AQUATIC NUISANCE WEED CONTROL PRESCRIPTION

THURSTON COUNTY
Lake Management Districts

The goal of this Nuisance Aquatic Plant Program is to protect beneficial uses and the natural environment of the lake while maintaining a balance between habitat, water quality, recreational and aesthetic values. The intention of the program is not to eradicate native plants, but rather to lower excessive and sometimes dangerous plant densities while preserving a healthy ecosystem.

This prescription applies specifically to Lake Lawrence, Long Lake, Pattison Lake and Offut Lake, Thurston County Lake Management Districts (LMDs). LMDs are predominantly shallow, eutrophic lakes which naturally supports a robust community of submersed aquatic plants and warm water fisheries. At normal densities, these plants provide important habitat and food for fish and other wildlife. Nutrient uptake by aquatic vegetation improves water quality and clarity and can help suppress blooms of harmful algae. At higher densities, excessive vegetation can degrade aquatic environments by reducing light penetration and oxygen levels, lowering diversity of native species and restricting recreational use by boats, kayaks, paddleboards and swimming. In extreme cases, excessive aquatic vegetation can impose a dangerous risk of entanglement to swimmers.

Excessive plant densities in Thurston County LMDs are aggravated by several conditions:

1. Shallow water: extensive areas with shallow water and gradual slopes allow sunlight to easily reach the lake's sediments, encouraging rooted aquatic plant development.
2. High nutrient levels in the water and sediments from storm water runoff; high phosphorus levels in parent soils & sediments; input from surrounding agricultural sources, wetlands and upland lakes; and septic systems that may be failing or not well maintained.
3. Warmer weather increases temperatures in ground water, open water and surrounding soils, which in turn allows for a longer growing season, longer boating and fishing seasons. Ground water temperatures have increased 2° F in the last ten years.
4. Fluctuations in lake levels can allow established plants to expand into deeper water.

Some of the aquatic species that commonly contribute to excessive densities in the lake:

Potamogeton amplifolia	*Big-leaf Pondweed*
Potamogeton strictifolius	*Narrow-leaf Pondweed*
Elodea canadensis	*American Waterweed (Elodea)*
Najas sp.	*Water Nymph*
Stukenia pectinate	*Sago Pondweed*
Nitella sp.	*Nitella*
Filamentous algae	*(these use the other macrophytes as "scaffolding")*

These species are rarely found in single plant species colonies, and are most often found in mixed plant communities in the following aquatic environments:

1. Shallow still water between 1-8 feet deep, warm temperatures, muddy and mucky sediments, with muck reaching 5 feet deep in some areas, little to low water flow rates.
2. Shallow water between 1-4 feet deep, but with muck reaching as much as 10 feet deep in the parts of the lake.
3. Gradual slopes ranging from 1-15 feet deep, soft to mucky substrate, allowing plants to expand into the deeper areas of the lake.
4. Steeper slopes where plants are restricted to 10–12-foot depths.
5. Deep water 12-20 feet where macrophytes are not likely to be found unless they have drifted into place or are noxious plants capable of colonizing and growing in deep water.

Impacts:

Inadequate lake management can lead to substantial detriment to recreation, wildlife and aesthetic value:

- Impaired water quality and threats to public safety
- Reduced or no access to swimming
- Decreased boating and fishing opportunities
- Some types of watercrafts excluded from use (jet-skis, kayaks, and canoes)
- Reduced fish and wildlife habitat
- Unpleasant odors

Injury Levels:

Injury levels are reached when vegetation becomes dense within a few feet of the surface.

These dense plants may also contain filamentous algae, further compounding the problem. When injury levels are reached, recreation, such as boating and swimming, is no longer safe or feasible. When Thurston County began monitoring programs in the 1960's, some areas of lakes were regularly reaching injury levels, requiring reduction through manual and mechanical harvesting and herbicide treatment. Injury levels have begun to occur with greater frequency and have increased in severity as storm water runoff from agriculture and residential development transport more nutrients into the lake. As we experience warmer summers and milder winters due to climate change, some areas of the lake are beginning to experience dense vegetation throughout the year.

