INDICATOR 2.2: LABOR RIGHTS

"Labor rights are upheld including rights as specified in ILO Fundamental Principles and Rights at Work. "

Relevant Indicators from the Category 1 (Legality) Centralized National Risk Assessment:

- *Indicator 1.11 (Health and Safety):* Low Risk at the national level
- *Indicator 1.12 (Legal Employment):* Low Risk at the national level

Context and Considerations (from FSC-PRO-60-002a)

- Are social rights covered by relevant legislation and enforced in the country or area concerned? (refer to Category 1)
- Are rights like freedom of association and collective bargaining upheld?
- Is there evidence of occurrences of compulsory or forced labor?
- Is there evidence of occurrences discrimination?
- Is there evidence of occurrences of child labor?
- Is the country signatory to the relevant ILO Conventions or are the ILO Fundamental Rights and Principles at work upheld?
- Is there evidence that any groups (including women) feel adequately protected related to the rights mentioned above?
- Are any violations of labor rights limited to specific sectors?

Assessment:

General Social Rights

The Declaration on Fundamental Principles and Rights at Work reads as follows [Source: 25]:

> "All ILO Members, even if they have not ratified the Conventions in question, have an obligation arising from the very fact of membership in the Organization to respect, to promote and to realize, in good faith and in accordance with the Constitution, the principles concerning the fundamental rights which are the subject of those Conventions, namely:
>
> a) freedom of association and the effective recognition of the right to collective bargaining;
>
> b) the elimination of all forms of forced or compulsory labour;
>
> c) the effective abolition of child labour; and
>
> d) the elimination of discrimination in respect of employment and occupation."

This indicator specifically addresses whether the country being assessed upholds the ILO Fundamental Principles and Rights at Work – which may be demonstrated by ratification of the 8 relevant ILO Core conventions, or using other evidence. Therefore, the fact that the United States has not ratified all 8 of the Conventions does not automatically infer that the country is not in compliance with the indicator.

The United States has extensive legislation protecting the social rights of individuals and workers. The following pieces of the US legal framework uphold the ILO Fundamental Principles and Rights of Work in the United States:

- The First Amendment to the United States Constitution, adopted in 1791, provides that "Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press, or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances". In practice, this means that the Constitution protects employees' rights of association, thereby prohibiting their discharge for union activity.
- Freedom of association in the US is protected by the 1935 National Labor Relations Act (NLRA; 29 USC §151-169), with primary responsibility for enforcement by the National Labor Relations Board (NLRB). Additionally, the US Code (29 USC §171(a)) states that, "it is the policy of the

United States that, “sound and stable industrial peace and the advancement of the general welfare, health, and safety of the Nation and of the best interests of employers and employees can most satisfactorily be secured by the settlement of issues between employers and employees through the processes of conference and collective bargaining between employers and the representatives of their employees”

- Forced and compulsory labor is prohibited by the 13th Amendment to the United States Constitution, and is codified in 18 USC § 1589. The amendment specifically outlaws slavery and involuntary servitude, except as punishment for a person duly convicted of a crime
- The Trafficking Victims Protection Act (most recently reauthorized in 2013) authorizes measures to combat human trafficking. Additionally, federal legislation requires every employer to pay each employee a minimum wage (29 U.S.C.§ 206) and overtime pay (29 U.S.C.§ 207).
- The Fair Labor Standards Act of 1938 (29 USC § 201-262) restricts the employment of children under the age of 16 with the exception of children working on farms owned by their parents, and forbids the employment of people younger than 18 in jobs deemed too dangerous (including logging).
- Discrimination with respect to employment is prohibited in the United States by Section VII of the Civil Rights Act of 1964 (Public Law 88-352), and is overseen by the U.S. Equal Employment Opportunity Commission. There are several additional and complementary pieces of legislation, such as: the Equal Pay Act of 1963 (EPA), which protects men and women who perform substantially equal work in the same establishment from sex-based wage discrimination; the Age Discrimination in Employment Act of 1967 (ADEA), which protects individuals who are 40 years of age or older; Title I and Title V of the Americans with Disabilities Act of 1990, as amended (ADA), which prohibit employment discrimination against qualified individuals with disabilities in the private sector, and in state and local governments; Sections 501 and 505 of the Rehabilitation Act of 1973, which prohibit discrimination against qualified individuals with disabilities who work in the federal government;

All indicators In the Category 1 (legality) assessment were designated as ‘low risk’ at a national scale, indicating that the relevant legislation is enforced.

Freedom of Association & Collective Bargaining

Even though the US has not ratified either of the associated Core Conventions, it has been a member of the ILO since 1980 (and previous to that was a member from 1934 to 1977). As a member, the US has obligations under the ILO Constitution, including a commitment under the Declaration on Fundamental Principles and Rights at Work. [Source: 26] Additionally, the US is subject to annual ILO review and reporting processes and also complaint processes (through the Committee on Freedom of Association, CFA). A report by the International Organisation of Employers (IOE) notes that “Most CFA case examinations of U.S. law have resulted in conclusions and recommendations that the law or practice subject of the complaint is consistent with the principles of freedom of association” and that “there has never been a wholesale criticism of the NLRA or NLRB by the CFA or the ILO” [Source: 27]. There are 42 closed complaints cases listed in the US member profile [Source: 26]. All of this provides strong evidence that the United States respects, promotes and realizes, in good faith, workers’ rights to “freedom of association and the effective recognition of the right to collective bargaining.”

Some sources question whether the United States is truly respecting workers’ rights to freedom of association and the effective recognition of the right to collective bargaining. Concerns include the exemption of a small number of worker categories (such as agricultural workers) from the NLRA [Source: 28,29,30,31], the ability of employers to hire replacement workers for those on strike [Source: 31], the perceived ability of employers to pressure employees against organizing in the workplace

[Source: 31], the predominance of enterprise-level bargaining [Source: 9], the perceived lack of fair election processes [Source: 30], and the perceived lack of adequate enforcement [Source: 31].

- While the NLRA is an important piece of legislation that protects workers' rights, it is not the only source of protection for workers in the US. The Member profile for the United States lists 80 separate pieces of national legislation associated with 'Freedom of association, collective bargaining and industrial relations' [Source: 26]. As noted above, the constitution itself protects the rights of all workers to associate and the US Code establishes in federal policy the respect of the country for collective bargaining – both of these cover all workers, regardless of whether they are covered by the NLRA. Additionally, in the 2003-2005 US Annual Reports to the ILO, the Government writes, "No Government's authorization is required to establish a workers' organization, or to conclude collective agreements. The exercise of freedom of association and the right to collective bargaining is recognized at enterprise, sector/industry, national (and international) levels for the following categories of workers: (i) medical professionals; (ii) teachers; (iii) agricultural workers; (iv) workers engaged in domestic work; (v) workers in export processing zones (EPZs) or enterprises/industries with EPZs status; (vi) migrant workers; (vii) workers of all ages; and (viii) workers in the informal economy." [Source: 28]
- US labor relations are different than those in other parts of the world. A predominance of enterprise-level bargaining reflects these differences, but does not indicate that collective bargaining is not respected, just that it is done differently. Employers have rights in the US that are different from other countries, including being allowed to actively communicate with employees during collective bargaining, but again this does not indicate that collective bargaining is not respected. While employers are allowed to hire replacement workers so that they may remain in business during strikes, they are required by law to bargain in good faith to resolve those strikes. [Source: 34]
- Concerns about election processes do not take into account (and were published prior to) recent changes in union election procedures that are universally considered to favor unions [Sources: 35,36]. It also fails to consider that, according to election statistics, unions are successful in approximately 70% of the elections that are held [Source: 37].
- There is a very robust system for enforcement of these rights. On the federal level, they are guaranteed by the NLRA, which protects the rights of employees and employers, "to encourage collective bargaining, and to curtail certain private sector labor and management practices, which can harm the general welfare of workers, businesses and the U.S. economy." [Source: 38] The Act also established the National Labor Relations Board (NLRB), which has primary responsibility for enforcement of the NLRA. Each year, approximately 20,000 charges are filed with the NLRB alleging unfair labor practices, and each one is investigated by regional field examiners and attorneys. More than half of these are withdrawn or dismissed, and of those that receive full investigation, a little over 1,000 each year result in formal complaints detailing the alleged violations. After a decision by a judge, the remaining cases are litigated and reviewed by the NLRB itself each year [Source: 39]. The US Annual Reports to the ILO summarize the millions of dollars that have been repaid to workers as a result of these enforcement actions [Source: 28]. This represents a heavily utilized and strong enforcement system.

In its 2017 report, the International Trade Union confederation (ITUC) categorizes the US as a Status 4 (Systemic violations of rights) in its annual index [Source: 32]. The categorization is based upon surveys of national unions and review of legislation and then comparison of these results with 97 indicators derived from the ILO Conventions and jurisprudence that represent violations of workers' rights. The primary concerns highlighted in the 2017 report were lack of consultation with unions regarding labor law and policy, and limits on certain types of strike actions.

- This index is based on the opinion of the unions, not metrics, and the views of employees and employers are not included.
- Other global indices and indicators that address labor rights recognize the US as being above the median [Sources: 39,70]
- The status categorization within this index is built upon indicators that are drawn from the ILO Conventions, but as noted by ILO itself, ratification of and conformance with the Conventions is not required for respect of the Fundamental Principles and Rights [Source: 25], and it is the Fundamental Principles and Rights that are the focus of Indicator 2.2 for this risk assessment. Therefore, lack of complete alignment with the Conventions and a lower status in this index does not *per se* indicate that the US does not respect the basic rights of association and collective bargaining.
- The issues highlighted in the report (e.g., consultation with unions regarding labor law and policy, and limits on certain types of strike actions) provide no information regarding whether the US respects the basic rights of association and collective bargaining.
- Therefore, it is still possible for the US to respect the Fundamental Principles and Rights, while being categorized with a lower status in this index.

It is possible to conclude from the information presented that while the US has not ratified and may not conform with all specifics in the associated Core Conventions, it respects the fundamental rights of freedom of association and the effective recognition of the right to collective bargaining.

Compulsory or Forced Labor

The US ratified Core Convention 105 (Abolition of Forced Labour Convention) in 1991 and the ILO web site indicates the status as 'In Force' [Source: 26]. The US has not yet ratified Convention 29 (Forced Labour Convention), but as noted above has legislation that addresses fundamental rights associated with compulsory or forced labor. There are also numerous additional policies, reports, action plans and executive orders that provide evidence of the country's efforts to ensure these rights, particularly as they relate to human trafficking [Source: 28].

The United States is consistently categorized as Tier 1 (the highest tier reflecting a country's efforts to address human trafficking problems) in the U.S. Department of State's Trafficking in Persons annual report [Source: 40]. The Global Slavery Index's 2016 assessment identifies the United States as a country with one of the lowest estimated prevalence of modern slavery and as a country with one of the strongest responses to modern slavery [Source: 41].

Some sources identify the situation of migrant workers in the agricultural sector as an area of concern [Sources: 42,43,44]. The agricultural sector is important for this assessment, as it includes both farmworkers and forest workers.

- One of the sources is an ILO report on forced labor [Source: 42]. The report is 57 pages in length and the United States is mentioned in a single paragraph within a section on the Agricultural, forestry and fishing sector. The US is identified as an example of a country with a high population of migrant and seasonal farmworkers. The report acknowledges that a high share of migrant workers is reflected in the number of cases of forced labour in the sector as a whole (globally), but does not indicate that the US is of specific concern.
- One of the sources identified is Anti-Slavery International, the world's oldest international human rights organization [Source 43]. While this organization has awarded organizations that are fighting forced labor in the United States agricultural sector, it does not identify the United States as a country in which they focus their anti-slavery efforts and a search of 'United States' at the

web site does not bring up any reports or other articles about specific concerns in the US or the US in general. Additionally, Anti-Slavery International recognizes the US Department of State's Trafficking in Persons Report (see above) as a valid global index of human trafficking and efforts to eliminate it.

- One of the sources is an article written for an online topical research digest hosted by the University of Denver [Source: 44]. The article notes a high occurrence of forced labor in the US, but does not provide any data or specific references as evidence. It states that the high occurrence is due to the absence of labor standards and regulations in the industry, and to the increasing number of undocumented immigrant farm workers that have no legal protection. The article recognizes the importance of the Trafficking Victims Protection Act and some limitations, but was written prior to reauthorizations of the act that increased the protections that it provides. However, the article does not recognize the Migrant and Seasonal Agricultural Worker Protection Act which is the principle federal employment law for farmworkers in the US [Source: 45].
- Perhaps most pertinently, these sources focus almost entirely on farmworkers, which are one component of the agricultural sector. However, forest workers are a separate component of the agricultural sector, but are not specifically addressed in these sources. While the 2017 Trafficking of Persons report [Source: 40] does identify forced labor in the forestry sectors of Burma, Czechia, Guyana, Mongolia, Sweden, and Uganda, and the 2016 List of Goods Produced by Child Labor or Forced Labor [Source: 46] identifies forced labor for timber in Brazil, North Korea, and Peru, the US is not mentioned in association with forestry or timber in either report.

While the US has not ratified both relevant Core Conventions, it is still possible to conclude that the US respects the fundamental right to the elimination of all forms of forced or compulsory labor, and in particular that there are no concerns identified in the forest sector.

Child Labor

The United States ratified Core Convention 182 (Worst Forms of Child Labor Convention) in 1999 and the ILO web site indicates the status as 'In Force' [Source: 26]. The US has not yet ratified Convention 138 (Minimum Age Convention), but as noted above has legislation that addresses fundamental rights associated with child labor. Additionally, every state has legislation that further limits the hours and days per week that minors may work in non-farm employment and 34 states have similar limits for farm work [Source: 47]. And all states have compulsory education until at least 16 years of age [Source: 28]. The US Annual Reports to the ILO also detail statistics on the effective enforcement of the federal legislation, including hundreds of cases, thousands of children affected and millions of dollars paid in fines each year [Source: 28].

The United States does not feature in the ILO Child Labour Country Dashboard, which indicates a low risk for child labour in the United States [Source 53]. The 2016 List of Goods Produced by Child Labor or Forced Labor [Source: 46] does not associate any goods produced in the US with child labor.

Some sources identify the situation of children in the agricultural sector as an area of concern [Sources: 43,48,49,50,51,52]. The agricultural sector is important for this assessment, as it includes both farmworkers and forest workers. However, the focus of all of these sources are exemptions in the US legislation that allow children under the age of 16 to work on family farms, and does not in any way include children working in forests. The US Labor legislation clearly prohibits the employment of minors between 16 and 18 years of age in forestry service occupations and associated occupations as they are "occupations particularly hazardous or detrimental to [the minors'] health or well-being" [Source: 54]. No sources of information were identified that suggest that child labor in the forest sector is a concern.

While the US has not ratified both relevant Core Conventions, it is still possible to conclude that the US respects the fundamental right to the effective abolition of child labor, particularly in the forest sector.

Discrimination

Even though the US has not ratified either of the associated Core Conventions, it has been a member of the ILO since 1980 (and previous to that was a member from 1934 to 1977). As a member, the US has obligations under the ILO Constitution, including a commitment under the Declaration on Fundamental Principles and Rights at Work. Additionally, the US is subject to annual ILO review and reporting processes. [Source: 26]

As noted above, the US has a suite of federal laws that prohibit discrimination in the workplace, including discrimination based on race, color, religion, sex, national origin, gender, age, pregnancy, disability, gender identity, sexual orientation, and genetic information. The Equal Employment Opportunity Commission (EEOC) is responsible for enforcement of these laws. In 2015, the EEOC received 89,385 private sector charges of discrimination and achieved 92,641 resolutions, including more than $356.6 million in monetary benefits [Source: 59].

Some sources question whether the United States is truly respecting workers' rights to elimination of discrimination. Concerns include differences in unemployment rates between African Americans and whites [Source: 55,56], wage gaps between races and genders [Sources: 56,57], discrimination against workers with family responsibilities [Sources: 49,56,58], slow progress on affirmative action, an increase in religious discrimination and age discrimination claims, and wage gaps and unemployment rate gaps for persons with and without disabilities [Source: 56].

- The US generally scores well or very well on global indices and reviews of gender equality in the workplace [Sources: 60,61], on social progress [Source: 38], fundamental rights (including discrimination) [Source: 63], and discrimination in employment & vocational training [Source: 64]
- Conclusions about racial, gender, religious, age and other discrimination cannot be drawn from simple statistics such as wage and unemployment gaps without delving deeper into the issues. FSC-GUI-60-008 (V1-0) states, "Concerning non-discriminatory employment and occupation practices, the working group clarified that differences in remuneration between workers are not considered discriminatory where they exist due to inherent requirements or specifics of the job, e.g. due to length of employment, experience, technical expertise and performance" [Source: 68]. There must be recognition or consideration of the many different factors that may contribute to employment differences where they do exist. For example, research results indicate that a majority of racial and gender wage gaps in the US can be explained by differences in education, labor force experience, occupation or industry and other factors that can be measured [Source: 67]. Therefore, while lack of a wage or unemployment gap could be used as evidence that discrimination does not exist, existence of a gap does not automatically infer that the US does not respect the fundamental right to the elimination of discrimination.
- In recent years, the US has significantly improved protections for workers with family responsibilities, including the 2010 Patient Protection and Affordable Care Act that amended the Fair Labor Standards Act to require that employers provide break time for nursing mothers [Source: 65], and the Family and Medical Leave Act of 1993 that requires the provision of leave time for family reasons (i.e., maternity/paternity leave) and for medical reasons [Source: 66]. A number of the sources with concerns were published prior to implementation of these new laws.
- No sources of information were identified that suggest that any form of discrimination related to race, religion, disability or age in the forest sector is a concern.

It is possible to conclude from the information presented that while the US has not ratified and may not conform with all specifics in the associated Core Conventions, it respects the fundamental rights of the elimination of discrimination in respect of employment and occupation, particularly in the forest sector.

Low Risk Thresholds that Apply:

(10) Applicable legislation for the area under assessment covers all ILO Fundamental Principles and Rights at Work, AND the risk assessment for the relevant indicators of Category 1 confirms enforcement of applicable legislation ('low risk'); AND

(12) Other available evidence do not challenge a 'low risk' designation.

Indicator 2.2 Risk Designation: Low Risk for the entire assessment area, particularly in the forest sector

Sources of Information:

25. International Labour Organization. The Declaration on Fundamental Principles and Rights at Work, including the Global and Country Reports. 2010. Retrieved from http://www.ilo.org/declaration/thedeclaration/textdeclaration/lang--en/index.htm
26. International Labour Organization. Member Profile: United States. Retrieved from http://www.ilo.org/gateway/faces/home/ctryHome?locale=EN&countryCode=USA&_adf.ctrl-state=nqv76qrog_9
27. International Organisation of Employers. A Response by the International Organisation of Employers to the Human Rights Watch Report —"A Strange Case: Violations of Workers' Freedom of Association in the United States by European Multinational Corporations", A Special Edition of the International Labour and Social Policy Review. 2011. Retrieved from http://www.ioe-emp.org/fileadmin/ioe_documents/publications/Policy%20Areas/business_and_human_rights/EN/_2011-05-00__IOE_Response_to_Human_Rights_Watch_Report.pdf
28. International Labour Organization. 2016 Annual Review Under the Follow-Up to the ILO 1998 Declaration Compilation of Baseline Tables. United States - Country baselines under the 1998 ILO Declaration Annual Review (2000-2016): Freedom of association and the effective recognition of the right to collective bargaining; The elimination of all forms of forced or compulsory labour; The effective abolition of child labour; and The elimination of discrimination in respect of employment and occupation. 2016. Retrieved from http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---declaration/documents/publication/wcms_565946.pdf
29. US Human Rights Network. Shadow Report Submissions and Updates Including An Executive Summary Of All Attached Reports Compiled By The US Human Rights Network (On Behalf Of Member And Partner Organizations) To The United Nations Human Rights Committee. Originally submitted SEPTEMBER 13, 2013. Revised FEBRUARY 10, 2014. Retrieved from http://tbinternet.ohchr.org/Treaties/CCPR/Shared%20Documents/USA/INT_CCPR_CSS_USA_16502_E.pdf, p.22-24
30. Union for Reform Judaism. Resolutions: Workers' Rights in the United States. 2005 Retrieved from https://urj.org/what-we-believe/resolutions/workers-rights-united-states
31. Human Rights Watch. A Strange Case - Violations of Workers' Freedom of Association in the United States by European Multinational Corporations. 2010. Retrieved from http://www.hrw.org/sites/default/files/reports/bhr0910web_0.pdf
32. International Trade Union Confederation. 2017 ITUC Global Rights Index, The World's Worst Countries for Workers. 2017. Retrieved from https://www.ituc-csi.org/IMG/pdf/survey_ra_2017_eng-1.pdf
33. International Labour Organization. Freedom of association in practice: Lessons learned, Global Report under the follow-up to the ILO Declaration on Fundamental Principles and Rights at Work. 2008. Retrieved from http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/wcms_096122.pdf

34. National Labor Relations Board. Bargaining in good faith with employees' union representative (Section 8(d) & 8(a)(5)). Retrieved from https://www.nlrb.gov/rights-we-protect/whats-law/employers/bargaining-good-faith-employees-union-representative-section
35. Richardson, Gerald M. Articles & Updates: NLRB Changes Union Election Procedures. Evans & Dixon LLC. Retrieved from http://www.evans-dixon.com/article/1251/NLRB-Changes-Union-Election-Procedures.aspx
36. FordHarrison, Ius Laboris USA. Publications: NLRB Adopts New Election Procedures. 2014. Retrieved from http://www.fordharrison.com/nlrb-adopts-new-election-procedures
37. Dubé, Lawrence E. NLRB Conducted More Elections in 2015, But Percentage of Union Wins Held Steady, Bloomberg BNA. 2016. Retrieved from https://www.bna.com/nlrb-conducted-elections-n57982068022/
38. National Labor Relations Board. National Labor Relations Act. Retrieved from https://www.nlrb.gov/resources/national-labor-relations-act
39. National Labor Relations Board. Charges and Complaints Issued. Retrieved from https://www.nlrb.gov/resources/national-labor-relations-act)Charges and Complaints Issued, National Labor Relations Board (https://www.nlrb.gov/news-outreach/graphs-data/charges-and-complaints/charges-and-complaints
40. U.S. Department of State. 2017 Trafficking in Persons Report. Retrieved from https://www.state.gov/j/tip/rls/tiprpt/2017/index.htm
41. The Global Slavery Index 2016. Retrieved from https://www.globalslaveryindex.org/findings/
42. International Labour Organization. Profits and Poverty: The Economics of Forced Labour. 2014. Retrieved from http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---declaration/documents/publication/wcms_243391.pdf
43. Anti-Slavery International. Retrieved from www.antislavery.org
44. Buckley, C. 2008. Forced Labor in the United States: A Contemporary Problem in Need of a Contemporary Solution. *In* Topical Research Digest: Human Rights and Contemporary Slavery. Human Rights & Human Welfare. University of Denver. Retrieved from https://www.du.edu/korbel/hrhw/researchdigest/slavery/us.pdf
45. Farmworker Justice. US Labor Law for Farmworkers. Retrieved from https://www.farmworkerjustice.org/advocacy-and-programs/us-labor-law-farmworkers
46. Bureau of International Labor Affairs, United States Department of Labor. List of Goods Produced by Child Labor or Forced Labor. 2016. Retrieved from https://www.dol.gov/sites/default/files/documents/ilab/reports/child-labor/findings/TVPRA_Report2016.pdf
47. US Department of Labor. State Labor Laws. Retrieved from https://www.dol.gov/whd/state/state.htm
48. Global March Against Child Labour: Protecting Children in Agriculture and Right to Food; Death of Two 14-Year-Old Girls in an Illinois Field Underscores the Need for an Overhaul of US Child Labor Laws. Retrieved from http://www.globalmarch.org/content/protecting-children-agriculture-and-right-food; http://www.globalmarch.org/content/death-two-14-year-old-girls-illinois-field-underscores-need-overhaul-us-child-labor-laws-–
49. Human Rights Watch. World Report 2014. Retrieved from https://www.hrw.org/world-report/2014/country-chapters/united-states?page=2
50. Verisk Maplecroft. Child Labor Index. Retrieved from https://maplecroft.com/about/news/child-labour-index.html
51. United Nations Human Rights Committee. Concluding observations on the fourth periodic report of the United States of America. 2014. Retrieved from http://www.ushrnetwork.org/sites/ushrnetwork.org/files/iccpr_concluding_obs_2014.pdf

52. Human Rights Watch. Take Action-End Child Labor in US Agriculture. Tobacco's hidden children. 2014. Retrieved from https://www.hrw.org/video-photos/interactive/2010/05/03/take-action-end-child-labor-us-agriculture; https://www.hrw.org/sites/default/files/reports/us0514_UploadNew.pdf
53. International Labour Organization. International Programme on the Elimination of Child Labour (IPEC)'s Countries Dashboard. Retrieved from http://www.ilo.org/ipec/Regionsandcountries/lang--en/index.htm
54. United States Department of Labor. Hazardous Jobs. Retrieved from https://www.dol.gov/general/topic/youthlabor/hazardousjobs
55. International Labour Organization. World of Work: The Magazine of the ILO. No. 72, August 2011. Retrieved from http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/wcms_160434.pdf
56. International Labour Organization. ILO Global Report, Equality at work: The continuing challenge. 2011. Retrieved from http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_154779.pdf
57. International Labour Organization. ILO Global Report, Equality at work: Tackling the challenges. 2007. Retrieved from http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---webdev/documents/publication/wcms_082607.pdf
58. Human Rights Watch. Submission to the Human Rights Committee During its Consideration of the Fourth Periodic Report of the United States. 2012. Retrieved from https://www.hrw.org/sites/default/files/related_material/HRW%20Submission%20to%20the%20HRC.pdf
59. US Equal Employment Opportunity Commission. Enforcement. Retrieved from https://www.eeoc.gov/eeoc/enforcement/index.cfm
60. The Global Gender Gap Report 2017 (https://www.weforum.org/reports/the-global-gender-gap-report-2017
61. International Labour Organization. ILO Maps and Charts: Which countries have the highest gender gap in the workplace? Retrieved from http://www.ilo.org/global/about-the-ilo/multimedia/maps-and-charts/enhanced/WCMS_556528/lang--en/index.htm
62. Porter, Michael E., Stern, S, and Green, M. Social Progress Index 2017. Social Progress Imperative. Retrieved from http://www.socialprogressindex.com/assets/downloads/resources/en/English-2017-Social-Progress-Index-Findings-Report_embargo-d-until-June-21-2017.pdf
63. World Justice Project. Rule of Law Index 2016. Retrieved from http://data.worldjusticeproject.org/#groups/USA
64. Migrant Policy Group. Migrant Integration Policy Index 2015. Retrieved from http://www.migpolgroup.com/diversity-integration/migrant-integration-policy-index/
65. United States Department of Labor. Section 7(r) of the Fair Labor Standards Act – Break Time for Nursing Mothers Provision. Retrieved from https://www.dol.gov/whd/nursingmothers/Sec7rFLSA_btnm.htm
66. United States Department of Labor. Family and Medical Leave Act. Retrieved from https://www.dol.gov/whd/regs/compliance/1421.htm
67. Patten, Eileen. Racial, gender wage gaps persist in U.S. despite some progress. Pew Research Center. 2016. Retrieved from http://www.pewresearch.org/fact-tank/2016/07/01/racial-gender-wage-gaps-persist-in-u-s-despite-some-progress/
68. Forest Stewardship Council. Guideline for Standard Developers on the Generic Criteria and Indicators Based on ILO Core Conventions Principles, FSC-GUI-60-008 (V1-0). 2017. Retrieved

from https://ic.fsc.org/en/what-is-fsc-certification/consultations/current-processes/report-on-compliance-with-the-ilo-core-conventions-principles
69. Pennsylvania State University's Center for Global Worker's Rights. Labor Rights Indicators. 2015. Retrieved from http://labour-rights-indicators.la.psu.edu
70. Maplecroft. Human Rights Risk Index 2016 – Q4. Retrieved from https://reliefweb.int/report/world/human-rights-risk-index-2016-q4

INDICATOR 2.3: INDIGENOUS & TRADITIONAL PEOPLES' RIGHTS

"The rights of indigenous and traditional peoples are upheld."

Relevant Indicators from the Category 1 (Legality) Centralized National Risk Assessment:

- *Indicator 1.13 (Customary Rights):* Low Risk at the national level
- *Indicator 1.15 (Indigenous Peoples Rights):* Low Risk at the national level

Context and Considerations (from FSC-PRO-60-002a)

- Are there indigenous peoples, and/or traditional peoples present in the area under assessment?
- Are the provisions of ILO Convention 169 and United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) enforced in the area concerned? (refer to Category 1)
- Is there evidence of violations of legal and customary rights of indigenous or traditional peoples?
- Are there any 'conflicts of substantial magnitude' pertaining to the rights of indigenous and/or traditional peoples?
- Are there any recognized laws and/or regulations and/or processes in place to resolve conflicts of substantial magnitude pertaining to indigenous or traditional peoples' rights?
- What evidence can demonstrate the enforcement of the laws and regulations identified above? (refer to Category 1)
- Is the conflict resolution broadly accepted by affected stakeholders as being fair and equitable?

For the purpose of Indicator 2.3, a 'conflict of substantial magnitude' is a conflict which involves one or more of the following:

a) Gross violation of the legal or customary rights of indigenous or traditional peoples;
b) Significant negative impact that is irreversible or that cannot be mitigated;
c) A significant number of instances of physical violence against indigenous or traditional peoples;
d) A significant number of instances of destruction of property;
e) Presence of military bodies;
f) Systematic acts of intimidation against indigenous or traditional peoples.

Guidance:

In the identification of conflicts of substantial magnitude one must also be aware of possible parallel activities of other sectors than the forest sector that also impact the rights of indigenous/traditional peoples and that there can be a cumulative impact. This cumulative impact can lead to a 'gross violation of indigenous peoples' rights' or 'irreversible consequences' but the extent of the contribution of forest management operations needs to be assessed.

The substance and magnitude of conflicts shall be determined through NRA development process according to national/regional conditions. NRA shall provide definition of such conflicts.

Assessment:

Historical Context

The federal government entered into more than 400 treaties with various Native American Nations from 1778 to 1871. After 1871, the United States instead used formal agreements between Native American Nations and the federal government as a replacement for treaties. Even though Congress ended treaty-making with tribes in 1871, the pre-existing treaties are still in effect and contain promises which bind the United States today. In total, almost 600 documents were signed between 1778 and 1911. In these treaties and other constructive arrangements between Native American Nations and the United States some lands were reserved for them and for their use. These are called reservations. Some provisions were included in the treaties for the Native American Nations to continue to use the land they ceded to the government by concluding the treaty. These usufructuary rights[1] outside the reservations were the rights of the Native Americans to hunt, fish, and gather forest products off the land or to get access to sacred sites. Because they retained these rights in their treaties, these are referred to as reserved rights. Many of these treaties and other arrangements have been violated by the United States and the current reservations do not always reflect the areas agreed upon as reservations in the treaties and other arrangements. [Sources: 122,123,124,125,126]

There is significant evidence of historical violations of legal and customary rights of Indigenous Peoples in the US, however, Indicator 2.3 requires an assessment of the current situation.

Current/Recent Context

According to the United States Census Bureau, approximately 5.2 million people in the U.S., or 1.7% of the total population, identified as Native American or Alaska Native alone or in combination with another ethnic identity in 2010. In addition, there are roughly half a million persons that identify entirely or partly as Native Hawaiians. [Source: 120] There are 567 federally recognized tribal entities in the United States, and many of these have federally recognized national homelands or 'reserves' [Source: 121]. Between 200-300 additional groups identify as historical Indigenous nations but have not been federally recognized, although some are in the recognition process and some have achieved recognition at the state level [Source: 122]. Indigenous peoples are present in all regions of the US.

There are a number of pieces of legislation at the core of federal policy protecting Native American rights, including: the Indian Self-Determination and Education Assistance Act of 1975, by which tribes are able to assume the planning and administration of federal programs that are devised for their benefit; the American Indian Religious Freedom Act of 1978, which directs federal officials to consult with tribes about actions that may affect religious practices; and the Native American Graves Protection and Repatriation Act of 1990, which directs federal agencies and museums to return indigenous remains and sacred objects to appropriate indigenous groups. A combination of other laws, policies, executive orders and programs fill out the suite of protections by providing additional protections for indigenous religion and culture, and addressing Indian economic and natural resource development, education and civil rights. [Source: 127,138] The low risk designations for relevant indicators in the Category 1 assessment indicate that these laws are enforced.

The Federal Government has several agencies dedicated specifically to indigenous affairs, the principal one being the Bureau of Indian Affairs (BIA) within the Department of the Interior. Under federal law, the United States holds in trust the underlying title to the Indian lands within reservations and other lands set aside by statute or treaty for the tribes. The Department is responsible for overseeing some 55 million surface acres and the subsurface mineral resources in some 57 million acres. [Source: 127]

[1] Usufructuary right: the right of enjoying a thing, the property of which is vested in another, and to draw from the same all the profit, utility and advantage which it may produce, provided it be without altering the substance of the thing.

These lands have traditionally been managed by the BIA, but in recent years (see below), more tribes are taking on land management responsibilities themselves. There are many other indigenous-specific agencies and programs throughout the Government. The Government has recently made an increased effort to appoint indigenous individuals to high-level government positions dealing with indigenous affairs, including the position of Assistant Secretary for Indian Affairs, which heads the BIA and the Senior Policy Advisor for Native American Affairs, which was created to advise the President on issues related to indigenous peoples. [Source: 127]

However, sources still express concerns regarding the rights of Native Americans in the US, including: violence against Native American women [Sources: 127,128,129]; access to, control over, and protections of places of cultural and religious significance [Sources: 122, 127, 130, 131, 132, 133, 134, 135, 138]; ability to achieve federal recognition [Sources: 127,135]; management of and control over trust lands and other lands and waters for which rights are held or that affect tribal well-being [Sources: 122,127,129,133,134,136,137,140]; use of consultation and Free, Prior and Informed Consent (FPIC) [Sources: 122,130,131,138,139]; doctrine used by the US Federal court system [Sources: 127, 136, 137]; and lack of ratification of and conformance with the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), and the ILO Convention 169 [Sources: 122,127,132].

Recent Federal Government Efforts

To address concerns such as those identified above, the US Federal government has made a number of recent changes to improve the effectiveness of the legislation and policy that address Native American rights. These efforts build on others in the last few decades that have been overall recognized as advancing indigenous self-determination and development with respect for cultural identity, and as being generally in line with the aspirations expressed by indigenous peoples [Source: 127].

Perhaps most importantly, while the U.S. did not vote for UNDRIP when it was originally adopted in 2007, at the request of Tribes, individual Native Americans and others in the country, it reviewed its position, including extensive government-to-government consultation with tribal leaders, and in 2010 decided to support the Declaration [Source: 73]. At the same time that the US government announced its endorsement of the Declaration, it also provided a statement of how it would support UNDRIP, and recognized, as did many tribal leaders, that this would require the US government to continue to work with tribal governments [Sources: 71,72,73]. The Declaration ensures that indigenous peoples' rights to cultural integrity, education, health, and political participation are protected. It provides for the recognition of indigenous peoples' rights to their lands and natural resources, and the observation of their treaty rights. It also requires countries to consult with indigenous peoples with the goal of obtaining their consent on matters with concern them (i.e., free, prior and informed consent or FPIC). Basically, it recognizes indigenous peoples' right to self-determination. [Source: 74]

[**NOTE:** ILO Convention 169, which the United States has not ratified, similarly recognizes indigenous peoples' right to self-determination, while setting standards for national governments regarding indigenous peoples' economic, cultural and political rights, including maintenance of their own identifies, languages and religions, control over their own institutions and ways of life and economic development, and participation in decision-making on activities that may impact them. [Source: 75]]

Recent changes in legislation and policy that are shaping the US Government's relations with tribes and helping to ensure tribes' self-determination, as required by UNDRIP and ILO Convention 169 include the following (and tribes are actively exercising that self-determination as a result [Source: 83]):

- Establishment of the White House Council on Native American Affairs to work on economic development, healthcare, tribal justice systems, education and the management of land and natural resources – chaired by the Secretary of the Interior, this group is tasked with making policy recommendations to the President, coordinating with Native organizations, coordinating

tribal consultations and assisting in organizing the yearly White House Tribal Nations Conference.

