



FOREST STEWARDSHIP COUNCIL®
UNITED STATES

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FSC® F000232

Environmental and Social Risk Assessment: National Guidance for the United States

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FSC-US

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Introduction and Purpose

The purpose of this document is to provide national-level guidance for the development of environmental and social risk assessments (ESRAs) for chemical pesticide application on FSC-certified land in the United States. The ESRA is a requirement of the FSC Pesticides Policy ([FSC-POL-30-001](#)) and must be completed by certificate holders who wish to apply any chemical pesticide on FSC-certified land.

The draft International Generic Indicators for the Use of Highly Hazardous Pesticides (HHP-IGIs) have not been incorporated into these national guidance ESRAs. FSC US is actively working with FSC International to better understand the expectations of certificate holders following release of the recently revised Interpretation regarding incorporation of draft HHP-IGI into certificate holders' ESRA. However, depending on the chemical pesticide and timing of application, CHs may immediately need to incorporate relevant portions of the draft HHP-IGI into their MU ESRA. The FSC US Pesticides [website](#) will be continuously updated to provide the most current information about updated interpretations and HHP-IGI drafts. Please visit this site regularly until the HHP-IGI are finalized and incorporated into the US FM Standard.

This document contains sections for the [FSC Pesticides Policy](#); [background and expectations](#), [methods](#) (efforts related to this document); and [instructions for certificate holders](#) who wish to adapt the national guidance ESRA to their management unit(s). The actual national guidance ESRAs provided in this document are national in scope and uses all forested land in the US as their land base. These ESRAs (including their [Environmental](#) and [Social](#) components) and [templates](#) for certificate holders are presented as appendices at the end of this document.

Please note that use of the national guidance ESRA presented in this document is not required (i.e., certificate holders may choose to develop and present their ESRA using different methods and format). This document was drafted by FSC US staff in coordination with stakeholder outreach and a small technical working group consisting of a representative from a certificate holder (a state natural resource agency), a representative from an auditing organization, and a toxicologist.

Policy Introduction

The FSC Pesticides Policy ([FSC-POL-30-001](#)) has been revised to employ a risk-based approach that considers the hazard of a chemical pesticide's active ingredient and the circumstances for which a chemical pesticide (i.e., includes fungicides, rodenticides, herbicides, piscicides, etc.) can be used. FSC requires certificate holders (CHs) to use integrated pest management (IPM) to avoid or eliminate chemical pesticides on management units (MUs). In various situations, the IPM will identify a chemical pesticide as the most suitable control option. "The [FSC Pesticides Policy](#) regulates the use of chemical pesticides in these situations" (FSC Pesticides Policy, 2019).

A primary component of the new, risk-based approach is the environmental and social risk assessment (ESRA). Completed by CHs at the MU-level, the ESRA is conducted once the CH's IPM has identified that chemical control is the best control option and they have decided on the specific pesticide that will be used. An ESRA is required for all chemical pesticides including [highly hazardous pesticides \(HHPs\)](#), categorized as Prohibited, Highly Restricted, and Restricted, as well as non-HHPs.

Figure 1 depicts how the FSC Pesticides Policy integrates with the CH's IPM, and Figure 2 provides a flow chart for navigating the FSC Pesticides Policy after the IPM has identified chemical control as the best option. As concept tools, both of these visual aids present the FSC Pesticides Policy in broad strokes. However, when using highly hazardous pesticides (HHPs), CHs will need to a) in the short term, understand how any recent Interpretations from FSC International affect their need to incorporate the most current draft of the HHP-IGIs into their ESRA and b) in the long term, comply with the relevant indicators in the National Forest Stewardship Standard once the HHP-IGIs are incorporated. The focus of the remainder of this document, is on providing national-level guidance for the ESRA component of the FSC Pesticides Policy.

For current information on the FSC Pesticides Policy, please visit the FSC US Pesticides [web page](#).

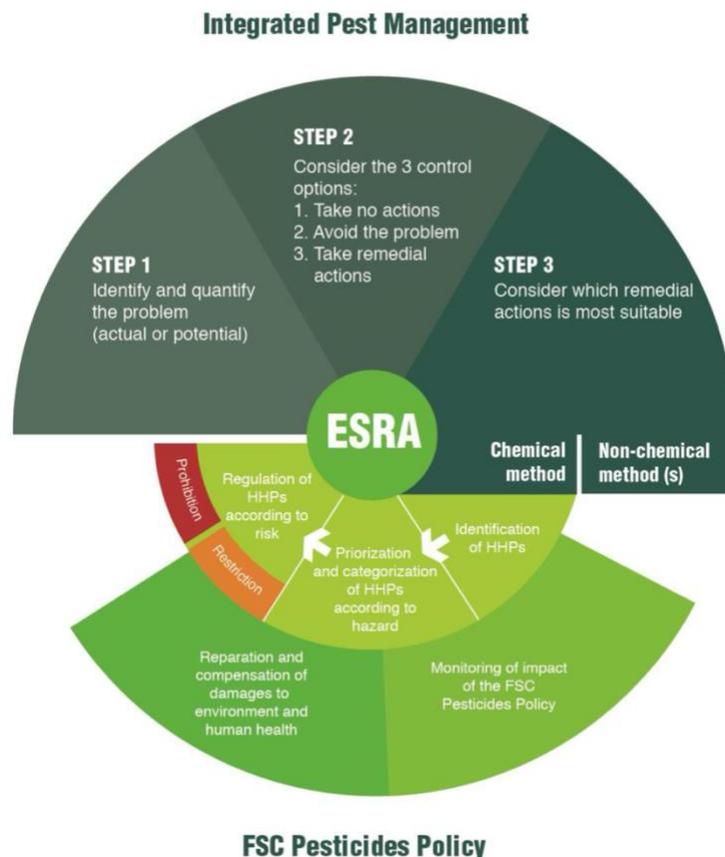


Figure 1. Relation between the FSC Pesticides Policy and Integrated Pest Management (FSC Pesticides Policy, 2019)

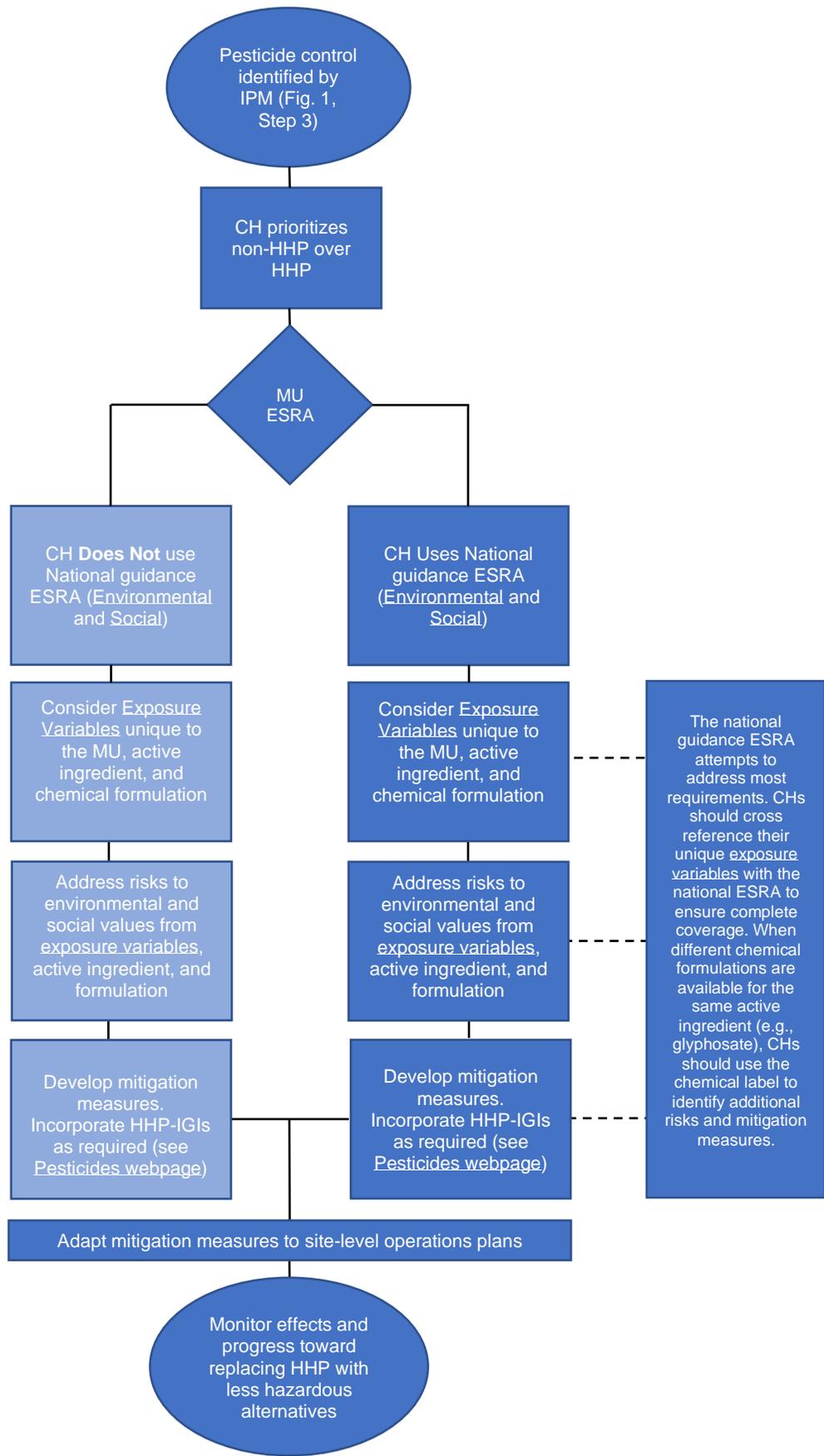


Figure 2. Flow chart for navigating the FSC Pesticides Policy after the IPM has identified chemical control as the best option. Links to components of the Environmental and Social Risk Assessment (ESRA) and for identification of highly hazardous pesticides (HHP) are provided. See also [ESRA Framework: Role of Organizations](#).

Background and Expectations

1. This document contains the national-level Environmental and Social Risk Assessment (ESRA) that has been developed as Guidance for certificate holders (CHs) and certification bodies (CBs).
2. CHs can choose to adapt, adopt, or not use this national-level guidance ESRA and develop their own. *In all cases, the FSC Pesticides Policy requires additional steps for conformance with the Policy* (see Figure 2 flow chart).
3. FSC International publishes International Generic Indicators to increase the consistency of FSC National Forest Stewardship Standards. The IGIs for the Pesticides Policy are draft as of Spring 2020. As of this publication, CHs will need to a) in the short term, understand how any recent Interpretations from FSC International affect their need to incorporate the most current draft of the HHP-IGIs into their ESRA and b) in the long term, comply with the relevant indicators in the National Forest Stewardship Standard once the HHP-IGIs are incorporated. Please visit the FSC US Pesticides [webpage](#) to find the most current information.
4. Policy links are provided in the Policy Reference Section

Methods

This section provides the methods that FSC US used to complete this national ESRA for glyphosate.

1. FSC attempted to address, in forestry settings, the majority of common characteristics of pesticides use ([exposure variables](#)) and their effect on the required list of social and environmental values.
2. The product of this work is the national guidance ESRA. The format is copied directly from the optional formatting provided in the FSC Pesticides Policy.
3. The information provided in this ESRA is based on a literature review of publicly available national-level risk assessments, Safety Data Sheets (SDS), and pesticide labels.
4. Referenced publicly available national-level risk assessments include a) the Environmental Protection Agency (EPA) registration review supporting and interim documents and b) United States Forest Service (USFS) human health and ecological risk assessments.
5. Broadly, EPA and USFS risk assessments were used to identify risks and SDS and pesticide labels were used to identify risk mitigation measures. References for all data sources are located on the Environmental and Social Tabs.
6. Determinations of Risk and Risk Mitigation measures in this ESRA are broadly applicable at all landscape scales and in most forestry settings.
7. Background on the methods utilized by the EPA and USFS are provided below:

US Forest Service Human Health and Ecological Risk Assessments

The USFS has prepared Human Health and Ecological Risk Assessments (HERAs). In the HERAs, the process of risk assessment is used to quantitatively evaluate the probability (i.e. risk) that use of pesticides in forests might pose harm to humans or other species in the environment. It is the same assessment process used for regulation of allowable residues of pesticides in food, as well as safety evaluations of medicines, cosmetics, and other chemicals. The Forest Service incorporates relevant information from the HERA into

environmental assessment documents prepared for pesticide projects. HERAs are used to guide decision-making and to disclose to the public potential environmental effects.

For additional information, see the USFS Pesticide Management and Coordination webpage at <https://www.fs.fed.us/foresthealth/protecting-forest/integrated-pest-management/pesticide-management/pesticide-risk-assessments.shtml>

EPA Pesticide Risk Assessments and Registration Review Decision Documents

EPA must review each registered pesticide at least every 15 years to determine whether it continues to meet the regulatory standard for registration. The registration review process is lengthy and thorough and includes things like:

- Collecting information about the pesticide and its current use and usage;
- Holding focus meetings to address areas of uncertainty like unclear labels or missing studies;
- Consider any new data or information on the pesticide;
- Requesting additional information from the manufacturer if necessary;
- Conducting ecological and human health risk assessments; and
- Issuing a Registration Review Decision.

The ecological and human health risk assessments consider risks to non-target organisms, including a full range of terrestrial and aquatic organisms (e.g. plants, invertebrates, fish, wildlife) and human applicators, workers and by-standers (adults and children, as appropriate). The Registration Review Decision includes, among other things, a summary of the findings of the risk assessments and any risk mitigation measures that must be adopted in order to apply the pesticide.

For additional information, see “Understanding the Science behind EPA’s Pesticide Decisions,” available online at <https://www.epa.gov/pesticide-registration/understanding-science-behind-epas-pesticide-decisions>.

Policy References/Links

This section contains useful policy links for certificate holders. It also contains actual language from the Pesticides Policy pertaining to two topics that are especially relevant to ESRAs including the role of Organizations in the ESRA framework and a description of local [exposure variables](#).

[FSC US Website – Pesticides Policy](#)

[FSC-POL-30-001 V3-0 EN FSC Pesticides Policy \(2019\)](#)

[FSC-POL-30-001a EN FSC Lists of Highly Hazardous Pesticides \(May 1st, 2019\)](#)

[FSC-STD-60-004a International Generic Indicators for the use of Highly Hazardous Pesticides \(Draft 1-0, 2020\)](#)

[INT-POL-30-001_07 Interpretation of Pesticides Policy \(see link under Tools and Resources at bottom of page\)](#)

FSC-POL-30-001 V3-0 EN FSC, ESRA framework: role of Organizations

4.12 The Organization shall:

1. Give preference, as a matter of principle, to non-chemical methods over chemical pesticides, chemical pesticides not listed in the FSC lists of HHPs over those listed in the FSC lists of HHPs, and FSC restricted HHPs over FSC highly restricted HHPs.
2. Undertake a comparative ESRA according to scale, intensity and risk (SIR) as part of its integrated pest management to identify the lowest risk option to control a pest, weed or disease, the conditions for its use and the generic mitigation and monitoring measures to minimize the risks.

3. Consider in their ESRA the minimum list of types of hazards, exposure elements and [exposure variables](#) described in Annex 2.
4. Select the option that demonstrates least social and environmental damages, more effectiveness and equal or greater social and environmental benefits.
5. Conform with the applicable international and national indicators and thresholds for the use of HHPs.
6. Before applying any chemical pesticide, incorporate the results of their ESRA to site operational plans, to identify site-specific risks and adapt the generic mitigation and monitoring measures previously identified in the IPM ESRA (Clause 4.12.2).
7. Make the ESRAs and incorporation to the operational plans available to affected stakeholders upon request.
8. Consult the online FSC database for information exchange on alternatives and monitoring procedures.
9. Have programs in place, according to SIR, to research, identify and test alternatives to replace FSC highly restricted HHPs and restricted HHPs with less hazardous alternatives. Programs shall have clear actions, timelines, targets and resources allocated. 10. Engage with stakeholders in conformance with the requirements in the applicable National Forest Stewardship Standard or Interim National Standard when conducting ESRA.
10. Not use any FSC Prohibited HHPs except in the case of an emergency situation or by governmental order. (See Annex 3. Procedure for use of FSC prohibited HHPs in case of emergency situations or governmental orders).
11. Inform third-party processing plants located in the spatial area of the MU and third-party nursery suppliers of the list of FSC prohibited chemical pesticides, encouraging them to avoid these pesticides in their processes and in the production of seedlings and other materials entering the management unit.
12. Request the list of FSC prohibited chemical pesticides used by processing plants and nurseries suppliers described in clause 4.12.12.

