

Brickellia eupatorioides var. *eupatorioides*

False Boneset

Asteraceae



Brickellia eupatorioides var. *eupatorioides* by Brian Keener, 2022

***Brickellia eupatorioides* var. *eupatorioides* 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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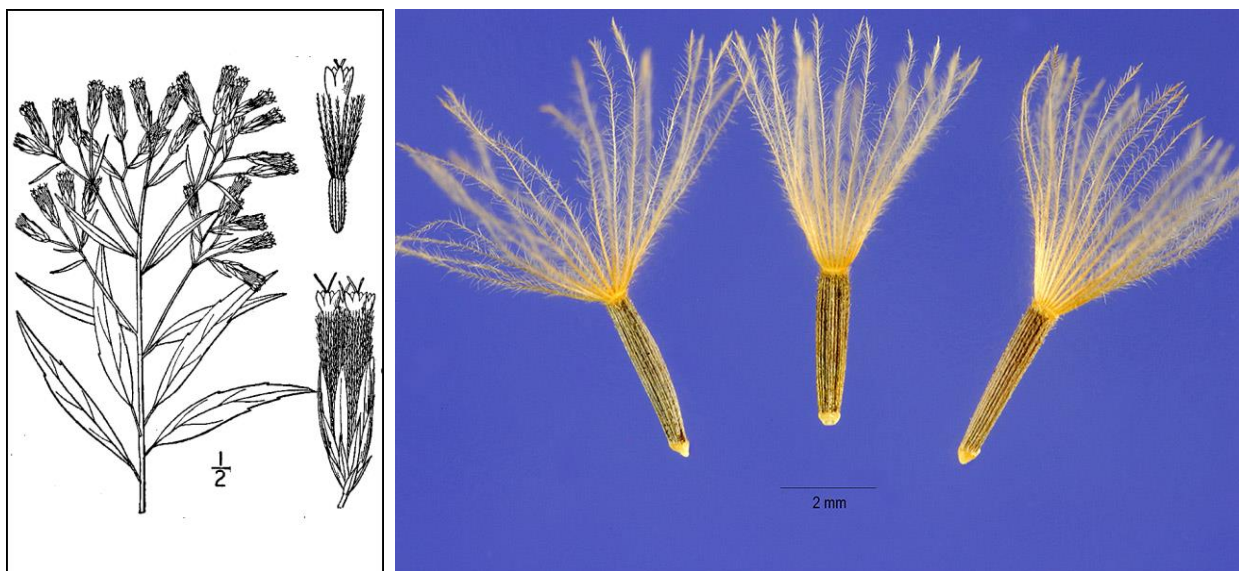
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Life History

False Boneset (*Brickellia eupatorioides* var. *eupatorioides*) is an herbaceous perennial member of the Aster Family (Asteraceae), sometimes described as a subshrub (SEINet 2025). A number of varieties of *B. eupatorioides* have been described (Shinners 1946, 1971) but var. *eupatorioides* is the only one known to occur in New Jersey (Kartesz 2015; NatureServe 2024; Scott 2020; USDA, NRCS 2024b).

Individual plants have one to many upright stems that branch above; the stem may be woody at the base and is sometimes tinged with burgundy. Stems reach 30–200 cm (4–5 ft) in height, are resinous, and can be hairy to mostly smooth (Clemants and Gracie 2006; LBJWC 2022; SEINet 2025; Strausbaugh and Core 1978; Weakley et al. 2025). Once established, the plant develops a very long taproot reported to grow at least 4.8 m (16 ft) deep (Hilty 2020; Kansas Wildflowers and Grasses 2007; Minnesota Wildflowers 2025).

The leaves of False Boneset are alternate, with the lower leaves appearing to be opposite or whorled as those are much closer together. Upper leaves are usually smaller and sessile, while lower leaves have a short petiole (to 1mm). The leaf blades are linear to lanceolate 25–100 mm in length, 5–40 mm wide and narrow at the base. Each leaf has one to three prominent veins, with margins entire to slightly toothed. The leaf surface is pubescent with resin glands on the underside (Gleason and Cronquist 1991; Hilty 2020; Missouri Botanical Garden 2025; Nesom 2022; Scott 2020; SEINet 2025; Strausbaugh and Core 1978; USDA, NRCS 2016; Weakley et al. 2025).



