

Draft Environmental Assessment
Proposed Shooting Range
Deer Creek Fish & Wildlife Area
Putnamville, IN

SUBMITTED TO:

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**DRAFT ENVIRONMENTAL ASSESSMENT
PROPOSED SHOOTING RANGE
DEER CREEK FISH & WILDLIFE AREA
PUTNAMVILLE, INDIANA
AUGUST MACK PROJECT NUMBER JP0464.380**

PREFACE

August Mack Environmental, Inc. (August Mack) is pleased to provide this Draft Environmental Assessment (EA), on behalf of the Indiana Department of Natural Resources (IDNR), to the U.S. Fish & Wildlife Service (USFWS) to support a shooting range proposed to be built at the Deer Creek Fish & Wildlife Area (FWA) near Putnamville, Indiana. This EA was prepared in accordance with Section 1508.9 of the Council of Environmental Quality's (CEQ) National Environmental Policy Act (NEPA) regulations for compliance review. Pittman-Robertson Act Federal Aid resources and State funds will be utilized to support this project. The USFWS administers these federal funds and will ultimately decide if the project complies with NEPA and other applicable federal regulations.

This report evaluates environmental effects of construction of the shooting range and will be used by the USFWS to evaluate the applicability of a "Finding of No Significant Impact" (FONSI) decision for the proposed construction or whether an Environmental Impact Statement will be required. A description of the affected environment and alternative options for the project are provided for review.

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- Attachment A:** Figures
Attachment B: Ecological Assessment Report
Attachment C: Cultural Resources Report

1.0 PROJECT OVERVIEW

1.1 Project Background

This EA has been prepared by August Mack, on behalf of the IDNR, to allow the USFWS to approve a shooting range proposed to be built at the Deer Creek FWA near Putnamville, Indiana. This EA was prepared in accordance with Section 1508.9 of the CEQ NEPA regulations to allow the USFWS to approve the proposed improvement of Federal Aid lands¹ when the conditions in this document are fully met. Pittman-Robertson Act Federal Aid resources along with State funds will be utilized on this project. The USFWS administers these federal funds and will ultimately decide if the project complies with NEPA and other applicable federal regulations.

The IDNR, Division of Fish & Wildlife, took possession of the land which comprises Deer Creek FWA in 2010 with a transfer of 1,962 acres from the Putnamville Correctional Facility. The Deer Creek FWA is located in Warren Township, Putnam County, Indiana, and is comprised of three (3) non-contiguous areas of rolling interspersed agriculture and mature oak hickory dominated woods. A small pond is located on the northern portion that offers recreational fishing for bass, bluegill and catfish. Deer Creek meanders through the southern part of the property and is associated with a low-head dam, an iron bridge and a concrete creek crossing for public access. The Putnamville Correctional Facility is centrally located within the Deer Creek FWA. A copy of the U.S. Geological Survey (USGS) 7.5-minute series topographic quadrangle for Putnamville and Reelsville depicting the property boundary for Deer Creek FWA is presented as **Figure 1 of Attachment A**.

1.2 Project Summary

IDNR has received Pittman-Robertson funds to help construct a new shooting range on an approximately 44-acre parcel situated in the southeastern corner of the Deer Creek FWA property. The constructed facility will be accessible via an asphalt driveway off of State Route (SR) 243. It will include 10, 25, 50 and 100 yard ranges with an adjacent designated shotgun range that will be open to the public. Other on-site improvements will include a building constructed to house restrooms, a vending area, an office and a storage area. The proposed shooting range will have handicapped facilities to ensure compliance with the Americans with Disabilities Act (ADA).

1.3 Purpose and Need

The purpose of the project is to develop a safe and publicly available shooting range facility within the limits of Deer Creek FWA to help promote hunter safety and skills training. Deer Creek FWA is centrally located to several major metropolitan areas. This

¹ Federal Aid lands are lands that have been acquired by State fish and wildlife agencies with funds from any grant program administered by the USFWS, Division of Federal Aid.

new state-of-the-art facility allowing the general public to practice firearm proficiency is considered to be in the public interest.

In recent years, the rise in firearm sales and shooting range traffic has increased demand for shooting range facilities throughout Indiana. Construction and operation of a new shooting range facility at Deer Creek FWA will allow the IDNR to address the rising regional demands and expand their ability to offer more hunter and firearm safety training courses in a centralized location. There has been a tremendous decline in hunting-related incidents across the country since the implementation of formal hunter education efforts in the late 1940s.

In order to purchase a hunting license in Indiana, the IDNR requires that anyone born after December 31, 1986, must complete a hunter education course offered by the IDNR and successfully pass a written test in order to obtain certification. Public shooting range facilities are the ideal place to learn how to handle firearms or improve on existing skills. Constructing and operating a public range at the Deer Creek FWA will promote hunter safety in this region of the state.

1.4 Determination

The USFWS Region 3 Regional Director will determine, based on the facts and recommendations contained in this document, whether this site-specific EA is adequate to support a FONSI. If the Regional Director determines that the proposed shooting range may have or will have a significant impact on the environment, the USFWS will require the preparation of a site-specific Environmental Impact Statement.

2.0 PROJECT ALTERNATIVES

2.1 Alternatives Considered and Dismissed

IDNR considered all FWAs in Indiana for the proposed shooting range facility during the preliminary planning process. Each potential FWA was evaluated and ranked based on several criteria, including, but not limited to, major geographical areas of need, anticipated public usage, and proximity to major highways and metropolitan areas. Based on IDNR's assessment, it was determined that only the Deer Creek FWA met the selection criteria. All other FWAs were dismissed from consideration for this proposed shooting range.

2.2 Alternatives Carried Forward for Detailed Analysis

2.2.1 Construct Range in Southwest Location (Alternative A)

Under this alternative, the new shooting range facility would be constructed in the southwest corner of the southern-most portion of Deer Creek FWA, located east of County Road 250, approximately 0.75 mile west of the State Route 243. A map depicting the property boundary for Deer Creek FWA and the proposed location of *Alternative A* is presented as **Figure 2 of Attachment A**. This site currently consists of a mixed use of wooded and grassland/open field. Preliminary evaluations of this site revealed several logistical issues (i.e. utilities) and establishing access to the site from State Route 243 would be labor intensive and cost prohibitive. In addition, an initial water/wetland delineation of this proposed site identified significant areas of potential impact. Based on these issues alone, this alternative was dismissed from further analysis and no detailed design was completed.

2.2.2 Proposed Action - (Construct Range in Southeast Location (Alternative B))

This proposed action involves construction of a public and handicap accessible shooting range facility in the southeast corner of the southern-most portion of Deer Creek FWA, located approximately 0.1 mile west of the State Route 243. A map depicting the property boundary for Deer Creek FWA and the proposed location of *Alternative B* is presented as **Figure 2 of Attachment A**. Proposed facilities will occupy approximately 25 acres and include the following:

- 10-yard, 25-yard and 50-yard pistol ranges with concrete planks and covered with baffles for the standing position and fixed benches and baffles are periodically spaced down range to retain rounds;
- 50-yard and 100-yard rifle ranges with concrete planks and covered with baffles for the standing position with fixed bench and baffles are periodically spaced down range to retain rounds;
- Four-position manual trap shot gun range;

- An approximately 1,420 square foot multi-purpose facility (ADA accessible) including indoor classroom space, ammunition sales, equipment storage areas, Range Master office and restrooms;
- New 24-foot wide entry drive off of SR 243;
- Parking facilities including paved spaces for those with disabilities in compliance with ADA requirements;
- Security measures including perimeter fencing, security cameras and building intrusion alarms;
- On-site wastewater treatment/disposal system with water main connected to Reelsville Water; and
- On-site storm water retention area.

The proposed layout of the shooting range is shown on **Figure 3 of Attachment A**. Photographs depicting the proposed site are included in the photographs section of **Attachment B**.

2.2.3 No Action (Alternative C)

Under this alternative, the new shooting range facility would not be constructed. Existing shooting ranges at other FWAs throughout the State would continue to operate in their current capacities. This alternative was not selected because it does not meet the purpose and need of the project and is not in the best interest of the public.

2.3 Summary of Alternatives

Table 1
Alternative Characteristics

Characteristic	Alternative A (Construct SW)	Alternative B (Construct SE)	Alternative C (No Action)
Site development required?	Yes	Yes	No
Highway Accessible?	No	Yes	No
Utilities Accessible?	No	Yes	No
Addresses hunter education needs?	Yes	Yes	No
Addresses Purpose and Need?	Yes	Yes	No
Significant environmental impact?	Yes	No	No

3.0 AFFECTED ENVIRONMENT

3.1 Physical Characteristics

The Deer Creek FWA consists of approximately 1,962 acres of three (3) non-contiguous areas of rolling forested and agricultural tracts of land in Warren Township, Putnam County, Indiana. Habitats associated with Deer Creek FWA include forested and agricultural tracts of land, grasslands, ponds, streams and other natural areas managed to promote fish and wildlife use. A small pond is located on the northern portion that offers recreational fishing for bass, bluegill and catfish. Deer Creek meanders through the southern part of the property and is associated with a low-head dam, an iron bridge and a concrete creek crossing for public access. The Putnamville Correctional Facility is centrally located within the Deer Creek FWA.

Specifically, the proposed 44-acre shooting range facility would be constructed in the southeast corner of the southern-most portion of the site, located east of County Road 250, approximately 0.1 mile west of the State Route 243 and 1.3 miles north of Interstate 70. The facility will be accessible via an improved drive leading west off of SR 243 and terminating at a gravel parking lot adjacent to the shooting ranges. All proposed ranges include habitat areas consisting primarily of old field and cropped field, including crops such as corn, soybeans and millet. Water/wetland features identified within the proposed shooting range parcel are limited to two emergent wetlands, two intermittent streams, and five ephemeral streams. Areas surrounding the proposed shooting range facilities include interspersed agriculture and mature oak hickory dominated woods.

3.2 Aquatic Resources

Redwing Ecological Services, Inc. (Redwing) conducted a water/wetland delineation of the proposed site on April 9, 2015 and May 6, 2015. The wetland delineation was accomplished through documentation of the presence/absence of hydric soils, wetland hydrology, and hydrophytic vegetation according to the Routine On-Site Determination Method, as defined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)* dated August, 2010. Soil, hydrology, and vegetation data were formally collected at four data points throughout the project site (see **Figure 3 of Attachment B**). Wetland Determination Data Forms are attached as **Appendix A of Attachment B**. The presence of open waters, such as streams and ponds, within the project area was determined based on evaluations of ordinary high water mark, defined bed and bank features, and flow regime. The quality of the on-site intermittent streams were assessed using the Rapid Bioassessment Protocol (RBP) developed by the U.S. Environmental Protection Agency. The RBP assessment forms taken at three locations in the study area are provided in **Appendix B of Attachment B**. The results of the delineation are summarized on the Preliminary Jurisdictional Determination Form attached as **Appendix C of Attachment B**.

Based on the field assessment, waters/wetlands identified on the property include two emergent wetlands totaling 0.68 acre, two intermittent streams totaling 1,512 linear feet (0.138 acre), and five ephemeral streams totaling 647 linear feet (0.027 acre) (**Figure 3 of Attachment B**). All identified features are considered jurisdictional due to their downstream connection to waters of the U.S. except for two ephemeral streams which have no connection to downstream waters.

3.2.1 Streams

Two intermittent streams and five ephemeral streams are present along drainages in the western and northern portions of the property boundaries.

- Intermittent Stream 1 is located in the northwestern portion of the site and originates from a culvert that runs under the existing roadway. It flows north for 29 feet before converging with Intermittent Stream 2. The RBP assessment of Intermittent Stream 1 resulted in a score of 119, which is considered “poor” quality. The stream measures two to three feet wide, has bank heights of less than one foot, and substrate consist of silt, gravel, and cobble. Flowing water at a depth of one inch was present within the channel during the field visit. Intermittent Stream 1 is considered jurisdictional due to its connection to downstream waters.
- Intermittent Stream 2 is located in the northern portion of the site and originates from Ephemeral Stream 5 then flows west for 1,483 feet before flowing off-site. The quality of Intermittent Stream 2 was assessed in two locations along the stream corridor due to a change in stream substrate and width. The RBP habitat assessment resulted in scores of 86 and 147, which is considered “poor” and “average” quality. The stream measures one to seven feet wide, has bank heights of one to four feet, and substrate consist of silt, gravel, and cobble. Flowing water at a depth of up to six inches was present within the channel during the field visit. Intermittent Stream 2 is considered jurisdictional due to its connection to downstream waters.
- Ephemeral Stream 1 is located within a sinkhole in the western portion of the site. It emerges from a seep and runs for 22 feet within the sinkhole before the flow returns underground. The stream flows over silt substrate in the bottom of the sinkhole, approximately four feet below ground level. Water was flowing at a depth of two to four inches during the field visit. Ephemeral Stream 1 is considered isolated due to its lack of connection to downstream waters.
- Ephemeral Stream 2 is located in the western portion of the site within the wooded corridor. It originates from a culvert that runs under the existing

roadway and flows for 82 feet before losing its channel at its downstream extent. The stream measures one-foot wide, has bank heights of less than one foot, and substrate comprised of silt. No water was observed within the stream channel during the field visit. Ephemeral Stream 2 is considered isolated due to its lack of connection to downstream waters.

- Ephemeral Stream 3 is located in the northwestern portion of the site where it originates from a culvert that runs under the existing roadway. It flows for 41 feet before converging with Intermittent Stream 2. The stream measures two to four feet wide, has bank heights of one to three feet, and substrate consist of mainly silt with some gravel and cobble. Pools of water at a depth of up to one inch was present within the channel during the field visit. Ephemeral Stream 3 is considered jurisdictional due to its connection to downstream waters.
- Ephemeral Stream 4 is located in the northwestern portion of the site. It originates from Wetland 1 and flows for 125 feet before converging with Intermittent Stream 2. The stream measures one to two feet wide, has bank heights of one to two feet, and substrate comprised of silt. Pools of water at a depth of up to two inches were present within the channel during the field visit. Ephemeral Stream 4 is considered jurisdictional due to its connection to downstream waters.
- Ephemeral Stream 5 is located in the northeastern portion of the site. It originates a culvert off site and flows for 377 feet before becoming Intermittent Stream 2. The stream measures one to three feet wide, has bank heights of one to four feet, and substrate comprised of silt, gravel, and cobble. No water was present within the channel during the field visit. Ephemeral Stream 5 is considered jurisdictional due to its connection to downstream waters.

3.2.2 Wetlands

Two emergent wetlands were identified on the project site. Wetland 1 is located in the northern portion of the site within an open field. Wetland 2 is located along Intermittent Stream 2 in the northern drainage feature. Wetland Determination Data Forms are provided in **Appendix A of Attachment B**. General site characteristics of soil, hydrology, and vegetation are discussed below.

3.3 Terrestrial Environment (Habitats/Vegetation)

3.3.1 Soils

The Soil Survey Geographic Database of Putnam County, Indiana, maps the project site as being underlain by Iva silt loam, Ava silt loam, Hickory loam, Muren silt loam, Grayford silt loam, Alford silt loam, and Cincinnati silt loam (see **Figure 5 of Attachment B**). The Ava, Iva and Muren soil series are listed as hydric, however, no hydric soil indicators were observed at the data points during the water/wetland delineation conducted by Redwing. Artificial drainage of the site for agriculture may have affected the development of hydric soils on site.

3.3.2 Hydrology

The main sources of hydrology to the project site include direct precipitation and surface runoff. The site generally drains to the west, towards a tributary of Deer Creek. The property is located outside of the 100-year floodplain (see **Figure 6 of Attachment B**). Wetland hydrology indicators observed on-site include saturation and oxidized rhizospheres on living roots. Shallow surface water was also present in portions of the site, but was likely due to heavy rain events that had occurred in the previous week, and was not indicative of wetland conditions.

3.3.3 Vegetation

The project site includes a combination of upland woods, old field habitat and cropped field. Species commonly observed in the upland woods include may-apple (*Podophyllum peltatum*), Virginia wild rye (*Elymus virginicus*), sugar maple (*Acer saccharum*), northern spicebush (*Lindera benzoin*), American elm (*Ulmus Americana*), northern red oak (*Quercus rubra*), and black cherry (*Prunus serotina*). Species commonly observed in the old field habitat include giant foxtail (*Setaria faberi*), redtop grass (*Agrostis gigantea*), Johnson grass (*Sorghum halepense*), tall goldenrod (*Solidago gigantea*), cocklebur (*Xanthium strumarium*), annual ragweed (*Ambrosia artemisiifolia*), yellow rocket (*Barbarea vulgaris*), butterweed (*Packera glabella*), hairy bittercress (*Cardamine hirsuta*), pigweed species (*Amaranth* spp.), purple deadnettle (*Lamium purpureum*), and aster species (*Symphotrichum* spp.). These species are listed as facultative upland (FACU), facultative wetland (FACW), and obligate upland (UPL) in *The National Wetland Plant List: Midwest Final Regional Wetland Plant List – April 2014* (NWPL).

Species commonly observed in the emergent wetlands include broad-leaf cattail (*Typha latifolia*), water primrose (*Ludwigia peploides*), fowl manna grass (*Poa palustris*), spotted touch-me-not (*Impatiens capensis*), and yellow-rocket (*Barbarea vulgaris*). These species are listed as obligate wetland (OBL), FACW and facultative (FAC) in the NWPL.

Several trees were scattered throughout the open field and along the southern boundary and include green ash (*Fraxinus pennsylvanica*), black cherry (*Prunus serotina*), black walnut (*Juglans nigra*), black locust (*Robinia pseudoacacia*), and elderberry saplings (*Sambucus nigra*). These species are listed as FACW and FACU in the NWPL.

Remnants of crops were intermixed with old field habitat and included soybeans (*Glycine max*), corn (*Zea mays*), and millet (*Panicum miliaceum*). These species are listed as UPL in the NWPL.

3.4 Wildlife, including Threatened, Endangered and Candidate Species

Redwing conducted a threatened endangered species survey of the proposed site on April 9, 2015 and May 6, 2015. On-Site natural areas were surveyed to document the presence/absence of suitable habitat for threatened/endangered species identified by the USFWS as having the potential to occur within Putnam County, Indiana. Note that the northern long-eared bat will be listed as “threatened” by the USFWS, effective May 4, 2015, and has therefore been included in this assessment. The methodology used to identify potential habitat for the federally-listed species is discussed below.

Indiana Bat: This federally-endangered species requires distinct habitat types during the summer and winter months. Summer foraging habitat includes areas of woodlands and edge habitat along fields, often in close proximity to bodies of water. Summer roosting habitat includes live or dead trees with a diameter-breast-height (dbh) of five (5) inches or greater that exhibit exfoliating bark, cracks, crevices, or cavities located either on upland slopes, bottomlands, or along streams. Winter hibernacula habitat consists of limestone caves with pools, rock shelters, and abandoned mine portals.

The project site was assessed for caves, rock shelters, and underground mines, which could represent potential winter habitat, and forested areas which could be considered potential summer habitat. Forested areas which contained trees (live or dead) with exfoliating bark, cracks or cavities, were mapped on aerial photographs. The location and extent of documented habitat areas were transferred into ArcGIS to calculate habitat acreages.

Northern Long-eared Bat: This federally-threatened species requires distinct habitat types during the winter and summer months. Winter habitat for the northern long-eared bat consists of caves and abandoned mines, as well as other cave-like structures such as abandoned railroad tunnels and storm sewers. Summer habitat consists of a variety of forested habitats used for roosting, foraging, and commuting, including forest blocks and woodlots, as well as linear features such as fencerows, riparian forests, and other wooded corridors. Suitable summer roosting habitat consists of live or dead trees

and snags with a dbh of three (3) inches or greater that exhibit exfoliating bark, crevices, cavities, or cracks. Northern long-eared bats have also been found roosting in man-made structures, including barns, sheds, and houses, and males and non-reproductive females may also roost in caves and mines during the summer. Foraging habitat includes mature, upland forests along hillsides and ridges, as well as forest clearings, water features, and roads within forested habitat. Commuting habitat is used to travel between roosting and foraging areas and typically includes forest edges and wooded linear features, including riparian corridors and fencerows.

The project site was assessed for caves, sinkholes, abandoned mines, and other underground features that could represent potential winter habitat for the northern long-eared bat, and forested areas that may provide potential summer habitat for this species. Forested areas that contained trees (live or dead) with a dbh of three (3) inches or greater with exfoliating bark, cracks, or cavities were mapped on aerial photographs. The location and extent of documented habitat areas were transferred into ArcGIS to calculate habitat acreages.

The majority of the site consists of cropped fields intermixed with old field habitat, while large low-lying area in the western portion of the site consists primarily of old field dominated by redtop grass and riparian upland forest along the northern drainage feature. An analysis of potential effects to listed T/E species identified by the USFWS as having the potential to occur within Putnam County is provided below.

Indiana Bat: As no caves, rock shelters or mine portals are present, no winter hibernacula habitat is present on the site. The upland woods habitat located in the north and western portions of the site, several individual green ash along the southern boundary, a small group of green ash and black cherry near the central portion of the site, and a small row of trees along the eastern survey boundary were identified as potential summer roosting habitat for this species due to the presence of trees with a dbh of five inches or greater with exfoliating bark, cracks, or crevices. Potential summer roosting habitat totals 7.19 acres (as shown in **Figure 4 of Attachment B**).

Effects and Minimization: Based on the absence of winter roost habitat, the low quantity and quality of the potential summer habitat on site, the commitment to clear trees in the unoccupied period (October 1 through March 31), and the presence of large tracts of suitable summer roosting habitat in other areas of the Deer Creek FWA, the proposed project is not anticipated to adversely affect the Indiana bat.

Northern Long-Eared Bat: No caves, abandoned mines, or other cave-like structures that could provide potential winter habitat or non-forested roosting habitat for the northern long-eared bat were identified at the project site. The upland woods habitat

along with several individual trees and a row of trees along the eastern survey boundary totaling 7.19 acres represents potential summer habitat for this species.

Effects and Minimization: Based on the absence of winter roost habitat, the low quantity and quality of the potential summer habitat on site, the commitment to clear trees in the unoccupied period (October 1 through March 31), and the presence of large tracts of suitable summer roosting habitat in other areas of the Deer Creek FWA, the proposed project is not anticipated to adversely affect the northern long-eared bat.

3.5 Cultural Resources

On May 5 and 6, 2015, Cultural Resource Analysts, Inc., personnel conducted a phase Ia archaeological survey of the proposed 44-acre parcel. Results of this survey are provided as **Attachment C**. Prior to fieldwork, a records review was conducted at the Indiana Department of Natural Resources, Indiana Division of Historic Preservation and Archaeology. The review indicated the project area had not been previously surveyed, and that no archaeological sites have been previously recorded within, or near, the project area boundaries. The project area is approximately 17.95 ha (44.3 acres) in size and was surveyed in its entirety. Field methods included pedestrian survey supplemented with systematic shovel testing.