- Federal Recognition: The US government continues to recognize additional tribes (there are now 567 recognized tribes and many others in the review process). A new final rule was published in 2015 to amend the regulatory process in order to speed it up and make it more transparent. [Sources: 76,77]
- Restoration of Trust Lands: Self-governance and tribal sovereignty are linked with the right to manage tribal lands. The Obama administration placed over 500,000 acres of land into trust for tribal nations, reversing a historic trend of loss of tribal homelands. [Source: 80]
- Economic Development: In 2016, the Indian Trust Asset Management Reform Act was signed into law (with great support from tribes), providing tribes with greater provisions to manage their own trust asset (including the above trust lands) and therefore their own economic opportunities, such as surface leasing, forest management and appraisals without approval of the Secretary of the Interior. [Sources: 78,79,83] And the 2010 Claims Resolution Act settled four tribal water rights issues, settled litigation that addressed mismanagement of trust assets, settled a lawsuit addressing alleged discrimination against Indian farmers in federal agricultural programs, and created a fund to address historic accounting and trust management issues. [Source: 73,81,82]
- Tribal Court: The 2013 reauthorization of the Violence Against Women Act included new provisions that gave tribes the authority to prosecute in tribal courts individuals who commit acts of domestic violence on tribal lands, regardless of whether they are Indian or not [Source: 82,83]. And even before these additional authorities were added, The Tribal Law and Order Act of 2010 gave tribes greater authority to prosecute crimes [Source: 73,83].
- U.S. Courts: After many years of unsuccessful filing and outcomes for cases heard at the US Supreme Court, during the 2015 term, 26 Indian law case petitions were filed, 5 were heard by the Court and there were four wins and one loss [Source: 86]. And it appears that this increase in activity at the Supreme Court level continued for 2016 and into 2017 [Source: 117].
- Government-to-Government Consultation/FPIC: The President issued an Executive Memorandum in late 2009 that directed all federal agencies to develop a plan within 90 days to consult and coordinate with tribal governments, thereby enforcing President Clinton's Executive Order 13175 "Consultation and Coordination with Indian Tribal Governments [Source: 90]. This Memorandum resulted in new policies regarding consultation and coordination with Indian Tribes [Source: 90,91,92,115,116].
- Health: The Indian Health Care Improvement Act (reauthorized in 2010) modernizes tribal health care networks and helps to ensure every Native American receives the health care promised to them. [Sources: 83,84]
- Education: The 2015 reauthorization of the Elementary and Secondary Education Act (called the Every Student Succeeds Act) includes several new indigenous peoples-specific provisions. [Sources: 73,85]
- Religion: In 2012, the Departments of Defense, the Interior, Agriculture, and Energy and the Advisory Council on Historic Preservation entered into a Memorandum of Understanding (MOU) regarding 'Interagency Coordination and Collaboration for the Protection of Indian Sacred Sites.' The action plan for the MOU requires that the provisions of the MOU be implemented in consultation with Indian tribes. [Source: 101]

Not only did the US endorse UNDRIP, but in 2016, as a member of the Organization of American States, the US adopted the American Declaration on the Rights of Indigenous Peoples (ADRIP). The ADRIP was finalized after almost 30 years of work with the indigenous peoples and 35 independent

states of the western hemisphere. It was developed with the guiding principle that no standard would be adopted that was lower than the standards contained in the UNDRIP. Some go beyond UNDRIP, including treaties, the rights of children, and the rights of peoples in voluntary isolation. [Sources: 102,103,104]

In his 2017 State of Indian Nations speech, National Congress of American Indians President, and Swinomish Indian Tribal Community member, Brian Cladoosby recognized that government-to-government relations with the US government were the best they had been since the formation of the US government. He also recognized many of the programs and policies detailed above that were being developed together by the US and tribal government and were being successfully implemented by the tribes. [Source: 83]

Resolution of Tribal Disputes

While there are examples of tribal disputes that are either ongoing or have not had successful resolution [Sources: 127,129,133,134,135,136, 137,138], these examples do not provide conclusive evidence that the system is broken and that that laws and regulations and/or other legally established processes do not exist that serve to resolve conflicts, because there are also an increasing number of more recent successes in resolving disputes through the court system, or through other means [Sources: 81,93,94,95,96,97,98,99,100,109,127,129,133,141,142,143].

Further, the US government is allowing its agencies to use and seeing an increase in use of alternative dispute resolution programs [Source: 87], and is even providing expertise specifically for tribal concerns through the Native Dispute Resolution Network (a network of American Indian, Alaska Native, Native Hawaiian and non-Native Environmental Conflict Resolution professionals) [Source: 88]. Conflict resolution through negotiation is closer to traditional Native approaches than mediation and much closer than use of the court system [Source: 89].

The point is that there are established processes that serve to resolve treaty and other rights disputes.

Forest Management By and For Tribes

Ultimately, Indicator 2.3 is concerned with the current and near future situation related to indigenous peoples' rights specifically within the forest sector.

A large part of self-determination is the right to manage your own assets and resources, including forest management and tribes in the assessment area are using forest management to further self-determination and tribal rights. [Sources: 107,118,119]

Indigenous peoples do not see a forest just as a source of economic resource, but as an integral element of their cultural being, and part of a Tribe's self-determination is making or being an integral part of making the decisions on how the forest is managed so that these values are respected [Source: 105]. Many tribes in the assessment area are engaging in sustainable forestry management practices, which are seen as models for forest management elsewhere, as is evidenced by the high-level of active participation in the Inter-Tribal Timber Council which was established in 1976 [Sources: 106,107,108,119]. In fact, 302 Tribes have forest lands and are engaged in forest management, and there has been an increase in Tribal Natural Resources Departments, those departments' active participation in forest management, and foresters on tribal staff, including a 84% increase in tribes taking over forest management from the Bureau of Indian Affairs (who managed the forests in trust for the tribes), and a 60% increase in tribal staffing from 1991 to 2011 [Source: 110; Expert: Mike Dockry].

Overall management of tribal lands has transformed from being completely dominated by Bureau of Indian Affairs (BIA) policies, which for forests emphasized timber production, to approaches that incorporate tribal visions and values for the land [Source: 110, 119, Expert: Mike Dockry]. The

legislation that regulates the management of trust lands was revised in 2012, providing tribes with much greater decision-making power over what happens with those lands [Sources: 78,79,83,119].

Tribes are becoming much more active, not just in management of their own lands, but also the lands around their reservation and trust lands. The Tribal Forest Protection Act (2004) gives Tribes the ability to propose and implement management projects on US Forest Service and US Bureau of Land Management lands around their trust lands in order to protect their rights, lands and resources by reducing threats on these other lands [Source: 111]. Tribes are active partners in the Anchor Forest program which is an effort to provide forest land stewardship across ownership boundaries and among disparate interests [Source 112]. Tribes are active partners in most of the 22 Landscape Conservation Cooperatives, particularly on initiatives related to climate change resilience [Source: 113,114]. Additionally, recent changes to the US Forest Service consultation procedures and requirements have improved tribal participation in decision-making on National Forest lands – there are extensive requirements for government-to-government consultation prior to management of forests where tribes have rights and/or customary use [Sources: 115,116,119].

Consultation with Tribes and Experts

FSC US staff consulted with two FSC-certified tribes, two forest managers with extensive experience working with Tribes, and a representative of an affiliation of tribes. In these consultations, FSC US staff heard concern expressed by the representative of the affiliation of tribes regarding localized forest management activities on ancestral lands to which the tribe in question does not have legal rights. However, the certified tribes and the forest managers supported a low risk designation, recognizing that there may be isolated and infrequent events, but that there are not widespread violations of tribal rights within the forest sector. (Experts: Marshall Pecore, Marc Gauthier, Jeff Lindsey, Paul Koll, Karen Brenner)

Low Risk Thresholds that Apply:

(17) The presence of indigenous and/or traditional peoples is confirmed or likely within the area under assessment. The applicable legislation for the area under assessment covers the basic principles of ILO governing the identification and rights of indigenous and traditional peoples and UNDRIP, AND risk assessment for relevant indicators of Category 1 confirms enforcement of applicable legislation ('low risk'); AND

(19) There is no evidence of conflict(s) of substantial magnitude pertaining to rights of indigenous and/or traditional peoples [**NOTE:** within the forest sector]; AND

(21) Other available evidence do not challenge a 'low risk' designation.

Indicator 2.3 Risk Designation: Low Risk for the entire assessment area, particularly in the forest sector

Sources of Information:

71. Cultural Survival. Victory!: U.S. Endorses UN Declaration on the Rights of Indigenous Peoples. Retrieved from https://www.culturalsurvival.org/news/victory-us-endorses-un-declaration-rights-indigenous-peoples
72. United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). Mattakeeset Tribe. Retrieved from http://mattakeesettribe.com/departments/undrip/
73. Announcement of U.S. Support for the United Nations Declaration on the Rights of Indigenous Peoples, Initiatives to Promote the Government-to-Government Relationship & Improve the Lives of Indigenous Peoples, A statement of how the U.S. will support UNDRIP that

accompanied the announcement of support, Advisory Council on Historic Preservation . 2012. Retrieved from http://www.achp.gov/docs/US%20Support%20for%20Declaration%2012-10.pdf
74. United Nations. United Nations Declaration on the rights of Indigenous Peoples. 2008. Retrieved from http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf
75. Indigenous Foundations. ILO Convention 169. Retrieved from http://indigenousfoundations.arts.ubc.ca/ilo_convention_169/
76. National Congress of American Indians. New Federal Recognition Rule Announced at NCAI Conference. 2015. Retrieved from http://www.ncai.org/news/articles/2015/06/30/new-federal-recognition-rule-announced-at-ncai-conference
77. Bureau of Indian Affairs. Highlights of the Final Federal Acknowledgement Rule (25 CFR 83). Retrieved from https://www.bia.gov/cs/groups/public/documents/text/idc1-030769.pdf
78. National Congress of American Indians. President Signs Indian Trust Asset Management Reform Act into Law. 2016. Retrieved from http://www.ncai.org/news/articles/2016/06/22/president-signs-indian-trust-asset-management-reform-act-into-law
79. National Congress of American Indians. Legislative Testimony: NCAI Support for H.R. 812 – The Indian Trust Asset Reform Act. 2015. Retrieved from http://www.ncai.org/attachments/Testimonial_BIzCvhdjJhHOyzjKQZoOUzymCzwCEonINdRAJKHFnPWVKTRmhfx_2015-04-09-NCAI-LtrHouseSubcmteIndianAffairs-SupportingHR812-Final.pdf
80. U.S. Department of Interior. 10/12/2016 Press Release, Obama Administration Exceeds Ambitious Goal to Restore 500,000 Acres of Tribal Homelands. 2016. Retrieved from https://www.doi.gov/pressreleases/obama-administration-exceeds-ambitious-goal-restore-500000-acres-tribal-homelands
81. Brownstein Hyatt Farber Schreck, LLP. Claims Resolution Act, a slide deck provided by the Native American Rights Fund. 2011. Retrieved from http://www.narf.org/nill/documents/water/2011/presentations/07-smith.pdf
82. U.S. Department of State. Report of the United States of America, Submitted to the U.N. Commissioner for Human Rights in Conjunction with the Universal Periodic Review, provided by the U.S. Department of State. Retrieved from https://www.state.gov/documents/organization/237460.pdf
83. Remarks of President Brian Cladoosby - 15th Annual State of Indian Nations Address, Washington D.C., February 13, 2017. Retrieved from http://www.ncai.org/NCAI_2017_State_of_Indian_Nations_Address_Final_-2-.pdf
84. Indian Health Service. Indian Health Care Improvement Act. 2010. Retrieved from https://www.ihs.gov/ihcia/
85. National Indian Education Association. The Every Student Succeeds Act (ESSA). Retrieved from http://www.niea.org/for-advocates/education-priorities/elementary-and-secondary-education-act-esea-and-every-students-succeeds-act-essa/
86. Native American Rights Fund. Tribal Supreme Court Project Update, September 27, 2016. Retrieved from http://www.atnitribes.org/sites/default/files/ATNI%20Tribal%20Supreme%20Court%20Project%20Update.pdf
87. Interagency Report Interagency Alternative Dispute Resolution Working Group. New Dispute Resolution Programs in the Federal Government, 2014 Update. Retrieved from https://www.adr.gov/2014-interagency-report.pdf

88. Udall Foundation. U.S. Institute for Environmental Conflict Resolution, Native Dispute Resolution Network. Retrieved from https://www.udall.gov/OurPrograms/Institute/NativeDisputeResolutionNetwork.aspx
89. Connors, T. 2016. Why Peacemaking Makes Sense in State Court Justice Systems. Judges' Journal, 55(4): 24-30. 2016. Retrieved from http://washtenawtrialcourt.org/Peacemaking/Why%20Peacemaking%20Makes.pdf
90. National Congress of American Indians. Consultation with Tribal Nations: An Update on Implementation of Executive Order 13175. January 2012. Retrieved from http://www.ncai.org/attachments/Consultation_hxjBLgmqyYDiGehEwgXDsRIUKvwZZKjJOjwUnKjSQeoVaGOMvfl_Consultation_Report_-_Jan_2012_Update.pdf
91. U.S. Environmental Protection Agency. Progress in Strengthening our Government-to-Government Relationship with Tribal Nations, The EPA Blog. 2017. Retrieved from https://blog.epa.gov/blog/2017/01/progress-in-strengthening-our-government-to-government-relationship-with-tribal-nations/
92. U.S. Department of Agriculture Department Regulation: Tribal Consultation, Coordination, and Collaboration. Office of Tribal Relations. 2013. Retrieved from https://www.fs.fed.us/spf/tribalrelations/documents/policy/consultation/Final_DR.pdf
93. Great Lakes Indian Fish & Wildlife Commission. Treaty Rights. Retrieved from http://www.glifwc.org/TreatyRights/
94. Columbia River Inter-Tribal Fish Commission. Fisheries Timeline: Chronology of tribal fishing and fishing rights in the Columbia River. Retrieved from https://www.critfc.org/about-us/fisheries-timeline/
95. The Harvard Project on American Indian Economic Development. Honoring Nations: 2000 Honoree – Treaty Rights/National Forest Memorandum of Understanding. Retrieved from http://hpaied.org/sites/default/files/publications/Treaty%20Rights%20National%20Forest%20Management%20MOU.pdf
96. Michigan Department of Natural Resources. 2007 Inland Consent Decree. Retrieved from http://www.michigan.gov/documents/dnr/press.2007inlandconsentdecreeFAQs_209923_7.pdf
97. Michigan Department of Natural Resources. 2000 Consent Decree. Retrieved from http://www.michigan.gov/dnr/0,4570,7-153-10364_36925-177786--,00.html
98. National Congress of American Indians. Supreme Court Unanimously Holds Reservation Boundaries not Diminished in Favor of the Omaha Tribe in Nebraska v. Parker, March 22, 2016. Retrieved from http://www.ncai.org/news/articles/2016/03/22/supreme-court-unanimously-holds-reservation-boundaries-not-diminished-in-favor-of-the-omaha-tribe-in-nebraska-v-parker
99. National Congress of American Indians. Standing Rock Claims Confirmed – Justice Demands Tribes Rights are Respected. 2017. Retrieved from http://www.ncai.org/news/articles/2017/06/14/standing-rock-claims-confirmed-justice-demands-tribes-rights-are-respected
100. Columbia River Inter-Tribal Fish Commission. Snake River Fall Chinook Recovery: A tribal success story. 2012. Retrieved from http://www.critfc.org/wp-content/uploads/2012/10/success-stories-full-set-.pdf
101. Departments of Defense, the Interior, Agriculture, and Energy, and the Advisory Council on Historic Preservation. Action Plan to Implement the Memorandum of Understanding Regarding Interagency Coordination and Collaboration for the Protection of Indian Sacred Sites. March 3, 2013. Retrieved from http://www.achp.gov/docs/SS%20MOU%20Action%20Plan%20%20March%205%202013.pdf
102. Organization of American States. A 17-Year Wait Pays off for Indigenous Peoples. 2016. Retrieved from http://www.oas.org/en/media_center/press_release.asp?sCodigo=E-075/16

103. United Nations. Message from the Chairperson on the occasion of the adoption of the American Declaration on the Rights of Indigenous Peoples. 2016. Retrieved from https://www.un.org/development/desa/indigenouspeoples/news/2016/07/message-from-the-chairperson-on-the-occasion-of-the-adoption-of-the-american-declaration-on-the-rights-of-indigenous-peoples/
104. Native American Rights Fund. Organization of American States Adopts Historic American Declaration on the Rights of Indigenous Peoples. Retrieved from http://www.narf.org/2016/06/american-declaration-rights-indigenous-people/
105. Saway, V.L. Indigenous Cultures and Forest Management. A paper submitted to the XII World Forestry Congress. 2003. Quebec City, Canada. Retrieved from http://www.fao.org/docrep/ARTICLE/WFC/XII/0841-A2.HTM
106. National Congress of American Indians. Native Resources. Retrieved from http://www.ncai.org/policy-issues/land-natural-resources/native-resources
107. Bureau of Indian Affiars. Forestry in Indian Country: Models of Sustainability for our Nation's Forests?, Evergreen Magazine ('The voice of American forestry and science-based forest policy'). Winter 2005. Retrieved from https://www.bia.gov/cs/groups/xnifc/documents/text/idc015961.pdf
108. Intertribal Timber Council. Retrieved from http://www.itcnet.org
109. US Supreme Court Decision: State of Minnesota v. Mille Lacs Band of Chippewa Indians. 526 U.S. 172, 175. 1999. Retrieved from https://supreme.justia.com/cases/federal/us/526/172/case.html
110. Intertribal Timber Council. Indian Forest Management Assessment Team (IFMAT) – III Report. 2013. Retrieved http://www.itcnet.org/issues_projects/issues_2/forest_management/assessment.html
111. Intertribal Timber Council. Tribal Forest Protection Act (TFPA). Retrieved from http://www.itcnet.org/issues_projects/issues_2/tfpa/tfpareports.html
112. The Anchor Forests Project. Retrieved from http://anchorforest.org
113. Landscape Conservation Cooperative Network. Retrieved from https://lccnetwork.org
114. National Congress of American Indians. Resolution: In Support of Landscape Conservation Cooperatives. Retrieved from http://www.ncai.org/resources/resolutions/in-support-of-landscape-conservation-cooperatives
115. US Forest Service. Tribal Relations Strategic Framework for the Eastern Region. 2015.
116. USDA Departmental Regulation 1350-002, Tribal Consultation, Coordination and Collaboration (DR 1350-002/2013)
117. Tribal Supreme Court Project – Updates & Articles. Retrieved from http://sct.narf.org/articlesupdates.html
118. Intertribal Timber Council. Forestry in Indian Country: Solving Federal Forestry's Rubik's Cube, Evergreen Magazine ('The voice of American forestry and science-based forest policy'). Spring 2014. Retrieved from http://www.itcnet.org/resources/publications.html
119. Society of American Foresters. 2017. A Special Issue of the Journal of Forestry – Tribal Forest Management: Innovations for Sustainable Forest Management. Journal of Forestry, 115(1).
120. Norris, T, Vines, P.L. and Hoeffel, E.M. 2012. The American Indian and Alaska Native Population: 2010. U.S. Census Bureau. C2010BR-10. Retrieved from https://www.census.gov/prod/cen2010/briefs/c2010br-10.pdf
121. U.S. Dept of the Interior, Bureau of Indian Affairs. Retrieved from https://www.bia.gov/
122. A Submission by The International Indian Treaty Council (IITC), Oglala Lakota Nation, Western Shoshone Defense Project and the Indigenous World Association (IWA) to the UN

Committee on the Elimination of Racial Discrimination following Examination of the United States 7th, 8th and 9th Periodic Reports. July 8 2014. Retrieved from http://tbinternet.ohchr.org/Treaties/CERD/Shared%20Documents/USA/INT_CERD_NGO_USA_17613_E.pdf

123. Spirling, A. US Treaty-making with American Indians: Institutional Change and Relative Power, 1784-1911. Department of Government, Harvard University. 2011. Retrieved from https://www.princeton.edu/~pcglobal/conferences/methods/papers/Spirling.pdf
124. Treaties with Native Americans. Retrieved from http://www.historyandtheheadlines.abc-clio.com/ContentPages/ContentPage.aspx?entryId=1678740¤tSection=1678598&productid=43
125. Miller, R. Native America, Discovered and Conquered (a blog). Lewis & Clark Law School. Retrieved from http://lawlib.lclark.edu/blog/native_america/?page_id=8
126. Milwaukee Public Museum. Indian Treaty Rights. Retrieved from http://www.mpm.edu/wirp/ICW-09.html
127. Report of the Special Rapporteur on the rights of indigenous peoples, James Anaya – Addendum: The situation of indigenous peoples in the United States of America, 30 August 2012. Retrieved from https://documents-dds-ny.un.org/doc/UNDOC/GEN/G12/162/70/PDF/G1216270.pdf?OpenElement
128. Amnesty International. Americas: Sacrificing Rights in the Name of Development: Indigenous Peoples Under Threat in the Americas. 2011. Retrieved from https://www.amnesty.org/en/documents/amr01/001/2011/en/
129. International Work Group for Indigenous Affairs. Indigenous World. 2014. Retrieved from https://www.iwgia.org/images/publications//0671_I2014eb.pdf
130. Summary [of stakeholders' submissions] prepared by the Office of the High Commissioner for Human Rights in accordance with paragraph 15(c) of the annex to Human Rights Council resolution 5/1, Human Rights Council Working Group on the Universal Periodic Review. 2010 Retrieved from https://documents-dds-ny.un.org/doc/UNDOC/GEN/G10/169/65/PDF/G1016965.pdf?OpenElement
131. UN Human Rights Committee. Concluding observations on the fourth periodic report of the United States of America (CCPR/C/USA/CO/4). 2014. Retrieved from http://tbinternet.ohchr.org/_layouts/treatybodyexternal/Download.aspx?symbolno=CCPR%2fC%2fUSA%2fCO%2f4&Lang=en
132. UN Human Rights Committee. Concluding observations on the sixth periodic report of the United States of America. (CERD/C/USA/CO/6). 2008. Retrieved from http://tbinternet.ohchr.org/_layouts/treatybodyexternal/Download.aspx?symbolno=CERD%2fC%2fUSA%2fCO%2f6&Lang=en
133. Intercontinental Cry. Indigenous Struggles 2013: Dispatches from the Fourth World. 2014. Retrieved from https://www.scribd.com/document/216154458/Indigenous-Struggles-2013
134. Intercontinental Cry. Indigenous Struggles 2012: Dispatches from the Fourth World. 2012. Retrieved from http://intercontinentalcry.org/wp-content/uploads/2013/01/Indigenous-Struggles-2012.pdf)
135. Society for Threatened Peoples. Press Release: An enlargement of the Shasta Dam will destroy our livelihood. 2014. Retrieved https://www.gfbv.de/en/news/an-enlargement-of-the-shasta-dam-will-destroy-our-livelihood-6908-1/
136. Inter-American Commission on Human Rights. Report Number 99/99, Case 11.140: Mary and Carrie Dann. 1999. Retrieved from http://www.cidh.oas.org/Indigenas/U.S.11140eng.htm

137. Onondaga Nation. Press Release: The Onondaga Nation Files Petition Against United Sates with Inter-American Commission on Human Rights. 2014. Retrieved from http://www.onondaganation.org/news/2014/the-onondaga-nation-files-petition-against-united-states-with-inter-american-commission-on-human-rights-41514/
138. United Nations Human Rights Committee. 109th Session, Consideration of the fourth periodic report of the United States of America under Article 40 of the International Covenant on Civil and Political Rights. Indigenous Peoples Consolidated Alternative Report. 2013. Retrieved from http://tbinternet.ohchr.org/Treaties/CCPR/Shared%20Documents/USA/INT_CCPR_CSS_USA_19233_E.pdf)
139. Department of the Interior. Report of the Commission on Indian Trust Administration and Reform. 2013. Retrieved from https://www.doi.gov/sites/doi.gov/files/migrated/cobell/commission/upload/Report-of-the-Commission-on-Indian-Trust-Administration-and-Reform_FINAL_Approved-12-10-2013.pdf
140. Portalewska, A. Restricting Fishing Rights, Undermining Tribal Sovereignty. Cultural Survival Quarterly Magazine. 2014. Retrieved from https://www.culturalsurvival.org/publications/cultural-survival-quarterly/restricting-fishing-rights-undermining-tribal-sovereignty#
141. Berditschevski, Michelle. News Release: Good medicine once again prevailed in U.S. District Court…, Mount Shasta Bioregional Ecology Center. 2017. Retrieved from http://mountshastaecology.org/2017/02/08/new-favorable-ruling-on-medicine-lake-highlands-geothermal-legal-case/
142. Callahan, Mary. Nearly 700 acres of Sonoma county coast protected under deal with landowners, Kashia Pomo. The Press Democrat. 2015. Retrieved from http://www.pressdemocrat.com/news/4615137-181/nearly-700-acres-of-sonoma?artslide=0)
143. McGreal, Chris. US should return stolen land to Indian tribes, says United Nations. The Guardian. 2012. Retrieved https://www.theguardian.com/world/2012/may/04/us-stolen-land-indian-tribes-un

Experts Consulted:

- Mike Dockry, U.S. Forest Service
- Marshall Pecore, Menominee Tribal Enterprises
- Marc Gauthier, Upper Columbia United Tribes
- Jeff Lindsey, Hoopa Valley Tribal Council
- Paul Koll, Forest Manager
- Karen Brenner, Consulting Forester

Annex E Detailed Descriptions of HCVs and Risk Designations

This annex is intended to provide the provide the Category 3 assessment in a more accessible format than the required National Risk Assessment template in the main document. Additionally, it includes supplemental details, context and guidance that are not in the main document which are intended to help readers better understand the rationale behind the identification of HCVs and risk designation decisions for Category 3 indicators. For any category with an associated annex, the content found in the main body of the risk assessment, not the annex, is definitive.

Category 3 – High Conservation Values

NOTES ON THE GENERAL ASSESSMENT PROCESS:

Identification of HCV was based primarily on the on the definitions in the FSC-US Forest Management Standard and additional guidance in the 'FSC-US Draft HCVF Assessment Framework,' with significant consideration of definitions in the NRA Framework (FSC-PRO-60-002a) and guidance in the 'Common Guidance for the Identification of HCV.' While the FSC-US assessment framework was never formally finalized, it has been in regular use since 2010. Using the FSC-US standard definitions and FSC-US assessment framework results in some differences from other global frameworks – most significantly, Roadless Areas are included in HCV 3 (instead of HCV 2), because in the US, they are quite rare and other than those protected within Federal Wilderness Areas (or other protective designations), they are generally quite small (not landscape level forests).

When possible, data sets that were consistent for the entire assessment area were used, but when these were not available, regional data, literature reviews and/or consultation with experts were used.

It is also worth noting that while the WWF Global 200 Ecoregions in the US were not used as a primary source of information for identifying HCV, when the forest types associated with the

HCV 1 Critical Biodiversity Areas, HCV 3 Old Growth and HCV 3 Priority Forest Types are considered together, they align well with the forested WWF Global 200 Ecoregions in the U.S.

NOTE: Static PDF maps of specified risk designations are available on the FSC US web site and a spatial data layer is available upon request.

NOTES ON BIODIVERSITY AND PROTECTIONS:

During the last ice age, glaciers covered the northern third of the United States. These glaciers carved out the Great Lakes basins, shaped the topography and left behind glacial deposits that formed the Great Lakes and Northeastern regions' soils. The varying soils and topography drive the diversity of species composition on forests across this part of the US.

The historical geologic activity in the southeast United States created the Appalachian Mountains. Large portions of the region were, at times, covered by seawater. This history led to a great diversity in soil types that are able to support many different habitats. The southeast United States is one of the most biodiverse temperate areas in the world. In addition to the geologic history, the temperate climate, high annual rainfall, and latitudinal range also contribute to the high diversity of ecosystems. [204]

The western United States is geologically young, with mountain ranges created by tectonic activity. The glaciers that once covered the northern part of the region deposited sediment and helped to carve out some of the mountains. [205] Climate and topography heavily influence the diversity of ecosystems.

Habitat destruction is the leading cause of biodiversity loss in the United States, followed by non-native invasive species [206]. Other threats to biodiversity that are frequently mentioned are similar to those seen globally: climate change, pollution, and over-exploitation.

As detailed in Category 1, the US has a broad and comprehensive legal structure that addresses the protection of socially and ecologically important sites, administered at both the federal and state level. The risks of non-compliance with these laws on public lands is generally low. The risk on private lands is also low, but attention should be given to areas known to be important to listed species.

Protective Designations

FSC US used the Protected Areas Database of the United States to assess whether or not land was under protection for Category 3 HCVs. This database is the official inventory of protected areas in the United States, published by the U.S. Geological Survey Gap Analysis Program (GAP). The database compiles public parks, designated areas, conservation easements, and Marine Protected Areas, and is continuously updated. The database includes conservation rankings for both GAP Status Codes 1-4 and International Union for the Conservation of Nature (IUCN) categories. [181] As is common practice, the following assessment considers an area as permanently protected if it has a GAP Status of 1 or 2 [185]:

- *Status 1:* An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a natural state within which disturbance events (of natural type, frequency, intensity, and legacy) are allowed to proceed without interference or are mimicked through management. Example: Federal Wilderness Area

- *Status 2:* An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a primarily natural state, but which may receive uses or management practices that degrade the quality of existing natural communities, including suppression of natural disturbance. Examples: National Park, National Wildlife Refuge, National Natural Landmark

PAD-US data is used to inform the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) World Database on Protected Areas. (WDPA) [181] The WDPA is used to report on progress towards the Aichi Biodiversity Targets, by the United Nations to track progress towards Sustainable Development Goals, and for other international assessments and reports. [182] Other non-governmental organizations that partner to help develop PAD-US include The Nature Conservancy, The Trust for Public Lands, NatureServe, and the Commission for Environmental Cooperation. [183] These uses of the data indicate that this is a highly-trusted source of information.

While there haven't been any studies that looked specifically at the effectiveness of protective designations in the US, there are studies that look at the network of protected lands in the US (as classified by the PAD-US) and whether they represent ecological systems accurately. The use of the PAD-US dataset in this way indicates that it is recognized and respected as a valid source for information about areas that are effectively protected. One of these studies even explicitly recognizes this by stating, "the protected areas network within the continental US is often viewed as one of our best conservation tools for securing vegetation communities and the species they support into the future." [184]

Additionally, most of the GAP Status 1 and 2 designations are written into federal law [185] and the US is typically rated well or very well on global indices and indicators for legality, governance and law enforcement (see Category 1 and Category 2 assessments).

HCV 1 – Species Diversity

FSC considers materials that come from places where High Conservation Values are threatened by forest management activities to be unacceptable materials. Therefore, the NRA assesses the risk of sourcing from these kinds of areas.

HCV 1 Definitions:

FSC-PRO-60-002a (NRA Framework): "Species Diversity. Concentrations of biological diversity including endemic species, and rare, threatened or endangered species that are significant at global, regional or national levels."

FSC-US Forest Management Standard: "HCV forest areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g., endemism, endangered species, refugia)." HCV 1 includes rare, threatened or endangered species.

Common Guidance for the Identification of HCV[1] - HCV 1:

[1] Brown, E., N. Dudley, A. Lindhe, D.R. Muhtaman, C. Stewart, and T. Synnott (eds.). 2013 (October). Common guidance for the identification of High Conservation Values. HCV Resource Network. P.25 (https://ic.fsc.org/en/what-is-fsc-certification/consultations/archive/hcv-common-guidance)

“Any area that contains significant concentrations of HCV 1 species (RTE or endemic), or which contains habitat critical to the survival of these species will be an HCV area. It does not mean that any sighting or recorded presence of a RTE species would qualify as HCV, only where the concentration of species is globally, regionally or nationally significant. Remember, these non-HCV values can still be protected under other environmental management principles.

It is not necessarily important to have a certain amount of biological diversity to qualify as an HCV 1; even a single species can be considered important enough to be an HCV 1 on its own if the species is, for example, listed in the IUCN Red List or on the National Protected Species list and is found in a population large enough to qualify as a significant concentration in the country in question.”

“The following qualify as HCV 1:

- A high overall species richness, diversity or uniqueness within a defined area when compared with other sites within the same biogeographic area.
- Populations of multiple endemic or RTE species.
- Important populations or a great abundance of individual endemic or RTE species, representing a substantial proportion of the regional, national or global population which are needed to maintain viable populations either:
    - Year-round (e.g. key habitat for a specific species) or,
    - Seasonally, including migratory corridors, sites for breeding, roosting or hibernation, or refuges from disturbance.
- Small populations of individual endemic or RTE species, in cases where the national, regional or global survival of that species is critically dependent on the area in question (such species are likely to be restricted to a few remaining areas of habitat, and to be classified as EN or CR on the IUCN Red List). In these cases, there is often consensus (among many stakeholders) that every surviving individual is globally significant (e.g. flagship species such as Panda, Indian Rhino, Mountain Gorilla).
- Sites with significant RTE species richness, or populations (including temporary concentrations) of priority species approaching those of key protected areas or other priority sites within the same biogeographic boundary.
- Particularly important genetic variants, subspecies or varieties. For example, the Cross River gorilla (Gorilla gorilla diehli, ca. 250 individuals remaining) is a genetically distinct subspecies of Western gorilla (Gorilla gorilla, ca. 95,000 individuals worldwide).”

Given the above definitions and guidance, the following assessment of HCV 1 focuses on concentrations of biodiversity within Critical Biodiversity Areas and on individual species, with an overall emphasis on rarity and endemism.

For the purposes of this risk assessment, the following thought process is applied:

1. *Are HCV 1 present? – If no, the area is designated ‘Low Risk.’ If yes, go to #2.*
2. *Is the HCV 1 threatened by forest management activities? – If no, the area is designated ‘Low Risk.’ If yes, the area is designated ‘Specified Risk.’*

CRITICAL BIODIVERSITY AREAS (CBA)

Data Used for HCV Identification:

This portion of the assessment was informed by a dataset of rarity-weighted richness for critically imperiled and imperiled species in the United States, a species richness index originally published by NatureServe and The Nature Conservancy (TNC) in 2000 that identifies areas with high concentrations of rare species[2]. The study identifies concentrations of biodiversity, based on occurrence data from NatureServe, of almost 2,800 rare species in the US, including plants, mollusks, arthropods, fish, reptiles, amphibians, birds, and mammals. The index preferences species with limited ranges by applying an additional weighting to species that is inversely proportionate to the size of the species' range (rarity-weighted richness index). The spatial unit of analysis was a grid of hexagons, each about 160,000 acres in size. Rarer species (endemic species with very limited ranges) were given more weight, based on the number of hexagons in which a species occurs. Specifically, if a species occurs only in one hexagon then it gets full weight (i.e., it counts as 1.0 species), if it occurs in two hexagons it counts as half (i.e., 0.5 species) in each of those hexagons, if it occurs in three hexagons it counts as 1/3, etc. These weighted values are then summed for each hexagon to get the rarity-weighted richness index for that hexagon. This dataset was updated by NatureServe in 2013, and the revised data were used for identification of concentrations of biodiversity, termed Critical Biodiversity Areas for these purposes of this risk assessment. A kernel density analysis was completed on the dataset, using a search radius of 100 km. A threshold was selected similar to that used by the original FSC US NRA Working Group (NRA WG) for their analysis of the original dataset. This threshold was selected to ensure known areas of high biodiversity were included. The resulting 16 areas from the more recent analysis may be viewed on a map available from the FSC US National Risk Assessment web page[3] and are individually assessed below for threats from forest management activities.

This study aligns well with the HCV 1 definition of concentrations of biological diversity, as it identifies places with an increased conservation significance. It also aligns in with the focus on endemic species, and rare, threatened or endangered (RTE) species.

One limitation of the NatureServe dataset is that it is driven by survey effort. However, overall NatureServe maintains the most standardized, most scientifically rigorous dataset that we have available for the entire area under assessment. While unlikely, it is possible that a concentration of biodiversity has been missed due to lack of survey, but as revisions of the NRA occur, updates to this dataset will be incorporated. At the same time, the inverse is likely not true; it is unlikely that an area that is not truly a concentration of biodiversity has been included just because it is well surveyed – the methodology which limits the analysis to rare species and applies the weighting of range-limited species, will help to ensure the index is one of biodiversity and not just species richness. As a result, the index for a particular place will not be bloated by a large number of common species documented through extensive survey effort.

It is also worth noting that this index is influenced by non-forest species. However, in areas that are predominately forested or forest matrix (and where forest management activities are more likely occurring) it should be representative of biodiversity in those areas and therefore help to focus this assessment on areas of greatest overall significance for the NRA. The dataset used

[2] Chaplin, S. J., R. A. Gerrard, H. M. Watson, L. L. Master, and S. R. Flack. 2000. The geography of imperilment: Targeting conservation towards critical biodiversity areas. Pages 159-199 in B. A. Stein, L. S. Kutner, and J. S. Adams, eds. Precious Heritage: The Status of Biodiversity in the United States. Oxford University Press, New York. 399pp. [http://www.natureserve.org/biodiversity-science/publications/precious-heritage-status- biodiversity-united-states]

[3] https://us.fsc.org/en-us/certification/controlled-wood/fsc-us-controlled-wood-national-risk-assessment-us-nra

for this assessment includes only the index numbers for each hexagon cell, so it is not possible to weight by survey effort or to remove species that are not forest-dependent.

Other datasets were investigated for this assessment, including U.S. Fish & Wildlife Service's designated Critical Habitat for listed species[4], Aquatic Biodiversity Hot Spots as defined in NatureServe's Rivers of Life report[5], and priority areas and opportunity areas from State Wildlife Action Plans. However, these other datasets provide information at different scales and for different spatial areas and overall are not as closely aligned with the definition of HCV 1 as the dataset selected for use. The NRA WG that the Rarity-Weighted Richness dataset from NatureServe provided the most consistent data across the entire assessment area at a scale that was deemed most appropriate for the NRA's purpose.

Summary of Risk Designations for identified HCV 1 Critical Biodiversity Areas:

Critical Biodiversity Area	**FSC US Region[6]**	**Risk Designation**
Southern California CBA	Pacific Coast	Low Risk
Central California CBA	Pacific Coast	Specified Risk for portions of CBA within the WWF Sierra Nevada ecoregion that are not permanently protected
Klamath-Siskiyou CBA	Pacific Coast	Specified Risk
Chihuahuan Desert CBA	Southwest	Low Risk
Southwest Non-Forested CBAs	Rocky Mountain/ Southwest/Non-Forested	Low Risk
Central Texas CBA	Non-Forested (Central U.S.)	Low Risk
Blue River CBA	Great Lakes	Low Risk
Central Appalachians CBA	Appalachian	Specified Risk
Southern Appalachians CBA	Appalachian/Southeast	Specified Risk
Cape Fear Arch CBA	Southeast	Specified Risk
Florida Panhandle CBA	Southeast	Specified Risk
Central Florida CBA	Southeast	Specified Risk
Southern Florida CBA	Southeast	Low Risk

Southern California CBA

FSC Region: Pacific Coast

Description: A portion of this CBA includes forested lands which are focused on the four National Forests (Los Padres, San Bernardino, Cleveland & Angeles) that border the greater Los Angeles metropolitan area. However, most of the CBA is non-forested.

Indication of Risk: Most of the CBA is non-forested [Source: 9] and therefore not likely to be threatened by forest management activities. While logging is one of a number of historic practices that have led to deterioration of the national forests in this CBA, the current threats are primarily driven by intensive development and recreational pressures due to their proximity to

[4] http://criticalhabitat.fws.gov/crithab/
[5] http://www.natureserve.org/sites/default/files/publications/files/riversoflife.pdf
[6] See Annex B for a map of FSC US Regions

Los Angeles [Source: 7]. The four major threats are fire and fuels (due to lack of forest management and fire suppression), invasive species, loss of open space to development, and unmanaged recreation [Sources: 7,8].

