Interior Alaska Elodea Eradication Project

Environmental Assessment

Alaska Department of Natural Resources
Division of Agriculture

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1. Purpose and Need

1.1 Introduction

This Environmental Assessment (EA) has been prepared to address management of the invasive freshwater aquatic plant, *Elodea* spp. (Elodea), in four interior Alaska waterbodies: Chena Slough, Totchaket Slough, Chena Lake, and the Chena River. The objectives of this EA are to (1) present and evaluate three alternative approaches for freshwater invasive plant management, (2) propose selection of the alternative that best meets State of Alaska Department of Natural Resources (DNR) eradication objectives while minimizing potential environmental impacts, (3) provide an opportunity for public and state and federal agency input (throughout the development of the EA) on planning options; and (4) determine whether the scope and magnitude of impacts expected from implementation of the proposed action alternative warrant preparation of an environmental impact statement (EIS). If significant impacts are expected, an EIS would be prepared. If not, DNR would implement the proposed (preferred) action alternative. In either case, the EA would be reviewed by the United State Fish and Wildlife Service (USFWS); the USFWS would disclose its final decision and supporting rationale in a separate decision document.

Our conservation concern with Elodea is its high potential to propagate, spread, and establish itself; displace native plants and disrupt ecosystem function; and degrade fish and wildlife aquatic habitat throughout the Yukon River drainage and other areas of Alaska. The DNR initiated an exterior quarantine in March, 2014 to prohibit the import, transport, purchase, sale, distribution and intentional transplant of Elodea species (*Elodea canadensis*, *Elodea nuttallii*, and hybrids) and three other aquatic invasive species within the State of Alaska. DNR and supporting agencies are also implementing a comprehensive management strategy (Stewart et al. 2015), working towards eventually eradicating Elodea from the entire State of Alaska including infested water bodies in Interior Alaska.

This EA presents and evaluates three alternative approaches for Elodea management. The no-action alternative would discontinue management of Elodea in the infested waterbodies, halting all public education and outreach efforts, and stopping monitoring. No methods for containing the spread of Elodea would be attempted, and existing infestations would be left uncontrolled. The second and third alternatives would entail an Integrated Pest Management Plan (IPMP) approach. An IPMP is a systematic planning, evaluation, and decision-making process incorporating adaptive management used to guide and direct management of pests such as invasive plant species (USFWS 2004). The second alternative is mechanical removal of Elodea using diver-assisted suction harvesting. The third alternative is treatment of Elodea infestations with fluridone, a systemic herbicide. Fluridone has proven effective at eradicating

Elodea from other infested waterbodies in Alaska, on the Kenai Peninsula (J. Morton, pers. comm.) and in Anchorage.

1.2 Background

Elodea species are invasive aquatic plants that have successfully invaded many areas in Europe and Asia (Nichols and Shaw 1986), New Zealand, Australia (Cook and Urmi-Konig 1985) and parts of Africa. In Europe, Elodea infestations have spread extensively across the landscape over the last 140 years, likely through inadvertent transport of plant fragments by humans. Elodea has spread from Ireland to Lake Baikal, Russia, crossing two continental divides. Elodea species are capable of causing large-scale changes to freshwater ecosystems, including changes in stream-flow dynamics, water nutrients, dissolved oxygen content, and invertebrate assemblages (Buscemi 1958, Pokorny *et al.* 1984). Elodea's rapid growth often results in the displacement of native plants, which can significantly alter fish and aquatic invertebrate habitat. Dense Elodea growth also interferes with recreational activities, such as fishing, swimming, floatplane operations, and boating.

1.2.1 Elodea in Alaska

In 2009, the USFWS Coastal and Aquatic Invasive Species Programs and Alaska Department of Fish and Game (ADF&G) published an identification manual to common native and potential invasive freshwater plants in Alaska (Morgan and Sytsma 2009). At that time the authors determined *Elodea canadensis* (Elodea) as invasive to Alaska. The determination was based on herbarium specimens collected for over 100 years throughout the state of Alaska and archived at the University of Alaska Fairbanks (UAF) Arctos database. Of the 1500 aquatic plant specimens, only one was Elodea, reported in Eyak Lake in 1982. The authors also conducted vegetation surveys to validate the determination of invasive aquatic plants listed in the publication. In September 2010, rooted and floating fragments of Elodea were found in the Chena Slough. The discovery of Elodea in Chena Slough launched an intensive effort to document the distribution of Elodea in the Fairbanks North Star Borough and to control the spread of this invasive plant to other regions of the state.

Currently in Alaska, Elodea is found in approximately 18 waterbodies (Figure 1); and is currently either being treated, or eradicated in eight: Stormy, Daniels, Beck, Sand, and Little Campbell Lakes, DeLong Lakes, Alexander Lake, and Lake Hood. In these locations it is an aggressive invader that is expected to have impacts on aquatic ecosystems including: loss of habitat to wetland obligate species such as moose, waterfowl, and furbearers; salmon and other resident fish; reduced biodiversity; increased sedimentation; degradation of water quality; and

displacement of native vegetation. Dense surfacing plants also impede navigability and risk safety for boat and floatplane operators, and inhibit recreational opportunities. Several Elodea infestations are likely to result in economic impacts to tourism, sport & commercial fishing, waterfront property value, and other stakeholders if not managed.

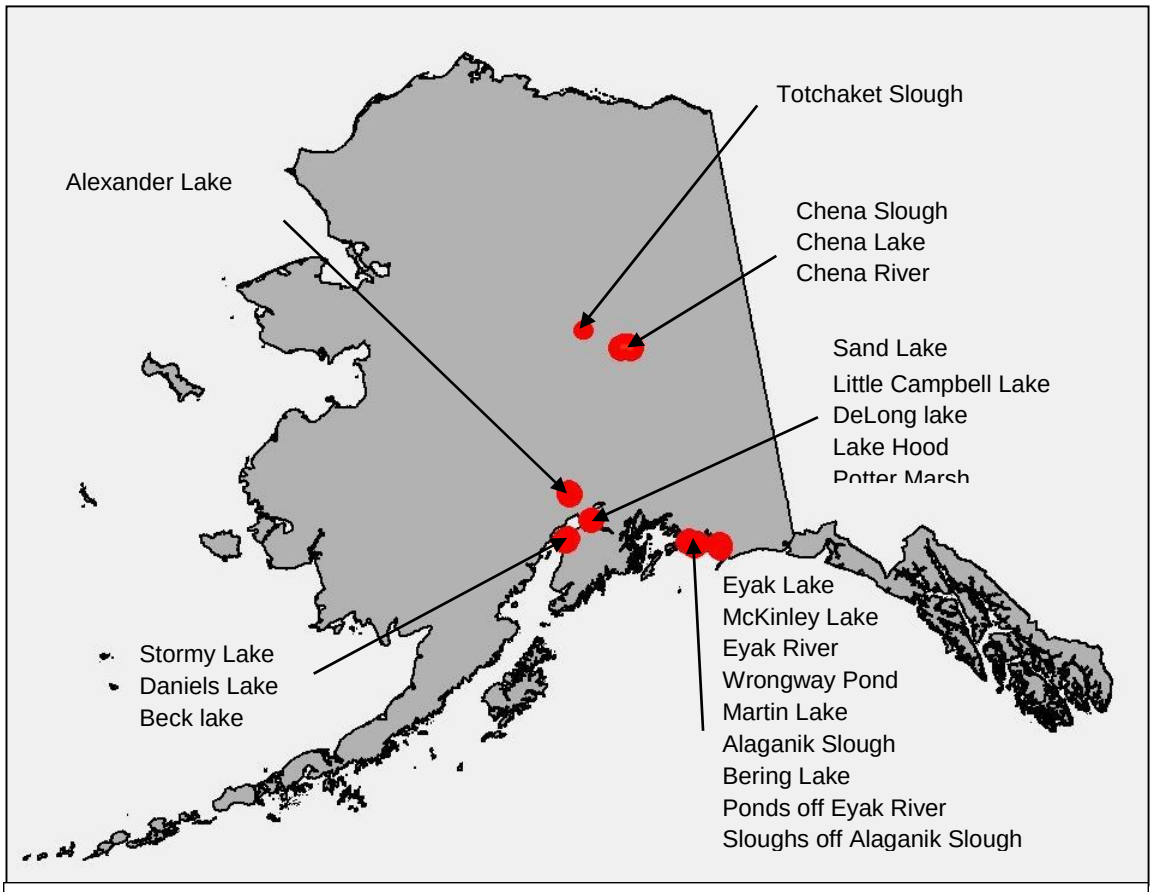


Figure 1. Known Elodea distribution in Alaska; however, Stormy, Daniels, and Beck lakes are thought to have been eradicated as of 2016, and Sand, Little Campbell, DeLong and Lake Hood have all started treatment in 2015.

1.2.2. Elodea in the Interior

In the Interior of Alaska, Elodea is found in Chena Slough, Chena Lake, Totchaket Slough, and isolated parts of Chena River. The Elodea infestations in Chena and Totchaket Sloughs are high-priority management issues because of the density and distribution of the infestations, and the sloughs' connectivity to downstream river systems. These river systems include critical rearing and migratory habitat for Chena, Tanana, and Yukon River Chinook salmon, Arctic grayling, and other important subsistence and sport fish species (Dion 2002, Ihlenfeldt 2006). Luizza et al. (2016) modeled Elodea habitat suitability for the entire state of Alaska using current known infestations (green dots in Figure 2). Based on the model, a large

portion of the Interior has high Elodea habitat suitability (Figure 2). Before this model was created, the Totchaket Slough infestation was not yet discovered; however, the model predicted that this area was susceptible to Elodea invasion.

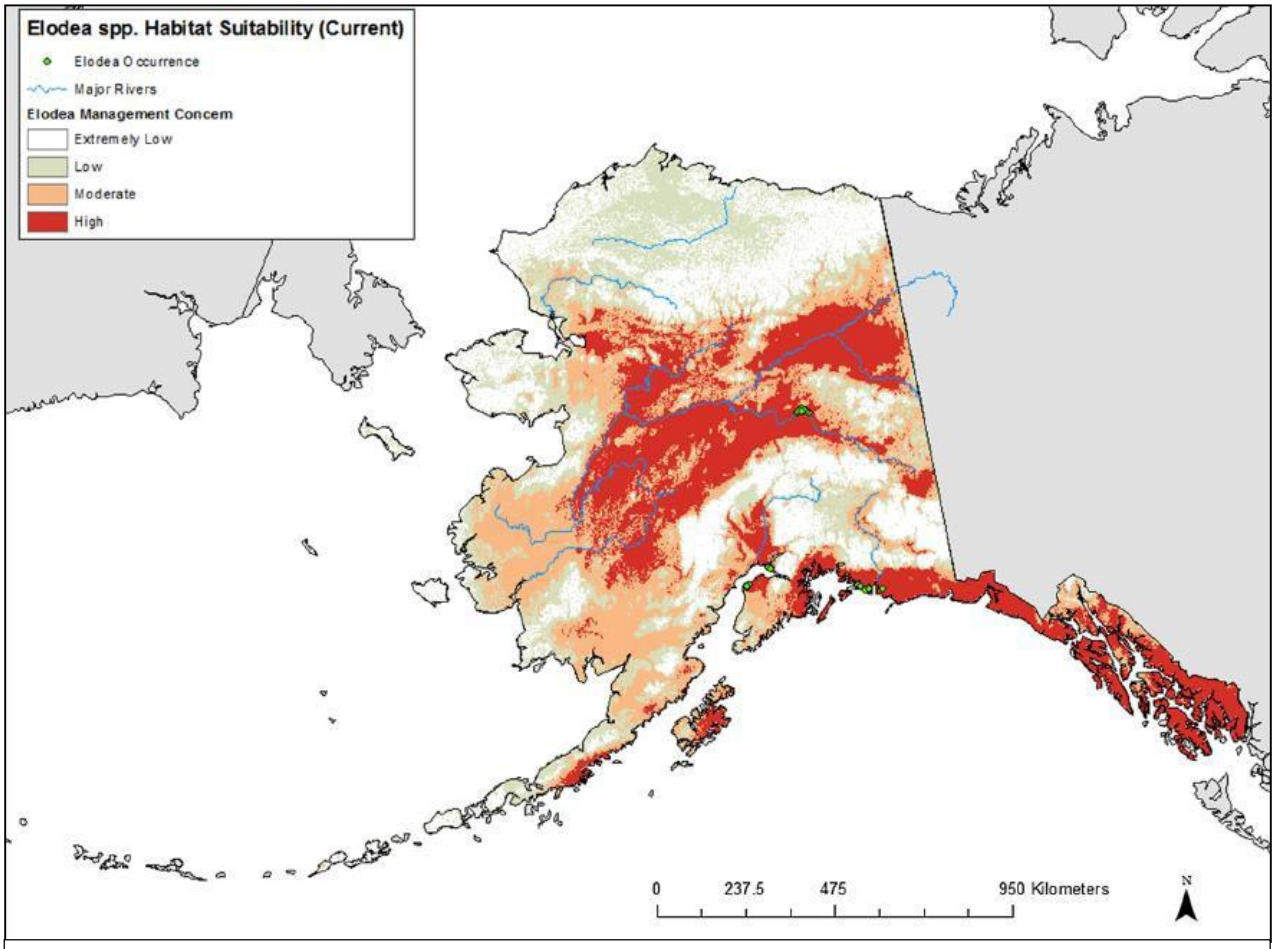


Figure 2. Habitat suitability ensemble showing the management concern for Elodea across Alaska (taken from Luizza et al. 2016). Areas in red denote high habitat suitability and high management concern. Green dots indicate Elodea occurrences as of the beginning of 2015.

The infested waterbodies in the Fairbanks and Nenana areas are used by a wide array of groups, including motorized and non-motorized boaters, anglers, hunters, floatplane operators, and other recreational users. Due to the wide array of users and high potential for natural dispersion by fragmentation, there is a high potential for spreading this plant to non- infested water bodies throughout the state of Alaska. Because motorized boats are not allowed on Chena Lake, the risk of spread is low; however, there is still risk that Elodea fragments could be spread to other waterbodies on recreational equipment including paddleboards, canoes, kayaks, and paddles.

1.2.3 Proposed Project Area

All four infested waterbodies are within the Fairbanks North Star Borough and the Yukon River drainage just north of the Alaska Range (Figure 3). Chena Slough flows into the Chena River, which drains into the Tanana River, a tributary of the Yukon River.

1.2.3.1. Chena Slough

The Chena Slough is a small tributary of the Chena River within the Fairbanks North Star Borough. Chena Slough is approximately 17 miles in length, five miles east of Fairbanks, and runs from the city of North Pole to the Chena River, with the watershed encompassing approximately 26 square miles. The land is relatively flat with a 16-foot elevation difference between the headwaters and the confluence in the Chena River. Most of the channel is 65-99 feet wide and averaging about three feet deep. The gravel streambed is overlain with a thick layer of organic mud (Dion 2002). Current stream flow is mainly from groundwater upwelling from the Tanana Aquifer (Dion 2002) supplemented by runoff from roads and drainage ditches (Tetra Tech 2011, Hydraulic Mapping & Monitoring 2013). Some portions of Chena Slough remain open water during the winter due to upwelling of groundwater, making breakup on the river occur earlier and often well before the Chena River.

Originally a swift-flowing channel connecting the Chena River to the Tanana River, the Chena Slough was dammed by the U.S. Army Corps of Engineers at the Moose Creek Dike after a catastrophic flood in 1967. Structural components of the dam and levee system, located about 20 miles east of Fairbanks, include massive concrete outlets and flood gates regulating flow into the Chena River system. The flood control structures have decreased the flow of water into the Chena Slough, thus changing habitat and fostering the growth of aquatic vegetation. Chena Slough is highly urbanized. Urbanization has increased growth of aquatic vegetation and eutrophication, resulting in increased suspended debris and thick deposits of organic mud (Dion 2002). An increase in vegetation and sedimentary depositional rates have resulted in impounded sediment and water upstream of many road crossings (Ihlenfeldt 2006). Emergent aquatic and terrestrial vegetation have also encroached on Chena Slough (Dion 2002).

1.2.3.2. Totchaket Slough

Totchaket Slough is a seven-mile long clear water stream that enters the Tanana River 12 river miles downstream of the city of Nenana. The catchment area of the slough is approximately 5,265 acres of relatively undisturbed area. Totchaket Slough is a slow flowing stream that supports a dense population of submersed aquatic plants. The slough has a narrow riparian corridor composed largely of alder and willow. Totchaket Slough is an important area for subsistence users in Nenana, who frequent the slough to harvest pike, moose and waterfowl. The surrounding land is primarily owned by the state, with a large portion held by Toghotthele

Native Corporation and Minto Native Corporation. The slough can be accessed via boat from the Tanana River.

1.2.3.3. Chena River

The Chena River is a non-glaciated tributary of the Tanana River. The Chena River originates in the Yukon-Tanana Uplands approximately 90 miles east of the city of Fairbanks, AK, and flows 155 miles to its confluence with the Tanana River southwest of Fairbanks. It drains an area of approximately 2,115 square miles, with an elevation change from 3,675 feet at its origin to 430 feet at the confluence with the Tanana River (Tetra Tech 2011). The lower portion of the Chena River is heavily urbanized. The Chena River flows through Fort Wainwright Army Base, an area that is on the National Priorities List because of known or threatened releases of hazardous substances, pollutants or contaminants (Gilder 2011). The Chena River supports one of the largest Chinook salmon populations in the Alaska portion of the Yukon River drainage, with an average return of over 4,800 fish from 2004-08 (Brase 2009). All Chinook salmon spawning is thought to occur above the Moose Creek dam (Brase 2009). Other fish species present in the Chena River are chum salmon, Arctic grayling, burbot, round whitefish, humpback whitefish, longnose sucker, slimy sculpin, lake chub, Arctic lamprey, Alaska blackfish, sheefish, least cisco, and northern pike. The Chena River watershed has important breeding habitat for 93 species of birds, and 35 other species including waterfowl, shorebirds, raptors, and songbirds are found during spring and fall migrations (Talbot et al. 2006). Mammals present in the watershed include moose, wolf, coyote, Northern flying squirrel, red squirrel, snowshoe hare, beaver, mink, red fox, and lynx (Talbot et al. 2006).

1.2.3.4. Chena Lake

Chena Lake is located 17 miles east of Fairbanks and three miles from North Pole on the Richardson Highway. Chena Lake is located on the Tanana Lowland, a wide floodplain underlain by thick beds of stratified gravels. Chena Lake has a surface area of 234 acres and a maximum depth of 38 feet. The lake is fed by upwelling groundwater and has no above-ground outflow. In 1979 when the Moose Creek Dam and Floodway became operational, borrow pits to form Chena Lake were also completed. In 1984 the designated Fairbanks North Star Borough recreational area at Chena Lake was completed. Local residents and visitors commonly use this area for non-motorized boating and fishing.

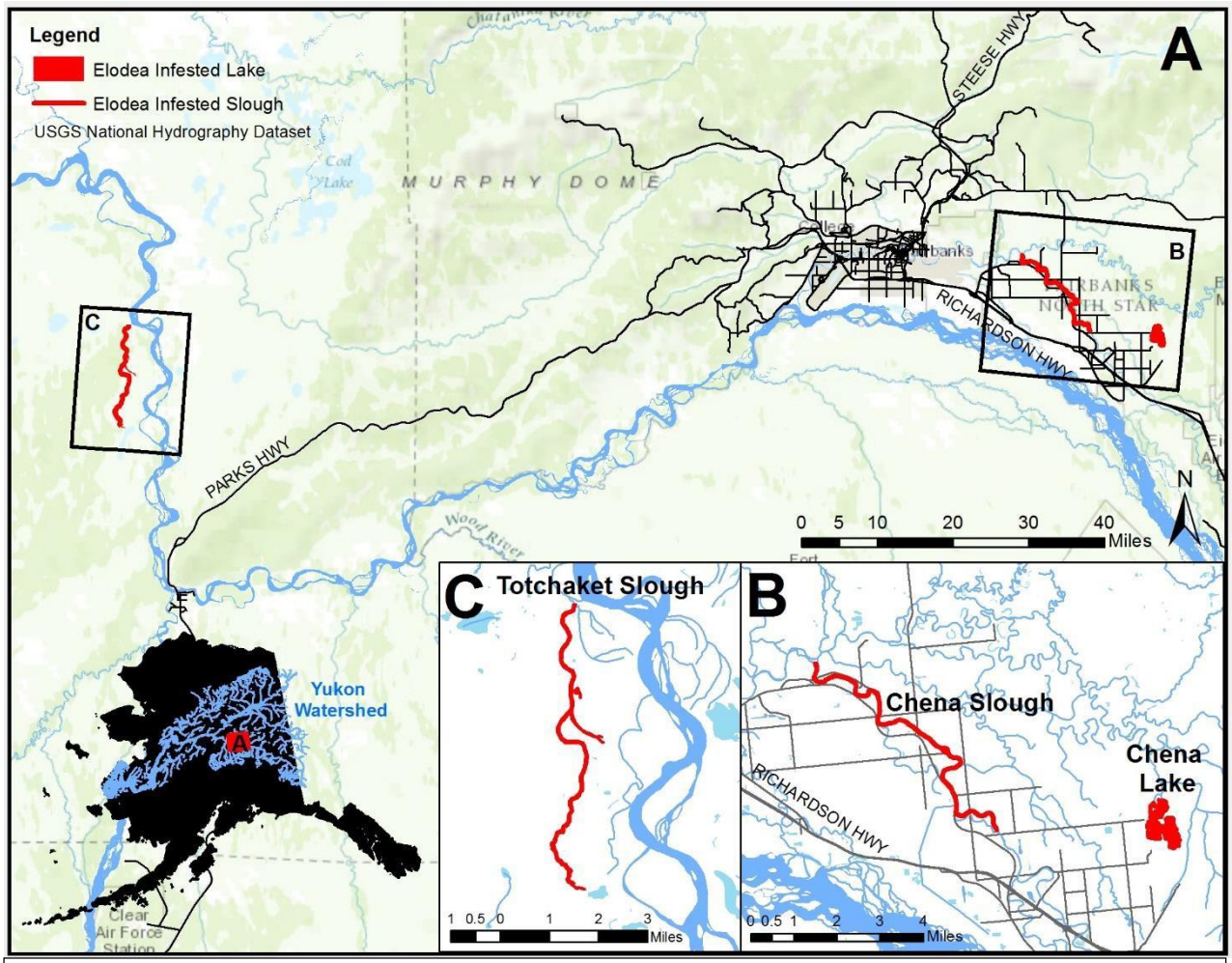


Figure 3. Proposed project area. Red waterbodies show extent of Elodea infestations in A: Interior Alaska, B: Chena Slough and Chena Lake, and C: Totchaket Slough.

1.3 Public Involvement

Since the proposed action (Alternative C – Herbicide Treatment, described in detail in Chapter 2 of this EA) involves the use of an herbicide approved for use in aquatic systems to eradicate invasive Elodea infestations, there may be controversy surrounding this proposed action. DNR has engaged in extensive community outreach through public outreach and education events, posting to social media, presentations at various meetings open to the general public as well as inviting stakeholders to attend and participate in the Fairbanks Elodea Steering Committee monthly meetings during the initial stages of planning for this EA.

Between 2015 and 2016, four public scoping meetings were held in North Pole, Fairbanks, and Nenana. The public was notified of these scoping meetings via newspaper advertisements, articles in the Fairbanks Daily News Miner, flyers posted at various businesses in Fairbanks, North Pole and Nenana, notices posted on various social media and websites, and through public radio (KUAC 89.9 FM) public service announcements. Further, 500 postcards were sent to all Chena Slough residents and Fairbanks Soil and Water

Conservation District (FSWCD) cooperators in Fairbanks and North Pole. A total of 250 scoping letters describing the issue of Elodea infestations and the proposed treatment plan were sent to landowners with property adjacent to Chena Slough.

1.4 Public Scoping

The objectives of scoping are to identify significant issues and to translate these into the purpose for the action, the needs for the action, the action or actions to be taken, alternatives to be considered in detail, alternatives not to be considered in detail, and impacts to be analyzed. The result of scoping is to streamline our analysis and decision-making process by ensuring that we address all important issues and that unimportant issues are eliminated from analysis.

In general, issues are significant because of the extent of their geographic distribution, the duration of their effects, or the intensity of interest or resource conflict. Non-significant issues are identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, or other higher-level decision; 3) unrelated to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The CEQ NEPA regulations explain this delineation in Sec. 1501.7(a)3, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)."

Through internal DNR and external (federal and local agencies, tribal entities, organizations, and private citizens) scoping, a wide range of issues were identified. While there was broad support for eradicating Elodea with herbicide at the Fairbanks and Nenana public meetings, a small group of Chena Slough residents were concerned primarily about the human health and safety effects. A summary of relevant issues selected for detailed analysis include the following and are considered in detail in this EA.

1.4.1 Comments on Ecological Effects

- How fluridone effects wildlife feeding on vegetation in treated areas
- The project's goal to restore Chena Slough to improve wildlife habitat, and water quality
- Effects of fluridone to aquatic ecosystems downstream including salmonids
- Effects on non-target riparian vegetation during high water events in Chena Slough
- If left unmanaged, the effects of invasive Elodea on native species, including salmonids
- Efficacy of fluridone treatment in flowing water and/or during fluctuating water levels
- Persistence of fluridone in the benthic layer
- Concern of fluridone treatment contaminating ground water
- The need to conduct additional Elodea surveys in the area and downstream of current infestation
- Future planning to prevent re-infestation of treated waterbodies

1.4.2 Comments on Impacts to Recreation, Land Use, Human Health and Safety, and Subsistence

- Concern that fluridone will move into the ground water and contaminate drinking wells of Chena Slough residents
- Effects of fluridone on human health if it migrates into drinking wells
- Removing Elodea to increase recreational opportunities
- Effects of fluridone on non-target vegetation including lawns, ornamental shrubs/trees and gardens (organic/non-organic) when irrigated with treated slough water
- Consumption of vegetables and berries irrigated with treated slough water
- Improvement of aesthetic character of the slough after treatment
- Bioaccumulation in animals that feed on treated vegetation which Native Alaskans harvest for subsistence

1.5 Purpose and Need of the Proposed Action

The purpose of the proposed action is to reach the primary goal of eradicating Elodea, with a secondary goal of restoring habitat. The overall need to meet these goals is to eliminate the negative impacts of Elodea on our natural resources.

1.5.1. Need for the Proposed Action

The need for the proposed action alternative (Alternative C – Herbicide Treatment) is based on Elodea surveys across the Fairbanks North Star Borough and an extensive landscape-scale survey of waterbodies along the Tanana River from 2010 to July 2016. The survey data indicated Elodea fragments are likely to have dispersed downstream from Chena Slough into the Tanana River drainage and become established in the slow moving waters of Totchaket Slough. Prevention of spread and further establishment of Elodea into the Yukon River drainage is important because Elodea has been shown to affect water quality and quantity, degrade aquatic fish habitat, increase sedimentation, and impede access to subsistence hunting areas affect recreational opportunities and pose a threat to safe operations of floatplane aircraft. Continued introduction and spread is expected with the wide array of users of these infested waterbodies.

There are only four waterbodies that are known to be infested with Elodea in the Interior: Chena Slough, Chena Lake, Totchaket Slough, and Chena Lake with approximately 50 waterbodies surveyed without Elodea since 2013. But hundreds of thousands of pristine waterbodies that are vulnerable to infestation as evidence from models (Luizza et al. 2016), thus presenting the opportunity to effectively eradicate existing infestations. The spread of Elodea from an urban lake in Anchorage (Sand Lake) to remote Alexander Lake in the Matanuska-Susitna Borough indicates how easily this plant can spread via fragments, and this threat of spread via boats and floatplanes will extend into the future. Given the current rate of spread, it is expected that, without intervention, infestations will continue to expand downstream from the source and if Elodea is inadvertently introduced in to local area floatponds we can expect Elodea to spread north to floatplane accessible lakes, exceeding

agency response rate.

Of particular concern is the potential for spread away from urban area waterbodies, centered on the road system and into natural, undisturbed areas. Specifically, the threat of spread away from the road system, along river corridors, and into adjacent Federal Conservation Units is an issue of high importance. At the current level of infestation strong efforts dedicated to eradication, prevention, early detection, and rapid response is still a feasible method of stopping spread of Elodea in this region. The underlying premise of the Proposed Action is that the risk of allowing Elodea to spread into river and lake systems is likely greater than risks associated with careful applications of an approved aquatic herbicide. Given the high economic cost of controlling invasive aquatic plants and the associated damage to other resources, it is recommended that the proposed action to treat Elodea infestations with herbicide be implemented now.

1.5.2. Purpose of the Proposed Action

The purpose of the proposed action is to eradicate Elodea from four interior Alaska infested waterbodies to prevent the further spread and introduction of Elodea within the Yukon River drainage. The goal of the proposed action is to protect fish and wildlife habitat, and other resource values in the area.

1.6 Decision to be Made

The State of Alaska Department of Environmental Conservation (DEC), DNR, and USFWS will decide whether or not to eradicate Elodea using herbicides. This EA considers three alternatives, Alternative A – No Action Alternative, Alternative B – Mechanical Removal, and the proposed action, Alternative C – Herbicide Treatment. The selected alternative from this EA will be implemented following official approval and concurrence from State and Federal agencies.

1.6.1 Relationship to Other State and Federal Conservation Plans

As of June of 2016, there were three existing approved EAs in the State of Alaska for herbicide treatment to eradicate Elodea. In 2013 the USFWS Kenai National Wildlife Refuge, Homer Soil and Water Conservation District, and DNR implemented the first eradication effort on the Kenai Peninsula for Daniels, Beck, and Stormy Lakes. The USFWS National Wildlife Refuge (NWR) System in Alaska manages 16 NWRs, six of which are downstream or north of the interior Alaska infestation. Since these refuges are dominated by wetlands and aquatic habitats they are at risk of infestation. National Wildlife Refuges are required by law, policy and purposes to conserve fish, wildlife, plants and their habitats while also ensuring that biological integrity, diversity and biological health are maintained. Thus, the proposed action would help meet the mandates and purposes of adjacent conservation units by preventing the further spread of this aquatic invasive into refuge aquatic habitats. In 2015, Citizens Against Noxious Weeds Invading the North, DNR, and USFWS Alaska Regional Office (Region 7) collaborated to start eradication treatments of

Elodea from Anchorage in DeLong, Little Campbell, and Sand Lakes. Also in 2015, DNR worked with USFWS Region 7 and the ADF&G to initiate eradicating Elodea in remote Alexander Lake in the Matanuska-Susitna Valley. The proposed action also conforms to the goals of the ADF&G Aquatic Nuisance Species Management Plan (ADF&G 2002), which includes coordinating with other programs, agencies and tribal entities to prevent the introduction and spread of aquatic invasive plants in Alaska and detecting, monitoring, containing and eradicating populations of aquatic nuisance species as quickly as possible with minimum environmental impacts. All of the noted projects produced an EA for the use of fluridone and/or diquat to treat Elodea.

1.6.2. Legal Authorities

Alaska Statute 03.05.027 states that DNR shall oversee the enforcement of regulations regarding noxious weeds, invasive plants, and coordinate with other agencies, public groups, and private organizations to control noxious and invasive plants. It also mandates that a state coordinator implement a comprehensive plan, including early detection and rapid response, to regulate and control the entry of prohibited noxious and invasive plants into the state. In 2013, DNR formally recognized Elodea as a noxious aquatic plant in Alaska through the quarantine process. It is DNR's legal responsibility to remove the threat imposed by invasive Elodea and develop a plan to coordinate an effective interagency response, to delineate, contain, and when feasible, implement a plan to eradicate Elodea. The FSWCD, in collaboration with the State of Alaska and the Fairbanks Elodea Steering Committee, has drafted an Integrated Management Plan for the local Elodea eradication efforts for the proposed project area (Appendix 8.1).

2. Alternatives

2.1 Introduction

In this section proposed alternatives are described which will enable reviewers to compare and contrast the environmental effects associated with each of the three alternatives presented. Implementation of alternatives B (Mechanical or Manual Removal) and C (Herbicide Treatment) would entail application of an IPMP approach. The No Action alternative (Alternative A) describes effects on resources when no action is taken to contain or eradicate Elodea from infested waters. Alternative B, Mechanical or Manual Removal responds to concerns about using a U.S. Environmental Protection Agency (EPA)-approved aquatic herbicide in Chena Slough, a densely populated area. Alternative C – Herbicide Treatment as the proposed action responds to the need for eradicating Elodea to prevent its further spread and the need to maintain the function of intact aquatic ecosystems in interior Alaska. Other alternatives were considered but have been eliminated from consideration because they did not meet the purpose and need of the project.

2.2 Alternatives Considered

2.2.1 Alternative A: No Action

Under the No Action alternative, DNR would not implement invasive plant management in the infested waterbodies. All monitoring and education efforts would be discontinued. No methods of containing the spread of Elodea would be attempted, and the existing infestations would be left uncontrolled.

The infestation in the Chena Slough and Totchaket Sloughs have a high risk of spreading to other locations because of their connectivity to downstream river systems and the wide array of users – transport vectors - who could potentially transport Elodea fragments to other waters. Spread of Elodea would be detrimental to the ecological and recreational values of water bodies throughout the region, thus, the no action alternative is not a viable alternative and would not meet the Purpose and Need described in this EA. Furthermore, the Chena Lake and Chena River infestations would be left to continue to proliferate, thereby likely reducing recreational values for which Chena Lake was created. In the Chena River rooted fragments would continue to grow, posing a possible safety hazard to boaters and floatplane traffic as well as a source of invasive plant propagules.

2.2.2 Alternative B: Mechanical or Manual Removal

Under Alternative B, actions would include use of mechanical or manual means to remove Elodea biomass in all four waterbodies and may include diver-operated suction harvesting (where a diver stationed on the river bed feeds the plant material into an intake hose), cutting, shredding, or hand-pulling. Suction harvesting and raking control methods were tested in a single location in Chena Slough for their efficacy in controlling Elodea in the summers of 2013

and 2014 (Lane 2014). The trials were conducted by FSWCD in conjunction with partners from Test the Waters Dive Shop. In shallow areas, teams of volunteers used spaded pitchforks to remove Elodea in 66 feet by 66 feet quadrats. Suction harvesting and raking were found to be extremely labor-intensive, taking approximately 400 hours of labor for 1 acre of removal (Lane 2014). In addition, these methods inevitably resulted in large-scale fragmentation of Elodea, making collection of fragments a major challenge, and increasing the risk of spread downstream to uninfested areas. By 2015, after two seasons of mechanical and manual removal, Elodea had regrown in the four treated patches in Chena Slough. It was difficult to determine whether this regrowth was due to roots that were missed by the removal methods, or due to fragments rooting from upstream. While suction harvesting may be a good tool for removing small, isolated patches of Elodea, it is unlikely to be an effective means of eradication in large infestations such as the ones in Chena Slough, Totchaket Slough and Chena Lake. However, the relatively small, isolated patches of Elodea in the Chena River can be removed via diver-assisted suction dredging.

2.2.2.1 Mechanical Removal of Elodea in the Chena River

The suction harvesting system consists of a sluiceway box with an attached intake hose and dredge motor mounted on top of a pontoon boat. Mesh bags, each with a capacity of 2 square feet, are attached to three output terminals on the sluiceway box to collect plant and sediment material. For suction harvesting, a diver stays anchored and feeds Elodea into a 4-inch diameter suction hose nozzle. The plant material along with sediment gets sucked through the hose into the sluiceway box where it is distributed out of the three terminals into the mesh bags. The bagged plant material will be transported to a secure upland location and buried or composted. In 2015 and 2016, a section of the Chena River between its mouth (where the Chena River flows into the Tanana River), and the mouth of Chena Slough (where the Chena Slough flows into the Chena River) was surveyed for Elodea. The survey team searched for Elodea in the river channel by visual observation, rake throws, and divers scouring the river bed for rooted Elodea. Surveying could only be conducted when conditions were appropriate for diving, and high water events in both seasons resulted in only a portion of the river being surveyed. The Chena River is a conduit for Elodea fragments originating in Chena Slough, but in most parts has a high enough flowrate that fragments are less likely to become established. As of 2016, one established patch of Elodea has been found, located at 64°50'22.97"N, 147°50'57.72"W. This patch was removed using a combination of suction harvesting and hand pulling in 2016, and will be monitored closely in subsequent years to mechanically and/or manually remove any regrowth. Any other small patches (less than $5ft^2$) that are found in the Chena River during subsequent dive surveys will be mechanically and/or manually removed.

2.2.3 Alternative C: Herbicide Treatment (Proposed Action)

The proposed action involves eradicating established populations of Elodea from Chena Slough, Totchaket Slough and Chena Lake using the systemic herbicide fluridone, with a combination of the following trade names and formulations: Sonar Genesis (liquid), SonarOne (pelleted), and/or SonarH4C (pelleted). Multiple treatments spanning 3 to 4 years may be necessary to completely eradicate Elodea populations from these waterbodies. This alternative offers the highest probability of achieving the goal of completely eradicating Elodea from all three waterbodies and preventing it from spreading to other waterbodies in the State while maintaining the ecological integrity of Alaska's waterways by having minimal non-target impacts. Alternative C actions also include the use of suction harvesting, but only for the small (less than $5ft^2$) isolated infestations in Chena River.

2.2.3.1 Alternative C: Description of Herbicide (Fluridone)

Herbicides have been key tools in aquatic plant management, and have been used for decades in controlling nuisance aquatic vegetation in water bodies in the United States (Gallagher and Haller 1990, Netherland et al. 2005). Several aquatic herbicides that are used for aquatic plant management were considered as a means of treating the Elodea infestations in interior Alaska (Table 1). Fluridone (Sonar^{TM}) was selected based on: 1) USAEPA approval for use in aquatic ecosystems, 2) the low risk posed to the environment, wildlife, and human health and safety, 3) its efficacy in treating aquatic plants at extremely low dosage, including long-term residue monitoring studies by USEPA, SePRO Corporation, and non-governmental, and non-industry entities, 4) DEC approval of several different formulations including liquid and time-released pellets noted above, and 5) its effectiveness in selectively eradicating Elodea from waterbodies in other areas of the state (Anchorage and the Kenai Peninsula).

Fluridone is a tan to off-white odorless crystalline solid, chemically formulated as 1-methyl-3-phenyl-5-[3-(trifluromethyl) phenyl]-4(1*H*)-pyridinone, and applied as either a pellet or liquid (Bartels et al. 1978, McCowen et al. 1979). Fluridone is the active ingredient of Sonar products, a commercially available herbicide used to selectively manage undesirable aquatic vegetation in freshwater ponds, lakes, reservoirs, rivers, and canals. The following fluridone formulations: SonarGenesis - liquid (6.3% active ingredient), Sonar H4C – pellets (2.7% active ingredient) and SonarONE – pellets (5% active ingredient) are proposed for treating the Elodea infestations in interior Alaska.

Aquatic Herbicide	LD-50 in rats (mg/kg body weight)	Mode of action	Further considerations
2,4-D	375-666	Systemic	Some formulations are highly toxic to fish. Potentially carcinogenic and an endocrine disruptor.
Acrolein	50	Contact	Non-specific, highly toxic biocide. Not appropriate for use in natural waters.
Copper sulfate pentahydrate	300	Systemic	Toxic to fish.
Diquat	120	Contact	Swiftly diluted in moving waters.
Endothall	51	Contact	May kill native plants. Cannot be applied within 600 feet of a drinking water well. Some formulations highly toxic to fish.
Flumioxazin	>5,000	Systemic	Not effective on Elodea (Glomski & Netherland 2013).
Fluridone	>10,000	Systemic	May injure some susceptible aquatic plants. Irrigation restrictions apply.
Glyphosate	5,600	Systemic	Effective only on plants that grow above water, non-specific to Elodea.
Imazamox	>5000	Systemic	Sensitivity of Elodea and native plants unknown.
Imazapyr	>5000	Systemic	Not effective on submerged plants.
Penoxsulam	> 5,000	Systemic	Likely to move into groundwater, some evidence of carcinogenic effects.
Triclopyr	630-729	Systemic	Ineffective in moving waters.

Table 1. Comparison of herbicides used in aquatic plant management.

Fluridone is a systemic herbicide that is absorbed through leaves, shoots, and roots of susceptible plants and interferes with the synthesis of RNA, proteins, and carotenoid pigments in plants, thereby disrupting photosynthesis. Disruption of photosynthesis prevents the formation of carbohydrates that are necessary to sustain the plant (Durkin 2008). Field tests in mixed invasive and native submersed aquatic vegetation showed 95% to 100% reductions in a year in invasive populations with native plant cover retention of approximately 70% (Madsen et al. 2002). Treatment of Michigan lakes resulted in drastic reductions in invasive Eurasian watermilfoil, increases in native submersed aquatic vegetation, and increases in size and abundance of native fish

populations (Schneider 2000).

All U.S. EPA approved herbicides have undergone extensive testing to determine toxicity levels through acute (high doses for short periods of time) and chronic (long-term exposure) studies on animals (USEPA 1986). Fluridone has been tested in both acute and chronic toxicity studies, as well as studies examining potential genetic, cancer, and reproductive effects. Fluridone has not been shown to result in the development of tumors, adverse reproductive effects and offspring development, or genetic damage (USEPA 1986). USEPA has approved the application of fluridone in water used for drinking as long as residue levels do not exceed 0.15 parts per million (ppm), which is equivalent to 150 parts per billion (ppb). One ppm is equivalent to approximately one drop of a substance in about 13.2 gallons of water; one ppb is equivalent to one drop of a substance in a tanker truck of water. Concentrations of the active ingredient fluridone up to 150 ppb are allowed in potable water sources. The proposed treatment concentrations of 5-10 ppb are well below the 150 ppb allowable limit in water used for drinking (USEPA 1986).

Fluridone is removed from treated water by degradation from sunlight, adsorption to sediments, and absorption by plants. In partially treated water bodies or moving waters, dilution reduces the herbicide concentration more rapidly following application, thus, reducing its effectiveness. However, a DEC-approved special local needs label was issued for Alaska to include flowing water sites (Appendix XX). In field studies, fluridone (various formulations) decreased logarithmically with time after treatment and was undetectable between 64 and 69 days after treatment (Langeland and Warner 1986). In other studies, fluridone levels decreased rapidly to values below detection levels after 60 days, with a half-life 7-21 days or less (Kamarianos et al. 1989; Osborne et al. 1989; Muir et al. 1980; McCowen et al. 1979). Fluridone can persist in hydrosoils (sediments) with a half-life exceeding one year (Muir et al. 1980). Soil samples were taken on the Kenai Peninsula to better understand the persistence of fluridone in Alaska. Preliminary results suggest that fluridone persists at low concentrations for at least a year in lake sediment.

Complete eradication using fluridone products generally require treatment of 45—90 days per growing season for two or more growing seasons, depending on the site and flow rate of treatment sites. The ideal time for application is shortly after ice out when plant biomass is relatively low, turbidity is low, water volume is low, and the plant is actively growing. However, later growing season (August and September) applications in Kenai and Anchorage have proven to be effective in reducing or eliminating Elodea.

2.2.3.2 Proposed Herbicide Treatment

The success rate of fluridone for treating Elodea exceeds 95% (DiTomaso et al. 2013). Treating Chena Slough, Chena Lake, and Totchaket Slough during the growing season in warmer temperatures would be most effective because herbicides translocate fluridone through the plant's tissues while actively growing. Similar to the Kenai and Anchorage Elodea eradication plans, the proposed application strategy for the Fairbanks area's fluridone application is to combine an initial treatment of a liquid formulation with a subsequent treatment of a pelleted formulation. This helps ensure the desired target concentration is reached quickly and maintained long enough for effective eradication. The projected time necessary to eradicate Elodea is approximately 2-3 years in Totchaket Slough and Chena Lake, and 3 -4 years in Chena Slough. In Chena Slough, Chena Lake, and Totchaket Slough for the first year of the project, an additional fall application of pelleted slow-release fluridone will be applied to maintain target concentrations under the ice during winter for the first year of treatment. Table 2 summarizes the ideal application schedule for each of the treatment areas.

	Year 1		**Year 2**		**Year 3**		**Year 4**	
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
Chena Slough	Liquid and pellet	Pellet	Liquid and pellet	Pellet (if needed)	Liquid and pellet	Pellet (if needed)	Liquid and pellet	Pellet (if needed)
Chena Lake	Liquid and pellet	Pellet	Pellet		Pellet (if needed)			
Totchaket Slough	Liquid and pellet	Pellet	Liquid and pellet	Pellet (if needed)	Liquid and pellet	Pellet (if needed)		

Table 2. Ideal application schedule for the proposed project.

The proposed treatment covers a 119-acre section of the Chena Slough from the vicinity of Plack Road to the mouth in 5 different "zones" (Figure 4). Pelleted and liquid formulations of fluridone will be applied in Chena Slough over a 3 to 4-year period. The first application of fluridone in Chena Slough is SonarGenesis (6.3% active ingredient), a liquid applied by a stationary metered injection system, over a 12-week period for each scheduled year of treatment. The injection system will help maintain the concentration of fluridone in the flowing water during the active growing season, and will be adjusted according to Chena Slough flow rates. For example, if flow rates decrease due to lack of rain, the injection system will be adjusted to lower the rate of fluridone applied to the slough. In addition, two treatments of

Sonar H4C (2.7% active ingredient), a pelleted fluridone formulation, are proposed in each year of treatment; one during the early part of the growing season, the other before ice forms on the slough. The pelleted Sonar H4C will be applied to the entire treatment area to maintain target concentrations. The application of the smaller Sonar H4C pellets will be distributed by hand spreaders from the shoreline. The combination of SonarGenesis and Sonar H4C would maintain an in-water concentration of 5 – 10 ppb of fluridone during the duration of the project until Elodea is eradicated. If eradication is achieved by the third year of treatment in the Chena Slough, a fourth season of application may be deemed unnecessary.

The proposed treatment of 3 years to the 232 acres of Totchaket Slough (Figure 5, B) will also utilize SonarGenesis for the first application. Due to the remote access and lack of a secure site or real-time metering for an injection system, SonarGenesis will be applied directly by boat with calibrated pump and tank with trailing hoses. The Totchaket Slough application will also utilize a pelleted fluridone formulation, SonarONE (5% active ingredient). SonarONE is being used in Totchacket Slough because it has larger pellets than the Sonar H4C formulation. While the same target concentration is being applied to both sloughs, the smaller pellets in Chena Slough allow for greater coverage in hard-to-reach-by-boat areas. The combination of SonarGenesis and SonarONE in Totchaket Slough would maintain an in-water concentration of 5 – 10 ppb of fluridone during the duration of the project until Elodea is eradicated.

This project proposes to conduct a whole lake treatment in Chena Lake (Figure 5, A); a total of 234 acres for up to 3 years in duration. The first year of applications will include one SonarGenesis application by boat followed by two SonarONE applications; again, one during the early part of the growing season, the other before ice forms on the slough. During successive years of treatment, a single follow-up treatment of SonarOne is proposed.

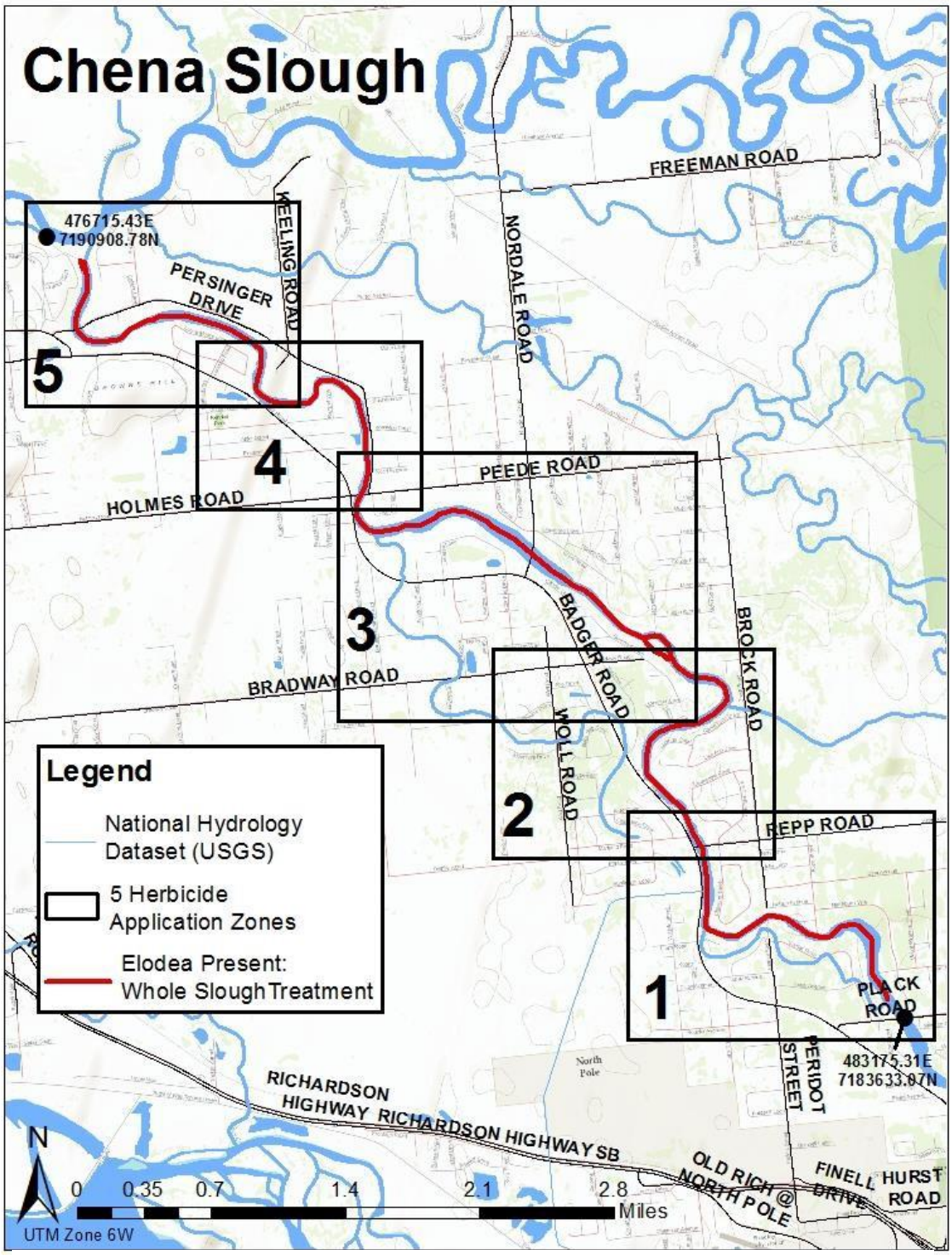
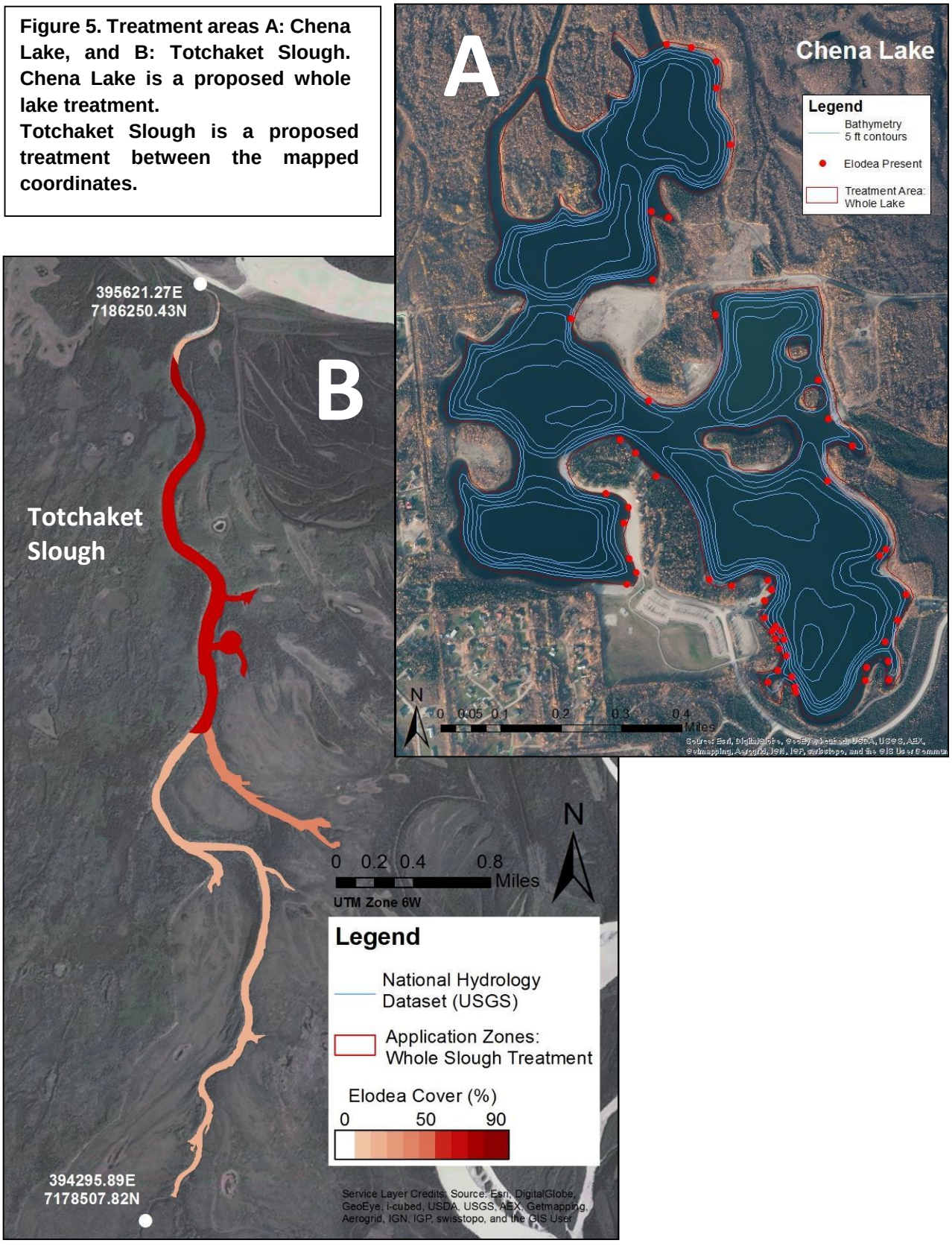


Figure 4. Overview of Chena Slough application area. The proposed treatment area is broken up into 5 application zones, and constrained to the coordinates noted on the map of Chena Slough.