Left: Britton and Brown 1913, courtesy USDA, NRCS 2024a. Right: Steve Hurst, 2005.

False Boneset has composite flowers that grow in small flat terminal clusters. Each head or cluster has 6–15 (– 21) creamy white, yellowish green, or pinkish lavender tubular disc florets without rays surrounded by greenish, straw colored, or purplish involucre bracts. There are several rows of bracts, the outer rows are shorter than the inner rows. The involucre is 7–11 mm high, slightly hairy and resinous (Clemants and Gracie 2006; Missouri Botanical Garden 2025;

Nesom 2022; Scott 2020; SEINet 2025; Strausbaugh and Core 1978; USDA, NRCS 2016; Weakley et al. 2025). Due to its wide distribution, False Boneset has been reported to bloom from July to October (LBJWC 2022) with plants blooming as early as May in some locations (Native Plant Society of Texas 2025; Scott 2020). In New Jersey, Stone (1911) observed flowering from early August to mid-September with Hough (1983) noting that the blooming period lasted to October.

The fruit is a cypsela (a dry, single-seeded fruit) 2.7–5.5 mm in length. Individual seeds are “narrowly cylindrical” and 10-ribbed, with an attached tawny or white pappus (tuft) of 10–20 (–28) plumose or subplumose bristles (Scott 2020; SEINet 2025). The tufts allow for wind dispersal of the seeds.

Pollinator Dynamics

False Boneset is primarily bee pollinated, notably by bumble bees (*Bombus* spp.), leaf-cutter bees (*Megachile* spp.), halictid bees, and other bees (Hilty 2020). The Eight-toothed Cuckoo Leafcutter Bee (*Coelioxys octodentata*), a nest parasite of other leafcutter bees, has also been observed visiting False Boneset (Grundel et al. 2011). There are no specialist bees known to pollinate the plant (Fowler and Droege 2020).

Other insect visitors include butterflies, skippers, and likely flower flies and beetles, which also visit the flowerheads for nectar and/or pollen (Hilty 2020). False Boneset is included on a list of most important nectar plants for the Monarch Butterfly (*Danaus plexipus*) (USDA, NRCS 2016). Weakley et al. (2025) reported that the flowers open in the early evening and remain open overnight, which would attract nocturnal pollinators such as certain moths. The flowers close by mid-day the following day. Given the fact that *Brickellia eupatorioides* var. *eupatorioides* is pollinated by many different insects it is likely that the species is self-incompatible, although no information was found in the references to confirm.

Seed Dispersal

Most seeds of False Boneset are wind-dispersed, carried by the short tufts of light brown or whitish plumose hairs located in a single row at one end of the seed (Strausbaugh and Core 1978). In the fall, sparrows and goldfinches readily consume the seeds (American Goldfinches [*Spinus tristis*] prefer Asteraceae seeds) and may also contribute to some seed movement (Everwilde Farms 2025; McGraw and Middleton 2020). Gambel’s Quails (*Callipepla gambelii*) in the southwestern United States are reported to also consume seeds of *Brickellia* species (Martin and Nelson 1951). No information was found regarding seed dispersal distances. The seeds of Canada Goldenrod (*Solidago canadensis*), a similar wind-dispersed plant in the aster family, were moved up to 2000 m (1.2 mi) away from the parent plant (with wind speeds of 13–18 mph) although most seeds were carried less than 50 m (162 ft) away (Zhang et al. 2022). Another study in Ohio found that seeds of the same goldenrod species were carried up to 0.6 m (2 ft) away (with a wind speed of 5 mph) from the parent plant (OSU 2025). The distance

traveled by a seed depends on many factors, such as wind speed and direction, humidity, topography, and openness of the habitat.

Regarding germination, Baskin and Baskin (2002) reported that seeds of False Boneset require physiological dormancy and recommended cold moist seed stratification for 60 days (see also Greene and Curtis 1950). Optimal germination temperatures occurred between 18–22° C (~64 to 72° F). False Boneset is reported to grow best in soils with circumneutral pH, however; no information was found about long term seed viability.

