Jewel Lake PUP Application 2019

Attachment 1 – Justification for use of pesticides

Elodea was discovered in Jewel Lake on November 1, 2018 by Alaska Department of Fish and Game staff members while setting and checking minnow traps at the public access site on Dimond Blvd. Department of Natural Resources, Division of Agriculture staff was able to walk on the frozen ice surface of Jewel Lake and complete a perimeter survey on November 7, 2018. Rooted and free-floating Elodea was found around the entire perimeter of the lake except directly in front of Jewel Lake Park beach at the end of W 88th Avenue. This infestation of Elodea must be treated as soon as possible to prevent its spread to other waterbodies both locally and beyond.

Human Health and Safety:

If Elodea is unmanaged and allowed to establish into thick, dense stands, it could jeopardize the health and safety of float plane pilots on Jewel Lake. When tangled in a mass at the lake's surface, Elodea can hinder the pilot's control over rudder direction resulting in the loss of taxiing direction. Loss of control of where the plane is travelling can potentially lead to collision and endanger the pilot's safety and the safety of those nearby. Unlike landplanes, taxiing seaplanes do not have brakes, are always in motion, and make collisions nearly unpreventable when control is lost. However, managing Elodea in a timely manner can prevent the risk of human safety in Jewel Lake.

According to the FAA Seaplane Operations Handbook (2004), safe landing areas are void of waterweeds or obstructions lying below the surface that could foul the water rudders. The handbook also states that proper safety inspection protocols before take-off include the removal of any vegetation or other debris lodged in the water rudder assembly. In order to comply with the safety standards of the FAA, Elodea should be properly managed in Jewel Lake.

Environmental harm:

Freshwater ecosystems are often severely impacted by Elodea invasion and recognized by agencies as a priority management issue. Elodea can form dense stands and canopies in the water column (extending to the water surface) altering water chemistry, displacing native vegetation, and creating habitats that are unsuitable for wildlife, resident fish populations, amphibians, and invertebrates. Elodea has impacted Chinook salmon spawning by reducing spawning habitat in a structured California river (Merz et al. 2008). The Mat-Su Basin Salmon Habitat Partnership identified Elodea as a potential threat to salmon resources in the 2013 Strategic Action Plan alongside other aquatic invasive species. Established single-species stands of Elodea lowers the biodiversity of waterbodies, which can diminish the productivity of an ecosystem. In Alaska, it is well documented that float planes can easily transport fragments of Elodea to other waterways in both remote and populated areas. If Elodea is not managed as a fast response to its discovery, our remote natural resources, including salmon, could be significantly impacted. Jewel Lake is a popular site for fishing year-round. If treatment is delayed, it is only a matter of time before Elodea spreads via anglers' boats or gear to other lakes in Anchorage and beyond on the road system in Alaska.

Economic Impact:

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 (Eiswerth

et al. 2000). Elodea and other aquatic invasive species can reduce property values on infested lakes. Thus, policies and opportunities for rapid response management to prevent future invasions can provide significant benefits to lakefront properties, community members, and specifically land owners on Jewel Lake.

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).

Quantified impact on Alaska's freshwater resources is not yet known for Elodea. However, rapid timeliness for management of Elodea is worth preserving our profitable freshwater resources at the present state. If we give Elodea an opportunity to spread to other waterbodies, our costs of management will most certainly increase while valuable and profitable resources diminish indefinitely. Economic impacts to Anchorage and beyond due to Elodea are preventable with rapid management action in Jewel Lake.

Justification for the use of herbicides:
Herbicide control of Elodea is the most effective method to achieve eradication and prevent further spread. Physical or mechanical controls for this plant are limited because Elodea reproduces readily from small fragments. Any physical disturbance of the plant easily breaks the stems into pieces that are capable of reproducing in new locations.

Elodea is difficult and expensive to eradicate, sometimes requiring multiple treatments of herbicide over two or three growing seasons. Therefore, it is important to begin treatment as soon as possible. Fluridone, a systemic herbicide, will selectively target Elodea at low application rates that have limited impacts on many other aquatic plants. Also, fluridone has low toxicity to fish and other non-target species. We will continually conduct surveys to determine if Elodea exists in presently unknown Anchorage waters.

References:

Eiswerth ME, Donaldson SG, Johnson WS. 2000. Potential environmental impacts and economic damages of Eurasian watermilfoil (Myriophyllum spicatum) in western Nevada and northeaster California. Weed Technology 14: 511–518.

FAA. 2004. Chapter 4: Seaplane Operations- Preflight and Takeoffs. https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/seaplane_handbook/media/faa-h-8083-23-3.pdf. 2 July 2015.