Figure 5. Treatment areas A: Chena Lake, and B: Totchaket Slough. Chena Lake is a proposed whole lake treatment.
Totchaket Slough is a proposed treatment between the mapped coordinates.



Liquid fluridone will be applied from motorboats or an injection system by DEC-certified pesticide applicators. Pelleted fluridone will be distributed to the water by a hand spreader or forced-air engine blower. With all application methods, the application rate will be calibrated to ensure that desired concentrations are achieved.

2.2.3.3. Determination of Effective Fluridone Concentration

Controlled lab tests have been conducted with Elodea samples from a lake on the Kenai Peninsula to calculate optimal fluridone concentrations required for effective eradication in Alaska. The lab results concluded that Alaska Elodea is more susceptible to fluridone than Elodea taken from other locations in the lower 48, and that 10 ppb is the most lethal after 28 days after treatment (Figure 6). The lab test results and success in the Anchorage area have guided proposed treatment concentrations for the proposed Fairbanks area infestations. The target concentration is 5-10 ppb, and as the label of Sonar products state, the maximum application rate or sum of all application rates is 150 ppb per annual growth cycle. The 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. The treatment plan is to maintain the target concentration of fluridone for the duration of

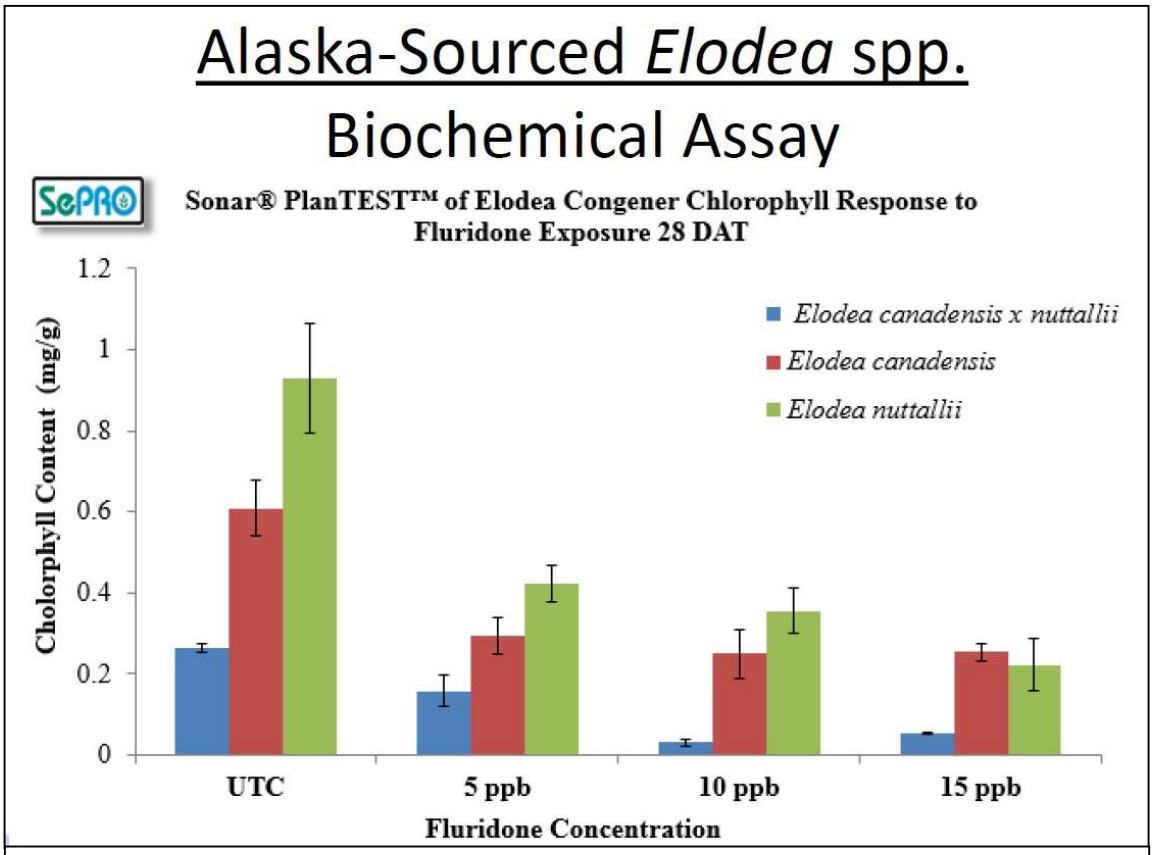


Figure 6. Controlled lab test results to determine most susceptible fluridone concentrations to eradicate Elodea found in Alaska.

the project until Elodea is eradicated. To ensure that concentrations are maintained, water samples will be collected from test sites distributed over the full treatment area. All project collaborators will follow the water sampling stipulations as noted in the DEC Pesticides Use Permit (Appendix 8.2). Waterbody samples will be taken at approximately 2, 4, 8, 12, and 16 week intervals during the growing season, and during winter months at locations based on waterbody morphology. Samples will also be taken in selected drinking water wells, pending landowner/water rights approval. All water samples will be collected using protocols established by, and sent to SePRO Corporation's analytical laboratory for determination of fluridone concentrations, and to a third party for immunoassay following the techniques described by Netherland et al. (2002). If mean fluridone concentrations fall below 75% of the target amount (10-15 ppb) for two consecutive samples, then supplemental fluridone in either liquid or pelleted formulations will be added to maintain target concentrations (but not to exceed 150 ppb in one annual growth cycle).

2.2.3.3. Herbicide Treatment Standard Operating Procedures

Due to the potential risk of exposure to applicators, safety protocols for storing, mixing, transporting, spill clean up, and disposing of containers will be formalized in a worker safety plan. The operating procedures will be debriefed to all applicators and product handlers before any scheduled applications, and given on a yearly basis. Fluridone used according to label instructions minimizes risk to applicators. There is no expected risk of exposure to the public from drift since liquid fluridone will be applied below the water's surface by direct injection or boat trailing hoses, at or near the waters surface with backpack sprayers. Applicators have the highest risk to exposure to fluridone, so they must avoid breathing spray mist, and avoid contact with skin, eyes, or clothing, and must wash thoroughly with soap and water after handling and wash exposed clothing before reusing. Fluridone labels contain additional requirements for safety and minimizing risk to exposure. Sonar Genesis, Sonar One, and Sonar H4C labels are included in Appendix 8.3 and the Safety Data Sheet (SDS) is available in Appendix 8.4.

2.3 Alternatives Considered but Eliminated from Detailed Analysis

This section includes descriptions of alternative actions identified through interagency and public scoping that were considered but eliminated from further analysis because they either did not meet the purpose and need of this project and or the treatments proposed are not proven effective or feasible at this time.

2.3.1 Drawdown or Draining

Lowering the water level of a lake or reservoir can be a successful solution to remove invasive

and nuisance aquatic vegetation in specific situations when water control structures are present. Chena Slough, Chena Lake, and Totchaket Slough do not have water control structures established to lower water levels enough for this proposed alternative to become feasible.
With the Chena Slough's connectivity to shallow groundwater, between 10 and 5 feet (Glass et al., 1986), it would be difficult to drawdown even if such a structure were to be put in place because the recharge rate would be faster than the drawdown rate (Beattie et al. 2011). Because the groundwater substrate is highly permeable, unconfined, and unconsolidated, other impacts such as surface subsidence, or shallow water wells becoming dry may occur if drawdown were feasible.

Given the remote area of Totchaket Slough and its attachment to surrounding wetlands, installing a water control structure and draining the slough would be logistically difficult and expensive. As with Chena Lake, drawdown or draining would be logistically difficult, and would defeat the flood control purpose of the lake. The deepest part of Chena Lake is 38 feet, thus making a water control structure nearly impossible to install to be effective. If pumping were needed to fully drain the Chena Lake, there would be a chance that Elodea could be displaced by the pumping system and infest a surrounding area.

Drawdown or draining of the proposed areas would have many unwanted long-term side effects such as negative impacts to adjacent wetland habitat, fish and wildlife becoming displaced, and extended loss of recreational and subsistence use while the waterbodies refill. Draining the sloughs or lake could still require chemical treatment or manual removal of all plant fragments to ensure Elodea is eradicated from the water body.

2.3.2 Benthic Barriers

A benthic barrier covers the sediment like a blanket, compressing aquatic plants while reducing or blocking light they require to grow. Examples of benthic barriers include burlap, plastics, Mylar, and woven synthetics. Placing benthic barriers over aquatic plant infestations can be a successful method of suppressing growth in small, shallow water bodies, and could potentially eradicate Elodea in areas where stands are sparse. However, benthic barriers would not be possible in the proposed waterbodies due to the large areas infested; Chena Slough alone is 118 surface acres. Also, in areas with dense biomass, benthic barriers would not be effective in controlling Elodea. Since the majority of the Chena Slough and Totchaket Slough have infestations which cover up to 90%, benthic barriers would not be realistic.

Additionally, gas production that results from decaying organic matter under the barrier may affect the long-term functioning and stability of the method (Gunnison and Barko 1992).

Limited permeability of a bottom barrier has been shown to create anoxic conditions and increased ammonium concentrations beneath the barrier. This can result in the elimination of native aquatic macroinvertebrate communities (Eakin and Barko 1995). This method is not species-specific and could impact benthic organisms and native plant species.

Additionally, the expense of treating the areas infested in interior Alaska is prohibitive. To cover only Chena Lakes, an area of 234.3 acres, with a standard benthic barrier ($425 per 700 sq ft) would cost approximately 6.2 million dollars. The addition of Chena Slough (118 acres) and Totchaket (232 acres), would raise the expense to a minimum total of 15.4 million dollars, not including installation costs.

The price, difficulty of installation over large areas, and the fact that benthic barriers are not effective at eradication for such large and dense infestations, indicates that this option is not a feasible one to consider.

2.3.3 Biological control

Biological control of Elodea has typically been attempted with the introduction of grass carp (*Ctenopharyngodon idella*), an herbivorous fish native to Asia. Biological controls will never eradicate a species, only control populations. The introduction of any non-native fish species to Alaskan waters is illegal, and therefore not considered feasible.

3. Affected Environment

3.1 Introduction

This chapter describes the present condition of the environment that we are proposing to treat. The key issues generated through the scoping process, and the requirements of National Environmental Policy Act (NEPA), define the general scope of the environmental concern for this project. This chapter forms the scientific and analytic basis for the comparison of alternatives.

The following critical elements have been considered for this EA, and unless specifically mentioned later in this document, have been determined to be unaffected by the proposed action: climate, threatened and endangered species, environmental justice, hazardous waste, prime/unique farmlands, and designated wild and scenic rivers.

3.2 Resources

2 3.2.1. Air Quality

Portions of the cities of Fairbanks and North Pole fall under the Particulate Matter 2.5 Non-Attainment Area, as designated by the EPA. This area contains Chena Slough and Chena Lake,

but not Totchaket Slough. Particulate matter levels in the area are primarily influenced by the use of wood and coal-burning stoves in winter, and should not be influenced by any treatment options. Drift is likely not to occur because liquid fluridone will be directly injected or applied at or just below surface waters. Minimal dust from the pelleted formulations may be deposited from the inactive ingredients while forced air is used to distribute pellets.

3.2.2 Water

Baseline water quality data exists for the Chena Slough; collected during a survey completed by DEC and USFWS in 2013. Currently, the Chena Slough is listed by DEC as an impaired waterbody in Category 5 section 303(d) due to sediment from urban runoff. However, it has been delisted for hydrocarbon contamination (Tetra Tech, 2011). There are no known contamination issues for Totchaket Slough or Chena Lake, however, baseline water quality information will be gathered by local Fairbanks area collaborators before the fluridone application.

3.2.3 Soil

Soil in the treatment areas are dominated by silt. Upland areas are covered by wind-blown loess that originate from glacial outwash, whereas the lowlands are dominated by water-laid silty sediments that are derived from glaciers or washed down from hillside. There is discontinuous permafrost throughout the region.

3.2.4 Vegetation

3.2.4.1 Native Plant Species

Aquatic vegetation in Chena slough consists of *Hippuris vulgaris, Potomageton alpinus, Sparganium* sp., and *Ranunculus aquatilis* (Dion 2002). Diatoms, *Nostoc* sp., and filamentous algae are also present in Chena Slough. Terrestrial stream and lakeside communities include wetland vegetation that includes black spruce and tamarack, blueberry, willow species, and sedges. Permafrost-free areas have well-drained soil that is dominated by deciduous trees such as paper birch and aspen.

Spruce, tamarack, and birch forest surrounds Chena Lake (ADFG 2011). Open land, marshes and sloughs also provide habitat (ADFG 2011). Several native and non-native terrestrial plants were introduced for re-vegetation and to control erosion from 1977-79 (Johnson et al. 1981).

3.2.4.2 Non-native Plant Species

Elodea is the only known submerged invasive non-native aquatic plant present in interior Alaska. Many cultivated species, such as turf grass and ornamental trees, can be found along the riparian buffer of Chena Slough along with other terrestrial invasive species.

3.2.5 Wildlife

Goldeneye ducks, grouse, moose, beaver, red fox, brown bear, kestrels, kingfishers, ospreys, shorebirds, swallows, muskrat, otter, mink, woodpeckers, rough-legged and sharp-shinned hawks, northern harriers, songbirds, mice, voles, hares, squirrels, lynx, wolves and black bears are all found in the surrounding areas (ADFG 2011).

3.2.6 Fish

Chena Slough was recognized in the 1990s as a world-class catch-and-release sport fishery for Arctic grayling (*Thymallus arcticus*) that provided important spawning and rearing habitat for Arctic grayling (*Thymallus arcticus*) (Dion 2002); other fish species documented in the slough include Chinook salmon (*Oncorhynchus tshawytscha*), chum salmon (*Oncorhynchus keta*), northern pike (*Esox lucius*), round whitefish (*Prosopium cylindraceum*), Arctic lamprey(*Lampetra camtschatica*), Alaska blackfish (*Dallia pectoralis)*, long-nose sucker (*Catostomus catostomus*) and slimy sculpin (*Cottus cognatus*) (Ihlenfeldt 2006). Planktonic organisms include copepods, daphnids, ostracods, Ephemoptera, Plecoptera, and Tricoptera (USACE 1997). In 1997 it was estimated (U.S. Army Corps of Engineers 1997) that 30 to 50% of the arctic grayling in the entire Chena River system were spawned in Chena Slough. Though the ADF&G has not released data on Chena Slough alone, mean annual grayling catch in the Chena River below Moose Creek Dam (combined with Chena Slough and Noyes Slough) declined between 2000 and 2010. Chena Slough is listed only once in the Anadromous Waters Catalog and Atlas and this is for Chinook salmon rearing documented at about the midpoint of the length of the slough. In the Chena River, at the point Chena Slough flows into it, chum salmon and Chinook salmon are present, and chum and Chinook spawning and rearing have been documented to occur, and a second record exists at the same location for juvenile Chinook salmon rearing.

Chena Lake has been stocked by ADFG with rainbow trout, silver salmon, and arctic char since 1982 (ADF&G 2016).

Northern pike (*Esox lucius*) are known to inhabit Totchaket Slough itself and the slough is close in proximity to Minto Flats State Game Refuge a well-known productive breeding area for Northern Pike in Interior Alaska. However, no systematic fisheries surveys have been conducted in Totchaket Slough. ADFG indicated that along with Northern pike the slough is likely inhabited by whitefish, burbot, juvenile coho salmon, and Alaska blackfish based on the known fish assemblages of the nearby river and sloughs Chinook, chum and coho salmon have been documented to be present in the Tanana River downstream of the Totchaket Slough mouth at Swanneck Slough and these records are recorded in the State of Alaska Anadromous

Water Catalog and Atlas. Upstream of the Totchaket Slough at the confluence of the Nenana and Tanana Rivers near the town of Nenana Chinook, chum and coho salmon have also been documented. Based on the juxtaposition of these records it is anticipated that juvenile anadromous fish of these salmon species are present in Totchaket slough although the presence of Northern pike (a predator of small-sized and juvenile fish) suggests that this would be sub-optimal habitat for juvenile salmon.

3.2.7 Threatened and Endangered Species

There are no threatened or endangered species present in interior Alaska.

3.3 Resource Uses

3.3.1 Human Health and Safety

Although herbicides are widely used to control unwanted species, public concerns have been raised regarding health and human safety. Fluridone is an EPA-registered herbicide that has been approved for use by ADEC. Any risks to human health during application (particularly to applicators) will be minimized by following a safety plan, including proper use of safety equipment. Orientation meetings will be held prior to all applications to cover planned activities, as well as spill prevention and response. People recreating in the area would not be at risk from chemical toxicants when the lakes are being treated.

3.3.2 Recreation

Chena Slough is used for recreational boating, and fishing. Totchaket Slough receives recreational boat use. Chena Lake is managed by the Fairbanks North Star Borough as a recreation area, and is a popular local site for swimming, non-motorized boating and camping. Chena Lake is also stocked with several fish species, and is used for sport fishing year round.

3.3.3 Land Use

Chena Slough is highly urbanized with private residences, many of which irrigate their lawns and gardens with slough water. Chena Lakes is managed as a borough recreational area. The land surrounding Totchaket Slough is used primarily for subsistence hunting or fishing.

3.3.4 Economics

The Fairbanks North-Star Borough occupies 7,444 square miles of interior Alaska, and is home to approximately 100,000 people, with a mean per capita income of $45,313 in 2013 (AKDOL, 2015). Major economic drivers are the Army and Air Force bases, production and refinery support for oil and mining industries, as well as the university, tourism and service industries. Nenana is in the Yukon-Koyukuk Census area, part of the unincorporated borough, with a population of 378 as of the 2010 census. The largest year-round employers in Nenana include

the Nenana City School District, City of Nenana, the Nenana Native Council, and the Tanana Chiefs Conference (Nenana Native Village, 2013).

3.3.5 Viewshed/Aesthetics

Chena Slough is part of the viewshed for many residents, but has been altered from its natural state to an urbanized area for many years (see the history of Chena Slough in section 1.5.1). Chena Lake is a popularly visited borough recreational area, but is man-made (see section 1.5.2). Totchaket Slough's veiwshed is almost completely in its natural state, and recreationalists use it for subsistence.

3.3.6 Subsistence

Chena Slough and Chena Lake are located in urban areas where subsistence activities do not occur. Totchaket Slough is the only Elodea-infested waterbody, considered in this EA, used primarily for subsistence (adjacent lands are privately owned by the Toghotthele Village Corporation). Nenana residents access various waterbodies in traditional harvest hunting areas including Totchaket to fish for pike and harvest waterfowl and moose beginning in spring through late fall.

4. Environmental Consequences

4.1 How to Read This Chapter

The NEPA requires that environmental documents disclose the environmental impacts of the proposed action, reasonable alternatives to that action, and any adverse environmental effects that cannot be avoided for the alternatives considered. Whenever federal funds are used for purchase of herbicides, as is the case for this proposed project, the project must assess the extent of impacts on resources as defined by the context (type and extent), duration, and intensity of the effect, based on an understanding and analysis by resource professionals and specialists. This chapter identifies the impacts to the physical, biological, and human aspects of the environment that could be *affected by the alternatives*.

4.2 Introduction

Environmental consequences are explained in full within the following text. Summaries of those consequences are presented in a table at the end of the chapter. Each resource and resource use was identified in Chapter 3: Affected Environment. Scoping Issues relevant to the purpose and need will be addressed relative to effects of the alternatives on physical and biological resources and the human environment at the end of this EA. Because herbicide use is often controversial and the impacts of herbicides are varied, Table 1 provides basic information on the herbicide likely to be used in Alternative C: Herbicide Treatment.

4.3 Methods: Categories of Impact

Thresholds were established for each impact topic to help understand the severity and magnitude of changes in resource conditions, both adverse and beneficial, of the various management alternatives (NPS 2015). Whereas issues describe the impact relationship between actions and resources, impact analysis predicts the magnitude of that relationship.

An environmental impact, relating to a topic, is expressed as the change in condition of the resources or environment under examination that can be attributed to the proposed action. Impacts are analyzed by considering the action relative to the resource baseline condition and the resulting effect. Impacts must be quantified as much as possible and interpreted in terms of their type, extent, duration, and intensity. For the purpose of this analysis, we will use the following terminology:

4.3.1. Type

- Beneficial impacts - a positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition; or
- Adverse impacts - in the context of most resources, an adverse impact refers to a change that moves the resource away from a desired condition or detracts from its appearance or condition.
- Direct impacts - impacts occurring from the direct use by or influence of invasive plant management; or
- Indirect impacts - impacts occurring from invasive plant management that indirectly alter a resource; it may also be a secondary effect of the initial action.

4.3.2. Extent

- Site specific – impacts apply to the immediate site of direct treatment and would not include surrounding watershed or landscape; or
- Local – impacts apply to the immediate site, but also extend to areas where the action was not directly applied.
- Regional – impacts would extend to adjacent waters.

4.3.3. Duration

- Short-term impacts – Those impacts occurring from invasive plant management in the immediate future (usually 1 to 6 months, or one growing season); or
- Long-term impacts – Those impacts occurring from invasive plant management and lasting for the next 10 years.

4.4 Resources

4.4.1 Air Quality

Alternative A - No Action

Ceasing management of Elodea would have no impact on air quality.

Alternative B - Mechanical Removal

Transportation to the sites, moving material to a disposal facility, and mechanical removal with suction harvester will produce a small amount of emissions from boat engines, which will dissipate rapidly.

Alternative C - Herbicide Treatment (Proposed Action)

Transportation to the site and use of four-stroke outboard motors will produce a small amount of emissions, which will dissipate rapidly.

Fluridone itself is not expected to cause air pollution. Fluridone is stable to oxidation and hydrolysis; volatilization of fluridone is not expected to be significant. Liquid fluridone will be applied at or just below the water surface and the pellets or granules will be applied with broadcast spreaders via boat, or via backpack spreaders in less accessible areas of Chena and Totchaket Sloughs. There is little concern regarding air drifting because liquid fluridone will be applied at or just below the water surface via weighted trailing hoses, and the pelleted/granular formulations are heavy enough that the wind speeds will not cause them to drift. Minimal dust from the pelleted fluridone may become airborne, but only in the vicinity of the application boat.

Summary of Effects

Impacts are similar for all treated water bodies. The No Action alternative would have no impact on air quality. Mechanical removal and herbicide treatment would have short-term, site-specific impacts on air quality, from emissions of vehicles and boat motors.

4.4.2 Water

Alternative A - No Action

The continued presence of Elodea is expected to continue to slow the flow of water in Chena Slough and Totchaket Slough via its dense vegetative cover as well as by increasing rates of sedimentation and is a direct negative impact to water quality and quantity. If no action is taken, increased risk of natural and anthropogenic vector spread of Elodea is likely to occur around the State to other water resources outside of the Fairbanks area. Water resources in areas where Elodea eradication are currently underway will have to be perpetually monitored for the risk of re-infesting the water as long as Elodea is present in the interior.

Alternative B - Mechanical or Manual Removal

Operation of the suction harvesting system which is required for manual removal of Elodea, temporarily increases water turbidity due to disturbance of the streambed. Adverse impacts (both short and long-term as well as direct and indirect) can be expected by using mechanical or manual removal methods on large infestations because the actions of mechanical or manual removal will increase fragmentation and downstream dispersal of Elodea.

Alternative C - Herbicide Treatment (Proposed Action)

The preferred alternative would apply fluridone to target waters to eradicate Elodea, an invasive aquatic plant. The anticipated direct impacts of using fluridone in water resources would be short-term. In field studies, fluridone did not adversely affect water quality parameters such as pH, dissolved oxygen, color, dissolved solids, hardness, nitrate nitrogen, total phosphates, and turbidity (McCowen et al. 1979).

Fluridone is registered by both the USEPA and the DEC and are deemed safe for use to treat aquatic invasive plants when applied according to label instructions. The concentration in the liquid formulation in SonarGenesis is 6.3%. The pelleted formulation has a fluridone concentration of 5% in SonarONE and 2.7% in SonarH4C. Regardless of formulation, the maximum application rate or sum of all application rates is 150 ppb per annual growth cycle, and the proposed project will not exceed this amount.

Short-term adverse impacts of herbicide application may include an increase in decaying and dead biomass within the waterbodies as the Elodea plants break down. This could result in temporary increases in organic material suspended in the waterbodies, and a decrease in dissolved oxygen levels (McCowen et al. 1979).

Long-term water quality is expected to improve with the application of fluridone to Chena Slough, Totchaket Slough and Chena Lake. Long-term beneficial impacts include improvement of water quality with the eradication of Elodea, and a restoration of native aquatic plant communities. When native plant communities are restored, water quality is expected to be maintained or improved. Furthermore, eradication of Elodea from Chena Slough will allow removal of this waterbody from the State DEC Impaired Water's waterbody listing.

Water and wetlands outside of the treated areas should not be impacted by fluridone. Due to fluridone's ability to bind to organic matter and the proposed low concentration application rates, fluridone should be undetectable once the Chena Slough enters the Chena River and where the Totchaket joins an adjacent slough of the Tanana. Water sampling sites outside of the treatment area will be used to monitor fluridone's movement in flowing waters. Chena Lake

has no outlet, and therefore areas outside of the treatment area should not be impacted.

Fluridone primarily degrades via photolysis (breakdown from solar energy) and secondarily through microbial degradation. A study summarizing field dissipation data for fluridone formulations found an average half-life of 20 days in pond water (ranging from 5 days to 60 days) and 3 months in pond hydrosoils (West et al., 1983). The half-life in open systems is considerably less and varied by dilution rates. In the San Joaquin Delta, fluridone applied at 20 ppb was measured at 1 ppb one week later (EDCP 2012).

Due to the soil binding properties of fluridone, is not expected to migrate into groundwater. Fluridone's strong affinity for organic material means it binds to soil, and will not travel past the first 2-3 inches of hydrosoil in lakes and streams (Muir et al. 1980).

In field trials, fluridone did not negatively affect water quality parameters such as pH, dissolved oxygen, color, dissolved solids, hardness, nitrate nitrogen, total phosphates, and turbidity (McCowen et al. 1979). Effects on water quality parameters for EFH such as clarity, dissolved oxygen, and nutrient levels that may be impacted by dead and decaying plant matter are expected to return to normal over a short period of time (ADEC 2016). Also, the treatment is proposed during summer months when the stream flow would result in rapid return to normal oxygen levels. ADEC does not believe that short-term addition of fluridone will cause any significant additional concern regarding the water quality in Chena Slough (ADEC 2016).

Summary of Effects

Discontinuing management of invasive plants (No Action) is expected to have long-term, adverse impacts on the water quality in Chena Slough and Totchaket Slough, slowing the flow of water and increasing sedimentation. If no action is taken, long-term adverse impacts to other waterbodies in Alaska from natural and anthropogenic spread are likely to occur. Mechanical treatments would have a short-term adverse impact by increasing turbidity, but short-term beneficial impact by removing Elodea and would continue to grow as a long-term negative impact. Herbicide treatments would have a short-term, local impact: the presence of decaying plant matter could decrease dissolved oxygen during treatment. The intended herbicide will be applied at low concentrations, and should not be detectable in the water outside the treatment area, or post treatment. Post treatment, water quality will improve (beneficial, long-term impact) due to the lack of Elodea.

4.4.3 Soil

Alternative A - No Action

Continued high sedimentation rates, from excess vegetation including Elodea, and from urbanization, should be expected.

Alternative B - Mechanical or Manual Removal

Manual removal would lead to disturbance of the sediment during treatment, a short-term adverse impact. Short-term sedimentation will be decreased due to the removal of Elodea (beneficial impact), but because mechanical removal will not eradicate Elodea in the proposed large areas, continued high sedimentation rates are expected in the long-term.

Alternative C - Herbicide Treatment (Proposed Action)

Fluridone binds to organic matter, and will not travel past an inch or two of lake or stream sediments (Muir et al. 1980). Soil samples will confirm fluridone concentrations in sediment profiles. The half-life for fluridone in lake hydrosoil can be up to one year (Muir et al. 1980). Given that application rates under 20 ppb will lead to concentration levels of 1 ppb in the water immediately after treatment in flowing water, residual fluridone in sediments will likely be below detectable levels (less than 1 ppb) in Chena Slough or Totchaket Slough after treatment ends.

Fluridone has an estimated half-life in water when used in control of aquatic vegetation of 20 days (EPA 1986) and a hydrosoil half-life of approximately 119 days (NCBI 2005). Once it adheres to soil particles, fluridone is biologically inactive, unable to continue to act as an herbicide (WDNR 2012). As a result, fluridone remains bioavailable for only a limited time (ADEC 2016).

Summary of Effects

The No Action alternative would increase sedimentation long-term (adverse impact) in Chena Slough and Totchaket Slough, but have minimal effect in Chena Lake. Mechanical removal would have the short-term adverse impact of disturbing the stream/lake bed in all three water bodies, but would have the beneficial long-term impact of reducing sedimentation in Chena and Totchaket Sloughs. However, because mechanical removal would not eradicate Elodea in the proposed areas, sedimentation rates would remain high unless mechanical removal happened in perpetuity. Herbicide treatment will lead to the presence of fluridone in stream and lake sediments in very low concentrations following treatment (short-term adverse impact). Due to eradicating Elodea, herbicide treatment would have the beneficial long-term impact of reducing sedimentation in Chena and Totchaket Sloughs.

4.4.4 Vegetation

4.4.4.1 Native Plant Species

Alternative A - No Action

Leaving Elodea unmanaged would have a significant impact on the native vegetation community of the three currently affected waterbodies, and has already threatened the native plant communities of downstream waters of the Yukon watershed. Native vegetation along the sloughs is already suppressed by the growth of Elodea, and the biodiversity of the sloughs have changed dramatically. Elodea density in Chena Slough and Totchaket Slough reaches 100% in some areas (Figures 5 and 7).

Alternative B – Mechanical or Manual Removal

Small patches of Elodea can be directly targeted by manual or manual removal. However, if manual removal were to occur in Chena Slough, Chena Lake, and Totchaket Slough, eradication would not be possible due the timeliness of labor and lack of resources. Positive short-term impacts include the removal of some Elodea biomass for native vegetation recovery. Negative short-term impacts include the removal of native vegetation since it is difficult to target one species in an area abundant with both native and invasive aquatic vegetation. Negative long-term impact is the creation of Elodea fragments potentially establishing new infestations downstream of Chena Slough or Totchaket Slough.

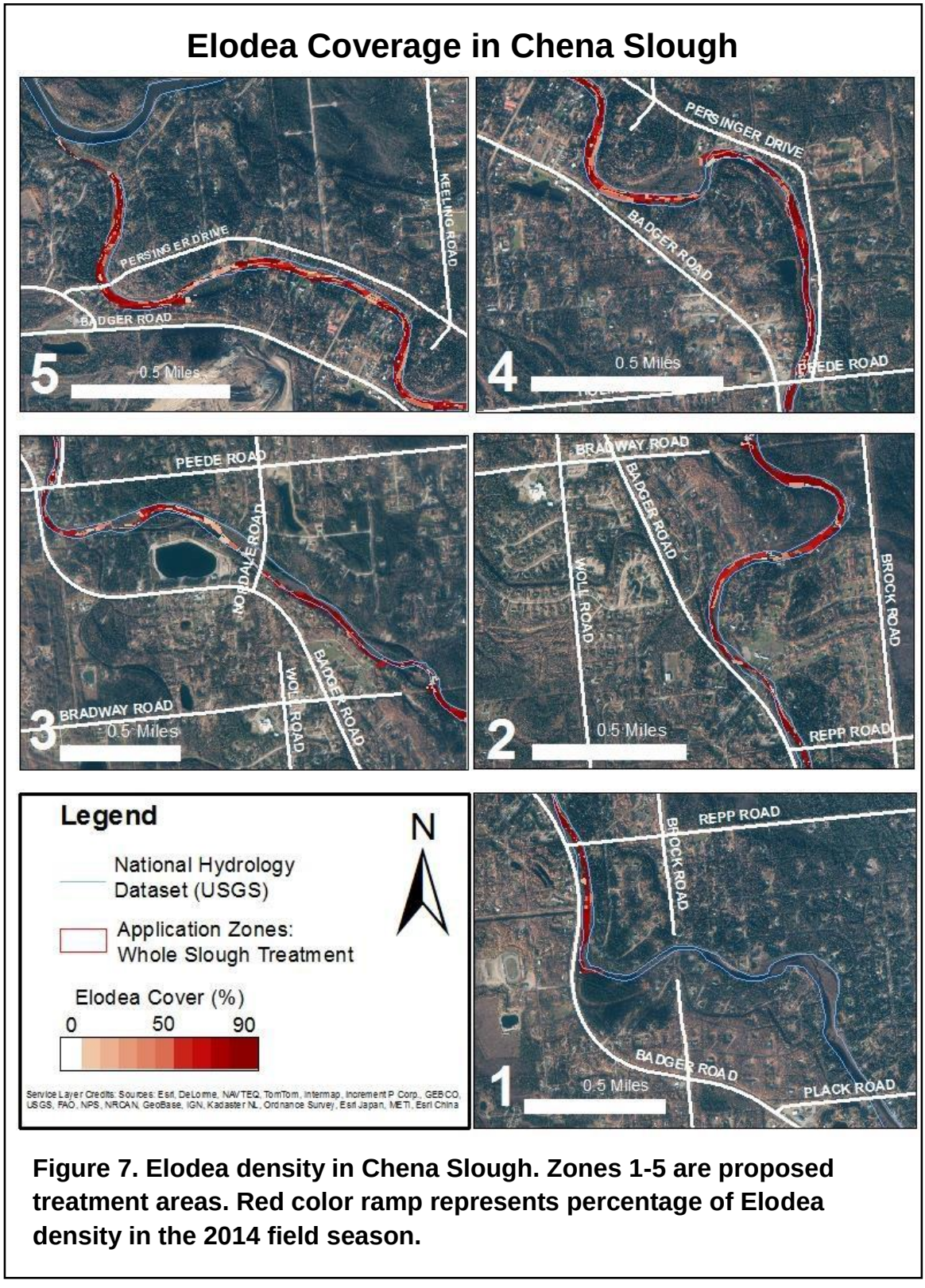


Figure 7. Elodea density in Chena Slough. Zones 1-5 are proposed treatment areas. Red color ramp represents percentage of Elodea density in the 2014 field season.

Alternative C - Herbicide Treatment (Proposed Action)

The desired outcome of the proposed project is the eradication of Elodea, but native submersed aquatic plants also will be impacted. Madsen et al. (2002) evaluated non-target plant effects in three lakes in southern Michigan that were treated with low-dosages of fluridone (Sonar AS) to control Eurasian watermilfoil. Despite achieving >93% reduction in the frequency of watermilfoil, native plant cover (composed mostly of *Ceratophyllum demersum*, *Chara* spp., *Heteranthera dubi*, *Potamogeton* spp., and *Vallisneria 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 lack of chlorophyll) usually recover within the year of treatment or become re-established within the following year (Kenaga 1992).

On the Kenai Peninsula and in Anchorage, lakes treated with fluridone have seen chlorosis of yellow pond lilies (*Nuphar polysepala*) and mortality of Northern water milfoil (*Myriophyllum sibiricum*) (J. Morton, pers. comm.). However, native plants primarily reproduce through seed, and fluridone is not expected to affect the seedbank. Both yellow pond lilies and Northern water milfoil are abundant species, and are anticipated to make a full long-term recovery.

In Chena Slough and Chena Lake, Elodea grows both alone in monotypic stands and in mixed assemblages with other native aquatic species as the dominant species. At the low concentrations proposed for the application (≤15 ppb), fluridone is expected to be lethal only to Elodea. The aquatic plant community is expected to shift back to one comprised entirely of native species.

Summary of Effects

Taking no action, Elodea would have a long-term adverse impact on native plant communities in the affected area, and threaten other native plant communities in the region. Manual removal of Elodea will have a short-term adverse impact on native vegetation, but a larger long-term beneficial impact. Herbicide treatment would have a short-term adverse impact on native aquatic plants during treatment, but the communities are expected to shift completely to native plants post-treatment (long-term beneficial, due to the removal of Elodea). Impacts of each alternative are similar for all three water bodies.

4.4.4.2 Non-native Plant Species

Alternative A - No Action

Making no attempt to remove Elodea from Interior waterbodies threatens the spread of this invasive plant to downstream waters. Additionally, Chena Slough and Chena Lake are used by recreational boaters, and Elodea could be spread to non-connected waterbodies in the State via recreational gear including boat trailers and floatplane rudders.

Alternative B - Mechanical or Manual Removal

A long-term negative impact of manual or mechanical removal of Elodea is the creation of fragments. Fragmentation occurs during any manual or mechanical removal, which raises the risk to downstream waterbodies for a new infestation. Additionally, the labor-intensive nature of manual removal prolongs the treatment time necessary, increasing the probability every year that other waterbodies may be invaded. Patches of Elodea have re-grown in the Chena Slough after suction harvesting (Lane 2014).

Alternative C - Herbicide Treatment (Proposed Action)

Fluridone is currently being used successfully on the Kenai Peninsula and in the Anchorage area to eradicate Elodea. After just two years of treatment, Kenai surveyed hundreds of points in all three lakes and only found one Elodea plant. Within a 3 to 4-year time-frame, treatment with fluridone will eradicate Elodea from Interior waters. To date, Elodea has only been found in 18 waterbodies around the State with an estimated 270 lakes surveyed. With a quarantine established to make it unlawful to sell or trade Elodea within the State of Alaska, and concerted statewide eradication efforts between State, Federal and local collaborators, extensive surveying in the interior, complete eradication is possible with the proposed project.

Summary of Effects

Discontinuing management of Elodea (No Action) would have a major, long-term adverse by spreading invasive species throughout the region and possibly the State. Mechanical removal of Elodea would have a beneficial impact, with the adverse impact of creating fragments that could threaten regional waterways. Herbicide treatment would have a beneficial impact, by removing invasive species. Impacts are similar for all three water bodies, but potential regional impacts are most important for whichever treatment is chosen for Totchaket and Chena Sloughs, due to their connectivity to the Yukon watershed.

4.4.5 Wildlife

Alternative A – No Action

Wildlife is likely not to be significantly impacted if no action is taken to eradicate Elodea. Bird food sources may be eliminated in infested areas, but birds may move to a different location to feed.

Alternative B – Mechanical or Manual Removal

If mechanical or manual removal occurs, short-term displacement is likely with wildlife, particularly birds. Mechanical removal will likely allow for native vegetation to repopulate, allowing native food sources of wildlife to be more available. However, if Elodea is not

eradicated and allowed to become a monotypic stand after its mechanical or manual suppression, then these beneficial effects will only be short-term.

Alternative C – Herbicide Treatment (Proposed Action)

Acute effects on birds

Only two species of birds: bobwhite quail (*Colinus virginianus*) and mallard duck (*Anas platyrhynchos*) have been used for acute fluridone toxicity studies. A single dose of 2,000,000 ppb of fluridone, administered by gavage (tube feeding directly into the stomach) to adult quail, resulted in no mortality although control and treated birds appeared lethargic through the sixth day, suggesting that birds were responding to gavage, rather than the herbicide (Kehr et al. 1978a). An LD50 (concentration that causes 50% mortality) of > 2,000,000 ppb was reported. Also during an eight-day dietary toxicity study with quail, an LC50 > 5,000,000 ppb was reported by Zucker et al. (1982).

During another eight-day study, the diet fed to mallards included fluridone concentrations of 1,250,000 ppb, 2,500,000 ppb, and 5,000,000 ppb; Kehr et al. 1978b). No mortality or signs of toxicity were reported in treated birds. However, the decline in body weight was likely due to birds rejecting the available food. An LC50 of > 5,000,000 ppb was reported.

Chronic effects on birds

Similar to acute studies, only quail and mallards have been used in reproduction studies of birds (ENSR 2005). Continuous dietary exposure of adult male and female quail to 0, 100,000 ppb, 300,000 ppb, and 1,000,000 ppb ppm fluridone for one generation noted no significant differences between control and treated birds for: percent eggs set/eggs laid; percent visible embryos/eggs set; percent 2-week-old survivors/viable embryos; percent 2-week-old survivors/number hatched; and percent number hatched/number laid (Ringer et al. 1981a). Also, there were no signs of toxicity. A NOEL of 1,000,000 ppb was reported.

Results for mallards from a replicate of the reproduction study for quail were the same (Ringer et al. 1981a). Also with mallards, treatment had no effect on food consumption or body weight, and no clinical or pathological effects were attributed to treatment. Feather loss, ataxia, and limping were attributed to aggressive behavior and effects from caging. A NOEL of 1,000,000 ppb was reported.

Displacement by treatment activities

Waterbirds (e.g., waterfowl, loons, grebes), shorebirds, and other species will undoubtedly be present and could be displaced from the waterbodies due to proposed treatment activities (i.e., boats and personnel). Adults of these species will be able to fly to other waters that are in close proximity, but young of the year and molting adults that cannot fly will be limited in their ability to leave the area. However, treatment activities will be of short duration throughout the proposed treatment areas, causing short-term, temporary displacement of adults and young of the year. Therefore, treatment activities will have minimal adverse effects.

Ingestion of treated water and food by birds

It is possible that waterbirds, shorebirds, raptors, and other species may ingest treated water or consume aquatic plants, fish, aquatic invertebrates, and sediments that have been exposed to treated water. Durkin (2008) used a hazard quotient to characterize the risk of harm to birds from ingesting treated water. Results indicated that at 150 ppb fluridone concentration, the highest labeled application rate, the hazard quotients for acute and chronic ingestion were below the level of concern by factors of 20,000 and 250, respectively. Also the hazard quotient for consumption of whole fish from treated waters by birds was below the hazard quotient level of concern by a factor of 10. Additionally, fluridone was not highly bioaccumulated in whole body catfish tissue (Hamelink et al. 1986), and 80-90% of the fluridone was excreted by adult rainbow trout during the first four days after exposure (Muir et al. 1982). Ingesting aquatic invertebrates from treated water may introduce trace amounts of herbicides to bird digestive systems (Durkin 2008).

Mammals

Six genera of mammals: rats (*Rattus sp.*), mice (*Mus p.*), dogs (*Canis sp.*), cats (*Felis sp*.), and rabbits (*Oryctolagus sp.*) have been tested for acute fluridone toxicity studies.

In acute toxicity studies on male and female, adult rats subjected to oral, single dose gavage with fluridone concentrations ranging from 500,000 ppb to 10,000,000 ppb, mortality was 30% of males at the highest concentration (Frick 1979a). At the other concentrations, no mortality was reported, and results noted leg weakness (Mauer 1985; Frick 1979a and 1979b), hypoactivity (inhibition of activity), diuresis (increased production of urine), ataxia (loss of body movements; Frick 1979a and 1979b), dyspnea (labored breathing), and ptosis (drooping eyelid; Frick 1979a) after 1 hour to 2 days post-dosing. Over the 7-14 day observation periods, surviving rats appeared normal after 24 hours post-dosing (Mauer 1985; Ansley and Levitt 1981; Ansley and Arthur 1980; Frick 1979a and 1979b). LD50's ranged from >500,000 ppb to 10,000,000 ppb (Mauer 1985; Frick 1979a and 1979b).

Single dose gavage at 10,000,000 ppb body weight fluridone concentration was used with male and female, adult mice and resulted in 30% and 20% mortality, respectively (Frick 1979a and b). Leg weakness, hypoactivity, ataxia, dyspnea, and ptosis were noted after 48 hours, but mice appeared normal by 72 hours and remained through the 14-day testing period. LD50 was > 10,000,000 ppb.

A single dose capsule at 500,000 ppb body weight fluridone concentration given orally to male and female adult dogs resulted in vomiting, but no mortality and no obvious signs of toxicity (Frick 1979a and b). LD50 was > 500,000 ppb. The same method using a 250,000 ppb body weight fluridone concentration with adult domestic cats resulted in similar responses as dogs (Frick 1979a and b). LD50 was > 250,000 ppb.

A single dose subcutaneous injection with fluridone concentrations ranging from 1,000,000 ppb to 5,000,000 ppb with adult male and female rats resulted in no mortality in both sexes

and hypoactivity for 1-24 hours post-injection for females (Frick 1979a). No signs of toxicity were noted in males. LD50 was > 2,0000,000 ppb. A similar study with adult female mice that used the same method and dosages resulted in no mortality with toxicity signs of hypoactivity, leg weakness, ptosis, and clonic convulsions (muscle spasm) between 2-24 hour post dosing (Frick 1979a and b). LD50 was > 5,000,000 ppb. Using the same method, but with both sexes and fluridone concentrations of 2,000,000 ppb body weight, another study reported 10% mortality for each sex with toxicity signs of signs of hypoactivity, leg weakness, and ptosis between 2-24hour post dosing (Frick 1979a and b). LD50 was > 2,000,000 ppb.

Single dose fluridone concentrations ranging from 500,000 ppb to 5,000,000 ppb were topically applied to the shaved or clipped backs of adult male and female rabbits (Ansley and Arthur 1980; Ansley and Levitt 1981; and Frick 1979b). No mortalities were noted, and effects ranged from no signs of toxicity or dermal irritation to mild erythema (reddening of the skin) and mild edema (swelling) at the treated locations in 16% of both males and females. Rabbits that exhibited these effects returned to normal after 6 days post- treatment. LD50's ranged from > 500,000 ppb) to > 5,000,000 ppb.

A single dose of one ml liquid fluridone, ranging from 5% (50,000,000 ppb) to 97% (970,000,000 ppb) concentration, was dripped into one eye of male and female adult rabbits (Ansley and Arthur 1980 and Frick 1979b). No mortalities occurred, and conjunctivitis ("pink eye") was noted within one hour in all rabbits. The irritation cleared within 72 hours for 50% of the test subjects. Conjunctival redness was noted after one hour in 75% of the rabbits, but cleared between 1-4 days post treatment. Corneal dullness was reported for 100% of rabbits after one hour with 67% exhibiting this sign through day 3. Slight to moderate iritis (inflammation of the iris) was observed in 100% of the animals after 1 hour. After 4 days, 17% of males exhibited pannus (extended tissue) of a portion of the corneal surface. No corneal lesions were noted, and corneal and iris membranes appeared unaffected.

The effects of fluridone through inhalation were tested by using one hour, single exposures of 2,130 ppb and 2,450 ppb to the noses and mouths of adult male and female rats (Frick 1979b). No mortality and no signs of toxicity were observed during the 14-day test. LD50's were > 2,130 ppb and > 2,450 ppb, respectively. A four hour, nose-only inhalation study with adult male and female rats at a fluridone concentration of 4,120 ppb resulted in no mortalities with toxicity signs of hypoactivity, chromodacryorrhea ("bloody tears" around the eye), and ataxia among females (Rohland and St. Clair 1981). All rats appeared normal on day 5 post treatment. LC50 was > 4,120 ppb.

Subchronic effects in mammals

Adult male and female rats were tested using dietary concentrations ranging from 0 ppb/day to 2,000,000 ppb/day for 89-90 days (Frick 1979a). No mortalities occurred, and no treatment related effects on clinical chemistry parameters (analysis of bodily fluids) were noted. Half of the treated males exhibited decreased red blood cell counts and hemoglobin and hematocrit levels. Half of all treated rats exhibited reduced food consumption at 536,000 ppb and

decreases in body weight at concentrations between 300,000 ppb/day and 536,000 ppb/day. All treated rats showed increased liver and kidney weights. Adult male and female mice were fed dietary fluridone concentrations from 0 to 560,000 ppb/day for 91-94 days (Frick 1979a). Concentrations of at least 330,000 ppb/day caused morphologic liver alterations with 17% of the treated mice dying likely due to hepatic centrilobular hypertrophy (enlargement of the central part of liver). At 150,000 ppb/day a slight increase in leukocyte (white blood cell) count was observed in half of females. Also, an increase in liver weights for half of all mice at concentrations from 1,000,000 ppb/day to 2,000,000 ppb/day were noted. The NOAEL (no-observed-adverse-effect level) was 15,000 ppb body weight/day body weight/day.

Over 92 days, oral capsules with fluridone concentrations ranging from 0 ppb/day to 200,000 ppb/day) were fed to adult male and female dogs (Frick 1979a). No mortality and no adverse effects on body weight, urinalysis, or organ weights were noted. Red blood cell counts and hemoglobin (blood protein that transports oxygen) and hematocrit (ratio of red blood cell volume to total blood volume) levels were slightly lower, but within normal ranges. Slightly elevated alkaline phosphatase (a phosphate removing enzyme) and blood urea nitrogen (BUN; a product of protein breakdown) levels were noted for the 200,000 ppb doses. The study concluded that there was no clear dose related response. The NOEL (no-observed-effect level) was 200,000 ppb/day.

Subchronic dermal effects of fluridone were tested for 21 days on the clipped, weekly-abraded skins of adult rabbits (Probst et al. 1981). At doses of 192,000 ppb/day, 90% of the tested rabbits exhibited transient, slight erythema (reddening of the skin) and desquamation (peeling). Thirty per cent of the tested rabbits showed moderate, well-defined erythema, mild desquamation, slight swelling, and mild skin cracks at doses of 384,000 ppb/day. At 786,000 ppb/day, 80% of the rabbits tested exhibited moderate to severe erythema with skin cracks, but only slight swelling. There were no changes in body weights or food consumption.

For subchronic teratology (study of abnormalities present from birth) testing, pregnant rats were given daily gavage doses from 0 to 1,000,000 ppb/day fluridone during days 6 to 15 of gestation (USEPA 2004). Mothers showed decreased body weight and food consumption at ≥ 300,000 ppb/day. The NOAEL was 100,000 ppb body weight/day. Fetuses exhibited decreased weight, delayed ossification (bone formation) at 1,000,000 ppb body weight/day. The NOAEL was 300,000 ppb body weight/day.

In another study, gavage doses ranging from 0 to 750,000 ppb/day of fluridone were tested with pregnant rabbits during days 6 to 18 of gestation (Probst and Adams 1980). No mortality for mothers and no effects on body weights or food consumption by mothers occurred at the ≤

125,000 ppb/day dose from day 6-18. Two percent of treated rabbits died post treatment on day 23 from the 300,000 ppb/day test, and 4% died on the same day from the 700,000 ppb/day test. At 300,000 ppb/day, mothers exhibited a 29% incidence of abortions above control mothers and slight decreases in body weight and food consumption during days 6-12 with full recovery noted during days 7-18. The number of fetal resorptions/litter increased 2.5 times at this treatment concentration. At 750,000 ppb/day, mothers exhibited a 55% incidence of abortion above control mothers and a decrease in body weights during days 6-12 with partial recovery post treatment on day 27. There were also decreases in food consumption during the treatment and post treatment periods. The NOAEL for maternal toxicity was 125,000 ppb/day.

In the same study, analyses of the fetuses from the tested mothers identified no fetal mortality and no effects on fetal body weight at any dosages. At 750,000 ppb/day dosage, fetuses were noted to have exencephally (malformation of the central nervous system), omphalocele (abdominal wall defects), rudimentary ears, and rudimentary forelimbs without digits. Increased incidences of thickened ribs and variations of the sternum were also noted.
No internal organ abnormalities were observed. The NOAEL for fetal developmental toxicity was 125,000 ppb/day.

Chronic effects in mammals
A three generation reproduction study tested rats using dietary intakes of fluridone levels ranging from 0 to 131,400 ppb/day (Probst et al. 1980). The first generation was exposed to these fluridone concentrations for two months during the growth and pre- mating phase. The resulting two generations were fed diets with the same concentrations for approximately 125 days each through the growth, maturation, mating, gestation, and lactation periods. No mortalities, no adverse effects on maternal body weights, and no treatment related signs of toxicity occurred in all generations. The NOAEL's for both maternal and reproductive toxicity were > 112,000 ppb/day. Body weights of third generation offspring were decreased on lactation day 21 (overall day 118) at the 112,000 ppb/day level. The NOAEL for offspring toxicity was 36,000 ppb/day. No evidence of embryo mortality, altered fetal growth, or developmental alteration was noted. The NOAEL for fetal developmental toxicity was > 112,000 ppb/day.

In a dietary study, adult rats, tested at fluridone intake levels ranging from 0 to 104,580 ppb/day for 1 year, exhibited no mortality or clinical signs of toxicity (Probst 1980a). In another dietary study, adult rats, tested at fluridone intake concentrations ranging from 0 to 97,080 ppb/day for 2 years, did not exhibit an increase in tumor incidence (Probst 1980b). At mid-doses ranging from 25,060 ppb/day and 30,510 ppb/day, rats showed decreases in body weights and eosinophil (white blood cells that combat parasites and allergies) counts and

increases in liver and kidney weights. At high doses ranging from 80,680 and 97,080 ppb/day, mortality increased 87% in males and 37% in females. Body weights decreased 59-66% in males and 81-89% in females. Other clinical signs of toxicity from high doses were chromorhinorrhea (colored secretion from the nose), decreased food consumption, increased incidences of atrophied testes, skin nodules and cysts, opaque, cloudy, red, pale, or ulcerated eyes, and altered kidney, liver, and red and white blood cell functions. The NOAEL was 7,650 ppb/day.

A dietary study over two years using adult mice that were tested with fluridone concentrations ranging from 0 to 50,000 ppb/day reported no treatment related effects on mortality, body weight, hematology, organ weights, eyes, muscle, or respiration (Probst 1981a). The NOAEL for systemic toxicity was 15,000 ppb/day.

Over one year, adult dogs were used in a dietary study of fluridone concentrations that ranged from 0 to 400,000 ppb/day (Probst 1981b). No mortality was reported, but a slight weight loss was noted for males at 150,000 ppb/day concentrations, and liver weights increased at 400,000 ppb/day concentrations for females. The NOEL was 75,000 ppb/day, and the NOAEL was 150,000 ppb/day.

Summary of Effects

A no action alternative will have several impacts on wildlife including the displacement of native food sources, and altering of habitat. Mechanical or manual removal will also temporarily displace native resident wildlife. Fluridone use at the proposed concentrations is not expected to have chronic or acute impacts on wildlife.

