Lythrum alatum var. *alatum*

Winged Loosestrife

Lythraceae

Lythrum alatum var. *alatum* by John Hilty

***Lythrum alatum* var. *alatum* Rare Plant Profile**

New Jersey Department of Environmental Protection
State Parks, Forests & Historic Sites
Forests & Natural Lands
Office of Natural Lands Management
New Jersey Natural Heritage Program

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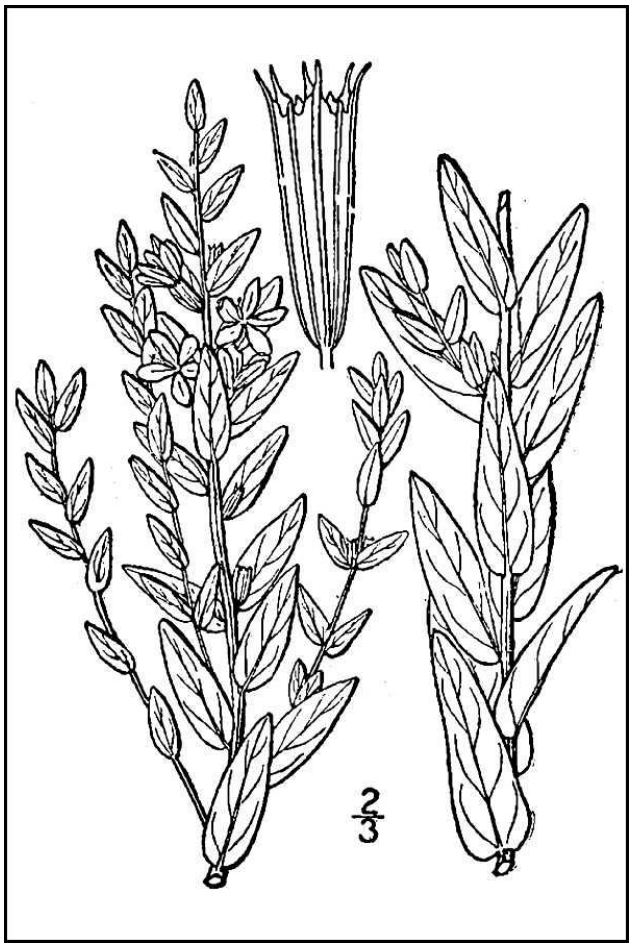
Life History

Lythrum alatum var. *alatum*, Winged Loosestrife, is a rhizomatous perennial herb in the Lythraceae. *L. alatum* plants often produce small clusters of stems from a single rootstock. The branches are strongly four-angled with slightly winged edges and they are frequently described as wandlike. The plants are usually under a meter in height: When a colony was encountered by Nick Koenig in a Kentucky field he described them as having "*brilliantly coloured fuschia flowers clustered on the middle of a stem no taller than my kneecap*" (Koenig and Lawrence 2024). The stalkless leaves of *L. alatum* var. *alatum* are 1–7.6 cm long, 2–14 mm wide, and rounded or slightly heart-shaped at the base. They tend to be smaller and alternate near the top of the stems while the lower ones are opposite or sub-opposite. The flowers are solitary in the upper leaf axils—they are about 1.5 cm wide and have six purple or purple-pink petals marked with dark central lines. *Lythrum alatum* is a distylous species so individual plants have one of two floral types. One form (pin) has a long style with short stamens and the other form (thrum) has a short style and long stamens. Examination of plants in 22 Minnesota populations found that the two types occurred with equal frequency (Anderson and Ascher 1993a). *Lythrum* fruits are small two-parted capsules surrounded by a persistent calyx. (See Robertson 1892, Britton and Brown 1913, Fernald 1950, Blackwell 1970, Graham 1975 & 2022, Gleason and Cronquist 1991).



Left: Britton and Brown 1913, courtesy USDA NRCS 2025a. Right: John Hilty, undated.

