INVASIVE SPECIES ALERT!

Yellow floating heart
(Nymphoides peltata)


B.C. Government

HAVE YOU SEEN THIS PLANT?

DESCRIPTION

- Native to Asia and Europe.
- Aquatic, substrate rooted perennial plant.
- Stems are long and branched reaching up to one meter or more and are located below the surface of the water.
- Flowers are 2-4cm in diameter and consist of five bright yellow petals with fringed edges. Blooms from June to August.
- Leaves are circular or heart-shaped and 3-10cm in diameter.

PRIMARY THREAT: Impedes use of shallow waters for recreation, irrigation & industrial activities, and alters natural ecosystems.

REPORT INVASIVE SPECIES

Download the App!

IAS

www.gov.bc.ca/invasive-species


B.C. Government

BIOLOGY & SPREAD

- Reproduces mainly by plant fragments, and by seed.
- Local dispersal mainly by water, human recreation, wildlife and intentional planting.
- Nursery sales are the main pathway for long distance spread.

HABITAT

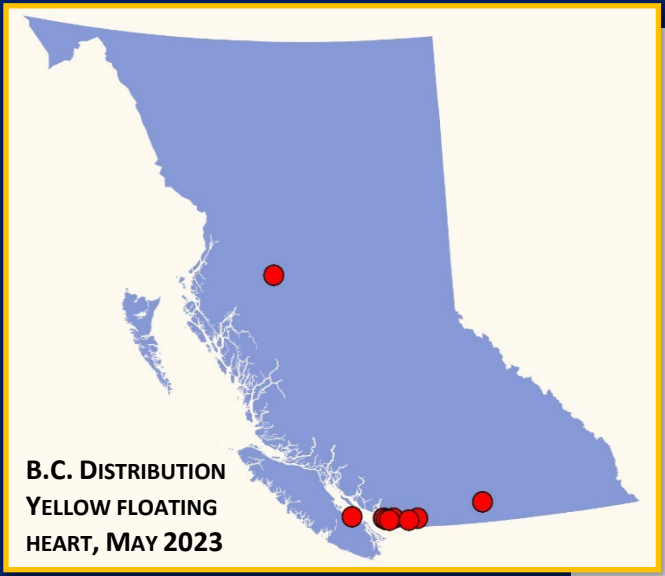
- Occurs in 0.5 to 4m depths in still or slow-moving fresh water including wetlands, lakes, ponds, reservoirs, swamps, rivers, sloughs, canals, ditches, channels, and slow moving streams

For more information:
https://www2.gov.bc.ca/gov/content?id=ECF57097F729403A8F2A464EBF09B7FE

BRITISH COLUMBIA

May 2023

Yellow floating heart (*Nymphoides peltata*)



B.C. Distribution Yellow floating heart, May 2023

Distribution & Status

- Management goal provincial eradication

Region	Status
Fraser Valley	2 waterbodies. Containment & control in progress.
Metro Vancouver	8 waterbodies. Contained; control in progress.
Bulkley Valley	1 one waterbody. Contained; control in progress.
Central Vancouver Island	2 waterbodies. Contained; control in progress.
South Okanagan	1 waterbody. Contained

Report Invasive Species

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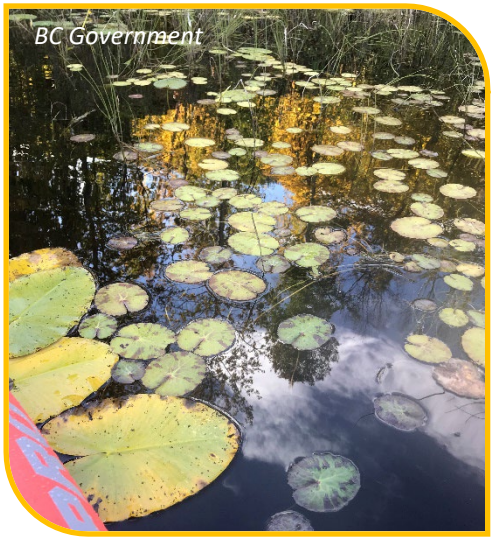
Look-alikes:

- Several *Nymphoides* species appear similar and require the flower to differentiate by species.
- Yellow floating heart leaves are small (3-10 cm diameter) compared to Yellow waterlily (*Nuphar lutea*)(10 to 40 cm)



Yellow waterlily (above left) compared to Yellow floating heart (above right)

Did you know?

- Mature plants are well adapted to withstand water level fluctuations
- Plants can adopt a land-form habit on saturated substrates

What Can You Do?

- **REPORT** sightings
- **CHOOSE** only non-invasive plants for your water garden

For more information:
https://www2.gov.bc.ca/gov/content?id=ECF57097F729403A8F2A464EBF09B7FE

BRITISH COLUMBIA

May 2023

MECHANICAL TREATMENT GUIDELINES FOR CONTROL OF YELLOW FLOATING HEART - SEYMOUR LAKE

NOTE: Any changes in and about a stream require an authorization under the *Water Sustainability Act* (WSA) or *Water Sustainability Regulation* (WSR). A stream refers to any natural watercourse as defined in the Act. Changes in and about a stream include any modification to the nature of a stream including any modification to the land, vegetation and natural environment of a stream or the flow of water in a stream; or any activity or construction within a stream channel that has or may have an impact on a stream or a stream channel and includes side channels of the stream.

