Alexander Creek Watershed Elodea Eradication Project: Environmental Assessment
FINAL

Alaska Department of Natural Resources
Division of Agriculture

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1.0 Introduction

Elodea spp. (Elodea) is Alaska's first invasive submersed freshwater aquatic plant. It was first documented in Alaska in 1982 in Cordova. Since then, it has been documented in several areas of the state including Fairbanks (2010), Anchorage (2011), the Copper River Delta (2012), the Kenai Peninsula (2013), and that Matanuska-Susitna (Mat-Su) Valley (2014). This project's proposed action is for the Alexander Creek Watershed in the Mat-Su Valley. This infestation is remote, but in a high-risk area for spreading due to high human use, presence of transport vectors, and connectivity. The statewide goal for invasive freshwater aquatic plants is eradication per Memorandum of Understanding between the Alaska Department of Natural Resources (ADNR), Alaska Department of Fish and Game (ADF&G), and the Alaska Department of Environmental Conservation (ADEC).

Elodea was likely introduced into Alaska as an aquarium plant, and then released into nearby waterbodies where it established populations. It has since spread via flowing water and anthropogenic vectors including boats, gear, and floatplane traffic. Elodea grows throughout the year, including under the ice during winter months when native plants have senesced (Bowmer et al. 1995). This trait allows it to be the first aquatic plant growing when ice cover melts, giving it another competitive advantage. Elodea can also reproduce from a single small plant fragment, allowing it to disperse easily (Bowmer et al. 1995; Thiebaut 2006). Elodea's aggressive growth can displace native vegetation by creating single-species stands and mats which increases sedimentation, alters hydrology, and potentially impacts the function, structure, and productivity of freshwater ecosystems (Kornijow et al. 2005; Mjelde et al. 2012; Merz et al. 2008; Bowmer et al. 1995).

Elodea was likely introduced to the Alexander Creek Watershed by floatplane from an Elodea infestation in an Anchorage lake. Alexander Lake was initially infested in 2014 and Sucker Lakes Complex infestation was discovered nearby in 2017. Coordinated herbicide treatments have since eradicated Elodea from most Anchorage locations as well as all Kenai Peninsula locations. As populations of Elodea in Alexander Creek Watershed continue to be left untreated, motor boats, anchors, fishing gear, float planes and wildlife are vectors of further spread. Eradicating Elodea from the Alexander Creek Watershed is a high priority because if left unmanaged, these infestations could serve as a primary source for new infestations, threatening pristine fish habitat in Southcentral Alaska and ultimately around the state. Therefore, the sooner Elodea is eradicated from the two infestations in the Alexander Creek Watershed, the more likely it is that other waterbodies in the Mat-Su will remain free of this highly invasive plant.

This Environmental Assessment evaluates the direct, indirect, and cumulative environmental effects of a proposed action to eradicate elodea from the Alexander Creek Watershed with herbicides and the alternatives to this action. Alternatives to the proposed herbicide treatments include no action, mechanical removal, benthic barriers, and water drawdown. The ADNR has prepared this document in compliance with the National Environmental Policy Act (NEPA), under the standards of the U.S. Fish and Wildlife Service (USFWS).

1.1 Need for Action and Project Goals

The goals and need for this project are to: 1) propose an effective method that meets ADNR's objective of eradicating Elodea while minimizing potential environmental impacts; 2) evaluate alternative approaches for managing Elodea in the Mat-Su Valley; 3) provide an opportunity for public input on the control and eradication options and 4) eradicate Elodea from the Alexander Creek Watershed. ADNR and the interagency task force will work together to select a preferred alternative and the EA would be reviewed by the USFWS which would then disclose its final decision and supporting rationale in a separate decision document.

1.2 Background: Elodea in Alaska

1.2.1. Elodea Distribution

The first documented occurrence of Elodea in Alaska was in 1982 in Eyak Lake, Cordova. In 2009, Elodea was found in Chena Slough near Fairbanks, and in Chena Lake and River in 2011. Elodea was also discovered in three Anchorage lakes in 2011: DeLong, Little Campbell, and Sand. In 2012, Elodea was found in Stormy and Daniels lakes on the Kenai Peninsula, and in McKinley Lake on the Copper River Delta. Elodea was found in another Kenai Peninsula lake, Beck Lake, in 2013. In 2014, Elodea was discovered to be in Alexander Lake in the Mat-Su, and Bering Lake, along with adjacent sloughs, on the Copper River Delta. In 2015, Elodea was found in Anchorage's Lake Hood, the world's busiest floatplane base, and Totchaket Slough in interior Alaska. In 2016, Elodea was found in the Sucker lake complex near Alexander Lake, and Little Survival Creek near Anchorage's Potter Marsh. In 2017, Elodea was discovered in Sport, Seppu, and Hilda lakes on the Kenai Peninsula; it was then found in Manley Slough (Tanana River) near Manley Hot Springs and Jewel Lake in Anchorage in 2018 (Figure 1).

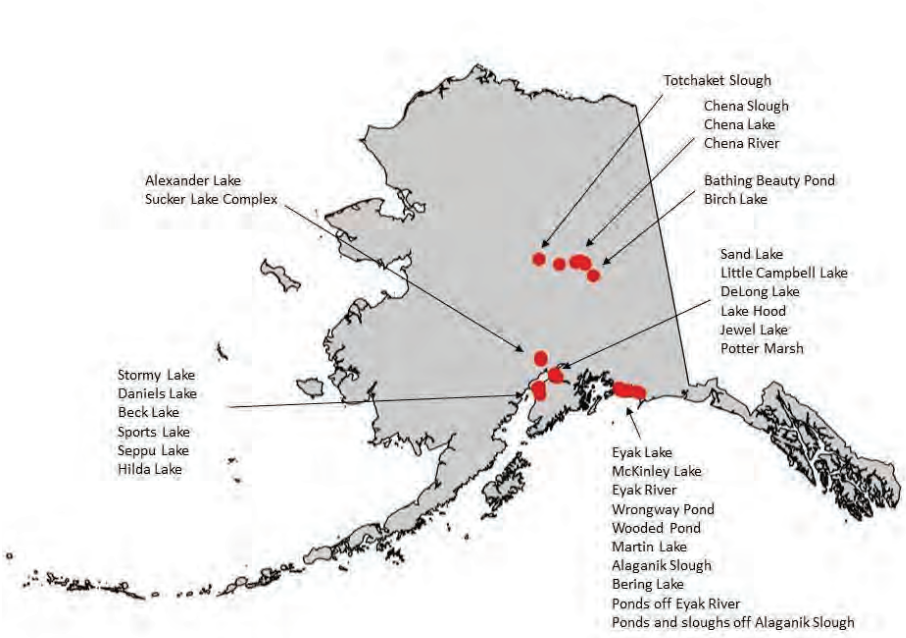

Figure 1 Alaska's past and current Elodea infestations.

In Anchorage, Elodea has been eradicated from all but Little Survival Creek and the newest infestation in Jewel Lake. On the Kenai Peninsula, Elodea has been eradicated from Beck, Daniels and Stormy Lakes, and appears to be eradicated from Sports, Seppu and Hilda Lakes as well. At this time, there are no other known infestations on the Peninsula. In Cordova, fluridone treatments occurred in 2016-2018 in a subset of infested ponds and sloughs off Eyak River and the effects of these treatments on Elodea and native species are being monitored. In 2019, herbicide treatment will begin on Wrongway Pond, a salmon-bearing waterbody on the Copper River Delta. The USFS is currently developing an Elodea monitoring and containment strategy to prevent further spread in the region. Elodea monitoring efforts continue throughout the state, with the highest concentration of surveys occurring near areas of known infestation, or high risk (e.g. remote lakes used by floatplanes).

1.2.2 Elodea Traits

Elodea is a submersed aquatic plant within the frog's-bit (Hydrocharitaceae) Family. Elodea reproduction is primarily vegetative; the plant readily breaks into transportable fragments, which take root in sediments. It is dioecious with separate male and female plants. It is tolerant of cold water and can survive freezing, with documented rapid invasions as far north as northern Finland (Heikkinen et al. 2009) and Norway (Rorslett et al. 1986).

Elodea canadensis is native to certain parts of North America, including northern portions of the contiguous U.S. and southern Canada. *Elodea nuttallii* distribution is similar but is more common further south (Bowmer et al. 1995). 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.

Elodea nuttallii is similar to *E. canadensis* but has shorter and narrower leaves that are bent and folded along the midrib. *Elodea nuttallii* is generally smaller and paler green with more branches than *E. canadensis*. Characteristics often overlap making the species difficult to distinguish. Hybrids with intermediate characteristics occur naturally between the two species (Spicer and Catling 1988, Cook and Urmi-König 1985). Taxonomic overlap due to hybridization is only further confused when parent stocks are introduced outside their native ranges; e.g., growth forms (phenotypes) of *E. nuttallii* can vary considerably in terms of leaf morphology and lateral shoot number (Thiebaut and Di Nino 2009). To date, morphological and genetic identification of Alaskan specimens have indicated *E. canadensis*, *E. nuttallii* or their hybrid (Kate Mohatt, unpublished data). Genetic analysis indicates that *Elodea nuttallii* occurs in Fairbanks, *E. canadensis* in Anchorage and Cordova, and their hybrid on the Kenai Peninsula. *Elodea canadensis x nuttallii* hybrids are known to be fertile and to produce viable seeds (cited in Spicer and Catling 1988).

Suitable habitat for Elodea in Alaska may increase in response to global climate change from physical and chemical changes to freshwater systems (Luizza et al. 2016). For example, bioclimatic models of future Elodea distribution in Europe suggest that Elodea will continue to aggressively colonize farther north (Heikkinen et al. 2009). *E. canadensis* is highly competitive with most vegetation, similar to other invasive aquatic plants including Brazilian waterweed (*Egeria densa*) and African Elodea (*Lagarosiphon major*), under a wide variety of water temperature conditions and variable light conditions (Riis et al. 2012).

1.2.3. Elodea Ecological and Economic Impacts

Elodea represents an enormous economic and ecological threat to Alaska's aquatic and fisheries resources. Elodea is a particularly injurious aquatic perennial. Outside its native range in North America, and elsewhere in Europe, New Zealand, Australia, and Africa, it has compromised water quality, grown so abundantly that boat and float plane navigability is hindered, reduced dissolved oxygen, and severely impacted native fisheries. Since it reproduces vegetatively, only a single plant fragment is needed to infest an entire waterbody.

Elodea can develop into dense, single species stands that prevent light from reaching other species and limit water movement. Stands can experience 5-6 year growth cycles, possibly related to iron availability, and then collapse and cause oxygen depletion with massive amounts of decaying vegetation (Josefsson 2011). Chemical composition, pH, and oxygen levels of a waterbody are all affected by Elodea infestations, which thereby affect fish, amphibian, and invertebrate populations. In higher latitudes of Norway, dense stands of Elodea introduced after 1970 were likely the cause of decreasing native macrophyte species and local extinctions of *Najas flexilis*, one of the most endangered species in Norway (Mjelde et al. 2012). Elodea has impacted Chinook Salmon by reducing available spawning habitat with increased sedimentation in a regulated California river (Merz et al. 2008). Elodea can clog water intake pipes at hydropower

and industrial plants or even cause scrape damage to boats in calcium encrusted stands (Josefsson 2011).

Elodea can impede recreational activities such as fishing, boating, and swimming, and has been shown to reduce property values on infested lakes. A study in New Hampshire found a 21-43% decline in property values associated with an infestation of variable milfoil, which can similarly clog waterbodies, crowd out native aquatic plant species, and reduce recreational activities like boating and swimming (Halstead et al. 2003). A Wisconsin study on 170 lakes infested with Eurasian watermilfoil (*Myriophyllum spicatum*) demonstrated that property values were reduced by 8–13%, and spread rate increased in relation to the number of lakes infested (Horsch and Lewis 2009). A similar study in Washington also with Eurasian watermilfoil showed a 19% decline in property values due to infestation (Olden and Tamayo 2014).

In addition, Elodea's dense mats are a safety concern for float planes during takeoff and landing, inhibit boat passage through infested waterbodies, and have the potential to degrade important salmon habitat. The combined total economic damage associated with damage to commercial sockeye salmon fisheries and the floatplane sector is estimated to equal at least $100 million each year (Schwoerer and Morton 2018) if Elodea is left untreated. This same research also showed significant and increasing risk of statewide spread and re-infestation of Lake Hood and other important float plane bases if Elodea is not managed statewide.

1.3 Legal Authorities

Alaska Statute 03.05.027 states that ADNR 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, ADNR formally recognized Elodea as a noxious invasive aquatic plant in Alaska, and in 2014 issued a statewide quarantine for both *Elodea canadensis* and *E. nuttallii.* It is ADNR's legal responsibility to remove the threat imposed by invasive Elodea and develop a plan to coordinate an effective interagency response plan to delineate, contain, and when feasible, implement a plan to eradicate Elodea.

The USFWS is mandated to prevent and eradicate invasive species through the National Invasive Species Act which amended the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990.

1.4 Proposed Action

The proposed action is to eradicate Elodea from the Alexander Creek Watershed using a combination of the herbicides fluridone and diquat. Fluridone and diquat are herbicides known to be the most effective of the management options in Alaska. The two infestations in the Alexander Creek Watershed, Alexander Lake and Sucker Lake Complex, are currently fully infested with Elodea and are beginning to spread into both lake outlet streams (Alexander Creek

and lower Sucker Creek). In order to achieve eradication, early detection with rapid response management techniques must be available to make this eradication effort successful. Therefore, this proposed action is intended to encompass the entire Alexander Creek Watershed to include the infested waterbodies as well as nearby waterbodies at high risk for contamination during the treatment years.

Fluridone in both pelleted and liquid form is proposed for use. Diquat is a nonselective, quick-acting contact herbicide that kills only the above ground biomass, not affecting root systems, and does not result in eradication alone where as fluridone is a selective systemic herbicide that is ultimately lethal to the entire plant and can result in eradication. Diquat would be applied following ice-out in order to selectively treat Elodea, as Elodea is the only plant that photosynthesizes during the winter months and in the very early spring (Morton et al. 2014). Elodea has been observed actively growing under ice on the Kenai Peninsula and in infested lakes in Anchorage (Kristine Dunker, pers. comm.; Morton 2015) Thus, at ice out, Elodea would be photosynthesizing while native plants are just starting to metabolize after their senescence.

Fluridone is a systemic aquatic herbicide that interferes with photosynthesis by inhibiting the formation of carotene, a plant pigment. This causes the rapid degradation of chlorophyll by sunlight, preventing the formation of carbohydrates necessary to sustain the plant. Elodea is highly sensitive to fluridone (Smith and Pullman 1997) and very low concentrations can selectively kill Elodea, while avoiding non-target impacts (Hamelink et al. 1986; Kamarianos et al. 1989; Schneider 2000; Sethi et al. 2017). Diquat is a contact liquid herbicide that is absorbed by the plant's leaves where it interferes with respiration. Diquat is commonly used in combination with Fluridone as a cost-effective method for preventing partial-lake infestations from becoming full-lake infestations, or to rapidly reduce the risk of dispersal to other waterbodies.

The goal of utilizing the herbicides in tandem is to reduce Elodea biomass by using diquat before the first application of fluridone; a method that has been successful in eradicating Elodea from the Kenai Peninsula. Fluridone treatments will then continue later in the summer season to maintain low concentrations of fluridone in the water column.

Eradicating Elodea will allow native aquatic plants to repopulate, return habitats toward their natural state, and reduce the threat of this highly invasive species from spreading to other waterbodies in the state. Eradicating Elodea will also reduce potential damage to native fish species resulting from habitat degradation or loss.

1.5 Location of Project

The Alexander Creek Watershed is 209,362 acres, and encompasses two known Elodea infestations in Alexander Lake, the Sucker Lake Complex, and small sections of both Alexander Creek and lower Sucker Creek. Other lakes within the watershed include Jean, Rabbit, and Trail lakes, in addition to numerous unnamed waterbodies. There are over 350 miles of streams and rivers within the Alexander Creek Watershed, many of which have historically served as

important spawning and rearing grounds for Chinook Salmon. Twelve creeks are currently listed on the state's Anadromous Waters Catalog, in addition to a number of smaller tributaries.

Deep, Fox, Clear, and Bear creeks all discharge from surrounding wetland areas from the lower Skwentna district into Alexander Lake. Alexander Lake is located in the Seward Meridian at T19N, R9W, Sections 3, 4, 9, 10, 14, 15, 16, and 22. Alexander Lake discharges into Alexander Creek, which is 42 miles of low velocity, winding, clearwater habitat with numerous backwater side sloughs and oxbow channels. Alexander Creek empties into the west side of the Susitna River approximately 8 river miles upstream of Cook Inlet.

The Sucker Lake Complex is located in the Seward Meridian at T18N, R9W, Sections 9, 10, 15, and 16. It is a system of three lakes connected by small channels. Upper Sucker Creek flows into Sucker Lake, and Sucker Lake discharges into Lower Sucker Creek, which flows into Alexander Creek after approximately 13 miles.

At this time, only Alexander Lake, the lake outlet, Sucker Lake Complex, and 0.5 mile of Lower Sucker Creek below the complex have been confirmed to have Elodea present. These areas are the primary target of herbicide use unless Elodea is located elsewhere in the Alexander Drainage.

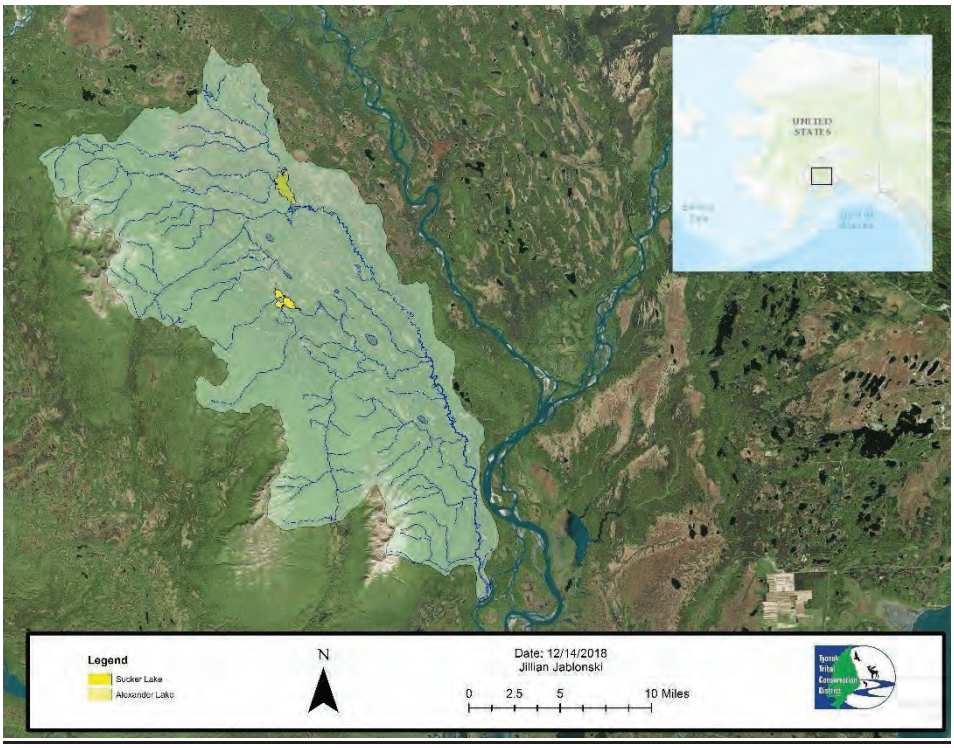

Figure 2. Outline of the Alexander Creek Watershed on the West side of Cook Inlet in Southcentral Alaska. Elodea infested lakes are highlighted in yellow. Alexander Lake is the northernmost lake highlighted.

