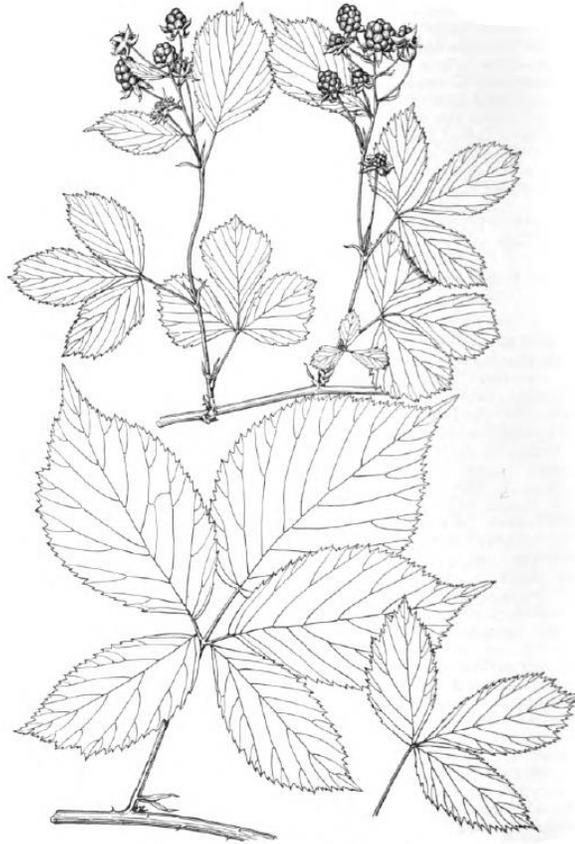


Rubus recurvicaulis

Blanchard's Dewberry

Rosaceae



Rubus recurvicaulis by L. H. Bailey, 1945

***Rubus recurvicaulis* 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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Life History

Rubus recurvicaulis (Blanchard's Dewberry) is a low perennial shrub in the Rosaceae. The plants produce biennial stems (canes) that are unbranched and vegetative during their first year and produce flowering branches during the second. The primary canes are 4–6 mm thick at the base and up to 2.5 meters long: They trail on the ground or form low (up to 0.6 m) arches, often rooting at the tips. The canes are armed with stiff, backward-pointing or somewhat curved prickles. In at least nine species of *Rubus*, including *R. flagellaris* and *R. pensilvanicus*, the color of the prickles differs from the stem color which may serve as a warning to potential herbivores (Rubino and McCarthy 2004); however prickle color was not specifically mentioned in descriptions of *R. recurvicaulis*. Blanchard's Dewberry has compound leaves: Those of the primary canes have 3–5 leaflets that are 7–10 cm long while those of the floral canes usually have 3 leaflets that are 4–6 cm long. In reference to his illustration (shown on the profile cover page), Bailey emphasized the characteristic shapes of leaves from the primary (lower left) and floral (lower right) canes. (See Blanchard 1906, Bailey 1945, Fernald 1950, Hodgdon and Steele 1966, Gleason and Cronquist 1991).



Leaves of floricanes (left) and primocanes (right), courtesy Harvard Herbarium.

Dewberry canes continue to develop throughout the growing season and buds for the following year are initiated during late fall (Sandler 2001). *Rubus recurvicaulis* blooms during the summer months, typically beginning in June or at some northern sites in July (Blanchard 1906, Sandler 2001, Rhoads and Block 2007), and fruit maturation is initiated immediately afterward (Stiles 1980). The floral branches produce a loose raceme of 4–8 flowers that are 3–4 cm wide and have five sepals, five white petals, and numerous stamens and pistils. *R. recurvicaulis* fruits are black and made up of many small, one-seeded drupelets that form a roundish cluster about 1.5 cm in diameter (Bailey 1945, Fernald 1950).