FSC-POL-30-001 V3-0 EN FSC, Annex 2, Section 2.2 Local exposure variables

The conditions of chemical pesticide use affect the level of exposure. To reduce the risk of chemical pesticide use, the following variables, at a minimum, shall be considered:

- Formulation (type and components).
- Mixture of active ingredients (composition and mixing process).
- Concentration of the active ingredient(s).
- Dose of the active ingredient(s).
- Frequency and interval of application.
- Scale of treatment area.
- Method of application (e.g., spot, foliar, spray, aerial, broadcast)
- Application system and equipment (e.g., knapsack sprayer, helicopter, drone, plane)
- Number of previous applications.
- Metabolites of the active ingredient.
- Capacity and skills of workers (license to handle pesticides, training, ability to read and understand labels and instructions).
- Personal protective equipment.
- Emergency related equipment (e.g., first aid, spill kits).
- Site conditions (e.g., soil type, topography of the area).
- Predicted weather and climatic conditions (e.g., wind speed and direction, temperature, humidity).
- Spray drift.
- Waste management systems.
- Information available to neighbors about pesticide application (e.g., risks associated with pesticide use, re-entry period after application).

Using this National Assessment: Instructions for Certificate Holders

1. The national guidance ESRA is presented following this section and contains two parts: Environmental and Social. Templates for CHs to use when adapting this ESRA for their MU are provided following the national guidance ESRA. The relationship between the MU ESRA and this national guidance ESRA and a flowchart for adapting this ESRA to the MU-level are provided in Figures 3 and 4, respectively.
2. Organizations need to have a chemical pesticide specific ESRA for each MU. Certificate holders have three options regarding the use of this national guidance ESRA when developing their own ESRAs:
 - a. **Adopt:** *Adopt the national guidance ESRA as is. Use this option when the MU does not have unique risks or features that call for use of additional or alternate mitigation measures beyond those identified in the national ESRA. Incorporate HHP-IGI as required, see [Pesticides page](#).*
 - b. **Adapt:** *Adapt the national guidance ESRA to the specific needs of your MU. Use this option if you need to augment this national ESRA with risks and mitigation strategies unique to the MU. The national guidance ESRA is used as the foundation for the MU ESRA, but additional or alternate mitigation measures are added to address unique risks and features (see Figures 3 and 4). Incorporate HHP-IGI as required, see [Pesticides page](#).*
 - c. **Use as an example:** *If you wish to use the base ESRA template provided within the Pesticide Policy but prefer to begin with a blank template and complete it yourself, this national ESRA may be useful as an example for how to complete the template.*

NOTE: In the national guidance ESRA, FSC US attempted to address most of the common pesticide application characteristics (a.k.a. [exposure variables](#)) and their effect on environmental and social values in US forests. However, if the CH chooses to adopt or adapt this template, the burden will be on the CH to identify any additional risks presented by the [exposure variables](#) and chemical formulation beyond those identified in this national ESRA (see numbers three through five, below).

3. In their MU ESRA, CHs need to consider MU characteristics (a.k.a. [exposure variables](#)) and chemical formulations, address the risks presented to environmental and social values, and develop appropriate mitigation measures to be implemented when those risks are present at the site level.
4. Relevant MU characteristics (a.k.a. [exposure variables](#)) include, but are not limited to:
 - a. pesticide characteristics (e.g., formulation, mixture, concentration, and dose),
 - b. application method/system,
 - c. site conditions (e.g., soil type, topography, weather, and climate), and
 - d. information available to neighbors about pesticides application shall be considered
5. Note that this national guidance ESRA has been completed for the active ingredient and that unique formulations (e.g., presence of a surfactant) may cause different risk characteristics that are not accounted for here. In these situations, the CH should cross reference the label for the specific formulation with the national guidance ESRA to identify any unaccounted-for risks and mitigation measures. These should then be added to the MU ESRA, and CHs should identify the specific formulation on their ESRA.
6. When considering application of a pesticide at the site level (i.e., as part of a Site Operations Plan, see Figure 2), CHs should consider site characteristics and implement the risk mitigation strategies developed at the MU level for those risks. Site-level characteristics to consider include, but are not limited to:
 - a. The scale of the operation: What area is being treated?
 - b. The intensity of the operation: Is the entire area treated? Are other areas nearby being treated?
 - c. The hazard represented: How toxic is the chemical pesticide to non-target values? Are high-risk values likely to be affected given the application method used?
 - d. Local conditions: This includes environmental, social and regulatory aspects. How does the environment of the area to be treated affect the choice of chemical pesticide(s) and/or application methods? Are there people living nearby and/or do they use the area to be treated for recreation, for NTFPs collection purposes? How do regulatory requirements affect the choice of chemical pesticide(s) and/or application methods?"

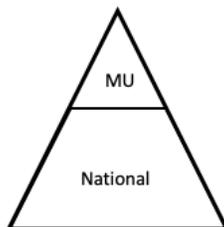


Figure 3. Adaptation Option for the Management Unit ESRA

The entire triangle represents the Organization’s MU ESRA. The ESRA is built on assessment of the *exposure variables* and social/environmental values identified at the national level. The top part of the triangle represents assessment of the *exposure variables*, chemical formulation, and environmental/social values that are unique to the MU (i.e., not addressed in the national ESRA). Together, these two assessments comprise the Organization’s MU ESRA when the Adaptation approach is selected.

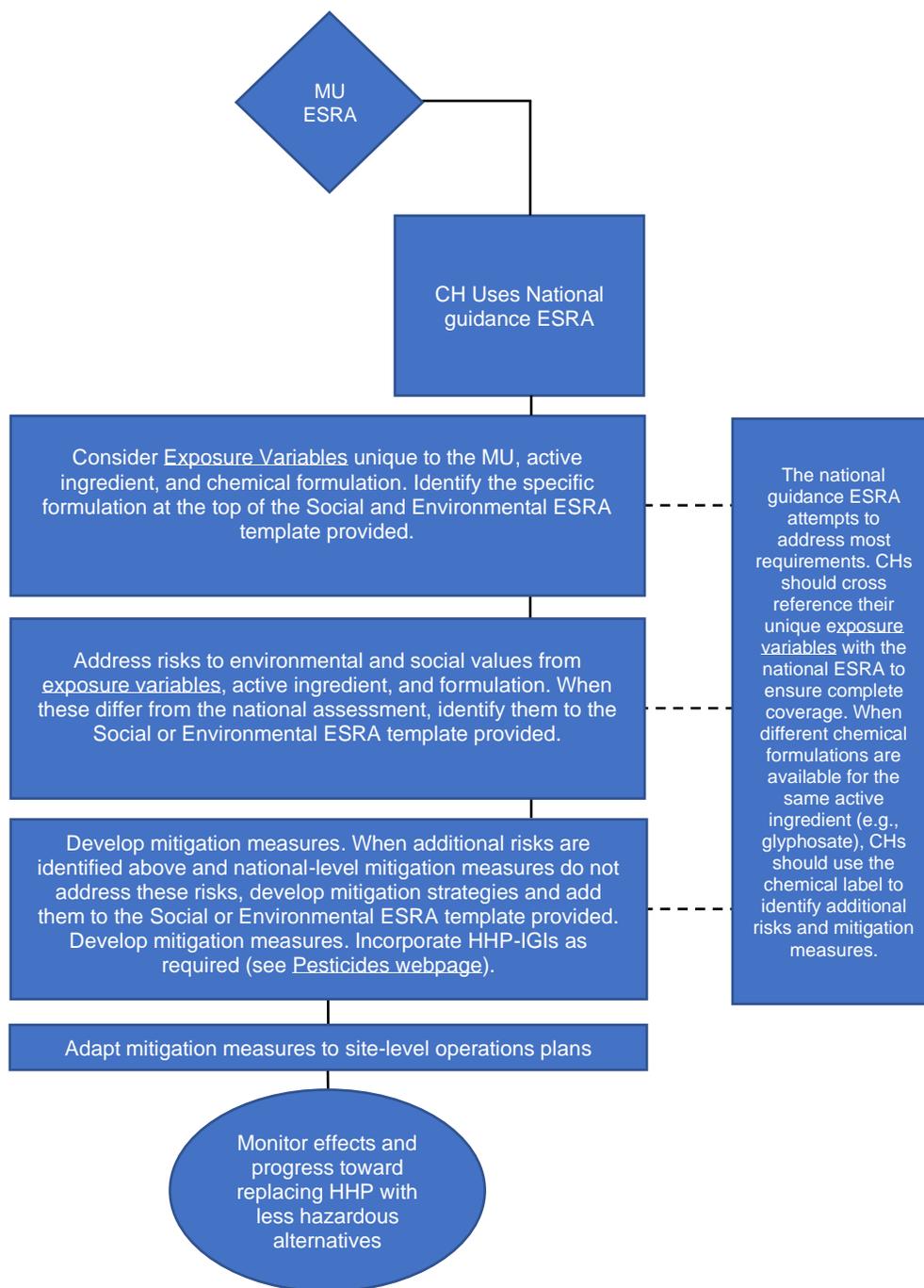


Figure 4. Flowchart for Adaptation of the National Guidance ESRA

Appendix 1: National Guidance ESRA for Glyphosate

A Note About Formulations

The FSC Pesticides Policy lists glyphosate and its salts as a restricted, highly hazardous pesticide. Identification of risk in the following environmental and social risk assessment for glyphosate and its salts is primarily based on risk assessments produced by the US Environmental Protection Agency (EPA) and the US Forest Service (USFS). Information regarding formulations from the USFS risk assessment for glyphosate is paraphrased, below¹. As identification of risk was derived from the EPA and USFS risk assessments, this ESRA utilizes the same approach regarding treatment of formulations and surfactants¹:

The USFS considered 52 formulations of glyphosate in its risk assessment (Table 1). When considering formulations, distinct surfactants are more important to the risk assessment than glyphosate's various salts. Additionally, expanded inert statements on product labels is encouraged but not required, and, for the most part, product labels for glyphosate do not clearly designate the use of surfactants.

Use of surfactants are a major issue in the USFS risk assessment for glyphosate, as they may enhance the toxicity of glyphosate but are difficult to account for. For instance, the identify of surfactants is required to be disclosed to the EPA as part of the registration process, but this information is not disclosed publicly, because it is classified as trade secret in the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Surfactants are also added to glyphosate formulations prior to application, further complicating the ability to account for them in this risk assessment.

Acknowledging the ambiguities that are characteristic of glyphosate formulations, the USFS risk assessment indicates that *"This document only assesses a surfactant when it is included as part of the formulated product; it does not assess a surfactant that may be included in the tank mix"*. Additionally, some commercial formulations of glyphosate contain other pesticides, and some pesticide labels indicate other pesticides which may be used with glyphosate. The USFS risk assessment indicates that *"As with the previous Forest Service risk assessments (SERA 1996, 2003) and the glyphosate risk assessments conducted by the U.S. EPA/OPP (1996a, 2008a), the current Forest Service risk assessment does not consider formulations with multiple active ingredients"*.

Table 1. Glyphosate Formulations Identified by the US Forest Service Risk Assessment¹**Table 2: Glyphosate Formulations Identified by the Forest Service**

Formulation Name	Supplier	EPA Reg. No.	Form	Salt	% a.i.	Surfactant	Other
Accord	Monsanto	524-326	L	IPA	41.5%		Aq
Accord Concentrate	DowAgro Sciences	62719-324	L	IPA	53.8%		
Accord SP	DowAgro Sciences	62719-322	L	IPA	41%	X	No longer available
Accord XRT	DowAgro Sciences	62719-517	L	IPA	53.6%	X-POEA ^[10]	
Accord XRT II	DowAgro Sciences	62719-556	L	DMA	50.2%	Inferred	
Aqua Star	Albaugh, Inc.	42750-59	L	IPA	53.8%	? ^[7]	
AquaMaster (a.k.a. Export and Rodeo)	Monsanto	524-343	L	IPA	53.8%		Aq
AquaNeat	Riverdale	228-365	L	IPA	53.8%		Aq
Buccaneer	Tenkoz Inc	55467-10	L	IPA	41.0%	X	
Buccaneer Plus	Tenkoz Inc	55467-9	L	IPA	41.0%	X	
Cornerstone	Winfield Solutions Agrisolutions	1381-191 71368-20-1381	L	IPA	41.0%	X	
Cornerstone Plus	Winfield Solutions	1381-192	L	IPA	41.0%	?	
Credit Extra	Nufarm	71368-65	L	Am K	17.86% 16.26%	X POEA?	
Credit Systemic Extra	Nufarm	71368-20	L	IPA	41.0%	X POEA?	
Diamondback	EZ-Ject	83220-1	Sh	IPA	83.5%		Injection
DuraMax	DowAgro Sciences	62719-556	L	DMA	50.2%	Inferred	
Durango (GF-1279)	DowAgro Sciences	62719-517	L	IPA	53.6%	X-POEA ^[10]	
Durango DMA (GF-1280)	DowAgro Sciences	62719-556	L	DMA	50.2%	Inferred	
Eliminator [4,6]	Gro Tec, Inc	71995-27	L	IPA	41.0%	X	
Foresters' Non Selective	Riverdale	228-381	L	IPA	53.8%	None ^[8]	
Glyphogan	Makhteshim Agan	66222-105	L	IPA	41.0%	Inferred	
Glyphomax 41 Plus [4]	DowAgro Sciences	62719-322	L	IPA	41.0%	Inferred	
Glyphomax XRT	DowAgro Sciences	62719-517	L	IPA	53.6%	X-POEA ^[10]	
Gly Star Plus	Albaugh Inc	42750-61	L	IPA	41.0%	X	
Glyphosate VMF	DuPont	352-609	L	IPA	53.8%		Cancelled ?
Glyphosate 41 Plus	CropSmart	42750-61-72693	L	IPA	41.0%	?	
GlyphoMate 41 or Pronto	PBI/Gordon Corporation	2217-847	L	IPA	41.0%	X	
Glyfos Aquatic	Cheminova A/S	4787-34	L	IPA	53.8%		Aq
Glyfos X-TRA	Cheminova A/S	4787-23	L	IPA	41.0%	X 15% ^[6]	
Glypro	DowAgro Sciences	62719-324	L	IPA	53.8%		
Gly-4 Plus	Universal Crop Protection Alliance	72693-1	L	IPA	41.0%	X	
Helosate Plus	Helm Agro US, Inc	74530-4	L	IPA	41.0%	Inferred	
Hi-yield Killzall	Voluntary Purchasing Groups Inc	67760-49-7401		IPA	53.8%		Aq
Honcho (a.k.a. Roundup Original)	Monsanto	524-445	L	IPA	41.0%	X	
Honcho Plus	Monsanto	524-454	L	IPA	41.0%	X	
Imitator Plus	Drexel Chemical	19713-526	L	IPA	41.0%	?	

Formulation Name	Supplier	EPA Reg. No.	Form	Salt	% a.i.	Surfactant	Other
KGro Grass and Weed Killer ^[5]	Swiss Farms Products Inc,	71995-27-73327	L	IPA	1.92%		
Mirage	Loveland Products	34704-866	L	IPA	41.0%	Inferred	
Ranger Pro	Monsanto	524-517	L	IPA	41.0%	X	
RapidFire	DowAgro Sciences	62719-556	L	DMA	50.2%	Inferred	
Rattler	Monsanto	524-445-ZE-5905	L	IPA	41.0%		
Razor	Nufarm	228-366 [1]	L	IPA	41.0%	X 8% ^[8]	
Razor Pro	Nufarm	228-366 [1]	L	IPA	41.0%	X 14% ^[8]	
Rodeo	DowAgro Sciences	62719-324	L	IPA	53.8%		
Roundup Original Max	Monsanto	524-539 [3]	L	K	48.7%	X	
Roundup Pro	Monsanto	524-475 [2]	L	IPA	41.0%	X 14.5%	
Roundup Pro Concentrate	Monsanto	524-539 [3]	L	IPA	50.2%	X 13%	
Roundup ProDry	Monsanto	524-505	G	Am	71.4%	X	
Roundup ProMax	Monsanto	524-579	L	K	48.7%	X	
Roundup UltraMax	Monsanto	524-512	L	IPA	50.2%	X	
Roundup UltraDry	Monsanto	524-504	G	Am	71.4%	X 25%	
Roundup WeatherMax	Monsanto	524-537	L	K	48.8%	X	
RT 3	Monsanto	524-544	L	K	48.8%	X	

^[1] Razor and Razor Pro appear to have the same EPA Registration number but the formulations are different.