The other generally accepted variety of *L. alatum* (var. *lanceolatum*), which is sometimes viewed as a distinct species, does not occur in New Jersey. In places where their ranges overlap var. *lanceolatum* can be distinguished by its tapering leaf bases and taller stems (Graham 2022, Weakley et al. 2024). Graham and Cavalcanti (2001) observed that *Lythrum* is chromosomally diverse but *L. alatum* and other native North American species share a count of n = 10. Members of the genus can reportedly hybridize when they co-occur and there are a number of horticultural cultivars (Shinners 1953, Graham 1975, Anderson and Ascher 1993b, Houghton-Thompson et al. 2005, Morris 2007). Seeds resulting from crosses between *L. alatum* and *L. salicaria* exhibited poor germination and limited growth (Brown and Mitchell 2001).

Throughout its range, *Lythrum alatum* var. *alatum* may flower from June through September (Robertson 1892, Blackwell 1970, Kaul and Rolfsmeier 1987, Rhoads and Block 2007, Weakley et al. 2024). The blooming period lasts for a month or two, during which time the flowers open from the bottom of the stem upward (Kinyo 2005, Hilty 2020). The fruits mature during September and October (Stone 1911, Hough 1983). As *L. alatum* stems senesce at the end of the growing season the plants produce fleshy, prostrate winter shoots that persist until spring and sometimes give rise to additional stems the following season (Graham 1975). During the winter, dead plants from the previous year remain standing and their four-angled stems, partly alternate leaves, and single axillary fruits can aid in their identification (Levine 1995).

Lythrum alatum var. *alatum* was one of more than 150 plant species evaluated for potential pharmaceutical or nutritional applications by Borchardt et al. (2008). The seeds of Winged Loosestrife had particularly high levels of antioxidant activity and some antimicrobial activity was also recorded in the species, so further investigations might lead to its commercialization for use in foods or medicines.

Pollinator Dynamics

Lythrum alatum is pollinated by insects. The flowers produce nectar, although they are not notably fragrant (Blackwell 1970, Hilty 2020). The showy blooms attract a broad array of insects, including bees, flies, butterflies, and moths, although some of the visitors feed on pollen without aiding in cross-fertilization. Long-tongued bees and butterflies appear to be the most effective pollinators (Robertson 1892, Parlin 1946, Levin 1970, Brown and Mitchell 2001, Brown et al. 2002, Kinyo 2005, Hilty 2020). *L. alatum* var. *alatum* plants may form large patches or be scattered around the habitat (Robertson 1892, Koenig and Lawrence 2024). A dense aggregation can attract a greater number of pollinators but a sparse distribution might result in the transmission of genes over greater distances (Levin and Kerster 1969).

Distylous species generally require the transmission of pollen between individuals with complementary floral forms (thrum ↔ pin) in order to develop viable seeds. Stamen length determines which part of an insect's body comes into contact with the pollen, thereby facilitating its transfer to a stigma of corresponding length. However, additional self-incompatibility mechanisms are at work in most, but not all, heterostylous species (Darwin 1864 & 1868, Cohen 2010). For example, early investigators noted that the morphs of some heterostylous species exhibited differences in pollen size or color, and a recent study of *Lythrum salicaria*—which is

tristylous (having three floral forms)—determined that different proteins were present in the pollen of different morphs (Kalinowski et al. 2007). All *Lythrum* species are generally reliant on cross-pollination and exhibit a strong tendency toward self-incompatibility (Anderson and Ascher 1993b, Anderson 2019). This was confirmed for *L. alatum* in a Minnesota study by Anderson and Ascher (1994). Capsules of cross-fertilized plants in five populations produced 7–69 seeds, with greater numbers developing in long-styled individuals, but most of the self-pollinated plants failed to produce any. In one population some self-fertilized individuals developed 1–3 seeds. Inhibition of pollen tube growth was noted as the primary strategy for limiting self-pollination.

Seed Dispersal and Establishment

Lythrum seeds are tiny, typically less than one millimeter in total length (Graham 2022). Mahady (2024) recorded an average mass of 16.4 µg/seed for *L. alatum*. Loosestrife seeds usually remain in the capsules for some time following dehiscence and are shed slowly throughout the winter. Wind initially shakes the small seeds free and transports them to new locations. Further dispersal may be aided by water or animals. The propagules may float for short periods or be moved via rain runoff. Animal dispersal is primarily by adherence to muddy feet, as the seeds are probably not large enough to attract the attention of foraging birds (Callaghan 1958, Ottenbreit 1991, Levine 1995, Yakimowski et al. 2005, Hilty 2020).

