



United States Department of the Interior  
FISH AND WILDLIFE SERVICE  
East Lansing Field Office (ES)  
2651 Coolidge Road, Suite 101  
East Lansing, Michigan 48823-6316

IN REPLY REFER TO:

April 10, 2015

Ms. Carol Lee-Roark  
Senior Environmental Scientist  
Sanderson Stewart  
106 E. Babcock  
Bozeman, MT 59715

Subject: **Biological Opinion** for Hammond Bay Biological Station Repair, Replacement and Renovation Project, Millersburg, MI (03E16000-2015-F 0047)

Dear Ms. Lee-Roark:

Pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C., 1531 *et seq.*) (Act), this document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (Opinion) for the Hammond Bay Biological Station Repair, Replacement and Renovation Project on Houghton's goldenrod (*Solidago houghtonii*). We received your request for formal consultation on December 2, 2014.

We base this Opinion on information provided in the November 24, 2014 Biological Assessment (BA), published literature, and information obtained from species experts. A complete administrative record of this consultation is on file at our office.

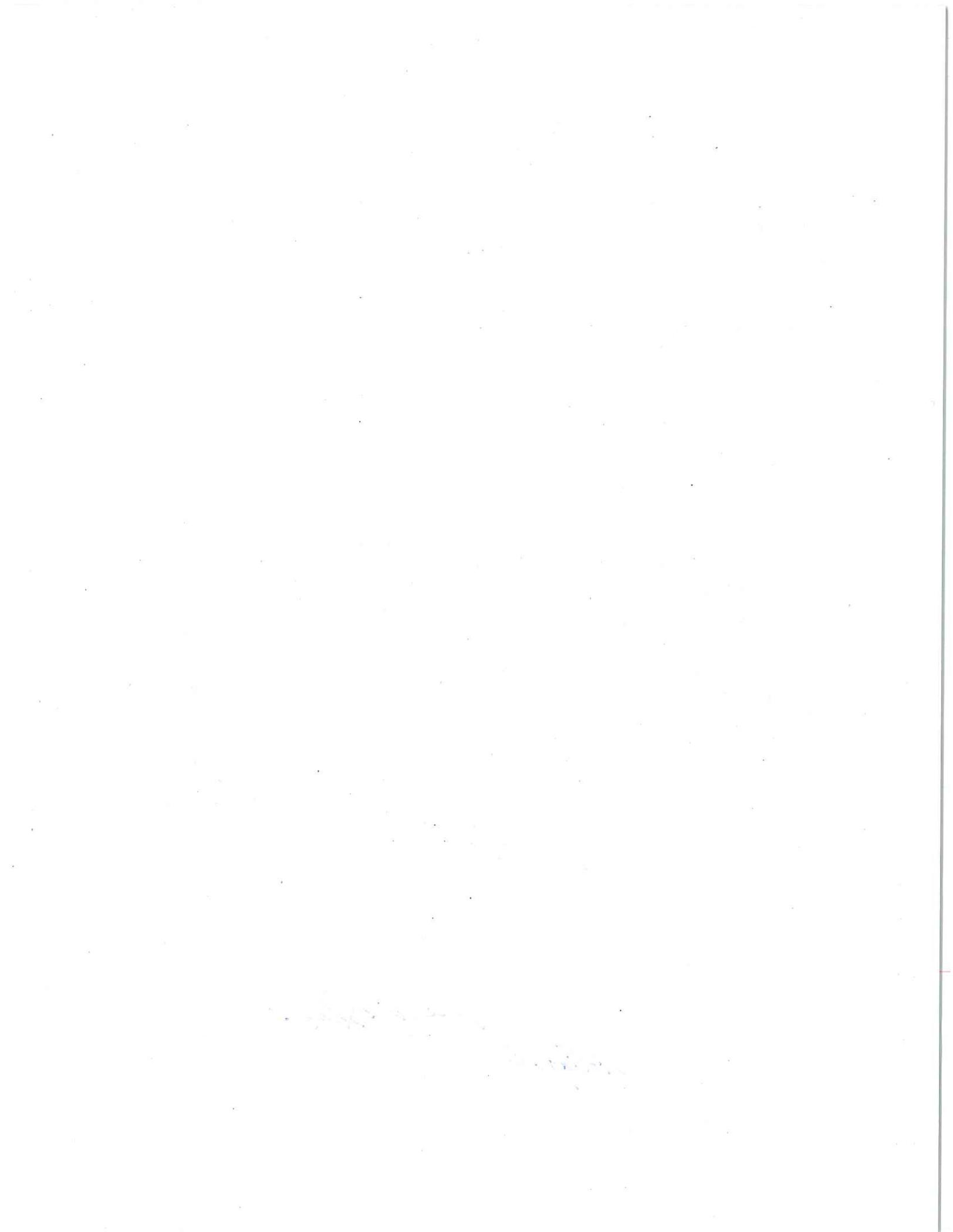
With respect to compliance with the Act, all aspects of the project description are binding, as well as all conservation measures proposed by the USGS to protect listed species. In addition, USGS must provide the Service with any new information that becomes available on the effects of the action on listed species or critical habitat in a manner or to an extent not considered in this opinion, as this may require reinitiation of consultation.

