



**Natural Heritage  
& Endangered Species  
Program**

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*Massachusetts Division of Fisheries & Wildlife*

**Estuary Arrowhead**  
***Sagittaria montevidensis***  
Cham. & Schlecht  
**ssp. *spongiosa*** (Englem.) Bogin

State Status: **Endangered**  
Federal Status: **None**

**DESCRIPTION:** Estuary Arrowhead is a spongy aquatic member of the Water-plantain family (Alismataceae). Like other species in this family, plants are rooted to the substrate with septate roots. The leaves are modified into narrow (4–18 cm long, 0.5–1 cm wide), spongy phyllodia, and the tips of the leaves are slightly expanded and spatula-like (or rarely more sagittate). Erect peduncles bear one to four whorls of white, inconspicuous flowers; flowers may also be solitary. Fruiting heads (1.2–2.1 cm in diameter) are comprised of a cluster of small, flattened achenes, each narrowly winged on the margins and with a short lateral beak.

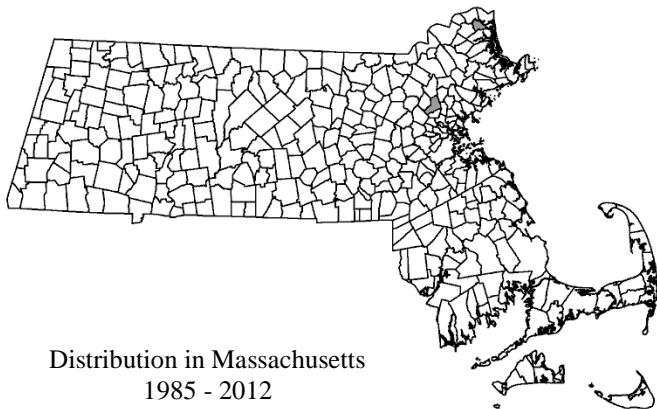
**AIDS TO IDENTIFICATION:** Estuary Arrowhead is the only annual arrowhead species in New England and one of a few arrowheads that occupy tidally-influenced habitats. It is best identified when in flower or fruit. Estuary Arrowhead can be recognized by its erect, spongy leaves with spatulate tips. In rare instances, this species may have expanded blades, typically without



*Estuary Arrowhead has small white flowers growing on erect peduncles. This aquatic annual is submerged at high tide.*  
Photo by Don Cameron, Maine Natural Areas Program.

basal lobes. Inflorescences are supported by thick, relatively short peduncles that are usually shorter than the leaves, and thick, spongy pedicels. The flowers are perfect (at least the lowermost ones), with erect, appressed sepals that enclose the flower and fruiting head. The pedicels become recurved when the flowers mature.

**SIMILAR SPECIES:** Estuary Arrowhead is similar to a few other arrowheads that may occur in tidal waters. River Arrowhead (*S. subulata*) also has bladeless leaves and recurved fruiting pedicels, but differs from Estuary Arrowhead by its longer (to 30 cm), wider (1–6 mm) leaves, longer peduncles, and greater number of flower whorls (up to 10). It has pistillate lower flowers with reflexed sepals in fruit, and achenes with one to three toothed wings on each face. Grass-leaf Arrowhead (*S. graminea*) can have phyllodial leaves but these are not spongy, and are long (to 30 cm) and flattened on top. It also has long peduncles (to 5 dm), up to 12 flower whorls, pistillate lower flowers with reflexed sepals, and



Distribution in Massachusetts  
1985 - 2012  
Based on records in the  
Natural Heritage Database

**A Species of Greatest Conservation Need in the Massachusetts State Wildlife Action Plan**

**Massachusetts Division of Fisheries & Wildlife**

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Please allow the Natural Heritage & Endangered Species Program to continue to conserve the biodiversity of Massachusetts with a contribution for 'endangered wildlife conservation' on your state income tax form, as these donations comprise a significant portion of our operating budget.

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ascending pedicels when in fruit (although this species rarely fruits in our range). Mud Arrowhead (*S. rigida*) has highly variable leaves and may have phyllodial leaves. It differs from Estuary Arrowhead by its longer peduncle (to 8 dm), greater number of flower whorls, upper staminate flowers with long pedicels (1.5–3 cm), lower pistillate flowers that are nearly sessile, and fruiting pedicels that are ascending, with larger achenes (2–3 mm) and reflexed sepals.

**POPULATION STATUS IN MASSACHUSETTS:**

Estuary Arrowhead is listed under the Massachusetts Endangered Species Act as Endangered. All listed species are protected from killing, collecting, possessing, or sale, and from activities that would destroy habitat and thus directly or indirectly cause mortality or disrupt critical behaviors. This species is known from Middlesex and Essex Counties.

**RANGE:** Estuary Arrowhead occurs from New Brunswick south along the coast to Delaware and eastern North Carolina.

**HABITAT:** Estuary Arrowhead is restricted to sandy shores and mudflats of freshwater and brackish tidal rivers and marshes in coastal areas. Plants are submersed under high tide conditions and exposed during low tides. Species found in association with Estuary Arrowhead in Massachusetts include Grass-leaf Arrowhead, Perfoliate Pondweed (*Potamogeton perfoliatus*), Little Spike-rush (*Eleocharis acicularis*), Water Purslane (*Ludwigia palustris*), Wild Rice (*Zizania aquatica*), Atlantic Mudwort (*Limosella australis*), Estuary Beggar-ticks (*Bidens hyperborea*), Lilaeopsis (*Lilaeopsis chinensis*), and Dotted Smartweed (*Persicaria punctata*).

**THREATS AND MANAGEMENT**

**RECOMMENDATIONS:** As for many rare species, exact needs for management of Estuary Arrowhead are not known. This species occurs in freshwater tidal marshes and stream banks, and any alteration of hydrological conditions or increased sedimentation due to changes in adjacent land use should be avoided. Competition from invasive wetland species could also reduce the available habitat of Estuary Arrowhead. All active management of rare plant populations (including invasive species removal) is subject to review under the Massachusetts Endangered Species Act, and should be planned in close consultation with the Massachusetts Natural Heritage & Endangered Species Program.

**Flowering and Fruiting in Massachusetts**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

**REFERENCES:**

Gleason, H.A., and A. Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*, 2<sup>nd</sup> edition. The New York Botanical Garden, Bronx, NY.

Haines, A. 2011. *Flora Novae Angliae – a Manual for the Identification of Native and Naturalized Higher Vascular Plants of New England*. New England Wildflower Society, Yale Univ. Press, New Haven, CT.

Updated 2015

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