Brickellia eupatorioides may send up multiple stems from the base of the main stem and taproot but does not spread via rhizomes or form large colonies. Instead, plants tend to occur “sporadically” (Hilty 2020). In contrast, LBJWC (2022) described False Boneset as “weedy” in some locations.

Habitat

False Boneset is found in dry, open places in rocky woods, limestone glades, bluffs, along railroad tracks and in clearings with sandy or well-drained soils (Clemants and Gracie 2006; Gleason and Cronquist 1991; Hilty 2020; LBJWC 2022). In the southwestern United States, it is found on mesas and in openings in pine forests (SEINet 2025). In the southeast False Boneset is reported from dry slopes, longleaf pine sandhills, shale barrens, and woodland thickets (Strausbaugh and Core 1978; Weakley et al. 2025). *Brickellia eupatorioides* is also found in prairies, for example, on the slopes and uplands of the Konza Prairie in Kansas and it is considered a representative species of the tallgrass prairie community (Towne 2002). With a heliophily rating of 8, False Boneset lies between being a sun-obligate that requires an open canopy (rating = 9) and “strongly preferring” sunny conditions (rating = 7) in order to thrive, flower, and fruit (Weakley et al. 2025). *Brickellia eupatorioides* var. *eupatorioides* can be found at elevations of 200–2300 m (656–7546 ft) (Scott 2020).

In New Jersey, the one remaining extant population is found on “open rock outcrops, ledges, and edges of thickets”. The historical and extirpated New Jersey occurrences were found in a variety of habitats including limestone bluffs, dry rocky hillsides facing the Delaware River, dry wooded slopes, margins of dry open sandy woods, and an open grassy hillside over Franklin limestone rock (NJNHP 2024).

Mycorrhizal fungal associations have been found to increase nutrient uptake and plant growth in most terrestrial plant species. Wilson and Hartnett (1998) studied prairie plant responsiveness to mycorrhizas and found that *B. eupatorioides* had a responsiveness to arbuscular mycorrhizal (AM) fungi of only 21.7% and corresponding mycorrhizal root colonization of 59.1%. While this indicated that there was some benefit to the relationship, it was not particularly strong as compared with other perennial Asteraceae prairie forbs from the study, most of which were significantly responsive. However, those AM associations did significantly improve phosphorous uptake in False Boneset (Kula et al. 2005).

Wetland Indicator Status

Brickellia eupatorioides 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 2024b)

BREUE

Coefficient of Conservancy (Walz et al. 2020)

CoC = 10. Criteria for a value of 9 to 10: Native with a narrow range of ecological tolerances, high fidelity to particular habitat conditions, and sensitive to anthropogenic disturbance (Faber-Langendoen 2018).

Distribution and Range

The global range of *Brickellia eupatorioides* var. *eupatorioides* is restricted to the eastern United States (POWO 2024). The map in Figure 1 depicts the extent of False Boneset in North America.

The USDA PLANTS Database (2024b) shows records of *Brickellia eupatorioides* var. *eupatorioides* in eight New Jersey counties: Atlantic, Burlington, Camden, Hunterdon, Middlesex, Monmouth, Sussex, and Warren (Figure 2). Collections have also been reported in Ocean and Union counties (Mid-Atlantic Herbaria 2024). The data include historic observations and do not reflect the current distribution of the species.