^[2] Based on the EPA master product label, this registration number applies to the following brand names: Roundup Ultra Herbicide; Roundup Ultra RT Herbicide; Roundup Pro Herbicide; Roundup Original II CA; MON 77360 Herbicide; Roundup W Herbicide; Gly 41 Herbicide.

^[3] Based on the Product Labels and MSDSs, Roundup Original Max and Roundup Pro Concentrate have the same EPA registration number but contain different salts of glyphosate.

^[4] Need specimen label. The EPA labels are not clear (are ambiguous) in terms of the formulation(s) covered.

^[5] MSDS cannot be located, including searches of <http://www.msdsonline.com> and <http://www.cdms.net>.

^[6] From Lajmanovich et al. 2003 but not specifically identified as Glyphos Plus.

^[7] Bringolf et al. (2007) state that Aqua Star does not contain the MON 0808 POEA surfactant. It is not clear whether or not this formulation contains a less toxic surfactant.

^[8] Information confirmed by Nufarm (Ehresman 2010a).

^[9] Dow (Fonseca 2010a) has indicated that Accord SP (EPA Reg. No. 62719-322) is not longer commercialized.

^[10] Based on information provided by Dow AgroSciences (Fonseca 2010a)

Key:

Form: L=Liquid; G=Granular; Sh=Shells

Salt: Am=Ammonium salt; DMA=Dimethylamine salt;

IPA=Isopropylamine salt; K=Potassium salt;

Other: Aq=Aquatic application; Inj=Injection.

Formulations containing herbicides other than glyphosate as the a.e. are not included.

Environmental National Assessment

Pesticide:	Glyphosate		Specific Formulation:
Hazard Status:	Glyphosate is a restricted, highly hazardous pesticide (HHP) based on its classification in the Chronic Toxicity hazard group and demonstration of the potential for carcinogenic properties (Criterion 3) per the FSC Pesticides Policy (FSC-POL-30-001 V3-0 EN) and the FSC Lists of Highly Hazardous Pesticides (FSC-POL-30-001a EN). However, risks from other FSC hazard groups and toxicity categories were not precluded from this assessment.		DISCLAIMER: Adoption or adaption of this national-level assessment alone does not guarantee compliance with FSC-POL-30-001 V3-0 (see Background/Expectations Section)
Exposure Elements	Minimum list of values	Description of why/why not a risk	National-level Mitigation strategies defined to minimize risk₁
Environmental	Soil (erosion, degradation, biota, carbon storage)	<p>Minimal indication of adverse effects to Soil was found when glyphosate is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>There is potential for soil erosion due to vegetation changes and effects on soil microorganisms.</p> <p>There is minimal indication of adverse effect to terrestrial microorganisms (1): Most studies find minimal effect on soil microorganisms based on field trials, but some contradictory studies find an effect when tests are performed in the lab (1).</p> <p>Effects on terrestrial vegetation may cause changes in microbial populations (1). Changes to terrestrial vegetation may also cause erosion of soil (1).</p>	<p>Follow all pesticide label application instructions. Follow applicable criterion and indicators from the FSC US FM Standard V1.0 (e.g., Criterion 4.3 for worker safety, Criterion 7.3 for worker training, Criterion 6.5 for protecting water resources, and Criteria 8.1 and 8.2 for Monitoring). Additional risk mitigation strategies are provided below. Organizations should take reasonable steps toward avoiding environmental and social impacts by considering the mitigation strategies provided below, as well as application-, Organization-, or location-specific strategies.</p> <p>General consideration of exposure variables designed to mitigate risk:</p>
		Water (ground water, surface waters, water supplies)	<p>Minimal indication of adverse effects to Water was found when glyphosate is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>All formulations may pose risk to sensitive aquatic plant species, while tolerant species should not be adversely affected by non-accidental exposures (1).</p> <p>Due to its herbicidal properties there is potential for secondary effects caused by spray drift to increase risks to non-target aquatic plants (2).</p>

		<p>Some formulations are more toxic to aquatic organisms due to the presence of an added surfactant. Rodeo, for example, has no surfactant added because it's intended for use in water to treat aquatic weeds (1).</p> <p>There is potential for contamination of water used for irrigation (1). However, risk of contaminated surface water for drinking water resources is low (1).</p>	<p>humidity) conditions and the likely effect on risk to environmental and social values.</p> <p>-Have appropriate waste management systems in place.</p> <p>Mitigating Risk to the Environment: <i>reduce contact with water resources and minimize application amounts and number of applications.</i></p>
Environmental	Atmosphere (air quality, greenhouse gasses)	<p>Minimal indication of adverse effects to Atmosphere was found when glyphosate is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>Studies done in South America have shown an association between spray formulations mixed with surfactants and the potential for genotoxic effects. However, the exposure concentrations, routes of exposure, and exposure patterns are not relevant to those expected to occur during and after forestry applications in the US (1, 2).</p>	<p>-Never apply directly to water, or areas where surface water is present. This includes when you are cleaning equipment (3).</p> <p>-Reduce applications by considering that when applying to annual or perennial weeds "that have been mowed, grazed, or cut and have not been allowed to regrow to the recommended stage for treatment" reduced control could result (3).</p> <p>-Reduce runoff by considering weather patterns, as weather events like heavy rainfall could wash the product off of targeted foliage (3).</p> <p>-Targeted spray should be uniform and complete, without reaching the point of runoff (3).</p>
	Non-target species (vegetation, wildlife, bees and other pollinators, pets)	<p>Most broadleaf plants will be killed or seriously injured by direct exposure to glyphosate, although there is significant range sensitivity among species (1). Minimal indication of adverse effects to other Non-target species (e.g., terrestrial microorganisms, mammals, invertebrates, and birds) was found when glyphosate is used according to label instructions in forestry applications (1). Additional considerations are provided, below.</p> <p>Hazard for acute exposure to small mammals (rabbits, rats) from consuming contaminated vegetation after terrestrial application (1). Additionally, consumption of contaminated insects may reach level of concern, especially for more toxic formulations (1). Unintentional secondary effects on vegetation may benefit or adversely affect mammals (1). Changes in vegetation are more likely to affect terrestrial invertebrates than their own exposure to</p>	<p>-Aerial applications should only be made under meteorological conditions that minimize the potential for spray drift (3).</p> <p>Mitigating Risk to Public Access/Public Welfare:</p> <p>- Reduce the possibility of public consumption of contaminated wild food (e.g., fruit or fungi) and public exposure to pesticides through public outreach and engagement, limiting access, and/or appropriate signage. For instance, users of the forest may be excluded from the area using barriers or signage until the pesticide dries.</p> <p>Minimizing Risk of Spray Drift: <i>unintentional spray drift has potential to significantly increase risk to the environment and public welfare.</i></p> <p>-Minimize potential for drift by increasing droplet</p>

		<p>glyphosate (1).</p> <p>Potential toxicity for terrestrial animals including insects, birds, and mammals at application rates exceeding common forestry application rates (1).</p> <p>Due to glyphosate being a post-emergence herbicide, foliar contact with it may pose a risk to terrestrial non-target plants. Offsite drift poses a risk to sensitive species (related to application method, application rate, site-specifics, etc.) (1). While terrestrial plants are very sensitive to foliar application, they are substantially less sensitive to soil exposure (per seedling emergence studies) (1).</p> <p>Precaution is needed with application in close proximity to water, as there is a potential of risk to amphibians, invertebrates, algae and other aquatic organisms (1).</p>	<p>size, considering weather patterns, and considering alternative application methods when pesticides must be applied adjacent to sensitive ecological areas (e.g., HCVs, etc.).</p> <ul style="list-style-type: none"> -Controlling droplet size: volume, pressure, number of nozzles, nozzle orientation, nozzle type, boom length (3). -For ground boom applications: release height during application should be no more than 4 feet above the ground or crop canopy (2). -For ground and aerial applications: nozzles and pressures should be chosen that deliver "fine" or coarser droplets. (Indicated in nozzle manufacturers catalogues; accordance with American Society of Agricultural & Biological Engineers Standard 572.1) (2). -Applicators should not spray during temperature inversions (2). -For aerial applications: should not be applied when wind speeds exceed 15 mph, and if this is the case then the boom length should be adjusted to 65% or "less of the wingspan for fixed wing aircraft and 75% or less of the rotor blade diameter for helicopters. Otherwise, the boom length must be 75% or less of the wingspan for fixed-wing aircraft and 90% or less of the rotor diameter for helicopters. The release height should be no higher than 10 feet from the top of the crop canopy or ground, unless a greater application height is required for pilot safety" (2).
Environmental	<p>Non-timber forest products (as FSC-STD-01-001 V5-2 FSC Principles and Criteria, criterion 5.1)</p>	<p>Minimal indication of adverse effects to Non-timber forest products was found when glyphosate is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>There is minimal indication of adverse effects to terrestrial microorganisms. There is potential for spray drift to expose surrounding fruit and/or vegetation to glyphosate (1).</p>	
	<p>High Conservation Values (particularly HCV 1-4)</p>	<p>Minimal indication of adverse effects to High Conservation Values was found when glyphosate is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>However, unintentional secondary effects on habitat, landscape and ecosystem are possible, primarily due to changes in vegetation (1).</p>	
	<p>Landscape (aesthetics, cumulative impacts)</p>	<p>Minimal indication of adverse effects to Landscape values was found when glyphosate is used according to label instructions in forestry applications. Additional considerations are</p>	

		<p>provided, below.</p> <p>However, unintentional habitat/ landscape effects are possible, primarily due to changes in vegetation (1).</p>	
	<p>Ecosystem services (water, soil, carbon sequestration, tourism)</p>	<p>Minimal indication of adverse effects to Ecosystem services was found when glyphosate is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>However, unintentional habitat/landscape/ecosystem effects are possible, primarily due to changes in vegetation (1).</p>	

¹ Mitigation strategies have been categorized to avoid redundancy

Sources

- (1) USDA/Forest Service. (2011). Glyphosate Human Health and Ecological Risk Assessment Final Report. Prepared by Syracuse Environmental Research Associates, Inc. under USDA Forest Service Contract AG-3187-C-06-0010. Retrieved from https://www.fs.fed.us/foresthealth/pesticide/pdfs/Glyphosate_SERA_TR-052-22-03b.pdf.
- (2) U.S. Environmental Protection Agency. (2019, May). Glyphosate Proposed Interim Registration Review Decision Case Number 0178 (Docket Number EPA-HQ-OP-2009-0361). Retrieved from <https://www.regulations.gov/document?D=EPA-HQ-OPP-2009-0361-14442>.
- (3) Dow AgroSciences, LLC. (2015). Safety Data Sheet [Rodeo]. Retrieved from <https://www.greenbook.net/corteva-agriscience-dow/rodeo>.

Social National Assessment

Pesticide:	Glyphosate		Specific Formulation:
Hazard Status:	Glyphosate is a restricted , highly hazardous pesticide (HHP) based on its classification in the Chronic Toxicity hazard group and demonstration of the potential for carcinogenic properties (Criterion 3) per the FSC Pesticides Policy (FSC-POL-30-001 V3-0 EN) and the FSC Lists of Highly Hazardous Pesticides (FSC-POL-30-001a EN). However, risks from other FSC hazard groups and toxicity categories were not precluded from this assessment.		DISCLAIMER: Adoption or adaption of this national-level assessment alone does not guarantee compliance with FSC-POL-30-001 V3-0 (see Background/Expectations Section)
Exposure Elements	Minimum list of values	Description of why/why not a risk	National-level Mitigation strategies defined to minimize risk₁
	High Conservation Values (especially HCV 5-6)	Minimal indication of adverse effects to High Conservation Values was found when glyphosate is used according to label instructions in forestry applications.	Follow all pesticide label application instructions. Follow applicable criterion and indicators from the FSC US FM Standard V1.0 (e.g., Criterion 4.3 for worker safety, Criterion 7.3 for worker training, Criterion 6.5 for protecting water resources, and Criteria 8.1 and 8.2 for Monitoring). Applicators or persons supervising application of restricted use pesticides are required to be certified in accordance with EPA regulations and state, territorial and tribal laws. Additional risk mitigation strategies are provided below. Organizations should take reasonable steps toward avoiding environmental and social impacts by considering the mitigation strategies provided below, as well as application-, Organization-, or location-specific strategies. General consideration of exposure variables designed to mitigate risk: -Know and understand the specific pesticide formulation, as its unique formulation may provide a different risk characterization. -Understand the mixture of active ingredients. -Seek to minimize the frequency, interval, and amount of application. -Use the most efficient and effective method of application by seeking to minimize risk to environmental and social values.
Health (fertility, reproductive health, respiratory health, dermatologic, neurological and gastrointestinal problems, cancer and hormonal imbalance)		<p>Risks to human health for workers is generally considered minimal (1). However, national assessments using the hazard quotient (HQ) methodology, as well as independent reports and research, indicate potential for toxicity in workers and the general public (1) as follows:</p> <p>Studies done in South America have shown an association between spray formulations mixed with surfactants and the potential for genotoxic effects. However, the exposure concentrations, routes of exposure, and exposure patterns are not relevant to those expected to occur during and after forestry applications in the US (1, 2).</p> <p>Systemic effects in workers due to dermal exposures have been reported and are a potential hazard. Such effects are "consistent with signs of gross over-exposure to glyphosate but would not be expected under normal circumstances" (1).</p> <p>While there is minimal to no hazard for the general public for aquatic applications, there is a potential</p>	

		<p>hazard present for acute exposure in terrestrial application if contaminated vegetation or fruit is consumed (1). There is minimal indication of adverse effects to residential handlers or non-occupational bystanders of glyphosate, this includes adverse effects related to spray drift (2).</p> <p>There is minimal to no hazard to workers identified for terrestrial and aquatic applications, assuming label directions are followed (1).</p> <p>Glyphosate formulations with a surfactant may pose greater risk; care should be taken to read and understand the SDS for glyphosate formulation that may contain a surfactant (1).</p>	<p>-Understand the site (e.g., soil type, topography, etc.) and climatic (e.g., wind, temperature, and humidity) conditions and the likely effect on risk to environmental and social values.</p> <p>-Have appropriate waste management systems in place.</p> <p>Mitigating Risk to Workers: <i>Label instructions should be followed when applying pesticides.</i></p> <p>-Reduce exposure by wearing appropriate personal protective equipment (PPE). For instance, use proper attire including long-sleeved shirt and long pants, shoes plus socks, protective eyewear, and gloves (3).</p>
Social	Welfare	Minimal indication of adverse effects to Welfare was found when glyphosate is used according to label instructions in forestry applications.	-Chemically resistant gloves should be worn, especially when exposure will be prolonged or contact is frequently repeated (3). Appropriate glove barrier materials include: "Butyl rubber. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl chloride ("PVC" or "vinyl")" (3). -If clothing has been drenched or heavily saturated with product it must be discarded. Persons with contaminated clothing should wash thoroughly after discarding, and before putting on clean clothing (3). -Hands should be washed before eating, drinking, chewing gum, using tobacco or using the toilet (3). -Although most conditions do not require respiratory protection, protection should be worn when irritation occurs or if there is potential to exceed the exposure limit requirements or guidelines (3).
	Food and water	Minimal indication of adverse effects to Food and water was found when glyphosate is used according to label instructions in forestry applications. Additional considerations are provided, below.	
		<p>Risk of contact with vegetation and/or fruit is possible. Consuming fruit and/or vegetation immediately after application was found to be more hazardous to wildlife (1).</p> <p>Risk of contamination of drinking water is low (1).</p>	
	Social Infrastructure; (schools and hospitals, recreational infrastructure, infrastructure adjacent to the management unit)	Minimal indication of adverse effects to Social Infrastructure was found when glyphosate is used according to label instructions in forestry applications.	Mitigating Risk to Public Access/Public Welfare: -Reduce the possibility of public consumption of contaminated wild food (e.g., fruit or fungi) and public exposure to pesticides through public
	Economic viability (agriculture, livestock, tourism)	Glyphosate application presents risk to sensitive nontarget vegetation (1), which may have economic impacts.	

