

**DRAFT**

**Prevention and Response Plan for Water  
Soldier (*Stratiotes aloides*) in Ontario**

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Prepared by the  
Ontario Ministry of Natural Resources and Forestry

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This Prevention and Response Plan is prepared under subsection 13(1) of the *Invasive Species Act, 2015*.

## Purpose and Rationale

Water soldier (*Stratiotes aloides*) is classified as a prohibited invasive species in Ontario Regulation 354/16 made under the *Invasive Species Act, 2015*, and as such, the prohibitions set out in section 7 of the Act apply to water soldier. These prohibited activities include bringing a member of the species into Ontario, as well as depositing, releasing, possessing, transporting, buying and selling members of the species. This prevention and response plan for water soldier authorizes certain activities otherwise prohibited by the Act. Individuals acting in accordance with the plan when carrying out activities to monitor, manage, control or eradicate water soldier in Ontario, and to prevent its further spread may proceed without the need for individual authorizations under the Act.

This prevention and response plan identifies the persons or groups of persons who are authorized to implement the plan, sets out the types of activities for which the plan applies and describes the conditions under which these persons will be permitted to possess, transport, and deposit water soldier in Ontario.

## Background

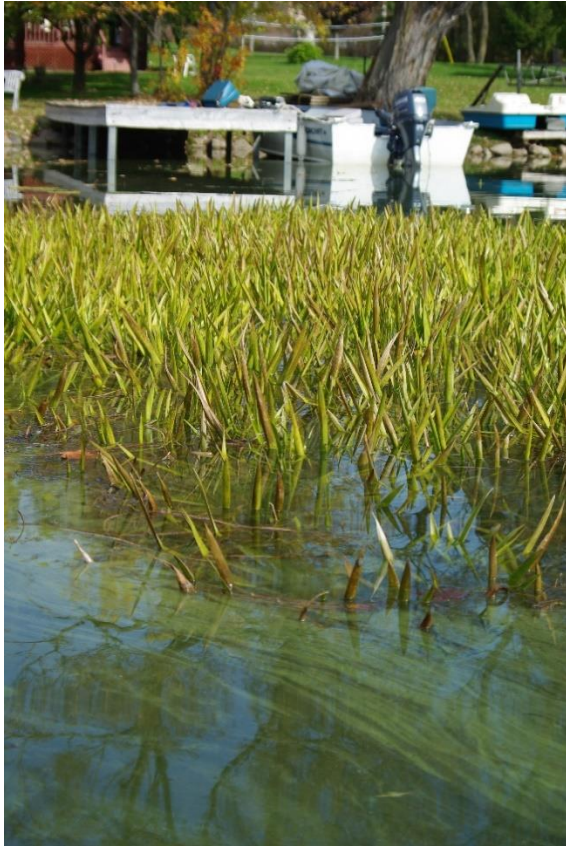


Figure 1: Water soldier (Photo credit: Ontario Federation of Anglers and Hunters)

Water soldier is an invasive perennial aquatic plant that is native to Europe and northwest Asia. The plant has long, thin, serrated leaves that grow in a rosette formation and is similar in appearance to the top of a pineapple. Water soldier is submergent (i.e., grows below the water surface) for most of the year. It may rise to the surface of the water as new leaves mature during the summer months. Water soldier typically grows in shallow waters (0.5-1.5 metres) but can grow in depths of up to 5 metres.

Water soldier forms dense mats of vegetation, aggressively outcompetes native aquatic plants, and impedes recreational activities such as boating, swimming and angling. It can also interfere with

infrastructure--including water intake structures, navigation canals and locks, and hydroelectric facilities--where periodic removal of entrained water soldier plants or plant parts from trash racks or other in-water structures may be required as part of ongoing facility maintenance.



*Figure 2: Emergent growth form of water soldier (Photo credit: F. MacDonald)*



*Figure 3: Submergent growth form of water soldier (Photo credit: F. MacDonald)*

Water soldier has the potential to invade lake and river ecosystems throughout Ontario and the Great Lakes basin ecosystem which could cause significant harm to biodiversity, and affect recreation, tourism and navigation in aquatic systems.