Figure 1. Filamentous algae growing on pondweeds and water nymph

Dominance Ratings:

Ratings are assigned during field surveys of the lake by both the rake fullness and visual observation methods, and range from 1 to 5, with 1 being the fewest plants, and 5 representing a full rake head with weeds falling off or a thick/abundance of plants. The dominance value doesn't really apply to the abundance of plants on a single rake throw or single visual observation, but rather the amount (combined frequency and abundance) of plants in a given area. The overall abundance of plants in each Aquatic Vegetation Assessment Site (AVAS) is the average of the rake throws made in that area. Each rake throw will be recorded on the survey sheet and the average of those rake throws will provide the rake throw dominance rating for that specific AVAS. In each area where a rake throw is done a visual observation will be made of the aquatic vegetation and recorded on the survey sheet. There may be times when water quality is to bad or aquatic vegetation growth is such it cannot be observed. When this happens simply record the fact a visual observation was done, but vegetation dominance could not be determined by inserting the abbreviation (VDCVD = Vegetation dominance could not be visually determined).

Dominance ratings carry different meanings for different plant species. For instance, a rating of 1 for Big-leaf Pondweed will not trigger action levels. Big Leaf Pondweed is a native plant and should not be controlled unless it presents a hazard to recreation and only those areas where it does present a hazard should it be controlled. On the other hand, a rating of "1" for an invasive/noxious Class "B" species such as Eurasian watermilfoil or Brazilian Elodea will trigger action levels for every site where this species is found and presents a situation that must be immediately addressed and reported to both the County and State Noxious Weed Control Board. Grant assistance may be available when these types of species are identified. Similarly, an invasive Class "C" species such as Curly Pondweed will not trigger action levels until a rating of 3 is identified. For native nuisance vegetation that has historically reached injury/hazard levels (Narrow Leaf Pondweed, Elodea and Water Nymph) in specific areas and can be controlled by the least amount of herbicide when applied early (post-emergent stage), treatment should be initiated when a rating of 2 is identified in any particular area. Only those areas reaching these levels will be evaluated for treatment. Bathymetry and sediment type are primary drivers for the speed at which any given species will reach the action threshold, although other factors are involved such as historical survey records, water levels, temperature, and water clarity.

Definitions for each Rating are shown below. These specific ratings and definitions were developed in coordination with the LMDs and Ecology's Aquatic Plant Specialist and provide the most uniform method of recording observations possible since there are no specific plant monitoring guidelines outlined in the Washington State Aquatic Plant and Algae General Permit other than any treatment requires a qualified, licensed, and insured contractor that applies any treatment in accordance with label instructions.

Rating	Definition
1	Few plants in only 1 or a few locations – used to record the fact that a plant or specific species was found.
2	Few plants, but with a wide patchy distribution. Small number of plants on rake head.
3	Plants growing in large patches, codominant with other plans. More plants than 1, but fewer than a full rake head.
4	Plants in nearly monospecific patches, dominate. Full rake head.
5	Thick growth covering area. Plants falling off rake head.

Littoral Zone and Nuisance Plant Growth:

Littoral zones are areas where nuisance levels of aquatic vegetation can be expected. These littoral zones are defined by the lake's bathymetry map and the ability of light to penetrate the water, but milder

winters and the introduction of plants that germinate and grow at greater depths may well increase the littoral's zone functional size. Each lakes littoral zone differs.

Lake Lawrence: this area comprises approximately 192 acres or 58% of the lake's 330 acres.

Long Lake: this area comprises approximately 200 acres or 61% of the lake's 330 acres.