		<p>There is a potential for spray drift to cause a risk to sensitive species "at distances of 100 feet for backpack applications, 500 feet for ground broadcast applications, and over 900 feet for aerial applications" (1).</p>	<p>outreach and engagement, limiting access, and/or appropriate signage. For instance, users of the forest may be excluded from the area using barriers or signage until the pesticide dries.</p> <p>-Consider effects on local communities and indigenous peoples when considering limiting access to treatment areas.</p>
Social	Rights (legal and customary)	<p>Minimal indication of adverse effects to Rights, accept when access is restricted, was found when glyphosate is used according to label instructions in forestry applications.</p>	<p>Minimizing Risk of Spray Drift: <i>unintentional spray drift has potential to increase risk to the environment and public welfare.</i></p> <p>-Minimize potential for drift by increasing droplet size, considering weather patterns, and considering alternative application methods when pesticides must be applied near residences, crops, or other public areas. Controlling droplet size includes changes in: Volume, pressure, number of nozzles, nozzle orientation, nozzle type, boom length (3).</p> <p>-For ground boom applications: release height during application should be no more than 4 feet above the ground or crop canopy (2).</p> <p>-For ground and aerial applications: nozzles and pressures should be chosen that deliver "fine" or coarser droplets. (Indicated in nozzle manufacturers catalogues; accordance with American Society of Agricultural & Biological Engineers Standard 572.1) (2).</p> <p>-Applicators should not spray during temperature inversions (2).</p> <p>-For aerial applications: should not be applied when wind speeds exceed 15 mph, and if this is the case then the boom length should be adjusted to 65% or "less of the wingspan for fixed wing aircraft and 75% or less of the rotor blade diameter for helicopters. Otherwise, the boom length must be 75% or less of the wingspan for fixed- wing aircraft and 90% or less of the rotor diameter for helicopters. The release height should be no higher than 10 feet from the top of</p>
	Others	<p>No additional values were identified in this assessment.</p>	

			the crop canopy or ground, unless a greater application height is required for pilot safety" (2).
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¹ Mitigation strategies have been categorized to avoid redundancy

Sources

- (1) USDA/Forest Service. (2011). Glyphosate Human Health and Ecological Risk Assessment Final Report. Prepared by Syracuse Environmental Research Associates, Inc. under USDA Forest Service Contract AG-3187-C-06-0010. Retrieved from https://www.fs.fed.us/foresthealth/pesticide/pdfs/Glyphosate_SERA_TR-052-22-03b.pdf.
- (2) U.S. Environmental Protection Agency. (2019, May). Glyphosate Proposed Interim Registration Review Decision Case Number 0178 (Docket Number EPA-HQ-OP-2009-0361). Retrieved from <https://www.regulations.gov/document?D=EPA-HQ-OPP-2009-0361-14442>.
- (3) Dow AgroSciences, LLC. (2015). Safety Data Sheet [Rodeo]. Retrieved from <https://www.greenbook.net/corteva-agriscience-dow/rodeo>.

Appendix 2: National Guidance ESRA for Imidacloprid

Environmental National Assessment

Pesticide:	Imidacloprid		Specific Formulation:
Hazard Status:	Imidacloprid is a highly hazardous pesticide (HHP) based on its classification in the Acute Toxicity hazard group and demonstration of the potential for acute toxicity to mammals and birds (Criterion 2) per the FSC Pesticides Policy (FSC-POL-30-001 V3-0 EN) and the FSC Lists of Highly Hazardous Pesticides (FSC-POL-30-001a EN). However, risks from other FSC hazard groups and toxicity categories were not precluded from this assessment.		DISCLAIMER: Adoption or adaption of this national-level assessment alone does not guarantee compliance with FSC-POL-30-001 V3-0 (see Background/Expectations Section)
Exposure Elements	Minimum list of values	Description of why/why not a risk	National-level Mitigation strategies defined to minimize risk₁
Environmental	Soil (erosion, degradation, biota, carbon storage)	<p>Minimal indication of adverse effects to soil was found when imidacloprid is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>No indication of adverse effects on soil microorganisms, although transient changes in soil microorganism population have been documented (1).</p> <p>The most affected terrestrial soil invertebrate is the earthworm, with only transient effects on earthworm populations (1).</p>	<p>Follow all pesticide label application instructions. Follow applicable criterion and indicators from the FSC US FM Standard V1.0 (e.g., Criterion 4.3 for worker safety, Criterion 7.3 for worker training, Criterion 6.5 for protecting water resources, and Criteria 8.1 and 8.2 for Monitoring). Applicators or persons supervising application of restricted use pesticides are required to be certified in accordance with EPA regulations and state, territorial and tribal laws. Additional risk mitigation strategies are provided below.</p> <p>Organizations should take reasonable steps to avoiding environmental and social impacts by considering the mitigation strategies provided below, as well as application-, Organization-, or location-specific strategies.</p> <p>General consideration of exposure variables designed to mitigate risk:</p> <ul style="list-style-type: none"> -Know and understand the specific pesticide formulation and/or tank mixture, as its unique formulation may provide a different risk characterization. -Understand how the mixture of active ingredients affects the pesticides risk profile. -Seek to minimize the frequency, interval, and amount of application.
	Water (ground water, surface waters, water supplies)	<p>Risk to aquatic species with minimal overall risk to human water resources.</p> <p>Accidental spill into small pond presents highest risk for contamination of water, along with potential contamination of surface water due to soil injection (1).</p> <p>These do not present a considerable risk to human water resources but may adversely affect aquatic invertebrates (1).</p> <p>Risk varies among groups of aquatic invertebrates, with severe risk characterization for sensitive groups.</p>	

		<p>Sensitive groups of aquatic invertebrates include: Ephemeroptera, Ostracoda, Diptera, and Hemiptera. Bivalves, most species of Cladocera and Artemia are four among the least sensitive groups of aquatic invertebrates (1).</p> <p>Substantial adverse effects on sensitive aquatic invertebrates in the event of an accidental spill. For non-accidental applications, highest risk is associated with soil injection. Less analysis of tree injection exposure risk exists: adverse effects will depend on the volume of water contaminated by falling leaves and the total number of leaves transported to the body of water (1).</p>	<p>-Use the most efficient and effective method of application by seeking to minimize risk to environmental and social values.</p> <p>-Understand the site (e.g., soil type, topography, etc.) and climatic (e.g., wind, temperature, and humidity) conditions and the likely effect on risk to environmental and social values.</p> <p>-Have appropriate waste management systems in place.</p> <p>Mitigating Risk to the Environment: <i>reduce contact with water resources and minimize application amounts and number of applications.</i></p>
Environmental	Atmosphere (air quality, greenhouse gasses)	Minimal indication of adverse effects to atmosphere was found when imidacloprid is used according to label instructions in forestry applications.	<p><i>General and non-target species:</i></p> <p>-This product is highly toxic to bees exposed to direct treatment or residues on blooming plants or weeds. Do not apply product to blooming plants or weeds if bees are foraging in the treatment area (2).</p>
	Non-target species (vegetation, wildlife, bees and other pollinators, pets)	<p>Risks to non-target species are mainly to terrestrial and aquatic invertebrates, and minimal risk to terrestrial and aquatic vertebrates, terrestrial and aquatic macrophytes, and algae was identified (1). Additional considerations are provided below.</p> <p>All application methods present risk to terrestrial invertebrates. Specifically, risks to honeybees and phytophagous insects exceed the level of concern. Honeybee concern is greatest with maple and less certain for ash and hemlock (1).</p> <p>Classified by EPA as moderately toxic to mammals; moderately toxic to practically nontoxic in birds; toxic to fish and other aquatic organisms; very highly toxic to bees and aquatic invertebrates (1).</p> <p>Risks to vertebrates (mammals, birds, and fish) are largely benign. Toxicity exposure would be surrounding contaminated surface water. While contaminated vegetation cannot be ruled out as an exposure pathway for vertebrates, it is not</p>	<p><i>Water:</i></p> <p>-Do not allow to get into surface water, drains and ground water (2).</p> <p>-Do not contaminate surface or ground water by cleaning equipment or disposal of wastes, including equipment wash water (2).</p> <p>-Do not apply when weather conditions favor runoff or drift (2).</p> <p>-Do not apply near lakes, streams, rivers, or ponds (2). Use buffer strips between application areas and sensitive areas.</p> <p>-Do not apply to soils which are waterlogged or saturated (2).</p> <p>-Do not allow pesticide to enter or run off into storm drains, drainage ditches, gutters, or surface waters. Applying this product in calm weather when rain is not predicted for the next 24 hours will help to ensure that wind or rain does not blow or wash pesticide off the treatment area (3).</p>

		<p>quantifiable. Potential secondary effects to nontarget species exist; for example, "adverse effects on terrestrial invertebrates may reduce populations of insectivorous birds" (1).</p> <p>Secondary effects could occur for virtually all nontarget organisms. These secondary effects caused by insecticide or mechanical methods could either be detrimental or beneficial to affected species (1).</p>	<p>-Do not apply near fish pools, ponds, streams, or lakes (3).</p> <p>-Rinsing application equipment over the treated area will help avoid run off to water bodies or drainage systems (2).</p>
Environmental	<p>Non-timber forest products (as FSC-STD-01-001 V5-2 FSC Principles and Criteria, criterion 5.1)</p>	<p>Minimal indication of adverse effects to non-timber forest products was found when imidacloprid is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>Potential for secondary effects on terrestrial or aquatic animals and plants, including changes in food availability and habitat quality (1).</p>	
	<p>High Conservation Values (particularly HCV 1-4)</p>	<p>Minimal indication of adverse effects to High Conservation Values was found when imidacloprid is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>Unintentional secondary effects on habitat, landscape and ecosystem could occur (1).</p>	
	<p>Landscape (aesthetics, cumulative impacts)</p>	<p>Minimal indication of adverse effects to landscape values was found when imidacloprid is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>Potential for secondary effects on terrestrial or aquatic animals and plants, including changes in food availability and habitat quality (1).</p>	
	<p>Ecosystem services (water, soil, carbon sequestration, tourism)</p>	<p>Minimal indication of adverse effects to ecosystem services was found when imidacloprid is used according to label instructions in forestry applications. Additional considerations are provided, below.</p>	

		Potential for secondary effects on terrestrial or aquatic animals and plants, including changes in food availability and habitat quality (1).	
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¹ Mitigation strategies have been categorized to avoid redundancy

Sources

- (1) USDA/Forest Service. (2016). Imidacloprid: Human Health and Ecological Risk Assessment Corrected FINAL REPORT. Prepared by Syracuse Environmental Research Associates, Inc. under USDA Forest Service Contract AG-3187-C-12-0009. Retrieved from <https://www.fs.fed.us/foresthealth/pesticide/pdfs/ImidaclopridFinalReport.pdf>.
- (2) Bayer AG (2014). Bayer Advanced 12 Month Tree & Shrub Protect & Feed Concentrate II Safety Data Sheet. Retrieved from: <https://images.homedepot-static.com/catalog/pdfimages/c7/c7e7c72a-29c8-419d-8d80-476506c265b2.pdf>.
- (3) Bayer AG (2016). Bayer Advanced Complete Imidacloprid Product Label. Retrieved from https://www3.epa.gov/pesticides/chem_search/ppls/072155-00031-20160822.pdf.

Social National Assessment

Pesticide:	Imidacloprid		Specific Formulation:
Hazard Status:	Imidacloprid is a highly hazardous pesticide (HHP) based on its classification in the Acute Toxicity hazard group and demonstration of the potential for acute toxicity to mammals and birds (Criterion 2) per the FSC Pesticides Policy (FSC-POL-30-001 V3-0 EN) and the FSC Lists of Highly Hazardous Pesticides (FSC-POL-30-001a EN). However, risks from other FSC hazard groups and toxicity categories were not precluded from this assessment.		DISCLAIMER: Adoption or adaption of this national-level assessment alone does not guarantee compliance with FSC-POL-30-001 V3-0 (see Background/Expectations Section)
Exposure Elements	Minimum list of values	Description of why/why not a risk	National-level Mitigation strategies defined to minimize risk₁
	High Conservation Values (especially HCV 5-6)	<p>Minimal indication of adverse effects to high conservation values was found when imidacloprid is used according to label instructions in forestry applications.</p>	<p>Follow all pesticide label application instructions. Follow applicable criterion and indicators from the FSC US FM Standard V1.0 (e.g., Criterion 4.3 for worker safety, Criterion 7.3 for worker training, Criterion 6.5 for protecting water resources, and Criteria 8.1 and 8.2 for Monitoring). Applicators or persons supervising application of restricted use pesticides are required to be certified in accordance with EPA regulations and state, territorial and tribal laws. Additional risk mitigation strategies are provided below. Organizations should take reasonable steps to avoiding environmental and social impacts by considering the mitigation strategies provided below as well as application-, Organization-, or location-specific strategies.</p>
	<p>Health (fertility, reproductive health, respiratory health, dermatologic, neurological and gastrointestinal problems, cancer and hormonal imbalance)</p>	<p>Minimal indication of adverse effects to health values was found when imidacloprid is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>As long as one adheres to proper worker protections there is no substantial risk for workers or members of the general public (1).</p> <p>Imidacloprid is neurotoxic to humans in acute exposures but “neurotoxicity is not generally noted in subchronic or chronic toxicity studies” (1). Effects occurring at lowest exposures (most sensitive effects) are on the endocrine system (1). Some accidental exposures (i.e. wearing contaminated gloves) are of concern: as with any pesticide; use of proper safety procedures render this risk insignificant (1).</p> <p>“Exposure scenarios would involve consumption of contaminated surface water following an accidental spill, or concentrations in surface water following soil injections” (1).</p>	<p>General consideration of exposure variables designed to mitigate risk:</p> <ul style="list-style-type: none"> -Know and understand the specific pesticide formulation, as its unique formulation may provide a different risk characterization. -Understand the mixture of active ingredients. -Seek to minimize the frequency, interval, and amount of application. -Use the most efficient and effective method of application by seeking to minimize risk to environmental and social values. -Understand the site (e.g., soil type, topography, etc.) and climatic (e.g., wind, temperature, and

		Evidence of non-carcinogenicity in humans as classified by EPA (1).	humidity) conditions and the likely effect on risk to environmental and social values. -Have appropriate waste management systems in place.
Social	Welfare	Minimal indication of adverse effects to welfare was found when imidacloprid is used according to label instructions in forestry applications.	Mitigating Risk to Workers: <i>When applying pesticides, label instructions should be followed.</i>
	Food and water	Minimal indication of adverse effects to food and water was found when imidacloprid is used according to label instructions in forestry applications. Additional considerations are provided below. Very low likelihood of incidental exposures surrounding contaminated vegetation, which therefore cannot be estimated quantitatively (1). Risk associated with non-accidental exposures would involve water contamination due to leaf fall from treated trees (1). This would likely have negative effects on aquatic invertebrates, depending on the volume of contaminated water and concentration of imidacloprid in leaves (1).	<i>Adhere to the below exposure controls (2):</i> -Chemical resistant nitrile rubber gloves -Safety glasses with side-shields -Wear long-sleeved shirt and long pants and shoes plus socks. -Wash hands thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, using the toilet or applying cosmetics. -In case of skin contact: Take off contaminated clothing and shoes immediately. Wash off immediately with plenty of water for at least 15 minutes. Call a physician or poison control center immediately (2). Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Avoid breathing dust (3).
	Social Infrastructure; (schools and hospitals, recreational infrastructure, infrastructure adjacent to the management unit)	Minimal indication of adverse effects to social infrastructure was found when imidacloprid is used according to label instructions in forestry applications.	<i>Safe handling:</i> -Maintain exposure levels below the exposure limit through the use of general and local exhaust ventilation. -Handle and open container in a manner as to prevent spillage (2).
	Economic viability (agriculture, livestock, tourism)	Minimal indication of adverse effects economic viability was found when imidacloprid is used according to label instructions in forestry applications. However, secondary effects due to lower invertebrate populations may be detrimental to some species and beneficial to others; for example, reduction in bird populations may result from imidacloprid use (1).	<i>Storage requirements:</i> -Store in original container and out of the reach of children, preferably in a locked storage area (2). Mitigating Risk to Public Access/Public Welfare:

		High risk to honeybees if imidacloprid is administered in maple trees prior to flowering and bee foraging in the spring. Risks are highest for foliar applications and soil injection applications and lowest for bark applications (1).	- Keep people and pets away from treated area until it has been watered and allowed to dry (3). -Reduce the possibility of public consumption of contaminated wild food (e.g., fruit or fungi) and public exposure to pesticides through public outreach and engagement, limiting access, and/or appropriate signage. For instance, users of the forest may be excluded from the area using barriers or signage until the pesticide dries.
Social	Rights (legal and customary)	Minimal indication of adverse effects to rights was found when imidacloprid is used according to label instructions in forestry applications.	-In case of accidental release: Isolate hazard area. Keep unauthorized people away. Avoid contact with spilled product or contaminated surfaces (2).
	Others	No additional values were identified in this assessment.	-Consider effects on local communities and indigenous peoples when considering limiting access to treatment areas. -Do not allow children or pets to enter the treated area until it has dried (2).