The maximum non-toxic dose for humans is calculated from the “no-observed-effect-level” (NOEL) seen in laboratory animals exposed to herbicide. Fluridone has no toxic effects at the doses expected to be encountered in the environment in mammals, fish and birds. 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 duck), insects (honey bees, amphipods, daphnids, midges, chironomids), earthworms, fish (fathead minnows *Pimephales promelas*, channel catfish *Ictaluris punctatus*, mosquitofish *Gambusia affinis*, rainbow trout *Oncorhynchus mykiss*, and other aquatic animals (Hamelink et al. 1986 Kamarianos et al. 1989; Muir et al. 1982; McCowen et al. 1979). Dermal exposure (skin contact) of test animals to fluridone has shown minimal to no toxicity in mammals from acute, concentrated contact. Chronic dermal exposure in mammals showed no signs of toxicity and only slight skin irritation. Mammals given varying fluridone doses up to 1,400 ppm per day excreted fluridone metabolites within 72 hours after exposure (McCowen et al. 1979). A dietary NOEL for

fluridone was established for birds that feed on aquatic plants and insects. The risk to birds from fluridone via diet was considered not harmful in doses exposed to in the environment (Muir et al. 1982). The acute median lethal concentration of fluridone was 4,300 ppb for invertebrates, and 10,400 ppb for fish. Fish in treated ponds showed no fluridone metabolites after treatment (Kamarianos et al. 1989).

Chronic studies in a 70-week period showed no effects on daphnids, midge larvae, fathead minnows, or channel catfish and rapid rates of metabolic excretion (Muir et al. 1982). Insects that fed on bottom sediments had higher rates of fluridone intake and persistence than other insects (Muir et al. 1982). Based on low bioaccumulation rates in fish in high levels of fluridone necessary to produce toxic responses in mammals and birds, it is not expected that fish-eating animals would be affected by fluridone at label registered application rates.

Honeybees and earthworms were not particularly sensitive to fluridone, even when directly dusted or placed in treated soil (Kamarianos et al. 1989). Irrigation of crops using water treated with fluridone led to only “residue” amounts in forage crops; containing 0.05 ppm after being fortified with 0.1 ppm (West and Day 1988). Fluridone tolerance levels for commodities range from 0.05 ppm to 0.1 ppm. Livestock consumption of fluridone-treated water resulted in levels of fluridone in lean meat and milk not found in environmental conditions when label rates were followed. Fluridone manufacturer recommendations indicate livestock can consume fluridone-treated water. The tolerance level for drinking milk is the same as for water: 150 ppb (West and Day 1988).

4.4.6 Fish and Aquatic Macroinvertebrates

Essential Fish Habitat in Treatment Areas

Of the three waterbodies for the proposed action, Essential Fish Habitat (EFH) has only been identified in Chena Slough for juvenile Chinook salmon (Alaska Department of Fish and Game’s Anadromous Waters Catalog nominations #96-026 and #97-038; attached). Nomination #96-026 documents juvenile Chinook salmon presence during June-September 1981, and nomination #97-038 documents presence during June and July 1996. More recent documentation of juvenile Chinook salmon presence in Chena Slough does not exist. The most upstream presence of juvenile Chinook salmon was at Nordale Road from nomination #96-026, approximately halfway between the upper most extent of the proposed treatment area and the mouth of Chena Slough.

Alternative A – No Action

The value of vegetation in maintaining diverse aquatic ecosystems has been well documented, and the influence of Elodea as an invasive aquatic plant species will and most likely has already have altered fish habitat since no action has occurred. Elodea, has the potential to degrade fish habitat by displacing native vegetation, changing nutrient and dissolved oxygen levels, and

changing stream flow characteristics and sedimentation rates, (ADEC 2016; ADNR 2016; Carey et al. 2016; FESC 2016; Luizza et al. 2016; Pokorny et al. 1984; and Buscemi 1958). In addition to affecting water quality and reducing the density of native aquatic vegetation, Elodea can alter aquatic communities if continually left unmanaged. An intermediate level of native vegetation (20 – 40% cover) should be maintained for fisheries and wildlife; however, figures 5 and 7 demonstrates that no action has resulted in nearly 100% cover of Elodea in the Chena Slough and parts of the Totchaket Slough, thus not maintaining diverse aquatic ecosystems. While fluridone will also affect native plants, negative impacts are expected to be minor and short-term with an overall expectation that the project will restore native plant communities and benefit fish habitat (ADEC 2016).

Alternative B – Mechanical or Manual Removal

Mechanical or manual removal of Elodea will temporarily alter fish habitat positively by reducing vegetation, and thus altering water quality to benefit fish and macroinvertebrates. However, unless mechanical or manual removal is completed in perpetuity, these alterations will only be long-term since mechanical or manual removal will not eradicate Elodea.

Alternative C – Herbicide Treatment (Proposed Action)

Toxicity in fish

Eight species of freshwater fish: rainbow trout (*Oncorhynchus mykiss*), bluegill sunfish (*Lepomis macrochirus*), channel catfish (*Ictalurus punctatus*), fathead minnow (*Pimephales promelas*), walleye (*Sander vitreus*), smallmouth bass (*Micropterus dolomieu*), largemouth bass (*M. salmoides*), and Chinook salmon (*O. tswaytscha*) have been used for acute fluridone toxicity studies.

Acute toxicity studies for adult rainbow trout resulted in a most dilute LC50 value (lethal concentration required to kill 50% of the sample over 96 hours) of 4,200 ppb (USDA and CDBW 2012; Durkin 2008, ENSR 2005, and Hamelink et al. 1986). A No Observed Effect Concentration (NOEC) was not reported in this study.

Similar testing for adult bluegill sunfish resulted in a minimum LC50 value of 7,170 ppb with fish becoming hypoactive for 24 hours at concentrations of 2,750 ppb, 3,650 ppb, and >5,000 ppb, but returning to normal for the remainder of the 96-hour study. The NOEC was 5,000 ppb. (Durkin 2008 and Probst and Negilski 1981c). USDA and CDBW (2012), Durkin (2008) and Hamelink et al. (1986) noted an LC50 value of 12,000 ppb for the same species. Habig (2004) reported a NOEC of 2,000 ppb for this species.

An acute toxicity test for newly hatched channel catfish resulted in a most dilute LC50 of 8,200 ppb (USDA and CDBW 2012; Durkin 2008, ENSR 2005, and Hamelink et al. 1986). No NOEC was reported.

A two generation test with fathead minnows resulted in a minimum LC50 of 22,000 ppb (Durkin 2008 and Hamelink et al. 1986). No NOEC was reported in this study.

Acute toxicity was also tested for early life stage walleye, smallmouth and largemouth bass with ages of fish ranging from 4-14 days post-hatch (USDA and CDBW 2012; Durkin 2008; and Paul et al. 1994). Over 96 hours the most dilute LC50 and NOEC for walleye were 1,800 ppb and 1,200 ppb; for smallmouth bass were 7,600 ppb and 6,200 ppb; and for largemouth bass were 13,000 ppb and 12,000 ppb.

Habig (2004) reported an acute LC50 value of 5,670 ppb and a NOEC value of 725 ppb for Chinook salmon smolts.

Also, in the Hamelink et al. (1986) study, differences in water hardness, temperature, and pH had no effect on the acute toxicity of fluridone to fish.

The range of toxicity values for fluridone from these studies was a minimum of 725 ppb for Chinook salmon smolts (Habig 2004) and a maximum of 22,000 ppb for fathead minnows (Durkin 2008 and Hamelink et al. 1986), indicating that Chinook salmon was the most sensitive to fluridone. Chinook salmon, rainbow trout, Arctic grayling (Thymallus arcticus), and Arctic char (Salvelinus alpinus) are salmonids and are the four species regularly stocked in Chena Lake (ADFG 2016). Also, a common fish species in Chena and Totchaket sloughs is Arctic grayling. Because the only two salmonids tested, rainbow trout and Chinook salmon are the same species as two of the stocked species, the effects of fluridone on these stocked fish is expected to be similar to those on the tested fish. Similarly, Arctic grayling and Arctic char are closely related, taxonomically, to, rainbow trout and Chinook salmon and would be expected to respond similarly to fluridone exposure. Therefore, because the acute LC50 for rainbow trout is 60.0 times and for Chinook salmon is 10.4 times higher than the maximum concentration (70 ppb) proposed for these waterbodies, it is highly unlikely that treatment levels will be acutely toxic to any of the four species. Another common species in Totchaket Slough is northern pike (Esox lucius). Although this species has not been tested for fluridone effects, and it is not closely related, taxonomically, to tested species, no adverse effects to this species are expected at the proposed treatment level.

Chronic effects on fish

Chronic toxicity of fluridone has been tested on three freshwater fish species: common carp (Cyprinus carpio), channel catfish, and fathead minnows. Common carp were subjected to an initial fluridone concentration of 42 ppb that decreased rapidly to a value below its detection limit after the 60th day (USDA and CDBW 2012, Durkin 2008, and Kamarianos et al. 1989). Throughout this period and continuing through the end of the study on day 84, observations of fish reported no mortality or clinical signs of adverse effects. Additionally, general body condition, swimming movements and behavior of the fish were normal. Gross pathological features of the skin, gills and fins were not evident, and hyperplasia, redness, hemorrhage or anemia were not observed in gill tissue. No NOEC was reported.

Channel catfish were continuously exposed to fluridone for 60 days at concentrations of 120 ppb, 250 ppb, 500 ppb, 1,000 ppb, and 2,000 ppb (USDA and CDBW 2012, Durkin 2008, and Hamelink et al. 1986). These fish showed no significant adverse growth or survival effects at or below a concentration of 500 ppb. However, a significant reduction in growth was observed at 1,000 and

2,000 ppb throughout the 60-day study. The NOEC for this species in this study was 500 ppb.

In a complementary study to catfish, fathead minnows were continuously exposed to fluridone through three generations of 35 days/generation at the same concentrations as the catfish (USDA and CDBW 2012, Durkin 2008, ENSR 2005, and Hamelink et al. 1986). No negative effects in fish were noted at concentrations ≤ 480 ± 30 ppb, but survival of second-generation fry declined within 30 days after hatching at concentrations of 960 ppb and 1,900 ppb. Also, no adverse effects on growth were observed at any concentration. The NOEC for this species in this study was 480 ppb.

Although these tested species do not occur in Alaska and are not taxonomically closely related to local species, testing results indicated that chronic effects on fish in the proposed treatment areas are not expected. Further, because the lowest concentration (480 ppb) that caused adverse effects in tested species was 6.8 times higher than the 70 ppb proposed for treatment, it is highly unlikely that treatment levels will be chronically toxic to any of the local species.

Accumulation in fish tissue

Whole body samples of catfish tissue after a 60 day exposure to fluridone concentrations from 120 ppb to 2,000 ppb indicated that it was not highly accumulated (Hamelink et al. 1986). Also, at 50 ppb concentration over 2, 4, 8, 24, 48, 96, and 120 hour exposures, 80-90% of fluridone was excreted by juvenile rainbow trout within four days (Muir et al. 1982). The remainder was eliminated more slowly, and liver, intestine, and pyloric caeca exhibited higher levels than muscle. Also, no residues of fluridone residues > 10 ppb were detected in Chinook salmon smolts (USDA and CEBW 2012). The study concluded that these fish were not concentrating fluridone in their tissues. Additionally, West et al. (1983) tested 175 samples from fish of several species exposed to fluridone between one day and 12 months and concluded that residues of fluridone did not accumulate in fish tissue. McCowen et al. (1979) also noted that fluridone did not accumulate in fish. Therefore, consumption of fish exposed to fluridone would likely pose a small risk to consumers.

ADEC is satisfied that use of fluridone in this project is not likely to result in unreasonable adverse impacts to fish, or other animal populations, vegetation, or other non-target organisms (ADEC 2016). As a result, no negative impacts to fish or their habitat are expected from the proposed pesticide use.

Toxicity in aquatic macroinvertebrates

Several taxa of freshwater macroinvertebrates: scuds (amphipods; Amphipoda), water fleas (cladocerans; Cladocera), midges (chironomids; Diptera), and copepods (Copepoda; Crustacea) have been used for acute and chronic fluridone toxicity studies.

Acute toxicity LC50 values for scuds (*Gammarus pseudolimnaeus*) ranged from 2,100 ppb to >

32,000 ppb across four tests, each of 96-hour duration (USDA and CDBW 2012; Durkin 2008 and Hamelink et al. 1986). In another test, the LC50 after 96 hours for amphipods was 2,100 ppb (Habig 2004). LC50 values for four genera of copepods ranged from 8,000 ppb to 13,000 ppb across seven tests of 48 hours per test per genus (USDA and CDBW 2012; Durkin 2008 and Naqvi and Hawkins 1989). A 96-hour test with water fleas resulted in an LC50 of 7,200 ppb, and a seven-day test resulted in an LC50 of 6,900 ppb (Riley and Finlayson 2004). The seven-day NOEC for water fleas was 2,430 ppb (CDFG 2004). Neither hardness nor salinity appeared to have an effect on the acute toxicity of fluridone to these taxa (Hamelink et al. 1986).

For acute toxicity, the fluridone concentrations that caused death in 50% of the samples (LC50) in scuds ranged from 30 to 457 times the proposed fluridone concentration of 70 ppb. For similar testing with scuds, the LC50 was noted at 30 times the proposed concentration, and for copepods, the LC50's occurred at 114 to 186 times the proposed concentration. Additionally, the LC50's for water fleas occurred at 35 to 103 times the proposed concentration. Therefore, the proposed treatment is not expected to be acutely toxic to aquatic macroinvertebrate populations.

A 60 day continuously exposed toxicity study with scuds (*G. pseudolimnaeus*) resulted in significantly lower survival and mean length than controls at a concentration of 1,200 ppb of fluridone, but no significant effects on these two characteristics were observed during the 30 day trials at this concentration (Durkin 2008; Hamelink et al. 1986). Also, at concentrations ≤ 600 ppb survival and growth were not significantly less than controls for both 30 and 60 day trials. Habig (2004) noted a NOEC for growth of 600 ppb over 60 days.

During 21-day continuously exposed trials with water fleas (*Daphnia magna*), adult survival ranged from 95% at 60 ppb and 100 ppb to 0% at 3,400 ppb (Durkin 2008; ENSR 2005 and Hamelink et. al 1986). Also, during 21-day testing, the average number of offspring produced was significantly less than controls at concentrations greater than 400 ppb. Habig (2004) determined the 21-day NOEC for water fleas was 200 ppb. Midge larvae (*Chironomus plumosus*) continuously exposed to fluridone at 1,200 ppb during 15, 20, 25, and 30 day trials resulted in cumulative adult emergence percentages that were significantly lower than controls (Durkin 2008; Hamelink et al. 1986). At concentrations ≤ 600 ppb for all time periods, there were no significant differences with controls. Habig (2004) noted a NOEC of 600 ppb for a 30-day adult emergence test.

For chronic toxicity, the most dilute fluridone concentrations that caused lower survival and smaller mean length in scuds was 8.6 times the proposed concentration of 70 ppb. Although mortality of water fleas occurred at a concentration less than (0.86 times) the proposed

concentration of 70 ppb, the mortality factor was only 5% and not significantly different than the mortality in the control sample. For midges the lowest concentration that adversely affected adult emergence was 8.6 times the maximum proposed fluridone level. Therefore, no expected negative impact on aquatic macroinvertebrate populations is expected.

Additionally, Arnold (1979) concluded that treatment at 1,000 ppb decreased benthic macroinvertebrate populations, but at 300 ppb, there was little impact. Sanders et al. (1979) also noted no substantial effects on benthic organisms when treatments ranged from 20-50 ppb. Haag and Buckingham (1991) used fluridone at concentrations of 4,600-9,200 ppb to test *Hydrellia* larvae, a fly (Ephydridae), with a two-week larval stage and noted significant mortality. However, this effect may have also been caused by loss habitat as leaflets of the targeted plant died.

Because of their high dispersal ability, high reproductive potential, and short life cycles with high generation turnover rates, aquatic macroinvertebrates are capable of rapid recovery from disturbance (Matthaei et al. 1996; Boulton et al. 1992; Anderson and Wallace 1984). Also, recolonization of flying aquatic invertebrates (e.g., mayflies and caddis flies) in the treated waterbodies would occur via aerial dispersal of adults from surrounding areas.

Concentrations of fluridone in water at averages of 900 ppb and 11,200 ppb and in sediment at averages of 37,000 ppb and 382,000 ppb resulted in approximately 10% mortality to midge larvae (Muir et al. 1982). The reasons for mortality were not clear, but it could not be attributed to the presence of the herbicide. Also, 80% of the fluridone was excreted by midge larvae within four hours, indicating a very low accumulation level. Also, after fluridone dissipates, it does not irreversibly accumulate in biological tissues (USDA and CDBW 2012).

Summary EFH

The application of fluridone in Chena Slough to eradicate Elodea will not have adverse effects on EFH but will temporarily affect EFH parameters, such as, water clarity, dissolved oxygen, and nutrients, due to the decomposition of dead and dying plant material. By eliminating Elodea, native plants will be able to reestablish themselves at pre-Elodea densities and distributions, and coupled with more efficient stream flow and less sedimentation, the treatment will result in long-term improved EFH for juvenile Chinook salmon. Also, eradication of Elodea from Chena Slough and other waterbodies is a priority for environmental agencies across the state (ADEC 2016) and will assist in maintaining EFH throughout Alaska.

4.4.7 Threatened and Endangered Species

Since there are no threatened or endangered species in the proposed project area, no consequences to these species exists.

4.5 Resource Uses

4.5.1 Human and Health Safety

Alternative A - No Action

If Elodea is left unmanaged, it can potentially cause human health and safety risks to those operating boats, floatplanes, or other motorized vehicles in infested areas. In 2015, the State of Alaska DEC issued an emergency exception to treat Elodea and excess aquatic vegetation in Lake Hood due to floatplane pilot's safety being at risk. Before herbicide treatment in Lake Hood, several occurrences of planes taxiing through aquatic vegetation and losing control became a hazards during busy airport operations. Given the abundance of Elodea in Chena Slough and Totchaket Slough, similar occurrences of human health and safety may occur with floatplane or motorized vehicles in the proposed waterbodies.

Alternative B - Mechanical or Manual Removal

The primary risks of mechanical or manual removal of Elodea in the Chena Slough, Chena Lake and Totchaket Slough are to divers operating the suction harvester. Minimal to no risk to the general public is expected for mechanical or manual removal of Elodea.

Alternative C - Herbicide Treatment (Proposed Action)

Human health and safety risks of a fluridone treatment is only applicable to those performing the treatment; negligible to no harm is expected for the general public. All fluridone applicators will be DEC certified, and wear the proper protective gear, required by the label.

The dietary NOEL (i.e., the highest dose ingested at which no adverse effects were observed in laboratory test animals) is approximately 8 mg of fluridone per kg of body weight per day (8mg/kg/day). A 70-kg (150 lb) adult would need to drink more than 1,000 gallons of water containing the maximum legal allowable concentration of fluridone in potable water, (150 ppb) for to receive an equivalent dose. A 20-kg (40 lb) child would need to drink approximately 285 gallons of fluridone-treated water in a day to receive a NOEL-equivalent dose. Therefore, the risk to humans and all mammals is negligible even if fluridone-treated water was ingested directly during or after treatment. Because fluridone degrades over time in the environment, chronic exposure for humans would not likely occur when the proposed action is completed (West et al. 1983, USEPA 1986). Additionally, human contact with fluridone can occur through swimming in treated waters, drinking treated waters, consuming fish from treated waters, or by consuming meat, poultry, eggs, or milk from livestock that were provided water from treated waters. There are no USEPA restrictions on the use of fluridone-treated water for swimming, fishing or consumption by livestock or pets when used according to label directions (USEPA 1986).

Fluridone has been in use in the US as an aquatic herbicide since 1986. There are no documented instances of human health impacts from application of fluridone according to label instructions. Fluridone is not considered to be a carcinogen or mutagen and is not associated with reproductive or developmental effects in test animals (WADOH, 2000).

Summary of Effects

Discontinued management of Elodea (No Action Alternative) would have minor short or long-term risks on human safety, depending on the circumstance. Mechanical removal presents risks to divers and field staff. Likewise, some health and safety risks are presented to herbicide operators, but the risk to public health from this herbicide at proposed treatment levels is negligible.

4.5.2 Recreation

Alternative A - No Action

The Chena and Totchaket Sloughs are currently overly abundant with vegetation; Elodea covering up 100% (Figures 5 and 7). Over abundant Elodea impedes navigation and slows water velocity. Additionally, the impacts of Elodea on fish habitat will decrease use of these waters for sport fishing as well as subsistence use. Not removing Elodea from Chena Lake would have an adverse impact on recreation, as navigability for non-motorized boats and swimming will be impacted by dense vegetation in the littoral zone.

Alternative B - Mechanical or Manual Removal

During mechanical or manual removal, use of boat launches and presence of work crews in waterbodies restricts the use and navigability, particularly in Chena and Totchaket sloughs. Recreation in Chena Lake would be temporarily impacted during the application. Due to the length of time necessary for manual treatment, this is a greater burden to access than some other potential treatments.

Alternative C - Herbicide Treatment (Proposed Action)

While the Chena and Totchaket sloughs are being treated, navigation of multiple boats would be limited because of the narrowness of the sloughs. Access to the boat launch in Chena Lake the days of treatment may be limited. Swimming in Chena Lake would be discouraged during days of treatment for public safety concerns around boats, not because of the risk to fluridone exposure. Fishing, swimming and boating are otherwise not restricted during application of fluridone to Chena Slough, Chena Lake and Totchaket Slough.

Summary of Effects

Recreation at Chena Lake would be unaffected by taking no action, and have short-term adverse impacts from manual removal or fluridone treatment. Recreation at Chena Slough would be adversely impacted by taking no action to remove Elodea in the long-term, and with short-term impacts adverse impacts from manual removal or fluridone treatment, but beneficial long-term impacts. Totchaket Slough is generally not used recreationally.

4.5.3 Land Use

Alternative A - No Action

If left unmanaged, it is likely that the Chena and Totchaket Sloughs will progressively fill in with sediment, due to the increase in sedimentation rates from vegetation and natural succession of shallow waterbodies. The reduction of the slough would negatively impact land use by eliminating water recreation, by reducing or eliminating the use of the slough for irrigation, and/or reducing the water-front aesthetics for land owners. The reduction of the slough could positively impact residents by increasing land use.

Alternative B – Mechanical or Manual Removal

Mechanical or manual removal may have limited short-term effects on land use, including the disposal of harvested vegetation. Lane (2013) and other FSWCD staff state that removal of material due to the excess weight of wet vegetation was difficult. Depositing or composting the vegetation for the mechanical or manual removal of Chena Slough, Chena Lake, and Totchaket Slough would impact the location of disposal.

Alternative C - Herbicide Treatment (Proposed Action)

Fluridone is a systemic herbicide that can negatively impact susceptible plants, including those irrigated or watered by proposed treated waterbodies. Where the use of Sonar treated water is desired for irrigating crops prior to the precautionary time frames on the label, the use of a FasTEST (fluridone concentration water samples) to measure the concentration is required in treated water before use. Where a FasTEST has determined that concentrations are less than 10 ppb, there are no irrigation precautions for irrigating established tree crops, established row crops or turf. It is not expected that fluridone at the proposed concentrations will effect riparian vegetation in the application areas. However, Sonar treated water is not to be used if water concentrations are greater than 5 ppb for tobaccos, tomatoes, peppers or other plants in the Solanaceae family and newly seeded crops or newly seeded grasses.

There are no risks to human health from consuming plants treated with fluridone. One study in California on edible aquatic vegetation harvested directly from lakes treated for 10 years with fluridone found no observable levels (>1ppb) of fluridone in 17 out 20 samples, and less than 4

ppb of fluridone in the 3 plants where fluridone was detected (Monheit et al. 2008).

FasTESTs will be completed throughout the proposed project for all treated waterbodies, and include some drinking water wells per DEC Pesticide Use Permit stipulations. A list of all FasTEST results with locations will be maintained on the FSWCD Elodea website. Chena Slough property owners will be notified of any irrigation or water use restrictions by mail, and will also be posted on the FSWCD Elodea website. Restrictions according to fluridone labels would also be posted on the FSWCD project website and on project notice signs in public access areas around the proposed treated waterbodies.

Summary of Effects:
The no action alternative would have no impact on land use in Chena Slough, Chena Lake or Totchaket Slough. Mechanical and manual removal may have minimal impacts on land use around proposed treatment sites due to disposal of harvested vegetation. Herbicide treatment would have short-term adverse impacts on usage of water for irrigation, which is likely to be of particular importance for land use near Chena Slough.

4.5.4 Economics

Alternative A - No Action
A study in New Hampshire found a 21-43% decline in property values associated with an infestation of variable milfoil, which also reproduces vegetatively, can clog water bodies, crowd out native aquatic plant species, and reduce recreational activities like boating and swimming (Halstead et al. 2003). In a Wisconsin study of 170 lakes infested with Eurasian watermilfoil, property values were reduced by an average of 13% (Horsch and Lewis 2009). A similar study in Washington also with Eurasian watermilfoil showed a 19% decline in property values (Olden and Tamayo, 2014). If no action occurs in Chena Slough, Chena Lake or Totchaket Slough, property values could be severely impacted.

Ecosystem services in Alaska provide natural resources that sustain economies, human health, cultural values, and quality of life. A natural state of Alaska's water resources can provide ecosystem services such as sustainable harvest of resident fish for consumption, or corridors to exploring an "untouched" camping spot. All ecosystem services have the potential for some quantitative economic value; however, Alaska has yet to determine the value of these services to the stakeholders and users. Therefore, quantified impact on Alaska's freshwater resources, and for the proposed project area is not yet known for Elodea.

Alternative B - Mechanical or Manual Removal
Mechanical or manual removal of Elodea in the Interior would positively impact local

economies by creating a need for a specific market; divers, dredges, boats, laborers, etc. However, because mechanical or manual removal of Elodea will not reach the proposed project goal of eradication, the need for such work would be needed in perpetuity.

Alternative C - Herbicide Treatment (Proposed Action)

Initial cost of treating the proposed project waterbodies with fluridone is relatively high, even at low concentrations. However, quantified impact on Alaska's freshwater resources is not yetknown for Elodea. Rapid timeliness for management of Elodea is worth preserving Alaska's profitable freshwater resources at the present state. If Elodea is given an opportunity to spread to other waterbodies, costs of management will most certainly increase and valuable, profitable resources will be lost indefinitely. Economic impacts to Alaska due to Elodea are preventable with rapid management action in Chena Slough, Chena Lake and Totchaket Slough.

Summary of Effects

The costs of controlling invasive and nuisance aquatic vegetation which include mechanical harvesting, underwater cultivation, diver hand-pulling, water level manipulation, biological control, and aquatic herbicide application, exceeds many millions of dollars annually in the U.S. (Eiswerth et al. 2000). In 2011 alone, Alaska spent over two million dollars on terrestrial invasive plants and almost $100,000 on freshwater invasive plants. However, since the management of Elodea has started around the State, this value has greatly increased; for example, the Anchorage project to treat the three smallest infestations cost ~$100,000 in just the product. If no action is taken to manage Elodea, the threat of property values being reduced could be significant. If mechanical or manual removal is completed to manage Elodea, expenses will be spent in perpetuity. If fluridone is utilized to eradicate Elodea, a relatively high initial cost of product would be spent, but countless amount of natural resources could be prevented from greater economic loss.

4.5.5 Viewshed/Aesthetics

Alternative A - No Action

There are long-term negative impacts on the viewshed of waterbodies due to presence of Elodea, which leads to waterbodies choked with a monoculture of vegetation. Lateral top growth of excess vegetation decreases the flow of water, and harbors increased growth of filamentous algae.

Alternative B - Mechanical or Manual Removal

Mechanical removal should have a long-term beneficial impact on the viewshed by clearing vegetation from the waterbodies, though the presence of work crews during the lengthy

removal period could have a negative impact. Additionally, the lack of complete eradication of Elodea from this treatment means the viewshed would only slightly improve, and without continuous management, return of Elodea to pre-treatment levels is likely.

Alternative C - Herbicide Treatment (Proposed Action)

Herbicide treatment might have a negative impact during treatment, due to the presence of decaying vegetation. However, fluridone is a systemic herbicide and slowly kills Elodea, so decaying vegetation may not be visible. It will result in a positive impact in the long run, due to the removal of Elodea.

Summary of Effects

Impacts on all waterbodies are the same, though the viewshed impacts will be more noticeable in highly-visited Chena Slough and Chena Lake. The No Action Alternative will have a long-term negative impact by allowing Elodea to remain. All other alternatives will have an adverse impact during treatment, but will result in the restoration of these water bodies and a long- term beneficial impact in their aesthetic quality.

4.5.6 Subsistence

Alternative A - No Action

Taking no action would allow the long-term degradation of fish habitat, impede navigability for subsistence purposes, and threaten many other downstream waters used for subsistence.

Alternative B - Mechanical or Manual Removal

Mechanical removal will improve navigability and fish habitat (though not eradicate Elodea), but produces fragments that could potentially spread Elodea to other downstream waterways.

Alternative C - Herbicide Treatment (Proposed Action)

Herbicide treatment at the proposed levels would have no direct effects on fish and wildlife during treatment (see sections 4.4.5 and 4.4.6). The biomass of some native aquatic plants, such as Northern watermilfoil, may be reduced during treatment, indirectly affecting abundance and location of mammals or waterfowl that feed on those plants. Eradicating Elodea has the long-term beneficial impact of improving navigability in infested waterways, improving fish habitat and restoring native aquatic plant communities.

No aquatic plants in the treated area are directly consumed for subsistence purposes although wildlife subsistence resources such as moose, muskrat and waterfowl do consume aquatic plants, their tubers and or seeds. Based on a bioconcentration factor (BCF) of 3.01, fluridone is not expected to bioaccumulate (concentrate in the tissues) of any animals that consume water or affected plants (WADOH, 2000). A BCF of 1000 is the threshold for which a substance is

considered bioaccumalitive under the USEPA Toxic Substances Control Act. We can expect treatment to have a beneficial impact to native aquatic plant populations as they will increase in cover after treatment and eradication of Elodea. Fluridone is not expected to accumulate in any terrestrial plants, even if treated waters flood terrestrial habitats.

Summary of Effects

Impacts are similar for Totchaket and Chena sloughs, since Chena Lake is not utilized for this subsistence use. Taking no action would allow the long-term degradation of fish habitat, impede navigability for subsistence purposes, and threaten many other downstream waters used for subsistence. Mechanical removal will improve navigability and fish habitat, but produces fragments that could spread Elodea to other waterbodies downstream. Herbicide treatment may have the indirect effect of reducing available aquatic forage plants during treatment, with the long-term beneficial impact of removing Elodea (restoring navigability, subsistence fishing and the native plant community).

4.6 Environmental Consequences Summary

RESOURCES			
Resource	**No Action**	**Mechanical or Manual Removal**	**Herbicide Treatment (Proposed Action)**
Air	No impact.	Short-term adverse impact due to use of gas-powered motors.	Short-term adverse impact due to use of gas-powered motors.
Water	Long-term adverse impact in the infested area, with potential of spreading throughout the region, due to the presence of Elodea slowing flow, lowering water quality and increasing sedimentation.	Short-term beneficial impact (controlling Elodea, lessening sedimentation and reduced water flow).	Short-term adverse impact (possibly decaying vegetation and reducing dissolved oxygen) with long-term beneficial impact (eradicating Elodea, slowing sedimentation and increasing water flow).

Soil	Long-term adverse impact: increased sedimentation due to the presence of Elodea.	Short-term adverse impact (disturbing streambed) with short- term beneficial impact (temporarily controlling Elodea, lessening sedimentation).	Short-to-mid-term adverse impact (fluridone binding to soil) with long-term beneficial impact (eradicating Elodea, slowing sedimentation).
Vegetation (Native and Non-native)	Long-term adverse impact to local native plant communities outcompeted by Elodea, and substantial risk of spread to regional native communities or areas that are already being managed.	Short-term adverse impact (disturbing streambed) with long-term beneficial impact (controlling Elodea, lessening competition). Increased risk to regional plant communities due to	Short-term adverse impact (injuring native plants with fluridone) with long-term beneficial impact (eradicating Elodea, allowing complete regrowth of native plant communities). Removes
Wildlife	No impact.	No impact.	Short-term adverse impact (Potential reduction in aquatic forage plants during treatment).
Fish and Aquatic	Long-term degradation of fish habitat, threatening other waterbodies.	Short-term impact to macroinvertebrates.	Potential short-term adverse impacts to aquatic invertebrates due to treatment with fluridone, long-term improvements to fish habitat.

Threatened and Endangered Species			

RESOURCE USES			
Recreation	Long-term adverse impacts to sport fishing and recreational boating.	Long-term beneficial impacts by improving navigability and sport fishing habitat. Short-term adverse impacts due to decreased access during treatment.	Long-term beneficial impacts by restoring navigability and sport fishing habitat. Short-term adverse impacts due to decreased access during treatment.
Land Use	No impact.	Short-term impact by Elodea material being removed.	Short-term adverse impact: water from the Sloughs and Lake should not be used to water sensitive crops during treatment. No long-term impacts.
Human Health and Safety	Potential to tangle boat motors, and spread by floatplanes.	Potential safety risks to divers and boat operators.	Potential risks to herbicide applicators.
Economics			
Viewshed/ Aesthetics			
Subsistence	Obstruction of navigability in Totchaket and Chena Sloughs, and potential to spread to other downstream waterways. Degradation of fish habitat.	Long-term beneficial impact by improving fish habitat and navigability.	Long-term beneficial impact by restoring fish habitat and improving navigability.

5. Consultation and Coordination

5.1 Specific Consultation and Coordination

Following several public meetings in Fairbanks, North Pole and Nenana and notice for this EA, DNR has incorporated public comments received and subsequent DNR responses into this final EA document. During the 30-day EA public commenting process, DNR received 4 formal comments. Here is a summary of the comments and responses:

Comment 1: The Alaska Committee for Noxious and Invasive Plant Management (CNIPM) supported Alternative C- Herbicide treatment as a low-risk, cost effective treatment to eradicate invasive Elodea in Interior Alaska. CNIPM did not find Alternative A- No Action acceptable because it jeopardizes Alaska's aquatic and fisheries resources, and Alternative B- Manual or Mechanical removal as viable option because the methods are ineffective, extremely labor-intensive, and costly.
Response to Comment 1: Thank you for your comment letter. Your comments will be incorporated in the final EA and taken in consideration.

Comment 2: The Harding Lake Association, which represents over 300 property owners on and around Harding Lake in Salcha, Alaska, supports the Interior Alaska Elodea Eradication Project. Representatives of the association attended public meetings and appreciate the thoroughness and seriousness DNR has taken to address Elodea in Interior and Kenai. The association also recognizes fluridone's benign impacts on fish populations, human contact and drinking water.
Response to Comment 2: Thank you for your comment letter. Your comments will be incorporated in the final EA and taken in consideration.

Comment 3: An individual wrote in support of the proposed action of Alternative C- Herbicide Treatment for Chena Slough, Chena Lake, and Totchaket Slough. They acknowledged the impacts to fish and wildlife population Elodea could have on the state, and the cost effectiveness to control Elodea in three areas in the Interior.
Response to Comment 3: Thank you for your comment letter. Your comments will be incorporated in the final EA and taken in consideration.

Comment 4: An individual wrote in support of the proposed action of Alternative C in the Interior Alaska Elodea Eradication project. Support for the proposed action was listed: Elodea threatens the health of Alaska's freshwater ecosystems; eradication will not be feasible with Alternative A- No Action, mechanical methods were tired, but didn't work and were time-consuming, labor-intensive and expensive; fluridone has been used successfully in south-central Alaska lakes, and fluridone is relatively benign to mammals compared to 2,4,-D, an active ingredient in many lawn weed and feed products.
Response to Comment 4: Thank you for your comment letter. Your comments will be incorporated in the final EA and taken in consideration.

5.1.1 Tribes

The lands adjacent to Totchaket Slough are owned by the State of Alaska, Toghottele Native Corporation, and Minto Native Corporation. The Fairbanks Elodea Steering Committee held a public meeting in May 2016 in Nenana to discuss the issue of Elodea and the proposed treatment plans in Totchaket Slough. The FSWCD presented these issues to the CEO of the Toghottele Native Corporation, and the Nenana Native Council, and provided outreach materials and signage on the importance of preventing the spread of Elodea. The IGAP (Indian General Assistance Program) coordinator in Nenana was educated on Elodea identification, and outreach materials were provided to the Native Council. FSWCD staff attended a workshop for IGAP Coordinators from throughout the Yukon River watershed and provided a training on Elodea identification in an attempt to incorporate monitoring for Elodea into the existing program (conducted by Yukon River Intertribal Watershed Council) for monitoring water quality at 70 villages along the Yukon River. The Nenana Native Council has been forthcoming in providing assistance for accessing Totchaket Slough.

5.1.2 Federal and State Agency

The DNR, Plant Materials Center's Invasive Plant Program has worked closely with federal agencies interested in helping reach the goal of eradicating Elodea statewide, as well as prioritizing surveys and prevention methods to user groups. On the Kenai Peninsula, the USFWS's Kenai Wildlife Refuge office initiated the first fluridone application in three infested lakes with great success. In Anchorage, DNR received funding and approval from the USFWS to use fluridone in three infested lakes to eradicate Elodea. For Lake Hood, DNR worked in collaboration with the State of Alaska Department of Transportation (DOT) maintenance and environmental staff to manage and eradicate Elodea and other nuisance vegetation causing safety concerns with both diquat and fluridone. In the Copper River Delta area, DNR is working in collaboration with the United States Department of Agriculture Forest Service (USDA FS) and a local non-profit group, Copper River Watershed Project, to start fluridone treatments on several infested ponds and a slough in 2016.

5.1.3 Interest Groups

In the Interior area, an Elodea Steering Committee was formed to include the FSWCD, USFWS, USDA FS, DNR, ADF&G, DEC, and other interested parties to discuss and collaboratively make management decisions about Elodea in the current infested waterbodies. Recently, members of the public have joined the monthly Fairbanks Elodea Steering Committee meetings, and been able to voice their opinions and ask questions about the management process. In particular, the Harding Lake community members have been publically in support of using fluridone for Elodea eradication. Pilot groups have also been active in the statewide Elodea eradication effort by participating in trainings for identification and surveying of remote access waterbodies, and allowing DNR and FSWCD speak at to their group meetings about the threat of Elodea.

5.2 Public Outreach

Public outreach and education have been essential since the discovery of Elodea in Chena Slough in 2010, and will continue to be an integral part of the Elodea eradication project. The prevention of spread of Elodea through public education and stakeholder involvement activities are being carried out simultaneously with eradication efforts over the course of the project. The Elodea Steering Committee has held numerous public meetings in North Pole and Fairbanks between 2010 and 2015, to discuss the issue of Elodea in interior area waterbodies, and strategies to control and eventually eradication. In 2016, public meetings were held in Nenana, in addition to North Pole and Fairbanks, due to the discovery of an Elodea infestation in the remote Totchaket Slough, which is heavily used for subsistence activities. Key stakeholder groups such as floatplane pilots, boat owners, and waterfront land owners are now being educated and incorporated into the effort to detect potential new infestations of Elodea in other waterbodies in interior Alaska. Public outreach and education on cleaning of boats and equipment at boat launches is being conducted in the interior in order to minimize the risk of spreading Elodea to un-infested water bodies. Clean-Drain-Dry signage that alerts users about invasive species transfer, and provides instruction on boat and gear decontamination are being installed at high-use and other key boat launches and floatplane ponds in the greater Fairbanks area. Public outreach events with educational activities for all ages are held periodically throughout the year. Public meetings will be held each year of the eradication program in spring and fall, to discuss the herbicide application plans for the season, and to present the results of the treatments respectively. Additionally, slough water, well water, and sediments in Chena Slough will be tested for fluridone concentration after treatment, and the results will be shared with the Chena Slough landowners and other interested members of the public. Informational brochures and mailings regarding Elodea are sent to all Chena Slough landowners to keep them informed. Public presentations to interested groups such as the Harding Lake Association, Fairbanks Chamber of Commerce, Chena Riverfront Commission, seaplane pilot's associations, Alaska State Legislature, are given throughout the year, to keep these groups informed about Elodea, and apprised of the progress of the eradication program.

5.3 List of Preparers

Heather Stewart: Alaska Department of Natural Resources, Invasive Plant and Agricultural Pest Coordinator

Aditi Shenoy: Fairbanks Soil and Water Conservation District. Invasive Plant Specialist

Delia Vargas Kretsinger: U.S. Fish and Wildlife Service, Yukon Flats National Wildlife Refuge, Wildlife Biologist

Jeff Adams: U.S. Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office, Branch Chief-Fisheries and Habitat Restoration

6. Permitting

Following the public meeting and notice for this EA, DNR will incorporate public comments received and subsequent DNR responses into this document. The revised document will then be submitted to USFWS to comply with the National Environmental Policy Act (NEPA) process to determine whether a Finding of No Significant Impact (FONSI) will be issued for the preferred action. Other major authorizations required to approve the preferred action include ADEC issuance of a Pesticide Use Permit, compliance with the Alaska Pollutant Discharge Elimination System (APDES), and approval by ADNR.

The following permits and approvals are needed prior to the proposed treatment:
Alaska Department of Environmental Conservation: Alaska Pollution Discharge Elimination System (APDES) Permit (Appendix 8.5) and Pesticide Use Permit
ADF&G (Alaska Department of Fish and Game) Fish Habitat Permit (Appendix 8.6)
ADNR Division of Mining Land and Water Land Use Permit (Appendix 8.7)

These permits will be added to the Appendix in this EA as they are approved.

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8. Appendix

8.1 Integrated Management Plan

INTEGRATED PEST MANAGEMENT PLAN FOR ERADICATING ELODEA FROM WATER BODIES IN INTERIOR ALASKA

January 2017

Prepared by
Fairbanks Elodea Steering Committee
AK Department of Environmental Conservation
AK Department of Fish and Game
AK Department of Natural Resources
City of Fairbanks, Public Works Department
Fairbanks Soil and Water Conservation District
US Fish and Wildlife Service

In consultation with:
Scott Schuler (SePRO Corporation, Carmel, IN)
Andrew Skibo (SePRO Corporation, Fort Collins, CO)

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I. Abstract

Elodea is an aggressive invasive aquatic plant that was first detected in the Chena River system in 2009. Surveys conducted in 2011 and 2012 revealed that the lower 10 miles of Chena Slough is heavily infested with *Elodea*. In addition, Chena Lake, at Chena Lakes Recreation Area is infested with Elodea, and a few isolated patches were found in the Chena River. In 2015, the Totchaket Slough, a slackwater slough located about 60 miles downriver of Fairbanks, was found to be heavily infested as well. In Alaska, *Elodea* infestations in water bodies can be expected to increase sedimentation, displace native vegetation, reduce biodiversity, degrade sensitive fish habitat, and interfere with safe river travel. A quarantine established at the boundaries of Alaska by the State Department of Natural Resources in 2014 underscores the gravity of this threat. *Elodea* can be spread readily via boats and floatplanes, and because it reproduces vegetatively, a single fragment is all that is needed to start a new infestation. Here we propose an integrated pest management approach to curb the spread of, and eventually eradicate, this species in water bodies in the Fairbanks, North Pole, and Nenana areas. We propose to use suction dredging in the Chena River, and aquatic herbicide treatments in Chena Slough, Chena Lake, and Totchaket Slough.

II. Background and Problem Statement

In September 2010, floating fragments of *Elodea* were found in the Chena River. This discovery was traced upstream to a dense ten-mile long infestation of *Elodea* in Chena Slough. This discovery launched an intensive effort to document the distribution of *Elodea* in the Fairbanks North Star Borough and to control the spread of this invasive plant to other regions of the state. In 2009, the State of Alaska and United States Fish and Wildlife Service published a list of native and non-native aquatic plants in Alaska (Portland State University 2009). At that time the authors determined that *Elodea* is non-native to Alaska. This determination was based on scientific information garnered from museum specimens archived at the University of Alaska Fairbanks Museum of the North that document the aquatic plant diversity and distribution within the state. The authors also conducted vegetation surveys to validate these determinations. Following this, an intensive effort was launched to document the distribution of *Elodea* in the Fairbanks North Star Borough (Fig.1) and to control the spread of this invasive plant to other regions of the state. In 2013 and 2014, manual and mechanical treatment trials were conducted in Chena Slough. These methods were found to be labor-intensive and time consuming and resulted in large-scale fragmentation of *Elodea*, increasing the threat of downstream invasion (Lane 2014).

In 2015, *Elodea* was discovered in Totchaket Slough by foresters from Tanana Chiefs Conference. This discovery prompted a rapid and extensive survey of water bodies in interior Alaska conducted by National Parks Service (NPS), United States Fish and Wildlife Service (USFWS), and Fairbanks Soil and Water Conservation District (FSWCD). In particular, sloughs and wetlands located adjacent to the Tanana and Tolovana Rivers that seemed to present suitable habitat for *Elodea* establishment, between Fairbanks and Minto were surveyed for the presence of *Elodea* (Fig.2). In addition, selected lakes and streams in the Salcha-Delta region were surveyed. No *Elodea* was detected in the water bodies visited during these surveys.

The *Elodea* infestations in Chena and Totchaket Sloughs are a high priority management issue in the region because of the coverage and density of the infestations, and the sloughs' connectivity to downstream river systems. These river systems include critical rearing and migratory habitat for Chena, Tanana, and Yukon River Chinook salmon, Arctic grayling, and other important subsistence and sport fish species (Dion 2002, Ihlenfeldt 2006). The Chena River system and other water bodies in the Fairbanks area are used by a wide array of groups, including motorized and non-motorized boaters, fishermen, hunters, and other recreational users. Due to the wide array of users, there is a high potential for spreading this plant to non-infested water bodies. If *Elodea* becomes established in local floatponds, it could be spread by floatplane throughout the state of Alaska. Thus the Fairbanks Elodea Steering Committee has chosen to pursue the use of herbicides to eradicate *Elodea* while continuing public outreach and education on this invasive species and how to prevent its spread.

Elodea is Alaska's first invasive aquatic plant. Recognizing the threat it posed in 2012, the State of Alaska charged the Department of Natural Resources (ADNR) with the responsibility to manage invasive aquatic plants. In 2014, the Alaska Department of Natural Resources, Division of Agriculture, established a quarantine of aquatic invasive weeds at the boundaries of Alaska to prohibit the entry and spread of five aquatic species, including *Elodea*. These management efforts were implemented in part to address current *Elodea* infestations in Alaska. ADNR has set a statewide management goal to eradicate *Elodea* and prevent it from spreading. This goal is being carried out in conjunction with local organizations, such as the FSWCD.

III. Management Goals and Objectives

Goal: The primary goal is to eradicate *Elodea* and to prevent its spread into uninfested waterbodies. Doing so will restore fish and aquatic habitat and recreational opportunities in the infested water bodies. An additional goal is to choose the most effective and appropriate method to eradicate *Elodea*. Eradicating *Elodea* and other aquatic invasive plants supports maintenance of intact, functioning aquatic ecosystems.

An integrated pest management (IPM) plan is a sustainable approach to managing pests that uses one or a combination of tools such as prevention, no action, biological, cultural, mechanical/physical and herbicide treatments in a way that minimizes health, environmental and economic risks. This IPM describes several different objectives, all leading to the ultimate goal of eradicating *Elodea* from interior Alaska.

The following objectives and strategies were developed to guide and implement this IPM.

Objective 1: Fulfill Regulatory and Policy Requirements

Strategies:

- Conduct outreach and education to the public, and receive public input, on the current status of the Elodea infestation and treatment alternatives prior to and during the environmental assessment analysis phase.
- Prepare planning, regulatory and NEPA documents. This strategy includes conducting a formal environmental assessment (EA) to solicit public and stakeholder input into the selection of treatment alternatives including the Elodea Steering Committee's preferred treatment to

eradicate *Elodea* with herbicide, preparing this integrated pest management plan, and applying for a pesticide use permit.

- Develop viable treatment alternatives, including individualized herbicide treatment prescriptions for each affected waterbody to be used in permitting applications.
- Finalize the EA and submit to US Fish and Wildlife Service for review
- Solicit public comments during DEC pesticide use permit comment period
- Finalize draft of IPM and acquire stakeholder signatures

Objective 2: Implement treatments in *Elodea* infested waterbodies.
The waterbodies will be treated in the following order of priority: 1) Chena Slough, 2) Totchaket Slough and 3) Chena Lake.

The Action Threshold at which point an approvement management strategy will be implemented to eliminate the *Elodea* population, will be considered as the presence of *Elodea*. Therefore, presence of *Elodea* in a waterbody, at any density or percent cover, is sufficient to trigger eradication efforts by approved methods.

Strategies:

- Develop herbicide treatment prescriptions for each affected waterbody in consultation with EPA-certified pesticide manufacturers, ADEC, and ADNR.
- Implement best management practices to eliminate/reduce potential impacts to non-target resources and to prevent spread of *Elodea* when treating different water bodies.
- Trained and certified pesticide applicators will comply with all Federal, State, and local pesticide use laws and regulations.
- Provide advance notification to the public and private property owners of all intended applications
- Maintain herbicide labels and MSDS as required, and maintain records of applications
- Monitor fluridone concentration in treated water bodies using the FasTest sampling protocol described below
- Make FasTest results of fluridone concentrations in treated waterbodies available online.

Objective 3. Survey high priority (or at-risk) waterbodies annually for invasive aquatic species infestations using a reconnaissance survey approach.

Strategies:

- Work with partners (e.g. USFWS, NPS, DNR and floatplane pilot's associations) to identify high priority waterbodies
- Develop a sampling plan.
- Work with others to conduct surveys of new and previously surveyed waterbodies as funding permits
- Work with others to map surveyed areas as funding permits
- Formalize sampling protocol to be shared with statewide invasive plant management community
- Continue to seek and acquire funding to conduct fieldwork

IV. Status of *Elodea*

Taxonomy

Five distinct species of *Elodea* are recognized, all native to parts of North and South America (Cook and Urmi-König 1985, Bowmer et al. 1995). Plants collected in Chena Slough in 2009 were initially identified by University of Alaska Museum of the North botanists as *Elodea canadensis* based on their morphological characteristics, though not recognized as invasive at the time. In 2010, samples were sent to University of Connecticut researchers for DNA analysis. Results showed specimens to be *Elodea nuttallii*. More sampling and genetic analyses are needed to determine definitively which species of *Elodea* occur in the slough. It may be *E. nuttallii, E. canadensis,* or a hybrid of the two. Because of this uncertainty, throughout this document we refer to the plant found in the Fairbanks area simply as *Elodea*.

Biology and Invasive Potential

Both *E. canadensis* and *E. nuttallii* are perennial submersed aquatic plants that propagate primarily through vegetative means. Propagation occurs when stem fragments are dispersed via water current, floating debris, wave action, or through human and wildlife activity (Spicer and Catling 1988, Barrat-Segretain and Elger 2004,). Both species have high regeneration (regrowth into viable plants) and colonization rates. Both species can withstand strong current and survive long distance dispersal, increasing invasion capabilities (Barrat-Segretain et al. 2002). Dispersing fragments grow roots at stem nodes where fragmentation occurred (Spicer and Catling 1988). Although very little is known about seed production and germination in Alaska, seed production in the *Elodea* genus is considered rare (Bowmer et al. 1995). The length of seed viability and life are also unknown (Spicer and Catling 1988).

Elodea species are generally tolerant of a wide variety of growing conditions; however, the plant prefers cold, clear, slow moving water for optimal growth (Cook and Urmi-König 1985). Both species grow in water temperatures of 10°—25°C and prefer depths ≤ 10 ft, but will eventually spread to water depths of 15-20 ft. The growth of *Elodea* is stimulated by fertilization with nitrogen, phosphorus, and potassium (Best et al. 1996). *Elodea* can survive and grow under ice (Bowmer et al. 1995) continuing to photosynthesize in lighting conditions of 29 to 120 foot-candles (Stuckey et al. 1978). Plants overwinter in water temperatures of 1 to 4^{o}C (Stuckey et al. 1978). *Elodea* develops dormant overwintering apices with densely crowded and strongly cuticularized leaves that are much hardier than the summer growth (Spicer and Catling 1988). Overwintering buds can occur at densities of up to 5000/m^2 (Bowmer et al. 1984). Overwintering buds are generally produced in autumn, and remain in the substrate until temperatures increase in the spring (Bowmer et al. 1984). As winter ends, growth is able to continue after only a few days of temperatures above 18^{o}C (Sculthorpe 1967).

There are some critical differences between the two species that may affect their hybrid. *Elodea canadensis* prefers mesotrophic lakes (moderate nutrient levels) whereas *E. nuttallii* prefers eutrophic lakes (high nutrient levels) and can tolerate higher levels of pollution. Both

species are salt intolerant but to varying degrees: ≤ 0.25% for *E. canadensi*s (Sand-Jensen 2000) and ≤ 1.4% for *E. nuttallii* (CAPM 2004); for comparative purposes, ocean water is typically 3.5% salt.

Elodea species are well documented as invasive aquatic plants that have successfully invaded many areas throughout Europe and Asia (Nichols and Shaw 1986), as well as New Zealand, Australia (Cook and Urmi-Konig 1985) and parts of Africa. In Europe, *Elodea* infestations have spread extensively across the landscape over the last 140 years, likely because of human movements inadvertently transporting plant fragments. *Elodea* has spread from Ireland to Lake Baikal, Russia—a distance of approximately 5,000 mi (8,000 km)—and crossed two continental divides. *Elodea* species are capable of causing large-scale changes to freshwater ecosystems, including changes in stream-flow dynamics, nutrient content, dissolved oxygen content, and invertebrate assemblages (Buscemi 1958, Pokorny et al. 1984). Its rapid growth often results in the displacement of native plants, which can significantly alter fish and aquatic invertebrate habitat. Dense *Elodea* growth also interferes with recreational activities, such as fishing, swimming, and boating, and can create hazardous conditions for float aircraft operations.

