

Hypericum majus

Larger Canadian St. John's-wort

Clusiaceae



Hypericum majus Rare Plant Profile

New Jersey Department of Environmental Protection
Division of Parks and Forestry
New Jersey Forest Service
Office of Natural Lands Management
New Jersey Natural Heritage Program

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Introduction

The Larger Canadian St. John's-wort is a NJ native species on the brink of extirpation in this state. It has a complicated and convoluted past, including divergence, speciation, and hybridization on its roster, yet with little specifics about its ecological background and with many trusted authorities describing its defining characteristics quite differently. The potential to hybridize with closely related species in the genus may be one of the confounding factors in this plant's described ambiguity. We do not have a New Jersey State Flora that describes *Hypericum majus* particular to our state, so for the purposes of this rare plant profile, several sources have been cited and discrepancies clearly noted as best as possible.



2004 © Peter M. Dziuk

Branching habit of Larger Canadian St. John's-wort



2013 © M. Costea and G. Costea

Conical, maroon seed pods



2013 © M. Costea and G. Costea

Leaves and stem may take on a reddish-purple hue



2018 © Robert L. Carr

*Close up of inflorescence displaying the fine red venation sometimes present in *H. majus* petals*



2010 © Peter M. Dziuk

Oblong seeds are less than a millimeter in length

Life History

Hypericum majus has been dually described as either a perennial (Gleason and Cronquist 1991) or annual herb (Rhoads and Block 2007); as rhizomatous (Gleason and Cronquist 1991), or with roots fibrous, without rhizomes or runners but occasionally with short offshoots in autumn (Gillet and Robson 1981). The stem is upright, 1 to 9 dm in height (Camp and Gamon 2011) slender, smooth, green or purplish, and squarish in cross section with narrow wings (Gillet and Robson 1981) and often branching (Illinois Wildflowers 2019). The stalkless leaves which are up to 38 mm in length and up to 8.5 mm in width are arranged oppositely and just barely clasping the stems (Minnesota Wildflowers 2019). The margins of the leaves are entire with tips ranging from blunt to pointed, their venation appearing nearly parallel with 3 to 7 distinct veins on leaves attached to the main stem. Like the stem, the leaves are known to sometimes turn purple later in the year (Illinois Wildflowers 2019).

The flowers are often clustered in groups at the ends of the primary as well as the secondary upright, branching stems (Minnesota Wildflowers 2019). Each flower is about 8 mm across, with 5 yellow petals and 5 light green sepals, has 14-22 yellow stamens, and a light-yellow pistil with 3 styles. The petals are oblong-elliptic in shape with occasional fine reddish veins while the sepals are lanceolate in shape, faintly veined, and hairless. The common name St. John's-wort indicates the start of the flowering season as the first blooms align with the pagan midsummer's day feast now known as St. John's Day (Ernst 2003) and continue to bloom until early fall. If pollinated, the resulting ovary is a conical purplish-maroon capsule. This capsule now sheathed by sepals upturned, splits open upon maturity releasing numerous seeds. The seeds are 0.5 mm in length, light yellow, covered in pits and ridges (Illinois Wildflowers 2019) and resemble a miniature ear of corn (Minnesota Wildflowers 2019).

Hypericum majus was the western member of a vicariant species pair, differing from the originally eastern member (*H. canadense*) by the broader leaves, usually more-congested inflorescence, and larger flowers. These species became sympatric in glaciated northeastern North America and now hybridize freely, notably in Wisconsin (efloras 2020). Hybrids are intermediate in form between the parents and have also been recorded from Connecticut, Massachusetts, and New Hampshire. *Hypericum majus* hybridizes also with *H. mutilum*, with subsp. *mutilum* in Maine, and with subsp. *boreale* in Michigan and Wisconsin (Gillet and Robson 1981).