¹ Mitigation strategies have been categorized to avoid redundancy

Sources:

- (1) USDA/Forest Service. (2016). Imidacloprid: Human Health and Ecological Risk Assessment Corrected FINAL REPORT. Prepared by Syracuse Environmental Research Associates, Inc. under USDA Forest Service Contract AG-3187-C-12-0009. Retrieved from <https://www.fs.fed.us/foresthealth/pesticide/pdfs/ImidaclopridFinalReport.pdf>.
- (2) Bayer AG (2014). Bayer Advanced 12 Month Tree & Shrub Protect & Feed Concentrate II Safety Data Sheet. Retrieved from: <https://images.homedepot-static.com/catalog/pdfimages/c7/c7e7c72a-29c8-419d-8d80-476506c265b2.pdf>.
- (3) Bayer AG (2016). Bayer Advanced Complete Imidacloprid Product Label. Retrieved from https://www3.epa.gov/pesticides/chem_search/ppls/072155-00031-20160822.pdf.

Appendix 3: National Guidance ESRA for Imazapyr

Environmental National Assessment

Pesticide:	Imazapyr		Specific Formulation:
Hazard Status:	Imazapyr is not considered a highly hazardous pesticide (HHP) per the FSC Pesticides Policy (FSC-POL-30-001 V3-0 EN) and the FSC Lists of Highly Hazardous Pesticides (FSC-POL-30-001a EN).		DISCLAIMER: Adoption or adaption of this national-level assessment alone does not guarantee compliance with FSC-POL-30-001 V3-0 (see Background/Expectations Section)
Exposure Elements	Minimum list of values	Description of why/why not a risk	National-level Mitigation strategies defined to minimize risk₁
Environmental	Soil (erosion, degradation, biota, carbon storage)	<p>Minimal indication of adverse effects to soil was found when imazapyr is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>Imazapyr has minimal documented adverse effects on soil microorganisms at concentrations expected within the top twelve inches of soil (1).</p> <p>Increasing adverse effects on cellulose breakdown are documented only when imazapyr concentrations reach levels far higher than anticipated in soil (1).</p>	<p>Follow all pesticide label application instructions. Follow applicable criterion and indicators from the FSC US FM Standard V1.0 (e.g., Criterion 4.3 for worker safety, Criterion 7.3 for worker training, Criterion 6.5 for protecting water resources, and Criteria 8.1 and 8.2 for Monitoring). Applicators or persons supervising application of restricted use pesticides are required to be certified in accordance with EPA regulations and state, territorial and tribal laws. Additional risk mitigation strategies are provided below. Organizations should take reasonable steps to avoiding environmental and social impacts by considering the mitigation strategies provided below as well as application-, Organization-, or location-specific strategies.</p> <p>General consideration of exposure variables designed to mitigate risk:</p> <ul style="list-style-type: none"> -Know and understand the specific pesticide formulation and/or tank mixture, as its unique formulation may provide a different risk characterization. -Understand how the mixture of active ingredients affects the pesticides risk profile. -Seek to minimize the frequency, interval, and amount of application. -Use the most efficient and effective method of application by seeking to minimize risk to environmental and social values.
	Water (ground water, surface waters, water supplies)	<p>Some indication of adverse effects to water was found when imazapyr is used according to label instructions in forestry applications. These are as follows below.</p> <p>As an effective herbicide, aquatic applications will damage aquatic macrophytes. Some sensitive species of algae may be damaged in the event of an extreme accidental spill (1).</p> <p>Expected imazapyr concentrations in water are far below the level of concern for toxicity in fish and aquatic invertebrates. Risk characterization assessment for amphibians is unavailable due to lack of relevant toxicity data (1). However, individual studies using Oregon spotted frogs and Bullfrogs have concluded that imazapyr use poses no significant risk to those species (4,5).</p>	

		<p>Contamination of runoff water will impact sensitive nontarget plant species. Risks are greater in areas with predominantly clay soils and high precipitation and are lower in areas with sandy soil (1).</p> <p>Similarly, contaminated irrigation water will impact sensitive nontarget plant species (1).</p>	<p>-Understand the site (e.g., soil type, topography, etc.) and climatic (e.g., wind, temperature, and humidity) conditions and the likely effect on risk to environmental and social values.</p> <p>-Have appropriate waste management systems in place.</p>
	Atmosphere (air quality, greenhouse gasses)	Minimal indication of adverse effects to atmosphere was found when imazapyr is used according to label instructions in forestry applications.	<p>Mitigation Risk to the Environment: <i>reduce contact with water resources and minimize application amounts and number of applications.</i></p>
Environmental	Non-target species (vegetation, wildlife, bees and other pollinators, pets)	<p>Imazapyr is hazardous to terrestrial macrophytes and as such nontarget macrophytes are at risk for spray drift and direct spray (1). Additional information for other non-target species is provided below.</p> <p>Despite data limited by the number of species available, imazapyr does not pose risk to mammals, birds, honeybees, fish, and aquatic invertebrates; it is classified as “practically non-toxic” by the EPA (1).</p> <p>Secondary effects to habitats and food availability could occur, which would affect virtually all nontarget organisms. These secondary effects caused by herbicide or mechanical methods could either be detrimental or beneficial to affected species (1).</p> <p>Adverse effects on microorganisms are not documented at expected imazapyr soil concentrations (1).</p>	<p>-Do not apply to water except as specified on the label. Treatment of aquatic weeds may result in oxygen depletion or loss due to decomposition of dead plants. Do not contaminate water when disposing of equipment, washwater, or rinsate" (3).</p> <p>Additionally, "DO NOT use on food or feed crops. DO NOT treat irrigation ditches, or water used for crop irrigation or for domestic uses. DO NOT apply where runoff or irrigation water may flow onto agricultural land as injury to crops may result" (3).</p> <p>-DO NOT apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high-water mark (4);</p> <p>-DO NOT contaminate water when cleaning equipment or disposing of equipment washwaters or rinsate. This herbicide is phytotoxic at extremely low concentrations. Non-target plants may be adversely affected from drift (3);</p> <p>-DO NOT apply where runoff or irrigation water may flow onto agricultural land as injury to crops may result. Keep from contact with fertilizers, insecticides, fungicides and seeds</p>
	Non-timber forest products (as FSC-STD-01-001 V5-2 FSC Principles and Criteria, criterion 5.1)	<p>Minimal indication of adverse effects to non-timber forest products was found when imazapyr is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>Secondary effects to habitats and food availability could occur, which would affect virtually all nontarget organisms. These secondary effects caused by</p>	<p>-DO NOT apply or drain or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots (3);</p>

		herbicide or mechanical methods could either be detrimental or beneficial to affected species. (1)	<p>-Minimize risk of spray drift: unintentional spray drift has potential to significantly increase risk to the environment and public welfare.</p> <p>Mitigating Risk to Public Access/Public Welfare:</p> <p>-Reduce the possibility of public consumption of contaminated wild food (e.g., fruit or fungi) and public exposure to pesticides through public outreach and engagement, limiting access, and/or appropriate signage. For instance, users of the forest may be excluded from the area using barriers or signage until the pesticide dries.</p>
	High Conservation Values (particularly HCV 1-4)	<p>Minimal indication of adverse effects to high conservation values was found when imazapyr is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>Unintentional secondary effects on habitat, landscape and ecosystem are possible due to changes in vegetation (1).</p>	
	Landscape (aesthetics, cumulative impacts)	<p>Minimal indication of adverse effects to Landscape values was found when glyphosate is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>However, unintentional habitat/ landscape effects are possible, primarily due to changes in vegetation (1).</p>	
	Ecosystem services (water, soil, carbon sequestration, tourism)	<p>Minimal indication of adverse effects to Ecosystem services was found when imazapyr is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>However, unintentional habitat/landscape/ecosystem effects are possible, primarily due to changes in vegetation (1).</p>	

¹ Mitigation strategies have been categorized to avoid redundancy

Sources

(1) USDA/Forest Service. (2011). Imazapyr Human Health and Ecological Risk Assessment. Prepared by Syracuse Environmental Research Associates, Inc. under USDA Forest Service Contract AG-3187-C-06-0010. Retrieved from https://www.fs.fed.us/foresthealth/pesticide/pdfs/Imazapyr_TR-052-29-03a.pdf.

(2) U.S. Environmental Protection Agency. (2015, December). Imazapyr Proposed Interim Registration Review Decision Case Number 3078 (Docket Number EPA-HQ-OP-2009-0361). Retrieved from <https://www.regulations.gov/document?D=EPA-HQ-OPP-2014-0200-0019..>

(3) SSI Maxim (2018). Pesticide Product Label [Arsenal]. Retrieved from https://www3.epa.gov/pesticides/chem_search/ppls/034913-00023-20180328.pdf.

(4) Trumbo, J. and Waligora, D. "The impact of the herbicides imazapyr and triclopyr triethylamine on bullfrog tadpoles." California Fish and Game 95, no. 3 (2009): 122-127.

(5) Yahnke, Amy E., Christian E. Grue, Marc P. Hayes, and Alexandra T. Troiano. "Effects of the herbicide imazapyr on juvenile Oregon spotted frogs." Environmental toxicology and chemistry 32, no. 1 (2013): 228-235.

Social National Assessment

Pesticide:	Imazapyr		Specific Formulation:
Hazard Status:	Imazapyr is not considered a highly hazardous pesticide (HHP) per the FSC Pesticides Policy (FSC-POL-30-001 V3-0 EN) and the FSC Lists of Highly Hazardous Pesticides (FSC-POL-30-001a EN).		DISCLAIMER: Adoption or adaption of this national-level assessment alone does not guarantee compliance with FSC-POL-30-001 V3-0 (see Background/Expectations Section)
Exposure Elements	Minimum list of values	Description of why/why not a risk	National-level Mitigation strategies defined to minimize risk₁
	High Conservation Values (especially HCV 5-6)	<p>Minimal indication of adverse effects to high conservation values was found when imazapyr is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>Unintentional secondary effects on habitat, landscape and ecosystem are possible due to changes in vegetation (1).</p>	<p>Follow all pesticide label application instructions. Follow applicable criterion and indicators from the FSC US FM Standard V1.0 (e.g., Criterion 4.3 for worker safety, Criterion 7.3 for worker training, Criterion 6.5 for protecting water resources, and Criteria 8.1 and 8.2 for Monitoring). Applicators or persons supervising application of restricted use pesticides are required to be certified in accordance with EPA regulations and state, territorial and tribal laws. Additional risk mitigation strategies are provided below. Organizations should take reasonable steps to avoiding environmental and social impacts by considering the mitigation strategies provided below, as well as application-, Organization-, or location-specific strategies.</p> <p>General consideration of exposure variables designed to mitigate risk:</p> <ul style="list-style-type: none"> -Know and understand the specific pesticide formulation, as its unique formulation may provide a different risk characterization. -Understand the mixture of active ingredients. -Seek to minimize the frequency, interval, and amount of application. -Use the most efficient and effective method of application by seeking to minimize risk to environmental and social values. -Understand the site (e.g., soil type, topography, etc.) and climatic (e.g., wind, temperature, and
	Health (fertility, reproductive health, respiratory health, dermatologic, neurological and gastrointestinal problems, cancer and hormonal imbalance)	<p>Minimal indication of adverse effects to human health was found when imazapyr is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>Minimal to no risk to worker health due to acute or long-term exposure if proper protective and safety procedures are followed. No indication of health risk to general public (1).</p> <p>Eye irritation is possible for workers handling highly concentrated imazapyr solutions for longer periods of time. Workers who use highly concentrated imazapyr should use special caution to prevent prolonged skin contact (1).</p>	
Social	Welfare	<p>Minimal indication of adverse effects to welfare was found when imazapyr is used according to label instructions in forestry applications.</p>	
	Food and water	<p>Minimal indication of adverse effects to food and water was found when imazapyr is used according to label instructions in forestry</p>	

		<p>applications. However, additional considerations are provided below.</p> <p>Risk of contact with contaminated vegetation, fruit, and water. These scenarios are extremely low risk due to the implausibility of acute or long-term occurrences (1). Of these, the predominant route of exposure is through consumption of contaminated vegetation (1).</p>	<p>humidity) conditions and the likely effect on risk to environmental and social values.</p> <p>-Have appropriate waste management systems in place.</p> <p>Mitigating Risk to Workers: <i>When applying pesticides, label instructions should be followed.</i></p>
	<p>Social Infrastructure; (schools and hospitals, recreational infrastructure, infrastructure adjacent to the management unit)</p>	<p>Minimal indication of adverse effects to social infrastructure was found when imazapyr is used according to label instructions in forestry applications.</p>	<p>Personal Protective Equipment (PPE): Some materials that are chemical-resistant to this product are listed below. Applicators and other handlers must wear:</p> <ul style="list-style-type: none"> • Long-sleeved shirt and long pants; • Chemical-resistant gloves, such as barrier laminate, butyl rubber or polyethylene; • Shoes plus socks.
	<p>Economic viability (agriculture, livestock, tourism)</p>	<p>Minimal indication of adverse effects to economic viability was found when imazapyr is used according to label instructions in forestry applications. However, additional considerations are provided below.</p> <p>There is a potential for spray drift to adversely affect sensitive terrestrial and aquatic plant species.</p> <p>Sensitive species will be affected up to 900 feet downwind of application site, regardless of application method, and will likely be affected well beyond 900 feet (1). Risk characterization is similar for aquatic plant species.</p> <p>Given no documented adverse effects on animals (1), there is low risk for economic viability of livestock or tourism.</p>	<p>Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions exist for washables, use detergent and hot water. Keep and wash PPE separately from other laundry. DO NOT enter treated areas without protective clothing until sprays have dried. (3)</p> <p><i>Applicators should:</i></p> <ul style="list-style-type: none"> -Avoid breathing spray mist. Avoid contact with skin, eyes or clothing. -Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. -Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. -Remove PPE immediately after handling this product. Wash the outside of gloves before

Social	Rights (legal and customary)	Minimal indication of adverse effects to rights was found when imazapyr is used according to label instructions in forestry applications.	<p>removing. As soon as possible, wash thoroughly and change into clean clothing (3).</p> <p>Mitigating Risk to Public Access/Public Welfare:</p> <ul style="list-style-type: none"> -Reduce the possibility of public consumption of contaminated wild food (e.g., fruit or fungi) and public exposure to pesticides through public outreach and engagement, limiting access, and/or appropriate signage. For instance, users of the forest may be excluded from the area using barriers or signage until the pesticide dries; -Consider effects on local communities and indigenous peoples when considering limiting access to treatment areas; -Do not allow children or pets to enter the treated area until it has dried.
	Others	No additional values were identified in this assessment.	<p>Minimizing Risk to Food and Water Resources:</p> <ul style="list-style-type: none"> -Minimize spray drift - unintentional spray drift has potential to significantly increase risk to the environment and public welfare. -DO NOT apply where runoff or irrigation water may flow onto agricultural land as injury to crops may result. -DO NOT apply directly to water bodies including lakes, streams, rivers, ponds.

¹ Mitigation strategies have been categorized to avoid redundancy

Sources

(1) USDA/Forest Service. (2011). Imazapyr Human Health and Ecological Risk Assessment. Prepared by Syracuse Environmental Research Associates, Inc. under USDA Forest Service Contract AG-3187-C-06-0010. Retrieved from https://www.fs.fed.us/foresthealth/pesticide/pdfs/Imazapyr_TR-052-29-03a.pdf.