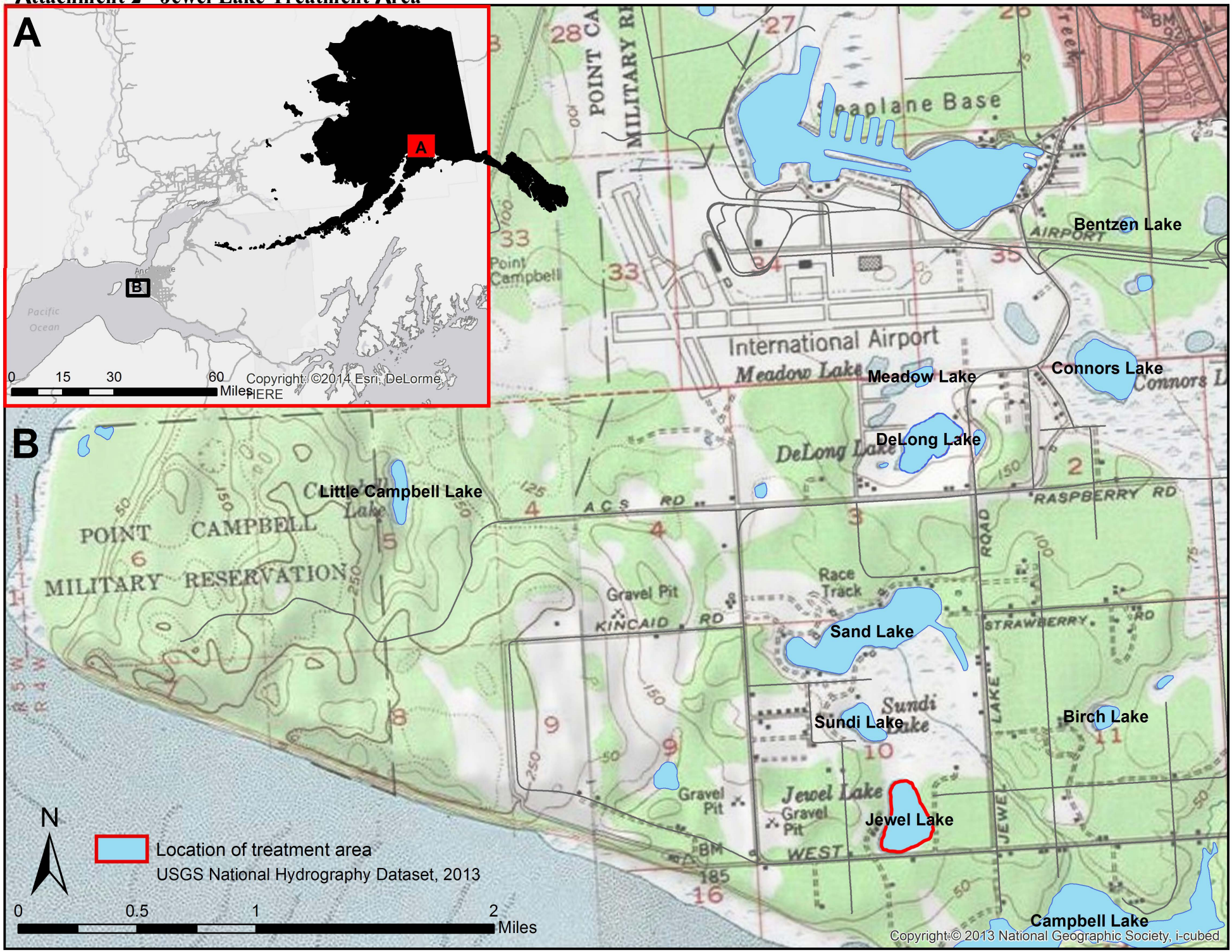
Halstead, J. M., J. Michaud, and S. Hallas-Burt. 2003. Hedonic analysis of effects of a nonnative invader (Myriophyllum heterophyllum) on New Hampshire (USA) lakefront properties. Environmental Management 32(3):391-398.

Horsch, E. J. and D. J. Lewis. 2009. The effects of aquatic invasive species on property values: evidence from a quasi-experiment. Land Economics 85(3):391-409.

