Submittal Document II.C. D-bar-A Scout Ranch Environmental Assessment of Biological Resources, prepared by King and MacGregor, dated November 10, 2015

D-BAR-A MINING & IMPROVEMENT PROJECT SITE
ENVIRONMENTAL ASSESSMENT of BIOLOGICAL RESOURCES
November 10, 2015

WETLANDS, STREAMS AND WATERBODIES – AFFECTED ENVIRONMENT

The existing biological resources at the D-Bar- A Mining & Improvement Project Site (Project Site) were examined along with the anticipated effects of the proposed mining activity. The biological resources examined include wetlands, surface water bodies, woodlands, vegetative cover and wildlife. The conclusions from this study are based upon review of available resource documents, interviews with D-bar-A Ranch and American Aggregates of Michigan staff, and on-site evaluations by natural resource professionals.

Regional Setting

The Project Site is located in the Flint River South Branch sub-watershed of the Flint River watershed in southeast Michigan. The site is also located at the northern edge of the Jackson Interlobate regional landscape ecosystem sub-subsection. This region, whose landforms were created by the presence of three glacial lobes approximately 13,000 to 16,000 years ago, includes areas of broad relatively level sandy outwash that surround sandy and gravelly, often steeply sloping end and ground moraines. This sub-subsection is characterized by relatively steep end-moraine ridges surrounded by pitted outwash deposits; kettle lakes and wetlands are common within the outwash. Most of the uplands have been farmed, except the steepest end moraines and ice-contact ridges, which have been maintained as woodlots or are now either recreation or wildlife management areas. Many of these steep ridges have been pastured in the past (USDA, 1995). The landscape is currently dominated by agriculture or pasture on the relatively level terrain, woodland and vacant open land, and low-density residential development. Adjoining land uses include the D-bar-A Ranch, low density residential, agriculture, a cemetery, vacant land and two active sand and gravel mines.

Wetlands

Part 303 Wetlands Protection of Natural Resources and Environmental Protection Act, PA 451 of 1994, as amended (Part 303), defines wetland as "…land characterized by the presence of water at a frequency and duration sufficient to support, and that under normal circumstances, does support, wetland vegetation or aquatic life, and is commonly referred to as a bog, swamp, or marsh, and which is any of the following:

(i) Contiguous to the Great Lakes or Lake St. Clair, an inland lake or pond, or a river or stream.
(ii) Not contiguous to the Great Lakes, an inland lake or pond, or a river or stream; and more than 5 acres in size.
(iii) Not contiguous to the Great Lakes, an inland lake or pond, or a river or stream; and 5 acres or less in size if the department determines that protection of the area is essential to the preservation of the natural resources of the state from pollution, impairment, or destruction and the department has so notified the owner."

King & MacGregor Environmental, Inc. (KME) has been involved in the evaluation of wetlands on the Project Site since 2005. KME has mapped all wetland boundaries on the Project Site based on topographic surveys, aerial photographs and site inspection and assessment.

Approximately 51.2 acres of wetland were identified on the Project Site (see Figure 5)with approximately 8.8 acres of these wetlands located within the mining area while the remaining

wetlands located on the Project Site are outside the mining area and will be left undisturbed. By total area, most are palustrine wetland systems and include forested, scrub-shrub and emergent/open water wetland habitats. Also present on the site are littoral lacustrine wetlands, associated with the lakes, and upper perennial riverine wetland, associated with the streams (FGDC & USFWS 2013). Of the approximate 51.2 acres of wetland on the Project Site, approximately 40.6 acres are anticipated to be regulated by the Michigan Department of Environmental Quality (MDEQ), under Part 303. Of these 40.6 acres of MDEQ-regulated wetlands, approximately 11 acres are forested, 16 acres are scrub-shrub and 13 acres are emergent/open water with the lacustrine and riverine wetlands totaling approximately 0.7 acre. The 10.6 acres of MDEQ non-regulated wetland include approximately 1.7 acres of forested wetland, 8.3 acres of scrub-shrub wetland and 0.6 acres of emergent wetland. All of the 8.8 acres of wetlands that are located within the mining area are anticipated to be non-regulated by the MDEQ. Table 1 provides a summary of wetland size, MDEQ regulation, location within or out of the mining area, and wetland habitat type. Please refer to the Existing Conditions Plans of the Mining and Reclamation Plan set prepared by SmithGroupJJR for the locations of these wetlands.

	Wetland Regulation/IN or Out of Mining Area (acres)				Wetland Habitat Type (acres)				
Wetland	**Reg IN**	**UnReg IN**	**Reg Out**	**UnReg Out**	**PFO**	**PSS**	**PEM**	**Riv/Lac**	**Lake**
A			8.9		5.2	2.7	1.0		
B		0.6			0.6				
C			0.5		0.5				
D			0.3		0.3				
E2			0.6		0.5			0.1	
E3			0.1			0.1			
F			14.9		3.0	8.0	3.6	0.3	11.9
G				0.3		0.3			
H				0.4		0.4			
I				0.2		0.2			
J			0.5		0.3	0.2			
K			3.3		0.4	2.9			
L			0.7		0.7				
M			5.4			0.8	4.4	0.2	10.2
N			0.2				0.2		
O			4.6			0.7	3.8	0.1	
P			0.6			0.6			
Q		2.4		0.8	0.8	1.8	0.6		
R		0.5			0.3	0.2			
S		0.4				0.4			
T		1.8				1.8			
U		0.3				0.3			
V		0.2		0.1		0.3			
W		0.1				0.1			
X		0.2				0.2			
Y		0.2				0.2			
Z		0.1				0.1			
AA		0.2				0.2			
AB		0.1				0.1			
AC		0.1				0.1			
AD		0.2				0.2			
AE		0.1				0.1			
AF		1.3				1.3			
Totals	**0.0**	**8.8**	**40.6**	**1.8**	**12.6**	**24.3**	**13.6**	**0.7**	**22.1**

Table 1. Wetland Area Summary

The two largest wetlands on the site are Wetland F (14.9 acres) and Wetland A (8.9 acres) which are contiguous to Beaver Lake and Trout Lake, respectively. These two groundwater fed wetland systems include a variety of forested, scrub-shrub and emergent wetland habitats. The tree species characteristic of forested wetlands are American elm (*Ulmus americana*), red maple (*Acer rubrum*), black willow (*Salix nigra*) and green ash (*Fraxinus pennsylvanica*) with an understory of plant species such as wild black currant (*Ribes americanum*), northern spice bush (*Lindera benzoin*) and various species of ferns and sedges (*Carex spp.*). Wetland A also includes areas

dominated by northern white cedar (*Thuja occidentalis*) and tamarack ((*Larix laricina*) Scrub-shrub wetlands are common on the Project Site where they occupy isolated depressions that usually contain several inches of water. Emergent wetlands are generally small, except around the lakes and in Wetlands F and O.