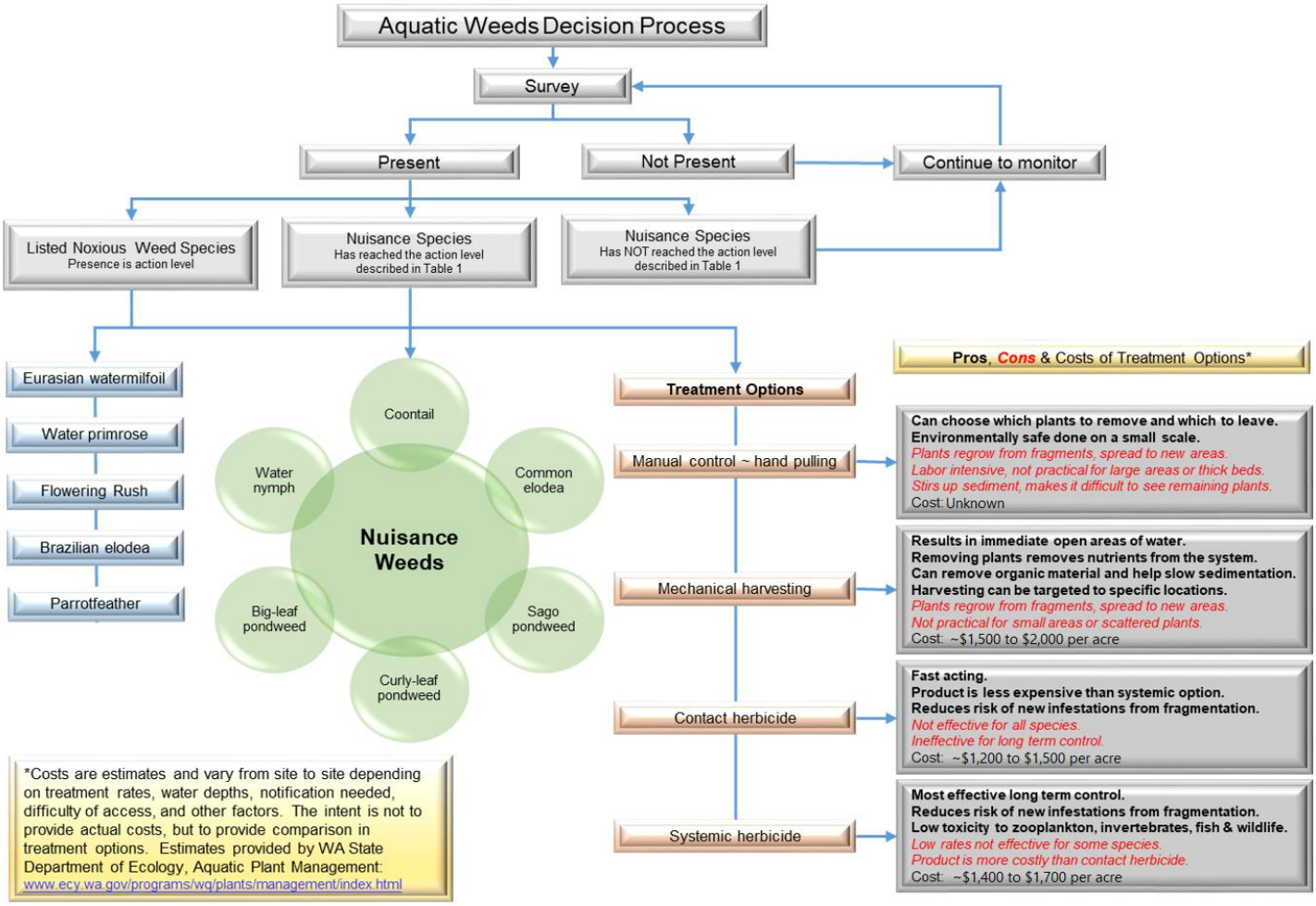
Pattison Lake: this area comprises approximately 79% of the lake's 271 acres.

Offut Lake: this area comprises approximately 42% of the lake's 192 acres.

These zones are based on bathymetry data Under Ecology's NPDES permit. Approximately 50% of the littoral zone may be treated annually.

