



Pesticide-Use Permit Application Packet To Apply Pesticides to Water

Part One: Contact Information

APPLICANT (Person, organization, or business applying for this permit)

Organization/business USDA Forest Service, Chugach National Forest

Contact person Kate Mohatt

Mailing address PO Box 129

City, State, Zip Girdwood, AK 99587

Telephone Number 907-754-2348

Email Address kmohatt@fs.fed.us

Is the applicant a government entity?

18 AAC 90.620

☒

Yes

☐

No

APPLICATOR (Person, organization, or business who will be applying the pesticides)

Organization/business USDA Forest Service, Chugach National Forest

Contact person Kate Mohatt

Mailing address PO Box 129

City/State/Zip Girdwood, AK 99587

Telephone Number 907-754-2348

Email Address kmohatt@fs.fed.us

Pesticide Applicator Certification Number 10212-2007-6/9

18 AAC 90.515(13)

State of Alaska DEC

APR 2 2018

Pesticide Control Program



Alaska Department of
Environmental Conservation
Division of Environmental Health
Pesticide Control Program

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Instructions

- Pesticide-use permits are required under the following circumstances:
 - **Aerial:** Application of pesticide from any type of aircraft or hovercraft, regardless of who owns the land being treated.
 - **Aquatic:** Application of pesticide to a pest located in a water body, including creeks, rivers, streams, ponds, wetlands, and swamps, regardless of who owns the surrounding lands. For vegetation, if the roots are in the water, this is considered an aquatic application even if only the emergent vegetation is treated.
 - **Public Project On Multiple Properties:** Pesticide program or project by a government entity (state, borough, or city) that applies pesticide to more than one property.
- This packet contains instructions and application forms for obtaining a permit to apply pesticides to waters of the state, including both fresh and marine waters.
- **Each** item must be completed and included in your application. Please address each item. If the required information is not applicable please include a brief explanation.
- An Alaska Pollution Discharge Elimination System (APDES) Permit from the DEC Division of Water is required before a pesticide may be applied to surface water. The APDES permit must be obtained **prior** to applying for an ADEC Pesticide Use Permit. For more information, contact Jim Rypkema at james.rypkema@alaska.gov, or (907) 334-2288.
- Check off each item as you complete it, and submit the entire packet and required information to the DEC Pesticide Program, at the address shown below.
- A notice of application is required for ALL permits. Once your application is complete, ADEC will provide the required text for you to post in local newspapers. You must also submit an affidavit of publication once publication is complete. 18 AAC 15.020, 18 AAC 15.050, 18 AAC 90.520
- The requested information in this form represents the minimum that is required under 18 AAC 90, 18 AAC 15.020, and 18 AAC 15.050; additional information can and should be provided as necessary or applicable.
- Please do not staple items, renumber required attachments, or alter the form in any way.
- You may submit all items EXCEPT the signature page electronically. The original signed signature page must be mailed or delivered to the address below.

Alaska Department of Environmental Conservation

Pesticide Control Program

1700 E. Bogard Road, #B103

Wasilla, Alaska 99654

907-376-1870

www.dec.state.ak.us/eh/pest/



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✓	#	Part Two: Treatment Location Information
	1	<p>Treatment site location: 18 AAC 90.515(8)(A)</p> <p>Street Address <u>Copper River Delta, Copper River Highway</u></p> <p>City <u>Cordova</u></p> <p>OR</p> <p>For remote areas, fill in an informal location description such as mileposts, landmarks, distance and direction from nearest community, latitude and longitude, UTM coordinates, etc.</p> <div><p>Eyak Cannery Ponds are .5 miles south of the Eyak Cannery Ruins and just south and west of the Eyak River. 60.49904 degrees N, -145.67277 degrees W; Wrong Way pond is 22 miles from Cordova and N of the highway at 60.449277 degrees N and -145.227962 degrees W; Wooded Pond is 22 miles from Cordova, north of the highway at 60.477139 degrees N and -145.233065 degrees W.</p></div>



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Describe treatment site (lake, stream, river, wetland, etc.), including inflow and outflow characteristics, stream flow, etc.:

The Eyak River area's Cannery Pond Complex treatment sites consist of five ponds (each less than 13 acres) and two narrow sloughs (approximately 10 ft average width) that add up to approximately 40 surface acres, with an average depth of 1.5 ft and yielding a total volume of 60 acre-feet. Cannery Complex water inputs are from rainwater, groundwater, and occasional contributions from nearby Eyak River during flood events. Outflow from the Cannery Complex is generally from overland outflow during high water events, resulting in turnover of stored water. Based on estimates from SePRO from previous pond treatments, we estimate a turnover rate of 7 to 40 days in the summer months depending on precipitation. There are few stream flow characteristics in these ponds outside of high water events; however, these ponds cannot be considered an exclusively closed pond system. Water level fluctuation is expected to be minimal outside of flood events, which primarily occur in the fall.

The Wooded and Wrongway ponds are within a small watershed, approximately 0.25 sq miles of surrounding topography that provide most of the water to the ponds. Both flow from nearby Saddlebag Creek. Back-flow from the Alaganik River are other possible sources of water for these ponds during high flow events.

Wrongway Pond is 18 surface acres in size, with an average depth of 2.9 feet, yielding approx. 52.2 acre-feet. The primary water source for this pond is surface run-off from surrounding hills that collect into a small stream, with occasional additional contributions of water from the nearby glacial-fed Saddlebag Creek. Wrongway Pond receives more water contribution from Saddlebag Creek, relative to nearby Wooded Pond, due to Wrongway Pond's elevational similarity to the creek. The outflow from Wooded Pond is connected to the delta via Saddlebag Creek and the Alaganik River, and is thus considered an open system. Larger water level fluctuations and turnover can be expected in Wrongway Pond during prolonged rain events and strong meltwater events. Outflow measured from May-September in 2016 and 2017 was an average of 2.9 acre-feet per day, with a monthly minimum of 0.6 acre-feet per day and a monthly maximum of 8.1 acre-feet per day. The mean residence time for Wrongway is 16 days. During dry early summer months, mean residence time may be as high as 77 days at Wrongway. During fall storms, mean residence time may be as low as 6 days.

Wooded Pond is 16 surface acres in size with an average depth of 6.1 feet, yielding a total volume of approx. 97.6 acre-feet. The water source for this pond is surface run-off from surrounding hills that collect into two small streams, with annually rare contributions of water from glacial-fed Saddlebag Creek. The outflow of Wooded Pond consists of two outlets over an alluvial area that then connects to the delta via Saddlebag Creek and the Alaganik River, and is considered an open system. Larger water level fluctuations and turnover can be expected in Wooded Pond during prolonged rain events and strong meltwater events. Outflow measured from May-September in 2016 and 2017 was an average of 8.3 acre-feet per day, with a monthly minimum of 0.6 acre feet per day, and a monthly maximum of 29.2 acre-feet per day. The mean residence time for Wooded Pond is 13 days. During dry early summer months, mean residence time may be as high as 173 days. During fall storms, mean residence time may be as short as 4 days.

Streamflow gauges will continue to monitor outflow at both Wooded and Wrong Way Ponds in 2018, and during treatment months from May-Sept. 2019-2021.



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✓	#	Part Two: Treatment Location Information
	3	<p>List each public or private drinking water system within 200 feet of the treatment area. 18 AAC 90.515(8)(D)</p> <p>There are no drinking water systems within 200 feet of any treatment area.</p>
	4	<p>Approximate size of the treatment area. Please specify units (acre feet, flow rate, etc. The units should match units on the pesticide label):</p> <p>18 AAC 90.515(8)(B)</p> <p>Eyak Cannery Ponds are approximately 40 surface acres with an average depth of 1.5 feet. Wrong Way Pond is 18 surface acres and an average depth of 2.9 feet. Wooded Pond is 16 surface acres and an average depth of 6.1 feet.</p>
	5	<p>If the treatment location has been identified as habitat for an endangered or threatened species, list each species and category (threatened, endangered). 50 CFR 17.11-12</p> <p>No endangered or threatened species are known from the area.</p>

✓	#	Part Three: Treatment Information
	1	<p>List the dates & times (or range of dates and times) that pesticide is proposed to be applied: 18 AAC 90.515(9)</p> <p>Complete eradication with fluridone products generally requires the treatment to cover a 45 to 90 day period of the growing season and for two or more growing seasons to be effective. Ideally the time for application is right after the ice is gone, when the plant biomass, turbidity, and water volume are low and the plant is actively growing. This herbicide can be applied at any time during the summer as long as there is at least 45 days remaining before ice returns. For planning purposes, we will assume that the last reasonable date for beginning treatment is September 1.</p> <p>Fluridone can be applied at any time that Elodea is growing, which appears to be almost year round based on studies in other areas of Alaska. It has been found growing under 2 feet of ice in the Anchorage area. It is possible that Elodea can be treated in the late fall due to this ability to live under ice, keeping concentrations maintained at lethal dosages by supplemental treatments through the ice. Despite lower intake of plants during this time, we think that this disadvantage may be offset by lower water volumes, with minimal mixing potential due to no wind or currents, and with reduced concerns about potential impacts to anadromous fish and human health.</p>



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✓	#	Part Three: Treatment Information																					
	2	<p>Target pest of pesticide project: 18 AAC 90.515(2)</p> <table border="1"><thead><tr><th>✓</th><th>Category</th><th>List specific targets</th></tr></thead><tbody><tr><td></td><td>Fungus</td><td>None</td></tr><tr><td></td><td>Vegetation</td><td><i>Elodea</i> (all species)</td></tr><tr><td></td><td>Insects</td><td>None</td></tr><tr><td></td><td>Fish</td><td>None</td></tr><tr><td></td><td>Rodents</td><td>None</td></tr><tr><td></td><td>Other</td><td></td></tr></tbody></table>	✓	Category	List specific targets		Fungus	None		Vegetation	<i>Elodea</i> (all species)		Insects	None		Fish	None		Rodents	None		Other	
✓	Category	List specific targets																					
	Fungus	None																					
	Vegetation	<i>Elodea</i> (all species)																					
	Insects	None																					
	Fish	None																					
	Rodents	None																					
	Other																						
	3	<p>Provide a description of the method of pesticide application, including details about any equipment that will be used. 18 AAC 90.515(10)</p> <p>Fluridone will be applied as time-release pellets anywhere from once to up to five times in the growing season to sustain effective concentrations.</p> <p>Materials and equipment would be transported to the site by truck and then by boat. Pesticide dispersal will be directly into the lake by DEC-certified applicators from outboard motorboats, inflatable kayaks, or by foot. Pelleted formulations will be distributed on the lake surface by a high-velocity blower applicator or hand spreader; in both cases, the application rate can and will be calibrated.</p> <p>The target concentration for fluridone will be formulated by calculating area of infestation, volume of water in infested areas, and desired persistence time but is generally expected to be in the range of 5-18 ppb, with no single application causing fluridone concentrations to exceed 18 ppb on a whole-lake concentration and the sum of all applications in a given season not to exceed 90 ppb.</p> <p>SePRO Corporation, producers of Sonar™ products, has calculated optimal lethal concentrations to maintain effective concentrations in the treatment zones. To ensure that concentrations are maintained, water samples will be collected from 3 or more sites in the target areas. For this whole-pond treatment, water samples will be collected every two to three weeks, starting two weeks after initial application, and running for at least 6 weeks. All water samples will be collected using protocols established by, and sent by overnight delivery to SePRO Corporation's analytical laboratory in Whitakers, NC for assays following techniques described by Netherland et al. (2002).</p> <p>All calculations in part 5, (#7—9) are based on a whole pond treatment of Eyak Cannery, Wooded and Wrong Way ponds. Calculated amounts are based maximum label rate and USEPA maximum allowable dose in one season of 150 ppb.</p>																					



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✓	#	Part Four: Pesticide List
	1	<p>List the common or brand name of EACH proposed pesticide and adjuvant. 18 AAC 90.515(1)</p> <ul style="list-style-type: none">• Pesticides MUST be registered in the State of Alaska.• Adjuvants MUST be registered in the State of Washington to be considered for use in Alaska. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"><p>Common Name: Fluridone Sonar ONE (USEPA 67690-45)-5%fluridone</p></div>
	2	<p>Total number of pesticides and adjuvants listed: <u>1</u></p>

To find pesticide products registered in Alaska, search by EPA registration number here:
<http://www.kellysolutions.com/ak/pesticideindex.htm>

To find adjuvants registered in Washington, search here <http://cru66.cahe.wsu.edu/labels/Labels.php>. For "Item to search on", select "Crop". For "Common name", select "adjuvant".