1.5.1 Lake Characteristics and Elodea Survey Results

The Alexander Creek Watershed contains numerous shallow, interconnected ponds and lakes, along with abundant freshwater wetlands. Emergent and submerged macrophytes are prolific throughout its waters. Alexander Creek was historically one of the most productive Chinook Salmon (*Oncorhynchus tshawytscha)* fisheries in Northern Cook Inlet. However, invasive Northern Pike (*Esox lucius*), introduced to Alexander Lake in the late 1960s, have decimated what was once a multimillion-dollar sport fishing industry and Chinook Salmon population in Alexander Creek. Since 2008, the fishery has been closed to harvest due to salmon returns being well below escapement goals. In response, ADF&G has been actively suppressing Northern Pike in the system since 2011. Preliminary results of the ADF&G project show encouraging results with Chinook Salmon re-establishing their distribution throughout the river and potentially increasing in productivity. If Elodea becomes established in the Alexander Creek Watershed, including side-channel slough habitats, it would provide excellent nursery habitat for invasive Northern Pike and therefore hinder ongoing efforts to bolster salmon productivity as well as potentially negate over 1.5 million dollars of investment in salmon recovery in the watershed.

Elodea was first discovered in Alexander Lake in August 2014 when an ADF&G biologist identified the plant while serendipitously traveling by airboat over the infestation on the way to pick up fuel for a fish survey. In September 2014, a comprehensive vegetation survey of Alexander Lake was completed by ADNR and ADF&G. A grid was surveyed by throwing a sampling rake attached to a rope in 300 points in the lake to sample submerged vegetation, in addition to visual detection which is possible because Alexander Lake's depth does not exceed 5 feet throughout most of the lake. A total of 20 species of both submersed, emergent, and shoreline vegetation were collected, with Elodea present at only 6 [2%] of the sample points. Elodea was observed to be sparsely distributed covering approximately 10 acres in the west-central part of the lake.

In 2015, a follow-up visual survey was completed to see if Elodea had spread from the previous season. Elodea was more abundant and more densely populated within the original 10 acre infestation but had not spread. A 2016 survey of the creek observed no rooted Elodea in the creek, however, floating fragments were observed approximately 1,600 feet from a rooted plant, travelling south towards Alexander Creek. In August of 2016, the original 300 survey points were sampled in a manner consistent with the 2014 survey of Alexander Lake. Of these 300 survey points, in 2016, Elodea was present in 80 [26%] of them, covering an estimated 500 acres with rooted, established Elodea. Most survey sites with Elodea present had densities nearing 100% surface cover, and floating fragments were observed in the channel on the south end of the lake. Follow up surveys in 2018 have determined that the current infestation is considered full-lake, meaning Elodea is present throughout the lake either rooted or free floating, and was seen floating but not yet rooted in upper Alexander Creek near the outlet of Alexander Lake in the spring of 2018.

Alexander Lake is 690 surface acres. The maximum depth varies seasonally with fluctuations in inputs and outputs but does not exceed 8 feet; the lake averages 4.5 feet in depth. The volume of Alexander Lake is 2,760 acre-feet.

Elodea was found to be present in the nearby Sucker Lake complex in 2016, and in 2018 the infestation was also considered full-lake. The Sucker Lake complex is a system of three lakes connected by small channels. The Sucker Lake complex is approximately 355 surface acres with a volume of 1,065 acre-feet and a mean depth of 3 feet. In addition, dense matted Elodea was observed in upper Sucker Creek and lower Sucker Creek up to a ½ mile downstream of the lake outlet.

Since 2011, over 50 other lakes in the Mat-Su have been surveyed by the Cook Inlet Aquaculture Association (CIAA), local Soil and Water Conservation Districts, Tyonek Tribal Conservation District (TTCD), and ADNR (Figure 3). At this time, the distribution of Elodea in the Alexander Creek Watershed is thought to include only Alexander Lake, Sucker Lake Complex, and Lower Sucker Creek. Annual surveys will continue as a part of this overall Elodea eradication effort.

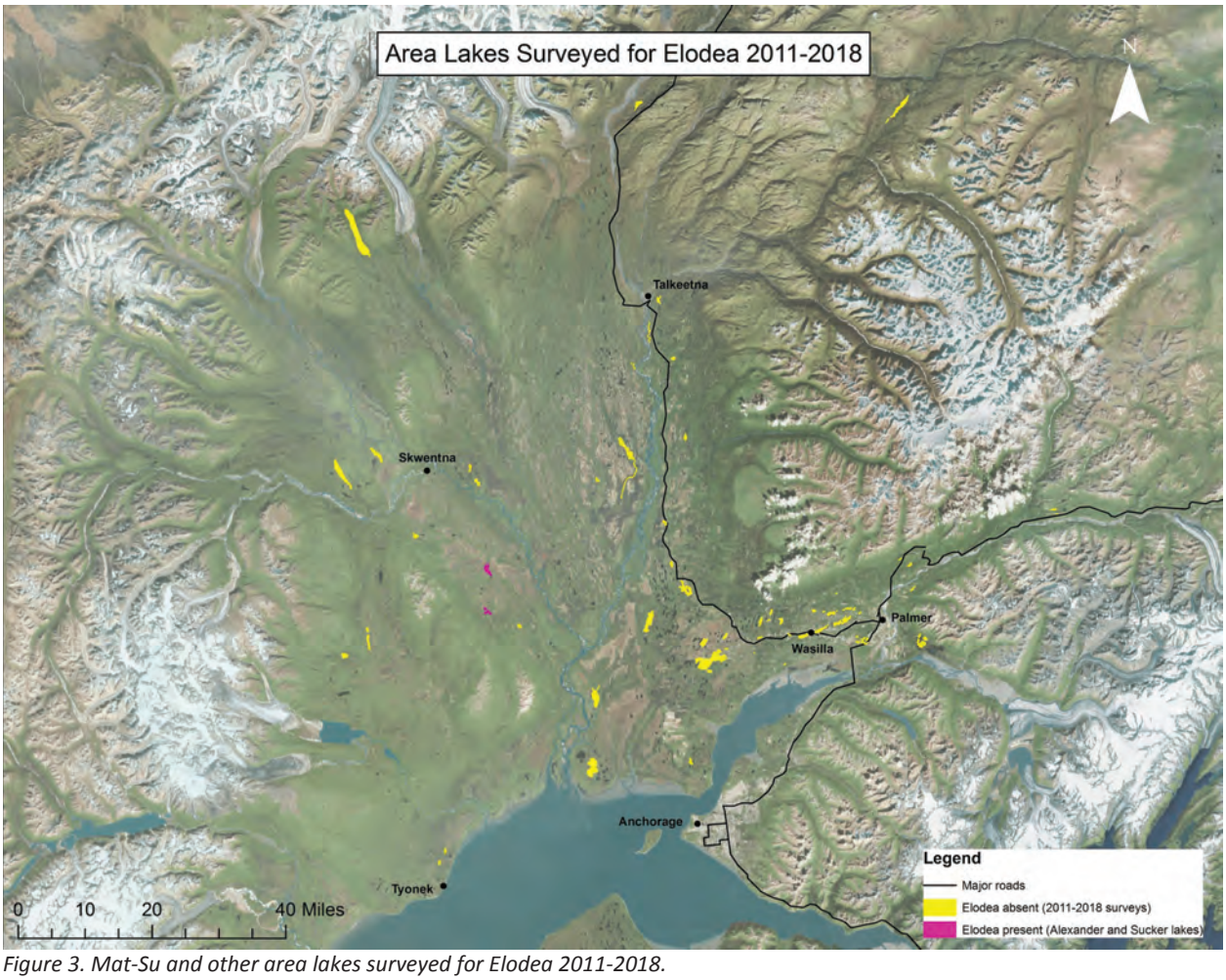

Figure 3. Mat-Su and other area lakes surveyed for Elodea 2011-2018.

2.0 Alternatives

In this section, alternative methods are assessed for the eradication of the invasive aquatic plant, Elodea. First we discuss alternatives that were considered by the interagency task force but were rejected because they do not achieve the goals of the project and are not feasible due to logistics and expense. We then discuss and examine the alternatives under consideration for implementation. These alternatives include alternative A (no action), Alternative B (mechanical removal), and Alternative C (eradication using both fluridone and diquat aquatic herbicide).

2.1 Alternatives Considered but Eliminated from Detailed Analysis

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

2.1.1 Alternative 1: Benthic Barriers

A benthic barrier covers the sediment like a blanket, compressing aquatic plants while reducing or blocking light. Using benthic barriers in the Alexander Creek Watershed would be impractical and expensive. The organic-rich thick lake sediments within lakes would be difficult to anchor tarps in, and installation would require trained divers to cover infestations as large at Alexander and Sucker Lakes (690-acre and 355 acres respectively). In areas with thick biomass, benthic barriers would not be effective in controlling Elodea, and could affect native vegetation populations. Benthic barriers may reduce biomass or prevent growth after several years of application but would not eradicate Elodea from the lakes (Laitala et al. 2012). Benthic barriers may be effective in suppressing growth or potentially eradicating Elodea in areas where the population in the littoral zone is sparse (Laitala et al. 2012), but this would not be possible in the Alexander Creek Watershed due to the size of the current infestations, remoteness of the site, and maintenance needs.

2.1.2 Alternative 2: Drawdown or Draining

Lowering water levels can expose sediment and plant beds, allowing vegetation to desiccate and eventually die off. Water level drawdown often occurs regularly in reservoirs for power generation, flood control, or irrigation but rarely in an area without a water level control structure. Draining infestations within the Alexander Creek Watershed would not be a practical alternative because of the size of current infestations, complexity of the watershed, and potential impacts on associated wetlands and wildlife in the lakes. Waterbodies with high discharge and influx rates such as Alexander Lake which has four contributing creeks, drawdown or draining would be logistically impossible. Waterbodies within the Alexander Creek Watershed lack an existing engineered drain and would therefore need structural changes for drawdown to be effective, which would be cost-prohibitive. Lake drawdown would also have many irreversible and detrimental unwanted side effects such as impacts to adjacent wetlands, Chinook Salmon spawning habitat, and wildlife, and extended loss of use while the lakes refill. Draining any natural waterbody would still leave some water in pools that would require chemical treatment or manual removal of all plant fragments to ensure Elodea did not survive.

2.2 Alternatives Considered

2.2.1 Alternative A: No Eradication or Control of Elodea (No Action Alternative)

The no action alternative would maintain the status quo and Elodea populations would remain in the Alexander Creek Watershed. As long as Elodea remains in the Alexander and Sucker Lake Complex, there is a high risk of spread via float planes to adjacent lakes and water bodies, and waterbodies where Elodea has already been successfully removed (e.g., Lake Hood, a lake on which 50,000 aircraft operations annually). There is also a high risk of natural dispersal of Elodea from its current extent in the lake downstream to Alexander and Sucker Creeks because of the likelihood of fragmentation via annual water flow fluctuations, floating ice carrying it downstream during spring break-up, humans, and possibly waterfowl. Spread of Elodea could be very detrimental to the ecological and recreational values of waterbodies throughout Southcentral Alaska due to the prevalence of vectors of transport, thus, the no action alternative is not a viable alternative.

2.2.2 Alternative B: Mechanical Removal

Mechanical removal via suction dredge, dragline, cutting, or similar mechanical treatments is highly ineffective at eradicating Elodea in medium to large infestations. Mechanical treatments have not been successful with Elodea removal except where removal is done merely to reduce biomass on an annual basis (Texas A&M, 2016). In Fairbanks, AK, suction dredging and removal by rake was assessed and found that this method required approximately 400 hours of labor to remove 1 acre of Elodea (Lane, 2014), and resulted in large scale fragmentation. This fragmentation poses a high risk of spreading Elodea downstream. Furthermore, given the remoteness of the Alexander Creek Watershed, disposing of and quarantining the removed biomass would be impractical, expensive, and further increase the risk of spread. Mechanical removal would not eradicate Elodea in the watershed, and may only serve to increase the density and distribution of Elodea, rather than eradicate the population. For these reasons, the interagency task force did not consider this alternative further.

2.2.3 Alternative C: Fluridone and Diquat Herbicide Treatment (Proposed Action)

ADNR's proposed action involves reducing biomass and eradicating established populations of the invasive aquatic plant Elodea from the Alexander Creek Watershed using the herbicides fluridone (Sonar) at up to 150 ppb annually and diquat (Littora®) at up to 2 gallons/acre. Fluridone alone is an effective tool at eradicating Elodea over time but using diquat and fluridone in tandem increases the chances of eradication, significantly reduces the risk of spread throughout the duration of the treatment, and reduces the overall time and cost of the treatment plan. Even using both herbicides, multiple treatments spanning several years may be necessary to completely remove the populations of Elodea from the Alexander Creek Watershed.

This alternative offers the highest probability of achieving the goal of eradicating Elodea from the Alexander Creek Watershed and eliminates the threat of spreading Elodea to other waterbodies throughout the State. Many at-risk or infested waterbodies within the Alexander Creek Watershed have the added challenge of hydrologic flow, requiring a more strategic approach to eradicate Elodea. Using the two herbicides in combination is an efficient and quick two-pronged

approach to reduce Elodea biomass quickly (using the contact herbicide diquat) while permanently killing the root systems (using the selective systemic herbicide fluridone).

2.2.3.1 Description of Proposed Alternative 3: Fluridone and diquat treatment

The infestations of Elodea within the Alexander Creek Watershed have spread at an unprecedented rate. Elodea was discovered in the Mat-Su Valley in Alexander Lake in 2014. In 2014 it was a 10-acre infestation and by 2016 it had spread to 500 acres within Alexander Lake. In 2016 it was discovered just a few miles to the South in the Sucker Lake Complex. By 2018, this complex was found to be a full lake infestation totaling 355 acres. If left unmanaged, Elodea will undoubtedly spread to other waterbodies with the potential of creating regional, if not statewide, ecological and economic impacts.

To maximize the likelihood of eradication and containment during treatment years (2019-2024), we propose to apply both fluridone and diquat in the spring to immediately reduce Elodea biomass with diquat and maintain lethal levels of fluridone throughout the growing season. We specifically plan to apply diquat to the heaviest areas of infestation in early spring before native plants have emerged, selectively treating Elodea and reducing its biomass, while minimizing the effects on native vegetation. Fluridone applications will follow, and fluridone concentrations will be maintained at a lethal level to Elodea (3-10 ppb) for at least two years. This concentration is not typically detrimental to native vegetation (Sethi et al. 2017).

The goal is to keep fluridone concentrations in infested waterbodies above 3 ppb and below 10 ppb throughout the spring and summer and into the winter for a period of three years, which would be sufficient time to eradicate the Elodea at this concentration range. This range of fluridone concentration is desired as Elodea is much more susceptible to fluridone at low concentrations (3–10 ppb) than native vegetation. Titration tests conducted with Elodea samples from a lake on the Kenai Peninsula to calculate fluridone concentrations confirmed that these were the optimal concentrations required for effective control in Alaska. These results have guided treatment concentrations applied at other Elodea locations in the state. Liquid fluridone (Sonar Genesis) is used to quickly introduce and elevate fluridone concentrations in waterbodies and is particularly useful in flowing systems. Pelleted fluridone (Sonar One) is used to maintain fluridone concentrations over a long period of time. The pellets dissolve and release fluridone slowly and consistently into the waterbody.

Lake Treatments:

We aim to eradicate Elodea from the Alexander Creek watershed in both lakes and creeks using diquat and fluridone. In infested lakes, we propose to apply diquat at up to 2 gallons per acre of infestation in the areas of heaviest growth directly after ice has melted in the spring. Applying diquat directly after ice out to areas where Elodea is growing in high densities allows the opportunity to directly target Elodea because it is primarily the only submerged aquatic plant photosynthesizing and actively growing early in the growing season. Diquat will reduce Elodea biomass quickly and allow direct access to root systems before our initial application of fluridone. Complete eradication with fluridone products generally require treatment to provide concentrations between 3-10 ppb for 45—90 days per growing season for two or more growing

seasons in series. 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 will be applied approximately 3 times throughout each growing season to maintain target concentrations and will be determined by water monitoring every 2-6 weeks. Pellets will be applied using a forced-air dispersal system from a boat using previously determined GPS locations to achieve even distribution of product throughout infested areas. In systems with low hydrologic flow, slow release pellets will be the primary product used to maintain 3-10 ppb. However, liquid forms of fluridone could be utilized if concentrations are too low or are being flushed out of the system too quickly. Liquid fluridone would be applied either from a boat using liquid herbicide applicators or from drip stations strategically located along the lakeshore.

Creek Treatments:

Treating Elodea in flowing water within the Alexander Creek Watershed will require methods that vary slightly from lake treatments. Specifically, the use of liquid formulations of fluridone will be necessary and are typically applied to moving water using liquid herbicide injection systems. These systems, commonly referred to as drip stations, inject liquid fluridone into the water to quickly raise the concentrations of fluridone and enables the ability to maintain these concentrations as water moves through the treatment area. Drip stations have been used in interior Alaska at Chena Slough and have been successful in dramatically reducing elodea presence in that waterbody.

For all habitat types, the best available hydrologic data, tested fluridone concentrations, Elodea dieback, as well as non-target effects, we will used to refine herbicide application rates and placement as each season progresses. Each summer there will be multiple applications of pelleted fluridone to Elodea infested areas and drip stations could be used to ensure the desired concentrations are maintained. Applications will occur seasonally based on weather and water conditions and are likely to occur in mid-June, early August, mid-September, and early-October. To ensure target concentrations are maintained, FastTEST water samples will be collected at 6 week intervals beginning two weeks following the initial application of herbicide. All water samples will be collected using protocols established by SePRO corporation (the herbicide manufacturer) and sent overnight to their analytical laboratory in Carmel, Indiana for immunoassay. If mean fluridone concentrations fall below 75% of the target level for two consecutive samples, then supplemental fluridone will be added. However, the sum of all applications in any given season will not exceed 150 ppb.