Action Levels:

Action levels are the thresholds at which control measures must be taken to avoid injury levels. These thresholds vary according to the plant species growing in a given area, and the density or dominance of the plants observed during surveys of the lake. Physical characteristics of each site also affect when plants will reach action levels. Dominance Ratings observed and recorded during surveys of the lake serve as a means of quantifying and standardizing density of plants that are found. These specific ratings and definitions were developed in coordination with the LMDs and Ecologies Aquatic Plant Specialist. The presence of any invasive or noxious weed species listed by the Washington State Noxious Weed Control Board may be considered as action level.



CONTROL OPTIONS:

MANUAL TECHNIQUES

Digging/Hand Pulling: Plants and rhizomes can be dug by hand from the sediment. This is a more labor-intensive method than harvesting and can provide longer control. Removal can be effective in small patches or for several plants. Some property owners have reported success in repeated cutting and digging. One of the problems with digging the rhizomes is the inability to collect 100% of all rhizomes which spreads the nuisance plants to other areas of the lake. Disturbing sediment can also mobilize seed banks and spread them to other areas.

Homeowners are responsible for controlling plants around their docks; many of the shoreline areas are not included in control programs due to access and cost or the isolated nature of the problems (i.e., 1 or 2 docks with thick plants will usually not warrant inclusion in the LMD's work plan). Homeowners can manually control plants around their docks by pulling or raking and this can occur at any time between spring and fall. Homeowners can also employ divers to remove limited numbers or isolated patches of noxious or invasive weed material from around their docks. No permit or authorization is required for this.

Weed Blankets: Some weed blankets were placed by Long and Lawrence LMDs in the past but were very difficult to remove according to WDFW's preferred schedule. Individual owners are still encouraged to employ them where appropriate.

MECHANICAL TECHNIQUES

Harvesting: Aquatic vegetation can be cut underwater by harvesters on floating barges or by hand-held tools. While temporary control is obtained, plant masses typically regrow within a couple of weeks, sometimes less, depending on species. In addition, the equipment may not be able to access shallow near shore areas or operate in narrow dock spaces. Harvesting is only effective within 2 feet of the lake bottom. In many large areas on our lakes, as shown by the bathymetry maps, the lake is only 4 feet deep. Therefore, harvesting only the top 2 feet is not an effective control method. While harvesting can be effective in some circumstances, fragments of cut plants may float away from the work zone so booms need to be deployed to collect as much material as possible.

Harvesting is an expensive control method. In 2023, harvesting costs were ~$1,700 per acre. Since some of the areas need to be cut multiple times during the recreation season, this temporary control can average more than $3,400 per acre. This cost continues to be too expensive to provide effective, widespread aquatic plant control during the recreational season, but is still an important tool in some areas of the lake.

Aquatic harvesting equipment can be used where herbicides are either not effective due to high flows and site conditions, or the species of plants dominating each site. Harvesting is also effective where narrow bands of vegetation run parallel to the shoreline or grow in small patches. This work can start when plant densities are sufficient to warrant expenditures, which may be as early as May, but often not until late-June to provide best control before the 4th of July holidays. However, harvesting cuts through the cells of the plant and this causes "bleeding" of phosphorus into the water column which can increase the availability of phosphorus for additional plant and algae growth.

Mechanical rotovating: Rotovating has been used on fragrant waterlily beds on Lake Lawrence in 1993, but it created rhizome fragments that were difficult to collect and further spread the plants around the lake. Large scale collection of all plant fragments must be part of any rotovating project. In general,

this control method is discouraged by the Department of Ecology due to several possible detrimental ecological consequences such as excessive turbidity, release of nutrients and toxic material from the sediment and interference with fish spawning and possible fish kills.

Diver Dredging: Is a control option where divers manually dislodge submersed vegetation, and another diver uses a hose to vacuum the plant material from the water onto a waiting platform or barge where the material is separated from the water through screens and collected in baskets. Diver dredging effectively removes all of the plant biomass including the roots and is usually conducted in March or April while water temperatures are low, and visibility is good.

This technique was tried in 2012 in Long Lake, but the screen and filter rapidly clogged up due to the size and texture of the large leaves. To attempt again the dredge would need to be retrofitted with a new screen, costing at least $1,000.