Streams

Part 301 Inland Lakes and Streams of the Natural Resources and Environmental Protection Act, PA 451 of 1994, as amended (Part 301) defines a stream as "…a natural or artificial…river, stream or creek…that has definite banks, a bed and visible evidence of a continued flow or continued occurrence of water…". Streams on the Project Site include unnamed headwater tributaries to Trout Lake and Beaver Lake as well as an unnamed headwater tributary in the eastern portion of the property which originates off-site to the south and exits the Project Site at Wilder Road. None of these streams are located within the mining area. These streams are likely fed by a combination of surface water and ground water.

Lakes

The definition of a lake under Part 301 is "A natural or permanent artificial inland lake or impoundment that has definite banks, a bed, visible evidence of a continued occurrence of water, and a surface area of water that is more than 5 acres." Two lakes are present on the Project Site, though they are both outside of the mining area.. These include Beaver Lake and an unnamed waterbody along Wilder Road.

Beaver Lake is an impoundment. The 20-foot high, 700-foot long dam was constructed in 1960 and the approximately 12-acre water surface is controlled with a gate valve and overflow spillway. (Firman, ca. 1978). The lake is fed by its tributary stream, surface water runoff, groundwater discharge and direct precipitation. The lake discharges through a pipe at the base of the dam to a stream which continues off-site to the north to Lockwood Lake, which is north of the project site. The impoundment has a narrow vegetated wetland shoreline fringe that is not maintained for recreational uses such as swimming and boating. Game fish in Beaver Lake include bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*) and northern pike (*Esox lucius*).

The Wilder Road waterbody is a very shallow lake of approximately 10 acres. Evidence that it may not always have been a lake comes from the Soil Survey of Lapeer County, Michigan (USDA SCS 1972), which shows this area mapped as the Houghton muck soil series, whereas current soil mapping shows it as Water (USDA NRCS 2015). This lake is fed by surface water runoff, groundwater and direct precipitation. It discharges to the east through a culvert under Wilder Road. This water body is very shallow and is not known to support a fishery.

WOODLANDS AND VEGETATIVE COVER – AFFECTED ENVIRONMENT

Woodlands

The Project Site is estimated to have been approximately 79 percent woodland in 2013 (see Figure 1).

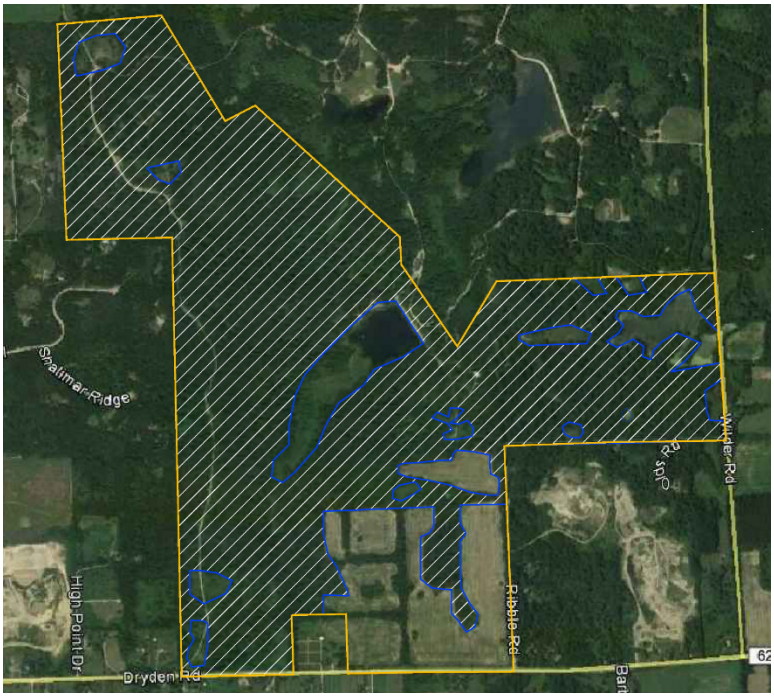


Figure 1 - 2013 Estimated Woodlands 79%

The area of woodland has been continually expanding following establishment of the D-bar-A Ranch. In 1982, the Project Site is estimated to have been approximately 60 percent woodland (see Figure 2), while in 1941, prior to establishment of the D-bar-A Ranch, the site is estimated to have been approximately 27 percent woodland (see Figure 3).

The cessation of agricultural activities on the D-bar-A Ranch portion of the Project Site has allowed woodland cover to increase from approximately 190 acres to approximately 560 acres over a period of approximately 75 years. The expansion of the woodland has created woodland habitats of various age and composition. According to long tenured employees of the BSA, many of the areas that have been reforested over the past 50 years have done so, in part, through the tree planting efforts of the Boy Scots of America (BSA). The older areas of woodland generally have more mature trees and are dominated by black, red and white oaks (*Quercus spp*.) as well as red maple. Younger woodland areas also contain the oaks and red maple but typically include a higher percentage of faster growing species such as aspens (*Populus spp.*), sassafras (*Sassafras albidum*) and black cherry (*Prunus serotina*). Younger woodland areas also frequently have an understory of non-native invasive shrub species such as Morrow's honeysuckle (*Lonicera morrowii*) and autumn olive (*Elaeagnus umbellata*).

Historically, woodland areas on the D-bar-A Ranch have been selectively cut to generate revenue. Larger oak trees have been the preferred species for harvest. The selective cuts appear to have had little or no permanent impact on the woodlands.