Treatments will be conducted by applicators with ADEC pesticide application certification from a boat with a surface-drive motor to apply herbicide using a forced-air blower applicator for pelleted fluridone. To calibrate the blower system, the identical weight of training pellets will be passed through the blower to measure the time required to deliver the prescribed amount of herbicide pellets. Calibrations will be repeated several times to obtain an average. That information will be used to determine how many minutes are 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 onboard GPS equipment to be followed by the driver of the application vessel. Boat speed will be determined by the amount of time required to deliver the prescribed weight of pellets to the treatment area. Liquid fluridone would be applied using drip

stations setup strategically, likely at creek inlets or other areas where flow rates or other factors are depleting fluridone concentrations and where sufficient high ground occurs on the lakeshore. Drip stations release liquid fluridone over a 12-week period, in order to maintain adequate herbicide concentration in flowing waters, or waterbodies with high rates of turnover. Diquat would be applied using standard liquid herbicide injection equipment from boats which injects the herbicide below the water's surface.

Public notification of the herbicide applications will be conspicuously posted on signs at all public access points of entry and exit at each lake as well as areas where floatplanes land, taxi, park, and takeoff. Signs will remain posted for at least 24 hours after the applications with contact names, phone numbers, time of application, and any appropriate label restrictions per ADEC requirements. All public notifications related to the fluridone treatments will include two consecutive newspaper notices at least 30 days before the first application including information about product name, EPA registration number, quantity of mixed herbicide and treatment locations. Individuals who have cabins on infested lakes or creeks within the Alexander Creek Watershed who have provided ADNR with contact information will also be notified.

2.2.3.2 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 (Durkin 2008).

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 A.S. (EPA Reg. No. 067690-4), Sonar Genesis (EPA Reg. No. 67690-54) , SonarONE™(EPA Re. No 67690-45), Sonar PR (EPA Reg. No. 67690-12), and Sonar H4C (EPA Reg. No. 67690-61) are included in Appendix 6.1 and the Safety Data Sheets (SDS) are available in Appendix 6.2.

2.2.3.3 Description of Diquat (Littora®)

Diquat dibromide (diquat) is a non-selective contact algicide, defoliant, desiccant, and herbicide. Herbicide uses include control of broadleaf and grassy weeds in non-crop and aquatic areas (USEPA 1995). Diquat is an organic solid of colorless or yellow crystals, or dark red-brown in water solution and is highly soluble in water. Diquat is absorbed by plant leaves where it interferes with cell respiration and prevents uptake of oxygen. Diquat is a quick-acting contact herbicide, causing injuring only to the parts of the plant to which it is applied (Pohanish 2015). Diquat is formulated as 6,7-dihydrodipyrido (1,2-a: 2',1'-c) pyrazinediium dibromide (Cochran et al. 1994; USEPA 1995). Littora®(USEPA Registration No. 67690-53) contains the active ingredient diquat dibromide and is approved for use in Alaska by the ADEC.

Littora®(0.37 diquat dibromide) is considered a moderately toxic material, labeled with the USEPA signal word “Caution” (SePro 2016). Diquat exhibits low acute toxicity via oral and dermal exposure but has moderate to severe acute toxicity by inhalation exposure. Consuming drinking water containing diquat in excess of the maximum contaminant level (MCL; 0.02 mg/l) over many years could result in cataracts in humans; single high-level exposure to diquat has not been shown to cause cataracts (CDC 2011). Concentrated diquat is a skin and eye irritant and may cause skin irritation and burning on contact (Sax 1984; Arena 1979). When mixed with surfactants or the closely related herbicide paraquat, diquat has caused scarring of the cornea (Cant and Lewis 1968; Grant and Schuman 1993). Pure diquat alone resulted in eye irritation and inflammation that later subsided (Ballantyne 1983, as cited in Grant and Schuman 1993). At high doses, 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; Cochran et al. 1994; Jones and Vale 2000).

Diquat is not known to cause genetic changes and is therefore not considered a mutagen in acute tests with mice. Diquat did not cause tumors in acute or chronic rat and mouse studies (USEPA 1995). Tests have been conducted on mice, rats, guinea pigs, rabbits, dogs, and cows (Cochran et al. 1994; USEPA 1995). Diquat did not directly affect the reproductive system in rats (Cochran et al. 1994). In tests conducted on rats and rabbits, noted developmental effects in fetuses were delayed skeletal ossification and an increased rate of malformations when fed through gavage for multiple days during gestation (Cochran et al. 1994; USEPA 1995), with greater effects occurring at higher doses (10 mg/kg-day). As these studies are important to consider, the concentrations proposed in this action are order of magnitude less than the concentrations test subjects were exposed to in the lab. For reference, in order to consume 10 mg/kg of diquat, a 150 lb. individual would need to drink over 500 gallons of treated water (at 0.34 ppm).

Oral diquat doses are metabolized mainly in the intestines with excretion in feces, as verified in tests with rats, goats, and cattle (WHO 2004; USEPA 1995). Minute traces (0.004% of oral doses) of diquat were found in cow milk (WHO 2004), and cows are considered sensitive to diquat exposure. Diquat is considered slightly to moderately toxic 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 60.6 mg/kg (SePRO 2017a, USEPA 1995). For rats, oral LD50 was 231 mg/kg, for mice 125 mg/kg, for dogs 100-200 mg/kg, and 101 mg/kg in rabbits (Clark and Hurst 1970).

Diquat is slightly toxic to fish. The LC50 (lethal concentration 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 ppm Chinook (king) salmon at eight hours (Pimental 1971), 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 (sublethal levels) by diquat, including suffering respiratory stress (yellow perch *Perca flavens*) (Bimber et al. 1976). There is no bioconcentration of diquat in fish (Garten and Trabalka 1983). Diquat is slightly to highly toxic to aquatic invertebrates (USEPA 1995), which display varying levels of sensitivity. Diquat has shown to be 300 times more toxic to amphipods than mayfly, with caddisfly, damselfly, and dragonfly less sensitive in that order (Nicholson and Clerman 1974, Wilson and Bond 1969).

Studies suggest that diquat is removed rapidly from the water column, with a dissipation half-life from <1 to 4 days (Emmett 2002). It is readily adsorbed to sediment, where it is persistent and remains stable. Once adsorbed, diquat is estimated to have a long aquatic system half-life of greater than 1,000 days (Emmett 2002). The K_{oc} value of a chemical measures its mobility in soil; a high K_{oc} value indicates the chemical adsorbs strongly to soil, suspended solids, and organic matter in water, and thus reduces its availability in the aquatic system. Diquat has a very high K_{oc} value ranging up to 7,900,000 (ENSR International 2005; European Commission 2001), indicating that it will bind rapidly with sediment and particulates in the water. Thus, for waters with high turbidity or increased levels of dissolved organic carbon (DOC), it would be expected that diquat will rapidly dissipate from the water column and adsorb to these suspended particles. However, very high levels of turbidity or DOC could impair diquat's efficacy if the chemical is adsorbed to particulates before plant contact (Poovey and Getsinger 2002). Neither temperature nor pH has been shown to strongly impact diquat's ability to adsorb to sediment or soil (Harris and Warren 1964; Emmett 2002).

Sediment adsorption rates are highest in loam, sandy clay loam, and sandy loam (Cochran et al. 1994). Diquat is resistant to degradation under aerobic and anaerobic conditions (Cochran et al. 1994; USEPA 1995; Emmett 2002), but because it binds nearly irreversibly to sediment, it is unlikely to contaminate groundwater or surface water, and poses little risk to aquatic organisms (USEPA 1995). The Maximum Contaminant Level (MCL) in water is 0.02 mg/L (milligrams per liter) or 20 ppb (USEPA 2002a). Granular activated carbon can be used to remove diquat to below MCL.

Water use restrictions following application of diquat differ based on application rate. At the application rate of 1 gallon per surface acre, the affected water should not be consumed as drinking water for 2 days following application, consumed by livestock/domestic animals for 1

day, used for turf and landscape irrigation for 2 days, or used for food crop irrigation for 5 days. There is no restriction on fishing or swimming in treated waters. When the application rate increases to 2 gallons per surface acre, the restriction on drinking water and turf and landscape irrigation increases to 3 days but remains the same for all other categories (SePRO 2016). At these application rates, diquat remains in acceptably low concentrations to not be of health concern (USEPA 2002b).

Applicators of Littora® will experience risks from exposure that can be minimized by proper use of PPE. Applicators must avoid breathing spray mist, or any contact with skin, eyes, or clothing. They must wash thoroughly with soap and water after handling and should wash exposed clothing before reuse. Using Littora® according to label instructions minimizes risk to applicators. Applicators must wear protective clothing when handling the concentrated produce to reduce skin exposure. Splashes should be immediately washed from eyes and skin. Applicators should avoid drift of the chemical and contact to skin or eyes. Breathing diquat spray or mist should also be avoided and use of respirators is recommended. A diquat Safety Data Sheet (SDS) is available in Appendix 6.3, and a Littora®label is available in Appendix 6.4.

3.0 Environmental Review and Comments

This section identifies and describes the ecological and human health impacts of the proposed action. Potential impacts are described with three broad subject areas: physical environment, biological environment, and human health. The description and comments will focus on issues identified as potential concerns by ADNR.

3.1 Physical Environment

3.1.1 Land Resources

Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Soil instability or changes in geologic substructure?		**X**			
b. Disruption, displacement, erosion, compaction, moisture loss, or over-covering of soil which would reduce lake productivity or fertility?		**X**			
c. Destruction, covering or modification of any unique geologic or physical features?		**X**			
d. Changes in siltation, deposition or erosion patterns that may modify the channel of a river or stream or the bed or shore of a lake?		**X**			

3.1.2 Water Resources

Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Discharge into, or any alteration of, surface water quality including but not limited to temperature, dissolved oxygen, and turbidity?			**X**		**See comment 3.1.2a**
b. Changes in drainage patterns or rate and amount of surface runoff?		**X**			
c. Alteration of the course or magnitude of flood water or other flows?		**X**			
d. Changes in the amount of surface water in any water body or creation of a new water body?		**X**			
e. Exposure of people or property to water related hazards such as flooding?		**X**			
f. Changes in the quality of groundwater?		**X**			**See comment 3.1.2f**
g. Changes in the quantity of groundwater?		**X**			
h. Increase risk of contamination of surface or groundwater?			**X**		**See comments 3.1.2a, 3.1.2f**
i. Effects on any existing water right or reservation?		**X**			
j. Effects on other water users as a result of any alteration in surface or groundwater quality?			**X**		**See comment 3.1.2f**
k. Will the project affect a designated floodplain?		**X**			
l. Will the project result in any discharge that would affect federal or state water quality regulations standards? (Also see 2a)			**X**		**See comment 3.1.2l**

Comment 3.1.2a. This project would apply two aquatic herbicides to surface waters to eradicate an invasive aquatic plant. The anticipated impacts to water quality are expected to be minimal and short-term. Both fluridone (brand name Sonar; Sonar A.S. (EPA Registration Number 067690-4), Sonar Genesis (EPA Reg. No. 67690-54) , SonarONE™(EPA Re. No 67690-45), Sonar PR (EPA Reg. No. 67690-12), and Sonar H4C (EPA Reg. No. 67690-61) and diquat (brand name Littora®, USEPA registration number 67690-53) are registered by both the USEPA and the ADEC and are deemed safe for use to eradicate invasive aquatic plants when applied according to label instructions.

The active ingredient in the Sonar product is fluridone. The pelleted formulation has a fluridone concentration of 5%. Regardless of formulation or application rate, the application will not exceed 150 ppb cumulatively in any one season as specified on the product label. Spill prevention measures will be undertaken to reduce the likelihood of spills. Spill risk will be minimized by implementing standard operating procedures to ensure the proper handling of fluridone products as detailed by the label.

The active ingredient in Littora® liquid aquatic herbicide is diquat dibromide at 37.3%. The rate of dilution will be 50 gallons of water to 2 gallons of product. Directly after at ice-out, we plan to apply Littora®at up to 2 gallons per acre of infestation. No excess mixed herbicide will be produced as product will not be mixed in advance or stored. Rather, product will only be mixed with lake water as part of the actual application process. There may be excess unmixed product (concentrate) which will remain properly stored away from water resources.

Diquat does not remain in the water column as it binds to sediment quickly and permanently. Due to the immobility of diquat once it binds to sediment, the EPA does not require surface water advisories (USEPA, 1995). Lakes within the Alexander Creek Watershed generally contain organic benthic zones covering peat or silt loam. Diquat is readily adsorbed to both of these soil types (Emmett 2002; Cochrane 1994), indicating it will be mobile in the system for a short period of time before binding indefinitely to sediment. Diquat is usually detectable in the water column from one to 35 days after treatment (DNR PUB-WT-969, 2012).

Long-term water quality is not expected to decrease with the application of fluridone or diquat within the Alexander Creek Watershed. Monitoring efforts on Kenai Peninsula lakes treated with herbicide showed no evidence for changes in water quality (Sethi et al. 2017). Application of diquat and fluridone is expected to eradicate Elodea, which will increase decomposition rates and organic matter within the lakes as the Elodea plants break down initially, and will decrease annually as the project progresses (up to 5 years). This could result in temporary increases in organic material suspended in the lakes, and a corresponding decrease in dissolved oxygen levels (McCowen et al. 1979). The algae levels within the lakes may also increase as a result of the decrease in Elodea, though algal levels in spring are typically low in waterbodies in the Alexander Creek Watershed. Increases in algae could reduce visibility within the lakes and also decrease dissolved oxygen. However, any changes or impacts to water quality resulting from an increase in algae are expected to be short-term and minor as flow rates through the lakes are quite high, turning over every 6-15 days dependant on flow rates.

Long-term water quality may improve with the reduction of the large biomass of Elodea in these lakes, and native submersed aquatic vegetation is expected to re-establish.

Comment 3.1.2f:
Diquat is persistent in the environment, but is not biologically available once it quickly binds to sediment (USEPA, 1995). The EPA considers diquat to be immobile once chemically bonded to soil particles, even as large as sand, but has stronger chemical bonds to smaller particles such as clay and silt (1995). The primary soil types in the Alexander Creek Watershed are peat and silt loam (NRCS 2018); studies have shown diquat is strongly adsorbed to peat and loam (Emmett 2002; Cochran et al. 1994), thus it is not expected to alter or contaminate groundwater resources.

Fluridone readily binds to organic and inorganic matter and is unable to travel more than a few inches through lake sediments (Muir et al. 1980). The immobility of the products proposed for use makes it highly unlikely that the herbicides could move into groundwater resources. Therefore, the proposed action is not expected to contaminate groundwater resources.

Comment 3.1.2l: Both diquat and fluridone bond tightly to sediments making leaching into groundwater exceedingly unlikely. Both herbicides will be applied to the surface water and are approved for such use. Diquat is expected to remain in the water column for a very short period of time before becoming biologically inactive once attached to sediment. Fluridone will remain in the water column throughout the treatment period at low concentrations (3-10 ppb) from slow release dry pellets. Fluridone readily attaches to sediment and did not migrate farther than a few inches into the sediment (Banks and Merkle 1979).

As required by state regulation, ADNR has submitted a pesticide use permit application to the ADEC, which must be approved prior to any fluridone or diquat treatments.

3.2 Biological Environment

3.2.1 Air Resources

Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Emission of air pollutants or deterioration of ambient air quality?			**X**		**See comment 3.2.1a**
b. Creation of odors?			**X**		**See comment 3.2.1b**
c. Alteration of air movement, moisture, or temperature patterns or any change in climate, either locally or regionally?		**X**			
d. Adverse effects on vegetation, including crops, due to increased emissions of pollutants?		**X**			
e. Will the project result in any discharge which will conflict with federal or state air quality regulations?		**X**			

Comment 3.2.1a
Any potential impacts to air will occur at the time of application. Emissions from boat motors is expected to be minimal and dissipate rapidly. Neither fluridone nor diquat are volatilized and present no risk of herbicide drift. However, applicators are most at risk of exposure and will take necessary precautions as listed on herbicide labels and proper use of PPE. Diquat does not require respirators during application, but respirators are recommended for fluridone applications. All personnel working near the application sites will wear respirators as a precaution during fluridone application, although no significant effects have been documented in exposure through inhalation (SePRO 2017c).

Comment 3.2.1b
Applicators will have the greatest potential contact with odors created by application of herbicides to water. However, as the diquat label recommends, they will wear respirators for protection. Any impacts caused by objectionable odors would be short-term and minor.

3.2.2 Vegetation

Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Changes in the diversity, productivity, or abundance of plant species (including trees, shrubs, grass, crops, and aquatic plants)?				**X**	
b. Alteration of a plant community?				**X**	**See comment 3.2.2b**
c. Adverse effects on any unique, rare, threatened, or endangered species?		**X**			
d. Reduction in acreage or productivity of any agricultural land?		**X**			
e. Establishment or spread of noxious weeds?		**X**			
f. Adverse effects on wetlands, or primate and unique farmland?		**X**			

Comment 3.2.2b:
Changes to the plant community are expected to be significant in the targeted lakes as the goal for the project is to eradicate Elodea which has become the dominant species in Alexander and Sucker Lakes over the last 5 years. The methods for this proposed action, however, intend to target the invasive species, while protecting native vegetation as much as possible.

Diquat is a general contact herbicide that will not selectively target Elodea; however, the timing of this application can target Elodea by applying the herbicide directly after ice has melted when Elodea is the only plant photosynthesizing. Diquat remains in the water column for a short period of time and then will become biologically inactive once bound to sediment. Some damage to native plants is possible but is not expected to have long term effects exceeding one or two years post-treatment. The aquatic plant community is expected to return to one comprised entirely of native species because of the existing seed bank in the sediment and upstream vegetation. Elodea has taken over these lakes in startling densities so it is likely that eradication of Elodea may create a more favorable competitive environment for native plants (Rybicki and Landwehr 2007). Other successful efforts in Alaska have documented increases in native aquatic plant species richness once Elodea was eradicated (Sethi et al. 2017).

Diquat will also be used sparingly and is only expected to be used until the Elodea densities have been significantly reduced. Fluridone is a selective herbicide and will be maintained at a concentration of 3-10 ppb, a concentration known to be detrimental to Elodea but not to the native species present. These two strategies are expected to have the quickest impact on the invasive species while intentionally minimizing impacts to native vegetation.