Bicknell (1910) observed that *Rubus* species had "an extraordinary natural variability and undoubtedly, also, a facility in hybridizing which is perhaps not exceeded in any other genus of our flora." The sentiment was echoed by Hodgdon and Steele (1966), who noted that "*Rubus* is an inherently difficult genus, as the different species intergrade in a perplexing manner." Symonds (1963) speculated that rapid evolutionary changes in *Rubus* may have been precipitated by extensive land clearing following the colonization of North America. Polyploidy is common in the genus, as is asexual reproduction, which further blurs the boundaries between species (Hodgdon and Steele 1966, Thompson 1997). The development of cultivars for agricultural production and their subsequent hybridization with native plants may also contribute to genetic confusion. Consequently, the number of species recognized in any particular region can vary tremendously (Alice et al. 2020): Zomlefer (1994) hedged her bets by reporting that the genus contained 250–3000+ species.

As a result, the positive identification of some *Rubus* species can be challenging. While *Rubus recurvicaulis* is sometimes thought to have a hybrid origin (see Synonyms and Taxonomy section) it is also reported to hybridize with many other species including *R. allegheniensis*, *R. amicalis*, *R. enselii*, *R. flagellaris*, *R. frondosus*, *R. hispidus*, *R. pensilvanicus*, *R. setosus*, *R. vermontanus* (Angelo and Boufford 2012). Steele and Hodgdon (1970) underscored the difficulty of ascertaining the parent species of some hybrids, particularly those from closely related groups, and stipulated that in some of their work identification of parent species as either *R. recurvicaulis* or *R. flagellaris* had been based on what appeared to be most likely at the particular site where a hybrid had been found. Some other information reported for species in the genus may have been based on misidentification of the studied plants (Thompson 1997).

Pollinator Dynamics

Insects visit *Rubus* flowers to collect both nectar and pollen (Hilty 2020), and some species reportedly have a sweet scent that may further aid in the attraction of pollinators (Genders 1977). *Rubus* plants tend to be pollinated by a wide variety of insects: For example, Robertson (1929) recorded 48 species on *R. canadensis*, 22 species on *R. occidentalis*, and 89 species on *R. villosus*. Stubbs et al. (1992) identified numerous bee species known to forage on *Rubus* flowers. Whittington et al. (2004) examined the pollen collected by bumblebees (*Bombus impatiens* and *B. occidentalis*) which had been placed in a greenhouse to fertilize tomatoes and found that most of the "foreign" pollen carried by the bees came from *Rubus* species. Honeybees (*Apis mellifera*) have been reported as effective pollinators of dewberries (Sandler 2001). Little carpenter bees (*Ceratina* spp.), long-horned bees (*Synhalonia* spp.), cuckoo bees (*Nomada* spp., *Coelioxys*

spp.), leaf-cutting bees (*Megachile* spp.), mason bees (*Osmia* spp., *Hoplitis* spp.), Halictine bees and Andrenine bees have also been identified as pollinators of *Rubus* flowers (Hilty 2020). *Andrena melanochroa* is a specialist on *Rubus* and several other genera in the rose family (Fowler and Droege 2020). Pollination ecologists have recognized *Rubus recurvicaulis* as a species of special value to native bees and to bumblebees (LBJWC 2007). While bees appear to be the primary pollinators of *Rubus* species the flowers are also visited by an assortment of other insects including syrphid flies, wasps, butterflies, and skippers (Hilty 2020). One such visitor reported on Blanchard's Dewberry by Yahner (1998) was the Hobomok Skipper (*Poanes hobomok*).

Although apparently not lacking for potential pollinators, *Rubus recurvicaulis* may also have some capacity for the development of seeds from unfertilized ovules. Because *Rubus* species can hybridize so readily polyploidy is common in the dewberries, including *R. recurvicaulis* (Einset 1945, Hodgdon and Steele 1966). The likelihood of asexual seed production is higher in hybrid and polyploid *Rubus* species (Crane 1940, Clark and Jasieniuk 2012). At low population densities dewberry plants are likely to invest more of their resources in clonal reproduction (Abrahamson 1975), and when conditions are favorable *Rubus* species can spread rapidly by vegetative means (Hodgdon and Steele 1966).