The first known wild population in North America was found in the Trent River in 2008, near the Hamlet of Trent River, Ontario. Since that time, it has spread downstream of the original infestation within the Trent Severn Waterway and has also been documented in both natural waters and offline ponds in a few other locations in southern Ontario.

Prior to its regulation in 2016, water soldier was used as an ornamental plant in water gardens and private ponds, which is the likely source of its introductions to Ontario.

However, it is now illegal to propagate water soldier in the province. Pond or water garden owners are encouraged to follow the provisions in this plan to control or remove water soldier to reduce the potential for this species to spread.



Figure 4: Water soldier infestation (Photo credit: V. McCulloch)

The Ministry of Natural Resources and Forestry (MNRF) and partners have been monitoring water soldier within Ontario waterbodies and have undertaken measures to control populations and prevent spread to new locations.

Volunteer groups, municipalities, shoreline residents, and other members of the public also play an important role monitoring, controlling and preventing the further introduction and spread of this invasive species in Ontario waters. Similarly, operators and staff of infrastructure facilities in areas of water soldier infestations can also prevent spread by undertaking precautionary measures to avoid incidental dispersal or downstream transport of water soldier plants or plant parts during operation or facility maintenance.

Sightings of water soldier in new locations should be reported to the Invading Species Hotline at 1-800-563-7711, or [www.eddmaps.org/ontario](http://www.eddmaps.org/ontario).

## Legislative Context

Under the *Invasive Species Act, 2015*, the Minister may cause a prevention and response plan to be prepared with respect to an invasive species. A prevention and response plan may include measures, practices or courses of action to deal with invasive species and may authorize persons identified in the plan to carry out activities to assist in the implementation of the plan.

Pursuant to subsection 13(4) of the Act this prevention and response plan authorizes the persons identified in this plan to carry out the measures and practices set out under this plan. Under subsection 9(3) of the Act, the persons identified in this plan will be permitted to possess, transport, deposit and release water soldier in the course of implementing the activities specified in this plan and in accordance with the conditions and provisions of this plan.

Note: As of the date of preparation of this plan, there is also an exception in Ontario Regulation 354/16 for the incidental possession and transport of water soldier plants that attach to a boat as a result of operating it in infested waters. This exception is subject to conditions which include requirements to take reasonable precaution to avoid moving plants to other areas of the water body, to remove any water soldier from the boat before transporting the boat overland and to dispose of water soldier away from any water body. Please refer to the regulation for the complete requirements and for any updates. This plan does not affect activities taken pursuant to the conditions of the regulation.

If you are considering an activity related to water soldier that is outside of the scope of this plan, authorization under the *Invasive Species Act, 2015* may be needed, if the activity is likely to involve actions that are prohibited under the Act (e.g. possession or transport of this plant). For information about obtaining an authorization under the Act, such as for research or education, contact the Ministry of Natural Resources and Forestry's Natural Resources Information and Support Centre at 1-800-667-1940, or via [email](#).

## Scope of the Plan

This prevention and response plan:

- (a) applies only to water soldier (*Stratiotes aloides*); and
- (b) applies to all areas in Ontario where the species is present.

For greater certainty, any reference to water soldier in this plan includes any part of water soldier, including leaves, clonal offsets, turions, and flowers.

## Authorized Persons

The following persons are authorized to carry out the following measures and practices to help control, eradicate and prevent the spread of water soldier in Ontario:

- (a) Any person engaged in water soldier prevention, monitoring or control or removal activities of water soldier by mechanical means or by hand under the control or supervision of a not-for-profit corporation, municipality or conservation authority.
- (b) Shoreline residents or waterfront property owners engaged in the control and removal of water soldier by mechanical means or by hand, including agents acting on their behalf, if the residence or waterfront property is:

- i. adjacent to the shore lands (lands covered or seasonally inundated by the water of a lake, river, stream or pond) where the control and removal of water soldier is to be carried out, or
- ii. separated from the shore lands where the control and removal of water soldier is to be carried out only by an unopened road allowance or a strip of public lands.

(c) Individuals engaged in control and removal of water soldier from an offline private pond or water garden, including agents acting on their behalf. An offline pond is separated from any other body of water and has no inlets or outlets to a stream channel.