Pollinator Dynamics

Some species within the genus *Hypericum* are known to be facultative apomictic, meaning that they can reproduce asexually if necessary, and nearly all *Hypericum* species are autogamous (self-fertilizing) and thus offer no nectar reward to would-be pollinators. However, their flowers do attract several species of insects that specifically harvest pollen or inadvertently collect it while searching in vain for nectar (Kevan and Tekhmenev 1993, Illinois Wildflowers 2019). Two known groups of insects that regularly visit the bright yellow flowers are Syrphid flies, bumblebees (*Bombus spp.*), Halictid bees (*Lasioglossum spp.* etc.), and occasional species of beetles (Flora Malesiana 2019, Illinois Wildflowers 2019).

Seed Dispersal

Dispersal mechanisms of *Hypericum majus* are not specifically known. According to Illinois Wildflowers (2019) the seeds of Larger Canadian St. John's-wort are very small and conducive to wind or water dispersal due to their low mass. Seeds in the Hypericeae family sometimes have wing-like expansions of the testa which could promote wind dispersal. Those without such an aid are normally dispersed by gravity; but the seeds of some species of wet habitats may be carried in mud on the feet of wading birds (Flora Malesiana 2019).

The seeds of *H. majus* and many others in the *Hypericum* genus are capsule-shaped and many possess an eliasome. This nutrient-rich appendage (or keel) may promote an association with ants. In this case, the specific association is known as myrmecochory, which is the process of dispersal whereby ants carry seeds back to the colony, consume the eliasome, and discard the still viable seed some distance from its parent plant (Gillet and Robson 1981).

Habitat

Throughout its range, Larger Canadian St. John's-wort is generally found in wet meadows and along shores (Hough 2018), in places considered to be high quality natural areas (Illinois Wildflowers 2019). In the Chicago Region (Minnesota south to Arkansas and northeast to Michigan) the species is considered common and grows throughout a broad array of habitats like calcareous moist sand, interdunal swales, somewhat dry prairies, along the borders of ponds and marshes, as well as in marshes with low water levels, and on floating peat mats (Southwest Regional Network of Expertise and Collections (SERNEC) 2019). In New England *Hypericum majus* is found in man-made or disturbed habitats, meadows and fields, shores of rivers or lakes, and wetland margins (GoBotany 2019). In Michigan it grows on moist sandy to mucky (or marly) shores, excavations, interdunal hollows; marshy or sedgy ground; fens; borders of streams and cedar swamps; in crevices in sandstone (Michigan Flora Online 2011) and in northern Ohio in disturbed bogs and wet ditches (Cooperrider 1989).

The species occurs in the country for which it is named, in various habitats across all the lower Canadian provinces. Furthest west in British Columbia, *H. majus* has been documented on the sunny margins of marshes, damp ground exposed by low water, lakeshores, wet seepy forest, marly peat blocks, and excavation pool margins (Consortium of Pacific Northwest Herbaria 2020). In the east, on Prince Edward Island the species was found in damp sand in roadside pits and dune slacks (Erskine 1960).

In New Jersey, *H. majus* occurs in moist, usually calcareous wet meadows and pond edges (Walz et al. 2018). Of the ten occurrences documented in the state's Natural Heritage Biotics database, the one confirmed to be extant was found in muddy substrate near the shore of a large limestone sink. Occurrences now considered as either historic or extirpated were all found in similar habitat (NJ Natural Heritage Program 2019). This type of habitat which is broadly defined as calcareous

sinkhole ponds is itself considered rare in New Jersey (Johnson and Walz 2013). Like *H. majus* several other state-endangered plant species can be found only in these rare, calcium-rich pockets of wetlands. Potential associated rare species include *Alisma triviale* (Large Water-plantain), *Boltonia montana* (Appalachia Mountain Boltonia), *Carex haydenii* (Cloud Sedge), *Carex lupuliformis* (Hop-like Sedge), *Glyceria borealis* (Small Floating Manna Grass), *Megalodonta beckii* (Water-marigold), *Neobeckia aquatica* (Lake Water-cress), *Panicum flexile* (Wiry Panic Grass), *Sagittaria cuneata* (Arum-leaf Arrowhead), *Schoenoplectus torreyi* (Torrey's Bulrush), *Sparganium natans* (Small Burr-reed), and *Utricularia minor* (Lesser Bladderwort).