Seed Dispersal

The fruits of *Rubus recurvicaulis* may be found from mid-July through September (Fernald 1950, Rhoads and Block 2007). *R. recurvicaulis* fruits are sometimes consumed by humans although Hodgdon and Steele (1966) noted that quality can vary from poor to good. Blanchard (1906) described his dewberry as "very edible" and recommended August 10–25 as the best time to pick the fruits in Maine. In nature, animals are the primary means of dispersal.

Haskell (1961) reported avian dispersal of *Rubus* seeds, noting that germination was enhanced by passage through a bird's digestive system. Stiles (1980) indicated that both birds and mammals were likely to play a role in dispersal of *Rubus* propagules, and that the sweetness and odor of the fruits made them especially likely to be consumed by mammals. Because the seeds are small and the fruits are relatively close to the ground, White-footed Mice (*Peromyscus leucopus*) could play an important part in their distribution. The mice are able to ingest small seeds and excrete them in viable condition, although they may also consume the outer parts of the fruit while leaving the seeds. A variety of resident and breeding birds are also known to disperse *Rubus* seeds (Stiles 1980), and mammals identified as potential dispersers for the genus include black bear, raccoon, coyote, fox, marten, skunk, and opossum (Willson 1993). The sweet, accessible fruits are also likely to attract box turtles (*Terrapene carolina*). Braun and Brooks (1987) evaluated the reptile as a possible agent for the dispersal of a number of native plants and found that *Rubus* fruits were particularly favored by the turtles. While passage through a turtle's digestive tract improved the germination percentages for some plant species, that was not the case with *Rubus*: Germination rates of excreted seeds were comparable to those of seeds that had not passed through turtles. Nevertheless, box turtles that consume dewberries are likely to deposit some viable seeds in new locations.

No information was found regarding the germination requirements of *Rubus recurvicaulis* although they are probably not too rigorous as the species is often found in disturbed sites (see next section). A number of *Rubus* species have been known to form mycorrhizae but that is not universal in the genus (Harley and Harley 1987, Wang and Qiu 2006) so it appears unlikely that fungal associations are required for establishment.

Habitat

Rubus recurvicaulis is most likely to be found in dry places. Blanchard (1906) described the settings as open or lightly shaded, and typical substrates have been characterized as rocky, gravelly, or sandy soils (Fernald 1950, Gleason and Cronquist 1991, Rhoads and Block 2007, Angelo and Boufford 2012). One natural habitat identified by Hodgdon and Steele (1966) was pockets of soil on ledges and cliffs. However, Blanchard's Dewberry can sometimes occur in wetter sites. In New Jersey, *R. recurvicaulis* was found growing in a low, wet swale at the edge of a of red maple/black gum swamp (NJNHP 2022). In Newfoundland the species' habitat was described as damp places, woodland borders, and ravines (Arsène 1927), and Sullivan (2008) reported it from a Nova Scotia salt marsh.

Many *Rubus* species grow in disturbed locations (Hodgdon and Steele 1966, Gleason and Cronquist 1991) and *R. recurvicaulis* is no exception. Blanchard (1906) observed that it was "very abundant in roads, mowings, and pastures". The New Jersey occurrence is situated along a mowed roadside (NJNHP 2022), and in other locations the habitat has been described as fields, thickets, railroad banks, and agricultural landscapes (Angelo 1990, Yahner 1998, Bertin 2013). Moola and Vasseur (2004) classified *R. recurvicaulis* as an early-seral species with an affinity for young (3–6 year old) clearcuts. During a vegetative study of Martha's Vineyard that focused on disturbance history and land use, habitats where Blanchard's Dewberry was found included tilled pine plantation, scrub oak shrubland, tree oak woodland, sandplain grassland, and agricultural grassland. The species was not found in sites identified as burned tree oak woodland or untilled pine plantation (Neill et al. 2007).