Ecological Impacts

Elodea can form dense mats, reducing the amount of light available to surrounding native aquatic plant species (Rorslett et al. 1986, Spicer and Catling 1988) resulting in displacement of native flora and a loss in plant species diversity when it becomes the dominant cover type. These dense *Elodea* populations can restrict water flow (Spicer and Catling 1988, Gollasch 2006) and impede navigation. *Elodea* accumulates nutrients while reducing nutrient availability to the substrate with unknown effects on stream productivity. *Elodea* infestations degrade water quality and thus aquatic fish habitat by increasing water turbidity and pH, causing changes in nutrient concentrations, and reducing oxygen concentrations near the substrate, but may increase oxygen concentrations 5 cm above the substrate, thus its use in fish aquariums. *Elodea* can also withstand desiccation and low water temperatures and can survive in nutrient poor environments.

Outside of its native range, new infestations of *Elodea* establish with a relatively explosive growth period that lasts 5 – 6 years (Sand-Jensen 2000, Mjelde et al. 2012). Predictive bioclimatic models that include climate warming, suggest that *Elodea* will continue to aggressively colonize even further north in Europe (Heikkinen et al. 2009). Similar studies have not been conducted in Alaska; however, given climate warming predictions for the state of Alaska (ACIA 2005) northward migration of *Elodea* within the state is highly likely.

Until the Alaska Division of Agriculture established a quarantine in 2014 at the boundaries of Alaska to prevent the entry and spread of *Elodea* species, *Elodea* was commonly used as an aquarium plant in Alaska and had been readily available in pet stores. It was frequently used in college and high school biology labs for experiments in plant cellular structure, living protoplasm, respiration, photosynthesis and other physiological processes (Catlin and Wojtas 1985). The *Elodea* infestation in Chena Slough is likely to have originated from dumped aquarium material.

In Alaska, *Elodea* appears to be isolated to aquatic habitats near urban centers with a few exceptions (Fig. 3). In these locations it is an aggressive invader that is expected to have severe impacts on aquatic ecosystems including: loss of habitat for wetland obligate species such as moose, waterfowl, and furbearers as well as salmon and other resident fish, reduced biodiversity, increased sedimentation, degradation of water quality, and displacement of native vegetation. Dense surfacing plants also impede water craft navigability and create hazardous conditions for float plane operations. This infestation is likely to result in significant economic impacts to tourism, sport & commercial fishing, and other stakeholders.

Given the plants tolerance to clear, slow flowing waters, its complex life history and its ability to easily colonize aquatic environments *Elodea* poses a significant threat to the state's vast aquatic resources.

Economic Impacts

Because the invasion of Alaskan water bodies by *Elodea* is relatively recent, it is difficult to assess the economic impacts of the invasion on the state and its people. Outside Alaska however, millions of dollars have been spent attempting to stop the spread of *Elodea* or control its explosive growth. For example, in Great Britain, the management of invasive aquatic plants costs between $44 and $60 million annually with *Elodea* management being the single largest expense, comprising more than a quarter of total cost (Oreska and Aldridge 2011). In 2005, the State of Florida spent 22.5 million dollars for aquatic plant control in public waters alone. In Orange Lake, Florida the sport fishery is thought to have suffered a 90% loss in revenue due to *Hydrilla* infestation (Colle et al. 1987). Cases outside Alaska suggest that once *Elodea* is established it can significantly increase management costs and lead to deterioration of recreational boating opportunities, fouling of boat propellers and floatplane rudders, impediment to fishing, and a reduction in property values (Zhang and Boyle 2010). In Wisconsin, property values dropped by approximately 13% following an infestation of Eurasian milfoil (Horsch and Lewis 2008). Infestations of *Elodea* have been shown to damage the aesthetic values of waterways and reduce recreational opportunities as well (Catlin and Wojtas 1986, Josefsson and Andersson 2001).

In Alaska, *Elodea* could significantly impact the subsistence community and thousands of peoples' ability to survive by impairing their ability to hunt, fish, and trap. Many Alaskans rely on subsistence resources such as salmon, whitefish, waterfowl and moose, that are dependent on healthy aquatic ecosystems. Not only do Alaska subsistence users harvest fish and game that depend on these waters but waterways are also significant means by which Alaskans traverse the state in pursuit of fish and game. The presence of *Elodea* in our waters could curtail these cultural activities.

Distribution

North America

(The following is from Morton et al. 2014)

Elodea nuttallii (commonly known as Western Waterweed or Nuttall's Waterweed) is native throughout much of North America from the southeastern United States into southern British Columbia. *Elodea canadensis,* or Canadian waterweed, is native to temperate North America; its distribution includes northern portions of the contiguous U.S. and southern Canada, excepting southern Alberta and southwestern Saskatchewan. Distribution is highest in parts of Quebec, the St. Lawrence Valley, the Great Lakes region, southern British Columbia, and the Pacific West Coast. *E. canadensis* is infrequent north of 51°N but it does occur as far north as 59°N. *Elodea* species are absent from northern Canada including the Yukon and northern British Columbia, displaying a sizeable gap in distribution between recent discoveries of *Elodea* in Alaska and the previously known northernmost locations in North America: approximately 615 miles from Cordova, 800 miles from Kenai-Soldotna, and 725 miles from Fairbanks. Furthermore, the Canadian locations are on the opposite side of the Coastal Range; a significant geographic barrier to disbursal. The native range of *E. nuttallii* overlaps *E. canadensis,* but the former is more prevalent further south.

Alaska

To date *Elodea* has been found in 22 locations within the state of Alaska (Fig. 3) including infestations near Fairbanks, Anchorage, Cordova, and Kenai. All but one of the infestations have been identified since 2009. These searches have been conducted by land management agencies and the statewide *Elodea* steering committee. Two infestations have been identified by citizens and reported to the state.

Though *Elodea* is native to much of North America, several lines of evidence show that it is not native to Alaska. *Elodea* was judged to be a "Potential Invasive" to Alaska in the book "Introduction to Common Native and Potential Invasive Freshwater Plants in Alaska." This book was written jointly by the Center for Lakes and Reservoirs at Portland State University, Alaska Department of Fish and Game, and the U.S. Fish and Wildlife Service, and published in 2009, prior to the discovery of the severe infestation in Chena Slough. Additional lines of evidence are detailed by Wurtz et al. (2013). The Arctos online database includes more than 1500 aquatic plant specimens widely collected across Alaska. The collection includes only one specimen of *Elodea* collected prior to 2009: the sample was from Eyak Lake. The Eyak Lake population is now believed to have begun with an aquarium dump. *Elodea* has not been found in the Yukon. Numerous floristic surveys have been conducted in Alaskan habitats that would seem to be good *Elodea* habitat – for example, water bodies in Minto Flats and the Yukon Flats.

Fairbanks

As of August, 2015, *Elodea* has been found in four waterbodies in interior Alaska including Chena Lake, Chena Slough, the Chena River, and Totchaket Slough (Fig. 2). Since 2011, a variety of different groups and government agencies have surveyed a range of different water bodies in interior Alaska. To date, all anadromous stream crossings within the Fairbanks North Star Borough have been surveyed at least once, along with known boat launches, selected float plane ponds, and many high use areas (Fig.1). Additional surveys have been conducted in gravel pits located within a half mile of Chena Slough.

A survey conducted by FSWCD in 2011 focused on the lower 10 miles of Chena Slough. Of the approximately 118 acres of slough in this 10-mile reach, *Elodea* was found to occupy 55 acres with coverage ranging from 1% to 100% (Fig. 4). Isolated patches were found downstream in the lower Chena River and at the confluence of the Chena and Tanana Rivers. The Chena Lakes population was initially detected around a boat launch in the lake, and a survey conducted in 2012 showed that *Elodea* is present throughout much of the perimeter (Fig. 5). Chena Lake's only outflow is via groundwater, so the *Elodea* in Chena Lake is confined to the lake unless moved by people or vehicles.

In August, 2015, foresters working for the Tanana Chiefs Conference reported an infestation of *Elodea* in Totchaket Slough, a slough of the Tanana River 12 miles downstream of the village of Nenana in 2015. This infestation was found to cover a 5.5-mile stretch of the slough that begins just upstream of the mouth and extends the entire length of the slough (Fig.6).

V. Site Descriptions

All four known *Elodea* infestations in interior Alaska are part of the Tanana River watershed. The Tanana River bisects the state of Alaska traversing 568 miles from the headwaters of Wrangell-St. Elias National Park to the mouth of the Yukon River.

Chena River

The Chena River is a non-glaciated tributary of the Tanana River. The Chena River originates in the Yukon-Tanana Uplands approximately 90 mi east of the city of Fairbanks, AK and flows 155 mi to its confluence with the Tanana River southwest of the city of Fairbanks; draining an area of approximately 2,115 mi^2, with an elevation change from 3,675 ft at its origin to 430 ft at the confluence with the Tanana River (Tetra Tech 2011). High flows occur on the Chena River from May to September. During winter months (November to April) the principal source of flow for the Chena River and related tributaries is groundwater. The mean annual flow rate in the upper Chena River (USGS gauge at Milepost 40 of Chena Hot Springs Rd) is 689 cfs. In downtown Fairbanks (USGS gauge at Wendell Street Bridge) the mean annual flow rate is 1,344 cfs (USACE 1997).

The lower portion of the Chena River is heavily urbanized. The Chena River flows through Fort Wainwright Army Base, an area that is on the National Priorities List because of known or threatened releases of hazardous substances, pollutants or contaminants (Gilder 2011). Some contaminated sites are directly adjacent to the Chena River and include soils around landfills, drum storage and disposal, areas around pipelines and fuel-loading facilities. The segment of the Chena River from the mouth to Fort Wainwright was added to the Alaska 1994 Clean Water Act (CWA) section 303(d) list of petroleum hydrocarbons/oil and grease and sediment by the ADEC (Gilder 2011). Clean up in the mid-1990s by the US Army led to the Chena River meeting water quality standards, resulting in removal from the list for hydrocarbons/oil and grease in 2010; however as of 2011 it remained on the list for sediment (Gilder 2011).

As much as 50% of the Chena River Basin is underlain by permafrost (USACE 1993 as cited in Talbot et al. 2006) and bogs and sloughs are common throughout the watershed. Many vegetative communities are represented throughout the watershed including: willow, herbs, white and black spruce, balsam poplar, aspen, tamarack, dwarf birch, feather moss, prickly rose, mosses lichens, Labrador tea, wildflowers, high and low bush cranberries, blueberries, cloud berries, raspberries, and currants (Talbot et al. 2006).

The Chena River supports one of the largest Chinook salmon populations in the Alaska portion of the Yukon River drainage, with an average return of over 4,800 fish from 2004-08 (Brase 2009). All Chinook salmon spawning is thought to occur above the Moose Creek dam (Brase 2009). Other fish species present in the Chena River are chum salmon, Arctic grayling, burbot, round whitefish, humpback whitefish, longnose sucker, slimy sculpin, lake chub, Arctic lamprey, Alaska blackfish, sheefish, least cisco, and northern pike.

The watershed has important breeding habitat for 93 species of birds and 35 other species are found during spring and fall migrations (Talbot et al. 2006). Waterfowl, shorebirds, raptors, and songbirds are represented (Talbot et al. 2006). Mammals present in the watershed include moose, wolf, coyote, Northern flying squirrel, red squirrel, snowshoe hare, beaver, mink, red fox, and lynx (Talbot et al. 2006).

Chena Slough

The Chena Slough is located in T1S, R1E, sections 11-14, and R2E, sections 18-20, 29, 32 and 33. Chena Slough itself is a small tributary of the Chena River, which is a major tributary of the Tanana River which flows into the Yukon River. The slough is fed by groundwater and runoff, originating south of North Pole, and drains into the Chena River. Chena Slough has been heavily modified over the years to prevent flooding in Fairbanks and ensure safe fish passage (Williams 1950, Neill et al. 1984, Ihlenfeldt 2006). Originally a swift-flowing channel connecting the Tanana to the Chena River, the Chena Slough was dammed by the Moose Creek Dike in 1945 to prevent flooding in downtown Fairbanks. After the catastrophic flood of 1967, many bridges and fish passage culverts on the Slough were hastily replaced. Construction of the Chena Lakes Flood Control project in the 1970s further reduced flow into the Slough. Restoration of fish passage in Chena Slough is ongoing, with 7 culverts replaced since 2000 (Ihlenfeldt 2006).

Chena Slough is heavily urbanized and flow has been minimized to reduce downstream flooding in Fairbanks. Houses abut virtually the entire length of the slough. This has led to a suite of problems including urban runoff and septic leakage. These in turn have led to increased growth of aquatic vegetation and eutrophication, leading to thick deposits of organic mud and increased suspended debris (Dion 2002). Increased emergent and terrestrial vegetation has also encroached on Chena Slough (Dion 2002). In addition, sediment and water have become impounded upstream of many road crossings (Chena Slough Technical Committee 2005). The actual ownership boundaries of the Chena Slough basin are under some dispute. Because the water course has narrowed so much in the last 50 years, there is disagreement between private property owners along the slough banks and the State of Alaska on where the property boundaries are. The Fairbanks – North Star Borough plat maps treat this issue inconsistently (C. Everett, personal communication, March 14, 2011).

Today Chena Slough is approximately 17 mi in length and runs from the city of North Pole to the Chena River, 5 mi east of Fairbanks, with the watershed encompassing approximately 26 mi^2. The land is relatively flat with a 16 ft elevation difference between the headwaters and the confluence with the Chena River. Most of the channel is 65-99 ft wide and 3 ft deep, and the gravel streambed is overlain with a thick layer of organic mud (Dion 2002). Current stream flow is mainly from ground water upwelling from the Tanana Aquifer (Dion 2002) supplemented by runoff from roads and drainage ditches (Tetra Tech 2011, Hydraulic Mapping & Monitoring 2013). Some portions of Chena Slough remain open during the winter due to groundwater, making breakup on the river occur earlier and often well before the Chena River.

Much of the area between Chena Slough and the Richardson Highway is periodically flooded. In 2002, aquatic vegetation in the slough consisted of *Hipparus vulgaris, Potomageton alpinus, Sparganium* sp., and *Ranunculus aquatilis* (Dion 2002). (No *Elodea* was found when Dion did her 2002 survey, but she did not sample the entire slough systematically.) Diatoms, *Nostoc* sp., and filamentous algae are also present (Dion 2002).

Chena Slough was recognized in the 1990s as a world-class catch-and-release sport fishery for Arctic grayling that provided important spawning and rearing habitat for Arctic grayling (Dion 2002). Other fish species documented in the slough include Chinook salmon, chum salmon, northern pike, round whitefish, Arctic lamprey, Alaska blackfish, long-nose sucker and slimy sculpin (Ihlenfeldt 2006). Beavers, muskrat, and waterfowl also use the Slough (Kennedy and Hall 2009). Planktonic organisms include copepods, daphnids, ostracods, Ephemoptera, Plecoptera, and Tricoptera (USACE 1997). In 1997 it was estimated that 30 to 50% of the arctic grayling in the entire Chena River system were spawned in Chena Slough (USACE 1997). Though the Alaska Department of Fish and Game has not released data on Chena Slough alone, mean annual grayling catch in the Chena River below Moose Creek Dam (combined with Chena Slough and Noyes Slough) declined between 2000 and 2010 (ADFG 2016).

Chena Lake

Chena Lake has a surface area of 234 acres and a maximum depth of 38 ft. Chena Lake is located in T1S, R3E, section 31 and T2S, R3E, section 6. The lake is fed by groundwater and has no above-ground outflow. Chena Lake is located 17 mi east of Fairbanks on the Richardson Highway, 3 mi from North Pole, on the Tanana Lowland which is a wide floodplain underlain by thick beds of stratified gravels. The lake is a borrow pit that was rehabilitated in 1984 and has been designated as a Fairbanks North Star Borough Recreation Area. Local residents and visitors commonly use this area for non-motorized boating and fishing.

Spruce, tamarack, and birch forest surrounds the lake (ADFG 2011). Open land, marshes and sloughs also provide habitat (ADFG 2011). Several native and non-native terrestrial plants were introduced for re-vegetation and to control erosion from 1977-79 (Johnson et al. 1981).

Chena Lake has been stocked by Alaska Department of Fish and Game with Rainbow trout, Silver salmon, and Arctic char since 1982 (FNSB 2011). Goldeneye ducks, grouse, moose, beaver, red fox, brown bear, kestrels, kingfishers, ospreys, shorebirds, swallows, muskrat, otter, mink, woodpeckers, rough-legged and sharp-shinned hawks, northern harriers, songbirds, mice, voles, hares, squirrels, lynx, wolves and black bears are all found in the surrounding area (ADFG 2011).

Totchaket Slough

Totchaket Slough is a 7-mile long clear water stream that enters the Tanana River 12 river miles downstream of the city of Nenana. The slough is located in T1S, R8W, section 32 and

T2S, R8W, sections 5, 8, 17, 20, 29. The catchment area of the slough is approximately 5265 acres. It is a slow flowing stream that supports a dense population of submersed plants. The slough has a narrow riparian corridor composed largely of alder and willow. The upland habitat consists of mixed deciduous trees and large white spruce. A narrow wetland dominated by *Equisetum fluviatile* exists on the lower 0.5-mile stretch of the river.

The slough supports pike and a wide array of waterfowl species. It is an important slough for subsistence users in Nenana, who frequent the slough to harvest pike, moose and waterfowl. The surrounding land is primarily owned by the state, with a large portion held by Toghotthele, the Nenana Native Corporation, and Minto Native Corporation. The slough can be accessed via boat from the Tanana River.

VI. Review of Management and Treatment Options

In 2010, shortly after the discovery of *Elodea* in Chena Slough, a steering committee and several action committees were formed to address the threat. A control options subcommittee evaluated the relative merits, drawbacks, feasibility, and costs of a wide range of options to manage and eventually eradicate *Elodea* in Chena Slough (Beattie et al. 2011). Engineering options such as drawing down the water level in the slough, mechanical options such as hand pulling, installation of benthic barriers, mechanical harvesting, and chemical methods using aquatic herbicides were considered.

Treatment Options

Option A - Take No Action

The no action alternative would maintain the status quo and *Elodea* populations would remain in all three Fairbanks-area waterbodies. All monitoring and education efforts would be halted. No methods of containing the spread of *Elodea* would be attempted, and the existing infestations would be left uncontrolled.

The infestation in Chena Slough has a high risk of spreading to other locations because of its connectivity to downstream river systems and the wide array of users who could potentially transport *Elodea* fragments to other waters. Similarly, the Totchaket Slough infestation is upstream of many potentially susceptible waters. Spread of *Elodea* could be very detrimental to the ecological and recreational values of water bodies throughout the region due to the prevalence of vectors of transport, thus, the no action alternative is not a viable alternative.

Option B - Mechanical/Physical methods

In 2013 and 2014, the Elodea Steering Committee and its members investigated the efficacy of mechanical and manual control methods for *Elodea* in Chena Slough.

Suction dredging and manual raking

These trials were conducted by Fairbanks Soil and Water Conservation District (FSWCD) in conjunction with partners from Test the Waters Dive Shop. The suction dredging

system consisted of a sluiceway box with an attached intake hose and dredge motor mounted on top of a pontoon boat. In shallow areas teams of volunteers used spaded pitchforks to remove *Elodea* in 65.6 ft X 65.6 ft quadrats. After two seasons of suction dredging and raking trials, it was determined that the system could be improved by increasing dredge flow rate, and increasing motor horse power. However, the main bottleneck in the process is the capacity to remove bagged *Elodea* and transport it off the work site. Suction dredging and raking were found to be extremely labor-intensive, taking approximately 400 hours of labor for 1 acre of removal (Lane 2014). In addition, these methods inevitably result in large scale fragmentation of *Elodea*, making downstream collection of fragments a major challenge. While suction dredging may be a good tool for removing small patches of *Elodea*, it is unlikely to be an effective means of complete eradication in large infestations such as the ones in Chena Slough, Totchaket Slough and Chena Lake.

Other mechanical methods

Several other mechanical methods were discussed, but had the major disadvantages of prohibitive costs of machinery (harvesting, rotovation/cultivation), excessive fragmentation (rotovation/cultivation, harvesting, hydraulic jets) or excessive sediment disturbance (rotovation/cultivation, hydraulic jets). See Beattie et al. (2011) for further discussion.

Drawdown

A drawdown of waterbodies can be an effective way to kill aquatic plants. However, water bodies need an existing drain for this to be possible. Chena Slough is fed by a highly transmissive aquifer, as is Totchaket Slough. Any water drained out would be swiftly replenished, making a drawdown infeasible. Similarly, Chena Lake lacks a drain, and moreover, engineering the Lake system to be drained would be prohibitively expensive.

Benthic barriers

The installation of bottom barriers - material blocking light from reaching the plants, while still allowing decomposing gases to surface - is typically used in shallow areas near docks and shores, and is effective at reducing plant biomass without creating fragments. For the size of the infestations in all three waterbodies, the cost of using benthic barriers would be prohibitive, and the infestations are too dense to be effectively treated by this method. Additionally, benthic barriers have the disadvantage of creating an anoxic environment beneath the barrier, impacting native benthic organisms. Complete eradication of *Elodea* is impossible with this method.

Option C – Treatment with aquatic herbicides

Elodea has been found to respond to a limited number of herbicides including fluridone, diquat, terbutryne, copper sulphates or chelates of copper, and paraquat (Bowmer et al. 1995). See Table 1 for the specifics of herbicide options.

Fluridone and diquat dibromide have been found to be effective herbicides for treating *Elodea* (DiTomaso et al. 2013). Fluridone is a selective systemic herbicide that ultimately kills the entire plant and can result in eventual eradication, whereas diquat is a non-selective, fast-acting contact herbicide that kills only aboveground biomass and does not result in eradication.

As a systemic herbicide, fluridone would travel through the vascular tissue of the affected vegetation and kill the root system as well as any above sediment biomass. Fragmentation would not occur, and complete eradication is possible. Fluridone is not highly toxic to fish or aquatic invertebrates. There are no water use restrictions for drinking, fishing, or swimming following an application of fluridone (USEPA 2004). Fluridone is strongly adsorbed to organic matter in soil, meaning that it does not easily move with water through a soil column (Muir et al. 1980).

Diquat is a contact herbicide, and its use would serve to reduce biomass of *Elodea*. The main advantage of this product is that it requires a relatively short contact time (around 4 hours) to be effective (Emmett 2002; Glomski et al. 2005). Diquat is slightly toxic to fish, but is rapidly removed from the water column. The strong chemical bonds formed by diquat adsorption to soil particles make the herbicide biologically and chemically inactive within 10 to 14 hours. Diquat alone would not eradicate *Elodea*, but its use in conjunction with fluridone could be more effective than fluridone alone.

Proposed management method:

Due to the density and distribution of the infestations near Fairbanks, as well as the threat that is posed to downstream aquatic ecosystems, the steering committee has chosen to pursue the use of herbicides to eradicate *Elodea*. Several aquatic herbicides that area used for aquatic plant management were considered as a means of treating the Elodea infestations in interior Alaska (Table 1). Fluridone (Sonar™) was selected based on: 1) USEPA approval for use in aquatic ecosystems, 2) the low risk posed to the environment, wildlife, and human health and safety, 3) its efficacy in treating aquatic plants at extremely low dosage, including long-term residue monitoring studies by USEPA, SePRO Corporation, as well as non-governmental, and non-industry entities, 4) DEC approval of several different formulations including liquid and time-released pellets, and 5) its demonstrated effectiveness in selectively eliminating Elodea from water bodies in other areas of the state (Anchorage and Kenai Peninsula). For these reasons, and the unfeasibility of mechanical and manual efforts in treating large infestations, the Fairbanks Elodea Steering Committee intends to pursue the use of chemical herbicides to treat the Chena Slough, Chena Lake, and Totchaket Slough infestations. The Chena River infestation will be treated using diver-assisted suction dredging.

The Elodea Steering Committee proposes to use fluridone (three formulations: Sonar Genesis™, Sonar One™, and SonarH4C™) to manage the Chena Slough, Chena Lake, and Totchaket Slough infestations. Information on diquat is included in this document for reference purposes only, so it can be considered for future use if needed.

Herbicidal treatment of *Elodea*:

Fluridone

(The following is from Morton et al. 2014)

Fluridone has been used successfully to manage *Elodea* in the Lower 48 (Dr. Lars. Anderson, UC-Davis, pers. comm.). Fluridone is a selective systemic aquatic herbicide which inhibits the formation of carotene, a plant pigment, causing the rapid degradation of chlorophyll by sunlight, which then prevents the formation of carbohydrates necessary to sustain the plant. Adequate concentrations must be maintained (albeit at very low concentrations) in the treated area for 45-90 days after the initial application, which is determined through periodic water monitoring.

Fluridone is a tan to off-white odorless crystalline solid, chemically formulated as 1-methyl-3-phenyl-5-[3-(trifluromethyl)phenyl]-4(1*H*)-pyridinone, and is applied as either a pellet or liquid (Bartels and Watson 1978, McCowen et al. 1979). Sonar by SePRO Corporation is a commercially available herbicide used to selectively manage undesirable aquatic vegetation in freshwater ponds, lakes, reservoirs, rivers, and canals. Sonar is currently approved for use by the Alaska Department of Environmental Conservation in five different formulations: two aqueous suspensions known as Sonar AS (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).

Fluridone may be applied to an entire water body (whole-lake) or on smaller infestations within a water body (partial-lake). In the former case, fluridone is generally applied as a liquid by boat through surface or underwater drip equipment depending on the size and distribution of necessary treatment areas. In the latter case, fluridone is typically applied as time-release pellets. A targeted, partial-lake treatment will result in less herbicide to the lake, reduced treatment costs, and fewer non-target impacts. In both cases, application will take place under appropriate conditions for boating, avoiding conditions of high wind, water flow, or wave action. The herbicide will be applied following all directions on the EPA approved label and will not exceed the maximum cumulative concentration (150 ppb).

Complete eradication with fluridone products generally require treatment of 45—90 days per growing season for two or more growing seasons. The ideal time for treatment is shortly after ice out (late May, early June) when plant biomass is low, turbidity is low, water volume is low, and the plant is actively growing.

Fluridone effect on *Elodea*

Fluridone is a slow-acting systemic herbicide used to control *Elodea*, hydrilla, Eurasian watermilfoil and other underwater plants. Like other systemic herbicides, fluridone is absorbed from water by plant shoots and from the hydrosoil by the roots of aquatic vascular plants (Marquis et al. 1981, Westerdahl and Getsinger 1988). The susceptibility of a plant to fluridone is associated with its uptake rate and rate of translocation. Fluridone interferes with the synthesis

of RNA, proteins, and carotenoid pigments in plants, and disrupts photosynthesis of targeted plants. Production of carotene is inhibited, preventing carbohydrate formation that is necessary to sustain the plant. Fluridone symptoms on submersed aquatic plants appear as progressive albescence of young leaves followed by leaf necrosis, initially appearing 3—6 days after application (McCowen et al. 1979), but requiring 45—90 days for optimal lethality. Eventually, aquatic plants gradually sink to the bottom and the amount of open water increases (McCowen et al. 1979). Fluridone does not affect water quality parameters such as pH, dissolved oxygen, color, dissolved solids, hardness, nitrate nitrogen, total phosphates, and turbidity (McCowen et al. 1979).

Although fluridone is considered to be a broad-spectrum herbicide, when used at very low concentrations, it can be used to selectively remove *Elodea*, which is considered highly susceptible to the effects of fluridone (McCorkelle et al. 1992). Some native aquatic plants, especially emergent plants, are minimally affected by low concentrations of fluridone (NYSFOLA 2009). At higher concentrations, fluridone controls a broad spectrum of annual grass and broadleaf weeds, but not algae (Bartels & Watson 1978, McCowen et al. 1979, Marquis et al. 1981). Fluridone has been field tested on a variety of invasive or non-native aquatic plants including salvinia, bladderwort, Eurasian watermilfoil, coontail, pondweeds, cattail, horsetail, duckweed, fanwort), vallisneria, water hyacinth, hydrilla and *Elodea* (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. Field tests in mixed invasive and native submersed 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 submersed aquatic vegetation, and increases in size and abundance of native fish populations (Schneider 2000).

Fluridone degrades on exposure to sunlight (photolysis), adsorption to sediments, and absorption by plants. In partially-treated water bodies, dilution reduces the level of the herbicide more rapidly following application. In field studies, the concentration of fluridone (in various formulations) decreased logarithmically with time after treatment and approached zero detectable presence 64—69 days after treatment (Langeland and Warner 1986). In other studies, fluridone levels decreased rapidly to a value below detection limits after 60 days in various parts of the water column, with a half-life ≤ 7—21 days (Kamarianos eta al. 1989, Osborne et al. 1989, Muir et al. 1980, McCowen et al. 1979). Fluridone can persist in hydrosoils (sediments) with a half-life exceeding one year (Muir et al. 1980).

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 doses for short periods of time) and chronic (long term exposure) studies on animals (USEPA 1986). Fluridone has been tested in both acute and chronic studies, as well as studies to examine genetic, cancer,

and reproductive effects. Fluridone was not shown to result in the development of tumors, adverse reproductive effects or offspring development, or genetic damage. Fluridone has been tested extensively on target aquatic invasive plants, as well as in long-term residue monitoring studies in treated waters.

The USEPA has approved the application of fluridone (Sonar^{TM}) 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) (USEPA 1986). For comparative purposes, 150 ppb is well below the 560 ppb set by USEPA as the maximum contaminant level (MCL). Sonar applications are allowed within one-fourth mile (1,320 feet) of a potable water intake at concentration equal to or less than 20 ppb, according to the label information. The target concentration for Chena Slough is 4-8 ppb. However, fluridone binds tightly to organic material; once applied, it is detectable only in the top 2-3 inches of sediments (Muir et al. 1980), and does not reach groundwater. Label restrictions on application near drinking water are precautionary. Human contact to fluridone may be through swimming in treated waters, drinking water from treated waters, by consuming fish from treated waters, or by consuming meat, poultry, eggs, or milk from livestock that were provided water from treated waters. There are no USEPA restrictions on the use of fluridone-treated water for swimming or fishing when used according to label directions (USEPA 1986).

The maximum non-toxic dose is characterized by the "no-observed-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 Sonar) is approximately 8 milligrams of Sonar per kilogram of body weight per day (8mg/kg/day). A 70-kg (150 lb.) adult would have to drink over 1,000 gallons of water containing the maximum legal allowable concentration of Sonar in potable water (150 ppb) every day for a significant portion of their lifetime to receive an equivalent dose. A 20-kg (40 lb.) child would have to drink approximately 285 gallons of Sonar treated water every day to receive a NOEL- equivalent dose. The risk therefore is negligible even if a human were to accidentally ingest water directly after Sonar treatment. As Sonar is only applied intermittently and in limited areas, and because it swiftly degrades 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 duck), insects (honey bee, amphipods, daphnids, midge, chironomid), earthworms, fish (fathead minnows, catfish, mosquitofish, rainbow trout), and other aquatic animals (Hamelink et al. 1986, Kamarianos et al. 1989, Muir et al. 1982, McCowen et al. 1979).

Exposure of test animals dermally (skin contact) has shown minimal toxicity to mammals by acute, concentrated contact. Chronic dermal exposure in mammals showed no signs of toxicity and slight skin irritation. Mammals were shown to excrete fluridone metabolites within 72 hours of varying doses of up to 1400 ppm/day (McCowen et al. 1979). A dietary NOEL was established for birds that may feed on aquatic plants or insects in treated waters. The risk to birds via diet was considered negligible. The acute median lethal concentrations of fluridone were 4.3 +/- 3.7 mg/L for invertebrates and 10.4 +/- 3.9 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. 1986, 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 mammal tissues. Irrigation of crops using water treated with fluridone lead to only 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 the livestock can be watered immediately from Sonar-treated water. The tolerance for milk is the same as for water (0.15 ppm).

Fluridone effects on non-target vegetation

The desired outcome of fluridone treatment is the eradication of *Elodea*, but native submersed aquatic plants will be impacted as well. Madsen et al. (2002) evaluated non-target plant effects in three lakes in southern Michigan that were treated with low-dosages of fluridone (Sonar AS®) to control Eurasian watermilfoil. Despite achieving >93% reduction in the frequency of watermilfoil, native plant cover (composed mostly of *Ceratophyllum demersum, Chara* spp., *Heteranthera dubi, Potamogeton* spp., and *Vallisneria 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 lack of chlorophyll) usually recover within the year of treatment or become re-established within the following year (Kenaga 1992).

Fluridone can persist for months (over the winter) in the water column when applied in autumn due to lower water temperatures and low light levels. This attribute has led managers in places where lakes freeze over to apply fluridone in the fall in the Midwest (WADOE 2002), allowing for longer exposure periods.

In Chena Slough and Chena Lake, *Elodea* grows both alone in monotypic stands and in mixed assemblages with other native aquatic plants as the dominant species. At the proposed low rates of application (leading to total concentrations of ≤150 ppb) fluridone is expected to be lethal only to *Elodea*. The aquatic plant community is expected to shift back to one comprised entirely of native species. There may be a time period during which *Elodea* is decaying that light and dissolved oxygen may be temporarily reduced. As the plant material continues to decay, water clarity and dissolved oxygen as well as nutrient levels are expected to return to normal water quality levels.

Diquat

The current treatment prescriptions for Chena Slough, Totchaket Slough, and Chena Lake include the use of fluridone only. As this treatment program unfolds, the steering committee may

consider the use of diquat in targeted locations where aquatic vegetation biomass is very high. Diquat can be used in such circumstances to reduce plant biomass, and thereby increase the efficacy of the subsequent fluridone application. The requisite permitting and NEPA process will be carried out for diquat, and detailed prescriptions will be added to update the current plan.

Diquat is considered a moderately toxic material, labeled with the USEPA signal word "warning" (USEPA 2002). Diquat exhibits low acute toxicity via oral and inhalation exposure, but has moderate to severe acute toxicity by dermal exposure. Humans drinking water containing diquat in excess of the maximum contaminant level (MCL) over many years could get cataracts. Diquat can cause eye irritation, and can cause serious burns and scarring of the cornea (Sax 1984). Diquat may be harmful to the gastrointestinal tract, kidneys, and liver of mammals, causing severe congestion and ulceration of stomach and gastrointestinal tract (Gosselin et al. 1984).

Diquat is not known to cause genetic changes and is therefore not considered a mutagen in acute tests with mice. Diquat does not cause tumors in rat studies both acute and chronic. Tests have been conducted on mice, rats, guinea pigs, rabbits, dogs, and cows (Cochran et al. 1994, Hayes and Laws 1990). Diquat causes cataracts in dogs and rats, and developmental effects in rats and rabbits (Cochran et al. 1994). Oral diquat doses are metabolized mainly in the intestines with excretion in feces, in tests with rats, hens, and cattle. Minute traces (0.004—0.015% of oral doses) of diquat were found in cow milk, and cows are considered sensitive to diquat exposure. Diquat is considered moderately-toxic to practically-nontoxic to birds, depending on the species. In mallards, acute toxicity (LD50 or lethal dose fifty in which half of the subjects are killed with that dose) was 564 mg/kg. For domestic hens, oral LD50 was 200-400 mg/kg, for rats 120/mg/L, for mice 233 mg/kg, and 188 mg/L in rabbits. Chronic exposure at the 4-week no-observed-effect-level (NOEL) for increased relative liver weight in rats from dietary exposure to diquat was 7.2 mg/kg-day (Cochran et al. 1994).

Diquat is slightly toxic to fish. The lethal concentration fifty (LC50, in which half of the experimental subjects are killed when exposed to that concentration) was 12.3 ppm for rainbow trout and 28.5 in Chinook (king) salmon at eight hours, and 16 ppm at 96 hours for northern pike and 20.4 ppm for fingerling trout. Some species of fish may be harmed but not killed by sublethal levels of diquat, including suffering respiratory stress (yellow perch) (Bimber et al. 1976). There is no bioconcentration of diquat in fish. Diquat is toxic to aquatic invertebrates, which display varying levels of sensitivity. Diquat has shown to be 300 more times toxic to amphipods than mayfly, with caddisfly, damselfly, and dragonfly less sensitive in that order (Nicholson and Clerman 1974, Wilson and Bond 1969).

The MCL is 0.02 milligrams per liter (mg/L) or 20 ppb for diquat (USEPA 2002). Diquat residue studies suggest that diquat is not persistent in water, as it binds to suspended particles in the water, which are then taken up by plants. The half-life is less than 48 hours in water. Affected plants decompose and release diquat, which is then degraded by microbes, photodegraded by sunlight (within 1 to 3 weeks), or adsorbed to sediment particles. Adsorbed

sediment diquat is also degraded by microbial activity, although diquat has been found in the bottom soil of pools and ponds four years after application. Adsorption rates are highest in loam, sandy clay loam, and sandy loam (Cochran et al. 1994). Granular activated carbon can be used to remove diquat to below MCL.

At its maximum application rate of 2 gallons per surface acre, the Littora® (a formulation of diquat) label for Landscape and Aquatic Herbicide specifies the following water use restrictions after treatment: 0 days for fishing and swimming, 1 day for consumption by livestock and domestic animals, 3 days for drinking, and 5 days for irrigating food crops and production ornamentals. The Restricted Entry Interval for this product is 24 hours.

VII. Proposed Treatments

- **Mechanical Control**

Chena River

Diver-assisted suction dredging will be implemented to remove any isolated patches of *Elodea* occurring in the Chena River. In 2015 Test the Waters conducted dive searches for *Elodea* in the Chena River, from the mouth of the Chena River to the mouth of Chena Slough. Throughout this section of the river, divers dove from 3 ft to the middle of the river to search the river bed for the plant, and visual searches were simultaneously conducted from shore. Only one live rooted patch of *Elodea* was found located at 64.839853, -147.849821 near the Tanana Chief Riverboat. Follow-up surveys to detect potential regrowth in this patch, or new patches of *Elodea* will be conducted in 2016 and on an ongoing basis. The suction dredge will be used to remove any patches of *Elodea* that are found in the river. The suction dredging activities have been permitted by the U.S. Army Corps of Engineers, and meet the non-reporting requirements for Nationwide Permit 27- Aquatic Habitat Restoration, Establishment and Enhancement.

- **Herbicide treatments**

The herbicide treatment prescriptions for all three water bodies were formulated in consultation with aquatic herbicide specialists from SePRO Corporation.

Chena Slough

We propose to treat a 118-acre section of Chena Slough from the vicinity of Plack Road to the mouth of the slough. Pelleted and liquid formulations of fluridone will be applied in Chena Slough over a 3 – 4 year period starting in spring 2017 (Table 2). The pelleted formulation leads to a slower herbicide release, with later liquid treatment maintaining the target concentration. The use of SonarH4C (pellets, 2.7% active ingredient) is proposed for use in Chena Slough. This pellet has a lower percentage of active ingredient than SonarOne, and will be used in order to more thoroughly cover the areal surface of the slough, and make sure pesticide is present in the many backwater areas. Two treatments (spring and summer) of SonarH4C are proposed in each

year of treatment (2017 – 2020). Sonar would be applied at the rate of 25 – 70 ppb in the spring and 25 – 50 ppb in the summer treatment. In addition, we propose a drip treatment of SonarGenesis (liquid) over a 12-week period in each year of treatment (Table 3). The injection station will be installed on private property upstream of the infestation, close to where Plack Rd crosses the slough. This liquid formulation will be administered via a liquid herbicide injection system (Fig. 6). This combination of Sonar pellets and injection of SonarGenesis would maintain an in-water concentration of 4 – 8 ppb of fluridone during the 12-week treatment period.

Chena Slough contains backwater areas that will be inspected during each application period for presence of *Elodea*. Many areas may require the application of SonarH4C or SonarGenesis via a backpack sprayer or small pellet spreader mounted to a barge or airboat. This would ensure coverage of all plants within the slough.

To prevent the spread of *Elodea*, a boom to catch fragments will be installed where the Slough enters the Chena River. There will be a series of two nets in the water channel (near the mouth of each slough), each of which will extend half way across the channel, and will extend to approximately 60-75% of the depth of the channel at that point. A multi filament seine net (mesh size 33 mm) will be hung from a buoyant boom, and there will be lead weights attached to the bottom of the net, allowing it to hang suspended in the water channel. The only points of contact with the substrate will be an anchor for a single guideline to fasten the net to the substrate, for each of the two nets, and three of the lead weights (per net) will go to the bottom. This construction would allow fish passage (the fish can swim around or under the nets), and boat movement (boats can maneuver around the nets). There will be orange markers on the boom, and an orange buoy fastened to the end of each net, in addition to signage posted upstream to notify boaters. The booms will be periodically cleaned throughout the season, and the adhering plant material transported to an upland location to be buried.

Chena Lake

We propose to conduct a whole lake treatment in Chena Lake (234 acres) (Table 3). *Elodea* cover was surveyed at seven points along the perimeter and at one point on an island in Chena Lake in 2011 (Fig. 4). Two applications of SonarOne (pellets) are proposed in the first year of treatment, in the spring and summer (Table 3). The pelleted formulations will be delivered using a granular spreader mounted on a boat (Fig. 8). One application of SonarGenesis (liquid) is proposed in the spring. During successive years of treatment a single follow up treatment of SonarOne is proposed. The projected time for treatment of the Elodea infestation in Chena Lake is 2- 3 years. FasTEST samples to monitor concentrations of fluridone in the water will be collected four times a year at 4 locations in the lake. Surveys to monitor *Elodea* density will be conducted by boat annually.

Totchaket Slough

We propose to treat the whole of Totchaket Slough, which covers an area of 232 acres (Table 4). Pelleted (Sonar ONE) and liquid (Sonar Genesis) formulations of fluridone will be applied to the slough over a 3 year period. In each year of treatment we propose three applications (spring, summer, and fall) of Sonar ONE pellets. We propose to apply Sonar ONE at the rate of 30 ppb in the spring, and 20 ppb during the summer and fall treatments. We propose to apply Sonar Genesis at the rate of 5 ppb during the spring treatment. The combination of Sonar pellet applications and application of Sonar Genesis are designed to maintain an in-water concentration of Sonar of 4 – 8 ppb during the 12 week treatment cycle. Water samples for FasTEST analysis will be collected at 3 locations along the slough 5 times per year.

Pesticide Application Procedures

First, a detailed investigation of the accessibility of different areas of the infested water bodies will be conducted, and specific application methods depending on the nature of the area will be detailed. SePRO Corporation will be contracted to manage the pesticide application in all three treatment areas. All materials and pesticide application equipment will be transported to the site by truck or boat. Pesticide dispersal will be made directly into the lake or slough by DEC-certified applicators from outboard motorboats or along shorelines. Boats will be equipped with delivery systems for liquid (SonarGenesis) or pellet (SonarH4C and SonarOne) herbicide to the water.

Pellet application: In accessible areas, pelleted herbicide will be applied using a forced air blower system mounted on a motorboat. The blower system will be calibrated using clay pellets with the same size and weight as the herbicide pellets. A set weight of training pellets will be passed through the blower to measure the time required to deliver the pellets, and this will be repeated several times to obtain an average. That information will be used to determine the time required to deliver the full prescription to the treatment area. Application routes will be determined based on swath width of the blower and programmed into the onboard GPS equipment. These swaths will be followed by the operator of the application vessel. The speed will be determined by the amount of time required to deliver the prescribed weight of pellets to the treatment area. Shoreline applications of pellet herbicide will be made by hand in areas that are not readily accessible by boat. Calibrated hand spreaders will be used by applicators to distribute pelleted herbicides in areas with low water levels, or areas with thick emergent vegetation.

Liquid Application: Liquid herbicide will be applied using a pump connected to weighted hoses mounted on a motorboat in Chena Lake. A forked intake line will draw lake or slough water and herbicide separately to be mixed and applied to the treatment area. The intake line that will draw herbicide will be metered. The intake rations will be calibrated by running both intakes with untreated water to determine the mix ratio (gallons of water: gallons of herbicide). That

ratio is combined with the pump discharge rate to determine the volume of herbicide being discharged per minute. Application routes will be determined based on swath width, programmed into the onboard GPS equipment, and followed by the operator of the application vessel.

The herbicide injection system to be installed in Chena Slough is a holding tank of herbicide with a small hose fed into the water, secured in a locked utility box (Fig. 8). The herbicide application is metered out via a peristaltic pump. Application rates can be adjusted in real time via a secure landline. Permission for placement of an injection system has been secured on private property for Chena Slough.

The goal is to maintain a concentration of herbicide that is lethal to Elodea in the treatment area for 45-90 days. See sampling protocols under 'monitoring'. If mean fluridone concentrations fall below 75% of the target amount for two consecutive samples, then supplemental fluridone will be added. Fluridone applications will not exceed 150 ppb in one year).

All applicators will be AK-DEC certified, and will act in accordance with all EPA label instructions. Applicators will review all safety procedures for pesticide application, including the treatment procedure for accidental exposure. As per the labels, gloves and eye protection are required to apply Sonar. In the case of diquat, applicators will wear all recommended personal protective equipment (PPE) to prevent contact including coveralls, chemically resistant gloves, footwear, goggles, and apron. Face shields or goggles will be worn for loading, mixing, clean up, repairs to equipment, or maintenance. Applicators will follow all procedures to prevent unintended exposure to the chemicals. Clean-up and equipment storage will follow all recommended procedures. There will be no eating or drinking by the applicator during application of the herbicide.

Applications of fluridone in Chena Lake and Chena Slough will take place under appropriate conditions for boating, avoiding conditions of high wind and water flow. Storage of any unused product will be in the original containers, in an appropriately secure facility (Fairbanks Fish and Wildlife Field Office, 101 12th Ave., Fairbanks, AK 99701), to ensure that no unintentional exposure to humans, animals, or the environment occurs (ADEC 2013). Warning signs for pesticide storage (in accordance with 18 AAC 90.615(e)) will be posted (ADEC 2013). Emptied containers will be triple-washed, punctured, and crushed on site immediately after use (CDTSC 2009). These containers will later be appropriately discarded in the landfill.

VIII. Monitoring and Assessment

All attributes will be assessed pre-treatment, during treatment, and post-treatment in Chena Slough:

Non-target attributes:

1. Water quality
2. Fish and aquatic invertebrates
3. Aquatic plants other than *Elodea*

Target attributes:

4. Presence of *Elodea*
5. Concentration of fluridone

The Sample Reach

The upper reach of documented *Elodea* presence in Chena Slough is downstream of the Plack Road crossing over Chena Slough (Fig.10). Within this reach, sample collection sites will occur below the Mission Road intersection downstream to the Plack Road intersection, with a total of four possible sample reaches. In the lower reach, including and downstream of the Plack intersection, there are a total of five intersections that can be used for sample collection sites. Water quality sample sites will be throughout the entire Chena Slough reach (above *Elodea* presence as well as below) to document the range of values prior to, during and after herbicide application. Three sample reaches for aquatic invertebrates and juvenile fish will be chosen based upon other site characteristics, based upon the presence of riffles and adult Arctic grayling. Aquatic vegetation will be sampled throughout the same sample reaches where water quality parameters were collected.

Sites

Sites for water quality and biological sampling established during a field visit on May 22, 2015.

SITE NUMBER	DESCRIPTION
CS-1	Mission Rd
CS-2	Airway Rd and Badger
CS-3	Plack Rd and Badger
CS-4	Peede Rd and Badger
CS-5	Persinger Rd

Water Quality

The following water quality parameters will be measured before, during and after the use of herbicides in the Chena Slough: pH, DO, turbidity, conductivity, and temperature. Water quality measurements will be taken at five sites from Mission Road to Persinger Road (see Sites above). In addition, dissolved oxygen will be monitored during three 24-hour periods to examine natural daily fluctuations in dissolved oxygen. All measurements will be taken in-situ with a handheld multi-meter and turbidimeter.

Fish and Aquatic Invertebrates

Five drift nets will be stationed below riffle sections so that flow coming off of the riffle will pass through the drift net. Nets will be set for 1 hour during which time the depth and flow at each drift net will be measured. Nets will be emptied into a white pan and the contents sorted through looking for juvenile fish. Any juvenile fish found will be counted, identified, measured and released. The remaining sample will be emptied into a labeled Nalgene bottle, covered with 80% denatured ethanol and stored until samples can be sorted, and aquatic invertebrates are counted and identified. Each late May, early July, and mid-August there will be samples collected from five sample sites for a total of 15 samples. Samples will be collected in 2015 (pre-treatment), 2016-2018 (during treatment) and in 2019 (post treatment).

Native Aquatic Plants

A late season survey will be conducted from Mission Road intersection down to near the Persinger intersection for aquatic plant composition. The plan is to sample when plants are at the peak of their growing season and before senescence. A throw rake will be thrown at randomly selected locations within a sample reach. Each sample capture will be examined for plant species, number, and condition.

Presence of *Elodea*

The three targeted infestations (Chena Slough, Chena Lake and Totchaket Slough) will be annually revisited to monitor for regrowth of *Elodea*. Additionally, continued surveying is essential to assess the spread of this invasive, and identify areas that may have become infested over the past 4 years. A rotating subset of the previously surveyed locations (Figs. 2 & 3) will be annually re-visited to investigate new infestations of *Elodea*. A survey protocol is in draft, based on the methods for the 2015 work throughout interior Alaska. Minor infestations will be manually controlled, or mechanically controlled in deeper waters (such as the Chena River).

Monitoring fluridone concentration

To ensure that target concentrations of fluridone are maintained, water samples will be collected routinely from each treatment area and subjected to FasTEST analysis. FasTEST is a rapid assay that measures the concentration of aquatic herbicides in water and soil samples.

Chena Lake will be sampled at 4 locations, 4 times per year (locations TBD). Totchaket Slough will be sampled 5 times a year, at three locations (Fig. 7). Chena Slough will be sampled at 10 sites, 8 times per season. All water samples will be collected using FasTEST protocols established by SePRO, and sent by overnight delivery to SePRO Corporation's analytical laboratory in Carmel, IN for immunoassay following the techniques described by Netherland et al. (2002). Approximately ~10% of water samples will be duplicated and sent to an independent lab for verification. All test results will be made available on FSWCD's website (http://www.fairbankssoilwater.org/). Chena Slough residents will be notified of treatment plans, irrigation restrictions and the availability of test results via mail before any treatment begins.

To examine whether fluridone is migrating into groundwater, sediment cores and well water will also be tested post-treatment, pending landowner and subsurface water rights. Depending on the depth of a well, it is expected that fluridone concentrations in drinking water wells will be negligible due to fluridone's chemical properties to be transported through soils. The soil organic carbon partitioning coefficient (Koc values) for fluridone range from 70 to 2700 for different types of soils; ~2700 in 60% clay with only 1.8% organic matter, and ~270 in fine sandy loam with 8.5% clay and 1.7% organic matter. The higher the Koc value, the less mobile organic chemicals are, while the lower the Koc value, the more mobile the organic chemicals are. Chena Slough is dominated by fine-grained, organic-rich sediments (Kennedy and Hall 2009), which are more likely to reflect higher Koc values for fluridone in the treatment area, reassuring that fluridone will not travel more than a few inches into the soil. Both SePRO Corporation and a third party will be utilized to determine concentrations.

IX. Preventing spread of *Elodea*

Outreach and Education

The treatments for eradication of *Elodea* proposed in this IPM plan will affect multiple user groups in the Fairbanks and North Pole areas. Chena Slough is lined by private residences and used year-round for recreational activities such as boating, fishing, and snow machining. Chena Lakes is a popular recreation area for swimming, fishing (summer and winter), and non-motorized boating. Also the Chena River is heavily populated and provides many of the same outdoor recreational activities. Engaging the public on the issue of *Elodea*, and educating them about boat and equipment cleaning are crucial to minimizing the spread of *Elodea* fragments from the existing infestations to new areas. Additionally, describing the life history of the plant, its effects on aquatic habitats, and the pros and cons of control options will provide the public with a better understanding for future actions.

Priorities for outreach:

1) Garner awareness and support for the proposed treatment plan.

- Engage local print and radio media outlets about the dangers of *Elodea* and the planned treatment in affected water bodies.
- Public meetings with residents in the North Pole area (required by permitting process).
- Public meetings with residents in Nenana (required by permitting process).
- Host *Elodea* Day at Chena Lakes Recreation Area, an informational public event co-sponsored by the Fairbanks North Star Borough.
- Maintain an up-to-date website containing information on *Elodea* and the treatment plan.
- Keep civic leaders informed of the *Elodea* treatment plan.
- Work with Chena Slough residents to find other irrigation sources during the treatment period

2) Prevent spread and re-introduction of *Elodea* in interior Alaska.

- Deploy signage providing information about *Elodea* and instructions on boat cleaning, as well as informational brochures, at key recreational areas and boat launches along the Chena River, and float plane ponds in the city of Fairbanks, near Nenana, and at Chena Lakes Recreation Area.
- Outreach in villages along the Yukon and Tanana to raise *Elodea* awareness and promote clean boating practices.
- Ongoing cooperation with the Salcha-Delta SWCD to continue surveying for *Elodea*.
- Present at local and statewide conferences and workshops about the presence of *Elodea* and efforts towards eradication in interior.
- Continue outreach at public events in the Fairbanks area to raise awareness about *Elodea*.
- Ongoing surveying efforts throughout interior Alaska (see 'Monitoring.')

X. Budget

Eradication of *Elodea* in the Chena River watershed (Chena Slough, Chena Lake, Chena River, and Totchaket Slough) will be a 3-4 year endeavor. Below is an estimate of the annual costs for purchasing the herbicide. The cost of application goes down in successive years. Moreover, there is a possibility actual costs will be considerably lower than these estimates, especially if *Elodea* is eradicated from Chena Slough in three years, and the fourth year of herbicide application is deemed unnecessary. Some of the application equipment will be available on loan from Kenai National Wildlife Refuge. The cost of the liquid herbicide injection system is approximately $15,000.

BUDGET

Year	Waterbody	Cost of herbicide	Total
1	Chena Slough	$148,000	$337,020
	Chena Lake	$98,700	
	Totchaket Slough	$90,320	
2	Chena Slough	$137,000	$274,320
	Chena Lake	$47,000	
	Totchaket Slough	$90,320	
3	Chena Slough	$137,000	$274,320
	Chena Lake	$47,000	
	Totchaket Slough	$90,320	
4	Chena Slough	$108,000	$108,000
	Chena Lake	$0	
	Totchaket Slough	$0	
	TOTAL		**$993,600**

The cost of herbicides needed for eradicating *Elodea* in each of the three infested water bodies is:
Chena Slough total cost of herbicides (4 years): **$530,000**
Chena Lake total cost of herbicides (3 years): **$192,700**
Totchaket Slough total cost of herbicides (3 years): **$270,960**

XI. Administrative Record

July 2009 – Specimen collected from the Chena Slough, vouchered at UA Herbarium.