The propagules of some other *Lythrum* species can remain viable in the soil for long periods (Callaghan 1958, Leck et al. 1988, Welling and Becker 1992, Smith et al. 2002), although no records of seed banking in *L. alatum* were found. Winged Loosestrife has been noted as a difficult species to grow from seed (e.g. Green and Curtis 1950). Germination of *L. alatum* requires sufficient light and soil that is constantly moist but not wet (Kinyo 2005). The seeds do not appear to require cold stratification: Mahady (2024) found that about 4% of *L. alatum* seeds germinated whether or not they were exposed to low temperatures during the winter. Examination of established *Lythrum alatum* plants in Ohio found that mycorrhizae were present in slightly less than half, which suggests that fungal associations are optional in the species (Turner et al. 2000).

Habitat

Although *Lythrum alatum* var. *alatum* has a slight tolerance for shade it is nearly always found in open conditions with plenty of available sunlight (Weakley et al. 2024). The species favors permanently wet or moist soils. Typical habitats include prairies, fens, wet meadows or fields, marshy shores, and swamp margins at elevations of 50–1500 meters above sea level (Robertson 1892, Pammel 1898, Turner 1934, Parlin 1946, Partch 1962, Blackwell 1970, Hough 1983, Kaul and Rolfsmeier 1987, Steinauer et al. 1996, Rhoads and Block 2007, Burton and Uzarski 2009, Graham 2022, Koenig and Lawrence 2024, NJNHP 2024). In buffalo wallows or other low spots in prairies, *L. alatum* can sometimes be found in sites that function as ephemeral ponds (Tryon and Easterly 1975, Collins and Uno 1983). In standing water the plants produce an extra layer of corky tissue at the base of their stems to permit continuous air flow to the roots, and they often

grow taller as well (Lempe et al. 2001, Mahady 2024). An unusual habitat was reported in Missouri: *L. alatum* var. *alatum* was found in sandstone glades where structural modifications resulting from intermittent streams had created temporary pools (Hays 1995).

Winged Loosestrife appears to do best in neutral to slightly acidic soils. The species is tolerant of salinity at low concentrations (up to 7.5 ppt) but stunted growth can result from excessively alkaline or saline conditions (Pearson and Leoschke 1992, Baum 2022, Mahady 2024). *Lythrum alatum* has been found in a number of anthropogenic habitats including ditches, reservoir shores, abandoned agricultural fields, cemeteries, and utility right-of-ways (Goodman et al. 1967, Hough 1983, Betz and Lamp 1989, Rhoads and Block 2007, Whitsitt and Tappe 2009, Wagner et al. 2014). Various historical New Jersey habitats were described as a pond, a boggy meadow, a thicket, a swamp, and a limestone swale. Other collection sites in the state were identified as a sand pit, a rubbish dump, and a water feature on a golf course (Mid-Atlantic Herbaria 2025).

Wetland Indicator Status

The U. S. Army Corps of Engineers divided the country into a number of regions for use with the National Wetlands Plant List and portions of New Jersey fall into three different regions (Figure 1). *Lythrum alatum* has more than one wetland indicator status within the state. In the Eastern Mountains and Piedmont region it is a facultative wetland species, meaning that it usually occurs in wetlands but may occur in nonwetlands. In other regions of the state *L. alatum* is an obligate wetland species, meaning that it almost always occurs in wetlands (U. S. Army Corps of Engineers 2022).