(d) Owners, operators and employees of hydroelectric facilities or other in-water structures engaged in activities to control or manage water soldier as part of the facility maintenance or construction activities.

## **Authorized Activities**

Authorized persons are permitted to undertake the following activities for the purpose of carrying out the measures and practices set out above, provided all the conditions set out in this plan are met:

- (a) Possession and transportation of water soldier in the course of prevention, monitoring, control, removal, maintenance and construction activities and for the purpose of disposal or destruction of the plant material.
- (b) Deposit and release of water soldier away from any body of water as required to dispose of plants or plant parts that were removed from a body of water, by mechanical means or by hand.

## **Conditions**

The following conditions apply to all persons carrying out activities authorized under this prevention and response plan:

1. No person acting under the authority of this prevention and response plan shall remove water soldier by means other than by mechanical means (e.g. rake, cutter bar) or by hand-pulling. This plan does not apply to the use of mechanical harvesters. Note: The use of herbicides to control water soldier is not subject to this condition as it does not involve the removal of water soldier from the water and is governed by other provincial legislation.
2. Reasonable precautions must be taken to ensure that water soldier is not dislodged or otherwise released downstream or to other waters during the course of prevention, monitoring, control or removal activities, in-water structure or facility maintenance, or construction activities.
3. All equipment and/or watercraft used in infested waters during the course of water soldier prevention, monitoring, or control or removal activities must be inspected and cleaned of any water soldier prior to movement overland.

4. If transported overland, any water soldier must be contained or secured in a manner that ensures that no plants or plant parts fall out during transport.

5. If water soldier is removed from the water, it must be disposed of or destroyed in a manner that ensures that no part of the plant will re-enter the body of water or enter into any other body of water.

## TIPS FOR CONTROLLING WATER SOLDIER

### 1) Use an integrated management approach

- Management approaches that include both hand pulling and herbicide applications will be the most effective.

### 2) Target control based on size of population, and time of year

- Hand-pulling (June -August) for individual plants and small groups of plants (<0.25 m<sup>2</sup>).
- Herbicide application (August -October) for larger populations (>0.25 m<sup>2</sup>).

### 3) Prevent spread during control

- Water current, wave and wind action can dislodge plants and seeds and carry them to new areas.
- Take precautions to prevent the release of plants downstream during control.

### 4) Clean equipment and watercraft

- All equipment and or watercraft used in infested waters during control must be inspected and cleaned prior to movement overland.

### 5) Dispose of water soldier carefully

- If transporting water soldier overland for disposal, it must be secured to ensure that no plants or plant parts are lost during transport.

### 6) Handle with care

The leaves have serrated edges that can cut the skin. Use proper safety gear (e.g. gloves) when handling.



## Best Management Practices for Authorized Persons Undertaking Control of Water Soldier

The following information provides a summary of control techniques for water soldier. It is provided for information purposes only and does not provide legal authority to engage in activities that may otherwise require authorization under other applicable laws.

**Do not carry out work during fish spawning season and other critical fish life stages, as set out in Ontario's [In-water Work Timing Window Guidelines](#)**

### Hand pulling

Individual water soldier plants, and small populations (<25 m<sup>2</sup>) can be controlled by pulling by hand, or with the use of hand-held mechanical devices (e.g. rake, cutter bar).

Hand pulling is advised only for plants that are easily accessible and if the entire patch can be removed. Pulling the plants will disturb the sediment and reduce visibility in the water, so repeated removal attempts after the water clears are required to ensure that all water soldier plants are removed.

The best time of year for manual removal is in the early summer before water soldier produces turions (dormant winter buds) which can be released from the plant during pulling. Avoid hand-pulling in late summer and fall to prevent dispersal of turions and offsets in the water current to new areas.

### Aquatic Herbicides

Within Canada, diquat (trade name Reward® Aquatic Herbicide) is the only herbicide currently registered by Health Canada's Pest Management Regulatory Agency (PMRA) for control of water soldier in aquatic systems.

Diquat can provide control of medium to large infestations of water soldier. It is a non-selective contact herbicide, and its use is best timed in fall (September to mid October) when water soldier is still actively growing. This will reduce impacts to native aquatic plants which have senesced or gone dormant by the fall. Herbicide treatments in fall can also impact reproductive propagules (i.e. turions and offsets) that remain on the water soldier plants. Depending on the situation, treatment earlier in the season may be warranted (e.g. prevent expansion of newly detected water soldier populations).