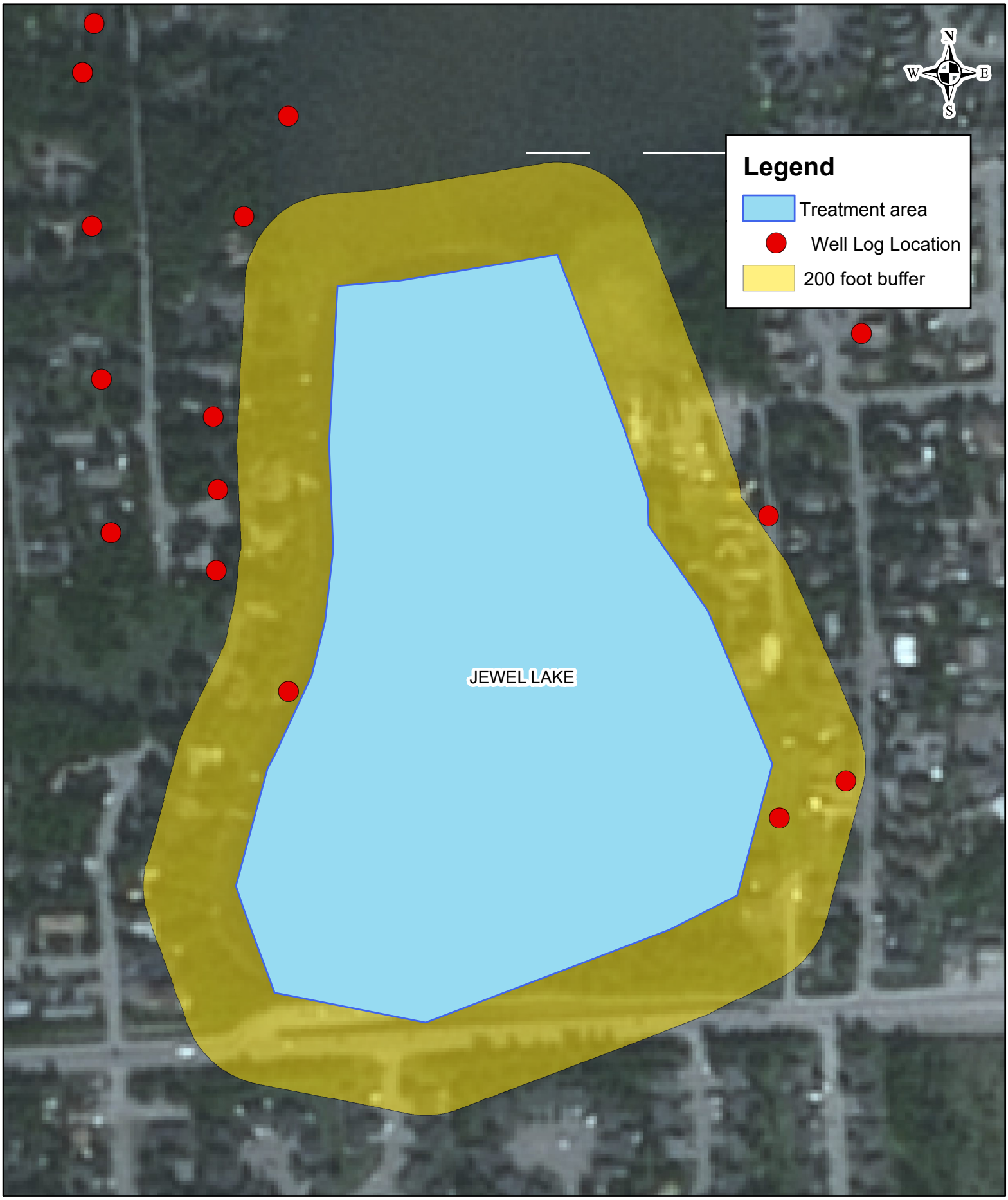
Merz, J. E., J. R. Smith, M. L. Workman, J. D. Setka, and B. Mulchaey. 2008. Aquatic macrophyte encroachment in Chinook salmon spawning beds: lessons learned from gravel enhancement monitoring in the Lower Mokelumne River, California. North American Journal of Fisheries Management 28:1568-1577.

Olden, Julian D. and Tamayo, Mariana. 2014. Incentivizing the public to support invasive species management: Eurasian Milfoil reduces lakefront property values. PLoS ONE. October 2014, Vol. 9 Issue 10, p 1-6. 6p. DOI: 10.1371.

Attachment 2 - Jewel Lake Treatment Area



Attachment 3 - Jewel Lake Full Lake Treatment W/200 Foot Buffer & Wells



Alaska Mapper

Spherical Mercator WGS 84 - EPSG:3857
Date Created: 4/5/2019

Wells

- Actual Well Location
- Estimated Well Location

Attachment 4 - Jewel Lake Drinking Water Sources

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(1H)-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 Statements 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 *Warranty Disclaimer* and *Misuse* statements inside label booklet. If terms are unacceptable, return at once unopened.

