



GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
LANSING



LIESL EICHLER CLARK
DIRECTOR

December 22, 2021

VIA E-MAIL AND U.S. MAIL

Dr. Stephen G. Termaath, GS-15, DAF
AFCEC/CIBE
Chief, BRAC Program Management Division
Installations Directorate
2261 Hughes Avenue, Suite 155
JBSA Lackland, Texas 78236-9853

Dear Dr. Termaath:

SUBJECT: Concurrence with the Interim Remedial Action Selected in the Interim Record of Decision (IROD) for the FT002 Clarks Marsh Area of the Former Wurtsmith Air Force Base (Site); Oscoda, Iosco County, Michigan

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) received access to the final IROD for the Clarks Marsh Area of the Site. After review of the information presented in the IROD and relevant supporting documentation, EGLE, on behalf of the State of Michigan, concurs with the interim action remedy selected by the United States Air Force (Air Force) in the IROD.

Specifically, EGLE concurs with the interim remedy selected by the Air Force for the FT002 Clarks Marsh area of the Site, which includes an expansion of the existing groundwater extraction and treatment system to treat groundwater contaminated by perfluorooctane sulphonate and perfluorooctanoic acid. This includes adding additional extraction wells, adding additional treatment components to the treatment system, and an expansion of the groundwater infiltration system. EGLE has provided comments to the Air Force on the Risk Assessment Preliminary Conceptual Site Models included in the IROD.

Part 201 Compliance

Through our respective attorneys, we have worked out an agreement on the appropriate applicable or relevant and appropriate requirements (ARARs) for the interim action. EGLE understands, given the limited scope of the interim action, that the interim action is aimed at meeting Michigan's effluent standards protective of surface waters based on the type of actions being implemented and that the actions required under this IROD are not targeted to meet cleanup criteria established under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), at the Site. EGLE also understands that any and all final cleanup actions at the Site will be broader than the pump-and-treat remedies required

under this IROD and that sitewide remedies will be required to comply with all state standards timely identified as ARARs. EGLE has and will continue to identify Part 201 cleanup criteria as ARARs for final cleanup actions at the Site.

Threatened and Endangered Species

Additionally, to reach concurrence, EGLE requested additional documentation to determine how the Air Force will comply with Part 365, Endangered Species Protection, of the NREPA, at the Site. To document that the ARAR table's identification of showy orchis as the only potentially impacted state listed endangered or threatened species was accurate, the Air Force provided EGLE additional documentation regarding Endangered Species Protection in the attached December 8, 2021, Memo for Record (MFR).¹

Based on information provided in the Air Force's December 8, 2021, MFR, the State of Michigan has determined that showy orchis is the only state-listed species that may be impacted by the interim action; this is consistent with the State's identified ARARs in the IROD. For the other state-listed species that were identified by the Michigan Natural Features Inventory (MNFI), Michigan is satisfied with the Air Force's and the MNFI's explanation of why these species will not be impacted.

Regarding how the Air Force must meet the substantive requirements of Part 365 in the MFR, the Air Force indicates that "a biologist will survey areas for the showy orchis before the Air Force conducts ground disturbance in the portion of the FT002 at Clark's IRA project boundary that contains showy orchis habitat. If the Air Force finds showy orchis, the Air Force will take photographs, report the location to the MDNR, and make the area off-limits to ground-disturbing activities." The Air Force has subsequently indicated that the United States Forest Service (Forest Service) has surveyed the area and the Air Force will conduct any needed follow up. These surveys should be submitted to the Michigan Department of Natural Resources (MDNR) and EGLE once available. In a December 20, 2021, letter to the MDNR, the Air Force's consultant, Aerostar SES LLC, again indicated it is likely showy orchis is present at the Site in the project boundary and that the Air Force intends to complete a survey of the area for showy orchis.

Surveys for showy orchis must be completed from the first week of May to the fourth week of June. The Air Force does not yet have a timeline for its interim remedial action activities, including the survey. However, the State of Michigan does not want to delay implementation of the IROD. If the Air Force does not have sufficient documentation from the Forest Service and timelines do not allow the Air Force to survey in the

¹ Due to language in the MFR, the State of Michigan wishes to clarify that the Michigan Natural Features Inventory (MNFI) has not been delegated authority by Michigan; the Michigan Department of Natural Resources (MDNR) remains the entity with authority regarding state threatened and endangered species. For state-listed species, the MDNR has given permission to MNFI, which is part of Michigan State University Extension, to conduct environmental reviews for state-listed species, but has not delegated its authority to apply or enforce the law.

appropriate time, the Air Force can meet state requirements by assuming that showy orchis is present on-site and working with the MDNR, in coordination with EGLE, to obtain a substantive requirements document for Part 365 compliance that allows impacts to showy orchis on the basis of protection of human health.