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✓	#	Part Five: Product Information For EACH proposed pesticide and adjuvant, fill out the following information. Copy and attach additional sheets for each product. <small>18 AAC 90.515(1-6)</small>				
	1	Common or brand name of proposed pesticide or adjuvant detailed on this sheet: <u>Sonar One</u>				
	2	EPA Registration Number (not applicable for adjuvants): <u>67690-45</u>				
	3	Specify the formulation of the pesticide or adjuvant (liquid, granular, aerosol, etc.): <u>granular</u>				
	4	Name of the seller or distributor from whom the pesticide will be obtained: <u>SePRO Corporation</u> OR Check here if pesticide is from a previous surplus <input type="checkbox"/> <small>18 AAC 90.515(1)</small>				
	5	List each active ingredient (or principal functioning agent) in this product AND its percent composition: <table border="1"><thead><tr><th>Active Ingredient</th><th>% composition</th></tr></thead><tbody><tr><td><u>Fluridone</u></td><td><u>5%</u></td></tr></tbody></table>	Active Ingredient	% composition	<u>Fluridone</u>	<u>5%</u>
Active Ingredient	% composition					
<u>Fluridone</u>	<u>5%</u>					



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✓	#	Part Five: Product Information For EACH proposed pesticide and adjuvant, fill out the following information. Copy and attach additional sheets for each product. 18 AAC 90.515(1-6)										
		<p>Product Name <u>SonarOne</u></p> <p>Which treatment scenarios are described in questions 6-8? <u>Whole lake/pond treatments of Eyak Cannery Pond Complex, Wrong Way, and Wooded Ponds.</u></p>										
	6	<p>If this product will be diluted prior to application to the water body, specify the rate of dilution as it will be applied for this project: 18 AAC 90.515(6)</p> <p>Not applicable – product won't be diluted <input checked="" type="checkbox"/></p> <p>UNITS MUST MATCH LABEL INSTRUCTIONS</p> <table border="1"><tr><td>Amount of product (list units)</td><td>N/A</td></tr><tr><td>Amount of diluent (list units)</td><td>N/A</td></tr></table> <p>Example:</p> <table border="1"><tr><td>3 oz product</td></tr><tr><td>1 gallon water</td></tr></table>	Amount of product (list units)	N/A	Amount of diluent (list units)	N/A	3 oz product	1 gallon water				
Amount of product (list units)	N/A											
Amount of diluent (list units)	N/A											
3 oz product												
1 gallon water												
	7	<p>Rate of application that will be used for this project: 18 AAC 90.515(6)</p> <p>UNITS MUST MATCH LABEL INSTRUCTIONS</p> <table border="1"><tr><td rowspan="3">Amount of product per treatment (30 ppb)*:</td><td>Cannery Ponds 2.43 lbs</td><td>per</td><td>Surface Acre</td></tr><tr><td>Wrong Way 4.698 lbs</td><td>per</td><td>Surface Acre</td></tr><tr><td>Wooded 9.882 lbs</td><td>per</td><td>Surface Acre</td></tr></table> <p>* Up to five treatments may be implemented per year at this rate as needed to maintain concentrations at treatment levels, and will not exceed maximum 150 ppb per year.</p>	Amount of product per treatment (30 ppb)*:	Cannery Ponds 2.43 lbs	per	Surface Acre	Wrong Way 4.698 lbs	per	Surface Acre	Wooded 9.882 lbs	per	Surface Acre
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	Wrong Way 4.698 lbs	per		Surface Acre								
	Wooded 9.882 lbs	per	Surface Acre									



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Total amount of product that will be applied to the treatment site for each application:

18 AAC 90.515(6)

UNITS MUST MATCH LABEL INSTRUCTIONS

Maximum per treatment (30 ppb):

	Application Rate (from Part 5, Question 7)		Application Area Size (from Part 2, Question 4)	=	Total Volume
Eyak Cannery Ponds Year 3	Treatment 1: 2.43 lbs Treatment 2: 2.43 lbs Treatment 3: 2.43 lbs Treatment 4: 2.43 lbs Treatment 5: 2.43 lbs	*	40 acres	=	97.2 lbs 97.2 lbs 97.2 lbs 97.2 lbs 97.2 lbs
Wrong Way Pond Year 1	Treatment 1: 4.698 lbs Treatment 2: 4.698 lbs Treatment 3: 4.698 lbs Treatment 4: 4.698 lbs Treatment 5: 4.698 lbs	*	18 acres	=	84.564 lbs 84.564 lbs 84.564 lbs 84.564 lbs 84.564 lbs
Wrong Way Pond Year 2	Treatment 1: 4.698 lbs Treatment 2: 4.698 lbs Treatment 3: 4.698 lbs Treatment 4: 4.698 lbs Treatment 5: 4.698 lbs	*	18 acres	=	84.564 lbs 84.564 lbs 84.564 lbs 84.564 lbs 84.564 lbs
Wrong Way Pond Year 3	Treatment 1: 4.698 lbs Treatment 2: 4.698 lbs Treatment 3: 4.698 lbs Treatment 4: 4.698 lbs Treatment 5: 4.698 lbs	*	18 acres	=	84.564 lbs 84.564 lbs 84.564 lbs 84.564 lbs 84.564 lbs
Wooded Pond Year 1	Treatment 1: 9.882 lbs Treatment 2: 9.882 lbs Treatment 3: 9.882 lbs Treatment 4: 9.882 lbs Treatment 5: 9.882 lbs	*	16 acres	=	158.112 lbs 158.112 lbs 158.112 lbs 158.112 lbs 158.112 lbs
Wooded Pond Year 2	Treatment 1: 9.882 lbs Treatment 2: 9.882 lbs Treatment 3: 9.882 lbs Treatment 4: 9.882 lbs Treatment 5: 9.882 lbs	*	16 acres	=	158.112 lbs 158.112 lbs 158.112 lbs 158.112 lbs 158.112 lbs
Wooded Pond Year 3	Treatment 1: 9.882 lbs Treatment 2: 9.882 lbs Treatment 3: 9.882 lbs Treatment 4: 9.882 lbs Treatment 5: 9.882 lbs	*	16 acres	=	158.112 lbs 158.112 lbs 158.112 lbs 158.112 lbs 158.112 lbs



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✓	#	Part Six: Storage and Disposal 18 AAC 90.615
	1	<p>List the location where pesticide will be stored prior to final disposal.</p> <p>Physical Address <u>Cordova Ranger District, 913 LeFever St,</u></p> <p>City, State, Zip <u>Cordova, AK 99574</u></p>
	2	<p>Describe how and where excess <u>mixed</u> pesticides and adjuvants will be disposed:</p> <div style="border: 1px solid black; padding: 5px;"><p>There should be no excess mixed product since the product will not be mixed in advance and stored in tanks, but rather the concentrate will be measured and mixed with the lake water during the pumping and application process. There may be excess unmixed product (concentrate) but not excess mixed product.</p></div>
	3	<p>Describe how and where empty pesticide and adjuvant containers will be disposed:</p> <div style="border: 1px solid black; padding: 5px;"><p>Emptied containers will be rinsed three times on site and then punctured on-site so no other use can be made of the container. These containers will then be taken for recycling at the landfill recycling facility or disposed of in the landfill itself if not recyclable.</p></div>
	4	<p>If excess material or empty containers will be disposed in a landfill, provide the following information:</p> <p>Facility Name <u>Cordova Refuse Department and Bailer Facility</u></p> <p>City, State, Zip <u>Cordova AK 99574</u></p> <p>Date when disposal site was contacted to confirm acceptance of materials: <u>12/04/2015</u></p>



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Please provide EACH required item in a separate, stand-alone document.

Check off each item that is attached. Some items may not be applicable; if so, check the N/A column.

Part Seven: Supporting Documentation

✓	#	N/A	Item
x	1.	Required	Justification for the pesticide application - why you need to apply a pesticide and the benefits you expect to achieve from the treatment.
x	2.	Required	Map that shows the location of the treatment area within the state of Alaska. Map must be issued by the United States (e.g USGS), the State, or the Municipality.
x	3.	Required	Maps and/or aerial photos that show details within the treatment area, included areas where pesticides will be applied. Map/photo must include a scale to show distances.
na	4.		Map and/or aerial photo that shows the treatment area and the location of all sources of drinking water within 200 feet of the treatment area. Map/photo must include a scale to show distances.
x	5.	Required	EPA approved label for each proposed pesticide and adjuvant to be used.
x	6.	Required	Material Safety Data Sheet for each proposed pesticide and adjuvant to be used.
x	7.	Required	Description of potential impacts to the environment and non-target plants and animals including invertebrates. Should address any potential impacts to biodiversity and distribution of species, potential for anoxia due to plant decomposition, impact to the overall ecological health of the water body, and any other expected impacts.
x	8.	Required	Description of precautions planned to protect human health, safety, welfare, animals, and the environment.
na	9.		Proof of liability insurance (for non-government applicants)
na	10.		Information about how the proposed pesticide application might affect any threatened or endangered species that may be found in or near treatment area, and any proposed measures to prevent or reduce impacts.
x	11.	Required	Documentation of compliance with APDES permit requirements (see instructions on page 1).



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Part Eight: Signatures

All applications must be signed as follows, per 18 AAC 15.030:

- **Corporations:** A principal executive officer, an officer that is no lower than the level of vice president, or a duly authorized representative who is responsible for the overall management of the project or operation
- **Partnerships:** A general partner
- **Sole proprietorship:** The proprietor
- **Municipal, state, federal, or other public entity:** A principal executive officer, ranking elected official, or duly authorized employee

I, _____ certify under penalty of perjury, that all of the information
And exhibits in this application and attached documentation are true, accurate, and complete.

Applicant's Signature

Month

Day

Year

Applicant's Title



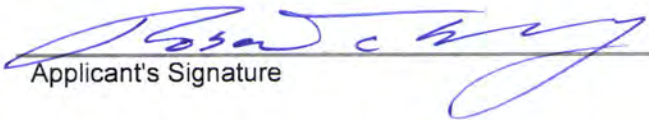
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- **Municipal, state, federal, or other public entity:** A principal executive officer, ranking elected official, or duly authorized employee

I, Robert Skorogowsky certify under penalty of perjury, that all of the information
And exhibits in this application and attached documentation are true, accurate, and complete.


Applicant's Signature

03 - 20 - 2018
Month Day Year

District Ranger
Applicant's Title

ATTACHMENT 1.

Justification

The purpose and need for action is to eradicate the non-native invasive plant *Elodea canadensis* (elodea) from several ponds in the Eyak Cannery pond complex, Wooded pond, and Wrong Way pond. By controlling elodea in targeted areas this project will lessen the likelihood of dispersing this invasive plant into other aquatic systems and will reduce impacts it has on native plant communities. Additionally, this project would provide valuable information that will assist in evaluating the feasibility and effects of controlling this invasive species in other parts of the Copper River Delta. Proposed treatment ponds are representative of many other ponds, lakes and river systems infested with elodea in the Copper River Delta. This project will include monitoring to better understand the ecological role of elodea and elodea removal where it has become established and may provide some implications of broader-scale removal across the Copper River Delta.

The first record of elodea in Alaska was from Cordova's Eyak Lake in 1982. In 2011 and 2012, the US Forest Service surveyed several locations throughout the lake, and found elodea to be present in nearly all areas surveyed. During subsequent surveys elodea has been found in Eyak Cannery Ponds, Wooded Pond, Wrong Way Pond, McKinley Lake, the Alaganik Slough system, Martin Lake, Bering Lake, and several unnamed ponds and sloughs near the Eyak River and Alaganik slough. The plant was not found in surveys of Little Martin, Tokun, Kushtaka, Pothole, or Elsner lakes. Elodea surveys have not been conducted on all ponds and lakes of the delta.

Preliminary data on the CRD does not show a decrease in native plant diversity in areas where elodea has become established; however, over time, elodea has been known to form dense mats, displace native plants, decrease productivity in plankton, and lower biodiversity. Eyak Lake is used frequently for floatplane docking and take-off, and poses a significant threat as a source for distribution of elodea to more remote lakes and aquatic systems on the Copper River Delta, in the Copper Basin, and in Prince William Sound.

The three ponds targeted for herbicide treatment contain varying amounts of elodea mixed within the native vegetation. Plant community assessments detected an average percent cover of elodea in 1 meter quadrat samples to be 15, 24 and 23% in the Eyak Cannery, Wrong Way and Wooded ponds respectively.

The invasive species noted for this permit are perennial in their growth habits and possess extensive root structures in the ponds that enable individual plants to re-sprout. This means that cutting the plant manually only induces further regrowth of the upper portion. Additionally, the potential exists for manual removal to allow small fragments of the plants to float away and become rooted elsewhere. The potential for dissolved oxygen drop is minimal due to the length of effective concentration exposure time (~45 days) required for effective eradication of this species with Sonar; the delayed onset of symptomatology >2 weeks after treatment; and gradual collapse of treated plant colonies as opposed to rapid onset of symptomatology and broad scale plant biomass collapse associated with traditional contact herbicides.

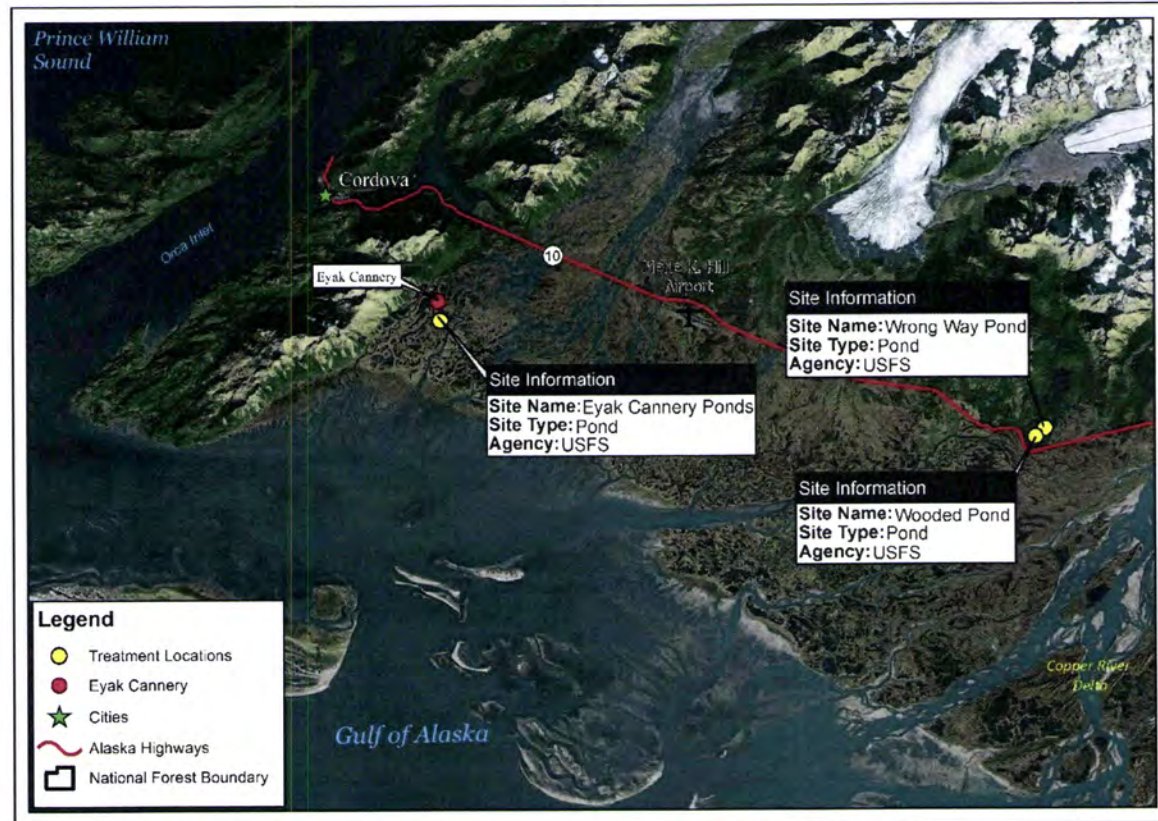
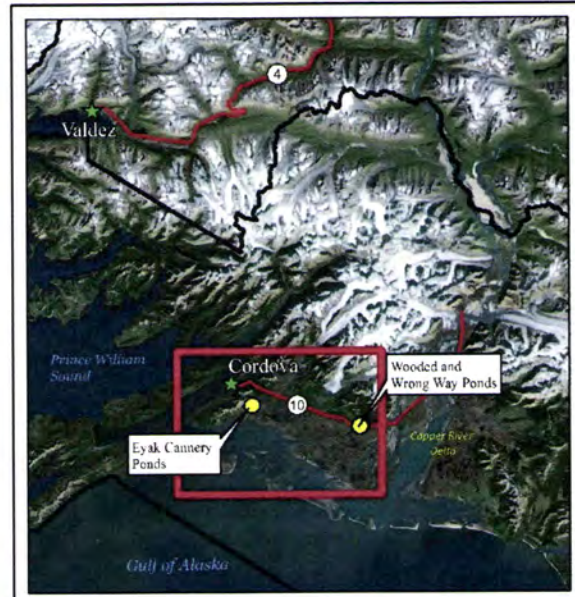
The systemic herbicide Sonar® ONE¹ (active ingredients: fluridone) was selected as the treatment for this invasive species because it provides a low-cost per acre with a very high rate of efficacy in reducing and eradicating this plant from the water bodies treated. Neither of the herbicides are known to have effect on non-target organisms such as fish, birds, or mammals.