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

EPA Reg. 67690-45 FPL20170208

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 tidal saltwater. 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 this product 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. This product is a pelleted formulation containing 5% fluridone. It is absorbed from water by plant shoots and from hydrosoil by the roots of aquatic vascular plants. It is important to maintain this product in contact with the target plants for as long as possible. Rapid water movement or any condition which results in rapid dilution of this product in treated water will reduce its effectiveness. In susceptible plants, this product 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. Species susceptibility to this product may vary depending on time of year, stage of growth and water movement. For best results, apply this product 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 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 water from a Sonar-treated area for hydroponic farming unless one of the following has been verified for the relevant active water intake and its withdrawal of surface water:
  - o A FasTEST has been run and the concentration in water at the intake is less than 1 ppb; or
  - o A filtration or water treatment process following water intake has been verified analytically to reduce the concentration in potential irrigation water below 1 ppb.
- **Greenhouse and Nursery Plants:** Do not use water from a Sonar-treated area for greenhouse and nursery irrigation unless one of the following has been verified for the relevant active water intake and its withdrawal of surface water:
  - o For the irrigation of woody ornamental plants, a FasTEST has been run and the concentration at the intake is less than 5 ppb; or
  - o For the irrigation of other greenhouse or nursery plants, the concentration is confirmed less than 1 ppb; or

o A filtration or water treatment process following water intake has been verified analytically to reduce the concentration in potential irrigation water below either the 1 or 5 ppb levels cited above.

- **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 this product 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 this product 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, this product 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.

Use Precautions

- **Irrigation:** Irrigation with 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 treated water. Greater potential for crop injury occurs where treated water is applied to crops grown on low organic and sandy soils.

	Days After Application		
Application Site	**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 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 this product. It is recommended to consult a SePRO Aquatic Specialist prior to application of this product 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 *(Philaris 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 this product 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 productconcentration 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 =
Average 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. This product 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 this product 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:
Non-refillable, rigid 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 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.
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.
Non-refillable, non-rigid container. DO NOT reuse or refill this container. Completely empty liner into application equipment by shaking and tapping sides and bottom to loosen clinging particles. If not emptied in this manner, the bag may be considered an acute hazardous waste and must be disposed of in accordance with local, state and federal regulations. When completely empty, offer for recycling if available or dispose of in a sanitary landfill or by incineration or if allowed by state and local authorities, by burning. If burned, stay out of smoke. If outer packaging is contaminated and cannot be reused, dispose of it in the manner required for its liner.

Warranty Disclaimer: SePRO Corporation warrants that this product conforms to the chemical description on the product label. Testing and research have also determined that this product is reasonably fit for the uses described on the product label. To the extent consistent with applicable law, SePRO Corporation makes no other express or implied warranty of fitness or merchantability nor any other express or implied warranty and any such warranties are expressly disclaimed.

Misuse: Federal law prohibits the use of this product in a manner inconsistent with its label directions. To the extent consistent with applicable law, the buyer assumes responsibility for any adverse consequences if this product is not used according to its label directions. In no case shall SePRO Corporation be liable for any losses or damages resulting from the use, handling or application of this product in a manner inconsistent with its label.

For additional important labeling information regarding SePRO Corporation's Terms and Conditions of Use, Inherent Risks of Use and Limitation of Remedies, please visit *http://www.seprolabels.com/terms/* or scan the image below.

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

Conforms to HCS 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 : EYE IRRITATION - Category 2B
AQUATIC HAZARD (ACUTE) - Category 3
AQUATIC HAZARD (LONG-TERM) - Category 3

GHS label elements

Signal word : Warning

Hazard statements : H320 - Causes eye irritation.
H412 - Harmful to aquatic life with long lasting effects.

Precautionary statements

Prevention : P273 - Avoid accidental release to the environment.
P264 - Wash hands thoroughly after handling.

Response : P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 - If eye irritation persists: Get medical attention.

Storage : Not applicable.

Disposal : P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.

Section 2. Hazards identification

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Not available.

Ingredient name	%	CAS number
Proprietary ingredient 3	40 - 60	-
Proprietary ingredient 4	20 - 40	-
Proprietary ingredient 1	10 - 20	-
Fluridone	5	59756-60-4
Proprietary ingredient 2	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.

Section 4. First aid measures

Ingestion : No known significant effects or critical hazards.

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

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

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. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

Section 6. Accidental release measures

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 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. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Fluridone	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.

Section 8. Exposure controls/personal protection

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.

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 : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

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.

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.

Section 9. Physical and chemical properties

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Not available.