Risk Designation: Low Risk

Sources of Information:

7. Center for Biological Diversity. Introduction to the Four Southern California National Forests: Los Padres, Angeles, San Bernardino, Cleveland. Retrieved from http://www.biologicaldiversity.org/programs/public_lands/forests/southern_california_forests/pdfs/Intro-4-S-CA-National-Forests.pdf

8. U.S. Forest Service. Four Threats. 2006. Retrieved from https://www.fs.fed.us/projects/four-threats/

9. U.S. Geological Survey. GAP Land Cover Data Portal. Retrieved from http://gapanalysis.usgs.gov/gaplandcover/

Central California CBA

FSC Region: Pacific Coast, Rocky Mountain

Description: The California Floristic Province is recognized by many international conservation organizations as a globally recognized center of biodiversity. This CBA includes two general ecological regions that support high levels of biodiversity – the higher elevation Sierra Nevada mountains and the lower elevation California coastal region. For the purposes of this assessment, the focus is on the Sierra Nevada portion, because the concentrations of biodiversity in the coastal area are primarily associated with non-forested coastal prairies.

The Sierra Nevada hosts a wide variety of biodiversity including hundreds of vertebrates, rare species, and endemic plants. Approximately 400 terrestrial vertebrate species have been documented the Sierra Nevada and 13 are endemic to the range. Species include the white-headed woodpecker (Picoides albolarvatus), Sierra green sulfur butterfly (Colias behrii), Behr's colias butterfly (Colias behrii), Yosemite toad (Bufo canorus), Mount Lyell salamander (Hydromantes platycephalus), the threatened limestone salamander (H. brunus), Clark's nutcracker (Nucifraga columbiana), mountain lion (Felis concolor), sugar pine (Pinus lambertiana), and Ponderosa pine (P. ponderosa).

Biodiversity in the forested areas of this part of the California Floristic Province is dependent on a diversity of stand types and ages, including species diversity of trees, forest openings, and standing and downed woody structure. Forest management has the potential to influence this within stand and between stand diversity. The priority habitats that primarily support the concentration of biodiversity in this area are Mixed Conifer Stands and Montane Meadows.

The Sierran mixed conifer habitat occurs as a vegetation band ranging 770 to 1230 m (2500 to 4000 ft) in the north to 1230 to 3076 m (4000 to 10,000 ft) in the southern Sierra Nevada. It supports a large number of rare species, including spotted owl, fisher, pine marten, bald eagle and peregrine falcon.

Montane meadows are grassland habitats, both wet and dry, that occur in the higher elevations of the Sierra Nevada. They represent the most botanically diverse ecosystems in the Sierra Nevada and are also important for wildlife species, especially birds.

Indication of Risk:

- Mixed Conifer Stands – Threats include forest simplification due to forest management activities (affecting both within stand and between stand diversity), logging, grazing, and fire suppression. [Sources: 10,11]

- Montane Meadows – Habitat loss to vineyards, orchards & development, fire suppression, invasive species, grazing, and road construction (resulting in channel incision) for forest management and other activities are all identified as threats [Sources: 10,15,16]
- While a portion of the Sierra Nevada is protected [Source: 18], the priority habitats also occur in portions of the CBA that are not protected [Sources: 12,15].
- The portion of the CBA in the Rocky Mountain region is almost completely non-forested [Source: 91]

Risk Designation: Specified Risk for the portion of the CBA that is in the WWF Sierra Nevada ecoregion and that are not effectively protected (as demonstrated by GAP Status 1 & 2 areas in the PAD-US[7] dataset and USFS Inventoried Roadless Areas[8]). Low Risk for the remainder of the CBA.

Sources of Information:

10. Mooney, Harold and Erika Zavaleta, eds. 2016. Ecosystems of California: Threats & Responses. CA: The Regents of the University of California. 72 p.

11. World Wildlife Fund. Sierra Nevada Forests. Retrieved from http://www.worldwildlife.org/ecoregions/na0527

12. North, Malcolm, ed. 2012. Managing Sierra Nevada Forests. Gen. Tech. Rep. PSW-GTR-237. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 184 p.

13. North, Malcolm; Peter Stine, Kevin O'Hara, William Zielinski, and Scott Stephens. 2009. An Ecosystem Management Strategy for Sierra Mixed-Conifer Forests. Gen. Tech. Rep. PSW-GTR-220. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 49 p.

14. Sierra Forest Legacy. Montane Meadows. Retrieved from https://www.sierraforestlegacy.org/FC_FireForestEcology/TH_MontaneMeadows.php

15. Ratliff, R.D. 1985. Meadows in the Sierra Nevada of California: State of Knowledge Gen. Tech. Rep. PSW-GTR-84. Berkeley, CA: Pacific Southwest Forest and Range Experiment Station, U.S. Forest Service, U.S. Department of Agriculture; 52 p.

16. Viers, Joshua H., et al. 2013. Montane Meadows in the Sierra Nevada: Changing Hydroclimatic Conditions and Concepts for Vulnerability Assessment. Center for Watershed Sciences, University of California Davis. 63 p.

17. California Department of Fish and Game. California Wildlife Habitat Relationships System: Sierran Mixed Conifer. 2005. Retrieved from https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=67311&inline

18. US Geological Survey. US-Protected Areas Database. Retrieved from http://gapanalysis.usgs.gov/padus/

91. Intact Forest Landscapes. Intact Forest Landscapes Data Download, The IFL Mapping Team. Retrieved from http://www.intactforests.org/data.ifl.html

[7] https://gapanalysis.usgs.gov/padus/data/download/

[8] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

Klamath-Siskiyou CBA

FSC Region: Pacific Coast, specifically within the Klamath Region in northern California and southwestern Oregon (this CBA consists of two non-adjacent polygons, but both occur within the WWF Klamath-Siskiyou ecoregion)

Description: The biodiversity in the Klamath-Siskiyou ecoregion is driven by geologic, topographic, and climatic complexity. This diversity in the geophysical landscape promotes a diversity of forest and other ecosystem types that provide habitat for a very large number of terrestrial and aquatic species, including many invertebrate species. Forest-based biodiversity in the Klamath-Siskiyou is largely sustained in diverse mixed conifer stands adapted to low-mid fire severity and frequency.

Indication of Risk: Structural changes within mixed conifer stands due to altered fire regimes and conversion to monodominant stands through forest management can affect the biodiversity values of these areas. Other threats include fire suppression, habitat loss (due to logging), mining, road building, and grazing [Sources: 19,20,22]

Risk Designation: Specified risk for the entire CBA

Sources of Information:

19. California Department of Fish and Game. California Wildlife Habitat Relationships System: Klamath Mixed Conifer. 2005. Retrieved from https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=67316

20. Klamath-Siskiyou Wildlands Center. The Klamath-Siskiyou Ecoregion. Retrieved from http://kswild.org/

21. Nature Serve. NatureServe Explorer Database. Retrieved from http://explorer.natureserve.org/

22. World Wildlife Fund. Klamath-Siskiyou. Retrieved from https://www.worldwildlife.org/ecoregions/na0516

Chihuahuan Desert CBA

FSC Region: Southwest

Description: This CBA extends from western Texas into New Mexico and is mostly non-forested. However, a small forested area occurs mostly within the Lincoln National Forest of New Mexico and is associated with the Sacramento Mountains area.

The Sacramento Mountains area identified as a conservation priority due to the high concentration of biodiversity and forests provide habitat to a number of rare species, including the Sacramento Mountain Salamander and Mexican Spotted Owl. The driver of biodiversity appears to be the diversity of habitats resulting from this area being a transition zone that includes both more northern and more southern species, and large elevation change that results in habitats from desert to sub-alpine.

Lincoln National Forest has a very diverse landscape, with vegetation types that range from rare cacti in the lower elevations to Englemann spruce higher up.

Indication of Risk: Historically, threats included timber harvest, but evidence indicates that threat is lower and conservation efforts are now focused on restoration of the forests. The more significant threats are currently from stand-replacing fires – particularly for forest-dependent species like the Mexican spotted owl – and climate change. [Sources: 207,208,211]

Risk Designation: Low Risk

Sources of Information:

207. New Mexico Department of Game and Fish. State Wildlife Action Plan for New Mexico. 2016. Retrieved from http://www.wildlife.state.nm.us/download/conservation/swap/New-Mexico-State-Wildlife-Action-Plan-SWAP-Final-2017.pdf

208. The Nature Conservancy. Ecoregional Conservation Analysis of the Arizona-New Mexico Mountains. 1999. Retrieved from http://azconservation.org/dl/TNCAZ_Ecoregions_Assessment_AZ-NM_Mtns.pdf

209. Ganey, J.L., Apprill, D.L., Rawlinson, T.A., Kyle, S.C., Jonnes, R.S., and Ward Jr., J.P. 2013. Nesting habitat of Mexican spotted owls in the Sacramento Mountains, New Mexico. Journal of Wildlife Management. 77:1426–1435

210. U.S. Forest Service. Lincoln National Forest. Retrieved from https://www.fs.usda.gov/main/lincoln/home)

211. U.S. Fish & Wildlife Service, Southwest Region. Mexican Spotted Owl Recovery Plan, First Revision (Strix occidentalis lucida). 2012. Retrieved from https://ecos.fws.gov/docs/recovery_plan/MSO_Recovery_Plan_First_Revision_Dec2012.pdf

Southwestern Non-Forested CBAs

FSC Region: Southwest

Description: There are four CBA that occur in northwest Nevada, southwest Utah, southern Arizona, and central Texas.

Indication of Risk: These CBA are almost entirely non-forested and therefore unlikely to be threatened by forest management activities. [Source: 91]

Risk Designation: Low Risk

Sources of Information:

91. Intact Forest Landscapes. Intact Forest Landscapes Data Download, The IFL Mapping Team. Retrieved from http://www.intactforests.org/data.ifl.html

Central Texas CBA

FSC Region: Non-Forested (Central U.S.)

Description: A limited portion of this CBA, which occurs in an area adjacent to and including the greater Austin metropolitan area, is forested. It represents a confluence of a number of biotic regions which result in a highly diverse landscape and therefore high biodiversity. The biotic regions include Rolling Plains, Cross Timbers and Prairies, Blackland Tallgrass Prairies, Post Oak Savannah, the Edwards Plateau, and South Texas Tamaulipan Thorn Scrub.

Indication of Risk: Threats to the area include habitat destruction from development (mostly urban development), introduced species, loss of aquifers and springs (again primarily due to increased development and overuse of water resources), water pollution and agricultural effects. Therefore, between the small amount of forest and the threats being primarily associated with urban and agricultural development, it is unlikely that the concentration of biodiversity within the CBA is being threatened by forest management activities.

Risk Designation: Low Risk

Sources of Information:

28. Environmental Science Institute. Hotspot of Biodiversity: Unique and Endangered Animals of Central Texas, a 'Hot Science – Cool Talks' presentation given at the University of Texas at Austin by Dr. David Hills, Professor of Integrative Biology. 2000. Retrieved from http://www.esi.utexas.edu/talk/hotspot-biodiversity/

Blue River CBA

FSC Region: Lake States

Description: The Blue River runs through the heart of the CBA boundary. It is recognized as one of the cleanest rivers in Indiana and is home to a number of rare plant and animal species, including the Eastern Hellbender, several species of darters and freshwater mussels. The steep topography of the area provides many riffles, creating habitat for fish and other aquatic life. [Sources: 212, 213]

Karst systems, made primarily of limestone, are abundant in the CBA. The associated caves and springs have been heavily surveyed and exhibit a high level of species diversity. These karst systems provide habitat for many globally rare cave invertebrates. Surface water and runoff flows directly into karts systems instead of being filtered through the soil and bedrock, leaving them susceptible to degradation. These limestone caves also serve as hibernaculum to extensive populations of Indiana bat. [Sources: 212,214; Expert: Allen Pursell]

Indication of Risk:

- Aquatic Habitats – Available information indicates that threats are related to development and associated pollution and sedimentation from agriculture. [Source: 214] No threats from forest management activities were identified. The information available on threats to the eastern hellbender support this assessment. [Source: 213]
- Karst systems – The threats to these systems include chemical pollution, soil runoff and failing septic systems, recreation, dumping, and development of the land above the systems. No threats from forest management activities were identified. [Sources: 214, 215,216; Expert: Allen Pursell]

Risk Designation: Low Risk

Sources of Information:

212. Hauswald, Cassie. Blue River Project. Retrieved from http://www.inindianawater.org/story/the-blue-river-project/

213. The Nature Conservancy. Indiana Hellbender Salamanders. Retrieved from https://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/indiana/placeweprotect/blue-river-project-office.xml

214. Hoen, Jessica – NRCS Salem IN. South Fork-Blue River Watershed Management Plan. 2017. Retrieved from https://www.in.gov/idem/nps/files/wmp_blue_river-south_fork_5-180.pdf

215. Indiana Karst Conservancy. IKC Slide Show. Retrieved from http://ikc.caves.org/slideshow

216. The Nature Conservancy. Journey with Nature: Karst & Caves. Retrieved from https://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/indiana/journeywithnature/karst-caves.xml

Expert Consulted: Allen Pursell, The Nature Conservancy

Central Appalachians CBA

FSC Region: Appalachian (this CBA is an extension of the Southern Appalachian CBA, but for the purposes of this assessment, they are being separated at the regional boundary)

Description: This CBA corresponds with the higher elevation portions of WWF's 'Appalachian Mixed Mesophytic Forest' area, one of their Global 200 biodiversity areas. The area represents one of two regions left in the world where relicts of ancient mesic forests still exist. The region acted as a refuge for mesic species during drier eras and this in combination with the incredible topographic and soil diversity resulted in very high biodiversity. The broadleaf forests and aquatic habitats drive the region's biodiversity.

The forests are significant in the diversity of different forest types that occur and within them the large number of different tree species that occur, along with incredibly diverse understories and associated wildlife species. Both the Mesophytic Cove Forests and the Spruce-Fir Forests assessed below as HCV 3 occur within this CBA. The geologic history, change in elevation, and diverse topography and climate have resulted in a very large number of microhabitats within the region – each with a unique biodiversity. Additionally, the mountains served as a refuge for northern species during the last ice age, and due to the changes in elevation that reflect changes in the climates at different latitudes, the area can harbor a mix of both traditionally more northern and more southern species within the same broad geographic area. The area is particularly diverse in songbirds, salamanders, land snails, amphibians and herbaceous plants.

The region's freshwater systems are together considered to be the richest temperate freshwater ecosystem in the world – representing the highest richness and endemism in mussels, fish, crayfish and other invertebrates for the entire world. The southern running riverine systems allowed many aquatic species to escape the glaciers of the last ice age and then re-establish afterward.

Indication of Risk:

- Mixed Mesophytic Forest – Historically, harvests within these diverse forests have been a significant threat, as few are adapted for large-scale disturbance. Removal of overstory trees, both through clear-cut harvests and high-grading where only the most valuable species were removed, resulted in changes to species composition and forest structure, and therefore the biodiversity adapted to them. Extensive fragmentation of intact forest landscapes has occurred. Over 95% of the Mixed Mesophytic Forest habitat has been converted or degraded, leaving a very small number of examples of old-growth and intact examples of these diverse forest types. Most of these remaining remnants occur within protected areas, or in places inaccessible for forest management. Conservation now focuses on ensuring the protection of these areas, restoration of other examples, and reforming more intact landscape-level forests. Other threats in the region include climate change, air and water pollution from mining, new highways and utility rights-of-way, ORV recreation, and over populations of deer [Source: 34,35,217,218,219,220].
- Aquatic Habitats - In addition to threats associated with agriculture, development, and mining, the following threats were associated with forest management: Hydrologic alteration partially due to forestry practices and conversion from hardwood forests to non-native planted pine (which may include ditching as a practice in wetter areas), reduced water quality partially due to loss of near-stream forested habitat and sedimentation associated with forestry practices and lack of BMP implementation, and severe erosion of river banks. Three states that intersect the CBA have implementation rates of forestry Best Management Practices (BMPs) that are below the national average. [Sources: 30,33,35,218,222]

Risk Designation: Specified risk for portions of the CBA that occur within the Appalachian region and that are not effectively protected (as demonstrated by GAP Status 1 & 2 areas in the PAD-US[9] dataset and USFS Inventoried Roadless Areas[10]). Low risk for the remainder of the CBA.

Sources of Information:

29. Southeast Aquatic Resources Partnership. Conserving Fish Habitat from Rivers to the Sea: The story of the Southeast Aquatic Resources Partnership. 2014. Retrieved from http://www.southeastaquatics.net/resources/sarps-special-reports/conserving-fish-habitat-from-rivers-to-the-sea-the-story-of-the-southeast-aquatic-resources-partnership-1/view

30. Southeast Aquatic Resources Partnership. Southeast Aquatic Habitat Plan. 2008. Retrieved from http://southeastaquatics.net/resources/pdfs/SAHP08.pdf

33. Southeast Aquatic Resources Partnership and The Nature Conservancy. Roanoke River Conservation Action Plan. 2005. Retrieved from http://southeastaquatics.net/resources/pdfs/RoanokePlan.pdf

34. World Wildlife Fund. The Global 200 – Appalachian mixed mesophytic forests. Retrieved from https://www.worldwildlife.org/ecoregions/na0402

35. Southeast Aquatic Resources Partnership and The Nature Conservancy. Conserving the Duck River: A plan for collaborative action. 2005. Retrieved from http://southeastaquatics.net/resources/pdfs/DuckRiverCAP-2005v2.1.pdf

217. Appalachian Mountains Joint Venture. Ecological Priorities. Retrieved from http://amjv.org/index.php/conservation/category/eco

218. Greater Appalachian Conservation Partnership. Introduction to the Appalachian Region. Retrieved from http://amjv.org/index.php/conservation/category/eco)

219. EcoForesters. Threats to Our Forests. Retrieved from https://www.ecoforesters.org/forest-threats.html

220. The Nature Conservancy. Central Appalachian Mountains Conservation Challenges. Retrieved from https://www.nature.org/ourinitiatives/regions/northamerica/areas/centralappalachians/overview/index.htm

221. Highlands Biological Station. Biodiversity of the Southern Appalachians. Retrieved from http://highlandsbiological.org/nature-center/biodiversity-of-the-southern-appalachians/

222. Cristan, R., Aust, W.M., Colding, M.C., Barrett, S.M., Munsell, J.F., and Schilling, E. 2016. Effectiveness of forestry best management practices in the United States: Literature review. Forest Ecology and Management 360: 133-151.

Southern Appalachians CBA

FSC Region: Southeast, specifically portions of Alabama and the very northwestern corner of Georgia (this CBA is an extension of the Central Appalachian CBA, but for the purposes of this assessment, they are being separated at the regional boundary)

Description: Biodiversity values in the southern Appalachians are largely driven by exceptional aquatic biodiversity that includes fish, mussels, snails, crayfish, herpetofauna and plants.

[9] https://gapanalysis.usgs.gov/padus/data/download/

[10] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

Alabama is recognized as having the greatest number of freshwater species of mollusks and fish in the United States, and many of these species have very restricted distributions and specialized habitat requirements that make them highly vulnerable to extinction. The Cahaba River watershed is the center of the biodiversity hotspot, but the biodiversity area includes other smaller watercourses as well. [Source 224] In addition to lakes, rivers and streams, aquatic habitats driving this concentration of biodiversity include bogs, swamps, ephemeral pools, fens, seeps, swamp forests and wet meadows. Other priority habitats that are associated with the concentration of biodiversity that occurs in this CBA include glades and montane longleaf pine.

Bibb County Glades (i.e. rock outcrops), exposed limestone glades, and sandstone glades in Central Alabama have high density of rare plants. These are open habitats that are dominated by upland herbaceous plant species. There is typically an absence of a tree canopy on glades, resulting in large amounts of sunlight and heat on the surface. Bibb County Glades are listed as a Priority Area for Conservation Action in the 2015 Alabama State Wildlife Action Plan. [Source 224]

Montane longleaf pine habitats occur in steep rolling topography historically maintained by fire, mostly outside of or on the edge of the Coastal Plain. Biodiversity values are driven in part by the understory plant community.

Indication of Risk:

- Aquatic Habitats – Alabama's Wildlife Action plan identifies the following as statewide conservation actions that are needed: minimize nonpoint-source pollution in waterways, including from silvicultural sources; minimize disturbance to riparian zones, including from forestry, and minimize or better manage use of fertilizers, herbicides and pesticides near aquatic habitats (and forest practices were identified as a source for this threat). Implementation of forestry Best Management Practices (BMPs) are specifically mentioned for the first two as tactics for achieving the actions. [Source: 224] Additionally, three of the watershed/river basin plans that overlap this CBA include threats or conservation actions related to sedimentation from forestry or silvicultural activities [Sources: 254,255,257]. The Cahaba plan identifies silviculture activities as the number two priority regarding significant contributions of sediment [Source: 254].
- Glades – Threats include grazing, non-native species, quarrying, root-digging, plant and animal collecting, removal of large rocks for landscaping, urban development, plowing for fire breaks, use as logging decks (resulting in soil/vegetation disturbance and soil erosion), conversion to other land uses, and ORV damage [Sources: 37,39]. No threats from forest management activities were identified. [Source 224, Expert: Chuck Byrd]
- Montane Longleaf Pine – Biodiversity values can be adversely affected by forest management activities via conversion of longleaf to other pine types, and the use management techniques, including herbicide application that have the potential to inhibit native understory communities. [Expert: Troy Ettel] As the bulk of the biodiversity exists in the understory of a longleaf pine system, restoration or maintenance of understory species composition is an essential component of longleaf pine conservation. While herbicides can be an essential tool in restoration of longleaf pine, there is mixed evidence regarding the impact of herbicides on understory vegetation – different chemicals and application methods may have differing affects. [Sources: 225,226] Regional experts [Troy Ettel; Carl Nordman] have confirmed that conversion to other managed forest types continues to be a threat. While these other forest types may provide an acceptable habitat for some species, their establishment is threatening the existing longleaf pine areas. It is possible to harvest in and sustainably manage longleaf pine systems [Source: 227, Expert: Troy Ettel] and therefore timber management by

itself is not considered a threat. Other threats include fire-suppression, urban development, forest conversion, non-native species, climate change [Sources: 40,41,42]

Risk Designation: Specified risk for portions of the CBA that are not effectively protected (as demonstrated by GAP Status 1 & 2 areas in the PAD-US[11] dataset and USFS Inventoried Roadless Areas[12]). Low risk for the remainder of the CBA.

Sources of Information:

29. Southeast Aquatic Resources Partnership. Conserving Fish Habitat from Rivers to the Sea: The story of the Southeast Aquatic Resources Partnership. 2014. Retrieved from http://www.southeastaquatics.net/resources/sarps-special-reports/conserving-fish-habitat-from-rivers-to-the-sea-the-story-of-the-southeast-aquatic-resources-partnership-1/view

254. Cahaba River Basin Clean Water Partnership. Cahaba River Basin Management Plan. Retrieved from http://www.cleanwaterpartnership.org/docs/default-source/resources/cahaba-river-basin/cahababasinmgtplan.pdf?sfvrsn=f42694f3_4

255. Upper Coosa Basin Watershed Management Plan. July 2004. Retrieved from http://www.cleanwaterpartnership.org/docs/default-source/resources/coosa-river-basin/upper-coosa-mgt-plan(1).pdf?sfvrsn=e42c94f3_4

36. Murdock, Nora A. and McMillian, P.A. Rare Animals and Plants of Southern Appalachian Wetlands. Retrieved from https://www.wcc.nrcs.usda.gov/ftpref/wntsc/strmRest/SEwetlands/appxB.pdf

37. Nelson, P.W., J.A. Fitzgerald, K. Larson, R. McCoy, A. Schotz, J. Taft, T. Witsell, B. Yahn.
Central Hardwoods Joint Venture Glade Conservation Assessment For the Interior Highlands and Interior Low Plateaus Of the Central Hardwoods Region. 2013. Retrieved from http://www.chjv.org/pdf/CHJV_Glade_Assessment_30_May_2013_FINAL_PRINT_version.pdf

38. Middle Tennessee State University. Center for Cedar Glade Studies. Retrieved from http://www.mtsu.edu/glade-center/index.php

39. U.S. Department of the Interior Southeast Climate Science Center. Insular Ecosystems of the Southeastern United States: A Regional Synthesis to Support Biodiversity Conservation in a Changing Climate. 2016. Retrieved from https://pubs.usgs.gov/pp/1828/pp1828.pdf

40. The Longleaf Alliance. Retreived from http://www.longleafalliance.org/

41. Brockway, Dale G., Tomczak, K.W., Johnson, D.J., Everett, E. Restoration of Longleaf Pine Ecosystems. 2005. Retrieved from https://www.srs.fs.usda.gov/pubs/20672

42. Regional Working Group for America's Longleaf. Range-wide Longleaf Conservation Plan. 2009. Retrieved from http://www.americaslongleaf.org/resources/conservation-plan/

43. Oswalt, Christopher M., Cooper, J.A., Brockway, D.G., Brooks, H.W., Walker, J.L., Connor, K.F., Oswalt, S.N., & Conner, R.C. History and Current Condition of Longleaf

[11] https://gapanalysis.usgs.gov/padus/data/download/

[12] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

Pine in the Southern United States. 2012. Retrieved from https://www.srs.fs.fed.us/pubs/gtr/gtr_srs166.pdf

224. Alabama Department of Conservation and Natural Resources. Alabama State Wildlife Action Plan. 2015. Retrieved from http://georgiaalabamalandtrust.org/wp-content/uploads/2017/08/AlabamaStateWildlifePlan2017.pdf

225. Longleaf Alliance. Proceedings of the Fourth Longleaf Alliance Regional Conference. Longleaf Alliance Report No. 6. 2003. Retrieved from http://www.auburn.edu/academic/forestry_wildlife/lpsdl/pdfs/4th_Combined.pdf

226. The Longleaf Alliance. Herbicides. Retrieved from https://www.longleafalliance.org/what-we-do/restoration-management/herbicides

227. Rachel E. Greene, Raymond B. Iglay, Kristine O. Evans, Darren A. Miller, T. Bently Wigley, Sam K. Riffell. 2016. A meta-analysis of biodiversity responses to management of southeastern pine forests—opportunities for open pine conservation. Forest Ecology and Management 360: 30–39

257. Tennessee River Basin Watershed Management Plan, Clean Water Partnership, May 2003. Retrieved from http://www.cleanwaterpartnership.org/docs/default-source/resources/tennessee-river-basin/tennesseeriverbasinmanagementplan.pdf?sfvrsn=be2f94f3_4

Experts Consulted:

- Chuck Byrd, The Nature Conservancy
- Troy Ettel, The Nature Conservancy
- Carl Nordman, NatureServe

Cape Fear Arch CBA

FSC Region: Southeast, specifically in the southeastern-most part of North Carolina

Description: The geologic and hydrologic history of the Cape Fear Arch region have resulted in a diversity of wet and dry habitats. This diversity in addition to the sand and limestone deposits that have resulted in a very high diversity of natural communities and associated plant and animal species. The region is considered to have the greatest biological diversity along the Atlantic Coast north of Florida and has been identified in North Carolina's Wildlife Action Plan, the Nature Conservancy's Mid-Atlantic Coastal Plain Ecoregional Plan and One North Carolina Naturally as high priority areas for conservation. Rare species associated with the region include Red-cockaded woodpecker, Wood Stork, Cape Fear shiner, shortnose sturgeon, venus fly-traps, golden sedge, green pitcher plant and rough-leaf loosestrife. In one ecotone within the region 22, endemic and an additional 22 near-endemic plants have been documented. The region also represents an important stopover site for migrating birds.

Important drivers of biodiversity in this region include longleaf pine forests and pocosins (coastal peatlands). Pocosins typically occur within Carolina bays as a mosaic, along with Atlantic white cedar forests and nonriverine swamp forests. Most of the world's pocosins occur in North Carolina and the Cape Fear Arch region has some of the very best examples of high and low pocosins. Pocosins are identified as a Coastal Plain priority natural community in the North Carolina Wildlife Action Plan.

In the outer Coastal Plain, pocosins occur within nutrient-poor peatlands (organic soils) in shallow depressions on plateaus and are typically continuously saturated with water. They harbor rare native plant diversity like the venus fly trap and rare wildlife species like the red-cockaded woodpecker. Pocosins generally have a pine overstory, often Pond pine. Higher, drier

sites generally have a dense evergreen shrub layer, while the wettest sites may only have low shrubs, stunted pines and beds of sphagnum, pitcher plants and cranberry.

Longleaf pine forests once covered much of the Atlantic Coastal Plain, but the extent and condition of the system has been severely depleted due to habitat fragmentation, unsustainable harvest, conversion to other land uses and vegetative types, invasive species, and exclusion of natural fire regimes. Upland, Flatwood and Savanna types of longleaf pine systems occur in the Cape Fear vicinity. The CBA includes a portion of the focal areas for the Cape Fear Arch Longleaf Initiative, a successful private-public conservation partnership.

Indication of Risk:

- Pocosins – When the canopy has been completely removed through timber harvest, pocosins often do not regenerate. An associated threat from forest management is the conversion of native pine to planted pine and resulting loss of biodiversity, particularly if associated with changes in hydrology due to ditching [Source: 39,45,46,47]. While these other forest types may provide an acceptable habitat for some species, their establishment is threatening the existing pocosins. Other threats include hydraulic alteration, conversion to agriculture, road construction, and sand quarrying, habitat fragmentation, introduction of non-native species, climate change and fire suppression [Sources: 45,46].
- Longleaf Pine - Biodiversity values can be adversely affected by forest management activities via conversion of longleaf to other pine types, and the use management techniques, including herbicide application that have the potential to inhibit native understory communities [Expert: Troy Ettel]. As the bulk of the biodiversity exists in the understory of a longleaf pine system, restoration or maintenance of understory species composition is an essential component of longleaf pine conservation. While herbicides can be an essential tool in restoration of longleaf pine, there is mixed evidence regarding the impact of herbicides on understory vegetation – different chemicals and application methods may have differing affects. [Sources: 225,226] Regional experts [Troy Ettel; Carl Nordman] have confirmed that conversion to other managed forest types continues to be a threat. While these other forest types may provide an acceptable habitat for some species, their establishment is threatening the existing longleaf pine areas. It is possible to harvest in and sustainably manage longleaf pine systems [Source: 227, Expert: Troy Ettel] and therefore timber management by itself is not considered a threat. Other threats include fire-suppression, urban development, fragmentation, non-native species, intensive pine straw raking, and climate change [Sources: 45,41,42,40].

Risk Designation: Specified risk for the entire CBA

Sources of Information:

44. Cape Fear Arch Conservation Collaboration. A Collaborative Voice for Nature. Retrieved from http://capefeararch.org/about/

21. NatureServe. NatureServe Explorer Database. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchSystemUid=ELEMENT_GLOBAL.2.723240

39. U.S. Department of the Interior Southeast Climate Science Center. Insular Ecosystems of the Southeastern United States: A Regional Synthesis to Support Biodiversity Conservation in a Changing Climate. 2016. Retrieved from https://pubs.usgs.gov/pp/1828/pp1828.pdf

45. North Carolina Wildlife Resources Commission. North Carolina Wildlife Action Plan. 2005. Retrieved from http://www.ncwildlife.org/portals/0/Conserving/documents/ActionPlan/WAP_complete.pdf

46. Cape Fear Arch Conservation Collaboration. Cape Fear Arch Conservation Plan & Focal Areas Appendix. Retrieved from http://capefeararch.org/resources/

47. U.S. Forest Service. Southern Forests Futures Project – Technical Report. 2013. Retrieved from https://www.srs.fs.fed.us/pubs/gtr/gtr_srs178.pdf

48. North Carolina Wildlife Resources Commission. Pocosin. Retrieved from http://216.27.39.104/Portals/0/Conserving/documents/Coast/CP_Pocosin.pdf?ver=2011-08-15-161939-077

41. Brockway, Dale G., Tomczak, K.W., Johnson, D.J., Everett, E. Restoration of Longleaf Pine Ecosystems. 2005. Retrieved from https://www.srs.fs.usda.gov/pubs/20672

42. Regional Working Group for America's Longleaf. Range-wide Longleaf Conservation Plan. 2009. Retrieved from http://www.americaslongleaf.org/resources/conservation-plan/

40. The Longleaf Alliance. Retrieved from http://www.longleafalliance.org/

225. Longleaf Alliance. Proceedings of the Fourth Longleaf Alliance Regional Conference. Longleaf Alliance Report No. 6. 2003. Retrieved from http://www.auburn.edu/academic/forestry_wildlife/lpsdl/pdfs/4th_Combined.pdf

226. The Longleaf Alliance. Herbicides. Retrieved from https://www.longleafalliance.org/what-we-do/restoration-management/herbicides

227. Rachel E. Greene, Raymond B. Iglay, Kristine O. Evans, Darren A. Miller, T. Bently Wigley, Sam K. Riffell. 2016. A meta-analysis of biodiversity responses to management of southeastern pine forests—opportunities for open pine conservation. Forest Ecology and Management 360: 30–39

Experts Consulted:

- Troy Ettel, The Nature Conservancy
- Carl Nordman, NatureServe

Florida Panhandle CBA

FSC Region: Southeast

Description: The Florida Panhandle is reported to be one of the 5 richest biodiversity hotspots in North America. Of particular importance is the richness of frogs (27 species), snakes (42 species) and turtles (18 species) [Source: 49]. This concentration of biodiversity is driven by the river systems (particularly the Apalachicola River), longleaf pine savanna habitat and unique steephead ravines. Species of particular interest include the Okaloosa darter (Etheostoma okaloosae) which is endemic to the Florida Panhandle, and the Red-cockaded Woodpecker (Picoides borealis) which is associated with the longleaf pine.

Biodiversity richness within the Apalachicola system is driven by reptiles, amphibians, and mussels. Biodiversity values are centered on the area where the Chattahoochee River meets the Flint River and form the Apalachicola River.

Historically longleaf pine savanna supported incredibly high species richness, with up to 150 species of plants per hectare. Longleaf pine habitats were historically maintained by fire and biodiversity values are driven in part by the resulting understory plant community. Eglin Air Force Base within this CBA includes one of the largest remaining longleaf pine forests under single ownership.

Steephead Ravines along the Apalachicola River system contain a wide diversity of species including RTE species, due largely to the heterogeneity of site conditions and microclimates. They also harbor the southernmost range of many northern species.

Indication of Risk:

- Apalachicola Bay/River System – Threats to this aquatic system are varied and include persistent drought resulting in reduced flow level, loss of floodplain and wetland habitat due to reduced flow levels, point and non-point source pollution (including sediments from forestry operations due to insufficient ground cover and inadequate buffers), unrestrained growth and development. [Sources: 50,51] The Apalachicola River and Bay Surface Water Improvement and Management Plan identifies implementation of silvicultural Best Management Practices (BMPs) as a significant component of one of its priority projects [Source: 256].
- Longleaf Pine Savanna – Biodiversity values can be adversely affected by forest management activities via conversion of longleaf to other pine types, and the use management techniques, including herbicide application that have the potential to inhibit native understory communities. [Expert: Troy Ettel] As the bulk of the biodiversity exists in the understory of a longleaf pine system, restoration or maintenance of understory species composition is an essential component of longleaf pine conservation. While herbicides can be an essential tool in restoration of longleaf pine, there is mixed evidence regarding the impact of herbicides on understory vegetation – different chemicals and application methods may have differing affects. [Sources: 225,226] Other threats include fire-suppression, urban development, fragmentation, non-native species, and climate change [Sources: 41,42,40,53]. The Florida Wildlife Action Plan [Source: 54] did not identify Forestry practices as a threat to Sandhill habitats (dominated by longleaf pine), but did find them to be a high source of stress for Natural pineland habitats (also dominated by longleaf pine) and regional experts [Troy Ettel; Carl Nordman] have confirmed that conversion to other managed forest types continues to be a threat. While these other forest types may provide an acceptable habitat for some species, their establishment is threatening the existing longleaf pine areas. It is possible to harvest in and sustainably manage longleaf pine systems [Source: 227, Expert: Troy Ettel] and therefore timber management by itself is not considered a threat. Both Sandhill and Natural pineland habitats are documented within the CBA [Source: 57]
- Steephead Ravines – Reported threats include altered hydrologic regimes, conversion to other land uses, fire suppression. Forestry practices were identified as a low source of stress to the habitat in the Florida Wildlife Action Plan. [Source: 54]

Risk Designation: Specified risk for the entire CBA

Sources of Information:

49. Blaustein, Richard J. Biodiversity Hotspot: The Florida Panhandle. BioScience, Vol. 58 No. 9, pp. 784-790. 2008. Retrieved from http://www.masternaturalist.ifas.ufl.edu/docs/newsletters/res/biocience_biodiversity.pdf

50. Apalachicola Riverkeeper. Retrieved from http://apalachicolariverkeeper.org

51. The Nature Conservancy in Florida. Apalachicola- St. Marks, Community-Based Watershed Plan. 2014. Retrieved from https://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/florida/fl-community-watershed-apalachicolastmarks.pdf

52. LandScope America. Apalachicola River Basin. Retrieved from http://www.landscope.org/florida/places/apalachicola_prairies_flatwoods/

41. Brockway, Dale G., Tomczak, K.W., Johnson, D.J., Everett, E. Restoration of Longleaf Pine Ecosystems. 2005. Retrieved from https://www.srs.fs.usda.gov/pubs/20672

42. Regional Working Group for America's Longleaf. Range-wide Longleaf Conservation Plan. 2009. Retrieved from http://www.americaslongleaf.org/resources/conservation-plan/

40. The Longleaf Alliance. Retrieved from http://www.longleafalliance.org/

53. The Nature Conservancy. Florida, Longleaf Pine Forests: A Goal of 8 Million Acres. Retrieved from https://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/florida/howwework/longleaf.xml

54. Florida Fish and Wildlife Conservation Commission. Florida's State Wildlife Action Plan – Sandhill habitat, Seepage/Steephead Stream. 2012. Retrieved from http://myfwc.com/conservation/special-initiatives/fwli/action-plan/

147. Oswalt, Christopher M., et.al. History and Current Condition of Longleaf Pine in the Southern United States, General Technical Report SRS-166. 2012. Retrieved from https://www.srs.fs.fed.us/pubs/gtr/gtr_srs166.pdf

55. Florida Natural Areas Inventory. Guide to the Natural Communities of Florida – Mesic Flatwoods. 2010. Retrieved from http://fnai.org/PDF/NC/Sandhill_Final_2010.pdf

56. Northwest Florida Environmental Conservancy. Steepheads. Retrieved from http://www.nwflec.com/northwestfloridaenvironmentalconservancypart2/id12.html

57. Florida Fish and Wildlife Research Institute. Florida's Wildlife Legacy Initiative (mapping application for the Florida Wildlife Action Plan and other Florida conservation initiatives). Retrieved from http://ocean.floridamarine.org/FWLI/

225. Longleaf Alliance. Proceedings of the Fourth Longleaf Alliance Regional Conference. Longleaf Alliance Report No. 6. 2003. Retrieved from http://www.auburn.edu/academic/forestry_wildlife/lpsdl/pdfs/4th_Combined.pdf

226. The Longleaf Alliance. Herbicides. Retrieved from https://www.longleafalliance.org/what-we-do/restoration-management/herbicides

256. Northwest Florida Water Management District. Apalachicola River and Bay Surface Water Improvement and Management (SWIM) Plan. 2017. Retrieved from https://www.nwfwater.com/Water-Resources/Surface-Water-Improvement-and-Management/Apalachicola-River-and-Bay

227. Rachel E. Greene, Raymond B. Iglay, Kristine O. Evans, Darren A. Miller, T. Bently Wigley, Sam K. Riffell. 2016. A meta-analysis of biodiversity responses to management of southeastern pine forests—opportunities for open pine conservation. Forest Ecology and Management 360: 30–39

Experts Consulted:

- Troy Ettel, The Nature Conservancy
- Carl Nordman, NatureServe

Central Florida CBA

FSC Region: Southeast

Description: As in other areas of the southern US, native pine ecosystems are an important driver for biodiversity in this CBA. Pine flatwoods in Central Florida are associated with xeric uplands/sandhills that provide a range of biodiversity values. Longleaf pine is the dominant tree species in pine flatwoods, however as with other longleaf pine systems, the native plant diversity is one of the most significant components of the overall biodiversity. Rare wildlife supported by this habitat include Florida black bear (*Ursus americanus floridanus*), Florida panther (*Felix concolor coryi*), Southeastern kestrel (*Falco sparverius paulus*), Red-cockaded Woodpecker (*Picoides borealis*), Florida sandhill crane (*Grus canadensis pratensis*), Bald eagle (*Haliaeetus leucocephalus*), eastern indigo snake (*Drymarshon corais couperi*), and Chapman's rododendron (*Rhododendron chapmanii*).