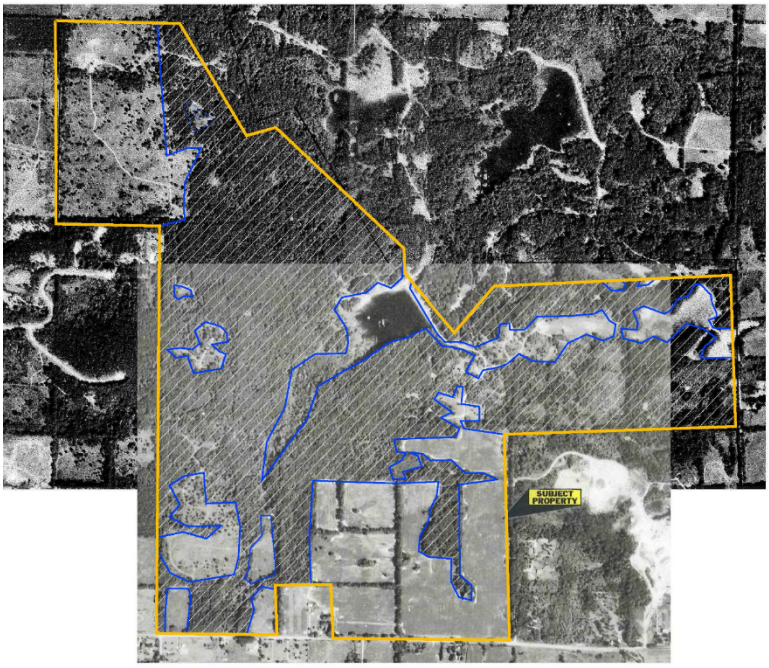


Figure 2 - 1982 Estimated Woodlands 60%

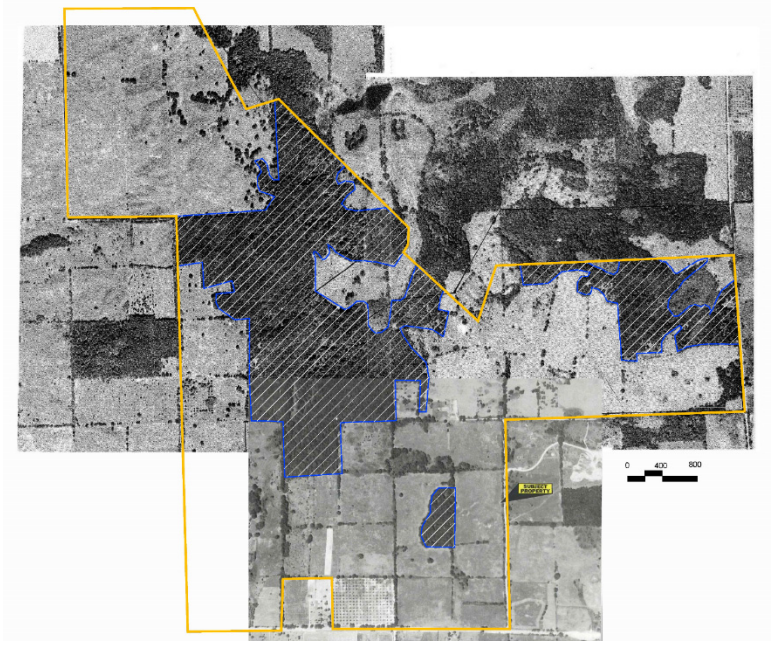


Figure 3 - 1941 Estimated Woodlands 27%

Vegetative Cover

The pre-settlement vegetation of the Project Site is shown on maps published by the Michigan Natural Features Inventory (MNFI) as having been primarily black oak barren (MNFI 1995, see Figure 4). Oak barrens are fire-dependent grasslands dominated by oaks which have between 5 and 60 percent canopy. With the suppression of fire in the landscape, oak barrens succeed to closed canopy forests (NFI, 2001). No existing oak barren habitat was identified on the property.

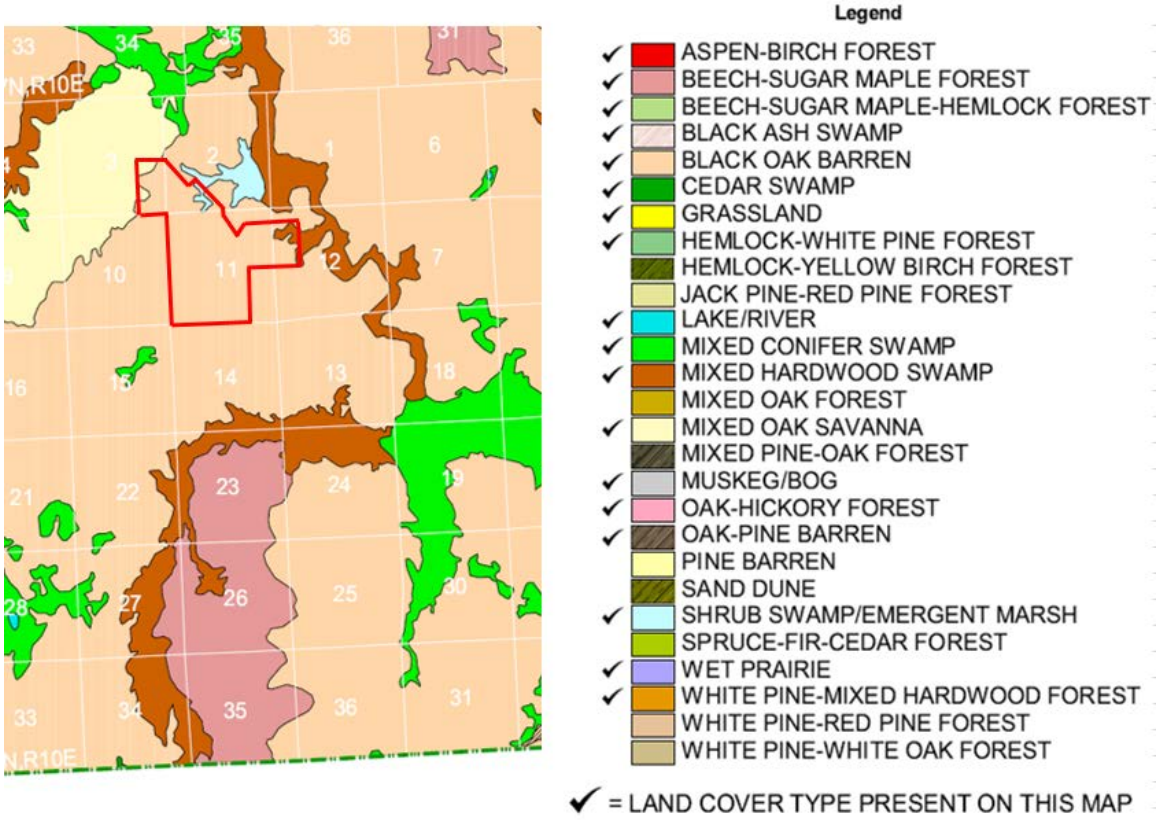


Figure 4 - Excerpt from Vegetation circa 1800 of Lapeer County Michigan

Of the approximately 724 acre Project Site, the primary vegetative cover types are woodland (approximately 556 acres) and active agriculture (approximately 75 acres). The remaining area is primarily open or semi-open upland meadow and emergent and scrub-shrub wetlands (see Figure 5).