Flow time (ISO 2431) : 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	Rabbit	-	-	-

There is no data available.

Sensitization

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

Mutagenicity

Conclusion/Summary : Based on active ingredients: no known evidence.

Carcinogenicity

Conclusion/Summary : Based on active ingredients: no known evidence.

Reproductive toxicity

Conclusion/Summary : Based on active ingredients: no known evidence.

Teratogenicity

There is no data available.

Section 11. Toxicological information

Neurotoxicity

Conclusion/Summary : Based on active ingredients: no known evidence.

Immunotoxicity

Conclusion/Summary : Based on active ingredients: no known evidence.

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 : Dermal contact. Eye contact. Inhalation. Ingestion.

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.

Section 11. Toxicological information

Numerical measures of toxicity

Acute toxicity estimates

There is no data available.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Fluridone	EC50 3 mg/L LC50 8 mg/L LC50 >5.2 mg/L LC50 >6.5 mg/L Chronic NOEC 0.84 mg/L Chronic NOEC 0.43 mg/L	Daphnia - *Daphnia magna* Crustaceans - *Eucyclops sp.* Fish - *Cyprinodon variegatus* Fish - *Pimephales promelas* Daphnia - *Daphnia magna* Fish - *Oncorhynchus tshawytscha*	48 hours 48 hours 96 hours 96 hours 21 days 75 days

Persistence and degradability

There is no data available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Fluridone	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	-	-	-
Environmental hazards	No.	No.	No.

AERG : Not applicable.

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.

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

Section 15. Regulatory information

Composition/information on ingredients

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

SARA 313

There is no data available.

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 3

Pennsylvania : The following components are listed: Proprietary ingredient 3

California Prop. 65

No products were found.

Section 16. Other information

Procedure used to derive the classification

Classification	Justification
EYE IRRITATION - Category 2B AQUATIC HAZARD (ACUTE) - Category 3 AQUATIC HAZARD (LONG-TERM) - Category 3	On basis of test data Calculation method Calculation method

History

Date of issue mm/dd/yyyy : 06/30/2017

Date of previous issue : 09/15/2015

Version : 5

Prepared by : KMK Regulatory Services Inc.

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.

Attachment 7. Potential Impacts to Environment

Environmental Impact:
Freshwater ecosystems are negatively impacted by Elodea invasions and is recognized by State, Federal, and Tribal agencies as a priority management issue. Elodea can form dense stands and canopies in the water column (extending to the water surface) altering water chemistry, displacing native vegetation, and creating habitats that are unsuitable for wildlife, resident fish populations, amphibians, and invertebrates. Established single-species stands of Elodea lowers the biodiversity of waterbodies, which can diminish the productivity of an ecosystem. In Alaska, it is well documented that float planes can easily transport fragments of Elodea to other waterways in both remote and populated areas. If Elodea is not managed, it will easily be spread to other waterbodies that could be significantly impacted.

Economic Impact:
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. Elodea and other aquatic invasive species can reduce property values on infested lakes. Thus, policies and opportunities for rapid response management to prevent future invasions can provide significant benefits to lakefront properties, community members, and the sportfishing resources of Jewel Lake.

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).

Quantified impact on Alaska's freshwater resources is not yet known for Elodea. However, rapid timeliness for management of Elodea is worth preserving our profitable freshwater resources at the present state. If Alexander Lake were to be treated shortly after it's discovery in 2014 for 42 acres, it would've cost ~$96,000 in product alone. Assuming we use the same application rates for the same fluridone product but increase the application area to ~690 acres (whole-lake), the cost of product alone is $1,500,00. If we give Elodea an opportunity to spread to other waterbodies, our costs of management will most certainly continue to increase exponentially and valuable, profitable resources will be lost indefinitely. Economic impacts to Alaska due to Elodea are preventable with rapid management action.

Justification for the use of herbicides:

Herbicide control of Elodea is the most effective method to achieve eradication and prevent further spread. Physical or mechanical controls for this plant are limited because Elodea reproduces readily from small fragments. Any physical disturbance of the plant easily breaks the stems into pieces that are capable of reproducing in new locations. In Alexander Lake, it is speculated that the operation of outboard motors and floatplane activity leaves plant fragments in the water, potentially distributing Elodea to establish in different areas around the lake.

Description of Fluridone

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, and disrupts photosynthesis. Disruption of photosynthesis prevents the formation of carbohydrates that are necessary to sustain the plant.