Project operations would be based from private property on the lakes that have been approved by landowners. Herbicide applications would be conducted from boats, which would avoid trampling of lakeside and nearshore vegetation. Prior to removing boats and equipment, all equipment would be carefully inspected to ensure that Elodea is not transported to other waterbodies.

3.2.3 Fish and Wildlife

Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Deterioration of critical fish or wildlife habitat?		**X**			
b. Changes in the diversity or abundance of mammals or bird species?			**X**		**See comment 3.2.3b**
c. Changes in diversity or abundance of other species?			**X**		**See comment 3.2.3c**
d. Introduction of new species into an area?		**X**			
e. Creation of a barrier to the migration or movement of animals?		**X**			
f. Adverse effects on any unique, rare, threatened, or endangered species?		**X**			
g. Increase in conditions that stress wildlife populations or limit abundance (including harassment, legal, or illegal harvest or other human activity)?		**X**			
h. Will the project be performed in any area in which T & E species are present, and will the project affect any T & E species or their habitat?		**X**			**See comment 3.2.3h**

i. Will the project introduce or export any species not presently or historically occurring in the receiving location?		**X**			

Comment 3.2.3b

Mammals:
There are many mammals and waterfowl that frequent the Alexander Creek Watershed throughout the year. Moose, bear, beaver, voles, wolves, fox, and others have the potential to inhabit the area during the treatment period. These animals could ingest the water through drinking, eating affected vegetation, and/or swimming. Diquat is expected to remain in the water column for a short period of time before binding to plant matter or sediments and becoming biologically inactive. The concentrations of diquat in the water column will be minimal and are not expected to impact wildlife. Because of dilution in the water column, animals swimming in the water directly after or during herbicide application of diquat is considered "practically non-toxic" in rats at >5,050 mg/kg body weight; which itself is not an environmentally relevant exposure levels (SePro 2017a). Direct ingestion of diquat is considered "slightly toxic" to rats at 886 mg/kg body weight (SePro 2017a). Dogs exposed to chronic ingestion showed "nothing remarkable" with minimal effects to the animals with the no observed effect level (NOEL) at 0.5mg/kg/day and the lowest observed effect (LOEL) of 2.5mg/kg/day (USEPA, 1995). These concentrations far exceed what mammals would be exposed to at treatment sites in the Alexander Creek Watershed and any effects seen on tested animals during diquat trials were seen in chronic exposures at high concentrations as discussed in section 2.2.3.3. Therefore, minimal to no effects are expected to occur in mammal populations.

Fluridone is expected to remain in the water column for the duration of the project at very low concentrations (3-10 ppb). Ingestion of treated waters by mammals is expected to have minimal to no effects. The EPA requires no time between application and use for drinking, swimming, fishing, or livestock/pet consumption with concentrations below 150 ppm (SePro, 2017b). The EPA's Ecological Fate and Effects Division (EFED) classifies Fluridone as Practically Nontoxic to terrestrial mammals due to the LD50 value of >10,000 mg/kg (10,000,000 ppb) body weight in rats (Durkin, 2008), a concentration that far exceeds the 3-10 ppb concentrations proposed in this action. Thus, there are minimal to no adverse effects expected to mammals from drinking lake water treated with fluridone as proposed.

Waterfowl:
Waterfowl are seasonally abundant in the Alexander Creek Watershed, and toxicity due to either diquat and fluridone exposure is expected to be minimal to non-existent. For diquat, the USEPA found that the lethal dose for 50% of test animals (LD50) in mallard ducks was 60.0mg/kg, and the lethal concentration to kill 50% of test animals (LC50) was 5000 ppm over 8 days (SePro 2017a). These concentrations far exceed what any waterfowl would be exposed to over the course of this proposed action. For chronic exposure, the reproduction LOEL was 25 ppm for

mallards (SePro 2017a). Concentrations of diquat will not come close to this level and since diquat quickly becomes biologically unavailable, no chronic exposure is expected.

Fluridone is proposed to remain in the water column for the duration of the project. It is possible that birds may ingest treated water or consume aquatic plants, fish or aquatic invertebrates that have been exposed to or affected by treated water. Ingestion or exposure to treated water is unlikely to have any effects at the proposed treatment levels because the toxicity of fluridone to waterfowl and other birds is low. USEPA categorizes fluridone for acute toxicity in birds as Practically Nontoxic based on >5000 ppm in both mallards and quail (Durkin, 2008). Ingesting fish exposed to fluridone will also have minimal or no impact on birds because fish do not bioaccumulate fluridone. Ingesting invertebrates from treated water may introduce trace amounts of herbicides to digestive systems of birds. However, all laboratory examples regarding effects of fluridone on animals involved specimens subjected to unusually high concentrations of herbicides, which far exceed any concentrations proposed in this project. Thus, we expect minimal, short-term or no or impacts to waterfowl or other birds.

Waterfowl will likely be present and could be temporarily displaced from Alexander Lake's treatment site due to treatment activities (i.e., boats). Because of the close proximity and availability of other waters to the project area, there should be minimal or no impacts to waterfowl during project activities.

Comment 3.2.3c
Other species that could be present during treatment include zooplankton, aquatic insects, some terrestrial insects, fish, and other birds. The effects to these species from fluridone treatments are expected to be minimal to none due to the low concentrations needed to effectively treat Elodea. Diquat can be toxic to aquatic organisms at high concentrations or with chronic exposure, but the proposed low concentrations and single applications of diquat should minimize any unintended negative effects.

Invertebrates
Micro- and macroinvertebrates can be affected by fluridone, and its effects on aquatic macroinvertebrate populations vary. However, effects are expected to be minimal because most insects and earthworms are not sensitive to fluridone at low concentrations (Haag and Buckingham 1991) and all invertebrates tested experienced detrimental effects at rates that far exceed the proposed action. For example, acute toxicity LC50 values for four genera of copepods ranged from 8.0 mg/L (8,000 ppb) to 13.0 mg/L (13,000 ppb) across seven tests of 48 hours per test per genus (Durkin 2008). These concentrations are 800 and 1,300 times more potent than the maximum proposed fluridone target concentrations. The only study that found reduced biomass of macroinvertebrates (fly larvae; Hydrellia) used fluridone at concentrations of 4600-9200 ppb (Haag and Buckingham 1991), far exceeding EPA-approved label concentrations. Another study conducted at low fluridone concentrations (5 ppb) for the treatment of milfoil with similar concentrations and with similar species as in our proposed project, found no negative effects on macroinvertebrate biomass (Cheruvelil et al. 2000).

Freshwater molluscs (*Anodonta beringiana,* species unconfirmed, Smith et al. 2004) are likely present in lakes within Alexander Creek Watershed. As filter feeders, molluscs can be more sensitive to fluridone than other macroinvertebrates (Archambault et al. 2015). However, fluridone was not acutely toxic to molluscs at 5-15 ppb and was not lethal to adult molluscs at concentrations as high as 300 ppb over 28 days, indicating little chance for exposure effects at the significantly lesser proposed concentrations of 3-10 ppb (Archambault et al. 2015).

The EPA level of concern (LOC) was not reached at all approved application rates for diquat in non-chronic exposure studies for freshwater invertebrates (USEPA, 1995). There is evidence that chronic exposure to diquat poses risks to some freshwater invertebrates including freshwater snails (Ducrot et al., 2010). However, chronic exposure is not expected to occur as diquat remains biologically active for only a short period of time before becoming biologically inactive, as it binds to organic and inorganic material within the water column, directly to plant material, or to sediments. According to the EPA, these factors lead to the conclusion that, while the possibility of acute or chronic risk to aquatic organisms exists, the probability that it will occur is low (USEPA, 1995), especially in isolated, low concentration application events such as proposed here.

Because of their short life cycles, high dispersal abilities, and generally high reproductive potential, aquatic invertebrates are capable of rapid recovery from disturbance (Matthaei et al. 1996; Boulton et al. 1992; Anderson and Wallace 1984). Recolonization of aquatic invertebrates (e.g., mayflies and caddisflies) in the treated lakes would occur via aerial dispersal of adult invertebrates from adjacent areas. No impacts on benthic organisms were reported in field studies where fluridone treatment was >1000 ppb (Durkin 2008).

Amphibians

The wood frog (*Rana sylvatica*) is the only known amphibian in the Alexander Creek Watershed. Wood frogs use lakes to breed, lay eggs, and develop into tadpoles and adult frogs and then can use both terrestrial and aquatic systems for their adult life stage. Adult frogs may be more resistant to herbicide effects than earlier life stages; unfortunately, little research exists on the effects on amphibian species for fluridone (Durkin 2008). Diquat was found to have little effects on amphibians with studies finding little to no effect on tadpole survival (Cooke, 1977; Thomas 2015). However, in Cooke 1977, tadpoles in treated ponds weighed less than the control subjects; so the potential for effects appear exist but are limited. Given this proposal's infrequent use of diquat at EPA approved application rates and the lack of effects documented on amphibians even during vulnerable juvenile life stages, it is highly unlikely that amphibians will experience detrimental effects as a result of the proposed actions.

Non-game animals

Non-game mammals varying in size from foxes to voles could be present and drink or swim in treated lake water. Mammalian laboratory toxicity thresholds for fluridone and diquat exceed the expected treatment concentrations by orders of magnitude (see comment 2.2.3b), and nearly all of the cited examples of fluridone and diquat effects on animals in the Proposed Activities Section involved subjecting laboratory specimens to concentrations far above concentrations

used in aquatic plant control management "environmentally relevant concentrations". Therefore, we expect impacts to non-target organisms to range from non-existent to short-term.

Fish

There are a number of species of culturally, economically, and ecologically important fish that inhabit the Alexander Creek Watershed including Rainbow Trout (*Oncorhynchus mykiss*), Chinook Salmon (*Oncorhynchus tshawytscha*), Coho Salmon (*Oncorhynchus kisutch)*, Sockeye Salmon (*Oncorhynchus nerka*), Chum Salmon (*Oncorhynchus keta*), Pink Salmon (*Oncorhynchus gorbuscha*), Arctic Grayling (*Thymallus arcticus*), Nine Spined Stickleback (*Pungitius pungitius*), Three Spined Stickleback (*Gasterosteus aculeatus),* Burbot *(Lota lota)*, Round Whitefish (*Prosopium cylindraceum*), Humpback Whitefish (*Coregonus pidschian*), Longnose Sucker (*Catostomus catostomus*), Dolly Varden (*Salvelinus malma*), Slimy Sculpin (*Cottus cognatus*), and Pacific Lamprey (*Entosphenus tridentatus*). Northern Pike is the only known invasive fish in Alexander Creek Watershed in both the creek and lake and is currently under active mechanical suppression efforts by ADF&G (Dunker and Rutz 2015).

In acute toxicity studies for fluridone, Chinook Salmon had a no observed effect concentration (NOEC) of 0.43 mg/L (430 ppb), 44 times less than the proposed fluridone concentrations. During 96-hour acute toxicity tests, the Flathead minnows (*Pimephales promelas)* had a 96 hour LC50 of 6.5 mg/L (6,500 ppb) (SePro 2017c); LC50 values for other fish range from 0.75-23.8 ppm, 75 and 238 times the proposed project fluridone concentrations (3 - 10 ppb) (Table 1).

The NOEC for arguably the most culturally important and sensitive species, the Chinook Salmon, is 44 times greater than the proposed highest concentration of Fluridone for this project. Based on the orders of magnitude differences between toxicity endpoints and the proposed project ambient water concentrations, it is unlikely that the proposed fluridone application would pose a threat to fish species in the Alexander Creek Watershed.

Diquat is not expected to pose direct impacts to fish species in the Alexander Creek Watershed. Rainbow Trout 96-hour LC50 was 14.83ppm; and the 34-day chronic toxicity LOEC on the Flathead minnow was 1.5ppm (SePro 2017a). A literature review summarized in Table 2 from Johnson et al. 2006 describe the LC50 values for diquat on a range of fish species. The proposed action minimizes the time that diquat is active in the water column before it permanently binds to sediment and becomes biologically inactive. In diquat dissipation studies conducted in Florida ponds, the half-life in the water column was 1-2 days, after which diquat bound permanently to sediment in the water column and in the benthic zone (USEPA, 1995). Although the water temperatures in Alaska are generally lower than those in this study, the chemical processes of diquat binding to sediments are not expected to be significantly impacted (slowed down) and therefore lengthen exposure to chronic levels as diquat is completely adsorbed at both 0 and 50 degrees Celsius (Harris and Warren 1964). This characteristic leads to the conclusion that at the proposed application rate of up to 2 gallons of Littora/acre once a year, fish species will be unaffected by the herbicide.

However, there is potential for indirect effects of adding diquat to dense mats of Elodea. The indirect effect of a sudden die off of plant matter can produce a decrease in dissolved oxygen due to decomposition of large amounts of biomass. A sudden and sharp decrease in dissolved oxygen can suffocate fish. This effect is expected to be fleeting because diquat will be added only once a year, at a time of minimum plant growth (right after ice-out), and because diquat is intended to be used in only the early stages of the project. For areas where a loss of dissolved oxygen is a concern, the label suggests that diquat be added to half of the waterbody at a time with a 14 day period in between treatments. This action must be followed in full lake treatments where the plants have grown to the water's surface or when the treatment would result in significant reductions in total plant biomass. In applications of diquat in California, no fish kills have been observed when controlling dense mats of *Egeria densa* with diquat, an aquatic invasive plant, and the decrease in this plant has only worked to improve habitat for native fish species (Johnson et al. 2006). When this description fits the treatment areas within the Alexander Creek Watershed, this stipulation will be followed to minimize the risk of fish mortality due to a potential lethal drop in dissolved oxygen.

Concerns about a loss of dissolved oxygen is lessened in the current infestation in Alexander Lake as ADFG has determined that Alexander Lake does not contain a substantial population of resident fish due years of predation by invasive Northern Pike. Through their suppression efforts, however, Chinook Salmon returns are beginning to improve with more juvenile salmon present annually. These and other anadromous or freshwater species that reside in the creeks would be unlikely to be impacted by a loss of dissolved oxygen as oxygen would be replenished quickly in a flowing system. If Elodea is ever to be found in very slow moving sloughs where a loss of dissolved oxygen would be of concern, the waterbody would be treated similar to a lake where only half of the section would be treated at a time, as the label prescribes.

Bioaccumulation is an increase in the concentration of a chemical in a biological organism over time compared to the chemical's concentration in the environment while biomagnification is the process of chemical buildup in an organism from prey consumption (Johnson et al., 2006). Diquat has been determined to have no potential for bioaccumulation or biomagnification because diquat is highly soluble in water and is rapidly excreted by fish and other animals (Johnson et al. 2006). No accumulation of fluridone residues were detected in Chinook salmon smolt tissue after exposure to 50 ppb over 2, 4, 8, 24, 96, and 120 hour exposures (USDA and CDBW, 2012; ADNR, 2017). Bioaccumulation, however, was detected in fish and plants exposed to high concentrations of fluridone, but the chemical dissipated from the organisms once the chemical left the water column (Johnson et al., 2006).

Egeria densa Control Program
Acute Response of Various Fish to Varying Concentrations of Fluridone

Species	LC50 * Value (ppm)	Comments	Reference
Rainbow trout	11.7	96-hour test	USEPA, 1986
Rainbow trout	10.4 +/-3.9	96-hour test	Hamelink and others, 1986
Bluegill	12.0	96-hour test	USEPA, 1986
Bluegill	10.4 +/-3.9	96-hour test	Hamelink and others, 1986
Fathead minnow	10.4 +/-3.9	96-hour test	Hamelink and others, 1986
Sheepshead minnow	10.4 +/-3.9	96-hour test	Hamelink and others, 1986
Channel catfish	10.4 +/-3.9	96-hour test	Hamelink and others, 1986
Bluegill	2	NOEC	In Habig, 2004
Rainbow trout	4.2	96-hour test	In Habig, 2004
Fathead minnow	22	96-hour test	In Habig, 2004
Channel catfish	8.2	96-hour test	In Habig, 2004
Sheepshead minnow	10.7	96-hour test	In Habig, 2004
Sheepshead minnow	3.1	NOEC	In Habig, 2004
Chinook smolts	**>5.76**	**96-hour test**	**In Habig, 2004**
Chinook smolts	**0.725**	**NOEC**	**In Habig, 2004**
Delta smelt, larval	6.1	96-hour test	DBW, 2003
Delta smelt, larval	1.28	NOEC	DBW, 2003
Sacramento splittail, larval	4.8	96-hour test	DFG-ATL, 2003
Sacramento splittail, larval	1.3	96-hour NOEC	DFG-ATL, 2003
Sacramento splittail, larval	2.8	96-hour LOEC	DFG-ATL, 2003
Sacramento splittail, juvenile	23.8	96-hour test	DBW, 2003
Sacramento splittail, juvenile	19.3	NOEC	DBW, 2003
Fathead minnow, larval	6.2	96-hour test	DBW, 2003
Fathead minnow, larval	1.88	NOEC	DBW, 2003
Summary Range (ppm)	0.725 – 23.8		

Table 1. LC 50 values of fluridone on various fish species from Johnson et al. 2006, the Egeria densa Control Program Second Addendum to 2001 Environmental Impact Report, prepared by the State of California.

Egeria densa Control Program
Acute Response of Various Fish Species to Diquat Concentration

Species	LC50 * Value (ppm)	Comments	Reference
Chinook salmon	**28.5**	**8-hour test**	**Pimentel, 1971**
Rainbow trout	12.3	8-hour test	Pimentel ,1971
Northern pike	16	96-hour test	Johnson and Finley, 1980
Fingerling trout	20.4	96-hour test	Johnson and Finley, 1980
Bluegill	245	96-hour test	Johnson and Finley, 1980
Bluegill	35	96-hour test	Gilderhus, 1967
Yellow perch	60	96-hour test	Johnson and Finley, 1980
Black bullhead	170	96-hour test	Johnson and Finley, 1980
Larval walleye, largemouth bass, smallmouth bass	0.74 to 4.9	96-hour test	Paul and others, 1994
Largemouth bass	7.8	96-hour test	Surber and Pickering, 1962
Mosquito fish	298	96-hour test	Gilderhus, 1967
Fathead minnow, larval	1.4	96-hourtest	CDFG ATL, 2002
Fathead minnow, larval	1.1	NOEC	CDFG ATL, 2002
Delta smelt, larval	1.1	96-hour test	CDFG ATL, 2002
Delta smelt, larval	0.82	NOEC	CDFG ATL, 2002
Sacramento splittail, larval	3.7	96-hour test	Riley and Finlayson, 2004
Sacramento splittail, larval	2.3	96-hour NOEC	DFG-ATL, 2003
Sacramento splittail, larval	4.6	96-hour LOEC	DFG-ATL, 2003
Fathead minnow, larval	0.43	96-hour test	Riley and Finlayson, 2004
Fathead minnow, larval	0.40	7-day LC50	Riley and Finlayson, 2004
American eel	43	96-hour test	Pesticide Action Network, 2006
Goldfish	92	96-hour test	Pesticide Action Network, 2006
Sheepshead minnow	228	96-hour test	Pesticide Action Network, 2006
Striped bass	33	96-hour test	Pesticide Action Network, 2006
Emerald shiner	26	96-hour test	Pesticide Action Network, 2006
Fathead minnow, adult	35	96-hour test	Pesticide Action Network, 2006
Summary Range (ppm)	0.40 – 298		

Table 2. LC 50 values of diquat on various fish species from Johnson et al. 2006, the Egeria densa Control Program Second Addendum to 2001 Environmental Impact Report prepared by the State of California.