We look forward to future cooperation with USGS to conserve our Nation's threatened and endangered species. If you have any questions, please contact Mr. Vince Cavalieri of this office at 517-351-5467.

Sincerely,

  
Scott Hicks  
Field Supervisor

cc: Mr. Dan Kennedy, Michigan DNR



## **BIOLOGICAL OPINION**

### **Hammond Bay Biological Station Repair, Replacement and Renovation Project**

Analysis of Effects on:  
Houghton's Goldenrod

#### **Prepared for:**

United States Department of the Interior  
U.S. Geological Survey  
11188 Ray Road  
Millersburg, Michigan

#### **Prepared by:**

United States Department of the Interior  
U.S. Fish and Wildlife Service  
East Lansing Field Office  
East Lansing, Michigan

April 10, 2015.

## Introduction

This document transmits the U.S. Fish and Wildlife Service's (USFWS) Biological Opinion (Opinion) on the effects of the Hammond Bay Biological Station Repair, Replacement, and Renovation project on Piping Plover (*Charadrius melodus*) and Houghton's goldenrod (*Solidago houghtonii*), in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C., 1531 et seq.). We received the request for formal consultation on December 2, 2014.

We base this Opinion on information provided in the Biological Assessment (BA) for the Hammond Bay Repair, Replacement, and Renovation Project, as well as published literature, and information obtained from species experts. A complete administrative record of this consultation is on file at the Service's East Lansing Field Office (ELFO).

## Consultation History

- |                  |  |
|------------------|--|
| January 2013     | Initial coordination between the USFWS and the US Geological Survey (USGS) on the preliminary conceptual design phase during initial Draft Environmental scoping.  |
| December 2, 2014 | USGS concluded that the proposed action will have no effect on Piping Plover, Rufa Red Knot ( <i>Calidris canutus rufa</i> ), Eastern Massasauga ( <i>Sistrurus catenatus</i> ) or Dwarf lake iris ( <i>Iris lacustris</i> ) but is likely to adversely affect Houghton's Goldenrod. Formal section 7 consultation was initiated with an accompanying final Biological Assessment, dated November 20 <sup>th</sup> , 2014. |

## BIOLOGICAL OPINION

### Description of Proposed Action and Action Area

The proposed action is designed to improve the existing facility conditions located at the USGS Hammond Bay Biological Station (HBBS). HBBS is located along the shoreline of Lake Huron near Millersburg in Presque Isle County, Michigan. The Action Area (Figure 1) consists of the current research campus, which is already mostly developed, as well as the following natural community types: limestone cobble shore, sand and gravel beach, Great Lakes marsh, northern shrub thicket, and boreal forest. Project actions are designed to bring HBBS up to current standards, improve energy efficiency and improve the environment for the staff with minimal impacts to current science research programs. This proposed project will enable USGS to meet needs for improving scientific information for protecting, restoring, enhancing and managing living resources and habitats in the Great Lakes basin. Additionally HBBS has a more specific research mission involving invasive species.