The two polygons that compose this CBA are in areas that receive the highest possible scores in an assessment of Florida's biodiversity hotspots, they include top priority areas from the Florida Critical Lands and Waters Identification Project, and also represent other spatial priorities (e.g., landscape integrity, rare species habitat conservation, strategic habitat conservation areas).

Indication of Risk: Reported threats to Pine flatwoods include conversion to agriculture and pine plantations, alteration of fire regimes, non-native species, hydrologic alteration, substrate disturbance (Wiregrass may not withstand disturbance associated with planting pine), invasion by melaleuca if logged and over drained, and recreational damage [59,60,61]. Forestry practices were identified as a high source of stress to the natural pineland habitat in the Florida Wildlife Action Plan, in association with the following stresses which all had high ranks for the habitat: Altered fire regime, Altered hydrologic regime, Habitat destruction or conversion, Altered community structure, Altered species composition/dominance, and Fragmentation of habitats, communities, ecosystems [Source: 59].

Risk Designation: Specified risk for the entire CBA (both polygons)

Sources of Information:

58. University of Florida IFAS Extension. Florida Forest Stewardship, Pine Flatwoods. Retrieved from http://www.sfrc.ufl.edu/extension/florida_forestry_information/forest_resources/pine_flatwoods.html

59. Florida Fish and Wildlife Conservation Commission. Florida Wildlife Action Plan – Natural Pineland habitat. 2012. Retrieved from http://myfwc.com/conservation/special-initiatives/fwli/action-plan/

60. U.S. Fish & Wildlife Service. Multi-Species Recovery Plan for South Florida – Hydric Pine Flatwoods. Retrieved from https://www.fws.gov/verobeach/MSRPPDFs/HydricPineFlat.pdf

61. U.S. Fish & Wildlife Service. Multi-Species Recovery Plan for South Florida – Mesic Pine Flatwoods. Retrieved from https://www.fws.gov/verobeach/MSRPPDFs/MesicPineFlat.pdf

55. Florida Natural Areas Inventory. Guide to the Natural Communities of Florida – Mesic Flatwoods. 2010. Retrieved from http://fnai.org/PDF/NC/Mesic_Flatwoods_Final_2010.pdf

62. Florida Natural Areas Inventory. Guide to the Natural Communities of Florida – Wet Flatwoods. 2010. Retrieved from http://fnai.org/PDF/NC/Wet_Flatwoods_Final_2010.pdf

63. Florida Natural Areas Inventory. Longleaf Pine Database. Retrieved from http://fnai.org/longleafGDB.cfm

57. Florida Fish and Wildlife Research Institute. Florida's Wildlife Legacy Initiative (mapping application for the Florida Wildlife Action Plan and other Florida conservation initiatives). Retrieved from http://ocean.floridamarine.org/FWLI/

Southern Florida CBA

FSC Region: Southeast

Description: This CBA consists primarily of the Everglades region and urban and suburban portions of the city of Miami. The Everglades are the largest subtropical wilderness in the United States - a highly biodiverse area in part due to the diversity of the landscape, including uplands that are primarily rockland communities, freshwater wetland communities, and microalgae communities.

Indication of Risk: The Everglades portion of the CBA is protected as a National Park and the majority of the remainder of the CBA occurs primarily in urban and developed areas (agriculture and other development) with very little extent of forested communities and therefore where normal forest management is unlikely to be occurring [Source: 57].

Risk Designation: Low Risk

Sources of Information:

64. U.S. National Park Service. Everglades National Park – America's Everglades – the largest subtropical wilderness in the United States. Retrieved from (https://www.nps.gov/ever/index.htm

65. U.S. Fish & Wildlife Service. Multi-Species Recovery Plan for South Florida, The South Florida Ecosystem. Retrieved from https://www.fws.gov/verobeach/MSRPPDFs/SFecosystem.pdf

57. Florida Fish and Wildlife Research Institute. Florida's Wildlife Legacy Initiative (mapping application for the Florida Wildlife Action Plan and other Florida conservation initiatives). Retrieved from http://ocean.floridamarine.org/FWLI/

INDIVIDUAL SPECIES

While HCV1 does not typically include individual occurrences of a single species, it does include situations where a single rare species population is concentrated or where an endemic species with very limited distribution exists and therefore the area is significant at a global, regional or national level.

Legislative Protections for Critically Imperiled Species in the United States:

The federal Endangered Species Act (ESA) was enacted by Congress in 1973 to protect imperiled plant and animal species. Under the ESA, the federal government has the responsibility to protect species that are likely to become extinct throughout all or a large portion of their range (endangered species), species that are likely to become endangered in the near future (threatened species), and critical habitat vital to the survival of endangered or threatened species. The ESA has been extremely successful in keeping listed species from becoming

extinct – less than 1% of the species listed are now extinct and has also been successful in recovering imperiled species[13].

However, there are also significant concerns about the ESA. It is the responsibility of the U.S. Fish & Wildlife Service (USFWS) to identify critical habitat and develop recovery plans for listed species. Analysis has shown that species with critical habitat designated and completed recovery plans are more likely to have improving population trends and less likely be declining, compared to species without these[14]. However, due to limited resources, USFWS has not been able to complete both of these tasks for all listed species.

And there is great concern about how many imperiled species are not getting listed and therefore not receiving the successful protections of the ESA. NatureServe maintains the most comprehensive dataset of imperiled species in the United States – tracking more than 28,000 species and 9,000 subspecies, using standardized criteria for identifying occurrences and for determining species status. However, only around 20% of the species NatureServe defines as 'imperiled' are federally listed, with an emphasis on terrestrial vertebrate species[15] (aquatic and invertebrate species are typically less well understood, and considered less gregarious, thereby drawing less attention from the human population as a whole).

The above described evidence and expert opinion [Daniel Hall[16]; Annika Terrana[17]] indicate that current implementation of the ESA does not protect all species that fall within HCV 1. Challenges relate primarily to: 1) delayed or incomplete implementation of the federal ESA, particularly on private lands in some states and ii) Inconsistent listing of important species that meet ESA criteria, due to backlogged listing processes or competing priorities.

Forty-six of the 50 states have some kind of endangered species legislation and while they provide some back-up to the ESA, and in some states help to fill in where the ESA doesn't, they vary greatly from state to state. Most provide some kind of process for 'listing' species at the state scale and prohibit the 'take' and/or trafficking of these species, but many fewer go further and also protect the habitat of these species[18].

Therefore, between the limits of the federal Endangered Species Act and the inconsistencies between the state level protections, it is not possible to conclude that the most imperiled species (HCV1) are comprehensively protected by law. Therefore, individual species must be considered within the context of HCV 1 for the NRA.

Data Used for HCV Identification:

Consistent data regarding status of individual species are virtually impossible to find for the entire assessment area. The most consistent source of information on species occurrences, imperilment and conservation needs in North America is the NatureServe dataset[19]. This dataset provides the framework for identification of HCV1 species for the NRA. The NRA WG identified the following criteria as part of their identification HCV 1 species: level of imperilment, rarity, vertebrate species, and forest habitat dependency.

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[13] Suckling, K., Mehrhoff, L.A., Beam, R., and Hartl, B. 2016 A Wild Success: A Systematic Review of Bird Recovery Under the Endangered Species Act. Center for Biological Diversity. (http://www.esasuccess.org/pdfs/WildSuccess.pdf)

[14] Taylor, M.F.J., Suckling, K.F., and Rachlinski, J.J. 2005. The Effectiveness of the Endangered Species Act: A Quantitative Analysis. BioScience. 55:4, pp. 360-367. (http://www.biologicaldiversity.org/campaigns/esa/pdfs/bioscience2005.pdf)

[15] Evans, D.M, Che-Castaldo, J.P., Crouse, D., Davis, F.W., Epanchin-Niell, R., Flather, C.H., Frohlich, R.K., Goble, D.D., Li, Y-W., Male, T.D., Master, L.L, Moskwik, M.P., Neel, M.C., Noon, B.R., Parmesan, C., Schwartz, M.W., Scott, J.M, and Williams, B.K. 2016. Species Recovery in the United States: Increasing the Effectiveness of the Endangered Species Act. Ecological Society of America. Issues in Ecology, Report 20. (https://www.esa.org/esa/wp-content/uploads/2016/01/Issue20.pdf)

16 Environmental Consultant

17 World Wildlife Fund

[18] George, S. and Snape, W.J. III. 2010. State Endangered Species Acts. *In* Baur, D.C. and Irvin, W.R., eds. 2010. Endangered Species Act: Law, Policy, and Perspectives. Chicago, IL: American Bar Association: 344-359. (http://www.biologicaldiversity.org/publications/papers/StateEndangeredSpeciesActs.pdf)

[19] NatureServe Explorer: An Online Encyclopedia of Life (http://explorer.natureserve.org)

These criteria were applied by FSC US staff in a standardized manner (developed in consultation with the current Working Group and Experts: Dominick Dellasala[20], James Strittholt[21]) to filter out HCV 1 species from the NatureServe dataset:

- Imperilment-Rarity-Vertebrate: 156 vertebrate species with a G1 conservation status rank (critically imperiled at a global scale) and either an S1 conservation status rank (critically imperiled at a state scale) in at least one state or an S2 conservation status rank (imperiled at a state scale) in at least one state were identified from the NatureServe dataset. Any species with an S4 or S5 conservation status rank (apparently secure or secure, respectfully, at a state scale) in any state were removed.
- Forest Habitat Dependency: The above species were then filtered by the habitat associations provided by the NatureServe dataset – species were retained if the Terrestrial habitats included anything labeled as 'Forest' or 'Woodland' or if the Palustrine habitats included anything labeled as 'Forested Wetland' or 'Riparian.' The remaining species were further filtered through review of habitat information available in the associated NatureServe Species Account, or additional information sources as needed. This filtering process identified 20 species.
- Finally, species were filtered by recency of confirmed occurrences – species were retained if there was a formal documented occurrence within the last 20 years. Following this filtering process, 19 species remained and are included in this assessment as HCV 1 species.

Species that made it through the first filter (Imperilment-Rarity-Vertebrate), but not the second (Forest Habitat Dependency) could also potentially be considered HCV 1 species, but they would all be classified as 'Low Risk' as they are not forest dependent, and therefore unlikely to be threatened by forest management activities. These species are not specifically identified in the assessment below, but are listed in Annex F.

Following the above filtering process, NatureServe species accounts and other information sources were reviewed to determine known threats for the remaining species. Species for which identified threats did not include forest management activities or species for which there was one primary threat that was not related to forest management activities and all other threats were insignificant as a result were given 'Low Risk' designations. Species with documented threats from forest management activities and those for which it was not possible to determine threats where given 'Specified Risk' designations for specific spatial areas. For listed species, the current range as designated by the listing authority was used for the specified risk area. For other species, counties with known occurrences were used. The county scale was chosen to provide as a scale at which it would be relatively easy for a certificate holder to determine whether or not the area of specified risk intersected with their supply area and as a scale that would most likely capture the area in which forest management activities could be having an effect on the species in question. If a certificate holder wishes to do so, they could work with local Natural Heritage Network partners and/or local conservation organizations to develop a more refined area of occurrence and influence by forest management activities.

20 Geos Institute
21 Conservation Biology Institute

Summary of Risk Designations for Identified HCV 1 Species:

HCV 1 Species	FSC US Region[22]	Risk Designation
Lesser Slender Salamander	Pacific Coast	Specified Risk for current range as defined by CDFW
Relictual Slender Salamander	Pacific Coast	Low Risk
Scott Bar Salamander	Pacific Coast	Low Risk
Sierra Buttes Salamander	Pacific Coast	Low Risk
Southern Mountain Yellow-legged Frog	Pacific Coast	Low Risk
California Condor	Pacific Coast	Low Risk
Island Scrub-jay	Pacific Coast	Low Risk
Black-spotted Newt	Southwest	Low Risk
Robust Cottontail	Southwest	Low Risk
Cheoah Bald Salamander	Appalachian	Specified Risk for Graham and Swain Counties, NC
Spring Pygmy Sunfish	Southeast	Low Risk
Waccamaw Killifish	Southeast	Low Risk
Dusky Gopher Frog	Southeast	Specified Risk for current critical habitat in Mississippi, as defined by USFWS
Houston Toad	Southeast	Specified Risk for current critical habitat, as defined by USFWS
Patch-nosed Salamander	Southeast	Specified Risk for Stephens and Habersham Counties, GA and Oconee County, SC
Rim Rock Crowned Snake	Southeast	Low Risk
Black-capped Petrel	Southeast	Low Risk
Florida Bonneted Bat	Southeast	Low Risk
Red Wolf	Southeast	Low Risk

Lesser Slender Salamander (*Batrachoseps minor*)

FSC Region: Pacific Coast, specifically San Luis Obispo County, CA.

Description: The Lesser Slender Salamander has a restricted distribution in the southern Santa Lucia Range of north-central San Luis Obispo County, CA, generally above 400m. For more information, contact the California Department of Fish and Wildlife.

Federal/State Listing Status: Not listed

Indication of Risk: G1; S1 (California); Forest & woodland habitats; Little is known about this species and specific threats have not yet been documented. However, the species depends on forest habitat and down woody debris is likely an important habitat element [Source 70], which

[22] See Annex B for a map of FSC US Regions

can be affected by forest management, and therefore the precautionary approach should be taken.

Risk Designation: Specified Risk for the current range, as defined by the California Department of Fish & Wildlife [Source: 71]

Sources of Information:

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Batrachoseps+minor

71. California Department of Fish and Wildlife. California Wildlife Habitat Relationships System. Retrieved from https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=1524&inline=1

72. International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/59129/0

Relictual Slender Salamander (*Batrachoseps relictus*)

FSC Region: Pacific Coast, specifically Kern County, CA

Description: The Relictual Slender Salamander's known historical range includes the vicinity of Breckenridge Mountain, in the southern Sierra Nevada of CA, including the lower Kern River Canyon and higher elevations on Breckenridge Mountain. The historical range spans only 15 kilometers, and the two known extant populations are less than 5 kilometers apart. The species occurs mainly in heavily forested areas in mixed pine-fir-incense cedar forests. For more information, contact the California Department of Fish and Wildlife.

Federal/State Listing Status: Not listed

Indication of Risk: G1; S1 (California); Conifer Forest/Riparian; Little is known about this species and specific threats have not yet been documented. However, the species depends on forest habitat and down woody debris is likely an important habitat element [Source 70], which can be affected by forest management. The entire known range of this species occurs within an Inventoried Roadless Area within the Sequoia National Forest (see the HCV 3 Roadless Areas assessment for details on the effective protection that this designation provides).

Risk Designation: Low Risk

Sources of Information:

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Batrachoseps+relictus

71. California Department of Fish and Wildlife. California Wildlife Habitat Relationships System. Retrieved from https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=1513&inline=1

72. International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/2650/0

258. U.S. Forest Service. Sequoia National Forest Inventoried Roadless Areas Map. 2000. Retrieved from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev3_058780.pdf

Scott Bar Salamander (*Plethodon asupak*)

FSC Region: Pacific Coast, specifically Siskiyou County, CA

Description: The Scott Bar Salamander is known from a few locations in northern California: Walker Gulch, Muck-a-Muck Creek above Scott Bar, and Mill Creek. It is associated with cool and moist talus slopes on a northern facing exposure within mature and old-growth forest and breeds terrestrially. Little is known about the species. For more information, contact the California Department of Fish and Wildlife.

Federal/State Listing Status: Listed as threatened in the State of California.

Indication of Risk: G1G2; S1S2 (California); Forest, woodland & riparian habitats; While there is agreement that the species is associated with talus slopes within forested areas, there is conflicting evidence as to whether it is associated with late successional forest, and to what extent it is affected by forest management activities. The species occurs on both federal and private lands and 10% of its range is within Inventoried Roadless Areas, and 51% of its range is in a reserve designation that withdraws those lands from timber harvest, and another 19% occurs within retention areas where commercial timber management is also restricted. Only 30% of the species' range is within the General Matrix portions of national forests and on private lands where timber management might occur. However, as a listed species in the State of California, the surveys and protective actions are required as part of the Timber Harvest Plan (THP) review process prior to harvests on private lands. A petition was put forward in 2004 to list the species (along with the Siskiyou Mountains Salamander) under the Federal Endangered Species Act, but the listing was found to be unwarranted for both species, primarily due to the protections already in place. A new petition for listing the Siskiyou Mountains Salamander was submitted in 2018 by the same organizations, providing rationale of changes in forest practice rules in the State of Oregon, but the Scott Bar Salamander was not included in the second petition. [Source: 72,73,229,230]

Risk Designation: Low Risk

Sources of Information:

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Plethodon+asupak

71. California Department of Fish and Wildlife. California Wildlife Habitat Relationships System. Retrieved from https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=1538&inline=1

72. International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/61904/0

73. U.S. Fish & Wildlife Service, Yreka Fish and Wildlife Office. Local Species Information – Siskiyou Mountains (Plethodon stormi) and Scott Bar (Plethodon asupak) Salamanders. 2013. Retrieved from https://www.fws.gov/yreka/plethodonspecies.html

174. California Department of Fish and Wildlife. California's Wildlife. Retrieved from https://www.wildlife.ca.gov/Data/CWHR/Life-History-and-Range

229. Federal Register. Vol. 73, No. 16, January 24, 2008, 12-Month Finding on a Petition to List the Siskiyou Mountains Salamander (Plethodon stormi) and Scott Bar Salamander (Plethodon asupak) as Threatened or Endangered. Retrieved from https://www.gpo.gov/fdsys/pkg/FR-2008-01-24/pdf/E8-918.pdf

230. DeGross, D.J. and Bury, R.B. Science Review for the Scott Bar Salamander (Plethodon asupak) and the Siskiyou Mountains Salamander (P. stormi): Biology, Taxonomy, Habitat, and Detection Probabilities/Occupancy. US Department of the

Interior, US Geological Survey. Open-File Report 2007-1352. 2007. Retrieved from https://pubs.usgs.gov/of/2007/1352/pdf/OFR20071352.pdf

Sierra Buttes Salamander (*Hydromantes sp. 3*)

FSC Region: Pacific Coast, specifically northern California

Description: The Sierra Buttes Salamander is known from only one isolated small area in Sierra County, CA. They have a very limited home ranges and there are no known threats.

Federal/State Listing Status: Not listed

Indication of Risk: G1Q; S1 (California); Riparian habitat; No current threats identified and the area in which the population exists is unlikely to be developed [Source: 70].

Risk Designation: Low Risk

Sources of Information:

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Hydromantes+sp.+3

Southern Mountain Yellow-legged Frog (*Rana muscosa*)

FSC Region: Pacific Coast, specifically southern California

Description: The Southern Mountain Yellow-legged Frog occurs in the southern Sierra Nevada mountains of California and in the mountains in southern California. It is found on/in sunny riverbanks, meadow streams, isolated pools, and lake borders in the Sierra Nevada, along with cool rocky stream courses fed by springs and snow melt in southern California. At high elevations, they may be inactive for 7-9 months of the year.

Federal/State Listing Status: Federally endangered in the U.S. in southern California.

Indication of Risk: G1; S1 (California); Riparian habitat; Threats to the frog include non-native fish introductions, disease, introduction of contaminants, livestock grazing, human use in and along streams, hydrologic alterations, climate change and vulnerability to catastrophic events. [Source: 70,72] No substantive threats from forest management activities identified.

Risk Designation: Low Risk

Sources of Information:

74. US Fish & Wildlife Service. Environmental Conservation Online System. Retrieved from https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=D02H

71. California Department of Fish and Wildlife. California Wildlife Habitat Relationships System. Retrieved from https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=1502&inline=1

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Rana+muscosa

72. International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/19177/0

California Condor (*Gymnogyps californianus*)

FSC Region: Pacific Coast

Description: The California Condor's large range includes rocky, open-country scrubland, coniferous forests and oak savanna. It uses cliffs, rocky outcrops and large trees as nesting sites, but overall forest does not appear to be a limiting factor. The bird can travel large distances to search for carrion for feeding.

Federal/State Listing Status: Federally endangered in the U.S., except where listed as an experimental population. The bird is also listed as endangered by the State of California.

Indication of Risk: G1; S1 (California, Arizona); Woodland habitats; Current and historical threats are primarily from toxins, with the current major threat being lead poisoning from ammunition [Sources: 75,74,70,72]. No substantive threats from forest management activities identified.

Risk Designation: Low Risk

Sources of Information:

75. California Department of Fish and Wildlife. California Condor. Retrieved from https://www.wildlife.ca.gov/Conservation/Birds/California-Condor

74. US Fish & Wildlife Service. Environmental Conservation Online System. Retrieved from https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=B002

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Gymnogyps+californianus

72. International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/22697636/0

Island Scrub-jay (*Aphelocoma insularis*)

FSC Region: Pacific Coast, specifically Santa Cruz Island, CA

Description: The Island Scrub-jay is found on Santa Cruz Island in the Channel Islands, California. The breeding population is relatively stable. Habitat comments specify 'open' woodland areas.

Federal/State Listing Status: Not listed

Indication of Risk: G1; S1 (California); Woodland habitat; Habitat degradation caused by introduced livestock is a historical threat to the bird. Changes in vegetation (e.g., due to grazing or lack of grazing) can threaten the food supply and the species' small range makes it vulnerable to localized disasters, disease and non-native species invasion [Sources: 76,70]. No substantive threats from forest management activities identified.

Risk Designation: Low Risk

Sources of Information:

76. National Audubon Society. Guide to North American Birds. Retrieved from http://www.audubon.org/field-guide/bird/island-scrub-jay

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Aphelocoma+insularis

Robust Cottontail (*Sylvilagus robustus*)

FSC Region: Southwest

Description: The Robust Cottontail has a small range in Texas, New Mexico and Mexico. It occurs at higher elevations and has disappeared from two of the four mountain ranges where it was known to occur.

Federal/State Listing Status: Not listed

Indication of Risk: G1G2; S1 (New Mexico); Forest & woodland habitats; The species is likely sensitive to drought and climate change may therefore be a threat. Habitat destruction from urbanization, development, cattle grazing and brush clearing are reducing the available habitat [Sources: 70,72]. No substantive threats from forest management activities identified.

Risk Designation: Low Risk

Sources of Information:

77. Animal Diversity Web. Sylvilagus robustus – robust cottontail. 2012. Retrieved from http://animaldiversity.org/accounts/Sylvilagus_robustus/

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Sylvilagus+robustus

72. International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/41310/0

Cheoah Bald Salamander (*Plethodon cheoah*)

FSC Region: Appalachian, specifically the Cheoah Bald area in Graham and Swain Counties, NC

Description: The Cheoah Bald Salamander's range is not yet well defined, but it is believed to be limited a portion of the Appalachian Mountains at the very western extent of North Carolina within the elevational range of 975-1,524 meters, associated with the Cheoah Bald. The salamander is endemic to the mesic forests that occur on the bald and may be common in suitable habitat. It appears that much of the species' range may occur within the Nantahala National Forest and it is identified as a Federal Species of Concern. For more information, contact the North Carolina Natural Heritage Program or the Nantahala National Forest.

Federal/State Listing Status: Not listed

Indication of Risk: G1G2; S1S2 (North Carolina); Forest & woodland habitats; Clear cutting is a major threat to local populations. Some populations have been found in second growth forests, providing evidence that they are able to re-populate after harvest, but literature suggests it takes decades and with so few known populations extant [Source: 70], that kind of disruption could have a significant effect on the species as a whole. The 1994 Amendment to the Nantahala National Forest Plan included new definitions of management areas that provide an indication of whether timber management will likely occur [Source: 231]. The Cheoah Bald area is located within management areas that at this time either do not allow timber management, or are identified as being likely unsuitable for timber management [Sources: 232,233]. However, as the species' range is not yet fully delineated, it is not possible to know whether all or most of the range occurs within these management areas.

Risk Designation: Specified Risk for the entirety of Graham and Swain Counties, NC

Sources of Information:

70. 1 NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Plethodon+cheoah

82. 2 North Carolina Natural Heritage Program. Species/Community Search. Retrieved from https://www.ncnhp.org/data/species-community-search

72. 3 International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/59333/0

231. 4 USDA Forest Service. Land and Resource Management Plan, Amendment 5. Nantahala and Pisgah National Forests. 1994. Retrieved from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm8_050373.pdf

232. 5 USDA Forest Service. Nantahala National Forest Management Area Map. Nantahala and Pisgah National Forests. Retrieved from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm8_050374.pdf

233. 6 USDA Forest Service. Summary of Management Areas. Nantahala and Pisgah National Forests. Retrieved from https://www.fs.usda.gov/detail/nfsnc/landmanagement/planning/?cid=stelprdb5194769

139. 7 North Carolina Wildlife Resources Commission. North Carolina Wildlife Action Plan. 2015. Retrieved from http://ncwildlife.org/Portals/0/Conserving/documents/2015WildlifeActionPlan/NC-WAP_2015_ePDF_052016_chapters1-8.pdf

Spring Pygmy Sunfish (*Elassoma alabamae*)

FSC Region: Southeast

Description: The spring pygmy sunfish is known to exist in one spring complex in the Tennessee River watershed. It relies on dense underwater vegetation for both shelter and hunting grounds.

Federal/State Listing Status: Not listed

Indication of Risk: G1; S1 (Alabama); Forested wetland habitat; Identified threats are changes to hydrology and decreased water quality due to incompatible land management activities in the surrounding agricultural and pasture lands [Sources: 83,70,72]. No substantive threats from forest management activities identified.

Risk Designation: Low Risk

Sources of Information:

83. Center for Biological Diversity. Spring Pygmy Sunfish. Retrieved from http://www.biologicaldiversity.org/species/fish/spring_pygmy_sunfish/index.html

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Elassoma+alabamae

72. International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/202436/0

Waccamaw Killifish (*Fundulus waccamensis*)

FSC Region: Southeast, specifically Lake Waccamaw and its tributaries in Columbus County, NC

Description: Waccamaw Killifish range is limited to Lake Waccamaw and its tributaries in eastern North Carolina. The fish is very common within its small range and this combined with the population size suggests that the population is either stable or declining at a very slow rate. For more information, contact the North Carolina Natural Heritage Program.

Federal/State Listing Status: Not listed

Indication of Risk: G1; S1 (North Carolina); Forested Wetland habitat; No major threats are currently believed to exist. Greatest conservation concern is related to septic tank runoff causing eutrophication. It is also noted that upland deforestation and consequent siltation could negatively affect demersal eggs, however, deforestation is not considered to be a normal forest management activity. Therefore, it is not considered a meaningful risk to the Waccamaw Killifish habitat from forest management activities. Additionally, the species' habitat is indirectly protected by designation as critical habitat for another species under the U.S. Endangered Species Act. [Source: 70]

Risk Designation: Low Risk

Sources of Information:

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Fundulus+waccamensis

82. North Carolina Natural Heritage Program. Species/Community Search. Retrieved from http://ncnhde.natureserve.org/content/map

72 International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/8709/0

Dusky Gopher Frog (*Lithobates sevosus*)

FSC Region: Southeast, specifically the lower coastal plain of Mississippi.

Description: The Dusky Gopher Frog historically occurred on the Coastal Plain from eastern Louisiana to the Mobile River delta in Alabama. Now, it is only known from one site in Harrison County and a couple of sites in Jackson County, MS, although there are also active efforts to reintroduce into wetlands in Perry County. Occurs in upland areas of sandy soils that were historically forested with longleaf pine and in the temporary wetland breeding sites that are embedded within the forested landscape. Most of life is spend in or near underground refugia that were historically gopher tortoise burrows. Critical habitat was designated in 2012 within four counties in Mississippi and one in Louisiana. Current populations are documented in two of the Mississippi Counties (Harrison and Jackson) and active efforts toward reintroduction are occurring in the third (Perry). The species has not been documented in Louisiana since 1967 and there is no evidence of active reintroduction efforts. For more information, contact the Mississippi Department of Wildlife, Fisheries, and Parks.

Federal/State Listing Status: Federally endangered wherever found. Also listed as endangered by the State of Mississippi.

Indication of Risk: G1; S1 (Mississippi); Woodland, forested wetland & riparian habitats; Major threats include population isolation, urbanization, disease, and a lack of suitable habitat. Habitat degradation is a significant factor, driven by multiple sources including, changes in forest type from longleaf pine to other forest types, forest degradation caused by grazing and the disruption

of the natural fire regime, and land management practices that alter the soil horizon, forest litter, herbaceous community and the occurrence of down woody debris. Timber site prep and other forestry practices that alter temporary wetlands can damage breeding areas. [Sources: 70,72]

Risk Designation: Specified Risk for the critical habitat, as defined by the U.S. Fish & Wildlife Service [Source: 176], with the exception of the polygon in Louisiana.

Sources of Information:

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Lithobates+sevosus

84. MS Department of Wildlife, Fisheries, and Parks & MS Museum of Natural Science. Endangered Species of Mississippi, page 56. 2014. Retrieved from http://www.mdwfp.com/media/3231/endangered_species_of_mississippi.pdf

72. International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/58714/0

176. US Fish & Wildlife Service. Environmental Conservation Online System Species Profile for Dusky Gopher Frog. Retrieved from https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=D031

234. USDOI Fish & Wildlife Service. Dusky Gopher Frog (Rana sevosa) Recovery Plan. 2015. Retrieved from https://ecos.fws.gov/docs/recovery_plan/2015_07_16_Final%20RP_R_sevosa_08212015%20(1).pdf

235. USDA Forest Service. Land and Resource Management Plan. National Forests in Mississippi. 2014. Retrieved from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3814664.pdf

Houston Toad (*Anaxyrus houstonensis*)

FSC Region: Southeast, specifically southeast Texas

Description: The Houston Toad is native to the central coastal region of Texas. Populations have been found in nine counties, with the largest in Bastrop County. The species is restricted to areas with soft sandy soils, typically with pine forest. Breeding sites include shallow water of roadside ditches, temporary ponds in residential areas and pastures, and other seasonally flooded low spots where water persists for at least 60 days. For more information, contact the Fish and Wildlife Service in Texas.

Federal/State Listing Status: Federally endangered wherever found. Also listed as endangered by the State of Texas.

Indication of Risk: G1; S1 (Texas); Forest & woodland habitats; Habitat conversion poses the most serious threat. Some forestry practices, such as thinning and burning, may benefit the toad, while others, such as clear cutting, are harmful. Other threats include prolonged drought and the presence of fire ants. [Source: 86]

Risk Designation: Specified Risk for the current critical habitat, as defined by U.S. Fish & Wildlife Service [Source: 177]

Sources of Information:

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Anaxyrus+houstonensis

177. US Fish & Wildlife Service. Environmental Conservation Online System Species Profile for Houston toad. Retrieved from http://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=D004

85. U.S. Fish & Wildlife Service. Houston Toad Recovery Plan. 1984. Retrieved from https://ecos.fws.gov/docs/recovery_plan/840917.pdf

72. International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/3170/0

86. U.S. Fish & Wildlife Service. Endangered Species Houston Toad. 2009. Retrieved from http://ifw2es.fws.gov/HoustonToad

Patch-nosed Salamander (*Urspelerpes brucei*)

FSC Region: Southeast, specifically Stephens and Habersham Counties, GA and the Tugaloo River in Oconee County, SC.

Description: The known range of the Patch-nosed Salamander is a small, first order stream located at the foot of the Blue Ridge escarpment in Stephens County, GA. For more information, contact the Georgia Department of Natural Resources, Wildlife Resources Division.

Federal/State Listing Status: Not listed

Indication of Risk: G1; S1 (Georgia); Riparian habitat; Little is known about this species and specific threats have not yet been documented. However, any factor that would disrupt water flow, canopy cover, or leaf-litter layer would likely impact the species [Sources: 70,72]. As all of these can potentially be affected by forest management, the precautionary approach should be taken.

Risk Designation: Specified Risk for the entirety of Stephens and Habersham Counties, GA and Oconee County, SC

Sources of Information:

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Urspelerpes+brucei

87. Georgia DNR Wildlife Resources Division. Species Distribution Map Retrieved from http://gakrakow.github.io/range_maps2.html

88. Georgia DNR Wildlife Resources Division. Species Profile for Patch-nosed Salamander. 2011. Retrieved from http://georgiawildlife.com/sites/default/files/uploads/wildlife/nongame/pdf/accounts/amphibians/urspelerpes_brucei.pdf

72. International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/summary/185664/0

Rim Rock Crowned Snake (*Tantilla oolitica*)

FSC Region: Southeast, specifically southern Florida

Description: The Rim Rock Crowned Snake are known to occur in various locations in and around Miami and the Florida Keys. Little is known about its diet and life history.

Federal/State Listing Status: Listed as threatened by the State of Florida.

Indication of Risk: G1G2; S1S2 (Florida); Forest & woodland habitats; Occurs in highly populated areas of Florida where forest management is unlikely to be occurring. Primary threats

are intensive development and other disturbances (e.g., alteration of natural hydrological and fire regimes). [Source: 70] No substantive threats from forest management activities identified.

Risk Designation: Low Risk

Sources of Information:

89. Florida Fish and Wildlife Conservation Commission. Rim Rock crowned snake. Retrieved from http://myfwc.com/wildlifehabitats/imperiled/profiles/reptiles/rim-rock-crowned-snake/

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Tantilla+oolitica

72. International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/63954/0

Black-capped Petrel (*Pterodroma hasitata*)

FSC Region: Southeast

Description: The bird's primary habitat is open ocean and only U.S. observations are at sea off the southeastern states. Nesting sites are located outside of the United States. Current threats to the Black-capped Petrel are primarily habitat loss in Caribbean countries.

Federal/State Listing Status: Not listed

Indication of Risk: G1; S1N (North Carolina); Forest & woodland habitats; Species does not use forests within the assessment area, and therefore it is unlikely to be threatened by forest management activities within the assessment area [Source: 70].

Risk Designation: Low Risk

Sources of Information:

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Pterodroma+hasitata

72. International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/22698092/0

76. National Audubon Society. Guide to North American Birds. Retrieved from https://www.audubon.org/bird-guide http://www.audubon.org/field-guide/bird/black-capped-petrel

Florida Bonneted Bat (*Eumops floridanus*)

FSC Region: Southeast, specifically south Florida

Description: Florida Bonneted Bats are rare and only occur in a few counties in south Florida. They have been found foraging in a wide variety of forested and non-forested habitats, in both natural and man-made areas.

Federal/State Listing Status: Federally endangered wherever found.

Indication of Risk: G1; S1 (Florida); Forest, woodland & riparian habitats; Vulnerable to ongoing loss and degradation of habitat and extirpation of local roosting populations due to human activities, climate change, stochastic events such as hurricanes and effects of non-native species [Sources: 74,70,72]. No substantive threats from forest management activities identified.

Risk Designation: Low Risk

Sources of Information:

89. Florida Fish and Wildlife Conservation Commission. Retrieved from http://myfwc.com/wildlifehabitats/imperiled/profiles/mammals/florida-bonneted-bat/

74. US Fish & Wildlife Service. Environmental Conservation Online System. Retrieved from https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=A0JB

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Eumops+floridanus

72. International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/136433/0

Red Wolf (*Canis rufus*)

FSC Region: Southeast, specifically eastern NC

Description: Red wolf is currently only known to exist in a limited area of eastern North Carolina, occupying the peninsula between the Albemarle and Pamlico Sounds. The wolf is common within the reintroduction area, but the occurrence outside of this area is unknown. For more information, contact the North Carolina Natural Heritage Program.