September 2010 – Floating fragments of *Elodea* were found in the Chena River. Dense infestation found upstream in Chena Slough. Plants recognized as invasive.

December 2010 – Public meeting, Elodea Steering Committee formed. FSWCD takes lead.

April 2011 –"Control Options for *Elodea* spp. in the Chena Slough near Fairbanks, Alaska" white paper written.

Summer 2011 – Extensive surveying in Tanana Valley watershed. *Elodea* discovered in Chena Lake.

Summer 2012 – Survey of Chena Lake perimeter. Tanana Valley Watershed Association surveyed the Chena River.

Summers 2013 & 2014 – Trials for mechanical and manual removal of *Elodea* in the Chena Slough conducted by FSWCD and Test the Waters Dive Shop.

March 2014 – DNR quarantine of *Elodea* for the state of Alaska.

December 2014 – Public meeting in North Pole.

January 26th 2015 – Elodea Steering Committee re-convened, monthly meetings here-after.

April 2015 – Informational meeting. 1st draft Integrated Pest Management.

June 18th 2015 – Public meeting in North Pole.

Summer 2015 – Extensive surveys for *Elodea* in interior Alaska. Discovery of Elodea in the Totchaket Slough north of Nenana. Ongoing mechanical removal of *Elodea* in the Chena Slough.

September 2015 – First draft DEC Pesticide Use Permit (PUP) for fluridone.

January 26th 2016 – DEC PUP submitted by DNR

February 8th 2016 – Start of DEC public commenting period on the Pesticide Use Permit

February 12th 2016 – Funds for herbicides requested from Alaska State Legislature

February 29th 2016 – First draft of NEPA Environmental Assessment

March 7th & 8th 2016 – Public meetings held in Fairbanks, North Pole, and Nenana.

March 8th 2016 – End of public commenting period

April 2016 – Pesticide Use Permit revised to address concerns raised at the public meetings. Sonar Genesis Special Local Need 24(c) label prepared by SePRO, submitted

to EPA and approved. The revised permit reflected:1) more detailed information on wells within the treatment area, 2) increased water and sediment sampling, and 3) inclusion of the 24(c) for Sonar Genesis.

April 29th 2016 – Revised PUP submitted to DEC for review.

May 1st and May 2nd – Public Notification of the DEC public commenting period on the Pesticide Use Permit posted

June 2nd – Public commenting period ended.

November 9th 2016 – DEC completed its evaluation of the pesticide use permit application, and issued a permit to Alaska Department of Natural Resources, Division of Agriculture (Permit No. 16-AQU-07) for the application of Sonar Genesis, Sonar One, and Sonar H4C all with active ingredient fluridone to waters of the state to control invasive Elodea in Chena Lake, Chena Slough, and Totchaket Slough in the Fairbanks area.

January 3rd 2017 – The Draft Environmental Assessment for the Interior Alaska Elodea Eradication Project was submitted by ADNR, Division of Agriculture to the U.S. Fish and Wildlife Service for review. The public commenting period on the draft EA will end on February 3rd 2017.

XII. Figures and Tables

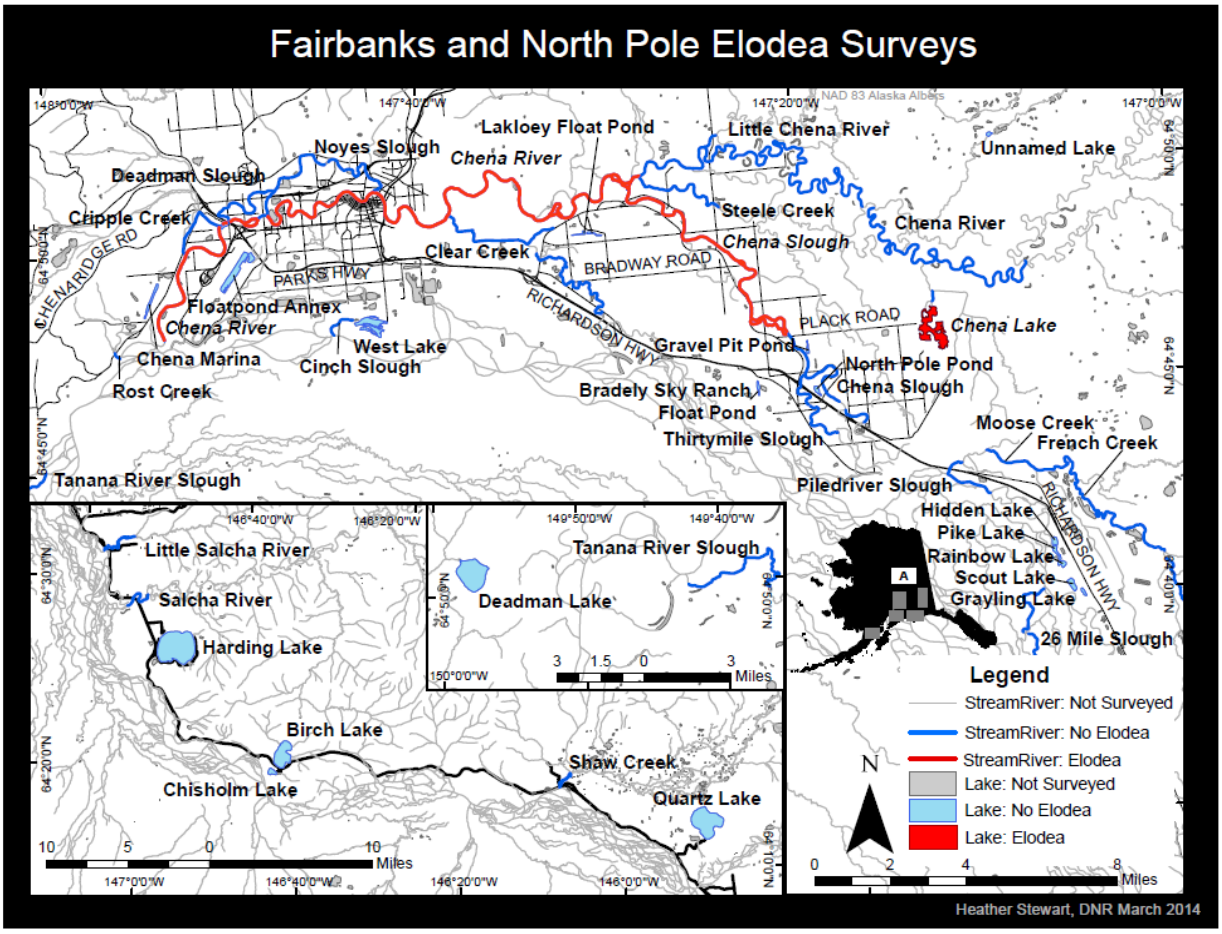

Fig.1 Map showing water bodies in the Fairbanks and North Pole areas that were surveyed for *Elodea* in 2011.

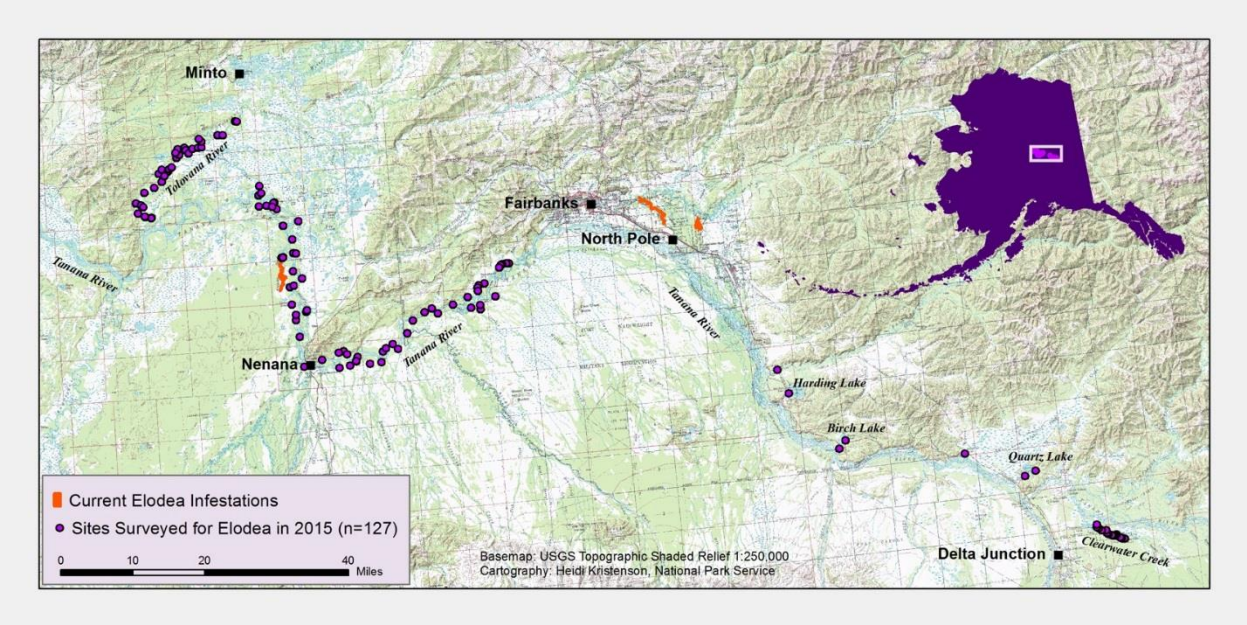

Fig.2 Locations of known *Elodea* infestations in interior Alaska, and 2015 survey locations.

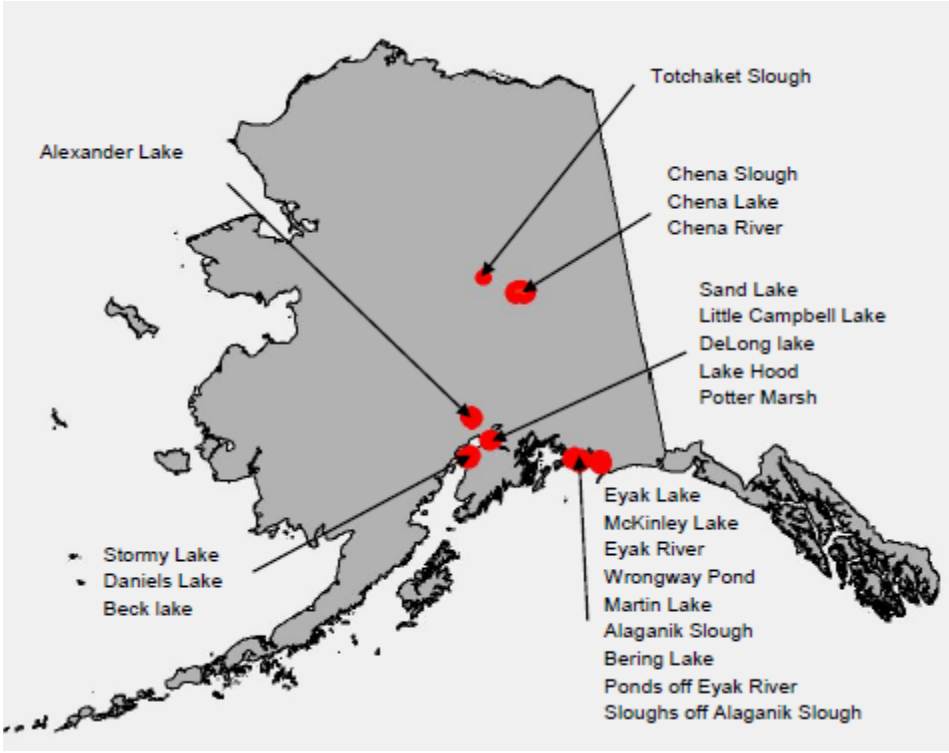

Fig.3 Map indicating the locations of known Elodea infestations within the state of Alaska.

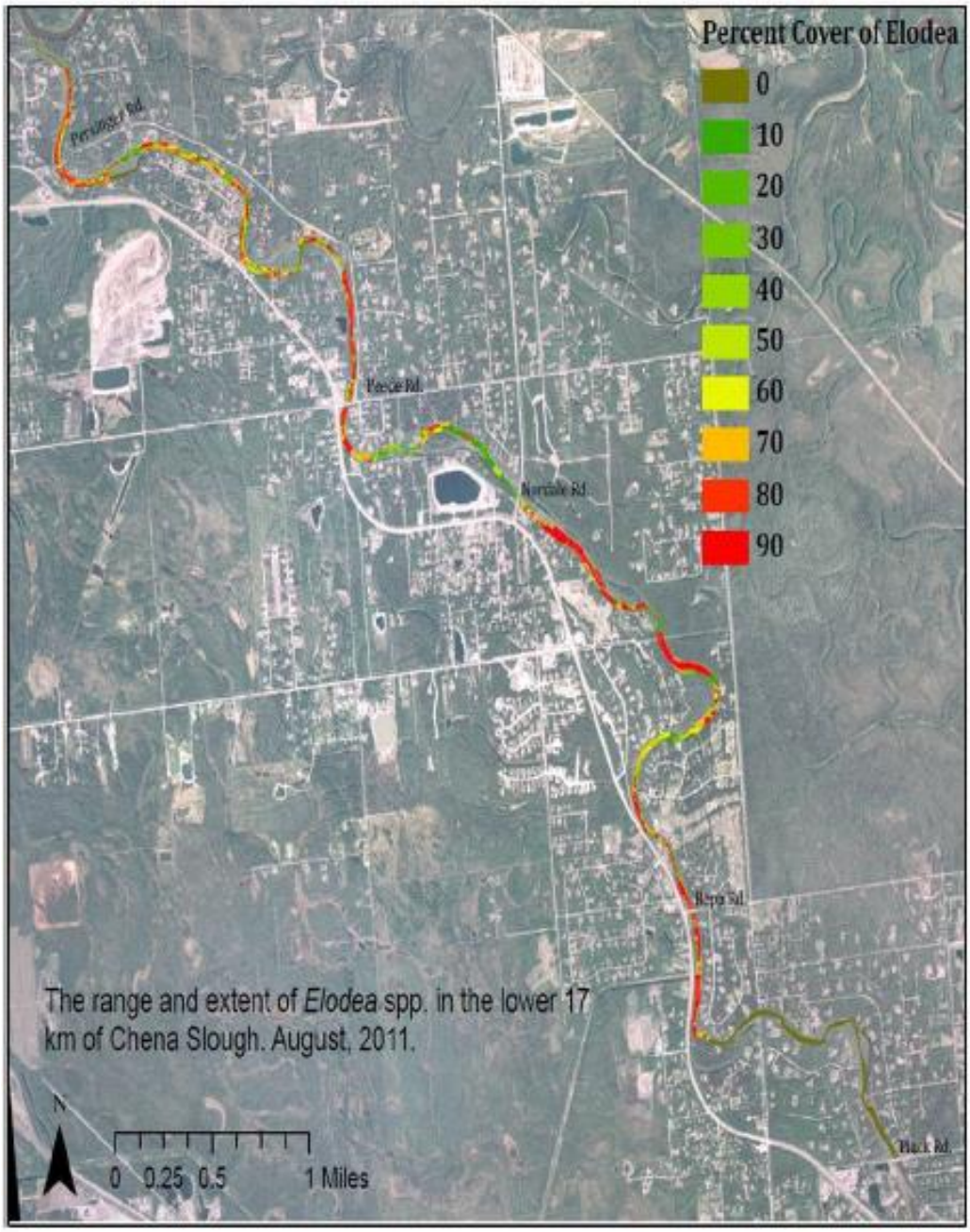

Fig. 4 Variations in density of *Elodea* within the Chena Slough infestation, measured in 2011.

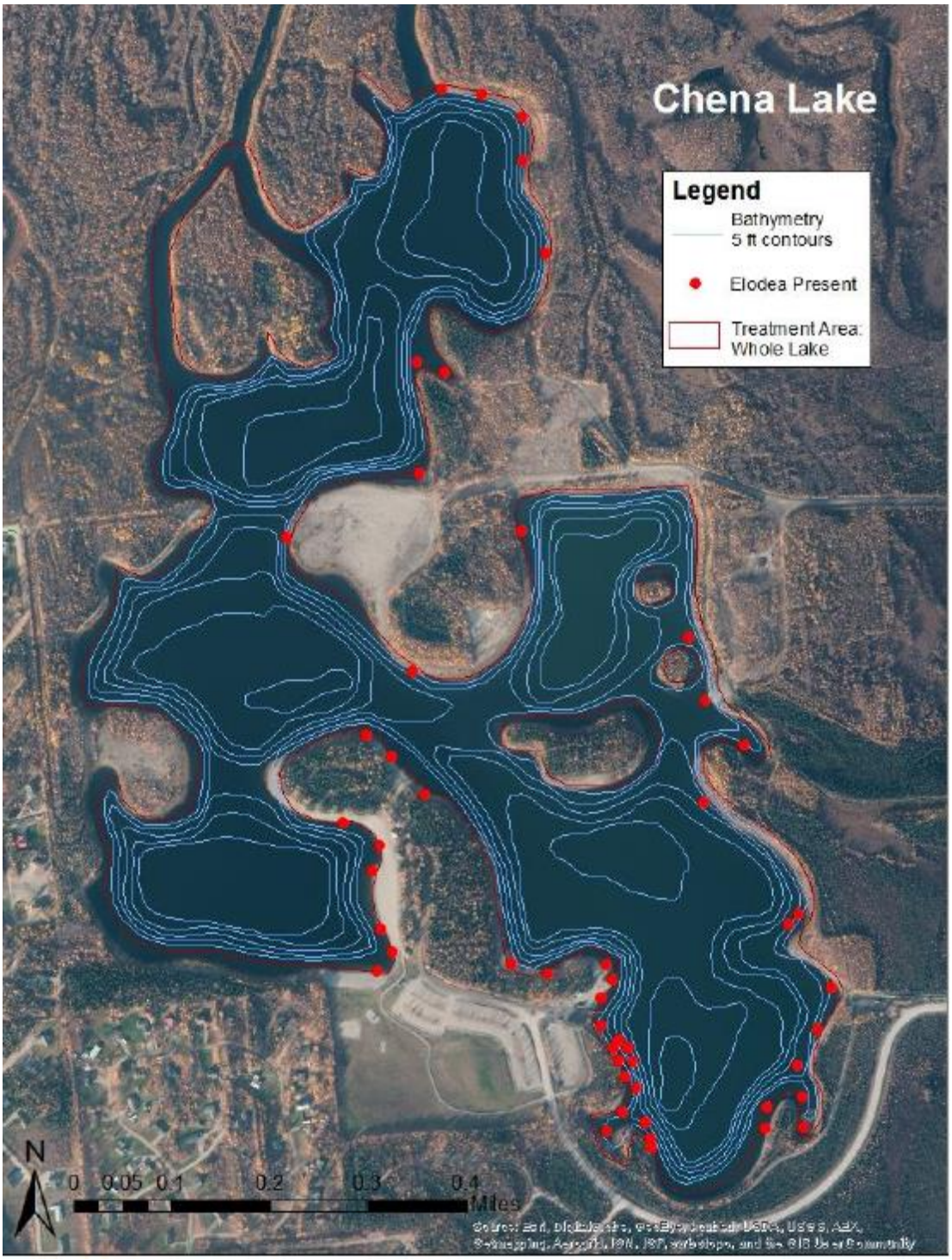

Fig.5 *Elodea* locations in Chena Lake, measured in 2012.

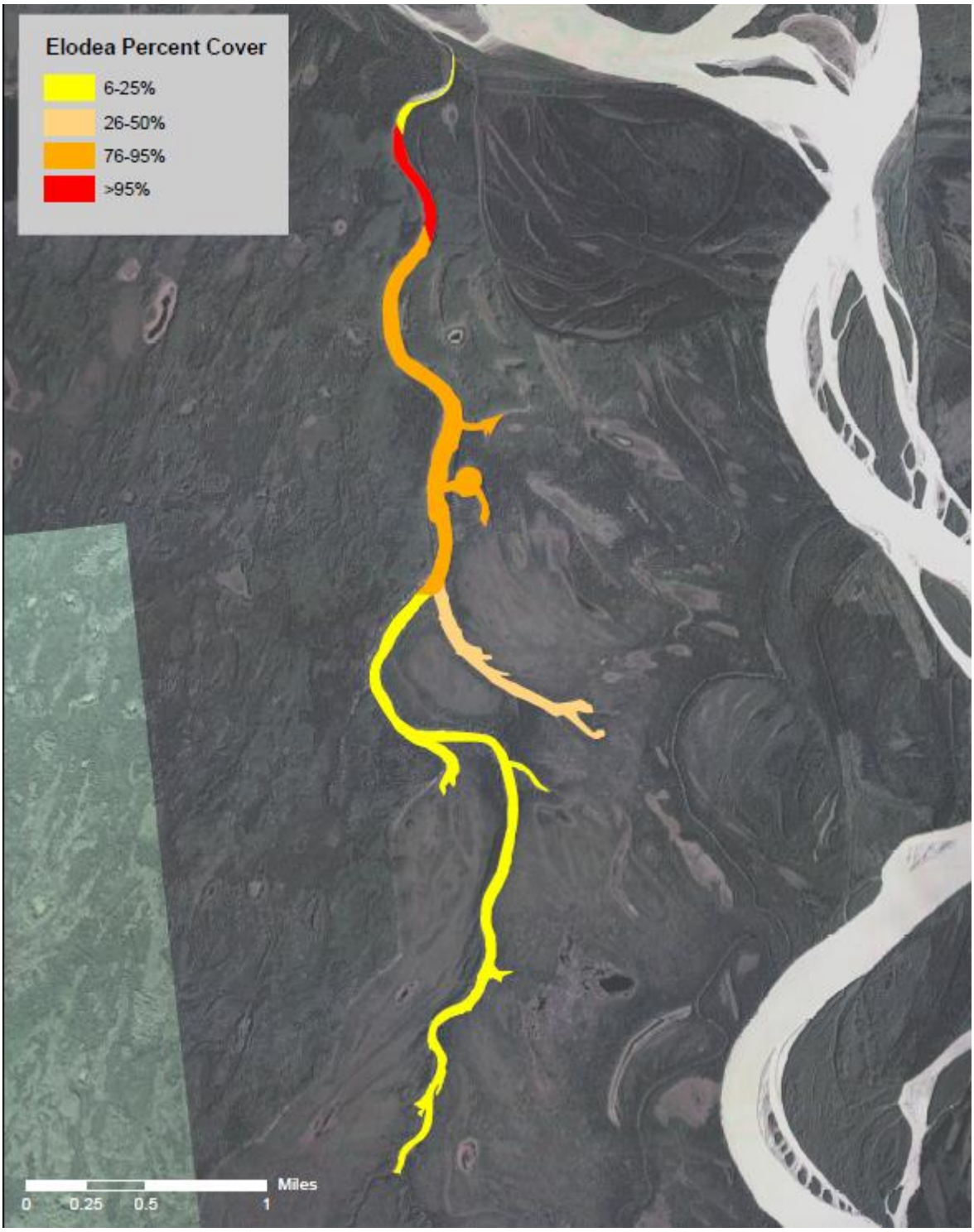

Fig. 6 Variation in *Elodea* density throughout the infestation in Totchaket Slough.

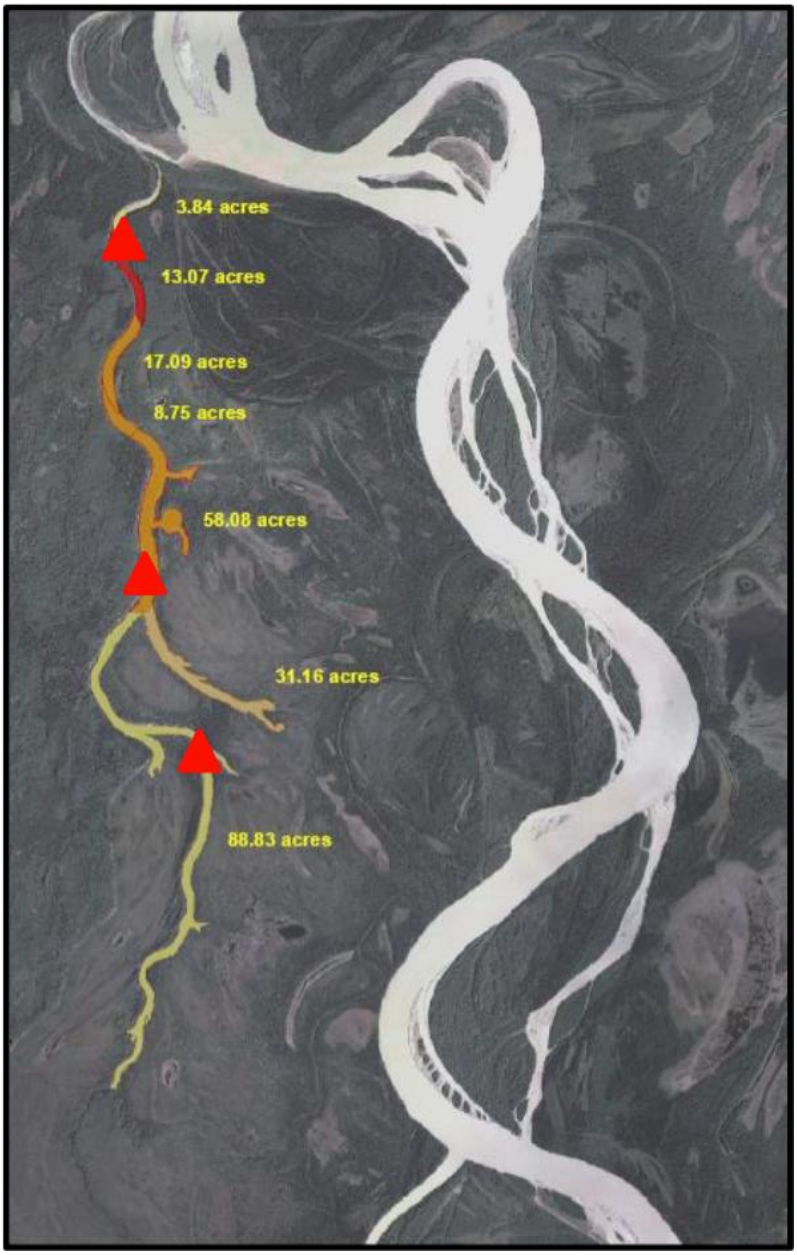

Fig. 7 FasTest locations along Totchaket Slough

Fig. 8 Herbicide drip system apparatus for delivery of liquid herbicide (Sonar Genesis).

Fig. 9 Vortex granular spreader system mounted to a boat for application of pelleted herbicide (Sonar ONE and Sonar H4C).

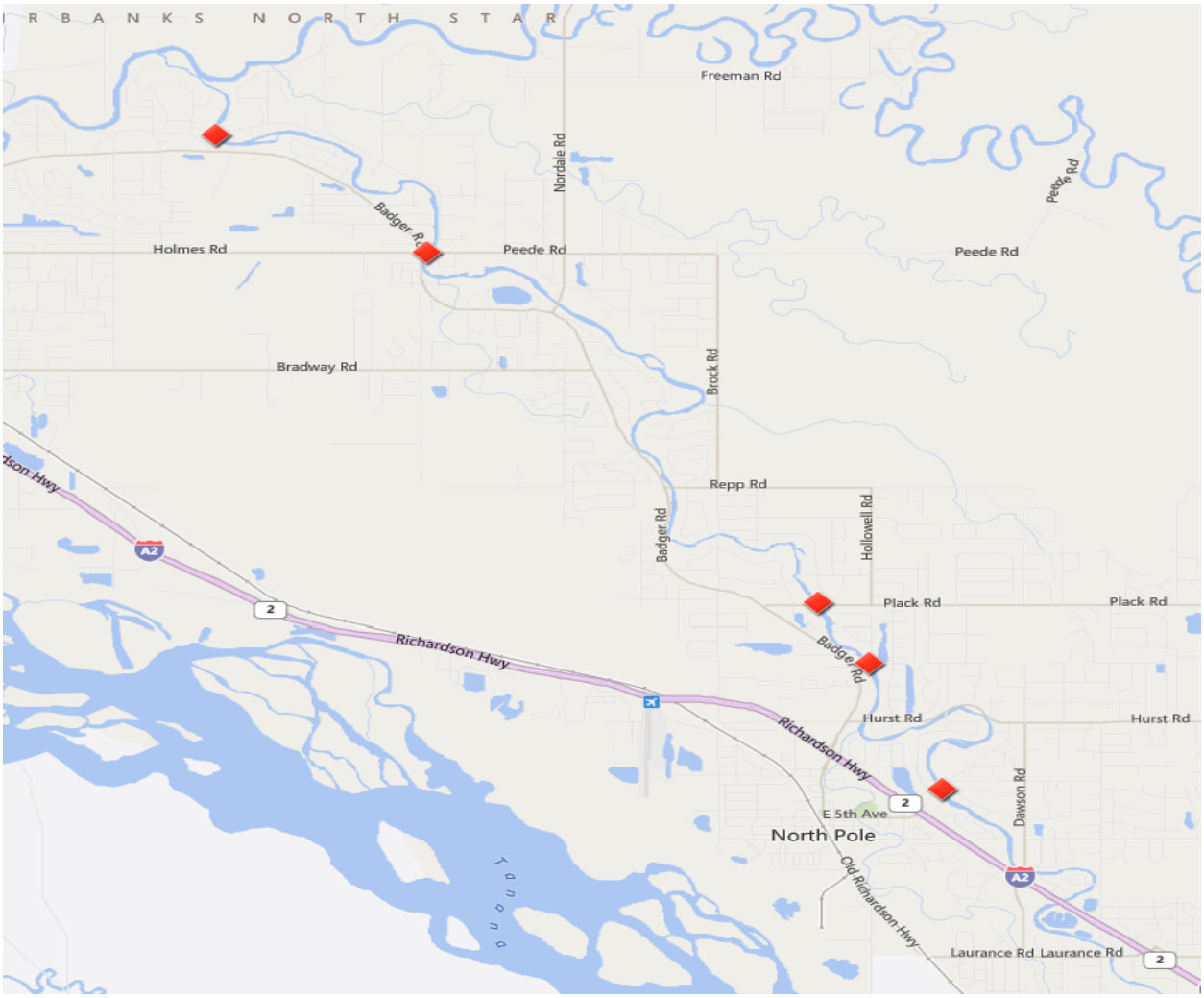

Fig.10 Location of monitoring sites along Chena Slough

Table 1. Comparison of aquatic herbicides. Herbicides in **bold** considered further.

Aquatic Herbicide	LD-50 in rats (mg/kg body weight)	Mode of action	Further considerations
2,4-D	375-666	Systemic	Some formulations are highly toxic to fish. Potentially carcinogenic and an endocrine disruptor.
Acrolein	50	Contact	Non-specific, highly toxic biocide. Not appropriate for use in natural waters.
Copper sulfate pentahydrate	300	Systemic	Toxic to fish.
Diquat	120	Contact	Swiftly diluted in moving waters.
Endothall	51	Contact	May kill native plants. Cannot be applied within 600 feet of a drinking water well. Some formulations highly toxic to fish.
Flumioxazin	>5,000	Systemic	Not effective on Elodea (Glomski & Netherland 2013).
Fluridone	>10,000	Systemic	May injure some susceptible aquatic plants. Irrigation restrictions apply.
Glyphosate	5,600	Systemic	Effective only on plants that grow above water, non-specific to Elodea.
Imazamox	>5000	Systemic	Sensitivity of Elodea and native plants unknown.
Imazapyr	>5000	Systemic	Not effective on submerged plants.
Penoxsulam	> 5,000	Systemic	Likely to move into groundwater, some evidence of carcinogenic effects.
Triclopyr	630-729	Systemic	Ineffective in moving waters.

Table 2. Detailed application prescription for Chena Slough treatment

		Application 1		Application 2	
Year	**Product**	**Rate (ppb)**	**gal or lbs**	**Rate (ppb)**	**gal or lbs**
1	Sonar Genesis	8.0	244.0		
	Sonar H4C	70.0	2494.6	50.0	1781.8
2	Sonar Genesis	8.0	232.0		
	Sonar H4C	50.0	1781.8	40.0	1687.3
3	Sonar Genesis	8.0	232.0		
	Sonar H4C	50.0	1781.8	40.0	1687.3
4	Sonar Genesis	4.0	164.7		
	Sonar H4C	50.0	1781.8	25.0	1054.6

Table 3. Detailed application prescription for Chena Lake treatment

		Application 1		Application 2	
Year	**Product**	**Rate (ppb)**	**gal or lbs**	**Rate (ppb)**	**gal or lbs**
1	Sonar Genesis	7.0	141.7		
	SonarONE	6.0	1214.6	3.0	607.3
2					
	SonarONE	7.0	1417.0		
3					
	SonarONE	7.0	1417.0		

Table 4. Detailed application prescription for Totchaket Slough treatment

		Application 1		Application 2		Application 3	
Year	**Product**	**Rate (ppb)**	**gal or lbs**	**Rate (ppb)**	**gal or lbs**	**Rate (ppb)**	**Gal or lbs**
1	Sonar Genesis	5.3	20.0				
	SonarONE	30.0	1127.5	20.0	751.7	20.0	751.7
2	Sonar Genesis	5.3	20.0				
	SonarONE	30.0	1127.5	20.0	751.7	20.0	751.7
3	Sonar Genesis	5.3	20.0				
	SonarONE	30.0	1127.5	20.0	751.7	20.0	751.7

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8.2 DEC Pesticide Use Permit

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Environmental Conservation

DIVISION OF ENVIRONMENTAL HEALTH
Pesticide Control Program

1700 E. Bogard Road Bldg. B, Ste. 103
Wasilla, Alaska 99654
Main: 907.376.1856
Toll free: 800.478.2577
Fax: 907.376.2382

November 9, 2016

Heather Stewart
Natural Resource Specialist III
Alaska Plant Materials Center
5310 S Bodenburg Spur
Palmer, AK 99645

Subject: Permit to Apply Pesticides #16-AQU-07

Dear Ms. Stewart,

The Department of Environmental Conservation (DEC) has completed its evaluation of your request for a permit for the application of the pesticides Sonar Genesis, with EPA registration number 67690-54 and state of Alaska registration number AK-1600001; Sonar One, with EPA registration number 67690-45; and Sonar H4C, with EPA registration number 67690-61, all with active ingredient fluridone to waters of the state to control invasive Elodea in Chena Lake, Chena Slough, and Totchaket Slough in the Fairbanks area. DEC is issuing the enclosed permit in accordance with Alaska Statute 46.03.330 and Title 18, Chapter 90.525 of the Alaska Administrative Code (18 AAC 90.525).

Any person who disagrees with this decision may request an adjudicatory hearing in accordance with 18 AAC 15.195 - 18 AAC 15.340, or an informal review by the Division Director in accordance with 18 AAC 15.185. Informal review requests must be delivered to the Division Director, Alaska Department of Environmental Conservation, 555 Cordova Street, Anchorage, AK 99501 within 15 days of the permit decision. Adjudicatory hearing requests must be delivered to the Commissioner of the Department of Environmental Conservation, 410 Willoughby Avenue, Suite 303, Juneau, Alaska 99801, within 30 days of the permit decision. In both cases, please also send a copy of the request to DEC Pesticide Program, 1700 E. Bogard Road, Building B Suite 103, Wasilla, AK 99654. If a hearing is not requested within 30 days, the right to appeal is waived. More information about the submission of a request for an informal review or adjudicatory hearing may be found at **www.dec.state.ak.us/commish/ReviewGuidance.htm**.

Sincerely,

Robert J. Blankenburg, P.E.
Solid Waste & Pesticides Program Manager

Enclosure

STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
555 CORDOVA STREET
ANCHORAGE, ALASKA 99501

PERMIT TO APPLY PESTICIDES

Permit No.:	16-AQU-07
Date Issued:	November 9, 2016
Date Effective:	December 19, 2016
Date Expires:	December 31, 2020

The Alaska Department of Environmental Conservation (ADEC), under authority of Alaska Statute 46.03.330 and Title 18, Chapter 90.525 of the Alaska Administrative Code (18 AAC 90.525), hereby grants a Permit to Apply Pesticides to:

Heather Stewart
Natural Resource Specialist III
Alaska Plant Materials Center
5310 S Bodenburg Spur
Palmer, AK 99645

for the purpose of applying the pesticides Sonar Genesis, with EPA registration number 67690-54 and state of Alaska registration number AK-1600001; Sonar One, with EPA registration number 67690-45; and Sonar H4C, with EPA registration number 67690-61, all with active ingredient fluridone to waters of the state to control invasive Elodea in Chena Lake, Chena Slough, and Totchaket Slough in the Fairbanks area.

The permit holder shall manage and apply the pesticide in accordance with 18 AAC 90 and the permit application materials submitted March 4, 2016. In addition, the following permit conditions and stipulations are required:

1. Apply pesticide only when target plants are actively growing.

2. Use pesticides only in the manner specified by the label instructions. Adhere to all the requirements specified by the pesticide product label.

3. Ensure that pesticides are applied only by a person properly certified by DEC to apply such pesticides, or a person under the direct supervision of a person so certified.

4. Apply pesticides using properly calibrated equipment, and in strict compliance with safety precautions.

5. Monitor downstream areas of the outflow of Chena Slough for impacts to vegetation. Visual monitoring shall be conducted once a week throughout active application of liquid pesticide product. Notify the DEC Pesticide Program immediately of any detected impacts.

6. Identify and obtain permission to test at least 5 private drinking wells along the length of the treatment area in Chena Slough. Assay each drinking water well for the presence of fluridone within ten days of initial application, and then at least every eight weeks thereafter until

concentrations of fluridone in the treatment area of Chena Slough decrease to less than 5 ppb.

7. If fluridone in excess of 20 ppb is detected in any private drinking water well, refrain from any additional fluridone application until specifically authorized to continue by DEC.

8. Conduct visual monitoring for dams or blockages along the length of the Chena Slough treatment area at least weekly throughout the duration of the treatment.

9. Install and monitor at least two stream flow gauges in the Chena Slough treatment area.

10. Investigate the cause of any unexpected changes in stream flow indicated on stream flow gauges within 24 hours.

11. If flooding events occur, refrain from any additional fluridone application until stream flow has returned to pre-flood levels.

12. If damming or blockage of stream flow occurs, refrain from any additional fluridone application until damming or blockage is resolved, and stream flow has returned to pre-blockage levels.

13. Locate all automatic drip stations in a secure, locked box capable of containing any leaks which might occur at the distribution site.

14. Monitor the drip station at least once per week when in use, and immediately repair any malfunctions or leaks.

15. Obtain baseline measurements of water quality parameters including pH, dissolved oxygen, conductivity, turbidity, nitrogen, and phosphorus levels prior to treatment in two separate locations in Chena Lake, and in locations that are upstream and downstream of treatment areas in both Chena and Totchaket Sloughs.

16. Prior to application, notify each resident adjacent to treatment area that waters should not be used for irrigation purposes, and cautioning them to use an alternative irrigation source until ambient concentrations are less than 5 ppb. Ensure that residents can obtain information about measured ambient concentrations.

17. Maintain the following records for each pesticide used. Records must be available to DEC upon request:

    - Product name
    - EPA registration number
    - Target pest
    - Date and time of application
    - Location of drip stations
    - Method of application
    - Weather conditions during application
    - Amount of pesticide used
    - Location and size of treatment area
    - Names of applicators

- Purchase, storage, and disposal information
- Drinking water well laboratory results
- Schedule and results of visual vegetation monitoring
- Schedule and results of visual dam and blockage monitoring
- Results of any stream flow investigations
- Schedule and results of drip station monitoring
- Pre-treatment watet quality parameters
- Irrigation notification dates and addresses.

18. Dispose of empty pesticide containers in accordance with label directions and 18 AAC 90.615(a). Any burning of pesticide containers must be done in compliance with 18 AAC 50.

19. Immediately report any spill or accident, alleged accident, or complaint to the DEC Pesticide Program at 1-800-478-2577.

20. Ensure that decontamination, safety, and spill cleanup supplies are available at the treatment site at all times during application.

21. Store all pesticide containers securely, as required by 18 AAC 90.615(d). Post a warning notice on the outside of each storage area in compliance with 18 AAC 90.615(e)-(h).

22. No later than **March 31 of each year** throughout the duration of the permit, submit a written Summary of Treatment Results in accordance with 18 AAC 90.535. This summary must include the following information:
    - All records specified under Stipulation 17;
    - Assessment of success or failure of the treatments; and
    - Any observed effect on human health, safety or welfare, animals, or the environment.

In addition to the above stipulations, the ADEC Pesticide Program may monitor treatments to ensure compliance with 18 AAC 90 and the Permit Conditions and Stipulations.

This permit expires on **December 31, 2020**, or upon completion of the above described project, whichever comes first, and may be revoked in accordance with 18 AAC 90.540.

Robert J. Blankenburg, P.E.
Solid Waste & Pesticides Program Manager

8.2.1 DEC Decision Document

Department of Environmental Conservation
Division of Environmental Health

Department of Natural Resources
Application for
Permit to Use Pesticide
For Control of Elodea
In the Fairbanks Area

Public Noticed
May 2 through June 2, 2016

Decision Document
November 9, 2016

Project Description
On April 27, 2016, the Alaska Department of Natural Resources (DNR), Division of Agriculture submitted an application for a permit to apply herbicide to control invasive Elodea in Chena Lake, Chena Slough, and Totchaket Slough in the Fairbanks area.

Elodea is an invasive aquatic plant that has the potential to grow abundantly and compromise water quality, hinder boat and float plane traffic, reduce dissolved oxygen, and impact fisheries. Control of this invasive plant is necessary to prevent spread to other locations. Physical or mechanical controls are inappropriate, as these methods break the plant into fragments which can then reproduce.

The proposed products include;

- Sonar Genesis, with EPA registration number 67690-54 and state of Alaska registration number AK-1600001;
- Sonar One, with EPA registration number 67690-45; and
- Sonar H4C, with EPA registration number 67690-61.

All products have the active ingredient fluridone. Treatment is proposed to occur between May and October throughout the duration of the permit.

Fluridone is a selective systemic herbicide labeled for use in controlling aquatic vegetation in a variety of aquatic sites. Fluridone kills target plants by inhibiting the formation of carotene. In the absence of carotene, chlorophyll is degraded by sunlight, preventing the plant from photosynthesizing.

Liquid product (Sonar Genesis) will be applied from motorboats using a weighted trailing hose to inject liquid herbicide into the lower portions of the water column (Chena Lake, Totchaket Slough) or via a continuous drip system (Chena Slough). Pelleted product (Sonar One, Sonar H4C) will be applied from motorboats using a forced air blower system, or applied by hand along shorelines.

The target concentration, which must be maintained for a minimum of 45 days, is 8 parts per billion (ppb). Application rates differ from target concentrations. The application rates for pelleted products (Sonar ONE and Sonar H4C) reflect the slow release rate inherent in these products, and are listed at 30 ppb and 70 ppb, respectively. These application rates are calculated to result in a steady concentration at the target level of 8 ppb.

Public Comment
Notice of the permit application was published in the Fairbanks Daily Newsminer on May 1 and 2, 2016. Notice included information about the opportunity to submit comments on the permit application. The Alaska Department of Environmental Conservation (DEC) also posted the public notice online at *www.state.ak.us/dec/eh/pest* and *www.dec.state.ak.us/public_notices.htm*.

The public comment period for the permit application began on May 2, 2016 and ended June 2, 2016. DEC received 25 written comments within the comment period.

Pesticide Use Permit Evaluation

Under 18 AAC 90.505, a pesticide use permit is required to apply pesticides to waters of the state. Permits will only be issued if DEC determines that no unreasonable adverse effect is expected as a result applying the pesticide. Per definitions in 18 AAC 90.990(54), "unreasonable adverse effect" means an unreasonable risk to humans, animals, or the environment, taking into account the economic, social, and environmental costs and benefits of the use of a pesticide, as determined by the department.

Human and animal health risks and environmental costs and benefits of pesticide application are determined by evaluation of the product(s) proposed for use, site-specific aspects of the proposed application, and environmental impacts of use, including impacts on animals or other non-target species. Social and economic costs and benefits involve the analysis of perceived or actual impacts and benefits of the proposed project on the public, and the economic impact of performing or not performing the project. DEC's analysis of these aspects is laid out in the following sections.

Human Health Risk and Environmental Cost/Benefit Analysis

Product Evaluation

Before manufacturers can sell pesticides in the United States, the Environmental Protection Agency (EPA) evaluates the pesticides thoroughly to make sure they can be used without posing harm or "unreasonable adverse effects" to human health or the environment.

Pesticide products must undergo rigorous testing and evaluation prior to registration approval. EPA scientists and analysts carefully review data to determine whether to register a pesticide product, and whether specific restrictions are necessary. EPA uses internal and external reviews involving peers and the public through a comment process when conducting these evaluations.

The scientific data requirements for product registration are very detailed. Required data includes characterizations of the pesticide's chemistry and manufacturing process; mammalian and eco-toxicology; environmental fate; residues in or on human and livestock food or feed crops; applicator, occupational, and bystander exposures; product efficacy; and incident reports. Registrants can be required to conduct and submit up to 100 or more individual scientific studies for the registration of a new pesticide.

By definition, all pesticides are toxic to some degree. The level of risk from a pesticide depends on how toxic or harmful the substance is, and the likelihood of people coming into contact with it. Uncertainty factors are built into the risk assessment. These factors create an additional margin of safety for protecting people who may be exposed to the pesticides.

In order for a pesticide to be registered, the EPA must determine that the product can be used as labeled without causing unreasonable adverse effects to humans or the environment. If risks or concerns are identified, appropriate risk mitigation measures are required. These are implemented through product label requirements, which may include reductions in application rates, restrictions to approved sites or commodities, advisory statements, implementation of specific management practices, and other restrictions or limitations designed to mitigate risk.

The proposed product label must provide the active pesticide ingredients, application directions, use restrictions, and warnings. This label information is based on the underlying scientific data and conclusions about potential hazards, exposures, and risks from use according to the label.

EPA also conducts regular reassessments of currently registered pesticides. Through this re-registration program, EPA assesses new scientific studies and information about registered products. If there is new evidence documenting unreasonable risk to human health and the environment, the allowed usage is modified and the label changed. When EPA identifies data gaps, new studies are required and reviewed.

If new information or studies show that a pesticide represents an unreasonable risk even after a change of allowable usage, EPA has the authority to cancel registration of products containing that pesticide. Whenever EPA determines there are urgent human and environmental risks from pesticide exposures that require prompt attention, EPA will take appropriate regulatory action, regardless of the registration review status of that pesticide.

EPA's extensive analyses of each pesticide product, and incorporation of new scientific data regarding safety and use of existing products, is sufficient to protect human health and the environment from unreasonable adverse effects if used in accordance with the label.

The proposed products are currently registered with EPA and are also registered in the state of Alaska. Fluridone is approved for application to flowing waters. The federally approved product label for Sonar Genesis did not specifically address application to flowing waters; a state Special Local Needs registration status was applied for and received for this product.

Site and Conditions Evaluation

Product Characteristics
Fluridone binds to clay and soils with high organic matter, especially in pellet form (Washington DNR, 2012). Once bound to sediments, the products become biologically unavailable and are no longer active. For fluridone, proposed treatment levels are at very low concentrations and therefore require a contact time of 45-90 days (Washington DNR, 2012).

In most situations, fluridone is characterized as binding quickly to suspended sediment soils and organic matter, resulting in moderate to low mobility in soil. Pesticides bind more readily to fine grained particles, due to the increased surface area to which the molecules can adhere. Due to chemical characteristics, fluridone also tends to bind more readily to organic sediments.

Once it adheres to soil particles, fluridone is unavailable to disperse or to continue to act as an herbicide. Fluridone has an estimated half-life in water of only 20 days (EPA, 1986) and a hydrosoil half-life of approximately 119 days (NCBI, 2005). As a result, fluridone remains present in the environment for only a limited time.

Site Characteristics

Chena Lake is a man-made lake built for flood control located 16 miles east of Fairbanks. It has no inlets or outlets during normal flows, and the flood control structure has never been used since construction in 1979. There is some residential development near Chena Lake; five drinking water wells have been identified within 200 feet of the lake.

Totchaket Slough is 12 miles north of Nenana. It normally has a very low flow, with an average 8.5 ft^3/s measured in 2015. It is recharged from groundwater and wetlands, and discharges into the Nenena River. It is relatively remote, with no drinking water wells identified nearby.

Chena Slough is 4 miles east of Fairbanks. It normally has a low flow, with an average 52 ft^3/s measured in 2015. It is recharged from groundwater, and discharges into the Chena River. This area has significant residential development along its length. Many residents have lawns or gardens, and 153 drinking water wells have been identified within 200 feet of the treatment area.

There are no potable water intakes identified in any of the proposed treatment areas.

Under Alaska Statute 46.15, residents must obtain a water rights permit from the Department of Natural Resources prior to diverting or withdrawing significant quantities of water (greater than 500 gallons per day for ten or more days). As of July, 2016, DNR Water Resources has not issued any permits for this activity in the treatment areas. There may be a number of users who withdraw smaller quantities of water to irrigate gardens or landscaping.

The geology and hydrology of Chena Slough and the rest of the proposed treatment area are well understood. A large number of studies have been conducted over the years to provide an extremely well documented, comprehensive hydrologic and geologic characterization of the area.

There is significant documentation that Chena Slough is underlain with organic rich, fine grained sediment. Several studies note that Chena Slough has extensive vegetative mats, rooted aquatic plant growth, and excessive accumulation of organic fines. A United States Geological Society study (Kennedy, 2009) concluded that, "organic rich fine-grained sediments accumulate in Chena Slough because of the road crossing impoundments and flow velocities that are not high enough to flush the fines downstream." Chena Slough has been included on Alaska's section 303(d) list of impaired waters since 1994; it is listed due to excessive sediment loads.

The soil organic carbon partitioning coefficient, denoted as K_{oc}, is a measure of the tendency of a chemical to bind to soils. These values can vary substantially, depending on soil type, soil pH, the properties of the pesticide, and the type of organic matter in the soil. The larger the K_{oc} value, the stronger the adsorption of the chemical to soil, leading to lower mobility.

In areas with fine grained, organic rich soils, such as the Chena Slough, the K_{oc} of fluridone has been measured to be approximately 2,700, which indicates low mobility, or ability to travel through soils (Reinert 1989). It is possible (although no documentation has been provided) that some limited areas could be underlain with gravel. The K_{OC} in these immediate areas would be lower. However, fluridone would bind to other fine grained soils as it moves through the surrounding substrate.

A Groundwater Ubiquity Score (GUS) is used to rank herbicides on their potential to migrate towards groundwater. The GUS relates herbicide persistence (soil half-life) and the tendency of the herbicide to bind to soils (K_{oc}). GUS is calculated by multiplying log10 (soil half-life) by [4-log10(K_{oc})].

GUS	Potential to move toward groundwater
< 0.1	Extremely low
1.0-2.0	Low
2.0-3.0	Moderate
3.0-4.0	High
> 4.0	Very high

Using a soil half-life of 119 days (NCBI, 2005) and a K_{oc} of 2,700, as appropriate for areas with fine grained, organic rich soils, such as the Chena Slough, the GUS for fluridone is calculated to be 1.3, or a low potential to move towards groundwater.

Calculation of GUS for fluridone in Chena Slough

log10 (119) X (4 – log10 [2,700]) =

2.1 X (4 – 3.4) =

2.1 X 0.6 =

1.3

Even when more conservative factors are used to accommodate any differences in soil parameters, the GUS would still fall in the low range. For example, if the K_{oc} value is reduced by 20% (K_{oc} = 2,160), and a conservative soil half-life of 360 days is assumed (NCBI), the GUS would be 1.8, which is still in the low range.

Water quality in Chena Slough is already significantly compromised. In addition to sediment loads, nearby areas are known to have sulfolane contamination. Recent studies also found a number of semi-volatile organic compounds, PCBs, and historical DDT in its sediments, as well as elevated levels of phosphorous, sulfate, and chlorides (Kennedy, 2009).

Colder temperatures in Alaska can affect breakdown of some pesticides, and result in longer persistence. However, as explained above, fluridone binds to suspended sediment in the water column and to soils. Therefore, any increase in persistence would be irrelevant because the product becomes biologically unavailable when bound to sediments.

Fluridone has been used a number of times in recent years in Alaskan lakes, including Stormy Lake, Beck Lake, and Daniels Lake on the Kenai Peninsula; Lake Hood, Sand Lake, Campbell Lake, Little Campbell Lake, and DeLong Lake in Anchorage; and Eyak Cannery Ponds near Cordova. No unreasonable adverse effects have been identified as a result of any of these uses, even in lakes with significantly higher application rates, such as Campbell Lake. Fluridone has also been extensively

used in similar applications in other states, with no significant impacts to human health, non-target organisms, or the environment.

DEC is satisfied that the hydrology, geology, and other site characteristics of the treatment area are adequately understood. DEC is also satisfied that conditions would prevent significant migration of fluridone into surrounding ground water.

Human Health
The health effects of the proposed pesticide have been extensively studied and are well understood. This pesticide has been registered since 1986 and has been widely used across the United States.

A complete human health risk assessment for fluridone was completed in support of the EPA's 2004 fluridone Tolerance Reassessment Eligibility Decision (TRED). This assessment found that the food, drinking water, and recreational swimmer risks are not of concern separately or when aggregated.

One measure of risk that the EPA considers is the Residential Margin of Exposures (MOEs). MOEs greater than 100 are considered to be not of concern. The drinking water MOEs for fluridone and degradates are greater than 7,500. The recreational swimmer MOEs for fluridone and degradates are greater than 4,800. In the available toxicity studies, there was no indication that fluridone is an endocrine disruptor, nor does it impair immune function (EPA, 2004).