Any mechanical control of Yellow floating heart (only in the immediate vicinity of docks or licensed water intakes) by a land owner, municipality, regional district or improvement district or other body, will require a Change Approval for Work In and About a Stream (Notification) to be submitted at least 45 days prior to removal. For more information, refer to the FrontCounter BC website at: https://portal.nrs.gov.bc.ca/web/client/-/change-approval-for-work-in-and-about-a-stream.

MECHANICAL TREATMENT METHODS FOR YELLOW FLOATING HEART

SCOPE

Yellow floating heart spreads readily in water, for this reason most management in the B.C.is completed by the provincial government, to ensure each treatment site is contained and removal efforts do not increase spread.

There are currently only 18 confirmed sites of Flowering rush in British Columbia, the majority in confined ponds. Seymour Lake is the second largest infestation of Yellow floating heart in the province at 1.4 hectares, and the only confirmed population in the Bulkley Nechako region. The Province is working to contain and manage Yellow floating heart in Seymour Lake and requests that the public avoid disturbing or removing the plants and fragments.

IMPORTANT: These guidelines are intended for the removal of Yellow floating heart *only* where plant density is restricting the use of private docks or licensed water intakes in Seymour Lake.

Large-scale cutting or mowing of invasive aquatic plants in the lake is *strongly discouraged*, this will increase fragmentation, rate of reproduction and spread, resulting in a larger more damaging Yellow floating heart population.

Site Type

Site types suitable for manual Yellow floating heart removal are locations where plant density is restricting the use of private docks or licensed water intakes, limited to the area in the immediate vicinity of these structures. Ideally, Yellow floating heart removals will occur under dry conditions or in still (no movement) water less than or equal to one metre depth.

Reproduction & Spread

Yellow floating heart is extremely difficult to control and spreads readily via propagules or reproductive plant parts, including stem and root fragments, and seed. Viable propagules can float in the upper water column. Yellow floating heart spreads mainly by water, human water recreation and improper garden waste disposal. However, nursery sales are the main pathway for long distance dispersal.

Target Invasive Plant

- Yellow floating heart (*Nymphoides peltata*)
- Plant propagules or the reproductive plant parts; including rhizomes, stolons, stem fragments, and seeds (flower heads should also be removed to prevent seeding).
- Remove target invasive plant propagules rooted to the water body substrate and suspended in the water column.
- Yellow floating heart reproduces by seed and vegetative growth, but spread is primarily from stems and roots fragmenting. Roots, stems and seeds will float in the upper water column currents until deposited in the substrate in still water (deposition points) where they will establish new plants.
- Yellow floating heart is typically rooted to the substrate but may be uprooted and free-floating.
- Removal of rooted plants requires careful hand loosening of substrate to ensure the entire root fragment is removed without breakage.

Treatment Methods

- *Management Goals*: The management goals for this document are to prevent spread, then suppress growth of the target invasive plant in immediate vicinity of docks and licensed water intakes.
    - *Containing the Work Site*: The perimeter of each wetted work site must be isolated with a floating containment boom in advance of disturbing the target plants (Figure 1). A simple boom will contain the majority of floating plant fragments during removal efforts (e.g. joined foam pool noodles). When the removals are completed, ALL floating plant fragments should be collected with a net and the work site thoroughly searched and cleaned to ensure no escapees before dismantling the boom. All boom materials and equipment should be thoroughly cleaned of plant materials before moving to the next work site. If flowers are present, cut flowers directly into a garbage bag prior to removing the remainder of the plant.
    - No removals should occur in areas with flow or current.
    - It is extremely important to REMOVE ALL PLANT FRAGMENTS FROM THE LAKE.

Figure 1. Example floating containment boom around work site.

Figure 2. Example throw scythe and water rake.

Table 1. Yellow floating heart summary of treatment methods by site type at Seymour Lake.

Site Type	Method
<1 m depth	Hand Removal - Carefully loosen the soil at the base of the plant by hand and raise the trailing root masses in their entirety. Take care to pull up all stems, stolons and rhizomes from the sediment and avoid breaking or fragmenting the plants. Collect ALL plant parts.
>1 m depth	Cutting - Cut each stem once as deep as possible using a single fluid motion with a throw scythe and/or water rake. Collect ALL plant parts. Avoid multiple cutting passes in a single location, this will divide each plant stem into multiple fragments that will be more difficult to contain and collect and will increase the rate of plant reproduction and spread. Collect ALL plant parts.