Wetland Indicator Status

Rubus recurvicaulis 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 2022)

RURE2

Coefficient of Conservatism (Walz et al. 2018)

CoC = 2. Criteria for a value of 1 to 2: Native invasive or widespread native that is not typical of (or only marginally typical of) a particular plant community; tolerant of anthropogenic disturbance (Faber-Langendoen 2018).

Distribution and Range

The global range of *Rubus recurvicaulis* is restricted to the United States and Canada (POWO 2022). The map in Figure 1 depicts the extent of Blanchard's Dewberry in North America.

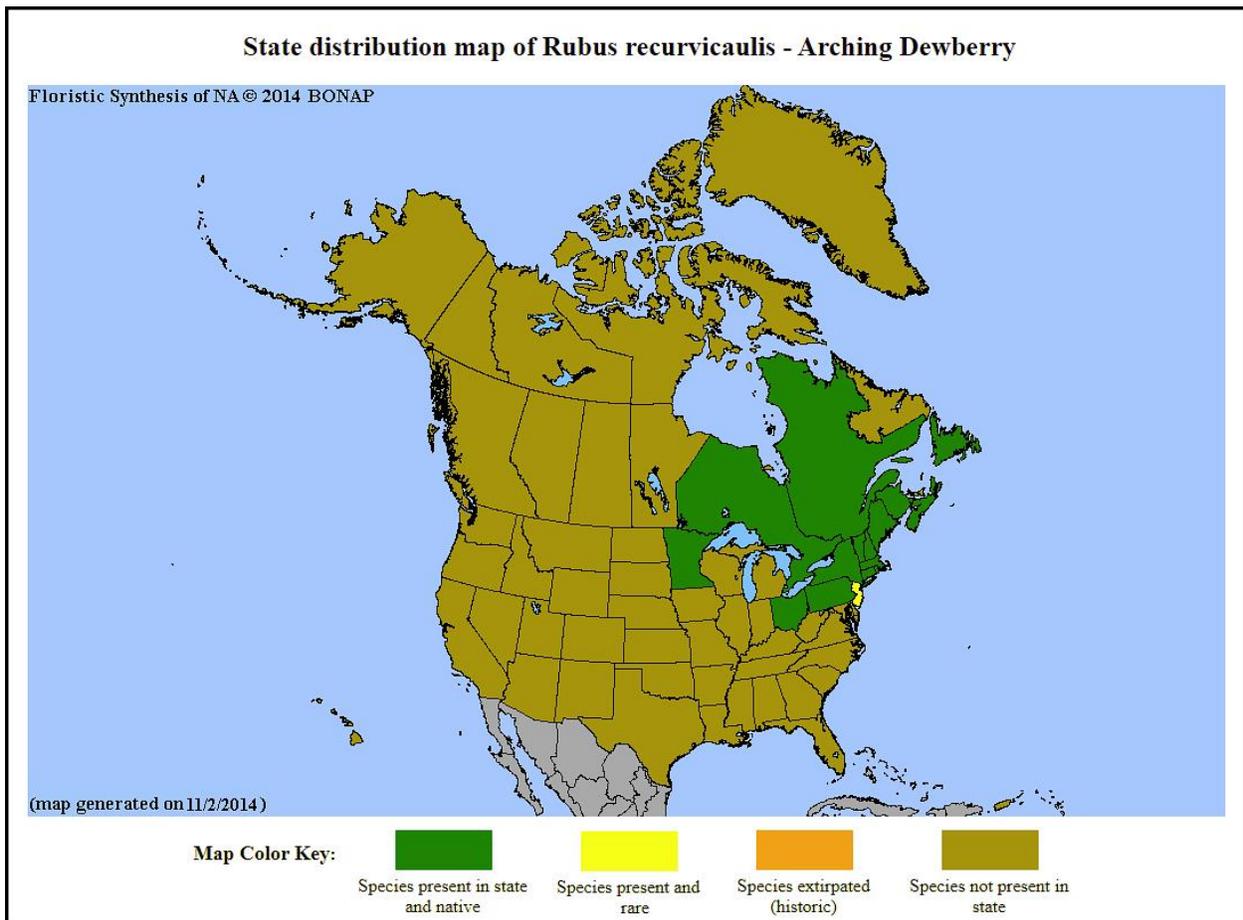


Figure 1. Distribution of *R. recurvicaulis* in North America, adapted from BONAP (Kartesz 2015).

The USDA PLANTS Database (2022) shows records of *Rubus recurvicaulis* in one New Jersey county: Ocean County (Figure 2). A single occurrence, consisting of two plants, was discovered in 1995 and that continues to be the only site where Blanchard's Dewberry has been documented in the state (NJNHP 2022). However, there is some indication that the species may also be present in somewhere along the state's coast (USFWS 2013).