Dietary risk assessment incorporates both exposure to, and toxicity of, a given pesticide. Dietary risk is expressed as a percentage of an identified level of concern. This level of concern is referred to as the population adjusted dose (PAD), and reflects an amount that is predicted to result in no unreasonable adverse health effects, including sensitive members such as children. Estimated risks that are less than 100% of the PAD are below EPA's level of concern. For fluridone, the acute dietary exposure estimates are less than 1% of the acute PAD. The chronic dietary exposure estimates ranged from 1% of the chronic PAD for the general U.S. population, to 3.6% of the chronic PAD for children ages 1-2 (EPA, 2004).

The EPA has evaluated fluridone and has determined that it likely does not cause cancer. Fluridone is classified as a group E carcinogen, "evidence of non-carcinogenicity for humans." This classification is based on the lack of evidence of carcinogenicity in mice and rats (EPA, 2004).

The Material Safety Data Sheet (MSDS) for Sonar ONE which was included in the permit application dates from 2009. It does state that the product contains material which can cause cancer. However, the current 2015 MSDS does not include this statement. According to manufacturer SePro, the statement was related to a formulation additive, not the active ingredient fluridone. There is no evidence that the current formulation of Sonar ONE causes cancer.

There is some evidence that the degradation product N-methyl formamide (NMF), causes birth defects. However, since NMF has only been detected in the lab and not following actual fluridone treatments, EPA has indicated that fluridone use should not result in NMF concentrations that would adversely affect the health of water users. Further discussion of degradates can be found below.

DEC is satisfied that the proposed project would not result in any unreasonable risks to human health.

Degradates
As part of its evaluation of pesticides, EPA assesses potential impacts from degradates. There are two major compounds that may result when fluridone degrades; 3-trifluromethyl benzoic acid and NMF.

There is some evidence that the degradation product NMF may cause birth defects or other damage to fetuses and may cause damage to liver or other cells. However, NMF has only been detected in the lab and has never been observed as a breakdown product following actual fluridone treatments in natural conditions.

The State of Washington performed calculations to examine potential human health effects of NMF (WSDOE, 2000). They found that the safety factors for NMF exposure through drinking water and through skin absorption are very high. "Under worst case conditions, a person would need to drink 15,852 gallons of treated drinking water per day to reach the No-Observed-Effect Level (NOEL) or greater than 78,077 gallons per day under realistic case conditions. For incidental ingestion, a person would have to swim in fluridone treated water for 1,014 years under worst case conditions and for >5,070 years under realistic case conditions in order to be exposed to equal the NOEL" (WSDOE, 2000).

Since NMF has never been observed in natural conditions following fluridone treatments, EPA has indicated that fluridone use should not result in NMF concentrations that would adversely affect the health of water users (EPA, 2004).

The other primary degradate of fluridone is 3-trifluromethyl benzoic acid. There is no documentation indicating health risks associated with this degradate.

DEC is satisfied that degradates of fluridone as a result of this project are not likely to result in an unreasonable adverse effect.

Medical Uses
Some recent studies indicate that fluridone may have a pharmaceutical use as an anti-inflammatory. Research found that fluridone at micro-molar concentrations may have anti-inflammatory effects on several cell types, via action as an inhibitor of abscisic acid.

The potential that fluridone may be developed as an anti-inflammatory medication in the future does not represent viable evidence that use of fluridone as an herbicide presents any unreasonable risk to human or animal health. Fluridone has been extensively used in similar applications in other states, with no significant impacts to human health, non-target organisms, or the environment.

Drinking Water
Fluridone has a strong tendency to bind to soil particles, which means it is unable to migrate through the ground into nearby drinking water wells. In accordance with label instructions, low

concentrations of fluridone are allowable even when applied directly to potable water sources, a reflection of the low risk to human health from this product. The target concentration for fluridone for this project is 8 ppb, well below the allowable level of fluridone in drinking water sources.

DEC believes that detection in drinking water wells is remote, based on its low mobility in soil. However, in the unlikely event that fluridone does migrate through soil into nearby wells, DEC believes that concentrations would be well below levels of concern and would not be likely to result in an unreasonable adverse effect to human health.

As a precaution, the permit will stipulate a specific schedule for testing for the presence of fluridone in drinking water wells. If fluridone in excess of 20 ppb (label limit for application within ¼ mile of potable water intakes) is detected, additional fluridone application will be prohibited until specifically authorized by DEC. This is considered to be highly unlikely, as the target concentration is 8 ppb.

DEC is satisfied that any impacts to drinking water wells would not represent an unreasonable risk to human health.

High Water Events
Flooding events that impact drinking water wells can result in contamination from numerous sources, including sewer/septic systems and other types of contamination. Wells that have been impacted from flooding should always be cleaned and disinfected prior to use, to ensure water is safe to drink. The target concentration for fluridone for this project is 8 ppb, well below the allowable level of fluridone in drinking water sources. As such, DEC believes that other adverse effects that could occur if a drinking water wellhead is submerged by flood water are a much larger concern than any fluridone that might be present.

During high water flow events, such as storms and break up, the additional water flow would further dilute the concentration of fluridone. Terrestrial plants have less water permeable surfaces, and so are not as susceptible to the effects of fluridone as aquatic vegetation. In addition, fluridone must be in contact with vegetation for extended periods in order to be effective (treatment levels must be maintained for 45-90 days for elodea). As a result, impacts to terrestrial vegetation due to flooding would not be expected.

There are no restrictions for irrigation with treated water for trees, turf, or established plants when levels of fluridone are less than 10 ppb. Plants such as tomatoes, peppers, or newly seeded crops can be more sensitive to treated water; the pesticide labels limit irrigation for these plants if concentrations are greater than 5 ppb. The increased water flow during a flooding event would dilute the concentration of fluridone to less than 5 ppb, so damage to terrestrial plants from fluridone would not be expected. Many plants would be expected to drown during a flooding event in any case.

A dam or blockage could result in elevated levels of water with treatment concentration of fluridone. As a precaution, the permit will include a stipulation that requires the permit holder to monitor visually for dams or blockages weekly, as well as quickly investigate any unexpected changes in stream flow indicated on stream flow gauges. The permit will also include a stipulation that additional fluridone may not be applied during flooding events or if damming or blockage is present.

As explained above, fluridone binds readily to suspended sediment soils and organic matter. Fluridone is not expected to migrate through ground water to impact drinking water wells, even if water levels rise as a result of increased flow, flooding, or damming.

DEC is satisfied that changes to stream flow or flood events will not result in an unreasonable risk to human health or the environment.

Irrigation Uses
Terrestrial plants are not as susceptible to the effects of fluridone as aquatic vegetation. However, the product labels do establish some restrictions on use of treated water for irrigation. In accordance with label for Sonar Genesis, there are no restrictions for irrigation to established turf and lawns, established crops, ornamental plants, and most other types of vegetation. The labels for Sonar One and Sonar H4C caution against using treated water to irrigate established crops, turf, plants, or trees for seven days after treatment. Damage may occur to seedlings or plants in the nightshade family (tomatoes, peppers, potatoes, tobacco, etc.), at concentrations of 5 ppb or above.

Under Alaska Statute 46.15, residents must obtain a water rights permit from the Department of Natural Resources prior to diverting or withdrawing significant quantities of water (greater than 500 gallons per day for ten or more days), including waters from Chena Slough. As of July, 2016, DNR Water Resources has not issued any permits for this activity.

There may be a number of users who withdraw smaller quantities of water from Chena Slough to irrigate gardens or landscaping. These individuals may need to use an alternative source of water during the treatment period, such as well water. Any residents who use water from Chena Slough to irrigate will be cautioned to use an alternative irrigation source for the week immediately following treatments.

DEC is satisfied that the benefits of eradicating elodea through the use of fluridone are greater than the potential detriment of temporary loss of the use of small quantities of irrigation water.

Stream Flow/Downstream Impacts
Chena Lake is a closed water system. Totchaket Slough and Chena Slough are both recharged primarily by upwelling groundwater, and have limited outflow. Totchaket Slough streamflow was measured in 2015 with an average 8.5 cubic feet per second. Chena Slough streamflow was measured in 2015 with an average 52.0 cubic feet per second.

The label for fluridone allows for application to flowing water areas. While some pesticide will flow downstream of the sloughs, the relatively low streamflow is not expected to result in rapid dispersal. Within the sloughs, additional pesticide will need to be added to maintain required concentration. Proposed additional amounts are well within label limits.

Pesticide concentrations are expected to drop downstream due to degradation, dilution, binding to sediment and soil, and pesticide uptake by plants. The levels that would be present downstream would be less than normal treatment concentrations, and therefore well under the levels of concern. As a

precaution, the permit will stipulate that downstream areas must be monitored for impacts to vegetation.

Concentrations of fluridone downstream are expected to be negligible. No herbicidal effects are anticipated to occur downstream of treatment areas. DEC is satisfied that there will be no unreasonable adverse effects to areas downstream of treatment areas.

Non-Target Organisms
Within treatment areas, impacts to non-target organisms are not expected to be significant. Fluridone has been used a number of times in recent years in Alaskan lakes with no unreasonable adverse effects identified. Fluridone has been extensively used in similar applications in other states, with no significant impacts to non-target organisms.

Fluridone does not appear to have any apparent short-term or long-term effects on fish at normal application rates (Washington DNR, 2012). When used at label rates, there are no anticipated impacts to birds or mammals from fluridone. Fluridone shows moderate toxicity to aquatic invertebrates. Invertebrates that are affected would be expected to repopulate treated areas once treatment was completed.

As the permit application acknowledges, some non-target plants will be affected by the proposed pesticide use. In practical application, Elodea has been found to be more susceptible to the effects of fluridone than many native plants, so effects to non-target plants are expected to be limited. Elodea reproduces by fragmentation and maintains an extensive root system. Many native aquatic plants are seed producers, and seeds will not be affected by the fluridone treatment. Studies of other lakes in Alaska treated to control aquatic invasive plants have shown that native plants usually recover within a short period of time. Negative impacts to native plant communities are expected to be minor and short term in nature; overall the project is expected to restore native plant communities and benefit fish habitat.

DEC is satisfied that use of fluridone in this project is not likely to result in an unreasonable adverse impacts to invertebrate, fish, or other animal populations, vegetation, or other non-target organisms.

Water Quality
Effects on water quality parameters such as clarity, dissolved oxygen, and nutrient levels, which may be impacted by decaying plant matter, are expected to return to normal over a short period of time. The treatment is proposed during summer months when there is high lake turnover. This mixing is expected to result in a rapid return to normal oxygen levels in lakes. For the sloughs, stream flows would also result in rapid return to normal oxygen levels.

Environmental Benefit of Pesticide Application
The main environmental benefit of the proposed action is to eliminate Elodea, which is an invasive aquatic weed. The control of invasive species is a priority for environmental management agencies and groups across the state. Elodea is included on UAA's Alaska Exotic Plants Information Clearinghouse (AKEPIC) list of Non-Native Plant Species, developed in coordination with the U.S. Forest Service, National Park Service, Bureau of Land Management, U.S. Fish and Wildlife Service, Department of Natural Resources Plant Material Center, and Alaska Natural Heritage Program. There is evidence to show that Elodea poses a threat to natural habitats.

Allowing Elodea to remain in some areas, including the proposed treatment area, could result in spread to additional waterbodies across the state. It is common for plant fragments to adhere to boats, planes, and other equipment, and therefore be transported to other locations.

Social and Economic Costs and Benefits

Social or Economic Costs
The potential economic/social costs of applying herbicide under the proposed project are:

- temporary loss of the use of small quantities of irrigation water used by residents adjacent to treatment areas; and
- decline of property values due to potential negative perceptions of herbicide use.

No significant users of irrigation water have been identified; DNR has not issued any water use permits to allow this activity. DEC does not believe that the temporary loss of the use of small quantities of irrigation water represent a significant economic or social impact. These users should be able to use an alternative source such as well water during the treatment period.

The proposed herbicide is not expected to impact drinking water wells, which could affect property values. Herbicides and other pesticides are routinely used by homeowners, and this use has not been shown to adversely affect property values.

Water quality in Chena Slough is already significantly compromised. Nearby areas are known to have some contamination from sulfolane. It has been included on Alaska's section 303(d) list of impaired waters since 1994 due to excessive sediment loads. Recent studies also found a number of semi-volatile organic compounds, PCBs, and historical DDT in its sediments, as well as elevated levels of phosphorous, sulfate, and chlorides (Kennedy, 2009). As a result, the perception of the water quality in Chena Slough is already somewhat negative.

Fluridone binds readily to suspended sediment soils and organic matter. Once it adheres to soil particles, fluridone is unavailable to disperse or to continue to act as an herbicide. Fluridone has an estimated half-life in water of only 20 days (EPA, 1986) and a hydrosoil half-life of approximately 119 days (NCBI, 2005). As a result, fluridone remains present in the environment for only a limited time.

DEC does not believe that short term addition of fluridone will change the perception or cause any significant additional concern regarding the water quality in Chena Slough. DEC is satisfied that that the proposed project is not likely to result in a negative impact to property values.

Social or Economic Benefits
The potential economic/social benefits of applying herbicide under the proposed project affect both the specific treatment area, and the statewide efforts to eradicate invasive elodea. At the treatment area, benefits of the proposed project are:

- improved navigation and safety for boat and float plane traffic and other recreation;
- reduced silt build up due to trapping in elodea vegetation mats; and
- improved fish habitat, resulting in enhanced fishing opportunity.

On a larger scale, control of invasive species is a priority for environmental management agencies and groups across the state. Elodea is included on UAA's Alaska Exotic Plants Information Clearinghouse (AKEPIC) list of Non-Native Plant Species, developed in coordination with the U.S. Forest Service, National Park Service, Bureau of Land Management, U.S. Fish and Wildlife Service, Department of Natural Resources Plant Material Center, and Alaska Natural Heritage Program. There is evidence to show that Elodea poses a threat to natural habitats and native species.

Allowing Elodea to remain in some areas, including the proposed treatment area, could result in spread to additional waterbodies across the state. It is common for plant fragments to adhere to boats, planes, and other equipment, and therefore be transported to other locations where it becomes established.

The potential economic/social benefits over a larger area of applying herbicide under the proposed project include:

- Preventing negative impacts to water quality such as reduced levels of dissolved oxygen caused by excessive elodea growth;
- Decreased silt trapping from elodea vegetation mats;
- Improved navigation and safety for boat traffic and other recreation;
- Reduced impacts to streamflow;
- Protection of native plant communities;
- Preventing severe impact to native fisheries; and
- Significantly reduced costs of controlling elodea now when it is confined to discrete populations, as opposed to costs of controlling after it has spread to additional waterbodies spread over a larger area.

DEC recognizes that some individuals are opposed to herbicide use, and the application of herbicides for elodea control will concern them. The benefits of application are significant, however, given the damage caused to water bodies by elodea, and the realistic threat of spread to other areas. This represents a serious environmental risk, in addition to potential social and economic impacts.

Evaluation Results
Based on this analysis, there is no evidence to indicate that conditions in Alaska or at the proposed application sites would significantly affect the persistence, fate, mobility, or action of these products

and would result in unreasonable adverse effects. The EPA evaluation and registration process is in itself sufficient to ensure no unreasonable adverse effects should be expected from the proposed use of pesticides specified in the permit application for the Fairbanks Area Elodea Control Project. In addition, fluridone has been used a number of times in recent years in Alaskan lakes with no unreasonable adverse effects identified. Fluridone has been extensively used in similar applications in other states, with no documented significant impacts to human health, non-target organisms, or the environment.

As additional protective measures, the permit will include the following stipulations:

- Require a specific schedule for testing for the presence of fluridone in drinking water wells.
- If fluridone in excess of 20 ppb is detected in drinking water wells, additional fluridone application will be prohibited until specifically authorized by DEC.
- Require weekly visual monitoring for dams or blockages in Chena Slough.
- Require installation and monitoring of two stream gauges in Chena Slough.
- Require investigation of any unexpected changes in stream flow indicated on stream flow gauges.
- Prohibition against applying additional fluridone during flooding events or if damming or a blockage is present
- Require visual monitoring of downstream areas for impacts to vegetation.
- Require that the automatic drip station controls in Chena Slough be located in a secure, locked box capable of containing any leaks which might occur at the distribution site.
- Require weekly monitoring of the drip station to ensure proper functioning.
- Require baseline measurement of water quality parameters such as clarity, dissolved oxygen, and nutrient levels, prior to treatment.
- Require notification to residents who may use treated waters for irrigation, cautioning them to use an alternative irrigation source for the week immediately following treatment.

Conclusion

The Pesticide Program has reviewed the permit application materials and determined that the proposed project is unlikely to result in any unreasonable adverse effects to humans, animals, or the environment, based on consideration of economic, social, and environmental costs and benefits of the use of the herbicide.

When used in accordance with label instructions, no unreasonable adverse effects are expected with these products. Similar applications have been successfully completed in other states and Alaska, with no problems observed.

Based on these findings, the Pesticide Program will grant a Pesticide Use Permit for the above referenced project.

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8.2.2 Responsiveness Summary

Department of Environmental Conservation
Division of Environmental Health

Department of Natural Resources
Application for
Permit to Use Pesticide
For Control of Elodea
In the Fairbanks Area

Public Noticed
May 2 through June 2, 2016

RESPONSIVENESS SUMMARY
November 9, 2016

INTRODUCTION

Project Description

On April 27, 2016, the Alaska Department of Natural Resources (DNR), Division of Agriculture submitted an application for a permit to apply herbicide to control invasive Elodea in Chena Lake, Chena Slough, and Totchaket Slough in the Fairbanks area.

Elodea is an invasive aquatic plant that has the potential to grow abundantly and compromise water quality, hinder boat and float plane traffic, reduce dissolved oxygen, and impact fisheries. Control of this invasive plant is necessary to prevent spread to other locations. Physical or mechanical controls are inappropriate, as these methods break the plant into fragments which can then reproduce.

The proposed products include:

- Sonar GENESIS, with EPA registration number 67690-54 and state of Alaska registration number AK-1600001;
- Sonar ONE, with EPA registration number 67690-45; and
- Sonar H4C, with EPA registration number 67690-61.

All products have the active ingredient fluridone. Treatment is proposed to occur between May and October throughout the duration of the permit.

Fluridone is a selective systemic herbicide labeled for use in controlling aquatic vegetation in a variety of aquatic sites. Fluridone kills target plants by inhibiting the formation of carotene. In the absence of carotene, chlorophyll is degraded by sunlight, preventing the plant from photosynthesizing.

Liquid product (Sonar Genesis) will be applied from motorboats using a weighted trailing hose to inject liquid herbicide into the lower portions of the water column (Chena Lake, Totchaket Slough) or via a continuous drip system (Chena Slough). Pelleted product (Sonar One, Sonar H4C) will be applied from motorboats using a forced air blower system, or applied by hand along shorelines.

Public Comment

Notice of the permit application was published in the Fairbanks Daily News-Miner on May 1 and 2, 2016. Notice included information about the opportunity to submit comments on the permit application. The Alaska Department of Environmental Conservation (DEC) also posted the public notice online at *www.state.ak.us/dec/eh/pest* and *www.dec.state.ak.us/public_notices.htm*.

The public comment period for the permit application began on May 2, 2016 and ended June 2, 2016. DEC received 25 written comments within the comment period.

Decision Process and Purpose of Responsiveness Summary

The purpose of this document is to respond to comments received during the public comment period. Information regarding DEC's evaluation of the permit application is included in a separate Decision Document. In its decision, DEC considers whether the proposed pesticide use complies with requirements of Title 18, Chapter 90 of the Alaska Administrative Code (18 AAC 90), and whether the proposed use could result in an unreasonable adverse effect, including an unreasonable

risk to human, animals, or the environment, taking into account the economic, social, and environmental costs and benefits of the use of a pesticide.

The following pages provide information about DEC's decision process, a summary of the comments that were submitted during the public comment period, and DEC's response to those comments.

Pesticide Product Registration Process

Before manufacturers can sell pesticides in the United States, the Environmental Protection Agency (EPA) evaluates the pesticides thoroughly to make sure they can be used without posing harm or "unreasonable adverse effects" to human health or the environment.

Pesticide products must undergo rigorous testing and evaluation prior to registration approval. EPA scientists and analysts carefully review data to determine whether to register a pesticide product, and whether specific restrictions are necessary. EPA uses internal and external reviews involving peers and the public through a comment process when conducting these evaluations.

The scientific data requirements for product registration are very detailed. Required data includes characterizations of the pesticide's chemistry and manufacturing process; mammalian and eco-toxicology; environmental fate; residues in or on human and livestock food or feed crops; applicator, occupational, and bystander exposures; product efficacy; and incident reports. Registrants can be required to conduct and submit up to 100 or more individual scientific studies for the registration of a new pesticide.

By definition, all pesticides are toxic to some degree. The level of risk from a pesticide depends on how toxic or harmful the substance is, and the likelihood of people or other non-target organisms coming into contact with it. Uncertainty factors are built into the risk assessment. These factors create an additional margin of safety for protecting people who may be exposed to the pesticides.

In order for a pesticide to be registered, the EPA must determine that the product can be used as labeled without causing unreasonable adverse effects to humans or the environment. If risks or concerns are identified, appropriate risk mitigation measures are required. These are implemented through product label requirements, which may include reductions in application rates, restrictions to approved sites or commodities, advisory statements, implementation of specific management practices, and other restrictions or limitations designed to mitigate risk.

The proposed product label must provide the active pesticide ingredients, application directions, use restrictions, and warnings. This label information is based on the underlying scientific data and conclusions about potential hazards, exposures, and risks from use according to the label.

EPA also conducts regular reassessments of currently registered pesticides. Through this re-registration program, EPA assesses new scientific studies and information about registered products. If there is new evidence documenting unreasonable risk to human health and the environment, the allowed usage is modified and the label changed. When EPA identifies data gaps, new studies are required and reviewed.

If new information or studies show that a pesticide represents an unreasonable risk even after a change of allowable usage, EPA has the authority to cancel registration of products containing that pesticide. Whenever EPA determines there are urgent human and environmental risks from pesticide exposures that require prompt attention, EPA will take appropriate regulatory action, regardless of the registration review status of that pesticide.

EPA's extensive analyses of each pesticide product, and incorporation of new scientific data regarding safety and use of existing products, is sufficient to protect human health and the environment from unreasonable adverse effects if used in accordance with the label.

DEC does a thorough review of the proposed application to ensure that it complies with label instructions. DEC also evaluates the proposed site and conditions to ensure there are no factors which might pose additional risk.

RESPONSE TO COMMENTS

1. Comment Summary

Concerns over health effects of fluridone:

- Fluridone is not safe for consumption
- The acceptable level for fluridone in drinking water wells is zero.
- We do not know what levels of this herbicide are safe for consumption.
- There are unknown side effects of fluridone.
- Fluridone is a carcinogen (page 61, Sonar ONE MSDS).

Response:

The health effects of the proposed pesticide have been extensively studied and are well understood. This pesticide has been registered since 1986 and has been widely used across the United States.

A complete human health risk assessment for fluridone was completed in support of the EPA's 2004 fluridone Tolerance Reassessment Eligibility Decision (TRED). This assessment found that the food, drinking water and recreational swimmer risks are not of concern separately or when aggregated.

One measure of risk that the EPA considers is the Residential Margin of Exposures (MOEs). MOEs greater than 100 are considered to be not of concern. The drinking water MOEs for fluridone and degradates are greater than 7,500. The recreational swimmer MOEs for fluridone and degradates are greater than 4,800. In the available toxicity studies, there was no indication that fluridone, is an endocrine disruptor, nor does it impair immune function.

Dietary risk assessment incorporates both exposure to, and toxicity of, a given pesticide. Dietary risk is expressed as a percentage of an identified level of concern. This level of concern is referred to as the population adjusted dose (PAD), and reflects an amount that is predicted to result in no unreasonable adverse health effects, including sensitive members such as children. Estimated risks that are less than 100% of the PAD are below EPA's level of concern. For fluridone, the acute dietary exposure estimates are less than 1% of the acute PAD. The chronic dietary exposure estimates ranged from 1% of the chronic PAD for the general U.S. population, to 3.6% of the chronic PAD for children ages 1-2.

The EPA has evaluated fluridone and has determined that it likely does not cause cancer. Fluridone is classified as a group E carcinogen, "evidence of non-carcinogenicity for humans." This classification is based on the lack of evidence of carcinogenicity in mice and rats.

The Material Safety Data Sheet (MSDS) for Sonar ONE which was included in the permit application dates from 2009. It does state that the product contains material which can cause cancer. However, the current 2015 Safety Data Sheet does not include this statement. According to manufacturer SePRO, the statement was related to a formulation additive, not the active ingredient fluridone. There is no evidence that the current formulation of Sonar ONE causes cancer.

There is some evidence that the degradation product N-methyl formamide (NMF), causes birth defects. However, since NMF has only been detected in the lab and not following actual fluridone treatments, EPA has indicated that fluridone use should not result in NMF concentrations that would adversely affect the health of water users. More discussion of degradates is found under **Comment 14**.

DEC is satisfied that the proposed project would not result in any unreasonable risks to human health.
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2. Comment Summary
Regarding geologic and hydrologic characteristics of the treatment area:

- There needs to be more research and investigation done about how fluridone moves through groundwater.
- A thorough ground hydrology study should be required.
- Not all parts of Chena Slough have fine grained organic rich sediment as stated on page 28 of the permit application.
- Many areas within the treatment area have a gravel bottom.
- The K_{oc} of fluridone will not apply to areas of the slough with a clean gravel bottom.
- Fluridone may travel only a few inches through soils rich in organics and clay, but some parts of Chena Slough are gravel.
- There is a shallow aquifer/groundwater in Chena Slough area.
- Chena Slough and the aquifer are interconnected/the same water body.
- Chena Slough is not a slough, it is a groundwater seepage system with a highly permeable substrate and unconfined aquifer.
- Ground water hydrology has not been adequately studied.
- The permit application's description of geological and hydrological characteristics of the slough is inadequate.

Response:
The geology and hydrology of Chena Slough and the rest of the proposed treatment area are well understood. A large number of studies have been conducted over the years to provide an extremely well documented, comprehensive hydrologic and geologic characterization of the area.

There is significant documentation that Chena Slough is underlain with organic rich, fine grained sediment. Several studies note that Chena Slough has extensive vegetative mats, rooted aquatic plant growth, and excessive accumulation of organic fines. A United States Geological Society study (Kennedy, 2009) concluded that, "organic rich fine-grained sediments accumulate in Chena Slough because of the road crossing impoundments and flow velocities that are not high enough to flush the fines downstream". Chena Slough has been included on Alaska's section 303(d) list of impaired waters under the Clean Water Act since 1994; it is listed due to excessive sediment loads.

The soil organic carbon partitioning coefficient, denoted as K_{oc}, is a measure of the tendency of a chemical to bind to soils. These values can vary substantially, depending on soil type, soil pH, the

properties of the pesticide, and the type of organic matter in the soil. The larger the K_{oc} value, the stronger the adsorption of the chemical to soil, leading to lower mobility.

In most situations, fluridone is characterized as binding quickly to suspended sediment soils and organic matter, resulting in moderate to low mobility in soil. Pesticides bind more readily to fine grained particles, due to the increased surface area to which the molecules can adhere. Due to chemical characteristics, fluridone also tends to bind more readily to organic sediments.

In areas with fine grained, organic rich soils, such as the Chena Slough, the K_{oc} of fluridone has been measured to be approximately 2,700, which indicates low mobility, or ability to travel through soils (Reinert 1989). It is possible (although no documentation has been provided) that some limited locations within the application area could be underlain with gravel. The K_{OC} in these immediate areas would be lower. However, fluridone would bind to other fine grained soils as it moves through the surrounding substrate.

DEC is satisfied that the hydrology and geology of the Chena Slough are adequately understood. DEC is also satisfied that conditions in the slough would prevent significant migration of fluridone into surrounding ground water.
++

3. Comment Summary
Regarding concern over impacts to drinking water wells:

- There needs to be a guarantee that fluridone won't reach drinking water wells.
- Fluridone contamination in wells would require use of a water storage system which would be very expensive.
- The acceptable level for fluridone in drinking water wells is zero.

Response:
As discussed in detail in response to **Comment 2**, fluridone is not expected to migrate through ground water significantly, and will therefore not be expected to reach drinking water wells. The behavior of the proposed pesticide has been extensively studied and is well understood. Fluridone has a strong tendency to bind to soil particles, which means it is unlikely to migrate through the ground into nearby drinking water wells.

In accordance with label instructions, low concentrations of fluridone are allowable even when applied directly to potable water sources, a reflection of the low risk to human health from this product. The target concentration for fluridone for this project is 8 ppb, well below the allowable level of fluridone in drinking water sources.

DEC is satisfied that any potential impacts to drinking water wells would not represent an unreasonable risk to human health.
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4. Comment Summary
Regarding label restrictions near potable water intakes:

- The labels state that you may not apply the products within ¼ mile of any functioning potable water intake at application rates greater than 20 ppb.
- Drinking water wells may not technically meet the definition of a potable water intake, but Chena Slough should still be considered a source of potable water because it is actually a groundwater seepage system and the substrate is highly permeable.

Response:
There are no potable water intakes identified in any of the proposed treatment areas. The fluridone label prohibits application exceeding 20 ppb within ¼ mile of potable water intakes. The target concentration for fluridone for this project is 8 ppb, well below the allowable level of fluridone in drinking water sources.

Drinking water wells are separated from the surface water by soils which present a barrier to movement of pesticide. Drinking water wells are therefore not considered potable water intakes as defined by the label.

The behavior of the proposed pesticide has been extensively studied and is well understood. Fluridone has a strong tendency to bind to soil particles, which means it is unlikely to migrate through the ground into nearby drinking water wells.

As discussed in **Comment 2 and 3**, fluridone is unlikely to migrate to drinking water wells, and DEC is satisfied that any impacts to drinking water would not represent an unreasonable risk to human health.
++

5. Comment Summary
Concern over effects of high water events or floods:

- Water from the slough discharges to the surrounding groundwater during high flow events such as storms and breakup.
- There should be daily inspections of each culvert, and of water levels, to ensure that correct discharge and flow information is available.
- Beaver dams have changed water levels drastically in the past. A dam could limit water flow and increase fluridone concentration.
- Chena and Totchaket Sloughs flood frequently.
- If treated waters flow onto private property, it would affect lawns, vegetation, and gardens.
- A large volume of rainfall in could raise water levels and contaminate wells.

Response:
Flooding events that impact drinking water wells can result in contamination from numerous sources, including sewer/septic systems and other types of contamination. Wells that have been impacted from flooding should always be cleaned and disinfected prior to use, to ensure water is

safe to drink. The target concentration for fluridone for this project is 8 ppb, well below the allowable level of fluridone in drinking water sources.

During high water flow events, such as storms and break up, the additional water flow would further dilute the concentration of fluridone. Terrestrial plants have less water permeable surfaces, and so are not as susceptible to the effects of fluridone as aquatic vegetation. In addition, fluridone must be in continuous contact with vegetation for extended periods in order to be effective (treatment levels must be maintained for 45-90 days for elodea). As a result, impacts to terrestrial vegetation due to flooding would not be expected.

There are no restrictions for irrigation with treated water for trees, turf, or established plants when levels of fluridone are less than 10 ppb. Plants such as tomatoes, peppers, or newly seeded crops can be more sensitive to treated water; the pesticide labels limit irrigation for these plants if concentrations are greater than 5 ppb. The increased water flow during a flooding event would dilute the concentration of fluridone to less than 5 ppb, so damage to terrestrial plants from fluridone would not be expected. Many plants would be expected to drown during a flooding event in any case.

A dam or blockage could result in elevated levels of water with treatment concentration of fluridone. As a precaution, the permit will include a stipulation that requires the permit holder to monitor visually for dams or blockages weekly, as well as investigate any unexpected changes in stream flow indicated on stream flow gauges. The permit will also include a stipulation that additional fluridone may not be applied during flooding events or if damming or blockage is present.

As explained in **Comment 2**, fluridone binds readily to suspended sediment soils and organic matter. Fluridone is not expected to migrate through ground water to impact drinking water wells, even if water levels rise as a result of increased flow, flooding, or damming.

DEC is satisfied that changes to stream flow or flood events will not result in an unreasonable risk to human health or the environment.
++

6. Comment Summary
Who would be liable for damage to private property if wells were contaminated, treated waters flowed onto property, or other damage occurred?

Response:
No unreasonable adverse effects are expected as a result of the proposed project. However, as a state agency, DNR is self-insured through the state. As the permittee, DNR is responsible for ensuring that all pesticide regulations and the terms of the Pesticide Use Permit are complied with.
++

7. Comment Summary
There are many areas already contaminated with sulfolane that leaked accidentally. We do not wish to deal with the possibility of two contaminants in this area.

Response:
We understand and appreciate the concern about groundwater contamination in the North Pole area, particularly with the sulfolane contamination in nearby areas. In the case of the proposed fluridone application to Chena Slough, we do not believe there will be any concerns with impact to groundwater near the treatment area. Fluridone has an estimated half-life in water of only 20 days (EPA, 1986), so it will not be present beyond a limited time. See **Comment 2** for further discussion of impacts to ground water.
++

8. Comment Summary
Regarding identification of drinking water wells:

- There are many drinking water wells within 200 feet of Chena Slough.
- There are nearly 1000 drinking wells within ½ mile of the treatment area.
- DNR did not do an acceptable job in identifying drinking water wells in the current permit application.
- The lack of research shows negligence for safety.

Response:
As stated in the permit application, DNR obtained drinking water well information from the DEC Safe Drinking Water Information System as well as Fairbanks North Star Borough databases listing improved parcels. DEC believes that DNR made a reasonable effort to identify drinking water wells for this permit application. Because of the characteristics of fluridone, there are no expected impacts to drinking water near the treatment area. See **Comments 2 and 3** for further discussion of impacts to drinking water wells.
++

9. Comment Summary
There are several ponds and gravel pits within 200 feet of Chena Slough.

Response:
As explained in **Comment 2**, fluridone binds readily to suspended sediment soils and organic matter. Fluridone is not expected to migrate through ground water to impact nearby ponds or gravel pits. In the case of a flooding or high water event that flowed into nearby ponds, the additional water flow would dilute the concentration of fluridone to levels that would not result in impacts to the ponds.
++

10. Comment Summary
The label states that the hydrology must be thoroughly evaluated when used in moving water. This has not been done.

Response:
The labeled application rate is dependent on the average flow rate in moving water. Other than that, the labels for all three products do not require a thorough evaluation of hydrology.

The geology and hydrology of Chena Slough and the rest of the proposed treatment area are well understood. A large number of studies have been conducted over the years to provide an extremely well documented, comprehensive hydrologic and geologic characterization of the area. More discussion of hydrology of the treatment area is found under **Comment 2**.

DEC is satisfied that the applicant has sufficient information on the hydrology of the proposed treatment areas in order to correctly determine application rates.
++

11. Comment Summary
Comments related to testing for contamination:

- There needs to be a specific plan regarding testing drinking water wells for presence of fluridone and its degradates.
- The permit should prohibit further application of fluridone if it is detected in any drinking water wells.
- Random testing of wells should be required.

Response:
As discussed in **Comment 2**, fluridone is not expected to migrate through ground water or reach drinking water wells. However, as a precaution, the permit will stipulate a specific schedule for testing for the presence of fluridone in drinking water wells. If fluridone in excess of 20 ppb (label limit for application within ¼ mile of potable water intakes) is detected, additional fluridone application will be prohibited until specifically authorized by DEC. This is considered to be highly unlikely, as the target concentration is 8 ppb.
++

12. Comment Summary
Concern related to total amounts of pesticide to be applied:

- The permit application states that additional fluridone will be added to maintain the required concentration in the treatment area.
- There should be an upper limit for the total amount that can be applied.
- Some of the calculations given in the permit are very close to 150 ppb label limit.
- The permit should specify the maximum total amount that can be applied.
- If all listed products are applied, the combined total will exceed 150 ppb.
- If the concentration is lower than expected due to streamflow, they will need to add more pesticide and it could exceed the 150 ppb limit.

Response:
The pesticide product labels provide specific limits on the amount of each product that can be applied each year. All of the targeted application rates listed in this permit application are well below the label limits.
++

13. Comment Summary

The plan underestimates the amount of chemical needed due to streamflow in Chena Slough.

Response:
Hydrology and stream flow of Chena Slough is well documented in a number of studies (see **Comment 2**). Additional stream flow studies have been conducted by the applicants in recent months to ensure accurate data. In addition, two stream gauges will be installed and monitored as part of the proposed project.

The permit application allows for additional product to be added to maintain required concentrations. However, amounts exceeding 150 ppb in one year are not permitted.
++

14. Comment Summary
Concern over degradates of fluridone (compounds that form as the fluridone breaks down or degrades):

- Degradates of fluridone are a health hazard (Sonar ONE MSDS Hazard Identification).
- N-methyl formamide (NMF), a degradate of fluridone, travels in water.
- NMF is classified as a chemical that can damage fertility, can harm an unborn child, can cause liver damage, and can cause respiratory damage. (pubchem database)
- 3-trifluromethyl benzoic acid is a degradate of fluridone.
- How long will degradates persist in water?
- What are the effects of degradates?

Response:
As part of its evaluation of pesticides, EPA assesses potential impacts from degradates. There are two major compounds that may result when fluridone degrades; 3-trifluromethyl benzoic acid and NMF.

There is some evidence that the degradation product NMF may cause birth defects or other damage to fetuses and may cause damage to liver or other cells. However, NMF has only been detected in the lab and has never been observed as a breakdown product following actual fluridone treatments in natural conditions.

The State of Washington performed calculations to examine potential human health effects of NMF (WSDOE, 2000). They found that the safety factors for NMF exposure through drinking water and through skin absorption are very high. "Under worst case conditions, a person would need to drink 15,852 gallons of treated drinking water per day to reach the No-Observed-Effect Level (NOEL) or greater than 78,077 gallons per day under realistic case conditions. For incidental ingestion, a person would have to swim in fluridone treated water for 1,014 years under worst case conditions and for >5,070 years under realistic case conditions in order to be exposed to equal the NOEL" (WSDOE, 2000).

Since NMF has never been observed in natural conditions following fluridone treatments, EPA has indicated that fluridone use should not result in NMF concentrations that would adversely affect the health of water users (EPA, 2004).

The other primary degradate of fluridone is 3-trifluromethyl benzoic acid. There is no documentation indicating health risks associated with this degradate.

DEC is satisfied that degradates of fluridone resulting from this project are not likely to result in an unreasonable adverse effect.
++

15. Comment Summary
Concern over property values:

- Any detection of chemical in wells will make it impossible for homeowners to sell their homes.
- No amount of fluridone is acceptable in wells.

Response:
DEC considers the social and economic costs and benefits in determining whether a proposed pesticide application poses an unreasonable adverse effect. In general, this evaluation considers both the costs and benefits of applying pesticides, and the costs and benefits of not applying pesticides (effectively, costs and benefits of not treating the pest). The risk of not controlling Elodea and allowing it to spread across the state is considered to be significant.

The proposed herbicide is not expected to impact drinking water wells (see **Comments 2 and 3**). Herbicides and other pesticides are routinely used by homeowners, and this use has not been shown to adversely affect property values.

Water quality in Chena Slough is already significantly compromised. Nearby areas are known to have some contamination from sulfolane. Chena Slough has been included on Alaska's section 303(d) list of impaired waters since 1994 due to excessive sediment loads. Recent studies also found a number of semi-volatile organic compounds, PCBs, and historical DDT in its sediments, as well as elevated levels of phosphorous, sulfate, and chlorides (Kennedy, 2009).

DEC does not believe that short term addition of fluridone will change the perception or cause any significant additional concern regarding the water quality in Chena Slough. DEC does not believe that there will be any significant negative impact to property values as a result of the project.
++

16. Comment Summary
Fluridone is banned in Europe and Japan.

Response:
This information is incorrect. Due to lack of demand and economic benefit, the manufacturer generally did not register Sonar products for sale in Europe or Japan. Sonar has never been registered for sale in Japan. Of European countries, the only country Sonar was previously registered in was France.

The manufacturer voluntarily withdrew the registration in France when the expense of new data requirements to maintain registration exceeded the market opportunity (personal communication, SePRO). Once a product is removed from the market in the European Union, it is considered banned and cannot be sold; however, it is important to understand that this ban is not based on environmental or toxicological reasons.
++

17. Comment Summary
Regarding need to control Elodea:

- More research is needed on Elodea.
- Decisions over whether to eradicate Elodea should involve hydrologists, geologists, chemists, environmental consultants, etc.
- Elodea needs to be eradicated, not just controlled, or it could spread to other areas.

Response:
Control of invasive species is a priority for environmental management agencies and groups across the state. The need for control of Elodea is well documented in the Justification portion of the Pesticide Use Permit application.

Elodea is included on UAA's Alaska Exotic Plants Information Clearinghouse (AKEPIC) list of Non-Native Plant Species, developed in coordination with the U.S. Forest Service, National Park Service, Bureau of Land Management, U.S. Fish and Wildlife Service, Department of Natural Resources Plant Material Center, and Alaska Natural Heritage Program. There is evidence to show that Elodea poses a threat to natural habitats.
++

18. Comment Summary
Comments regarding efficacy of project:

- It will not be possible to treat all areas of Chena Slough to eradicate all Elodea.
- Chena Slough is the perfect habitat for Elodea, so even if it is eradicated it will return.
- There is Elodea in the Chena River. It will allow Elodea to return to treated areas.

Response:
Fluridone has been used extensively for aquatic vegetation control for many years. Characteristics and behavior of fluridone products have been widely studied and are well understood. Fluridone has been successfully used to control Elodea in numerous locations in Alaska in recent years. There is no evidence that the proposed treatment areas under this permit are significantly different such that use of fluridone would be ineffective.

While it is possible for Elodea to repopulate a treated area, the goal for Elodea in Alaska is eradication. Downstream areas, such as the Chena River, are unlikely to provide a reservoir for repopulation unless the Elodea is moved by mechanical means.
++

19. Comment Summary
Concerns regarding efficacy of products:

- There is no evidence that use of fluridone will be successful.
- The product label states that Elodea is often tolerant to fluridone.
- The type of Elodea found in the proposed treatment area is not listed on the product label.

Response:
Fluridone has been used extensively for aquatic vegetation control for many years. Characteristics and behavior of fluridone products have been widely studied and are well understood. Fluridone has been successfully used to control Elodea in Alaska in numerous lakes in recent years.
++

20. Comment Summary
SePRO is too involved in promoting this project. It stands to profit from use of its products.

Response:
It is unlikely that the small quantities of product proposed for this project represent a significant profit for the manufacturers.

Regardless of who is funding the project or who may stand to profit, DEC's role in this process is to determine whether or not the proposed project is likely to result in unreasonable adverse effects, and then issue or deny the permit based on that evaluation.
++

21. Comment Summary
Four to five years is too long a time to have a chemical continuously applied to the water.

Response:
As stated in the permit application, the goal is to maintain treatment levels for 45-90 days per season. After the second season, the need for additional applications will be evaluated.
++

22. Comment Summary
Fluridone will move with the current to other areas, and impact other residents.

Response:
Chena Lake is a closed water system. Totchaket Slough and Chena Slough are both recharged primarily by upwelling groundwater, and have limited outflow. Totchaket Slough streamflow was measured in 2015 with an average 8.5 cubic feet per second. Chena Slough streamflow was measured in 2015 with an average 52.0 cubic feet per second.

The label for fluridone allows for application to flowing water areas. While some pesticide will flow downstream of the sloughs, the relatively low streamflow is not expected to result in rapid dispersal. Within the sloughs, additional pesticide will need to be added to maintain required concentration. Proposed additional amounts are well within label limits.

Pesticide concentrations are expected to drop downstream due to degradation, dilution, binding to sediment and soil, and pesticide uptake by plants. The levels that would be present downstream would be less than normal treatment concentrations, and therefore well under the levels of concern. As a

precaution, the permit will stipulate that downstream areas must be monitored for impacts to vegetation.

Concentrations of fluridone downstream are expected to be negligible. No herbicidal effects are anticipated to occur downstream of treatment areas. DEC is satisfied that there will be no unreasonable adverse effects to areas downstream of treatment areas.
++

23. Comment Summary
Concern over impacts to non-target vegetation:

- Fluridone is non-selective and will kill native plants, including trees and willows.
- Native vegetation may not be able to re-establish themselves.
- The 2011 document "Control Options for Elodea spp. In the Chena Slough" states that fluridone has a potential to kill desirable aquatic vegetation and could impact other non-target organisms.

Response:
Fluridone has been used extensively for aquatic vegetation control for many years. Characteristics and behavior of fluridone products have been widely studied and are well understood.

As the permit application acknowledges, some non-target plants will be affected by the proposed pesticide use. In practical application, however, Elodea has been found to be more susceptible to the effects of fluridone than many native plants, so effects to non-target plants are expected to be limited. Elodea reproduces by fragmentation and maintains an extensive root system. Many native aquatic plants are seed producers, and seeds will not be affected by the fluridone treatment. Studies of other lakes in Alaska treated to control aquatic invasive plants have shown that native plants usually recover within a short period of time. Negative impacts to native plant communities are expected to be minor and short term in nature; overall the project is expected to restore native plant communities.

Fluridone is not expected to have any short or long-term effects on invertebrates, fish, or other animals that are exposed to normal treatment concentrations. As described above, impacts to non-target plant communities are expected to be minor and short term in nature. As a result, no negative impacts to invertebrate, fish, or other animal populations are expected.

Effects on water quality parameters such as clarity, dissolved oxygen, and nutrient levels, which may be impacted by decaying plant matter, are expected to return to normal over a short period of time.

There is no evidence that the proposed use would result in an unreasonable adverse effect, including an unreasonable risk to animals or the environment.
++

24. Comment Summary
Concern over impacts to animals:

- Insects and microorganisms have increased mortality rates due to fluridone.

- Cumulative exposure to low levels of fluridone over several years could have a detrimental effect on fish and bird populations.
- The 2011 document "Control Options for Elodea spp. In the Chena Slough" states that fluridone has a potential to impact non-target organisms.
- Moose that are harvested downstream of the slough could be impacted.

Response:
Within treatment areas, impacts to non-target organisms are not expected to be significant. Fluridone has been used a number of times in recent years in Alaskan lakes with no unreasonable adverse effects identified. Fluridone has also been extensively used in similar applications in other states, with no significant impacts to non-target organisms.

Fluridone does not appear to have any apparent short-term or long-term effects on fish at normal application rates (Washington DNR, 2012). When used at label rates, there are no anticipated impacts to birds or mammals from fluridone. Fluridone shows moderate toxicity to aquatic invertebrates. Invertebrates that are affected would be expected to repopulate treated areas once treatment was completed.

Negative impacts to native plant communities are expected to be minor and short term in nature (see **Comment 23**); overall the project is expected to restore native plant communities and benefit fish habitat. As a result, no negative impacts to fish or their habitat are expected from the proposed pesticide.
++

25. Comment Summary
The population density in the area warrants additional concern.

Response:
DEC's role in this process is to determine whether or not the proposed project is likely to result in unreasonable adverse effects, and then issue or deny the permit based on that evaluation. The number of people in an area would not change that evaluation.

There have been a number of fluridone permits issued in highly populated areas, including Sand Lake, Lake Hood, and other water bodies within Anchorage. No negative impacts have been identified as a result of these permits.
++

26. Comment Summary
Concern over use of slough water for irrigation:

- Irrigation from fluridone treated water may cause injury to gardens, crops, and other vegetation.
- Many people use Chena Slough to water their gardens.
- EPA restricts irrigation using fluridone treated water for 14 days.

Response:
Terrestrial plants are not as susceptible to the effects of fluridone as aquatic vegetation. However, the product labels do establish some restrictions on use of treated water for irrigation. In accordance with the label for Sonar Genesis, there are no restrictions for irrigation to established turf and lawns, established crops, ornamental plants, and most other types of vegetation. The labels for Sonar One and Sonar H4C caution against using treated water to irrigate established crops, turf, plants, or trees for seven days after treatment. None of the labels restrict irrigation restriction for a period of 14 days.

All three product labels note that damage may occur to seedlings or plants in the nightshade family (tomatoes, peppers, potatoes, tobacco, etc.), at concentrations of 5 ppb or above.

Under Alaska Statute 46.15, residents must obtain a water rights permit from the Department of Natural Resources prior to diverting or withdrawing significant quantities of water (greater than 500 gallons per day for ten or more days), including waters from Chena Slough. As of July, 2016, DNR Water Resources has not issued any permits for this activity.

There may be a number of users who withdraw smaller quantities of water from Chena Slough to irrigate gardens or landscaping. These individuals may need to use an alternative source of water during the treatment period, such as well water. Any residents who use water from Chena Slough to irrigate will be cautioned to use an alternative irrigation source for the week immediately following treatments.
++

27. Comment Summary
Fluridone treated water may be dangerous to recreational water users.

Response:
The labels for the proposed pesticides specify that there is no water use restriction following application for fishing or swimming at the proposed concentration. No quarantine is required after application. There is no evidence that the proposed use would result in an unreasonable adverse effect, including an unreasonable risk to humans.
++

28. Comment Summary
Comments related to use of fluridone to treat Elodea in other lakes:

- Fluridone has been successfully used to treat Elodea in Beck, Daniels, and Stormy Lakes in Kenai, and should also be successful for this project.
- Successful use of fluridone in other areas is not an indication that it would work in Badger Slough. Badger Slough is unique, so using fluridone in that location would be experimental.

Response:
Results from the Kenai area lakes Elodea eradication show good results, with significant reductions in most test areas. In addition, results from the Kenai area lakes do not indicate any problems with the use of these products in typical Alaska lakes. There is no evidence that the proposed treatment

areas under this permit are significantly different such that use of fluridone would result in significantly different results. There is no evidence that the proposed treatment would result in an unreasonable adverse effect, including an unreasonable risk to human, animals, or the environment.
++

29. Comment Summary
This project is too expensive.

Response:
State agency budgets are reviewed and approved through the state budgeting process. Costs associated with this project are funded by the applicant.

DEC's role in this process is to issue the permit allowing the activity, if it is determined that no unreasonable adverse effect is expected as a result. Expense of the project is not a consideration in determining if unreasonable adverse effects might occur.
++

30. Comment Summary
We were led to believe that Elodea was a threat to grayling spawning, but the environmental assessment for the Alexander Lake Elodea eradication project states that Elodea provides an excellent nursery habitat for northern pike.

Response:
Elodea has the potential to grow abundantly and crowd out native plant species. It simplifies aquatic habitat by displacing native vegetation, alters nutrient availability, and reduces dissolved oxygen. Its growth can decrease stream flow and increase sedimentation, which can degrade spawning habitat. While invasive northern Pike may benefit from these changes, native salmonid species, including grayling, are negatively impacted by Elodea.
++

31. Comment Summary
Regarding threat from Elodea/spread of Elodea:

- Waiting to address this problem could lead to Elodea spreading to other lakes and streams, with possibly disastrous consequences, including safety risk to boats and float planes, degradation of aquatic habitat, loss of salmon habitat and serious impacts downstream in the Yukon River drainage.
- Elodea is a serious threat to freshwater ecosystems in Alaska. It will spread and cause permanent damage to lakes, rivers, and fisheries.
- Elodea does not impact local homeowners.
- Elodea has been present in Chena Slough much longer than the ten years stated in the permit application. It is likely not as easily spread as indicated in the application.
- There is Elodea in the Chena River.

Response:
Control of invasive species is a priority for environmental management agencies and groups across the state. The need for control of Elodea is well documented in the Justification portion of the

Pesticide Use Permit application.

Elodea is included on UAA's Alaska Exotic Plants Information Clearinghouse (AKEPIC) list of Non-Native Plant Species, developed in coordination with the U.S. Forest Service, National Park Service, Bureau of Land Management, U.S. Fish and Wildlife Service, Department of Natural Resources Plant Material Center, and Alaska Natural Heritage Program. There is evidence to show that Elodea poses a threat to natural habitats. Allowing Elodea to remain in some areas could result in spread to other areas across the state. It is common for plant fragments to adhere to boats, planes, and other equipment, and therefore be transported to other locations.
++

32. Comment Summary
Based on information from an integrated pest management plan for the Kenai Peninsula, Elodea growth levels out after several years. Application of chemicals may not be necessary.

Response:
Control of invasive species is a priority for environmental management agencies and groups across the state. The need for control of Elodea is well documented in the Justification portion of the Pesticide Use Permit application.

Elodea is included on UAA's Alaska Exotic Plants Information Clearinghouse (AKEPIC) list of Non-Native Plant Species, developed in coordination with the U.S. Forest Service, National Park Service, Bureau of Land Management, U.S. Fish and Wildlife Service, Department of Natural Resources Plant Material Center, and Alaska Natural Heritage Program. There is evidence to show that Elodea poses a threat to natural habitats. Allowing Elodea to remain in some areas could result in spread to other areas across the state.
++

33. Comment Summary
Concerns over whether this permit follows label requirements:
- This permit was not prepared according to the product label.
- The manufacturers recommended use (for Sonar products) does not apply.

Response:
In its evaluation, DEC reviews the pesticide product labels and compares them to the proposed project. No conflicts were identified; the proposed project complies with label requirements.
++

34. Comment Summary
Alternative controls should be used.
- Mechanical methods of control are proven successful.
- Increasing water flow could control Elodea, since it grown in still or slow-moving water (Integrated Pest Management Plan for Eradicating Elodea from the Kenai Peninsula).

Response:
Control options for Elodea have been well researched in Alaska and other locations. It is common knowledge that Elodea is very difficult to control. Because it can reproduce and spread from small

plant fragments, most mechanical methods actually result in further spreading of the pest. Water draw downs, increasing stream flows, and other alternatives have significant impacts and associated challenges.

DEC's decision on whether to issue a permit is based on whether or not the proposed use could result in an unreasonable adverse effect. It is not dependent on other potential control methods.
++

35. Comment Summary
Regarding risk from use of fluridone:

- The risk from use of fluridone is low to non-existent.
- The primary impact to local residents will be inability to use slough water to irrigate gardens.
- The risk from pesticide use is not founded, while the risk from spread of Elodea is large.