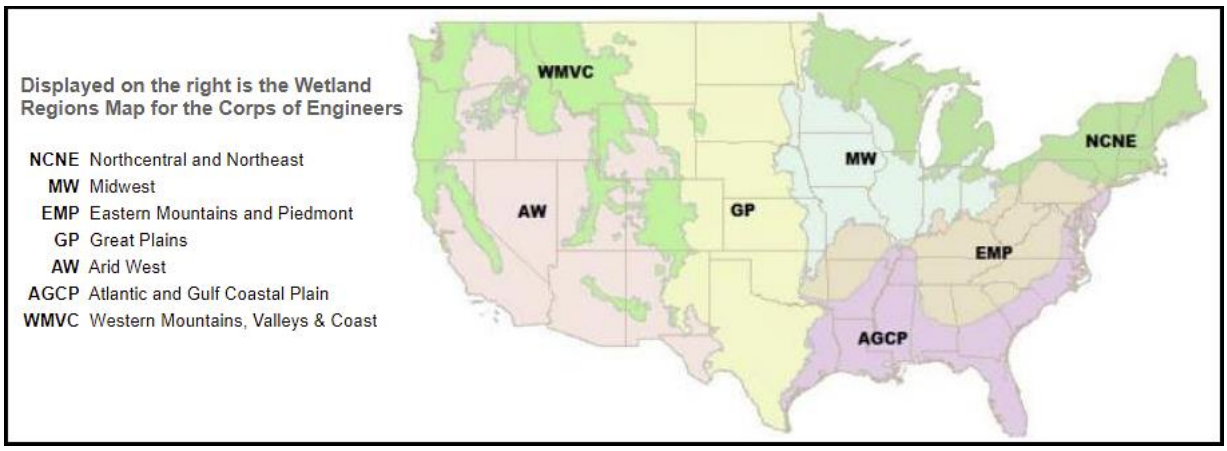


Figure 1. Mainland U. S. wetland regions, adapted from U. S. Army Corps of Engineers (2022).

USDA Plants Code (USDA, NRCS 2025b)

LYALA4

Coefficient of Conservancy (Walz et al. 2020)

CoC = 7. Criteria for a value of 6 to 8: Native with a narrow range of ecological tolerances and typically associated with a stable community (Faber-Langendoen 2018).

Distribution and Range

The native range of *Lythrum alatum* var. *alatum* encompasses a large portion of the central and eastern United States, extending north into Ontario. The variety can also be found throughout much of Mexico although its range is discontinuous (POWO 2025). The map in Figure 2 depicts the extent of Winged Loosestrife in the United States and Canada. *L. alatum* was excluded from the flora of Florida following the description of a new species by Franck and Werner (2023). Although Fernald (1950) indicated that the range of *L. alatum* extended west to British Columbia, records from that province are restricted to a single occurrence that was probably introduced and the species has not been seen there since 1889 (Cody 1978).