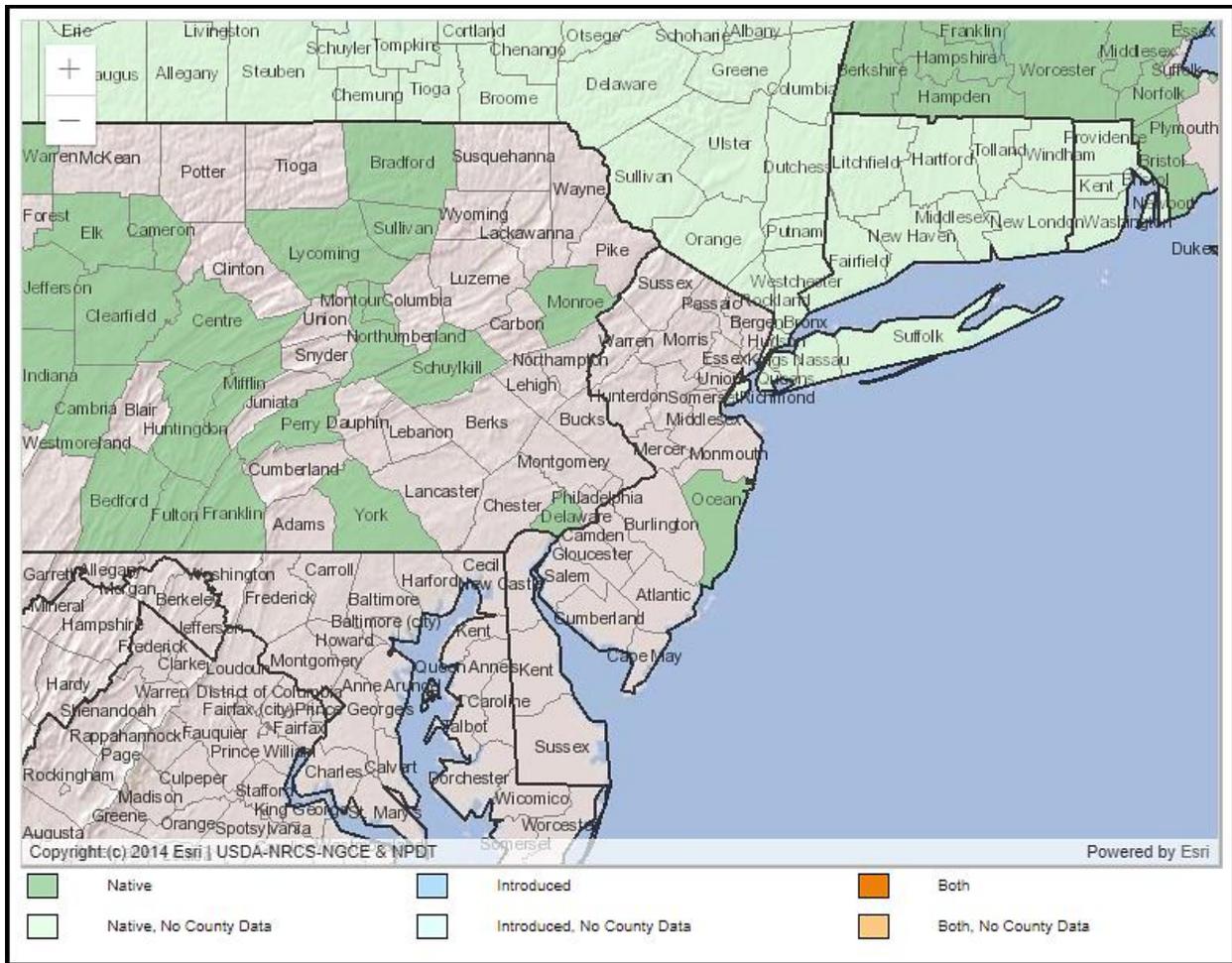


Figure 2. County records of *R. recurvicaulis* in New Jersey and vicinity (USDA NRCS 2022).

Conservation Status

Rubus recurvicaulis is apparently secure at a global scale. The G4 rank means the species is at fairly low risk of extinction or collapse due to an extensive range and/or many populations or occurrences, although there is some cause for concern as a result of recent local declines, threats, or other factors (NatureServe 2022). The map below (Figure 3) illustrates the conservation status of *R. recurvicaulis* throughout its range. Blanchard's Dewberry is critically imperiled (very high risk of extinction) in New Jersey and imperiled (high risk of extinction) in New Brunswick. The dewberry is viewed as a hybrid in Quebec (see Synonyms section). Raposa and Schwartz (2007) characterized *R. recurvicaulis* as a rare species in Rhode Island.

