

# *Lechea tenuifolia*

**Narrow-leaf Pinweed**

**Cistaceae**



2015 © Peter M. Dziuk

*Lechea tenuifolia* by Peter M. Dziuk, 2015

## ***Lechea tenuifolia* Rare Plant Profile**

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

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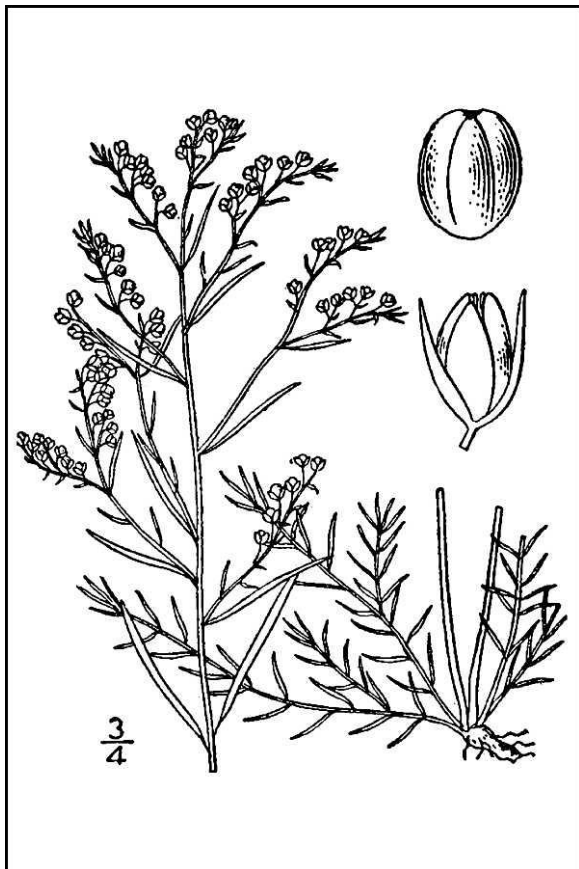
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## Life History

*Lechea tenuifolia* (Narrow-leaf Pinweed) is a small herb in the rock-rose family that may be perennial or biennial depending on where it is located. *Lechea* plants have crooked roots with short, stout branches and produce two types of stems from a short woody base. Sterile stems that develop during the fall are basal and horizontal, persisting throughout the winter and dying back in the spring, while the summer stems are upright and reproductive. The horizontal stems of *L. tenuifolia* typically range from 3–7 cm in length and are branched, sometimes forming dense mats, and have numerous bright green leaves that are 4–6 mm long and no more than a millimeter wide. During the growing season an individual plant can produce several erect, branching stems which are 12–40 cm high and have scattered leaves 8–20 mm long and 1–1.5 mm wide. Leaves on the branches may be smaller than those on the main stems. Short, appressed hairs are present on the stems, leaf undersides, and floral parts. The flowers are tiny and easily overlooked, and the oval fruits are comparable in size to the head of a pin. (See Britton 1894, Britton and Brown 1913, Hodgdon 1938, Fernald 1950, Wilbur and Daoud 1961, Gleason and Cronquist 1991, Barringer 2004, Spaulding 2013, Weakley 2015, Lemke 2020).



Left: Britton and Brown 1913, courtesy USDA NRCS 2022a. Right: Peter M. Dziuk, 2014.

In New Jersey, *Lechea tenuifolia* may flower from July through September (Barringer 2004). Six other pinweeds also occur in New Jersey (Kartesz 2015) and the small features of the plants can make the species difficult to distinguish. Britton (1894) noted that the *Lecheas* "bloom very shyly" and Hodgdon (1938) described *Lechea* flowers as "minute and about as conspicuous as