The desired future condition is the restoration of natural aquatic vegetation communities in the targeted ponds through the elimination of the non-native invasive plant elodea. This project is designed to begin the process of determining the feasibility and ecological implications of complete eradication of this plant in the Copper River Delta, where it has become established. Eradication of this species would allow native vegetation communities to dominate and would prevent further spread into ponds and other water bodies not currently infested. The desirable percent cover for elodea after the first year of treatment is < 1% average percent cover in each of the three ponds, with complete eradication (0% elodea cover) achieved after 2 to 3 years of treatment.

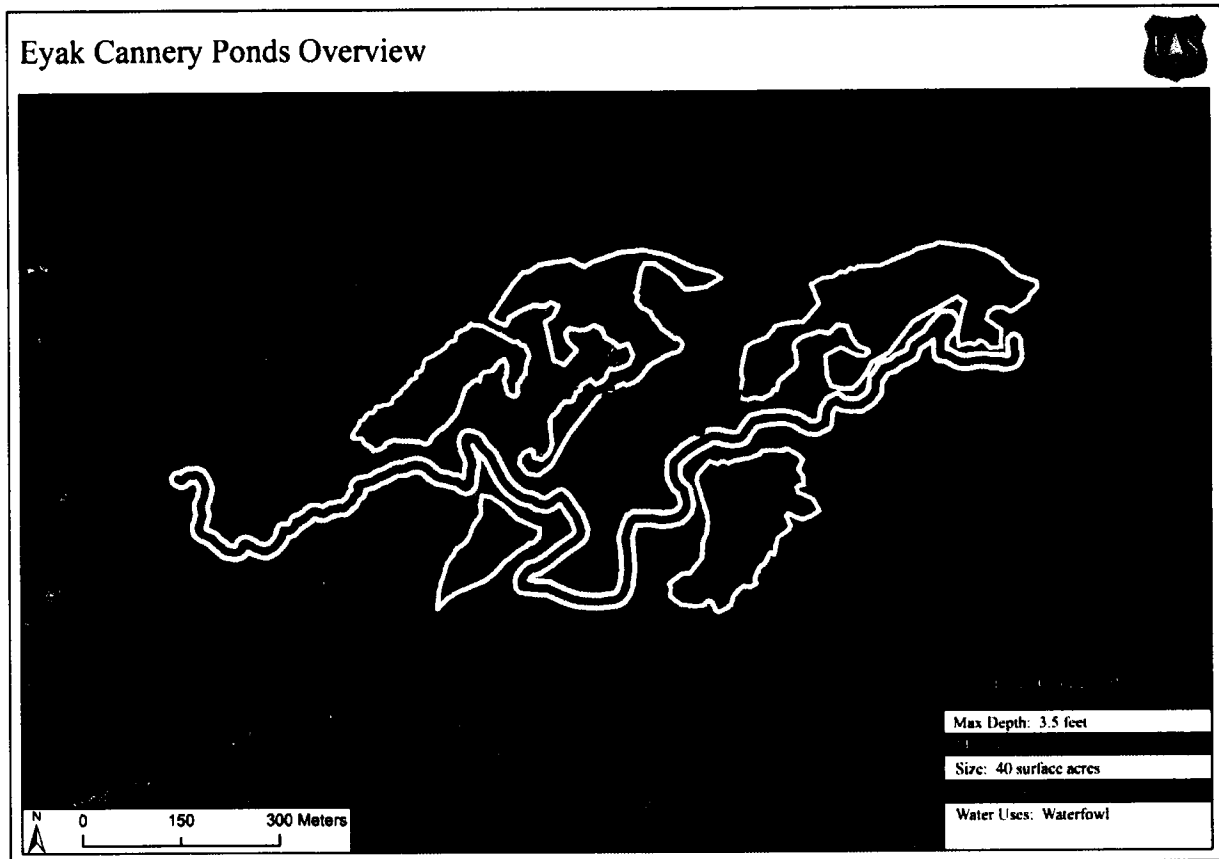
¹ USEPA Registration number: 67690-45

ATTACHMENT 2.

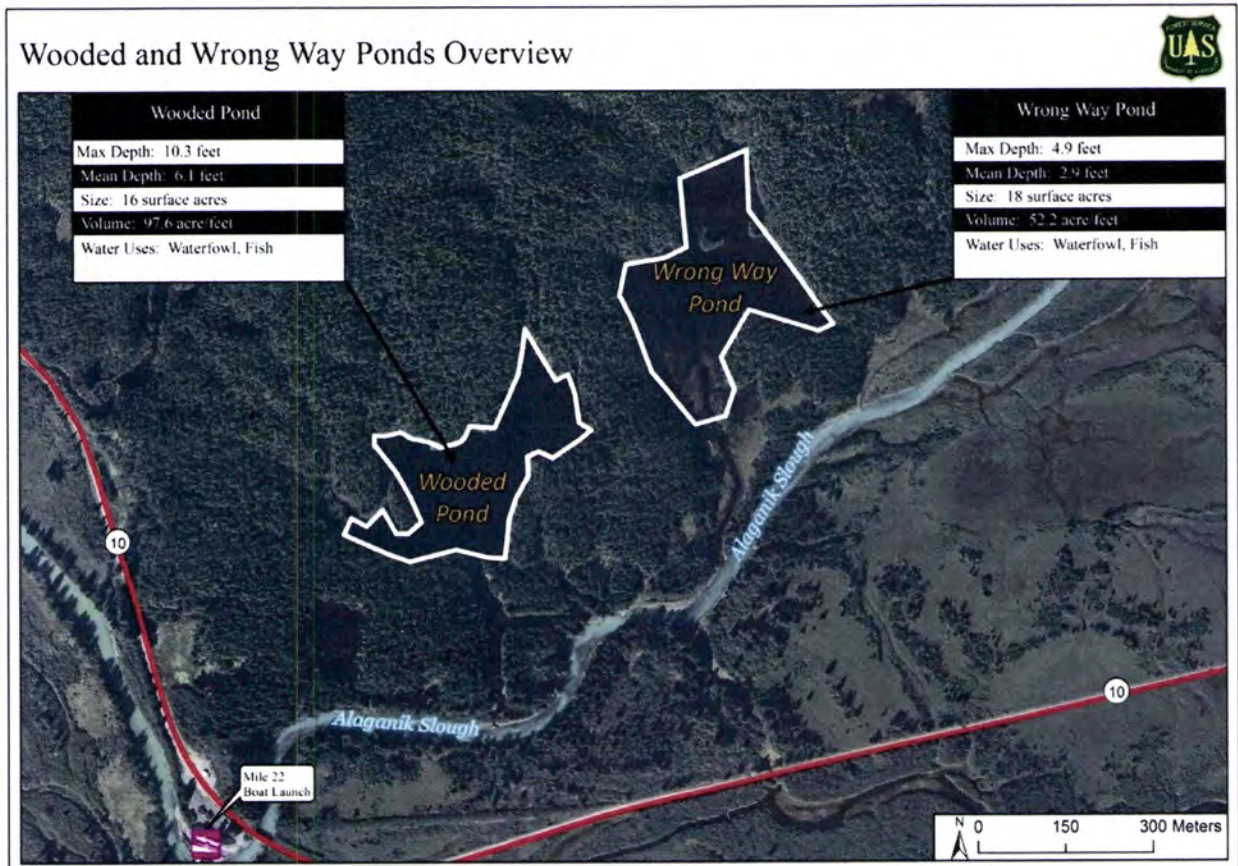
Map that shows the location of the treatment area within the state of Alaska



ATTACHMENT 3A. Map that shows details within the Eyak Cannery treatment area, included areas where pesticides will be applied. White line shows the shoreline boundary of the pesticide application area.



ATTACHMENT 3B. Map that shows details within the Wooded and Wrong Way Ponds treatment area, included areas where pesticides will be applied. White line shows the shoreline boundary of the pesticide application area.



SonarOne®

Aquatic Herbicide



PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION. Harmful If Swallowed. Causes moderate eye irritation. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco. Avoid contact with eyes or clothing. Wear protective eyewear.

KEEP OUT OF REACH OF CHILDREN CAUTION/PRECAUCIÓN

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

FIRST AID	
If swallowed	<ul style="list-style-type: none">• Call a poison control center or doctor immediately for treatment advice.• Have person sip a glass of water if able to swallow.• Do not induce vomiting unless told to do so by a poison control center or doctor.• Do not give anything by mouth to an unconscious person.
If in eyes	<ul style="list-style-type: none">• Hold eye open and rinse slowly and gently with water for 15 to 20 minutes.• Remove contact lenses, if present, after the first 5 minutes; then continue rinsing eye.• Call a poison control center or doctor for treatment advice.
If on skin or clothing	<ul style="list-style-type: none">• Take off contaminated clothing.• Rinse skin immediately with plenty of water for 15 to 20 minutes.• Call a poison control center or doctor for treatment advice.
If inhaled	<ul style="list-style-type: none">• Move person to fresh air.• If person is not breathing, call 911 or an ambulance; then give artificial respiration, preferably mouth-to-mouth, if possible.• Call a poison control center or doctor for further treatment advice.

HOTLINE NUMBER

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. In case of emergency endangering health or the environment involving this product, call INFOTRAC at 1-800-535-5053.

ENVIRONMENTAL HAZARDS

Do not apply to water except as specified on the label. Do not contaminate water outside the intended treatment area by disposal of equipment washwaters. Do not apply in tidewater/brackish water. Lowest rates should be used in shallow areas where the water depth is considerably less than the average depth of the entire treatment site, for example, shallow shoreline areas. Trees and shrubs growing in water treated with SonarOne herbicide may occasionally develop chlorosis. Follow use directions carefully so as to minimize adverse effects on non-target organisms.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

Read all *Directions for Use* carefully before applying.

PRODUCT INFORMATION

SonarOne herbicide is a selective systemic aquatic herbicide for management of aquatic vegetation in fresh water ponds, lakes, reservoirs, drainage canals, irrigation canals, and rivers. SonarOne is a pelleted formulation containing 5% fluridone. SonarOne is absorbed from water by plant shoots and from hydrosol by the roots of aquatic vascular plants. It is important to maintain SonarOne in contact with the target plants for as long as possible. Rapid water movement or any condition which results in rapid dilution of SonarOne in treated water will reduce its effectiveness. In susceptible plants, SonarOne inhibits the formation of carotene. In the absence of carotene, chlorophyll is rapidly degraded by sunlight.

Herbicidal symptoms of SonarOne appear in 7 - 10 days and appear as white (chlorotic) or pink growing points. Under optimum conditions 30 - 90 days are required before the desired level of aquatic weed management is achieved with SonarOne. Species susceptibility to SonarOne may vary depending on time of year, stage of growth and water movement. For best results, apply SonarOne prior to initiation of weed growth or when weeds begin active growth. Application to mature target plants may require an application rate at the higher end of the specified rate range and may take longer to control.

SonarOne is not corrosive to application equipment.

This label provides recommendations on the use of a chemical analysis for the active ingredient. SePRO Corporation recommends the use of High-Performance Liquid Chromatography (HPLC) for the determination of the active ingredient concentration in the water. Contact SePRO Corporation to incorporate this test, known as a FastEST, into your treatment program. Other proven chemical analyses for the active ingredient may also be used. The FastEST is referenced in this label as the preferred method for the rapid determination of the concentration of the active ingredient in the water.

Application rates are provided in pounds of SonarOne to achieve a desired concentration of the active ingredient in part per billion (ppb). The maximum application rate or sum of all application rates is 90 ppb in ponds and 150 ppb in lakes and reservoirs per annual growth cycle. This maximum concentration is the amount of product calculated as the target application rate, NOT determined by testing the concentrations of the active ingredient in the treated water.

Use Precautions and Restrictions

- **Obtain Required Permits:** Consult with appropriate state or local water authorities before applying this product to public waters. Permits and/or posting treatment notification may be required by state or local public agencies.
- **New York State:** Application of SonarOne is not permitted in waters less than two (2) feet deep, except as permitted under FIFRA Section 24(c), Special Local Need registration.
- **Hydroponic Farming:** Do not use SonarOne treated water for hydroponic farming unless a FastEST has been run and confirmed that concentrations are less than 1 ppb.
- **Greenhouse and Nursery Plants:** Consult with SePRO Corporation for site-specific recommendations prior to any use of SonarOne treated water for irrigating greenhouse or nursery plants. Without site-specific guidance from SePRO, do not use SonarOne treated water for irrigating greenhouse or nursery plants unless a FastEST has been run and confirmed that concentrations are less than 1 ppb.