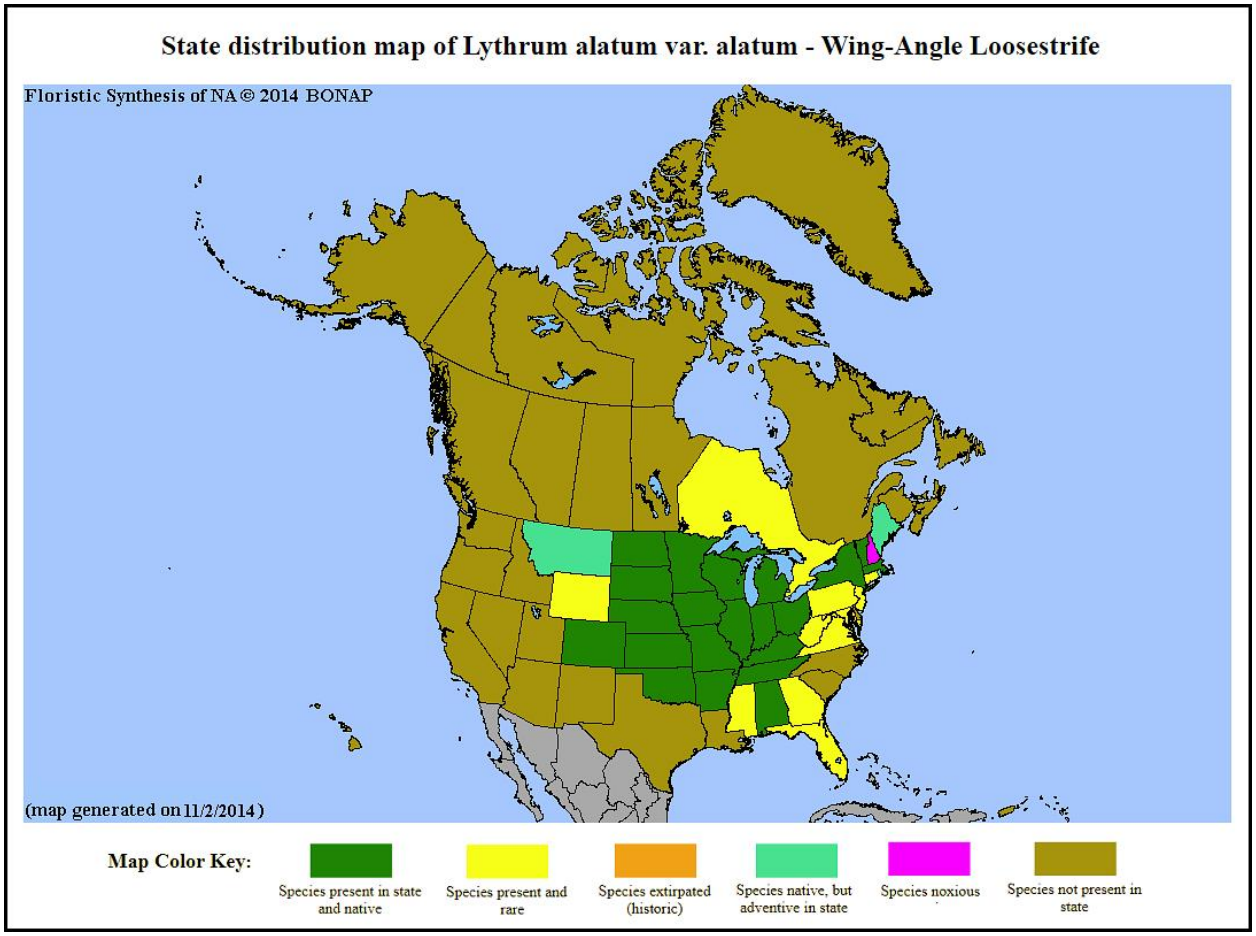


Figure 2. Distribution of L. alatum var. alatum in the United States and Canada, adapted from BONAP (Kartesz 2015).

The USDA PLANTS Database (2025b) shows records of *Lythrum alatum* var. *alatum* in eight New Jersey counties: Cape May, Gloucester, Mercer, Middlesex, Morris, Ocean, Sussex, and Warren (Figure 3 below). Collections have also been made in Camden, Cumberland, Essex, and Union counties (Moore 1989, Mid-Atlantic Herbaria 2025). The data include historic observations and do not reflect the current distribution of the species.