those of a *Juncus*, although much more rarely seen." The flowers open only for a short period early in the day and the three reddish petals are seldom observed because they wither soon after blooming (Fernald 1950, Lemke 2020). Consequently, pinweeds are best identified during the fall when they are in fruit. *Lechea* flowers have five sepals: The two outermost sepals are linear and the three innermost sepals are ovoid, and the length of the outer sepals relative to the inner ones can help to separate the species. Many other New Jersey pinweeds have outer sepals shorter than the inner ones but those of *L. tenuifolia* equal or exceed the inner sepals. Mature capsules of *L. tenuifolia* are completely enclosed by the sepals, unlike the fruits of some other species that extend beyond the calyx. Those characters, in combination with the narrow leaves and appressed pubescence, should be sufficient to recognize Narrow-leaf Pinweed (Wilbur and Daoud 1961, Spaulding 2013, Weakley 2015).

### **Pollinator Dynamics**

No information was found regarding the pollination mechanism of *Lechea tenuifolia*. In fact, much of the available information on the pollination of pinweeds is general and somewhat speculative—probably because the flowers of *Lechea* plants are inconspicuous and ephemeral. Insect pollination is predominant in the Cistaceae and may be carried out by an assortment of bees, flies, or beetles (Brizicky 1964, Zomlefer 1994). Brizicky (1964) indicated that plants in the rock-rose family may fall back on self-fertilization when insect pollinators are in short supply but Zomlefer (1994) suggested that self-pollination may prevail in *Lechea* because the flowers rarely expand. Apparently some species of *Lechea* are cleistogamous, producing flowers that fertilize themselves without ever opening (Darwin 1877).

Hodgdon (1938) thought that some type of cross-fertilization was likely in *Lechea* because a number of the pinweeds appeared to hybridize. Barringer (2004) discussed possible pollination mechanisms for the genus based on floral structure, noting that the minute flowers and red petals suggested pollination by small flies or butterflies but the exerted stamens, feathery stigma branches, and preference of most species for open habitats suggested wind pollination. A tiny fly was observed visiting the flowers of *Lechea minor* by Alice Carter, who carried out her research by watching various plants for long periods—sometimes for days—in order to spot the insects who served as their pollinators (Carter 1892).

### **Seed Dispersal**

*Lechea tenuifolia* produces fruits from August through October (Weakley 2015, Barringer 2004). The capsules typically contain 2–3 seeds although occasionally as many as 5 are present (Lemke 2020). Hodgdon (1938) observed that there were two forms of *L. tenuifolia*, one with small seeds and fruits and one with larger fruits, but noted that both types could occur anywhere in the plant's range and the difference did not justify subdividing the species.

No special adaptations for seed distribution have been reported in the Cistaceae, and the seeds are usually dispersed by gravity in close proximity to the parent plants (Brizicky 1964). A study of the reproductive ecology of *Lechea intermedia* var. *depauperata* showed that it—like many

members of the rock-rose family—was a temporal disperser, relying on elapsed time rather than spatial distance for the establishment of new colonies. Plants that utilize a temporal dispersal strategy deposit their seeds locally, where they remain for extended periods of time until dormancy is broken by environmental triggers and germination occurs (Crisfield et al. 2019).

*Lechea tenuifolia* shares a number of characteristics with *L. intermedia* var. *depauperata* and it seems likely that Narrow-leaf Pinweed is also mainly reliant on temporal dispersion. Emergence of *Lechea tenuifolia* seedlings has been reported following disturbances by fire (McCall and Gibson 1999, Weekley and Menges 2003) and clear-cutting (DeiTredici 1977). In all instances the species was not present in the vegetation at adjacent undisturbed sites, and in the latter case the *L. tenuifolia* seeds were likely to have been dormant in the soil for about 70 years.

If moisture softens the seed coats, propagules could occasionally adhere to animals and be transported for greater distances in that manner (Brizicky 1964). In Kansas *Lechea tenuifolia* is preferentially used for shelter by Black-tailed Jackrabbits (*Lepus californicus*) because its numerous low branches can provide shade (West et al. 1961). It is conceivable that small mammals that have sheltered beneath pinweed plants could sometimes carry seeds to new locations.



*L. tenuifolia* by Peter M. Dziuk, 2015.