Although it is only found within a very narrow habitat in New Jersey, Larger Canadian St. John's wort has been alleged to be one of many pest species in commercial cranberry bogs in Pacific north western states where its eastern genotype was introduced along with the non-indigenous cranberry. In France where *Hypericum majus* was introduced in metropolitan areas and considered potentially invasive, it occurs along banks of rivers, lakes, ponds, marshes, in meadows and fields, and on the edges of wetlands (Pineau and Ouest 2017).

Wetland Indicator Status

Larger Canadian St. John's-wort is a facultative wetland species (FACW). According to US Army Corps of Engineers National Wetland Plant List Indicator Rating Definitions these plants "usually occur in wetlands but may occur in non-wetlands. These plants predominately occur with hydric soils, often in geomorphic settings where water saturates the soils or floods the soil surface at least seasonally".

USDA Plants Code

HYMA2

Coefficient of Conservatism (Walz et al., 2018)

CoC = 10; Criteria: 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 map below (Figure 1) shows a general view of the range & state rarity status of *Hypericum majus*.

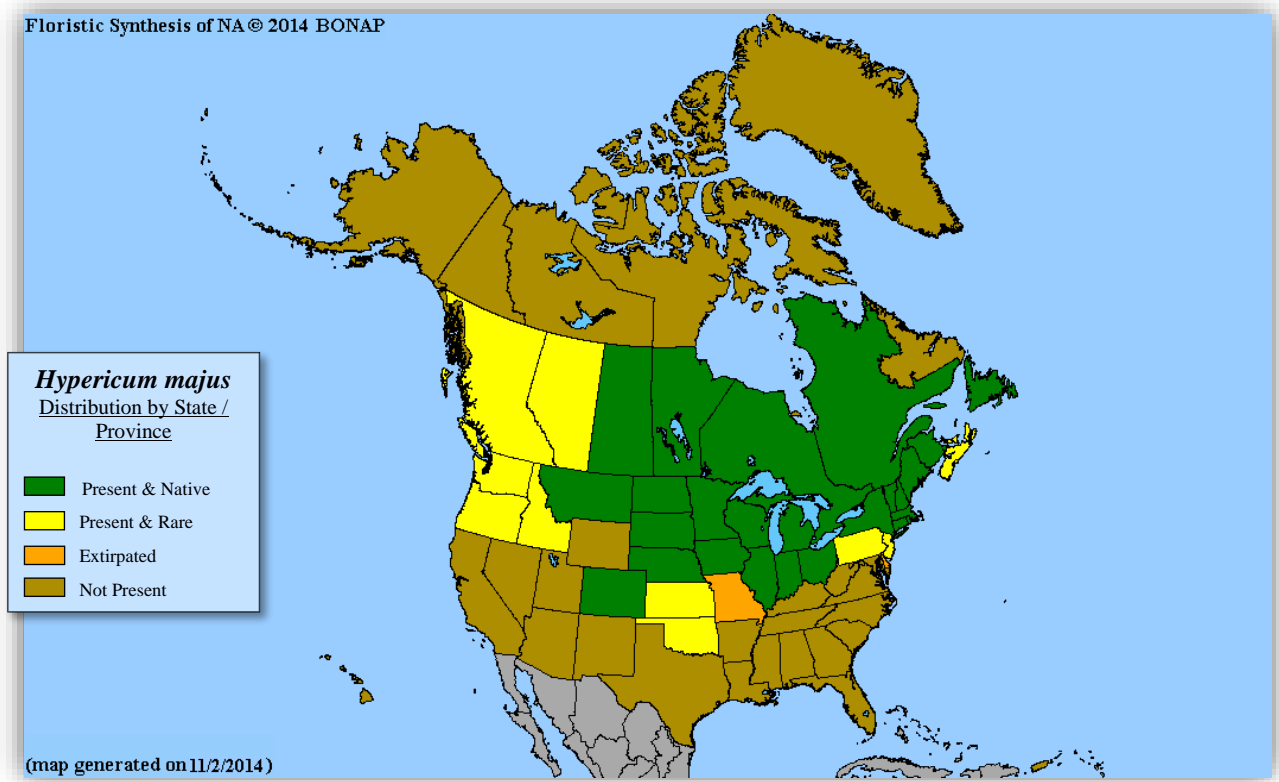


Figure 1 State Distribution Map of *Hypericum majus*

Below (Figure 2) is a county level distribution map focusing on New Jersey and contiguous counties of the surrounding states. This map is compiled from herbarium and state literature occurrence data of which many are now historic. A closer look at the current NJ county level distribution and rarity status of the species as documented in the Biotics database will be discussed in the following section on "Conservation Status".