Divers have also hand pulled plants and placed them in a basket. This has been less disruptive to the sediment, eliminates the clogged screen issue and accomplishes the objective. This technique has been used in Long Lake for Eurasian Water Milfoil as well as Brazilian Elodea. This method is very expensive and usually only done for small areas or concentration of invasive species.

Diver dredging is less disruptive to lake ecology than "vacuum dredging", where plants are actually removed from the sediment with the vacuum hose, rather than hand removal. Vacuum dredging can create detrimental effects similar to rotovating.

CULTURAL TECHNIQUES

Prevention: All LMDs are committed to taking steps to prevent the introduction of invasive aquatic weeds and continuing to research and apply methods that reduce nutrient levels, resulting in improved water quality and the reduction of excessive nuisance weeds.

Education for homeowners that emphasizes prevention is provided in several forms to include a YouTube Channel (https://www.youtube.com/@lakelawrence), which all Thurston County LMDs have linked to their respective websites, and information flyers, emails and guest speakers that includes topics such as:

- *Shoreline erosion: Plant native vegetation buffer strips along the lakeshore to filter the nutrients from rainfall or irrigation runoff coming from lawns.*
- *Reduce or eliminate fertilization on lakeside properties.*
- *Clean up pet waste.*
- *Clean, drain and dry boats when entering or leaving a lake to avoid transporting non-native species.*
- *Don't let grass clippings and leaves get into the lake.*
- *Low to no phosphorus detergents & fertilizers.*
- *Making sure septic systems are properly maintained.*

Bottom Barrier: Bottom barriers are essentially "underwater blankets" that cover the bottom sediments and the plants growing there. Barriers kill the plants under them and prevent new plants from establishing. They can be made of many different materials, including burlap, sand-gravel, and a material called Texel, which is specifically manufactured for aquatic plant control. Bottom barriers, screens, and non-biodegradable anchor materials must be completely removed within two years of placement, according to state regulations.

The results of control with bottom barriers have been marginal. Aquatic vegetation can grow through slits in the fabric, which vent gasses created in the organic lake sediment. Floating plants can root into fibrous mats, and nearby plant roots can also recolonize these areas. Barriers have been very difficult to install in the light, loose sediment and require regular maintenance.

Dredging: Another cultural control is to deepen the lake, which makes conditions less favorable to plants. Deeper water reduces the littoral zone and areas where the aquatic plants may grow. Dredging was studied extensively at Lake Lawrence. Because of the detailed engineering reports and demonstration projects, we have a good understanding of the challenges associated with this approach. The volume of sediment that would have to be removed, disposal sites, federal and state permit requirements, and associated high costs to develop and implement dredging, mean that dredging is not a feasible option for large scale plant control efforts. Additionally, safety concerns would likely close the lake while dredging is underway. Any one of these issues would eliminate dredging from consideration for lake-wide control, but it could be effective in small, localized situations.

BIOLOGICAL TECHNIQUES

There are currently no available biological control techniques for submersed vegetation in Thurston County lakes. Grass carp have been the most commonly proposed biological control option in Washington State. In 2004, when the Integrated Aquatic Vegetation Management Plans for Long Lake and Lake Lawrence were developed, the state's permitting agency, the Washington State Department of Fish and Wildlife (WDFW), determined that the agency was unwilling to permit grass carp even sterile grass carp to be stocked in Lake Lawrence or Long Lake. This position has not changed.