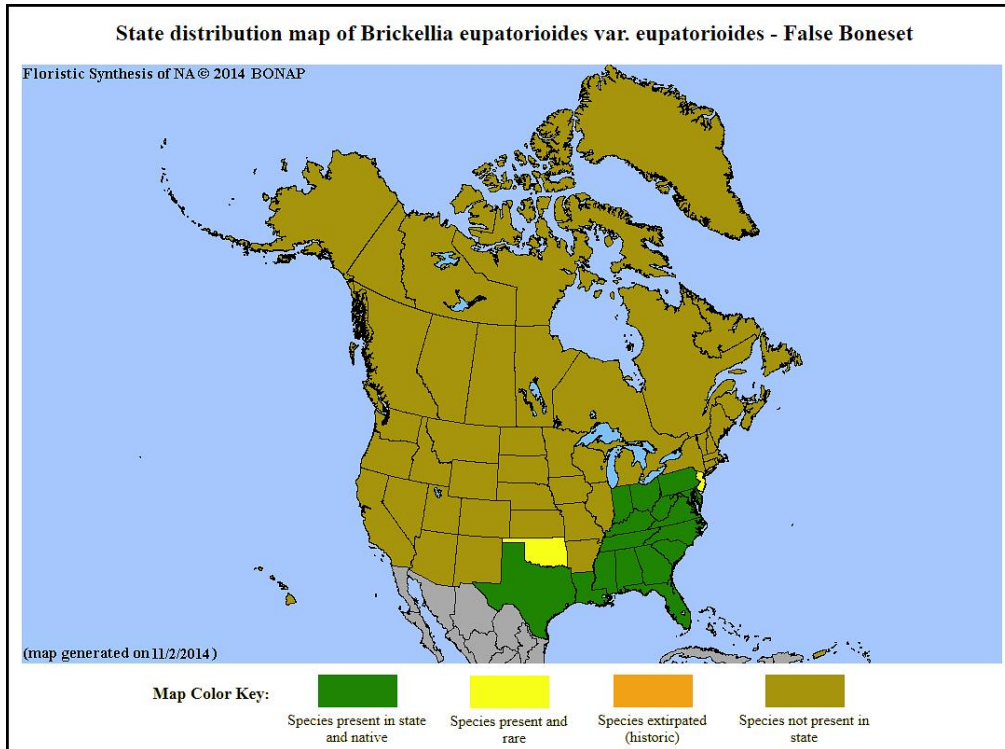


Figure 1. Distribution of *B. eupatorioides* var. *eupatorioides* in North America, adapted from BONAP (Kartesz 2015).