(2) U.S. Environmental Protection Agency. (2015, December). Imazapyr Proposed Interim Registration

Review Decision Case Number 3078 (Docket Number EPA-HQ-OP-2009-0361). Retrieved from <https://www.regulations.gov/document?D=EPA-HQ-OPP-2014-0200-0019..>

(3) SSI Maxim (2018). Pesticide Product Label [Arsenal]. Retrieved from https://www3.epa.gov/pesticides/chem_search/ppls/034913-00023-20180328.pdf..

Appendix 4: National Guidance ESRA for Triclopyr

Environmental National Assessment

Pesticide:	Triclopyr		Specific Formulation:
Hazard Status:	Triclopyr is not considered a highly hazardous pesticide (HHP) per the FSC Pesticides Policy (FSC-POL-30-001 V3-0 EN) and the FSC Lists of Highly Hazardous Pesticides (FSC-POL-30-001a EN).		DISCLAIMER: Adoption or adaption of this national-level assessment alone does not guarantee compliance with FSC-POL-30-001 V3-0 (see Background/Expectations Section)
Exposure Elements	Minimum list of values	Description of why/why not a risk	National-level Mitigation strategies defined to minimize risk₁
Environmental	Soil (erosion, degradation, biota, carbon storage)	<p>Minimal indication of adverse effects to Soil was found when triclopyr is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>Potential for erosion if groundcover is exposed to herbicide, as well as adverse effects on terrestrial invertebrates (1). Adverse effects on terrestrial microorganisms is unlikely (1).</p>	<p>Follow all pesticide label application instructions. Follow applicable criterion and indicators from the FSC US FM Standard V1.0 (e.g., Criterion 4.3 for worker safety, Criterion 7.3 for worker training, Criterion 6.5 for protecting water resources, and Criteria 8.1 and 8.2 for Monitoring). Applicators or persons supervising application of restricted use pesticides are required to be certified in accordance with EPA regulations and state, territorial and tribal laws. Additional risk mitigation strategies are provided below. Organizations should take reasonable steps to avoiding environmental and social impacts by considering the mitigation strategies provided below as well as application-, Organization-, or location-specific strategies.</p> <p>General consideration of exposure variables designed to mitigate risk:</p> <ul style="list-style-type: none"> -Know and understand the specific pesticide formulation and/or tank mixture, as its unique formulation may provide a different risk characterization. -Understand how the mixture of active ingredients affects the pesticides risk profile. -Seek to minimize the frequency, interval, and amount of application.
	Water (ground water, surface waters, water supplies)	<p>Water contamination is possible, which would adversely affect aquatic plants (including algae):</p> <p>Low risk to nontarget species, including humans, associated with contaminated surface water (1).</p> <p>Substantial drift or off-site transport via runoff could result in acute effects in sensitive fish or aquatic vegetation (1).</p> <p>Triclopyr BEE has been found to be much more toxic than triclopyr TEA, and triclopyr acid to terrestrial plants and most groups of aquatic organisms (1): "Acute toxicity data for aquatic animals generally indicate that triclopyr ACID and TEA are practically non-toxic to fish and invertebrates, while triclopyr BEE is moderately to highly toxic to these same taxa on an acute exposure basis" (1). Additionally, EPA explains that "The chronic toxicity of triclopyr ACID and TEA to freshwater fish and invertebrates is relatively similar to acute toxicity values and range from 24 to 74 mg</p>	

		<p>a.i./L. In contrast, the chronic toxicity of triclopyr BEE to freshwater fish and invertebrates tends to be much greater than the ACID or TEA active ingredients" (1). However, once it enters the environment, triclopyr BEE is rapidly converted to the less toxic acid form.</p> <p>Higher rates of rainfall make surface water contamination more likely. However, because "triclopyr BEE is not persistent in soil or surface water, longer-term risks to aquatic animals after terrestrial applications of triclopyr BEE appear to be negligible" (1).</p>	<p>-use the most efficient and effective method of application by seeking to minimize risk to environmental and social values.</p> <p>-Understand the site (e.g., soil type, topography, etc.) and climatic (e.g., wind, temperature, and humidity) conditions and the likely effect on risk to environmental and social values.</p> <p>-Have appropriate, waste management systems in place.</p> <p>Mitigating Risk to the Environment: <i>reduce contact with water resources and minimize application amounts and number of applications.</i></p>
Environmental	Atmosphere (air quality, greenhouse gasses)	<p>Minimal indication of adverse effects to atmosphere was found when triclopyr is used according to label instructions in forestry applications. Additional considerations are provided, below.</p> <p>Triclopyr BEE is more volatile than Triclopyr TEA (1).</p>	<p><i>General and non-target species:</i></p> <p>-Minimize risk of spray drift: unintentional spray drift has potential to significantly increase risk to the environment and public welfare. Follow product-specific guidelines for reducing spray drift for specific application scenarios (2).</p> <p>-Do not apply where runoff or irrigation water may flow onto agricultural land as injury to crops may result (3).</p>
	Non-target species (vegetation, wildlife, bees and other pollinators, pets)	<p>Negative impacts on non-target species exist for plants and mammals.</p> <p>Developmental and reproductive effects are documented in mammals at acute, subchronic, and chronic toxicity studies (1).</p> <p>Large mammals are the nontarget organisms at the greatest risk, and contaminated vegetation is the predominant exposure scenario (1).</p> <p>Overt and severe maternal toxicity has been shown to have adverse developmental and reproductive effects. Developmental effects have been indicated as delayed growth in offspring, rather than frank abnormalities and occur only at doses of frank maternal toxicity (1).</p>	<p>-Reduce volatilization potential by minimizing spray contact with nonpermeable surfaces (roads, rocks), especially during higher air temperatures (3).</p> <p><i>Water:</i></p> <p>-This pesticide is toxic to fish. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment washwaters (3).</p> <p>-Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System</p>

		<p>Potential for adverse effects on birds, but avian studies are not as numerous or detailed as those involving mammals (1). Triclopyr BEE is more toxic to fish than triclopyr acid (TEA); nonetheless, application of triclopyr BEE up to 3 lb a.e./acre does not reach a level of concern. However, accidental spill scenarios would likely result in substantial adverse effects on fish (1).</p> <p>Triclopyr BEE has been found to be much more toxic than triclopyr TEA, and triclopyr acid to terrestrial plants and most groups of aquatic organisms (1).</p> <p>Direct spray, substantial drift, and substantial runoff from the application site are expected to cause damage to aquatic and terrestrial macrophytes and algae, given that triclopyr is an effective herbicide (1).</p> <p>Triclopyr is considered “practically non-toxic” to bees (1); general risks to terrestrial invertebrates is secondary to changes in vegetation cover (i.e. changes in terrestrial invertebrate populations comes as a result of changes to vegetation) (1).</p>	<p>(NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority</p> <ul style="list-style-type: none"> -Do not apply to open water (2). -Do not apply to saltwater bays or estuaries (2). -Do not apply on ditches that are used to transport irrigation water (3).
Environmental	<p>Non-timber forest products (as FSC-STD-01-001 V5-2 FSC Principles and Criteria, criterion 5.1)</p>	<p>Minimal indication of adverse effects to non-timber forest products was found when triclopyr is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>Secondary effects to habitats and food availability could occur, which would affect virtually all nontarget organisms. These secondary effects caused by herbicide or mechanical methods could either be detrimental or beneficial to affected species (1).</p>	
	<p>High Conservation Values (particularly HCV 1-4)</p>	<p>Minimal indication of adverse effects to high conservation values was found when triclopyr is used according to label instructions in forestry applications. Additional considerations are provided below.</p>	

		Unintentional secondary effects on habitat, landscape and ecosystem are possible (1).	
	Landscape (aesthetics, cumulative impacts)	Minimal indication of adverse effects to landscape was found when triclopyr is used according to label instructions in forestry applications. Additional considerations are provided below. Unintentional habitat/ landscape effects are possible (1).	
	Ecosystem services (water, soil, carbon sequestration, tourism)	Minimal indication of adverse effects to ecosystem services was found when triclopyr is used according to label instructions in forestry applications. Additional considerations are provided below. Potential for secondary effects on terrestrial or aquatic animals and plants, including changes in food availability and habitat quality (1).	

¹ Mitigation strategies have been categorized to avoid redundancy

Sources

- (4) (1) USDA/Forest Service. (2011). Triclopyr Human Health and Ecological Risk Assessment. Prepared by Syracuse Environmental Research Associates, Inc. under USDA Forest Service Contract AG-3187-C-06-0010. Retrieved from https://www.fs.fed.us/foresthealth/pesticide/pdfs/181126Triclopyr-2011_RA.pdf.
- (5) Dow AgroSciences LLC (2011). Pesticide Product Label [Element 3A]. Retrieved from <http://www.cdms.net/ldat/ld8R1006.pdf>.
- (6) Dow AgroSciences (2018). Pesticide Product Label [Garlon 4]. Retrieved from: https://www3.epa.gov/pesticides/chem_search/ppls/062719-00527-20180205.pdf.

Social National Assessment

Pesticide:	Triclopyr		Specific Formulation:
Hazard Status:	Triclopyr is not considered a highly hazardous pesticide (HHP) per the FSC Pesticides Policy (FSC-POL-30-001 V3-0 EN) and the FSC Lists of Highly Hazardous Pesticides (FSC-POL-30-001a EN).		DISCLAIMER: Adoption or adaption of this national-level assessment alone does not guarantee compliance with FSC-POL-30-001 V3-0 (see Background/Expectations Section)
Exposure Elements	Minimum list of values	Description of why/why not a risk	National-level Mitigation strategies defined to minimize risk₁
	High Conservation Values (especially HCV 5-6)	Minimal indication of adverse effects to high conservation values was found when triclopyr is used according to label instructions in forestry applications.	Follow all pesticide label application instructions. Follow applicable criterion and indicators from the FSC US FM Standard V1.0 (e.g., Criterion 4.3 for worker safety, Criterion 7.3 for worker training, Criterion 6.5 for protecting water resources, and Criteria 8.1 and 8.2 for Monitoring). Applicators or persons supervising application of restricted use pesticides are required to be certified in accordance with EPA regulations and state, territorial and tribal laws. Additional risk mitigation strategies are provided below. Organizations should take reasonable steps to avoiding environmental and social impacts by considering the mitigation strategies provided below as well as application-, Organization-, or location-specific strategies. General consideration of exposure variables designed to mitigate risk: -Know and understand the specific pesticide formulation, as its unique formulation may provide a different risk characterization. -Understand how the mixture of active ingredients affects the pesticides risk profile. -Seek to minimize the frequency, interval, and amount of application. -use the most efficient and effective method of application by seeking to minimize risk to environmental and social values. -Understand the site (e.g., soil type, topography, etc.) and climatic (e.g., wind, temperature, and
	Health (fertility, reproductive health, respiratory health, dermatologic, neurological and gastrointestinal problems, cancer and hormonal imbalance)	<p>Minimal indication of adverse effects to human health was found when triclopyr is used according to label instructions in forestry applications. However, additional considerations are provided below:</p> <p>Aquatic applications of triclopyr do not present identifiable risk to humans, while terrestrial applications present some risk to general public of non-accidental exposure through consumption of contaminated fruit or vegetation (1).</p> <p>For workers: triclopyr BEE exceeds chronic level of concern for typical application rates. Upper bounds for estimated exposures for both TEA and BEE formulations exceed the chronic level of concern (1). However, studies assessing realistic worker exposures used in USFS programs show no indication of risk; realistically, eye irritation is the only adverse effect on workers associated with triclopyr application (1).</p> <p>High hazard quotients (HQs) associated with terrestrial applications are of concern, especially for females, given known adverse developmental effects in mammals (1). However, these effects are</p>	

		<p>seen at doses that cause “frank signs of maternal toxicity” and “available toxicity studies suggest that overt and severe toxicity would not be associated with any of the upper bounds HQs” (1). Additional epidemiology studies on females of reproductive age with exposure to triclopyr is necessary, as some results have shown increase in the odds of miscarriage for women in the USFS who used herbicides.</p> <p>Overall, USFS asserts that there is no substantial or likely risk to acute or long-term exposure scenarios assuming adherence to proper worker protections (1).</p>	<p>humidity) conditions and the likely effect on risk to environmental and social values.</p> <p>-Have appropriate waste management systems in place.</p> <p>Mitigating risk to water and food resources: See Environmental Risk Assessment mitigation strategies.</p> <p>Mitigating Risk to Workers: <i>When applying pesticides label instructions should be followed.</i></p> <p>-Applicators and other handlers must wear personal protective equipment (PPE), including the following as found on the Element 3A pesticide label (2):</p> <ul style="list-style-type: none"> • Long-sleeved shirt and long pants • Shoes plus socks • Protective eyewear • Chemical resistant gloves (>14 mils) such as butyl rubber, natural rubber, neoprene rubber or nitrile rubber. • Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. • Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. • Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing. • Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse these items. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.
Social	Welfare	Minimal indication of adverse effects to welfare was found when triclopyr is used according to label instructions in forestry applications.	
	Food and water	<p>Risk of contact with contaminated vegetation, fruit, and water. However, these scenarios are extremely low risk due to the implausibility of acute or long-term occurrences. (1)</p> <p>Accidental spill into a small pond would also result in HQs above the level of concern to the general public for triclopyr TEA applications (1).</p>	
	Social Infrastructure; (schools and hospitals, recreational infrastructure, infrastructure adjacent to the management unit)	Minimal indication of adverse effects to social infrastructure was found when triclopyr is used according to label instructions in forestry applications.	
	Economic viability (agriculture, livestock, tourism)	Minimal indication of adverse effects to economic viability was found when triclopyr is used according to label instructions in forestry applications. Additional considerations are provided below:	

		<p>Risks to nontarget plant species due to drift, with highest risk due to aerial application and lowest from backpack application (1).</p> <p>Exposure of nontarget plants is possible through contaminated irrigation water, but concentrations will likely not reach level of concern (1).</p>	<p>• Application crews should not walk through treated vegetation, as foliar application occurs up to shoulder high brush (1).</p> <p>Mitigating Risk to Public Access/Public Welfare:</p>
Social	Rights (legal and customary)	Minimal indication of adverse effects to rights was found when triclopyr is used according to label instructions in forestry applications.	<p>-Reduce the possibility of public consumption of contaminated wild food (e.g., fruit or fungi) and public exposure to pesticides through public outreach and engagement, limiting access, and/or appropriate signage. For instance, users of the forest may be excluded from the area using barriers or signage until the pesticide dries (3).</p> <p>-Consider effects on local communities and indigenous peoples when considering limiting access to treatment areas.</p> <p>-Do not allow children or pets to enter the treated area until it has dried.</p>
	Others	No additional values were identified in this assessment.	

¹ Mitigation strategies have been categorized to avoid redundancy

Sources

- (1) (1) USDA/Forest Service. (2011). Triclopyr Human Health and Ecological Risk Assessment. Prepared by Syracuse Environmental Research Associates, Inc. under USDA Forest Service Contract AG-3187-C-06-0010. Retrieved from https://www.fs.fed.us/foresthealth/pesticide/pdfs/181126Triclopyr-2011_RA.pdf.
- (2) Dow AgroSciences LLC (2011). Pesticide Product Label [Element 3A]. Retrieved from <http://www.cdms.net/ldat/ld8R1006.pdf>.
- (3) Dow AgroSciences (2018). Pesticide Product Label [Garlon 4]. Retrieved from: https://www3.epa.gov/pesticides/chem_search/ppls/062719-00527-20180205.pdf.