The current survey resulted in the documentation of three previously unrecorded archaeological sites (12Pm431, 12Pm432, and 12Pm433). Site 12Pm431 consists of a single prehistoric lithic artifact as well as a single historic ceramic artifact that were located on the ground surface. Site 12Pm432 consists a mid-nineteenth-century historic ceramic scatter, which appears to represent dumping activity associated with one or both potteries that are listed on the 1864 landowner's atlas approximately 1.2 km (.7 mi) east of the site location. Site 12Pm433 consists of two twentieth-century historic brick foundation remnants, a row of wooden fence posts, and a subsurface brick feature. Due to lack of integrity and research potential, Sites 12Pm431, 12Pm432, and 12Pm433 are recommended as not eligible for inclusion in the National Register of Historic Places. Therefore, no archaeological sites recommended eligible for, or listed in, the National Register of Historic Places will be affected by this project, and project clearance is recommended.

3.6 Local Socio-Economic Conditions

The proposed project is located in a rural area of Warren Township, Putnam County, Indiana, and is located within the limits of Deer Creek FWA with very sparse population. The Putnamville Correctional Facility is located approximately 1.1 miles north of the proposed Site and operates a private shooting range facility for its employees. Most of the surrounding area consisting of natural areas and wildlife habitat managed as part of Deer Creek FWA. A single private residential home is located approximately 0.25 miles east of the Site along State Route 243, with additional

residential home located approximately 0.4 mile east of the Site along State Route 243. These homes appear to be associated with active agricultural fields which may serve as a source of income for the residents. An active gravel quarry is located approximately 0.3 miles south of the Site. Putnamville is the nearest town and is located approximately 1.9 miles northeast of the Site. The current population of the Town of Putnamville, as reported by the United States Postal Service zip-code database, is 39 persons.

3.7 Cumulative Impacts

The proposed project is not expected to conflict with any local, state, or federal plans for the area. Due to the adjacent land under the management of the IDNR, there are no other known plans for the immediate project area that would result in cumulative impacts when combined with the selected alternative. No other future land use for the proposed shooting range area were planned.

3.8 Permitting Regulations

Jurisdictional waters of the U.S., including wetlands, are defined by 33 CFR Part 328.3 and are protected by Section 404 of the Clean Water Act (33 USC 1344), which is administered and enforced by the United States Army Corp of Engineers (USACE). Impacts to wetlands, ponds, and streams can require permits ranging from activities that are preauthorized, to those requiring a Nationwide Permit (NWP) or Regional General Permit (RGP), to those requiring a full Individual Permit. Certain activities can also require Water Quality Certification (WQC) from the Indiana Department of Environmental (IDEM). Impacts to greater than 0.1 acre of wetlands or 300 feet of stream generally require compensatory mitigation.

Under current regulations in Indiana, impacts to greater than one acre of jurisdictional waters or 1,500 feet of stream require an Individual Permit from the USACE. Impacts to waters/wetlands of the U.S. between 0.1 acre and 1.0 acre or between 300 and 1,500 feet of stream can be authorized under a RGP from the USACE. Impacts to less than 0.1 acre of jurisdictional waters and 300 feet of stream are pre-approved under the RGP, but require formal notification to IDEM. Under the permit review process, the USACE is required to consult with the USFWS regarding potential impacts to T/E species under the federal Endangered Species Act and with the State Historic Preservation Office (SHPO) regarding potential impacts to cultural/historic sites eligible for listing on the National Register of Historic Places (NRHP) under the National Historic Preservation Act. It appears that T/E species issues will be limited to clearing of potential bat summer habitat trees. An archaeological survey by Cultural Resource Analysts, Inc. concluded that no significant historic or prehistoric cultural resources are present on site.

4.0 ENVIRONMENTAL CONSEQUENCES

This section addresses the various impacts associated with the alternatives considered for project completion, including the Proposed/Preferred Alternative, one additional alternative to the proposed action, and a No Action Alternative.

4.1 Construct Range in Southwest Location (Alternative A)

One possible alternative to the proposed action would be to construct the shooting range in the southwest corner of Deer Creek FWA. Selection of this alternative would involve establishing approximately 0.75 miles of access road to the Site from State Route 243. In addition, the installation of a potable groundwater well on-Site and the tie-in of utilities to existing lines along State Route 243 would be labor intensive and cost prohibitive. Environmental consequences associated with this alternative are summarized below.

Table 2
Summary of Environmental Consequences for Alternative A

	Impact	Comments
Land Use	Yes	Some wildlife habitat at site will be disturbed, including well installation, and off-Site utility and road improvements.
Terrestrial Habitats/ Vegetation	Yes	To offset the loss of some terrestrial habitats (old fields, cropped fields and minimal forested areas), new berms and disturbed areas will be seeded to encourage vegetative growth.
Wildlife, including T&E Species	Yes	Seasonal tree clearing restrictions will be used to minimize potential impacts to T&E species (i.e., Indiana and Northern long-eared bat). Perimeter fencing may restrict wildlife access to the new range facilities, especially for larger mammals. New berms will be seeded to encourage use by small mammals.
Wetlands	Yes	Significant impacts to greater than one acre of jurisdictional wetlands requiring federal permitting.
Streams	Yes	Significant impacts to greater than one acre of jurisdictional waters requiring federal permitting.
Cultural Resources	No	Preliminary site investigation revealed no sites eligible for listing on the NRHP. No cultural resource impacts are anticipated.
Socio-Economic Conditions	Yes	Construction would increase the availability of hunter safety training opportunities.
Noise	No	During construction, there will be increase truck and equipment noise. No environmental issues related to noise are anticipated. The area surrounding the project area is sparsely populated.
Cumulative Impacts	No	There are no other known plans for the proposed area that would result in cumulative impacts when combined with this alternative.

4.2 Proposed Action (Alternative B)

This proposed action involves construction of a public and handicap accessible shooting range facility on approximately 44 acres in the southeast corner of the southern-most portion of the Deer Creek FWA, conveniently located approximately 0.1 mile west of the State Route 243 and 1.3 miles north of Interstate 70. Environmental consequences associated with this alternative are summarized below.

Table 3
Summary of Environmental Consequences for Proposed Action

	Impact	Comments
Land Use	Yes	Some wildlife habitat at site will be disturbed, including minimal off-Site utility and access road improvements. Habitat disturbance is less than for the alternative location in the southwest section of the Deer Creek FWA.
Terrestrial Habitats/ Vegetation	Yes	There will be a loss of some terrestrial habitats (old fields, cropped fields and minimal forested areas). To offset these impacts, new berms and disturbed areas will be seeded to encourage vegetative growth.
Wildlife, including T&E Species	Yes	Seasonal tree clearing restrictions will be used to minimize potential impacts to T&E species (i.e., Indiana and Northern long-eared bat). Perimeter fencing may restrict wildlife access to the new range facilities, especially for larger mammals. New berms will be seeded to encourage use by small mammals.
Wetlands	No	Wetlands totaling 0.68 acre identified on the site but no impacts are anticipated.
Streams	Yes	Limited impacts of less than 0.1 acre require formal RGP Notification process to IDEM.
Cultural Resources	No	A site investigation revealed no locations eligible for listing on the NRHP. No cultural resource impacts were identified on the site.
Socio-Economic Conditions	Yes	Construction would increase the availability of hunter safety training opportunities.
Noise	No	During construction, there will be increase truck and equipment noise. No environmental issues related to noise are anticipated. The area surrounding the project area is sparsely populated.
Cumulative Impacts	No	There are no other known plans for the immediate project area that would result in cumulative impacts when combined with this alternative.

4.3 No Action (Alternative C)

With the No Action Alternative, existing shooting ranges at other FWAs throughout the State would continue to operate at their current locations and capacities and there would be no changes in land use or direct loss of terrestrial habitats/vegetation, wildlife, wetlands, streams, or cultural resources. The existing ranges would continue to be subject to crowding, which affects the availability of hunter safety training opportunities. The increased travel distances for the general public from major metropolitan areas to existing shooting ranges is considered a negative environmental consequence of this alternative.

Table 4
Summary of Environmental Consequences of No Action Alternative

	Impact	Comments
Land Use	No	No change in land use.
Terrestrial Habitats/Vegetation	No	No change; terrestrial habitats/vegetation remains same.
Wildlife, including T&E Species	No	No change; wildlife, including T&E Species remains same.
Wetlands	No	No change; wetlands remain same.
Streams	No	No change; streams remain same.
Cultural Resources	No	No potential for disturbance of any cultural resource sites.
Socio-Economic Conditions	No	No change; Socio-Economic Conditions
Noise	No	No work would be completed and no noise impacts would result.
Cumulative Impacts	No	No work would be completed and no cumulative impacts would result.

4.4 Summary of Environmental Consequences by Proposed Action Alternative

The water/wetland delineation identified two emergent wetlands totaling 0.68 acre, two intermittent streams totaling 1,512 linear feet (0.138 acre), and five ephemeral streams on site totaling 647 linear feet (0.027 acre). A review of proposed site plans for the project indicates that possibly only Ephemeral Stream 1 will be impacted by the project. It emerges from a seep and runs for 22 feet and is considered isolated due to its

lack of connection to downstream waters, which would allow the project to be authorized under the Regional General Permit (RGP) Notification process with IDEM. However, if additional impacts to jurisdictional waters/wetlands are proposed, the project may require a RGP or Individual Section 404 Permit from the USACE, an Individual Water Quality Certification from IDEM, and compensatory mitigation.

Since the project contains potential habitat for federally-listed T/E bat species, the 404/401 permitting process requires consultation with the USFWS. Potential summer habitat for the Indiana bat and northern long-eared bat totals 7.19 acres. No winter habitat is present for either species. Due to the presence of large areas of suitable habitat in other areas of the Deer Creek FWA, the project is not anticipated to result in adverse effects to these species. If tree clearing activities can be conducted between October 1 and March 31, it is likely that no additional requirements or restrictions would be required by the USFWS. However, if the project will require tree clearing activities between April 1 and September 30, additional services or conservation measures may be required by the USFWS. Based on the recently completed Phase Ia Cultural/Historic Resources Survey, no impacts to significant cultural resources are anticipated. Clearing trees (summer habitat) between October 1 and March 31 will avoid direct impacts to the bats. If the habitat needs to be cleared between April 1 and September 30, consulting with the USFWS Bloomington Field Office is recommended.

The proposed action alternative would have no negative environmental impacts in terms of cultural resources, noise and cumulative impacts. The addition of improvements to the land is considered a positive socio-economic consequence since the end result would increase the availability of hunter safety training and firearm proficiency.

Table 5
Summary of Environmental Consequences for All Alternatives

Area of Concern	Alternative A Southwest Area	Alternative B Southeast Area Proposed Action	Alternative C No Action
Land Use	Some wildlife habitat at site will be converted to a developed use, including well installation and significant off-Site utility and road improvements.	Some wildlife habitat at site will be converted to a developed use. Minimal off-Site utility and access road improvements. Less habitat disturbance than Alternative A.	No change in land use.
Terrestrial Habitats/ Vegetation	There will be a loss of some terrestrial habitats (old fields, cropped fields and minimal forested areas). To offset impacts, new berms and disturbed areas will be seeded to encourage vegetative growth.	There will be a loss of some terrestrial habitats (old fields, cropped fields and minimal forested areas). To offset these impacts, new berms and disturbed areas will be seeded to encourage vegetative growth.	No change; Terrestrial habitats and Vegetation remains same.
Wildlife/T&E	Seasonal tree clearing restrictions will be used to minimize potential impacts to T&E species (i.e., Indiana and Northern long-eared bat). Perimeter fencing may restrict wildlife access to the new range facilities, especially for larger mammals. New berms will be seeded to encourage use by small mammals.	Seasonal tree clearing restrictions will be used to minimize potential impacts to T&E species (i.e., Indiana and Northern long-eared bat). Perimeter fencing may restrict wildlife access to the new range facilities, especially for larger mammals. New berms will be seeded to encourage use by small mammals.	No change; wildlife, including T&E Species remains same.
Wetlands	Significant impacts to greater than one acre of jurisdictional wetlands requiring federal permitting.	Wetlands totaling 0.68 acre identified on the site but no impacts are anticipated.	No change; no wetlands present.
Streams	Significant impacts to greater than one acre of jurisdictional waters requiring federal permitting.	Limited impacts of less than 0.1 acre require formal RGP Notification process to IDEM.	No change; streams remain same.
Cultural Resources	A preliminary site investigation revealed no sites eligible for listing on the NRHP. No cultural resource impacts are anticipated.	A site investigation revealed no locations eligible for listing on the NRHP. No cultural resource impacts were identified on the site.	No potential for disturbance of any cultural resource sites.

Area of Concern	Alternative A Southwest Area	Alternative B Southeast Area Proposed Action	Alternative C No Action
Socio-Economic Conditions	Construction would increase the availability of hunter safety training opportunities.	Construction would increase the availability of hunter safety training opportunities.	No change; conditions remain same.
Noise	During construction, there will be increase truck and equipment noise. No environmental issues related to noise are anticipated. The area surrounding the project area is sparsely populated.	During construction, there will be increase truck and equipment noise. No environmental issues related to noise are anticipated. The area surrounding the project area is sparsely populated.	No work would be completed and no noise impacts would result.
Cumulative Impacts	There are no other known plans for the proposed area that would result in cumulative impacts when combined with this alternative.	There are no other known plans for the proposed area that would result in cumulative impacts when combined with this alternative.	No work completed and no cumulative impacts would result.

5.0 LIST OF PREPARERS

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6.0 COORDINATION WITH PUBLIC AND OTHERS

The site of the proposed new shooting range facility is located within Deer Creek FWA, Warren Township, Putnam County, Indiana on land that is managed by the IDNR, Division of Fish & Wildlife. This EA has been prepared in consultation with the IDNR, Division of Fish & Wildlife, who is ultimately responsible for complying with the conditions set forth in this document and has been involved in all stages of project planning and design.

A news release of this draft EA will be prepared by the USFWS External Affairs Office and distributed to media in the USFWS Region 3 and other interested regional and national groups for a 30-day public comment period. The news release provides information about the project and includes information about how the public can provide comments about the project. It also includes deadline to provide comments as well as contact person at state level where comments can be submitted.

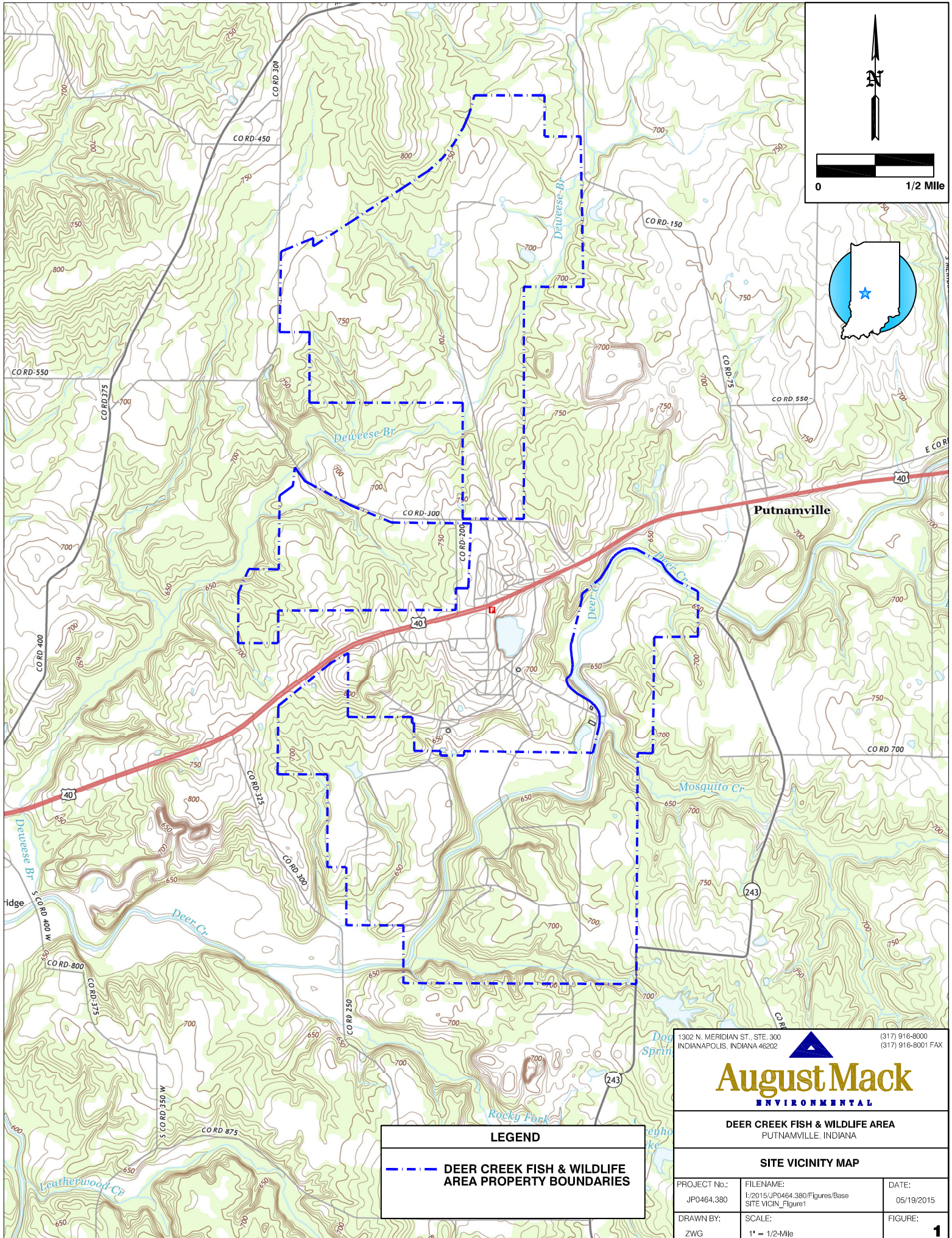
The State of Indiana shall make this draft EA available on its official government website to alert the public of the availability of this report for public comment.

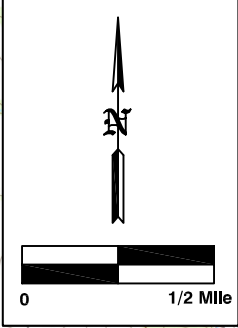
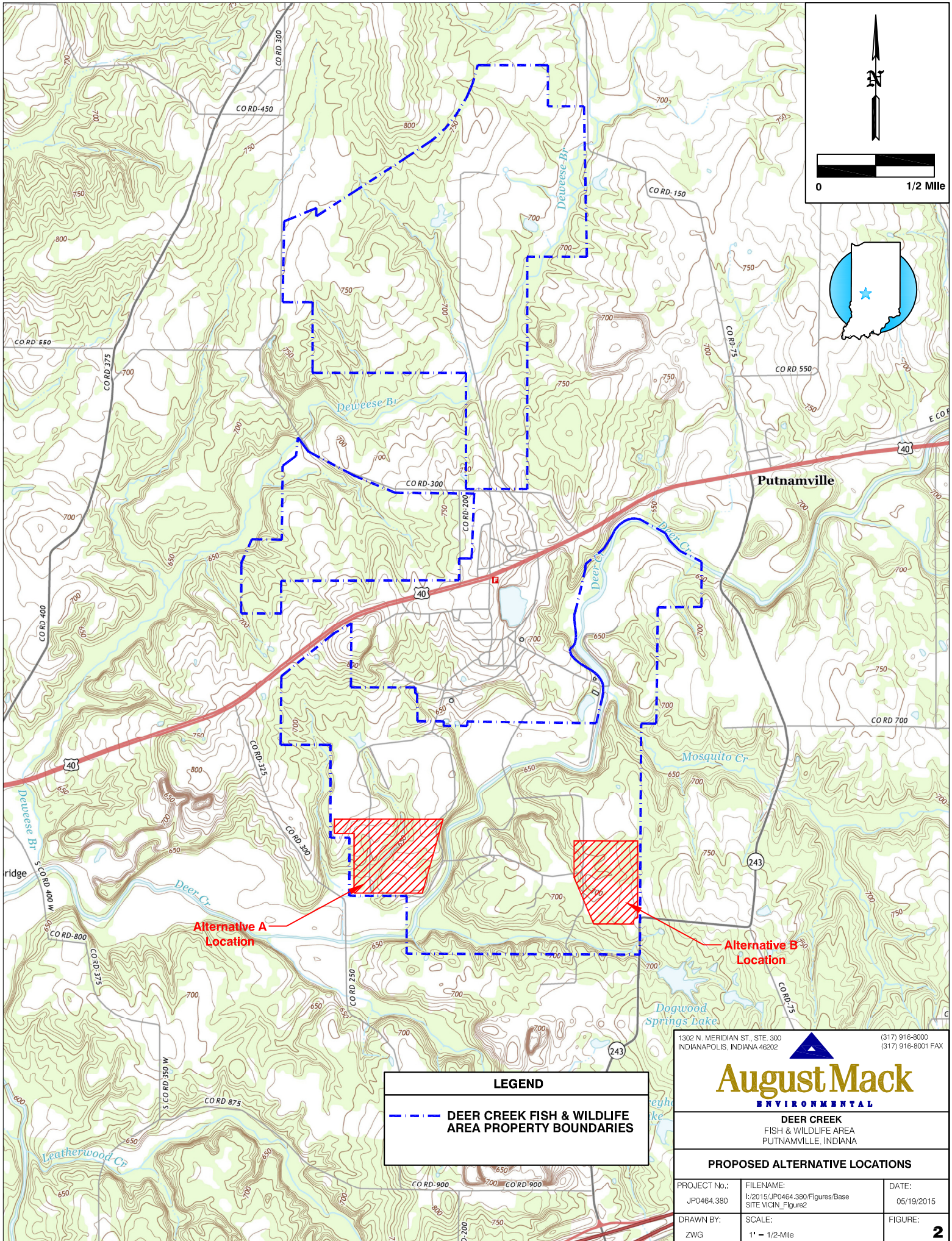
7.0 PUBLIC COMMENT ON DRAFT EA AND RESPONSES

The USFWS will make this EA available as a draft document for public review and comment in order to identify any controversy associated with the project. If public comments are significant, the draft EA shall be revised and made available to public again for further comment. If there are no comments or comments do not warrant revision of the draft EA, the draft report status will be considered final. Any subsequent correspondence between IDNR and USFWS will be documented and provided as a separate attachment in the final EA report. The USFWS, Wildlife and Sport Fish Restoration Program (WSFR) will make a final determination on whether a FONSI is appropriate for the project or if an Environmental Impact Statement (EIS) will be required. If it is determined that this project will have no significant environmental impact, the WSFR will prepare a FONSI and Environmental Action Statement (EAS) which is routed to the USFWS Chief and Regional Director for signature.