Response:
The need for control of Elodea is well documented (see **Comment 31**). Fluridone has been used extensively for aquatic vegetation control for many years. Characteristics and behavior of fluridone products have been widely studied and are well understood. There is no evidence that the proposed use would result in an unreasonable adverse effect, including an unreasonable risk to animals or the environment.
++

36. Comment Summary
Spreading pellets with a calibrated spreader is "impractical."

Response:
The permit application states fluridone pellets will be applied using a calibrated forced air blower mounted on a motor boat. This method has been successfully used for several other Alaska fluridone projects. There is no indication that circumstances are significantly different for this project.
++

37. Comment Summary
The permit application states that liquid application will be conducted by an automatic drip system, which will be controlled based on current discharge readings. There are no discharge meters installed in Chena Slough.

Response:
Two stream gauges will be installed and monitored as part of the proposed project. This requirement will be stipulated in the permit.
++

38. Comment Summary
The testing schedule for fluridone concentration allows for up to 4 weeks between sampling. This would allow incorrect concentrations to persist for too long. Testing should be required each week.

Response:
The permit application states that water samples will be taken at approximately 2, 4, 8, 12, and 16 weeks intervals.

Over time, concentrations are expected to diminish, due to degradation, adsorption to sediments, and dilution from incoming water. Although fluridone must be maintained at the correct concentration for 6.5 – 13 week to be effective, there is no requirement or concern from an environmental or health perspective if levels diminish below the effective concentration.
++

39. Comment Summary
The permit should require sediment sampling.

Response:
As explained in **Comment 2**, fluridone binds readily to suspended sediment soils and organic matter. Once it adheres to soil particles, fluridone is unavailable to disperse or to continue to act as an herbicide. It degrades over time in the sediment, with a hydrosoil half-life of approximately 17 weeks (NCBI, 2005). As a result, fluridone remains present in the environment for only a limited time.

It would be expected that fluridone would be present in sediment samples in the treated area for a period of time after application, and that levels would decrease to an undetectable level over several months. Testing for the present of fluridone in sediment is not necessary, as it is already understood that the product will be present.

However, the applicant has stated that they do intend to conduct sediment profile sampling for the purposes of determining the depth that fluridone penetrates into the sediment.
++

40. Comment Summary
Regarding concerns over the drip station for Chena Slough:
- The remote control drip station is too risky.
- What happens if there is a leak or changes to water flows?

Response:
The drip station controls will be located in a secure box which will be locked to prevent any tampering. The box would contain any leaks which might occur at the distribution site. The applicant intends to check the drip station weekly to ensure proper functioning. These requirements will be stipulated in the permit.
++

41. Comment Summary
The 2011 document "Control Options for Elodea spp. In the Chena Slough" states that water flow rates in Chena Slough might make use of fluridone ineffective.

Response:
Additional evaluation of streamflow has been conducted since the cited document was produced. Proper metering and dosing have been calculated based on updated streamflow data.
++

42. Comment Summary
The 2011 document "Control Options for Elodea spp. In the Chena Slough states that fluridone could impact other non-target organisms through changes in dissolved oxygen and nutrients.

Response:
Fluridone has been used extensively for aquatic vegetation control for many years. Characteristics and behavior of fluridone products have been widely studied and are well understood.

As the permit application acknowledges, some non-target plants will be affected by the proposed pesticide use. In practical application, Elodea has been found to be more susceptible to the effects of fluridone than many native plants, so effects to non-target plants are expected to be limited. Elodea reproduces by fragmentation and maintains an extensive root system. Many native aquatic plants are seed producers, and seeds will not be affected by the fluridone treatment. Studies of other lakes in Alaska treated to control aquatic invasive plants have shown that native plants usually recover within a short period of time. Negative impacts to native plant communities are expected to be minor and short term in nature; overall the project is expected to restore native plant communities and benefit fish habitat.

Fluridone is not expected to have any short or long-term effects on invertebrates, fish, or other animals that are exposed to normal treatment concentrations. As described above, impacts to plant communities are expected to be minor and short term in nature. As a result, no negative impacts to invertebrate, fish, or other animal populations are expected.

Effects on water quality parameters such as clarity, dissolved oxygen, and nutrient levels, which may be impacted by decaying plant matter, are expected to return to normal over a short period of time. Problems with decreased dissolved oxygen levels are not expected with fluridone because it is a very slow-acting herbicide with effects occurring over a long period of time. As a precaution, the permit will stipulate that baseline measurements must be made prior to treatment.

There is no evidence that the proposed use would result in an unreasonable adverse effect, including an unreasonable risk to animals or the environment.
++

43. Comment Summary
The permit application does not address overall eradication of Elodea.

Response:
DNR, in association with other groups, does have a statewide plan for management of Elodea. However, pesticide use permits are issued for specific projects; in this case Elodea in some areas near Fairbanks.
++

44. Comment Summary
Regarding the experience and knowledge of applicants:

- The people who completed the permit application are not familiar with the proposed treatment area and are not experts in this field.
- The applicants have experience over several years in applying aquatic herbicides in Alaska to control Elodea.

Response:
DEC does a thorough review of the proposed application to ensure that it complies with label instructions. DEC also evaluates the proposed site and conditions to ensure there are no factors which might pose additional risk.

Pesticide application under a Pesticide Use Permit must be conducted or directly overseen by a certified pesticide applicator. DNR listed several qualified individuals in their permit application.

In addition, the applicants have experience with numerous previous aquatic pest control operations in Alaska and elsewhere.

DEC is satisfied that the permit application contains sufficient information to allow for an adequate evaluation of site and conditions. DEC is further satisfied that the permit applicants have the knowledge, training, and experience to comply with regulations and requirements.
++

45. Comment Summary
The public comment period was too short.

Response:
As is standard, a 30 day public comment period was provided to allow the public to prepare and submit comments. DEC did not receive any requests to extend the comment period. DEC is satisfied that all affected parties had sufficient opportunity to become informed about the proposed permit and provide comments to DEC.
++

46. Comment Summary
DNR did not do an acceptable job in identifying drinking water wells in the original permit application.

Response:
DNR did submit a previous pesticide use permit application for this project; that permit application was withdrawn to allow for additional information to be gathered.

The current permit application under consideration in this Responsiveness Summary included adequate identification of drinking water wells. See **Comment 8** for additional discussion of identification of drinking water wells.

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47. Comment Summary
The environmental assessment for the Alexander Lake project states that application rates greater than 20 ppb within ¼ miles of potable water intake are restricted.

Response:
DEC conducts an individual evaluation for each pesticide use permit. This includes a thorough review of the proposed application to ensure that it complies with label instructions. DEC also evaluates the proposed site and conditions to ensure there are no factors which might pose additional risk.

In April 2016, DNR received a pesticide use permit to apply fluridone to control elodea in Alexander Lake. However, comparison to previous permits is not relevant to the evaluation for this permit.

The product approved under a pesticide use permit for Alexander Lake is Sonar ONE, one of the products proposed under the Fairbanks Elodea Control permit. The label for this product (which is identical for both the Fairbanks and Alexander Lakes projects) prohibits application exceeding 20 ppb within ¼ mile of potable water intakes.

There are no potable water intakes in the proposed treatment areas of either project. Drinking water wells are not considered potable water intakes, as they are separated by soil or other substrate which inhibit movement of the pesticide. See **Comments 2 and 3** for further discussion of impacts to drinking water wells.
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48. Comment Summary
The environmental assessment for the Alexander Lake project states that there are no commercial agricultural uses, human exposure though livestock is unlikely, and there are no private wells within 200 feet. Chena Slough has drinking water wells, and residents have gardens.

Response:
DEC conducts an individual evaluation for each pesticide use permit. This includes a thorough review of the proposed application to ensure that it complies with label instructions. DEC also evaluates the proposed site and conditions to ensure there are no factors which might pose additional risk. Comparison to previous permits is not relevant to the evaluation for this permit.

Concerns related to drinking water wells and impacts of irrigation or damage to gardens are addressed in **Comments 2, 3, 5, and 26**.

Citations:

Bureau of Land Management. November, 2005. *Fluridone Ecological Risk Assessment Final Report.*

EPA. March 31, 1986. Chemical Fact Sheet For Fluridone. Fact Sheet Number: 81.

EPA. April 1, 2004. Memorandum: Fluridone and its major degradate, N-methyl formamide B Drinking Water Assessment for the Health Effects Division (HED) Reregistration Eligibility Decision
Document.

EPA. September, 2004. *Report of the Food Quality Protection Act (FQPA) Tolerance Reassessment Progress and Risk Management Decision (TRED) for Fluridone.*

EPA. September, 2009. *Fluridone Summary Document Registration Review: Initial Docket.* EPA-HQ- OPP-2009-0160.

EPA/DEC. November, 2011. Watershed Characterization for the Chena River Watershed,

Alaska. Hydraulic Mapping and Modeling. February 2013. *Chena Slough Hydrologic and Hydraulic*

Analysis for
Existing Conditions and Channel Modifications Final Report http://www.fairbanksweeds.org/user-files/Final-Chena%20Slough%20H&H%20Report%20Existing%20Conditions%20and%20Proposed%20Chan nel%20Modifications.pdf

Kennedy, B. W., Hall, C. C. 2009. Occurrence of Selected Nutrients, Trace Elements, and Organic Compounds in Streambed Sediment in the Lower Chena River Watershed near Fairbanks, Alaska, 2002-03. USGS Scientific Investigation Report 2009-5067.

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Reinert, K.H. 1989. Environmental Behavior of Aquatic Herbicides in Sediments. Chapter 13 In Reactions and Movements of Organic Chemicals in Soils. Soil Science Society of American and American Society of Agronomy. Special Publication No. 22. Madison, Wisconsin.

Sonar ONE Aquatic Herbicide Safety Data Sheet. SePRO Corporation, September 15, 2015, https://sepro.com/documents/SonarONE_MSDS.pdf, (accessed.June 12, 2016).

USDA/Forest Service. 2008. *Fluridone Human Health and Ecological Risk Assessment Final Report.* November 25, 2008.

WSDOE, 2000. Draft supplemental environmental impact statement: assessments of aquatic herbicides. Olympia, WA. http://www.ecy.wa.gov/pubs/0010040.pdf

WDNR. 2012. *Fluridone chemical fact sheet.* DNR PUB-WT-972. January.

8.1Sonar Labels

Sonar® Genesis

Aquatic Herbicide

SPECIMEN

SePRO

AN HERBICIDE FOR MANAGEMENT OF FRESHWATER AQUATIC VEGETATION IN PONDS, LAKES, RESERVOIRS, POTABLE WATER SOURCES, DRAINAGE CANALS AND IRRIGATION CANALS.

For use in New York State, comply with Section 24 (C) Special Local Need labeling for Sonar Genesis, SLN NY120006.

Active Ingredient	
fluridone: 1-methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4(1H)-pyridinone	6.3%
Other Ingredients	93.7%
TOTAL	100.0%

Contains 0.5 pounds active ingredient per gallon.

Keep Out of Reach of Children

DANGER / PELIGRO

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.)

Refer to the inside of the label booklet for additional precautionary information and Directions for Use including Storage and Disposal.

NOTICE: Read the entire label before using. Use only according to label directions. **Before buying or using this product, read *Terms and Conditions of Use, Warranty Disclaimer, Inherent Risks of Use* and *Limitation of Remedies* inside label booklet.**

Sonar is a registered trademark of SePRO Corporation.
SePRO Corporation 11550 North Meridian Street, Suite 600
Carmel, IN 46032 U.S.A.

EPA Reg. No. 67690-54
FPL20121219

Concentrated Formulation

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

Corrosive. Causes irreversible eye damage. Harmful if swallowed. Avoid contact with skin. Do not get in eyes or on clothing. Wear protective eyewear (goggles, face shield, or safety glasses). Wear long-sleeved shirt and long pants, socks, shoes, and chemical resistant gloves. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet. Remove and wash contaminated clothing before reuse.

KEEP OUT OF REACH OF CHILDREN

DANGER / PELIGRO

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 in eyes	• 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 swallowed	• 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 on skin or clothing	• 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.
NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage.	
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 life or property 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 by disposal of equipment washwaters. 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 Sonar Genesis aquatic 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.

DO NOT apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Ensure spray drift to nontarget susceptible species does not occur.

DO NOT apply Sonar Genesis Aquatic Herbicide in any manner not specifically described in this label.

Observe all cautions and limitations on this label and on the labels of products used in combination with Sonar Genesis. **DO NOT** use Sonar Genesis other than in accordance with the instructions set forth on this label. Keep containers closed to avoid spills and contamination.

IN CASE OF EMERGENCY

In case of large-scale spillage regarding this product, call INFOTRAC at 1-800-535-5053.

In case of medical emergency regarding this product, call:
- Your local doctor for immediate treatment
- Your local poison control center (hospital)
- INFOTRAC: 1-800-535-5053

Steps to be taken in case material is released or spilled:
- Dike and contain the spill with inert material (sand, earth, etc.) and transfer liquid and solid diking material to separate containers for disposal.
- Remove contaminated clothing, and wash affected skin areas with soap and water.
- Wash clothing before reuse.
- Keep the spill out of all sewers and open bodies of water.

PRODUCT INFORMATION

Sonar Genesis is a selective systemic aquatic herbicide for management of freshwater aquatic vegetation in ponds, lakes, reservoirs, drainage canals and irrigation canals, including dry or de-watered areas of these sites. Sonar Genesis is absorbed from water by plant shoots and from hydrosoil by the roots of aquatic vascular plants. For in-water treatments, it is important to maintain the specified concentration of Sonar Genesis in contact with the target plants for a minimum of 45 days. Rapid water movement or any condition which results in rapid dilution of Sonar Genesis in treated water will reduce its effectiveness. In susceptible plants, Sonar Genesis inhibits the formation of carotene. In the absence of carotene, chlorophyll is rapidly degraded by sunlight. Herbicidal symptoms of Sonar Genesis appear in seven to ten days and appear as white (chlorotic) or pink growing points in many susceptible plant species. Under optimum conditions, a minimum of 30 to 90 days may be required before the desired level of aquatic plant management is achieved. Plant species susceptibility to Sonar Genesis may vary depending on time of year, stage of growth, and water movement. For best results, apply Sonar Genesis 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.

Sonar Genesis is not corrosive to application equipment.

This label provides recommendations on the use of a laboratory analysis for the active ingredient. SePRO Corporation recommends the use of high-performance liquid chromatography (HPLC) for the determination of fluridone concentrations in water. It is recommended to contact SePRO Corporation for the incorporation of this test, known as a FasTEST, in a treatment program. FasTEST is referenced in this label as the preferred method for the rapid determination of the active ingredient in water. Other proven chemical analyses for the active ingredient may also be used.

Application rates and calculations of Sonar Genesis are provided to achieve a desired concentration of fluridone in parts per billion (ppb). **The maximum application rate or sum of all application rates is 90 ppb in ponds and 150 ppb in lakes, reservoirs and static canals per annual growth cycle.** For purposes of Sonar Genesis 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. This maximum concentration is the amount of product calculated as the target application rate, NOT determined by testing the concentration of fluridone in the treated water.

Use Restrictions and Precautions

- **Obtain Required Permits:** Consult with appropriate state or local pesticide and/or water authorities before applying this product in or around public waters. Permits and posting or treatment notification may be required by state or local public agencies.
- **Chemigation:** Do not apply Sonar Genesis through any type of irrigation system.
- **Hydroponic Farming:** Do not use Sonar Genesis 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 Sonar Genesis treated water for irrigating greenhouse or nursery plants. Without site-specific guidance from SePRO, do not use Sonar Genesis 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 Applications With Sonar Genesis (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 Sonar Genesis within ¼ mile (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 treated water.

- **Potable Water Intakes:** In lakes and reservoirs or other sources of potable water, do not apply Sonar Genesis at application rates greater than 20 ppb within one-fourth mile (1,320 feet) of any functioning potable water intake. At application rates of 4 to 20 ppb, Sonar Genesis may be applied where functioning potable water intakes are present. **NOTE: Existing potable water intakes which are no longer in use, such as those replaced by potable water wells or connections to a municipal water system, are not considered to be functioning potable water intakes.**
- **Irrigation:** Irrigation from a Sonar Genesis treated area may result in injury to the irrigated vegetation. Follow these precautions and inform those who irrigate from areas treated with Sonar Genesis of the irrigation time frames or FasTEST requirements presented in the table below. Follow the following time frames and assay directions to reduce the potential for injury to vegetation irrigated with water treated with Sonar Genesis. Greater potential for crop injury occurs where Sonar Genesis 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	Assay required
Canals	7	14	Assay required
Lakes and Reservoirs ††	7	14	Assay required
Dry or De-watered Canals †††	0	0	†††

† For purposes of Sonar Genesis 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. When applying Sonar Genesis to exposed sediments of aquatic sites such as lakes and reservoirs, follow these time frames prior to using water for irrigation once sites are reflooded.

††† When Sonar Genesis is applied to exposed sediments of dry or de-watered irrigation canals, treatments must be made at least 2 weeks prior to when the canals are to be refilled, and allow canals to refill for a minimum of 24 hours before using water for irrigation.

Where the use of Sonar Genesis treated water is desired for irrigating crops prior to the time frames established above, the use of FasTEST analysis is recommended to measure the concentration of fluridone in the treated water. Where a FasTEST has determined that the fluridone concentrations are less than 10 parts per billion, there are no irrigation precautions for irrigating established tree crops, plants, 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 Sonar Genesis treated water if measured fluridone 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 in the previous year without direct consultation with a SePRO Aquatic Specialist. It is recommended that a SePRO Aquatic Specialist be consulted prior to commencing irrigation of these sites.**

PLANT CONTROL INFORMATION

Sonar Genesis selectivity is dependent upon dosage, time of year, stage of growth, method of application and water movement. The following categories, controlled and partially 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 Sonar Genesis. It is recommended to consult a SePRO Aquatic Specialist prior to application of Sonar Genesis to determine a plant's susceptibility to the planned treatment.

Vascular Aquatic Plants Controlled by Sonar Genesis:

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., including *M. spicatum x sibiricum* hybrids*)*

Emersed Plants:
spatterdock (*Nuphar luteum*)
water-lily (*Nymphaea* spp.)
watershield (*Brasenia schreberi)*

Floating Plants:
common duckweed (*Lemna minor*)
Salvinia (*Salvinia* spp.)

Vascular Aquatic Plants Partially Controlled by Sonar Genesis:

Submersed Plants:
Illinois pondweed (*Potamogeton illinoensis*)
limnophila (*Limnophila sessiliflora*)
tapegrass, American eelgrass (*Vallisneria americana*)

Emersed Plants:
alligatorweed (*Alternanthera philoxeroides*)
American lotus (*Nelumbo lutea*)
cattail (*Typha* spp.)
creeping waterprimrose (*Ludwigia peploides*)
parrotfeather (*Myriophyllum aquaticum*)
smartweed (*Polygonum* spp.)
spikerush (*Eleocharis* spp.)
waterpurslane (*Ludwigia palustris*)

Floating Plants:
common watermeal (*Wolffia columbiana)*†

Shoreline Grasses:
barnyardgrass (*Echinochloa crusgalli*)
giant cutgrass (*Zizaniopsis miliacea*)
reed canarygrass (*Phlaris arundinaceae*)
southern watergrass (*Hydrochloa caroliniensis*)
torpedograss (*Panicum repens*)

† Consult with a SePRO Aquatic Specialist about techniques to enhance efficacy of watermeal, including incorporation of Galleon S.C. Aquatic Herbicide into a Sonar Genesis treatment program, in difficult to control sites.

MIXING AND APPLICATION DIRECTIONS

The aquatic plants present in the treatment site should be identified prior to application to determine their susceptibility to Sonar Genesis. 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.

Sonar Genesis may be applied or metered directly into the treated area or diluted with water prior to application. Add the specified amount of Sonar Genesis to water in the spray tank during the filling operation. Surface and subsurface application of the spray can be made with conventional spray equipment. Sonar Genesis can also be applied near the surface of the hydrosoil using weighted trailing hoses. A minimum spray volume of 5 to 100 gallons per acre may be used. Sonar Genesis may also be directly metered into the pumping system where it is diluted with water.

Tank Mix Directions

Sonar Genesis may be tank mixed with other aquatic herbicides and algaecides to enhance efficacy and plant selectivity provided that this label does not prohibit such mixing. When tank mixing, read and follow the labeled precautionary statements, directions for use, weeds controlled, and other restrictions for each tank mix product. **Use in accordance with the most restrictive label limitations and precautions of the products used in the tank-mix.** No labeled rate or dose should be exceeded. To ensure compatibility, a jar test is recommended before field application of any tank mix combination. It is recommended to consult with SePRO Corporation for latest tank mix recommendations.

NOTE: Tank mixing or use of Sonar Genesis with any other product which is not specifically and expressly authorized by the label shall be at the exclusive risk of the user, applicator and/or application adviser, to the extent allowed by applicable law.

Application Rate Calculation

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

Sonar Genesis gallons required per treated surface acre = surfaces acres X average water depth of treatment site (feet) **x** desired ppb concentration of active ingredient **x** 0.0054.

For example, the amount per acre of Sonar Genesis required to provide a concentration of 30 ppb of active ingredient in a 1 acre pond with an average depth of 5 feet is calculated as follows:

1 acre x 5 feet **x** 30 ppb **x** 0.0054 = 0.81 gallons per treated surface acre
or
0.81 gallons x 4 quarts/gallon = 3.2 quarts per treated surface acres
or
0.81 gallons x 128 ounces/gallon = 104 ounces per treated surface acre

Application to Ponds

Sonar Genesis may be applied to the entire surface area of a pond. For single applications, rates may be selected to provide 30 to 90 ppb to the treated water. 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 are shown in the following table. For additional application rate calculations, refer to the *Application Rate Calculation* section of this label. Split or multiple applications may be used to control more difficult target plants and/or where dilution of treated water is anticipated; however, the sum of all applications must not exceed a total of 90 ppb per annual growth cycle.

Average Water Depth of Treatment Site (feet)	Gallons of Sonar Genesis per Treated Surface Acre†	
	30 ppb	90 ppb
1	0.16	0.48
2	0.32	0.97
3	0.48	1.45
4	0.64	1.94
5	0.81	2.43
6	0.97	2.91
7	1.13	3.40
8	1.29	3.88
9	1.45	4.37
10	1.62	4.86

† To calculate the number of quarts of Sonar Genesis required, use the calculation as follows: gallons per surface acre x 4 quarts/gallon = quarts per surface acre

For example: targeting a concentration of 30 ppb in a one acre pond with average depth of 5 feet would require 0.81 gallons or 3.2 quarts.

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, Sonar Genesis 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.

A. 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 Sonar Genesis at an application rate of 10 to 90 ppb. Application rates necessary to obtain these concentrations in treated water are shown in the following table. For additional rate calculations, refer to the *Application Rate Calculation* 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, it is recommended to contact a SePRO Aquatic Specialist for 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. Retreatments may be required to control more difficult to control species or in the event of a heavy rainfall event where dilution of the treatment concentration 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.

SINGLE APPLICATION OF Sonar Genesis		
Average Water Depth of Treatment Site (feet)	Gallons of Sonar Genesis per Treated Surface Acre to Achieve†	
	10 ppb	90 ppb
1	0.05	0.48
2	0.10	0.97
3	0.16	1.45
4	0.21	1.94
5	0.27	2.43
6	0.32	2.91
7	0.37	3.40
8	0.43	3.88
9	0.48	4.37
10	0.54	4.86

† To calculate the number of quarts of Sonar Genesis required, use the calculation as follows: gallons per surface acre x 4 quarts/gallon = quarts per surface acre

For example: targeting a dose of 10 ppb in a 20 acre lake with average depth of 5 feet would require 0.27 gallons per surface acre or 1.0 quarts.

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, through the use of a water analysis, e.g. FasTEST, add additional Sonar Genesis to maintain this lower dose for the sufficient time to ensure efficacy and enhance selectivity. Water may be treated at an initial application concentration of 4 to 50 ppb. Additional split applications should be conducted to maintain a sufficient concentration for a minimum of 45 days or longer. **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, it is recommended to contact a SePRO Aquatic Specialist for assistance in selecting the appropriate concentrations and timing of application to meet specific plant management goals. When utilizing split or multiple applications of Sonar Genesis, the utilization of FasTEST is strongly recommended to determine the actual concentration in the water over time. For split or multiple applications, the sum of all applications must not exceed 150 ppb per annual growth cycle.

NOTE: In treating lakes or reservoirs that contain functioning potable water intakes and the application requires treating within ¼ 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.

B. Partial Lake or Reservoir Treatments

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

Treatment Areas Greater Than ¼ Mile from a Functioning Potable Water Intake

For single applications, apply Sonar Genesis at application rates from 30 to 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.

Treatment Areas 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 multiple applications of Sonar Genesis 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 to Sediments of Dry or De-Watered Aquatic Sites

For application of Sonar Genesis to sediments of dry or de-watered aquatic sites, including exposed sediments of lakes or reservoirs, irrigation canals, non-irrigation canals and drainage canals, apply a maximum of 4 gallons of Sonar Genesis per surface acre per annual growth cycle. Apply Sonar Genesis evenly to the sediment surface, with a minimum spray solution of 30 to 100 gallons per surface acre. High levels of organic matter in treated sediments may reduce efficacy. Sonar Genesis may be applied with other aquatic herbicides labeled for this use. It is recommended that a SePRO Aquatic Specialist be consulted for further use recommendations.

Direct foliar application to floating, topped-out and emerged aquatic vegetation

For application of Sonar Genesis to floating, topped-out and emerged aquatic vegetation in ponds, lakes, reservoirs, drainage canals and irrigation canals, including dry or de-watered areas of these sites, apply a maximum of 4 gallons of Sonar Genesis per surface acre per annual growth cycle. Apply Sonar Genesis evenly to the treatment area using properly calibrated broadcast equipment in a minimum spray solution of 20 to 100 gallons per surface acre. For treatment of vegetation in or on water, do not exceed a water concentration of 150 ppb. Spot treatments can be made with up to 5% Sonar Genesis by volume when application rate does not exceed 4 gallons Sonar Genesis per surface acre. It is recommended that a SePRO Aquatic Specialist be consulted for site specific recommendations.

Application to Drainage Canals and Irrigation Canals

Static Canals:

In static drainage and irrigation canals, apply Sonar Genesis at the rate of 30 to 150 ppb per treated surface acre. The maximum application rate or sum of all application rates cannot exceed 150 ppb per annual growth cycle.

Moving Water Canals:

In slow moving bodies of water use an application technique that maintains a concentration of 10 to 40 ppb in the target area for a minimum of 45 days. Sonar Genesis 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 Containing a Functioning Potable Water Intake

In treating a static or moving water canal which contains a functioning potable water intake, applications of Sonar Genesis 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 Sonar Genesis are made within ¼ mile of a functioning potable water intake, a FasTEST analysis must utilized to demonstrate that concentrations do not exceed 150 ppb at the functioning potable water intake.

Application Rate Calculation — Moving Water Drainage and Irrigation Canals

The amount of Sonar Genesis 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 (feet per second) **x** average canal width (ft.) **x** average canal depth (ft.) = 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** 0.0054 = Gallons Sonar Genesis required per day

STORAGE AND DISPOSAL

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

Pesticide Storage: Keep from freezing. Store in original container only. Do not store near feed or foodstuffs. In case of leak or spill, use absorbent materials to contain liquids 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 ≤ 5 gallons) as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. 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 >5 gallons) 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 and continue to drain for 10 seconds after the flow begins to drip. 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 user 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.

SePRO Corporation
11550 North Meridian Street, Suite 600
Carmel, IN 46032

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Carmel, IN 46032, U.S.A.

SonarOne®

Aquatic Herbicide

SPECIMEN

SePRO

An herbicide for management of aquatic vegetation in fresh water ponds, lakes, reservoirs, potable water sources, drainage canals, irrigation canals and rivers.

Active Ingredient	
fluridone: 1-methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4(1*H*) pyridinone	5.0%
Other Ingredients	95.0%
TOTAL	100.0%

Contains 0.05 pound active ingredient per pound of product.

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.)

Refer to the inside of the label booklet for additional precautionary information and *Directions for Use* including *Storage and Disposal.*

NOTICE: Read the entire label before using. Use only according to label directions. **Before buying or using this product, read *Terms and Conditions of Use, Warranty Disclaimer, Inherent Risks of Use* and *Limitation of Remedies* inside label booklet.**

Sonar is a registered trademark of SePRO Corporation.
SePRO Corporation 11550 North Meridian Street, Suite 600, Carmel, IN 46032, U.S.A.

EPA Reg. No. 67690-45
FPL20120928

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	• 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	• 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	• 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	• 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 hydrosoil 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*)

Emersed 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 (*Phlaris arundinaceae*)
southern watergrass (*Hydrochloa caroliniensis*)
torpedograss (*Panicum repens*)

Vascular Aquatic Plants Not Controlled By SonarOne:

Emersed 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:
maidencane (*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 (¼) 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.

A. 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 **x** 25 **x** 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.

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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.

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

Sonar® H4C

Aquatic Herbicide

SPECIMEN

SePRO

An herbicide for management of aquatic vegetation in fresh water ponds, lakes, reservoirs (including inlets and tributaries), potable water sources, drainage canals, irrigation canals and rivers.

Active Ingredient	
fluridone: 1-methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4(1*H*) pyridinone	2.7%
Other Ingredients	97.3%
TOTAL	100.0%

Contains 0.027 lb active ingredient per pound.

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.)

Refer to inside of label booklet for additional precautionary information and *Directions for Use* including *First Aid* and *Storage and Disposal*.

NOTICE: Read the entire label before using. Use only according to label directions. **Before buying or using this product, read *Terms and Conditions of Use, Warranty Disclaimer, Inherent Risks of Use* and *Limitation of Remedies* inside label booklet. If terms are unacceptable, return unopened at once.**

Sonar is a registered trademark of SePRO Corporation.

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

EPA Reg. No. 67690-61
FPL20141006

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION. Harmful if swallowed. Harmful if absorbed through skin. Harmful if inhaled. Causes moderate eye irritation. Avoid contact with eyes or clothing. Avoid breathing dust. Wear long sleeved shirt, long pants, shoes and socks.

KEEP OUT OF REACH OF CHILDREN

CAUTION/PRECAUCIÓN

FIRST AID	
If swallowed	• 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 on skin or clothing	• 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	• 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.
If in eyes	• 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 for 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.**	

USER SAFETY RECOMMENDATIONS

- wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

Follow use directions carefully so as to minimize adverse effects on non-target organisms. Trees and shrubs growing in water treated with Sonar H4C may occasionally develop chlorosis. 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.

DIRECTIONS FOR USE

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

Read all Directions Carefully Before Applying Sonar H4C.

PRODUCT INFORMATION

Sonar H4C herbicide is a selective systemic aquatic herbicide for management of aquatic vegetation in fresh water ponds, lakes, reservoirs (including inlets and tributaries), drainage canals, irrigation canals, and rivers. Sonar H4C is a pelleted formulation containing 2.7% fluridone designed to provide enhanced numbers of pellets (greater coverage) in treated areas versus other Sonar pellet formulations at equivalent herbicide dosing. This higher density of pellets has the potential to improve herbicide contact with target vegetation in higher exchange treatment scenarios such as spot or small-partial application designs. Sonar H4C is absorbed from water by plant shoots and from hydrosoil by the roots of aquatic vascular plants. It is important to maintain Sonar H4C in contact with the target plants for as long as possible. Rapid water movement or any condition which results in rapid dilution of Sonar H4C in treated water will reduce its effectiveness. In susceptible plants, Sonar H4C inhibits the formation of carotene. In the absence of carotene, chlorophyll is rapidly degraded by sunlight.

Herbicidal symptoms of Sonar H4C appear in seven to ten days and appear as white (chlorotic) or pink growing points. Under optimum conditions, 30 to 90 days are required before the desired level of aquatic weed management is achieved with Sonar H4C. Species susceptibility to Sonar H4C may vary depending on time of year, stage of growth and water movement. For best results, apply Sonar H4C 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.

Sonar H4C is not corrosive to application equipment.

The label provides recommendations on the use of a chemical analysis for the active ingredient. SePRO Corporation recommends the use of a 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 Sonar H4C to achieve a desired concentration of the active ingredient in parts per billion (ppb). **The maximum application rate or sum of all application rates is 90 ppb in ponds (< 10 Acres) 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 Restrictions

- **Obtain Required Permits:** Consult with appropriate state or local water authorities before applying this product. Permits may be required by state or local public agencies.
- **New York State:** Application of Sonar H4C 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 Sonar H4C 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 Sonar H4C treated water for irrigating greenhouse or nursery plants. Without site-specific guidance from SePRO, do not use Sonar H4C 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 Applications With Sonar H4C (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 Sonar H4C 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 Sonar H4C 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, Sonar H4C may be applied 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:** 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 Sonar H4C 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 without consultation with a SePRO Aquatic Specialist. It is recommended that a SePRO Aquatic Specialist be consulted prior to commencing irrigation of these sites.

Use Precautions

- **Irrigation:** Irrigation with Sonar H4C treated water may result in injury to the irrigated vegetation. Follow these precautions and inform those who irrigate from areas treated with Sonar H4C of the irrigation time frames or FasTEST requirements presented in the table below. These time frames and FasTEST recommendations are suggestions which should be followed to reduce the potential for injury to vegetation irrigated with water treated with Sonar H4C. Greater potential for crop injury occurs where Sonar H4C 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 Sonar H4C 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 Sonar H4C treated water is desired for irrigating crops prior to the time frames established above, the use of a FasTEST is recommended 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.

PLANT CONTROL INFORMATION

Sonar H4C 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 Sonar H4C. It is recommended to consult a SePRO Aquatic Specialist prior to application of Sonar H4C to determine a plant's susceptibility to Sonar H4C.

Vascular Aquatic Plants Controlled by Sonar H4C: [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:
azolla (*Azolla* spp.)
duckweed (*Lemna, Landoltia,* and *Spirodela* spp.)

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 Sonar H4C use rates (not to exceed maximum labeled rates) when selective control of exotic species is desired.

Vascular Aquatic Plants Partially Controlled by Sonar H4C:

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

Emersed 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*)

Floating Plants:
Salvinia (*Salvinia* spp.)

Shoreline Grasses:
barnyardgrass (*Echinochloa crusgalli*)
giant cutgrass (*Zizaniopsis miliacea*)
reed canarygrass (*Philaris arundinaceae*)
southern watergrass (*Hydrochloa caroliniensis*)
torpedograss (*Panicum* repens)

Vascular Aquatic Plants Not Controlled by Sonar H4C:

Emersed 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:
maidencane (*Panicum hemitomon*)

NOTE: algae (chara, nitella, and filamentous species) are not controlled by Sonar H4C

APPLICATION DIRECTIONS

The aquatic plants present in the treatment site should be identified prior to application to determine their susceptibility to Sonar H4C. 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
Sonar H4C may be applied to the entire surface area of a pond. For single applications, rates may be selected to provide 45 to 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 45 to 90 ppb and must not exceed a total of 90 ppb per annual growth cycle.

Average Water Depth of Treatment Site (feet)	Pounds of Sonar H4C per Treated Surface Acre	
	45 ppb	90 ppb
1	4.5	9
2	9	18
3	13.5	27
4	18	36
5	22.5	45
6	27	54
7	31.5	63
8	36	72
9	40.5	81
10	45	90

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, Sonar H4C 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.

A. 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 Sonar H4C at an application rate not to exceed 90 ppb, and in a suggested range of 16 to 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 not to exceed 90 ppb 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 Sonar H4C Per Treated Surface Acre	
	16 ppb	90 ppb
1	1.6	9
2	3.2	18
3	4.8	27
4	6.4	36
5	8	45
6	9.6	54
7	11.2	63
8	12.8	72
9	14.4	81
10	16	90
11	17.6	99
12	19.2	108
13	20.8	117
14	22.4	126
15	24	135
16	25.6	144
17	27.2	153
18	28.8	162
19	30.4	171
20	32	180

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 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.

NOTE: In treating lakes or reservoirs that contain potable water intakes and when the application requires treating within ¼ 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.

B. Partial Lake or Reservoir Treatments

Where dilution of Sonar H4C 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 Sonar H4C 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 Sonar H4C 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 Sonar H4C at application rates not to exceed 150 ppb, and in a suggested range of 45 to 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 Sonar H4C 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 Sonar H4C to be applied to provide the desired ppb concentration of active ingredient in treated water may be calculated as follows:

Pounds of Sonar H4C required per treated acre =
Average water depth of treatment site **x**
Desired ppb concentration of active ingredient **x** 0.1

For example, the pounds per acre of Sonar H4C required to provide a concentration of 25 ppb of active ingredient in water with an average depth of 5 feet is calculated as follows:

5 **x** 25 **x** 0.1 = 12.5 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 Sonar H4C at typical use rates of 37 to 74 pounds per surface acre.

Moving Water Canals and Rivers:

The performance of Sonar H4C 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 to 40 ppb in the applied area for typically a minimum of 45 days. Sonar H4C 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 Sonar H4C 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 Sonar H4C 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 Sonar H4C 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 (feet 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** 0.1 = pounds Sonar H4C 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 user 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.

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(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.

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

8.1.1 *Special Local Needs Label*

(next 3 pages)

Sonar® Genesis Aquatic Herbicide

EPA Reg. No. 67690-54
24(c) Special Local Need Registration (SLN AK-16-0001)

This label for Sonar Genesis Aquatic Herbicide expires and must not be distributed or used in accordance with this SLN registration after 31 December 2021.

FOR DISTRIBUTION AND USE ONLY FOR THE MANAGEMENT OF *Elodea spp*. IN THE STATE OF ALASKA

An herbicide for management of freshwater aquatic vegetation in ponds, lakes, reservoirs -- including flowing water sites, potable water sources, drainage canals, and irrigation canals.

ATTENTION

- 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.
- **This 24(c) supplemental labeling applies only for use in the management of *Elodea spp.* in The State of Alaska.**
- **See product label for Precautionary Statements, Environmental Hazards, First Aid, Storage and Disposal, Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies.**
- This FIFRA Section 24(c) labeling must be in the possession of the user at the time of application.
- All restrictions and precautions on the EPA registered label are to be followed.

DIRECTIONS FOR USE

PRODUCT INFORMATION

Sonar Genesis is a selective systemic aquatic herbicide for management of freshwater aquatic vegetation in ponds, lakes, reservoirs, including flowing water sites, potable water sources, drainage canals and irrigation canals, including dry or de-watered areas of these sites.

Application rates and calculations of Sonar Genesis are provided to achieve a desired concentration of the active ingredient in parts per billion (ppb). **Sonar Genesis applications will seek to maintain active ingredient concentrations above 2 ppb in target management areas for the duration of treatment program selected by managing state agencies. Flow rate in the treatment area and other factors can be considered to maintain effective concentrations. Exact treatment design including target application rates, pulsed treatment approaches and similar adjustments based on latest available technical information on Sonar Genesis use for *Elodea spp.* management may be**

incorporated if determined to match water use needs of the managed area and are otherwise allowable per this label and the product's container label.

Use Restrictions and Precautions

- **Follow all container label restrictions and precautions.**

- **Water Use Restrictions Following Applications With Sonar Genesis when used to flowing water sites for *Elodea spp.* Control in the State of Alaska:**

Average Water Concentration	Drinking†	Fishing	Swimming	Livestock/Pet Consumption	Irrigation††
2-15 ppb	0	0	0	0	See irrigation instructions below

† Note below, under *Potable Water Intakes*, the information for application of Sonar Genesis within ¼ mile (1,320 feet) of a functioning potable water intake.
†† Note below, under *Irrigation*, fluridone concentrations that provide the widest safety margin for irrigating with treated water.

- **Potable Water Intakes:** At target application rates of 2-15 ppb, Sonar Genesis may be applied to flowing water sites where functioning potable water intakes are present. **NOTE: Existing potable water intakes which are no longer in use, such as those replaced by potable water wells or connections to a municipal water system, are not considered to be functioning potable water intakes.**

- **Irrigation:** Irrigation from a Sonar Genesis treated area may result in injury to the irrigated vegetation. Inform those who irrigate from areas treated with Sonar Genesis of the following irrigation restrictions and precautions:
  - 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 Sonar Genesis treated water if measured fluridone concentrations are greater than 5 ppb.
  - For other irrigation uses including watering of established turf, established crops and ornamental species: There are no restrictions on irrigation.
  - **It is recommended that a SePRO Aquatic Specialist be consulted prior to commencing irrigation with treated waters.**

MIXING AND APPLICATION DIRECTIONS

Sonar Genesis may be applied or metered directly into the treated area or diluted with water prior to application. Sonar Genesis can be applied by drip or metered application below the water surface.

Application to flowing water sites for *Elodea spp.* control

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

1. Average flow rate (feet per second) **x** average canal width (ft.) **x** average canal 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** 0.0054 = Gallons Sonar Genesis required per day.

While 2 – 15 ppb rates are anticipated for *Elodea spp.* control in flowing sites, alternate rates up to the 150 ppb federal label maximum for non-potable water and 20 ppb for potable water are permissible to meet management objectives. For application rates greater than 20 ppb, follow all additional water use restrictions on container label.

EPA Registration No. 67690-54
FPL20160324

8.2 Sonar Safety Data Sheets

Conforms to HazCom 2012/United States

SAFETY DATA SHEET

Sonar® Genesis

Aquatic Herbicide

Section 1. Identification

GHS product identifier : Sonar® Genesis
Aquatic Herbicide

Other means of identification : Not available.

EPA Registration No. : 67690-54

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 : ACUTE TOXICITY (inhalation) - Category 3
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
AQUATIC HAZARD (LONG-TERM) - Category 3

GHS label elements

Hazard pictograms : Skull and crossbones

Signal word : Danger

Hazard statements : Toxic if inhaled.
Causes serious eye irritation.
Causes skin irritation.
Harmful to aquatic life with long lasting effects.

Section 2. Hazards identification

Precautionary statements

Prevention : Wear protective gloves. Wear eye or face protection. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Avoid breathing vapor. Wash hands thoroughly after handling.

Response : IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. Wash contaminated clothing before reuse. If skin irritation occurs: Get medical attention. 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 : Store locked up.

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
Fluridone	6.3	59756-60-4
Proprietary ingredient 1	30 - 40	-
Proprietary ingredient 2	40 - 50	-
Proprietary ingredient 3	5 - 10	-
Proprietary ingredient 4	1 - 5	-
Proprietary ingredient 5	1 - 5	-
Proprietary ingredient 6	0.5 - 2.5	-
Proprietary ingredient 7	0.1 - 0.5	-

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. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. 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 necessary, call a poison center or physician. 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.

Section 4. First aid measures

Skin contact : Flush contaminated skin with plenty of water. Continue to rinse for at least 20 minutes. Get medical attention. 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. 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 serious eye irritation.

Inhalation : Toxic if inhaled. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Skin contact : Causes skin irritation.

Ingestion : Irritating to mouth, throat and stomach.

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 : Adverse symptoms may include the following:
irritation
redness

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. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. 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

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. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. 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".

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 released in large quantities.

Methods and materials for containment and cleaning up

Spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. 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 get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. 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. Store locked up. 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 : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

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.

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.

Section 8. Exposure controls/personal protection

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, air-purifying or supplied air 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	:	Liquid. [Clear.]
Color	:	Golden yellow.
Odor	:	Sweet, non-pungent. [Slight]
Odor threshold	:	Not available.
pH	:	4.6 [Conc. (% w/w): 1%]
Melting point	:	Not available.
Boiling point	:	Not available.
Flash point	:	Open cup: >93.3°C (>200°F)
Burning time	:	Not applicable.
Burning rate	:	Not applicable.
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	:	0.97
Solubility	:	Dispersible in water.
Solubility in water	:	Not available.
Partition coefficient: n-octanol/water	:	Not available.
Auto-ignition temperature	:	Not available.
Decomposition temperature	:	Not available.
SADT	:	Not available.
Viscosity	:	Kinematic (room temperature): 0.303 cm^2/s (30.3 cSt)

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
Sonar® Genesis	LC50 Inhalation Vapor LD50 Dermal LD50 Oral	Rat Rat Rat	>2.04 mg/L >5000 mg/kg 5000 mg/kg	4 hours - -

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Sonar® Genesis	Skin - Primary dermal irritation index (PDII) Eyes - Cornea opacity	Rabbit Rabbit	4.9 43	- -	1 hours 24 hours

Sensitization

Product/ingredient name	Route of exposure	Species	Result
Sonar® Genesis	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)

Name	Category	Route of exposure	Target organs
Proprietary ingredient 5	Category 3	Not applicable.	Respiratory tract irritation

Section 11. Toxicological information

Specific target organ toxicity (repeated exposure)

There is no data available.

Aspiration 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 serious eye irritation.

Inhalation : Toxic if inhaled. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Skin contact : Causes skin irritation.

Ingestion : Irritating to mouth, throat and stomach.

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 : Adverse symptoms may include the following:
irritation
redness

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
Fluridone	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
Proprietary ingredient 4	Acute EC50 5.65 mg/L Fresh water	Crustaceans - *Ceriodaphnia dubia* - Neonate	48 hours
Proprietary ingredient 5	Acute LC50 28.2 mg/L Fresh water	Fish - *Pimephales promelas*	96 hours

Persistence and degradability

There is no data available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Fluridone	3.16	-	low
Proprietary ingredient 5	2.9	25.33	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	-	-	-

Section 14. Transport information

Transport hazard class(es)	-	-	-
Packing group	-	-	-
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) PAIR**: Proprietary ingredient 7
TSCA 8(a) CDR Exempt/Partial exemption: Not determined
Commerce control list precursor: Proprietary ingredient 6
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

Section 15. Regulatory information

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Proprietary ingredient 2	40 - 50	No.	No.	No.	Yes.	No.
Proprietary ingredient 3	5 - 10	No.	No.	No.	Yes.	No.
Fluridone	6.3	No.	No.	No.	Yes.	No.
Proprietary ingredient 4	1 - 5	No.	No.	No.	Yes.	No.
Proprietary ingredient 5	1 - 5	Yes.	No.	No.	Yes.	No.

SARA 313

No products were found.

State regulations

Massachusetts : The following components are listed: Proprietary ingredient 5

New York : None of the components are listed.

New Jersey : The following components are listed: Proprietary ingredient 1

Pennsylvania : The following components are listed: Proprietary ingredient 1; Proprietary ingredient 5

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): Not determined.

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 : Listed

Section 16. Other information

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

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

Section 16. Other information

History

Date of issue mm/dd/yyyy	:	04/15/2015
Date of previous issue	:	08/15/2011
Version	:	2
Revised Section(s)	:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16.
Prepared by	:	KMK Regulatory Services Inc.
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.

Conforms to HazCom 2012/United States

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

Aspiration 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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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of issue mm/dd/yyyy : 09/15/2015

Date of previous issue : 04/15/2013

Version : 4

Revised Section(s) : 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16.

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.

Conforms to HazCom 2012/United States

SAFETY DATA SHEET

Sonar® H4C

Section 1. Identification

GHS product identifier : Sonar® H4C

Other means of identification : Not available.

EPA Registration No. : 67690-61

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. 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 1	70 - 90	-
Proprietary ingredient 2	5 - 10	-
1-Methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4-pyridone	2.7	59756-60-4
Proprietary ingredient 3	1 - 5	-

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.

Over-exposure signs/symptoms

Section 4. First aid measures

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. Avoid breathing vapor or mist. 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 : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. 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 breathing vapor or mist. 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

Section 8. Exposure controls/personal protection

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.

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, air-purifying or supplied air 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.

Color : Gray.

Odor : Earthy (faint).

Odor threshold : Not available.

pH : 5.41 [Conc. (% w/w): 100%] @ 23ºC

Melting point : Not available.

Boiling point : Not available.

Flash point : Not available.

Burning time : Not applicable.

Burning rate : Not applicable.

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 : 1.1

Solubility : Easily soluble in the following materials: cold water and hot water.

Section 9. Physical and chemical properties

Solubility in water : Soluble.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

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
Sonar H4C	LD50 Dermal LD50 Oral	Rabbit Rat	>2000 mg/kg >5000 mg/kg	- -

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Sonar H4C	Skin - Mild irritant Eyes - Mild irritant	Rabbit Rabbit	- -	- -	- -

Sensitization

Product/ingredient name	Route of exposure	Species	Result
Sonar H4C	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

Section 11. Toxicological information

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.

Aspiration 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 11. Toxicological information

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	-	-	-

Section 14. Transport information

Transport hazard class(es)	-	-	-
Packing group	-	-	-
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

Section 15. Regulatory information

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
1-Methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl] -4-pyridone	2.7	No.	No.	No.	Yes.	No.

SARA 313

No products were found.

State regulations

Massachusetts : None of the components are listed.

New York : None of the components are listed.

New Jersey : The following components are listed: Proprietary ingredient 1

Pennsylvania : The following components are listed: Proprietary ingredient 1

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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Section 16. Other information

History

Date of issue mm/dd/yyyy	:	09/15/2015
Version	:	1
Revised Section(s)	:	Not applicable.
Prepared by	:	KMK Regulatory Services Inc.
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.

8.3 APDES Permit

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

December 16, 2015

Joni Scharfenberg
Director, Fairbanks SWCD
590 University Ave, Suite 2
Fairbanks, AK 99709

Re: AKG870009: Chena Slough & Chena Lakes Recreation Area, Totchaket Slough, FSWCD, Elodea

Dear Ms. Scharfenberg:

This letter acknowledges that you have submitted a Notice of Intent (NOI) form to be covered under the APDES Pesticide General Permit (PGP). As the permittee, you are authorized to discharge to Waters of the U.S. under the terms and conditions of this permit ten (10) calendar days after acknowledgment of receipt of the permittee's completed NOI is posted on ADEC's Storm Water Permit Search website (http://www.dec.state.ak.us/Applications/Water/WaterPermitSearch/Search.aspx).

As stated above, this letter acknowledges receipt of a NOI. However, it is not an ADEC determination of the validity of the information you provided. Your eligibility for coverage under the Permit is based on the validity of the certification you provided. Your signature on the NOI certifies that you have read, understood, and are implementing all of the applicable requirements. An important aspect of this certification requires that you correctly determine whether you are eligible for coverage under this permit.

As you know, the PGP requires you to have developed and begun implementing a Pesticide Discharge Management Plan (PDMP) and establishes additional monitoring, corrective action, record keeping, and annual reporting requirements. You must also comply with any additional location-specific requirements applicable to Alaska.

For tracking purposes, the following number has been assigned to your Notice of Intent Form: **AKG870009**.

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: NOI

cc: w/enclosure (email)
Karin Hendrickson, Pesticide Program Coordinator, DEC-EH/Pesticides
Aditi Shenoy, FSWCD
Heather Stewart, DNR, Palmer

AKG870009 Auth2.docx

AKG870009

Appendix D. Notice of Intent Form

Submit Notice of Intent Form to:

Alaska Department of Environmental Conservation
Wastewater Discharge Authorization Program
555 Cordova Street
Anchorage, AK 99501
Phone: (907) 269-6285; Fax: (907) 269-3487; Email: DEC.Water.WQPermit@alaska.gov

Submit Notice of Intent Form to:
Alaska Department of Environmental Conservation - Wastewater Discharge Authorization Program
555 Cordova Street; Anchorage, AK 99501
Phone: (907) 269-6285; Fax: (907) 269-3487; Email: DEC.Water.WQPermit@alaska.gov

AKG870009

EPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460
NOTICE OF INTENT (NOI) OF COVERAGE UNDER THE PESTICIDE GENERAL PERMIT (PGP) FOR DISCHARGES FROM THE APPLICATION OF PESTICIDES

Form Approved
OMB No.
2040-0284

Submission of this completed Notice of Intent (NOI) constitutes notice that the Operator identified in Section B intends to be authorized to discharge pollutants to Waters of the United States within the pest management area identified in Section C under EPA's Pesticide General Permit. Submission of this NOI constitutes notice that the party identified in Section B of this form has read, understands, and meets the eligibility conditions of Part 1 of the permit; agrees to comply with all applicable terms and conditions of the permit; and understands that continued authorization under the permit is contingent on maintaining eligibility for coverage. To be granted coverage, all information required on this form must be completed. Please read and make sure you comply with all permit requirements, including the requirement for large entities to prepare a Pesticide Discharge Management Plan (PDMP) prior to NOI submittal. Refer to the instructions at the end of this form to complete your NOI.

Electronic Submission Waiver (skip if submitting through EPA's eNOI system)

☑ I hereby acknowledge my waiver request from the use of EPA's electronic Notice of Intent system (eNOI) because my use of eNOI will incur undue burden or expense over my use of this paper NOI form.

Briefly describe the reason why use of the electronic system causes undue burden or expense.
eNOI not available

A. Notice of Intent Status

1. Mark whether this is the first time you are requesting coverage under the Pesticide General Permit or if this is a change of information for a discharge already covered under the Pesticide General Permit. If this is a change of information, supply the NPDES permit tracking number for the discharge.

a. ☑ Original NOI Submission

b. ☐ NOI Change of Information: _____ (NPDES Permit Tracking Number)

Please note: When selecting A.1.b please fill out Section B (Operator Name and Mailing Address) and the fields of the NOI that need to be modified.

B. Operator Information

1. Operator Name: AK Department of Natural Resources
2. IRS Employer Identification Number (EIN): 92-6011185
3. Operator Type (check one):
   a. ☐ Federal government
   b. ☑ State government
   c. ☐ Local government
   d. ☐ Mosquito control district (or similar)
   e. ☐ Irrigation control district (or similar)
   f. ☐ Weed control district (or similar)
   g. ☐ Other: If other, provide brief description of type of operator:
4. Are you a large entity as defined in Appendix A of the permit? (check one):
   ☑ Yes ☐ No
   Please note: If you answer "Yes" to question 4 you are required to develop a Pesticide Discharge Management Plan (PDMP) and submit an Annual Report reflecting all pesticide uses for which you are requesting permit coverage under this NOI.
5. In which state are your pest management areas located? Please specify only one state per NOI: AK
6. Mailing Address:
   a. Street: 5310 Boedenburg Spur Rd
   b. City: Palmer c. State: AK d. ZIP Code: 99645-
   e. Telephone: 907-745-8721 Ext f. Fax: - -
   g. Contact Name: Heather Stewart
   h. E-mail: heather.stewart@alaska.gov

Submit Notice of Intent Form to:
Alaska Department of Environmental Conservation - Wastewater Discharge Authorization Program
555 Cordova Street; Anchorage, AK 99501
Phone: (907) 269-6285; Fax: (907) 269-3487; Email: DEC.Water.WQPermit@alaska.gov

Submit Notice of Intent Form to:
Alaska Department of Environmental Conservation - Wastewater Discharge Authorization Program
555 Cordova Street; Anchorage, AK 99501
Phone: (907) 269-6285; Fax: (907) 269-3487; Email: DEC.Water.WQPermit@alaska.gov

AKG870009

C. Pest Management Areas: Complete Section C for each Pest Management Area for which coverage under EPA's Pesticide General Permit is desired. Copy this section for non-electronic submissions.