• **Water Use Restrictions Following Application with SonarOne (Days)**

Application Rate	Drinking†	Fishing	Swimming	Livestock/Pet Consumption	Irrigation††
Maximum Rate (150 ppb) or less	0	0	0	0	See irrigation instructions below

† Note below, under Potable Water Intakes, the information for application of SonarOne within ¼ miles (1,320) feet of a functioning potable water intake.

†† Note below, under Irrigation, specific time frames or fluridone concentrations that provide the widest safety margin for irrigating with fluridone treated water.

- **Potable Water Intakes:** Concentrations of the active ingredient fluridone up to 150 ppb are allowed in potable water sources; however, in lakes and reservoirs or other sources of potable water, do not apply SonarOne at application rates greater than 20 ppb within one-fourth (1/4) mile (1,320 feet) of any functioning potable water intake. At application rates of 8-20 ppb, SonarOne may be applied within ¼ mile where functioning potable water intakes are present. **NOTE:** Existing potable water intakes which are no longer in use, such as those replaced by connections to potable water wells or a municipal water system, are not considered to be functioning potable water intakes.
- **Irrigation:** Irrigation with SonarOne treated water may result in injury to the irrigated vegetation. Follow these precautions and inform those who irrigate from areas treated with SonarOne of the irrigation time frames or water FastEST requirements presented in the table below. Follow the following time frames and FastEST directions to reduce the potential for injury to vegetation irrigated with water treated with SonarOne. Greater potential for crop injury occurs where SonarOne treated water is applied to crops grown on low organic and sandy soils.

Application Site	Days After Application		
	Established Tree Crops	Established Row Crops/Turf/Plants	Newly Seeded Crops/Seedbeds or Areas to be Planted Including Overseeded Golf Course Greens
Ponds and Static Canals †	7	30	FastEST required
Canals	7	7	FastEST required
Rivers	7	7	FastEST required
Lakes and Reservoirs ††	7	7	FastEST required

† For purposes of SonarOne labeling, a pond is defined as a body of water 10 acres or less in size. A lake or reservoir is greater than 10 acres.

†† In lakes and reservoirs where one-half or greater of the body of water is treated, use the pond and static canal irrigation precautions.

Where the use of SonarOne treated water is desired for irrigating crops prior to the time frames established above, use the FastEST to measure the concentration in the treated water. Where a FastEST has determined that concentrations are less than 10 parts per billion, there are no irrigation precautions for irrigating established tree crops, established row crops or turf. For tobacco, tomatoes, peppers or other plants within the Solanaceae Family and newly seeded crops or newly seeded grasses such as overseeded golf course greens, do not use SonarOne treated water if concentrations are greater than 5 ppb; furthermore, when rotating crops, do not plant members of the Solanaceae family in land that has been previously irrigated with fluridone concentrations in excess of 5 ppb. It is recommended that a SePRO Aquatic Specialist be consulted prior to commencing irrigation of these sites.

PLANT CONTROL INFORMATION

SonarOne selectivity is dependent upon dosage, time of year, stage of growth, method of application, and water movement. The following categories: controlled, partially controlled, and not controlled, are provided to describe expected efficacy under ideal treatment conditions using higher to maximum label rates. Use of lower rates will increase selectivity of some species listed as controlled or partially controlled. Additional aquatic plants may be controlled, partially controlled, or tolerant to SonarOne. It is recommended to consult a SePRO Aquatic Specialist prior to application of SonarOne to determine a plant's susceptibility to SonarOne. **NOTE: algae (chara, nitella, and filamentous species) are not controlled by SonarOne.**

Vascular Aquatic Plants Controlled By SonarOne: ¹

Submersed Plants:

bladderwort (*Utricularia* spp.)
common coontail (*Ceratophyllum demersum*) †
common Elodea (*Elodea canadensis*) †
egeria, Brazilian Elodea (*Egeria densa*)
fanwort, Cabomba (*Cabomba caroliniana*)
hydrilla (*Hydrilla verticillata*)
naiad (*Najas* spp.) †
pondweed (*Potamogeton* spp., except Illinois pondweed) †
watermilfoil (*Myriophyllum* spp. except variable-leaf milfoil)

Floating Plants:

salvinia (*Salvinia* spp.)
duckweed (*Lemna*†, *Spirodela*†, and *Landoltia* spp.)
mosquito fern (*Azolla caroliniana*) †

Shoreline Grasses:

paragrass (*Urochloa mutica*)

¹ Species denoted by a dagger (†) are native plants that are often tolerant to fluridone at lower use rates. Please consult a SePRO Aquatic Specialist for recommended SonarOne use rates (not to exceed maximum labeled rates) when selective control of exotic species is desired.

Vascular Aquatic Plants Partially Controlled By SonarOne:

Submersed Plants:

Illinois pondweed (*Potamogeton illinoensis*)
limnophila (*Limnophila sessiliflora*)
tapegrass, American eelgrass (*Vallisneria americana*)
watermilfoil-variable-leaf (*Myriophyllum heterophyllum*)

Emerald Plants:

alligatorweed (*Alternanthera philoxeroides*)
American lotus (*Nelumbo lutea*)
cattail (*Typha* spp.)
creeping waterprimrose (*Ludwigia peploides*)
parrotfeather (*Myriophyllum aquaticum*)
smartweed (*Polygonum* spp.)
spatterdock (*Nuphar luteum*)
spikerush (*Eleocharis* spp.)
waterlily (*Nymphaea* spp.)
waterpurslane (*Ludwigia palustris*)
watershield (*Brasenia schreberi*)

Shoreline Grasses:

barnyardgrass (*Echinochloa crusgalli*)
giant cutgrass (*Zizaniopsis miliacea*)
reed canarygrass (*Phalaris arundinacea*)
southern watergrass (*Hydrochloa caroliniensis*)
torpedograss (*Panicum repens*)

Vascular Aquatic Plants Not Controlled By SonarOne:

Emerald Plants:

American frogbit (*Limnobium spongia*)
arrowhead (*Sagittaria* spp.)
bacopa (*Bacopa* spp.)
big floatingheart, banana lily (*Nymphoides aquatica*)
bulrush (*Scirpus* spp.)
pickerelweed, lanceleaf (*Pontederia* spp.)
rush (*Juncus* spp.)
water pennywort (*Hydrocotyle* spp.)

Floating Plants:

floating waterhyacinth (*Eichhornia crassipes*)
waterlettuce (*Pistia stratiotes*)

Shoreline Grasses:

maiden cane (*Panicum hemitomon*)

NOTE: Algae (chara, nitella, and filamentous species) are not controlled by SonarOne.

APPLICATION DIRECTIONS

The aquatic plants present in the treatment site should be identified prior to application to determine their susceptibility to SonarOne. It is important to determine the area (acres) to be treated and the average depth in order to select the proper application rate. Do not exceed the maximum labeled rate for a given treatment site per annual growth cycle.

Application to Ponds

SonarOne may be applied to the entire surface area of a pond. For single applications, rates may be selected to provide 30 - 90 ppb to the treated water, although actual concentrations in treated water may be substantially lower at any point in time due to the slow-release formulation of this product. When treating for optimum selective control, lower rates may be applied for sensitive target species. Use the higher rate within the rate range where there is a dense weed mass, when treating more difficult to control species, and for ponds less than 5 acres in size with an average depth less than 4 feet. Application rates necessary to obtain these concentrations in treated water are shown in the following table. For additional application rate calculations, refer to the *Application Rate Calculation—Ponds, Lakes and Reservoirs* section of this label. Split or multiple applications may be used where dilution of treated water is anticipated; however, the sum of all applications should total 30 - 90 ppb and must not exceed a total of 90 ppb per annual growth cycle.

Average Water Depth of Treatment Site (feet)	Pounds of SonarOne per Treated Surface Acre	
	45 ppb	90 ppb
1	2.5	5.0
2	5.0	10.0
3	7.5	15.0
4	10.0	20.0
5	12.5	25.0
6	15.0	30.0
7	17.0	34.0
8	19.5	39.0
9	22.0	44.0
10	24.5	49.0

Application to Lakes and Reservoirs

The following treatments may be used for treating both whole lakes or reservoirs and partial areas of lakes or reservoirs (bays, etc.). For best results in treating partial lakes and reservoirs, SonarOne treatment areas should be a minimum of 5 acres in size. Treatment of areas smaller than 5 acres or treatment of narrow strips such as boat lanes or shorelines may not produce satisfactory results due to dilution by untreated water. Rate ranges are provided as a guide to include a wide range of environmental factors, such as target species, plant susceptibility, selectivity and other aquatic plant management objectives. Application rates and methods should be selected to meet the specific lake/reservoir aquatic plant management goals.

NOTE: In treating lakes or reservoirs that contain potable water intakes and where the application requires treating within one-fourth (1/4) mile of a potable water intake, no single application can exceed 20 ppb. Additionally, the sum of all applications cannot exceed 150 ppb per annual growth cycle.

Whole Lake or Reservoir Treatments (Limited or No Water Discharge)

Single Application to Whole Lakes or Reservoirs

Where single applications to whole lakes or reservoirs are desired, apply SonarOne at an application rate of 16 - 90 ppb. Application

rates necessary to obtain these concentrations in treated water are shown in the following table. For additional application rate calculations, refer to the *Application Rate Calculation—Ponds, Lakes and Reservoirs* section of this label. Choose an application rate from the table below to meet the aquatic plant management objective. **Where greater plant selectivity is desired such as when controlling Eurasian watermilfoil and curlyleaf pondweed, choose an application rate lower in the rate range.** For other plant species, SePRO recommends contacting a SePRO Aquatic Specialist in determining when to choose application rates lower in the rate range to meet specific plant management goals. Use the higher rate within the rate range where there is a dense weed mass or when treating more difficult to control plant species or in the event of a heavy rainfall event where dilution has occurred. In these cases, a second application or more may be required; however, the sum of all applications cannot exceed 150 ppb per annual growth cycle. Refer to the section of this label entitled, *Split or Multiple Applications to Whole Lakes or Reservoirs*, for guidelines and maximum rate allowed.

Average Water Depth of Treatment Site (feet)	Pounds of SonarOne Per Treated Surface Acre	
	16 ppb	90 ppb
1	0.9	5.0
2	1.7	10.0
3	2.6	15.0
4	3.5	20.0
5	4.3	25.0
6	5.2	30.0
7	6.0	34.0
8	6.9	39.0
9	7.8	44.0
10	8.6	49.0
11	9.5	54.0
12	10.4	59.0
13	11.2	64.0
14	12.1	68.0
15	13.0	73.0
16	13.8	78.0
17	14.7	83.0
18	15.6	88.0
19	16.4	93.0
20	17.3	98.0

Split or Multiple Applications to Whole Lakes or Reservoirs

To meet certain plant management objectives, split or multiple applications may be desired in making whole lake treatments. Split or multiple application programs are desirable when the objective is to use the minimum effective dose and to maintain this lower dose for the sufficient time to ensure efficacy and enhance selectivity. Under these situations, use the lower rates (16 - 75 ppb) within the rate range. **In controlling Eurasian watermilfoil and curlyleaf pondweed and where greater plant selectivity is desired, choose an application rate lower in the rate range.** For other plant species, SePRO recommends contacting a SePRO Aquatic Specialist in determining when to choose application rates lower in the rate range to meet specific plant management goals. For split or repeated applications, the sum of all applications must not exceed 150 ppb per annual growth cycle.

B. Partial Lake or Reservoir Treatments

Where dilution of SonarOne with untreated water is anticipated, such as in partial lake or reservoir treatments, split or multiple applications may be used to extend the contact time to the target plants. The application rate and use frequency of SonarOne in a partial lake is highly dependent upon the treatment area. An application rate at the higher end of the specified rate range may be required and frequency of applications will vary depending upon the potential of untreated

water diluting the SonarOne concentration in the treatment area. Use a rate at the higher end of the rate range where greater dilution with untreated water is anticipated.

Application Sites Greater Than ¼ Mile from a Functioning Potable Water Intake

For single applications, apply SonarOne at application rates from 45 - 150 ppb. Split or multiple applications may be made; however, the sum of all applications cannot exceed 150 ppb per annual growth cycle. Split applications should be conducted to maintain a sufficient concentration in the target area for a period of 45 days or longer. The use of a FastEST is recommended to maintain the desired concentration in the target area over time.

Application Sites within ¼ Mile of a Functioning Potable Water Intake
In treatment areas that are within ¼ mile of a potable water intake, no single application can exceed 20 ppb. When utilizing split or repeated applications of SonarOne for sites which contain a potable water intake, a FastEST is required to determine the actual concentration in the water. Additionally, the sum of all applications cannot exceed 150 ppb per annual growth cycle.

Application Rate Calculation — Ponds, Lakes and Reservoirs

The amount of SonarOne to be applied to provide the desired ppb concentration of active ingredient equivalents in treated water may be calculated as follows:

Pounds of SonarOne required per treated acre =

Avg. water depth of treatment site x

Desired ppb concentration of active ingredient equivalents x 0.054

For example: the pounds per acre of SonarOne required to provide a concentration of 25 ppb of active ingredient equivalents in water with an average depth of 5 feet is calculated as follows:

$5 \times 25 \times 0.054 = 6.75$ pounds per treated surface acre.

NOTE: Calculated rates may not exceed the maximum allowable rate in pounds per treated surface acre for the water depth listed in the application rate table for the site to be treated.

Application to Drainage Canals, Irrigation Canals and Rivers

Static Canals

In static drainage and irrigation canals, apply SonarOne at the rate of 20 - 40 pounds per surface acre.

Moving Water Canals and Rivers

The performance of SonarOne will be enhanced by restricting or reducing water flow. In slow moving bodies of water use an application technique that maintains a concentration of 10 - 40 ppb in the applied area for a minimum of 45 days. SonarOne can be applied by split or multiple broadcast applications or by metering in the product to provide a uniform concentration of the herbicide based upon the flow pattern. The use of a FastEST is recommended to maintain the desired concentration in the target area over time.