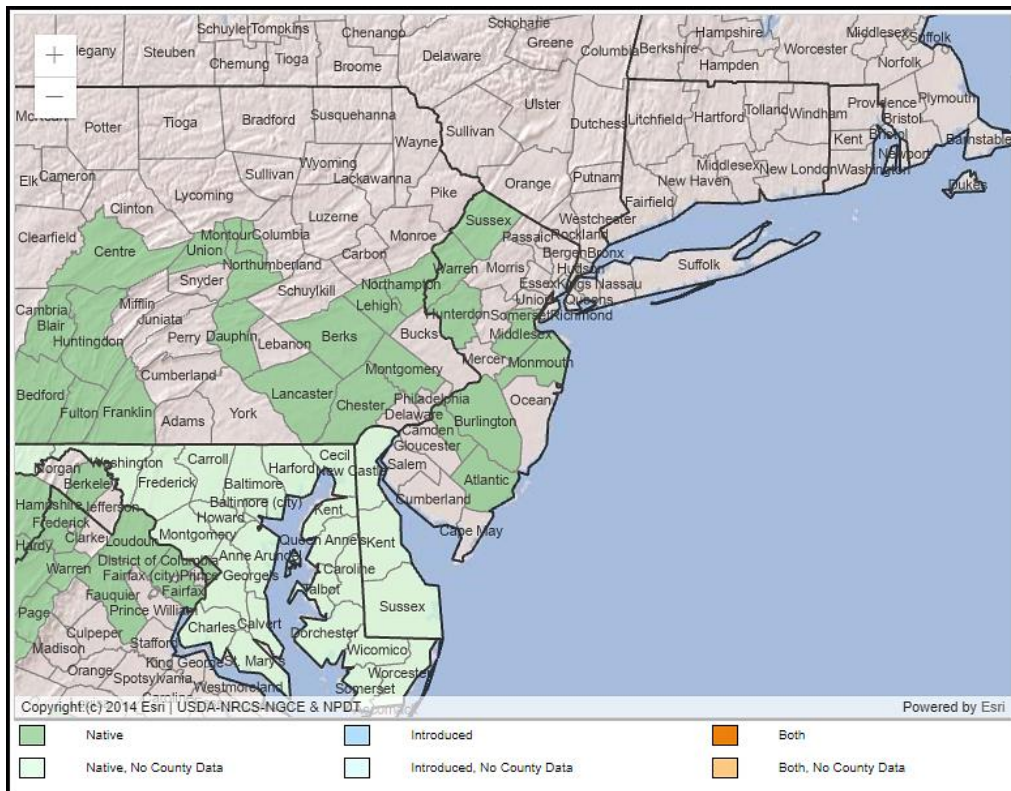


Figure 2. County records of *B. eupatorioides* var. *eupatorioides* in New Jersey and vicinity (USDA, NRCS 2024b).

Conservation Status

Brickellia eupatorioides var. *eupatorioides* is considered globally secure. The G5T5 rank indicates that 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 2024). The map below (Figure 3) illustrates the conservation status of *B. eupatorioides* var. *eupatorioides* throughout its range. False Boneset is secure, apparently secure, or unranked in most of the states where it occurs. At the northeastern end of its range, it is imperiled (high risk of extinction) in one state (New Jersey) and critically imperiled (very high risk of extinction) in one state (Pennsylvania).

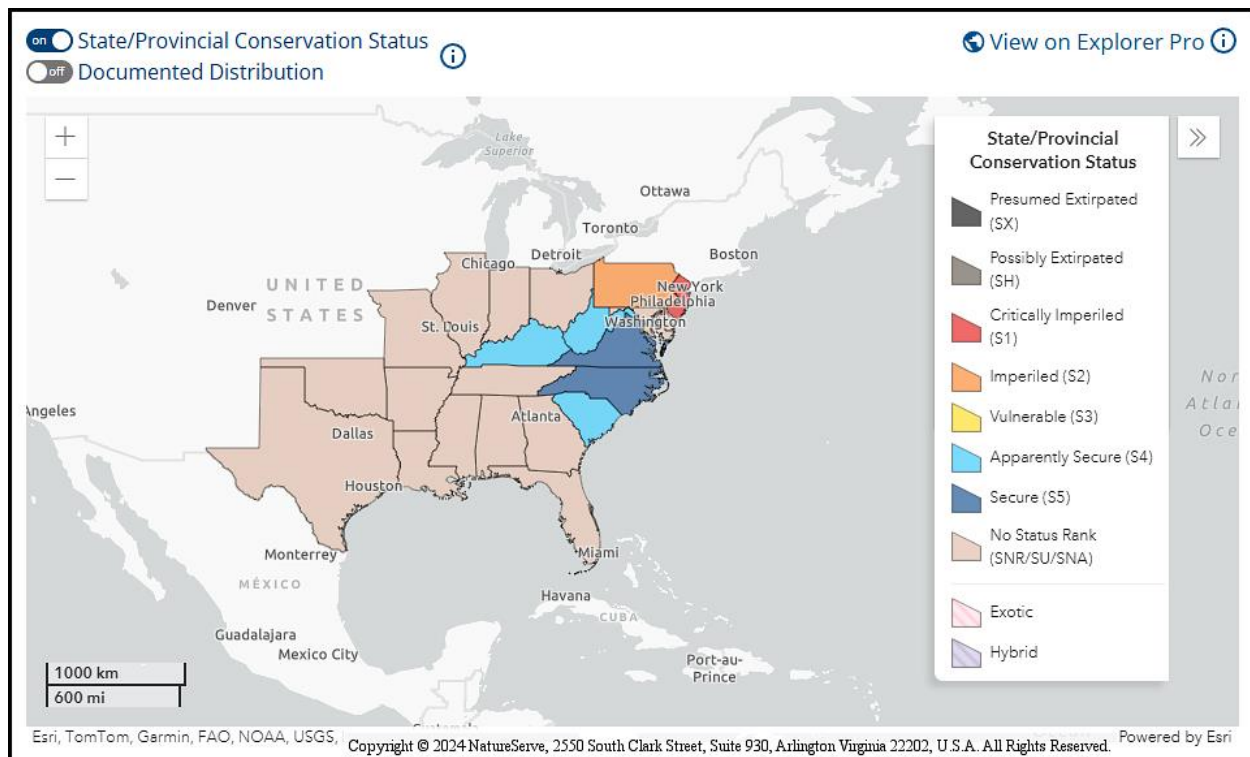


Figure 3. Conservation status of *B. eupatorioides* var. *eupatorioides* in North America (NatureServe 2024).