**Figure 1. Map of Hammond Bay Biological Station located in Presque Isle County, MI.**

Much of the proposed work will take place in the already altered footprint of the current research campus, an area composed primarily of structures, graveled areas, pavement and landscaped lawn. Some of the work will however occur outside of this area in natural communities. This project has three main proposed actions:

- (1) Repair, renovate and/or replace Main laboratory building
- (2) Utility work, including new intake lines and water tank
- (3) Renovation of the Upper Laboratory

Much of the proposed work for the repair, renovation and/or replacement of the main laboratory building will occur within an area that is already developed. Within these construction limits vegetation will be removed and topsoil stockpiled during construction. A silt fence will be set-up at or within the construction limits. The final grading will replace the topsoil and vegetation.

Two excursions will occur outside the construction limits. This proposed utility work will include a new intake line, pump house, piping and distribution systems, a new water tank, and a new outlet/discharge structure. The intake line will be buried; it will be a standard waterline installation. Topsoil and existing vegetation will be stockpiled near the excavation and replaced above the newly installed waterline.

The outlet structure, energy dissipation structure and outflow swale are proposed as an outlet at the headwall, a 5-foot wide by 10-foot long area of riprap to dissipate discharge flow energy, and a 5-foot bottom width drainage swale graded to meet the surrounding topography and direct flows downslope across the beach to the lake. The drainage swale grading is anticipated to be accomplished with standard construction equipment. The outflow line will be buried, so impacts should be temporary, impacts from the outlet structure, energy dissipation structure and outflow swale are anticipated to be permanent.

The only federally listed species found in the impacted portion of the Action Area is the Houghton's Goldenrod. It is anticipated that there will be adverse impacts to Houghton's Goldenrod plants due to the burial of the new water line and the creation of the new outfall and discharge swale. There is the potential that over 2,000 Houghton Goldenrod plants could be adversely affected by these actions.

#### Conservation Measures

- 1) The soil and vegetation excavated during these actions will be placed to side of the excavation and kept moist. It will then be replaced after the activities have been completed.
- 2) The area will be fenced for further protection and educational signage will be placed around the area.

## STATUS OF THE SPECIES

### *Piping Plover*

The Biological Assessment states that the Action Area contains Piping Plover Critical Habitat. While designated Piping Plover Critical Habitat does occur within the county, no critical habitat occurs within the Action Area. As there does not appear to be any habitat within the action area that would support nesting Piping Plovers and USGS has made a “No Effect” determination for this species, we will not consider it further.

### *Houghton’s Goldenrod*

#### Species and Habitat Description

The Houghton’s goldenrod is a member of the Asteraceae (aster) family and a species of the Upper Great Lakes region. It is characterized by its flat-topped, branched inflorescence comprised of relatively few, showy, large flower heads that may number from 5 to 30 or more. Its smooth, slender, often somewhat reddish stems can reach a height of 29 inches and has well-scattered, long (7.8 inches), narrow (0.8 inches wide), pointed leaves often folded along the midrib, tapering to a slightly clasping base (USFWS 1997, Penskar et al. 1996). The branches and flower stalks of the inflorescence are finely hairy, with fine upcurving hairs, and the achenes are smooth and ribbed (Penskar et al. 1996).

The Service listed Houghton’s goldenrod as a threatened species under the Act on July 18, 1988 (USFWS 1997). The species is primarily restricted to the northern shores of Lakes Michigan and Huron in Michigan and Ontario and found on calcareous beach sands, rocky and cobble shores, beach flats, edges of marl ponds, and most commonly, the shallow, trough-like interdunal wetlands that parallel shoreline areas (USFWS 1997, Penskar et al. 1996). Houghton’s goldenrod also occurs on seasonably wet limestone pavement, which is the species’ more typical habitat in the eastern portion of its range, primarily in Ontario (Morton 1979, Semple and Ringius 1992), as well as in a marl fen in New York (Penskar et al. 1996). It usually occurs where there is a relatively low density of competing vegetation (USFWS 1997).

Most populations of Houghton’s goldenrod are restricted to narrow shoreline habitat of the Great Lakes within active, dynamic zones, such as beach flats, dunes, and interdunal wetlands (USFWS 1997). These sites are affected by Great Lakes water fluctuations and are constantly exposed to wave and wind action and continual movement of sand leading to cycles of destabilization, plant colonization, and subsequent dune restabilization (USFWS 1997). Much less commonly, a few Houghton’s goldenrod populations occur in an unusual northern wet-prairie-like habitat within jack pine barrens, where it occupies seasonally inundated areas and old interdunal depressions in a sandy glacial outwash landscape (USFWS 1997, Penskar et al. 1996). A single occurrence of the species is also located in the far-eastern portion of its range within a marl fen (USFWS 1997).