CHEMICAL TECHNIQUES

Chemical techniques involve the application of herbicides specifically formulated for use in water bodies that have passed three tiers of environmental review: Federal, Washington State, and Thurston County. Aquatic herbicides may be specific to certain habitats (emergent, floating or submersed), or to certain plant properties (broad-leaf or grass-like), or, because of biochemistry, only particular species within any of these larger groups. Chemical control in Thurston County LMD began in 1991 with a one-time, whole-lake treatment of Eurasian watermilfoil with Sonar ® in Long Lake. Up until that time, milfoil was being mechanically harvested, which fragmented and spread the plant throughout the entire lake. The whole-lake Sonar application virtually eradicated the milfoil, and no further chemical treatments were made. When small patches of milfoil began growing again, the LMD employed divers to remove the plants by hand. Lake Lawrence first used herbicides in 1996 after years of alternative methods failed to control fragrant water lilies that covered nearly one-third of Lake Lawrence. Herbicides were not applied to nuisance submerged plants in Long Lake and Lake Lawrence until 2007, and are now applied under an NPDES permit issued by the Washington State Department of Ecology. As shown above every possible non herbicide control method was employed prior to any consideration of herbicides. Many of these control methods are still employed, when possible, to reduce the use of herbicides.

Timing and Treatment: Herbicide applications should occur at a time that will prevent injury levels of nuisance vegetation from occurring. Timing will vary according to the specific herbicide that is used and the target plant species, but control is often most effective early in a species' growing season in areas where the nuisance plants reach action levels, typically April-May. This early treatment timing will substantially reduce or eliminate human contact with the treated areas because cool to cold weather generally limits recreational activities. Note that some species' growing season begins in the summer. Targeted treatment dates may require an exemption of the fish window as outlined in the APAM Permit.

Swimming and Lake Use Advisories: Advisory notices and any use restrictions are posted along the shoreline and at public access points according to label and APAM permit requirements. Cautionary signs include the date of the treatment, product used, and all water use restrictions and precautions.

Applications: Sites where action levels are triggered by observed dominance ratings will be considered for possible treatment. Prior to treatment, conditions will be verified via survey to determine whether the sites require treatment. Adjustments in the specific treatment areas will be made at that time. Applications are done by contracted licensed, insured, aquatic vegetation management companies using appropriate, calibrated application equipment and methods.

Herbicide	Rates	Mix
Fluoridone **Sonar®, Sonar Q®, Sonar PR®** Aquatic Broadcast/Educator Note: • Systemic herbicide • Slow uptake, slow acting • May require 3 applications to total a maximum of 150 ppb • Early to mid-spring depending on previous monitoring and current lake & weather conditions • Most effective when plants are emerging - water nymph, narrow leaf pondweed, elodea and similar types of aquatic vegetation	Up to 150 ppb (sum of applications per growth cycle)	**Partial Lake or Reservoir Treatments** Where dilution of Sonar with untreated water is anticipated, such as in partial lake or reservoir treatments, split or multiple applications may be used to ex- tend the contact time to the target plants. The application rate and use frequency of Sonar PR 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 concentration in the treatment area. Use a rate at the higher end of the range where greater dilution with untreated water is anticipated. Application Sites Greater Than 1/4 Mile from a Functioning Potable Water In- take: For single applications, apply Sonar 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.
Imazamox **Clearcast®, Clearcast 2.7G®** Aquatic Broadcast/Injection or Broadcast/Educator Note: • Contact herbicide • 2 applications within a week of each other • May vary from 300ppb to 500ppb de- pending on species • Rapid uptake, but slow acting	Up to 500 ppb (per application)	**Surface Application** Clearcast may be broadcast-applied to the water surface or injected below the water surface. Apply Clearcast to water to achieve a final concentration of the active ingredient of no more than 500 ppb. Multiple applications may be made during the annual growth cycle to maintain the desired vegetation response.
Endothall **Aquathol K®, Aquathol Super K®** Aquatic Broadcast/Educator Note: • Contact herbicide, however experience is that repeated use significantly reduces plant density. It can work much like a systemic if treatment is applied prior to seed production. • For use on Curly & Big Leaf Pondweed, Water Nymph & other species in certain circumstances • Rapid emergence may not allow slow- acting herbicide sufficient time to work May not be used within 400 feet of the channelized lake outlet	1 to 5 ppm	**Quiescent, Slow Moving or Flowing Water Treatments** Use higher labeled rates when making treatments to small areas with an in- creased potential for rapid dilution or when treating narrow areas such as for boat lanes or shoreline treatments where dilution may reduce the exposure of plants to the herbicide. Use lower labeled rates for large contiguous treatment blocks or in protected areas such as coves where reduced water movement will not result in rapid dilution from the target treatment area. Personal Protective Equipment (PPE): Mixers, loaders, applicators and other handlers must wear: long-sleeved shirt and long pants, socks and shoes, chemical resistant gloves, protective eyewear and NIOSH-approved half– or full -face respirator with a cartridge or canister approved for dusts and mists or a cartridge with any N, R, P, or HE filter. Note: the quarter-face cup style respirator does not meet this requirement.
Glyphosate **Aquamaster®** Note: • Contact herbicide, but works like a systemic on lilies and emergent plants • Check label to determine if addition of a non-ionic surfactant approved for aquatic applications will increase the effectiveness of your product.	.75—1%	***Spot foliar applications for Fragrant Water Lily*** Spray the top surface of the leaves, enough to be wet but not dripping. Spot application means the herbicide is applied only to the target plants, and not on the surrounding plants or water. Due to recent health reviews, Thurston County recognized some scientific studies have concluded the use of glyphosate products have carcinogenic potential. The risk of spot spraying with these products is considered to be low provided the applicator uses personal protection equipment which includes chemically resistant gloves in addition to long sleeve shirt, long pants, socks and shoes and all other label precautions are followed.