Static or Moving Water Canals or Rivers Containing a Functioning Potable Water Intake

In treating a static or moving water canal or river which contains a functioning potable water intake, applications of SonarOne greater than 20 ppb must be made more than ¼ mile from a functioning potable water intake. Applications less than 20 ppb may be applied within ¼ mile from a functioning potable water intake; however, if applications of SonarOne are made within ¼ mile from a functioning water intake, a FastEST must be utilized to demonstrate that concentrations do not exceed 150 ppb at the potable water intake.

Application Rate Calculation — Drainage Canals, Irrigation Canals and Rivers

The amount of SonarOne to be applied through a metering system to provide the desired ppb concentration of active ingredient in treated water may be calculated as follows:

1. Average flow rate (ft. per second) x average width (ft.) x average depth (ft.) x 0.9 = CFS (cubic feet per second)
2. CFS x 1.98 = acre feet per day (water movement)
3. Acre feet per day x desired ppb x 0.054 = pounds SonarOne required per day.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

Pesticide Storage: Store in original container only. Do not store near feed or foodstuffs. In case of leak or spill, contain material and dispose as waste.

Pesticide Disposal: Wastes resulting from use of this product may be used according to label directions or disposed of at an approved waste disposal facility.

Container Handling

Nonrefillable Container. DO NOT reuse or refill this container.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying; then offer for recycling, if available, or reconditioning, if appropriate, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures approved by state and local authorities.

Triple rinse containers small enough to shake (capacity ≤ 50 pounds) as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container ¼ full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

Triple rinse containers too large to shake (capacity > 50 pounds) as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container ¼ full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank, or store rinsate for later use or disposal. Repeat this procedure two more times.

Pressure rinse as follows: Empty the remaining contents into application equipment or mix tank. Hold container upside down over application equipment or mix tank, or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container and rinse at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Refillable Container. Refill this container with pesticide only. DO NOT reuse this container for any other purpose. Triple rinsing the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. Triple rinse as follows: To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times. When this container is empty, replace the cap and seal all openings that have been opened during use; return the container to the point of purchase or to a designated location. This container must only be refilled with a pesticide product. Prior to refilling, inspect carefully for damage such as cracks, punctures, abrasions, worn-out threads and closure devices. Check for leaks after refilling and before transport. Do not transport if this container is damaged or leaking. If the container is damaged, or leaking, or obsolete and not returned to the point of purchase or to a designated location, triple rinse emptied container and offer for recycling, if available, or dispose of container in compliance with state and local regulations.

TERMS AND CONDITIONS OF USE

If terms of the following *Warranty Disclaimer*, *Inherent Risks of Use* and *Limitation of Remedies* are not acceptable, return unopened package at once to the seller for a full refund of purchase price paid. Otherwise, to the extent consistent with applicable law, use by the buyer or any other person constitutes acceptance of the terms under *Warranty Disclaimer*, *Inherent Risks of Use*, and *Limitation of Remedies*.

WARRANTY DISCLAIMER

SePRO Corporation warrants that the product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, SEPRO CORPORATION MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

INHERENT RISKS OF USE

It is impossible to eliminate all risks associated with use of this product. Plant injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label such as unfavorable temperatures, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of SePRO Corporation or the seller. To the extent consistent with applicable law, all such risks shall be assumed by buyer.

LIMITATION OF REMEDIES

To the extent consistent with applicable law, the exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories) shall be limited to, at SePRO Corporation's election, one of the following:

(1) Refund of purchase price paid by buyer or user for product bought, or
(2) Replacement of amount of product used.

To the extent consistent with applicable law, SePRO Corporation shall not be liable for losses or damages resulting from handling or use of this product unless SePRO Corporation is promptly notified of such losses or damages in writing. In no case shall SePRO Corporation be liable for consequential or incidental damages or losses.

The terms of the *Warranty Disclaimer*, *Inherent Risks of Use* and this *Limitation of Remedies* cannot be varied by any written or verbal statements or agreements. No employee or sales agent of SePRO Corporation or the seller is authorized to vary or exceed the terms of the *Warranty Disclaimer* or this *Limitation of Remedies* in any manner.

* Sonar is a registered trademark of SePRO Corporation

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SePRO Corporation
11550 North Meridian Street, Suite 600
Carmel, IN 46032, U.S.A.

SAFETY DATA SHEET



SonarOne[®] Aquatic Herbicide

Section 1. Identification

GHS product identifier : SonarOne[®] Aquatic Herbicide

Other means of identification : Not available.

EPA Registration No. : 67690-45

Relevant identified uses of the substance or mixture

Aquatic herbicide.

Supplier's details : SePRO Corporation
11550 North Meridian Street
Suite 600
Carmel, IN 46032 U.S.A.
Tel: 317-580-8282
Toll free: 1-800-419-7779
Fax: 317-580-8290
Monday - Friday, 8am to 5pm E.S.T.
www.sepro.com

Emergency telephone number (with hours of operation) : INFOTRAC - 24-hour service 1-800-535-5053

The following recommendations for exposure controls and personal protection are intended for the manufacture, formulation and packaging of this product. For applications and/or use, consult the product label. The label directions supersede the text of this Safety Data Sheet for application and/or use.

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2B
AQUATIC HAZARD (LONG-TERM) - Category 3

GHS label elements

Signal word : Warning

Hazard statements : Causes eye irritation.
Harmful to aquatic life with long lasting effects.

Precautionary statements

Prevention : Avoid accidental release to the environment. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.

Response : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Storage : Not applicable.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified : None known.



Section 3. Composition/information on ingredients

Substance/mixture : Mixture
Other means of identification : Not available.

CAS number/other identifiers

CAS number : Not applicable.

Ingredient name	%	CAS number
Proprietary ingredient 2	40 - 80	-
Proprietary ingredient 3	10 - 40	-
Proprietary ingredient 4	10 - 40	-
1-Methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4-pyridone	5	59756-60-4
Proprietary ingredient 1	1 - 5	-

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 20 minutes. If irritation persists, get medical attention.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Skin contact** : Flush contaminated skin with plenty of water. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

- Eye contact** : Causes eye irritation.
- Inhalation** : No known significant effects or critical hazards.
- Skin contact** : No known significant effects or critical hazards.
- Ingestion** : No known significant effects or critical hazards.

Section 4. First aid measures

Over-exposure signs/symptoms

- | | |
|---------------------|--|
| Eye contact | : Adverse symptoms may include the following:
pain or irritation
watering
redness |
| Inhalation | : No known significant effects or critical hazards. |
| Skin contact | : No known significant effects or critical hazards. |
| Ingestion | : No known significant effects or critical hazards. |

Indication of immediate medical attention and special treatment needed, if necessary

- | | |
|-----------------------------------|--|
| Notes to physician | : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours. |
| Specific treatments | : No specific treatment. |
| Protection of first-aiders | : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. |

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- | | |
|---------------------------------------|---|
| Suitable extinguishing media | : Use an extinguishing agent suitable for the surrounding fire. |
| Unsuitable extinguishing media | : None known. |

- | | |
|---|---|
| Specific hazards arising from the chemical | : This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain. |
|---|---|

- | | |
|---|--|
| Hazardous thermal decomposition products | : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
halogenated compounds
metal oxide/oxides |
|---|--|

- | | |
|---|-------------------------------------|
| Special protective actions for fire-fighters | : No special measures are required. |
|---|-------------------------------------|

- | | |
|---|---|
| Special protective equipment for fire-fighters | : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. |
|---|---|

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- | | |
|------------------------------------|---|
| For non-emergency personnel | : No action shall be taken involving any personal risk or without suitable training. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment. |
| For emergency responders | : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel". |

Section 6. Accidental release measures

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). May be harmful to the environment if accidentally released in large quantities.

Methods and materials for containment and cleaning up

Spill : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid accidental release to the environment. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

None.

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Section 8. Exposure controls/personal protection

- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.
- Skin protection**
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Use a properly fitted, particulate filter respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

- Appearance**
- Physical state** : Solid. [Pellets.]
- Color** : Brown to gray.
- Odor** : Faint earthy/musty.
- Odor threshold** : Not available.
- pH** : 7.8 [Conc. (% w/w): 31%]
- Melting point** : Not available.
- Boiling point** : Not available.
- Flash point** : Not applicable.
- Burning time** : Not available.
- Burning rate** : Not available.
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Not available.
- Lower and upper explosive (flammable) limits** : Not available.
- Vapor pressure** : Not available.
- Vapor density** : Not available.
- Relative density** : 1.02 at 20°C
- Solubility** : Not available.
- Solubility in water** : Insoluble. Pellet disintegrates in water.
- Partition coefficient: n-octanol/water** : Not available.
- Auto-ignition temperature** : Not available.
- Decomposition temperature** : Not available.

Section 9. Physical and chemical properties

SADT : Not available.

Viscosity : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Incompatible materials : Reactive or incompatible with the following materials: oxidizing materials.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
SonarOne® Aquatic Herbicide	LD50 Dermal LD50 Oral	Rabbit Rat	>2000 mg/kg >5000 mg/kg	- -

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
SonarOne® Aquatic Herbicide	Eyes - Mild irritant Skin - Mild irritant	Rabbit Rabbit	- -	- -	- -

Sensitization

Product/ingredient name	Route of exposure	Species	Result
SonarOne® Aquatic Herbicide	skin	Guinea pig	Not sensitizing

Mutagenicity

There is no data available.

Carcinogenicity

There is no data available.

Reproductive toxicity

There is no data available.

Teratogenicity

There is no data available.

Specific target organ toxicity (single exposure)

There is no data available.

Specific target organ toxicity (repeated exposure)

There is no data available.

Section 11. Toxicological information

Inhalation hazard

There is no data available.

Information on the likely routes of exposure : Routes of entry anticipated: Oral, Dermal, Inhalation.

Potential acute health effects

Eye contact : Causes eye irritation.
Inhalation : No known significant effects or critical hazards.
Skin contact : No known significant effects or critical hazards.
Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness
Inhalation : No known significant effects or critical hazards.
Skin contact : No known significant effects or critical hazards.
Ingestion : No known significant effects or critical hazards.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : No known significant effects or critical hazards.
Potential delayed effects : No known significant effects or critical hazards.

Long term exposure

Potential immediate effects : No known significant effects or critical hazards.
Potential delayed effects : No known significant effects or critical hazards.

Potential chronic health effects

General : No known significant effects or critical hazards.
Carcinogenicity : No known significant effects or critical hazards.
Mutagenicity : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

There is no data available.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
1-Methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4-pyridone	Acute EC50 3 mg/L Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 8 mg/L Fresh water	Crustaceans - Eucyclops sp.	48 hours
	Acute LC50 1.8 mg/L Fresh water	Fish - Sander vitreus	96 hours
	Chronic NOEC 0.2 mg/L Fresh water	Daphnia - Daphnia magna	21 days
	Chronic NOEC 0.43 mg/L	Fish - Oncorhynchus tshawytscha	75 days

Persistence and degradability

There is no data available.

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
1-Methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4-pyridone	3.16	-	low

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling empty containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-

**Section 14. Transport information**

Environmental hazards	No.	No.	No.
Additional information	-	-	-

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined
United States inventory (TSCA 8b): All components are listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304**Composition/information on ingredients**

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Immediate (acute) health hazard

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Fluridone	5	No.	No.	No.	Yes.	No.

SARA 313

No products were found.

State regulations

Massachusetts : None of the components are listed.



Section 15. Regulatory information

- New York** : None of the components are listed.
New Jersey : The following components are listed: Proprietary ingredient 2
Pennsylvania : The following components are listed: Proprietary ingredient 2
California Prop. 65

No products were found.

International regulations

- International lists** : **Australia inventory (AICS)**: Not determined.
China inventory (IECSC): Not determined.
Japan inventory: Not determined.
Korea inventory: Not determined.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.
Philippines inventory (PICCS): Not determined.
Taiwan inventory (CSNN): All components are listed or exempted.
- Chemical Weapons Convention List Schedule I Chemicals** : Not listed
- Chemical Weapons Convention List Schedule II Chemicals** : Not listed
- Chemical Weapons Convention List Schedule III Chemicals** : Not listed

Section 16. Other information

Hazardous Material Information System (U.S.A.)

Health : 1 * **Flammability :** 0 **Physical hazards :** 0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Health : 1 **Flammability :** 0 **Instability :** 0

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History

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Prepared by : KMK Regulatory Services Inc.

Section 16. Other information

Key to abbreviations

: ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Environmental Impacts of Small Scale Elodea Treatment on the Copper River Delta

This section summarizes the potential impacts of the small scale elodea treatment for each impacted resource. Resources that were not impacted and therefore not further analyzed include: Recreation, Subsistence, and Heritage.

Background

Elodea

All species in the genus *Elodea* are submerged freshwater aquatic plants and are considered non-native and invasive in Alaska (Wurtz et. al. 2013). Genetic analysis of elodea samples from the Cordova area revealed that the species is *Elodea canadensis* Michx., or Canadian waterweed (Thum 2015). This species is considered native to other places in North America such as most provinces of Canada and in the lower 48 states, but is absent in Texas, Georgia and Louisiana. It is also considered introduced in Puerto Rico.

The first record of elodea in Alaska was in 1982, from Cordova's Eyak Lake. Vegetation sampling was conducted throughout the entire lake at that time, however, the plant was only found in one location off Mavis Island. In 2011 and 2012, the US Forest Service surveyed several locations throughout the lake, and found elodea to be present in nearly all areas surveyed. While the original population of elodea in Eyak Lake is believed to have come from a fish aquarium, the plant has spread throughout the Copper River Delta area by other means.

In 2012, the Forest Service continued surveys for this plant beyond Eyak Lake and found it in McKinley Lake, Wooded Pond, Wrong Way Pond, Alaganik Slough, and Martin Lake. These surveys continued through the summer of 2014, where additional infestations were found in Bering Lake and several small ponds and sloughs off Eyak River and Alaganik Slough. In 1993, Bering Lake was surveyed for aquatic vegetation and elodea was not detected at that time (unpublished data from Copper River Delta Institute 1993). Elodea was not found in surveys conducted on Little Martin, Tokun, Kushtaka, Pothole, or Elsner lakes. Surveys conducted across Prince William Sound and in the eastern half of the Kenai Peninsula also turned up no additional infestations.

