

# European Frog-Bit

*Hydrocharis morsus-ranae*



Photo courtesy of Mark Warman, Cleveland Metroparks.

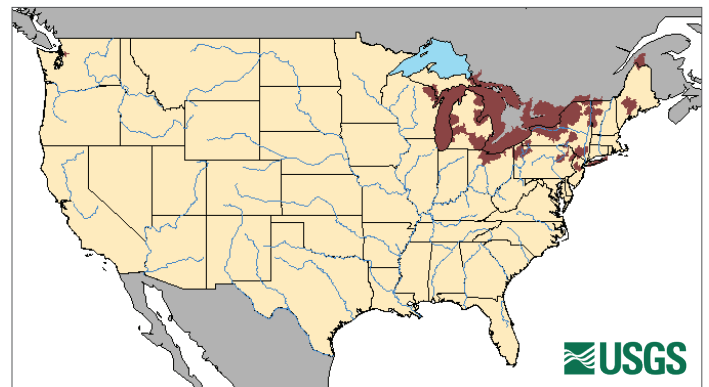
European Frog-Bit is a free-floating, herbaceous, aquatic plant that resembles a miniature water lily. It has been found in the Great Lakes since the 1930s but is now spreading inland into streams and lakes within the basin. The dense floating mats formed by European Frog-Bit restrict available sunlight and nutrients, displace native plant species, reduce biodiversity, and impact water flow.

## Species Description

European Frog-Bit can reach 20 cm (8 in) in length. The thick, leathery leaves are small (1.5-6.5 cm [0.6-2.5 in] long), heart-shaped, and occur in clumps that are not anchored to the bottom sediment. A dark purplish-red spongy coating is present on the underside of the leaves, allowing the plant to float on the water's surface. Flowers are small, white, and showy, about 1 cm (0.4 in) in length. Each flower has three petals and a yellow center which show up in early summer. While water lily species may be confused with European Frog-Bit, water lily flowers are much larger, with more than three petals. Stem-like extensions called stolons run from the center of the plant to produce juvenile plants. These stolons also produce turions (vegetative winter buds) that break free and sink to the water bottom to lie dormant for the winter.

## Native & Introduced Ranges

Native to Europe and northern Asia, European Frog-Bit was introduced intentionally in the United States as a commercial ornamental that escaped cultivation and spread to the Canadian shorelines of Lake Erie, Lake Ontario, the St. Lawrence River in New York, and Lake Champlain in Vermont. Populations are also present in Michigan, New Jersey, Ohio, and Washington. This species was first confirmed in Pennsylvania in Warren County in 2013 and has since spread to additional locations.



USGS

## Biology & Spread

Most populations of European Frog-Bit tend to be dominated by only one sex, and therefore it seldom produces seeds. Instead, it relies on plant fragments or turions to spread to new areas. A single plant can produce 100 to 150 turions in one season, which float to the surface and begin to grow in the spring. It can also hitchhike on boats, trailers, waterfowl, and flowing currents, and be spread to new areas. European Frog-Bit can also be spread as humans purchase it as an aquarium plant for water gardens.

## Habitat

Preferring quiet, still, calcium-rich areas, the European Frog-Bit is typically found in marshes, fens, swamps, backwaters, bays, sheltered coves, poorly drained ditches, and slow-moving shorelines of rivers, streams, and lakes.

## Impacts

European Frog-Bit populations can expand rapidly, allowing them to overtake wetlands with dense mats of vegetation that decrease the amount of nutrients, dissolved oxygen, and light penetration available to native vegetation attempting to grow beneath, often making it the dominant species in wetlands. European Frog-Bit can also deplete oxygen levels by limiting water circulation and increasing the decomposition of dead plants, potentially killing fish and other aquatic organisms. These mats can also change water hydrology, water quality, and inhibit the movement of waterfowl and fish, negatively affecting the ecosystem. However, some studies show that European Frog-Bit can serve as a food source for some types of water birds, fish, and insects.

## Prevention & Control

Once established, European Frog-Bit can be very difficult and costly to control and most solutions are only temporary. Mechanical harvesting, chemicals, and biological agents are three common methods suggested to control European frog-bit. Mechanical harvesting can have significant negative impacts on aquatic ecosystems. Hand removal can provide limited, or temporary relief. Chemicals have been used as effective controls in ditches, however, chemical treatments are not target-specific and can eliminate other aquatic plants, including beneficial species. Biological controls are also not target-specific and to date, there are none released for European Frog-Bit.



Photo courtesy of Leslie J. Mehrhoff, University of Connecticut, Bugwood.org.



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Preventing the introduction and spread of European Frog-Bit is the best way to protect natural habitats from harm.

- Know how to identify and report European Frog-Bit.
- Always check for and remove plants, mud, and debris from boats, trailers, clothing, and equipment before entering a water body and before leaving a water body.
- Drain all water from bait buckets, bilges, and live wells before transporting to new areas.
- Clean all gear and equipment with hot water (140°F or 40° C) or salt water, OR let boats and equipment dry thoroughly for at least five days before entering a new water body.
- When choosing plants for a pond or water garden, purchase from a licensed nursery and choose regionally native or non-invasive plants. Check with your state natural resource agency to confirm which plants to avoid for your region.

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## References:

- Zhu, B. and Rudstam, L.G. 2014. Shading as a Control Method for Invasive European Frogbit (*Hydrocharis morsus-ranae* L.). PLoS ONE. 9. E98488. 10.1371/journal.pone.0098488.
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