Herbicide	Rates	Mix
Imazapyr **Habitat®, Polaris®** Note: • Systemic for lilies • Check label to determine if addition of a non-ionic surfactant approved for aquatic applications will increase the effectiveness of your product.	1%	***Spot foliar applications for Fragrant Water Lily*** Spray the top surface of the leaves, enough to be wet but not dripping. Spot application means the herbicide is applied only to the target plants, and not on the surrounding plants or water
Penoxsulam **Galleon SC®** Aquatic Injection/Educator Note: • Systemic and contact • Controls pennywort, elodea, hydrilla, Eurasian watermilfoil, sago pondweed, water lettuce and other aquatic vegetation.	Up to 150 ppb (sum of applications per growth cycle)	***A selective systemic aquatic herbicide for management of freshwater aquatic vegetation in lakes; including shoreline and riparian areas within or adjacent to lakes and other sites.*** For best results, apply Galleon SC immediately after weeds begin active growth. Application to mature target plants may require higher application rates and longer exposure periods to achieve control. There are no restrictions on the use of treated water for potable use or by livestock, pets or other animals. There are no restrictions on the use of treated water for recreational purposes, including swimming and fishing.
Any new herbicide subsequently approved by Thurston County as a low hazard herbicide.	Per Label Instructions	***Per Label Instructions***

GENERAL METHODS FOR SELECTING CONTROL OPTIONS:

Prevention

- Preventative measures are employed throughout the year. Where and whenever possible, preventative methods are encouraged in order to bring about the highest water quality possible and to minimize the need for other forms of nuisance weed control.

Harvesting

- Is the preferred method of control in Conservation Areas and narrow strips of weeds.
- Can be a choice to follow-up where an herbicide application was insufficient to adequately control excessive growth over the length of the growing season.

Manual Control

- Individual homeowners along the shoreline are responsible for manual control of aquatic weeds from the shoreline out to the ends of their docks.
- Small populations (isolated, single plants or very small patches) of aquatic noxious weeds may be re- moved manually by divers where there are few locations, and plants can be removed from the lake with a minimal threat of fragmentation.

Diver Dredging

- This method has been proven effective when used on infestations of noxious weeds that are found in populations exceeding levels where manual removal alone, without the assistance of suction removal from the water column, is too time consuming or otherwise infeasible. An example would be Brazilian elodea found in one or more areas exceeding 1,000 sq. ft.

Herbicide Application

- Aquathol K® or Aquathol Super K® is a preferred choice of herbicide for high flow areas and where the plant community is predominantly water nymph, curly pondweed, big leaf pondweed or emerges in mid to late summer.
- Sonar®, Galleon SC® or Clearcast® are chosen interchangeably to prevent resistance and for areas dominated by pondweeds and spring-growing plants. The plant community matrix is variable and changes frequently in response to many factors.