If you need further information or assistance, please contact Mr. Joshua Mosher, Acting Director, Remediation and Redevelopment Division, at 517-897-7267; MosherJ1@Michigan.gov; or EGLE, P.O. Box 30426, Lansing, Michigan 48909-7926.

Sincerely,

A handwritten signature in blue ink, appearing to read "Liesl Eichler Clark".

Liesl Eichler Clark
Director
517-284-6700

Attachment

cc/att: Mr. Dan Medina, Air Force
Dr. Catherine Varley, Air Force
Mr. Steve Willis, Air Force
Ms. Polly Synk, Michigan Department of Attorney General
Ms. Megen Miller, Michigan Department of Attorney General
Mr. Daniel Kennedy, MDNR
Mr. Aaron B. Keatley, Chief Deputy Director, EGLE
Mr. Joshua Mosher, EGLE
Mr. David Kline, EGLE
Mr. John Bradley, EGLE
Ms. Beth Place, EGLE



8 December 2021

MEMORANDUM FOR ADMINISTRATIVE RECORD

FROM: Jennifer Tyson
Aerostar SES LLC
1006 Floyd Culler Court
Oak Ridge, TN 37830

SUBJECT: Revised Michigan Natural Features Inventory (MNFI) Consultation for FT002 at Clark's Marsh Interim Remedial Action (IRA), Former Wurtsmith Air Force Base, Michigan

In accordance with Section 7 of the Endangered Species Act (16 U.S.C. §1536) and pursuant to Part 365 Endangered Species Protection of the Michigan Natural Resources Environmental Protection Act 451 of 1994 (Michigan Compiled Laws §324.36503 and 324.36505), the Air Force has informally consulted with federal and Michigan officials regarding potential effects that the FT002 at Clark's Marsh interim remedial action (IRA) at the former Wurtsmith Air Force Base in Iosco County, Michigan (Figure 1) could have on floral and faunal species listed by the United States or Michigan as threatened or endangered.

For federally listed species, the Air Force conducted informal consultation with the U.S. Fish and Wildlife Service (USFWS). USFWS identified habitat for one endangered species, the eastern massasauga rattlesnake, within the Clark's Marsh IRA boundary. The Air Force will take mitigative measures to avoid adversely affecting the rattlesnake, and operations will not destroy nests or habitats. The Air Force received USFWS' concurrence of Not Likely to Adversely Affect (NLAA) on 25 January 2021.

For state-listed species, the Michigan Department of Natural Resources (MDNR) has delegated the listed species inventory to Michigan State University (MSU), which manages the Michigan Natural Features Inventory (MNFI). Subsequent to an earlier consultation, the Air Force requested that MSU clarify which species and their habitats are a concern for the FT002 at Clark's Marsh IRA. MSU responded to the request on 23 November 2021 with Rare Species Review #2910 (Revised), which is attached to this memorandum for record. MSU's MNFI database search found recorded occurrences of four (4) state-listed species within the MNFI defined 1.5-mile project radius. Below is a summary of MSU's comments along with the Air Force's evaluation of the likelihood of the FT002 at Clark's Marsh IRA project adversely affecting these species:

- The Kirtland's warbler (*Setophaga kirtlandii*) is listed as state endangered by MDNR. MSU's 23 Nov 2021 Rare Species Review #2910 (Revised) (hereinafter "the 23 Nov 2021 review") stated that this species' habitat is confined to relatively homogenous stands of jack pine (*Pinus banksiana*). They seldom inhabit stands of less than 80 acres in size. Because the Clark's Marsh

IRA boundary does not include any stands or any portion of a stand of jack pine, the Air Force does not anticipate any adverse impacts to this species as a result of this project.