Additional control efforts in subsequent years may be necessary to address any regrowth and plants that were missed.

**Note:** The efficacy of diquat can be affected by temperature, turbidity, water flow and depth. Follow the product label for directions on application rate and limitations of use.



Figure 5: Water soldier infestation in Trent-Severn Waterway in August 2015 prior to control. (Photo credit: V. McCulloch)



Figure 6: Trent-Severn Waterway following successful control of water soldier with herbicide. (Photo credit: H. Simpson).

## Updates to or Cancellation of the Prevention and Response Plan

Under the *Invasive Species Act, 2015*, the Minister may cause a prevention and response plan to be updated from time to time as he or she considers appropriate. The Minister will publish and give notice of any updates to the prevention and response plan as appropriate.

The Minister may also cancel a prevention and response plan by publishing notice of the cancellation on a website maintained by the government of Ontario and by giving notice of the cancellation of the plan in any other manner that he or she considers appropriate.

## Other Considerations

Permits, approvals or authorizations may be required from other agencies and/or levels of government before an activity related to the control or removal of water soldier can be initiated. It is the responsibility of the individual to ensure that all other permissions, approvals and authorizations are acquired prior to proceeding with any water soldier control or removal activities. For example, the presence of a species at risk may require additional authorizations.

Other requirements (such as requirements for permits) that could apply to water soldier control activities will depend on the location in Ontario, as well as the timing and type of activity being

undertaken. While not an exhaustive list of permits or rules that may apply to water soldier control or removal activities, several examples for consideration include the following:

### **Aquatic Plant Removal in Provincial Crown Land and Shore Lands**

In Ontario, the beds of most waterbodies are provincial Crown land. This does not include federal lands and water bodies (e.g., the Trent-Severn and Rideau Canal waterways), and certain isolated or offline waterbodies on private lands. The Ministry of Natural Resources and Forestry (MNR) manages Crown and shore lands under the Public Lands Act (PLA). According to the Regulations under the Act, a person can remove invasive aquatic plants, including water soldier, by mechanical means or by hand without a permit if they follow all of the [rules for removing aquatic invasive plants](#) prescribed by the Regulations (O. Reg. 239/13, s. 9 (1)). These rules include following the [In-water Work Timing Window Guidelines](#) established to protect fish from impacts during spawning migrations and other critical life stages. If you cannot meet all of the prescribed rules, or want to conduct control or removal activities outside of the timing window guidelines, you will need a work permit to remove water soldier. Information on how and when you need a work permit for projects on Crown land and shore lands as well as permit applications can be obtained [online](#) or by contacting your local [MNR office](#).

### **Please also refer to e-laws regularly, to check for any updates to the requirements under the PLA. Herbicides**

If you plan to use herbicides to control water soldier or other aquatic plants, approval is required from the Ontario Ministry of Conservation, Environment and Parks (MECP). Information on requirements for aquatic herbicide applications can be obtained by contacting a MECP [ministry regional office](#) to discuss plans and what pesticide permits may be required.

### **Aquatic Plant Removal in the Trent-Severn Waterway, Rideau Canal or other Federal Waters**

The Trent-Severn Waterway and the Rideau Canal are National Historic Sites under the federal authority of the Parks Canada Agency. As a result, approval is required from the Parks Canada Agency for any plant removal activity in these or other federal waters. Permit applications and guidelines for aquatic plant removal can be obtained [online](#).

Federal waters that are not regulated by Parks Canada are generally under the authority of Fisheries and Oceans Canada. Information about requirements related to projects near water can be obtained [online](#).

### **Resources to Support the Implementation of the Plan**

For more information about the [Invasive Species Act, 2015](#) and [regulations](#) pertaining to water soldier and other regulated invasive species visit <https://www.ontario.ca/page/invasive-species-ontario>.

For more information about how to identify water soldier, report new occurrences, and prevent its further spread in Ontario see the water soldier fact sheet on the Invasive Species Awareness Program website at [www.invadingspecies.com](http://www.invadingspecies.com).