Comment 3.2.3h: There will be no effects to any threatened or endangered species. Cook Inlet Beluga whales are the only threatened or endangered species found in the Cook Inlet drainage but are not located in or near the Alexander Creek Watershed. Any herbicide potentially discharged from treated areas would be highly diluted and would be below detectable levels by the time it reached Cook Inlet.

3.3 Human Environment

3.3.1 Noise/Electrical Effects

Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Increase in existing noise levels?			**X**		**See comment 3.3.1a**
b. Exposure of people to severe or nuisance noise levels?			**X**		**See comment 3.3.1b**
c. Creation of electrostatic or electromagnetic effects that could be detrimental to human health or property?		**X**			
d. Interference with radio or television reception and operation?		**X**			

Comment 3.3.1a: The noise generated from this project would result from the use of outboard motors during application of the herbicides, and an increase in floatplane traffic on treated waterbodies. The noise generated from these activities would be short-term and minor.

Comment 3.3.1b: The greatest exposure to severe noise will be to the applicators who are operating the application boats and equipment. These individuals will use ear protection during the applications.

3.3.2 Land Use

Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Alteration or interference with the productivity or profitability of the existing land use area?			**X**		
b. Conflicted with a designated natural area or area of unusual scientific or educational importance?		**X**			

c. Conflict with any existing land use whose presence would constrain or potentially prohibit the proposed action?		**X**			
d. Adverse effects on the relocation of residences?		**X**			

Comment 3.3.2a
Hunting, fishing, and other subsistence activities within the Alexander Creek Watershed are of high importance to local landowners, the tribe, and business operators. Through preliminary public scoping by working directly with landowners near Elodea infested waters, it became evident that project's boat traffic and temporary access restrictions could potentially conflict with fall subsistence hunting activities. This effect will be easily minimized by timing treatments to avoid general season moose and waterfowl openings and by communicating directly with landowners prior to treatment activities to avoid overlap whenever possible.

3.3.3 Risk/Health Hazards

Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Risk of an explosion or release of hazardous substances (including, but not limited to oil, pesticides, chemicals, or radiation) in the event of an accident or other forms of disruption?			**X**		**See comment 3.3.3a**
b. Affect an existing emergency response or emergency evacuation plan or create a need for a new plan?		**X**			
c. Creation of any human health hazard or potential hazard?			**X**		**See comment 3.3.3a**
d. Will any chemical toxicants be used?			**X**		**See comment 3.3.3d**

Comment 3.3.3a: The primary risk of human exposure to hazardous substances (fluridone and diquat) from this project would be to the pesticide applicators. To minimize exposure risk, all

applicators would wear PPE as stipulated by the product labels. Fluridone and diquat applications would be supervised by an ADEC-certified pesticide applicator with an aquatic pesticide certification.

Diquat and fluridone will be transported, handled, applied, and stored according to the label specifications to minimize the possibility of human exposure or a spill. Accidental spills are a concern and a spill response plan has been developed, along with a general safety plan, for all aspects of the project.

Comment 3.3.3d: Although herbicides are widely used to control unwanted species, public concerns have been raised regarding health and human safety. Fluridone and diquat are EPA-registered herbicides that have 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 the herbicides when the lakes are being treated. Public notifications through news releases, signs, and ADNR personnel and task force partners in the project area should be adequate to keep any potential recreationists from being exposed to waters during the days of treatment.

3.3.4 Community Impact

Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Alteration of the location, distribution, density, or growth rate of the human population of the area?		**X**			
b. Alteration of the social structure of a community?		**X**			
c. Alteration of the level of distribution of employment or community or personal income?		**X**			
d. Changes in the industrial or commercial activity?		**X**			
e. Increased traffic hazards or effects on existing transportation facilities or patterns of movement of people and goods?		**X**			

3.3.5 Public Services/Taxes/Utilities

Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Will the proposed action have an effect upon or result in the need for new or altered governmental services in any of the following areas: fire or police protection, schools, parks/recreational facilities, roads or other public maintenance, water supply, sewer or septic systems, solid waste disposal, health, or other governmental services? If any, specify:		**X**			
b. Will the proposed action have an effect upon the local or state tax base and revenues?		**X**			
c. Will the proposed action result in need for new facilities or substantial alterations of any of the following utilities: electric power, natural gas, other fuel supply or distribution systems, or communications?		**X**			
d. Will the proposed action result in increased use of any energy source?		**X**			
e. Define projected revenue sources		**X**			
f. Define projected maintenance costs		**X**			

3.3.6 Aesthetics/Recreation

Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Alteration of any scenic vista or creation of an aesthetically offensive site or effect that is open to public view?		**X**			
b. Alteration of the aesthetic character of a community or neighborhood?			**X**		**See comment 3.3.6b**
c. Alteration of the quality or quantity of recreational/tourism opportunities and settings?			**X**		**See comment 3.3.6c**
d. Will any designated or proposed wild and science rivers, trails, or wilderness areas be impacted?		**X**			

Comment 3.3.6b: Landowners with property in the vicinity of treated areas will be notified of the days of treatment. Any alterations of the aesthetic character of the lake environments would be minor and limited to the days of treatments.

Comment 3.3.6c: Elodea removal will improve boating, floatplane operations, hunting, and angling quality within the Alexander Creek Watershed which could increase recreational use. The long-term benefits of eradicating this invasive plant population would outweigh any short-term, minor recreational impacts associated with the herbicide treatments.

3.3.7 Cultural/Historical Resources

Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Destruction or alteration of any site, structure, or object of prehistoric, or paleontological importance?		**X**			
b. Physical change that would affect unique cultural views?		**X**			
		X			

c. Effects on existing religious or sacred uses of a site or area?					
d. Will the project affect historic or cultural resources?		**X**			

3.3.8 Summary Evaluation of Significance

Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Have impacts that are individually limited, but cumulatively considerable? (A project or program may result in impacts on two or more separate resources which creates a significant effect when considered together or in total)		**X**			
b. Involved potential risks or adverse effects which are uncertain but extremely hazardous if they were to occur?				**X**	**See comment 3.3.8b**
c. Potentially conflict with the substantive requirements of any local, state, or federal law, regulation, standard, or formal plan?		**X**			
d. Establish a precedent or likelihood that future actions with significant environmental impacts will be proposed?		**X**			
e. Generate substantial debate or controversy about the nature of the impacts that would be created?	**X**		**X**		**See comment 3.3.8e**
f. Is the project expected to have organized opposition or generate substantial public controversy?			**X**		**See comment 3.3.8e,f**
g. List any federal or state permits required.					**See comment 3.3.8g**

Comment 3.3.8b: There is always some potential that a crisis or emergency could result from this project due to unforeseen accidents in a remote location. The site, safety, and storage plans will be developed to minimize the risk of a crisis or emergency occurring. The plans will be included in the Integrated Pest Management Plan to provide a structured and planned response should a crisis or emergency occur.

Comment 3.3.8e and 3.3.8f: In general, the use of herbicides can generate controversy. Outreach efforts by ADNR will help educate the public on the safe and effective use of fluridone and diquat, and the benefits of eradicating Elodea from the Alexander Creek watershed. Conversations with property owners and other stakeholders have helped this education effort and will continue throughout the course of the project. It is unknown if this project will have any significant opposition.

Comment 3.3.8g: The following permits and approvals are needed prior to the proposed treatment: ADEC: Alaska Pollution Discharge Elimination System (APDES) Permit and Pesticide Use Permit, and ADNR Division of Mining Land and Water Land Use Permit.

4.0 Consultation and Coordination

Following the public meeting(s) and notice for this Environmental Assessment, ADNR will incorporate public comments received and subsequent ADNR 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.

4.1 List of Preparers

Nicole Swenson: Tyonek Tribal Conservation District, Conservation Director

Jillian Jablonski: Tyonek Tribal Conservation District, Conservation Technician

Daniel Coleman: Alaska Department of Natural Resources, Division of Agriculture, Invasive Plant and Agricultural Pest Coordinator

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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.

SonarOne is a registered trademark of SePRO Corporation
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.

Sonar Genesis®

Aquatic Herbicide

SPECIMEN

SePRO

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 NY 120006

Active Ingredient

Fluridone: 1-methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl] -4(1*H*)-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 inside of 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 North Meridian Street, Suite 600 • Carmel, IN 46032, U.S.A.

EPA Reg. No. 67690-54
FPL20170208

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

Keep Out of Reach of Children
DANGER/PELIGRO

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 (nitrile or butyl; ≥ 14 mils) 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.

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 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 apply directly to tidal saltwater sites. 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 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.

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 this product 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 this product. It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture. **DO NOT** use this product 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

This product 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. It 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 this product in contact with the target plants for a minimum of 45 days. 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 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 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.

This product 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 for this product 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 this product's 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

- **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 this product through any type of irrigation system.
- **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 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 this product 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 this product 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, this product 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.**

Use Precautions

- **Irrigation:** Irrigation from area treated with this product may result in injury to the irrigated vegetation. Follow these precautions and inform those who irrigate from areas treated with this product 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 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	Assay required
Canals	7	14	Assay required
Lakes and Reservoirs††	7	14	Assay required
Dry or De-watered Canals†††	0	0	†††

† For purposes of this 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 this product 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 this product 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 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

This product's 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 this product. It is recommended to consult a SePRO Aquatic Specialist prior to application 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 *(Philaris 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 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 this product. 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.

This product may be applied or metered directly into the treated area or diluted with water prior to application. Add the specified amount of this product to water in the spray tank during the filling operation. Surface and subsurface application of the spray can be made with conventional spray equipment. This product 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. This product may also be directly metered into the pumping system where it is diluted with water.

Tank Mix Directions
This product 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. **It is the pesticide user's responsibility to ensure that all products in the listed mixtures are registered for the intended use. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.** 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 this product 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 this product to be applied to provide the desired ppb concentration of active ingredient in treated water may be calculated as follows:

Gallons of product 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 product 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

This product 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 Product 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 product 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, 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.

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 this product 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		
Average Water Depth of Treatment Site (feet)	Gallons of Product 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 product 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 product 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 this product, 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.

Partial Lake or Reservoir Treatments

Where dilution 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 product's 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 this product 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 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 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 product per surface acre per annual growth cycle. Apply product 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. This product 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 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 product per surface acre per annual growth cycle. Apply product 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% of this product by volume when application rate does not exceed 4 gallons of product 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 this product at the rate of 30 to 150 ppb. 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. 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 Containing a Functioning Potable Water Intake:
In treating a static or moving water canal which contains a functioning potable water intake, applications 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 are made within ¼ mile of a functioning potable water intake, a FasTEST analysis must be 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 product 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 of product 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
Non-refillable 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.
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.

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://seprolabels.com/terms* or scan the image below.

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

Sonar **A.S.**

Aquatic Herbicide

SPECIMEN

SePRO

An herbicide for management of aquatic vegetation in fresh water 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 AS, SLN NY 95-0002

Active Ingredient:
fluridone: 1-methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4(1*H*)-pyridinone 41.7%
Other Ingredients 58.3%
TOTAL 100.0%
Contains 4 pounds active ingredient per gallon.

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.)

Shake well before using.

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. 067690-4
FPL20150414

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

CAUTION. Harmful if swallowed, absorbed through skin, or inhaled. Avoid breathing of spray mist or contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

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 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.
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 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 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 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 Sonar A.S. 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.

SHAKE WELL BEFORE USING.

PRODUCT INFORMATION

Sonar A.S. herbicide is a selective systemic aquatic herbicide for management of aquatic vegetation in fresh water ponds, lakes, reservoirs, drainage canals and irrigation canals, including dry or de-watered areas of these sites. Sonar A.S. 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 A.S. 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 A.S. in treated water will reduce its effectiveness. In susceptible plants, Sonar A.S. inhibits the formation of carotene. In the absence of carotene, chlorophyll is rapidly degraded by sunlight. Herbicidal symptoms of Sonar A.S. 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 plant management is achieved with Sonar A.S. Species susceptibility to Sonar A.S. may vary depending on time of year, stage of growth, and water movement. For best results, apply Sonar A.S. 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 A.S. 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 an Enzyme-Linked Immunoassay (ELISA Test) for the determination of the active ingredient concentration in the water. Contact SePRO Corporation for the utilization of this test, known as a FasTEST, for the incorporation of this analysis in your treatment program. Other proven chemical analyses for the active ingredient may also be used. The chemical analysis, a 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 ounces or quarts of Sonar A.S. 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 and 150 ppb in lakes, reservoirs and static canals per annual growth cycle.** This maximum concentration is the amount of product calculated as the target application rate, NOT determined by testing the residues of the active ingredient in the treated water.

Product Use Precautions

- **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.
- **Chemigation:** Do not apply Sonar A.S. through any type of irrigation system.
- **Hydroponic Farming:** Do not use Sonar A.S. 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 A.S. treated water for irrigating greenhouse or nursery plants. Without site-specific guidance from SePRO, do not use Sonar A.S. 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 A.S. (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 A.S. within ¼ mile (1,320 feet) of a functioning potable water intake.

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

- **Potable Water Intakes:** In lakes and reservoirs or other sources of potable water, do not apply Sonar A.S. at application rates greater than 20 ppb within one-fourth mile (1,320 feet) of any functioning potable water intake. At application rates of 6 - 20 ppb, Sonar A.S. 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 A.S. treated area may result in injury to the irrigated vegetation. Follow these precautions and inform those who irrigate from areas treated with Sonar A.S. of the irrigation time frames or water assay 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 A.S. Greater potential for crop injury occurs where Sonar A.S. 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 A.S. 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 A.S. 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 A.S. is applied to exposed sediments of dry or de-watered canals, allow canals to refill for a minimum of 24 hours before using water for irrigation.

Where the use of Sonar A.S. treated water is desired for irrigating crops prior to the time frames established above, the use of a FasTEST assay is recommended to measure the concentration in the treated water. Where a FasTEST has determined that the 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 Sonar A.S. 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. It is recommended that an aquatic specialist be consulted prior to commencing irrigation of these sites.**

PLANT CONTROL INFORMATION

Sonar A.S. 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 A.S. Consult an aquatic specialist prior to application of Sonar A.S. to determine a plant's susceptibility to Sonar A.S.
NOTE: Algae (chara, nitella, and filamentous species) are not controlled by Sonar A.S.

Vascular Aquatic Plants Controlled by Sonar A.S.:

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)

Emersed Plants:
spatterdock (*Nuphar luteum*)
water-lily (*Nymphaea* spp.)

Floating Plants:
common duckweed (*Lemna minor*)

Shoreline Grasses:
paragrass (*Urochloa mutica*)

Vascular Aquatic Plants Partially Controlled by Sonar A.S.:

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

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*)
watershield (*Brasenia schreberi*)

Floating Plants:
common watermeal (*Wolffia columbiana*)†
salvinia (*Salvinia* spp.)

Shoreline Grasses:
barnyardgrass (*Echinochloa crusgalli*)
giant cutgrass (*Zizaniopsis miliacea*)
reed canarygrass (Philaris arundinaceae)
southern watergrass (*Hydrochloa caroliniensis*)
torpedograss (*Panicum repens*)

† Partial control only with Sonar A.S. applied at the maximum labeled rate.

Vascular Aquatic Plants Not Controlled by Sonar A.S.:

Emersed Plants:
American frogbit (*Limnobium spongia*)
arrowhead (*Sagittaria* spp.)
bacopa (Bacopa spp.)
big floatingheart, banana lily (*Nymphoides aquatica*)
bulrush (*Scirpus* spp.)
floating waterhyacinth (*Eichhornia crassipes*)
pickerelweed, lanceleaf (Pontederia spp.)
rush (*Juncus* spp.)
water pennywort (*Hydrocotyle umbellata*)

Floating Plants:
waterlettuce (*Pistia stratiotes*)

Shoreline Grasses:
maidencane (*Panicum hemitomon*)

MIXING AND APPLICATION DIRECTIONS

The aquatic plants present in the treatment site should be identified prior to application to determine their susceptibility to Sonar A.S. 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.

Shake Sonar A.S. well before using. Add the specified amount of Sonar A.S. to water in the spray tank during the filling operation. Agitate while filling and during spraying. Surface or subsurface application of the spray can be made with conventional spray equipment. Sonar A.S. can also be applied near the surface of the hydrosoil using weighted trailing hoses. A spray volume of 5 to 100 gallons per acre may be used. Sonar A.S. may also be diluted with water and the concentrated mix metered into the pumping system.

Tank Mix Directions
Sonar A.S. may be tank mixed with other aquatic herbicides and algaecides to enhance efficacy and plant selectivity. Refer to the companion herbicide or algaecide label for use directions, precautions, and restrictions on use.

Application to Ponds
Sonar A.S. 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. 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—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 must not exceed a total of 90 ppb per annual growth cycle.