Federal/State Listing Status: Federally endangered wherever found, except where listed as an experimental population. Listed as endangered by the State of North Carolina.

Indication of Risk: G1Q; S1 (North Carolina, South Carolina); Forest, woodland, forested wetland & riparian habitats; Historical decline was due in part to habitat loss, but it is considered a habitat generalist that can thrive in forested and non-forested habitats. Current threats are hybridization with coyotes (primary), climate change (only population is on a peninsula, 3 ft above sea level), human induced mortality, and habitat loss and fragmentation due to urbanization/development [Sources: 70,72].

Risk Designation: Low Risk

Sources of Information:

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=Canis+rufus

72. International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/3747/0

82. North Carolina Natural Heritage Program. Species/Community Search. Retrieved from http://ncnhp.org/data/species-community-search

90. US Fish & Wildlife Service. Red Wolf Program Review. Retrieved from https://www.fws.gov/redwolf/evaluation.html

74. US Fish & Wildlife Service. Environmental Conservation Online System. Retrieved from https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=A00F

Black-spotted Newt (*Notophthalmus meridionalis*)

FSC Region: Southwest, specifically along the Gulf Coastal Plain of Texas

Description: Black-spotted Newts are known from a small number of sites in Texas and Mexico, although their distribution may have been much greater historically. They breed temporary ponds, roadside ditches and pools of small streams – with a preference for warm, shallow

waters with vegetative cover. Adults are associated with deep, poorly drained, clayey sediments that are more likely to form ephemeral ponds or wetlands following heavy rain. For more information, contact the Texas Parks and Wildlife Department.

Federal/State Listing Status: Listed as threatened by the State of Texas.

Indication of Risk: G1; S2 (Texas); Riparian habitat. Much of the species' original habitat has been converted to agricultural lands or through urban development. Additionally, insecticide and herbicide use is identified as a significant threat. [Sources: 70,72,236,237,238] No threats from forest management identified.

Risk Designation: Low Risk

Sources of Information:

70. NatureServe. NatureServe Explorer: An Online Encyclopedia of Life. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?searchName=notophthalmus+meridionalis

72. International Union for Conservation of Nature and Natural Resources. The IUCN Red List of Threatened Species. Retrieved from http://www.iucnredlist.org/details/59452/0

236. AmphibiaWeb. Notophthalmus meridionalis. Retrieved from https://amphibiaweb.org/species/4263

237. Herps of Texas. Black-spotted Newt. Retrieved from http://www.herpsoftexas.org/content/black-spotted-newt

238. Texas Parks and Wildlife Magazine. Wild Thing: Orange Bellies. 2016. Retrieved from https://tpwmagazine.com/archive/2016/aug/scout5_wildthing_newt/

HCV 2 – Landscape-Level Ecosystems and Mosaics

FSC considers materials that come from places where High Conservation Values are threatened by forest management activities to be unacceptable materials. Therefore, the NRA assesses the risk of sourcing from these kinds of areas.

HCV 2 Definitions:

FSC-PRO-60-002a (NRA Framework): "Landscape-level ecosystems and mosaics. Intact forest landscapes and large landscape-level ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance."

FSC-US Forest Management Standard: "HCV forest areas containing globally, regionally or nationally significant large landscape level forests, contained within, or containing the management unit, where viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance."

Common Guidance for the Identification of HCV[23] - HCV 2:

[23] Brown, E., N. Dudley, A. Lindhe, D.R. Muhtaman, C. Stewart, and T. Synnott (eds.). 2013 (October). Common guidance for the identification of High Conservation Values. HCV Resource Network. P.25 (https://ic.fsc.org/en/what-is-fsc-certification/consultations/archive/hcv-common-guidance)

- Large areas (e.g. could be greater than 50,000 ha, but this is not a rule) that are relatively far from human settlement, roads or other access. Especially if they are among the largest such areas in a particular country or region.
- Smaller areas that provide key landscape functions such as connectivity and buffering (e.g. protected area buffer zone or a corridor linking protected areas or high-quality habitat together). These smaller areas are only considered HCV 2 if they have a role in maintaining larger areas in the wider landscape.
- Large areas that are more natural and intact than most other such areas and which provide habitats of top predators or species with large range requirements.

Given the above definitions and guidance, the following assessment of HCV focuses on large forested landscapes that are significant at global, regional or national scales.

For the purposes of this risk assessment, the following thought process is applied:

1. *Are HCV 2 present? – If no, the area is designated 'Low Risk.' If yes, go to #2.*
2. *Is the HCV 2 threatened by forest management activities? – If no, the area is designated 'Low Risk.' If yes, the area is designated 'Specified Risk.'*

LANDSCAPE-LEVEL FORESTS

NOTE: *As clarified at the very beginning of this document, Roadless Areas are considered HCV 3 within the context of the assessment area, due to their rarity and typical small size.*

Pre-European colonization, Native Americans managed the US landscapes in a way that resulted in extensive mosaics of agriculture, grassland, savanna, woodlands and forests. Just prior to European colonization, the US is estimated to have been 46% forested. By 1910, about a third of that forest was gone (primarily converted to agriculture), and most of the remaining forest had been harvest at least once. The original nature of much of this forest will never return, as actively managed forests are generally not allowed to reach fully mature conditions when the forests themselves are driving the soil characteristics, light intensities and moisture levels to which the full complement of biodiversity would be adapted. This means that our modern forests typically contain much less biodiversity than their predecessors, and this is exacerbated further by intensive management and continued forest fragmentation. [Sources: 178,179] As a result, HCV 2 forests are fairly limited in the assessment area and generally occur in areas that are less accessible for harvest or development and/or have greater protections that limit development and commercial harvesting.

Data Used for HCV Identification:

In its HCV 2 assessment for the original National Risk Assessment Working Group (NRA WG), The Nature Conservancy (TNC) considered the following datasets [Source: 3]:

- TNC Matrix Forest Blocks[24]: Dataset developed by TNC for forest matrix in the eastern US. Forest matrixes in this context "are large contiguous areas whose size and natural condition allow for the maintenance of ecological processes, viable occurrences of matrix forest communities, embedded large and small patch communities, and

[24] http://databasin.org/datasets/68c240fb9dc14fda8ccd965064fb3321

embedded species populations."[5] This dataset only covers a limited section of the eastern US.

- Northwest Forest Plan Land Use Allocation[25]: Several datalayers map the different management areas associated with the Northwest Forest Plan, which is a series of federal policies and guidelines for managing federally owned forest land in the Pacific Northwest. These data are limited to public lands.

However, TNC ultimately did not include these datasets because neither of them fit the full definition of HCV 2 and also because of their limited spatial extent. However, TNC concluded that the Greenpeace/ WRI Intact Forest Landscapes dataset [Source: 4] is reasonably robust, given that it is relatively straightforward to identify intact forest using remote sensing. Additionally, the description of areas identified by this dataset (see below) closely aligns with the above definitions of HCV 2. Therefore, this dataset is used in the following assessment as a proxy for all HCV 2 in the assessment area, as it effectively describes all HCV 2 in the US.

Description: For the purposes of the dataset, an Intact Forest Landscape (IFL) is described as an unbroken expanse of natural ecosystems within the zone of current forest extent, showing no signs of significant human activity, and large enough that all native biodiversity, including viable populations of wide-ranging species, could be maintained. The conservation value of IFLs is great due to their carbon storage, protection of biodiversity, regulation of hydrological regimes, and other essential ecosystem functions that they provide. [Source: 94]

Indication of Risk:

- Eastern Conterminous US: The IFL in the dataset only occur in three areas – within the Adirondack management area in upstate New York, within the Okefenokee National Wildlife Refuge in southeastern Georgia, and within the Everglades on the southern tip of Florida. The areas in New York and Georgia occur on land that is permanently protected (GAP Status 1 or 2). Most of the Everglades area is permanently protected within a National Park. However, there is an IFL located just north of the National Park within the Big Cypress National Preserve (established in 1974). While the Big Cypress swamp area is not Gap Status 1 or 2 (i.e., permanently protected), it has been managed as part of a broader plan to protect the entire Everglades system, which includes managing the forest to protect the hydrology of the greater Everglades region and to improve or restore natural communities. [Sources: 97,98,100] In 2002, a National Park Service suitability assessment identified that about a third of the Preserve likely met criteria for Federal Wilderness Area protection – indicating that the management of this area has effectively protected the ecosystem [Source: 180]. Therefore, it is possible to conclude that this area is unlikely to be threatened by forest management activities.
- Western Conterminous US: The IFL in the dataset occur largely within permanently protected areas, but some also occur outside of the Gap Status 1 or 2 areas. Almost all of the IFL that are not permanently protected occur within Inventoried Roadless Areas on lands managed by the U.S. Forest Service which are legislatively protected from timber harvest. There is one significant exception in northwestern Wyoming – an area that is part of the Wind River Reservation and is located within the White Reservation Roadless Area, which has been effectively protected by the Tribe since 1934 (as is evidenced by its continued roadless status 80 years later). [Sources: 99,100]

  As detailed in the HCV 3 assessment, Inventoried Roadless Areas are covered by the 'Roadless Rule' which was signed into law in 2001 and prohibits timber harvesting except in very specific circumstances, which are almost all for improving the quality and function of the ecological system. The Roadless Rule is considered to be very

[25] http://databasin.org/datasets/5570316b9f174178a652136bac47ae4c

successful – it has limited the road building on the 58.5 million acres of roadless areas to only 75 miles and has logging to only a tiny fraction, and this was mostly outside of the assessment area for this NRA. [Sources: 101,102] Therefore, it is unlikely that these areas are threatened by forest management activities.

Risk Designation: Low Risk

Sources of Information:

94. Intact Forest Landscapes. Overview. Retrieved from http://intactforests.org/index.html

4. Potapov P., Yaroshenko A., Turubanova S., Dubinin M., Laestadius L., Thies C., Aksenov D., Egorov A., Yesipova Y., Glushkov I., Karpachevskiy M., Kostikova A., Manisha A., Tsybikova E., Zhuravleva I. 2008. Mapping the World's Intact Forest Landscapes by Remote Sensing. Ecology and Society, 13 (2). (http://www.intactforests.org; 'IFL for year 2013' datalayer used in this assessment)

3. Fargione, J., Platt, J., Schneebeck, C., and McRae, B. 2014. Mapping High Conservation Value Forests in the United States: Methodology and Data Sources. A Report by The Nature Conservancy for the Forest Stewardship Council-US. (Available upon request from Forest Stewardship Council US)

97. U.S. National Park Service. Big Cypress National Preserve, Florida. Retrieved from https://www.nps.gov/bicy/index.htm

98. Florida Fish and Wildlife Conservation Commission. A Management Plan for the Everglades Complex of Wildlife Management Areas 2015-2020. 2015. Retrieved from http://myfwc.com/media/4055870/EvergladesComplexManagementPlan.pdf

99. Aragon, Don. The Wind River Indian Tribes. International Journal of Wilderness. 2007. Retrieved from http://www.wilderness.net/library/documents/IJWAug07_Aragon.pdf

100. US Geological Survey. US-Protected Areas Database. Retrieved from http://gapanalysis.usgs.gov/padus/

101. U.S. Forest Service. 2001 Roadless Rule. Retrieved from https://www.fs.usda.gov/roadmain/roadless/2001roadlessrule

102. Anderson, Michael. The Wilderness Society. The Roadless Rule: A Tenth Anniversary Assessment. Retrieved from https://wilderness.org/sites/default/files/Roadless-Rule-paper-10th-anniversary.pdf

178. Bronaugh, W. North American Forests in the Age of Man. American Forests Magazine. 2012. Retrieved from http://www.americanforests.org/magazine/article/north-american-forests-in-the-age-of-man/

179. U.S. Forest Resource Facts and Historical Trends. United States Department of Agriculture. 2014. Retrieved from https://www.fia.fs.fed.us/library/brochures/docs/2012/ForestFacts_1952-2012_English.pdf

180. US National Park Service. 2002-2003 Annual NPS Wilderness Report. 2003. Retrieved from https://www.wilderness.net/NWPS/documents/NPS/2002-2003_wilderness_report.pdf

HCV 3 – Ecosystems and Habitats

FSC considers materials that come from places where High Conservation Values are threatened by forest management activities to be unacceptable materials. Therefore, the NRA assesses the risk of sourcing from these kinds of areas.

HCV 3 Definitions:

FSC-PRO-60-002a (NRA Framework): "Ecosystems and habitats. Rare, threatened, or endangered ecosystems, habitats or refugia."

FSC-US Forest Management Standard: "HCV forest areas that are in or contain rare, threatened or endangered ecosystems." HCV 3 includes old growth, primary forests, roadless areas (without evidence of roads or skid trails and greater than 500 acres or that have unique attributes), and other ecosystems that are considered 'rare' at a global, regional, or local (state) level. HCV 3 old growth includes both Type 1 (stands that have never been logged and that display late successional/old growth characteristics) and Type 2 (stands that have been logged, but that retain significant late-successional/old growth structure and functions). Primary forests (a forest ecosystem with the principal characteristics and key elements of native ecosystems that is relatively undisturbed by human activity) are generally synonymous with old growth forests.

Common Guidance for the Identification of HCV[26] - HCV 3:

Ecosystems that are:

- Naturally rare because they depend on highly localized soil types, locations, hydrology or other climatic or physical features, such as some types of limestone karst forests, inselbergs, montane forest, or riverine forests in arid zones.
- Anthropogenically rare, because the extent of the ecosystem has been greatly reduced by human activities compared to their historic extent, such as natural seasonally flooded grasslands on rich soils, or fragments of primary forests in regions where almost all primary forests have been eliminated.
- Threatened or endangered (e.g. rapidly declining) due to current or proposed operations.
- Classified as threatened in national or international systems (such as the IUCN Red List of Ecosystems)

Given the above definitions and guidance, the following assessment of HCV focuses on old growth forests (including primary forest), roadless areas and other rare forested ecosystems with an overall emphasis on systems that are significant at global, regional or national scales.

For the purposes of this risk assessment, the following thought process is applied:

3. *Are HCV 3 present? – If no, the area is designated 'Low Risk.' If yes, go to #2.*
4. *Is the HCV 3 threatened by forest management activities? – If no, the area is designated 'Low Risk.' If yes, the area is designated 'Specified Risk.'*

[26] Brown, E., N. Dudley, A. Lindhe, D.R. Muhtaman, C. Stewart, and T. Synnott (eds.). 2013 (October). Common guidance for the identification of High Conservation Values. HCV Resource Network. P.25 (https://ic.fsc.org/en/what-is-fsc-certification/consultations/archive/hcv-common-guidance)

OLD GROWTH FOREST (INCLUDING PRIMARY FOREST)

Data Used for HCV Identification:

Late successional (Old Growth) data considered in this assessment include:

- **Possible Old Growth on National Forest Land in the Southern Appalachians** (Southern Appalachians Assessment: Terrestrial Resources Technical Report. 1996; http://www.samab.org/site/publications/).
- **Late seral forest on private lands for the Klamath-Siskiyou ecoregion** (Conservation Biology Institute, 2002; http://databasin.org/datasets/806a5cf3afc04778a6aa34725a757857).
- **Coastal Temperate Rainforest - Remaining Late Seral Forest Fragments in Northwest North America** (Ecotrust, Pacific GIS, & Conservation International, 1995; http://databasin.org/datasets/7f72a68ac6c343bda3ffff4bef3926de).
- **Northern California (USA) U.S. Forest Service Late-Successional Reserves** (USFS 2003, http://databasin.org/datasets/e12f559cda4743b1b76cc8715bcd677a).

All of these datalayers have similar characteristics and can be treated as a group. They are all based on remote sensing data and demonstrate areas with an increased likelihood of late successional forest. However, they were not developed using consistent methodologies and do cover the entire assessment area, and therefore cannot be used to develop a complete picture of the assessment area. They are also not spatially explicit maps of late successional forest. The LANDFIRE data set[27] was also considered, but even with additional analysis completed by The Nature Conservancy[28], was found by the original FSC US NRA Working Group (NRA WG) to have too great a potential for false positives to be considered for this assessment.

Based upon the above datalayers, the NRA WG concluded that old growth has a high enough likelihood of occurrence outside of protected areas in the Pacific Coast and Rocky Mountain regions (see Annex B for FSC regions) that they should be fully assessed as part of the NRA.

Ultimately, FSC US staff, in consultation with experts [Dominick Dellasala, James Strittholt] and the current Working Group developed an alternate methodology for identifying areas with a higher likelihood of containing Old-Growth for the Pacific Coast and Rocky Mountains Regions. The methodology was a step-wise filtering process that began with an above ground forest biomass data layer (developed by the U.S. Forest Service[29]). The first step was to apply ecoregion-specific thresholds (based upon a literature search), followed by removal of areas within perimeters of fires since 2000 (U.S. Geological Survey[30]), and then removal of areas with recent forest gain or forest loss (Global Forest Watch[31]). Finally, removal of areas with GAP Status 1 or 2 protections (PAD-US dataset[32]), Inventoried Roadless Areas (U.S. Forest

[27] LANDFIRE, Landscape Fire and Resource Management Planning Tools, is a shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior, (https://www.landfire.gov/)

[28] Mapping High Conservation Value Forests in the United States: Methodology and Data Sources, By The Nature Conservancy for the Forest Stewardship Council-US (available upon request from FSC US)

[29] https://data.fs.usda.gov/geodata/rastergateway/biomass/index.php

[30] https://rmgsc.cr.usgs.gov/outgoing/GeoMAC/historic_fire_data/

[31] http://data.globalforestwatch.org/datasets/tree-cover-loss-hansenumdgoogleusgsnasa

[32] https://gapanalysis.usgs.gov/padus/data/download/

Service[33]) or conservation easements with an environmental purpose (Natural Resources Conservation Service[34]).

The inclusion of old growth forest in the assessment also addresses forest types (e.g., coastal temperate rainforest) in the Pacific Coast and Rocky Mountain region that prior to European settlement would have existed predominantly as late-successional forest, due to their natural disturbance regime. When Old Growth, HCV 3 Priority Forest Types, and HCV 1 Critical Biodiversity Areas are considered together, they align well with the forested WWF Global 200 Ecoregions in the U.S.

Description: Old growth forests are highly important to human populations for ecological, social and economic reasons. There is no single, widely accepted definition, but this assessment uses the definitions of Type 1 and Type 2 Old Growth in the FSC US Forest Management Standard (which focus on forests that have not been disturbed and do not include areas of re-growth that are now mature). Most definitions, including the FSC US definitions, focus on old trees and structural complexity. These habitat characteristics are important to a number of rare species that depend upon western U.S. old growth forests, including Northern Spotted Owls, Marbled Murrelet, and American marten, along with much lesser known (and appreciated) species of land snails, mollusks, and amphibians.

Old growth forest is generally considered to be rare, but how rare depends on the part of the country being considered: in the Pacific Northwest (including Northern California), the estimate is that old growth constitutes approximately 6% of the existing forest, in the northeast, it's less than 1%, while in the southeast it's closer to 0.5% and even less in the southwest and Great Lakes [Source: 106].

Old growth forests are important in maintaining biodiversity, values for society, and ecological services such as carbon sequestration and soil quality. A comprehensive spatial inventory of old growth forests across the entire US does not exist, though old growth forests are much less common in the eastern United States [Source: 106]. They are much more abundant on public lands in the western United States and a few inventories of old growth forest in the Pacific Northwest and northern California exist. [Source: 107, 108, 109, 110]

Indication of Risk:

- Eastern conterminous U.S. (FSC US Great Lakes, Northeast, Ozark-Ouachita, Appalachian, Southeast and Mississippi Alluvial Valley Regions): The remaining pockets of old growth (as defined by FSC US) are more often than not on public lands and generally are in some kind of protective designation, or exist in areas that are inaccessible for forest management. [Source: 106; Experts: Dominick Dellasala, James Strittholt]
- Western conterminous U.S. (FSC US Pacific Coast, Rocky Mountain and Southwest Regions): Threats to old growth forests include a lack of managing younger forests with a goal of creating old growth forests, timber harvest, invasive species, pests, pathogens, forest fragmentation, fire suppression, catastrophic wildfires and climate change. [Source: 106,111; Experts: Dominick Dellasala, James Strittholt] In frequent-fire forests of the western US, logging is no longer the primary threat to old growth, instead threats also include land management policies that suppress fire and do not mimic the effects of fire through active management [Sources: 106,112]. In the Southwest, fires suppression remains the greatest threat, along with invasive species, climate change and development [106]. While the Northwest Forest Plan has significantly reduced the loss of

[33] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

[34] https://www.conservationeasement.us/downloads/?created=true

Old Growth to timber harvest on federal lands guided by the plan (all within the Pacific Coast Region), losses continue at lower rates. Additionally, losses on non-federal lands in the Northwest, particularly private lands, have continued at much higher rates than on federal lands. Supporting evidence of these conclusions and generally that Old Growth in the Northwest is still being lost to timber harvest can be found in status assessments for species that are dependent upon late successional forests. [Sources: 104,116,117,121,161,239,240; Experts: Dominick Dellasala, James Strittholt]

Risk Designation: Specified risk for lands in the Pacific Coast and Rocky Mountain regions that were identified through the filtering methodology described above. Low risk for the remainder of the assessment area.

Sources of Information:

106. National Commission on Science for Sustainable Forestry. Beyond Old Growth: Older Forests in a Changing World. 2008. Retrieved from http://andrewsforest.oregonstate.edu/sites/default/files/lter/pubs/pdf/pub4524.pdf

107. Conservation Biology Institute. Old Growth Forests in the Pacific Northwest, USA. 2010. Retrieved from https://databasin.org/galleries/90e11cbab3724db2aa801e67643d9151

108. Conservation Biology Institute. Late seral forest on private lands for the Klamath-Siskiyou ecoregion. 2010. Retrieved from https://databasin.org/datasets/806a5cf3afc04778a6aa34725a757857

109. Conservation Biology Institute. Coastal Temperate Rainforest – Remaining Late Seral Forest Fragments in Northwest North America. 2010. Retrieved from https://databasin.org/datasets/7f72a68ac6c343bda3ffff4bef3926de

110. Conservation Biology Institute. Northern California (USA) U.S. Forest Service Late-Successional Reserves (LSRs). 2010. Retrieved from https://databasin.org/datasets/e12f559cda4743b1b76cc8715bcd677a

111. Committee on Energy and Natural Resources, United States Senate. Old-Growth Forest in the Pacific Northwest, Hearing before the Subcommittee on Public Lands and Forests. 2008. Retrieved from https://www.gpo.gov/fdsys/pkg/CHRG-110shrg43391/html/CHRG-110shrg43391.htm

112. Vosick, Diane, Ostergren, D.M., and Murfitt, L. Old-growth policy. Ecology and Society. 2007. Retrieved from http://www.ecologyandsociety.org/vol12/iss2/art19/

104. Krankina, O.N., DellaSala, D.A., Leonard, J, and Yatskov, M. 2014. High-Biomass Forests of the Pacific Northwest: Who Manages Them and How Much is Protected? Environmental Management. 04 June 2014. 10 pp.

116. Desimone, S.M. 2016. Periodic Status Review for the Marbled Murrelet in Washington. Washington Department of Fish and Wildlife, Wildlife Program. 36 pp.

117. Buchanan, J.B. 2016. Periodic Status Review for the Northern Spotted Owl in Washington. Washington Department of Fish and Wildlife, Wildlife Program. 30 pp.

121. Marbled Murrelet (Brachyramphus marmoratus) 5-Year Review. 2009. US Fish & Wildlife Service. 108 pp.

161. Status Review of the Marbled Murrelet (Brachyramphus marmoratus) in Oregon and Evaluation of Criteria to Reclassify the Species from Threatened to Endangered under the Oregon Endangered Species Act. 2018. Oregon Department of Fish & Wildlife. 134 pp.

239. U.S. Fish & Wildlife Service. Status Review of the Northern Spotted Owl, Frequently Asked Questions. Retrieved from

https://www.fws.gov/oregonfwo/Species/Data/NorthernSpottedOwl/Documents/FAQ90-dayPetition4-7-15.pdf

240. California Fish and Game Commission. Notice of Findings: Listing the northern spotted owl as a threatened species is warranted. 2017. Retrieved from http://www.fgc.ca.gov/CESA/index.aspx

Experts Consulted:

- Dominick Dellasala, Geos Institute
- James Strittholt, Conservation Biology Institute

ROADLESS AREAS

NOTE: *As clarified at the very beginning of this document, Roadless Areas are considered HCV 3 within the context of the assessment area, due to their rarity and typical small size.*

Data Used for HCV Identification:

There is no comprehensive, consistent data set available for roadless areas within the assessment area. The NRA WG worked with TNC to explore various options for identifying roadless areas[35]. A number of existing data sets, including the U.S. Census Bureau's TIGER road dataset[36], and more novel analyses developed by TNC, were considered, but were assessed by the NRA WG to include too many occurrences of false positives, based upon the FSC US Forest Management Standard's definition of roadless area, which includes the absence of forest roads and skid trails. The NRA WG concluded that roadless areas were best represented in this assessment by official federal datasets of inventoried roadless areas on U.S. Forest Service (USFS) administered lands[37] and Wilderness Study Areas on Bureau of Land Management (BLM) administered lands[38]. These data sets are both vetted by agency staff and can be confidently assessed to represent roadless areas.

To help confirm the NRA WG's conclusion, FSC US staff consulted with science and land management staff at a number of regional and state land conservancies throughout the assessment area. These experts were asked about the potential for roadless areas, as defined by the FSC US Forest Management Standard, to occur on forested private lands that are not permanently protected and not FSC forest management certified (i.e., places outside of public lands where these HCV would not already be protected).

Description: The 'Roadless Rule' was signed into law in 2001. It prohibits road construction, road reconstruction and timber harvesting on 58.5 million acres of inventoried roadless areas on National Forests, except in very specific circumstances. These are in addition to 35 million acres of Congressionally-designated Wilderness Areas that are permanently protected and frequently adjacent to the inventoried roadless areas. By law, the extremely limited circumstances under which harvest may occur within these roadless areas are almost all associated with management actions designed to improve the character and function of the ecological system. The Roadless Rule has been even more successful than even the U.S. Forest Service predicted it would be. In 10 years, only 75 miles of roads were built within inventoried roadless areas, and only a miniscule fraction were logged, and those were mostly outside of the assessment area. In its Tenth Anniversary Assessment of the Roadless Rule, The Wilderness Society (TWS)

[35] Mapping High Conservation Value Forests in the United States: Methodology and Data Sources, By The Nature Conservancy for the Forest Stewardship Council-US (available by request from FSC US)
[36] https://www.census.gov/geo/maps-data/data/tiger-line.html
[37] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437
[38] http://databasin.org/datasets/eea0e495148b446594356982001c458c

concludes that the Roadless Rule has been very effective in preventing new road building within inventoried roadless areas. The TWS assessment also concludes that the Rule has been effective in stopping commercial logging within inventoried roadless areas – the major exception to this that TWS identified was in Alaska's Tongass National Forest, which is outside of this NRA's assessment area. [Sources: 101,102]

While inventoried roadless areas received extensive court challenges, these have been resolved – concluding with the U.S. Supreme Court in 2016 declining to hear a final challenge from the State of Alaska. This decision confirmed the federal Ninth Circuit court's ruling, and reinforced the settled rule that federal agencies cannot arbitrarily change policies and ignore previous factual findings simply because a new president has taken office. [Source: 118]

In 1980, The BLM completed an inventory of all lands it managed, looking for large, natural areas with outstanding opportunities for solitude or primitive and unconfined recreation (and as a result, generally roadless). These areas were assessed and for suitability as Congressionally-designated Wilderness Areas, and those deemed suitable were proposed to Congress. A large portion of these have been protected by Congress, and the 538,405 acres that remain are in Wilderness Study Areas (WSA) status. The BLM's policy on management of WSAs directs BLM staff to "manage and protect WSAs to preserve wilderness characteristics so as not to impair the suitability of such areas for designation by Congress as wilderness" including prohibiting new surface disturbances that are not completed with the intent to maintain or improve conditions. [Sources: 118,119]

Indication of Risk:

- A spatial assessment of the 'forest zone' data layer that is packaged with Greenpeace's Intact Forest Landscapes data layers and the BLM's Wilderness Study Areas data layer indicates that very few WSAs occur within the identified forested zones [Sources: 91,115]. Therefore, it is unlikely that they will be threatened by forest management activities.
- Under federal law (Roadless Rule), timber harvest is not currently allowed within Inventoried Roadless Areas on National Forests [Source: 101]. Even though they do not have permanent legal protection, evidence suggests that the Roadless Rule has been very successful in maintaining the roadless character of these areas, and in severely limiting timber harvest [Source: 102]. Therefore, they are unlikely to be threatened by forest management activities.
- Expert consultation suggests that in most regions of the assessment area, lands that meet the FSC US Forest Management Standard's roadless criteria are believed to either no longer exist or to be so rare as to be functionally unidentifiable. One expert noted that at least in northern forested regions, large land holdings are typically heavily managed and therefore heavily roaded. Another noted that while the roads and skid trails may not have been used recently, the evidence of them still exists and they will be used again in the future. For those rare roadless areas greater than 500 acres that do occur on forested private lands that are not permanently protected, it was noted that these would most likely occur in areas that are too inaccessible or of such low productivity that logging of these areas is unlikely a risk. Therefore, while there may be a very small number of roadless areas that meet the FSC US Forest Management Standard criteria on private lands within the assessment area that are not permanently protected, it is unlikely that they are actively threatened by forest management activities.

Risk Designation: Low Risk

Sources of Information:

101. U.S. Forest Service. 2001 Roadless Rule. Retrieved from https://www.fs.usda.gov/roadmain/roadless/2001roadlessrule

102. Anderson, Michael. The Wilderness Society. The Roadless Rule: A Tenth Anniversary Assessment. Retrieved from https://wilderness.org/sites/default/files/Roadless-Rule-paper-10th-anniversary.pdf

118. EarthJustice. Timeline: The Roadless Rule. Retrieved from http://earthjustice.org/features/timeline-of-the-roadless-rule

119. U.S. Bureau of Land Management. Wilderness Study Areas. Retrieved from https://www.blm.gov/nlcs_web/sites/id/st/en/prog/NLCS/wilderness_study_areas0.html

120. U.S. Bureau of Land Management. BLM Manual 6330 – Management of Wilderness Study Areas (Public). Retrieved from https://www.blm.gov/nlcs_web/sites/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.31915.File.dat/6330.pdf

91. ntact Forest Landscapes. Intact Forest Landscapes Data Download, The IFL Mapping Team. Retrieved from http://www.intactforests.org/data.ifl.html

115. Conservation Biology Institute. Wilderness Study Area - USA, October 2012. 2013. Retrieved from http://databasin.org/datasets/eea0e495148b446594356982001c458c

Experts Consulted:

- Marisa Riggi, Northeast Wilderness Trust
- Karin Heiman, Southeast Regional Land Conservancy
- Dave Werntz, Conservation Northwest
- David Whitehouse, The Conservation Fund
- David Kirk, Wilderness Land Trust
- Tina Hall, The Nature Conservancy in Michigan
- John McNulty, Seven Islands Land Company
- John Gunn, University of New Hampshire, Dept. of Natural Resources & Environment

PRIORITY FOREST TYPES

Data Used for HCV Identification:

Priority Forest Types were developed by the NRA WG using the FSC US Forest Management Standard as guidance in addition to the HCV Resource Network guidance and additional stakeholder input. These Priority Forest Types are regionally defined (see Annex B for FSC regions).

Potential Priority Forest Types in the Pacific Coast and Rocky Mountain regions that are by definition Old Growth (e.g. Old Growth Douglas Fir stands) and/or that prior to European settlement would have existed predominantly as late-successional forest due to their natural disturbance regime (e.g., coastal temperate rainforest) are not included here as Priority Forest Types, but instead are addressed through the Old Growth assessment described above. While the following forest types were initially identified by the original Working Group using guidance associated with the FSC US Forest Management Standard as a framework, they were reviewed for potential gaps using the forested WWF Global 200 ecoregions in the U.S. as a framework, but no significant gaps were identified when these Priority Forest Types were considered in conjunction with HCV 3 Old Growth (including Coastal Temperate Rainforest), and the forest types associated with the HCV 1 Critical Biodiversity Areas (e.g., the Mixed Mesophytic Forests

of the Central Appalachian CBA and the coniferous forests of the Klamath-Siskiyou and Sierra Nevada CBAs).

Summary of Risk Designations for identified HCV 3 Priority Forest Types:

Priority Forest Type	FSC US Region[39]	Risk Designation
Mesophytic Cove Sites	Appalachian	Specified Risk for the portion of the Appalachian region that occurs within the WWF-defined Appalachian & Mixed Mesophytic Forests ecoregion, and above 300 meters elevation
Native Spruce-Fir	Appalachian	Low Risk
Late Successional Bottomland Hardwoods	Southeast/ Mississippi Alluvial Valley	Specified Risk for the portions of the Southeast and Mississippi Alluvial regions that are within the identified extent of the forest type
Native Longleaf Pine Systems	Southeast	Specified Risk for Counties that are identified in Figure 1 of the Range-wide Longleaf Conservation Plan as having 10,000 or more acres of Longleaf Pine

Mesophytic Cove Sites

FSC Region: Appalachian

Description: Mesophytic cove sites are highly diverse, closed-canopy hardwood forest occurring on mesic, sheltered sites (coves) at low- to moderate-elevation (300-1,100 m / 1000-3600 ft), and sometimes higher. They tend to occur in large patches (tens to hundreds of acres) on concave slopes that accumulate nutrients and moisture. These kinds of areas occur within the portion of the FSC US Appalachian region that is within the WWF Global 200 Appalachian & Mixed Mesophytic Forests ecoregion. They are characterized by high diversity and often great structural complexity. The ground level flora in particular has high species richness, often with abundant spring ephemerals. The forests often have a dense canopy, dominated by hardwoods with conifers also present. They are distinct and different from a homogenous yellow-poplar grove. Rich cove forests have very fertile soils with a diverse herb layer and contain few shrubs in the midstory. Acidic cove forests are less fertile than rich coves and typically have a thick evergreen midstory (rhododendron, etc.) that results in less diversity on the forest floor, but are otherwise similar - they have more acidic soils and more shrubs. [Sources: 125,241] This forest type can be defined using NatureServe's Ecological Classification Standard[40] for the following ecological systems (with the first typically occurring west of the Allegheny Front, and the second occurring to the east):

- South Central Interior Mesophytic Forest (CES 202.887)
- Southern and Central Appalachian Cove Forest (CES 202.373) – this type includes both 'acidic' and 'rich' coves

[39] See Annex B for a map of FSC US Regions

[40] NatureServe. 2009. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 06 February 2009. (http://downloads.natureserve.org/get_data/data_sets/veg_data/nsDescriptions.pdf)

While the sheltered, mesic sites that support Cove Forests are not particularly rare, examples are very rare that retain structural components like the dense canopy and high species diversity (both in the overstory and understory) – characteristics that may take 200 years to initially develop. These sites will not have evidence of having been previously clear-cut or farmed (followed by regrowth of the forest). Typically, they will include basswood, buckeye, cucumber, walnut, and magnolias in the mid-story and yellow-poplar, beech, sugar maple, northern red oak, white oak, ash, and hickories in the overstory.

Southern Blue Ridge Mountains Cove Forest was identified as a priority habitat in the 2005 North Carolina Wildlife Action Plan. Both Acidic and Rich Cove Forests are considered to be rare natural communities in Virginia. In addition to a very diverse flora, mesophytic coves provide habitat for rare animal species with limited ranges like the cerulean warbler and crevice salamander. Other associated species of concern include red wolf, Roan Mountain Sedge, Addison's Leatherflower, Blomquist Leafy Liverwort, Bluish Veilwort, Appalachian blue violet, blue wild indigo, Tellico salamander, Peaks of Otter salamander, and bog turtle. [Sources: 124,125,126,130,242; Experts: Greg Meade, Andrew Goldberg, Christopher Reeves]

Indication of Risk: The most significant current threats to this forest type are invasive species and conversion to other uses. However, threats also include incompatible forest management that results in alterations to the structure and composition of the forest or conversion to other forest types (white pine), climate change, chronic deer herbivory, harvesting of herbs and pollution [Sources: 124,125,127,129; Expert: Andrew Goldberg]. Mesophytic Cove Forest sites can be managed in a compatible way using methods that do not disturb soil productivity, hydrology or the understory, that maintain the diversity of the overstory without losing oak or moving toward monocultures of maple or poplar, that limit openings and that don't result in 'high-grading' the forest (removing all trees of high commercial value and leaving the remainder). Incompatible forest management occurs when these guidelines are not followed and remains a threat to these systems in the Appalachian region. [Source: 243; Expert: Andrew Goldberg].

While less severe disturbances, such as logging and fire, may not reduce herbaceous species richness or diversity to the same extent as more severe disturbances like mining and agriculture, they can still affect herbaceous species composition or abundance and therefore the quality and functioning of the system. Overall, the magnitude of impact from activities that occur within these sites on the herbaceous species are directly proportional to severity of disturbance. [Source: 127]

Risk Designation: Specified Risk for the portions of the Appalachian region that are within the WWF Global 200 Appalachian & Mixed Mesophytic Forests ecoregion, occur above 300 m elevation, and that are not effectively protected (as demonstrated by GAP Status 1 & 2 areas in the PAD-US[41] dataset and USFS Inventoried Roadless Areas[42]).