- The river darter (*Percina shumardi*) is listed as state endangered by MDNR. MSU's 23 Nov 2021 review stated that this species inhabits rivers and stream with gravel substrates and moderate to swift current. MSU also stated that the species was observed in 1925 in an area far away from the FT002 at Clark's Marsh IRA project boundary; therefore, MSU found that it was unlikely that negative impacts would occur. The Air Force does not anticipate any adverse impacts to this species as a result of this project; in addition to the very unlikely presence of the river darter, the FT002 at Clark's Marsh IRA project boundary does not include any rivers or streams.
- The channel darter (*Percina copelandi*) is listed as state endangered by MDNR. MSU's 23 Nov 2021 review stated that this species inhabits rivers and large streams. MSU also stated that the species' occurrence is historical (i.e., it was observed a long time ago) and was seen far away from the FT002 at Clark's Marsh IRA project boundary; therefore, MSU found that it was unlikely that negative impacts would occur. The Air Force does not anticipate any adverse impacts to this species as a result of this project; in addition to the very unlikely presence of the channel darter, the FT002 at Clark's Marsh IRA project boundary does not include any rivers or streams.
- The showy orchis (*Galearis spectabilis*) is listed as state threatened by MDNR. MSU's 23 Nov 2021 review stated that this plant inhabits rich deciduous woods, often near spring ponds. Habitat for the showy orchis appears to be present within the southern portion of the project boundary. Therefore, a biologist will survey areas for the showy orchis before the Air Force conducts ground disturbance in the portion of the FT002 at Clark's IRA project boundary that contains showy orchis habitat. If the Air Force finds showy orchis, the Air Force will take photographs, report the location to MDNR, and make the area off-limits to ground-disturbing activities. Therefore, the Air Force does not anticipate any adverse impacts to this species as a result of this project.

In addition to state threatened and endangered species, the MNFI research identified a list of 13 species of state special concern which occurred within the 1.5-mile study radius. State special concern species are not regulated but were included in MSU's review. One state special concern species, the eastern massasauga rattlesnake (*Sistrurus catenatus*), is also listed as federally threatened and was addressed separately through informal consultation with USFWS.

Under contract to the Air Force, Aerostar SES LLC has conducted the consultation and review of the listed species and has developed the opinion that the proposed project will not adversely affect state-listed threatened or endangered species or their habitats.

If you have any questions, please reach me via email at JTyson@ses-grp.com.