ATTACHMENT A

Figures





LEGEND

--- DEER CREEK FISH & WILDLIFE AREA PROPERTY BOUNDARIES



August Mack
ENVIRONMENTAL

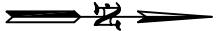
1302 N. MERIDIAN ST., STE. 300
INDIANAPOLIS, INDIANA 46202

(317) 916-8000
(317) 916-8001 FAX

**DEER CREEK FISH & WILDLIFE AREA
PUTNAMVILLE, INDIANA**

PROPOSED ALTERNATIVE LOCATIONS

PROJECT No.: JP0464.380	FILENAME: I:/2015/JP0464.380/Figures/Base SITE VICIN_Figure2	DATE: 05/19/2015
DRAWN BY: ZWG	SCALE: 1" = 1/2-Mile	FIGURE: 2



SAFETY PLAN KEY NOTES

- 1) 5'x 10' CHAIN LINK FENCE & GATES AROUND PERIMETER OF RIFLE/PISTOL RANGE.
- 2) CONCRETE RANGE WALL, PERIMETER & INTERNAL RANGE SEPARATION.
- 3) RANGE BUILDING, SCORE POINT OF ENTRY TO RIFLE/PISTOL RANGE.
- 4) MAIN ENTRY BARBERS GATE. SEE DETAIL 6A/C301.
- 5) WARNING SIGN ON POST 30' HANGING ON EXISTING FENCE, SPACED AT 100' AROUND PERIMETER OF SAFETY ZONES, BY OWNER.
- 6) PROHIBITED DANGER ZONE. NO PERSONNEL PERMITTED IN THIS AREA DURING ALL FIRE ACTIVITIES.



1A SAFETY PLAN

DRAWING PROVIDED BY:
SCHMIDT ASSOCIATES
RANGE SAFETY PLAN: C-002
DATED: 4/10/2015

1302 N. MERIDIAN ST., STE. 300
INDIANAPOLIS, INDIANA 46202

(317) 916-9000
(317) 916-8001 FAX



DEER CREEK
FISH & WILDLIFE AREA
PUTNAMVILLE, INDIANA

SAFETY PLAN

PROJECT No.:	FILENAME:	DATE:
JPO464.380	L:\2015\JPO464.380\Drawings\Base	05/19/2015
DRAWN BY:	SCALE:	FIGURE:
ZMG	NTS	3

ATTACHMENT B

Ecological Assessment Report



May 15, 2015

Mr. Richard Braun
August Mack Environmental, Inc.
1302 North Meridian Street - Suite 300
Indianapolis, Indiana 46202

**Subject: Ecological Assessment Report
 Deer Creek Shooting Range
 Putnam County, Indiana
 Redwing Project No.: 15-018**

Dear Mr. Braun:

Redwing Ecological Services, Inc. (Redwing) is pleased to submit this Ecological Assessment Report to August Mack Environmental, Inc. (AME) for the Deer Creek Shooting Range located in southern Putnam County, Indiana. The approximately 44-acre parcel is located just northwest of IN-243, approximately one mile north of the I-70 exit (Figure 1). The purpose of this report is to document the location and extent of waters/wetlands on the property and to address potential impacts to federally-listed threatened/endangered (T/E) species that could result from the proposed project.

The property is located in the southeastern corner of the Deer Creek Fish and Wildlife Area, managed by the Indiana Department of Natural Resources. Habitat consists primarily of upland woods, old field, and cropped field, including crops such as corn, soybeans and millet (Figure 2). Water/wetland features identified within the property boundary include 0.68 acre of wetland, 1,512 linear feet (0.138 acre) of intermittent stream, and 647 linear feet (0.027 acre) of ephemeral stream (Figure 3).

Habitat for federally-listed T/E species includes 7.19 acres of potential summer roosting habitat for the Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*) (Figure 4). This report summarizes study methodology, results, T/E effects analysis, permitting regulations, and a discussion of the ecological features on site.

METHODOLOGY

Redwing wetland scientists conducted a water/wetland delineation and T/E species survey of the project site on April 9, 2015 and May 6, 2015. The wetland delineation was accomplished through documentation of the presence/absence of hydric soils, wetland hydrology, and hydrophytic vegetation according to the Routine On-Site Determination Method, as defined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)* (August 2010). Soil, hydrology, and vegetation data were formally collected at nine data points throughout the project site (Figure 3). Wetland Determination Data Forms are attached as Appendix A. The presence of open waters, such as streams and ponds, within the project area was determined based on evaluations of ordinary high water mark (OHWM), defined bed and bank features, and flow regime. The quality of the on-site intermittent streams were assessed using the Rapid Bioassessment Protocol (RBP) developed by the U.S. Environmental Protection Agency. The RBP assessment forms taken at three locations in the study area are provided in Appendix B. The results of the delineation are summarized on the Preliminary Jurisdictional Determination Form attached as Appendix C. The delineation has not been verified by the U.S. Army Corps of Engineers (USACE), who has final authority over determining the location and extent of waters/wetlands.

On-site natural areas were surveyed to document the presence/absence of suitable habitat for T/E species identified by the USFWS as having the potential to occur within Putnam County, Indiana. Note that the northern long-eared bat was listed as “threatened” by the USFWS, effective May 4, 2015. The methodology used to identify potential habitat for the federally-listed species is discussed below.

Indiana Bat: This federally-endangered species requires distinct habitat types during the summer and winter months. Summer foraging habitat includes areas of woodlands and edge habitat along fields, often in close proximity to bodies of water. Summer roosting habitat includes live or dead trees with a diameter-breast-height (dbh) of five inches or greater that exhibit exfoliating bark, cracks, crevices, or cavities located either on upland slopes, bottomlands, or along streams. Winter hibernacula habitat consists of limestone caves with pools, rock shelters, and abandoned mine portals.

The project site was assessed for caves, rock shelters, and underground mines, which could represent potential winter habitat, and forested areas which could be considered potential summer habitat. Forested areas which contained trees (live or dead) with exfoliating bark, cracks or cavities, were mapped on aerial photographs. The location and extent of documented habitat areas were transferred into ArcGIS to calculate habitat acreages.

Northern Long-eared Bat: This federally-threatened species requires distinct habitat types during the winter and summer months. Winter habitat for the northern long-eared bat consists of caves and abandoned mines, as well as other cave-like structures such as abandoned

railroad tunnels and storm sewers. Summer habitat consists of a variety of forested habitats used for roosting, foraging, and commuting, including forest blocks and woodlots, as well as linear features such as fencerows, riparian forests, and other wooded corridors. Suitable summer roosting habitat consists of live or dead trees and snags with a dbh of three inches or greater that exhibit exfoliating bark, crevices, cavities, or cracks. Northern long-eared bats have also been found roosting in man-made structures, including barns, sheds, and houses, and males and non-reproductive females may also roost in caves and mines during the summer. Foraging habitat includes mature, upland forests along hillsides and ridges, as well as forest clearings, water features, and roads within forested habitat. Commuting habitat is used to travel between roosting and foraging areas and typically includes forest edges and wooded linear features, including riparian corridors and fencerows.

The project site was assessed for caves, sinkholes, abandoned mines, and other underground features that could represent potential winter habitat for the northern long-eared bat, and forested areas that may provide potential summer habitat for this species. Forested areas that contained trees (live or dead) with a dbh of three inches or greater with exfoliating bark, cracks, or cavities were mapped on aerial photographs. The location and extent of documented habitat areas were transferred into ArcGIS to calculate habitat acreages.

WATER/WETLAND DELINEATION RESULTS

Based on the field assessment, waters/wetlands identified on the property include two emergent wetlands totaling 0.68 acre, two intermittent streams totaling 1,512 linear feet (0.138 acre), and five ephemeral streams totaling 647 linear feet (0.027 acre) (Figure 3). All identified features are considered jurisdictional due to their downstream connection to waters of the U.S. except for two ephemeral streams which have no connection to downstream waters. The following table summarizes water/wetland features within the site boundary.

Feature	Length (ft)	Area (ac)	Status
Wetland 1	--	0.57	Jurisdictional
Wetland 2	--	0.11	Jurisdictional
Wetland Total	--	0.68	
Intermittent Stream 1	29	0.002	Jurisdictional
Intermittent Stream 2	1,483	0.136	Jurisdictional
Intermittent Stream Total	1,512	0.138	
Ephemeral Stream 1	22	0.001	Isolated
Ephemeral Stream 2	82	0.002	Isolated
Ephemeral Stream 3	41	0.003	Jurisdictional
Ephemeral Stream 4	125	0.004	Jurisdictional
Ephemeral Stream 5	377	0.017	Jurisdictional
Ephemeral Stream Total	647	0.027	
Total Jurisdictional Features	2,055	0.842	

STREAMS

Two intermittent streams and five ephemeral streams are present along drainages in the western and northern portions of the property boundaries.

Intermittent Stream 1 is located in the northwestern portion of the site and originates from a culvert that runs under the existing roadway. It flows north for 29 feet before converging with Intermittent Stream 2. The RBP assessment of Intermittent Stream 1 resulted in a score of 119, which is considered “poor” quality. The stream measures two to three feet wide, has bank heights of less than one foot, and substrate consist of silt, gravel, and cobble. Flowing water at a depth of one inch was present within the channel during the field visit. Intermittent Stream 1 is considered jurisdictional due to its connection to downstream waters.

Intermittent Stream 2 is located in the northern portion of the site and originates from Ephemeral Stream 5 then flows west for 1,483 feet before flowing off-site. The quality of Intermittent Stream 2 was assessed in two locations along the stream corridor due to a change in stream substrate and width. The RBP habitat assessment resulted in scores of 86 and 147, which is considered “poor” and “average” quality. The stream measures one to seven feet wide, has bank heights of one to four feet, and substrate consist of silt, gravel, and cobble. Flowing water at a depth of up to six inches was present within the channel during the field visit. Intermittent Stream 2 is considered jurisdictional due to its connection to downstream waters.

Ephemeral Stream 1 is located within a sinkhole in the western portion of the site. It emerges from a seep and runs for 22 feet within the sinkhole before the flow returns underground. The stream flows over silt substrate in the bottom of the sinkhole, approximately four feet below ground level. Water was flowing at a depth of two to four inches during the field visit. Ephemeral Stream 1 is considered isolated due to its lack of connection to downstream waters.

Ephemeral Stream 2 is located in the western portion of the site within the wooded corridor. It originates from a culvert that runs under the existing roadway and flows for 82 feet before losing its channel at its downstream extent. The stream measures one-foot wide, has bank heights of less than one foot, and substrate comprised of silt. No water was observed within the stream channel during the field visit. Ephemeral Stream 2 is considered isolated due to its lack of connection to downstream waters.

Ephemeral Stream 3 is located in the northwestern portion of the site where it originates from a culvert that runs under the existing roadway. It flows for 41 feet before converging with Intermittent Stream 2. The stream measures two to four feet wide, has bank heights of one to three feet, and substrate consist of mainly silt with some gravel and cobble. Pools of water at a depth of up to one inch was present within the channel during the field visit. Ephemeral Stream 3 is considered jurisdictional due to its connection to downstream waters.

Ephemeral Stream 4 is located in the northwestern portion of the site. It originates from Wetland 1 and flows for 125 feet before converging with Intermittent Stream 2. The stream measures one to two feet wide, has bank heights of one to two feet, and substrate comprised of silt. Pools of water at a depth of up to two inches were present within the channel during the field visit. Ephemeral Stream 4 is considered jurisdictional due to its connection to downstream waters.

Ephemeral Stream 5 is located in the northeastern portion of the site. It originates a culvert off site and flows for 377 feet before becoming Intermittent Stream 2. The stream

measures one to three feet wide, has bank heights of one to four feet, and substrate comprised of silt, gravel, and cobble. No water was present within the channel during the field visit. Ephemeral Stream 5 is considered jurisdictional due to its connection to downstream waters.

WETLANDS

Two emergent wetlands were identified on the project site. Wetland 1 is located in the northern portion of the site within an open field. Wetland 2 is located along Intermittent Stream 2 in the northern drainage feature. Wetland Determination Data Forms are provided in Appendix A. General site characteristics of soil, hydrology, and vegetation are discussed below:

Soils: The Soil Survey Geographic Database of Putnam County, Indiana, maps the project site as being underlain by Iva silt loam, Ava silt loam, Hickory loam, Muren silt loam, Grayford silt loam, Alford silt loam, and Cincinnati silt loam (Figure 5). The Ava, Iva and Muren soil series are listed as hydric. No hydric soil indicators were observed except the wetland data points.

Hydrology: The main sources of hydrology to the project site include direct precipitation and surface runoff. The site generally drains to the west, towards a tributary of Deer Creek. The property is located outside of the 100-year floodplain (Figure 6). Wetland hydrology indicators observed on-site include saturation and oxidized rhizospheres on living roots. Shallow surface water was also present in portions of the site, but was likely due to heavy rain events that had occurred in the previous week, and was not indicative of wetland conditions.

Vegetation: The project site includes a combination of upland woods, old field habitat, and cropped field. Species commonly observed in the upland woods include may-apple (*Podophyllum peltatum*), Virginia wild rye (*Elymus virginicus*), sugar maple (*Acer saccharum*), northern spicebush (*Lindera benzoin*), American elm (*Ulmus Americana*), northern red oak (*Quercus rubra*), and black cherry (*Prunus serotina*). Species commonly observed in the old field habitat include giant foxtail (*Setaria faberi*), redtop grass (*Agrostis gigantea*), Johnson grass (*Sorghum halepense*), tall goldenrod (*Solidago gigantea*), cocklebur (*Xanthium strumarium*), annual ragweed (*Ambrosia artemisiifolia*), yellow rocket (*Barbarea vulgaris*), butterweed (*Packera glabella*), hairy bittercress (*Cardamine hirsuta*), pigweed species (*Amaranth* spp.), purple deadnettle (*Lamium purpureum*), and aster species (*Symphotrichum* spp.). These species are listed as facultative upland (FACU), facultative wetland (FACW), and obligate upland (UPL) in *The National Wetland Plant List: Midwest Final Regional Wetland Plant List – April 2014* (NWPL).

Species commonly observed in the emergent wetlands include broad-leaf cattail (*Typha latifolia*), water primrose (*Ludwigia peploides*), fowl manna grass (*Poa palustris*), spotted touch-me-not (*Impatiens capensis*), and yellow-rocket (*Barbarea vulgaris*). These species are listed as obligate wetland (OBL), FACW and facultative (FAC) in the NWPL.

Several trees were scattered throughout the open field and along the southern boundary and include green ash (*Fraxinus pennsylvanica*), black cherry (*Prunus serotina*), black walnut (*Juglans nigra*), black locust (*Robinia pseudoacacia*), and elderberry saplings (*Sambucus nigra*). These species are listed as FACW and FACU in the NWPL.

Remnants of crops were intermixed with old field habitat and included soybeans (*Glycine max*), corn (*Zea mays*), and millet (*Panicum miliaceum*). These species are listed as UPL in the NWPL.

THREATENED/ENDANGERED SPECIES EFFECTS ANALYSIS

The majority of the site consists of cropped fields intermixed with old field habitat (including a large low-lying area in the western portion of the site dominated by redtop grass) and riparian upland forest along the northern drainage feature. An analysis of potential effects to listed T/E species identified by the USFWS as having the potential to occur within Putnam County is provided below.

Indiana Bat: As no caves, rock shelters or mine portals are present, no winter hibernacula habitat is present on the site. The upland woods habitat located in the north and western portions of the site, several individual green ash along the southern boundary, a small group of green ash and black cherry near the central portion of the site, and a small row of trees along the eastern survey boundary were identified as potential summer roosting habitat for this species due to the presence of trees with a dbh of five inches or greater with exfoliating bark, cracks, or crevices. Potential summer roosting habitat totals 7.19 acres (Figure 4).

Effects and Minimization: Based on the absence of winter roost habitat, the low quantity and quality of the potential summer habitat on site, the commitment to clear trees in the unoccupied period (October 1 through March 31), and the presence of large tracts of suitable summer roosting habitat in other areas of the Deer Creek Wildlife Area, the proposed project is not anticipated to adversely affect the Indiana bat.

Northern Long-Eared Bat: No caves, abandoned mines, or other cave-like structures that could provide potential winter habitat or non-forested roosting habitat for the northern long-eared bat were identified at the project site. The upland woods habitat along with several individual trees and a row of trees along the eastern survey boundary totaling 7.19 acres represents potential summer habitat for this species.

Effects and Minimization: Based on the absence of winter roost habitat, the low quantity and quality of the potential summer habitat on site, the commitment to clear trees in the unoccupied period (October 1 through March 31), and the presence of large tracts of suitable summer roosting habitat in other areas of the Deer Creek Wildlife Area, the proposed project is not anticipated to adversely affect the northern long-eared bat.

PERMITTING REGULATIONS

Jurisdictional waters of the U.S., including wetlands, are defined by 33 CFR Part 328.3 and are protected by Section 404 of the Clean Water Act (33 USC 1344), which is administered and enforced by the USACE. Impacts to wetlands, ponds, and streams can require permits ranging from activities that are preauthorized, to those requiring a Nationwide Permit (NWP) or Regional General Permit (RGP), to those requiring a full Individual Permit. Certain activities can also require Water Quality Certification (WQC) from the Indiana Department of Environmental (IDEM). Impacts to greater than 0.1 acre of wetlands or 300 feet of stream generally require compensatory mitigation.

Under current regulations in Indiana, impacts to greater than one acre of jurisdictional waters or 1,500 feet of stream require an Individual Permit from the USACE. Impacts to waters/wetlands of the U.S. between 0.1 acre and 1.0 acre or between 300 and 1,500 feet of stream can be authorized under a RGP from the USACE. Impacts to less than 0.1 acre of jurisdictional waters and 300 feet of stream are pre-approved under the RGP, but require formal notification to IDEM.

Under the permit review process, the USACE is required to consult with the USFWS regarding potential impacts to T/E species under the federal Endangered Species Act and with the State Historic Preservation Office (SHPO) regarding potential impacts to cultural/historic sites eligible for listing on the National Register of Historic Places (NRHP) under the National Historic Preservation Act. It appears that T/E species issues will be limited to clearing of potential bat summer habitat trees. An archaeological survey by Cultural Resource Analysts, Inc. concluded that no significant historic or prehistoric cultural resources are present on site.

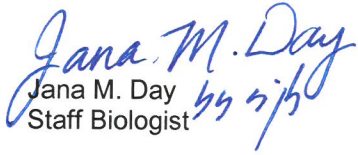
DISCUSSION

The water/wetland delineation identified two emergent wetlands totaling 0.68 acre, two intermittent streams totaling 1,512 linear feet (0.138 acre), and five ephemeral streams on site totaling 647 linear feet (0.027 acre). A review of proposed site plans for the project indicates that possibly only Ephemeral Stream 1 will be impacted by the project, which would allow the project to be authorized under the Regional General Permit (RGP) Notification process with IDEM. If no response is received within 30 days of the submittal of a complete application, the project is considered approved. However, if additional impacts to jurisdictional waters/wetlands are proposed, the project may require a RGP or Individual Section 404 Permit from the USACE, an Individual Water Quality Certification from IDEM, and compensatory mitigation.

Since the project contains potential habitat for federally-listed T/E bat species, the 404/401 permitting process requires consultation with the USFWS. Potential summer habitat for the Indiana bat and northern long-eared bat totals 7.19 acres. No winter habitat is present for either species. If the tree clearing activities can be conducted between October 1 and March 31, it is likely that no additional requirements or restrictions would be required by the USFWS. However, if the project will require tree clearing activities between April 1 and September 30, additional services or conservation measures may be required by the USFWS. Based on the recently completed Phase Ia Cultural/Historic Resources Survey, no impacts to significant cultural resources are anticipated.

We appreciate the opportunity to assist you on this project. Please contact Jana Day or Ron Thomas at (502) 625-3009 with any questions regarding this report or the overall project.

Sincerely,

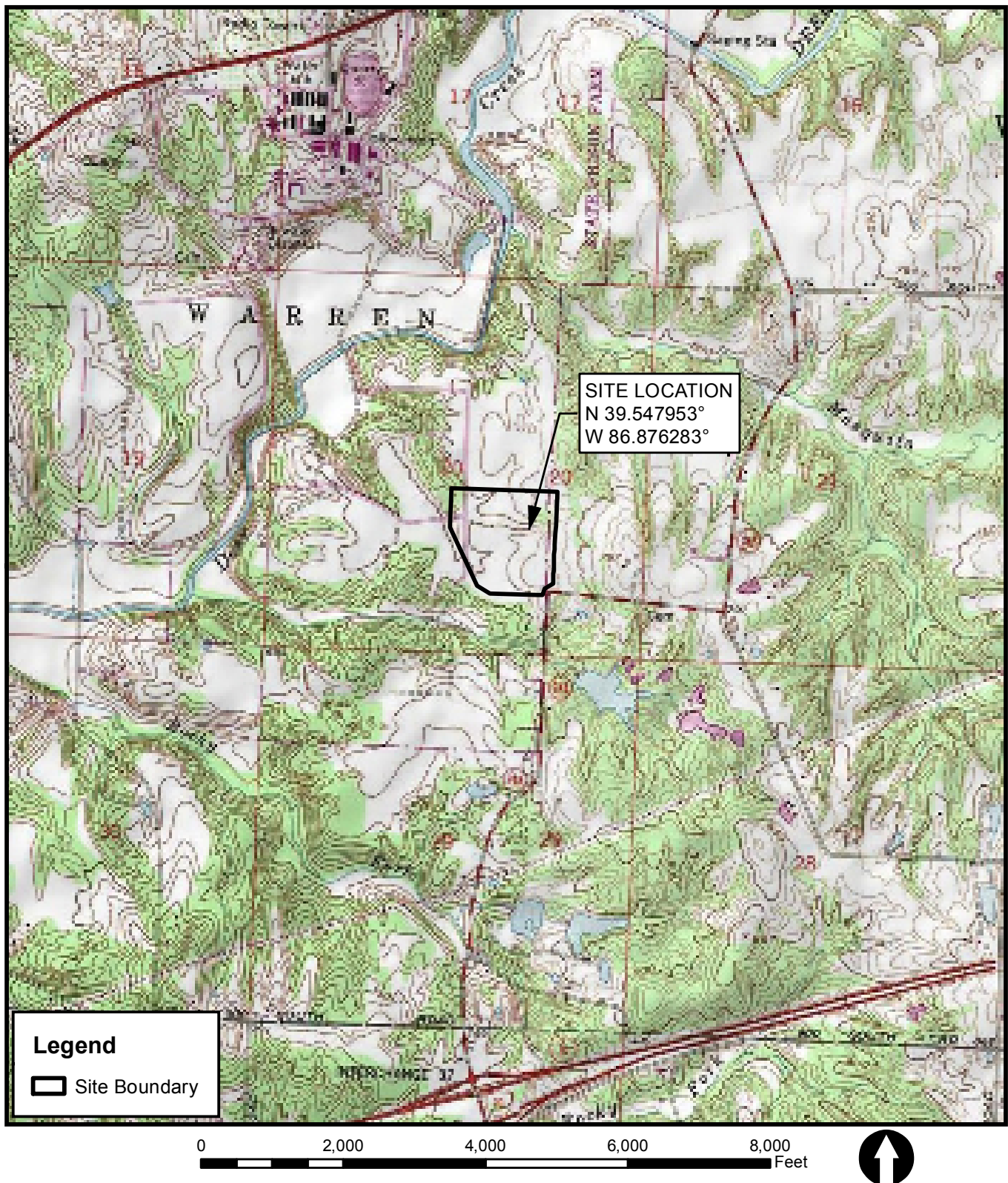

Jana M. Day
Staff Biologist


Ronald L. Thomas
Principal
Senior Ecologist

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Attachments: Figures
 Photographs
 Appendix A: Wetland Determination Data Sheets
 Appendix B: Rapid Bioassessment Protocol Forms
 Appendix C: Preliminary Jurisdictional Determination Form