Appendix 5: National Guidance ESRA for Metsulfuron-methyl

Environmental National Assessment

Pesticide:	Metsulfuron-methyl		Specific Formulation:
Hazard Status:	Metsulfuron-methyl is not considered a highly hazardous pesticide (HHP) per the FSC Pesticides Policy (FSC-POL-30-001 V3-0 EN) and the FSC Lists of Highly Hazardous Pesticides (FSC-POL-30-001a EN).		DISCLAIMER: Adoption or adaption of this national-level assessment alone does not guarantee compliance with FSC-POL-30-001 V3-0 (see Background/Expectations Section)
Exposure Elements	Minimum list of values	Description of why/why not a risk	National-level Mitigation strategies defined to minimize risk₁
Environmental	Soil (erosion, degradation, biota, carbon storage)	<p>Minimal indication of adverse effects to atmosphere was found when metsulfuron-methyl is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>Some adverse effects on microorganisms are unlikely but may also occur (1).</p> <p>Wind erosion and soil loss is likely off-site due to runoff from clay and drift at distances of 500 feet or more from the application site, especially in more arid environments where soil and topographic conditions favor erosion; this erosion could lead to adverse effects on plants (1).</p> <p>Adverse effects on soil microorganisms are likely to be transient and resolve within 9 to 14 days (1).</p>	<p>Follow all pesticide label application instructions. Follow applicable criterion and indicators from the FSC US FM Standard V1.0 (e.g., Criterion 4.3 for worker safety, Criterion 7.3 for worker training, Criterion 6.5 for protecting water resources, and Criteria 8.1 and 8.2 for Monitoring). Applicators or persons supervising application of restricted use pesticides are required to be certified in accordance with EPA regulations and state, territorial and tribal laws. Additional risk mitigation strategies are provided below. Organizations should take reasonable steps to avoiding environmental and social impacts by considering the mitigation strategies provided below, as well as application-, Organization-, or location-specific strategies.</p> <p>General consideration of exposure variables designed to mitigate risk:</p> <ul style="list-style-type: none"> -Know and understand the specific pesticide formulation and/or tank mixture, as its unique formulation may provide a different risk characterization. -Understand how the mixture of active ingredients affects the pesticides risk profile. -Seek to minimize the frequency, interval, and amount of application.
	Water (ground water, surface waters, water supplies)	<p>Effects on aquatic ecosystems are characterized by potential adverse effects to aquatic plants. Additional considerations are provided below.</p> <p>Aquatic macrophytes are at some risk if metsulfuron-methyl is applied near bodies of water (1).</p> <p>Adverse effects in aquatic microorganisms are not anticipated at estimated peak concentrations (1).</p> <p>Concentrations of metsulfuron-methyl in water is expected to be low and adverse effects on aquatic animals is not anticipated (1).</p>	

		<p>Metsulfuron-methyl has the potential to impact surface water quality due to runoff, especially for poorly drained soils or where there is a shallow water table (3).</p>	<p>-Use the most efficient and effective method of application by seeking to minimize risk to environmental and social values. -Understand the site (e.g., soil type, topography, etc.) and climatic (e.g., wind, temperature, and humidity) conditions and the likely effect on risk to environmental and social values. -Have appropriate waste management systems in place.</p>
	<p>Atmosphere (air quality, greenhouse gasses)</p>	<p>Minimal indication of adverse effects to atmosphere was found when metsulfuron-methyl is used according to label instructions in forestry applications.</p>	<p>-Use the most efficient and effective method of application by seeking to minimize risk to environmental and social values. -Understand the site (e.g., soil type, topography, etc.) and climatic (e.g., wind, temperature, and humidity) conditions and the likely effect on risk to environmental and social values. -Have appropriate waste management systems in place.</p>
	<p>Non-target species (vegetation, wildlife, bees and other pollinators, pets)</p>	<p>Minimal indication of adverse effects to mammals, birds, terrestrial insects, and microorganisms when metsulfuron-methyl is used according to label instructions in forestry applications. However, there are risks to non-target plants; additional considerations are provided below.</p> <p>Highest risk for small mammals consuming contaminated insects, but this is expected to be insignificant and does not reach the level of concern (1). It is noteworthy that metsulfuron-methyl has only been tested in a limited number of species and under conditions that do not well represent populations of free-ranging nontarget terrestrial mammals or birds (1).</p> <p>Honeybees have shown to be no more sensitive than birds or mammals (1).</p> <p>Runoff and drift may negatively impact terrestrial plants: "This herbicide is injurious to plants at extremely low concentrations. Nontarget plants may be adversely effected from drift and run-off" (3). Exposure may result in adverse effects to plants in terrestrial or wetland areas located adjacent to or downwind from an application site (4).</p> <p>Secondary effects to habitats and food availability could occur, which would affect virtually all nontarget organisms. These secondary effects caused by</p>	<p>Mitigating Risk to the Environment: <i>reduce contact with water resources and minimize application amounts and number of applications.</i></p> <p><i>General and non-target species:</i></p> <p>-Minimize application amounts and number of applications. -Minimize risk of spray drift: unintentional spray drift has potential to significantly increase risk to the environment and public welfare. -Consider that this herbicide is injurious to plants at extremely low concentrations. Nontarget plants may be adversely affected from drift and run-off.</p> <p><i>Water:</i></p> <p>-Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. -Do not contaminate water when cleaning equipment or disposing of equipment washwaters or rinsate (3). -To mitigate risk to surface water: "A level, well-maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, streams, and springs will reduce the potential loading of metsulfuron-methyl from runoff water and sediment. Runoff of this product will be greatly reduced by avoiding applications when rainfall or irrigation is expected to occur within 48 hours" (3).</p>

		herbicide or mechanical methods could either be detrimental or beneficial to affected species (1).	<p>-Do not treat frozen or snow-covered soil (3).</p> <p><i>Soil:</i></p> <p>-Leave treated soil undisturbed to reduce the potential for herbicide movement by soil erosion due to wind or water (4).-</p> <p>-Avoid using metsulfuron-methyl in areas where soils are vulnerable to wind erosion. This is usually soils with "high silt and/or fine to very fine sand fractions and low organic matter content. Other factors which can affects the movement of windblown soil include the intensity and direction of prevailing winds, vegetative cover, site slope, rainfall, and drainage patterns" (3).</p>
Environmental	Non-timber forest products (as FSC-STD-01-001 V5-2 FSC Principles and Criteria, criterion 5.1)	<p>Minimal indication of adverse effects to non-timber forest products was found when metsulfuron-methyl is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>As with any effective herbicide, vegetation will likely be altered within the treatment area, which may lead to secondary effects on terrestrial or aquatic animals as well as nontarget plants (1).</p>	
	High Conservation Values (particularly HCV 1-4)	<p>Minimal indication of adverse effects to high conservation values was found when metsulfuron-methyl is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>Unintentional secondary effects on habitat, landscape and ecosystem are possible (1).</p>	
	Landscape (aesthetics, cumulative impacts)	<p>Minimal indication of adverse effects to landscape was found when metsulfuron-methyl is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>Potential for secondary effects on terrestrial or aquatic animals and plants, including changes in food availability and habitat quality (1).</p>	
	Ecosystem services (water, soil, carbon sequestration, tourism)	<p>Minimal indication of adverse effects to ecosystem services was found when metsulfuron-methyl is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>Potential for secondary effects on terrestrial or aquatic animals and plants, including changes in food availability and habitat quality (1).</p>	

¹ Mitigation strategies have been categorized to avoid redundancy

Sources:

- (1) USDA/Forest Service. (2016). Metsulfuron methyl: Human Health and Ecological Risk Assessment. Prepared by Syracuse Environmental Research Associates, Inc. under GSA Forest Service BPA: WO-01-3187-0150. Retrieved from <https://www.fs.fed.us/foresthealth/pesticide/pdfs/ImidaclopridFinalReport.pdf>.
- (2) US EPA (2016). Proposed Interim Registration Review Decision for 22 Sulfonylurea (SU) Herbicides.
- (3) Bayer Environmental Science (2019). Escort XP Pesticide Label. Retrieved from: https://www3.epa.gov/pesticides/chem_search/ppls/000432-01549-20190510.pdf
- (4) Bayer CropScience (2015). Escort XP Herbicide Safety Data Sheet. Accessed from: <https://sds.chemicalsafety.com/sds/pda/msds/getpdf.ashx?action=msdsdocument&auth=200C200C200C200C2008207A200D2078200C200C200C200C200C200C200C200C2008¶m1=ZmRwLjFfMzI2NDgwMDNORQ==&unique=1585234531>

Social National Assessment

Pesticide:	Metsulfuron-methyl		Specific Formulation:
Hazard Status:	Metsulfuron-methyl is not considered a highly hazardous pesticide (HHP) per the FSC Pesticides Policy (FSC-POL-30-001 V3-0 EN) and the FSC Lists of Highly Hazardous Pesticides (FSC-POL-30-001a EN).		DISCLAIMER: Adoption or adaption of this national-level assessment alone does not guarantee compliance with FSC-POL-30-001 V3-0 (see Background/Expectations Section)
Exposure Elements	Minimum list of values	Description of why/why not a risk	National-level Mitigation strategies defined to minimize risk₁
	High Conservation Values (especially HCV 5-6)	Minimal indication of adverse effects to high conservation values was found when metsulfuron-methyl is used according to label instructions in forestry applications.	Follow all pesticide label application instructions. Follow applicable criterion and indicators from the FSC US FM Standard V1.0 (e.g., Criterion 4.3 for worker safety, Criterion 7.3 for worker training, Criterion 6.5 for protecting water resources, and Criteria 8.1 and 8.2 for Monitoring). Applicators or persons supervising application of restricted use pesticides are required to be certified in accordance with EPA regulations and state, territorial and tribal laws. Additional risk mitigation strategies are provided below. Organizations should take reasonable steps to avoiding environmental and social impacts by considering the mitigation strategies provided below, as well as application-, Organization-, or location-specific strategies. General consideration of exposure variables designed to mitigate risk: -Know and understand the specific pesticide formulation, as its unique formulation may provide a different risk characterization. -Understand how the mixture of active ingredients affects the pesticides risk profile. -Seek to minimize the frequency, interval, and amount of application. -use the most efficient and effective method of application by seeking to minimize risk to environmental and social values. -Understand the site (e.g., soil type, topography, etc.) and climatic (e.g., wind, temperature, and
	Health (fertility, reproductive health, respiratory health, dermatologic, neurological and gastrointestinal problems, cancer and hormonal imbalance)	<p>Minimal indication of adverse effects to mammals, birds, terrestrial insects, and microorganisms when metsulfuron-methyl is used according to label instructions in forestry applications. However, there are risks to non-target plants; additional considerations are provided below.</p> <p>Highest risk for small mammals consuming contaminated insects, but this is expected to be insignificant and does not reach the level of concern (1). It is noteworthy that metsulfuron-methyl has only been tested in a limited number of species and under conditions that do not well represent populations of free-ranging nontarget terrestrial mammals or birds (1).</p> <p>Honeybees have shown to be no more sensitive than birds or mammals (1).</p> <p>Runoff and drift may negatively impact terrestrial plants. Exposure may result in adverse effects to plants in terrestrial or wetland areas located adjacent to or downwind from an application site (4).</p>	

		Secondary effects to habitats and food availability could occur, which would affect virtually all nontarget organisms. These secondary effects caused by herbicide or mechanical methods could either be detrimental or beneficial to affected species (1).	humidity) conditions and the likely effect on risk to environmental and social values. -Have appropriate, waste management systems in place.
Social	Welfare	Minimal indication of adverse effects to welfare was found when metsulfuron-methyl is used according to label instructions in forestry applications.	Mitigating risk to water and food resources: See Environmental Risk Assessment mitigation strategies.
	Food and water	Minimal indication of adverse effects to food and water was found when metsulfuron-methyl is used according to label instructions in forestry applications. Additional considerations are provided below. Although consumption of contaminated vegetation is possible, hazard is still well below the level of concern; even less hazardous are consumption of fruit, water, and fish (1). Contamination of water is possible from runoff and wind erosion, which is more prominent in more arid regions and with predominantly clay soils; contaminated irrigation water may adversely affect terrestrial and aquatic plants. However, effects depend on exposure conditions, such as precipitation levels, topography, and hydrological conditions (1).	Mitigating Risk to Workers: <i>Label instructions should be followed when applying pesticides.</i> -Take off contaminated clothing and shoes immediately. Wash off immediately with plenty of water for at least 15 minutes. -Use personal protective equipment. When respirators are required, select NIOSH approved equipment based on actual or potential airborne concentrations and in accordance with the appropriate regulatory standards and/or industry recommendations. -Chemical resistant nitrile rubber gloves are needed for hand protection. -Safety glasses with side-shields are needed for eye protection. -Long-sleeved shirts, long pants, shoes, and socks are needed for skin and body protection. -Wash hands thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, using the toilet or applying cosmetics (3). -Avoid contact with skin, eyes, and clothing. Applicators and handlers must wear long-sleeved shirts, long pants, shoes and socks. Remove clothing if they become contaminated and then rinse skin immediately with plenty of water for 15-20 minutes.
	Social Infrastructure; (schools and hospitals, recreational infrastructure, infrastructure adjacent to the management unit)	Minimal indication of adverse effects to social infrastructure was found when metsulfuron-methyl is used according to label instructions in forestry applications.	
	Economic viability (agriculture, livestock, tourism)	Minimal indication of adverse effects to economic viability was found when metsulfuron-methyl is used according to label instructions in forestry applications.	Mitigating Risk to Public Access/Public Welfare:

		<p>Risks to crops and other terrestrial plants due to exposure through runoff, contaminated irrigation water, drift, and wind erosion. However, effects depend on exposure conditions, such as precipitation levels, topography, and hydrological conditions (1).</p> <p>Minimal to no risk to fish and terrestrial animals (1). Unintentional secondary effects on ecosystems and landscape are possible due to changes in vegetation (1).</p>	<p>-Reduce the possibility of public consumption of contaminated wild food (e.g., fruit or fungi) and public exposure to pesticides through public outreach and engagement, limiting access, and/or appropriate signage. For instance, users of the forest may be excluded from the area using barriers or signage until the pesticide dries.</p> <p>-Consider effects on local communities and indigenous peoples when considering limiting access to treatment areas.</p> <p>-Do not allow children or pets to enter the treated area until it has dried.</p>
Social	Rights (legal and customary)	<p>Minimal indication of adverse effects to rights was found when metsulfuron-methyl is used according to label instructions in forestry applications.</p>	
	Others	<p>No additional values were identified in this assessment.</p>	

¹ Mitigation strategies have been categorized to avoid redundancy

Sources:

- (1) USDA/Forest Service. (2016). Metsulfuron methyl: Human Health and Ecological Risk Assessment. Prepared by Syracuse Environmental Research Associates, Inc. under GSA Forest Service BPA: WO-01-3187-0150. Retrieved from <https://www.fs.fed.us/foresthealth/pesticide/pdfs/ImidaclopridFinalReport.pdf>.
- (2) US EPA (2016). Proposed Interim Registration Review Decision for 22 Sulfonylurea (SU) Herbicides.
- (3) Bayer Environmental Science (2019). Escort XP Pesticide Label. Retrieved from: https://www3.epa.gov/pesticides/chem_search/ppls/000432-01549-20190510.pdf
- (4) Bayer CropScience (2015). Escort XP Herbicide Safety Data Sheet. Accessed from: <https://sds.chemicalsafety.com/sds/pda/msds/getpdf.ashx?action=msdsdocument&auth=200C200C200C200C2008207A200D2078200C200C200C200C200C200C200C200C2008¶m1=ZmRwLjFmZlI2NDgwMDNORQ==&unique=1585234531>

Appendix 6: National Guidance ESRA for Sulfometuron-methyl

Environmental National Assessment

Pesticide:	Sulfometuron-methyl		Specific Formulation:
Hazard Status:	Sulfometuron-methyl is not considered a highly hazardous pesticide (HHP) per the FSC Pesticides Policy (FSC-POL-30-001 V3-0 EN) and the FSC Lists of Highly Hazardous Pesticides (FSC-POL-30-001a EN).		DISCLAIMER: Adoption or adaption of this national-level assessment alone does not guarantee compliance with FSC-POL-30-001 V3-0 (see Background/Expectations Section)
Exposure Elements	Minimum list of values	Description of why/why not a risk	National-level Mitigation strategies defined to minimize risk₁
Environmental	Soil (erosion, degradation, biota, carbon storage)	<p>Risk to soil microorganisms, despite uncertainty in magnitude of risk; risk of soil erosion and runoff due to impacts on vegetation:</p> <p>Some studies have found damage to soil bacteria, but there is low certainty and a lack of data regarding concentrations of sulfometuron-methyl in soil from typical application rates (1). Despite the lack of certainty in direct exposure risks, damage to vegetation from application of sulfometuron-methyl will likely cause secondary changes in the soil microbial community (1).</p> <p>Adverse effects on vegetation may leave soil more vulnerable to erosion, which in turn may result in adverse effects on sensitive plant species (1).</p>	<p>Follow all pesticide label application instructions. Follow applicable criterion and indicators from the FSC US FM Standard V1.0 (e.g., Criterion 4.3 for worker safety, Criterion 7.3 for worker training, Criterion 6.5 for protecting water resources, and Criteria 8.1 and 8.2 for Monitoring). Applicators or persons supervising application of restricted use pesticides are required to be certified in accordance with EPA regulations and state, territorial and tribal laws. Additional risk mitigation strategies are provided below. Organizations should take reasonable steps to avoiding environmental and social impacts by considering the mitigation strategies provided below as well as, application-, Organization-, or location-specific strategies.</p> <p>General consideration of exposure variables designed to mitigate risk:</p> <ul style="list-style-type: none"> -Know and understand the specific pesticide formulation and/or tank mixture, as its unique formulation may provide a different risk characterization. -Understand how the mixture of active ingredients affects the pesticides risk profile. -Seek to minimize the frequency, interval, and amount of application.
	Water (ground water, surface waters, water supplies)	<p>Risk to water resources is primarily characterized by risk to aquatic plants, with minimal to no risk to aquatic animals or algae (1).</p> <p>Risk to aquatic plants is significantly lower than risk to terrestrial plants. However, application of sulfometuron-methyl near bodies of water will pose risk to aquatic macrophytes (1).</p> <p>Contamination of irrigation water is possible as an exposure route for nontarget plant species (1). In general, sulfometuron-methyl may contaminate surface/runoff water, especially in areas with poor soil drainage or shallow water table (3).</p>	