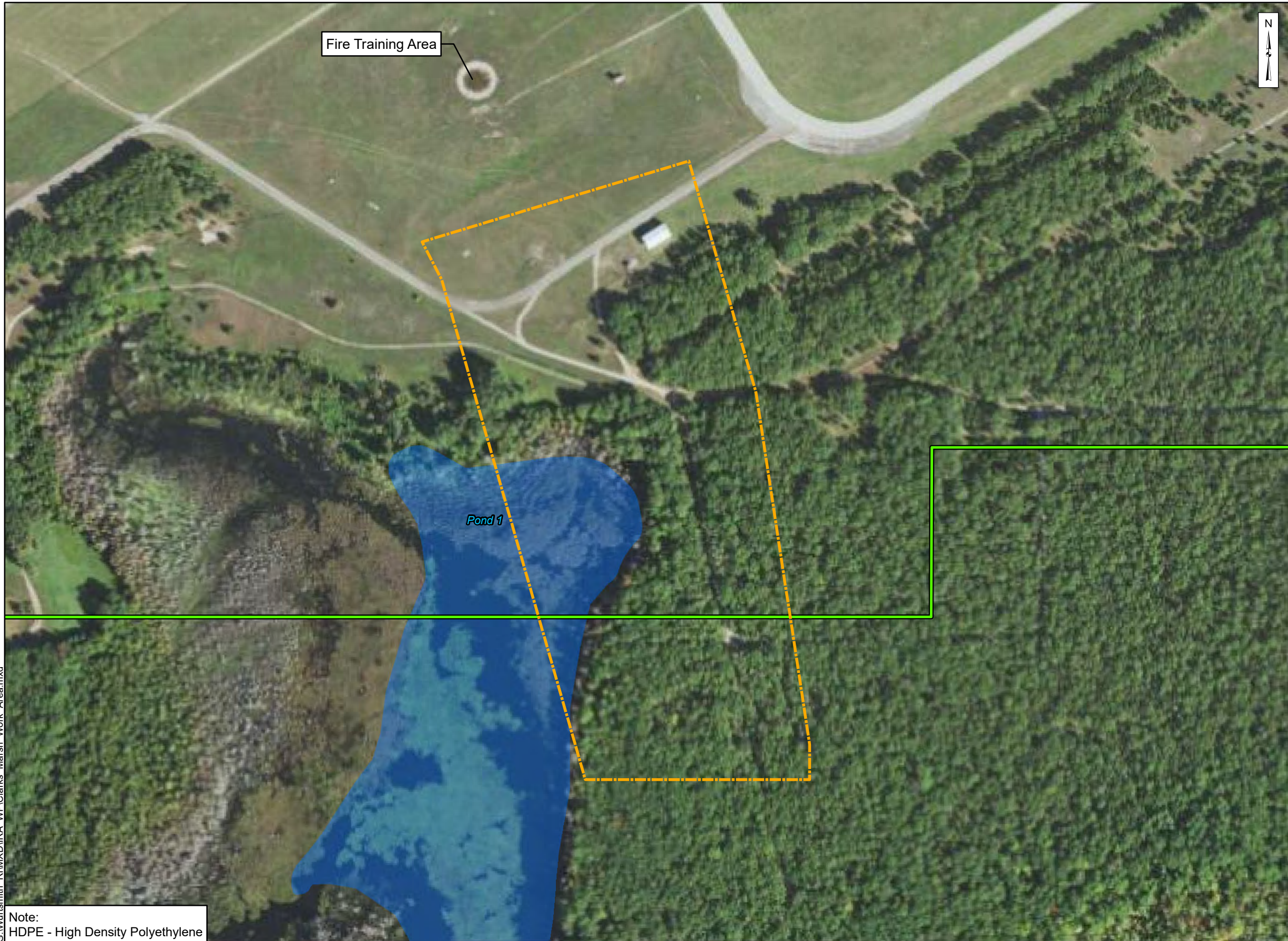


JENNIFER TYSON, AICP
SENIOR ENVIRONMENTAL SCIENTIST
AEROSTAR SES LLC

Attachments:

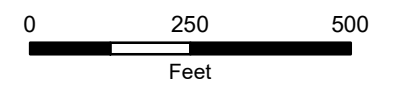
Figure 1

Revised Michigan Natural Features Inventory (MNFI) Consultation



Legend

- Clarks_Marsh_Work_Area
- Installation Boundary



Former Wurtsmith AFB
Iosco County, Michigan

Figure 1
Clark's Marsh Work Area



Air Force Civil Engineer Center
2261 Hughes Avenue
Building 171, Ste 155
JBSA Lackland, Texas 78236



Drawn: Signiski

Date: 10/8/2021

Service Layer Credits: Esri ArcGIS Online Aerial Photography

G:\Wurtsmith_RIMXD\NIRA_WPI\Clarks_Marsh_Work_Area.mxd

Note:
HDPE - High Density Polyethylene

Ms. Jennifer Tyson
Aerostar SES LLC
1006 Floyd Culler Court
Oak Ridge, TN 37830

November 23, 2021

**Re: Rare Species Review #2910 (Revised) – Former Wurtsmith AFB
Remedial Investigation, Iosco County, MI (T24N R8-9E).**

Ms. Tyson:

The location for the proposed project was checked against known localities for rare species and unique natural features, which are recorded in the Michigan Natural Features Inventory (MNFI) natural heritage database. This continuously updated database is a comprehensive source of existing data on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features. The absence of records in the database for a particular site may mean that the site has not been surveyed. The only way to obtain a definitive statement on the status of natural features is to have a competent biologist perform a complete field survey.

Under Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection, "a person shall not take, possess, transport, ...fish, plants, and wildlife indigenous to the state and determined to be endangered or threatened," unless first receiving an Endangered Species Permit from the Michigan Department of Natural Resources (MDNR), Wildlife Division. Responsibility to protect endangered and threatened species is not limited to the lists below. Other species may be present that have not been recorded in the database.



MSU EXTENSION

**Michigan Natural
Features Inventory**

PO Box 13036
Lansing MI 48901

(517) 284-6200
Fax (517) 373-9566

mnfi.anr.msu.edu

At-risk species have been documented within 1.5 miles of the project area **and it is possible that negative impacts will occur**. Keep in mind that MNFI cannot fully evaluate this project without visiting the project site. MNFI offers several levels of [Rare Species Reviews](#), including field surveys which I would be happy to discuss with you.