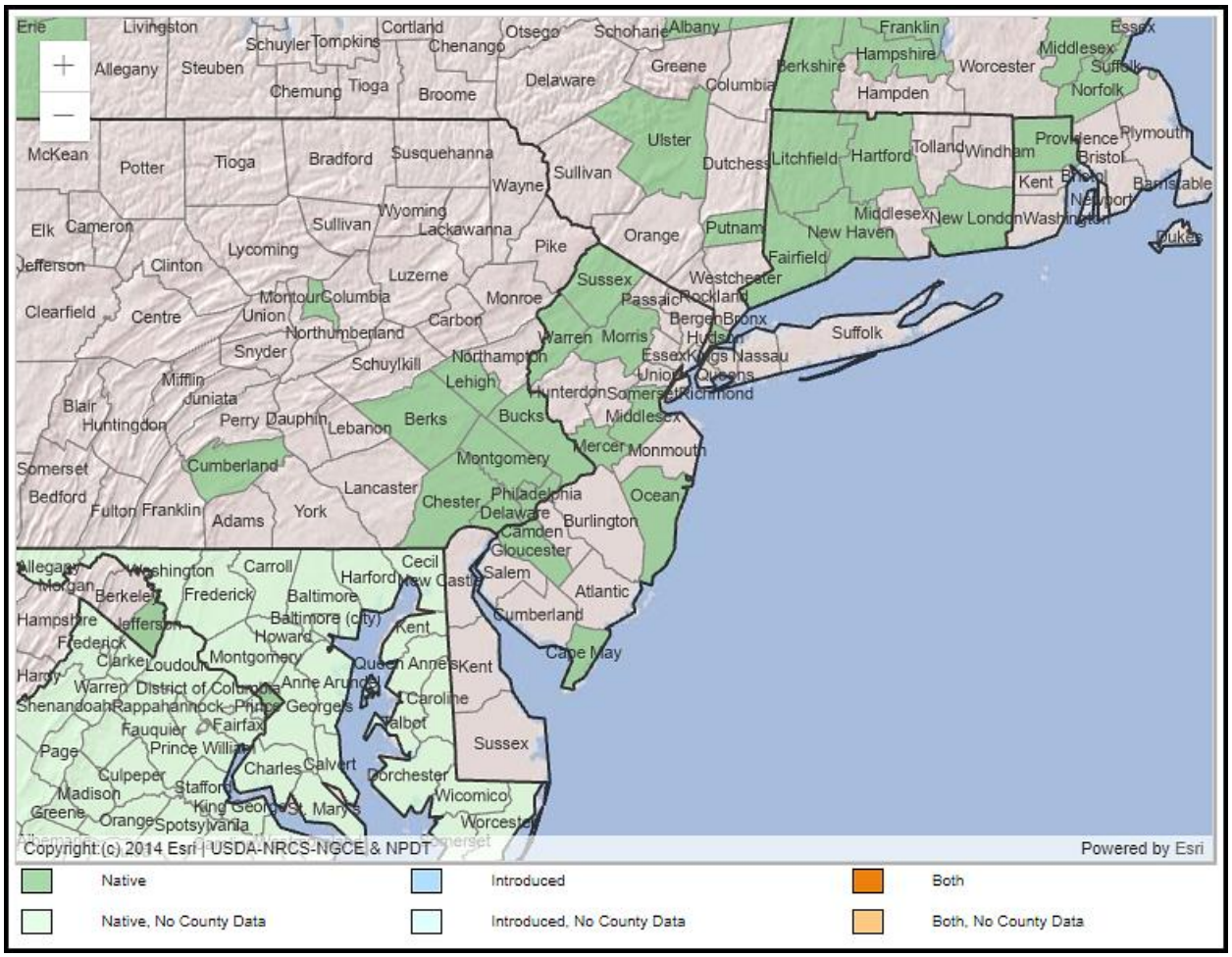


Figure 3. County records of L. alatum var. alatum in New Jersey and vicinity (USDA NRCS 2025b).

Conservation Status

Lythrum alatum var. *alatum* is considered globally secure. The G5T5 rank means the variety has a very low risk of extinction or collapse due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats (NatureServe 2025). The map below (Figure 4) illustrates the conservation status of *L. alatum* var. *alatum* in the United States and Canada. The variety is unranked in most of the states where it occurs. It is vulnerable (moderate risk of extinction) in Ontario, imperiled (high risk of extinction) in two states, and critically imperiled (very high risk of extinction) in three states. Occurrences in Maine and Rhode Island are not accepted as native.