Note:

1. Herbicides will only be used in accordance with chemical label instructions and applied only by licensed, qualified, and insured contractors after lake surveys show the need, in the case of nuisance vegetation, or the presence of invasive/noxious species. Only those littoral areas requiring treatment will be treated.
2. LMDs should identify priority treatment areas (e.g., Public Boat Launches, Community Boat Launches, Narrow-high traffic areas [canals, corridors between basins, etc.], Public and Community swim areas, high density private parcels, etc.). These are areas where it is important to treat when weeds meet or exceed action levels in order to prevent invasive/noxious species from entering the lake.
3. When new aquatic herbicides are approved for use by the Thurston County Department of Health, they can be used for control on lakes with LMDs without requiring a revision of the prescription.

Table 1. Plant dominance action levels

Species	Probable Action Level when one or more species reach these Dominances	Probable Action Level if using a systemic herbicide	Probably Action Level if using a contact herbicide
Water-nymph	2	2	3
Fragrant Water Lily	2	NA	2
Curly pondweed	3	3	3
Common elodea	2	2	3
Coontail	3	3	3
Sago pondweed	2	2	3
Bladderwort	3	3	3
Tape grass	3	NA	3
Big-leaf pondweed	3	2	3
Narrow-leaf pondweed	3	2	3

Conservation Habitat:

Conservation Habitat areas for Long and Lawrence Lake were initially based on adjacency to land parcels that were undeveloped. These mapped areas have changed little since then. This Permit is issued every five years, nuisance vegetation in Conservation Habitat areas must be addressed with non-herbicide methods, such as harvesting. Invasive/noxious weed species in Conservation Habitat may be addressed as they are identified. While some flexibility is provided for, it is important to note that during the 10 years that Thurston County has held an NPDES Permit, the vast majority of mapped Conservation Habitat Areas have fallen within the same general locations in the lake.

New LMDs will consider similar conservation habitat areas during their Integrated Aquatic Vegetation Management Plan (IAVMP) development. These areas do not preclude treatment for non-native, invasive and noxious species, but should not be treated for native vegetation. This provides “clean” areas for fish and wildlife habitat.

Monitoring:

In 2014 shallow water zones, up to 12 ft. deep, were surveyed with high accuracy sonar equipment for both Lake Lawrence and Long Lake. A similar survey will be completed by Pattison and Offut Lakes when their Integrated Aquatic Vegetation Management Plan (IAVMP) is done. Note that the littoral zone, where macrophyte growth is supported, extends to greater depths if the slope is gradual or if there are significant fluctuations in water levels. Areas were delimited according to depth, slope, substrate, flow, and previous years’ surveys, and are monitored during the growing season. A list of species found to be prevalent in previous years has been developed, with plant density ratings shown above for each species. Note that some species will need control work earlier than others in shallow areas. It is the overall makeup of the plant community as well as the density of the plants that will indicate control work is necessary. In addition, the monitoring performed the preceding year (fall) will assist in predicting growth in the spring. A spreadsheet has been prepared for use during monitoring surveys.

Following the initial control of the plant, inspections will be conducted as part of each season's program. Dominance Ratings will be recorded for species that are observed in each site. Observations will be recorded in a uniform fashion on standardized forms that facilitate monitoring data entry into a database. Records will be kept to provide historical accounts of weed control strategies and to help evaluate and select future weed control options.

As required by Thurston County Policy an annual report and evaluation will be prepared by the LMD Steering Committees and/or contractors accomplishing the work with a copy provided to the Thurston County Pest and Vegetation Management Advisory Committee (PVMAC). The report will include, but not be limited to: (1) the areas where manual or mechanical removal occurred, (2) the number of cubic yards removed, (3) areas where herbicide treatment was conducted, (4) number of acres treated and herbicide used, and (4) maps of treatment areas and resulting Dominance Ratings.

References:

Lawrence Lake Integrated Aquatic Vegetation Management Plan, September 2004.

Long Lake Integrated Aquatic Vegetation Management Plan, September 2004.

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