New Jersey is the state where *Brickellia eupatorioides* var. *eupatorioides* is critically imperiled. 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. *B. eupatorioides* var. *eupatorioides* 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 False Boneset 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 first New Jersey record of *Brickellia eupatorioides* was from Camden County (Willis 1874). During the late 1800s and early 1900s the species was collected from numerous counties all around the state, although not in the Pine Barrens (Britton 1889; Keller and Brown 1905; Stone 1911; Taylor 1915). After that time, it was rarely encountered. Hough (1983) indicated that Warren County was the only place where the species had been seen since 1930, and that record was probably based on a 1963 discovery by Vincent Abraitys (Snyder 1984). Abraitys' population was soon lost, likely due to successional changes in the habitat, but Snyder (2000) discovered three new populations in Sussex County—one in 1982 and two others in 1991. Around the turn of the century only two Sussex County occurrences remained (Breden et al. 2006) and at present only one is thought to be extant. Four populations are ranked as historical, nine as extirpated, and one other old record lacks sufficient information for ranking (NJNHP 2024).

Threats

Woody plant succession, invasive species encroachment, and direct human impacts threaten False Boneset populations. In New Jersey, a moderately sized healthy population of False Boneset exhibited a 34-year decline (1982–2016) due to a combination of habitat succession with oaks (*Quercus* spp.) and Eastern Red Cedar (*Juniperus virginiana*) along with non-native bush honeysuckle shading out the False Boneset. As a final blow, any remaining plants were destroyed by a bulldozer during the construction of a house onsite. Similarly, another New Jersey population, now considered extirpated, also was destroyed by development (NJNHP 2024).

Regarding herbivory as a threat, according to Hilty (2020) the leaves of False Boneset are bitter and nutrient-poor, so it is not often browsed by wild mammals or livestock, and some plant nurseries feature False Boneset as being resistant to White-tailed Deer (*Odocoileus virginianus*) herbivory (e.g., Missouri Wildflowers Nursery 2025). In contrast, Warren and Hurst (1981) reported that False Boneset sustained moderate grazing pressure from deer in the spring and fall and high use in summer months in the Mississippi pine plantations they studied. Herbivory by deer may or may not be a threat, depending on location, deer population density, or other factors, although in New Jersey overbrowsing by deer is a widespread concern. Apart from mammals, insects such as grasshoppers also readily feed on boneset leaves with Hilty (2020) mentioning specifically *Melanoplus confusus* (Little Pasture Grasshopper), *Melanoplus differentialis* (Differential Grasshopper), *Melanoplus keeleri* (Keeler's Spur-throat Grasshopper), and *Melanoplus discolor* (Contrasting Spur-throat Grasshopper), the first two of which are found in New Jersey.

False Boneset flowers and developing seeds are also fed upon by various moth larvae including the Three-lined Flower Moth (*Schinia trifascia*), Oleagina Flower Moth (*Schinia oleagina*), and Rockies Boneset Flower Moth (*Schinia grandimedia*). *Entylia carinata* (family Membracidae) has also been observed on this species (Hilty 2020). Other threats, such as disease, habitat fragmentation, or genetic isolation were unmentioned in the literature reviewed, although New Jersey's one remaining occurrence is quite isolated from any other natural populations at this point.

Climate Change Vulnerability

Information from the references cited in this profile was used to evaluate the vulnerability of New Jersey's *Brickellia eupatorioides* var. *eupatorioides* population 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 False Boneset was assessed as Moderately Vulnerable, meaning that its abundance and/or range extent in New Jersey is likely to decrease by 2050 due to climate change.

The only known extant New Jersey population of *Brickellia eupatorioides* var. *eupatorioides* included in the Natural Heritage Program database is in northwestern New Jersey. For this reason, rising sea level should not be a concern for this occurrence. However, there is less certainty regarding effects of rising sea levels on other possible occurrences in the state, and the extent of the species' ability to colonize new sites is unknown.