Sincerely,

Michael A. Sanders

Michael A. Sanders
Environmental Review Specialist/Zoologist
Michigan Natural Features Inventory

Comments for Rare Species Review #2910: It is important to note that Michigan Natural Features Inventory is not a regulatory agency regarding endangered species legislation, nor do we issue endangered species permits. It is the applicant's responsibility to comply with both state and federal threatened and endangered species legislation. Therefore, if a state listed species occurs at a project site, and you think you need an endangered species permit please contact: Casey Reitz, Michigan DNR Wildlife Division, 517-284-6210, or ReitzC@michigan.gov. If a federally listed species is involved and, you think a permit is needed, please contact Jessica Pruden, Endangered Species Program, U.S. Fish and Wildlife Service, East Lansing office, 517-351-8375, or jessica_pruden@fws.gov.

Special concern species and natural communities are not protected under endangered species legislation, but efforts should be taken to minimize any or all impacts. Species classified as special concern are species whose numbers are getting smaller in the state. If these species continue to decline they would be recommended for reclassification to threatened or endangered status.

Please consult MNFI's [Rare Species Explorer](#) for additional information on Michigan's rare plants and animals.

Table 1: Occurrences of threatened & endangered species within 1.5 miles of site.

ELCAT	SNAME	SCOMNAME	USES	SPROT	G_RANK	S_RANK	FIRSTOBS	LASTOBS	EORANK
Animal	<i>Setophaga kirtlandii</i>	Kirtland's warbler	LE	E	G3G4	S3	1992	2002	E
Animal	<i>Percina shumardi</i>	River darter		E	G5	S1	1925	1925-04-30	H
Animal	<i>Percina copelandi</i>	Channel darter		E	G4	S1	1924	1986-08-27	H
Animal	<i>Setophaga kirtlandii</i>	Kirtland's warbler	LE	E	G3G4	S3	1997	2003	E
Plant	<i>Galearis spectabilis</i>	Showy orchis		T	G5	S2	2010-06-21	2010-06-21	C?

Comments for Table 1:

Kirtland's warbler - the state endangered Kirtland's warbler (*Setophaga kirtlandii*) has been known to occur in the area and will possibly be impacted by the project. This species depends upon large, relatively homogenous stands of jack pine (*Pinus banksiana*) with scattered small openings. Stands less than 80 acres in size are seldom occupied. Kirtland's warblers will start using a jack pine stand when the height of the trees reaches 5 to 7 feet. Nests are built on the ground, concealed in the low cover of grasses, sedges, blueberries and other ground cover vegetation. Once jack pines exceed 18 feet, the lower branches begin to die and the ground cover changes in composition, resulting in unfavorable nesting conditions. Kirtland's warblers feed on flying insects, larvae and ripe berries. The majority of males arrive in Michigan in early to mid-May. This species migrates to the Bahama Archipelago in late August and September.

Management and Conservation: in summary, the site may include suitable Kirtland's warbler habitat. Potential impacts include direct destruction of species and disturbance of critical habitat.

River darter – the state endangered river darter (*Percina shumardi*) has been known to occur in the AuSable River. The occurrence is Historic (1925) and far removed from the area and **it is unlikely that negative impacts will occur**. As its name implies, the river darter is an inhabitant of rivers and large streams. Deeper riffles with gravel substrates and moderate to swift currents are preferred. The river darter is believed to spawn midsummer on gravel riffles. Invertebrates

are its primary prey, particularly blackfly and sand caddisfly larvae. Only one known population of river darter remains in Michigan (based on fish technical committee notes – 2005).

Channel darter - the state endangered channel darter (*Percina copelandi*) has been known to occur in the Au Sable River. However, the occurrence is Historic and far removed from the area and **it is unlikely that negative impacts will occur**. The channel darter inhabits rivers and large creeks in areas of moderate current over sand and gravel. They have also been reported in the nearshore waveswept areas of Lake Huron and Lake Erie in coarse-sand, fine-gravel beach and sandbar habitats.