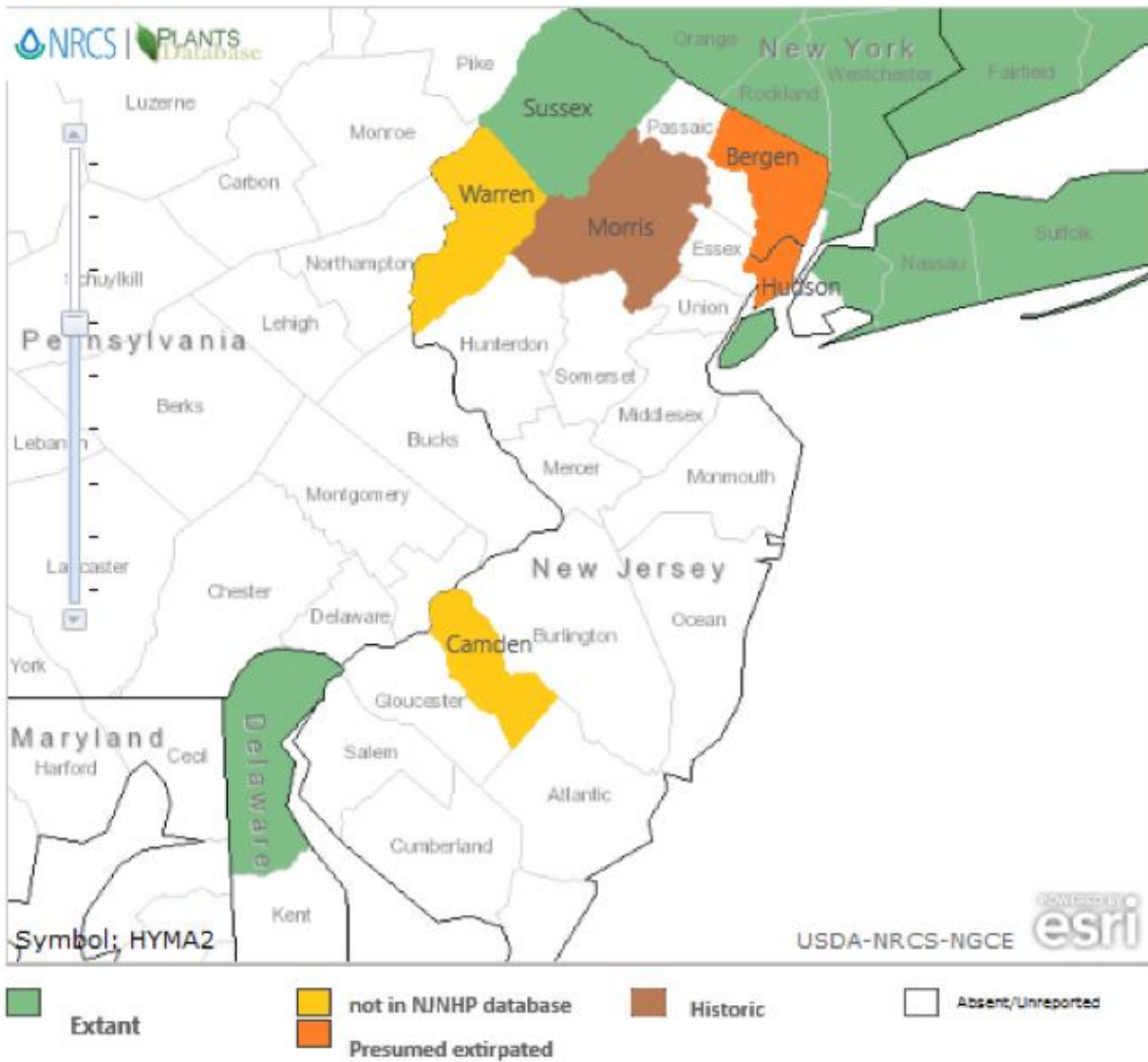