FIGURES



DEER CREEK SHOOTING RANGE
PUTNAM COUNTY, INDIANA



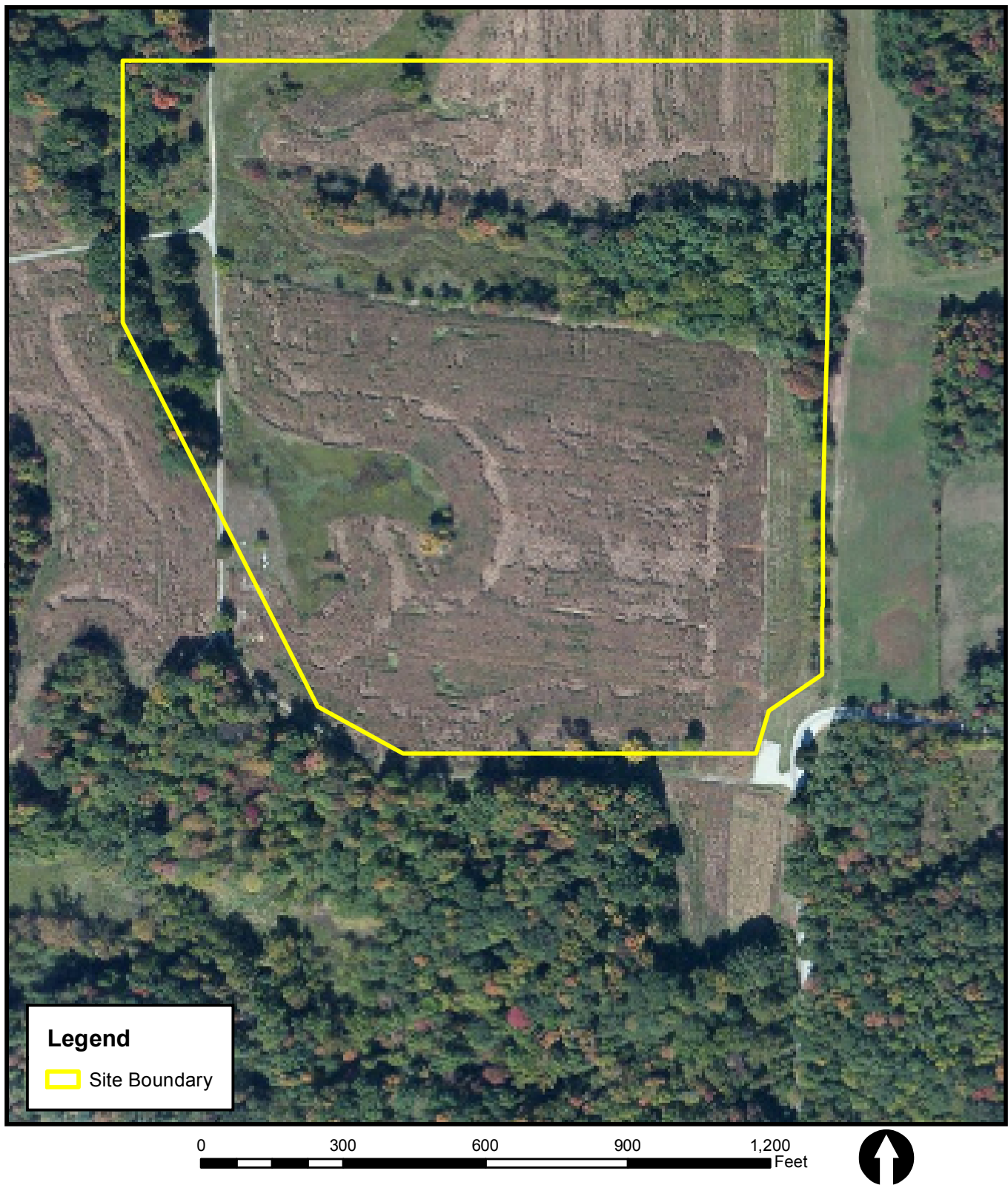
SITE LOCATION MAP

REVISED DATE: 05-7-15

DRAWN BY: JMD

FIGURE 1

Source: World Imagery - Esri and the GIS User Community (2012).



DEER CREEK SHOOTING RANGE
PUTNAM COUNTY, INDIANA



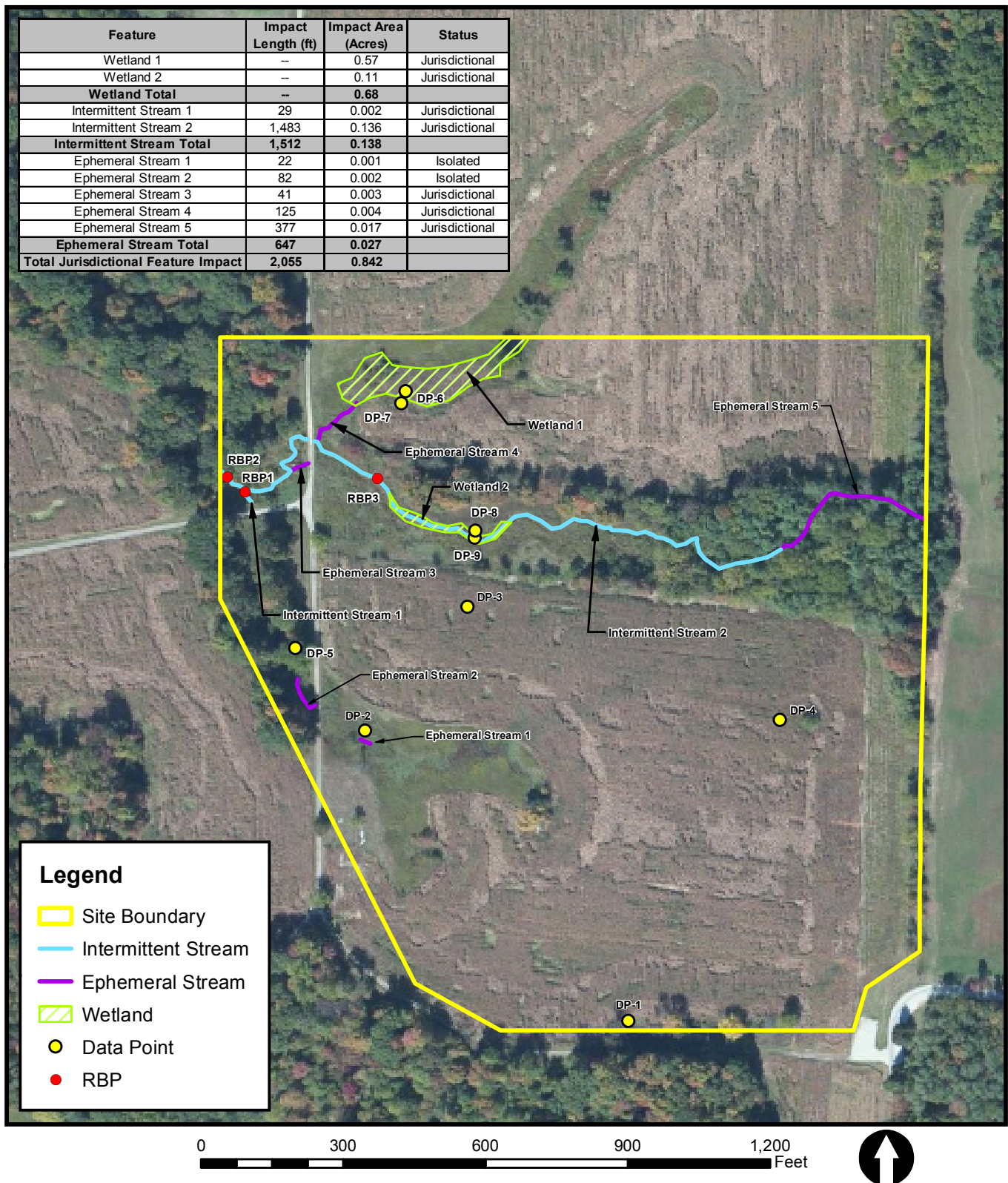
AERIAL PHOTOGRAPH MAP

REVISED DATE: 05-7-15

DRAWN BY: JMD

FIGURE 2

Source: World Imagery - Esri and the GIS User Community (2012).



DEER CREEK SHOOTING RANGE
PUTNAM COUNTY, INDIANA



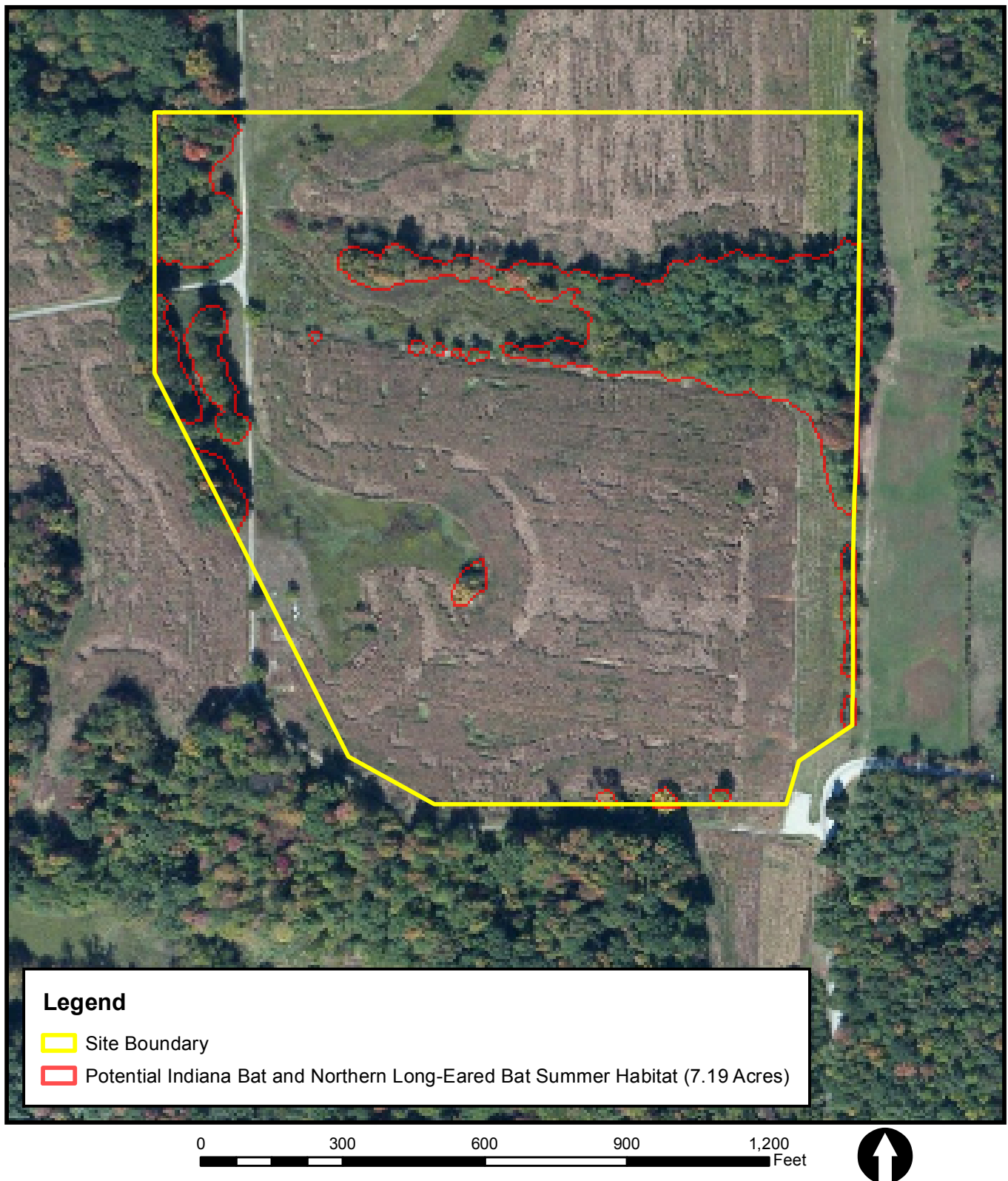
WATER/WETLAND
LOCATION MAP

REVISED DATE: 05-08-15

DRAWN BY: JMD

FIGURE 3

Source: World Imagery - Esri and the GIS User Community (2012).



DEER CREEK SHOOTING RANGE
PUTNAM COUNTY, INDIANA

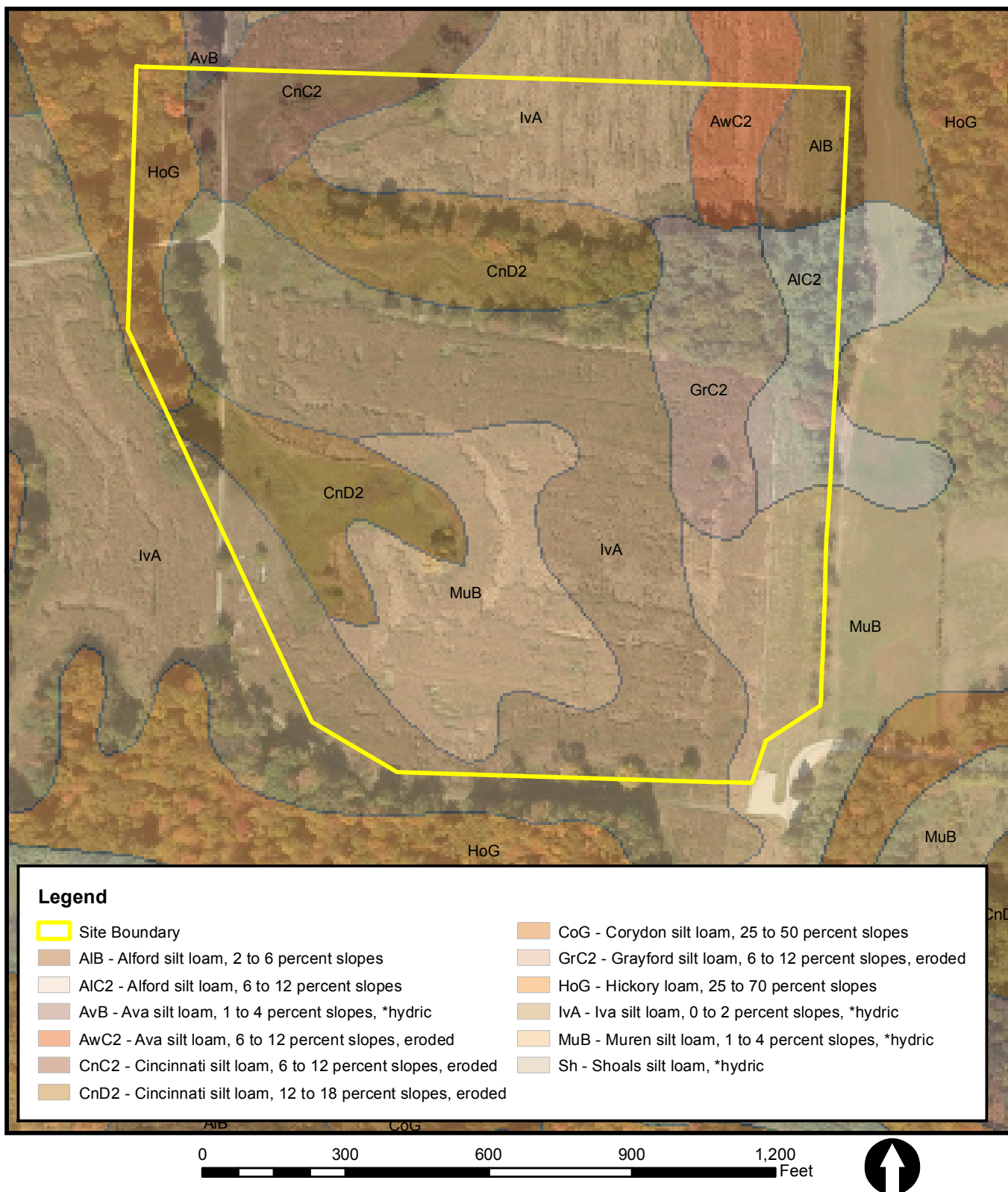


HABITAT MAP

REVISED DATE: 05-07-15 DRAWN BY: JMD

FIGURE 4

Source: World Imagery - Esri and the GIS User Community (2012);
Soil Survey Geographic (SSURGO) database for Putnam County, Indiana (2014).



DEER CREEK SHOOTING RANGE
PUTNAM COUNTY, INDIANA



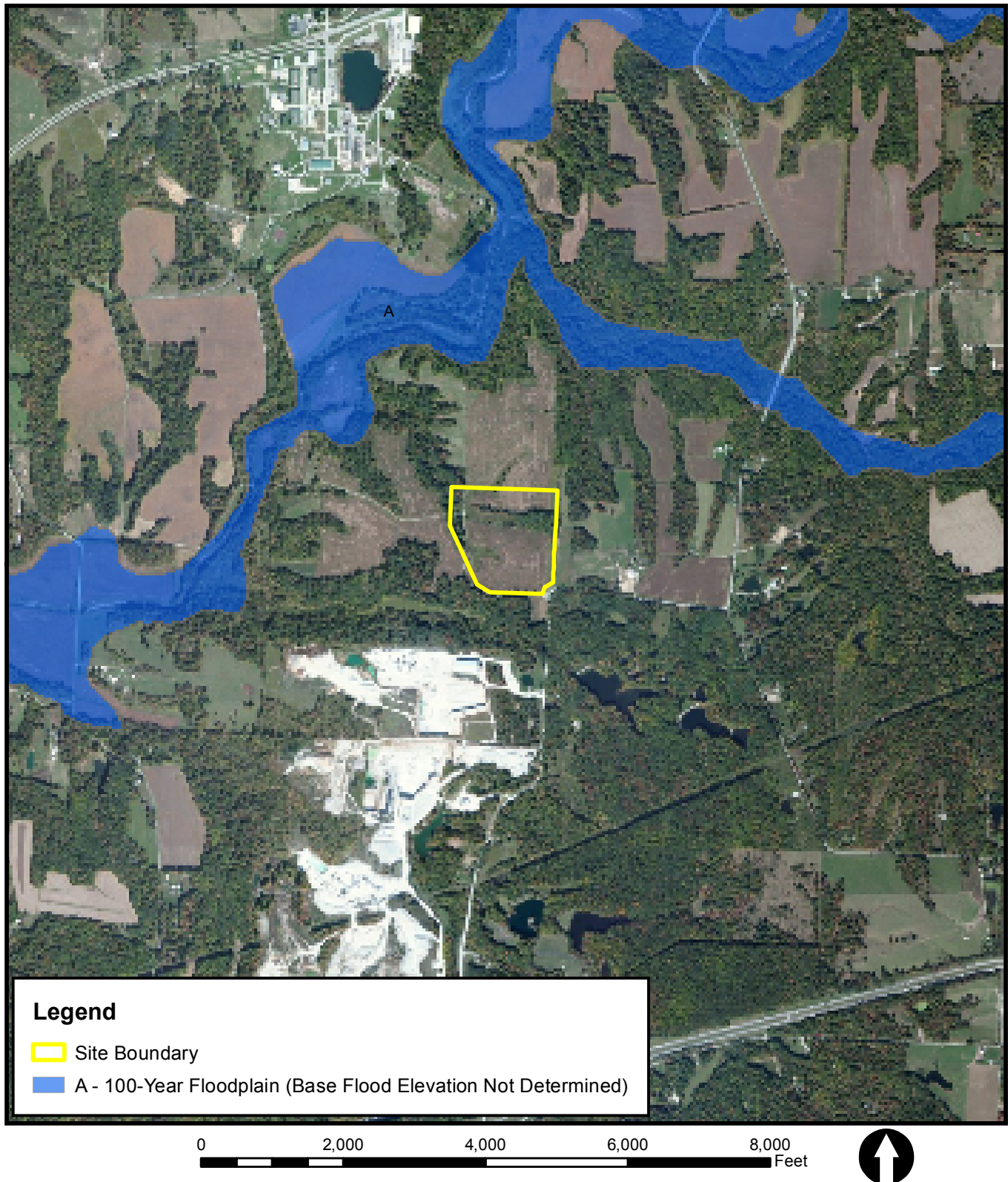
SOIL SURVEY MAP

REVISED DATE: 05-7-15

DRAWN BY: JMD

FIGURE 5

Source: World Imagery - Esri and the GIS User Community (2012). FEMA Floodplains: Indiana Department of Natural Resources (2014).



DEER CREEK SHOOTING RANGE
PUTNAM COUNTY, INDIANA



FEMA FLOODPLAIN MAP

REVISED DATE: 05-7-15

DRAWN BY: JMD

FIGURE 6

PHOTOGRAPHS



Photograph 1: General view of the site from the southeast corner. The majority of the site consists of rows of crops intermixed with areas of old field and some upland woods habitat. April 9, 2015.



Photograph 2: Cropland, facing southwest from the northeast corner of the site, showing planted soybeans growing between patches of old field habitat. Crop species include soybean (*Glycine max*), corn (*Zea mays*), and millet (*Panicum miliaceum*). Old field species include giant foxtail (*Setaria faberi*), Johnson grass (*Sorghum halepense*), tall goldenrod (*Solidago gigantea*), cocklebur (*Xanthium strumarium*), and annual ragweed (*Ambrosia artemisiifolia*). April 9, 2015.



Photograph 3: View of the upland woods habitat located in the northern and western portions of the site. Species commonly observed in the upland woods include may-apple (*Podophyllum peltatum*), Virginia wild rye (*Elymus virginicus*), sugar maple (*Acer saccharum*), northern spicebush (*Lindera benzoin*), American elm (*Ulmus Americana*), northern red oak (*Quercus rubra*), and black cherry (*Prunus serotina*). This habitat represents potential summer habitat for the Indiana bat (*Myotis sodalis*) and the northern long-eared bat (*Myotis septentrionalis*). May 6, 2015.



Photograph 4: Wetland 1, located in the northern portion of the site, is dominated by cattail (*Typha latifolia*) and water primrose (*Ludwigia peploides*). May 6, 2015.



Photograph 5: Wetland 2, located in the northern portion of the site, is dominated by fowl manna grass (*Poa palustris*) and touch-me-not (*Impatiens capensis*). May 6, 2015.



Photograph 6: Intermittent Stream 1, located in the western portion of the site. May 6, 2015.



Photograph 7: Intermittent Stream 2, located in the western and northern portion of the site. May 6, 2015.



Photograph 8: Ephemeral Stream 1, located in the western portion of the site. April 9, 2015.



Photograph 9: Ephemeral Stream 2, located in the western portion of the site. May 6, 2015.



Photograph 10: Ephemeral Stream 3, located in the western portion of the site. May 6, 2015.



Photograph 11: Ephemeral Stream 4, located in the northern portion of the site. May 6, 2015.



Photograph 12: Ephemeral Stream 5, located in the eastern portion of the site. May 6, 2015.