Random point sampling of the aquatic vegetation within the proposed treatment ponds revealed that *Elodea canadensis* is one of the most dominant vascular plant species, with mean percent cover ranging between 15% and 24% in the plots where it occurs. Temporal sampling indicates that over the course of the growing season, this species tends to increase in biomass with greater cover in deeper parts of the ponds, between .4 and 1.6 meters. The average percent cover of elodea increased in September relative to native species. This is consistent with "brown down"

observations reported for some terrestrial invasive plants in Alaska in which senescence in the invasives is delayed in the fall.

In other areas where elodea has been introduced, it has been found to form dense mats, displace native plants, decrease productivity in plankton, and lower biodiversity. Salmon spawning habitat is affected when dense elodea beds slow water velocity, allowing fine sediment particles to settle, covering gravels where salmon lay their eggs.

Elodea has been identified as a state-wide priority to eradicate. Eyak Lake is used frequently for floatplane docking and take-off, and poses a significant threat as a point of distribution for elodea to more remote lakes and aquatic systems in the Copper River Delta, Copper Basin, and Prince William Sound. The Copper River Watershed Project is working closely with the U.S. Forest Service and State of Alaska to develop a management plan for elodea in Cordova and on the Copper River Delta.

Herbicide (Fluridone)

Fluridone is a systemic herbicide that is absorbed by all plant parts of susceptible plants. It interferes with the synthesis of RNA, proteins, and carotenoid pigments of plants which disrupts photosynthesis. Fluridone controls a broad spectrum of annual grass and broadleaf weeds, but not algae (Bartels et al. 1978, Berard et al. 1978, McCowen et al. 1979, Marquis et al. 1981). Fluridone is a tan to off-white odorless crystalline solid and is chemically formulated as 1-methyl-3-phenyl-5-[3-(trifluoromethyl) phenyl]-4(1*H*)-pyridinone (Bartels et al. 1978, McCowen et al. 1979).

Fluridone has been field tested on a variety of invasive or non-native aquatic plants including salvinia (*Salvinia* spp.), bladderwort (*Utriculata* spp.), Eurasian watermilfoil (*Myriophyllum spicatum*), coontail (*Ceratophyllum demersum*), pondweeds (*Potamogeton* spp.), cattail (*Typha* spp.), horsetail (*Equisetum* spp.), duckweed (*Lemna* spp.), fanwort (*Cabomba caroliniana*), vallisneria (*Vallisneria* spp.), water hyacinth (*Eichornia crassipes*), hydrilla (*Hydrilla* spp.), and elodea (*Elodea* spp.) (McCowen et al. 1979). Field tests in mixed invasive and native submerged aquatic vegetation showed reduction in invasive populations with native plant cover retention of approximately 70% (Madsen et al. 2002). Treatments of Michigan lakes resulted in drastic reductions in invasive Eurasian watermilfoil, increases in native submerged aquatic vegetation, and increases in size and abundance of native fish populations (Schneider 2000).

In these field tests, fluridone did not affect water quality parameters such as pH, dissolved oxygen, color, dissolved solids, hardness, nitrate, nitrogen, total phosphates, and turbidity (McCowen et al. 1979). Because fluridone does not work on algae, ponds or waterbodies with high algal concentrations should not be treated with this herbicide as the algal coating on elodea can prevent herbicide absorption.

Sonar by SePRO Corporation is a commercially available form of fluridone used to selectively manage undesirable aquatic vegetation in freshwater ponds, lakes, reservoirs, rivers, and canals. Sonar is currently approved for use in Alaska by the AK Department of Environmental Conservation in five different formulations: two aqueous suspensions known as Sonar AS (U. S. Environmental Protection Agency [USEPA] USEPA Registration Number 67690-4) and Sonar Genesis (USEPA Registration Number 67690-54), and three time-released pellet forms known as

Sonar Q (USEPA Registration Number 67690-3), Sonar PR Precision Release (USEPA Registration Number 67690-12), and SonarONE (USEPA Registration Number 67690-45).

All USEPA approved pesticides have undergone extensive testing to determine toxicity level through acute (high doses for short periods of time) and chronic (long term exposure) studies on animals (USEPA 1986). Sonar has been tested in both acute and chronic studies, as well as studies to examine genetic, cancer, and reproductive effects. Sonar was not shown to result in the development of tumors, adverse reproductive effects or offspring development, or genetic damage. Sonar has been tested extensively on target aquatic invasive plants, as well as in long-term residue monitoring studies in treated waters. Sonar is labeled with the signal word "caution" by the USEPA on the label, indicating a level of toxicity lesser than those labeled with either "danger" (more toxic) or "poison" (most toxic). The USEPA has approved Sonar's application in water used for drinking as long as residue levels do not exceed 150 parts per billion (ppb). Sonar applications can be made within one-fourth mile (1,320 feet) of a potable water intake. This treatment concentration is well below the 150ppb allowable limit in water used for drinking (USEPA 1986). Human contact to fluridone may be through swimming in treated waters, drinking water from treated waters, consuming fish from treated waters, or consuming meat, poultry, eggs, or milk from livestock that were provided water from treated waters. No ponds or lakes on the Copper River Delta have any commercial agricultural use, so exposure through livestock is highly unlikely. There are no USEPA restrictions on the use of fluridone-treated water for swimming or fishing when used according to label directions (USEPA 1986).

Botanical Resources

No federally listed threatened or endangered plants are known or suspected to occur on the Chugach National Forest. No Region 10 Sensitive plants are known from the project area, nor are their habitats present. Eleven rare plants listed on the Alaska Center for Conservation Science (ACCS) rare plant list are known or suspected in the vicinity of the project area on the Cordova Ranger District.

Direct and Indirect Effects of the Proposed Action

Native plants will be exposed to the herbicide fluridone in the treatment ponds at varying concentrations during the life of this project. The effects from the herbicide to other native plants, particularly rare species known or suspected in the ponds, will vary. Some plants are more sensitive than others, and may show varying degrees of observable signs of effects from the herbicide. This may depend on factors such as life history and time of emergence and senescence. The herbicide fluridone was developed to target certain invasive aquatic plants that occur in other parts of the U.S such as hydrilla (*Hydrilla verticillata*) and Eurasian watermilfoil (*Myriophyllum spicatum*), which are similar in growth habit and invasiveness as elodea. All these invasive plants are easily broken into fragments which makes eradication by other means nearly impossible.

In this report, effects to rare plants are defined as the observation of a response resulting from the action of a chemical stressor. This definition is used by the Environmental Protection Agency's

EcoTox database to report effects to living organisms from the literature from herbicide or chemical applications.

Direct effects to an individual plant in the treatment ponds due to herbicide application includes impacts to metabolism and photosynthesis such as 1) impacts to the metabolism by the chemical compounds of the plant and therefore adjusting the biochemistry, enzyme production or hormones, 2) changing the photosynthetic pathway and stopping photosynthesis from occurring, which would change the plants morphology and growth rate and may result in death of leaves and other plant parts, 3) reduced growth of root tubers where starch is stored for many aquatic plants if photosynthesis is altered, and 4) changes in reproductive behavior due to other changes in the plants metabolism induced by the herbicide.

Direct effects are expected from this project for some species of known or suspected rare plants, depending on their sensitivity. Sensitivities are not known for all plant species exposed to fluridone, but studies in other northern regions provide examples of what can occur in similar aquatic habitats. For example, a study in Vermont, whole-lake treatments of a sustained 6 ppb, reported some impacts to native species following fluridone treatments to eradicate *Myriophyllum spicatum* (Getsinger et al 2002). Though several individual species experienced significant reductions in occurrence following the fluridone treatment, over 47 percent of the lake sampling points remained vegetated by native plants at the end of the study. At water depths less than 4 m, native plant cover was approximately 78 percent. Reductions in frequency of occurrence values were reported for six native species in one lake following the fluridone application. These included the plant species *Ceratophyllum demersum*, *Elodea canadensis*, *Myriophyllum sibiricum*, *Nuphar flexilis*, *Potamogeton gramineus* and *Potamogeton illinoensis*. *Nuphar flexilis* rebounded to pretreatment levels during the following year, after not being found at the end of the first season, indicating that the tuber health remains viable after one year of wide-spread leaf mortality. The broad-leaved pondweeds including *P. gramineus* and *P. illinoensis* also remained widely distributed in both lakes in the second year although at significantly reduced levels.

Two plants considered sensitive to fluridone in Vermont (*Ceratophyllum demersum* and *Myriophyllum sibiricum*) also occur in the ponds in the project area, but are not rare on the CRD. Additionally, a few genera in the Vermont study are the same that are found in the CRD ponds, but it is uncertain if similar negative effects to the Vermont species will also be observed in the CRD treatment ponds (ex. *Nuphar*, *Potamogeton*). Additionally, a pondweed species, *Potamogeton robbinsii*, occurs in the Vermont and CRD treatment ponds, and is considered rare in Alaska. No negative effects were reported with the Vermont fluridone treatments. A common algae of the CRD, *Chara* sp., was also present in the Vermont study and showed no negative impacts to fluridone treatments. In all cases reductions in percent cover were experienced in the treatment ponds for some species, but no species completely disappeared after the second year. Of particular interest to this project, the Vermont study also contained the Alaska invasive elodea and impacts were observed to this species at 6 ppb.

Indirect effects to plants outside the CRD ponds include all the possible direct effects occurring to plants outside the immediate treatment areas up to ¼ mile. Indirect effects are not expected to occur on rare species due to the proposed action

Cumulative Effects of Proposed Action

Cumulative effects considered in this project are based on what may occur to the population of a species in each treatment pond that is exposed to the herbicide in addition to other changes that may have occurred to rare plant populations on the CRD. For this project, effects to a population of a plant species within the treatment ponds include 1) effects on the species or taxonomic group occupying the same area at a given time such as mass die-off, and 2) interruption of ecosystem processes that the rare plants are part of. Cumulative effects to rare species populations are not expected to occur on the Copper River Delta.

Direct and Indirect Effects of the No Action Alternative

Direct effects of the No Action alternative would result in elodea continuing to reproduce in the ponds where it grows, and eventually displacing rare plant habitat. Rare plants could be directly impacted in the ponds by being outcompeted by elodea.

Indirect effects of the No Action Alternative would result in propagules of elodea becoming detached and migrating to other ponds, and becoming established where it does not currently grow. This could be accomplished by animals, flooding, or by people accessing the ponds. This could indirectly effect rare plants as those propagules would continue to become newly established in new locations and compete for resources with rare aquatic plants.

Cumulative Effects of the No Action Alternative

Cumulative effects of the No Action Alternative to rare plants on the CRD are that elodea will continue to grow and be transported to other ponds and waterways, and further degrade the aquatic habitat for native plants.

Aquatic Biological Resources

The fish species in Wrongway and Wooded ponds include coho salmon (*Oncorhynchus kisutch*), cutthroat trout (*O. clarkii*), Dolly Varden (*Salvelinus malma*), coastrange sculpin (*Cottus aleuticus*), and threespine stickleback (*Gasterosteus aculeatus*). Only threespine stickleback have been found in the Eyak Cannery ponds. There are no federally listed threatened, endangered, or proposed fish species in the project area. There are no Forest Service designated sensitive species in the Alaska Region.

Direct and Indirect Effects of Proposed Action

The issues that were identified were the effects of the toxicity of fluridone to fish, the zooplankton they feed upon, the phytoplankton the zooplankton feed upon, and the aquatic macrophytes that provide habitat for fish, zooplankton, and aquatic invertebrates. Public comments expressed concern on the effects of fluridone on the aquatic food chain and the possibility of bioaccumulation of fluridone in the food chain.

The toxicity of fluridone to fish would be a direct effect, whereas the effects to the fish's prey items and habitat could constitute indirect effects. For the sake of simplicity, these will be discussed together as appropriate.

The effects of the treatment will all be of a temporal nature. Fluridone in the water will degrade and get flushed out of the ponds within several months, while fluridone in the pond sediments were found to have a half-life of about 12 months in the most extreme study, and under anaerobic conditions (Durkin 2008).

The proposed levels of fluridone that will be used to treat the elodea are too low to directly affect fish, aquatic invertebrates, and zooplankton species. The estimated NOEC (no observable effect concentration) for rainbow trout, which are closely related to cutthroat trout and other salmonids, is five times higher than the proposed concentration to be used in the CRD ponds. The NOEC for amphipods and midge larvae is 33 times greater than the proposed treatment level. For *Daphnia magna*, the most sensitive zooplankton species reported, the NOEC is 11 times higher than the proposed treatment level. Thus, there will be no direct effects from fluridone toxicity to the fish or aquatic invertebrates, and zooplankton species that they feed upon.

Fish species in the project ponds feed heavily on aquatic invertebrates and zooplankton, and zooplankton could be impacted indirectly by phytoplankton populations. There are many different species of algae that make up the phytoplankton community with varying degrees of sensitivity to fluridone. No studies reported effects to phytoplankton at the proposed treatment level, although some did at slightly higher levels. Other studies have found no effects at much higher treatment levels, and one study found no effect to the makeup of the phytoplankton community. The fish species in the project ponds also use other food sources and are not necessarily dependent on the zooplankton and phytoplankton chain.

There are 20-24 different species of aquatic macrophytes that have been documented in the project ponds, some of which, including elodea, are sensitive to fluridone, while others are tolerant. Although some species may be reduced by fluridone treatments, the tolerant species may increase with reduced competition. Even if the existing amount of aquatic vegetation is reduced, the vegetated cover should not fall below the 10% level that is considered the lower bound for diverse and productive fish habitat. Aquatic macrophytes provide fish species with cover from predators, shade, and habitat for prey items, but macrophytes can also restrict movement and decrease visibility of prey items. Visual predators such as coho salmon and cutthroat trout may benefit from the reduction in vegetation, while threespine stickleback, a smaller prey species, may suffer a loss of cover. Dolly Varden and coastrange sculpin use the benthic habitat and may not be affected. Movement and visibility may increase, but the reduction of habitat and surface area supplied by elodea may have unknown impacts on the aquatic invertebrate and phytoplankton populations. These populations could decrease in response to the loss of habitat provided by elodea, resulting in decreased prey populations for fish species. However, changes of the CRD aquatic food web due to elodea presence or absence are relatively unknown. Data collected pre- and post-treatment will allow further understanding of CRD aquatic food web changes.