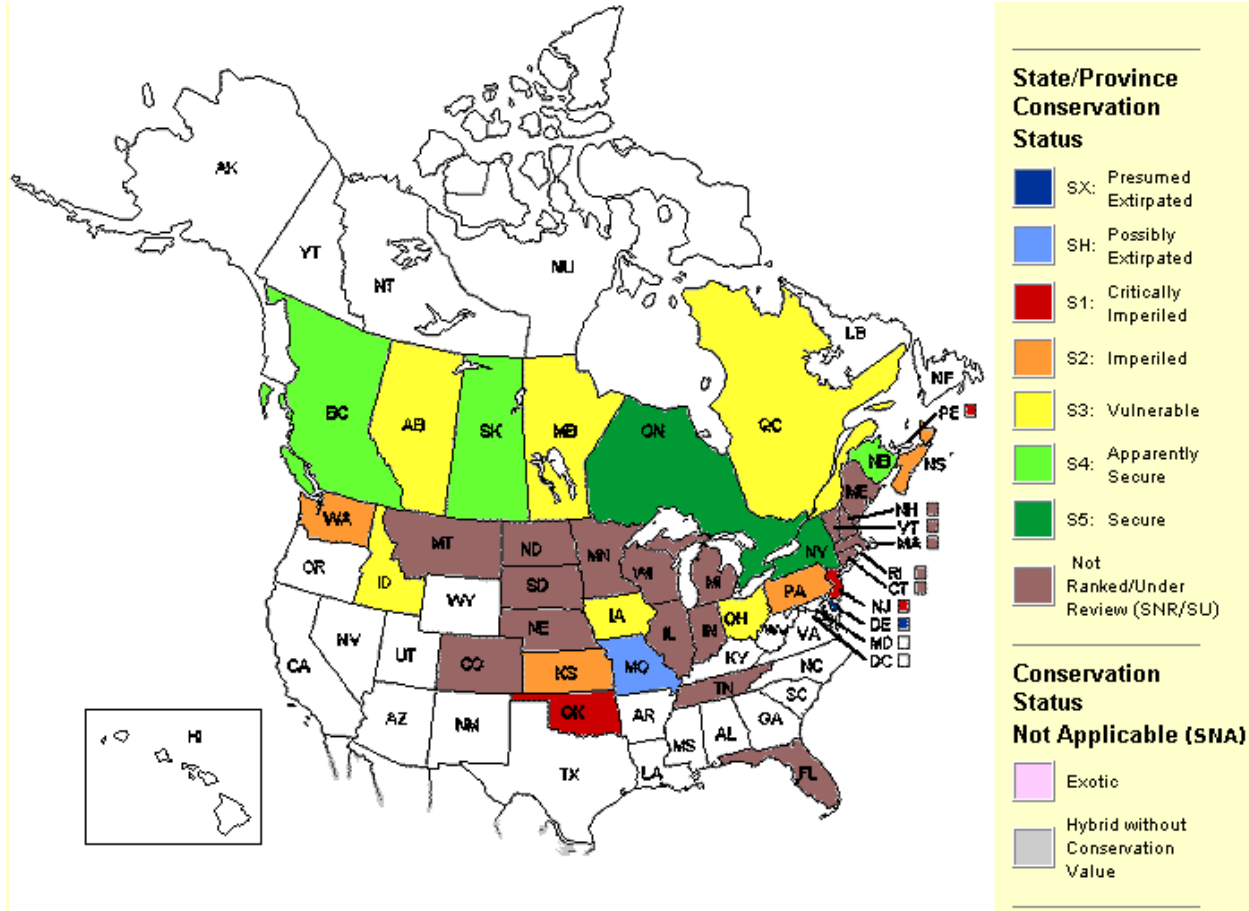