APPENDIX A

WETLAND DETERMINATION DATA SHEETS

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Deer Creek Shooting Range City/County: Putnam Sampling Date: 4/9/2015
 Applicant/Owner: August Mack Environmental State: Indiana Sampling Point: DP-1
 Investigator(s): R. Fangman, S. Brower Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): low area between road and field Local relief (concave, convex, none): concave Slope (%): 1
 Lat.: 39.546835° N Long.: 86.876247° W Datum: _____
 Soil Map Unit Name: IvA - Iva silt loam, 0 to 2 percent slopes NWI Classification: _____
 Are climatic/hydrologic conditions of the site typical for this time of the year? Yes (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? _____ Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present?	<u>No</u>	Is the Sampled Area within a Wetland?	<u>No</u>
Hydric soil present?	<u>No</u>		
Wetland hydrology present?	<u>No</u>		

Remarks: (Explain alternative procedures here or in a separate report.)
 Heavy rain events within past week.

VEGETATION (Four Strata) -- Use scientific names of plants

Tree Stratum	Plot Size (30')	Absolute % Cover	Dominant Species	Indicator Status
1 <u>Juglans nigra</u>		<u>30</u>	<u>Yes</u>	<u>FACU</u>
2 <u>Prunus serotina</u>		<u>15</u>	<u>Yes</u>	<u>FACU</u>
3 _____				
4 _____				
5 _____				
		<u>45</u> =	Total Cover	

Sapling/Shrub Stratum	Plot Size (15')	Absolute % Cover	Dominant Species	Indicator Status
1 <u>Rosa multiflora</u>		<u>15</u>	<u>Yes</u>	<u>FACU</u>
2 _____				
3 _____				
4 _____				
5 _____				
		<u>15</u> =	Total Cover	

Herb Stratum	Plot Size (5')	Absolute % Cover	Dominant Species	Indicator Status
1 <u>Schedonorus arundinaceus</u>		<u>20</u>	<u>Yes</u>	<u>FACU</u>
2 <u>Solidago gigantea</u>		<u>20</u>	<u>Yes</u>	<u>FACW</u>
3 <u>Persicaria maculosa</u>		<u>15</u>	<u>No</u>	<u>FACW</u>
4 <u>Poa pratensis</u>		<u>10</u>	<u>No</u>	<u>FAC</u>
5 <u>Allium vineale</u>		<u>5</u>	<u>No</u>	<u>FACU</u>
6 <u>Solanum carolinense</u>		<u>5</u>	<u>No</u>	<u>FACU</u>
7 <u>Vernonia gigantea</u>		<u>5</u>	<u>No</u>	<u>FAC</u>
8 _____				
9 _____				
10 _____				
		<u>80</u> =	Total Cover	

Woody Vine Stratum	Plot Size (30')	Absolute % Cover	Dominant Species	Indicator Status
1 _____				
2 _____				
3 _____				
4 _____				
5 _____				
			Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)
 Total Number of Dominant Species Across all Strata: 5 (B)
 Percent of Dominant Species that are OBL, FACW, or FAC: 20.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:
 OBL species _____ x 1 = _____
 FACW species _____ x 2 = _____
 FAC species _____ x 3 = _____
 FACU species _____ x 4 = _____
 UPL species _____ x 5 = _____
 Column totals _____ (A) _____ (B)
 Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid test for hydrophytic vegetation
 2 - Dominance test is >50%
 3 - Prevalence index is ≤3.0*
 4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)
 Problematic hydrophytic vegetation¹ (explain) _____

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? No

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							Sampling Point: DP-1	
Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 3	10YR 3/2	100					silty clay loam	
3 - 10	10YR 4/3	83	10YR 5/1	15	D	M	silty clay loam	
			7.5YR 5/8	2	C	M		
10 - 14	10YR 5/3	60	10YR 5/1	30	D	M	silty clay loam	
			7.5YR 5/8	10	C	M		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains - ²Location: PL=Lining, M=Matrix

Hydric Soil Indicators: ☐ Histosol (A1) ☐ Histic Epipedon (A2) ☐ Black Histic (A3) ☐ Hydrogen Sulfide (A4) ☐ Stratified Layers (A5) ☐ 2 cm Muck (A10) ☐ Depleted Below Dark Surface (A11) ☐ Thick Dark Surface (A12) ☐ Sandy Mucky Mineral (S1) ☐ 5 cm Mucky Peat or Peat (S3)	Indicators for Problematic Hydric Soils³: ☐ Sandy Gleyed Matrix (S4) ☐ Sandy Redox (S5) ☐ Stripped Matrix (S6) ☐ Loamy Mucky Material (F1) ☐ Loamy Gleyed Matrix (F2) ☐ Depleted Matrix (F3) ☐ Redox Dark Surface (F6) ☐ Depleted Dark Surface (F7) ☐ Redox Depressions (F8) ☐ Coast Prairie Redox (A16) ☐ Dark Surface (S7) ☐ Iron-Manganese Masses (F12) ☐ Very Shallow Dark Surface (TF12) ☐ Other (Explain in Remarks)
---	--

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? <u> No </u>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
☐ Surface Water (A1) ☐ High Water Table (A2) ☒ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Sparsely Vegetated Concave Surface (B8)	☐ Water-Stained Leaves (B9) ☐ Aquatic Fauna (B13) ☐ True Aquatic Plants (B14) ☐ Hydrogen Sulfide Odor (C1) ☐ Oxidized Rhizospheres on Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Thin Muck Surface (C7) ☐ Gauge or Well Data (D9) ☐ Other (Explain in Remarks)	☐ Surface Soil Cracks (B6) ☐ Drainage Patterns (B10) ☐ Moss Trim Lines (B16) ☐ Dry-Season Water Table (C2) ☐ Crayfish Burrows (C8) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Stunted or Stressed Plants (D1) ☐ Geomorphic Position (D2) ☐ FAC-Neutral Test (D5)	

Field Observations:			
Surface water present?	Yes <u> </u>	No <u> </u>	Depth (inches): <u> </u>
Water table present?	Yes <u> </u>	No <u> </u>	Depth (inches): <u> </u>
Saturation present? (includes capillary fringe)	Yes <u> </u>	No <u> </u>	Depth (inches): <u> 0 - 2 </u>
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: Saturation due to recent heavy rains and not considered a wetland hydrology indicator.			

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Deer Creek Shooting Range City/County: Putnam Sampling Date: 4/9/2015
 Applicant/Owner: August Mack Environmental State: Indiana Sampling Point: DP-2
 Investigator(s): R. Fangman, S. Brower Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): wide swale Local relief (concave, convex, none): concave Slope (%): 1
 Lat.: 39.548519° N Long.: 86.878211° W Datum: _____
 Soil Map Unit Name: CnD2 - Cincinnati silt loam, 12 to 18 percent slopes, eroded NWI Classification: _____
 Are climatic/hydrologic conditions of the site typical for this time of the year? Yes (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present?	<u>Yes</u>	Is the Sampled Area within a Wetland?	<u>No</u>
Hydric soil present?	<u>No</u>		
Wetland hydrology present?	<u>No</u>		

Remarks: (Explain alternative procedures here or in a separate report.)
 Heavy rain events within past week.

VEGETATION (Four Strata) -- Use scientific names of plants

Tree Stratum	Plot Size (30')	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
		0 =	Total Cover	

Sapling/Shrub Stratum	Plot Size (15')	Absolute % Cover	Dominant Species	Indicator Status
1	<u>Sambucus nigra</u>	30	Yes	FACW
2	<u>Rosa multiflora</u>	20	Yes	FACU
3				
4				
5				
		50 =	Total Cover	

Herb Stratum	Plot Size (5')	Absolute % Cover	Dominant Species	Indicator Status
1	<u>Agrostis gigantea</u>	80	Yes	FACW
2	<u>Solidago gigantea</u>	5	No	FACW
3	<u>Allium vineale</u>	5	No	FACU
4	<u>Galium sp.</u>	2	No	--
5				
6				
7				
8				
9				
10				
		92 =	Total Cover	

Woody Vine Stratum	Plot Size (30')	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
		=	Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)
 Total Number of Dominant Species Across all Strata: 3 (B)
 Percent of Dominant Species that are OBL, FACW, or FAC: 66.67% (A/B)

Prevalence Index Worksheet

Total % Cover of:
 OBL species _____ x 1 = _____
 FACW species _____ x 2 = _____
 FAC species _____ x 3 = _____
 FACU species _____ x 4 = _____
 UPL species _____ x 5 = _____
 Column totals _____ (A) _____ (B)
 Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid test for hydrophytic vegetation
 X 2 - Dominance test is >50%
 ____ 3 - Prevalence index is ≤3.0*
 ____ 4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)
 ____ Problematic hydrophytic vegetation¹ (explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							Sampling Point: DP-2	
Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 4	10YR 3/3	100					silty clay loam	
4 - 14	10YR 4/3	100					silty clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains - ²Location: PL=Lining, M=Matrix

Hydric Soil Indicators: ☐ Histosol (A1) ☐ Histic Epipedon (A2) ☐ Black Histic (A3) ☐ Hydrogen Sulfide (A4) ☐ Stratified Layers (A5) ☐ 2 cm Muck (A10) ☐ Depleted Below Dark Surface (A11) ☐ Thick Dark Surface (A12) ☐ Sandy Mucky Mineral (S1) ☐ 5 cm Mucky Peat or Peat (S3)	Indicators for Problematic Hydric Soils³: ☐ Sandy Gleyed Matrix (S4) ☐ Sandy Redox (S5) ☐ Stripped Matrix (S6) ☐ Loamy Mucky Material (F1) ☐ Loamy Gleyed Matrix (F2) ☐ Depleted Matrix (F3) ☐ Redox Dark Surface (F6) ☐ Depleted Dark Surface (F7) ☐ Redox Depressions (F8)	☐ Coast Prairie Redox (A16) ☐ Dark Surface (S7) ☐ Iron-Manganese Masses (F12) ☐ Very Shallow Dark Surface (TF12) ☐ Other (Explain in Remarks)
---	--	--

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? <u> No </u>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
☐ Surface Water (A1) ☐ High Water Table (A2) ☐ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Sparsely Vegetated Concave Surface (B8)	☐ Water-Stained Leaves (B9) ☐ Aquatic Fauna (B13) ☐ True Aquatic Plants (B14) ☐ Hydrogen Sulfide Odor (C1) ☐ Oxidized Rhizospheres on Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Thin Muck Surface (C7) ☐ Gauge or Well Data (D9) ☐ Other (Explain in Remarks)	☐ Surface Soil Cracks (B6) ☐ Drainage Patterns (B10) ☐ Moss Trim Lines (B16) ☐ Dry-Season Water Table (C2) ☐ Crayfish Burrows (C8) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Stunted or Stressed Plants (D1) ☐ Geomorphic Position (D2) ☐ FAC-Neutral Test (D5)	

Field Observations:					
Surface water present?	Yes ☐	No ☐	X ☒	Depth (inches): <u> NA </u>	Wetland Hydrology Present? <u> No </u>
Water table present?	Yes ☐	No ☐	X ☒	Depth (inches): <u> >14 </u>	
Saturation present? (includes capillary fringe)	Yes ☐	No ☐	X ☒	Depth (inches): <u> >14 </u>	
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:					
Remarks: Recent heavy rains.					

Project/Site:	Deer Creek Shooting Range		City/County:	Putnam	Sampling Date:	4/9/2015
Applicant/Owner:	August Mack Environmental		State:	Indiana	Sampling Point:	DP-3
Investigator(s):	R. Fangman, S. Brower		Section, Township, Range:			
Landform (hillslope, terrace, etc.):	hillcrest	Local relief (concave, convex, none):	concave		Slope (%):	2
Lat.: 39.549234° N	Long.: 86.877444° W	Datum:				
Soil Map Unit Name:	IvA - IvA silt loam, 0 to 2 percent slopes				NW1 Classification:	
Are climatic/hydrologic conditions of the site typical for this time of the year?			Yes (If no, explain in remarks)			
Are vegetation	soil	or hydrology	significantly disturbed?		Are "normal circumstances" present?	
Are vegetation	soil	or hydrology	naturally problematic?		Yes	
(If needed, explain any answers in remarks)						

Hydrophytic vegetation present?	<u>No</u>	Is the Sampled Area within a Wetland? <u>No</u>
Hydric soil present?	<u>No</u>	
Wetland hydrology present?	<u>No</u>	
Remarks: (Explain alternative procedures here or in a separate report.) Heavy rain events within past week.		

Tree Stratum					Plot Size (30')		Absolute % Cover	Dominant Species	Indicator Status
1									
2									
3									
4									
5									
					=	Total Cover			
Sapling/Shrub Stratum					Plot Size (15')		Absolute % Cover	Dominant Species	Indicator Status
1									
2									
3									
4									
5									
					=	Total Cover			
Herb Stratum					Plot Size (5')		Absolute % Cover	Dominant Species	Indicator Status
1	<i>Barbarea vulgaris</i>				40	Yes	FAC		
2	<i>Cardamine hirsuta</i>				20	Yes	FACU		
3	<i>Lamium purpureum</i>				15	No	UPL		
4	<i>Allium vineale</i>				5	No	FACU		
5	<i>Sorghum halepense</i>				5	No	FACU		
6	<i>Stellaria media</i>				5	No	FACU		
7	<i>Conyza canadensis</i>				5	No	UPL		
8									
9									
10									
					95	=	Total Cover		
Woody Vine Stratum					Plot Size (30')		Absolute % Cover	Dominant Species	Indicator Status
1									
2									
3									
4									
5									
					=	Total Cover			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across all Strata: 2 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 50.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species x 1 =

FACW species x 2 =

FAC species x 3 =

FACU species x 4 =

UPL species x 5 =

Column totals (A) (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

1 - Rapid test for hydrophytic vegetation

2 - Dominance test is >50%

3 - Prevalence index is ≤3.0*

4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)

Problematic hydrophytic vegetation¹ (explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? No

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							Sampling Point: DP-3	
Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 6	10YR 4/3	100					silty clay loam	
6 - 14	10YR 4/3	60	7.5YR 5/8	10	C	M	silty clay loam	
			10YR 5/1	30	D	M		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains - ²Location: PL=Lining, M=Matrix

Hydric Soil Indicators: ☐ Histosol (A1) ☐ Histic Epipedon (A2) ☐ Black Histic (A3) ☐ Hydrogen Sulfide (A4) ☐ Stratified Layers (A5) ☐ 2 cm Muck (A10) ☐ Depleted Below Dark Surface (A11) ☐ Thick Dark Surface (A12) ☐ Sandy Mucky Mineral (S1) ☐ 5 cm Mucky Peat or Peat (S3)	Indicators for Problematic Hydric Soils³: ☐ Sandy Gleyed Matrix (S4) ☐ Sandy Redox (S5) ☐ Stripped Matrix (S6) ☐ Loamy Mucky Material (F1) ☐ Loamy Gleyed Matrix (F2) ☐ Depleted Matrix (F3) ☐ Redox Dark Surface (F6) ☐ Depleted Dark Surface (F7) ☐ Redox Depressions (F8) ☐ Coast Prairie Redox (A16) ☐ Dark Surface (S7) ☐ Iron-Manganese Masses (F12) ☐ Very Shallow Dark Surface (TF12) ☐ Other (Explain in Remarks)
---	--

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? <u> No </u>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
☐ Surface Water (A1) ☐ High Water Table (A2) ☐ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Sparsely Vegetated Concave Surface (B8)	☐ Water-Stained Leaves (B9) ☐ Aquatic Fauna (B13) ☐ True Aquatic Plants (B14) ☐ Hydrogen Sulfide Odor (C1) ☐ Oxidized Rhizospheres on Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Thin Muck Surface (C7) ☐ Gauge or Well Data (D9) ☐ Other (Explain in Remarks)	☐ Surface Soil Cracks (B6) ☐ Drainage Patterns (B10) ☐ Moss Trim Lines (B16) ☐ Dry-Season Water Table (C2) ☐ Crayfish Burrows (C8) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Stunted or Stressed Plants (D1) ☐ Geomorphic Position (D2) ☐ FAC-Neutral Test (D5)	

Field Observations:			
Surface water present?	Yes	<u> X </u>	No
Water table present?	Yes	<u> </u>	No
Saturation present?	Yes	<u> </u>	No
(includes capillary fringe)			
Depth (inches):	<u> 1 </u>		
Depth (inches):	<u> >14 </u>		
Depth (inches):	<u> >14 </u>		
Wetland Hydrology Present? <u> No </u>			
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: Surface water present due to recent heavy rain events and not considered a wetland hydrology indicator.			

Project/Site:	Deer Creek Shooting Range			City/County:	Putnam	Sampling Date:	4/9/2015
Applicant/Owner:	August Mack Environmental			State:	Indiana	Sampling Point:	DP-4
Investigator(s):	R. Fangman, S. Brower			Section, Township, Range:			
Landform (hillslope, terrace, etc.):	hillcrest		Local relief (concave, convex, none):	concave		Slope (%):	2
Lat.: 39.548578° N	Long.: 86.875109° W		Datum:				
Soil Map Unit Name:	GrC2 - Grayford silt loam, 6 to 12 percent slopes, eroded					NWI Classification:	
Are climatic/hydrologic conditions of the site typical for this time of the year?				Yes (If no, explain in remarks)			
Are vegetation	soil	or hydrology	significantly disturbed?	Are "normal circumstances" present?			
Are vegetation	soil	or hydrology	naturally problematic?	Yes			
(If needed, explain any answers in remarks)							

Hydrophytic vegetation present?	<u>No</u>	Is the Sampled Area within a Wetland? <u>No</u>
Hydric soil present?	<u>No</u>	
Wetland hydrology present?	<u>No</u>	
Remarks: (Explain alternative procedures here or in a separate report.) Heavy rain events within past week.		

Tree Stratum	Plot Size (30')	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
		=	Total Cover	

Sapling/Shrub Stratum	Plot Size (15')	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
		=	Total Cover	

Herb Stratum	Plot Size (5')	Absolute % Cover	Dominant Species	Indicator Status
1	<i>Cardamine hirsuta</i>	30	Yes	FACU
2	<i>Ranunculus abortivus</i>	20	Yes	FACW
3	<i>Glycine max</i>	20	Yes	UPL
4	<i>Lamium purpureum</i>	15	No	UPL
5	<i>Trifolium repens</i>	10	No	FACU
6	<i>Barbarea vulgaris</i>	5	No	FAC
7	<i>Amaranthus sp.</i>	5	No	--
8				
9				
10				
		105 =	Total Cover	

Woody Vine Stratum	Plot Size (30')	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
		=	Total Cover	

Dominance Test Worksheet	
Number of Dominant Species that are OBL, FACW, or FAC:	1 (A)
Total Number of Dominant Species Across all Strata:	3 (B)
Percent of Dominant Species that are OBL, FACW, or FAC:	33.33% (A/B)

Prevalence Index Worksheet	
Total % Cover of:	
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column totals	(A) (B)
Prevalence Index = B/A =	

Hydrophytic Vegetation Indicators:	
1 - Rapid test for hydrophytic vegetation	
2 - Dominance test is >50%	
3 - Prevalence index is ≤3.0*	
4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)	
Problematic hydrophytic vegetation ¹ (explain)	
¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic	
Hydrophytic Vegetation Present?	No

Midwest Region - Version 2.0

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							Sampling Point: DP-4	
Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 4	10YR 4/3	100					silty clay loam	
4 - 14	10YR 4/4	75	10YR 5/1	5	D	M	silty clay loam	
			7.5YR 2.5/1	10	D	M		
			7.5YR 5/8	10	C	M		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains - ²Location: PL=Lining, M=Matrix

Hydric Soil Indicators: ☐ Histosol (A1) ☐ Histic Epipedon (A2) ☐ Black Histic (A3) ☐ Hydrogen Sulfide (A4) ☐ Stratified Layers (A5) ☐ 2 cm Muck (A10) ☐ Depleted Below Dark Surface (A11) ☐ Thick Dark Surface (A12) ☐ Sandy Mucky Mineral (S1) ☐ 5 cm Mucky Peat or Peat (S3)	Indicators for Problematic Hydric Soils³: ☐ Sandy Gleyed Matrix (S4) ☐ Sandy Redox (S5) ☐ Stripped Matrix (S6) ☐ Loamy Mucky Material (F1) ☐ Loamy Gleyed Matrix (F2) ☐ Depleted Matrix (F3) ☐ Redox Dark Surface (F6) ☐ Depleted Dark Surface (F7) ☐ Redox Depressions (F8)	☐ Coast Prairie Redox (A16) ☐ Dark Surface (S7) ☐ Iron-Manganese Masses (F12) ☐ Very Shallow Dark Surface (TF12) ☐ Other (Explain in Remarks)
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³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? <u> No </u>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
☐ Surface Water (A1) ☐ High Water Table (A2) ☐ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Sparsely Vegetated Concave Surface (B8)	☐ Water-Stained Leaves (B9) ☐ Aquatic Fauna (B13) ☐ True Aquatic Plants (B14) ☐ Hydrogen Sulfide Odor (C1) ☐ Oxidized Rhizospheres on Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Thin Muck Surface (C7) ☐ Gauge or Well Data (D9) ☐ Other (Explain in Remarks)	☐ Surface Soil Cracks (B6) ☐ Drainage Patterns (B10) ☐ Moss Trim Lines (B16) ☐ Dry-Season Water Table (C2) ☐ Crayfish Burrows (C8) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Stunted or Stressed Plants (D1) ☐ Geomorphic Position (D2) ☐ FAC-Neutral Test (D5)	

Field Observations:					
Surface water present?	Yes ☐	No ☐	X ☒	Depth (inches): <u> NA </u>	Wetland Hydrology Present? <u> No </u>
Water table present?	Yes ☐	No ☐	X ☒	Depth (inches): <u> >14 </u>	
Saturation present?	Yes ☐	No ☐	X ☒	Depth (inches): <u> >14 </u>	
(includes capillary fringe)					
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:					
Remarks:					

Recent heavy rains.

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Deer Creek Shooting Range City/County: Putnam Sampling Date: 5/6/2015
 Applicant/Owner: August Mack Environmental State: Indiana Sampling Point: DP-5
 Investigator(s): R. Fangman, J. Day Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 1
 Lat.: 39.548998° N Long.: 86.878730° W Datum: _____
 Soil Map Unit Name: CnD2 - Cincinnati silt loam, 12 to 18 percent slopes, eroded NWI Classification: _____
 Are climatic/hydrologic conditions of the site typical for this time of the year? Yes (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present?	<u>No</u>	Is the Sampled Area within a Wetland?	<u>No</u>
Hydric soil present?	<u>No</u>		
Wetland hydrology present?	<u>No</u>		
Remarks: (Explain alternative procedures here or in a separate report.)			