Pest Management Area # 1 of ## 2

1. Pest Management Area Name: Chena Slough

Provide a map of the location of the Pest Management Area (attach map) or describe the location of the Pest Management Area in detail.

Map of the pest management area attached

2. Are any of your activities for which you are requesting coverage under this NOI occurring on Indian Country Lands? ☐ Yes ☑ No

If yes, identify the reservation or otherwise describe those areas:

3. Are any of your activities (in this pest management area) for which you are requesting coverage under this NOI occurring on areas considered "federal facilities" as defined by the permit? ☐ Yes ☑ No

4. Mailing address and contact information of the pesticide applicator (or check here ☐ if same as provided in Section B):

a. Street: FSWCD 590 University Ave Suite 2

b. City: Fairbanks c. State: AK d. ZIP Code: 99709-

e. Telephone: 907-479-1213 Ext f. Fax: - -

g. Contact Name: Aditi Shenoy

h. E-mail: aditi.shenoy@gmail.com

5. Pesticide Use Patterns to be included in this Pest Management Area (check all that apply):

a. ☐ Mosquito and Other Flying Insect Pest Control
b. ☑ Weed and Algae Pest Control
c. ☐ Animal Pest Control
d. ☐ Forest Canopy Pest Control

6. Receiving Waters (check one):

a. ☑ Coverage requested for all Waters of the United States within the Pest Management Area identified above.

b. ☐ Coverage requested specifically for the following Waters of the United States within the Pest Management Area identified above.

c. ☐ Coverage requested for all Waters of the United States within the Pest Management Area identified above except for:

7. Tier 3 Waters

Is coverage requested for discharge to a Tier 3 water (Outstanding National Resource Water) of the United States? ☐ Yes ☑ No
If yes, answer a and b:

a. Name of Tier 3 water(s):

b. Provide rationale for determination that pesticide discharge is necessary to protect water quality, the environment, and/or public health and that any such discharge will not degrade water quality or will degrade water quality only on a short-term or temporary basis:

8. Water Quality Impaired Waters

Operators are not eligible for coverage under this permit for any discharges from a pesticide application to Waters of the United States if the waters are identified as impaired by a substance which is either an active ingredient of the pesticide designated for use or is a degradate of such an active ingredient. See Part 1.1.2.1 of the permit. Check one:

a. ☑ Waters are NOT impaired by any substance which is either an active ingredient of a pesticide to be discharged or a degradate of such an active ingredient

b. ☐ Waters are on a current state list as being impaired by a substance which is either an active ingredient of a pesticide to be discharged or a degradate of such an active ingredient; however, evidence is attached documenting that the waters are no longer impaired.

D. Endangered Species Protection: Complete Section D for each Pest Management Area for which coverage under EPA's Pesticide General Permit is desired. Copy this section for non-electronic submissions.

Pest Management Area # 1 of ## 2

1. Identify the criterion for which you are eligible for permit coverage as it applies to Federally Listed Threatened or Endangered Species (i.e., Species) and/or Federally Designated Critical Habitat (i.e., Habitat) (check one):

a. ☑ Pesticide application activities will not result in a point source discharge to one or more Waters of the United States containing National Marine Fisheries Service (NMFS) Listed Resources of Concern, as defined in Appendix A, of the PGP.

b. ☐ Pesticide application activities for which permit coverage is being requested will discharge to one or more Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A of the PGP, but consultation with NMFS under Section 7 of the Endangered Species Act (ESA) has been concluded for pesticide application activities covered under the PGP. Consultations can be either formal or informal, and would have occurred only as a result of a separate federal action. The consultation addressed the effects of pesticide discharges and discharge-related activities on federally-listed threatened or endangered species and federally-designated critical habitat, and must have resulted in either:

i. A biological opinion from NMFS finding no jeopardy to federally-listed species and no destruction/adverse modification of federally-designated critical habitat; or

ii. Written concurrence from NMFS with a finding that the pesticide discharges and discharge-related activities are not likely to adversely affect federally-listed species or federally-designated critical habitat.

c. ☐ Pesticide application activities for which permit coverage is being requested will discharge to one or more Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A of the PGP, but all "take" of these resources associated with such pesticide application activities has been authorized through NMFS' issuance of a permit under section 10 of the ESA, and such authorization addresses the effects of the pesticide discharges and discharge-related activities on federally-listed species and federally-designated critical habitat. (The term "take" means to harass, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. See Section 3 of the Endangered Species Act, 16 U.S.C. § 1532 (19).)

d. ☐ Pesticide application activities were, or will be, discharged to one or more Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A of the PGP, but only in response to a Declared Pest Emergency Situation.

e. ☐ Pesticide application activities for which permit coverage is being requested in the NOI will discharge to one or more Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A of the PGP. Eligible discharges include those where the Decision-maker includes in the NOI written correspondence from NMFS that pesticide application activities performed consistent with appropriate measures will avoid or eliminate the likelihood of adverse effects to NMFS Listed Resources of Concern.

f. ☐ Pesticide application activities for which permit coverage is being requested in the NOI will discharge to one or more Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A of the PGP. Eligible discharges include those from pesticide application activities that are demonstrated by the Decision-maker as not likely to adversely affect NMFA Listed Resources of Concern or that the pest poses a greater threat to the NMFS Listed Resources of Concern than does the discharge of the pesticide.

2. If you checked criterion d or criterion f above, provide the following information for all discharges to Waters of the United States containing NMFS Listed Resources of Concern identified within the pest management area for which permit coverage is being requested. For discharges pursuant to criterion d, Declared Pest Emergency Situations, information for items a through g should also include any discharges that have already occurred prior to NOI submission as well as the activities you performed in the 15 day period before submission of this NOI was required. In some cases, implementation of pest management measures as specified in the permit involves a degree of "adaptive management" such that exact timing and quantities of applications cannot be determined in advance for the duration of the permit. In such cases, the permittee must provide the required information to the extent feasible and consistent with the implementation of the selected pest management measures.

a. Describe the location of the pest management area in detail or provide a map of the location:

_____

b. Pest(s) to be controlled:

_____

_____

c. Pesticide product(s) to be discharged and method of application: _____

d. Planned quantity and rate of discharge(s) for each method of application: _____

e. Number of planned discharges: _____

f. Approximate date(s) of planned discharge(s): _____

g. Your rationale supporting your determination that you meet the criterion for which you are submitting this NOI, including appropriate measures to be undertaken to avoid or eliminate the likelihood of adverse effects. For certifications pursuant to Criterion D, indicate whether the discharge is likely to adversely affect NMFS Listed Resources of Concern and, if so, any feasible measures to avoid or eliminate such adverse effects (attach additional pages as necessary):

_____

_____

_____

_____

_____

_____

_____

_____

C. Pest Management Areas: Complete Section C for each Pest Management Area for which coverage under EPA's Pesticide General Permit is desired. Copy this section for non-electronic submissions.

Pest Management Area # 2 of ## 2

1. Pest Management Area Name: CHENA LAKES RECREATION AREA

Provide a map of the location of the Pest Management Area (attach map) or describe the location of the Pest Management Area in detail.
MAP OF THE PEST MANAGEMENT AREA ATTACHED

2. Are any of your activities for which you are requesting coverage under this NOI occurring on Indian Country Lands? ☐ Yes ☑ No
If yes, identify the reservation or otherwise describe those areas:

3. Are any of your activities (in this pest management area) for which you are requesting coverage under this NOI occurring on areas considered "federal facilities" as defined by the permit? ☐ Yes ☑ No

4. Mailing address and contact information of the pesticide applicator (or check here ☑ if same as provided in Section B):

a. Street:

b. City: c. State: d. ZIP Code: -

e. Telephone: - - Ext f. Fax: - -

g. Contact Name:

h. E-mail:

5. Pesticide Use Patterns to be included in this Pest Management Area (check all that apply):

a. ☐ Mosquito and Other Flying Insect Pest Control
b. ☑ Weed and Algae Pest Control
c. ☐ Animal Pest Control
d. ☐ Forest Canopy Pest Control

6. Receiving Waters (check one):

a. ☑ Coverage requested for all Waters of the United States within the Pest Management Area identified above.
b. ☐ Coverage requested specifically for the following Waters of the United States within the Pest Management Area identified above.
c. ☐ Coverage requested for all Waters of the United States within the Pest Management Area identified above except for:

7. Tier 3 Waters

Is coverage requested for discharge to a Tier 3 water (Outstanding National Resource Water) of the United States? ☐ Yes ☑ No
If yes, answer a and b:

a. Name of Tier 3 water(s):
b. Provide rationale for determination that pesticide discharge is necessary to protect water quality, the environment, and/or public health and that any such discharge will not degrade water quality or will degrade water quality only on a short-term or temporary basis:

8. Water Quality Impaired Waters

Operators are not eligible for coverage under this permit for any discharges from a pesticide application to Waters of the United States if the waters are identified as impaired by a substance which is either an active ingredient of the pesticide designated for use or is a degradate of such an active ingredient. See Part 1.1.2.1 of the permit. Check one:

a. ☑ Waters are NOT impaired by any substance which is either an active ingredient of a pesticide to be discharged or a degradate of such an active ingredient
b. ☐ Waters are on a current state list as being impaired by a substance which is either an active ingredient of a pesticide to be discharged or a degradate of such an active ingredient; however, evidence is attached documenting that the waters are no longer impaired.

D. Endangered Species Protection: Complete Section D for each Pest Management Area for which coverage under EPA's Pesticide General Permit is desired. Copy this section for non-electronic submissions.

Pest Management Area # 2 of ## 2

1. Identify the criterion for which you are eligible for permit coverage as it applies to Federally Listed Threatened or Endangered Species (i.e., Species) and/or Federally Designated Critical Habitat (i.e., Habitat) (check one):

a. ☑ Pesticide application activities will not result in a point source discharge to one or more Waters of the United States containing National Marine Fisheries Service (NMFS) Listed Resources of Concern, as defined in Appendix A, of the PGP.

b. ☐ Pesticide application activities for which permit coverage is being requested will discharge to one or more Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A of the PGP, but consultation with NMFS under Section 7 of the Endangered Species Act (ESA) has been concluded for pesticide application activities covered under the PGP. Consultations can be either formal or informal, and would have occurred only as a result of a separate federal action. The consultation addressed the effects of pesticide discharges and discharge-related activities on federally-listed threatened or endangered species and federally-designated critical habitat, and must have resulted in either:

i. A biological opinion from NMFS finding no jeopardy to federally-listed species and no destruction/adverse modification of federally-designated critical habitat; or

ii. Written concurrence from NMFS with a finding that the pesticide discharges and discharge-related activities are not likely to adversely affect federally-listed species or federally-designated critical habitat.

c. ☐ Pesticide application activities for which permit coverage is being requested will discharge to one or more Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A of the PGP, but all "take" of these resources associated with such pesticide application activities has been authorized through NMFS' issuance of a permit under section 10 of the ESA, and such authorization addresses the effects of the pesticide discharges and discharge-related activities on federally-listed species and federally-designated critical habitat. (The term "take" means to harass, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. See Section 3 of the Endangered Species Act, 16 U.S.C. § 1532 (19).)

d. ☐ Pesticide application activities were, or will be, discharged to one or more Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A of the PGP, but only in response to a Declared Pest Emergency Situation.

e. ☐ Pesticide application activities for which permit coverage is being requested in the NOI will discharge to one or more Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A of the PGP. Eligible discharges include those where the Decision-maker includes in the NOI written correspondence from NMFS that pesticide application activities performed consistent with appropriate measures will avoid or eliminate the likelihood of adverse effects to NMFS Listed Resources of Concern.

f. ☐ Pesticide application activities for which permit coverage is being requested in the NOI will discharge to one or more Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A of the PGP. Eligible discharges include those from pesticide application activities that are demonstrated by the Decision-maker as not likely to adversely affect NMFA Listed Resources of Concern or that the pest poses a greater threat to the NMFS Listed Resources of Concern than does the discharge of the pesticide.

2. If you checked criterion d or criterion f above, provide the following information for all discharges to Waters of the United States containing NMFS Listed Resources of Concern identified within the pest management area for which permit coverage is being requested. For discharges pursuant to criterion d, Declared Pest Emergency Situations, information for items a through g should also include any discharges that have already occurred prior to NOI submission as well as the activities you performed in the 15 day period before submission of this NOI was required. In some cases, implementation of pest management measures as specified in the permit involves a degree of "adaptive management" such that exact timing and quantities of applications cannot be determined in advance for the duration of the permit. In such cases, the permittee must provide the required information to the extent feasible and consistent with the implementation of the selected pest management measures.

a. Describe the location of the pest management area in detail or provide a map of the location:

b. Pest(s) to be controlled:

c. Pesticide product(s) to be discharged and method of application:

d. Planned quantity and rate of discharge(s) for each method of application:

e. Number of planned discharges: _____

f. Approximate date(s) of planned discharge(s):

g. Your rationale supporting your determination that you meet the criterion for which you are submitting this NOI, including appropriate measures to be undertaken to avoid or eliminate the likelihood of adverse effects. For certifications pursuant to Criterion D, indicate whether the discharge is likely to adversely affect NMFS Listed Resources of Concern and, if so, any feasible measures to avoid or eliminate such adverse effects (attach additional pages as necessary):

E. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. On the basis of my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Printed Name: JONI SCHARFENBERG

Title: DIRECTOR FAIRBANKS SWCD

E-Mail: joniscg@gmail.com

Signature/Responsible Official: Joni Scharfenberg Date: / /

NOI Preparer (Complete if NOI was prepared by someone other than the certifier)

Preparer Name:

Organization:

Phone: - - Ext Date: / /

E-Mail:

Submit Notice of Intent Form to:
Alaska Department of Environmental Conservation - Wastewater Discharge Authorization Program
555 Cordova Street; Anchorage, AK 99501
Phone: (907) 269-6285; Fax: (907) 269-3487; Email: DEC.Water.WQPermit@alaska.gov

AKG870009

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, DC 20460
NOTICE OF INTENT (NOI) OF COVERAGE UNDER THE PESTICIDE GENERAL PERMIT (PGP) FOR DISCHARGES FROM THE APPLICATION OF PESTICIDES

Form Approved
OMB No.
2040-0284

Submission of this completed Notice of Intent (NOI) constitutes notice that the Operator identified in Section B intends to be authorized to discharge pollutants to Waters of the United States within the pest management area identified in Section C under EPA's Pesticide General Permit. Submission of this NOI constitutes notice that the party identified in Section B of this form has read, understands, and meets the eligibility conditions of Part 1 of the permit; agrees to comply with all applicable terms and conditions of the permit; and understands that continued authorization under the permit is contingent on maintaining eligibility for coverage. To be granted coverage, all information required on this form must be completed. Please read and make sure you comply with all permit requirements, including the requirement for large entities to prepare a Pesticide Discharge Management Plan (PDMP) prior to NOI submittal. Refer to the instructions at the end of this form to complete your NOI.

Electronic Submission Waiver (skip if submitting through EPA's eNOI system)

☑ I hereby acknowledge my waiver request from the use of EPA's electronic Notice of Intent system (eNOI) because my use of eNOI will incur undue burden or expense over my use of this paper NOI form.

Briefly describe the reason why use of the electronic system causes undue burden or expense.

eNOI not available

A. Notice of Intent Status

1. Mark whether this is the first time you are requesting coverage under the Pesticide General Permit or if this is a change of information for a discharge already covered under the Pesticide General Permit. If this is a change of information, supply the NPDES permit tracking number for the discharge.

a. ☐ Original NOI Submission

b. ☑ NOI Change of Information: AKG870009 (NPDES Permit Tracking Number)

Please note: When selecting A.1.b please fill out Section B (Operator Name and Mailing Address) and the fields of the NOI that need to be modified.

B. Operator Information

1. Operator Name: AK Dept of Natural Resources
2. IRS Employer Identification Number (EIN): 92 - 6001185
3. Operator Type (check one):
   a. ☐ Federal government
   b. ☑ State government
   c. ☐ Local government
   d. ☐ Mosquito control district (or similar)
   e. ☐ Irrigation control district (or similar)
   f. ☐ Weed control district (or similar)
   g. ☐ Other: If other, provide brief description of type of operator:
4. Are you a large entity as defined in Appendix A of the permit? (check one):
   ☑ Yes ☐ No
   Please note: If you answer "Yes" to question 4 you are required to develop a Pesticide Discharge Management Plan (PDMP) and submit an Annual Report reflecting all pesticide uses for which you are requesting permit coverage under this NOI.
5. In which state are your pest management areas located? Please specify only one state per NOI: AK
6. Mailing Address:
   a. Street: 5310 Boddenburg Spur Rd
   b. City: Palmer c. State: AK d. ZIP Code: 99645 -
   e. Telephone: 907 - 745 - 8721 Ext f. Fax: - -
   g. Contact Name: Heather Stewart
   h. E-mail: heather.stewart@alaska.gov

Alaska Department of Environmental Conservation - Wastewater Discharge Authorization Program
555 Cordova Street; Anchorage, AK 99501
Phone: (907) 269-6285; Fax: (907) 269-3487; Email: DEC.Water.WQPermit@alaska.gov

AKG870009

C. Pest Management Areas: Complete Section C for each Pest Management Area for which coverage under EPA's Pesticide General Permit is desired. Copy this section for non-electronic submissions.

Pest Management Area # 3 of ## 3

1. Pest Management Area Name: Totchaket Slough

Provide a map of the location of the Pest Management Area (attach map) or describe the location of the Pest Management Area in detail.

Map of the pest management area attached.

2. Are any of your activities for which you are requesting coverage under this NOI occurring on Indian Country Lands? ☑ Yes ☐ No

If yes, identify the reservation or otherwise describe those areas:

Partial ownership of land surrounding the slough is by Toghotthele Inc, the local Native corporation.

3. Are any of your activities (in this pest management area) for which you are requesting coverage under this NOI occurring on areas considered "federal facilities" as defined by the permit? ☐ Yes ☑ No

4. Mailing address and contact information of the pesticide applicator (or check here ☑ if same as provided in Section B):

a. Street:

b. City: c. State: d. ZIP Code: –

e. Telephone: – – Ext f. Fax: – –

g. Contact Name:

h. E-mail:

5. Pesticide Use Patterns to be included in this Pest Management Area (check all that apply):

a. ☐ Mosquito and Other Flying Insect Pest Control
c. ☐ Animal Pest Control
b. ☑ Weed and Algae Pest Control
d. ☐ Forest Canopy Pest Control

6. Receiving Waters (check one):

a. ☑ Coverage requested for all Waters of the United States within the Pest Management Area identified above.

b. ☐ Coverage requested specifically for the following Waters of the United States within the Pest Management Area identified above.

c. ☐ Coverage requested for all Waters of the United States within the Pest Management Area identified above except for:

7. Tier 3 Waters

Is coverage requested for discharge to a Tier 3 water (Outstanding National Resource Water) of the United States? ☐ Yes ☑ No
If yes, answer a and b:

a. Name of Tier 3 water(s):

b. Provide rationale for determination that pesticide discharge is necessary to protect water quality, the environment, and/or public health and that any such discharge will not degrade water quality or will degrade water quality only on a short-term or temporary basis:

8. Water Quality Impaired Waters

Operators are not eligible for coverage under this permit for any discharges from a pesticide application to Waters of the United States if the waters are identified as impaired by a substance which is either an active ingredient of the pesticide designated for use or is a degradate of such an active ingredient. See Part 1.1.2.1 of the permit. Check one:

a. ☑ Waters are NOT impaired by any substance which is either an active ingredient of a pesticide to be discharged or a degradate of such an active ingredient

b. ☐ Waters are on a current state list as being impaired by a substance which is either an active ingredient of a pesticide to be discharged or a degradate of such an active ingredient; however, evidence is attached documenting that the waters are no longer impaired.

AKG870009

D. Endangered Species Protection: Complete Section D for each Pest Management Area for which coverage under EPA's Pesticide General Permit is desired. Copy this section for non-electronic submissions.

Pest Management Area # 3 of ## 3

1. Identify the criterion for which you are eligible for permit coverage as it applies to Federally Listed Threatened or Endangered Species (i.e., Species) and/or Federally Designated Critical Habitat (i.e., Habitat) (check one):

a. ☑ Pesticide application activities will not result in a point source discharge to one or more Waters of the United States containing National Marine Fisheries Service (NMFS) Listed Resources of Concern, as defined in Appendix A, of the PGP.

b. ☐ Pesticide application activities for which permit coverage is being requested will discharge to one or more Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A of the PGP, but consultation with NMFS under Section 7 of the Endangered Species Act (ESA) has been concluded for pesticide application activities covered under the PGP. Consultations can be either formal or informal, and would have occurred only as a result of a separate federal action. The consultation addressed the effects of pesticide discharges and discharge-related activities on federally-listed threatened or endangered species and federally-designated critical habitat, and must have resulted in either:

i. A biological opinion from NMFS finding no jeopardy to federally-listed species and no destruction/adverse modification of federally-designated critical habitat; or

ii. Written concurrence from NMFS with a finding that the pesticide discharges and discharge-related activities are not likely to adversely affect federally-listed species or federally-designated critical habitat.

c. ☐ Pesticide application activities for which permit coverage is being requested will discharge to one or more Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A of the PGP, but all "take" of these resources associated with such pesticide application activities has been authorized through NMFS' issuance of a permit under section 10 of the ESA, and such authorization addresses the effects of the pesticide discharges and discharge-related activities on federally-listed species and federally-designated critical habitat. (The term "take" means to harass, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. See Section 3 of the Endangered Species Act, 16 U.S.C. § 1532 (19).)

d. ☐ Pesticide application activities were, or will be, discharged to one or more Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A of the PGP, but only in response to a Declared Pest Emergency Situation.

e. ☐ Pesticide application activities for which permit coverage is being requested in the NOI will discharge to one or more Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A of the PGP. Eligible discharges include those where the Decision-maker includes in the NOI written correspondence from NMFS that pesticide application activities performed consistent with appropriate measures will avoid or eliminate the likelihood of adverse effects to NMFS Listed Resources of Concern.

f. ☐ Pesticide application activities for which permit coverage is being requested in the NOI will discharge to one or more Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A of the PGP. Eligible discharges include those from pesticide application activities that are demonstrated by the Decision-maker as not likely to adversely affect NMFA Listed Resources of Concern or that the pest poses a greater threat to the NMFS Listed Resources of Concern than does the discharge of the pesticide.

2. If you checked criterion d or criterion f above, provide the following information for all discharges to Waters of the United States containing NMFS Listed Resources of Concern identified within the pest management area for which permit coverage is being requested. For discharges pursuant to criterion d, Declared Pest Emergency Situations, information for items a through g should also include any discharges that have already occurred prior to NOI submission as well as the activities you performed in the 15 day period before submission of this NOI was required. In some cases, implementation of pest management measures as specified in the permit involves a degree of "adaptive management" such that exact timing and quantities of applications cannot be determined in advance for the duration of the permit. In such cases, the permittee must provide the required information to the extent feasible and consistent with the implementation of the selected pest management measures.

a. Describe the location of the pest management area in detail or provide a map of the location:

_____

b. Pest(s) to be controlled:

_____

_____

c. Pesticide product(s) to be discharged and method of application: _____

d. Planned quantity and rate of discharge(s) for each method of application: _____

e. Number of planned discharges: _____

f. Approximate date(s) of planned discharge(s): _____

g. Your rationale supporting your determination that you meet the criterion for which you are submitting this NOI, including appropriate measures to be undertaken to avoid or eliminate the likelihood of adverse effects. For certifications pursuant to Criterion D, indicate whether the discharge is likely to adversely affect NMFS Listed Resources of Concern and, if so, any feasible measures to avoid or eliminate such adverse effects (attach additional pages as necessary):

_____

_____

_____

_____

_____

_____

_____

_____

E. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. On the basis of my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Printed Name: Joni $charfenberg

Title: Director Fairbanks SWCD

E-Mail: jonisc@gmail.com

Signature/Responsible Official: Joni Scharfenberg Date: 11/23/2015

NOI Preparer (Complete if NOI was prepared by someone other than the certifier)

Preparer Name: Aditi Shenoy

Organization: Fairbanks SWCD

Phone: 907-479-1213 Ext 104 Date: 11/23/2015

E-Mail: aditi.shenoy@gmail.com

Instructions for Completing the Notice of Intent (NOI) for Coverage Under the Pesticide General Permit (PGP) for Discharges from the Application of Pesticides

Who Must File a NOI with EPA?

Any Operator, as described in the Part 1.2.2 of the permit and meeting the eligibility requirements identified in Part 1.1 of the permit and Table 1 below must submit a complete and accurate NOI. As required in the permit, only certain Operators that are also Decision-makers must submit NOIs.

Table 1. Decision-Makers Required to Submit NOIs

PGP Part/ Pesticide Use	Which Decision-Makers Must Submit NOIs?	For Which Pesticide Application Activities?
All four use patterns identified in Part 1.1.1	Any Decision-maker with an eligible discharge to a Tier 3 water (Outstanding National Resource Water) consistent with Part 1.1.2.2	Activities resulting in a discharge to a Tier 3 water
All four use patterns identified in Part 1.1.1	Any Decision-maker with an eligible discharge to Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A	Activities resulting in a discharge to Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A
1.1.1(a) - Mosquito and Other Flying Insect Pest Control	Any Agency for which pest management for land resource stewardship is an integral part of the organization's operations.	All activities resulting in a discharge for which the Federal or State agency is responsible for pest control
	Mosquito control districts, or similar pest control districts	All activities resulting in a discharge for which the Decision-maker is responsible for pest control
	Local governments or other entities that exceed the annual treatment area threshold identified here	Adulticide treatment if more than 6,400 acres during a calendar year
1.1.1(b) - Weed and Algae Pest Control	Any Agency for which pest management for land resource stewardship is an integral part of the organization's operations.	All activities resulting in a discharge for which the Federal or State agency is responsible for pest control
	Irrigation and weed control districts, or similar pest control districts	All activities resulting in a discharge for which the Decision-maker is responsible for pest control
	Local governments or other entities that exceed the annual treatment area threshold identified here	Treatment during a calendar year if more than either: 20 linear miles OR 80 acres of water (i.e., surface area)
1.1.1(c) - Animal Pest Control	Any Agency for which pest management for land resource stewardship is an integral part of the organization's operations.	All activities resulting in a discharge for which the Federal or State agency is responsible for pest control
	Local governments or other entities that exceed the annual treatment area threshold identified here	Treatment during a calendar year if more than either: 20 linear miles OR 80 acres of water (i.e., surface area)
1.1.1.(d) - Forest Canopy Pest Control	Any Agency for which pest management for land resource stewardship is an integral part of the organization's operations.	All activities resulting in a discharge for which the Federal or State agency is responsible for pest control
	Local governments or other entities that exceed the annual treatment area threshold identified here	Treatment if more than 6,400 acres during a calendar year

If you have questions about whether you need to file an NOI or questions about completing the form, see www.epa.gov/npdes/pesticides or contact the NOI Center toll free at 866-352-7755.

One NOI can be submitted for multiple pest management areas in a state for which you are seeking permit coverage; however, no more than one state can be included on any single NOI form.

When to File the NOI Form?

Do not file your NOI until you have obtained and thoroughly read a copy of the permit. A copy of the permit is on EPA's website (www.epa.gov/npdes/pesticides).The permit describes procedures to ensure your eligibility, prepare your Pesticide Discharge Management Plan (PDMP), and complete the NOI form questions—all of which must be done before you sign the NOI certification statement attesting to the accuracy and completeness of your NOI. You will also need a copy of the permit once you have obtained coverage so that you can comply with the implementation requirements of the permit. Note: PDMP is not required for 1) any application made in response to a Declared Pest Emergency Situation, as defined in Appendix A of the permit; and 2) any Decision-maker that is required to submit an NOI solely because their application results in a point source discharge to Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A of the permit.

All eligible discharges are authorized for permit coverage through January 12, 2012 without submission of an NOI. For any discharges after January 12, 2012, Decision-makers meeting the eligibility requirements identified in the Part 1.1of the permit and Table 1 must submit a complete and accurate NOI according to Tables 2, and 3 and consistent with the requirements of the Part 1.2 of the permit. For example, for discharges occurring on or before January 12, 2012 but continuing after January 12, 2012, NOIs are due no later than January 3, 2012 to ensure uninterrupted coverage.

Table 2. NOI Submittal Deadlines and Discharge Authorization Dates for Discharges from the Application of Pesticides [1]

After January 12, 2012, any eligible discharge for which an NOI is required must submit an NOI consistent with the earliest due date identified below. If EPA receives an NOI on or before January 2, 2012 (or on or before December 12, 2011, for discharges to Waters of the United States containing NMFS Listed Resources of Concern), uninterrupted coverage continues.2 NOI due dates for any discharges occurring on or after January 12, 2012 are as follows:

Operator Type	NOI Submission Deadline	Discharge Authorization Date[2]
Any Decision-maker with any discharge to Waters of the United States containing NMFS Listed Resources of Concern, except for those discharges in response to a Declared Pest Emergency Situation, as defined in Appendix A.	At least 30 days before any discharge to Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A.[5]	No earlier than 30 days after EPA posts on the Internet a receipt of a complete and accurate NOI.[3, 5]
Any Decision-maker with a discharge in response to a Declared Pest Emergency for which that activity triggers the NOI requirement identified in Part 1.2.2, except for any discharges to Waters of the United States containing NMFS Listed Resources of Concern.	At least 30 days after beginning discharge.	Immediately upon beginning to discharge for activities conducted in response to a Declared Pest Emergency Situation.
Any Decision-maker with any discharge to Waters of the United States containing NMFS Listed Resources of Concern, in response to a Declared Pest Emergency Situation, as defined in Appendix A.	Within 15 days after beginning to discharge in response to a Declared Pest Emergency Situation.	Immediately upon beginning to discharge for activities conducted in response to a Declared Pest Emergency Situation for a period of at least 60 days.[4]
Any Decision-maker that exceeds any annual treatment area threshold.	At least 10 days before exceeding an annual treatment area threshold.	No earlier than 10 days after EPA posts on the Internet receipt of a complete and accurate NOI.
Any Decision-maker otherwise required to submit an NOI as identified in Table 1	At least 10 days before any discharge for which an NOI is required	No earlier than 10 days after EPA posts on the Internet receipt of a complete and accurate NOI.

[1] State, territory and tribal specific requirements in addition to the requirements in this table are provided in Part 9.0.

[2] On the basis of a review of an NOI or other information, EPA may delay authorization to discharge beyond any timeframe identified in Table 2, determine that additional technology-based and/or water quality-based effluent limitations or other conditions are necessary, or deny coverage under this permit and require submission of an application for an individual NPDES permit, as detailed in Part 1.3 of the permit.

[3] Within 30 days after EPA posts on the Internet receipt of a complete and accurate NOI, for those areas with NMFS Listed Resources of Concern, as defined in Appendix A of the permit, NMFS will provide EPA with a determination as to whether it believes the eligibility criterion of "not likely to adversely affect listed species or designated critical habitat" has been met, could be met with conditions that NMFS identifies, or has not been met. EPA expects to rely on NMFS' determination in deciding whether to withhold authorization. If NMFS does not provide EPA with this information within 30 days of EPA posting on the Internet receipt of a complete and accurate NOI, the discharges will be authorized 30 days after EPA posts on the Internet receipt of a complete NOI.

[4] In any Declared Pest Emergency Situation in areas with Waters of the United States containing NMFS Listed Resources of Concern, NMFS will have 30 days after submission of an NOI to provide EPA with a determination as to whether the eligibility criteria of "not likely to adversely affect listed species or designated critical habitat" has been met, could be met with conditions that NMFS identifies, or has not been met. EPA expects to rely on NMFS' determination in deciding whether to allow continued permit coverage and if additional conditions are necessary. If NMFS does not provide EPA with a recommendation within 30 days of EPA posting on the Internet receipt of a complete and accurate NOI, authorization for these discharges will continue. If EPA identifies additional permit conditions, or includes additional permit conditions recommended by NMFS, as necessary to qualify discharges as eligible for coverage beyond 60 days under the PGP, those conditions remain in effect for the life of the permit.

[5] EPA may authorize certain discharges in less than 30 days, but no fewer than 10 days, for any discharges authorized under Criterion B, C, or E of Part 1.1.2.4 (for which NMFS has already evaluated the effects of these discharges).

Table 3. NOI Change of Information Submittal Deadlines and Discharge Authorization Dates

Operator Type	NOI Submission Deadline	Discharge Authorization Date
Any Decision-maker requiring permit coverage for a pest management area not identified on a previously submitted NOI for this permit, except for discharges to any; (1) Tier 3 water, or (2) Waters of the United States containing NMFS Listed Resources of Concern. Except for such waters, changes other than identification of a new pest management area or a new pesticide use pattern do not require a revised NOI submittal.	At least 10 days before beginning to discharge in that newly identified area unless discharges are in response to a Declared Pest Emergency Situation in which case not later than 30 days after beginning discharge.	No earlier than 10 days after EPA posts on the Internet the receipt of a complete and accurate NOI unless discharges are in response to a Declared Pest Emergency Situation in which case coverage is available immediately upon beginning to discharge from activities conducted in response to Declared Pest Emergency Situation.
Any Decision-maker discharging to a Tier3 water not identified by name on a previously submitted NOI for this permit, except for Tier 3 waters containing NMFS Listed Resources of Concern	At least 10 days before beginning to discharge in that newly identified area unless discharges are in response to a Declared Pest Emergency Situation in which case not later than 30 days after beginning discharge.	No earlier than 10 days after EPA posts on the Internet the receipt of a complete and accurate NOI unless discharges are in response to a Declared Pest Emergency Situation in which case coverage is available immediately upon beginning to discharge from activities conducted in response to Declared Pest Emergency Situation.
Any Decision-maker with any discharge to Waters of the United States containing NMFS Listed Resources of Concern, as defined in Appendix A, not identified on a previously submitted NOI for this permit. This includes changes in any treatment area, pesticide product, method or rate of application, or approximate dates of applications.	At least 30 days before beginning to discharge in that newly identified treatment area unless discharges are in response to a Declared Pest Emergency Situation in which case not later than 15 days after beginning discharge.	No earlier than 30 days after EPA posts on the Internet receipt of a complete and accurate NOI unless discharges are in response to a Declared Pest Emergency Situation in which case coverage is available immediately upon beginning to discharge from activities conducted in response to Declared Pest Emergency Situation.

Where to File the NOI Form

The Decision-maker must prepare and submit the NOI using EPA's electronic Notice of Intent system (eNOI) available on EPA's website (www.epa.gov/npdes/pesticides/enoi) unless eNOI is otherwise unavailable or the Decision-maker has filed a waiver from the requirement to use eNOI for submission of the NOI. The Electronic Submission Waiver is at the top of this form. Decision-makers waived from the requirement to use eNOI for NOI submission must certify to EPA on this form that use of eNOI will incur undue burden or expense over the use of the paper NOI form and then provide a basis for that determination.

EPA will immediately post on the pesticides eNOI Website all NOIs received. Late NOIs will be accepted, but authorization to discharge will not be retroactive.

If you file a waiver from using eNOI; you must send the NOI to one of the addresses listed below.

Via United States Mail:
United States Environmental Protection Agency
Office of Water, Water Permits Division
Mail Code 4203M, ATTN: NPDES Pesticides
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Via overnight/express delivery:
United States Environmental Protection Agency
Office of Water, Water Permits Division
EPA East Building - Room 7420, ATTN: NPDES Pesticides
1201 Constitution Avenue, NW
Washington, DC 20004
Phone: 202-564-9545

If you have questions, contact EPA's Pesticides Notice Processing Center toll free at 866-352-7755.

- If you file a paper NOI, submit the original with a signature in ink. Do not send copies. Also, faxed copies will not be accepted.
- If you are required to develop a PDMP, that document does not need to be submitted for review unless specifically requested by EPA. You must keep a copy of your PDMP on-site or otherwise make it available to facility personnel responsible for implementing provisions of the permit.

Completing the NOI Form

To complete this form, type or print in uppercase letters in the appropriate areas only. Please make sure you complete all questions. Make sure you make a photocopy for your records before you send the completed original form to the address above. You may also use this paper form as a checklist for the information you will need when filing an NOI electronically via EPA's Pesticides eNOI System.

Section A. NOI Status

1. Indicate if this is the first time you are requesting coverage under the permit or if this is a change of information.

a. Check this box if this is the first time you are requesting coverage under the permit for these discharges. If this is the first time you are requesting coverage, refer to Table 2 for NOI submittal deadlines and discharge authorization dates. Note: All eligible discharges are authorized for permit coverage through January 12, 2012 without submission of an NOI.

b. Check this box if this is a change of information for a discharge already covered under the permit. If this is a change of information, supply the NPDES permit tracking number that you received in your confirmation letter or e-mail from EPA's Pesticide Notice Processing Center. You can find the tracking number assigned to your previous NOI using EPA's eNOI System (www.epa.gov/npdes/pesticides/enoi). For additional details regarding a change of information, see Table 3. Also fill out Section B of this form (Operator Name and Mailing Address) and the associated fields of information that need to be modified on the NOI.

Section B. Operator Information

1. Provide the legal name of the person, firm, public organization or any other public entity that is the Decision-maker for the pesticides applications described in this notice. A Decision-maker is an Operator who has control over the decision to perform pesticide applications including the ability to modify those decisions that result in a discharge to Waters of the United States.
2. Provide the Employer Identification Number (EIN from the Internal Revenue Service (IRS)), commonly referred to as your tax payer ID number. If the operator does not have an EIN, enter "N/A" in the space provided.
3. Indicate the type of Operator: federal government, state government, local government, mosquito control district (or similar), irrigation control district (or similar), weed control district (or similar), or other. If other, provide brief description of type of Operator in the space provided.
4. Indicate whether or not you are a "large entity" as defined in Appendix A of the permit. Note that if you are a large entity, you are required to develop a Pesticide Discharge Management Plan (PDMP) and submit future Annual Reports reflecting all pesticide uses for which you are requesting permit coverage under this NOI.
5. Indicate which state your pest management areas are located. Specify only one state per NOI. If there is more than one state, additional NOIs must be submitted.
6. Provide the Decision-maker's mailing address, telephone number, fax number (optional), name, and e-mail address. Correspondence will be sent to this address.

Section C. Pest Management Area: Information for each Pest Management Area for which coverage under EPA's Pesticide General Permit is desired.

1. Indicate whether you are submitting an NOI for multiple pest management areas. A pest management area is the area of land, including any water, for which you have responsibility and are authorized to conduct pest management activities as covered by this permit (e.g., if you are a mosquito control district, your pest management area is the total area of the district). You must complete a Section C for each pest management area. If you are submitting an NOI for only one area, enter "1" of "1." If you are submitting NOIs for multiple pest management areas, enter the number for the NOI for which you are requesting coverage followed by the total number of pest management areas for which you are requesting coverage. Enter the name of the pest management area. Attach a map of the pest management area or describe the location of the pest management area in the space provided.
2. Indicate whether pesticide application will occur on Indian County Lands, and if so, provide the name of the reservation, if applicable.
3. Indicate whether pesticide application will occur on a Federal Facility, as defined in Appendix A of the permit.
4. Enter the mailing address of the contact person for the pest management area. If this address is the same as the Decision-maker's mailing address, indicate that by checking the box. If it is a different address, enter the mailing address, telephone number, fax number (optional), contact name, and e-mail address.
5. Indicate the pesticide use patterns for the pest management area for which the NOI is required. For additional information regarding pesticide use patterns, see Part 1.1.1 of the permit. Check all the use patterns that apply to the pest management area.
6. Indicate if permit coverage is being requested for all Waters of the United States within the pest management area or if permit coverage is being requested to specific Waters of the United States within the pest management area. If specific waters are being requested, write the names of the waterbodies. If permit coverage is being requested for all waters of the United States within the pest management area except for specific waterbodies, name those specific waterbodies in the space provided. EPA's Water Locator Tool can help you identify the closest receiving water to your facility (http://cfpub.epa.gov/npdes/stormwater/tmdltool.cfm).
7. Indicate if permit coverage is being requested to discharge to a Tier 3 (Outstanding National Resource Water) Water of the United States. If yes, write the name(s) of the Tier 3 water(s) in the space provided. Describe and demonstrate why it is necessary to apply the pesticide discharge to protect the water quality, environment, and/or public health and that any such discharge will not degrade water quality or will degrade water quality only on a short-term or temporary basis.
8. Verify that waters within the pest management area are either not impaired by substances which are either active ingredients in the pesticide planned for use or degradates of such active ingredients, OR that evidence shows that the target waters in question are no longer impaired. See Part 1.1.2.1 of the permit for more information on discharges to Water Quality Impaired Waters.

Section D. Endangered Species Protection. Complete Section D for each Pest Management Area for which coverage under EPA's PGP is desired.

Identify the Pest Management Areas, corresponding to those in Part C.

1. Coverage under the permit is available only for discharges and discharge-related activities, as defined in Appendix A of the permit, that are not likely to jeopardize the continued existence of any species that are federally- listed as endangered or threatened ("listed") under the Endangered Species Act (ESA) and not likely to result in the adverse modification or destruction of habitat that is federally-designated as critical under the ESA ("critical habitat") except as provided in criterion b, c, and for at least 60 days, d, below. For a subset of listed species and critical habitat, identified as NMFS Listed Resources of Concern and defined in Appendix A, there are specific criteria for determining eligibility. To demonstrate eligibility, you must meet one or more of the six criteria (a-f) for the entire term of coverage under the permit.
2. If you checked criterion d or criterion f, you are required to provide a description of the location of the pest management area or a map of the location, the pest(s) to be controlled, pesticide product(s) to be discharged and method of application, planned quantity and rate of discharge(s) for each application method, number of planned discharges, approximate date(s) of planned discharge(s), and the rational supporting your determination that you meet the criterion for which the Decision-maker is submitting this NOI and documentation demonstrating the finding of "not likely to adversely affect." If you certify under criteria f and do not hear from EPA within 30 days, you may assume your discharge is authorized. For certifications pursuant to Criterion d, indicate whether the discharge is likely to adversely affect NMFS Listed Resources of Concern and, if so, any feasible measures to avoid or eliminate such adverse effects. If you are certifying under criterion d (which allows you to discharge 15 days before you even submit your NOI), your NOI should describe both the pest emergency activities you plan to do after you submit your NOI as well as the activities you performed in that 15 day period before you had to submit the NOI. See Part 1.1.2.4 of the permit for more information regarding Endangered and Threatened Species and Critical Habitat Protection. If you certify under criterion d and do not hear from EPA, you may assume that permit authorization continues unless notified otherwise.EPA may authorize certain discharges in less than 30 days, but no fewer than 10 days, for any discharges authorized under criterion b, c, or e (for which NMFS has already evaluated the effects of these discharges). If you certify under one of these criteria and do not hear from EPA within 30 days, you may assume your discharge is authorized.

Section E. Certification

Enter the certifier's printed name and title. Sign and date the form. For more information about the certification statement and signature, see Appendix B of the permit. (CAUTION: An unsigned or undated form will not be accepted.) Federal statutes provide for severe penalties for submitting false information. Federal regulations require this application to be signed as follows:

For a corporation: by a responsible corporate officer, means:

(i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or

(ii) the manager of one or more manufacturing, production, or operating facilities, provided the manager is authorized to make management decisions that govern the operation of the regulated activity including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long-term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

For a partnership or sole proprietorship: by a general partner or the proprietor; or

For a municipal, state, federal, or other public facility: by either a principal executive or ranking elected official.

If the NOI was prepared by someone other than the certifier (for example, if the NOI was prepared by the PDMP contact or a consultant for the certifier's signature), include the name, organization, phone number and e-mail address of the NOI preparer.

Paperwork Reduction Act Notice

The public reporting and recordkeeping burden for this collection of information is estimated to average 2.5 hours or 150 minutes per response.

Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed NOI form to that address.

8.4 ADF&G Fish Habitat Permit

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Fish and Game

DIVISION OF HABITAT
Fairbanks Regional Office

1300 College Road
Fairbanks, Alaska 99701-1551
Main: 907.459.7289
Fax: 907.459-7303

FISH HABITAT PERMIT

FH16-III-0100

ISSUED: May 11, 2016
EXPIRES: October 31, 2020

Aditi Shenoy
Fairbanks Soil and Water Conservation District
PO Box 60750
Fairbanks, Alaska 99706

Dear Ms. Shenoy:

RE: Water Withdrawal/ Boom Deployment
Chena (Badger) Slough (Stream No. 334-40-11000-2490-3301-4010)
FM, T1S, R1E, Sec 11, 12, 13, 14; and FM, T1S, R1E, Sec 18, 19, 20, 29, 32, and 33
Totchaket Slough
FM, T2S, R8W, Sec 5, 8, 17, 20 and 29; and FM, T1S, R8W, Sec 32
Chena Lake
FM, T2S, R3E, Sec 6; and FM, T1S, R3E, Sec 31

Pursuant to AS 16.05.871(b), the Alaska Department of Fish and Game (ADF&G), Division of Habitat, has reviewed your proposal to withdraw water from Chena Lake, Chena (Badger) Slough and Totchaket Slough for mixing with herbicide concentrate for eradication of the invasive plant *Elodea spp*. The division has also reviewed your plans to deploy a boom at the outlet of Badger and Totchaket sloughs to capture *Elodea spp*. fragments that may flow out of the herbicide treated sloughs.

Project Description
Water will be withdrawn from Chena Lake, Chena (Badger) Slough and Totchaket Slough with a small diameter pump and mixed with herbicide concentrate at the rate of less than 500 gallons annually from Chena Lake, and less than 100 gallons annually from each Chena and Totchaket sloughs. The liquid herbicide solution will then be dispersed back into the waterbody.

Your outlet boom will be a staggered fyke net, such that the wings of the fyke will be staggered, and the net suspended to allow fish passage. There will be a series of two nets in the water channel (near the

mouth of each slough), each of which will extend half way across the channel, and will extend (down) to approximately 60-75% of the depth of the channel at that point. A multi filament seine net (33mm mesh) will be hung from a buoyant boom, and there will be lead weights attached to the bottom of the net, allowing it to hang suspended in the water channel. The only points of contact with the substrate will be an anchor for a single guideline to fasten the net to the substrate, for each of the two nets, and three of the lead weights (per net) will go to the bottom. This construction would allow fish passage (the fish can swim around or under the nets), and boat movement (boats can maneuver around the nets). There will be orange markers on the boom, and an orange buoy fastened to the end of each net, in addition to signage posted upstream to notify boaters.

A description of your boom design was received by our office via email on March 15, 2016 and the details of water withdrawals were received on May 10, 2016.

Anadromous Fish Act
Chena (Badger) Slough has been specified as being important for the spawning, rearing, or migration of anadromous fishes pursuant to AS 16.05.871(a). In the project reach, the slough provides rearing habitat for juvenile Chinook salmon. Resident fish species including Arctic grayling and northern pike are seasonally present in both Chena and Totchaket sloughs. Chena Lake is annually stocked with rainbow trout, Arctic char and Chinook salmon by the ADF&G Ruth Burnett Hatchery. Your project as proposed should not obstruct the efficient passage and movement of fish.

Determination
In accordance with AS 16.05.871(d), project approval is hereby given subject to the project description above with the following stipulations:

1) The boom shall be designed, deployed, and monitored to prevent impingement or entrapment of fish. The apparatus shall not block fish passage at any time.

2) Each water intake structure shall be designed to prevent the entrainment, impingement and/or entrapment of fish and shall be installed and maintained at each intake location. The effective screen openings may not exceed 0.25 inches (1/4 inch), and water velocity at the screen/water interface may not exceed 0.5 feet per second when the pump is operating.

   Note: For detailed information regarding screened intake device design please consult our webpage http://www.adfg.alaska.gov/index.cfm?adfg=uselicense.withdrawal and Technical Report No. 97-8 (http://www.adfg.alaska.gov/static/license/uselicense/pdfs/97_08.pdf). Feel free to contact our office for additional assistance.

You are responsible for the actions of contractors, agents, or other persons who perform work to accomplish the approved project. For any activity that significantly deviates from the approved plan, you shall notify the Division of Habitat and obtain written approval in the form of a permit amendment before beginning the activity. Any action that increases the project's overall scope or that negates, alters, or minimizes the intent or effectiveness of any stipulation contained in this permit will be deemed a significant deviation from the approved plan. The final determination as to the significance of any deviation and the need for a permit amendment is the responsibility of the Division of Habitat. Therefore, it is recommended you consult the Division of Habitat immediately when a deviation from the approved plan is being considered.

For the purpose of inspecting or monitoring compliance with any condition of this permit, you shall give an authorized representative of the state free and unobstructed access, at safe and reasonable times, to the permit site. You shall furnish whatever assistance and information as the authorized representative reasonably requires for monitoring and inspection purposes.

This letter constitutes a permit issued under the authority of AS 16.05.871 and must be retained on site during project activities. Please be advised that this determination applies only to activities regulated by the Division of Habitat; other agencies also may have jurisdiction under their respective authorities. This determination does not relieve you of your responsibility to secure other permits; state, federal, or local. You are still required to comply with all other applicable laws.

In addition to the penalties provided by law, this permit may be terminated or revoked for failure to comply with its provisions or failure to comply with applicable statutes and regulations. The department reserves the right to require mitigation measures to correct disruption to fish and game created by the project and which was a direct result of the failure to comply with this permit or any applicable law.

You shall indemnify, save harmless, and defend the department, its agents, and its employees from any and all claims, actions, or liabilities for injuries or damages sustained by any person or property arising directly or indirectly from permitted activities or your performance under this permit. However, this provision has no effect if, and only if, the sole proximate cause of the injury is the department's negligence.

Portions of this permit decision issued under the authorities of AS 16.05.871 (anadromous waterbodies only) may be appealed in accordance with the provisions of AS 44.62.330-630.

Any questions or concerns about this permit may be directed to Audra Brase at (907) 459-7282 or emailed audra.brase@alaska.gov.

Sincerely,

Sam Cotten, Commissioner

BY: Audra L. J. Brase, Regional Supervisor
Division of Habitat
Alaska Department of Fish and Game

ecc: Klaus Wuttig, ADF&G SF, Fairbanks
Bob Henszey, USFWS, Fairbanks
Heather Stewart, DNR, Palmer
Permit Coordinator, ADF&G SF, Anc
Tammy Davis, ADF&G SF, Juneau
Al Ott, ADF&G Hab, Fairbanks
Bonnie Borba, ADF&G CF, Fairbanks
Tim Pilon, ADEC, Fairbanks
NOAA Fisheries, Anchorage

AB/

8.5 DNR Land Use Permit

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Natural Resources
DIVISION OF MINING, LAND & WATER
NORTHERN REGIONAL LAND OFFICE

3700 Airport Way
Fairbanks, AK 99709-4699
Main: 907.451.2740
TDD: 907.451.2770
Fax: 907.451.2751

March 1, 2016

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINING, LAND & WATER,
NORTHERN REGION, LAND OFFICE
3700 AIRPORT WAY
FAIRBANKS, AK 99709-4699

PUBLIC NOTICE
LAS 30823
Fairbanks Soil and Water Conservation District

Subject to AS 38.05.850, the Northern Regional Land Office is considering the issuance of a Land Use Permit (LAS 30823) to the Fairbanks Soil and Water Conservation District (FSWCD). The applicant has requested a permit for the purpose of treatment of the aquatic invasive species elodea in three waterways.

The DNR DMLW NRO proposes to issue a permit for using aquatic herbicides in three water bodies (Chena Slough, Chena Lake, and Totchaket Slough) to treat elodea infestations. This activity must also be permitted through the Alaska Department of Environmental Conservation (ADEC) with a Pesticide Use Permit, and applications of herbicide fluridone will be carried out in consultation with ADEC. Details of toxicity, environmental impacts, and calculations of application rates are available in the attached DEC Pesticide Use Permit application.

FSWCD proposes to treat the three water bodies with pelleted and liquid formulations of the aquatic herbicide fluridone applied in pellet (Sonar H4C and Sonar ONE) and liquid form (Sonar Genesis) over a 3-4 year period. Sonar pellets will be delivered by boat in spring and summer, and liquid herbicide will be delivered via an injection system over a 12 week period each year. Water sampling will be carried out to ensure that a lethal dose of the herbicide is maintained in the eradication zone during each treatment period (45-90 days each season).

All herbicides will be applied by AK-DEC certified pesticide applicators. Fluridone is a low-toxicity chemical, and it will be applied at a low concentration (4-8ppb). Any spills will be diluted by water. No Personal Protection Equipment (PPE) is required for the application of fluridone. No chemicals will be stored on state lands.

Elodea density will be monitored each pre- and post-treatment. Elodea surveys will be carried out by boat and shoreline surveys.

Signage will be posted indicating the use of aquatic herbicides, potential risks, and precautions.

Chena Slough will be accessed via a private boat launch. Chena Lake will be accessed via a FNSB boat launch. Totchaket Slough will be accessed via the Tanana River. Boats and vehicles will be fueled at gas stations, no fuel will be stored on site.

The DNR DMLW Lands Section believes that this is consistent with Department of Natural Resources standards and proposes to issue a permit for treatment of elodea through December 2019 under LAS 30823.

APPLICANT: Fairbanks Soil and Water Conservation District
PROJECT NAME: LAS 30823
DEADLINE FOR COMMENTS: 5:00 PM, March 15, 2016

The Land Use Permit application and associated documents, including the Pesticide Use Permit application to ADEC and information about the proposed herbicides, is available by contacting (907) 451-2737 or e-mail: kimberley.maher@alaska.gov.

The public is invited to comment on the proposed permit. Comments must be received by the Division of Mining, Land and Water by 5:00 PM, March 15, 2016. Comments may be submitted in writing to the above address or via email. Any questions or comments concerning this proposal should be directed to Kimberley Maher. Telephone: (907) 451-2737; Fax: (907) 451-2751 or e-mail: kimberley.maher@alaska.gov.