Although there may be some short-term changes to the existing macrophytes, the removal of elodea should allow the native plant community to become re-established after the treatment has ended and the fluridone has degraded. The fish species, which have evolved and adapted to the native plants communities over thousands of years, should then be able make the adjustments to the more natural ecosystem.

In response to the comments, because of the low toxicity of fluridone and the diverse species of algae and aquatic macrophytes, the overall phytoplankton, zooplankton, aquatic invertebrates, and fish populations are not likely to be substantially affected. However, slight changes in aquatic food webs could occur with subsequent changes in habitat, i.e. the presence or eradication of elodea. The degree of this change will be better understood with the completion of current research looking at aquatic invertebrate communities of elodea and native plant beds.

Fluridone is hydrophilic, meaning it is not likely to accumulate in fats where other pesticides can be stored. Hydrophilic properties coupled with proposed low concentrations of fluridone could eliminate or greatly reduce chances of bioaccumulation in aquatic food chains. Aquatic organisms have been shown to metabolize and excrete fluridone at steady rates. After being exposed to clean water, fish were able to excrete 80-90% fluridone after four days. Overall, fluridone should have negligible bio concentration.

Cumulative Effects of Proposed Action

There have been no significant human activities in the past and no current activities that would significantly affect fish or fish habitat. No activities are proposed for the future that could affect any of the ponds. Because the proposed treatment will not affect fish, their prey, or their habitat, and there are no past or foreseen future effects, there will be no cumulative effects.

Direct and Indirect Effects of the No Action Alternative

The distinction between direct and indirect effects is often subtle. For this discussion, the toxicity of fluridone to fish would be a direct effect, whereas the effects to the fish's prey items and habitat would constitute indirect effects. For the sake of simplicity, these will be discussed together as appropriate.

Because no fluridone will be applied under the No Action alternative, there will be no effects to fish or other organisms from the toxicity of fluridone. In response to the public comments, there would also be no effect from fluridone on the food web or any chance of fluridone being consumed and bioaccumulating in the organisms at higher trophic levels.

If the elodea is not treated, it could eventually dominate and cover the project ponds, although its ability to outcompete all native plants is not documented in this area. Thick vegetation can reduce feeding efficiency for salmonids and reduce the available feeding area. Thus, it is likely that the salmonid habitat and populations in the ponds would be reduced. Threespine stickleback may benefit from the additional cover.

Large quantities of decaying elodea could reduce dissolved oxygen levels in the winter, causing stress to salmonids and coast range sculpin. There are reports, however, that elodea has been found to be green and photosynthesizing under ice in the winter. Thus, additional information is needed on how much of the biomass actually dies and decays from year to year.

Downstream areas in Eyak River and Alaganik Slough are already infested with elodea, but the spread of elodea from the Eyak Cannery ponds could affect about 3.5 miles of channels in the Mountain Slough system. As previously stated, elodea could facilitate sedimentation which could change some stream bed characterizations from gravel to silt. This change could impact salmon spawning and rearing in the Mountain Slough system. However, elodea on the CRD has not established populations to this extent, and direct impacts to local salmon habitat is largely unknown.

If the No Action alternative is adopted, studies should be conducted to determine if elodea is having increasing adverse effects. Specifically, studies should monitor the spread of elodea and the use of elodea for fish habitat. If this is the case, fluridone treatment could be warranted in the future and the magnitude of the effect might be contained.

Cumulative Effects of the No Action Alternative

There have been no significant human activities in the past and no current activities that would significantly affect fish or fish habitat in the project area. No activities are proposed for the future that could affect any of the ponds. While the increasing spread of elodea could likely reduce salmonid habitat, this is not compounded by other activities, so there are no cumulative effects.

Wildlife

No Threatened or Endangered species or Critical Habitats are found within the project areas. Several species listed as threatened, endangered, or candidate species, Region 10 Sensitive Species, MIS, and SSI species that occur in Alaska, including the Eskimo curlew, short-tailed albatross, spectacled eider, Steller's eider, polar bear, Pacific walrus, and wood bison are not addressed further because the proposed treatment areas are outside of their known range or they are not known to be present within the project area. For this reason, the elodea Invasive Plant Treatment Project will have no effect on these species and they will not be addressed further in this report.

Effects of the proposed herbicide treatment to wildlife species and their associated habitat were analyzed according to the impact scale in Table 1. Additional life history, habitat, and species occurrence information was used in analyzing the effects upon individual species.

Table 1. Impact scale of effects on wildlife

Impact Type	Description of Effects
Negligible Impacts	<ol style="list-style-type: none"> 1. No species of concern present 2. Impacts are temporary and wildlife species can relocate to similar or higher quality habitat 3. A negligible impact equates to “no effect” determination for threatened and endangered species and the “no impact” determination for sensitive species
Minor Impacts	<ol style="list-style-type: none"> 1. Non-breeders of concern are present in low numbers 2. Habitat is not critical for reproduction or survival and animals can relocate to similar or higher quality habitat 3. No serious concerns express by State or Federal Fish & Wildlife officials 4. A minor impact equates to a “not likely to adversely affect” determination for threatened and endangered species and the “may impact individuals but not likely to cause a trend to federal listing or a loss of viability” determination for sensitive species.
Moderate Impacts	<ol style="list-style-type: none"> 1. Breeding animals of concern are present and/or present for critical life stages 2. Mortality/interference with activities necessary for survival are likely to occur occasionally 3. Mortality/interference are not expected to threaten the continued existence of species in the area 4. A moderate impact equates to a “likely to adversely affect” determination for threatened and endangered species and the “may impact individuals but not likely to cause a trend to federal listing or a loss of viability” determination for sensitive species.
Major Impacts	<ol style="list-style-type: none"> 1. Breeding animals present in high numbers and/or during critical life stages 2. Project area has history of use during critical life stages and project will occur during these critical periods of time 3. Habitat is limited and animals cannot relocate to avoid impacts 4. Mortality, injury, physiological stress, effects on reproduction/raising of young are expected on a regular basis AND these threats continue to threaten the survival of the species 5. State or Federal officials express serious concern 6. A major impact equates to a “likely to adversely affect” determination for threatened and endangered species and the “likely to result in a trend to federal listing or a loss of viability” determination for sensitive species.

Direct and Indirect Effects of Proposed Action

Direct effects of the proposed action on wildlife species includes consumption of treated water or food sources that have been directly exposed to fluridone (i.e. invertibrates, fish, plants). Fluridone, when applied at the approved concentration rate, has not been found to be toxic to waterfowl or wildlife species (Cornell Cooperative Extension 2015). Acute exposure causes few adverse effects but if chronically exposed in large doses (150 mg/day) adverse effects can occur (Utah State 2005). Laboratory animals (mice, rats, dogs) fed fluridone in their diets showed little signs of toxicity even when levels exceed 1000 ppm. No adverse effects were observed in mallard and quail when exposed to 1000 ppm over time (PMEP 1986). The proposed treatment will occur at 5 - 18 ppb, well below the numbers that were studied in laboratory tests. Ingesting fish, invertebrate, or plant species that have been treated with fluridone may introduce trace amounts of the chemical into the wildlife species digestive system. However, low amounts are easily metabolized and excreted by mammals and birds (Alaska DNR 2013). Mammals have

excreted fluridone metabolites within 72 hours of exposure (up to 1400 ppm/day, McCowen et al 1979)

Another direct effect of the proposed action on wildlife species includes the exposure of the herbicide to skin and eyes due to their use of the treated ponds for food sources and travel corridors. Whether the wildlife species is swimming, diving, or walking across a treated body of water, the animal's skin and eyes may be exposed to fluridone. Fluridone is not irritating to the skin in acute exposure, and only minor effects were noted after application of undiluted fluridone to the eyes of rabbits. Thus, no adverse effects are expected from contact with dilute solutions (Cornell Cooperative Extension 2015).

Trumpeter swans and dusky Canada geese are known to nest in the Eyak Cannery Pond area. Application of herbicide will occur anywhere from May-July. Both of these species are nesting at this time, and increased activity in this area may disrupt nesting/brood rearing behavior. This area is visited yearly during nest monitoring in June and July. Therefore, the proposed action will have **minor effects** on both trumpeter swans and dusky Canada geese.

Indirect effects of the proposed action to wildlife species includes changes in food webs, decrease in health due to direct ingestion of herbicide through food or water consumption, and displacement due to changes in food webs, preferred habitats, etc. Toxicity of fluridone is low. It has been tested for acute and chronic toxicity, as well as reproductive effects, on mammals (rats, mice, rabbits), birds (bobwhite quail, mallard), insects, earthworms, fish, and other aquatic animals (Hamelink et al. 1986, Kamarianos et al. 1989, Muir et al. 1982, McCowen et al 1979). Fluridone is not considered to be a carcinogen or mutagen and is not associated with reproductive or developmental effects in test animals (Utah State University 2015). Bioaccumulation is not known to occur, though food webs may be changed. This change may decrease the diversity, abundance, and quality of the food and water sources available to wildlife species. This in turn may affect the overall health of wildlife populations. However, the CRD is a huge wetland complex, with a large number of ponds available for wildlife use.

Cumulative Effects of Proposed Action

Cumulative effects of the proposed action to wildlife species on the CRD includes bioaccumulation, accidental spills, and drifting of the herbicide downstream. Fluridone has low bioaccumulation in fish, birds, or mammal tissues (CWMA 2014). A spill response plan will be developed. In the event that an accidental spill of fluridone occurs, protocols from this will be followed to ensure that the situation is properly handled. Drifting of the herbicide downstream is not likely to occur in the Eyak Cannery Pond system as it is mostly closed, but both Wooded and Wrong Way ponds are open systems. Dissemination will likely occur before the herbicide reaches the larger system, causing minimal to no effects to wildlife found downstream. Changes in the food webs associated with these ponds may change. This change may decrease the diversity, abundance, and quality of the food and water sources available to wildlife species. This in turn may affect the overall health of wildlife populations. However, the CRD is a huge wetland complex, with a large number of ponds available for wildlife use.

Direct and Indirect Effects of the No Action Alternative

Direct effects of the No Action alternative would result in elodea continuing to reproduce and grow in the ponds where it is currently found, and may potentially displace native vegetation. Elodea could eventually take over smaller pond systems, creating dense stands that could directly affect wildlife species by removing water and/or food resources from the landscape or in the case of beaver, muskrat, and waterbirds the elodea may hinder or completely remove travel corridors.

Indirect effects of the No Action Alternative would result in propagules of elodea becoming detached and migrating to other ponds, and becoming established where it does not currently grow. This could occur due to wildlife use, flooding, or by people accessing the ponds. This may indirectly affect wildlife as the shift in habitat type could alter food web dynamics that are currently in place. This in turn may affect overall food and water availability to wildlife species. In addition, the diversity, abundance, and quality of water and food resources would decrease which could affect the health, vigor, and overall survival of wildlife species.

Cumulative Effects of the No Action Alternative

Cumulative effects of the No Action Alternative would result in the continual growth and spread of elodea to other ponds and waterways, further degrading the pond complexes found on the CRD. This continual degradation will change the food webs found within the pond systems which may affect wildlife health across the CRD. Water and food sources, as well as travel corridors will change and potentially be removed from the system. As mentioned previously, the quality, diversity, and abundance of food and water resources could affect the overall health of wildlife species. However, the CRD is a huge wetland complex, with a large number of ponds available for wildlife use. The availability of these ponds will depend on the extent of the elodea infestation.

Hydrology

Direct and Indirect Effects of Proposed Action

Direct and indirect effects of the proposed fluridone treatments may include short term alteration of water quality, hydrosols (sediments) and compositional changes in wetland vegetation. Any expected changes in surface and groundwater water quality and hydrosols would be minor, could be mitigated, and would not pose any hazard to humans or aquatic life. The treatment should not have any effect on soil instability or changes in geologic substructure, changes in watershed morphology, drainage patterns, amount of surface or groundwater, rates of runoff, groundwater quality, or on any existing water rights or water users as a result of alteration of water quality.

Overall, water quality is not expected to significantly decrease by the application of fluridone to the proposed treatment ponds and sloughs. Field studies have shown that fluridone has not had a direct effect on water quality parameters such as pH, dissolved oxygen, color, dissolved solids, hardness, nitrate nitrogen, total phosphates, or turbidity (McCowen et al., 1979). Indirect effects of fluridone application may result in short term water quality degradation.

The application of fluridone may be completed utilizing motorized or non-motorized boats and/or rafts and will likely result in death of elodea. Indirect effects of the application include increasing decaying biomass within the treated areas, potential petroleum product contamination from outboard motors, and potential minor bank erosion. Increased decaying biomass may result in extra organic material floating in treated areas and a temporary decrease in dissolved oxygen as the plants break down. Potential petroleum contamination and increased turbidity as a result of bank erosion is unlikely or minor due to project design criteria and implementation of Best Management Practices (BMPs). Any of these affects or potential water quality alterations will be short term in nature following treatments each year. In the long term water quality will likely increase with the reduction of the large biomass of elodea, and the expected increase in native aquatic vegetation.

The USEPA has approved Sonar's application of fluridone in water used for drinking as long as residues do not exceed 150 parts per billion (ppb) (USEPA, 1986). Human contact to fluridone may be through swimming in treated waters, drinking from treated waters, or consuming fish or wildlife from treated waters. The proposed fluridone treatment concentrations for the Cannery ponds and sloughs, and Wrong Way and Wooded ponds is < 18 ppb, well below the 150 ppb allowable limit in water used for drinking.

Fluridone is removed from treated water by degradation from sunlight, adsorption to sediments, and absorption by plants. Field studies have shown that fluridone concentrations decrease with time after treatment and approach zero detectable presence between 64 and 69 days after treatment (Langeland and Warner, 1986). Additional studies have shown rapid decreases of fluridone levels in various parts of the water column after 60 days of treatment, with a half-life of 7-21 days or less (Kamarianos et al., 1998; Osborne et. al., 1989; Muir, et. al., 1980, McCowen et. al., 1979). Fluridone can persist in hydrosols (sediments) longer, with a half-life exceeding one year (Muir et. al., 1980).