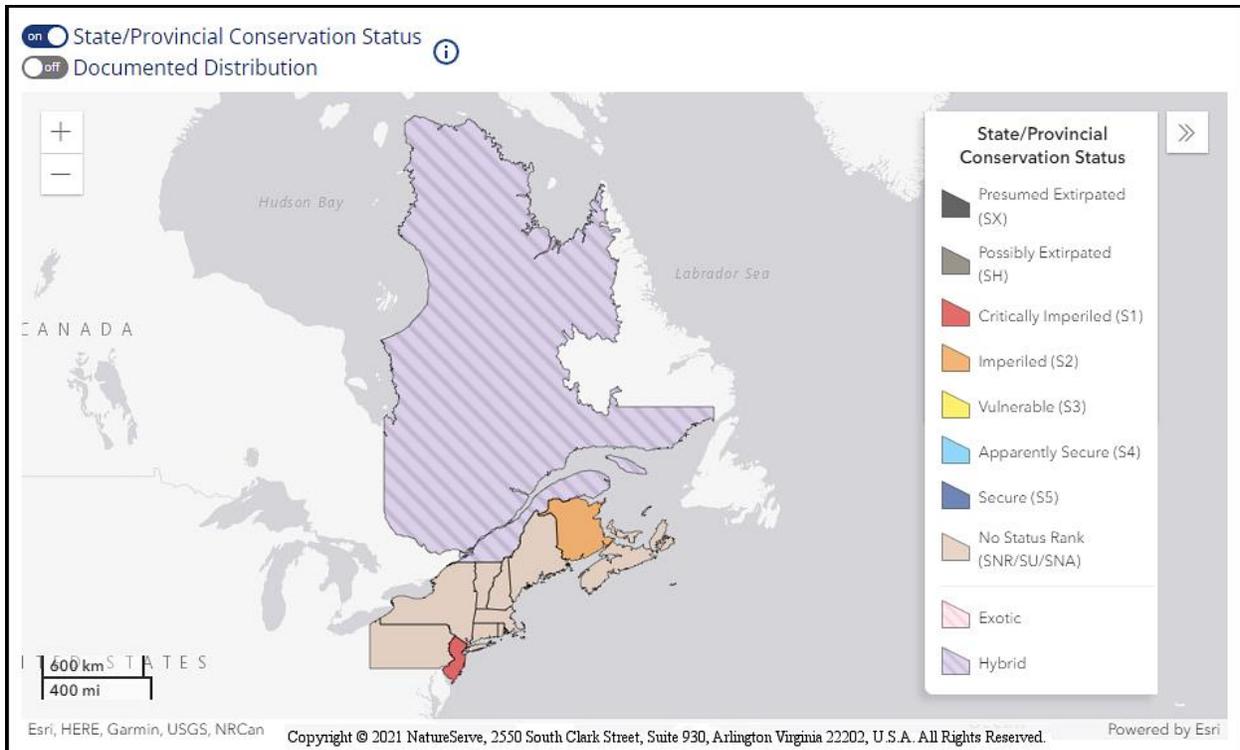


Figure 3. Conservation status of *R. recurvicaulis* in North America (NatureServe 2022).

Rubus recurvicaulis is ranked S1.1 in New Jersey (NJNHP 2022), meaning that it is critically imperiled due to extreme rarity. A species with an S1.1 rank has only ever been documented at a single location in the state. *R. recurvicaulis* 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).

Threats

Because *Rubus recurvicaulis* is often associated with open habitats and recently disturbed sites, individual occurrences may be threatened by natural successional processes. A review of changes in the flora of one Massachusetts county between the mid 1900s and the early 2000s found that the sole occurrence of *R. recurvicaulis* was lost during that period (Bertin 2013). At present, there is not sufficient information to determine whether *R. recurvicaulis* can readily colonize new sites as old ones become less suitable or if loss of habitat to succession would pose a broad threat to the species.

It is likely that *Rubus recurvicaulis* has some sensitivity to herbicides. Tests of the effectiveness of various herbicides on the closely related *R. flagellaris* showed that most types caused some reduction in stem density and yield, with the greatest amount of damage caused by brands that contained metsulfuron (Sather and Bradley 2012). Populations of *R. recurvicaulis* that are situated along roads, railways or utility right-of-ways could be diminished by vegetation control practices that utilize herbicide.