The woodlands vary in botanical quality based primarily on age. The older woodlands tend to have a more diverse flora and fewer invasive species. The younger woodlands probably developed from pastures, since no old stumps were observed and most trees appeared to be not more than 50 years old. These areas contain more invasive species. The trees and shrubs that characterize the upland woodlands are red oak (*Quercus rubra*), white oak (*Quercus alba*), black oak (*Quercus nigra*), red maple, big-tooth aspen (*Populus grandidentata*), black cherry, sassafras, hop-hornbeam (*Ostrya virginiana*), serviceberry (*Amelanchier spp*.), blue berry (*Vaccinium spp*.), black raspberry (*Rubus spp*.), honeysuckle and autumn olive. The most common herbaceous plants are wild sarsaparilla (*Aralia nudicaulis*), poke milkweed (*Asclepias exaltata*), Pennsylvania sedge (*Carex pensylvanica*), bottle-brush grass (*Hystrix patula*), May-apple (*Podophyllum peltatum*), large-leaved aster (*Eurybia macrophylla*), glutinous tick-trefoil (*Desmodium glutinosium*), wild geranium (*Geranium maculatum*), spreading dogbane (*Apocynum androsaemifolium*), Indian pipe (*Monotropa uniflora*), poison-ivy (*Toxicodendron radicans*), early meadow-rue (*Thalictrum dioicum*), and bracken fern (*Pteridium aquilinum*).

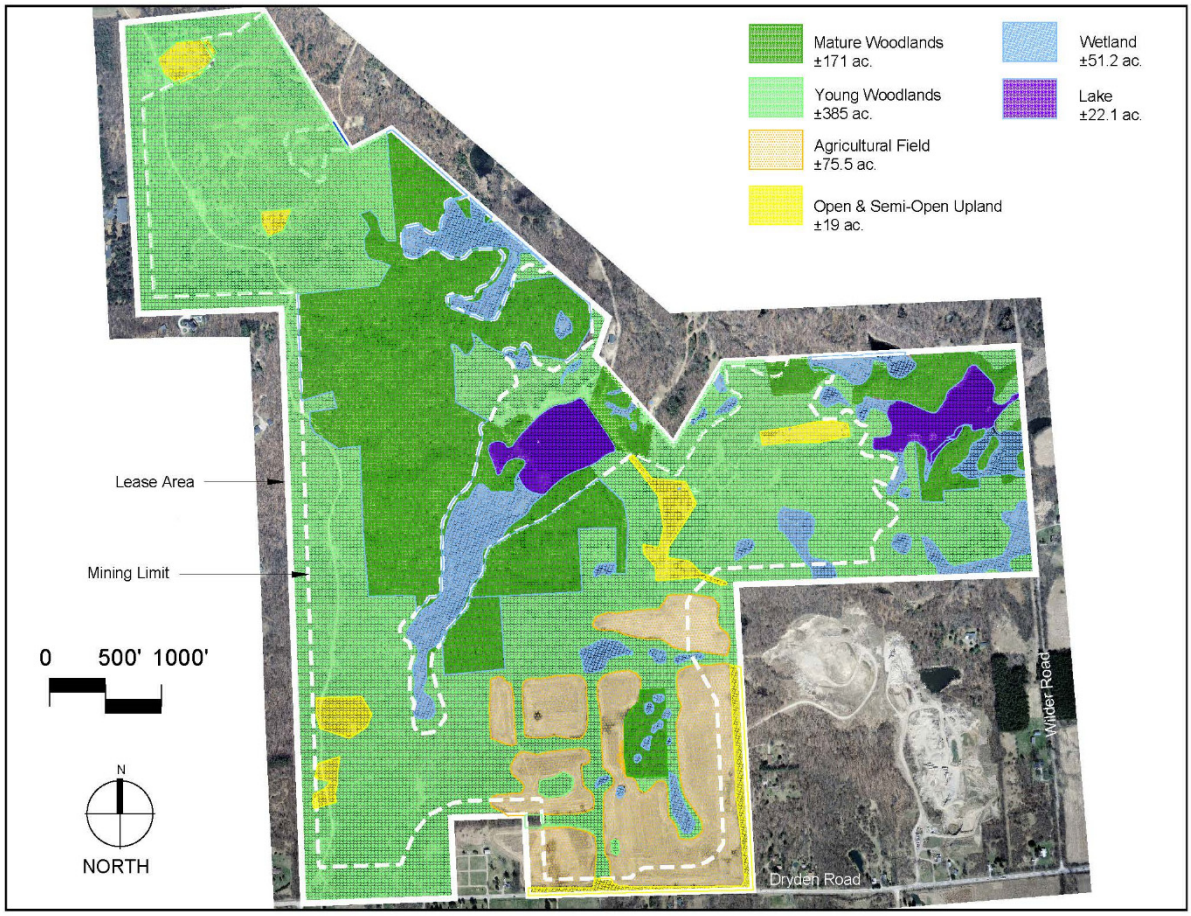


Figure 5 - Land Cover

Most of the open and semi-open upland areas appear to be abandoned pastureland. Plants characteristic of these areas include a mixture of both native and non-native species including common juniper (*Juniperus communis*), staghorn sumac (*Rhus typhina*), hawthorn (*Crataegus spp*.), honeysuckle, autumn olive, smooth brome grass (*Bromus inermis*), wild bergamot (*Monarda fistulosa*), spotted knapweed (*Centaurea maculosa*), common milkweed (*Asclepias syriaca*), butterfly-weed (*Asclepias tuberosa*), wild carrot (*Daucus carota*), white sweet clover (*Melilotus albus*), black-eyed Susan (*Rudbeckia hirta*), bull thistle (*Cirsium vulgare*), red clover (*Trifolium pretense*), tall goldenrod (*Solidago altissima*), common St. John's-wort (*Hypericum perforatum*), and great mullein (*Verbascum thapsus*).