Sources of Information:

124. Nature Serve Explorer – Ecological Communities & Systems. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?init=Ecol

125. North Carolina Wildlife Resources Commission. Cove Forests, North Carolina Wildlife Action Plan. Retrieved from http://www.ncwildlife.org/Portals/0/Conserving/documents/Mountains/Cove%20Forests%204_4_4.pdf?ver=2017-05-09-170732-313

41 https://gapanalysis.usgs.gov/padus/data/download/

42 https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

126. The Nature Conservancy. Southern and Central Appalachian Cove Forest. Retrieved from https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/Documents/HabitatGuides/96.pdf

127. Elliott, Katherine J., Vose, J.M., & Rankin, D. Herbaceous species composition and richness of mesophytic cove forests in the southern Appalachians: synthesis and knowledge gaps. 2014. Retrieved from https://www.srs.fs.usda.gov/pubs/ja/2014/ja_2014_elliott_001.pdf

128. U.S. Geological Survey. Alliance Detail Report: A0235 (Southern Appalachian Mesophytic Forest). 2014. Retrieved from https://www1.usgs.gov/csas/nvcs/nvcsGetUnitDetails?elementGlobalId=841935

129. Virginia Department of Conservation and Recreation. The Natural Communities of Virginia Classification of Ecological Groups and Community Types, Rich Cove Forests. 2017. Retrieved from http://www.dcr.virginia.gov/natural-heritage/natural-communities/nctb1

130. Virginia Department of Conservation and Recreation. The Natural Communities of Virginia: Ecological Groups and Community Types. 2017. Retrieved from http://www.dcr.virginia.gov/natural-heritage/natural-communities/document/comlist04-17.pdf

131. The Nature Conservancy. South-Central Interior Mesophytic Forest. Retrieved from https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/Documents/HabitatGuides/80.pdf

241. Farmer, Sarah. Life on the Forest Floor: Woodland Herbs of Southern Appalachian Cove Forests. USDA Forest Service Southern Research Station, Compass Live. 2014. Retrieved from https://www.srs.fs.usda.gov/compass/2014/08/14/life-on-the-forest-floor-woodland-herbs-of-southern-appalachian-cove-forests/

242. Clebsch, E.E.C and Busing, R.T. 1989. Secondary Succession, Gap Dynamics, and Community Structure in a Southern Appalachian Cove Forest. Ecology. 70(3): 728-735.

243. Hull, B., Perry, A., Megalos, M., Gagnon, J., Davis, J., Persons, S., Goslee, K., Hamilton, R., and Groot, H. 2006. Appalachian Voices Forestry Handbook. Appalachian Voices. Boone, NC. 132 pp.

Experts Consulted:

- Greg Meade, The Nature Conservancy
- Andrew Goldberg, Rainforest Alliance (formerly Dogwood Alliance)
- Christopher Reeves, IKEA (formerly University of Kentucky Extension)

Native Spruce-Fir Forests

FSC Region: Appalachian

Description: Comprised of native Red Spruce and Frasier Fir, these habitats occur on Appalachian mountaintops, generally above 4,500 feet in elevation in West Virginia, Virginia, Tennessee and North Carolina. They are a rare boreal forest type that are isolated from other boreal forest types and provide necessary habitat to endemic high-elevation species. They differ from similar forests further north due to less frequent fires, being less continuously cold and much wetter (i.e., rain and fog tend to concentrate on the mountain tops), and inclusion southern US associated species. This forest type can be defined using NatureServe's

Ecological Classification Standard[43] for Central and Southern Appalachian Spruce-Fir Forest (CES 202.028). [Sources: 124,133]

Spruce and Fir Forests are considered to be a rare natural community in Virginia, an endangered community in North Carolina, as well as being rare globally [Sources: 130,132,133]. They provide habitat for the federally and state listed norther flying squirrel, as well as other species of concern, including pygmy salamanders, Weller's salamanders and snowshoe hare.

Indication of Risk: Forests dominated by Fraser fir is significantly threatened by air pollution and invasive species (balsam woolly adelgid). Other threats include climate change, catastrophic fire, and development [Sources: 132,133]. Due to the rarity and threatened nature of this forest type, it is a conservation priority and typically occurs in areas that are managed for restoration of the ecological community and/or are protected [Expert: Andrew Goldberg]. In North Carolina, an estimated 91% of the existing extent is in some kind of conservation ownership [Source: 134].

Risk Designation: Low Risk

Sources of Information:

124. Nature Serve Explorer – Ecological Communities & Systems. Retrieved from http://explorer.natureserve.org/servlet/NatureServe?init=Ecol

130. Virginia Department of Conservation and Recreation. The Natural Communities of Virginia: Ecological Groups and Community Types. 2017. Retrieved from http://www.dcr.virginia.gov/natural-heritage/natural-communities/document/comlist04-17.pdf

132. Virginia Department of Conservation and Recreation. The Natural Communities of Virginia Classification of Ecological Groups and Community Types, Spruce and Fir Forests. 2017. Retrieved from http://www.dcr.virginia.gov/natural-heritage/natural-communities/ncta1

133. North Carolina Wildlife Resources Commission. Spruce-Fir Forest, 2015 North Carolina Wildlife Action Plan. Retrieved from http://www.ncwildlife.org/Portals/0/Conserving/documents/Mountains/SBR_Spruce_Fir.pdf?ver=2011-08-15-151616-140

134. U.S. Forest Service. Spruce-Fir Forest Ecological Zone, a DRAFT document prepared as part of the Nantahala and Pisgah National Forest Plan Revision. Retrieved from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5436769.pdf

Expert Consulted: Andrew Goldberg, Rainforest Alliance (formerly Dogwood Alliance)

Late Successional Bottomland Hardwoods

FSC Region: Southeast, Mississippi Alluvial Valley

Description: Bottomland Hardwoods are floodplain forests that are periodically inundated or saturated. Hydrology drives the entire ecosystem and means that even small changes can result in very significant effects on the system. Much of the original bottomland hardwood in the US has been cleared for agriculture, particularly so in the Mississippi valley, and much of the forest has been mismanaged – leaving very few examples of intact late successional forest. [Sources: 135,139,141,143] 'Bottomland Hardwoods' as a category includes a number of different species associations that vary depending primarily upon the extent of flooding (e.g., permanently flooded cypress swamps vs slightly drier, temporarily flooded forests dominated by

[43] NatureServe. 2009. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 06 February 2009. (http://downloads.natureserve.org/get_data/data_sets/veg_data/nsDescriptions.pdf)

oak), but also soil characteristics, detrital decomposition rates, soil and water pH, nutrient availability and turnover rates, flood depth and water velocity, light intensity, and disturbance. Bottomland hardwoods do not have very distinct seral stages defined by significant changes in species composition, but instead maintain most of the same species, with slight shifts in composition. Therefore, a late successional stand is not defined by the species, as much as by the structural composition (e.g., more stratification) and existence of large wood debris, including standing hollow trees – these changes occur at about 80 years in most Bottomland hardwood types and perhaps a little later in cypress swamps. While old Bottomland Hardwood stands are not particularly rare, the late successional stands, with characteristics as previously described, are quite rare, due to a history of selective clear-cutting and high-grading. Those that are a little drier (slightly higher up the banks are rarer than the permanently flooded cypress swamps, due to greater historical access for timber management and conversion to agriculture. However, even the wettest sites are now seeing increased harvest, due to increased demand for materials. [Sources: 244,245; Experts: Mike Aust, David Stahle, Jeff Marcus, Bob Kellison, Mike Schafale]

All bottomland hardwoods are important to biodiversity, but the rarity of occurrences and extremely diverse stand conditions of the late successional forests make them particularly important. Woody species diversity can be comparable to the most diverse upland forests in the US. They tend to have structurally complex vegetation and a deep litter layer. The dense vegetation and the landscape connectivity they provide make them important travel corridors for wildlife. This forest type also supports some of the densest breeding populations of imperiled migratory song birds in the eastern U.S., including Swainson's Warbler, Prothonotary warblers, and Red-eyed vireo. Other species of concern include Ivory-billed woodpecker and Louisiana black bear. [Sources: 135,139,140,143,144]

Bottomland hardwoods in the Coastal Plain and Mississippi Alluvial Valley have some similarities, but also differ in some significant ways. In the Coastal Plain areas, bottomland hardwoods tend to occur in more narrow bands that follow a river or stream, whereas in the Mississippi Alluvial Valley, they extend much greater distances from the river/stream, resulting in much larger areas of the forest type. There are also differences between the two regions in land use histories, forest successional patterns, forest product markets and other attributes. There are some similarities in tree species associated with the systems in these two regions, but also differences. [Source: 135,138] Overall, the forest type includes a wide array of tree species (more than 70 species), with species composition at any particular site driven by the local processes and disturbance regimes (e.g., gradient of flooding: infrequently vs. occasionally vs. permanently). [Source: 135,137,138,141]

This forest type can be defined using NatureServe's Ecological Classification Standard[44] for the following ecological systems (but for the purposes of this assessment is also limited to late successional occurrences):

- Southern Coastal Plain Blackwater River Floodplain Forest (CES 203.493)
- Southern Piedmont Large Floodplain Forest (CES 202.324)
- Southern Piedmont Small Floodplain and Riparian Forest (CES 202.323)
- South-Central Interior Large Floodplain (CES 202.705)
- Southern Atlantic Coastal Plain Large River Floodplain Forest (CES 203.066)
- West Gulf Coastal Plain Large River Floodplain Forest (CES 203.488)
- West Gulf Coastal Plain Small Stream and River Forest (CES 203.487)
- Mississippi River Bottomland Depression (CES 203.490)

[44] NatureServe. 2009. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 06 February 2009. (http://downloads.natureserve.org/get_data/data_sets/veg_data/nsDescriptions.pdf)

- Mississippi River High Floodplain (Bottomland) Forest (CES 203.196)
- Mississippi River Low Floodplain (Bottomland) Forest (CES 203.195)
- Mississippi River Riparian Forest (CES 203.190)

'Late successional' is typically defined as beginning at around 80 years of age [Sources: 141,142; Experts: Mike Aust, David Stahle, Mike Schafale]. For the purposes of this assessment, 'late successional' refers to bottomland hardwoods that are at least 80 years old and have the complex structural characteristics associated with late successional stands, but are not necessarily Old Growth (as defined in the FSC US Forest Management Standard).

Indication of Risk: Significant threats include development, changes to hydrology (droughts, water withdraws, ditching), incompatible forest management (results in changes to canopy age and structure, to hydrology and to available dead and down woody debris), pollution, fragmentation, climate change, invasive species (including spread that is exacerbated by logging activities), and economic drivers that alter forest management goals (i.e., economic drivers that increase harvest rates and demands for materials, resulting in pressure to harvest in places/in ways that aren't appropriate). [Sources: 135,139] Changes to the vegetative cover in these systems can significantly affect hydrologic flow, and therefore change the entire system [Source: 135,137,138,139,141,144; Expert: Mike Schafale].

Forest management occurring within bottomland hardwoods is not necessarily in itself a threat, but how the management is applied, particularly in the context of the local landscape, is the most significant concern [Sources: 135,136,140,144]. The professionals responsible for managing these forests are frequently trained with a focus on upland silviculture, but those same techniques can have ecologically damaging effects when applied in bottomland hardwood system, due to the different disturbance regimes, ecosystem dynamics and regeneration needs. [Source: 135]

As with the overall characteristics of the system, there are also some differences in threats between the Coastal Plain and Mississippi Alluvial Valley. In the Mississippi Valley, the river-driven seasonal flooding allows management activities to occur in relatively dry conditions, and silvicultural treatments can generate positive ecological and economic impacts. In contrast, bottomland hardwood forests in the Coastal Plain may not have the same opportunities for dependable, seasonable dry periods and are more often treated under challenging (wet) conditions than those in the Mississippi Alluvial Valley; therefore, clearcut silviculture (resulting in significant change to the vegetative cover) is more commonly implemented to meet economic and ecological goals. In the Coastal Plains, the systems are still not fully understood and it is not always known which silvicultural techniques are most appropriate in which situations, nor how decisions about forest management activities interact with other natural and human-derived threats. Whereas in the Mississippi Alluvial Valley, the demand for forest products can promote silviculture that does not achieve forest conditions desired for biodiversity and ecological function (i.e., size, structure and composition of forest vegetation, availability of dead and down woody debris). There is some evidence (and research is ongoing) that the size and location of openings, which species are retained, harvest method (equipment and techniques), past disturbance of hydrology and availability of red maple/sweet gum seed in the surrounding landscape all can have an impact on successful development of stands with the desired species composition and habitat elements. Silviculture decisions should emphasize the geomorphic setting and hydrologic conditions of the site, while restoring or maintaining the species and structural diversity. [Sources: 144, Experts: Amanda Mahaffey, Mike Aust, Jeff Marcus, Mike Schafale]

The above discussion of threats is generalized to all Bottomland Hardwoods; however, the same threats apply to the subset of these forests which has been identified as HCV 3 – Late Successional Bottomland Hardwoods.

Risk Designation: Specified Risk for the extent of the Bottomlands Hardwood distribution that occurs within the portions of the Southeast and Mississippi Alluvial Valley regions that are also within the USFS Outer Coastal Plain Mixed Forest and Lower Mississippi Riverine Forest Ecological Subregions (USFS Ecological Subregions of the USA[45]) and that are not effectively protected (as demonstrated by GAP Status 1 & 2 areas in the PAD-US[46] dataset and USFS Inventoried Roadless Areas[47]).

Sources of Information:

135. Forest Stewards Guild. Ecological Forestry Practices for Bottomland Hardwood Forests of the Southeastern U.S. 2016. Retrieved from http://www.forestguild.org/publications/research/2016/FSG_Bottomland_Hardwoods.pdf

136. Mississippi State University Extension. Bottomland Hardwood Management Species/Site Relationships. 2016. Retrieved from http://extension.msstate.edu/publications/publications/bottomland-hardwood-management-speciessite-relationships

137. Breithaupt, David. Louisiana Department of Wildlife & Fisheries, Wildlife Division – Private Lands Program. Forest management in bottomland hardwoods. Retrieved from http://www.wlf.louisiana.gov/sites/default/files/pdf/publication/34723-forest-management-bh-low-res/forest_management_in_bh_low-res.pdf

138. U.S. Forest Serive, Southern Region. Southern Hardwood Management. Management Builletin, R8-MB 67. 1994. Retrieved from http://web.extension.illinois.edu/forestry/publications/pdf/forest_management/USFS_Southern_Hardwood_Mgmt.pdf

139. North Carolina Wildlife Resources Commission. North Carolina Wildlife Action Plan. 2015. Retrieved from http://www.ncwildlife.org/Portals/0/Conserving/documents/2015WildlifeActionPlan/NC-WAP_2015_ePDF_052016_chapters1-8.pdf

140. Brunswig, N., Richardson, S., Johnson, M. and Keitkamp, B. 2016. Bird-Friendly Recommendations for Bottomland Forests in the Carolinas: Birds and People on Common Ground. In Schweitzer, Callie J.; Clatterbuck, Wayne K.; Oswalt, Christopher M., eds. 2016. Proceedings of the 18th biennial southern silvicultural research conference. e–Gen. Tech. Rep. SRS–212. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 614 p. Retrieved from https://www.srs.fs.usda.gov/pubs/gtr/gtr_srs212/gtr_srs212_019.pdf

141. U.S. Forest Service Northern Research Station. Bottomland Hardwoods, Web-Based Forest Management Guide. Retrieved from https://www.nrs.fs.fed.us/fmg/nfmg/bl_hardwood/mgt/unevenex.html

142. U.S. Department of Defense. Development of restoration trajectory metrics in reforested bottomland hardwood forests applying a rapid assessment approach. 2013. Retrieved from https://digitalcommons.unl.edu/usarmyresearch/182

143. Ober, Holly K. The Importance of Bottomland Hardwood for Wildlife. University of Florida IFAS Extension. Retrieved from http://edis.ifas.ufl.edu/pdffiles/UW/UW31600.pdf

[45] https://databasin.org/datasets/662c543156c14313b87d9b99b7a78221

[46] https://gapanalysis.usgs.gov/padus/data/download/

[47] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

144. Lower Mississippi Valley Joint Venture: Forest Resource Conservation Working Group. Restoration, Management and Monitoring of Forest Resources in the Mississippi Alluvial Valley: Recommendations for Enhancing Wildlife Habitat. 2007. Retrieved from https://www.murraystate.edu/colorbox/biology/faculty/gagnon/Bottomland%20Forest%20Report%20LMVJV.Reduced.pdf

244. Hodges, J.D. 1997. Development and ecology of bottomland hardwood sites. Forest Ecology and Management. 90: 117-125.

245. Wharton, C.H., Kitchens, W.M., Pendleton, E.C., and Sipe, T.W. 1982. The Ecology of Bottomland Hardwood Swamps of the Southeast: A community profile. U.S. Fish and Wildlife Service, Biological Services Program, Washington, D.C. FWS/OBS-81/37. 133 pp.

Experts Consulted:

- Amanda Mahaffey, Forest Stewards Guild
- Mike Aust, Virginia Tech, Forest Resources & Environmental Conservation
- David Stahle, University of Arkansas
- Jeff Marcus, The Nature Conservancy
- Bob Kellison, Professor Emeritus, North Carolina State University
- Michael Schafale, North Carolina Natural Heritage Program

Native Longleaf Pine Systems

FSC Region: Southeast

Description: Once one of the most widespread forest types in the US, longleaf pine savannah has been reduced to less than 5% of its original range. In terms of proportion of original extent that remains, this makes this system one of the rarest in the world. While there has been recent success in increasing the extent of longleaf pine, it is still only a tiny fraction of its historical extent and thus continues to be considered rare. They are associated with particularly high animal and plant diversity, including nearly 900 endemic plant species and rare wildlife such as the Red-cockaded Woodpecker, Bachman's Sparrow, Henslow's Sparrow, Eastern Harvest Mouse, Gopher Tortoise, Wolf spider, Eastern Indigo Snake, and Flatwoods Salamander. Twenty-nine federally listed species are associated with longleaf pine systems and their historic decline. [Sources: 40,146,150,246]

Characteristics of these fire-dependent systems include longleaf pine as the dominant tree, a conspicuous lack of mid-story trees and shrubs, and a well-developed, diverse ground layer (dominated by bunch grasses and other flowering plants). Longleaf Pine systems can be sub-categorized into four basic groups: Montane, Sandhill, Rolling Hill, and Flatwoods & Savanna [Sources: 40,147]. At a landscape scale, naturally occurring longleaf systems typically exist as an uneven-aged mosaic of even-aged patches, which vary in size, shape, structure, composition and density depending upon the local conditions. This variability helps to drive the high biodiversity associated with them, with most of that biodiversity in the ground layer. Fire is the most important driver in the system, maintaining both the structural characteristics and the species diversity, particularly in the ground layer. [Sources: 40,145,147,148,150].

Longleaf pine is responsible in part for the high biodiversity associated with the Southern Appalachian, Florida Panhandle, Central Florida, and Cape Fear Arch Critical Biodiversity Areas.

"Native" in this instance refers to existing longleaf pine that is on a site that has historically been maintained as longleaf pine. Longleaf pine stands that have been restored in areas that have not been historically maintained in longleaf pine do not apply under this definition. "Native" does

not imply a particular regeneration method; these stands may be either planted or naturally regenerated.

This forest type can be defined using NatureServe's Ecological Classification Standard[48] for the following ecological systems:

- Southeastern Interior Longleaf Pine Woodland (CES 202.319)
- East Gulf Coastal Plain Interior Upland Longleaf Pine Woodland (CES 203.496)
- East Gulf Coastal Plain Near-Coast Pine Flatwood (CES 203.375)
- Central Florida Pine Flatwood (CES 203.832)
- Southern Atlantic Coastal Plain Wet Pine Savanna & Flatwood (CES 203.536)
- Florida Longleaf Pine Sandhill (CES 203.284)
- West Gulf Coastal Plain Wet Longleaf Pine Savanna & Flatwood (CES 203.191)

Indication of Risk: Threats include altered stand structure (due to lack of fire), conversion to other forest types, conversion to other land uses (development and agriculture), habitat disturbance, fragmentation, and modification of hydrological features threaten native longleaf pine systems. As a fiber-producing forest type, long-leaf cannot complete with loblolly or slash pine for short-term returns on investment. As a result, native longleaf is still being converted to other forest types [Sources: 145,147,148,149,150, Experts: Troy Ettel, Carl Nordman], and while these other forest types may provide an acceptable habitat for some species, their establishment is threatening the existing longleaf pine areas. The hydrology of a site is important for both establishment of longleaf pine systems, but also for the natural function of the wetlands (ephemeral and permanent) that typically occur within them. The hydrology of a site can be affected by both past and current silvicultural practices. [Sources: 247,248]

Biodiversity values can be adversely affected by forest management activities via conversion of longleaf to other pine types, and the use of management techniques, including herbicide application that have the potential to inhibit native understory communities. [Expert: Troy Ettel] As the bulk of the biodiversity exists in the understory of a longleaf pine system, restoration or maintenance of species composition is an essential component of longleaf pine conservation. While herbicides can be an essential tool in restoration of longleaf pine, there is mixed evidence regarding the impact of herbicides on understory vegetation – different chemicals and application methods may have differing affects. [Sources: 225,226]

Threats are different in different places, with lack of fire being the overall greatest concern, followed by conversion to other land uses (development) and incompatible forest management practices (conversion to other forest types). However, the interactions between these three threats compound the problems - it is much more difficult to implement fire as a management tool when near urban areas, and fire is suppressed in the typical management of loblolly or slash pine, so that even the ground layer plant diversity is lost. [Expert: Troy Ettel] It is possible to harvest in and sustainably manage longleaf pine systems [Source: 227, Expert: Troy Ettel] and therefore timber management by itself is not considered a threat.

Risk Designation: Specified Risk for counties that are identified in Figure 1 of the Range-wide Longleaf Conservation Plan as having 10,000 or more acres of Longleaf Pine [Source: 146, p.32] and that are not effectively protected (as demonstrated by GAP Status 1 & 2 areas in the PAD-US[49] dataset and USFS Inventoried Roadless Areas[50]).

[48] NatureServe. 2009. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 06 February 2009. (http://downloads.natureserve.org/get_data/data_sets/veg_data/nsDescriptions.pdf)

[49] https://gapanalysis.usgs.gov/padus/data/download/

[50] https://www.fs.usda.gov/detail/roadless/2001roadlessrule/maps/?cid=stelprdb5382437

Sources of Information:

40. The Longleaf Alliance. Retrieved from http://www.longleafalliance.org

145. Brockway, Dale G., Outcalt, K.W., Tomczak, D.J., & Johnson, E.E. Restoration of Longleaf Pine Ecosystems, General Technical Report SRS-83. 2006. Retrieved from http://www.longleafalliance.org/what-we-do/education/publications/documents/general-longleaf-restoration/lla52.pdf

146. Regional Working Group for America's Longleaf. Range-wide Longleaf Conservation Plan. 2009. Retrieved from http://www.americaslongleaf.org/media/86/conservation_plan.pdf

147. Oswalt, Christopher M., et.al. History and Current Condition of Longleaf Pine in the Southern United States, General Technical Report SRS-166. 2012. Retrieved from https://www.srs.fs.fed.us/pubs/gtr/gtr_srs166.pdf

148. Louisiana Department of Wildlife and Fisheries.Eastern Longleaf Pine Savannah. Retrieved from http://www.wlf.louisiana.gov/sites/default/files/pdf/document/32872-eastern-longleaf-pine-savannah/eastern_longleaf_pine_savannah.pdf

149. Johnson, Rhett & Gjerstad, Dean. Landscape-Scale Restoration of the Longleaf Pine Ecosystem. 1998. Retrieved from http://www.longleafalliance.org/what-we-do/education/publications/documents/general-longleaf-restoration/lla132.pdf

150. The Nature Conservancy. Longleaf Pine: Restoring a National Treasure. Retrieved from https://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/longleaf-pine-forests-landing-page.xml

227. Rachel E. Greene, Raymond B. Iglay, Kristine O. Evans, Darren A. Miller, T. Bently Wigley, Sam K. Riffell. 2016. A meta-analysis of biodiversity responses to management of southeastern pine forests—opportunities for open pine conservation. Forest Ecology and Management 360: 30–39

246. National Resources Conservation Service. Longleaf Pine Initiative. Retrieved from https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/programs/initiatives/?cid=nrcsdev11_023913)

247. Williams, Lisa D., and Changwoo Ahn. 2015. Plant community development as affected by initial planting richness in created mesocosm wetlands. Ecological Engineering 75 : 33-40.

248. David H. Van Lear, W.D. Carroll, P.R. Kapeluck, Rhett Johnson. 2005. History and restoration of the longleaf pine-grassland ecosystem: Implications for species at risk. Forest Ecology and Management 211: 150–165.

225. Longleaf Alliance. Proceedings of the Fourth Longleaf Alliance Regional Conference. Longleaf Alliance Report No. 6. 2003. Retrieved from http://www.auburn.edu/academic/forestry_wildlife/lpsdl/pdfs/4th_Combined.pd

226. The Longleaf Alliance. Herbicides. Retrieved from https://www.longleafalliance.org/what-we-do/restoration-management/herbicides

Experts Consulted:

- Troy Ettel, The Nature Conservancy
- Carl Nordman, NatureServe

HCV 4 – Critical Ecosystem Services

HCV 4 Definitions:

FSC-PRO-60-002a (NRA Framework): "Critical ecosystem services. Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes."

FSC-US Forest Management Standard: "HCV forest areas that provide basic services of nature in critical situations (e.g., watershed protection, erosion control)." Examples include situations where all or part of the forest is critical for providing a source of community drinking water, for protecting community drinking water supplies, for mediating flooding or controlling stream flow regulation and water quality, or for controlling erosion, landslides or avalanches that would threaten local communities.

Common Guidance for the Identification of HCV[51] - HCV 4:

An ecosystem service is critical where a disruption of that service poses a threat of severe, catastrophic or cumulative negative impacts on the welfare, health or survival of local communities, on the functioning of important infrastructure (roads, dams, reservoirs, hydroelectric schemes, irrigation systems, buildings, etc.), or on other HCVs.

The concept of critical situations relates to:

- Cases where loss of or major damage to an ecosystem service would cause serious prejudice or suffering to recipients of the service either immediately or periodically (e.g. regulation of water provision during critical drought periods), or
- Cases where there are no viable, readily available or affordable alternatives (e.g. pumps and wells) that can be relied on if the service fails.

Given the above definitions and guidance, the following assessment of HCV 4 focuses on forests that protect drinking water and water quality as ecosystems services for local communities.

For the purposes of this risk assessment, the following thought process is applied:

5. *Are HCV 4 present? – If no, the area is designated 'Low Risk.' If yes, go to #2.*
6. *Is the HCV 4 threatened by forest management activities? – If no, the area is designated 'Low Risk.' If yes, the area is designated 'Specified Risk.'*

Risk Assessment for HCV 4:

Data Used for HCV Identification:

The only dataset that the NRA WG found for the HCV4 assessment was the USFS Forests to Faucets Dataset[52] (Surface Drink Water Importance Index, Index of Forest Importance to Surface Drinking Water). This dataset highlights areas important to drinking water based on the number of people that depend for drinking water on a given watershed (i.e. HUC 12), weighted for distance upstream from the water intake. The NRA WG concluded that this datalayer shows the importance of watersheds in the US to drinking water provision, and therefore the existence

[51] Brown, E., N. Dudley, A. Lindhe, D.R. Muhtaman, C. Stewart, and T. Synnott (eds.). 2013 (October). Common guidance for the identification of High Conservation Values. HCV Resource Network. P.25 (https://ic.fsc.org/en/what-is-fsc-certification/consultations/archive/hcv-common-guidance)

[52] https://www.fs.fed.us/ecosystemservices/FS_Efforts/forests2faucets.shtml

of HCV 4 associated with drinking water throughout much of the assessment area, particularly in the Eastern US and along the Pacific Coast.

While HCV 4 includes much more than just drinking water (as indicated in the definitions and guidance above), there are not datasets available for consistent identification of all HCV 4 throughout the assessment area. Therefore, the following risk assessment will consider the entire assessment area to have potential for occurrence of HCV 4.

Description: The importance of well managed forests for HCV 4 (i.e., drinking water, watershed protection, erosion control, landslides, etc.) has been well documented. For example, studies have indicated that the cost of water purification for populated areas is lower when the forests within the source watershed are well managed [Source: 156]. Conversely, when forest management is not implemented well in HCV 4 areas, the effects can typically be seen through increased sediment and/or other pollutants in the water, affecting overall water quality along with impacts to the other critical ecosystem services that these forested areas provide. Therefore, the following assessment of whether HCV 4 are threatened by forest management activities and/or whether they are effectively protected, focuses on forestry best management practices (BMPs) developed for compliance with federal regulations governing Non-Point Source pollution of US waters as a proxy for forest management practices that effectively protect HCV 4.

Indication of Risk: The Clean Water Act (CWA), which is enforced by the US Environmental Protection Agency (EPA) establishes the basic structure for regulating discharges of pollutants (including sediment) into the waters of the United States and regulating quality standards for surface waters. Overall, EPA monitoring indicates that contaminants are very rarely associated with forest management activities - of all of the different sources of pollution and contaminants listed by the EPA, forest management is at the very bottom of the list. However, it can still be a contributor. [Sources: 152,153,155,156].

Every state in the US has developed a set of forestry BMPs – some as early as the 1970s. BMPs are recognized by the CWA as being the best way to address nonpoint source pollution from land management activities, even though they do vary somewhat from state-to-state. However, in terms of HCV 4, states typically include BMPs that address wetlands (which would most likely include HCV 4 for flooding), steep slopes (which would most likely include HCV 4 for landslides and erosion control), and buffer zones adjacent to streams (which would most likely include HCV 4 for erosion control). [Sources: 154,158] Therefore, if BMPs effectively protect these kinds of areas from degradation (and resulting water quality effects), it would be possible to conclude that they would also effectively protect HCV 4.

All states with substantial levels of timber harvest have invested in nonpoint source pollution programs that are based on BMPs. Peer reviewed research has found that when forestry BMPs are implemented, they protect water quality [Source: 158,249]. Indicator 4.19 of the National Report on Sustainable Forests indicates that the area and percent of forest land with significant soil degradation is low, suggesting that implemented BMPs are effective [Source: 157]. Other research, though somewhat limited, supports this conclusion [Source: 250,252,253], with recognition that the level of effectiveness may vary some with the varying specifications of BMPs [Source: 251].

Those states that have invested in BMP monitoring programs generally report high levels of compliance and/or few significant risks to water quality [Source: 154]. Following a survey that requested results of state monitoring of BMPs, the National Association of State Foresters estimated that implementation rates average 91% nationwide [Source: 156,158]. Additionally, evidence indicates that those implementation rates are increasing over time [Source: 158,249]. Effectiveness of BMPs is also likely increasing with time, as they receive periodic review and revision [Source: 249].

Management practices that threaten HCV 4 (as defined by the FSC US HCV Framework) would result in increased sediment and/or other pollutants in affected waters. Conversely, forest management practices that do not threaten water quality will also effectively maintain the provision of other ecosystem services by those same forests. Evidence of the effectiveness of forestry BMPs, combined with the reported levels of compliance, indicates that there is a high likelihood that HCV 4 are not being threatened by forest management practices throughout the assessment area due to the implementation of forestry BMPs associated with State nonpoint source pollution programs for compliance with the federal Clean Water Act.

Risk Designation: Low Risk for the entire assessment area

Sources of Information:

152. U.S. Environmental Protection Agency. Summary of the Clean Water Act – 33 U.S.C. §1251 et seq. (1972).
Retrieved from https://www.epa.gov/laws-regulations/summary-clean-water-act

153. Centers for Disease Control and Prevention. Drinking Water FAQ. 2012. Retrieved from https://www.cdc.gov/healthywater/drinking/public/drinking-water-faq.html

154. Schilling, E.B. Technical Bulletin No. 0966: Compendium of Forestry Best Management Practices for Controlling Nonpoint Source Pollution in North America. 2009. National Council for Air and Stream Improvement. Retrieved from http://www.ncasi.org/Programs/Reports-and-Articles/Technical-Bulletins-and-Special-Reports/Technical-Bulletins/Index.aspx

155. Luntz, Taryn. U.S. Drinking Water Widely Contaminated. Scientific American. 2009. Retrieved from https://www.scientificamerican.com/article/tap-drinking-water-contaminants-pollutants/

156. National Association of State Foresters. Protecting Water Quality through State Forestry Best Management Practices. Retrieved from http://stateforesters.org/sites/default/files/issues-and-policies-document-attachments/Protecting_Water_Quality_through_State_Forestry_BMPs_FINAL.pdf

157. US Forest Service. National Report on Sustainable Forests – 2010. Retrieved from https://www.fs.fed.us/research/sustain/national-report.php

158. Cristan, R., Aust, W.M., Colding, M.C., Barrett, S.M., Munsell, J.F., and Schilling, E. 2016. Effectiveness of forestry best management practices in the United States: Literature review. Forest Ecology and Management 360: 133-151.

249. Ice, G. History of innovative best management practice development and its role in addressing water quality limited waterbodies. J. Environ. Eng. 2004, 130, 684–689.

250. Barrett, Scott M.; Aust, W. Michael; Bolding, M. Chad; Lakel, William A.; Munsell, John F. 2016. Estimated Erosion, Ground Cover, and Best Management Practices Audit Details for Postharvest Evaluations of Biomass and Conventional Clearcut Harvests. Journal of Forestry. 114(1): 9-16.

251. Witt, Emma L.; Barton, Christopher D.; Stringer, Jeffrey W.; Kolka, Randall K.; Cherry, Mac A. 2016. Influence of Variable Streamside Management Zone Configurations on Water Quality after Forest Harvest. Journal of Forestry. 114(1): 41-51

252. Jeffery L. Vowell and Russel B. Frydenborg. 2004. A biological assessment of best management practice effectiveness during intensive silviculture and forest chemical application. Water, Air and Soil Pollution: Focus. 4(1): 297-307.

253. Vowell, J. 2001. Using stream bioassessment to monitor best management practice effectiveness. Forest Ecology and Management 143(1-3): 237-244

HCV 5 – Community Needs

HCV 5 Definitions:

FSC-PRO-60-002a (NRA Framework): "Community needs. Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (e.g., for livelihoods, health, nutrition, water, etc.), identified through engagement with these communities or indigenous peoples."

FSC-US Forest Management Standard: "HCV forest areas fundamental to meeting basic needs of local communities (e.g., subsistence, health)." HCV 5 includes forest areas that local people use to obtain resources on which they are critically dependent. This may be the case if local people harvest food products from the forest, or collect building materials or medicinal plants where no viable alternative exists. Forest uses such as recreational hunting or commercial timber harvesting (i.e., that is not critical for local building materials) are not basic human needs.

Common Guidance for the Identification of HCV[53] - HCV 5:

Fundamental for satisfying basic necessities. A site or resource is fundamental for satisfying basic necessities if the services it provides are irreplaceable (i.e. if alternatives are not readily accessible or affordable), and if its loss or damage would cause serious suffering or prejudice to affected stakeholders. Basic necessities in the context of HCV 5 may cover any or all of the provisioning services of the environment… including tangible materials that can be consumed, exchanged or used directly in manufacture, and which form the basis of daily life….

HCV 5 is most likely to be more important in areas where whole communities or significant portions of them are heavily dependent on those ecosystems for their livelihoods, and where there is limited availability of alternatives. In general, if local people derive benefits from natural or traditionally managed ecosystems, HCV 5 may be present.

The following indicate a high likelihood of HCV 5 in the area:

- Most houses are built from, and household tools made from, locally available traditional/ natural materials,
- There is little or no water and electricity infrastructure
- Farming and livestock raising are done on a small or subsistence scale
- Indigenous hunter-gatherers are present
- There is presence of permanent or nomadic pastoralists
- Hunting and/or fishing is an important source of protein and income
- A wild food resource constitutes a significant part of the diet, either throughout the year or only during critical seasons

Given the above definitions and guidance, the following assessment of HCV 5 focuses on forests that provide tangible materials for the physical needs of the people that depend upon them and have no alternative, with an emphasis on areas where the dependence is associated with whole communities or significant portions of communities of indigenous or non-indigenous peoples.

[53] Brown, E., N. Dudley, A. Lindhe, D.R. Muhtaman, C. Stewart, and T. Synnott (eds.). 2013 (October). Common guidance for the identification of High Conservation Values. HCV Resource Network. P.25 (https://ic.fsc.org/en/what-is-fsc-certification/consultations/archive/hcv-common-guidance)

For the purposes of this risk assessment, the following thought process is applied:

7. *Are HCV 5 present? – If no, the area is designated 'Low Risk.' If yes, go to #2.*
8. *Is the HCV 4 threatened by forest management activities? – If no, the area is designated 'Low Risk.' If yes, the area is designated 'Specified Risk.'*

Risk Assessment for HCV 5:

Data Used for HCV Identification:
No evidence of HCV 5 related to non-tribal communities in the conterminous United States was found through a literature search on this topic. There is some evidence that they may occur in Alaska and Hawaii [Sources: 160, 5], but these states are not included in the assessment area for the NRA. FSC US also surveyed US certification bodies with forest management clients to inquire if they have received any comments from communities or stakeholders that depend on forests for their livelihood during forest management public consultations – the response was negative from all surveyed certification bodies [Source: 159]. There is no reason to believe that HCV 5 would be more or less likely to occur on certified vs noncertified lands (the focus of the NRA), therefore, our survey of certification bodies provides a sampling of lands throughout the assessment area.

FSC US staff consulted with two FSC-certified tribes, two forest managers with extensive experience working with Tribes, and a representative of an affiliation of tribes.

Description: Limited subsistence activities by individuals from non-tribal communities are believed to occur in the conterminous United States, but the question is really whether these activities meet the above definitions for HCV 5. The US Forest Service has broadened its consideration of subsistence to include and emphasize both social and cultural subsistence [Sources: 160, 5] and other assessments of 'subsistence' use of Non-Timber Forest Products focus on how these products are sold and/or traded and become part of a market system on which people depend [Source: 5, 162]. Neither of these is consistent with the HCV 5 definition above. It is important to note that HCV 5 does not include forest uses such as recreational hunting or commercial timber harvesting. In rural areas in heavily forested environments, there is evidence of subsistence need at the scale of the individual, but not whole communities, or significant portions of communities [Source: 5].