Average Water Depth of Treatment Site (feet)	Quarts of Sonar A.S. per Treated Surface Acre to Achieve		Fluid Ounces of Sonar A.S. per Treated Surface Acre to Achieve	
	45 ppb	90 ppb	45 ppb	90 ppb
1	0.12	0.24	3.8	7.7
2	0.24	0.49	7.7	15.7
3	0.37	0.73	11.8	23.4
4	0.49	0.98	15.7	31.4
5	0.61	1.22	19.5	39.0
6	0.73	1.46	23.4	46.7
7	0.85	1.70	27.2	54.4
8	0.98	1.95	31.4	62.4
9	1.10	2.19	35.2	70.1
10	1.22	2.44	39.0	78.1

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 A.S. 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 A.S. 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—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 an 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. 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 A.S.				
Average Water Depth of Treatment Site (feet)	Quarts of Sonar A.S. per Treated Surface Acre to Achieve		Fluid Ounces of Sonar A.S. per Treated Surface Acre to Achieve	
	10 ppb	90 ppb	10 ppb	90 ppb
1	0.03	0.24	0.86	7.78
2	0.05	0.49	1.73	15.55
3	0.08	0.73	2.59	23.33
4	0.11	0.97	3.46	31.10
5	0.14	1.22	4.32	38.88
6	0.16	1.46	5.18	46.66
7	0.19	1.70	6.05	54.43
8	0.22	1.94	6.91	62.21
9	0.24	2.19	7.78	69.98
10	0.27	2.43	8.64	77.76
11	0.30	2.67	9.50	85.54
12	0.32	2.92	10.37	93.31
13	0.35	3.16	11.23	101.1
14	0.38	3.40	12.10	108.9
15	0.41	3.65	12.96	116.6
16	0.43	3.89	13.82	124.4
17	0.46	4.13	14.69	132.2
18	0.49	4.37	15.55	140.0
19	0.51	4.62	16.42	147.7
20	0.54	4.86	17.28	155.5

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. a FasTEST, add additional Sonar A.S. to maintain this lower dose for the sufficient time to ensure efficacy and enhance selectivity. Water may be treated at an initial application 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, SePRO recommends contacting an aquatic specialist in determining when to choose application rates lower in the rate range to meet specific plant management goals. When utilizing split or multiple applications of Sonar A.S., the utilization of a 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 A.S. 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 A.S. 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 A.S. 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 A.S. 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 A.S. 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 A.S. to be applied to provide the desired ppb concentration of active ingredient in treated water may be calculated as follows:

Quarts of Sonar A.S. required per treated surface acre =
Average water depth of treatment site (feet) **x**
Desired ppb concentration of active ingredient **x** 0.0027

For example, the quarts per acre of Sonar A.S. 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** 0.0027 = 0.33 quarts per treated surface acre

When measuring quantities of Sonar A.S., quarts may be converted to fluid ounces by multiplying quarts to be measured **x** 32. For example, 0.33 quarts **x** 32 = 10.5 fluid ounces.

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

Application to Sediments of Dry or De-Watered Aquatic Sites

For application of Sonar A.S. 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 2 quarts of Sonar A.S. per surface acre per annual growth cycle. Apply Sonar A.S. 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 A.S. may be applied with other aquatic herbicides labeled for this use. Please contact your SePRO Aquatic Specialist for further use recommendations.

Application to Drainage Canals and Irrigation Canals

Static Canals:
In static drainage and irrigation canals, apply Sonar A.S. 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:
The performance of Sonar A.S. will be enhanced by restricting or reducing water flow. In slow moving bodies of water use an application technique that maintains a concentration of 15 - 40 ppb in the target area for a minimum of 45 days. Sonar A.S. 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 A.S. 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 A.S. are made within ¼ mile of a functioning potable water intake, a FasTEST 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 A.S. 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.) **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** 0.0027 = Quarts of Sonar A.S. 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, 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.
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.

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 U.S.A.

Sonar® PR

Precision Release

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 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 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.

EPA Reg. No. 67690-12

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Sonar is a registered trademark of SePRO Corporation

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

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION. Harmful If Swallowed, Absorbed Through Skin, or If Inhaled. Avoid breathing of dust or contact with skin, eyes or clothing. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

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 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.
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 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 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

Follow use directions carefully so as to minimize adverse effects on non-target organisms. Trees and shrubs growing in water treated with Sonar PR may occasionally develop chlorosis. 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.

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 PR.

PRODUCT INFORMATION

Sonar PR 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. This product 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, Sonar PR inhibits the formation of carotene. In the absence of carotene, chlorophyll is rapidly degraded by sunlight. Herbicidal symptoms of this product 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 this product. 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.

Sonar PR 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 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 PR 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 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 PR 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 Applications with Sonar PR (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 PR 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 PR 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 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 Sonar PR treated water may result in injury to the irrigated vegetation. Follow these precautions and inform those who irrigate from areas treated with this product 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 this product. Greater potential for crop injury occurs where 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 PR 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 PR 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. **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 concentration 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

Sonar PR 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 to determine a plant's susceptibility to this product.

Vascular Aquatic Plants Controlled by Sonar PR[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)

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 PR use rates (not to exceed maximum labeled rates) when selective control of exotic species is desired.

Vascular Aquatic Plants Partially Controlled by Sonar PR

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 PR

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 PR

APPLICATION DIRECTIONS

The aquatic plants present in the treatment site should be identified prior to application to determine their susceptibility to Sonar PR. 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 PR 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 PR 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, Sonar PR 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 PR at an application rate 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 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 an 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 PR 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

continued

Average Water Depth of Treatment Site (feet)	Pounds of Sonar PR per Treated Surface Acre	
	16 ppb	90 ppb
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 to 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 an 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 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 PR 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 product's 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 PR at application rates from 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 PR 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 PR to be applied to provide the desired ppb concentration of active ingredient equivalents in treated water may be calculated as follows:

Pounds of Sonar PR 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 Sonar PR 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 Sonar PR at the rate of 20 to 40 pounds per surface acre.

Moving Water Canals and Rivers:
The performance of Sonar PR 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 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 Sonar PR 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 Sonar PR 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** 0.054 = pounds Sonar PR 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.

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

Sonar® H4C

Aquatic Herbicide

SPECIMEN

SePRO

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 lbs. 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 statements 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 *Warranty Disclaimer* and *Misuse* statements inside label booklet. If terms are unacceptable, return at once unopened.**

EPA Reg. No. 67690-61 FPL20170113

Sonar is a registered trademark of SePRO Corporation.

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

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

Keep Out of Reach of Children

CAUTION/PRECAUCIÓN

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.

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 this product 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 this product.

PRODUCT INFORMATION

This product 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. This product 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. This product 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 this product 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 this product. 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.

This product 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 product 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 this product 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:

- ◦ A FasTEST has been run and the concentration in water at the intake is less than 1 ppb; or
- ◦ 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:
  - ◦ For the irrigation of woody ornamental plants, a FasTEST has been run and the concentration at the intake is less than 5 ppb; or
  - ◦ For the irrigation of other greenhouse or nursery plants, the concentration is confirmed less than 1 ppb; or
  - ◦ 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 (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 up to 20 ppb, this product 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 water treated with this product if concentrations are greater than 5 ppb. It is recommended that a SePRO Aquatic Specialist be consulted prior to commencing irrigation of these sites.

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.

Use Precautions

- **Irrigation:** Irrigation with water treated with this product may result in injury to the irrigated vegetation. Follow these precautions and inform those who irrigate from areas treated with this product of the irrigation time frames or FasTEST requirements presented in the table below. Follow these time frames and FasTEST recommendations to reduce the potential for injury to vegetation irrigated with water treated with this product. Greater potential for crop injury occurs where water treated with this product 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 this product's 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 water treated with this product 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

This product's 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 it.

Vascular Aquatic Plants Controlled:[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 appropriate use rates (not to exceed maximum labeled rates) when selective control of exotic species is desired.

Vascular Aquatic Plants Partially Controlled:

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:

Emersed Plants:
American frogsbit (*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 this product.

APPLICATION DIRECTIONS

The aquatic plants present in the treatment site should be identified prior to application to determine their susceptibility to this product. 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

This product 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 product 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, 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 this product 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 product 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 this product 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 this product's 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 this product at 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 this product 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 product to be applied to provide the desired ppb concentration of active ingredient in treated water may be calculated as follows:

Pounds of product 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 product 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.

C. Application to Drainage Canals, Irrigation Canals and Rivers

Static Canals:
In static drainage and irrigation canals, apply this product at typical use rates of 37 to 74 pounds per surface acre. The maximum application rate or sum of all application rates cannot exceed 150 ppb per annual growth cycle.

Moving Water Canals and Rivers:

This product's performance 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. 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 this product 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 this product 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 product 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 Container. DO NOT reuse or refill this container. Completely empty container into application equipment, then offer for recycling if available or dispose of empty container in a sanitary landfill or by incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

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.

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FPL20170113

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

SAFETY DATA SHEET

SonarOne® Aquatic Herbicide

Section 1. Identification

GHS product identifier : SonarOne® Aquatic Herbicide

Other means of identification : Not available.

EPA Registration No. : 67690-45

Relevant identified uses of the substance or mixture

Aquatic herbicide.

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

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

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

Section 2. Hazards identification

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

Classification of the substance or mixture : 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

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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.

SAFETY DATA SHEET

Sonar® Genesis

SonarOne® 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.

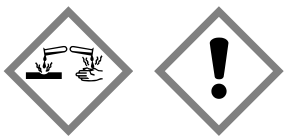
Section 2. Hazards identification

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 4
SKIN IRRITATION - Category 2
SERIOUS EYE DAMAGE - Category 1
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
AQUATIC HAZARD (ACUTE) - Category 2
AQUATIC HAZARD (LONG-TERM) - Category 3

GHS label elements

Hazard pictograms :



Signal word : Danger

Section 2. Hazards identification

Hazard statements : H332 - Harmful if inhaled.
H318 - Causes serious eye damage.
H315 - Causes skin irritation.
H335 - May cause respiratory irritation.
H401 - Toxic to aquatic life.
H412 - Harmful to aquatic life with long lasting effects.

Precautionary statements

Prevention : P280 - Wear protective gloves. Wear eye or face protection.
P271 - Use only outdoors or in a well-ventilated area.
P273 - Avoid accidental release to the environment.
P261 - Avoid breathing vapor.
P264 - Wash hands thoroughly after handling.

Response : P304 + P340 + P312 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell.
P302 + P352 + P362+P364 - IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse.
P332 + P313 - If skin irritation occurs: Get medical attention.
P305 + P351 + P338 + P310 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.

Storage : P405 - Store locked up.

Disposal : P501 - 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.

Ingredient name	%	CAS number
Proprietary ingredient 1	30 - 40	-
Proprietary ingredient 2	40 - 50	-
Proprietary ingredient 3	40 - 50	-
Proprietary ingredient 4	5 - 10	-
Fluridone	6.3	59756-60-4
Proprietary ingredient 5	1 - 10	-
Proprietary ingredient 6	1 - 10	-
Proprietary ingredient 7	0.1 - 1	-
Proprietary ingredient 8	0.1 - 1	-

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

There are no 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 : Get medical attention immediately. Call a poison center or physician. 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. Chemical burns must be treated promptly by a physician.

Inhalation : Get medical attention immediately. Call a poison center or physician. 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. 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 : Get medical attention immediately. Call a poison center or physician. Flush contaminated skin with plenty of water. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 20 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Get medical attention immediately. Call a poison center or physician. 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. Chemical burns must be treated promptly by a physician. 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 damage.

Inhalation : Harmful if inhaled. May cause respiratory irritation.

Skin contact : Causes skin irritation.

Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
pain
watering
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Skin contact : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

Section 4. First aid measures

Ingestion : Adverse symptoms may include the following:
stomach pains

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. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

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 : In a fire or if heated, a pressure increase will occur and the container may burst. This material is toxic to aquatic life. 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. 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".

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 get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Avoid accidental 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. 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
Proprietary ingredient 1	**AIHA WEEL (United States, 10/2011).** TWA: 10 mg/m³ 8 hours.
Proprietary ingredient 2	None.
Proprietary ingredient 3	None.
Fluridone	None.
Proprietary ingredient 5	None.
Proprietary ingredient 6	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.

Section 8. Exposure controls/personal protection

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 and/ or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

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 : 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)

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Section 9. Physical and chemical properties

Vapor density : Not available.

Relative density : 0.97

Solubility : Not available.

Solubility in water : Dispersible in water.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

Viscosity : Kinematic (room temperature): 0.303 cm^2/s (30.3 cSt)

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
Sonar® Genesis	LC50 Inhalation Dusts and mists 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	- -	60 minutes 24 hours

There is no data available.

Sensitization

Product/ingredient name	Route of exposure	Species	Result
Sonar® Genesis	skin	Guinea pig	Not sensitizing

Section 11. Toxicological information

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.

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)

Name	Category	Route of exposure	Target organs
Proprietary ingredient 3 Proprietary ingredient 6	Category 3 Category 3	Not applicable. Not applicable.	Respiratory tract irritation Respiratory tract irritation

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 serious eye damage.

Inhalation : Harmful if inhaled. May cause respiratory irritation.

Skin contact : Causes skin irritation.

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
watering
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Skin contact : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

Ingestion : Adverse symptoms may include the following:
stomach pains

Section 11. Toxicological information

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

Route	ATE value
Inhalation (vapors)	1100 mg/L

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Proprietary ingredient 1	Acute EC50 >110 mg/L Fresh water	Daphnia - *Daphnia magna*	48 hours
	Acute LC50 1020 mg/L Fresh water	Crustaceans - *Ceriodaphnia dubia*	48 hours
	Acute LC50 710 mg/L Fresh water	Fish - *Pimephales promelas*	96 hours
Proprietary ingredient 3	Acute EC50 5 mg/L Fresh water	Algae - *Pseudokirchneriella subcapitata*	72 hours
	Acute LC50 21 mg/L Fresh water	Fish - *Oncorhynchus mykiss*	96 hours
Fluridone	EC50 3 mg/L	Daphnia - *Daphnia magna*	48 hours
	LC50 8 mg/L	Crustaceans - *Eucyclops sp.*	48 hours
	LC50 >5.2 mg/L	Fish - *Cyprinodon variegatus*	96 hours
	LC50 >6.5 mg/L	Fish - *Pimephales promelas*	96 hours
	Chronic NOEC 0.84 mg/L	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
Proprietary ingredient 1	-1.07	-	low
Proprietary ingredient 3	3.44	-	low
Fluridone	3.16	-	low
Proprietary ingredient 6	2.9	25.33	low

Section 12. Ecological information

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) PAIR**: Proprietary ingredient 8

TSCA 8(a) CDR Exempt/Partial exemption: Not determined

United States inventory (TSCA 8b): All components are listed or exempted.

Commerce control list precursor: Proprietary ingredient 7

Section 15. Regulatory information

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
Proprietary ingredient 2	No.	No.	No.	Yes.	No.
Proprietary ingredient 3	No.	No.	No.	Yes.	No.
Fluridone	No.	No.	No.	Yes.	No.
Proprietary ingredient 4	No.	No.	No.	Yes.	No.
Proprietary ingredient 5	Yes.	No.	No.	Yes.	No.

SARA 313

There is no data available.

State regulations

Massachusetts : The following components are listed: Proprietary ingredient 6

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 6

California Prop. 65

No products were found.

Section 16. Other information

Procedure used to derive the classification

Classification	Justification
ACUTE TOXICITY (inhalation) - Category 4	On basis of test data
SKIN IRRITATION - Category 2	Calculation method
SERIOUS EYE DAMAGE - Category 1	On basis of test data
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3	Calculation method
AQUATIC HAZARD (ACUTE) - Category 2	Calculation method
AQUATIC HAZARD (LONG-TERM) - Category 3	Calculation method

History

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Version : 3

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.

SAFETY DATA SHEET

Sonar® A.S. Aquatic Herbicide

Section 1. Identification

GHS product identifier : Sonar® A.S. Aquatic Herbicide

Other means of identification : Not available.

EPA Registration No. : 67690-4

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 2
AQUATIC HAZARD (LONG-TERM) - Category 2

GHS label elements

Hazard pictograms :

Signal word : Warning

Hazard statements : H320 - Causes eye irritation.
H411 - Toxic to aquatic life with long lasting effects.

Precautionary statements

Prevention : P271 - Use only outdoors or in a well-ventilated area.
P273 - Avoid accidental release to the environment.
P261 - Avoid breathing vapor.

Section 2. Hazards identification

Response : P391 - Collect spillage.
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.

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 1	40 - 60	-
Fluridone	42	59756-60-4
Proprietary ingredient 3	10 - 20	-
Proprietary ingredient 2	1 - 5	-
Proprietary ingredient 5	0.1 - 1	-
Proprietary ingredient 6	0.1 - 1	-
Proprietary ingredient 4	0.01 - 0.1	-

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.

Section 4. First aid measures

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

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 : In a fire or if heated, a pressure increase will occur and the container may burst. This material is toxic 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. 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".

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. Collect spillage.

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. 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.
Proprietary ingredient 1	**AIHA WEEL (United States, 10/2011).** TWA: 10 mg/m³ 8 hours.
Proprietary ingredient 2	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.

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 : Liquid. [Opaque.]

Color : Off-white to tannish-gray.

Odor : Faint sweetness.

Odor threshold : Not available.

pH : 5.6 to 7.6

Section 9. Physical and chemical properties

Melting point	:	Not available.
Boiling point	:	100°C (212°F)
Flash point	:	Closed cup: >93.3°C (>199.9°F)
Evaporation rate	:	Not available.
Flammability (solid, gas)	:	Not available.
Lower and upper explosive (flammable) limits	:	Not available.
Vapor pressure	:	0.31 kPa (2.3 mm Hg) [room temperature]
Vapor density	:	Not available.
Relative density	:	1.15
Solubility	:	Easily soluble in the following materials: cold water and hot water.
Solubility in water	:	Soluble in water.
Partition coefficient: n-octanol/water	:	Not available.
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
Sonar® A.S. Aquatic Herbicide	LC50 Inhalation Dusts and mists LD50 Dermal LD50 Oral	Rat Rabbit Rat	>10.4 mg/L >4000 mg/kg >2000 mg/kg	4 hours - -

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Sonar® A.S. Aquatic Herbicide	Eyes - Mild irritant	Rabbit	-	-	-

Section 11. Toxicological information

Skin : Not irritating.

Eyes : Not available.

Sensitization

Product/ingredient name	Route of exposure	Species	Result
Sonar® A.S. 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.

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

Section 11. Toxicological information

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	EC50 3 mg/L	Daphnia - Daphnia magna	48 hours
	LC50 8 mg/L	Crustaceans - Eucyclops sp.	48 hours
	LC50 >5.2 mg/L	Fish - Cyprinodon variegatus	96 hours
	LC50 >6.5 mg/L	Fish - Pimephales promelas	96 hours
	Chronic NOEC 0.84 mg/L	Daphnia - Daphnia magna	21 days
	Chronic NOEC 0.43 mg/L	Fish - Oncorhynchus tshawytscha	75 days
Proprietary ingredient 3	Acute EC50 >110 mg/L Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 1020 mg/L Fresh water	Crustaceans - Ceriodaphnia dubia	48 hours
	Acute LC50 710 mg/L Fresh water	Fish - Pimephales promelas	96 hours
Proprietary ingredient 4	Acute EC50 97 ppb Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 10 to 20 mg/L Fresh water	Crustaceans - Ceriodaphnia dubia	48 hours
	Acute LC50 167 ppb Fresh water	Fish - Oncorhynchus mykiss	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 3	-1.07	-	low

Mobility in soil

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

Section 12. Ecological information

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	UN3082	UN3082	UN3082
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fluridone)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fluridone). Marine pollutant (Fluridone)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Fluridone)
Transport hazard class(es)	9 	9 	9 
Packing group	-	-	-
Environmental hazards	Yes.	Yes.	Yes.