The emergent wetland areas contain a variety of primarily native species including sedge species (*Carex spp.*), skunk cabbage (*Symplocarpus foetidus*), broad-leaf cattail (*Typha latifolia*), water plantain (*Alisma spp*.), bur-reed (*Sparganium spp*.), water-meal (*Wolffia spp*.), golden groundsel (*Packera aurea*), duckweed (*Lemnaceae spp*.), great water dock (*Rumex hydrolapathum*), and nodding beggar-ticks (*Bidens cernua*). In the scrub-shrub wetlands, buttonbush (*Cephalanthus occidentalis*) is the most common shrub though common winterberry (*Ilex verticillata*) and willows (*Salix spp*.) also occur. Plants that occur in the poorly drained soil along the perimeter of these wetlands include American elm, black ash (*Fraxinus nigra*), nannyberry (*Viburnum lentago*), skunk cabbage, spotted touch-me-not (*Impatiens capensis*), duckweed, lake sedge (*Carex lacustris*), hog-peanut (*Amphicarpaea bracteata*), false nettle (*Boehmeria cylindrica*), and fowl

mannagrass (*Glyceria striata*). The tree species characteristic of forested wetlands are American elm, red maple, black willow and green ash with an understory of species such as wild black currant, northern spice bush and various species of ferns.

No federal endangered or threatened plant species are listed on the U.S. Fish and Wildlife Service's County Distribution of Federally-Listed Threatened, Endangered, Proposed, and Candidate Species for Lapeer County (USFWS, 2015 – Appendix 1). An information request submitted to the MNFI for element occurrence records of protected species (Appendix 2) within four miles of the site identified one state threatened plant species, Goldenseal (*Hydrastis canadensis),* as having been last observed in 1933.Botanical inventories performed in 2015 identified 140 different plant species on the Project Site. Of these, approximately 120 species are native to Michigan. No plant species listed as federal or state endangered or threatened species were identified on the Project Site.

WILDLIFE HABITAT – AFFECTED ENVIRONMENT

Wildlife, for the purposes of this assessment, has been divided into the following groups: mammals, birds, and reptiles and amphibians. While no specific surveys were undertaken for wildlife, observations of wildlife were made by field biologists during the botanical and wetland assessments, and likely species to be present were identified by an evaluation of the habitat types present on the Project Site and wildlife species known from Lapeer County.

Direct and indirect evidence of regionally common mammals such as white-tailed deer (*Odocoileus virginianus*), gray squirrels (*Sciurus carolinensis*), raccoon (*Procyon lotor*), and Eastern cottontail (*Sylvilagus floridanus*) was observed throughout the site. Other mammalian species common to rural areas that are likely to access to the site for breeding and/or foraging include other squirrel species, opossum (*Didelphis virginiana*), red fox (*Vulpes fulva*), coyote (*Canis latrans*), striped skunk (*Mephitis mephitis*), chipmunks (*Tamias striatus*), voles (*Microtus pennsylvanicus* and *Pitymys pinetorum*), moles (*Scalopus aquaticus* and *Condylura cristata*), mice (*Mus musculus*, *Peromyscus leucopus, Peromyscus maniculatus,* and *Zapus hudsonius*) and bats (*Eptesicus fuscus, Lasionycteris noctivagans, Lasiurus borealis, Lasiurus cinereus, Myotis keenii, Myotis lucifugus,* and *Nycticeius humeralis*).

Regionally common birds such as American Crow (*Corvus brachyrhynchos*), American Robin (*Turdus migratorius*), Blue Jay (*Cyanocitta cristata*), European Starling (*Sturnus vulgaris*), White-breasted Nuthatch (*Sitta carolinensis*), and Tufted Titmouse (*Baeolophus bicolor*) were observed as were woodpeckers (*Picidae spp*.), Great Blue Heron (*Ardea herodias*), and Red-tailed Hawk (*Buteo jamaicensis*). Other songbirds and raptor species common to the region likely have access to the site for nesting and foraging. Waterfowl habitat is available in the lakes. D-bar-A Ranch staff reported seeing a bald eagle foraging on the ranch property but no nest site has ever been identified.

Observations of reptiles and amphibians on the Project Site included western chorus frog (*Pseudacris triseriata triseriata*), northern leopard frog (*Rana pipens*), green frog (*Rana clamitans melanota*) and a Blandings turtle (*Emydoidea blandingii*) (a Michigan Special Concern species). Other common species such as gray tree frog (*Hyla versicolor* and *chrysoscelis*), western chorus frog, bullfrog (*Rana catesbeiana*), northern water snake (*Nerodia sipedon*), Eastern garter snake (*Thamnophis sirtalis*), northern ribbon snake (*Thamnophis sauritus septentrionalis*), common snapping turtle (*Chelydra serpentine*), and common map turtle (*Graptemys geographica)* are likely present.

The U.S. Fish and Wildlife Service (USFWS, 2015) lists two mammalian species and one reptile as occurring in Lapeer County. These species and their federal status are Indiana bat (*Myotis sodalis,* endangered), northern long-eared bat (*Myotis septentrionalis,* threatened) and eastern massasauga (*Sistrurus catenatus catenatus,* proposed threatened). The bat species are associated with woodland habitats (USFWS 2015). The eastern massasauga rattlesnake is typically found in wet areas including wet prairies, marshes and low areas along rivers and lakes (USFWS, 2013).

The MNFI information request identified one amphibian and two reptile species. These species and their state status are Blanchard's cricket frog (*Acris crepitans blanchardi*) (state threatened), spotted turtle (*Clemmys guttata*) (state threatened), and eastern massasauga(*Sistrurus catenatus catenatus,* special concern). Blanchard's cricket frogs are found by ponds, lakes, floodings, bogs, seeps and slow moving streams and rivers (MNFI 2000). Spotted turtles require clean, shallow, slow moving bodies of water with muddy or mucky bottoms and some aquatic and emergent vegetation but also utilize shallow wetlands, ponds, wet meadows, tamarack swamps, bogs, fens, marshes, seepage, small woodland streams and roadside ditches (MNFI 2000). Blanchard's cricket frog was last observed in 1989, spotted turtle in 1985, and eastern massasauga in 1995. D-bar-A Ranch staff reported that rattlesnakes had not been observed since the early 1980's. No protected reptile or amphibian species were observed during the course of 2015 Project Site evaluations.

WETLANDS, STREAMS AND WATERBODIES – ANTICIPATED IMPACTS

Regional Setting

The site is located in a rural landscape of agriculture, pasture, woodland, vacant open land and low-density residential development. The proposed activity will convert primarily woodland area, along with agricultural and open and semi open fields, into grassland, pasture, or agricultural fields, which is consistent with the regional setting. Areas of the site that are not actively used or maintained or where active habitat restoration is not undertaken, will revert to scrub and forest land over time as the Project Site historically has, albeit with the involvement of the BSA in tree planting.

Wetlands

The MNFI indicates that there are approximately 19,846 acres of wetlands in Lapeer County (McKenna Associates 2006). The approximately 41 acres of MDEQ regulated wetland identified on the Project Site comprise less than one-quarter of one percent of the wetlands in Lapeer County.