## **Habitat**

*Lechea tenuifolia* is most likely to occur in dry, open sites with nutrient-poor substrates, a habitat preference shared by many species in the Cistaceae (Crisfield et al. 2019). The pinweed has been documented at elevations of 100–300 meters (Lemke 2020). Blankinship (1903) categorized *L. tenuifolia* as xerophytic, having found it only in sand barren formations (dry sand hills, drifting sands, and open sandy fields and plains) and hilltop-barren formations (cliffs or other high points of exposed slate or granite). Narrow-leaf Pinweed has been associated with sandstone barrens and clay barrens in Indiana (Homoya 1994) and in dry sandy prairies or gaps in sand savannas in Minnesota (Smith 2020). Other natural habitats include rocky glades, openings in dry woods, and woodland margins (Baskin and Baskin 1978, NYNHP 2008, Spaulding 2013, Weakley 2015, Lemke 2020). In New Jersey, one *L. tenuifolia* occurrence was found growing on a rock ledge (Snyder 1994).

*Lechea tenuifolia* often has a patchy distribution in the habitats where it occurs, favoring microsites without competing vegetation (Reiss 1986, Smith 2020). Some communities such as those in Minnesota or in Florida scrublands are naturally maintained by fire, which enables the reestablishment of *L. tenuifolia* by removing much of the ground-level vegetation (Weekley and Menges 2003, Smith 2020). Other types of disturbance can also create habitat for the pinweed and it has been found growing in old fields; in clear cuts; along roadsides, trails, runways, or firebreaks; and in a successional community on top of an abandoned strip mine (Hodgdon and Steele 1972, O'Connor and Blackwell 1974, Reiss 1986, NYNHP 2008, Spaulding 2013, NJNHP 2022).

## **Wetland Indicator Status**

*Lechea tenuifolia* is not included on the National Wetlands Plant List (NWPL). Any species not on the NWPL is considered to be Upland (UPL) in all regions where it occurs. The UPL designation means that it almost never occurs in wetlands (U. S. Army Corps of Engineers 2020).

## **USDA Plants Code (USDA, NRCS 2022b)**

LETE

## **Coefficient of Conservatism (Walz et al. 2018)**

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 global distribution of *Lechea tenuifolia* is restricted to the United States and Canada (Kartesz 2015, POWO 2022). The map in Figure 1 depicts the extent of Narrow-leaf Pinweed in North America.