- *Hand Removal* (≤1 m water depth): Carefully loosen the soil at the base of the plant by hand and raise the trailing root masses in their entirety. Take care to pull up all stems, stolons and rhizomes from the sediment and avoid breaking or fragmenting the plants. Caution, stem and roots fragment readily. Collect ALL plant parts.
    - Where plants are growing densely, it may be difficult to remove an individual plant in its entirety without disturbing adjacent plants. Care should be taken to remove the entire plant population and surrounding substrate systematically to ensure that no propagule fragments remain in the substrate or water.
    - Hand removal is best suited to areas with loose, organic substrate rather than compact gravel. Site suitability can be assessed quickly.
    - Hand removal should not be done in areas where fragmentation will occur (e.g. compact gravel substrate, water >1 m deep
    - Digging should be avoided, this will fragment roots, forming new plants.
    - Organic substrates are ideal for effective hand removal in shallow waters; however, it also leads to poor visibility in the water column once disturbed. Minimizing substrate disturbance will aid good visibility and be healthier for aquatic life.

- *Cutting* (>1 m water depth): If hand removal of the entire plant is not an option, plants can be cut using a throw scythe and/or water rake (Figure 2). The throw scythe and water rake can be used in combination to cut and collect plant material, or the rake can be used in isolation. The scythe should not be used in isolation, it will cut but not collect the plant material. Cut each stem once using a single fluid motion with a throw scythe or water rake. Avoid multiple cutting passes in a single location, this will divide each plant stem into multiple fragments that will be more difficult to contain and collect and will increase the rate of plant reproduction and spread. Once cut, carefully collect all plant fragments directly into a garbage bag.
  - The throw scythe consists of a V-shaped blade at the end of a long handle to which a 30-metre rope is attached. The cutter may be used from a watercraft, dock, steep shoreline, or standing in water greater than one-metre deep. Before throwing the scythe, the rope should be attached to a secure anchor. Throw the cutter horizontally as far as possible into the plant mat. Let the cutter sink to the bottom, then retrieve with firm pulls on the rope to cut the leaf stems rather than gradually pulling on the plant mass and ripping. Most of the cut plant material will float to the surface.
  - Maintain sharp blades on the scythe to ensure that it cuts, rather than rips the plants.
  - Care should always be exercised when operating cutting equipment to avoid contact with people, wildlife, or watercraft.
  - Care should be taken to locate obstructions or dangers (e.g. submersed electric cables) in advance of treatments.
  - Cutting should not be done in areas of ≤1 m water depth.
  - Large-scale cutting or mowing invasive aquatic plants in the lake is ***strongly discouraged.***
- *Non-Target Impacts*:
  - Ensure steps are taken to minimize the introduction of sediment to any water course.
  - Ensure no entrapment of fish.
  - Avoid deleterious substances from entering any water course.
  - Minimize removal of native vegetation.

CONTAINMENT

- *Collection*: All removed plant material should be collected in industrial strength garbage bags (2mm ideal) and disposed of at a private dry land site. Special care will be taken to ensure that once plant material is removed from the waterway it does not contact water during transport or disposal.
- *Transport*: Handling of plant material should be kept to a minimum and always contained. Care will be taken to ensure that no plant material re-enters the water system.

DISPOSAL

- *Disposal Sites*: Suitable long-term disposal sites will be located on private, dry land (no moisture), well above the high-water mark (highest water level in an average year), a barrier (e,g.. tarp) between the plant waste and soil, and in an area that will not be disturbed.
- *Transport*: Handling of plant material should be kept to a minimum and always contained. Care should be taken to ensure that no plant material re-enters the water system.
- *Stockpiling*: If plant material is temporarily stockpiled at a location and then moved to a long-term disposal site, bagged plant material should be contained in a large tarp during transport and care should be taken to ensure that no plant material escapes during transport.

WARNING: Yellow floating heart can adapt a land-form habit and continue to actively grow and spread on saturated substrates out of water. Stockpiled plant material must remain contained.

SANITATION

- Ensure that watercraft and equipment arrive and depart the work site in a clean condition and are maintained free of fluid leaks and aquatic plants and animals, especially invasive species.
- Apply the principles of Clean, Drain, Dry: https://www2.gov.bc.ca/gov/content/invasive-mussels/what-can-you-do to minimize disturbance and prevent propagule spread of aquatic invasive species. Propagules refer to reproductive plant parts, including but not limited to seeds, rhizomes, stolons, and bulbs:
  - *Clean*: Thoroughly inspect and clean watercraft, trailers, and equipment; and remove vegetation and other aquatic species, dirt, debris, or surface deposits including mussel shells or residue that could mask the presence of attached mussels, or other aquatic invasive species;
  - *Drain*: To the extent practical, all water drained from any live-well, bait-well, storage compartment, bilge area, engine compartment, deck, ballast tank, water storage and delivery systems, cooler or other water storage area on the watercraft, trailer, engine or equipment; and,
  - *Dry*: No visible sign of standing water, or in the case of equipment, wetness on or in the watercraft, trailer, engine or equipment.
- Wash, refuel and service machinery and store fuel and other materials for the machinery in such a way as to prevent any deleterious substances from entering the water.

MATERIALS & EQUIPMENT

- Floating containment boom (e.g. joined foam pool noodles)
- Net (mesh diameter $\leq$10 mm)
- Hand pruning shears (for deadheading)
- Throw scythe and/or water rake
- Industrial strength polypropylene garbage bags (2mm thick)
- Tarp
- Personal protective equipment