	<p>Atmosphere (air quality, greenhouse gasses)</p>	<p>Minimal indication of adverse effects to atmosphere was found when sulfometuron-methyl is used according to label instructions in forestry applications.</p>	<p>-Use the most efficient and effective method of application by seeking to minimize risk to environmental and social values.</p> <p>-Understand the site (e.g., soil type, topography, etc.) and climatic (e.g., wind, temperature, and humidity) conditions and the likely effect on risk to environmental and social values.</p> <p>-Have appropriate waste management systems in place.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Environmental</p>	<p>Non-target species (vegetation, wildlife, bees and other pollinators, pets)</p>	<p>Primary risk to non-target species is for non-target plants, with minimal indication of adverse effects to other non-target species, such as animals or algae, when sulfometuron-methyl is used according to label instructions in forestry applications.</p> <p>Risk depends largely on potency relative to application rate; the highest rate used in USFS applications will damage sensitive nontarget species “up to distances of up to about 900 feet from the application site” (1).</p> <p>Runoff and drift may negatively impact terrestrial plants. Exposure may result in adverse effects to plants in terrestrial or wetland areas located adjacent to or downwind from an application site (1).</p> <p>Secondary effects to habitats and food availability could occur, which would affect other nontarget organisms. These secondary effects caused by herbicide or mechanical methods could either be detrimental or beneficial to affected species (1).</p> <p>Risk to terrestrial and aquatic animals from direct exposure is low (1).</p>	<p>Mitigating Risk to the Environment: <i>Reduce contact with water resources and minimize application amounts and number of applications.</i></p> <p><i>General and non-target species:</i></p> <p>-Minimize application amounts and number of applications.</p> <p>-Minimize risk of spray drift: unintentional spray drift has potential to significantly increase risk to the environment and public welfare.</p> <p>-Consider that this herbicide is injurious to plants at extremely low concentrations. Nontarget plants may be adversely affected from drift and run-off.</p> <p><i>Water:</i></p> <p>-Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high-water mark (3).</p> <p>-Do not contaminate water when cleaning equipment or disposing of equipment wash waters or rinsate (3).</p>
	<p>Non-timber forest products (as FSC-STD-01-001 V5-2 FSC Principles and Criteria, criterion 5.1)</p>	<p>Minimal indication of adverse effects to non-timber forest products was found when sulfometuron-methyl is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>As with any effective herbicide, vegetation will likely be altered within the treatment area, which may lead to secondary effects on terrestrial or aquatic animals as well as nontarget plants (1).</p>	<p>-To mitigate risk to surface water: "A level, well-maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, streams, and springs will reduce the potential loading of metsulfuron-methyl from runoff water and sediment. Runoff of this product will be greatly reduced by avoiding applications when rainfall or irrigation is expected</p>

	<p>High Conservation Values (particularly HCV 1-4)</p>	<p>Minimal indication of adverse effects to high conservation values was found when sulfometuron-methyl is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>Unintentional secondary effects on habitat, landscape and ecosystem are possible (1).</p>	<p>to occur within 48 hours" (3).</p> <p><i>Soil:</i></p> <p>-Do not treat frozen or snow-covered soil. -Leave treated soil undisturbed to reduce the potential for herbicide movement by soil erosion due to wind or water (4).- As sulfometuron-methyl "has the potential to move off-site due to wind erosion," avoid using in areas where soils are vulnerable to wind erosion. This is usually soils with "high silt and/or fine to very fine sand fractions and low organic matter content. Other factors which can affects the movement of windblown soil include the intensity and direction of prevailing winds, vegetative cover, site slope, rainfall, and drainage patterns" (3).</p>
	<p>Landscape (aesthetics, cumulative impacts)</p>	<p>Minimal indication of adverse effects to landscape was found when sulfometuron-methyl is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>Potential for secondary effects on terrestrial or aquatic animals and plants, including changes in food availability and habitat quality (1).</p>	
	<p>Ecosystem services (water, soil, carbon sequestration, tourism)</p>	<p>Minimal indication of adverse effects to non-timber forest products was found when sulfometuron-methyl is used according to label instructions in forestry applications. Additional considerations are provided below.</p> <p>Potential for secondary effects on terrestrial or aquatic animals and plants, including changes in food availability and habitat quality (1).</p>	

¹ Mitigation strategies have been categorized to avoid redundancy

Sources:

- (1) USDA/Forest Service. (2016). Metsulfuron Methyl: Human Health and Ecological Risk Assessment. Prepared by Syracuse Environmental Research Associates, Inc. under GSA Forest Service BPA: WO-01-3187-0150. Retrieved from <https://www.fs.fed.us/foresthealth/pesticide/pdfs/ImidaclopridFinalReport.pdf>.
- (2) US EPA (2016). Proposed Interim Registration Review Decision for 22 Sulfonyluea (SU) Herbicides. Retrieved from: https://www3.epa.gov/pesticides/chem_search/reg_actions/interim-reg-review-decision_30-Jun-16.pdf
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- (4) Bayer CropScience (2016). Oust XP Herbicide Safety Data Sheet. Accessed from: <https://sds.chemicalsafety.com/sds/pda/msds/getpdf.ashx?action=msdsdocument&auth=200C200C200C200C2008207A200D2078200C200C200C200C200C200C200C200C2008¶m1=ZmRwLjFfMDk0NjgwMDNORQ==&unique=1585249496>

Social National Assessment

Pesticide:	Sulfometuron-methyl		Specific Formulation:
Hazard Status:	Sulfometuron-methyl is not considered a highly hazardous pesticide (HHP) per the FSC Pesticides Policy (FSC-POL-30-001 V3-0 EN) and the FSC Lists of Highly Hazardous Pesticides (FSC-POL-30-001a EN).		DISCLAIMER: Adoption or adaption of this national-level assessment alone does not guarantee compliance with FSC-POL-30-001 V3-0 (see Background/Expectations Section)
Exposure Elements	Minimum list of values	Description of why/why not a risk	National-level Mitigation strategies defined to minimize risk₁
	High Conservation Values (especially HCV 5-6)	Minimal indication of adverse effects to high conservation values was found when sulfometuron-methyl is used according to label instructions in forestry applications.	Follow all pesticide label application instructions. Follow applicable criterion and indicators from the FSC US FM Standard V1.0 (e.g., Criterion 4.3 for worker safety, Criterion 7.3 for worker training, Criterion 6.5 for protecting water resources, and Criteria 8.1 and 8.2 for Monitoring). Applicators or persons supervising application of restricted use pesticides are required to be certified in accordance with EPA regulations and state, territorial and tribal laws. Additional risk mitigation strategies are provided below. Organizations should take reasonable steps to avoiding environmental and social impacts by considering the mitigation strategies provided below, as well as application-, Organization-, or location-specific strategies.
	Health (fertility, reproductive health, respiratory health, dermatologic, neurological and gastrointestinal problems, cancer and hormonal imbalance)	<p>Minimal indication of adverse effects to human health was found when sulfometuron-methyl is used according to label instructions in forestry applications. Additional considerations are provided below:</p> <p>For typical and maximum application rates, most exposure scenarios for workers and the general public do not reach a level of concern and there is minimal to no risk to health (1).</p> <p>Most hazardous exposure scenario for the general public is the consumption of contaminated water by a child, which just reaches the level of concern at the maximum application rate (1). No chronic exposure scenarios reach the level of concern for the general public (1).</p> <p>Exposure to high levels of sulfometuron-methyl can result in damage to the skin and eyes, risk that can be minimized with proper hygiene and handling procedures (1).</p> <p>Although limited data exists, reports in animals of chronic exposure leading to changes in blood consistent with hemolytic anemia, suggesting that</p>	<p>Additional risk mitigation strategies are provided below.</p> <p>General consideration of exposure variables designed to mitigate risk:</p> <ul style="list-style-type: none"> -Know and understand the specific pesticide formulation, as its unique formulation may provide a different risk characterization. -Understand how the mixture of active ingredients affects the pesticides risk profile. -Seek to minimize the frequency, interval, and amount of application. -use the most efficient and effective method of application by seeking to minimize risk to environmental and social values. -Understand the site (e.g., soil type, topography, etc.) and climatic (e.g., wind, temperature, and

		those with pre-existing anemia may be at risk (1). Additionally, sulfometuron-methyl may have the capacity to alter thyroid gland function, suggesting that those with pre-existing thyroid dysfunction may be at risk (1).	humidity) conditions and the likely effect on risk to environmental and social values. -Have appropriate waste management systems in place.
Social	Welfare	<p>Minimal indication of adverse effects to welfare was found when sulfometuron-methyl is used according to label instructions in forestry applications. Additional considerations are provided below:</p> <p>However, although limited data exists, reports in animals of chronic exposure leading to changes in blood consistent with hemolytic anemia, suggesting that those with pre-existing anemia may be at risk (1). Additionally, sulfometuron-methyl may have the capacity to alter thyroid gland function, suggesting that those with pre-existing thyroid dysfunction may be at risk (1).</p>	<p>Mitigating risk to water and food resources: See Environmental Risk Assessment mitigation strategies.</p> <p>Mitigating Risk to Workers: <i>Label instructions should be followed when applying pesticides.</i></p> <p>-Take off contaminated clothing and shoes immediately. Wash off immediately with plenty of water for at least 15 minutes. -Use personal protective equipment. When respirators are required, select NIOSH approved equipment based on actual or potential airborne concentrations and in accordance with the appropriate regulatory standards and/or industry recommendations. -Chemical resistant nitrile rubber gloves are needed for hand protection. Safety glasses with side-shields are needed for eye protection. Long-sleeved shirts, long pants, shoes, and socks are needed for skin and body protection. -Wash hands thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, using the toilet or applying cosmetics (3). -Avoid contact with skin, eyes, and clothing. Applicators and handlers must wear long-sleeved shirts, long pants, shoes and socks. Remove clothing if they become contaminated and then rinse skin immediately with plenty of water for 15-20 minutes. -Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet (4).</p>
	Food and water	<p>Minimal indication of adverse effects to food and water was found when sulfometuron-methyl is used according to label instructions in forestry applications. Additional considerations are provided below:</p> <p>Consumption of contaminated water may pose risk for a young child in the event of consumption immediately after an accidental spill (1).</p> <p>The combination of consumption of eating contaminated fruit, drinking contaminated water, and consuming contaminated fish at “rates characteristic of subsistence populations” does not lead in hazard above the level of concern (1).</p> <p>Contamination of water is possible from runoff and wind erosion, which is more prominent in more arid regions and with predominantly clay soils; contaminated irrigation water may adversely affect terrestrial and aquatic plants. However, effects depend on exposure conditions, such as</p>	<p>Mitigating Risk to Access/Public Welfare:</p>

		precipitation levels, topography, and hydrological conditions (1).	<p>-Reduce the possibility of public consumption of contaminated wild food (e.g., fruit or fungi) and public exposure to pesticides through public outreach and engagement, limiting access, and/or appropriate signage. For instance, users of the forest may be excluded from the area using barriers or signage until the pesticide dries.</p> <p>-Consider effects on local communities and indigenous peoples when considering limiting access to treatment areas.</p> <p>-Do not allow children or pets to enter the treated area until it has dried.</p>
	Social Infrastructure; (schools and hospitals, recreational infrastructure, infrastructure adjacent to the management unit)	Minimal indication of adverse effects to social infrastructure was found when sulfometuron-methyl is used according to label instructions in forestry applications.	
	Economic viability (agriculture, livestock, tourism)	<p>Minimal indication of adverse effects to economic viability was found when sulfometuron-methyl is used according to label instructions in forestry applications. Additional considerations are provided below:</p> <p>Risks to crops and other terrestrial plants due to exposure through runoff, contaminated irrigation water, drift, and wind erosion. However, effects depend on exposure conditions, such as precipitation levels, topography, and hydrological conditions (1).</p> <p>Minimal to no risk to fish and terrestrial animals (1). Unintentional secondary effects on ecosystems and landscape are possible due to changes in vegetation (1).</p>	
Social	Rights (legal and customary)	Minimal indication of adverse effects to rights was found when sulfometuron-methyl is used according to label instructions in forestry applications.	
	Others	No additional values were identified in this assessment.	

¹ Mitigation strategies have been categorized to avoid redundancy

Sources:

- (1) USDA/Forest Service. (2016). Metsulfuron Methyl: Human Health and Ecological Risk Assessment. Prepared by Syracuse Environmental Research Associates, Inc. under GSA Forest Service BPA: WO-01-3187-0150. Retrieved from <https://www.fs.fed.us/foresthealth/pesticide/pdfs/ImidaclopridFinalReport.pdf>.
- (2) US EPA (2016). Proposed Interim Registration Review Decision for 22 Sulfonylurea (SU) Herbicides. Retrieved from: https://www3.epa.gov/pesticides/chem_search/reg_actions/interim-reg-review-decision_30-Jun-16.pdf
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Appendix 7: Management Unit ESRA Templates

Environmental Management Unit Assessment Template

Pesticide:			<i>Specific Formulation:</i>
Hazard Status:			DISCLAIMER: Adoption or adaption of this national-level assessment alone does not guarantee compliance with FSC-POL-30-001 V3-0 (see Background/Expectations Section)
Exposure Elements	Minimum list of values	Description of why/why not a risk on the Management Unit (indicate “No change from national Guidance ESRA” if no change from the national assessment)¹	Management Unit Mitigation strategies defined to minimize risk (indicate “No change from national Guidance ESRA” if no change from the national assessment)²
Environmental	Soil (erosion, degradation, biota, carbon storage)		
	Water (ground water, surface waters, water supplies)		
	Atmosphere (air quality, greenhouse gasses)		
Environmental	Non-target species (vegetation, wildlife, bees and other pollinators, pets)		
	Non-timber forest products (as FSC-STD-01-001 V5-2 FSC Principles and Criteria, criterion 5.1)		
	High Conservation Values (particularly HCV 1-4)		

	Landscape (aesthetics, cumulative impacts)		
	Ecosystem services (water, soil, carbon sequestration, tourism)		

¹ Certificate holders should enumerate in this column the difference between the national-level risk assessment and the one being developed for their management unit

² Certificate holders should enumerate in this column the difference between the national-level risk mitigation strategies and the ones being developed for their management unit

Social Management Unit Assessment Template

Pesticide:			<i>Specific Formulation:</i>
Hazard Status:			DISCLAIMER: Adoption or adaption of this national-level assessment alone does not guarantee compliance with FSC-POL-30-001 V3-0 (see Background/Expectations Section)
Exposure Elements	Minimum list of values	Description of why/why not a risk on the Management Unit (indicate “No change from national Guidance ESRA” if no change from the national assessment)¹	Management Unit Mitigation strategies defined to minimize risk (indicate “No change from national Guidance ESRA” if no change from the national assessment)²
	High Conservation Values (especially HCV 5-6)		
	Health (fertility, reproductive health, respiratory health, dermatologic, neurological and gastrointestinal problems, cancer and hormonal imbalance)		
Social	Welfare		
	Food and water		
	Social Infrastructure; (schools and hospitals, recreational infrastructure, infrastructure adjacent to the management unit)		
	Economic viability (agriculture, livestock, tourism)		

	Rights (legal and customary)		
	Others		

- ¹ Certificate holders should enumerate in this column the difference between the national-level risk assessment and the one being developed for their management unit
- ² Certificate holders should enumerate in this column the difference between the national-level risk mitigation strategies and the ones being developed for their management unit