In field studies, fluridone did not adversely affect water quality parameters such as pH, dissolved oxygen, color, dissolved solids, hardness, nitrate, total phosphates, and turbidity (McCowen et al. 1979). In Michigan, 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 lakes in Michigan 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). On the Kenai Peninsula, Alaska, lakes treated with fluridone exhibited an increase in native aquatic plant richness following Elodea eradication, with no impacts to water quality or zooplankton communities (Sethi et al. 2017).

Several formulations of fluridone are approved for use in Alaska by the ADEC. Fluridone is approved to be applied to an entire water body or on smaller, partial-lake infestations within a water body. Due to high seasonal and weather-induced fluctuations of flow, the infested waterbodies in the Alexander Creek Watershed will likely utilize both pelleted and liquid forms of fluridone and will be carefully monitored to maintain the appropriate concentrations. In both cases, applications take place under appropriate conditions for boating, by avoiding high winds or wave action. The herbicide would be applied following all directions on the U.S. Environmental Protection Agency (EPA) approved label including keeping concentrations well below the legal maximum annual cumulative concentration of 150 ppb.

Fluridone breaks down in treated water by degradation from sunlight, adsorption to sediments, and absorption by plants. In partially treated water bodies, dilution reduces the concentration of herbicides more rapidly following application. 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).

All 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, carcinogenic, and reproductive effects. Fluridone has not been shown to result in the development of tumors, adverse reproductive effects and fetal development, or genetic damage (USEPA 1986). Fluridone has been extensively tested for efficacy in treating aquatic plants, including long-term residue monitoring studies by EPA and SePRO Corporation, as well as non-governmental and non-industry entities.

The U.S. EPA 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 second in 12 days or one foot in 200 miles. Concentrations of the active ingredient fluridone up to 150 ppb (0.15 ppm) are allowed in potable water sources. However, application rates greater than 20 ppb within one-quarter mile (1,320 feet) of any functioning potable water intake is restricted. The proposed treatment concentrations of 3-10 ppb are well below the 150 ppb allowable limit in water used for drinking (USEPA 1986).

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. The only known agricultural use of water in the Alexander Creek Watershed is a peony flower farm on Trail Lake, an uninfested waterbody with no current plans of herbicide treatment. There are chickens for personal use raised on their property. The owners of the farm are active participants in the Elodea eradication Task Force so if treatments were ever planned for a Trail Lake infestation, communication of water use restrictions would be well communicated and human exposure through livestock would be minimal to non existent. There are 2 private wells identified within 200 feet of the Alexander Lake treatment area (22083 L and 22084 L) that utilize groundwater for drinking in the ADNR Well Log Tracking System (WELTS) and there are no EPA restrictions on the use of fluridone-treated water for swimming, fishing or consumption by livestock or pets when used according to label directions (SePRO 2017b). Restrictions include the use of treated water with a known concentration of more than 1 ppb on greenhouse and nursery plants or in hydroponic farming. SePRO recommends against using fluridone-treated water for crop irrigation when concentrations are greater than 10 ppb. The use of treated water with concentrations greater than 5 ppb is not recommended for use on plants within the Solanaceae Family (tobacco, tomatoes, and peppers), or newly seeded crops or grasses (SePRO 2017b).

The maximum non-toxic dose for humans is characterized by the “no-observed-effect-level” (NOEL) for herbicides. 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 (15 ppm) 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 after treatment. Because fluridone is only applied intermittently and in limited areas, and because it degrades over time in the environment, long-term continuous exposure for humans would not occur when the proposed action is completed.

Fluridone has minimal to no toxic effects on 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 on 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 (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 negligible. The acute median lethal concentration of fluridone was 4.3 (+/- 3.7) mg/L for invertebrates and 10.4 (+/- 3.9) mg/L for fish. Fish in treated ponds showed no fluridone metabolites after treatment (Kamarianos et al. 1989). Chronic studies showed no effects on daphnids, midge larvae, fathead minnows, or channel catfish and rapid rates of metabolic excretion (Hamelink et al. 2009; Muir et al. 1982), although insects that fed on bottom sediments had higher rates of fluridone intake and persistence than other insects (Muir et al. 1982). Honeybees and earthworms were not particularly sensitive to fluridone, even when directly dusted or placed in treated soil (ENSR 2005).

Fluridone has low bioaccumulation potential in fish, bird, or mammal tissues. Studies have shown that no identifiable resides of fluridone remain in the meat, milk, or eggs of animals that have consumed fluridone-treated water (cited in West and Day 1988). Fluridone manufacturer SePRO recommendations indicate livestock can consume fluridone-treated water without restriction. The tolerance level for meat, milk, and eggs is 0.05 ppm (40 CFR § 180.420).