The impacts of climate change may vary depending on the location of individual populations. Some of the effects of changing climactic conditions in New Jersey include higher temperatures, shifting precipitation patterns that increase the frequency and intensity of both droughts and floods, and rising sea levels along the coast (Hill et al. 2020). Because *Rubus recurvicaulis* appears to be well-suited for growth in dry conditions it may be able to persist through periods of drought. However, extended periods of inundation can cause crown mortality in some species of *Rubus* (Sandler 2001), so populations such as the one in New Jersey that grow in lower, wetter sites could be at risk. Occurrences that are located near the coast (e.g. Fogg 1930, Sullivan 2008, USFWS 2013) may be subjected to increased salinity or flooding.

Management Summary and Recommendations

The present status of New Jersey's sole documented occurrence of *Rubus recurvicaulis* is not known. Notes from the initial observation indicated that it was a small population—possibly newly established—that might be threatened by roadside management practices (NJNHP 2022). An updated assessment is needed to determine whether the colony has persisted, expanded, or disappeared. Future surveys of vegetation communities in the state could turn up additional occurrences of Blanchard's Dewberry. The inherent difficulty in identifying *Rubus* species may have caused some colonies to be overlooked. It is also possible that the range of *Rubus recurvicaulis* is slowly expanding southward. An early Massachusetts author described it as a species of northern affinity (Fogg 1930) and the range provided by Bailey (1945) was limited to northern New England and adjacent Canadian provinces. The current range extends down to New Jersey and throughout Pennsylvania (Rhoads and Block 2007, Kartesz 2015).