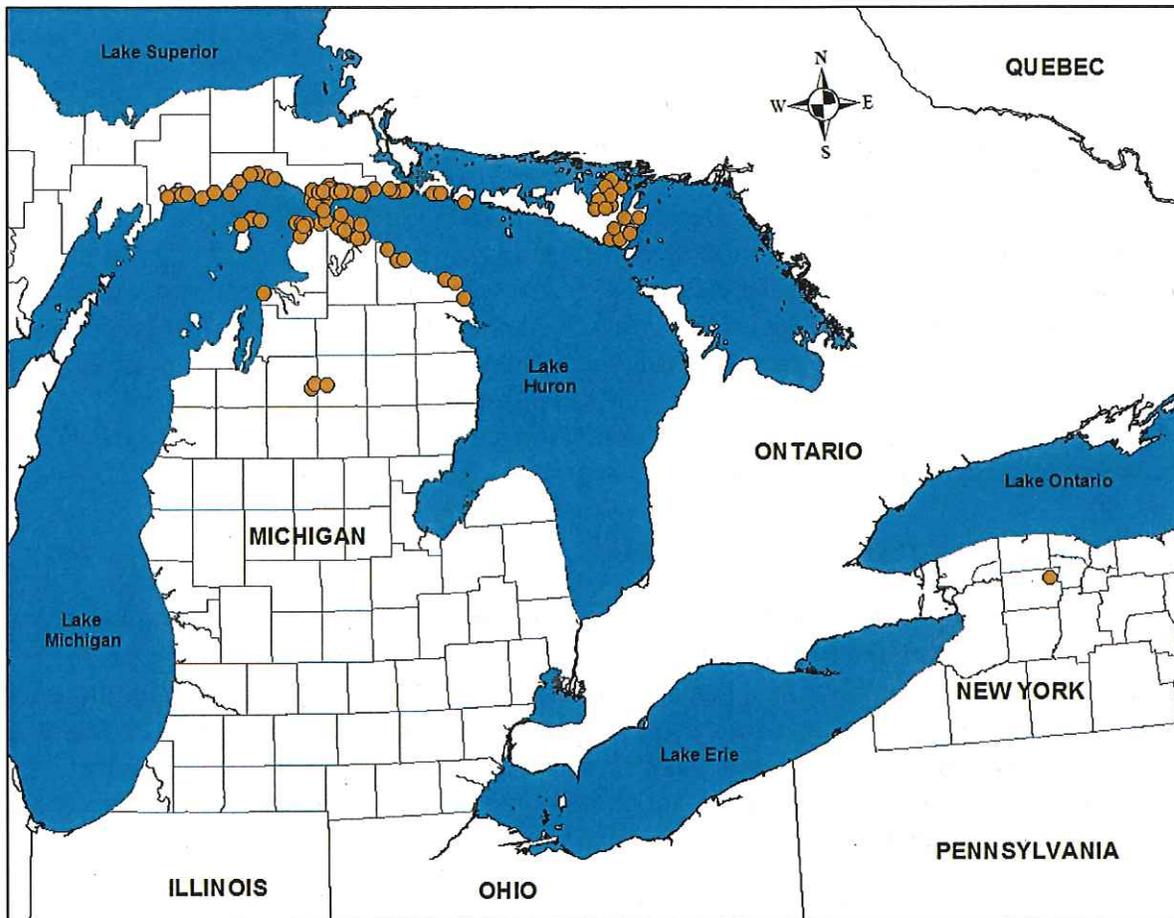
## Life History

Houghton's goldenrod is an herbaceous perennial arising from a branching, thickened base with a strongly fibrous root system. Stems are frequently clumped, produced vegetatively by means of relatively short rhizomes (Penskar et al. 1996). Numerous shoots or ramets are commonly produced and indicate that vegetative propagation is an important form of reproduction for this species. Houghton's goldenrod is insect-pollinated, bearing flower heads composed of six to nine large, bright yellow ray florets, which are pistillate, and numerous bisexual disc florets (Gleason and Cronquist 1991). Flowering occurs primarily in August and early September but may occur as early as late-July and not uncommonly well into October. Fruiting and seed dispersal appears to occur mostly from August through November and undoubtedly later (Penskar et al. 1996).