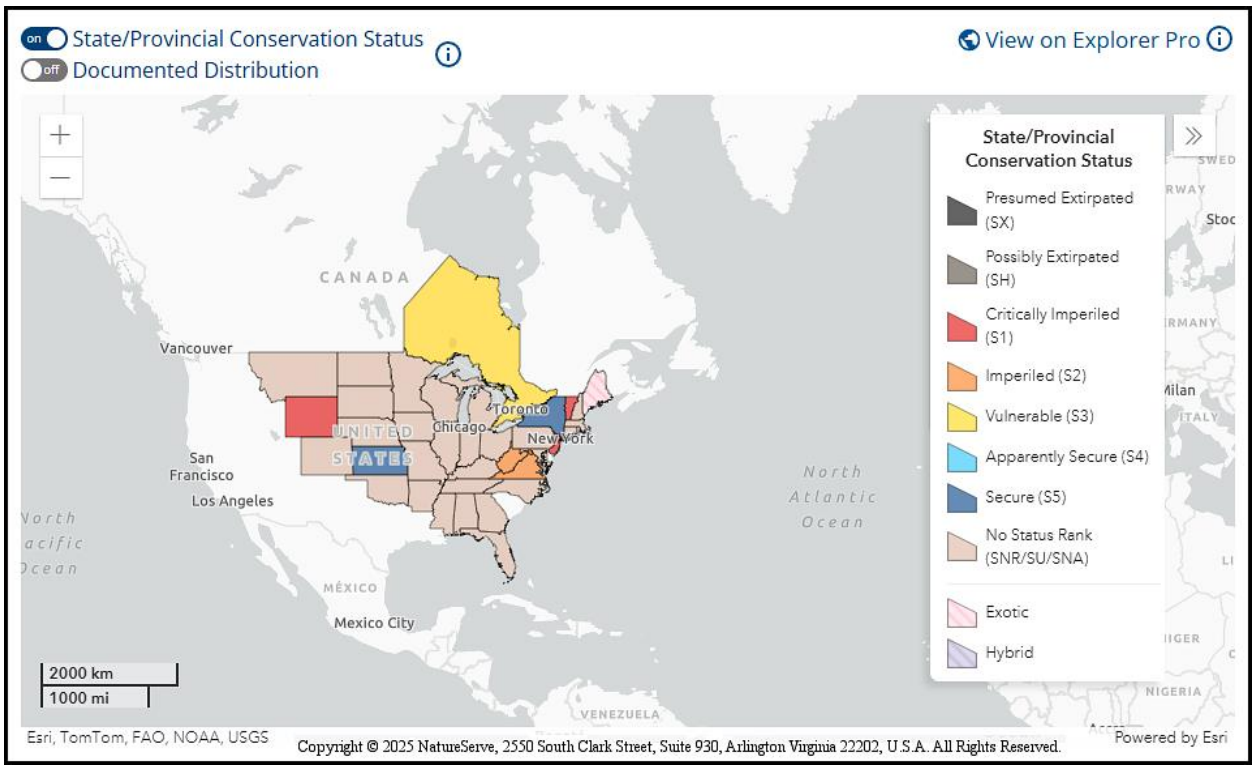


Figure 4. Conservation status of L. alatum var. alatum in the United States and Canada (NatureServe 2025).

Lythrum alatum var. *alatum* is critically imperiled (S1) in New Jersey (NJNHP 2024). The rank signifies five or fewer occurrences in the state. A species with an S1 rank is typically either restricted to specialized habitats, geographically limited to a small area of the state, or significantly reduced in number from its previous status. Winged Loosestrife has also been assigned a regional status code of HL, signifying that the species is eligible for protection under the jurisdiction of the Highlands Preservation Area (NJNHP 2010).

Lythrum alatum var. *alatum* was collected in Mercer County, New Jersey as early as 1887 and the loosestrife continued to be found at scattered locations around the state during the decades that followed, although some botanists thought it might have been introduced from the western states (Britton 1889, Keller and Brown 1905, Stone 1911, Taylor 1915, Fernald 1950). Hough (1983) noted that records from the coastal plain were old but it was still present in the northern part of the state. Since 2001, the New Jersey status of *L. alatum* var. *alatum* has gone from vulnerable to critically imperiled and only two populations are currently thought to be extant (NJNHP 2001, 2024).

Threats

Possible threats to *Lythrum alatum* var. *alatum* may result from habitat loss or degradation, succession, or invasive flora (Soteropoulos 2024). One New Jersey population experienced a significant decline at a site where it was once abundant after the habitat was destroyed by a combination of anthropogenic and successional changes. When last observed there was only a

small colony persisting on the bank of a drainage ditch (NJNHP 2024). In an Oklahoma prairie *L. alatum* was noted to be flourishing at a recently burned site (Collins and Uno 1983), likely due to the removal of competitors.

One widespread invasive species that particularly threatens *Lythrum alatum* is the closely related *L. salicaria* (Purple Loosestrife). *Lythrum salicaria* was introduced to the North American continent during the early 1800s and it has been present in New Jersey since 1864 (Stuckey 1980). *Lythrum hyssopifolium* was documented in the state around the same time but, unlike *L. salicaria*, it did not become a threat to native plant communities (Graham and Cavalcanti 2001, Mid-Atlantic Herbaria 2025). *Lythrum alatum* and *L. salicaria* grow in the same habitats and flower simultaneously but the introduced loosestrife is a stronger competitor: It reproduces vigorously and tolerates a wide range of soil conditions, even benefitting from nutrification. Its dense root masses and tall stems inhibit the germination and growth of *L. alatum* (Hager 2004, Hovick et al. 2011, Mahady 2024). In places where *L. alatum* is already established the presence of *L. salicaria* can limit its reproduction. The two species compete for pollinators, and the taller stems and showier floral display give the invasive loosestrife an advantage. Insects often visit both *Lythrum* species, transferring pollen between them, and *L. alatum* plants that receive *L. salicaria* pollen develop fewer viable seeds (Levin 1970, Brown and Mitchell 2001, Brown et al. 2002, Kinyo 2005).