Of the approximately 41 acres of presumed regulated wetland on the Project Site, none is anticipated to be directly impacted by the proposed mining project. Approximately 8.8 acres of MDEQ non-regulated wetland which are comprised of 17 isolated scrub-shrub wetlands will be impacted by the proposed mining project.

Indirect impacts to wetlands can come from construction processes as well as post construction conditions and include introduction of invasive species, soil erosion into wetlands and changes in wetland hydrology.

Mining activity can increase the potential for the establishment of invasive species through introduction of seeds by machinery and the presence of disturbed ground during construction. The Project Site does not have extensive areas of invasive species that would be spread by

machinery, however, the presence of disturbed ground provides opportunity for invasive species establishment if seeds are introduced by wind or wildlife. Activities such as re-planting of disturbed ground to establish non-invasive vegetative cover and treatment of invasive species that do become established during mining can serve to prevent additional onsite invasive species establishment.

Mining activity removes vegetative cover, exposing soils to storm water, which may result in soil erosion and sedimentation. Mitigating measures for control of sediments entering the wetlands from soil erosion include maintaining a 50-foot minimum wetland buffer setback, establishing silt fence along the wetland buffer setback prior to initial land clearing, and mining from the lower ground near the wetland toward higher ground, thereby creating a basin between the wetland and the active mining face where sediment can accumulate instead of eroding into the wetland. Ultimately, these basins may create new wetlands following the cessation of mining activities.

Wetland hydrology on the Project Site is predominantly fed by groundwater through direct discharge from porous soils or through groundwater fed streams Several wetlands that are perched on less permeable soils receive surface water inputs. . Since the proposed project does not anticipate any mining below the groundwater table, groundwater discharge to wetlands will continue. The proposed mining project wil change the topography of the land around some wetland areas to remain. The proposed project will maintain similar drainage areas to the remaining wetlands

Studies of surface water and groundwater impacts have been conducted and have concluded that the proposed modifications to land slopes and shape will not interrupt site hydrology, or impact the water supply to wetland outside of the mining area. No permanent direct or indirect impacts to the hydrology of regulated wetlands due to mining activity are anticipated.

Streams

No direct impacts to streams such as filling, excavation, enclosure or relocation are proposed. The headwater streams on the site are groundwater fed as are the wetlands which border them. Mitigating measures to address wetland hydrology will similarly affect stream hydrology in that groundwater discharge patterns and similar surface drainage areas will be maintained

Studies of surface water and groundwater impacts have been conducted and have concluded that the proposed modifications to land slopes and shape will not interrupt site hydrology, or impact the water supply to streams outside of the mining area. No permanent direct or indirect impacts to regulated streams due to mining activity are anticipated.

Lakes

No direct impacts to lakes such as filling, dredging, structures or surface water removal for aggregate processing are proposed. The hydrology of the Beaver Lake comes from surface water inputs from streams, direct precipitation, storm water runoff and groundwater discharge. Most of the onsite watershed for Beaver Lake is proposed for mining. However, the study of surface water hydrology concluded that storm water from precipitation events of less than 3 inches do not create overland surface flow, but instead infiltrate into the soil and become ground water. Therefore, the majority of water feeding the lakes come from direct precipitation and ground water. Changes to the physical shape of the land will not impact the lakes.

WOODLANDS AND VEGETATIVE COVER – ANTICIPATED IMPACTS

Woodlands

Approximately 133 acres of mature woods and 273 acres of young woods is proposed for removal. This represents approximately 66 percent and 74 percent of their respective onsite acreages. This significant reduction of woodland cover is an unavoidable part of the mining process and the ultimate creation of pasture and other land forms and land covers to support D-bar-A Ranch activities. Reforestation of some current woodland areas may occur through proactive management activities by the D-bar-A Ranch or through natural succession as has previously occurred. The BSA has established a Conservation Plan for the D-bar-A Ranch and have actively planted new trees on the site for the past 50 years. As part of this project, BSA has committed to continue with their current stewardship practices and plant new trees during the site reclamation process. The removal of approximately 400 acres of woodland represents approximately four-tenths of one percent of the total area of forested land cover estimated by the National Oceanic and Atmospheric Administration to exist in Lapeer County in 2010 (NOAA 2015) and is not regionally significant.

Vegetative Cover

In addition to woodland removal, approximately 57 acres of agricultural fields, 16 acres of open and semi-open upland, and 8.8 acres of non-regulated wetland will be permanently impacted as an unavoidable part of the mining process and the ultimate creation of new landscape forms and land covers.. The loss of mature woodland will reduce the overall floristic diversity of the Project Site. The creation of woodland edge will increase the opportunity for invasive species establishment in mature woodland to remain where they are currently infrequent. Activities such as re-planting of disturbed ground to establish non-invasive vegetative cover and treatment of invasive species which do become established during mining can serve to prevent additional onsite invasive species establishment in remaining areas of higher floristic quality.

WILDLIFE HABITAT – AFFECTED ENVIRONMENT

The conversion to pasture of existing non-grassland habitats will displace those wildlife species which breed, forage or shelter in woodlands. Mitigation of this transition will occur through the incremental clearing of habitats over the mining period. Initial clearing is estimated at approximately 40 acres with annual clearing of approximately 10 to 15 acres after that. To mitigate potential impacts to migrating bat species, tree clearing will be the restricted to the period of October 1 through March 31 when protected migratory bat species are not active in Michigan and most migratory bird species are not actively nesting or fledging. Mobile bird and mammal species will likely be displaced to similar habitats on the D-bar-A or on adjoining properties. Smaller or less mobile mammals, reptiles and amphibians will be subject to direct mortality. Common and protected wetland oriented wildlife species will be less affected than those species that are largely dependent on upland woodland, since there are no significant impacts to the majority of the wetlands. Indirect effects associated with the mining activities include vehicular traffic as well as noise and human activity which can disrupt or displace wildlife use or result in some insignificant accidental loss of wildlife. The wildlife mortality that is likely to occur is to a small amount of local wildlife and is not likely to have a significant effect on local wildlife populations. No threatened or endangered wildlife species were observed during the course of site evaluation. However, if protected wildlife species are identified on the site, mitigating measure can include seasonal limitations on mining activities, protective barriers and/or physical relocation of protected wildlife under permit from the Michigan Department of Natural Resources or the U.S. Fish and Wildlife Service.

SOURCES

1. **USDA 1995.** U.S. Department of Agriculture. Regional Landscape Ecosystems of Michigan, Minnesota and Wisconsin: A Working Map and Classification. Dennis A. Albert. St. Paul, MN.