AERG : 171

Additional information

DOT Classification : Non-bulk packages of this product are not regulated as hazardous materials unless transported by inland waterway. This product is not regulated as a hazardous material when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of §§ 173.24 and 173.24a.

IMDG : This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.

IATA : This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 5.0.2.4.1, 5.0.2.6.1.1 and 5.0.2.8.

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

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.
Proprietary ingredient 2	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

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

Health : 2 **Flammability :** 1 **Instability :** 0

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Section 16. Other information

Procedure used to derive the classification

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

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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.

SAFETY DATA SHEET

Sonar® PR Aquatic Herbicide

Section 1. Identification

GHS product identifier : Sonar® PR Aquatic Herbicide

Other means of identification : Not available.

EPA Registration No. : 67690-12

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
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
AQUATIC HAZARD (ACUTE) - Category 3
AQUATIC HAZARD (LONG-TERM) - Category 3

GHS label elements

Hazard pictograms :

Signal word : Warning

Hazard statements : H320 - Causes eye irritation.
H335 - May cause respiratory irritation.
H412 - Harmful to aquatic life with long lasting effects.

Section 2. Hazards identification

Precautionary statements

Prevention : P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P280 - Wear protective gloves. Wear eye or face protection. Wear protective clothing.
P273 - Avoid accidental release to the environment.
P264 - Wash hands thoroughly after handling.

Response : P304 + P340 + P312 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell.
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 : P405 - Store locked up.

Disposal : P501 - 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.

Ingredient name	%	CAS number
Proprietary ingredient3	60 - 90	-
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 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.

Skin contact : Flush contaminated skin with plenty of water. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Section 4. First aid measures

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 : May cause respiratory irritation.

Skin contact : No known significant effects or critical hazards.

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 : Adverse symptoms may include the following:
respiratory tract irritation
coughing

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. 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.

Section 5. Fire-fighting measures

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 : 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.

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. Collect spillage.

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.

Section 7. Handling and storage

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. 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
Proprietary ingredient 3 Fluridone	None. None.

Appropriate engineering controls : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, 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.

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. [Dark]
Odor	:	Faint earthy/musty.
Odor threshold	:	Not available.
pH	:	4.45 [Conc. (% w/w): 50%]
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	:	0.64 to 1.3
Solubility	:	Insoluble; pellets disintegrates in water.
Solubility in water	:	Insoluble; pellets disintegrates in water.
Partition coefficient: n-octanol/water	:	Not available.
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
Sonar® PR Aquatic Herbicide	LD50 Dermal LD50 Oral	Rabbit Rat	>2000 mg/kg >5000 mg/kg	- -

Irritation/Corrosion

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

There is no data available.

Sensitization

Product/ingredient name	Route of exposure	Species	Result
Sonar® PR 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.

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)

Name	Category	Route of exposure	Target organs
Proprietary ingredient 3	Category 3	Not applicable.	Respiratory tract irritation

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 : May cause respiratory irritation.

Skin contact : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Section 11. Toxicological information

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

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
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.

Section 12. Ecological information

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): Not determined.

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	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 : None of the components are listed.

Pennsylvania : None of the components are listed.

California Prop. 65

No products were found.

Section 16. Other information

Procedure used to derive the classification

Classification	Justification
EYE IRRITATION - Category 2B	On basis of test data
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3	Calculation method
AQUATIC HAZARD (ACUTE) - Category 3	Calculation method
AQUATIC HAZARD (LONG-TERM) - Category 3	Calculation method

Section 16. Other information

History

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

Date of previous issue : 07/15/2015

Version : 5

Prepared by : KMK Regulatory Services Inc.

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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 : 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	70 - 90	-
Proprietary ingredient 1	5 - 10	-
Fluridone	2.7	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 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

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 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. 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.

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 : 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.

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.

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.

Solubility in water : Soluble.

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 : None.

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	Eyes - Mild irritant	Rabbit	-	-	-

Sensitization

Product/ingredient name	Route of exposure	Species	Result
Sonar® H4C	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.

Neurotoxicity

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

Section 11. Toxicological information

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.

Numerical measures of toxicity

Acute toxicity estimates

Section 11. Toxicological information

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

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

Composition/information on ingredients

Section 15. Regulatory information

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

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.

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

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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.

Appendix 6.3: Littora Label

Littora®

Landscape and Aquatic Herbicide

SPECIMEN

SePRO

For use as a general herbicide to control weeds in commercial greenhouses and nurseries; ornamental seed crops*; landscape, industrial, recreational, commercial, residential, and public areas; turf renovation; dormant established turfgrass; and aquatic areas.

Active Ingredient

Diquat dibromide [6,7-dihydrodipyrido(1,2-a:2',1'-c)pyrazinediium dibromide] 37.3%
Other Ingredients 62.7%
TOTAL 100.0%

Contains 2 pounds diquat cation per one (1) U.S. gallon (3.73 pounds diquat dibromide per gallon).

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.)

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*. If terms are unacceptable, return at once unopened.**

*except in the state of California
Littora is a registered trademark of SePRO Corporation
Manufactured for: **SePRO Corporation**
11550 North Meridian Street, Suite 600
Carmel, IN 46032, U.S.A.

EPA Reg. No. 67690-53
FPL20151006

PRECAUTIONARY STATEMENTS

Hazards to Humans and Domestic Animals

KEEP OUT OF REACH OF CHILDREN

CAUTION / PRECAUCIÓN

Harmful if inhaled. Harmful if swallowed. Causes moderate eye irritation. Avoid breathing spray mist and contact with eyes or clothing.

FIRST AID	
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 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 the poison control center or doctor. • Do not give anything to an unconscious person.
If in eyes	• Hold eye open and rinse slowly and gently with water for 15 - 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.
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**.	

Note to Physicians: To be effective, treatment for diquat poisoning must begin **IMMEDIATELY**. Treatment consists of binding diquat in the gut with suspensions of activated charcoal or bentonite clay, administration of cathartics to enhance elimination, and removal of diquat from the blood by charcoal hemoperfusion or continuous hemodialysis.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Some materials that are chemical-resistant to this product are: barrier laminate, butyl rubber ≥14 mils, nitrile rubber ≥14 mils.

Mixers, Loaders, Applicators and Other Handlers Must Wear:

- Coveralls over long-sleeved shirt and long pants;
- Chemical-resistant gloves;
- Chemical-resistant footwear plus socks;
- Protective eyewear;
- Chemical-resistant headgear for overhead exposure;
- Chemical-resistant apron when cleaning equipment, mixing, or loading; and
- Face shield when mixing or loading.

Exception: After this product has been diluted to 0.50% or less in water (i.e., the labeled rate for some spot applications), applicators for *AQUATIC SURFACE APPLICATIONS* must, at a minimum, wear (Note: Mixers and loaders for this application method must still wear the PPE as described in the above section.):

- Long-sleeved shirt and long pants;
- Shoes plus socks;
- Waterproof gloves; and
- Protective eyewear.

Exception: At a minimum, applicators for *AQUATIC SUBSURFACE APPLICATIONS* must wear (Note: Mixers and loaders for this application method must still wear the PPE as described in the above section.):

- Short-sleeved shirt and short pants;
- Waterproof gloves; and
- Chemical-resistant footwear plus socks.

USER SAFETY REQUIREMENT

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them. Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

ENGINEERING CONTROLS

Mixers and loaders supporting aerial applications are required to use closed systems that provide dermal protection. The closed system must be used in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4)]. When using the closed system, mixers and loaders' PPE requirements may be reduced or modified as specified in the WPS.

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

USER SAFETY RECOMMENDATIONS

Users should:

- 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

This pesticide is toxic to aquatic invertebrates. **For Terrestrial Uses** do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment wash waters. **For Aquatic Uses** do not apply directly to water except as specified on this label.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling. Read the entire label. Use strictly in accordance with precautionary statements and directions for use, and with applicable state and federal regulations.

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. Do not apply this product through any type of irrigation system. Do not use this product for reformulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard (WPS), 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the WPS.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 24 hours.

PPE required for early entry to treated areas that is permitted under the WPS and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls over long-sleeve shirt and long pants;
- Chemical-resistant gloves;
- Chemical-resistant footwear plus socks;
- Protective eyewear; and
- Chemical-resistant headgear for overhead exposure.

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Keep all unprotected persons out of operating areas or vicinity where there may be drift.

For terrestrial uses, do not enter or allow entry of maintenance workers into treated areas, or allow contact with treated vegetation wet with spray, dew, or rain, without appropriate protective clothing until spray has dried.

For aquatic uses, do not enter treated areas while treatments are in progress.

PRODUCT INFORMATION

This product is a nonvolatile herbicide for general weed control in:

- Commercial greenhouses and nurseries;
- Ornamental seed crops (flowers, bulbs, etc. - except in the state of California);
- Landscape, industrial, recreational, commercial, residential, and public areas;
- Turf renovation (all turf areas except commercial sod farms);
- Dormant established turfgrass (Bermudagrass, zoysiagrass, nonfood or feed crop); and
- Aquatic areas.

Absorption and herbicidal action is usually quite rapid with effects visible in a few days. This product controls weeds by interfering with photosynthesis that occurs within green plant tissue. Weeds should be succulent and/or actively growing for best results.

Rinse all spray equipment thoroughly with water after use. Avoid spray drift to crops, ornamentals, and other desirable plants during application, as injury may result. Application to muddy water may result in reduced control. Minimize creating muddy water during aquatic application. Use of dirty or muddy water for diluting this product may result in reduced herbicidal activity. Avoid applying under conditions of high wind, water flow, or wave action.

Spray Drift Management

Avoiding spray drift at the application site is the responsibility of the applicator. The interactions of many equipment and weather-related factors determine the potential for spray drift. The applicator is responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target drift movement from aerial applications to agricultural field crops:

- The distance of the outermost nozzles on the boom must not exceed ¾ the length of the wingspan or rotor; and
- Nozzles must always point backward parallel with the air stream and never be pointed downward more than 45 degrees.

Where states have more stringent regulations, they must be observed.

Droplet Size

The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (See Wind, *Temperature and Humidity,* and *Temperature Inversions* sections of this label).

Controlling Droplet Size

Volume - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
Pressure - Do not exceed the nozzle manufacturer's recommended pressures. For many nozzle types, lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
Number of Nozzles - Use the minimum number of nozzles that provide uniform coverage.
Nozzle Orientation - Orienting nozzles so that the spray is released parallel to the airstream produces larger droplets than other orientations and is the recommended practice. Significant deflection from horizontal will reduce droplet size and increase drift potential.
Nozzle Type - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

Boom Length

For some use patterns, reducing the effective boom length to less than ¾ of the wingspan or rotor length may further reduce drift without reducing swath width.

Application Height

Applications should not be made at a height greater than 10 feet above the top of the target plants, unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

Swath Adjustment

When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase with increasing drift potential (higher wind, smaller drops, etc.).

Wind

Drift potential is lowest between wind speeds of 2-10 mph. However, many factors, including droplet size and equipment type, determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. Note: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

Temperature and Humidity

When making applications in low relative humidity conditions set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

Temperature Inversions

Applications should not occur during a temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

Sensitive Areas

The pesticide should only be applied when the wind is blowing away from adjacent sensitive areas (e.g., residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops).

USE IN COMMERCIAL GREENHOUSES AND NURSERIES

For general weed control in commercial greenhouses (beneath benches), field grown and container stock, and other similar areas, this product may be applied before crop emergence either pre- or post-plant in field grown ornamental nursery plantings, or post-emergence as a directed spray. This product may also be applied before crop emergence in ornamental seed crops (except in the state of California).

Avoid contact with desirable foliage as injury may occur. Do not use on food or feed crops.

Spot spray: Apply 1-2 quarts of this product plus the labeled rate of a 75% or greater nonionic surfactant per 100 gallons of water, or 0.75 ounces (22 milliliters) of this product plus the labeled rate of a 75% or greater nonionic surfactant per 1 gallon of water.

Broadcast: Apply 1-2 pints of this product in a minimum of 15 gallons of water per acre. Add the labeled rate of a 75% or greater nonionic surfactant per 100 gallons of spray mixture. Use an adequate spray volume to insure good coverage.

USE IN ORNAMENTAL SEED CROPS (FLOWERS, BULBS, ETC.) [EXCEPT IN THE STATE OF CALIFORNIA]

For pre-harvest desiccation of ornamental seed crops. NOT FOR FOOD OR FIBER CROPS.

Broadcast (Air or Ground): Apply 1.5-2 pints of this product plus the labeled rate of a 75% or greater nonionic surfactant per acre in sufficient water (minimum of 5 gallons by air; 15 gallons by ground) for desiccation and weed burndown. Repeat as needed at no less than at 5-day intervals; up to three applications. Do not use seed, screenings, or waste as feed or for consumption.

USE IN LANDSCAPE, INDUSTRIAL, RECREATIONAL, COMMERCIAL, RESIDENTIAL, AND PUBLIC AREAS

Littora Landscape and Aquatic Herbicide provides fast control of broadleaf and grassy weeds in industrial, recreational, golf course, commercial, residential, and public areas. This product is a nonselective herbicide that rapidly kills undesirable above ground weed growth in 24-36 hours. Avoid applications to desirable plants.

This product is a contact/desiccant herbicide; it is essential to obtain complete coverage of the target weeds to get good control. Improper application technique and/or application to stressed weeds may result in unacceptable weed control. For best results, apply to actively growing, young weeds. Difficult weeds (such as perennial or deeply-rooted weeds) can often be controlled by tank mixing this product with other systemic-type herbicides. Refer to other product labels for specific application directions.

For residual weed control, tank mix this product with a pre-emergent herbicide labeled for the intended use site. When mixing this product with another herbicide, it is recommended to mix just a small amount to first determine if the mixture is physically compatible before proceeding with larger volumes.

SePRO Corporation has not tested all possible tank mixtures with other herbicides for compatibility, efficacy or other adverse effects. Before mixing with other herbicides SePRO Corporation recommends you first consult your state experimental station, state university or extension agent.

- **Grounds maintenance weed control:** This product can be used as a spot or broadcast spray to control weeds in public, commercial and residential landscapes, including landscape beds, lawns, golf courses and roadsides. This product can also be used for weed control around the edges and non-flooded portions of ponds, lakes and ditches.
- **Trim and Edge weed control:** This product can be used to eliminate undesired grass and broadleaf plant growth in a narrow band along driveways, walkways, patios, cart paths, fence lines, and around trees, ornamental gardens, buildings, other structures, and beneath noncommercial greenhouse benches. Vegetation control with this product is limited to the spray application width. Do not exceed the labeled rate of this product as excessive rates may result in staining of concrete-based materials.

  Since this product does not translocate systemically, can be used as an edging or pruning tool when precisely applied to select areas of grass or to undesirable growth on desirable ornamental bedding plants, ground covers, etc.
- **Industrial weed control:** Littora Landscape and Aquatic Herbicide can be used as a spot or broadcast spray either alone or in combination with other herbicides as a fast burndown or control weeds in rights-of-ways, railroad beds/ yards, highways, roads, dividers and medians, parking lots, pipelines, pumping stations, public utility lines, transformer stations and substations, electric utilities, storage yards, and other non-crop areas.

Spot spray: Apply either 1-2 quarts of this product plus the labeled rate of a 75% or greater nonionic surfactant per 100 gallons water, or 0.75 ounces (22 milliliters) this product plus the labeled rate of a 75% or greater nonionic surfactant per 1 gallon of water.

Broadcast: 1-2 pints of this product per acre in sufficient water to insure good spray coverage. Add the labeled rate of 75% or greater nonionic surfactant per 100 gallons spray mixture. Greater water volumes are necessary if the target plants are tall and/or dense. It is recommended that 60 gallons or greater water volume be used to obtain good coverage of dense weeds.

USE IN TURF RENOVATION (ALL TURF AREAS EXCEPT COMMERCIAL SOD FARMS)

To desiccate golf course turf and other turf areas prior to renovation, apply 1-2 pints of this product per acre plus the labeled rate of a 75% or greater nonionic surfactant in 20-100 gallons of water (4 teaspoons of this product plus the labeled rate of a 75% or greater nonionic surfactant per 1 gallon of water) using ground spray equipment. Apply for full coverage and thorough contact with the turfgrass. Apply only when the turf is dry, free from dew and incidental moisture. For enhanced turf desiccation, especially in the case of thick turfgrass, water volumes should approach 100 gallons of water per acre.

For **suppression** of regrowth and quick desiccation of treated turfgrass, this product may be mixed with other systemic nonselective or systemic post-emergence grassy weed herbicides. Refer to other product labels for specific application directions and restrictions.

Avoid spray contact with, or spray drift to, foliage of ornamental plants or food crops. Do not graze livestock on treated turf or feed treated thatch to livestock.

USE IN DORMANT ESTABLISHED TURFGRASS (BERMUDAGRASS, ZOYSIAGRASS), NONFOOD OR FEED CROP

For control of emerged annual broadleaf and grass weeds, including little barley†, annual bluegrass, bromes including rescuegrass, six-weeks fescue, henbit, buttercup, and Carolina geranium in established dormant Bermudagrass lawns, parks, golf courses, etc.

Apply 1-2 pints this product per acre in 20-100 gallons of spray mix by ground as a broadcast application. Add the labeled rate of a 75% or greater nonionic surfactant per 100 gallons of spray mixture.

Bermudagrass must be dormant at application. Application to actively growing Bermudagrass or Bermudagrass in transition may cause delay or permanent injury. Users in the extreme Southern areas should be attentive to the extent of dormancy at the time of application.

†For control of little barley, apply this product prior to the mid-boot stage.

USE IN AQUATIC AREAS

New York - Not for Sale sale or Use use in New York State without Supplemental Special Local Needs Labeling.

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, tribal, or local public agencies.

Treatment of dense weed areas may result in oxygen loss from decomposition of dead weeds. This loss of oxygen may cause fish suffocation. Therefore, to minimize this hazard, do not treat more than ½ of the water body area at one time and wait 14 days between treatments when susceptible plants are mature and have grown to the water's surface, or when the treatment would result in significant reductions in total plant biomass. Waters having limited and less dense weed infestations may not require partial treatments.

For application only to **still water** (i.e. ponds, lakes, and drainage ditches) where there is minimal or no outflow to public waters.

and/or

For applications to **public waters** in ponds, lakes, reservoirs, marshes, bayous, drainage ditches, canals, streams, rivers, and other slow-moving or quiescent bodies of water for control of aquatic weeds. For use by:

- Corps of Engineers;
- Federal or State public agencies (i.e., Water Management District personnel, municipal officials); or
- Applicators and/or licensees (certified for aquatic pest control) that are authorized by the State or Local government.