In response to the rapid spread of Purple Loosestrife during the 1900s an attempt was made to reduce its prevalence with the introduction of allochthonus insects known to feed on the plants. A weevil (*Hylobius transversovittatus*) and two beetles (*Galerucella calmariensis* and *G. pusilla*) were initially screened for efficacy and host specificity. The weevils were noted to reduce plant biomass and seed production while the beetles were deemed capable of defoliating entire loosestrife populations. Although the studies found that the insects had a strong ovipositional and feeding preference for *Lythrum salicaria* there were indications that they could also utilize some native relatives, including *L. alatum* and *Decodon verticillatus*. Because a later blooming period reduced the danger for *Decodon* it was concluded that *Lythrum alatum* was the only non-target species facing a potential threat. Since the native plant was selected at a much lesser rate, the risk was deemed worthwhile and millions of the herbivorous insects were subsequently released, with the spread of the beetles being noted as particularly successful. The program has been effective in controlling *Lythrum salicaria*. (See Kok et al. 1992, Malecki et al. 1993, Blossey et al. 1994a & 1994b, NJFGW 1997, Corrigan et al. 1998, Wiedenmann 2005, Katovich et al. 2008, Mayer et al. 2017, NJDA 2025, CU 2025). Nevertheless, while the threat to *Lythrum alatum* from the introduced insects appears to be limited, their abundance in New Jersey could contribute to the decline of remaining populations—particularly if the decreased availability of *L. salicaria* induces them to seek an alternate host.

Climate Change Vulnerability

Information from the references cited in this profile was used to evaluate the vulnerability of New Jersey's *Lythrum alatum* var. *alatum* populations to climate change. The species was assigned a rank from NatureServe's Climate Change Vulnerability Index using the associated tool (Version 3.02) to estimate its exposure, sensitivity, and adaptive capacity to changing

climactic conditions in accordance with the guidelines described by Young et al. (2016) and the state climactic computations by Ring et al. (2013). Based on available data Winged Loosestrife was assessed as Less Vulnerable, meaning that climate change is not expected to have a notable detrimental impact on its extent in New Jersey by 2050. However, the conclusion was reached with low confidence because the results were approaching a moderate level of vulnerability.

Shifting climactic conditions in New Jersey are bringing about higher temperatures, more frequent and intense precipitation events, and increasing periods of drought (Hill et al. 2020). The natural distribution of *Lythrum alatum* var. *alatum* indicates that the variety is capable of growing in warmer conditions, and an Ohio study found that the loosestrife is blooming earlier in response to rising temperatures (Conover and Pelikan 2010). Established *L. alatum* plants are known to tolerate periodic inundation. However, both floods and droughts could have a significant detrimental effect on seed germination and establishment, which require a stable moisture regime (Kinyo 2005). Existing threats from Purple Loosestrife may also become more pronounced, as modeling of future conditions predicted that the reproductive fitness of *L. salicaria* will be enhanced by climate change (Colautti et al. 2017).

Management Summary and Recommendations

An updated statewide assessment of *Lythrum alatum* var. *alatum* is recommended. One of the two 'extant' populations was ranked as having poor viability when it was last seen in 2007 and the other has never been evaluated. Current information regarding the extent and condition of both occurrences is needed. Additional New Jersey sites where the species was previously reported do not appear to have been searched (NJNHP 2024). Management of any existing populations should be focused on maintaining an open canopy and controlling invasive plants, particularly *Lythrum salicaria*.

Synonyms

The accepted botanical name of the species is *Lythrum alatum* Pursh var. *alatum*. Orthographic variants, synonyms, and common names are listed below (ITIS 2025, POWO 2025, USDA NRCS 2025b).

Botanical Synonyms	Common Names
Lythrum dacotanum Nieuwl.	Winged Loosestrife
Lythrum hyssopifolium M. A. Curtis	Wing-angle Loosestrife
Lythrum lineare Hook. & Arn.	Winged Lythrum
Lythrum saturejifolium DC.	
Lythrum virgatum Walter	
Lythrum virginicum J. Kenn. ex DC.	

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