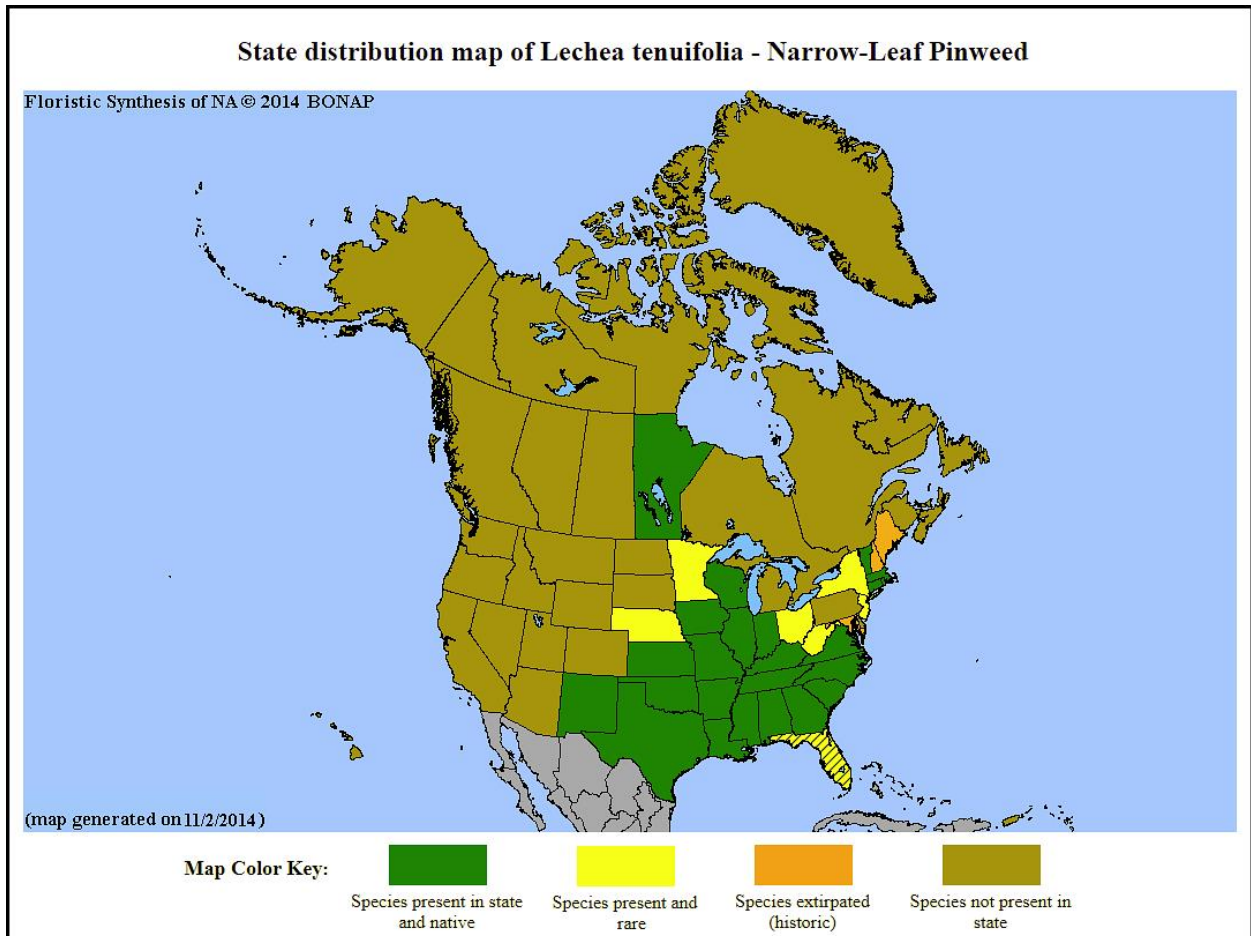


Figure 1. Distribution of *L. tenuifolia* in North America, adapted from BONAP (Kartesz 2015). Cross hatching /// indicates a questionable presence.

The USDA PLANTS Database (2022b) shows records of *Lechea tenuifolia* in three New Jersey counties: Monmouth, Morris, and Passaic (Figure 2 below). *L. tenuifolia* has also been collected in Burlington County (Hough 1983, Mid-Atlantic Herbaria 2022). The data include historic observations and do not reflect the current distribution of the species.