Federal treaties exist for lands within the assessment area that protect the rights of American Indians to hunt, fish, trap and gather on reservations and on treaty-specified lands off reservations. [Source: 160] While in many instances these activities do not constitute situations where all or a significant portion of the tribe is dependent upon the forest resources for basic subsistence related to food and firewood, in some instances they are essential for these purposes due to the poverty level within some tribes and lack of retirement income. Additionally, tribes that live within forested environments frequently gather materials from the forest that are essential for cultural or traditional activities or for medicinal use. Without these materials, the tribes would not be able to perform the activities and as a result, the culture and community well-being would suffer. It is important to note that these hunting and gathering rights are protected and conducted on either tribally owned land or on lands with specific and enforced treaty rights (i.e. National Forest). [Experts: Marshall Pecore, Marc Gauthier, Jeff Lindsey, Paul Koll, Karen Brenner]

As there are Native American communities throughout the forested portions of the United States that may be dependent upon places within the forest for basic necessities as described above, the following risk assessment considers the entire assessment area.

Indication of Risk: The United States is an industrialized nation that likely does not contain non-tribal communities within the conterminous states that directly rely on sites or resources fundamental to satisfying basic needs. Though subsistence activities by individuals from non-tribal communities likely do occur in the conterminous United States, evidence suggests that they do not meet the definition of HCV 5 and therefore it can be concluded that HCV 5 related to non-tribal communities are unlikely to occur in the assessment area.

In its consultations with experts, FSC US staff heard concern expressed by the representative of the affiliation of tribes regarding localized forest management activities on ancestral lands to which the tribe in question does not have legal rights. However, the certified tribe that responded regarding the risk designation and the forest managers supported a low risk designation, recognizing that there may be isolated and infrequent events, but that there is not a widespread threat to forests on which the tribes are dependent for materials used in cultural and traditional activities (which represent basic needs for tribal communities). [Experts: Marc Gauthier, Jeff Lindsey, Paul Koll, Karen Brenner]

Risk Designation: Low Risk for the entire assessment area

Sources of Information:

159. Certification Bodies Consulted: Kara Wires, Rainforest Alliance; Jim Colla, Bureau Veritas; Brendan Grady, SCS Global Services

160. Emery, Marla R. Interrupting the telos: locating subsistence in contemporary US forests. U.S. Forest Service. 2005. Retrieved from https://www.fs.fed.us/ne/newtown_square/publications/other_publishers/OCR/ne_2005_emery001.pdf

5. U.S. Department of Agriculture. National Report on Sustainable Forests—2010. 2011. Retrieved from https://www.fs.fed.us/research/sustain/national-report.php

162. Alexander, Susan J. and Emery, M. Non-Timber Forest Products in the United States: Harvest and Issues. A paper submitted to the XII World Forestry Congress. Retrieved from http://www.fao.org/docrep/ARTICLE/WFC/XII/0337-A1.HTM

Experts Consulted:

- Marshall Pecore, Menominee Tribal Enterprises
- Marc Gauthier, Upper Columbia United Tribes
- Jeff Lindsey, Hoopa Valley Tribal Council
- Paul Koll, Forest Manager
- Karen Brenner, Consulting Forester

HCV 6 – Cultural Values

HCV 6 Definitions:

FSC-PRO-60-002a (NRA Framework): "Cultural values. Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples."

FSC-US Forest Management Standard: "HCV forest areas critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities)." HCV 6 includes areas of cultural

significance that have traditional importance to local or indigenous people. These may be religious/sacred sites, burial grounds or sites at which regular traditional ceremonies take place. They may also include outstanding natural landscapes that have evolved as a result of social, economic, administrative, and/or religious imperative (i.e., fossils, artifacts, areas representing a traditional way of life), or areas that by virtue of their natural properties possess significant religious, artistic or cultural association.

Common Guidance for the Identification of HCV[54] - HCV 6:

The definition of HCV 6 is extremely broad and it is useful to divide it into two different categories: cultural values of global or national significance, and values critical for local people at the site scale.

Values of global or national significance: Sites, resources, habitats or landscapes which are significant at the global or national level are likely to have widely recognized historical, religious or spiritual importance and, in many cases, will have an official designation by national government or an international agency like UNESCO. Occasionally, new sites or resources of extraordinary cultural significance may be discovered through exploration of sites for development (e.g. ancient burial sites or prehistoric cave art); these can qualify as HCV 6 based on expert and stakeholder opinion, without an official designation.

Critical importance for the traditional cultures of local communities or indigenous peoples: HCV 6 represents areas of cultural significance that have traditional importance to local or indigenous people. These may be religious or sacred sites, burial grounds or sites at which traditional ceremonies take place. These are frequently well known by the local people, and some national laws require them to be identified and protected.

Given the above definitions and guidance, the following assessment of HCV 6 focuses on forests with cultural values that have global or national significance and indigenous peoples' sacred sites.

For the purposes of this risk assessment, the following thought process is applied:

9. *Are HCV 6 present? – If no, the area is designated 'Low Risk.' If yes, go to #2.*
10. *Is the HCV 6 threatened by forest management activities? – If no, the area is designated 'Low Risk.' If yes, the area is designated 'Specified Risk.'*

Risk Assessment for HCV 6:

Data Used for HCV Identification:

HCV 6 associated with cultural values of global or national significance in the US are generally identified through formal protection in National Monuments, National Natural Landscapes, National Parks, or in state or local designations and occur throughout the United States. There are national level and state level registries of sites and they occur throughout the assessment area.

Locations of sites sacred to Native American tribes are not generally publicly available due to tribal requests for confidentiality. However, as there were Native American communities throughout the United States prior to European colonization, these sites most likely occur throughout the assessment area. A large number of sites occur on federally-administered lands

[54] Brown, E., N. Dudley, A. Lindhe, D.R. Muhtaman, C. Stewart, and T. Synnott (eds.). 2013 (October). Common guidance for the identification of High Conservation Values. HCV Resource Network. P.25 (https://ic.fsc.org/en/what-is-fsc-certification/consultations/archive/hcv-common-guidance)

[Source: 173], however some do occur on other public lands, such as state-administered lands, and private lands. Therefore, the following risk assessment considers the entire assessment area.

FSC US staff also consulted with an FSC-certified tribe, two forest managers with extensive experience working with Tribes, and a representative of an affiliation of tribes.

Description: There are numerous UNESCO World Heritage sites in the United States [Source: 163], and additional sites and landscapes of national significance that occur primarily within designated National Monuments, National Parks, National Natural Landmarks, or special designations within other Federally- or State-managed managed lands. The significance of these places to the cultural identity of the United States goes without saying. A suite of laws provide protection for them [Source: 168]:

- Antiquities Act of 1906
- National Historic Preservation Act of 1966
- National Environmental Policy Act of 1969
- American Indian Religious Freedom Act of 1978
- Archaeological Resources Protection Act of 1979
- Native American Graves Protection and Repatriation Act of 1990
- Executive Order 13007 of 1996
- Executive Order 13084 of 1998
- State Preservation Laws

Native American tribes lost control over many of their sacred sites during European colonization and the movement of tribes to reservations in geographic locations different from those where they had traditionally lived [Source: 170]. Many of these sacred sites occur on Federally-administered lands. There has been a history of conflict with the Federal Government over protection of these sites. [Source: 165,171,172]

In more recent years, there have been positive changes in this relationship. In 2005, there was an active Sacred Lands Task force appointed by the Forest Service to develop recommendations to strengthen Forest Service procedures pertaining to sacred sites on National Forest lands [Source: 165]. In 2010, US Secretary of Agriculture directed the Office of Tribal Relations and Forest Service to engage in dialogue with Native American tribal leaders to identify ways to better protect sacred sites [Source: 166]. In 2012, a large number of federal agencies entered into a Memorandum of Understanding (MOU) regarding interagency coordination and collaboration for the protection of Indian sacred sites [Source 164]. An action plan for implementation of the MOU was released in 2013 and a progress report detailing accomplishments was released in 2014 [Source: 173]. Also in 2014, the National Congress of American Indians passed a resolution recognizing that MOU and also recognizing that there is still more work to do to implement it [Source: 164]. And in 2016, the US Department of Agriculture committed to enhanced interagency coordination and collaboration and extended the previously signed MOU [Source: 167]. In parallel, new collaborative partnerships are being formed and have been successful in placing sacred lands under protection through land conservancies [Source: 169].

All states have state preservation offices and associated laws, many of which are modeled on the National Historic Preservation Act and the National Environmental Policy Act which require state officials to conduct government to government consultations with Native Americans regarding the effects of governmental undertakings and the impact they may have on cultural resources. Many also have additional specific protections for Native American resources and other applicable laws such as burial protection laws and cemetery protection laws. These

provide an additional layer of protections, particularly for sites not on federal lands [Sources: 168,186]

Native American burial sites and sacred objects are given protection on all lands, public or private by the Native American Graves Act of 1990. [Source: 187]

FSC US staff surveyed US certification bodies with forest management clients to inquire if they have received any comments from communities or stakeholders (other than Indigenous Peoples) that depend on forests for cultural values during forest management public consultations – the response was negative from all surveyed certification bodies [Source: 159]. There is no reason to believe that HCV 6 would be more or less likely to occur on certified vs noncertified lands (the focus of the NRA), therefore, our survey of certification bodies provides a sampling of lands throughout the assessment area.

Indication of Risk: In the United States, globally and nationally significant cultural sites that occur in forested areas are permanently protected as National Monuments, National Natural Landmarks or Parks, thus effectively protecting these cultural values. Many of the Native American tribes' sacred sites occur on federally-managed lands and recent changes in federal policy and action are improving protection of federal lands [Source: 164, 165, 166, 167, 169, 170, 173]. Additional legislative protections also exist at a state scale [Sources: 7,13]. Our survey of certification bodies did not identify any evidence of threats from forest management activities to cultural values critical for local communities in a sampling of state-administered and private lands [Source 159].

FSC US staff conducted an extensive search of articles and information (including hundreds of news articles, press releases, law reviews, and congressional hearings) related to tribal disputes within the last 15 years over sacred sites and sacred places [e.g., Sources 188, 189, 190, 191, 192]. Only three disputes related to forest management activities were identified and in all cases, the courts ruled in favor of the tribes and protection of the sacred sites [Sources: 193, 194, 195]. The remainder dealt with issues primarily related to oil, gas and mineral extraction, development, and recreation.

In its consultations with experts, FSC US staff heard concern expressed by the representative of the affiliation of tribes regarding localized forest management activities on ancestral lands to which the tribe in question does not have legal rights. However, the certified tribe and the forest managers supported a low risk designation, recognizing that there may be isolated and infrequent events, but that there is not a widespread threat to tribal cultural and sacred sites. [Experts: Marc Gauthier, Jeff Lindsey, Paul Koll, Karen Brenner]

Risk Designation: Low Risk for the entire assessment area

Sources of Information:

159. Certification Bodies Consulted: Kara Wires, Rainforest Alliance; Jim Colla, Bureau Veritas; Brendan Grady, SCS Global Services

163. United Nations Educational, Scientific and Cultural Organization. Properties inscribed on the World Heritage List – United States. Retrieved from http://whc.unesco.org/en/statesparties/us

164. National Congress of American Indians. Religious Freedom & Sacred Places. Retrieved from http://www.ncai.org/policy-issues/community-and-culture/rel-freedom-and-sacred-places

165. Bureau of Indian Affairs. Forestry in Indian Country: Models of Sustainability for our Nation's Forests? Retrieved from https://www.bia.gov/cs/groups/xnifc/documents/text/idc015961.pdf

166. U.S. Forest Service. USDA Policy and Procedures Review and Recommendations: Indian Sacred Sites, 2012 Report to the Secretary of Agriculture. 2012. Retrieved from https://www.fs.fed.us/spf/tribalrelations/documents/sacredsites/SacredSitesFinalReportDec2012.pdf

167. U.S. Forest Service. At White House Conference, USDA Commits New Funds for Tribal Community Development. 2016. Retrieved from https://www.usda.gov/media/press-releases/2016/09/26/white-house-conference-usda-commits-new-funds-tribal-community

168. Phelan, Marilyn. A Synopsis of the Laws Protecting our Cultural Heritage. 1993. Retrieved from https://ttu-ir.tdl.org/ttu-https://ttu-ir.tdl.org/ttu-ir/bitstream/handle/10601/63/phelan7.pdf?sequence=1

169. Champagne, Duane. The Challenge of Protecting Sacred Land. Indian Country Today. 2013. Retrieved from https://indiancountrymedianetwork.com/history/sacred-places/the-challenge-of-protecting-sacred-land/

170. Champagne, Duane. Protecting Native American Sacred Sites. Indian Country Today. 2011. Retrieved from https://indiancountrymedianetwork.com/news/protecting-native-american-sacred-sites/

171. Trope, Jack F. Protecting Native American Sacred Sites and Religious Freedom. Retrieved from https://www.jstor.org/stable/1409063?seq=1#page_scan_tab_contents

172. Emenhiser, JeDon. The G-O Road Controversy: American Indian Religion and Public Land. 2005. Retrieved from http://users.humboldt.edu/jemenhiser/emenLyng.html

173. US Departments of Defense, Interior, Agriculture and Energy and the Advisory Council on Historic Preservation. Progress Report on the Implementation of the Memorandum of Understanding Regarding Interagency Coordination and Collaboration for the Protection of Indian Sacred Sites. 2014. Retrieved from http://www.achp.gov/docs/SacredSitesWorkingGroup-2013ProgressReport.pdf

186. Cook, William J. Preserving Native American Places: A Guide to Federal Laws and Policies that Help Protect Cultural Resources and Sacred Sites. National Trust for Historic Preservation. Retrieved from https://forum.savingplaces.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=1ba03f3f-8a68-04b7-beb5-c5a59440b283

187. National Parks Service Archaeology Program. Archeology Law and Ethics. Retrieved from https://www.nps.gov/archeology/public/publicLaw.htm

188. National Association of Tribal Historic Preservation Officers. News – Protecting Sacred Places (2001-2008). Retrieved from http://www.nathpo.org/News/newswire-sacred.htm

189. National Indian Law Library. Sacred Places News Stories (2003-2017). Retrieved from https://www.narf.org/nill/bulletins/news/arnews.html

190. indianz.com. News > More: sacred sites (2016-2017). Retrieved from https://www.indianz.com/m11/more.cgi?tag=sacred+sites

191. Committee on Indian Affairs. Native American Sacred Places, Hearing Before the Committee on Indian Affairs, First Session, United States Senate. 2003. Retrieved from https://www.gpo.gov/fdsys/pkg/CHRG-108shrg87991/html/CHRG-108shrg87991.htm

192. Committee on Indian Affairs. Native American Sacred Places, Hearing Before the Committee on Indian Affairs, Second Session, United States Senate. 2002. Retrieved from https://archive.org/stream/gov.gpo.fdsys.CHRG-107shrg80363/CHRG-107shrg80363#page/n0/mode/2up

193. National Association of Tribal Historic Preservation Officers. Supreme Court declines tribal challenge. 2002. Retrieved from http://www.nathpo.org/News/Sacred_Sites/News-Sacred_Sites13.html

194. Corbin, Amy. Sacred Land Film Project. Medicine Wheel. 2010. Retrieved from http://sacredland.org/medicine-wheel-united-states/

195. Indian Country Today. Federal Court Finds in Favor of Karuk Tribe, Halts Forest Work. Retrieved from https://indiancountrymedianetwork.com/news/federal-court-finds-in-favor-of-karuk-tribe-halts-forest-work/

Experts Consulted:

- Marc Gauthier, Upper Columbia United Tribes
- Jeff Lindsey, Hoopa Valley Tribal Council
- Paul Koll, Forest Manager
- Karen Brenner, Consulting Forester

Category 3 Control Measures

If an organization wishes to source from a specified risk area, addressing the specified risk through implementation of the following Control Measure is mandatory (CM 3.1). If an organization finds that this control measure is inadequate to mitigate risk found in its specific operations, and the conditions established by Clause 4.13 of the Controlled Wood standard (FSC-STD-40-005 V3-1) apply, the organization may replace the following mandatory control measure with more effective control measures.

CM 3.1: The organization is required to implement both parts of this Control Measures (CM 3.1.a and CM 3.1.b)

CM 3.1.a: The Organization implements either CM 3.1.a.i or CM 3.1.a.ii) for FSC US Regions relevant to the Organization's supply area:

CM 3.1.a.i: A representative of the Organization attends FSC US-coordinated Controlled Wood Regional Meetings when they occur. The meetings will include the following elements:

- Collaborative dialogues including both certificate holders and stakeholders that result in identification of a focused set of actions for each specified risk issue in the region that if implemented by certificate holders will reduce the risk of sourcing materials from lands where the HCV(s) is being threatened by forest management activities and that, when appropriate, includes a range in the level of resource investment required for implementation
- Sharing information, as requested by FSC US, to augment effectiveness verification of actions implemented as part of CM 3.1.b.

  NOTE: It is recognized that depending on the information requested, it may not be possible to share it at the Controlled Wood Regional Meeting, and in this situation the Organization shall share it as soon as possible following the meeting.

NOTE: It is the intention of FSC US to strive for very diverse participation in the Controlled Wood Regional Meetings, including certificate holders,

environmental organizations, social organizations, experts, academics, public agencies, and landowners who are not certificate holders.

NOTE: If the collaborative dialogues do not successfully identify a focused set of mitigation actions for each specified risk issue, FSC US will implement a contingency plan as detailed below.

NOTE: Following each Controlled Wood Regional Meeting, FSC US will produce a Report that includes: 1) A summary of information communicated in advance of, or at the meetings, regarding identified specified risk issues; 2) The outcomes of the collaborative dialogues; and 3) Details of information that has been requested of certificate holders to augment effectiveness verification.

NOTE: The FSC US Board of Directors will review the outcomes of the Controlled Wood Regional Meeting collaborative dialogues (or contingency plan) for any significant risks to the system. It is the Board's intention to endorse these outcomes unless a risk is identified, in which case the Board will approve a revised set of actions that will be published in the Report with rationale for any changes.

Compliance Verification: The Organization demonstrates to their certification body that a representative of the Organization attended the meeting(s) held for the region(s) in which the Organization sources materials and the Organization shared the requested information.

CM 3.1.a.ii: The Organization reviews the Controlled Wood Regional Meeting Report(s) and associated information and provides the information requested in the Report.

Compliance Verification: The Organization demonstrates to their certification body an awareness of all three elements of the Controlled Wood Regional Meeting Report and that the requested information was shared.

CM 3.1.b: For each area of specified risk from which the Organization sources materials, the Organization implements one or more of the actions identified during the collaborative dialogue at the Controlled Wood Regional Meeting, as detailed in the Controlled Wood Regional Meeting Report. When options for action with differential levels of resource investment required for implementation are identified, the action(s) implemented shall be commensurate with the scale and intensity of the Organization's potential impact on the HCV.

NOTE: The scale and intensity of the Organization's potential impact on the HCV will be informed by: 1) the volume of materials that are being sourced by the Organization from the specified risk area, 2) the spatial extent of the specified risk area from which the Organization is sourcing materials, and 3) the potential for harm caused by the forest management activities typically required to produce the type of materials sourced from the specified risk area by the Organization.

Compliance Verification: The Organization demonstrates when and how the action(s) identified was implemented and why that action(s) was selected.

Effectiveness Verification for Control Measure CM 3.1:
The Organization shall provide input into the effectiveness verification process through its implementation of CM 3.1.b. An assessment of the effectiveness of actions implemented in reducing the risk of sourcing from lands where HCV are harmed by forest management activities shall be determined by FSC US, in consultation with stakeholders, by evaluating the outcomes from each of the three elements of the Controlled Wood Regional Meetings and comparing them with outcomes from previous meetings, in combination with other monitoring data shared by stakeholders. The results of this assessment will be incorporated into the Controlled Wood Regional Meeting Report and will be used to inform future revisions to the National Risk Assessment.

NOTE: While effectiveness verification will be linked to the Controlled Wood Regional Meetings, which are expected to occur every 3 to 5 years, the Organization is still responsible for reviewing its Due Diligence System at least annually (as specified in FSC-STD-40-005 V3-1, Clause 1.6) to determine if any new information is available that would indicate revisions to the Organization's Due Diligence System are needed.

Contingency Plan for CM 3.1.a

In the event that the Controlled Wood Regional Meeting collaborative dialogues do not come to a successful resolution, the following will be implemented in sequential order until a resolution has been achieved.

1. A small group of certificate holder and stakeholder representatives from the region is formed to build on the information and perspectives shared during the dialogue at the regional meeting. The participants in the group are identified at the regional meeting at the point when it is apparent that it will not be possible find agreement on a set of mitigation actions by the end of the meeting. The participants must have demonstrated an ability to represent the perspective of the chamber with which they are most aligned, an ability to be open to other perspectives and new ideas and an ability to compromise. This group will be asked to complete the process within a short timeframe.
2. If the small group participants are not successfully identified at the regional meeting, FSC US will solicit participants representing a diversity of perspectives and formalize a group in consultation with the FSC US Board of Directors. (with the same constraints on participation as detailed above). Similar to #1 above, this group will be asked to build on the dialogue held at the regional meeting and develop a set of mitigation actions.
3. If the small group in #1 or #2 above is unable to find agreement on a set of mitigation actions within 6 weeks of the Controlled Wood Regional Meeting, FSC US Staff will build on the dialogue held at the regional meeting and the discussions of the small group, and develop a draft set of mitigation actions to be approved by the FSC US Board of Directors prior to being published in the regional meeting report.

Annex F G1-S1/S2 Species for HCV 1 Assessment

This annex lists all of the species that met the initial criteria for consideration in the HCV 1 individual species assessment (see Annex E for assessment methodology). The following species are all G1 (critically imperiled at a global scale) and S1 (critically imperiled at a state scale) in at least one state or G1 and S2 (imperiled at a state scale) in at least one state, based upon a data search completed through NatureServe's Explorer.

Name		Taxonomy		Conservation Status			Distribution
Common Name	**Scientific Name**	**Species Group (Broad)**	**Species Group (Fine)**	**Nature-Serve Global Status**	**U.S. Endangered Species Act Status**	**IUCN Red List Status**	**Country: States/ Provinces**
Austin Blind Salamander	***Eurycea waterlooensis***	Amphibians	Salamanders	G1	LE: Listed endangered	VU - Vulnerable	US: TX
Barton Springs Salamander	***Eurycea sosorum***	Amphibians	Salamanders	G1	LE: Listed endangered	VU - Vulnerable	US: TX
Berry Cave Salamander	***Gyrinophilus gulolineatus***	Amphibians	Salamanders	G1Q	C: Candidate	EN - Endangered	US: TN
Black-spotted Newt	***Notophthalmus meridionalis***	Amphibians	Salamanders	G1		EN - Endangered	US: TX
Black Toad	***Anaxyrus exsul***	Amphibians	Frogs and Toads	G1Q		VU - Vulnerable	US: CA
Blanco Blind Salamander	***Eurycea robusta***	Amphibians	Salamanders	G1Q		DD - Data deficient	US: TX
Cheoah Bald Salamander	***Plethodon cheoah***	Amphibians	Salamanders	G1G2		VU - Vulnerable	US: NC
Comal Blind Salamander	***Eurycea tridentifera***	Amphibians	Salamanders	G1		VU - Vulnerable	US: TX
Comal Springs Salamander	***Eurycea sp. 8***	Amphibians	Salamanders	G1Q			US: TX
Dolan Falls Salamander	***Eurycea sp. 10***	Amphibians	Salamanders	G1Q			US: TX
Dusky Gopher Frog	***Lithobates sevosus***	Amphibians	Frogs and Toads	G1	LE: Listed endangered	CR - Critically endangered	US: AL, LA, MS
Georgetown Salamander	***Eurycea naufragia***	Amphibians	Salamanders	G1	LT: Listed threatened	EN - Endangered	US: TX

Houston Toad	***Anaxyrus houstonensis***	Amphibians	Frogs and Toads	G1	LE: Listed endangered	EN - Endangered	US: TX
Jollyville Plateau Salamander	***Eurycea tonkawae***	Amphibians	Salamanders	G1	LT: Listed threatened	EN - Endangered	US: TX
Lesser Slender Salamander	***Batrachoseps minor***	Amphibians	Salamanders	G1G2		DD - Data deficient	US: CA
Patch-nosed Salamander	***Urspelerpes brucei***	Amphibians	Salamanders	G1		LC - Least concern	US: GA
Pedernales River Springs Salamander	***Eurycea sp. 6***	Amphibians	Salamanders	G1			US: TX
Relict Leopard Frog	***Lithobates onca***	Amphibians	Frogs and Toads	G1G2	C: Candidate	EN - Endangered	US: AZ, NV, UT (extirpated)
Relictual Slender Salamander	***Batrachoseps relictus***	Amphibians	Salamanders	G1		DD - Data deficient	US: CA
Salado Salamander	***Eurycea chisholmensis***	Amphibians	Salamanders	G1	LT: Listed threatened	VU - Vulnerable	US: TX
San Marcos Salamander	***Eurycea nana***	Amphibians	Salamanders	G1	LT: Listed threatened	VU - Vulnerable	US: TX
Scott Bar Salamander	***Plethodon asupak***	Amphibians	Salamanders	G1G2		VU - Vulnerable	US: CA
Texas Salamander	***Eurycea neotenes***	Amphibians	Salamanders	G1		VU - Vulnerable	US: TX
Giant Kanagaroo Rat	***Dipodomys ingens***	Mammal	Rodents	G1G2	LE: Listed endangered	EN - Endangered	US: CA
Buck Darter	***Etheostoma nebra***	Fishes	Bony Fishes	G1			US: KY
California Clapper Rail	***Railus obsoletus***	Birds	Other Birds	G1	LE: Listed endangered		US: AZ, CA, NV, NM, TX
Tricolored Blackbird	***Agelaius tricolor***	Birds	Perching Birds	G1G2		EN - Endangered	US: CA, NV, OR
Shenandoah Salamander	***Plethodon shenandoah***	Amphibians	Salamanders	G1	LE: Listed endangered	VU - Vulnerable	US: VA
Sierra Buttes Salamander	***Hydromantes sp. 3***	Amphibians	Salamanders	G1Q			US: CA
Southern Mountain Yellow-legged Frog	***Rana muscosa***	Amphibians	Frogs and Toads	G1	LE: Listed endangered	EN - Endangered	US: CA

Texas Blind Salamander	***Eurycea rathbuni***	Amphibians	Salamanders	G1	LE: Listed endangered	VU - Vulnerable	US: TX
West Virginia Spring Salamander	***Gyrinophilus subterraneus***	Amphibians	Salamanders	G1		EN - Endangered	US: WV
Wyoming Toad	***Anaxyrus baxteri***	Amphibians	Frogs and Toads	G1	LE: Listed endangered	EW - Extinct in the wild	US: WY
Black-capped Petrel	***Pterodroma hasitata***	Birds	Other Birds	G1		EN - Endangered	US: FL, GA, NC
California Condor	***Gymnogyps californianus***	Birds	Other Birds	G1		CR - Critically endangered	US: AZ, AZ (extirpated), CA, OR (extirpated), WA (extirpated)
Island Scrub-jay	***Aphelocoma insularis***	Birds	Perching Birds	G1		VU - Vulnerable	US: CA
Ivory-billed Woodpecker	***Campephilus principalis***	Birds	Other Birds	G1	LE: Listed endangered	CR - Critically endangered	US: AL (extirpated), AR, FL, GA (extirpated), IL (extirpated), KY (extirpated), LA (extirpated), MD (extirpated), MO (extirpated), MS (extirpated), NC (extirpated), OH (extirpated), OK (extirpated), SC (extirpated), TN (extirpated), TX (extirpated)
Short-tailed Albatross	***Phoebastria albatrus***	Birds	Other Birds	G1	LE: Listed endangered	VU - Vulnerable	US: AK, CA, HI, WA CA: BC
Whooping Crane	***Grus americana***	Birds	Wading Birds	G1	LE, XN: Listed endangered, nonessential experimental population	EN - Endangered	US: AR (extirpated), FL, GA, IA (extirpated), ID (extirpated), IL (extirpated), KS, KY (extirpated), LA, MN (extirpated), MT, ND (extirpated), NE, OK, SD, TN (extirpated), TX, UT (extirpated), WI (extirpated), WI CA: AB, MB (extirpated), MB, NT, NU (extirpated), ON, SK (extirpated), SK
Alabama Cavefish	***Speoplatyrhinus poulsoni***	Fishes	Bony Fishes	G1	LE: Listed endangered	CR - Critically endangered	US: AL
Alabama Sturgeon	***Scaphirhynchus suttkusi***	Fishes	Bony Fishes	G1	LE: Listed endangered	CR - Critically endangered	US: AL, MS
Amber Darter	***Percina antesella***	Fishes	Bony Fishes	G1G2	LE: Listed endangered	EN - Endangered	US: GA, TN

Banded Killifish - Lake Phelps Population	***Fundulus cf. diaphanus***	Fishes	Bony Fishes	G1Q			US: NC
Bankhead Darter	***Percina sipsi***	Fishes	Bony Fishes	G1		VU - Vulnerable	US: AL
Barrens Darter	***Etheostoma forbesi***	Fishes	Bony Fishes	G1G2		VU - Vulnerable	US: TN
Barrens Topminnow	***Fundulus julisia***	Fishes	Bony Fishes	G1		EN - Endangered	US: TN
Bayou Darter	***Etheostoma rubrum***	Fishes	Bony Fishes	G1	LT: Listed threatened	EN - Endangered	US: MS
Bear Lake Whitefish	***Prosopium abyssicola***	Fishes	Bony Fishes	G1			US: ID, UT
Big Bend Gambusia	***Gambusia gaigei***	Fishes	Bony Fishes	G1	LE: Listed endangered	VU - Vulnerable	US: TX
Blueface Darter	***Etheostoma sp. 14***	Fishes	Bony Fishes	G1			US: AL
Bluemask Darter	***Etheostoma akatulo***	Fishes	Bony Fishes	G1	LE: Listed endangered	EN - Endangered	US: TN
Bonytail	***Gila elegans***	Fishes	Bony Fishes	G1	LE: Listed endangered	CR - Critically endangered	US: AZ, CA, CO (extirpated), NM (extirpated), NN (extirpated), NV, UT, WY (extirpated)
Borax Lake Chub	***Siphateles boraxobius***	Fishes	Bony Fishes	G1	LE: Listed endangered	VU - Vulnerable	US: OR
Boulder Darter	***Etheostoma wapiti***	Fishes	Bony Fishes	G1	LE, XN: Listed endangered, nonessential experimental population	VU - Vulnerable	US: AL, TN
Caddo Madtom	***Noturus taylori***	Fishes	Bony Fishes	G1		EN - Endangered	US: AR
Cape Fear Shiner	***Notropis mekistocholas***	Fishes	Bony Fishes	G1	LE: Listed endangered	EN - Endangered	US: NC
Carolina Redhorse	***Moxostoma sp. 3***	Fishes	Bony Fishes	G1G2Q			US: NC, SC
Cheat Minnow	***Pararhinichthys bowersi***	Fishes	Bony Fishes	G1G2Q			US: MD (extirpated), PA, WV
Chesapeake Logperch	***Percina bimaculata***	Fishes	Bony Fishes	G1G2		VU - Vulnerable	US: MD, PA, VA (extirpated)
Chihuahua Catfish	***Ictalurus sp. 1***	Fishes	Bony Fishes	G1G2			US: NM, TX
Chihuahua Chub	***Gila nigrescens***	Fishes	Bony Fishes	G1G2	LT: Listed threatened	VU - Vulnerable	US: NM

Chucky Madtom	***Noturus crypticus***	Fishes	Bony Fishes	G1	LE: Listed endangered	CR - Critically endangered	US: TN
Citico Darter	***Etheostoma sitikuense***	Fishes	Bony Fishes	G1		VU - Vulnerable	US: TN
Clear Creek Gambusia	***Gambusia heterochir***	Fishes	Bony Fishes	G1	LE: Listed endangered	VU - Vulnerable	US: TX
Clinch Dace	***Chrosomus sp. 1***	Fishes	Bony Fishes	G1			US: TN, VA
Clinch Sculpin	***Cottus sp. 4***	Fishes	Bony Fishes	G1G2			US: VA
Colorado Pikeminnow	***Ptychocheilus lucius***	Fishes	Bony Fishes	G1	LE, XN: Listed endangered, nonessential experimental population	VU - Vulnerable	US: AZ, CA (extirpated), CO, NM, NN, NV (extirpated), UT, WY (extirpated)
Comanche Springs Pupfish	***Cyprinodon elegans***	Fishes	Bony Fishes	G1	LE: Listed endangered	EN - Endangered	US: TX
Conasauga Logperch	***Percina jenkinsi***	Fishes	Bony Fishes	G1	LE: Listed endangered	CR - Critically endangered	US: GA, TN
Cui-ui	***Chasmistes cujus***	Fishes	Bony Fishes	G1	LE: Listed endangered	CR - Critically endangered	US: NV
Cumberland Darter	***Etheostoma susanae***	Fishes	Bony Fishes	G1G2	LE: Listed endangered	EN - Endangered	US: KY, TN
Delta Smelt	***Hypomesus transpacificus***	Fishes	Bony Fishes	G1	LT: Listed threatened	EN - Endangered	US: CA
Desert Dace	***Eremichthys acros***	Fishes	Bony Fishes	G1	LT: Listed threatened	VU - Vulnerable	US: NV
Desert Pupfish	***Cyprinodon macularius***	Fishes	Bony Fishes	G1	LE: Listed endangered		US: AZ, CA
Devil's Hole Pupfish	***Cyprinodon diabolis***	Fishes	Bony Fishes	G1	LE: Listed endangered	VU - Vulnerable	US: NV
Devils River Minnow	***Dionda diaboli***	Fishes	Bony Fishes	G1	LT: Listed threatened	EN - Endangered	US: TX
Diamond Darter	***Crystallaria cincotta***	Fishes	Bony Fishes	G1	LE: Listed endangered	CR - Critically endangered	US: KY (extirpated), OH (extirpated), TN (extirpated), WV
Duskytail Darter	***Etheostoma percnurum***	Fishes	Bony Fishes	G1	LE, XN: Listed endangered, nonessential experimental population		US: VA

Egg-mimic Darter	***Etheostoma pseudovulatum***	Fishes	Bony Fishes	G1		VU - Vulnerable	US: TN
Etowah Chub	***Hybopsis sp. 9***	Fishes	Bony Fishes	G1Q			US: GA
Etowah Darter	***Etheostoma etowahae***	Fishes	Bony Fishes	G1	LE: Listed endangered	VU - Vulnerable	US: GA
Fountain Darter	***Etheostoma fonticola***	Fishes	Bony Fishes	G1	LE: Listed endangered	EN - Endangered	US: TX
Humpback Chub	***Gila cypha***	Fishes	Bony Fishes	G1	LE: Listed endangered	EN - Endangered	US: AZ, CO, NN, NV (extirpated), UT, WY (extirpated)
Ives Lake Cisco	***Coregonus hubbsi***	Fishes	Bony Fishes	G1Q			US: MI
Kern Brook Lamprey	***Entosphenus hubbsi***	Fishes	Lampreys	G1G2		VU - Vulnerable	US: CA
Laurel Dace	***Chrosomus saylori***	Fishes	Bony Fishes	G1	LE: Listed endangered	EN - Endangered	US: TN
Leon Springs Pupfish	***Cyprinodon bovinus***	Fishes	Bony Fishes	G1	LE: Listed endangered	VU - Vulnerable	US: TX
Little Colorado Spinedace	***Lepidomeda vittata***	Fishes	Bony Fishes	G1G2	LT: Listed threatened	VU - Vulnerable	US: AZ
Lost River Sucker	***Deltistes luxatus***	Fishes	Bony Fishes	G1	LE: Listed endangered	EN - Endangered	US: CA, OR
Lower Coosa Darter	***Etheostoma sp. 3***	Fishes	Bony Fishes	G1G2Q			US: AL
Marbled Darter	***Etheostoma marmorpinnum***	Fishes	Bony Fishes	G1			US: TN
Moapa Dace	***Moapa coriacea***	Fishes	Bony Fishes	G1	LE: Listed endangered	CR - Critically endangered	US: NV
Nueces Shiner	***Cyprinella sp. 2***	Fishes	Bony Fishes	G1G2Q			US: TX
Owens Pupfish	***Cyprinodon radiosus***	Fishes	Bony Fishes	G1	LE: Listed endangered	EN - Endangered	US: CA
Pahrump Poolfish	***Empetrichthys latos***	Fishes	Bony Fishes	G1	LE: Listed endangered		US: NV
Palezone Shiner	***Notropis albizonatus***	Fishes	Bony Fishes	G1	LE: Listed endangered	EN - Endangered	US: AL, KY, TN
Pearl Darter	***Percina aurora***	Fishes	Bony Fishes	G1	C: Candidate	EN - Endangered	US: LA, MS
Peppered Chub	***Macrhybopsis tetranema***	Fishes	Bony Fishes	G1		EN - Endangered	US: CO (extirpated), KS, NM, OK, TX
Plateau Shiner	***Cyprinella lepida***	Fishes	Bony Fishes	G1G2		EN - Endangered	US: TX