2. **FGDC & USFWS 2013.** Wetlands Subcommittee. Federal Geographic Data Committee and U.S. Fish and Wildlife Service. Federal Geographic Data Committee. Classification of wetlands and deepwater habitats of the United States. FGDE-STD-004-2013. Second Edition. Washington, DC.

3. **Self published ca. 1978.** Firman, Barb. The Artificial Lake System at D-A Scout Ranch.

4. **USDA SCS 1972.** United States Department of Agriculture Soil Conservation Services. Soil Survey of Lapeer County, Michigan. Washington, DC.

5. **USDA NRCS 2015.** United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

6. **MNFI 1995.** Michigan Natural Features Inventory. Michigan's Presettlement Vegetation, as interpreted from the General Land Office Surveys 1816-1856. Vegetation circa 1800 of Lapeer County, Michigan. Digital Map. Lansing, MI.

7. **NFI 2001.** Cohen, J.G. Natural Features Inventory. Natural community abstract for oak barrens. Lansing, MI. Updated June 2010.

8. **USFWS 2015.** http://www.fws.gov/midwest/Endangered/lists/michigan-cty.html.

9. **USFWS 2015.** http://www.fws.gov/midwest/EastLansing/te/nleb/pdf/MichiganNLEBRoostTreeHIbernaculaFactSheetUpdated21July2015.pdf

10. **USFWS 2013.** Eastern Massasuga Sistrurus catenatus catenatus fact sheet http://www.fws.gov/midwest/Endangered/reptiles/eama/pdf/eamaFactSheetJan2013.pdf

11. **MNFI 2000.** Y. Lee, D.A. Hyde and J. Legge. Michigan Natural Features Inventory. Special abstract for *Acris crepitans blanchardi* Blanchard's cricket frog). Lansing, MI. Updated April 2009.

12. **MNFI 2000.** Lee, Y. Michigan Natural Special animal abstract for *Clemmys guttata* (spotted turtle). Lansing, MI.

13. **McKennna Associates 2006.** Lapeer County Comprehensive Development Plan. Final Draft: August, 2006.

14. **NOAA 2015.** United State Department of Commerce National Oceanic and Atmospheric Administration National Ocean Service. http://www.coast.noaa.gov/ccapatlas/#.

Appendix 1: U.S. Fish & Wildlife Service County Distribution of Federally Listed Threatened, Endangered, Proposed, and Candidate Species for Lapeer County

Midwest Endangered Species Home

Michigan

County Distribution of Federally-Listed Threatened, Endangered, Proposed, and Candidate Species

Revised September 2015

County	Species	Status	Habitat
Lapeer	Indiana bat (*Myotis sodalis*)	Endangered	Summer habitat includes small to medium river and stream corridors with well developed riparian woods; woodlots within 1 to 3 miles of small to medium rivers and streams; and upland forests. Caves and mines as hibernacula.
	Northern long-eared bat *Myotis septentrionalis*	Threatened	Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. Roosts and forages in upland forests during spring and summer.
	Eastern massasauga (*Sistrurus catenatus*)	Proposed as Threatened	

Appendix B: Michigan Natural Features Inventory Information Request

Michigan Natural Features Inventory Information Request

Requestor: **Woody Held - King & MacGregor Environmental, Inc.**

Project:

Location: **T6N R10E Section 11**

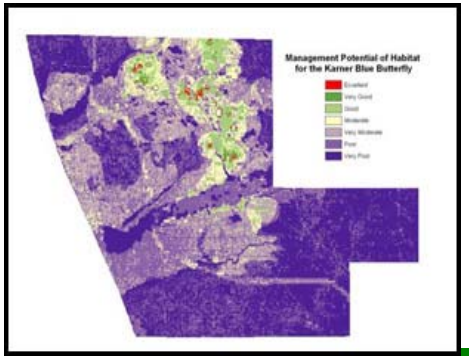
Request submission date: **January 20, 2015**

Print Date: **January 21, 2015**

Detailed information on the species listed in this report can be found in abstracts and the rare species explorer on the Michigan Natural Features Inventory (MNFI) website. The MNFI website can be found at: http://www.msue.msu.edu/mnfi

The species in this report are listed alphabetically by scientific name. Each record from the database is listed individually. Therefore you may see multiple listings for the same species. The locational and survey date information may be the only differentiating factors when looking at multiple occurrences for a given species. Heritage methodology is followed when entering species occurrences into the MNFI database. Detailed information on heritage methodology can be obtained on NatureServe's website at the link listed below.
http://www.natureserve.org/prodServices/heritagemethodology.jsp

By acceptance of the information services made available through MNFI the recipient understands that access to the information is provided for primary use only. MNFI requests that the user respect the confidential and sensitive nature of the information. There should be no redistribution of the information. Indiscriminate distribution of information regarding locations of many rare species represents a threat to their protection. Additionally, since the information is constantly being updated MNFI requests that any information service provided by MNFI is destroyed upon completion of the primary use. This information should be considered valid for one year only.



Acris crepitans blanchardi — Blanchard's cricket frog — Vertebrate Animal

FEDERAL STATUS:	STATE STATUS: T	GLOBAL RANK: G5T5	STATE RANK: S2S3	LAST OBSERVED DATE: 1989-08-04

USGS TOPOQUAD MAPSHEET CODE/NAME: 4208382/Thornville
COUNTY: Lapeer
WATERSHED: Flint

TOWN RANGE	SECTIONS
T06NR11E	29

Angelica venenosa — Hairy angelica — Vascular Plant

FEDERAL STATUS:	STATE STATUS: SC	GLOBAL RANK: G5	STATE RANK: S3	LAST OBSERVED DATE: 1956-08-18

USGS TOPOQUAD MAPSHEET CODE/NAME: 4208383/Metamora
COUNTY: Lapeer
WATERSHED: Flint

TOWN RANGE	SECTIONS
T06NR09E	1, 12, 13
T06NR10E	5, 6, 7, 8, 17, 18
T07NR09E	36
T07NR10E	31

Astragalus neglectus — Cooper's milk vetch — Vascular Plant

FEDERAL STATUS:	STATE STATUS: SC	GLOBAL RANK:G4	STATE RANK: S3	LAST OBSERVED DATE: 1922-06-14

USGS TOPOQUAD MAPSHEET CODE/NAME: 4208383/Metamora, 4308313/Lapeer, 4208384/Hadley, 4308314/Elba