Applicators of fluridone will have some risk of exposure, but this can be mitigated through proper use of personal protective equipment (PPE). There is, however, no expected risk of exposure to the public from airborne drift of the herbicide. Applicators must avoid breathing particle dust, 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 used according to label instructions minimizes risk to applicators. Fluridone product labels for Sonar Genesis (EPA Reg. No. 67690-54) , SonarONE^{TM}(EPA Re. No 67690-45), and the Safety Data Sheets (SDS) are attached.

References Cited

Durkin, P. 2008. Fluridone human health and ecological risk assessment final report. Syracuse Environmental Research Associates, Inc., USDA Forest Service SERA TR-052-10-02a.

Halstead, J.M., J. Michaud, and S. Hallas-Burt. 2003. Hedonic analysis of effects of a nonnative invader (*Myriophyllum heterophyllum*) on New Hampshire (USA) lakefront properties. Environmental Management 32(3): 391-398.

Hamelink, J., D. Buckler, F. Mayer, D. Palawski and H. Sanders. 1986. Toxicity of fluridone to aquatic invertebrates and fish. Environmental Toxicology and Chemistry 5: 87-94.

Horsch, E.J., and D.J. Lewis. 2009. The effects of aquatic invasive species on property values: evidence from a quasi-experiment. Land Economics 85(3): 391-409.

Kamarianos, A., J. Altiparmakis, X. Karamanlis, D. Kufidis, T. Kousouris, G. Fotis and S. Kilikidis. 1989. Experimental evaluation of fluridone effectiveness on fish productive aquatic ecosystems. Journal of Aquatic Plant Management 27: 24-26.

Langeland, K. and J. Warner. 1986. Persistence of diquat, endothall, and fluridone in ponds. Journal of Aquatic Plant Management 24:43-46.

McCowen, M., C. Young, S. West, S. Parka and W. Arnold. 1979. Fluridone, a new herbicide for aquatic plant management. Journal of Aquatic Plant Management 17: 27-30.

Merz, J.E., J.R. Smith, M.L. Workman J.D. Setka and B. Mulchaey. 2008. Aquatic macrophyte encroachment in Chinook salmon spawning beds: lessons learned from gravel enhancement monitoring in the Lower Mokelumne River, California. North American Journal of Fisheries Management 28: 1568-1577.

Muir, D., N. Grift, A. Blouw and W. Lockhart. 1980. Persistence of fluridone in small ponds. Journal of Environmental Quality 9(1): 151-156.

Muir, D.C.G., N.P. Grift, B.E. Townsend, D.A. Metner, and W.L. Lockhart. 1982. Comparison of the uptake and bioconcentration of fluridone and terbutryn by rainbow trout and *Chironomus tentans* in sediment and water systems. Environmental Contamination and Toxicology 11(5): 595-602.

Olden, J.D. and M. Tamayo, 2014. Incentivizing the public to support invasive species management: Eurasian Milfoil reduces lakefront property values. PLoS ONE 9(10) 1-6.

Osborne, J., S. West, R. Cooper and D. Schmitz. 1989. Fluridone and N-methylformamide residue determinations in ponds. Journal of Aquatic Plant Management 27: 74-78.

SePRO. 2017b. Sonar A.S. Aquatic Herbicide pesticide label. https://www.sepro.com/Documents/Sonar-AS_Label.pdf

Sethi, S.A., M.P. Carey, J.M. Morton, E. Guerron-Orejuela, R. Decino, M. Willette, J. Boersma, J. Jablonski, C. Anderson. 2017. Rapid response for invasive waterweeds at the Arctic invasion front: Assessment of collateral impacts from herbicide treatments. Biological Conservation 212(A): 300-309.

U.S. Environmental Protection Agency (USEPA). 1986. Pesticide Fact Sheet: Fluridone. No. 81, 5 pp.

Attachment 8. Description of Precautions

All personal and environmental use precautions listed in the MSDS sheets and product labels will be followed strictly. Transportation, storage, and application will all follow manufacturer guidelines. All application will be done by certified DEC Pesticide Applicators with Category 6 Aquatic Pest control endorsements.

Appropriate signage will be placed in the application areas to inform the cabin owners and lake users of the potential safety concerns. All adjacent property owners will be kept informed of the application procedure, interaction concerns, and follow-up monitoring results.

Public notification of pesticide applications in public places will be posted in writing at each public access point of entry and exit. Signs will stay posted at least 24 hours after the application with contact names, phone numbers, time of application, and any appropriate restrictions.

Application of the pesticides will adhere to custom prescriptions formulated for Alexander Lake and followed accordingly. This will minimize any potential for adverse effects on all non-target environmental elements.