Figure 2 County distribution of *Hypericum majus* in the State of New Jersey

Conservation Status



Hypericum majus is considered globally stable (G5) meaning that worldwide, the species is "secure: common; widespread and abundant" (NatureServe 2018) but is critically imperiled in many states throughout its range. Larger Canadian St. John's-wort is considered endangered (E) in New Jersey and according to the state's Natural Heritage Program that status indicates a "Native New Jersey plant species whose survival in the State or nation is in jeopardy". The state rank of S1, in accordance to the Nature Conservancy element ranks used by the New Jersey Natural Heritage Program (2016) defines the species as "Critically imperiled in New Jersey because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres). Elements so ranked are often restricted to very specialized conditions or habitats and/or restricted to an extremely small geographical area of the state. Also included are elements which were formerly more abundant, but because of habitat destruction or some other critical factor of its biology, they have been demonstrably reduced in abundance. In essence, these are elements for which, even with intensive searching, sizable additional occurrences are unlikely to be discovered."

The other status codes indicate that the species is "HL" or "protected by the Highlands Water Protection and Planning Act within the jurisdiction of the Highlands Preservation Area" and "LP" meaning that the "taxa [is] listed by the Pinelands Commission as endangered or threatened

within their legal jurisdiction. Not all species currently tracked by the Pinelands Commission are tracked by the Natural Heritage Program. A complete list of endangered and threatened Pineland species is included in the New Jersey Pinelands Comprehensive Management Plan" (NJNHP 2010).

NatureServe (2018) lists the following NJ counties where *H. majus* has been historically known to exist: Bergen*, Hudson*, Sussex, and Warren* (* Extirpated/possibly extirpated).

Threats

Larger Canadian St. John's-wort has been described as an early successional species adapted to grow in disturbed areas (Pennsylvania Natural Heritage Program 2012 [hereafter, "PA NHP"]). However, it is important to clarify the level of disturbance and types of habitat in which they occur. Johnson and Walz (2013) note many threats to *Hypericum majus* and its calcareous sinkhole habitat. These large-scale disturbances include all aspects of residential and commercial development (including recreation and tourism), annual and perennial non-timber crops, farming and ranching, mining and quarrying, the building and maintenance of roads and railroads and utility and service lines and the practice of logging and wood harvesting, ecosystem modifications, water quality degradation (which includes pollution from household sewage and urban wastewater, agricultural and forestry effluents, garbage, and solid waste), development and fragmentation, and habitat alteration due to climate change. A Climate Change Vulnerability Index assessment of 70 State Endangered Plant Species in New Jersey (Ring et al. 2013) reported that *Hypericum majus* is Moderately Vulnerable to climate change, primarily due to the potential shift in species geographic range.