Some intervention may be needed to conserve *Rubus recurvicaulis* populations in places where the species is rare. At certain sites, restriction of mowing or herbicide use might be helpful. In places where succession could eliminate *R. recurvicaulis* it may be beneficial to maintain a relatively open canopy, but a conservative approach would be needed in order to avoid harm to the dewberry plants. Based on the species noted absence at a burned site (Neill et al. 2007) and a lack of other data to the contrary, the use of fire is not recommended.

Rubus has long inspired debate over what defines a species (e.g. Bicknell 1910, Rydberg 2015) and today there is still much to be resolved about the genus (Alice et al. 2020). Clarity is needed regarding the status and extent of *Rubus recurvicaulis* in order to develop a better foundation for research about the species' characteristics and life history. Effective planning for conservation of Blanchard's Dewberry will require additional knowledge regarding its establishment requirements and ability to adapt to changes in habitat or climactic conditions.

Synonyms and Taxonomy

The accepted botanical name of the species is *Rubus recurvicaulis* Blanchard. Orthographic variants, synonyms, and common names are listed below (ITIS 2022, POWO 2022, USDA NRCS 2022). A bristly-pedicelled variety (*R. recurvicaulis* var. *armatus*) described by Fernald (1920) has since become a synonym for *R. plicatifolius* (Davis 1990, USDA NRCS 2022),

although it has been suggested that *R. plicatifolius* might itself be a synonym for *R. recurvicaulis* (Widrechner 1998). Despite the fact that Blanchard (1911) considered *Rubus recurvicaulis* to be a very distinct species, Rydberg (1915) suggested that it was a hybrid of *R. pergratus* and *R. procumbens* and a number of current sources—including ITIS, POWO, and Alice et al. (2020)—treat it as a hybrid of *R. flagellaris* and *R. pensilvanicus*. According to the range maps provided by Kartesz (2015) there are eight states where both *Rubus flagellaris* and *R. pensilvanicus* occur but neither *R. recurvicaulis* or *R. plicatifolius* have been reported, raising a question as to why the two purported parent species would not also have hybridized at the southern part of their range if that was the case.

Botanical Synonyms

Rubus × *recurvicaulis* Blanch.
Rubus × *akermanii* Fernald
Rubus × *darlingtonii* L. H. Bailey
Rubus × *dissitiflorus* Fernald
Rubus × *hypolasius* Fernald
Rubus × *janssonii* L. H. Bailey
Rubus × *largus* L. H. Bailey
Rubus onustus L. H. Bailey
Rubus recurvicaulis var. *inarmatus* Blanch.
Rubus × *rossbergianus* Blanch.
Rubus × *valentulus* L. H. Bailey

Common Names

Blanchard's Dewberry
Arching Dewberry
Arching Bramble
Sand Dewberry

Fernald (1950) recognized the species and also included the following as synonyms: *R. aptatus*, *R. armatus*, *R. botrosus*, *R. bretonis*, *R. fandus*, *R. oriens*, *R. polybotrys*, *R. rhodinsulanus*, *R. uvidus*, "and some others". Gleason and Cronquist (1991) recognized the species and listed the following as synonyms: *R. adenocaulis*, *R. arenicola*, *R. arundelanus*, *R. boyntonii*, *R. bracteoliferous*, *R. complex*, *R. conabilis*, *R. cordifrons*, *R. folioflorus*, *R. fraternalis*, *R. grandidens*, *R. grimesii*, *R. icens*, *R. minnesotanus*, *R. noveboracus*, *R. pauper*, *R. perpauper*, *R. pityophilus*, *R. plicatifolius*, *R. satis*, *R. setospinosus*, *R. talantus*, and *R. vagus*, although the authors noted that some taxons listed as synonyms might eventually prove to be hybrids.

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Harvard Herbarium. Image of *Rubus recurvicaulis* specimen collected by L. H. Bailey in Maine, June 30, 1909. Licensed by <http://creativecommons.org/licenses/by-nc/3.0/>

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