Shifting climactic conditions in New Jersey are also resulting in higher temperatures, more frequent and intense precipitation events, and increasing periods of drought (Hill et al. 2020). *Brickellia eupatorioides* var. *eupatorioides* is considered imperiled in New Jersey and Pennsylvania, both of which are at the north/northeastern extent of its current range. As a southern species, False Boneset can probably tolerate the warmer temperatures, and it is possible the species' range may extend farther northward in time. False Boneset is also drought tolerant, and may withstand increased periods of drought, though not extreme flooding events.

Woody plant succession and non-native invasive species encroachment are two known threats to False Boneset in New Jersey. With warming temperatures, the process of secondary forest succession in temperate regions is predicted to speed up, possibly reducing the persistence and availability of some of the more open habitats preferred by False Boneset (see Fridley and Wright 2018). Changes in future climatic conditions may also increase the threat of new invasive plant species encroachment into the state (Bellard 2013; Coville et al. 2021; Salva and Bradley 2023) as plant ranges shift in response to altered abiotic conditions.

Management Summary and Recommendations

The one remaining new Jersey population has not been visited since 1991, making it a priority to resurvey that occurrence to ascertain the condition of the habitat and viability of the population (NJNHP 2024). In addition, revisits to the three historical sites with unsearched suitable habitat would also be useful.

Depending on the site condition of the remaining element occurrence, management actions to open the canopy might be needed. This could include careful removal of trees and shrubs, particularly non-native invasive species in the vicinity of the population. Fire may also be a useful tool as False Boneset is reported to be relatively fire tolerant (Coastal Plain Plants 2023) and over time may respond favorably to fire. Towne and Kemp (2008) found that the frequency

of occurrence of *Brickellia eupatorioides* increased over time at their Kansas research sites with the application of summer prairie burns.

Although deer herbivory was not mentioned as a problem at the New Jersey occurrence when last visited in 1991, decades have passed since that last site visit and deer numbers have increased substantially. Should browsing be identified as a current threat, deer management may be required to reduce or eliminate browsing pressure.

If suitable habitat remains available, population restoration might be a consideration. It may be that the species will naturally migrate northward as the climate warms; however, some human assistance might speed up the re-establishment of the species in the state assuming other habitat needs are met.

Although False Boneset is a relatively common species elsewhere in its range, much remains unknown about the species' life history. Does the species have the capacity to self-pollinate? What is the dispersal distance of seeds? and seed longevity? How important is seed stratification to seed germination? Were habitat succession and development the primary factors that contributed to the decline of this species in New Jersey or were other factors at play? New Jersey is at the northern extent of the species' range—what range constraints are at work, and might climate change improve conditions for this species in the state in future years?

Synonyms and Taxonomy

The accepted botanical name of the species is *Brickellia eupatorioides* (L.) Shinnars var. *eupatorioides*. Orthographic variants, synonyms, and common names are listed below. In addition to the names shown below, thirteen species that were published by Rafinesque between 1836 and 1838 are also synonyms of *Brickellia eupatorioides* (POWO 2024). The designation of var. *eupatorioides* now appears to be superfluous because all the other varieties of *B. eupatorioides* were recently redefined as synonyms of different *Brickellia* species (NatureServe 2024; Nesom 2022; POWO 2024; Weakley et al. 2025).

Botanical Synonyms

Critonia eupatorioides Gaertn. ex Steud.
Eupatorium alternifolium Ard.
Eupatorium kuhnia Crantz
Kuhnia eupatorioides L.
Kuhnia eupatorioides L. var. *angustifolia* Raf.
Kuhnia eupatorioides var. *glutinosa* (Elliott) Hitchc.
Kuhnia eupatorioides L. var. *gracilis* Torr. & A. Gray
Kuhnia eupatorioides L. var. *pyramidalis* Raf.
Kuhnia glutinosa Elliott
Kuhnia kuhnia (Gaertn.) C. Mohr
Kuhnia paniculata Cass.

Common Names

False Boneset
Thoroughwort Brickell-bush

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