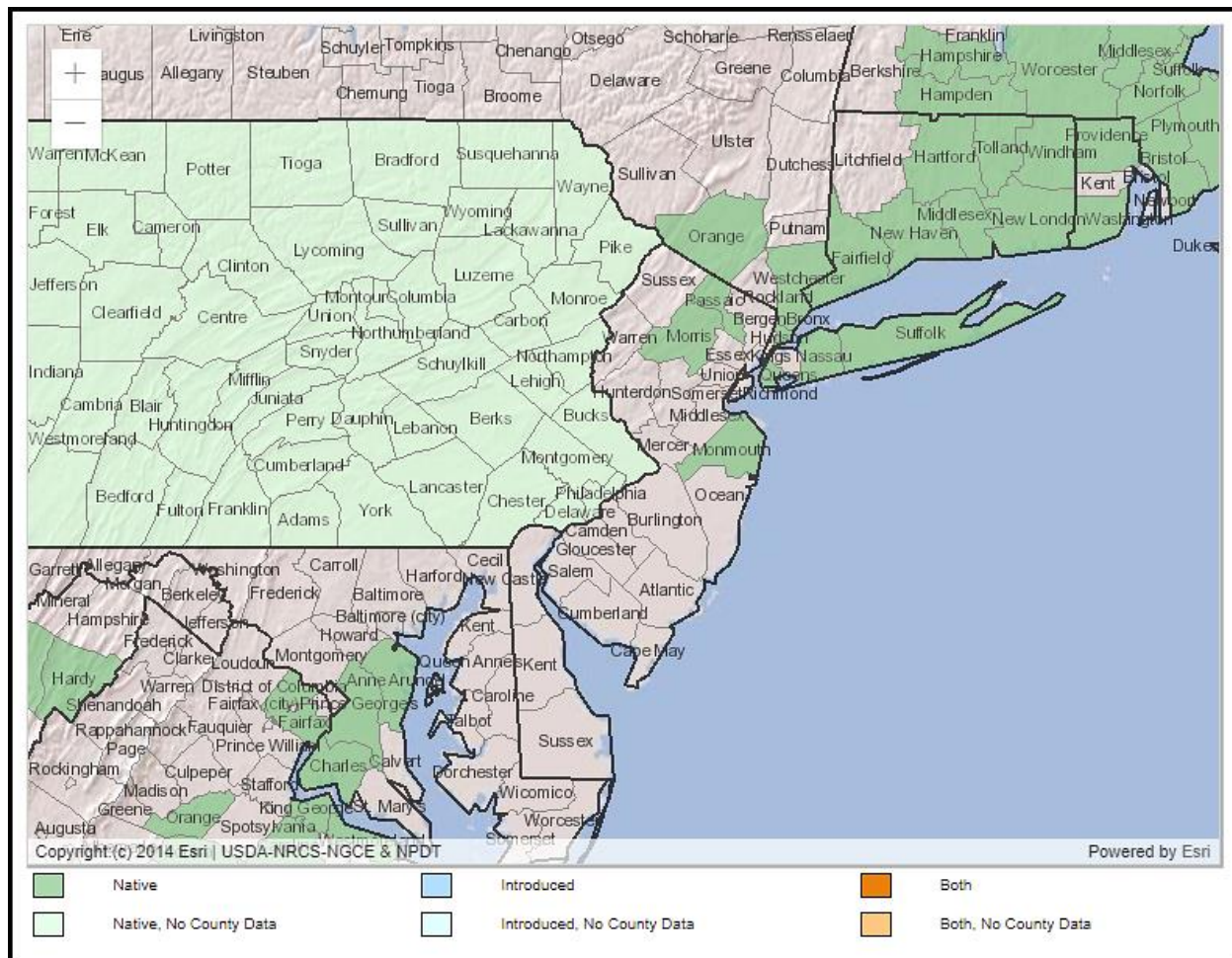


Figure 2. County records of *L. tenuifolia* in New Jersey and vicinity (USDA NRCS 2022b).

### Conservation Status

*Lechea tenuifolia* is considered globally secure. The G5 rank means the species 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 2022). The map below (Figure 3) illustrates the conservation status of Narrow-leaf Pinweed throughout its range. *L. tenuifolia* is critically imperiled (very high risk of extinction) in five states, imperiled (high risk of extinction) in two states, possibly extirpated in Maryland and presumed extirpated in Maine. The species is considered secure or apparently so in four states and is unranked in the majority of states where it occurs.