VEGETATION (Four Strata) -- Use scientific names of plants

Tree Stratum					Plot Size (30')		Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across all Strata: <u>4</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>50.00%</u> (A/B)
1										
2										
3										
4										
5										
						=	Total Cover			
Sapling/Shrub Stratum					Plot Size (15')		Absolute % Cover	Dominant Species	Indicator Status	Prevalence Index Worksheet Total % Cover of: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column totals _____ (A) _____ (B) Prevalence Index = B/A = _____
1	<u>Sambucus nigra</u>				15		Yes	FACW		
2	<u>Rubus occidentalis</u>				15		Yes	UPL		
3										
4										
5										
					30	=	Total Cover			
Herb Stratum					Plot Size (5')		Absolute % Cover	Dominant Species	Indicator Status	Hydrophytic Vegetation Indicators: _____ 1 - Rapid test for hydrophytic vegetation _____ 2 - Dominance test is >50% _____ 3 - Prevalence index is ≤3.0* _____ 4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) _____ Problematic hydrophytic vegetation ¹ (explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic Hydrophytic Vegetation Present? <u>No</u>
1	<u>Geranium maculatum</u>				25		Yes	FACU		
2	<u>Ambrosia trifida</u>				20		Yes	FAC		
3	<u>Lamium purpureum</u>				10		No	UPL		
4	<u>Galium aparine</u>				5		No	FACU		
5	<u>Trifolium repens</u>				5		No	FACU		
6										
7										
8										
9										
10										
					65	=	Total Cover			
Woody Vine Stratum					Plot Size (30')		Absolute % Cover	Dominant Species	Indicator Status	
1										
2										
3										
4										
5										
						=	Total Cover			

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							Sampling Point: DP-5	
Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 4	10YR 3/3	100					silt loam	
4 - 14	10YR 4/4	60	10YR 4/4	40	D	M	silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains - ²Location: PL=Lining, M=Matrix

Hydric Soil Indicators: ☐ Histosol (A1) ☐ Histic Epipedon (A2) ☐ Black Histic (A3) ☐ Hydrogen Sulfide (A4) ☐ Stratified Layers (A5) ☐ 2 cm Muck (A10) ☐ Depleted Below Dark Surface (A11) ☐ Thick Dark Surface (A12) ☐ Sandy Mucky Mineral (S1) ☐ 5 cm Mucky Peat or Peat (S3)	Indicators for Problematic Hydric Soils³: ☐ Sandy Gleyed Matrix (S4) ☐ Sandy Redox (S5) ☐ Stripped Matrix (S6) ☐ Loamy Mucky Material (F1) ☐ Loamy Gleyed Matrix (F2) ☐ Depleted Matrix (F3) ☐ Redox Dark Surface (F6) ☐ Depleted Dark Surface (F7) ☐ Redox Depressions (F8) ☐ Coast Prairie Redox (A16) ☐ Dark Surface (S7) ☐ Iron-Manganese Masses (F12) ☐ Very Shallow Dark Surface (TF12) ☐ Other (Explain in Remarks)
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³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? <u> No </u>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
☐ Surface Water (A1) ☐ High Water Table (A2) ☐ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Sparsely Vegetated Concave Surface (B8)	☐ Water-Stained Leaves (B9) ☐ Aquatic Fauna (B13) ☐ True Aquatic Plants (B14) ☐ Hydrogen Sulfide Odor (C1) ☐ Oxidized Rhizospheres on Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Thin Muck Surface (C7) ☐ Gauge or Well Data (D9) ☐ Other (Explain in Remarks)	☐ Surface Soil Cracks (B6) ☐ Drainage Patterns (B10) ☐ Moss Trim Lines (B16) ☐ Dry-Season Water Table (C2) ☐ Crayfish Burrows (C8) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Stunted or Stressed Plants (D1) ☐ Geomorphic Position (D2) ☐ FAC-Neutral Test (D5)	

Field Observations:					
Surface water present?	Yes ☐	No ☐	X ☒	Depth (inches): <u> NA </u>	Wetland Hydrology Present? <u> No </u>
Water table present?	Yes ☐	No ☐	X ☒	Depth (inches): <u> >14 </u>	
Saturation present?	Yes ☐	No ☐	X ☒	Depth (inches): <u> >14 </u>	
(includes capillary fringe)					
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:					
Remarks:					

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Deer Creek Shooting Range City/County: Putnam Sampling Date: 5/6/2015
 Applicant/Owner: August Mack Environmental State: Indiana Sampling Point: DP-6
 Investigator(s): R. Fangman, J. Day Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave Slope (%): 2
 Lat.: 39.550487° N Long.: 86.877903° W Datum: _____
 Soil Map Unit Name: CnC2 - Cincinnati silt loam, 6 to 12 percent slopes, eroded NWI Classification: _____
 Are climatic/hydrologic conditions of the site typical for this time of the year? Yes (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present?	<u>Yes</u>	Is the Sampled Area within a Wetland?	<u>Yes</u>
Hydric soil present?	<u>Yes</u>		
Wetland hydrology present?	<u>Yes</u>		
Remarks: (Explain alternative procedures here or in a separate report.)			

VEGETATION (Four Strata) -- Use scientific names of plants

Tree Stratum					Plot Size (30')		Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>100.00%</u> (A/B)
1										
2										
3										
4										
5										
						=	Total Cover			
Sapling/Shrub Stratum					Plot Size (15')		Absolute % Cover	Dominant Species	Indicator Status	Prevalence Index Worksheet Total % Cover of: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column totals _____ (A) _____ (B) Prevalence Index = B/A = _____
1										
2										
3										
4										
5										
						=	Total Cover			
Herb Stratum					Plot Size (5')		Absolute % Cover	Dominant Species	Indicator Status	Hydrophytic Vegetation Indicators: _____ 1 - Rapid test for hydrophytic vegetation X 2 - Dominance test is >50% _____ 3 - Prevalence index is ≤3.0* _____ 4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) _____ Problematic hydrophytic vegetation ¹ (explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic Hydrophytic Vegetation Present? <u>Yes</u>
1	<i>Typha latifolia</i>									
2	<i>Ludwigia peploides</i>									
3	<i>Barbarea vulgaris</i>									
4										
5										
6										
7										
8										
9										
10										
						=	Total Cover			
Woody Vine Stratum					Plot Size (30')		Absolute % Cover	Dominant Species	Indicator Status	
1										
2										
3										
4										
5										
						=	Total Cover			

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							Sampling Point: DP-6	
Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 14	2.5Y 5/2	80	7.5YR 4/6	20	D	M	silty clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains - ²Location: PL=Lining, M=Matrix

Hydric Soil Indicators: ☐ Histosol (A1) ☐ Histic Epipedon (A2) ☐ Black Histic (A3) ☐ Hydrogen Sulfide (A4) ☐ Stratified Layers (A5) ☐ 2 cm Muck (A10) ☐ Depleted Below Dark Surface (A11) ☐ Thick Dark Surface (A12) ☐ Sandy Mucky Mineral (S1) ☐ 5 cm Mucky Peat or Peat (S3)	Indicators for Problematic Hydric Soils³: ☐ Sandy Gleyed Matrix (S4) ☐ Sandy Redox (S5) ☐ Stripped Matrix (S6) ☐ Loamy Mucky Material (F1) ☐ Loamy Gleyed Matrix (F2) ☐ Depleted Matrix (F3) ☐ Redox Dark Surface (F6) ☐ Depleted Dark Surface (F7) ☐ Redox Depressions (F8) ☐ Coast Prairie Redox (A16) ☐ Dark Surface (S7) ☐ Iron-Manganese Masses (F12) ☐ Very Shallow Dark Surface (TF12) ☐ Other (Explain in Remarks)
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³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? <u>Yes</u>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
☐ Surface Water (A1) ☐ High Water Table (A2) ☒ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Sparsely Vegetated Concave Surface (B8)	☐ Water-Stained Leaves (B9) ☐ Aquatic Fauna (B13) ☐ True Aquatic Plants (B14) ☐ Hydrogen Sulfide Odor (C1) ☐ Oxidized Rhizospheres on Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Thin Muck Surface (C7) ☐ Gauge or Well Data (D9) ☐ Other (Explain in Remarks)	☐ Surface Soil Cracks (B6) ☐ Drainage Patterns (B10) ☐ Moss Trim Lines (B16) ☐ Dry-Season Water Table (C2) ☐ Crayfish Burrows (C8) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Stunted or Stressed Plants (D1) ☐ Geomorphic Position (D2) ☐ FAC-Neutral Test (D5)	

Field Observations:			
Surface water present?	Yes ☐	No ☒	Depth (inches): <u>NA</u>
Water table present?	Yes ☐	No ☒	Depth (inches): <u>>14</u>
Saturation present?	Yes ☐	No ☒	Depth (inches): <u>0 - 5</u>
(includes capillary fringe)			
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks:			

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Deer Creek Shooting Range City/County: Putnam Sampling Date: 5/6/2015
 Applicant/Owner: August Mack Environmental State: Indiana Sampling Point: DP-7
 Investigator(s): R. Fangman, J. Day Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): none Slope (%): _____
 Lat.: 39.550417° N Long.: 86.877940° W Datum: _____
 Soil Map Unit Name: IvA - Iva silt loam, 0 to 2 percent slopes NWI Classification: _____
 Are climatic/hydrologic conditions of the site typical for this time of the year? Yes (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? _____ Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present?	<u>No</u>	Is the Sampled Area within a Wetland?	<u>No</u>
Hydric soil present?	<u>No</u>		
Wetland hydrology present?	<u>No</u>		
Remarks: (Explain alternative procedures here or in a separate report.)			

VEGETATION (Four Strata) -- Use scientific names of plants

Tree Stratum					Plot Size (30')		Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet Number of Dominant Species that are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across all Strata: <u>1</u> (B) Percent of Dominant Species that are OBL, FACW, or FAC: <u>0.00%</u> (A/B)
1										
2										
3										
4										
5										
						=	Total Cover			
Sapling/Shrub Stratum					Plot Size (15')		Absolute % Cover	Dominant Species	Indicator Status	Prevalence Index Worksheet Total % Cover of: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column totals _____ (A) _____ (B) Prevalence Index = B/A = _____
1										
2										
3										
4										
5										
						=	Total Cover			
Herb Stratum					Plot Size (5')		Absolute % Cover	Dominant Species	Indicator Status	Hydrophytic Vegetation Indicators: _____ 1 - Rapid test for hydrophytic vegetation _____ 2 - Dominance test is >50% _____ 3 - Prevalence index is ≤3.0* _____ 4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet) _____ Problematic hydrophytic vegetation ¹ (explain) _____ ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic Hydrophytic Vegetation Present? <u>No</u>
1	<i>Stellaria media</i>		75	Yes	FACU					
2	<i>Lamium purpureum</i>		10	No	UPL					
3	<i>Trifolium repens</i>		5	No	FACU					
4	<i>Barbarea vulgaris</i>		2	No	FAC					
5	<i>Solidago canadensis</i>		2	No	FACU					
6	<i>Taraxacum officinale</i>		2	No	FACU					
7										
8										
9										
10										
						=	Total Cover	96		
Woody Vine Stratum					Plot Size (30')		Absolute % Cover	Dominant Species	Indicator Status	
1										
2										
3										
4										
5										
						=	Total Cover			

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							Sampling Point: DP-7	
Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-14	10YR 4/3	70	10YR 5/4	30	D	M	silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains - ²Location: PL=Lining, M=Matrix

Hydric Soil Indicators: ☐ Histosol (A1) ☐ Histic Epipedon (A2) ☐ Black Histic (A3) ☐ Hydrogen Sulfide (A4) ☐ Stratified Layers (A5) ☐ 2 cm Muck (A10) ☐ Depleted Below Dark Surface (A11) ☐ Thick Dark Surface (A12) ☐ Sandy Mucky Mineral (S1) ☐ 5 cm Mucky Peat or Peat (S3)	Indicators for Problematic Hydric Soils³: ☐ Sandy Gleyed Matrix (S4) ☐ Sandy Redox (S5) ☐ Stripped Matrix (S6) ☐ Loamy Mucky Material (F1) ☐ Loamy Gleyed Matrix (F2) ☐ Depleted Matrix (F3) ☐ Redox Dark Surface (F6) ☐ Depleted Dark Surface (F7) ☐ Redox Depressions (F8) ☐ Coast Prairie Redox (A16) ☐ Dark Surface (S7) ☐ Iron-Manganese Masses (F12) ☐ Very Shallow Dark Surface (TF12) ☐ Other (Explain in Remarks)
---	--

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? <u> No </u>
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Remarks:

HYDROLOGY

Wetland Hydrology Indicators			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
☐ Surface Water (A1) ☐ High Water Table (A2) ☐ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Sparsely Vegetated Concave Surface (B8)	☐ Water-Stained Leaves (B9) ☐ Aquatic Fauna (B13) ☐ True Aquatic Plants (B14) ☐ Hydrogen Sulfide Odor (C1) ☐ Oxidized Rhizospheres on Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Thin Muck Surface (C7) ☐ Gauge or Well Data (D9) ☐ Other (Explain in Remarks)	☐ Surface Soil Cracks (B6) ☐ Drainage Patterns (B10) ☐ Moss Trim Lines (B16) ☐ Dry-Season Water Table (C2) ☐ Crayfish Burrows (C8) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Stunted or Stressed Plants (D1) ☐ Geomorphic Position (D2) ☐ FAC-Neutral Test (D5)	

Field Observations:					
Surface water present?	Yes ☐	No ☐	X ☒	Depth (inches): <u> NA </u>	Wetland Hydrology Present? <u> No </u>
Water table present?	Yes ☐	No ☐	X ☒	Depth (inches): <u> >14 </u>	
Saturation present?	Yes ☐	No ☐	X ☒	Depth (inches): <u> >14 </u>	
(includes capillary fringe)					

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Deer Creek Shooting Range City/County: Putnam Sampling Date: 5/6/2015
 Applicant/Owner: August Mack Environmental State: Indiana Sampling Point: DP-8
 Investigator(s): R. Fangman, J. Day Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): none Slope (%): _____
 Lat.: 39.549676° N Long.: 86.877380° W Datum: _____
 Soil Map Unit Name: CnD2 - Cincinnati silt loam, 12 to 18 percent slopes, eroded NWI Classification: _____
 Are climatic/hydrologic conditions of the site typical for this time of the year? Yes (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present?	<u>No</u>	Is the Sampled Area within a Wetland?	<u>No</u>
Hydric soil present?	<u>Yes</u>		
Wetland hydrology present?	<u>No</u>		
Remarks: (Explain alternative procedures here or in a separate report.)			

VEGETATION (Four Strata) -- Use scientific names of plants

Tree Stratum	Plot Size (30')	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
		=	Total Cover	
Sapling/Shrub Stratum	Plot Size (15')	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
		=	Total Cover	
Herb Stratum	Plot Size (5')	Absolute % Cover	Dominant Species	Indicator Status
1	<u>Solidago altissima</u>	<u>40</u>	<u>Yes</u>	<u>FACU</u>
2	<u>Impatiens capensis</u>	<u>15</u>	<u>No</u>	<u>FACW</u>
3	<u>Barbarea vulgaris</u>	<u>10</u>	<u>No</u>	<u>FAC</u>
4	<u>Cirsium vulgare</u>	<u>10</u>	<u>No</u>	<u>FACU</u>
5	<u>Ambrosia trifida</u>	<u>5</u>	<u>No</u>	<u>FAC</u>
6				
7				
8				
9				
10				
		<u>80</u>	=	Total Cover
Woody Vine Stratum	Plot Size (30')	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
		=	Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)
 Total Number of Dominant Species Across all Strata: 1 (B)
 Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:
 OBL species _____ x 1 = _____
 FACW species _____ x 2 = _____
 FAC species _____ x 3 = _____
 FACU species _____ x 4 = _____
 UPL species _____ x 5 = _____
 Column totals _____ (A) _____ (B)
 Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid test for hydrophytic vegetation
 ____ 2 - Dominance test is >50%
 ____ 3 - Prevalence index is ≤3.0*
 ____ 4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)
 ____ Problematic hydrophytic vegetation¹ (explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? No

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							Sampling Point: DP-8	
Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 3	10YR 3/2	100					silty clay loam	
3 - 14	2.5Y 4/2	85	7.5YR 4/6	15	D	M	silty clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains - ²Location: PL=Lining, M=Matrix

Hydric Soil Indicators: ☐ Histosol (A1) ☐ Histic Epipedon (A2) ☐ Black Histic (A3) ☐ Hydrogen Sulfide (A4) ☐ Stratified Layers (A5) ☐ 2 cm Muck (A10) ☐ Depleted Below Dark Surface (A11) ☐ Thick Dark Surface (A12) ☐ Sandy Mucky Mineral (S1) ☐ 5 cm Mucky Peat or Peat (S3)	Indicators for Problematic Hydric Soils³: ☐ Sandy Gleyed Matrix (S4) ☐ Sandy Redox (S5) ☐ Stripped Matrix (S6) ☐ Loamy Mucky Material (F1) ☐ Loamy Gleyed Matrix (F2) ☐ Depleted Matrix (F3) ☐ Redox Dark Surface (F6) ☐ Depleted Dark Surface (F7) ☐ Redox Depressions (F8) ☐ Coast Prairie Redox (A16) ☐ Dark Surface (S7) ☐ Iron-Manganese Masses (F12) ☐ Very Shallow Dark Surface (TF12) ☐ Other (Explain in Remarks)
---	--

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? <u> No </u>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
☐ Surface Water (A1) ☐ High Water Table (A2) ☐ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Sparsely Vegetated Concave Surface (B8)	☐ Water-Stained Leaves (B9) ☐ Aquatic Fauna (B13) ☐ True Aquatic Plants (B14) ☐ Hydrogen Sulfide Odor (C1) ☐ Oxidized Rhizospheres on Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Thin Muck Surface (C7) ☐ Gauge or Well Data (D9) ☐ Other (Explain in Remarks)	☐ Surface Soil Cracks (B6) ☐ Drainage Patterns (B10) ☐ Moss Trim Lines (B16) ☐ Dry-Season Water Table (C2) ☐ Crayfish Burrows (C8) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Stunted or Stressed Plants (D1) ☐ Geomorphic Position (D2) ☐ FAC-Neutral Test (D5)	

Field Observations:					
Surface water present?	Yes ☐	No ☐	X ☒	Depth (inches): <u> NA </u>	Wetland Hydrology Present? <u> Yes </u>
Water table present?	Yes ☐	No ☐	X ☒	Depth (inches): <u> >14 </u>	
Saturation present?	Yes ☐	No ☐	X ☒	Depth (inches): <u> >14 </u>	
(includes capillary fringe)					
Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:					
Remarks:					

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: Deer Creek Shooting Range City/County: Putnam Sampling Date: 5/6/2015
 Applicant/Owner: August Mack Environmental State: Indiana Sampling Point: DP-9
 Investigator(s): R. Fangman, J. Day Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): concave Slope (%): 1
 Lat.: 39.549632° N Long.: 86.877388° W Datum: _____
 Soil Map Unit Name: CnD2 - Cincinnati silt loam, 12 to 18 percent slopes, eroded NWI Classification: _____
 Are climatic/hydrologic conditions of the site typical for this time of the year? Yes (If no, explain in remarks)
 Are vegetation _____, soil _____, or hydrology _____ significantly disturbed? Are "normal circumstances" present? Yes
 Are vegetation _____, soil _____, or hydrology _____ naturally problematic? (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present?	<u>Yes</u>	Is the Sampled Area within a Wetland?	<u>Yes</u>
Hydric soil present?	<u>Yes</u>		
Wetland hydrology present?	<u>Yes</u>		
Remarks: (Explain alternative procedures here or in a separate report.)			

VEGETATION (Four Strata) -- Use scientific names of plants

Tree Stratum					Plot Size (30')		Absolute % Cover	Dominant Species	Indicator Status	Dominance Test Worksheet	
1										Number of Dominant Species that are OBL, FACW, or FAC:	<u>2</u> (A)
2										Total Number of Dominant Species Across all Strata:	<u>2</u> (B)
3										Percent of Dominant Species that are OBL, FACW, or FAC:	<u>100.00%</u> (A/B)
4											
5											
						=	Total Cover				
Sapling/Shrub Stratum					Plot Size (15')		Absolute % Cover	Dominant Species	Indicator Status	Prevalence Index Worksheet	
1										Total % Cover of:	
2										OBL species	<u> </u> x 1 = <u> </u>
3										FACW species	<u> </u> x 2 = <u> </u>
4										FAC species	<u> </u> x 3 = <u> </u>
5										FACU species	<u> </u> x 4 = <u> </u>
						=	Total Cover			UPL species	<u> </u> x 5 = <u> </u>
										Column totals	<u> </u> (A) <u> </u> (B)
										Prevalence Index = B/A =	<u> </u>
Herb Stratum					Plot Size (5')		Absolute % Cover	Dominant Species	Indicator Status	Hydrophytic Vegetation Indicators:	
1	<i>Poa palustris</i>					80	Yes	FACW		<u> </u> 1 - Rapid test for hydrophytic vegetation	
2	<i>Impatiens capensis</i>					20	Yes	FACW		<u>X</u> 2 - Dominance test is >50%	
3										<u> </u> 3 - Prevalence index is ≤3.0*	
4										<u> </u> 4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)	
5										<u> </u> Problematic hydrophytic vegetation ¹ (explain)	
6											
7											
8											
9											
10											
						100	=	Total Cover			
Woody Vine Stratum					Plot Size (30')		Absolute % Cover	Dominant Species	Indicator Status	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic	
1										Hydrophytic Vegetation Present?	<u>Yes</u>
2											
3											
4											
5											
						=	Total Cover				

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							Sampling Point: DP-9	
Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 14	10YR 5/2	90	7.5YR 5/6	10	D	M	silty clay loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains - ²Location: PL=Lining, M=Matrix

Hydric Soil Indicators: ☐ Histosol (A1) ☐ Histic Epipedon (A2) ☐ Black Histic (A3) ☐ Hydrogen Sulfide (A4) ☐ Stratified Layers (A5) ☐ 2 cm Muck (A10) ☐ Depleted Below Dark Surface (A11) ☐ Thick Dark Surface (A12) ☐ Sandy Mucky Mineral (S1) ☐ 5 cm Mucky Peat or Peat (S3)	Indicators for Problematic Hydric Soils³: ☐ Sandy Gleyed Matrix (S4) ☐ Sandy Redox (S5) ☐ Stripped Matrix (S6) ☐ Loamy Mucky Material (F1) ☐ Loamy Gleyed Matrix (F2) ☐ Depleted Matrix (F3) ☐ Redox Dark Surface (F6) ☐ Depleted Dark Surface (F7) ☐ Redox Depressions (F8) ☐ Coast Prairie Redox (A16) ☐ Dark Surface (S7) ☐ Iron-Manganese Masses (F12) ☐ Very Shallow Dark Surface (TF12) ☐ Other (Explain in Remarks)
---	--

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? <u>Yes</u>
---	--

Remarks:

HYDROLOGY

Wetland Hydrology Indicators			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (minimum of two required)	
☐ Surface Water (A1) ☐ High Water Table (A2) ☒ Saturation (A3) ☐ Water Marks (B1) ☐ Sediment Deposits (B2) ☐ Drift Deposits (B3) ☐ Algal Mat or Crust (B4) ☐ Iron Deposits (B5) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Sparsely Vegetated Concave Surface (B8)	☐ Water-Stained Leaves (B9) ☐ Aquatic Fauna (B13) ☐ True Aquatic Plants (B14) ☐ Hydrogen Sulfide Odor (C1) ☒ Oxidized Rhizospheres on Living Roots (C3) ☐ Presence of Reduced Iron (C4) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Thin Muck Surface (C7) ☐ Gauge or Well Data (D9) ☐ Other (Explain in Remarks)	☐ Surface Soil Cracks (B6) ☐ Drainage Patterns (B10) ☐ Moss Trim Lines (B16) ☐ Dry-Season Water Table (C2) ☐ Crayfish Burrows (C8) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Stunted or Stressed Plants (D1) ☐ Geomorphic Position (D2) ☐ FAC-Neutral Test (D5)	

Field Observations:			
Surface water present?	Yes ☐	No ☒	Depth (inches): <u>NA</u>
Water table present?	Yes ☐	No ☒	Depth (inches): <u>>14</u>
Saturation present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): <u>0 - 14</u>

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX B

RAPID BIOASSESSMENT PROTOCOL FORMS

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: Intermittent Stream 1				LOCATION: Deer Creek Shooting Range			
STATION #: RBP 1				COUNTY: Putnam, Indiana		PROJECT: 15-018	
INVESTIGATORS: R. Fangman, J. Day				DATE: 5/6/2015		TIME: 11:45	
Verify Site LAT/LONG vs GPS Yes ☒ No ☐ N/A ☐				CANOPY COVER::		STREAM TYPE:	
				Fully Exposed (0-25%) ☒		Perennial ☐	
				Partially Exposed (25-50%) ☐		Ephemeral ☐	
				Partially Shaded (50-75%) ☐		Intermittent ☒	
				Fully Shaded (75-100%) ☐			
WEATHER				LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):			
Now Past 24 hours							
Has there been a scouring rain in the last 14 days?				Surface Mining ☐ Construction ☐ Forest ☒			
				Deep Mining ☐ Commercial ☐ Pasture/Grazing ☐			
				Oil Wells ☐ Industrial ☐ Silviculture ☐			
Yes ☐				Land Disposal ☐ Row Crops ☒ Urban Runoff/Storm Sewers ☐			
No ☒				Residential ☐			
INSTREAM FEATURES				HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width 2 - 3 ft				Dams ☐		Trees ☐ Herbaceous ☒	
Maximum Depth 0.1 ft				Bridge Abutments ☐		Grasses ☒ Shrubs ☒	
Reach Length 5 m				Island ☐		Dom. Tree/Shrub Taxa:	
Discharge -- cfs				Waterfalls ☐		Green Ash	
				Other: ☐		Spicebush	
Riffle/Run/Pool Sequence (No. Sampled in Reach)				2 Riffle 1 Run Pool			
P-CHEM Instrument Used:				Date Calibrated:			
Temp(°F) D.O. (mg/l) %Saturation pH(S.U.) Cond. Turb.							