Treated water may be used according to the water use restrictions set forth in Table 1 or when an approved assay or analytical method establishes that the water does not contain more than the desig-nated maximum contaminant level goal (MCLG) of 0.02 mg/l (ppm) of diquat dibromide (calculated as the cation).

TABLE 1: WATER USE RESTRICTIONS FOLLOWING APPLICATION (Days)

Application Rate (gallons/ surface acre)	Drinking	Fishing and Swimming	Livestock/ Domestic Animals Consumption	Irrigation to Turf and Landscape Ornamentals††	Irrigation to Food Crops and Production Ornamentals††
≥ 2	3 days	0	1 day	3 days	5 days
1	2 days	0	1 day	2 days	5 days
0.75	2 days	0	1 day	2 days	5 days
0.50	1 day	0	1 day	1 day	5 days
Spot Spray† (< 0.5)	1 day	0	1 day	1 day	5 days

† Add a nonionic surfactant (with at least 75% of the constituents active as a spray adjuvant) at the rate recommended by the manufacturer.

†† For preparing agricultural sprays for food crops, turf or ornamentals (to prevent phytotoxicity), do not use water treated with this product before the specified time period.

When the contents of more than one spray tank is necessary to complete a single aquatic application, no water holding restrictions apply between the consecutive spray tanks.

No applications are to be made in areas where commercial processing of fish, resulting in the produc-tion of fish protein concentrate or fish meal, is practiced.

Floating and Marginal Weed Control

This product may be applied by backpack, airboat, spray handgun, helicopter, airplane, or similar application equipment that results in thorough spray coverage.

- cattails, *Typha* spp.
- duckweed, including *Lemna* spp.
- frog's bit†, *Limnobium spongia*
- pennywort, *Hydrocotyle* spp.
- salvinia spp., including *Salvinia molesta*
- water hyacinth, *Eichhornia crassipes*
- water lettuce, *Pistia stratiotes*

† Not for use in California

Spot Treatment: Apply this product at 2 to 4 quarts per 100 gallons spray carrier (0.5 - 1.0% solution) with an approved aquatic surfactant or wetting agent at 0.25 - 1.0% v/v (1 quart to 1 gallon per 100 gallons water; refer to the surfactant label for product-specific rates). For cattail control, this product should be applied prior to flowering at the maximum application rate (8 quarts of this product /100 gallons spray carrier) plus the wetting agent. Repeat treatments may be necessary for complete control.

Spray to completely wet target weeds but not to runoff. Densely packed weeds or mats may require additional applications due to incomplete spray coverage. Re-treat as needed. For best results, re-treat weed escapes within 2 weeks of the initial treatment.

Broadcast Treatment: Apply this product at the rate of 0.5 - 2.0 gallons per surface acre in sufficient carrier along with 16-32 ounces per acre of an aquatic surfactant or wetting agent (refer to the surfactant label for product specific rates). Re-treat as necessary for densely populated weed areas. Good coverage is necessary for control of the target weeds.

For duckweed control, apply this product at 1 - 2 gallons/acre.

Submersed Weed Control

To control submersed weeds apply this product in water at 0.5 - 2.0 gallons per surface acre (per 4 foot water depth), or up to 0.5 gallons/acre foot in water with an average depth greater than 4 feet deep. For severe weed infestations or when treating more difficult to control species, use 0.5 gallons/acre foot of water. Refer to Table 2 for application rates.

- algae††, *Spirogyra* spp. and *Pithophora* spp.
- bladderwort, *Utricularia* spp.
- Brazilian elodea, *Egeria densa*
- coontail, *Ceratophyllum demersum*
- hydrilla, *Hydrilla verticillata*
- naiads, *Najas* spp.
- pondweeds†, *Potamogeton* spp.
- watermilfoils, including Eurasian, *Myriophyllum* spp.
- elodea, *Elodea* spp.

†This product controls *Potamogeton* species except Richardson's pondweed, (*P. richardsonii*).

††Suppression only. For control of *Spirogyra* and/or *Pithophora*, use this product in a tank mix with an approved algaecide.

TABLE 2: GALLONS OF PRODUCT PER SURFACE ACRE†				
Application Rate (gallons/acre)	Average Water Depth			
	1 Foot	2 Feet	3 Feet	4 Feet††
1	0.25 gal.	0.50 gal	0.75 gal.	1.0 gal.
2	0.50 gal	1.0 gal.	1.5 gals.	2.0 gals.

† For water depths ≤ 2 feet including shorelines, do not exceed 1 gallon per surface acre.

†† In treatment areas with an average water depth greater than 4 feet, apply a maximum of 0.5 gallons per acre foot of water.

Subsurface Applications: Where the submersed weed growth, especially hydrilla, has reached the water surface, apply either in a water carrier or an invert emulsion through trailing hoses to apply the dilute spray below the water surface to insure adequate coverage.

Bottom Placement: Where submersed weeds such as hydrilla, bladderwort, or coontail are growing in deeper water and are less mature (e.g. not to the surface of the water) and/or where the water is slowly moving through the weed growth, the use of an application method (such as invert emulsion carrier or long-trailing hoses) to inject this product near the bottom with weighted hoses may improve control.

Surface Application for Submerged Aquatic Weeds: Apply the recommended rate of this product as a spray in sufficient carrier to fully cover the target area. Applications should be made to ensure complete coverage of the weed areas. In mixed weed populations, use the high rate of application as indicated by weeds present. For dense submersed weeds or water over 2 feet deep, a surface spray is not recommended (This product should be applied subsurface in these situations.)

Tank Mixes With Other Aquatic Herbicides/Algaecides: For severe weed or algae infestations, the use of an approved algaecide either as a pretreatment to the application of this product or in a tank mix, may result in enhanced weed control.

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.** Do not exceed any labeled rate or dose. To ensure compatibility, a jar test is recommended before field application of any tank mix combination. Consult with SePRO Corporation for latest tank mix recommendations.

Littora Landscape and Aquatic Herbicide + Komeen®
The addition of Komeen, or other copper-based herbicides/algaecides, with this product may improve control on some species, such as hydrilla. For best results, apply 2 gallons this product in combination with 4 gallons of Komeen (0.8 lbs. a.i./gallon) per acre. For hydrilla control and control of other species with high sensitivity to copper, lower rates of Komeen may also enhance the activity of this product. Apply copper at a minimum of 0.1 ppm in combination with this product. Higher rates may be needed in areas with dense weeds.

Littora Landscape and Aquatic Herbicide + endothall
The addition of endothall with this product may improve control on some species, such as hydrilla. For best results, apply this product at 1 to 2 gallons per acre in combination with the dipotassium salt of endothall at 0.6 to 1.2 gallons/acre foot (i.e. 1 to 2.0 ppm a.i.). Higher rates may be used, but do not exceed the maximum allowed rate for either product.

NOTE: For Drinking (Potable) Water

- The drinking (potable) water restrictions for applications of this product plus endothall are to ensure that consumption of water by the public is allowed only when the concentration of endothall in the water is less than the MCL (Maximum Contamination Level) of 0.1 ppm. Applicators should consider the unique characteristics of the treated waters to assure that endothall concentrations in potable drinking water do not exceed 0.1 ppm at the time of consumption.
- For applications of this product plus endothall, the drinking water setback distance from functioning potable water intakes is ≥ 600 feet. Note: Existing potable water intakes that are no longer in use, such as those replaced by a connection to a municipal water system or a potable water well, are not considered to be functioning potable water intakes.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage and disposal.
Pesticide Storage: Keep pesticide in original container. Do not put concentrate or dilute into food or drink containers. Do not contaminate feed, foodstuffs, or drinking water. Do not store or transport near feed or food. Store at temperatures above 32°F.
Pesticide Disposal: Open dumping is prohibited. Pesticide wastes are toxic. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.
Non-refillable Container Disposal (rigid, 5 gallons or less): Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse 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 the procedure two more times. Then offer the container for recycling (if available) or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.
CONTAINER IS NOT SAFE FOR FOOD, FEED, OR DRINKING WATER!

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://seprolabels.com/terms* or scan the image below.

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

Conforms to HazCom 2012/United States

SAFETY DATA SHEET

Littora®

Landscape and Aquatic Herbicide

Section 1. Identification

Product name : Littora® Landscape and Aquatic Herbicide
Other means of identification : EPA Registration Number 67690-53

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 : **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

Hazard Classification:

Acute Oral Toxicity:	Category 4
Acute Dermal Toxicity:	Category 4
Acute Inhalation Toxicity:	Category 2
Acute Aquatic Toxicity:	Category 4

Signal Word: Caution

Hazard Statements: Toxic by inhalation. Irritating to eyes and skin. Harmful if swallowed.

Hazard Pictograms:

Precautionary Statements: Harmful if inhaled. Harmful if swallowed. Causes moderate eye irritation. Avoid breathing spray mist. Remove and wash contaminated clothing before reuse. Wash thoroughly with soap and water after handling before eating, drinking, chewing gum, or using tobacco. Avoid contact with eyes or clothing. Wear protective eyeware. Wear long-sleeved shirt, long pants, socks, shoes and gloves.

Description of Hazards not Otherwise Classified: This pesticide is toxic to aquatic invertebrates.

Section 3. Composition/information on ingredients

Hazardous Component Name	CAS No.	Average % by Weight
Diquat dibromide	85-00-7	37.3%

Section 4. First aid measures

General information:

When possible, have the product container or label with you when calling a poison control center or doctor or going for treatment.

If inhaled:

- Move person to fresh air.
- If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferable by mouth-to-mouth if possible.
- Call a poison control center or doctor for future 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 in eyes:

- Hold eye open and rinse slowly and gently with water for 15-20 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.

Notes to Physician:

To be effective, treatment for ingestion of the product must begin IMMEDIATELY. Treatment consists of binding the active ingredient, diquat, in the gut with suspensions of activated charcoal or bentonite clay, administration of cathartics to enhance elimination and removal of diquat from the blood by charcoal hemoperfusion or continuous hemodialysis.

Section 5. Fire-fighting measures

Fire Extinguishing Equipment:

Use dry chemical, foam or CO_2 extinguishing media. Wear full protective clothing and self contained breathing apparatus.

Fire and Explosion Hazards:

This product may form flammable and explosive hydrogen gas when in contact with aluminum. During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion.

Hazardous Decomposition Products: Flammable hydrogen gas may be formed on contact with aluminum. See "Conditions to Avoid", Section 10. May decompose at high temperatures forming toxic gases.

PPE for firefighters/fire fighting instructions:

Evacuate nonessential personnel from the area to prevent human exposure to fire, smoke, fumes or products of combustion. Prevent use of contaminated buildings, area, and equipment until decontaminated. Water runoff can cause environmental damage. If water is used to fight fire, dike and collect runoff.

Section 6. Accidental release measures

Personal Precautions:

Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Remove personal protective equipment immediately after handling this product. Wash the outside of gloves before removing.

Methods for Cleaning Up:

Control the spill at its source. Contain the spill to prevent from spreading or contaminated soil or from entering sewage and drainage systems or any body of water. Clean up spills immediately, observing precautions outlined in Section 8. Cover entire spill with absorbing material and place into compatible disposal container. Scrub area with hard water detergent (e.g. commercial products such as Tide, Joy, Spic and Span). Pick up wash liquid with additional absorbent and place into compatible disposal container. Once all material is cleaned up and placed in a disposal container, seal container and arrange for disposition.

Section 7. Handling and storage

Handling Procedures:

This product reacts with aluminum to produce flammable hydrogen gas. Do not mix or store in containers or systems made of aluminum or having aluminum fittings.

Storing Procedures:

Store the material in well-ventilated, secure area out of reach of children and domestic animals. Do not store food, beverages or tobacco products in the storage area. Prevent eating, drinking, tobacco use, and cosmetic application in areas where there is a potential for exposure to the material. Wash thoroughly with soap and water after handling.

Work/Hygienic Procedures:

Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Remove personal protective equipment immediately after handling this product. Wash the outside of gloves before removing.

Section 8. Exposure controls/personal protection

Exposure Limits:

OSHA PEL	Not established
ACGIH TLV	0.5 mg/m³ TWA (total No dust); 0.08 mg/m³ TWA (respirable dust)
NIOSH TWA	0.5 mg/m³

Engineering Controls:

Mixers and loaders supporting aerial applications are required to use closed systems that provide dermal protection. The closed system must be used in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4)]. When using the closed system, mixers and loaders PPE requirements may be reduced or modified as specified in the WPS.

Personal Protective Equipment:

Eye Protection	Use splash-proof goggles if needed to prevent liquid from getting into the eyes.
Ingestion	Prevent eating, drinking, tobacco usage and cosmetic application in areas where there is a potential for exposure the material. Wash thoroughly with soap and water after handling.
Skin Protection	Where contact is likely, wear chemical-resistant gloves (such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, natural rubber, polyvinyl chloride [PVC] or Viton), coveralls, socks and chemical-resistant footwear. For overhead exposure, wear chemical-resistant headgear.
Inhalation	A respirator is not normally required when handling this substance. Use effective engineering controls to comply with occupational exposure limits.

Section 9. Physical and chemical properties

Appearance	Dark brown liquid
Odor	Odorless
pH	4 - 6
Specific Gravity	1.2 g/mL at 20°C
Melting Point	Not Applicable
Water solubility	718,000 mg/L at 25°C and pH 7.2 (Diquat dibromide)
Vapor Pressure	$<10^{-8}$ mmHg at 25°C (Diquat dibromide)
Flash point	Not Applicable
Flammable Limits (% in Air)	Not Applicable
Autoignition Temperature	Not Applicable
Flammability	Not Applicable

Section 10. Stability and reactivity

Conditions to Avoid	Concentrate should not be stored in aluminum containers. Spray solutions should not be mixed, stored or applied in containers other than plastic, plastic-lined steel, stainless steel or fiberglass.
Hazardous Polymerization	Will not occur.
Chemical Stability	Stable under normal conditions.
Materials to Avoid	Strong alkalis and anionic wetting agents (e.g., alkyl and alkylaryl sulfonates). Corrosive to aluminum.
Hazardous Decomposition	Flammable hydrogen gas may be formed on contact with aluminum. See “Conditions to Avoid”, Section 10. May decompose at high temperatures forming toxic gases.

Section 11. Toxicological information

Acute Toxicity/Irritation Studies (Finished Product)

Ingestion:	Rat (Female):	LD_{50}: = 886 mg/kg body weight (Slightly Toxic)
Dermal:	Rat:	LD_{50}: > 5,050 mg/kg body weight (Practically Non-Toxic)
Inhalation:	Rat:	LD_{50}: = 0.62 mg/L air – 4 hours
Eye Contact:	Rabbit:	Mildly Irritating
Skin Contact:	Rabbit:	Slightly Irritating
Skin Sensitization:	Guinea Pig:	Not a Sensitizer

Reproductive & Development Effects:

Diquat dibromide:

Mutagenicity:	No evidence in in vivo assays
Developmental Toxicity:	In rabbit studies a small percentage of fetuses had minor defects at 3 and 10 mg ion/kg/d.

Chronic/Sub-Chronic Toxicity Studies:

Diquat dibromide:

Kidney weight decreases and cataracts seen in dogs at 12.5 mg ion/kg/d. No evidence for neurotoxic effects in rats dosed up to 400 ppm ion in the diet for 13 weeks.

Carcinogenicity:

Diquat dibromide:

No evidence of carcinogenicity in rat and mouse studies.

Other Toxicity Information:
None

Toxicity of Other Components:
Not Applicable

Target Organs:
Diquat Dibromide: Eye, kidney
Inert Ingredients: Not Applicable

Section 12. Ecological information

This pesticide is toxic to aquatic invertebrates. **For Terrestrial Uses** do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment wash waters. **For Aquatic Uses** do not apply directly to water except as specified on this label.

Summary of Effects
Diquat dibromide:
Very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

Eco-Acute Toxicity
Diquat dibromide:

Fish (Rainbow Trout)	96-hour LC_{50}	14.83ppm
Fish (Bluegill Sunfish)	96-hour LC_{50}	13.9ppm
Bird (Mallard Duck)	Oral LD_{50}	60.6 mg/kg
Bird (Mallard Duck)	8-day dietary LC_{50}	5000ppm
Bee (Contact)	LD_{50}	100ug/bee
Invertebrate (Water Flea)	48-hour EC_{50}	0.77ppm
Green Algae	4-day EC_{50}	9.4ppb

Eco-Chronic Toxicity
Diquat dibromide:

Invertebrate (Water Flea)	21-day LOEC	0.17ppm
Bird (Mallard Duck)	Reproduction LOEL	25ppm
Fish (Fathead Minnow)	34-day LOEC	1.5ppm

Environmental Fate
Diquat dibromide:
The information presented here is for the active ingredient, diquat dibromide. Stable in soil water. Immobile in soil. Sinks in water (after 24 hr).

Section 13. Disposal considerations

Waste Disposal:
Treatment, storage, transportation and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations. Do not flush to surface water or sanitary sewer system.

Disposal:
Do not contaminate water, food or feed by storage. Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Container Disposal:
Triple rinse containers. Puncture container to avoid re-use. Dispose of empty container in a sanitary landfill or by incineration, or, if allowed by State/Provincial and local authorities, by burning. If burned, stay out of smoke.

Section 14. Transport information

DOT CLASSIFICATION:
UN1760, Corrosive Liquid, N.O.S. (Diquat Dibromide), 8, PGIII

IMDG CLASSIFICATION:
UN1760, Corrosive Liquid, N.O.S. (Diquat Dibromide), 8, PGIII, EmS F-A, S-F, Stowage Category A

IATA CLASSIFICATION:
UN1760, Corrosive Liquid, N.O.S. (Diquat Dibromide), 8, PGIII, Packaging Instruction Y841

Section 15. Regulatory information

EPCRA SARA Title III Classification

Section 311/312 Hazard Classes: Acute Health Hazard
Chronic Health Hazard
Section 313 Toxic Chemicals: Not Applicable

California Proposition 65

None

CERCLA/SARA 302 Reportable Quantity (RQ)

Report product spills ≥ 268 gal. (based on diquat [RQ=1,000lbs] content in the formulation)

RCRA Hazardous Waste Classification (40 CFR 261)

Not Applicable

TSCA Status

Exempt from TSCA, subject to FIFRA

Section 16. Other information

NFPA 704 (National Fire Protection Association):

Health - 2 Flammability - 1 Reactivity - 0 Others - none

0 = minimal hazard, 1 = slight hazard, 2 = moderate hazard, 3 = severe hazard, 4 = extreme hazard

This information is provided in good faith but without express or implied warranty. The customer assumes all responsibility for safety and use not in accordance with label instructions.

Date of Issue: May 22, 2017

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.