Minnesota Department of Natural Resources
Pesticide Environmental and Social Risk Assessment

Pesticide Active Ingredient: Imazapyr

Version 1.0

2021
### Environmental Assessment

<table>
<thead>
<tr>
<th>Pesticide: Imazapyr</th>
<th>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).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Formulation (CAS#):</strong></td>
<td></td>
</tr>
<tr>
<td>Alligare Imazapyr 2 SL (81510-83-0): isopropylamine salt of imazapyr – 27.8%, other ingredients – 72.2%</td>
<td></td>
</tr>
<tr>
<td>Alligare Imazapyr 4 SL (81510-83-0): isopropylamine salt of imazapyr – 52.6%, other ingredients – 47.4%</td>
<td></td>
</tr>
<tr>
<td>Arsenal (81510-83-0): isopropylamine salt of imazapyr – 27.8%, other ingredients – 72.2%</td>
<td></td>
</tr>
<tr>
<td>Ecomazapyr 2 SL (81510-83-0): isopropylamine salt of imazapyr – 27.8%, other ingredients – 72.2%</td>
<td></td>
</tr>
<tr>
<td>Habitat (81510-83-0): isopropylamine salt of imazapyr – 27.77%, other ingredients – 72.23%</td>
<td></td>
</tr>
<tr>
<td>Polaris (81510-83-0): isopropylamine salt of imazapyr – 27.7%, other ingredients – 72.3%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exposure Elements</th>
<th>Minimum list of values</th>
<th>Description of why/why not a risk</th>
<th>Mitigation strategies defined to minimize risk³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental:</td>
<td></td>
<td></td>
<td>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. Applicators 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 and/or tank mixture, as its unique formulation may provide a different risk characterization.</td>
</tr>
<tr>
<td>Soil (erosion, degradation, biota, carbon storage)</td>
<td></td>
<td>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. Imazapyr has minimal documented adverse effects on soil microorganisms at concentrations expected within the top twelve inches of soil (1). Increasing adverse effects on cellulose breakdown are documented only when imazapyr concentrations reach levels far higher than anticipated in soil (1).</td>
<td></td>
</tr>
<tr>
<td>Water (ground water, surface waters, water supplies)</td>
<td></td>
<td>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. 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). 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</td>
<td></td>
</tr>
</tbody>
</table>
use poses no significant risk to those species (4,5).

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).

Similarly, contaminated irrigation water will impact sensitive nontarget plant species (1).

- Understand how the mixture of active ingredients affects the pesticide’s 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 humidity) conditions and the likely effect on risk to environmental and social values.
- Have appropriate waste management systems in place.

Mitigating Risk to the Environment:
Reduce contact with water resources, follow all label requirements, and minimize application amounts and number of applications.

- 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).

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).

- Do not apply directly to water, or to

<table>
<thead>
<tr>
<th>Environmental</th>
<th>Atmosphere (air quality, greenhouse gasses)</th>
<th>Minimal indication of adverse effects to atmosphere was found when imazapyr is used according to label instructions in forestry applications.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental</td>
<td>Non-target species (vegetation, wildlife, bees and other pollinators, pets)</td>
<td>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. 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). 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). Adverse effects on microorganisms are not documented at expected imazapyr soil concentrations (1).</td>
</tr>
<tr>
<td>Environmental</td>
<td>Non-timber forest products (as FSC-STD-01-001 V5-2 FSC Principles and Criteria, criterion 5.1)</td>
<td>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.</td>
</tr>
</tbody>
</table>
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)

<table>
<thead>
<tr>
<th>High Conservation Values (particularly HCV 1-4)</th>
<th>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.</th>
<th>areas where surface water is present, or to intertidal areas below the mean high-water mark (4); -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); -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. -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); -Minimize risk of spray drift: unintentional spray drift has potential to significantly increase risk to the environment and public welfare.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape (aesthetics, cumulative impacts)</td>
<td>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.</td>
<td>Unintentional habitat/landscape effects are possible, primarily due to changes in vegetation (1).</td>
</tr>
<tr>
<td>Ecosystem services (water, soil, carbon sequestration, tourism)</td>
<td>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.</td>
<td>Unintentional habitat/landscape/ecosystem effects are possible, primarily due to changes in vegetation (1).</td>
</tr>
</tbody>
</table>

1 Mitigation strategies have been categorized to avoid redundancy

Sources


Social Assessment

<table>
<thead>
<tr>
<th>Pesticide: Imazapyr</th>
<th>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).</th>
</tr>
</thead>
</table>
| Specific Formulation (CAS#): | Alligare Imazapyr 2 SL (81510-83-0): isopropylamine salt of imazapyr – 27.8%, other ingredients – 72.2%  
Alligare Imazapyr 4 SL (81510-83-0): isopropylamine salt of imazapyr – 52.6%, other ingredients – 47.4%  
Arsenal (81510-83-0): isopropylamine salt of imazapyr – 27.8%, other ingredients – 72.2%  
Ecomazapyr 2 SL (81510-83-0): isopropylamine salt of imazapyr – 27.8%, other ingredients – 72.2%  
Habitat (81510-83-0): isopropylamine salt of imazapyr – 27.77%, other ingredients – 72.23%  
Polaris (81510-83-0): isopropylamine salt of imazapyr – 27.7%, other ingredients – 72.3% |

### Exposure Elements

<table>
<thead>
<tr>
<th>Minimum list of values</th>
<th>Description of why/why not a risk</th>
<th>Mitigation strategies defined to minimize risk¹</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| High Conservation Values (especially HCV 5-6) | 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.  
Unintentional secondary effects on habitat, landscape and ecosystem are possible due to changes in vegetation (1). | 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. Applicators should take reasonable steps to avoid 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.  
-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 |
| Health (fertility, reproductive health, respiratory health, dermatologic, neurological and gastrointestinal problems, cancer and hormonal imbalance) | 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.  
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).  
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). |                                               |
| Welfare | Minimal indication of adverse effects to welfare was found when imazapyr is used according to label instructions in forestry applications. |                                               |
| Food and water | Minimal indication of adverse effects to food and |                                               |
### Mitigating Risk to Workers:

When applying pesticides, label instructions should be followed.

#### Personal Protective Equipment (PPE):

Some materials that are chemical-resistant to this product are listed below. Applicators and other handlers must wear:

- Long-sleeved shirt and long pants;
- Chemical-resistant gloves, such as barrier laminate, butyl rubber or polyethylene;
- Shoes plus socks.

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)

Applicators should:

- 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 removing. As soon as possible, wash thoroughly and change into clean clothing (3).

### Mitigating Risk to Public Access/Public Welfare:

- Reduce the possibility of public consumption of

| Social Infrastructure; (schools and hospitals, recreational infrastructure, infrastructure adjacent to the management unit) | Minimal indication of adverse effects to social infrastructure was found when imazapyr is used according to label instructions in forestry applications.
|---|---|
| Social | 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.
| Economic viability (agriculture, livestock, tourism) | 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.

There is a potential for spray drift to adversely affect sensitive terrestrial and aquatic plant species.

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.

Given no documented adverse effects on animals (1), there is low risk for economic viability of livestock or tourism.
<table>
<thead>
<tr>
<th>Rights (legal and customary)</th>
<th>Minimal indication of adverse effects to rights was found when imazapyr is used according to label instructions in forestry applications.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Others</td>
<td>No additional values were identified in this assessment.</td>
</tr>
</tbody>
</table>

- 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.

**Minimizing Risk to Food and Water Resources:**
- 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:**