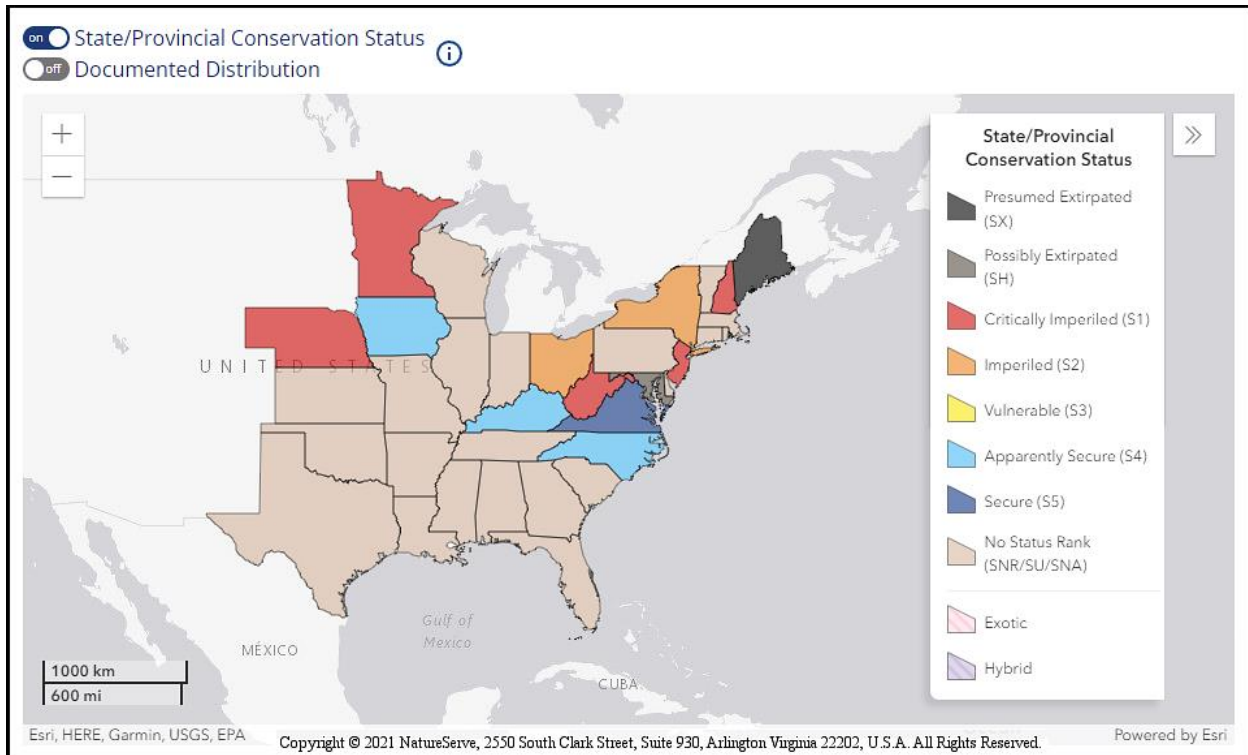


Figure 3. Conservation status of *L. tenuifolia* in North America (NatureServe 2022).

New Jersey is one of the states where *Lechea tenuifolia* is critically imperiled (NJNHP 2022). The S1 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. *L. tenuifolia* is also listed as an endangered species (E) in New Jersey, meaning that without intervention it has a high likelihood of extinction in the state. Although the presence of endangered flora may restrict development in certain communities, being listed does not currently provide broad statewide protection for plants. Additional regional status codes assigned to the pinweed signify that the species is eligible for protection under the jurisdictions of the Highlands Preservation Area (HL) and the New Jersey Pinelands (LP) (NJNHP 2010).

The earliest reports of *Lechea tenuifolia* in New Jersey were restricted to Monmouth County (Britton 1889, Keller and Brown 1905, Stone 1911) but it appears that no records of the species in the county were documented with specimens (Mid-Atlantic Herbaria 2022, NJNHP 2022). The first verifiable occurrence was found in Passaic County in 1916 (Snyder 1993) at a site that was soon destroyed by the construction of a reservoir during the 1920s (NJDWSC undated). Sixty years later, a search of suitable habitat in the vicinity of the extirpated population turned up a small *L. tenuifolia* colony at a new location (Snyder 1993). The species was subsequently found at two other locations in the state and is presently considered to be extant at three sites (NJNHP 2022).