Preliminary research findings suggest that Houghton's goldenrod is self-incompatible and is therefore reliant upon insect vectors for successful pollination (Jolls 1994). Insect families, such as Coleoptera, Diptera, Hemipter, Hymenoptera, Lepidoptera, and Orthoptera are attracted to *Solidago* flowers, which provide both nectar and pollen (Jolls 1994). Goldenrod pollen is well adapted to these invertebrate pollen vectors, since it is relatively heavy and minutely spiny and can readily attach to the hairs and bristles of insects in several groups (Semple and Ringius 1992).

## Rangewide Status and Distribution

Houghton's goldenrod is primarily found on the northernmost shores of Lakes Michigan and Huron, ranging east to the Bruce Peninsula in Ontario, Canada (Penskar et al. 1996) (Figure 6). Disjunct, inland populations occur in Crawford and Kalkaska counties, Michigan, with a second disjunct population in New York (Figure 6). Within the U.S range, Michigan has 74 element occurrence records of Houghton's goldenrod (MNFI 2010) within nine counties (Cheboygan, Chippewa, Crawford, Delta, Emmet, Kalkaska, Mackinac, Presque Isle, and Schoolcraft) and New York has only one documented occurrence, composed of approximate 771 plants in Genesee County (Young 2008). Michigan is the population center for the species.



**Figure 6. Rangewide distribution of Houghton's goldenrod**

## Threats

### *Habitat destruction*

Houghton's goldenrod is particularly vulnerable to extirpation because of the restriction of most occurrences to narrow shoreline habitats of the Great Lakes. Residential development, dune stabilization projects, recreational vehicle use, and excessive human foot traffic along portions of the shoreline of Lakes Michigan and Huron destabilize dune and beach flats, prevent or inhibit dune formation, and further fragments populations of Houghton's goldenrod. Disjunct populations, located in calcareous fens and dependent upon calcium-rich groundwater flowing through them, face additional threats. Modifications or contamination of the groundwater could cause these sites to become unsuitable for Houghton's goldenrod and could lead to extirpation of this species. As such, this species is likely threatened by off-site activities.

### *Non-native and invasive species*

Most populations of Houghton's goldenrod are threatened by the increase in invasive and non-native species, such as baby's breath (*Gypsophila paniculata*), *Phragmites australis*, purple loosestrife (*Lythrum salicaria*), and false brome (*Brachypodium sylvaticum*). The spread and encroachment of non-native invasive species threaten to stabilize the dunes by decreasing the movement of sand, which allows for increased vegetation cover build-up and speeds up the succession process. Disruption of the geomorphic processes that maintain dune systems leads to a decrease in habitat for native species. If not removed or controlled, these non-native invasive species will out-compete native species, shade the habitat or alter the hydrology. Invasive species control efforts are underway in three of the four Michigan State Parks with Houghton's goldenrod, as well as in New York, which is combating common reed (*Phragmites australis*) and false brome (*Brachypodium sylvaticum*).

### *Inadequacy of existing regulatory mechanisms*

Government units below the State level generally do not provide adequate protection for rare plants. At the State level, the Michigan Department of Environmental Quality continues to permit home development in Critical Dune Areas. Although permits may include conditions to avoid immediate loss of existing plants, these permits do not address fragmentation or potential alteration of dune-sustaining processes. The State of Michigan has no authority to require protection of plants from indirect effects and does not require State-level endangered species permits if direct impacts to the species are not expected.

The State of New York lists Houghton's goldenrod as an endangered species and affords it protection pursuant to the New York Environmental Conservation Law (NYSDEC 2010). Under this law, it is a violation to pick, pluck, sever, remove, damage by the application of herbicides, or carry away, without the consent of the landowner, any state protected plant (NYSDEC 2010). The New York State Department of Environmental Conservation (2010) does not require state issued permits to collect or destroy listed plants.

Section 9(a)(2)(B) of the Federal Act provides protection to federally listed plants only on Federal land, where Federal agency action occurs or in the case of endangered plants, where a knowing violation of any state law or regulation occurs. Because of Houghton's goldenrod's association with the shoreline and wetlands, consideration of effects to this species may occasionally trigger section 7 consultations with the U.S. Army Corps of Engineers (USACE) for actions requiring permits, pursuant to section 404 of the Clean Water Act.