Substrate Characterization						
Substrate	Est.	P.C.	Riffle <u>50</u> %	Run <u>50</u> %	Pool _____ %	Reach Total
Silt/Clay (<0.06 mm)			X	X		
Sand (0.06 – 2 mm)						
Gravel (2 – 64 mm)			X	X		
Cobble (64 – 256 mm)			X	X		
Boulders (>256 mm)						
Bedrock						

NOTES/COMMENTS:				
Bluegrass Bioregion (High Gradient Assessments)		Headwater (<5.0 mi ²)	Wadeable (>5.0 mi ²)	
Fully Supporting	(Excellent)	156-200	130-200	
Supporting but Threatened and Partially Supporting	(Average)	142-155	114-129	
Not Supporting	(Poor)	0-141	0-113	
Kentucky Division of Water's "Methods for Assessing Habitat in Wadeable Waters" (2011) (Revision 1)				

Project Name: Deer Creek Shooting Range										Stream Name: Intermittent Stream 1																																									
RBP High Gradient Habitat																																																			
Habitat Parameter		Condition Category																																																	
		Optimal					Suboptimal					Marginal					Poor																																		
SCORE		20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																														
1. Epifaunal Substrate/ Available Cover		Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.																																		
10																																																			
Score																																																			
2. Embeddedness		Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.																																		
12																																																			
Score																																																			
3. Velocity/Depth Regime		All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/ depth regime (usually slow-deep).																																		
10																																																			
Score																																																			
4. Sediment Deposition		Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.																																		
14																																																			
Score																																																			
5. Channel Flow Status		Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.																																		
8																																																			
Score																																																			
6. Channel Alteration		Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.																																		
18																																																			
Score																																																			
7. Frequency of Riffles (or bends)		Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.																																		
17																																																			
Score																																																			
Left/Right Bank		10					9					8					7					6					5					4					3					2					1				
8. Bank Stability		Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.																																		
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7 RB																																																			
9. Vegetative Protection		More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.																																		
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6 RB																																																			
10. Riparian Vegetative Zone Width		Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clearcuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.																																		
2 LB																																																			
2 RB																																																			
Total Score		NOTES/COMMENTS: Poor Quality																																																	
119																																																			

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: Intermittent Stream 2				LOCATION: Deer Creek Shooting Range			
STATION #: RBP 2				COUNTY: Putnam, Indiana		PROJECT: 15-018	
INVESTIGATORS: R. Fangman, J. Day				DATE: 5/6/2015		TIME: 11:32 AM ☒ PM ☐	
Verify Site LAT/LONG vs GPS Yes ☒ No ☐ N/A ☐				CANOPY COVER::		STREAM TYPE:	
				Fully Exposed (0-25%) ☐		Perennial ☐	
				Partially Exposed (25-50%) ☒		Ephemeral ☐	
				Partially Shaded (50-75%) ☐		Intermittent ☒	
				Fully Shaded (75-100%) ☐			
LAT		39.549994° N					
LONG		86.879244° W					
WEATHER				LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):			
Now		Past 24 hours					
Has there been a scouring rain in the last 14 days?		Heavy rain		Surface Mining ☐		Construction ☐	
		Steady rain		Deep Mining ☐		Commercial ☐	
		Intermittent showers		Oil Wells ☐		Industrial ☐	
Yes ☐		Clear/sunny		Land Disposal ☐		Row Crops ☒	
No ☒		Cloudy		Residential ☐		Forest ☒	
						Pasture/Grazing ☐	
						Silviculture ☐	
						Urban Runoff/Storm Sewers ☐	
INSTREAM FEATURES		HYDRAULIC STRUCTURES		STREAM FLOW		RIPARIAN VEGETATION	
Stream Width 5 - 7 ft		Dams ☐		Dry ☐		Trees ☒ Herbaceous ☒	
Maximum Depth 0.5 ft		Bridge Abutments ☐		Pooled ☐		Grasses ☒ Shrubs ☒	
Reach Length 50 m		Island ☐		Low ☐		Dom. Tree/Shrub Taxa:	
Discharge -- cfs		Waterfalls ☐		High ☐		Black Cherry	
		Other: ☐		Normal ☒		Green Ash	
Riffle/Run/Pool Sequence				(No. Sampled in Reach) <u>3</u> Riffle <u>3</u> Run <u>1</u> Pool			
P-CHEM				Instrument Used: _____ Date Calibrated: _____			
Temp(°F) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____							

Substrate Characterization						
Substrate	Est.	P.C.	Riffle <u>20</u> %	Run <u>60</u> %	Pool <u>20</u> %	Reach Total
Silt/Clay (<0.06 mm)			X	X	X	
Sand (0.06 – 2 mm)						
Gravel (2 – 64 mm)			X	X	X	
Cobble (64 – 256 mm)			X	X	X	
Boulders (>256 mm)						
Bedrock						

NOTES/COMMENTS:				
Bluegrass Bioregion (High Gradient Assessments)		Headwater (<5.0 mi²)	Wadeable (>5.0 mi²)	
Fully Supporting	(Excellent)	156-200	130-200	
Supporting but Threatened and Partially Supporting	(Average)	142-155	114-129	
Not Supporting	(Poor)	0-141	0-113	
Kentucky Division of Water's "Methods for Assessing Habitat in Wadeable Waters" (2011) (Revision 1)				



Project Name: Deer Creek Shooting Range										Stream Name: Intermittent Stream 2																																									
RBP High Gradient Habitat																																																			
Habitat Parameter		Condition Category																																																	
		Optimal					Suboptimal					Marginal					Poor																																		
SCORE		20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																														
1. Epifaunal Substrate/ Available Cover		Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.																																		
16																																																			
Score																																																			
2. Embeddedness		Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.																																		
15																																																			
Score																																																			
3. Velocity/Depth Regime		All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/ depth regime (usually slow-deep).																																		
13																																																			
Score																																																			
4. Sediment Deposition		Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.																																		
13																																																			
Score																																																			
5. Channel Flow Status		Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.																																		
12																																																			
Score																																																			
6. Channel Alteration		Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.																																		
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7. Frequency of Riffles (or bends)		Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.																																		
14																																																			
Score																																																			
Left/Right Bank		10					9					8					7					6					5					4					3					2					1				
8. Bank Stability		Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.																																		
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9. Vegetative Protection		More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.																																		
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9 RB																																																			
Total Score		NOTES/COMMENTS: Average Quality																																																	
147																																																			

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: Intermittent Stream 2				LOCATION: Deer Creek Shooting Range			
STATION #: RBP 3				COUNTY: Putnam, Indiana		PROJECT: 15-018	
INVESTIGATORS: R. Fangman, J. Day				DATE: 5/6/2015		TIME: 13:00	
Verify Site LAT/LONG vs GPS Yes ☒ No ☐ N/A ☐				CANOPY COVER::		STREAM TYPE:	
				Fully Exposed (0-25%) ☒		Perennial ☐	
				Partially Exposed (25-50%) ☐		Ephemeral ☐	
				Partially Shaded (50-75%) ☐		Intermittent ☒	
				Fully Shaded (75-100%) ☐			
LAT				LONG			
39.549980° N				86.878118° W			
WEATHER				LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):			
Now Past 24 hours							
Has there been a scouring rain in the last 14 days?				Surface Mining ☐ Construction ☐ Forest ☒			
				Deep Mining ☐ Commercial ☐ Pasture/Grazing ☐			
				Oil Wells ☐ Industrial ☐ Silviculture ☐			
Yes ☐ ☒ ☒ Clear/sunny				Land Disposal ☐ Row Crops ☒ Urban Runoff/Storm Sewers ☐			
No ☒ ☐ ☐ Cloudy				Residential ☐			
INSTREAM FEATURES				HYDRAULIC STRUCTURES		STREAM FLOW	
Stream Width 1 - 2 ft				Dams ☐		Trees ☐ Herbaceous ☒	
Maximum Depth 0.25 ft				Bridge Abutments ☐		Grasses ☒ Shrubs ☐	
Reach Length 50 m				Island ☐		Dom. Tree/Shrub Taxa:	
Discharge -- cfs				Waterfalls ☐		(Full) ☐ (Partial) ☐	
				Other: ☐			
				High ☐			
				Normal ☒			
Rifle/Run/Pool Sequence				(No. Sampled in Reach) ___ Rifle ___ 1 ___ Run ___ Pool			
P-CHEM				Instrument Used: Date Calibrated:			
Temp(°F) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. _____ Turb. _____							

Substrate Characterization						
Substrate	Est.	P.C.	Riffle_____ %	Run <u>100</u> _____ %	Pool_____ %	Reach Total
Silt/Clay (<0.06 mm)				X		
Sand (0.06 – 2 mm)						
Gravel (2 – 64 mm)						
Cobble (64 – 256 mm)						
Boulders (>256 mm)						
Bedrock						

NOTES/COMMENTS:				
Bluegrass Bioregion (High Gradient Assessments)		Headwater ($<5.0 \text{ mi}^2$)	Wadeable ($>5.0 \text{ mi}^2$)	
Fully Supporting	(Excellent)	156-200	130-200	
Supporting but Threatened and Partially Supporting	(Average)	142-155	114-129	
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Kentucky Division of Water's "Methods for Assessing Habitat in Wadeable Waters" (2011) (Revision 1)				

Project Name: Deer Creek Shooting Range										Stream Name: Intermittent Stream 2																																									
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0 LB																																																			
0 RB																																																			
Total Score		NOTES/COMMENTS: Poor Quality																																																	
86																																																			

APPENDIX C

**PRELIMINARY JURISDICTIONAL
DETERMINATION FORM**

ATTACHMENT

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD):

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:

August Mack Environmental, Inc.
c/o Mr. Richard Braun
1302 Meridian Street – Suite 300
Indianapolis, IN 46202

Represented by:
Redwing Ecological Services, Inc.
1139 South 4th Street
Louisville, KY 40203

C. DISTRICT OFFICE, FILE NAME, AND NUMBER:

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION: The approximately 25-acre parcel is located just northwest of IN-243, approximately one mile north of the I-70 exit, in Putnam County, Indiana. The purpose of this project is to construct a shooting range to compliment hunting activities that are allowed in the Deer Creek Wildlife Area.

(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)

State: Indiana County/parish/borough: Putnam City: Cloverdale
Center coordinates of site (lat/long in degree decimal format):
Lat. 39.548023° N, Long. 86.876386° W

Name of nearest waterbody: Deer Creek

Identify (estimate) amount of waters in the review area:

Non-wetland waters: linear feet: 2,055 0.162 acre
Cowardin Class: R4SB3, R6
Stream Flow: Intermittent, Ephemeral

Wetlands: 0.68 acre
Cowardin Class: PEM1

Name of any water bodies on the site that have been identified as Section 10 waters:

Tidal:
Non-Tidal:

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

- ☐ Office (Desk) Determination. Date:
☐ Field Determination. Date(s):

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in

reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Redwing, April 2015
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
 - ☐ Office concurs with data sheets/delineation report.
 - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps: .
- ☐ Corps navigable waters' study: .
- ☐ U.S. Geological Survey Hydrologic Atlas: .
 - ☐ USGS NHD data.
 - ☐ USGS 8 and 11 digit HUC maps.
- ☒ U.S. Geological Survey map(s). Cite scale & quad name: 1:24,000 – Reelsville and Cloverdale quads.
- ☒ USDA Natural Resources Conservation Service Soil Survey. Citation: Soil Survey Geographic Database for Putnam County, Indiana (2014).
- ☐ National wetlands inventory map(s). Cite name: .
- ☐ State/Local wetland inventory map(s): .
- ☒ FEMA/FIRM maps: FEMA DFIRM Flood Data for Indiana (2014) ☐ 100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)
- ☒ Photographs: ☒ Aerial (Name & Date): DigitalGlobe Imagery provided by ESRI (taken on February 12, 2012).
 - or ☒ Other (Name & Date): Site photographs – April 9, 2015
- ☐ Previous determination(s). File no. and date of response letter: .
- ☐ Other information (please specify): .

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Signature and date of
Regulatory Project Manager
(REQUIRED)

Signature and date of
person requesting preliminary JD
(REQUIRED, unless obtaining the signature is
impracticable)

Site number	Latitude	Longitude	Cowardin Class	Estimated amount of aquatic resource in review area	Class of aquatic resource
Wetland 1	39.550487° N	86.877903° W	PEM1	0.57 acre	non-section 10 – wetland
Wetland 2	39.549632° N	86.877388° W	PEM1	0.11 acre	non-section 10 – wetland
Intermittent Stream 1	39.549906° N	86.879109° W	R4SB3	29 linear feet/ 0.002 acre	non-section 10 – non-wetland
Intermittent Stream 2	39.549980° N	86.878118° W	R4SB3	1,483 linear feet/ 0.136 acre	non-section 10 – non-wetland
Ephemeral Stream 3	39.550050° N	86.878674° W	R6	41 linear feet/ 0.003 acre	non-section 10 – non-wetland
Ephemeral Stream 4	39.550348° N	86.878388° W	R6	125 linear feet/ 0.004 acre	non-section 10 – non-wetland
Ephemeral Stream 5	39.549728° N	86.874889° W	R6	377 linear feet/ 0.017 acre	non-section 10 – non-wetland

ATTACHMENT C

Cultural Resources Report

A PHASE IA ARCHAEOLOGICAL RECONNAISSANCE SURVEY FOR THE PROPOSED DEER CREEK SHOOTING RANGE ENVIRONMENTAL ASSESSMENT PROJECT IN CLOVERDALE, PUTNAM COUNTY, INDIANA



by
John P. Dickerson, MA

Prepared for



Prepared by



Kentucky | West Virginia | Ohio
Wyoming | Illinois | Indiana | Louisiana | Tennessee
Utah | Virginia | Colorado

A PHASE IA ARCHAEOLOGICAL RECONNAISSANCE SURVEY FOR THE PROPOSED DEER CREEK SHOOTING RANGE ENVIRONMENTAL ASSESSMENT PROJECT IN CLOVERDALE, PUTNAM COUNTY, INDIANA

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May 26, 2015

Lead Agency: Indiana Department of Natural Resources
Accession Number: 71.19.1396

ABSTRACT

On May 5 and 6, 2015, Cultural Resource Analysts, Inc., personnel conducted a phase Ia archaeological survey for the proposed Deer Creek Shooting Range Environmental Assessment project in Cloverdale, Putnam County, Indiana. Prior to fieldwork, a records review was conducted at the Indiana Department of Natural Resources, Indiana Division of Historic Preservation and Archaeology. The review indicated the project area had not been previously surveyed, and that no archaeological sites have been previously recorded within, or near, the project area boundaries. The project area is approximately 17.95 ha (44.30 acres) in size and was surveyed in its entirety. Field methods included pedestrian survey supplemented with systematic shovel testing.

The current survey resulted in the documentation of three previously unrecorded archaeological sites (12Pm431, 12Pm432, and 12Pm433). Site 12Pm431 consists of a single prehistoric lithic artifact and a single historic ceramic artifact that were located on the ground surface. Site 12Pm432 consists of a mid-nineteenth-century historic ceramic scatter, which appears to represent dumping activity associated with known potteries located outside the project area. Site 12Pm433 consists of mid- to late-twentieth-century outbuilding remnants. Due to a lack of archaeological integrity and research potential, Sites 12Pm431, 12Pm432, and 12Pm433 are recommended as not eligible for inclusion in the National Register of Historic Places. Therefore, no archaeological sites recommended eligible for, or listed in, the National Register of Historic Places will be affected by this project, and project clearance is recommended.

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I. INTRODUCTION

On May 5 and 6, 2015, Cultural Resource Analysts, Inc. (CRA), personnel conducted a phase Ia archaeological survey for the proposed Deer Creek Shooting Range Environmental Assessment project in Cloverdale, Putnam County, Indiana (Figure 1). The survey was conducted at the request of Redwing Ecological Services, Inc. John Dickerson and Cecilia Szmuto completed the fieldwork in approximately 11 person hours. Prior to initiating fieldwork, CRA personnel were not made aware that the property to be surveyed was located on land owned by the State of Indiana. Therefore, fieldwork was performed without obtaining the proper permit for excavation on state land. Through correspondence with Mitchell K. Zoll, Director of the Indiana Division of Historic Preservation and Archaeology (DHPA) on May 8, and May 13, 2015, Mr. Zoll was made aware of the oversight and indicated that no further action was required. Nevertheless, it should be noted that all fieldwork was conducted according to State guidelines and supervised by a qualified professional

archaeologist pursuant to IC 14-21-1. A records review conducted at the DHPA indicated the project area had not been previously surveyed.

The area of potential effects (APE) for the project was determined by the limits of potential ground disturbance associated with the shooting range. The total project area covers an area of 17.95 ha (44.30 acres) (Figure 2). The project was surveyed in its entirety utilizing pedestrian survey and supplemented with systematic shovel testing (Figure 3).

Purpose of Study

This survey was conducted to comply with federal regulations concerning the impact of federal actions on sites and structures listed in, or eligible for nomination to, the National Register of Historic Places (NRHP). These regulations include Section 106 of the National Historic Preservation Act of 1966, as amended, and the regulations published in the Code of Federal Regulations at 36 CFR Part 800. Federal actions include the use of federal funds or the granting of a federal permit.

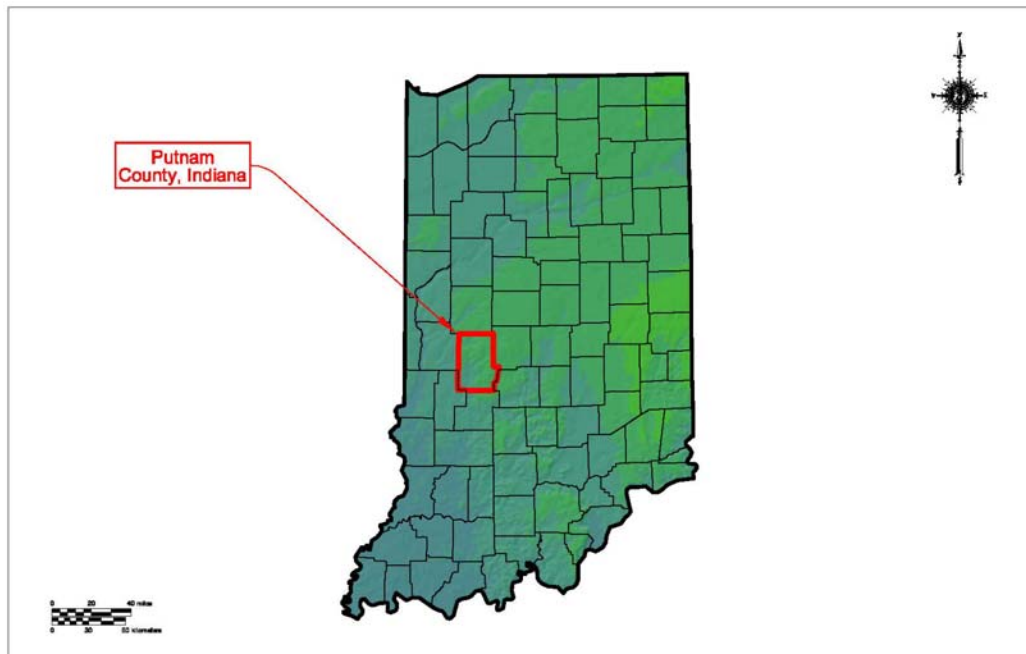


Figure 1. Map of Indiana showing the location of Putnam County.