Eastern massasauga rattlesnake (EMR) - the federally threatened and state special concern Eastern massasauga rattlesnake (*Sistrurus catenatus*) has been known to occur in the area. This is Michigan's only venomous snake and is found in a variety of wetland habitats including bogs, fens, shrub swamps, wet meadows, marshes, moist grasslands, wet prairies, and floodplain forests. Eastern massasaugas occur throughout the Lower Peninsula but are not found in the Upper Peninsula. Populations in southern Michigan are typically associated with open wetlands, particularly prairie fens, while those in northern Michigan are better known from lowland coniferous forests, such as cedar swamps. These snakes normally overwinter in crayfish or small mammal burrows often close to the groundwater level and emerge in spring as water levels rise. During late spring, these snakes move into adjacent uplands they spend the warmer months foraging in shrubby fields and grasslands in search of mice and voles, their favorite food.

Often described as “shy and sluggish”, these snakes avoid human confrontation and are not prone to strike, preferring to leave the area when they are threatened. However, like any wild animal, they will protect themselves from anything they see as a potential predator. Their short fangs can easily puncture skin and they do possess potent venom. Like many snakes, the first human reaction may be to kill the snake, but it is important to remember that all snakes play vital roles in the ecosystem. Some may eat harmful insects. Others like the massasauga consider rodents a delicacy and help control their population. Snakes are also a part of a larger food web and can provide food to eagles, herons, and several mammals.

Management and Conservation: any sightings of these snakes should be reported to the Michigan Department of Natural Resources, Wildlife Division. If possible, a photo of the live snake is also recommended.

Showy orchis - the state threatened showy orchis (*Galearis spectabilis*) has been known to occur near the project area. Showy orchis primarily inhabits rich deciduous woods, although vigorous woodland colonies are known to spread to more open habitat in Michigan. Showy orchis often occurs near temporary spring ponds in sandy clay or rich loam soils, or in the shadier and richer microhabitats alongside common spring ephemerals such as spring beauty (*Claytonia* sp.), large-flowered trillium (*Trillium grandiflorum*), and hepatica (*Hepatica* sp.). Flowering occurs from mid-May to June.

Management and Conservation: this species benefits from conservation of rich forest habitat, and avoidance of excessive logging and change in hydrology. Minimize development and fragmentation. When possible, leave large tracts of unharvested forests and allow natural processes to operate unhindered. Reportedly also very susceptible to herbivory from slugs.

Table 2: Occurrences of special concern species/other rare natural features within 1.5 -miles of site.

ELCAT	SNAME	SCOMNAME	USESA	SPROT	G_RANK	S_RANK	FIRSTOBS	LASTOBS	EORANK
Animal	<i>Sistrurus catenatus</i>	Eastern massasauga	LT	SC	G3	S3	1990	1994-08	AB
Animal	<i>Sistrurus catenatus</i>	Eastern massasauga	LT	SC	G3	S3	1990	2004-07-23	C
Animal	<i>Haliaeetus leucocephalus</i>	Bald eagle		SC	G5	S4	1962	2017	E
Animal	<i>Sistrurus catenatus</i>	Eastern massasauga	LT	SC	G3	S3	1963	2006-09-05	E
Animal	<i>Appalachia arcana</i>	Secretive locust		SC	G2G3	S2			H
Animal	<i>Sistrurus catenatus</i>	Eastern massasauga	LT	SC	G3	S3	1930	2012-05-23	A
Animal	<i>Appalachia arcana</i>	Secretive locust		SC	G2G3	S2	1937	1938	H
Animal	<i>Glyptemys insculpta</i>	Wood turtle		SC	G3	S2	1995-06-26	2005-08-15	E
Animal	<i>Accipiter gentilis</i>	Northern goshawk		SC	G5	S3	2001-06-04	2010-06-22	E
Animal	<i>Accipiter gentilis</i>	Northern goshawk		SC	G5	S3	2001-04-09	2001-04-09	E
Animal	<i>Appalachia arcana</i>	Secretive locust		SC	G2G3	S2	2001-08-15	2001-08-15	E
Animal	<i>Emydoidea blandingii</i>	Blanding's turtle		SC	G4	S2S3	2004-05-26	2008-06-12	E
Animal	<i>Ammodramus savannarum</i>	Grasshopper sparrow		SC	G5	S4	2006-06-19	2016-05-20	CD
Animal	<i>Emydoidea blandingii</i>	Blanding's turtle		SC	G4	S2S3	2005-08-05	2005-08-05	E
Animal	<i>Villosa iris</i>	Rainbow		SC	G5	S3			H
Animal	<i>Cincinnatia cincinnatiensis</i>	Campeloma spire snail		SC	G5	S3			H
Animal	<i>Myotis lucifugus</i>	Little brown bat		SC	G3	S1	1975-07-19	1975-07-19	H
Animal	<i>Myotis septentrionalis</i>	Northern long-eared bat	LT	SC	G1G2	S1	1976-05-27	1976-05-27	H
Animal	<i>Bombus terricola</i>	Yellow banded bumble bee		SC	G3G4	S2S3	1934-08-25	1934-08-25	H
Animal	<i>Lithobates palustris</i>	Pickerel frog		SC	G5	S3S4	1925-05-03	1950-06-01	H
Animal	<i>Lithobates palustris</i>	Pickerel frog		SC	G5	S3S4	1924-06-21	1924-06-21	H
Animal	<i>Glyptemys insculpta</i>	Wood turtle		SC	G3	S2	1996-06-26	2020-06-25	E