No contamination of groundwater is anticipated from this project. The primary soil types in the treatment areas are deep, poorly drained, silt loams with most soils, classified as moderately slow to slowly permeable (Davidson, 1992; Davidson and Harnish, 1978). There are no concerns for fluridone contaminating potable water supplies because of the inability of the pesticides to travel through the soil, binding ability to particles, high water table, poor permeability, and lack of users down gradient. No subsurface water rights exist in the immediate or downstream areas of the proposed treatments.

Wetlands are extensive in the 6th level HUC Alaganik Slough – Frontal Gulf of Alaska and Eyak River – Frontal Gulf of Alaska watersheds (Table 1). The direct effects to riparian and wetlands from this project include potential short-term loss of aquatic wetland vegetation. Field tests of treatments in mixed invasive and native submerged aquatic vegetation have shown temporary loss of native plant cover in addition to reduced invasive populations. These losses did not

significantly impact the native plant species diversity and maintained native plant cover at levels greater than seventy percent in the year of treatment and at one year posttreatment (Madsen et. al., 2002). Table 3 displays the types and percentages of wetlands analyzed at the HUC 6 watershed level that may be temporarily directly affected during fluridone treatment. Eradication and loss of the wetland invasives overtime will allow more native submerged vegetation to reestablish. In the long term wetland habitat, quality and diversity will be improved with the reestablishment of native aquatic vegetation.

Table 2. HUC 6 Wetlands affected summary by proposed treatments

6th Level HUC Watershed	Wetland Type Affected	% of Total Watershed Wetlands Directly Affected
Eyak River - Frontal Gulf of Alaska	Freshwater Emergent Wetland	0.26
	Freshwater Pond	1.76
Alaganik Slough - Frontal Gulf of Alaska	Freshwater Emergent Wetland	0.01
	Freshwater Pond	1.05

Total potential percentage and types of wetlands affected and analyzed at the HUC 6 watershed level from implementation of the proposed elodea treatment ponds and sloughs (data is from the USF&W Wetlands Inventory). Note that only up to thirty percent of these percentages would likely have any short term affects and loss of native vegetation (Madsen, et. al., 2002).

Cumulative Effects of Proposed Action

The cumulative effects of the proposed action will be improved Copper River Delta Ecosystem integrity and resiliency in the light of future projects and climate change.

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ATTACHMENT 8: Descriptions of precautions planned to protect human health, safety, welfare, animals, and the environment.

Fluridone effects on non-target animals (including humans)

Any pesticide approved by the U.S. Environmental Protection Agency (USEPA) has undergone extensive testing to determine toxicity level through acute (high dose for short periods of time) and chronic (long term exposure) studies on animals (USEPA 1986). Sonar has been tested in both acute and chronic studies, as well as studies to examine the potential for carcinogenic, mutagenic, and teratogenic effects. Sonar was not shown to result in the development of tumors, adverse reproductive effects or offspring development, or genetic damage. Sonar has been tested extensively on target aquatic nuisance plants, as well as in long-term residue monitoring studies in treated waters. Sonar is labelled with the signal word "caution" by the USEPA, indicating a level of toxicity lesser than those labelled with either "danger" (more toxic) or "poison" (most toxic).

The USEPA has approved Sonar's application in water used for drinking as long as residue levels do not exceed 0.15 parts per million (ppm) or 150 parts per billion (ppb). Sonar applications can be made within one fourth of a mile (1320 feet) of a potable water intake at rates less than or equal to 20 parts per billion. This treatment concentration is well below the 150ppb allowable limit in water used for drinking (USEPA 1986). Human contact with fluridone may occur through swimming, in treated waters, drinking treated waters, by consuming fish harvested from treated waters, or by consuming meat, poultry, eggs, or milk from livestock that were provided treated water. The ponds on the Copper River Delta have no commercial agricultural use, so exposure through livestock is unlikely. The ponds are not used for recreational activities (fishing, swimming). Even so, there are no USEPA restrictions on the use of fluridone-treated water for swimming or fishing when used according to label directions (USEPA 1986) should such activities occur despite the closure in force.

The maximum non-toxic dose is characterized by the "no observable effect level" or NOEL for pesticides. The dietary NOEL for fluridone (the highest dose at which no adverse effects were observed in laboratory test animals fed fluridone) is approximately 8 milligrams of fluridone per kilogram of body weight per day (8mg/kg/day). A 70Kg (150lb) adult would have to drink over 1,000 gallons of water containing the maximum USEPA allowable concentrations in potable water (150ppb) for a significant portion of their lifetime to receive an equivalent dose. A 20Kg (40lb) child would have to drink approximately 285 gallons of fluridone treated water every day to receive the same NOEL-equivalent dose. The risk therefore is negligible even if a human were to accidentally ingest water directly following a Sonar treatment. As Sonar is only applied intermittently and in limited areas, and because it disappears from the environment, continuous exposure over a lifetime for humans, mammals, and other animals is improbable. Fluridone has been tested for acute and chronic toxicity, as well as reproductive effects, on mammals (rats, mice, guinea pigs, rabbits, dogs), birds (bobwhite quail, mallard ducks), insects (honey bee, amphipods, daphnids, midge, chironomid), earthworms, fish (fathead minnows, catfish, mosquitofish, rainbow trout), and other aquatic animals (Hamelink et al. 2009, Kamarianos et al. 1989, Muir et al. 1982, McGowen et al. 1979).

Exposure of test animals dermally (skin contact) has shown minimal toxicity to animals by acute, concentrated contact. Chronic dermal exposure in mammals showed no signs of toxicity and only slight skin irritation. Mammals were shown to excrete fluridone metabolites within 72 hours of varying doses up to 1400ppm/day (McGowen et al. 1979). A dietary NOEL was established for birds that man feed on aquatic plants or insects in treated waters. The risk to birds was considered negligible. The acute median lethal concentrations of fluridone were 4.3+/- 3.7mg/L for invertebrates and 10.4+/-3.0 mg/L for fish. Fish in treated ponds have shown no fluridone metabolites after treatment (Kamarianos et al. 1989). Chronic studies showed no effects on daphnids, midge larvae, fathead minnows, or channel catfish and rapid rates of metabolic excretion (Hamelink et al. 2009, Muir et al. 1982). Insects that fed on bottom sediment had higher rates of fluridone intake and persistence than others (Muir et al. 1982). Honeybees and earthworms were not considered particularly sensitive to fluridone, even when directly dusted or placed in treated soil. Fluridone has low bioaccumulation potential in fish, bird, or mammalian tissues. Irrigation of crops using water treated with fluridone lead on to trace amounts detected in forage crops. Livestock consumption of Sonar-treated water resulted in negligible levels of Sonar in lean meat and milk. Sonar manufacturer recommendations indicate that livestock can water immediately from Sonar-treated water. The tolerance for milk is the same as for water 150ppb.

Fluridone effects on non-target vegetation

The desired outcome of this proposed treatment is high-level ($\geq 80\%$) control of nuisance aquatic vegetation; *Elodea canadensis*. Madsen et al. (2002) evaluated non-target plant effects in three lakes in southern Michigan that were treated with low dosages of fluridone to control Eurasian water milfoil (*Myriophyllum spicatum*). Despite achieving $>93\%$ reduction in the frequency of Eurasian water milfoil, native plant cover (composed primarily of *Ceratophyllum demersum*, *Chara* spp., *Heteranthera dui*, *Potamogeton* spp., and *Valisneria americana*) was maintained at $>70\%$ in the year of treatment and 1-year post treatment. Floating leaf plants, such as yellow pond lily, exhibiting chlorosis due to chlorophyll injury usually recover within the year of treatment or become reestablished within the following year (Kenaga 1992). At the low concentrations applied (<150 ppb), fluridone is expected to be only lethal *Elodea* species. There may be a time period when these established plant population assemblages are decaying that light and dissolved oxygen may temporarily be reduced. However, as the treatment plan takes these factors into account, these areas are expected to be localized rather than lake wide further mitigating risk associated with dissolved oxygen decrease to native fish populations. As plant materials continue to decay, water clarity and dissolved oxygen as well as nutrient levels are expected to return to normal levels; particularly so given the relatively high rates of lake turnover anticipated during the months of treatment (JUNE-SEPT).

Mitigation/Design Features

The following mitigation measures and Best Management Practices will be followed to minimize effects to soil, water, wetland, and heritage resources:

- Pesticide dispersal will be done directly into only the proposed waterways by DEC-certified applicators.
- Service and refueling of equipment (motorboats and gas-powered pumping systems) will be done at a minimum of 100 feet away from streams or waterbodies and wetlands. Equipment operators will carry absorbent pads and spill response kits, and follow approved disposal methods for waste products and repair leaky equipment promptly (FSH 2509.22).
- Oil and gas delivery and storage containers will be located and maintained in a manner that minimizes the potential for contamination of surface and subsurface soil and water resources from leaking storage containers. All oil and oil products shall not be stored within 100 feet of wetlands, streams or water bodies. All oils, greases, gasoline, diesel fuel and other petroleum products will be stored in approved containers. All empty fuel and petroleum containers, any used oils, fuels, lubricants and absorbent pads shall be removed from National Forest Land and properly disposed of at an approved facility (FSH 2509.22).
- A Pesticide Spill Contingency Plan will be incorporated into the Project Safety Plan to provide a response strategy for mitigating contamination of water from accidental spills (FSH 2109.14, chapter 60 and BMP 15.4).
- Transport and handle herbicide chemical containers in a manner that minimizes the potential for leaks and spills.
- Manage and store herbicide chemicals in accordance with all applicable Federal, State and local regulations, including labeling directions.
- Follow label directions and any applicable Federal and State laws for proper preparation and mixing of chemicals and cleaning and disposal of chemical materials and equipment.
- Inspect application equipment to ensure that chemicals will not leak and the application prescription can be achieved.
- Avoid application during times of heavy precipitation or flooding. Adjust application prescription based on water levels as needed to meet target concentrations.
- Time herbicide treatments to impact actively growing elodea especially when these times are outside the range of active native plant growth to reduce impacts to native plant species
- Avoid trampling and eroding banks during project implementation and while moving equipment in and out of waterways. If erosion becomes an issue consider revegetation using a local native plant material source following project completion or some other type of emergency bank/soil stabilization method.
- Clean all equipment and gear of invasive propagules before leaving treatment sites to avoid risk of spread.
- Any new archaeological sites will be reported to the District Archaeologist and the State Historic Preservation Office and identified for necessary avoidance measures.
- Post treated waterbodies with a public notification to ensure that individuals are aware of any actions being implemented while herbicides are present in the aquatic systems.



THE STATE
of **ALASKA**

GOVERNOR BILL WALKER

Department of Environmental
Conservation

DIVISION OF WATER
Wastewater Discharge Authorization Program

555 Cordova Street
Anchorage, Alaska 99501-2617
Main: 907.269.6285
Fax: 907.334.2415
www.dec.alaska.gov/water/wwdp

May 9, 2017

Mr. Robert Skorkowsky, District Ranger
USDA Forest Service, Cordova National Forest
PO Box 129
Cordova, AK 99577

Re: AKG870014: USDA Forest Service, Cordova National Forest

Dear Mr. Skorkowsky:

The Alaska Department of Environmental Conservation (DEC) has completed its review of your AKG870000 Pesticide General Permit (PGP) Notice of Intent (NOI) and is issuing the following authorization number: **AKG870014**. The wastewater discharge is authorized in accordance with the terms of the general permit and any site specific requirements in this authorization for the following pest management areas identified in the NOI:

Pest Management Area: Eyak Cannery Ponds, Wrong Way and Wooded Ponds, Copper River Delta

- Eyak Cannery Pond Lat 60.49435 N, Long -145.67257 W, two small ponds and sloughs (22 acres),
- Wrong Way Pond Lat. 60.449277 and Long. -145.227962 (18 acres)
- Wooded Pond Lat. 60.477139 N, and Long. -145.233065 W (16 acres)

Pesticide Use Patterns:

- ☐ Mosquito and Other Flying Insect Pest Control ☐ Animal Pest Control
☒ Weed and Algae Pest Control ☐ Forest Canopy Pest Control

Pest(s) to be controlled:	Pesticide Products	
	Product Name:	EPA Registration Number:
Elodea canadensis	SonarOne, Sonar Genesis	67690-54, 67690-54

An electronic copy of the PGP is available at http://dec.alaska.gov/water/wnpspc/stormwater/docs/AKG870000_2017_PGP.pdf and a copy of this authorization letter is posted to the DEC water permit search website <http://dec.alaska.gov/Applications/Water/WaterPermitSearch/Search.aspx>.

The authorization effective date is 5/9/2017

The authorization to discharge expires upon submittal of a Notice of Termination, see [Permit Part 1.2.6](#).

The permittee is reminded of the following permit requirements:

- Technology-Based Effluent Limitations, [Part 2.2, Decision-makers' Responsibilities for All Decision-makers](#)
- Technology-Based Effluent Limitations, [Part 2.2, Decision-makers' Responsibilities for Decision-makers Required to Submit NOIs](#)
- Water Quality, [Part 3](#)
- Monitoring, [Part 4](#)
- Pesticide Discharge Management Plan, [Part 5](#)
- Corrective Action, [Part 6](#)
- Recordkeeping, [Parts 7.1, 7.4, and 7.5](#)
- Annual Report, [Part 7.6](#)
- Standard Permit Conditions, [Permit Appendix A](#)

If you are self-applying a pesticide, your requirements also include:

- Technology-Based Effluent Limitations, [Part 2.1 Applicators' Responsibilities](#)

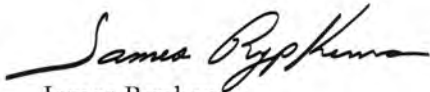
If you are self-applying a pesticide, your requirements also include:

- Technology-Based Effluent Limitations, [Part 2.1 Applicators' Responsibilities](#)

A copy of the [PGP AKG870000](#) and this authorization must be kept at the address provided in the NOI. This authorization does not relieve the permittee from other local, state, or federal government permitting requirements.

If you have any questions regarding the above, please contact me at 907-334-2288 or via email at James.Rypkema@alaska.gov.

Sincerely,



James Rypkema
Section Manager, Storm Water and Wetlands

Enclosure: Pesticide Discharge map.

cc: w/enclosure (email)

Kate Mohatt, USDA Forest Service (Girdwood, AK)