## **Threats**

Like many upland plant species, *Lechea tenuifolia* may be threatened by long-term loss of habitat to agriculture or development (Smith 2020). In the short term, populations can be threatened by the establishment of exotic plants or natural community succession (NYNHP 2008, Smith 2020) but if a good seed bank has been formed the plants may reappear in the future when some type of disturbance creates a gap. In habitats where the community is adapted to periodic burning, suppression of fires can prevent the reestablishment of *L. tenuifolia*. However, certain types of disturbance may also threaten active populations, particularly if plants are damaged or destroyed before they have an opportunity to set seed. Examples include traffic from off-road vehicles (NYNHP 2008) and excessive mowing of a roadside population (NJNHP 2022).

Seed predation by weevils could be a threat to populations of *Lechea tenuifolia*. The larvae of *Acanthoscelides atomus* have been found attacking seed capsules of both *L. tenuifolia* and *L. racemulosa*. The young bruchid beetles winter over in *Lechea* fruits and emerge as adults during the spring (Bottimer 1969). Similar damage to seed capsules of *L. intermedia* var. *depauperata* by a different species of weevil (*Anthonomus pusillus*) has also been documented (Crisfield et al. 2019). Significant harm to developing fruits could disrupt the pinweed's temporal dispersal strategy by preventing the establishment of a seed bank for future generations.

## **Management Summary and Recommendations**

The life strategy of *Lechea tenuifolia* appears to be responsive to habitat conditions. The species can flourish under the right circumstances and remain dormant for long periods when conditions are unfavorable. Management strategies for extant populations of the pinweed may require maintaining a balance between habitat stability and disturbance. In places like New Jersey where *L. tenuifolia* is critically imperiled, the site where a population has been documented should be protected even if plants can no longer be found onsite. When other vegetation in the vicinity of a colony is becoming dense, the creation of small gaps near the remaining plants (or in places where plants were formerly located) could provide safe germination sites for the pinweed.

Taylor (1915) described *Lechea tenuifolia* as "a rare and local species whose distribution is not as yet understood," and during the past century little light has been shed on the reason for the pinweed's rarity in New Jersey. Snyder (1994) remarked that the habitat utilized by *L. tenuifolia* was common in the state so a shortage of suitable places to grow did not explain its limited presence. Poor dispersal or loss of seeds to predators might contribute to the rarity of *L. tenuifolia* in New Jersey. Because so little research has been done on the reproduction and survival of Narrow-leaf Pinweed it is difficult to ascertain why life history strategies that appear to work well for the species in other parts of the country have been less effective in this state.

There are a number of areas where additional knowledge would be particularly beneficial in assessing the long-term viability and management needs of *L. tenuifolia*. It would be useful to understand whether the species utilizes insects for cross-fertilization and to what extent.

Additional topics ripe for research include the impacts of seed predation on reproductive success, mechanisms for long-distance dispersal, the species' germination requirements, and the ways in which climactic conditions may influence reproduction, establishment, and survival.

### **Synonyms**

The accepted botanical name of the species is *Lechea tenuifolia* Michx. Orthographic variants, synonyms, and common names are listed below (ITIS 2021, USDA NRCS 2022b, POWO 2022).

#### **Botanical Synonyms**

*Lechea tenuifolia* var. *occidentalis* Hodgdon  
*Lechea juncifolia* Walter  
*Lechea verna* Raf.  
*Lechea virgata* Raf.  
*Lechea virgata* var. *breviflora* Raf.

#### **Common Names**

Narrow-leaf Pinweed  
Slender Pinweed

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Dziuk, Peter M. 2014. Photo of *Lechea tenuifolia* plant. Image courtesy of Minnesota Wildflowers, <https://www.minnesotawildflowers.info/flower/narrowleaf-pinweed>, licensed by <https://creativecommons.org/licenses/by-nc-nd/3.0/>.

Dziuk, Peter M. 2015. Cover photo of *Lechea tenuifolia* flowers and photo of large plant. Images courtesy of Minnesota Wildflowers, <https://www.minnesotawildflowers.info/flower/narrowleaf-pinweed>, licensed by <https://creativecommons.org/licenses/by-nc-nd/3.0/>.

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