While the regular seasonal disturbance of the water table raising and lowering keeps calcareous sinkhole habitat in balance for species such as *Hypericum majus*, novel underlying changes in hydrology whether anthropogenically induced or naturally occurring could be quite devastating. For example, Camp and Gamon (2011) note that significant changes to the hydrologic regime from dam construction may have contributed to the loss of some populations of the species in their state. An example of a naturally occurring hydrological change may be the building of a beaver dam in the vicinity of the sinkhole (Johnson and Walz 2013).

Invasive species of plants that have proven to be detrimental to the survival of *H. majus* include *Phragmites australis* (which was reported to have overrun a population in NJ now considered historic (NJNHP 2019), purple loosestrife (*Lythrum salicaria*), and canary reedgrass (*Phalaris arundinacea*) (Camp and Gamon 2011). Those species and more including Japanese stiltgrass (*Microstegium vimineum*), Japanese knotweed (*Polygonum persicaria*), garlic mustard (*Alliaria petiolata*), and Japanese barberry (*Berberis thunbergii*) all threaten the integrity of buffer habitat upland of sinkhole ponds and other wetland areas that could potentially be home to Larger Canadian St. John's-wort.

Many insects are known to feed destructively on various species of St. John's-wort, including a flea beetle (*Paria sellata*), aphids (*Aphis hyperici*, *Hyalomyzus sensoriatu*s), seed-eating larvae

of the weevil, *Anthonomus rutilus*, and the larvae of an oligolectic moth, the Grey Half-spot (*Nedra ramosula*) (Illinois Wildflowers 2019).

H. majus is considered an adventive species in commercial cranberry bogs in the western and midwestern United States and its presence is managed with herbicides. However, the genotype was introduced from the eastern United States along with commercial cranberries and is not considered endangered because of this (Zika 2003, Colquhoun 2015).

Management Summary and Recommendations

In New Jersey where there is now only one known extant population of Larger Canadian St. John's-wort, every possible measure must be taken to ensure no further decline of the species. Occurrences of *Hypericum majus* and any other rare plants associated should be protected during all management activities taking place on natural lands within their vicinity (Lichthardt and Mancuso 2003). Timbering and other large-scale disturbances should be avoided in and around the forested wetlands where Larger Canadian St. John's-wort and other species of concern are present as well as avoiding areas of suitable habitat where the species could potentially occur (PA NHP 2012).

Changes in the hydrological nature of suitable habitat need to be monitored if there is any development taking place nearby that could affect the local water table. Water quality monitoring should be continuous if there is concern that effluent from agriculture, home & business wastewater, road construction, logging practices, and mining may have a negative physical impact on or create chemical changes to the habitat. The effects of run-off should be calculated before implementing impervious surfaces like roads, parking lots, and buildings in the vicinity of sensitive wetlands.

It is best to keep direct human contact to a minimum in natural areas that contain sensitive species. If trails exist nearby, they can be redirected to avoid the crushing of plants and compaction of soils from off-road vehicles as well as divert hikers that may introduce seeds and eggs of potentially invasive/harmful species brought along on their clothing from outside areas.

Invasive wetland plants such as *Phragmites australis* must be managed to avoid their spread and ultimate dominance of the wetland areas. Special care should be taken into reviewing the best management practices for managing each species of invasive and adventive plants that are evident in wetland settings. In cases where mechanical removal alone will not suffice, a licensed professional may be required to implement chemical applications in the sensitive wetland habitat.

While there are several species of insect that are damaging to the members of the genus *Hypericum* there is currently no documented insect that destructively feeds specifically on *H. majus*. It is advised to monitor known populations for any insect damage throughout the year and further study any potentially negative impacts observed.

Synonyms

Botanical Name

Hypericum majus (A. Gray) Britton

Botanical Synonyms

Hypericum canadense L. var. *majus* A. Gray

Common Names

Canadian St. John's-wort
Greater Canadian St. John's wort
Greater St. Johnswort
Sand St. John's Wort
Large St. Johnswort
Larger Canada St. John's Wort
Irish St. John's-wort
Tall St. John's-wort

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