### *Climate Change*

A majority of Great Lakes climate change simulations show a reduction in lake levels, but a high degree of uncertainty in possible future lake levels, depending on future emissions (Angel and Kunkel 2010). It is likely that the competing effects of shifting precipitation and warmer temperatures will result in little change in Great Lake levels until the end of the century, when net decreases in lake levels are expected under higher emission scenarios (Hayhoe et al. 2010).

If Great Lakes levels recede, more beach and dune formation may occur, potentially increasing habitat for shoreline occurrences of Houghton's goldenrod (Penskar, pers. comm. 2009). Increased water temperatures will also result in decreased ice cover that, when combined with an expected intensity of winter storms, will leave coastal areas more vulnerable to the effects of winter storms and flooding (Fang and Stefan 2000; AMEC 2006). Decreased ice cover allows for encroachment by native and non-native plant species; however, more intense winter storms could alter Houghton's goldenrod habitat. A warmer climate could also bring about a northward shift and an even greater increase in non-native invasive species that may be more problematic in the dunes and lakeshore systems, thus increasing competition with native plant species (Malcolm et al. 2002; AMEC 2006; Penskar, pers. comm. 2009).

### Summary and Synthesis of the Species Status

Houghton's goldenrod is a rare Great Lakes endemic with narrow habitat restrictions. These restrictions make it more vulnerable to natural and man-made threats, such as the rising and lowering of Great Lakes levels, invasive species encroachment, residential development, and dune stabilization projects. Climate change represents a new, unknown threat for Houghton's goldenrod. Regional warming as well as increasing periods of drought may have a significant effect on habitat suitability. Climate change may also result in lowering Great Lakes level, potentially increasing the amount of available habitat for many coastal dune plant species but also potentially allowing invasive species to expand their range and increase competition with Houghton's goldenrod.

A recent Endangered Species Act status review conducted for Houghton's goldenrod concluded that the population is properly classified as threatened under the Act (USFWS 2011). The majority of Houghton's goldenrod populations lacks routine management and monitoring and is threatened by invasive species encroachment. Previously recognized threats to Houghton's goldenrod have not significantly diminished, and climate change represents a new, unknown threat; however, no new information is available to suggest this species' status has changed since listing. Additionally, regulatory mechanisms are needed to ensure long-term conservation of habitat and routine management and monitoring.

### **Environmental Baseline**

#### Status of the Species within the Action Area

Based on the Biological Assessment and a Rare Species Assessment completed by MNFI at HBBS, Houghton's Goldenrod was locally common on exposed sand and gravel areas above the marsh zone on the Lake Huron Shoreline (Slaughter and Cuthrell 2014). Population densities were variable, from as low as an estimated <0.1 plants per square meter in the well-vegetated inland cobble zone to as high as 100 plants per square meter in wetter, less vegetated areas closer to the shoreline. These plants are part of a larger population that extends at least 1 mile WSW of HBBS and likely continues to the east of HBBS as well, though the eastern area has not been surveyed (Slaughter and Cuthrell 2014). The higher densities in the wetter areas near the lakeshore is consistent with the habitat requirements for the species, which suggests that plants are found mostly in the lower wet areas of the shoreline in clumps and groups (USFWS 1997).

Michigan is the population center for Houghton's goldenrod, containing eighty percent of the rangewide population of the species. It is primarily present along the northern shores of Lakes Michigan and Huron, and a small disjunct population occurs inland, within the central portion of the northern Lower Peninsula (Figure 6). Although the majority of the Michigan population of Houghton's goldenrod is not systematically monitored, invasive species control and removal programs along the Great Lakes shoreline benefits native plant species. However, due to a lack of comprehensive and systematic monitoring, comparable and quantitative information about current and past habitat conditions and population trends of most occurrences are lacking.

### Factors Affecting the Species within the Action Area

#### **Effects of the Action**

*Effects of the action refer to direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.*

#### Houghton's Goldenrod

During the course of this project, greater than 2,800 Houghton's Goldenrod plants could be taken by the burial of the new water intake line and the construction of the new outfall/discharge swale. During this construction plants could be dug up, destroyed or lost to high outflows in the new swale.