Attachment 9. Proof of Liability Insurance

The entity applying for this Pesticide Use Permit is the State of Alaska, Department of Natural Resources, Division of Agriculture it is a government applicant.

Attachment 10. Threatened or Endangered Species

There are no threatened or endangered species in the proposed treatment area.

THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Environmental Conservation
DIVISION OF WATER
Wastewater Discharge Authorization Program

555 Cordova Street
Anchorage, Alaska 99501-2617
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www.dec.alaska.gov/water/wwdp

April 11, 2019

State of Alaska, Department of Natural Resources (DNR)
Attention: Robert Carter
5310 S. Bodenburg Spur
Palmer, AK 99645

Re: AKG870019: DNR - Delong Lake, Little Campbell Creek, Little Survival Creek, Sand Lake, Jewel Lake

Dear Mr. Carter:

The Alaska Department of Environmental Conservation (DEC) has completed its review of your AKG870000 Pesticide General Permit (PGP) Notice of Intent (NOI) and is issuing the following authorization number: **AKG870019**. The wastewater discharge is authorized in accordance with the terms of the general permit and any site specific requirements in this authorization for the following pest management areas identified in the NOI:

Pest Management Area: Delong Lake, 1 of 5
Pesticide Use Patterns:
☐ Mosquito and Other Flying Insect Pest Control ☐ Animal Pest Control
☒ Weed and Algae Pest Control ☐ Forest Canopy Pest Control

Pest(s) to be controlled:	Pesticide Products	
	Product Name:	EPA Registration Number:
Elodea spp.	SonarOne	67690-45
Elodea spp.	Sonar Genesis	67690-54
Elodea spp.	Littora	67690-53

Pest Management Area: Little Campbell Lake, Anchorage, 2 of 5
Pesticide Use Patterns:
☐ Mosquito and Other Flying Insect Pest Control ☐ Animal Pest Control
☒ Weed and Algae Pest Control ☐ Forest Canopy Pest Control

Pest(s) to be controlled:	Pesticide Products	
	Product Name:	EPA Registration Number:
Elodea spp.	SonarOne	67690-45
Elodea spp.	Sonar Genesis	67690-54
Elodea spp.	Littora	67690-53

Pest Management Area: Little Survival Creek/Potter's Marsh, Anchorage, 3 of 5
Pesticide Use Patterns:
☐ Mosquito and Other Flying Insect Pest Control ☐ Animal Pest Control
☒ Weed and Algae Pest Control ☐ Forest Canopy Pest Control

Pest(s) to be controlled:	Pesticide Products	
	Product Name:	EPA Registration Number:
Elodea spp.	SonarOne	67690-45
Elodea spp.	Sonar Genesis	67690-54
Elodea spp.	Littora	67690-53

Pest Management Area: Sand Lake, Anchorage 4 of 5
Pesticide Use Patterns:

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

Pest(s) to be controlled:	Pesticide Products	
	Product Name:	EPA Registration Number:
Elodea spp.	SonarOne	67690-45
Elodea spp.	Sonar Genesis	67690-54
Elodea spp.	Littora	67690-53

Pest Management Area: Jewel Lake, Anchorage, 5 of 5
Pesticide Use Patterns:

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

Pest(s) to be controlled:	Pesticide Products	
	Product Name:	EPA Registration Number:
Elodea spp.	SonarOne	67690-45
Elodea spp.	Sonar Genesis	67690-54
Elodea spp.	Littora	67690-53

An electronic copy of the PGP is available at http://dec.alaska.gov/media/14096/akg870000-2017-pgp.pdf and a copy of this authorization letter is posted to the DEC water permit search website http://dec.alaska.gov/Applications/Water/WaterPermitSearch/Search.aspx.

The authorization effective date is 4/11/2019

The authorization to discharge expires upon submittal of a Notice of Termination, see Permit Part 1.2.6.

The permittee is reminded of the following permit requirements: Technology-Based Effluent Limitations, Part 2.2, Decision-makers' Responsibilities for All Decision-makers

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

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

- Technology-Based Effluent Limitations, Part 2.1 Applicators' Responsibilities

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

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

Sincerely,

James Rypkema
Section Manager, Storm Water and Wetlands

Enclosure: Pesticide Discharge map.

cc: w/enclosure (email)
Kristine Dunker, ADFG
Daniel Coleman, ADNR

Attachment 12. Additional Pesticide Applicators

Krissy Dunker – 10372-2109-6

Alaska Department of Fish and Game

Parker Bradley – 10299-2105-6

Alaska Department of Fish and Game

Tim Stallard – 10176-4/6/9

Alien Species Control, LLC