COUNTY: Genesee, Lapeer

WATERSHED: Flint

TOWN RANGE	SECTIONS
T06NR08E	1, 2, 3, 10, 11, 12, 13, 14, 23, 24, 25
T06NR09E	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36
T06NR10E	4, 5, 6, 7, 8, 9, 16, 17, 18, 19, 20, 29, 30
T07NR08E	13, 23, 24, 25, 26, 35, 36
T07NR09E	13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36
T07NR10E	19, 29, 30, 31, 32

Clemmys guttata — Spotted turtle — Vertebrate Animal

FEDERAL STATUS:	STATE STATUS: T	GLOBAL RANK:G5	STATE RANK: S2	LAST OBSERVED DATE: 1985

USGS TOPOQUAD MAPSHEET CODE/NAME: 4208382/Thornville

COUNTY: Lapeer

WATERSHED: Flint

TOWN RANGE	SECTIONS
T06NR11E	17, 20

Emydoidea blandingii — Blanding's turtle — Vertebrate Animal

FEDERAL STATUS:	STATE STATUS: SC	GLOBAL RANK: G4	STATE RANK: S3	LAST OBSERVED DATE: 2000-08-16

USGS TOPOQUAD MAPSHEET CODE/NAME: 4208382/Thornville

COUNTY: Lapeer

WATERSHED: Flint

TOWN RANGE	SECTIONS
T06NR11E	16, 17, 20, 21

Hydrastis canadensis — Goldenseal — Vascular Plant

FEDERAL STATUS:	STATE STATUS: T	GLOBAL RANK: G4	STATE RANK: S2	LAST OBSERVED DATE: 1933-07-05

USGS TOPOQUAD MAPSHEET CODE/NAME: 4208372/Lake Orion, 4208373/Oxford, 4208383/Metamora, 4208382/Thornville

COUNTY: Lapeer, Oakland

WATERSHED: Flint, Clinton

TOWN RANGE	SECTIONS
T04NR09E	1
T04NR10E	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17
T04NR11E	4, 5, 6, 7, 8, 9, 17, 18
T05NR09E	12, 13, 24, 25, 36
T05NR10E	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36
T05NR11E	4, 5, 6, 7, 8, 9, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30, 31, 32, 33, 34
T06NR10E	32, 33, 34, 35, 36
T06NR11E	31

Oecanthus laricis — Tamarack tree cricket — Invertebrate Animal

FEDERAL STATUS:	STATE STATUS: SC	GLOBAL RANK:G1G2	STATE RANK: S1S2	LAST OBSERVED DATE: 2000-09-06

USGS TOPOQUAD MAPSHEET CODE/NAME: 4208382/Thornville
COUNTY: Lapeer
WATERSHED: Flint

TOWN RANGE	SECTIONS
T06NR11E	20

Sistrurus catenatus catenatus — Eastern massasauga — Vertebrate Animal

FEDERAL STATUS: C	STATE STATUS: SC	GLOBAL RANK:G3G4T3T4(	STATE RANK: S3S4	LAST OBSERVED DATE: 1995-08

USGS TOPOQUAD MAPSHEET CODE/NAME: 4208383/Metamora
COUNTY: Lapeer
WATERSHED: Flint

TOWN RANGE	SECTIONS
T07NR09E	25, 26, 35, 36
T07NR10E	31

Michigan Natural Features Inventory Information Request

Print Date: January 21, 2015
Information valid for one year.

Enclosed is the data requested from Michigan Natural Features Inventory (MNFI). This information is a list of Element Occurrences (EO) at the section level. In some cases, the extent of an animal's range or a community type may extend past the sections listed.

The MNFI database is an ongoing and continuously updated information base. The database is the only comprehensive single source of existing information on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. This database cannot provide a definitive statement on the presence, absence, or condition of the natural features in any given locality, since most sites have not been specifically or thoroughly surveyed for their occurrence. Furthermore, plant and animal populations and natural communities change with time. Therefore, the information services provided should not be regarded as a complete statement on the occurrence of special natural features of the area in question. In many cases the information may require the interpretation of a trained scientist.

The recipient(s) of the information understand that state endangered and threatened species are protected under state law (Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection). Any questions, observations, new findings, violations or clearance of project activities should be conducted with the Michigan Department of Natural Resources, Wildlife Division. Contact Lori Sargent or Todd Hogrefe at (517) 373-1263. The recipient(s) of the information understand that federally endangered and threatened species are protected under federal law (Endangered Species Act of 1973). Any questions, observations, new findings, violations or clearance of project activities should be conducted with the U.S. Fish and Wildlife Service in East Lansing. Their phone number is (517) 351-2555. Recipients of the information are responsible for ensuring the protection of protected species and obtaining proper clearance before project activities begin.

By acceptance of the information services made available through MNFI the recipient understands that access to the information is provided for primary use only. MNFI requests that the user respect the confidential and sensitive nature of the information. There should be no redistribution of the information. Indiscriminate distribution of information regarding locations of many rare species represents a threat to their protection. Additionally, since the information is constantly being updated MNFI requests that any information service provided by MNFI is destroyed upon completion of the primary use. This information should be considered valid for one year only.

This information is used to guide conservation and land management activities. Some of the element records are historical. While this information may not be important for regulatory purposes, it is important for management and restoration purposes and for scientific use.

State Protection Status Code Definitions
E = Endangered
T = Threatened
SC = Special concern
X = Presumed extirpated (legally 'threatened' if rediscovered)

Federal Protection Status Code Definitions
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
The priority assigned by NatureServe <http://www.natureserve.org>'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.
GH = Of historical occurrence throughout its range, i.e. formerly part of the established biota, with the expectation that it may be rediscovered (e.g. Bachman's Warbler).
GU = Possibly in peril range-wide, but status uncertain; need more information.
GX = Believed to be extinct throughout its range (e.g. Passenger Pigeon with virtually no likelihood that it will be rediscovered).
G? = Incomplete data
Q = Taxonomy uncertain
T = Subspecies
U = Unmappable through out the global geographic extent
? = Questionable

Subnational Heritage Status Rank Definitions
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.
SA = Accidental in state, including species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds or even thousands of miles outside their usual range.
SE = An exotic established in the state; may be native elsewhere in North America (e.g. house finch or catalpa in eastern states).
SH = Of historical occurrence in state and suspected to be still extant.
SN = Regularly occurring, usually migratory and typically nonbreeding species.
SR = Reported from state, but without persuasive documentation which would provide a basis for either accepting or rejecting the report.
SRF = Reported falsely (in error) from state but this error persisting in the literature.
SU = Possibly in peril in state, but status uncertain; need more information.
SX = Apparently extirpated from state.