Comments for Table 2:

Bald eagle - the state special concern bald eagle (*Haliaeetus leucocephalus*) has been known to nest in the area. Bald eagle nests are usually located within ½ - mile of water and at the top of tall, established trees. These birds prefer forested habitats adjacent to the shorelines of lakes, large rivers, floodings, and other bodies of water where prey is available throughout the breeding season which runs from mid-March through the end of June. Live trees are generally preferred over dead ones. In Michigan, eagles arrive on nesting territories between mid-February and mid-March. Nesting pairs are usually faithful to previous nesting sites. By October and November, immature bald eagles and most adults move southward, with many remaining in Michigan throughout the winter.

Effective August 8, 2007, the bald eagle in the lower 48 States was **removed** from the Federal List of Endangered and Threatened Wildlife (Federal Register Vol. 72, No. 130; July 9, 2007) but are still protected under the Migratory Bird Treaty Act, the Lacey Act and the [Bald and Golden Eagle Protection Act](#): which prohibits anyone from “taking” bald eagles, including their parts, eggs or nests.

Management and Conservation: bald eagles are extremely sensitive to human activity during the first 12 weeks of the breeding season. To help provide clarity on the management of bald eagles after delisting, the U.S. Fish and Wildlife Service (USFWS) published National Bald Eagle Management Guidelines in May 2007. These guidelines as well as other information regarding bald eagles can be viewed at the USFWS [Midwest Bald Eagle page](#). The management guidelines were established to help people minimize harmful impacts, especially where they may constitute a “disturbance.”

A variety of human activities can potentially interfere with bald eagles, affecting their ability to forage, nest, roost, breed or raise young. A [permit](#) from USFWS is recommended if you are unable to minimize or prevent disturbance, injury or potential mortality of bald or golden eagles as a result of an otherwise lawful activity. For permit information in Michigan contact Jessica Pruden, USFWS East Lansing Field Office, 2651 Coolidge Road, East Lansing, MI 48823, Ph: 517-351-8375, jessica_pruden@fws.gov.

Wood turtle - the state special concern wood turtle (*Glyptemys insculpta*) has been known to occur in the area. Wood turtles are most common in or near sandy-bottomed streams or rivers, although they also occur in streams with partially rocky or silty beds. Although largely aquatic, these turtles become more terrestrial during the summer months when they can be found wandering through woodlands, swamps, meadows, etc. Wood turtles are opportunistic omnivores, consuming leaves, berries, algae, fungi, insects, slugs, snails, earthworms, and will scavenge recently dead animals. Preferred nesting sites are open and unshaded (having little or no vegetation cover), with moist sand or sandy soil, and sufficiently elevated above the water that flooding is unlikely. Nesting occurs from mid-May to mid-June. Hatchlings emerge in late August or early September. Nesting mortality typically exceeds 80 percent. Hibernation (typically mid-October through mid-April) nearly always occurs under water.

Management and Conservation: the most serious threat to this species is poaching for commercial pet trade and incidental collecting by the public. Maintaining good water quality, controlling sedimentation, restricting pesticide use near waterways, implementing minimum development set-back distances, and leaving buffer zones along streams during timber harvest, grazing, and agricultural operations can help preserve Wood Turtle habitat. Road construction near streams and rivers should be avoided or minimized. Wood turtles are highly intolerant of water pollution and sedimentation.