Pygmy Madtom	***Noturus stanauli***	Fishes	Bony Fishes	G1	LE, XN: Listed endangered, nonessential experimental population	EN - Endangered	US: TN
Pygmy Sculpin	***Cottus paulus***	Fishes	Bony Fishes	G1	LT: Listed threatened	CR - Critically endangered	US: AL
Razorback Sucker	***Xyrauchen texanus***	Fishes	Bony Fishes	G1	LE: Listed endangered	CR - Critically endangered	US: AZ, CA, CO, NM, NN, NV, UT, WY (extirpated)
Relict Darter	***Etheostoma chienense***	Fishes	Bony Fishes	G1	LE: Listed endangered	EN - Endangered	US: KY
Rio Grande Silvery Minnow	***Hybognathus amarus***	Fishes	Bony Fishes	G1	LE, XN: Listed endangered, nonessential experimental population	EN - Endangered	US: NM, TX (extirpated)
Roanoke Logperch	***Percina rex***	Fishes	Bony Fishes	G1G2	LE: Listed endangered	VU - Vulnerable	US: NC, VA
Robust Redhorse	***Moxostoma robustum***	Fishes	Bony Fishes	G1		EN - Endangered	US: GA, NC, SC
Rush Darter	***Etheostoma phytophilum***	Fishes	Bony Fishes	G1	LE: Listed endangered	EN - Endangered	US: AL
Salish Sucker	***Catostomus sp. 4***	Fishes	Bony Fishes	G1			US: WA CA: BC
San Felipe Gambusia	***Gambusia clarkhubbsi***	Fishes	Bony Fishes	G1		VU - Vulnerable	US: TX
Santa Ana Sucker	***Catostomus santaanae***	Fishes	Bony Fishes	G1	LT: Listed threatened	VU - Vulnerable	US: CA
Shortnose Sucker	***Chasmistes brevirostris***	Fishes	Bony Fishes	G1	LE: Listed endangered	EN - Endangered	US: CA, OR
Slackwater Darter	***Etheostoma boschungi***	Fishes	Bony Fishes	G1	LT: Listed threatened	EN - Endangered	US: AL, TN
Slender Chub	***Erimystax cahni***	Fishes	Bony Fishes	G1	LT, XN: Listed threatened, nonessential experimental population	EN - Endangered	US: TN, VA
Smoky Madtom	***Noturus baileyi***	Fishes	Bony Fishes	G1	LE, XN: Listed endangered, nonessential experimental population	VU - Vulnerable	US: TN

Sonoyta Pupfish	***Cyprinodon eremus***	Fishes	Bony Fishes	G1			US: AZ
Spring Pygmy Sunfish	***Elassoma alabamae***	Fishes	Bony Fishes	G1	LT: Listed threatened		US: AL
Striated Darter	***Etheostoma striatulum***	Fishes	Bony Fishes	G1		VU - Vulnerable	US: TN
Texas Pipefish	***Syngnathus affinis***	Fishes	Bony Fishes	G1			US: TX
Toothless Blindcat	***Trogloglanis pattersoni***	Fishes	Bony Fishes	G1G2		VU - Vulnerable	US: TX
Trispot Darter	***Etheostoma trisella***	Fishes	Bony Fishes	G1		VU - Vulnerable	US: AL, GA, TN
Tuxedo Darter	***Etheostoma lemniscatum***	Fishes	Bony Fishes	G1		VU - Vulnerable	US: KY, TN
Upper Coosa Darter	***Etheostoma sp. 1***	Fishes	Bony Fishes	G1G2Q			US: AL, GA
Vermilion Darter	***Etheostoma chermocki***	Fishes	Bony Fishes	G1	LE: Listed endangered	CR - Critically endangered	US: AL
Virgin River Chub	***Gila seminuda***	Fishes	Bony Fishes	G1	LE: Listed endangered	EN - Endangered	US: AZ, NV, UT
Waccamaw Darter	***Etheostoma perlongum***	Fishes	Bony Fishes	G1Q		VU - Vulnerable	US: NC
Waccamaw Killifish	***Fundulus waccamensis***	Fishes	Bony Fishes	G1		VU - Vulnerable	US: NC
Waccamaw Silverside	***Menidia extensa***	Fishes	Bony Fishes	G1	LT: Listed threatened	VU - Vulnerable	US: NC
Wall Canyon Sucker	***Catostomus sp. 1***	Fishes	Bony Fishes	G1			US: NV
Warner Sucker	***Catostomus warnerensis***	Fishes	Bony Fishes	G1	LT: Listed threatened	VU - Vulnerable	US: NV, OR
Watercress Darter	***Etheostoma nuchale***	Fishes	Bony Fishes	G1	LE: Listed endangered	EN - Endangered	US: AL
White River Sculpin	***Cottus sp. 3***	Fishes	Bony Fishes	G1			US: NV
White River Spinedace	***Lepidomeda albivallis***	Fishes	Bony Fishes	G1	LE: Listed endangered	CR - Critically endangered	US: NV
White Sands Pupfish	***Cyprinodon tularosa***	Fishes	Bony Fishes	G1		VU - Vulnerable	US: NM
Widemouth Blindcat	***Satan eurystomus***	Fishes	Bony Fishes	G1G2		VU - Vulnerable	US: TX

Woundfin	***Plagopterus argentissimus***	Fishes	Bony Fishes	G1	LE, XN: Listed endangered, nonessential experimental population	CR - Critically endangered	US: AZ, NV, UT
Yaqui Chub	***Gila purpurea***	Fishes	Bony Fishes	G1	LE: Listed endangered	VU - Vulnerable	US: AZ
Yellowcheek Darter	***Etheostoma moorei***	Fishes	Bony Fishes	G1	LE: Listed endangered	EN - Endangered	US: AR
Yellowfin Madtom	***Noturus flavipinnis***	Fishes	Bony Fishes	G1	LT, XN: Listed threatened, nonessential experimental population	VU - Vulnerable	US: GA (extirpated), TN, VA
Black-footed Ferret	***Mustela nigripes***	Mammals	Carnivores	G1	LE, XN: Listed endangered, nonessential experimental population	EN - Endangered	US: AZ, CO, KS, MT, ND, NE, NM, NN (extirpated), OK (extirpated), SD, TX (extirpated), UT, WY CA: AB (extirpated), SK (extirpated)
Florida Bonneted Bat	***Eumops floridanus***	Mammals	Bats	G1	LE: Listed endangered	CR - Critically endangered	US: FL
Guadalupe Fur Seal	***Arctocephalus townsendi***	Mammals	Carnivores	G1	LT: Listed threatened	NT - Near threatened	US: CA
North Atlantic Right Whale	***Eubalaena glacialis***	Mammals	Whales and Dolphins	G1	LE: Listed endangered	EN - Endangered	US: DE (extirpated), DE, FL, GA, MA, MD, ME, NC, NJ, NY, RI, TX CA: LB, NB, NF, NS, PE, QC
Northern Myotis	***Myotis septentrionalis***	Mammals	Bats	G1G2	PE: Proposed endangered	LC - Least concern	US: AL, AR, CT, DC, DE, FL, GA, IA, IL, IN, KS, KY, LA, MA, MD, MD, ME, MI, MN, MO, MS, MS, NC, ND, NE, NH, NJ, NY, OH, OK, PA, RI, SC, SD, TN, VA, VT, WI, WV, WY, WY CA: AB, BC, LB, MB, MB, NB, NF, NS, NT, ON, PE, QC, SK, SK, YT
Red Wolf	***Canis rufus***	Mammals	Carnivores	G1Q	LE, XN: Listed endangered, nonessential experimental population	CR - Critically endangered	US: AL (extirpated), AR (extirpated), FL (extirpated), GA (extirpated), IL (extirpated), IN (extirpated), KY (extirpated), LA (extirpated), MO (extirpated), MS (extirpated), NC, OK (extirpated), SC, TN (extirpated), TX (extirpated), VA (extirpated)

Robust Cottontail	***Sylvilagus robustus***	Mammals	Other Mammals	G1G2		EN - Endangered	US: NM, TX
Salt-marsh Harvest Mouse	***Reithrodontomys raviventris***	Mammals	Rodents	G1G2	LE: Listed endangered	EN - Endangered	US: CA
Sherman's Short-tailed Shrew	***Blarina shermani***	Mammals	Other Mammals	G1			US: FL
Strecker's Pocket Gopher	***Geomys streckeri***	Mammals	Rodents	G1Q			US: TX
Arizona Night Lizard	***Xantusia arizonae***	Reptiles	Lizards	G1G2		LC - Least concern	US: AZ
Blunt-nosed Leopard Lizard	***Gambelia sila***	Reptiles	Lizards	G1	LE: Listed endangered	EN - Endangered	US: CA
Coachella Fringe-toed Lizard	***Uma inornata***	Reptiles	Lizards	G1Q	LT: Listed threatened	EN - Endangered	US: CA
Rim Rock Crowned Snake	***Tantilla oolitica***	Reptiles	Snakes	G1G2		EN - Endangered	US: FL
Sandstone Night Lizard	***Xantusia gracilis***	Reptiles	Lizards	G1		VU - Vulnerable	US: CA
Sierra Night Lizard	***Xantusia sierrae***	Reptiles	Lizards	G1			US: CA
Alabama Red-bellied Cooter	***Pseudemys alabamensis***	Turtles		G1	LE: Listed endangered	EN - Endangered	US: AL, MS
Kemp's Ridley Sea Turtle	***Lepidochelys kempii***	Turtles		G1	LE: Listed endangered	CR - Critically endangered	US: AL, CT, DE, FL, GA, LA, MA, MD, ME, MS, NC, NC, NH, NJ, NY, RI, TX, VA

This annex is intended to provide the Category 4 assessment in a more accessible format than the required National Risk Assessment template in the main document. Additionally, it includes supplemental details, context and guidance that are not in the main document which are intended to help readers better understand the rationale behind the risk designation decisions for the Category 4 indicator. For any category with an associated annex, the content found in the main body of the risk assessment, not the annex, is definitive.

Category 4 – Conversion

FSC considers materials that come from places where forests (natural or semi-natural) are converted to non-forest use or plantation to be unacceptable materials. Therefore, the NRA assesses the risk of sourcing from these kinds of areas.

Definitions from the FSC-US Forest Management Standard:

Forest: Generally, an ecosystem characterized by tree cover; more particularly, a plant community predominantly of trees and other woody vegetation that is growing closely together.

Natural Forest: Natural forests include old growth and primary forests as well as managed forests where most of the principal characteristics and key elements of native ecosystems such as complexity, structure, wildlife and biological diversity are present.

Semi natural forest: A forest ecosystem with many of the characteristics of native ecosystems present. Semi-natural forests exhibit a history of human disturbance (e.g., harvesting or other silvicultural activities), are very common in the United States, and include a considerable amount of unmanaged and most of the managed forest land other than plantations.

NOTE: Non-forest conditions include agriculture, development, and other infrastructure. Timber harvest and natural disturbances are not considered conversion to non-forest conditions as long as the site is regenerated, and is maintained in natural or semi-natural forestland (i.e. not non-forest or Plantation) in the long term. Sites that do not have tree cover due to recent harvest or disturbance are still considered forestland as long as they are managed in a way that will regenerate the stand in a manner consistent with natural or semi-natural forests, including tree planting.

Plantation: Forest areas lacking most of the principal characteristics and key elements of native ecosystems as defined by FSC-approved national and regional standards of forest stewardship, which result from the human activities of either planting, sowing or intensive silvicultural treatments (source: FSC-STD-01-001).

The use of establishment or subsequent management practices in planted forest stands that perpetuate the stand-level absence of most principle characteristics and key elements of native forest ecosystems will result in a stand being classified as a plantation. The details addressing ecological conditions used in stand-level classification are outlined in related guidance. Except for highly extenuating circumstances the following are classified as plantations:

- cultivation of exotic species or recognized exotic sub-species;

- block plantings of cloned trees resulting in a major reduction of within-stand genetic diversity compared to what would be found in a natural stand of the same species;
- cultivation of any tree species in areas that were naturally non-forested ecosystems.

NOTE: Not all planted stands are plantations.

- Appendix G in the FSC-US Forest Management Standard provides additional details for: 1) guidance on the classification of plantations; 2) guidance on principle characteristics and key elements of native forest ecosystems; and 3) guidance on management practices related to plantations.
- A Plantation Classification Worksheet is available from the FSC US website: http://us.fsc.org/download.fsc-us-plantation-classification-worksheet.205.htm

'Low Risk' Thresholds from FSC-PRO-60-002a (NRA Framework:

- There is less than 5,000 ha (12,355 acre) net average annual loss or there is less than 0.02% net average annual loss of natural forest in the assessment area in the past 5 years; AND/OR
- Applicable legislation for the area under assessment covers laws that prevent conversion (to the outcome required by the indicator), AND the risk assessment for relevant indicators of Category 1 confirms that the law is enforced; AND
- Other available evidence does not challenge a 'low risk' designation (e.g., No significant economic drivers for conversion are identified; Data do not yield evidence that conversion is occurring on a widespread or systematic basis)

NOTE: The following changes are not considered applicable conversion according to FSC-PRO-60-002a (NRA Framework): (legal) road construction, logging landings, and infrastructure development to support forestry operations

CATEGORY 4 RISK ASSESSMENT

The following assessment was developed by FSC US staff, building upon the work completed by and for the original National Risk Assessment Working Group (NRA WG). It begins with an assessment of applicable legislation to determine whether natural vegetation land use changes are prevented (or kept to a level that does not exceed the stated threshold) by US legislation or public policy. This is followed by an assessment of whether the spatial threshold was exceeded, which consisted of a data analysis using data sets that were consistent for as much of the assessment area as possible were used. The remainder of the assessment was based upon regional and finer-scale data, literature reviews and consultation with experts.

Assessment of Applicable Legislation:

Legislation relevant to the conversion of natural forests to plantations or non-forest use.

- There is no separate legal framework that governs conversion of forest land in the US. Conversion, if addressed, is typically covered by legislation for harvesting timber.
- Federal Lands:

    - Federal law requires the maintenance of forest within National Forests (16 USC §§ 475)
    - The National Forest Management Act (NFMA) of 1976 § 6(g), directs the US Forest Service to develop planning regulations that provide for preservation of biodiversity and restocking after harvest for lands that they administer (i.e., National Forests).
    - The key law for Bureau of Land Management (BLM) timberlands, the O & C Lands Act, calls for management for permanent forest production, 43 USC §.
- Each state likely has similar requirements for the forested lands that they administer, but each state will be unique.
- For private lands, the key laws will usually be state and local land use laws. These will vary greatly from state to state, and from municipality to municipality. Even in states that do not require local zoning ordinances, it is a planning tool that is used by essentially all major urban areas.
- Forested wetlands on all ownership types are subject to Clean Water Act § 404 regulation, which is administered by state government in most states. While silvicultural activities must comply with the requirements of this legislation, they are exempt from the requirement to acquire a permit prior to implementation of activities. However, conversion of forests is not considered normal silvicultural activity and so is not exempt from § 404 permit requirements.

Summary: There is not any national legislation related to conversion, most states regulate conversion of wetlands, but the most applicable legislation would be local zoning ordinances. However, local zoning ordinances vary greatly, and there is no possible way to evaluate them across the assessment area (there are 1800 local municipalities in Michigan alone). Therefore, while the risk assessment for relevant indicators in Category 1 does conclude that laws in the US are enforced, it is not possible to conclude from this assessment that applicable legislation prevents conversion to the outcome required by the indicator, and therefore it is necessary to complete an assessment of the rates and extent of conversion in the area being assessed as part of the National Risk Assessment.

Sources:

1. 16 U.S. Code § 475 - Purposes for which national forests may be established and administered, Legal Information Institute (http://www.law.cornell.edu/uscode/text/16/475)
2. 16 U.S. Code § 1604 - National Forest System land and resource management plans, Legal Information Institute (http://www.law.cornell.edu/uscode/text/16/1604)
3. 43 U.S. Code § 2601 - Conservation management by Department of the Interior; permanent forest production; sale of timber; subdivision, Legal Information Institute (https://www.law.cornell.edu/uscode/text/43/2601)
4. US Forest Service video (https://www.youtube.com/watch?v=IFNe_KZhPZw#t=15)
5. US Department of Agriculture. 2011. National Report on Sustainable Forests—2010 (http://www.fs.fed.us/research/sustain/national-report.php)

Assessment of Rates, Extent and Drivers of Conversion:

Ecoregion-Scale Assessment

The NRA WG agreed to use of the best available datasets for determining rates of conversion. The two datasets that are readily available and have sufficient sampling effort to provide rigor are The USDA Forest Inventory and Analysis (FIA)[1] and National Land Cover Dataset (NLCD)[2].

The primary limitation of FIA data is that the sample density is low (1 plot per 6,000 acres), and that the plot design was changed substantially in the 1990s such that older data is not compatible with more recent data. Due to these limitations, FIA could not (as of 2014) be used in the Western US, or in a few eastern ecoregions with small sample sizes. Where it is available, FIA provides a reasonably robust dataset for estimating rates of conversion.

NLCD data does not directly distinguish between permanent forest cover loss (conversion) and temporary loss due to harvest or disturbance. To account for non-conversion harvest or disturbance, any pixel that changes from forest cover to herbaceous or shrub/scrub cover should therefore not be considered as converted to a non-forest use. A given pixel should only be considered converted when forest cover changes to either a developed or agricultural use.

NLCD and FIA demand different sets of assumptions with regard to forest conversion estimates. The main assumption made in FIA estimates is that the sample plot is representative of its associated 6,000-acre grid cell. The main assumption made in NLCD estimates is that herbaceous and shrub/scrub cover should be considered "pre-forest" and treated like forest cover. The validity of this argument depends heavily on the ecoregion being considered, and how well defined that ecoregion is. For ecoregions with complex forest / non-forest mosaics, there will be erroneous estimates where conversion occurs on grassland or shrubland. For both datasets, it is important that these assumptions be considered on a case-by-case basis.

The NRA WG made a decision to use FIA estimates where available, and to rely upon NLCD estimates where either FIA annual inventory plots have not been remeasured or there is an insufficient number of plots to provide reliable estimates.

Where acceptable sub-regional data is available and acceptable, as determined by the NRA WG, additional sub-regional estimates of conversion were made to provide more spatially explicit assessments of specified risk.

National Council for Air & Stream Improvement (NCASI) produced an analysis for FSC US of FIA data for the eastern US ecoregions, and an NLCD analysis for western US ecoregions. In the NLCD analysis of western ecoregions, 19 out of 23 ecoregions exhibited a net forest loss, and 15 out of 23 ecoregions exhibited a net loss greater than the 0.02% annual threshold. All of the eastern FIA ecoregions demonstrated net forest cover gain.

The authors of the NCASI Analysis produced for FSC US also published a peer-reviewed article in the Journal of Forestry that provides an estimate of variance for the FIA data [Source: 23]. Their results demonstrate that the standard error associated with these FIA analyses is almost always greater than the difference between the estimates and a zero forest cover change. That is, the rates of forest cover change are so small as to be statistically insignificant.

It should be noted that in order to obtain an estimate of variance, the authors used a different methodology to estimate forest cover change in the Journal of Forestry article than they did in the analysis prepared for FSC US. The two results are therefore not directly comparable.

FSC US then analyzed the same datasets with slightly different assumptions and methodologies. The FSC US analysis used the newer World Wildlife Fund (WWF) ecoregion delineations instead of Bailey's ecoregions. In the FSC US analysis, 10 out of 20 eastern ecoregions had a net loss of forest cover according to FIA data. Of these, 9 exceeded the

[1] https://www.fia.fs.fed.us/tools-data/
[2] https://www.mrlc.gov/index.php

0.02% threshold. Of 13 ecoregions analyzed using NLCD data, 6 had net loss, of which only one (Puget Trough) exceeded the 0.02% threshold.

Note that Global Forest Watch data[3] were reviewed, but were not used to analyze conversion for the risk assessment for a number of reasons. Global Forest Watch data on forest change does not distinguish between types of forest management, legality of harvest, or the cause of forest loss (natural disturbance versus human-caused). Even a well-managed harvest will show as forest loss on Global Forest Watch data. Additionally, the replacement of natural forest with a plantation would be considered forest gain. Some types of silvicultural practices, including even-aged management, clear cuts and final harvests, are used more frequently in the United States than in other parts of the world and would show as 'converted' with this kind of remote sensing data analysis. These data limitations lead to FSC US considering Global Forest Watch as an inconclusive data source for assessing conversion from forest to non-forest cover for the purposes of the NRA.

Overall both the FIA and NLCD datasets and separate analyses by FSC US and NCASI demonstrate that forest cover in the United States is relatively stable. Although standard errors are not available for these analyses, Van Deusen et. al. [Source: 23] emphasize that the expected estimates of error for FIA data analyses are greater than the differences demonstrated by both FSC US and NCASI.

No estimate of error is available for the NLCD data, but the measured rates of forest cover change are sufficiently small that it is reasonable to assume that they are also within a standard error of zero. This is further emphasized by the difference between the FSC US and NCASI analyses that results from slightly different sets of assumptions. While these are both very robust datasets, the actual rates of change are simply too small to reliably measure their difference from zero.

Summary: Due to these limitations, it is not possible to conclusively determine whether the conversion rates actually exceeded the 0.02% threshold, as required by Indicator 4.1 of the National Risk Assessment Framework procedure (FSC-PRO-60-002a). These analyses clearly demonstrate that at an ecoregion scale, forest cover in the assessment area is relatively stable. However, there is evidence that forest conversion continues to be an issue at a sub-ecoregional scale [Sources: 12,15,20,22].

SubEcoregion-Scale Assessment

Forests have been converted to a variety of non-forest land uses, but the largest historic losses in the US are due to urban and agricultural expansion. However, the rate of forest loss in the US has slowed and some areas are beginning to gain forestland. [Source: 13, 15] The U.S. Department of Agriculture has conducted a Natural Resources Inventory since 1982 that shows trends in land use on a state-by-state basis. Forestland cover changes depend on the state, and generally track other forestland change estimates. In every state, agricultural land diminished in that time frame, from a national total of 420 million acres in 1982 to 357 million acres by 2007. Concurrently, developed (urban) land increased by 40 million acres to 111 million acres. [Sources: 13, 17] These data indicate that conversion to agricultural lands is likely no longer a driver for conversion of forested lands. Additionally, while tree plantations are expected to continue to increase in extent in the US, this will most likely occur through afforestation (from agricultural lands), not conversion of existing forests [Source: 18]. This leaves urbanization as the strongest pressure for forest conversion, a conclusion that is supported by numerous sources. [Sources: 7, 9, 10, 11, 12, 25] Therefore, FSC US staff concluded, in consultation with

[3] http://data.globalforestwatch.org/datasets?group_ids=eb644fddcce44adaaf525757ed0f53c7

the NRA WG, that population growth and the associated urban development present the best possible proxy for forest conversion in this risk assessment.

Evidence indicates that forestland is growing in the North Central (a broad area that includes the FSC US Great Lakes Region and the northern portion of the FSC US Non-Forested Region), Northeastern, and Rocky Mountain portions of the United States, while the Southeast and Pacific Coast regions are experiencing forest loss and concurrent rapid population growth. [Sources: 7,24]

Within the Southeastern United States, the highest rates of urban development are occurring in the Piedmont region from northern Georgia through North Carolina into Virginia. Forest loss is also occurring along the Atlantic Coast and in eastern Texas. [Source: 9,10,11,12] Despite the high rates of urban growth and development across the Southeast, this growth is not consistent across the region. [Source 12]

The Pacific Coast Region is also experiencing urban growth leading to conversion from forest to non-forest land use, though this growth appears to be concentrated on the western portions of Washington and Oregon. [Source 8,16] The National Resources Inventory has indicated a decline in forest land in the three Pacific Coast states. [Source 13] However, the most recent assessment of California's Forests and Rangelands indicates that in the most recent years assessed, wildfire disturbance was the most common disturbance in forests [Source 30].

Indication of Risk: In the United States, there is no legal framework that consistently or comprehensively governs conversion of forestland to non-forestland or from forestland to plantation. Overall, the rate of deforestation in the US is very low. Urban development has been found to be a primary driver of conversion from forest to non-forest land uses [Sources: 7,9,10,11,12,25]. Rates of urban development vary throughout the United States with higher rates in the Pacific Coast region and portions of the Southeast Region [Sources: 7,24]. These two regions are also the regions identified as experiencing more recent forestland loss. Therefore, the greatest risk of materials entering the supply chain from conversions will most likely be in these two regions; however, the risk is not consistent across the regions.

Conversion is driven by population growth and the associated urban development. Therefore, population growth by county between 2015 and 2016 and residential building permits issued by Core Based Statistical Areas (CBSAs) over the same time period were used together as a proxy to identify counites where there is likely a greater risk of materials from conversions entering the FSC supply chain. [Sources: 26,27] CBSAs consist of the county or counties associated with a core urbanized or urban area with a population of at least 10,000. These data were analyzed using a population growth threshold of 2% and a building permits issued threshold of 1500. These thresholds were selected based on analyses done by the US Census Bureau [Source 28] and the US Department of Housing and Urban Development. [Source 29] Additionally, non-forested portions of counties were removed (based upon the forest cover data layer available from the IFL Mapping Team[4]).

Risk Designation:

- Pacific Coast Region: Specified Risk for the following counties:
    - Oregon: Columbia, Deschutes*, Yamhill
    - Washington: Pierce, Snohomish, Thurston
- Southeast Region: Specified Risk for the following counties:
    - Alabama: Baldwin
    - Delaware: Sussex

[4] Forest Zone Extent (http://www.intactforests.org/data.ifl.html)

- Florida: Clay, Collier, Flagler, Hernando, Hillsborough, Lake, Lee, Nassau, Orange, Osceola, Pasco, Polk, Santa Rosa, St. Johns, St. Lucie, Volusia
- Georgia: Barrow, Bryan, Cherokee, Clayton, Columbia, Effingham, Forsyth, Henry, Paulding
- North Carolina: Brunswick, Cabarrus, Chatham, Currituck, Johnston, Mecklenburg, Pender, Wake
- South Carolina: Berkeley, Horry, Jasper, Lancaster, York
- Texas: Bastrop*, Brazos*, Liberty*, Montgomery, Waller*
- Virginia: Loudoun, New Kent

- Remainder of the assessment area: Low Risk

NOTE: An asterisk ('*') denotes counties that are only partially designated due to non-forested portions being removed.

NOTE: Static PDF maps of specified risk designations are available on the FSC US web site and a spatial data layer is available upon request.

Sources of Information:

7. Alig, Ralph J., Plantinga, A.J., Ahn, S., and Kline, J.D. **Land Use Changes Involving Forestry in the United States: 1952 to 1997, With Projections to 2050.** U.S. Forest Service, U.S. Department of Agriculture. 2003. Retrieved from http://www.uvm.edu/cosmolab/papers/Alig_2003_4051.pdf
8. Conservation Biology Institute. **Conversion Potential, Pacific Northwest**. 2014. Retrieved from https://databasin.org/datasets/0d87f5ae8be84a5ca153f42318d2c1f8
9. Wear, David N. and Greis, John G. **Southern Forests Futures Project – Technical Report**, USDA USFS Southern Research Station. 2013. Retrieved from https://www.srs.fs.fed.us/pubs/gtr/gtr_srs178.pdf
10. Hanson, Craig, et.al. **Southern Forests for the Future**. World Resources Institute. 2010. Retrieved from http://www.wri.org/publication/southern-forests-future
11. Terando, Adam J., Costanza, J., Belyea, C., Dunn, R.R., McKerrow, A., Collazo, J.A. **The Southern Megalopolis: Using the Past to Predict the Future of Urban Sprawl in the Southeast U.S.** 2014. Retrieved from http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0102261
12. Alig, R., Stewart, S.I., Wear, D.N., Stein, S., Nowak, D.J. **Conversions of forest land: trends, determinants, projections, and policy considerations** *in* Pye, J.M, Rauscher, M.J., Sands, Y., Lee, D.C., and Beatty, J.S. 2010. **Advances in threat assessment and their application to forest and rangeland management.** PNW-GTR-802. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 109 p. Retrieved from https://www.fs.fed.us/pnw/pubs/gtr802/Vol1/pnw_gtr802vol1_alig.pdf
13. US Department of Agriculture. **2012 NRI Summary Report**. 2015. Retrieved from https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd396218.pdf
15. Nelson, Mark D., Flather, C.H., Riitters, K.H., Sieg, C., Garner, J.D. **National Report on Sustainable Forests – 2015: Conservation of Biological Diversity**. US Department of Agriculture, Forest Service, Pacific Northwest Research Station. 2015. Retrieved from https://www.nrs.fs.fed.us/pubs/50436

16. Bradley, Gordon, et al. **Future of Washington's Forest and Forest Industries Study, Study 4: Forest Land Conversion in Washington State**. 2007. Retrieved from http://www.ruraltech.org/projects/fwaf/final_report/pdfs/05_study4_landconv.pdf
17. United States Environmental Protection Agency. **EPA's Report on the Environment: Land Use.** 2009. Retrieved from https://cfpub.epa.gov/roe/indicator.cfm?i=51
18. Stanturf, J.A. and Zhang, D. **Plantations Forests in the United States of America: Past, Present and Future.** A paper submitted to the XII World Forestry Congress. 2003. Quebec City, Canada. Retrieved from http://www.fao.org/docrep/article/wfc/xii/0325-b1.htm
20. Smail, Robert A.; Lewis, David J. 2009. **Forest-land conversion, ecosystem services, and economic issues for policy: a review.** PNW-GTR-797. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 40 p.
21. Belyea, Curtis M., Terando, A.J. **Urban Growth Modeling for the SAMBI Designing Sustainable Landscapes Project**. Biodiversity and Spatial Information Center, NC State University. 2013. Retrieved from http://www.basic.ncsu.edu/dsl/urb.html
22. Masek, J. G., et al. (2011), **Recent rates of forest harvest and conversion in North America**, J. Geophys. Res., 116, G00K03, doi:10.1029 /2010JG001471.
23. Van Deusen, Paul C.; Roesch, Francis A.; Wigley, T. Bently. 2013. **Estimating forestland area change from inventory data**. Journal of Forestry 111(2):126–131
24. M. C. Hansen, P. V. Potapov, R. Moore, M. Hancher, S. A. Turubanova, A. Tyukavina, D. Thau, S. V. Stehman, S. J. Goetz, T. R. Loveland, A. Kommareddy, A. Egorov, L. Chini, C. O. Justice, J. R. G. Townshend. **High-Resolution Global Maps of 21st-Century Forest Cover Change.** Science, 2013; 342 (6160): 850. Retrieved from http://science.sciencemag.org/content/342/6160/850.full
25. Stein, Susan M., Carr, Mary M., McRoberts, Ronald E., Mahal, Lisa G. **Forests on the Edge: The Influence of Increased Housing Density on Forest Systems and Services.** 2012. Retrieved from https://pdfs.semanticscholar.org/d313/f1ac4cc0e9686bfa0f63e226cdf9ebe630b5.pdf?_ga=2.265978191.1785220568.1525278333-91389044.1525278333
26. United States Census Bureau. **County Population Totals and Components of Change: 2010-2016.** 2017. Retrieved from https://www.census.gov/data/tables/2016/demo/popest/counties-total.html
27. U.S. Department of Housing and Urban Development. **SOCDS Building Permits Database.** State of the Cities Data Systems (SOCDS), Retrieved from https://socds.huduser.gov/permits/summary.odb
28. United States Census Bureau. **Maricopa County Added Over 222 People Per Day in 2016, More Than Any Other County.** 2017. Retrieved from https://www.census.gov/newsroom/press-releases/2017/cb17-44.html
29. U.S. Department of Housing and Urban Development. **US Counties Building Permits.** Building Permits Database. Retrieved from https://www.huduser.gov/portal/tmaps/BuildingPermits/BP.html
30. California Department of Forestry and Fire Protection, Fire and Resource Assessment Program. California's Forests and Rangelands: 2010 Assessment. Retrieved from http://frap.fire.ca.gov/data/assessment2010/pdfs/california_forest_assessment_nov22.pdf

CATEGORY 4 CONTROL MEASURES

If an organization wishes to source from a specified risk area, addressing the specified risk through implementation of one of the following two Control Measures is mandatory (CM 4.1 or CM 4.2). If an organization finds that these control measures are inadequate to mitigate risk found in its specific operations, and the conditions established by Clause 4.13 of the Controlled Wood standard (FSC-STD-40-005 V3-1) apply, the organization may replace the following mandatory control measures with more effective control measures.

CM 4.1: The Organization is required to implement both parts of this Control Measure (CM 4.1.a and CM 4.1.b)

CM 4.1.a The Organization develops and implements binding written agreements with suppliers that: i) mitigate the risk that material supplied originates from forest areas converted into plantation or non-forest use; or ii) assure that if some conversion has occurred, that material supplied originates from limited and legal sources of conversion (e.g., conversion that results in conservation benefits, publicly approved changes in zoning in urban areas, etc.) and does not come from sources where the conversion threatens High Conservation Values.

CM 4.1.b The Organization implements CM 4.2.b.

Effectiveness Verification for Control Measure CM 4.1: The Organization is responsible for demonstrating the effectiveness of its binding written agreements. FSC US will assess the effectiveness of actions implemented under 4.1.b, similar to as described below in 'Effectiveness Verification for Control Measure CM 4.2'.

CM 4.2: The Organization is required to implement both parts of this Control Measure (CM 4.2.a and CM 4.2.b)

CM 4.2.a: The Organization implements either CM 4.2.a.i or CM 4.2.a.ii for FSC US Regions relevant to the Organization's supply area:

CM 4.2.a.i: A representative of the Organization attends FSC US-coordinated Controlled Wood Regional Meetings when they occur. The meetings will include the following elements:

- Collaborative dialogues including both certificate holders and stakeholders that result in identification of a focused set of actions that fit within the framework detailed below, and that, if deemed appropriate by Regional Meeting participants, includes a range in the level of resource investment required for implementation.

  Actions identified must help to achieve one of the following outcomes[5]:

  A. Convene partners to identify and protect priority forest areas
  B. Promote national policies and markets to help private landowners conserve forests
  C. Provide resources and tools to help communities expand and connect forests

[5] Drawn from the U.S. Forest Service Open Space Conservation Strategy (https://www.fs.fed.us/openspace/national_strategy.html)

D. Participate in community growth planning to reduce ecological impacts and wildfire risks

- Sharing information, as requested by FSC US, to augment effectiveness verification of actions implemented as part of CM 4.2.b.

  NOTE: It is recognized that depending on the information requested, it may not be possible to share it at the Controlled Wood Regional Meeting, and in this situation the Organization shall share it as soon as possible following the meeting.

NOTE: It is the intention of FSC US to strive for very diverse participation in the Controlled Wood Regional Meetings, including certificate holders, environmental organizations, social organizations, experts, academics, public agencies, and landowners who are not certificate holders.

NOTE: If the collaborative dialogues do not successfully identify a focused set of mitigation actions, FSC US will implement a contingency plan as detailed below.

NOTE: Following each Controlled Wood Regional Meeting, FSC US will produce a Report that includes: 1) A summary of information communicated in advance of, or at the meetings, regarding forest conversion; 2) The outcomes of the collaborative dialogues; and 3) Details of information that has been requested of certificate holders to augment effectiveness verification.

NOTE: The FSC US Board of Directors will review the outcomes of the Controlled Wood Regional Meeting collaborative dialogues (or contingency plan) for any significant risks to the system. It is the Board's intention to endorse these outcomes unless a risk is identified, in which case the Board will approve a revised set of actions that will be published in the Report with rationale for any changes.

Compliance Verification: The Organization demonstrates to their certification body that a representative of the Organization attended the meeting(s) held for the region(s) in which the Organization sources materials and the Organization shared the requested information.

CM 4.2.a.ii: The Organization reviews Controlled Wood Regional Meeting Report(s) and associated information and provides the information requested in the Report.

Compliance Verification: The Organization demonstrates to their certification body an awareness of all three elements of the Controlled Wood Regional Meeting Report and that the requested information was shared.

CM 4.2.b: The Organization shall implement one or more of the actions identified during the collaborative dialogue at the Controlled Wood Regional Meeting, as detailed in the Controlled Wood Regional Meeting Report. When options for action with differential levels of resource investment required for implementation are identified, the action(s) implemented shall be commensurate with the scale and intensity of the Organization's potential impact on the forests in the region.

NOTE: The scale and intensity of the Organization's potential impact on the forests in the region will be informed by: 1) the volume of materials that are being sourced by the Organization from the specified risk area, and 2) the spatial extent of the specified risk area from which the Organization is sourcing materials.

Compliance Verification: The Organization demonstrates when and how the action(s) identified was implemented and why that action(s) was selected.

Effectiveness Verification for Control Measure CM 4.2:
The Organization shall provide input into the effectiveness verification process through its implementation of CM 4.2.a.i. An assessment of the effectiveness of actions implemented in reducing the risk of sourcing from lands where natural or semi-natural forests are being converted to non-forest or plantations shall be determined by FSC US, in consultation with stakeholders, by evaluating the outcomes from each of the three elements of the Controlled Wood Regional Meetings and comparing them with outcomes from previous meetings, in combination with other monitoring data shared by stakeholders. The results of this assessment will be incorporated into the Controlled Wood Regional Meeting Report and will be used to inform future revisions to the National Risk Assessment.

NOTE: While effectiveness verification will be linked to the Controlled Wood Regional Meetings, which are expected to occur every 3 to 5 years, the Organization is still responsible for reviewing its Due Diligence System at least annually (as specified in FSC-STD-40-005 V3-1, Clause 1.6) to determine if any revisions to the Organization's Due Diligence System are needed.

Contingency Plan for CM 4.2.a

In the event that the Controlled Wood Regional Meeting collaborative dialogues do not come to a successful resolution, the following will be implemented in sequential order until a resolution has been achieved.

1. A small group of certificate holder and stakeholder representatives from the region is formed to build on the information and perspectives shared during the dialogue at the regional meeting. The participants in the group are identified at the regional meeting at the point when it is apparent that it will not be possible find agreement on a set of mitigation actions by the end of the meeting. The participants must have demonstrated an ability to represent the perspective of the chamber with which they are most aligned, an ability to be open to other perspectives and new ideas and an ability to compromise. This group will be asked to complete the process within a short timeframe.
2. If the small group participants are not successfully identified at the regional meeting, FSC US will solicit participants representing a diversity of perspectives and formalize a group in consultation with the FSC US Board of Directors. (with the same constraints on participation as detailed above). Similar to #1 above, this group will be asked to build on the dialogue held at the regional meeting and develop a set of mitigation actions.
3. If the small group in #1 or #2 above is unable to find agreement on a set of mitigation actions within 6 weeks of the Controlled Wood Regional Meeting, FSC US Staff will build on the dialogue held at the regional meeting and the discussions of the small group, and develop a draft set of mitigation actions to be approved by the FSC US Board of Directors prior to being published in the regional meeting report.