It is anticipated that greater than 1,000 Houghton's Goldenrod plants could be taken by the burial of the new water intake line. However, the soil and vegetation excavated for the new water line will be kept moist and replaced once the burial is complete; and as there is some evidence that transplanting Houghton's Goldenrod can be successful, these plants may not be lost.

Impacts from the outfall / discharge swale could lead to a permanent loss of a 15-foot wide swath across 125 feet of beach. There will be episodic discharges from the laboratory across this swale with flows that are anticipated to be more than Houghton's Goldenrod can withstand. There is the potential that greater than 1,800 individual Houghton's Goldenrod plants could be lost due to the outfall/discharge swale.

#### Synopsis of the Effects on Houghton's Goldenrod

Approximately 2,800 individual Houghton goldenrod plants could be damaged or killed during the course of the project. Conservation measures will be in place to avoid or minimize these impacts. Additionally, beneficial effects are anticipated as a result of educational signage and maintenance of facility fencing.

## **Cumulative Effects**

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the act.

There are no known future non-Federal actions which are reasonably certain to occur within the project area. This site is owned by USGS and any future action would be pursuant to section 7 of the Act.

## **Conclusion**

After reviewing the current status of the Houghton's goldenrod, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of this species. No critical habitat has been designated for this species; therefore, none will be affected.

Approximately 2,800 Houghton's goldenrod could be lost in the action area, though plants will remain. However this is part of a large occurrence of this species that extends at least 1 mile WSW from HBBS and likely also continues along the lakeshore to the east. The 2,800 plants represent less than 1% of the total plants in this B rank occurrence (a 15 foot width of beach in an occurrence that stretches over a mile). We expect that the amount of plants removed from this one population would not have a discernible impact on the overall population viability at this occurrence.

The Hammond Bay occurrence is one of 74 occurrences of Houghton's goldenrod in Michigan (USFWS 2010, 2011). The proposed project would not impact any of these other occurrences.

For these reasons, we conclude that the proposed action, taken together with cumulative effects, would not directly or indirectly reduce the likelihood of both the survival and recovery of Houghton's goldenrod by reducing the species' reproduction, numbers, or distribution.

## **INCIDENTAL TAKE STATEMENT**

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of an incidental take statement.

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to the take of listed plant species; therefore, an incidental take statement is not necessary for this proposed action. Limited protection of listed plants, however, is provided to the extent that the act prohibits the removal and reduction to possession of federally listed endangered plants on areas under Federal jurisdiction or the destruction of endangered plants on non-Federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law. Regulations (50 CFR 17.71) extend this protection to threatened plants as well.

### **Conservation Recommendations**

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service has identified the following actions that, if undertaken by the Coastal Program, will further the conservation and assist in the recovery of Pitcher's thistle and Houghton's goldenrod.

1. Transplant Houghton's Goldenrod plants out of the discharge swale to nearby areas out of the path of the high flows.
2. Conduct or fund invasive species control and habitat management efforts within Houghton's goldenrod habitat throughout the Lake Michigan lakeshore.
3. Monitor short and long-term impacts of the project on Houghton's goldenrod, include information on survival rates of juveniles and whether or not they reach the adult flowering stage. This would benefit researchers and managers for planning future coastal habitat restoration projects in areas where Houghton's goldenrod are present.
4. Individuals will take measures to reduce the spread of invasive plants by cleaning off footwear, clothing, tools, and equipment prior to entering or after visiting the beach.

In order to keep the Service informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

### **Reinitiation Notice**

This concludes formal consultation on the Hammond Bay Biological Station Repair, Replacement, and Renovation Project at HBBS Millersburg, Michigan. In accordance with 50 CFR 402.16, reinitiation of formal consultation is required where Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals that the agency action may affect listed species or critical habitat in a manner or to an extent not considered in this opinion,

(3) the agency action is subsequently modified in a manner that causes an adverse effect to the listed species not considered in this opinion or (4) a new species is listed or critical habitat is designated that may be affected by the action.

If any of the following occurs during the course of completing the project, it represents new information requiring reinitiation of consultation:

1. The number of individual Houghton's goldenrod plants to be removed exceeds approximately 3,000.
2. New information is found that Piping Plover or other listed species are found within or immediately adjacent to the Action Area.

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