As a species of special concern, the wood turtle is not protected under state or federal endangered species legislation, but it is becoming rare throughout its range and **it is protected under the authority of the Department of Natural Resources Director’s Order, Regulations on the Take of Reptiles and Amphibians, dated October 12, 2001 (section 324 of PA 451).**

Grasshopper sparrow - the special concern grasshopper sparrow (*Ammodramus savannarum*) has been known to occur in the area. This small sparrow is readily identified by its’ high pitch insect-like buzzy song "tik-tuk tikeeeeeeeeeez". Grasshopper sparrows can be found in native prairies, cultivated fields, old fields, hayfields, pastures and open savanna; they seem to prefer drier sites with tall dense vegetation. The nest is generally well concealed on the ground by overhanging vegetation. Spring arrival occurs in April and May and by mid-May grasshopper sparrows are on their breeding ground. Two broods are possible during the breeding season, which means nesting can last into August. Fall migration is complete by late October.

Management and Conservation - all vegetation management activities (mowing, controlled burns and brush clearing) should be conducted in the fall (October and November) after the fall migration. A rotational burn disturbance regime should be implemented when possible, to

promote a diversity of grassland habitat. Herbicide or insecticide applications should also be avoided during the nesting season.

Blanding's turtle - the state special concern Blanding's turtle (*Emydoidea blandingii*) has been known to occur in the area. Blanding's turtles inhabit shallow bodies of water with some aquatic plant growth and a muddy bottom, such as marshes, ponds, swamps, lake inlets and coves, and river backwaters. Blanding's turtles are active from early April to late October. They are most often seen wandering overland in spring and fall. Females seeking nest sites may travel considerable distances and are commonly seen on or near roads. Most feeding occurs underwater and includes crayfish, insects, worms, leeches, snails, small fish, tadpoles, frogs, and some plants. Nesting occurs in June where eggs are buried in a sandy, sunny location. Hatchlings emerge in August or September. Blanding's turtles hibernate underwater (more rarely under debris close to water) from late October or early November until early April.

Management and Conservation: primary threats to the Blanding's turtles include loss or altering of wetland habitats and destruction on roads. The most critical conservation need for this species is protection and management of suitable wetland and adjacent upland habitats. Maintaining good water quality, restricting herbicide and pesticide use in or near wetlands, implementing minimum development set-back distances, leaving buffer zones during timber harvest, grazing and agricultural operations, and minimizing the construction of roads in or near suitable wetlands would be beneficial to this species. Timber harvesting can benefit this species by creating or maintaining open habitat conditions for thermoregulation and nesting. Minimizing adult mortality or removal is crucial for population viability given this species' life history. Thus, habitat management activities should be conducted in such a manner so as to minimize the potential for causing take of adults (e.g., timber harvesting during the inactive season). Minimizing road mortality and illegal collection also would be beneficial to this species. In some cases, on-site protection of nest sites and predator control may be necessary to facilitate or increase successful reproduction or population recruitment.

As a species of special concern, the Blanding's turtle is not protected under state or federal endangered species legislation, but it is becoming rare throughout its range and **it is protected under the authority of the Department of Natural Resources Director's Order, Regulations on the Take of Reptiles and Amphibians, dated October 12, 2001 (section 324 of PA 451).**

Codes to accompany Occurrence Tables:

State Protection Status Code Definitions (SPROT)

E: Endangered

T: Threatened

SC: Special concern

Federal Protection Status Code Definitions (USES)

LE = listed endangered

LT = listed threatened

LELT = partly listed endangered and partly listed threatened

PDL = proposed delist

E(S/A) = endangered based on similarities/appearance

PS = partial status (federally listed in only part of its range)

C = species being considered for federal status

Global Heritage Status Rank Definitions (GRANK)

The priority assigned by [NatureServe](#)'s national office for data collection and protection based upon the element's status throughout its entire world-wide range. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.

G1 = critically imperiled globally because of extreme rarity (5 or fewer occurrences range-wide or very

few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 = imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3: Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g. a single western state, a physiographic region in the East) or because of other factor(s) making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.

G4: Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5: Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

Q: Taxonomy uncertain

State Heritage Status Rank Definitions (SRANK)

The priority assigned by the Michigan Natural Features Inventory for data collection and protection based upon the element's status within the state. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.

S1: Critically imperiled in the state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation in the state.

S2: Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.

S3: Rare or uncommon in state (on the order of 21 to 100 occurrences). S4 = apparently secure in state, with many occurrences.

S5 = demonstrably secure in state and essentially ineradicable under present conditions. SX = apparently extirpated from state.