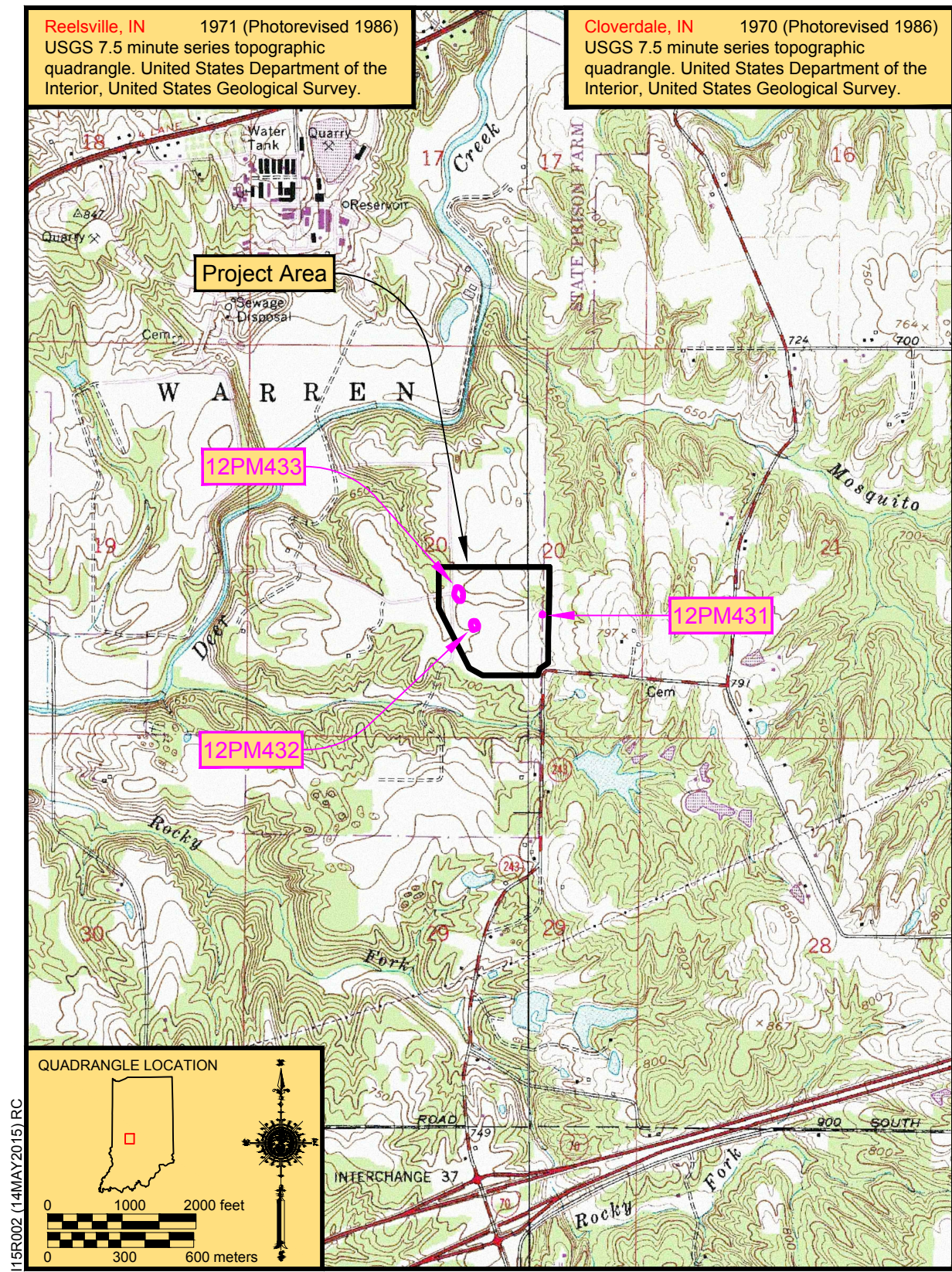


Figure 2. Location of project area on topographic quadrangle.

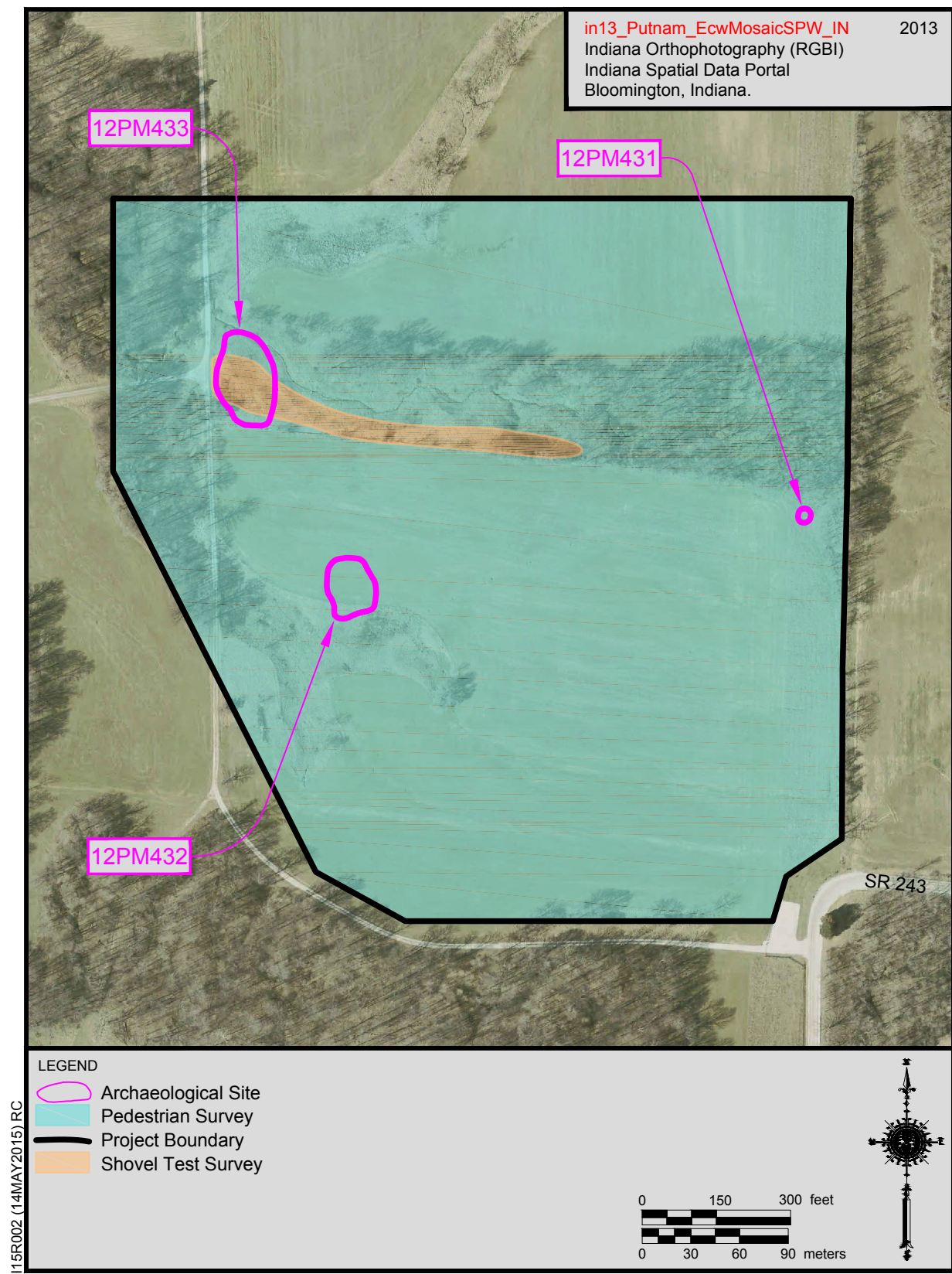


Figure 3. Project area plan map.

For the purposes of this assessment, a site is defined as “a place where past human occupation, habitations, or activities occurred, indicated by the presence of one or more artifacts,” including “non-portable evidence of past human behavior or activity found on or in the ground” (IC 14-21-1-2). Cultural deposits meeting this definition but less than 50 years of age were not considered sites in accordance with “Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (National Park Service 1983).”

The following is a description of the survey area, of previous research in the survey area vicinity, of the field methods used, the results of this investigation, and of recommendations. The survey and report are intended to conform to Indiana DHPA draft guidelines and those set forth in the scope of work for this project. Cultural materials, field notes, records, and site photographs will be curated with the Indiana State Museum in Indianapolis under Accession Number 71.19.1396.

Project Description

Indiana Department of Natural Resources (DNR) is proposing the construction of a 17.95 ha (44.30 acres) shooting range at the current location of the Deer Creek Fish and Wildlife Area. The new shooting range will be sited on Indiana state surplus land that was formerly part of the Putnamville Correctional Facility. The shooting range will include a new parking lot, which will consist of 40 parking spaces, and will be situated in the southern portion of the project area. The parking lot will connect to the main portion of the range, which will include five firing lanes, each of which will include backstops. An alternate shotgun range will be constructed west of the main structure,.

II. ENVIRONMENTAL SETTING

Putnam County is located within the Tipton Till Plain physiographic region to the

north and Martinsville Hills physiographic region to the south (Gray 2000). The topography in the northern portion of the county is characterized by flat to nearly flat land punctuated by ridges and rounded knobs. The southern portions have a greater relief and include areas of dissected uplands, low, level floodplains, and broad rolling hills (United States Department of Agriculture [USDA] 2006). The bedrock geology is divided within the county with the northern sections dominated by Illinoian-age loess and glacial till, with bedrock of Middle to Late Mississippian age. The southern portion of the county is underlain by Late Ordovician shale and limestone (USDA 2006). Putnam County is primarily drained by the Eel River and its tributaries (Environmental Protection Agency [EPA] 2013; Robards 1981).

Putnam County is located within the Beech-Maple Forest region (Braun 2001:305–326). Historically, beech was the dominant canopy tree, while sugar maple dominated the understory (Braun 2001:305). Currently, white oak, northern red oak, black walnut, hickory, sugar maple, and white ash are major species found in well-drained areas. Pin oak, blackgum, American sycamore, green ash, silver maple, and cottonwood grow in wetter areas (United States Department of Agriculture [USDA] 2006:347). Major wildlife species in this area include white-tailed deer, red fox, gray squirrel, raccoon, opossum, cottontail rabbit, quail, duck, turkey, dove, and geese. Fish found in this area include largemouth bass, smallmouth bass, catfish, bluegill, and crappie (USDA 2006:347).

In Putnam County, the average temperature in the winter is 30 degrees Fahrenheit. In the summer, the average temperature is 74 degrees. The average annual precipitation is 40 inches (Robards 1981).

Description of the Project Area

The project area is located near the town of Cloverdale, Indiana, and is situated west of State Road (SR) 243 (see Figure 2). The project area encompasses approximately 17.95 ha (44.30 acres), which includes an agricultural field, wooded areas, and an unimproved gravel road. Elevations range from 211 m (694 ft) above mean sea level (AMSL) in the western most portion of the project area, to 221 m (728 ft) AMSL in the eastern most portion of the project area.

Vegetation within the agricultural field consisted of tall grasses, weeds, unharvested soy bean plants, and corn chaff (Figure 4). The agricultural field had been subjected to plow stripping in order to improve the ground surface visibility. The plow strips measured 2.0 (6.6 ft) wide, were spaced at 10.0 m (32.8 ft) intervals, and exhibited good ground surface visibility (greater than 30 percent). The wooded areas consisted of secondary

growth and tall grasses (Figure 5). The areas of the agricultural field that were not subjected to plow stripping, and the wooded areas, featured poor ground surface visibility (less than 30 percent) (see Figures 4 and 5). The agricultural field located in the northern most portion of the project area had not been strip plowed prior to the current survey. Vegetation in this area consisted of harvested soy bean chaff. However, ground surface visibility was good (greater than 30 percent) across the entire area (Figure 6).

Soils within the project area are mapped as Alford silt loam (AIB), Ava silt loam (AvB), Cincinnati silt loam (CnD2), Grayford silt loam (GrC2), Hickory loam (HoG), Iva silt loam (IvA), and Muren silt loam (MuB) (Soil Survey Staff 2015). Each of these soil series is classified as an Alfisol. Alfisols are found on landforms that formed during the late Pleistocene or earlier. Archaeological deposits would only be found on, or very, near the ground surface on landforms mapped with these Alfisols (Soil Survey Staff 1999:489–493).



Figure 4. Overview of plow stripping, facing south.



Figure 5. Overview of wooded area, facing north.



Figure 6. Overview of northern agricultural field, facing west.

Soils observed within the plow strips consisted of dark yellowish brown (10YR 4/4) silty clay loam with heavy redoximorphic features present on the surface. These soils generally conform to the range of characteristics attributed to the Iva, Muren, and Grayford series soils with which the majority of the agricultural field is mapped. Redoximorphic features are common to Iva and Muren soils, and indicated that the landform was poorly drained.

Disturbance was prevalent throughout the project area. The agricultural field had been disturbed by logging, sustained plowing, and the subsequent erosion associated with these practices. Disturbance also includes the construction of an unimproved gravel road that is situated on the southern and western border of the project area (Figure 7).

III. PREVIOUS RESEARCH AND CULTURAL OVERVIEW

Prior to initiating fieldwork, a search of records maintained by various sources

were referenced. Primarily, records maintained at the Indiana DHPA were researched. Online resources and various references maintained at the CRA offices also were examined.

The information gathered from this review was used to: 1) determine if any parts of the project area had been previously surveyed for archaeological resources; 2) identify any previously recorded archaeological sites that were situated within the project area; 3) provide information concerning what archaeological resources could be expected within the project area; and 4) provide a context for any archaeological resources recovered within the project area. The results are discussed below.

According to DHPA records, there have been two previous professional surveys completed within a 1.6 km (1.0 mi) radius of the current project area (Keller and Nunson 1984; Stillwell 2005). The records review also indicated that the project area had not been previously surveyed. No previously recorded sites were located within the 1.6 km search radius of the current project area.



Figure 7. Overview of unimproved gravel road on western boundary, facing south.

Previous Archaeological Investigations

In 1984, the Glenn A. Black laboratory of archaeology conducted a phase Ia archaeological reconnaissance survey of a proposed water systems improvement for the Reelsville Water Company, Inc. The project entailed the construction of a new approximately 12 mile water line. This survey resulted in the identification of two previously unrecorded archaeological sites (12Pm260 and 12Pm261). Site 12Pm260 consists of a prehistoric isolated find. Site 12Pm261 consists of 2 cores, 13 flakes, 1 hammerstone, 2 manos, and fire-cracked rock, all of unknown temporal affiliation. Both sites documented during this survey were determined ineligible for inclusion on the NRHP (Keller and Nunson 1984).

In 2005, Archaeological Consultants of Ossian conducted a phase Ia archaeological reconnaissance survey for the construction of a 32 km (20 mi) long utility corridor in Putnam and Clay Counties, Indiana. The project area was surveyed using both pedestrian survey and shovel testing methods. This survey resulted in the identification of one previously unrecorded archaeological site (12Pm308). Site 12Pm308 consisted of single prehistoric lithic of unknown temporal affiliation. This site was determined ineligible for inclusion on the NRHP (Stillwell 2005).

NRHP Historic Properties

A search of the NRHP and State Historic Architecture and Archaeological Research Database (SHAARD) records indicated that Putnam County has 23 historic property listings. However, no archaeological sites or structures listed in the NRHP were situated within or near the current project area.

Indiana Historic Sites and Structures Survey

There are no properties listed in the Indiana Historic Sites and Structures Survey

(IHSSI) within the project area (SHAARD 2015).

Indiana Cemetery and Burial Database

The online DHPA cemetery and burial database was accessed in May 2015 (SHAARD 2015). No cemeteries are listed within 30 m (100 ft) of the project area.

Archaeological Site Data

A review of the archaeological records was conducted using the Indiana DHPA SHAARD in May 2015. Based on the site file information, 414 archaeological sites have been recorded in Putnam County (Table 1).

Most of the sites recorded in Putnam County have been located on the Greencastle (n = 215; 52 percent), Poland (n = 43; 10.4 percent) and Russellville (n = 43; 10.4 percent) topographic quadrangles (see Table 1). Site components represented are predominately indeterminate prehistoric (n = 356; 79 percent) and historic (n = 48; 10.6 percent). Other commonly occurring site components are Late Archaic (n = 11; 2.4 percent) and Early Archaic (n = 11; 2.4 percent). Site types within Putnam County predominately consist of Prehistoric scatters (n = 294; 70.7 percent) and Isolated finds (n = 96; 23.1 percent).

Cultural Overview

A brief overview of the prehistoric temporal periods and cultures that have been recorded on the Crawfordsville topographic quadrangle is presented below. These components are discussed within a larger cultural context that includes all of central Indiana.

The Paleoindian cultural tradition in the northeastern United States has been recognized as part of a widespread, homogeneous New World culture typified by a distinctive lithic assemblage. The most distinctive members of this assemblage are lanceolate shaped, often fluted, projectile

Table 1. Summary of Select Information for Previously Recorded Archaeological Sites in Putnam County, Indiana. Data Obtained from DHPA/SHAARD and May Contain Coding Errors (SHAARD 2015).

Site Components Represented in Putnam County*	N	Percent
Paleoindian	1	0.22%
Early Archaic	11	2.44%
Middle Archaic	5	1.11%
Late Archaic	11	2.44%
Terminal Late Archaic	1	0.22%
Early Woodland	2	0.44%
Middle Woodland	2	0.44%
Late Woodland	6	1.33%
Late Prehistoric, Mississippian	0	0.00%
Indeterminate Prehistoric	356	78.94%
Historic	48	10.64%
Total	451	100.00%
Sites on Topographic Maps in Putnam County	N	Percent
Bellmore	6	1.45%
Brazil East	2	0.48%
Cataract	2	0.48%
Center Point	0	0.00%
Clinton Falls	19	4.59%
Cloverdale	13	3.14%
Coatesville	4	0.97%
Eminence	2	0.48%
Greencastle	215	51.93%
Mansfield	0	0.00%
North Salem	17	4.11%
Poland	43	10.39%
Qunicy	1	0.24%
Reelsville	15	3.62%
Roachville	32	7.73%
Russellville	43	10.39%
Total	414	100.00%
Site Types Represented in Putnam County	N	Percent
Cemetery	12	2.88%
Historic farmstead	2	0.48%
Historic scatter	8	1.92%
Isolated Find	96	23.08%
Prehistoric camp/lithic scatter	294	70.67%
Prehistoric village	1	0.24%
Mound(s)	2	0.48%
Rockshelter	1	0.24%
Total	416	100.00%

* One site may represent more than one time period

points. In general, Paleoindian sites reflect areas where small groups of people would perform specific tasks of short duration. This type of site casts a very low archeological profile across the landscape. In this region of Indiana, evidence for the presence of Early and Late Paleoindian occupations is most common in the form of isolated finds of fluted and unfluted points (Stafford et al. 1988:29–30).

The division between hunters who used early fluted points and their descendants in the Archaic period is a purely arbitrary one (Griffin 1978:226). Yet as the time dimension increases, typological comparisons of artifact assemblages begin to take on distinct regional characteristics. The typical artifact assemblage for the Archaic is composed of corner- and side-notched projectile points that increase in both quantity and stylistic variation through time but that are accompanied by a decrease in quality of individual workmanship (Munson and Cook 1980). The Archaic is customarily divided into three subperiods: Early (8000–6000 B.C.), Middle (6000–3500 B.C.), and Late (3500–1000 B.C.).

In general, Early Archaic sites are widely dispersed throughout central Indiana (Mohow 1992:17; Stafford et al. 1988:33). Hafted bifaces of the Thebes, Kirk, Rice-Lobe, and LeCroy clusters are common Early Archaic diagnostic artifacts found throughout Indiana. These hafted biface styles have been recovered from dated contexts in the Ohio Valley ranging from 9500 to 8000 B.C. (Cantin 2000; Collins 1979). Generally, based on stratigraphic excavations on the Ohio River floodplain, varieties of Thebes hafted bifaces appear earlier than Kirk types, followed by LeCroy and MacCorkle (Justice 1987). In general, Early Archaic sites are widely dispersed throughout southwestern and central Indiana (Mohow 1992:17; Stafford et al. 1988:33).

Middle Archaic assemblages include several side-notched types including Raddatz and Godar (Justice 1987). Increased ground and pecked stone tools such as atlatl weights, mortars, pestles, grooved axes, nutting stones, and grinding slabs are also noted. Furthermore, a shift to exploitation of a fuller-range of habitats and a logistical subsistence strategy is recognized during the Middle Archaic period (Stafford 1994; Stafford et al. 1988; Stafford et al. 2000). These changes are indicated by the presence of a wider range of plant and animal remains, evidence of larger occupations, as well as the occurrence of more-diverse artifact assemblages (Stafford et al. 2000). These changes during this period are

most likely responses to shifting environmental regimes, increasing populations, and technological advances.

After 3000 B.C., a shift in settlement and mobility strategies is noted, possibly related to the changing climatic regimen in the region (i.e., Brown and Vierra 1983). The full development of a logistically organized hunting and gathering settlement-subsistence system is established throughout much of the Ohio Valley by this time (Anslinger et al. 1994:23–25). In addition to a change in settlement and subsistence during the Late Archaic, population increase is also suggested. For example, more Late Archaic sites than Early and Middle Archaic sites are recorded in the region (Stafford et al. 1988). This increase in site occurrence may be related to changing population levels during the Archaic period but may also be a result of site survey biases. For example, many site deposits with earlier components may be inaccessible to traditional survey methods, as they may be possibly buried in deep stream alluvium. A better understanding of the site types of this time period from the region is required for testing the current Late Archaic settlement-subsistence model and temporal placement.

The Woodland period, like the preceding Archaic period, is divided into three subperiods: Early Woodland (1000–200 B.C.), Middle Woodland (200 B.C.–A.D. 400), and Late Woodland (A.D. 400–900). Overall, the Woodland period witnessed a continuation and elaboration of cultural practices that began during the Late Archaic. During this period of interregional dynamism, there was a trend toward more sedentary life ways, increasingly elaborate burial ceremonialism, cultivation of plant foods, and possibly stratified social organization. These trends, along with the appearance of fired ceramic vessels, mark the transition between Archaic and Woodland peoples (Griffin 1978).

Evidence for the Adena in Indiana comes mostly from the north-central and east-central portions of the state and is characterized by the presence of large burial mounds containing log tombs and grave goods (i.e., McCord and

Cochran 1996). Typical diagnostic artifacts from the time period include large bladed, stemmed bifaces such as Adena and Dickson cluster hafted bifaces, as well as diagnostic cord-marked pottery.

The Middle Woodland in Indiana has been considered a continuation of the Early Woodland, with more complex social interactions, evident by an increase in trade materials and a larger span of typical artifacts. Diagnostic artifacts include Snyders, Chesser, Lowe, and Stueben hafted bifaces (Justice 1987), as well as copper celts, beads, and stone platform pipes.

The most prevalent manifestation within the Middle Woodland is the Hopewell, which largely resembles the Early Woodland Adena phase. However, an increase in burial mound, mound complex, and earthwork construction is evident in the Middle Woodland time frame.

The Albee phase (800–1200 A.D.) is the only defined Late Woodland manifestation in the region (Stafford et al. 1988:39; Winters 1967:60–90). In Indiana, Jack's Reef points were generally considered to be diagnostic of Albee, but it is now recognized that only triangular Madison points have been found associated with Albee in good contexts (McCord and Cochran 2003; Redmond and McCullough 2000). Albee sites are recorded in large numbers along the West Fork of the White River in west-central Indiana (Stafford et al. 1988:39). Elsewhere in Indiana, Albee components are apparent at the Secrest-Reasoner (Black 1935), Commissary (Swartz 1982), and Heshner (Cochran 1988) sites in east-central Indiana, as well as at the Morell-Sheets site (McCord and Cochran 1994) in Montgomery County, west-central Indiana. An overview of the Albee Complex in Indiana shows that at least 18 Albee mortuary and habitation sites have been recorded throughout the state (Anslinger 1990:37–40).

Three distinct late prehistoric populations have been recognized in the region: Western Basin Tradition, Fort Ancient, and Oneota (McCullough et al. 2004). Based on the co-occurrence of Fort Ancient and Great Lakes diagnostic pottery on the same sites, the Oliver

Phase has been defined for much of central and south-central Indiana (McCullough 2000; McCullough et al. 2004). Oliver Phase sites have been identified along much of the White River valley and date from circa A.D. 1200 to the early 1400s. Oneota groups are also noted in the region by circa A.D. 1300 and it has been suggested that non-violent interaction between the Oliver and Oneota groups was common (McCullough et al. 2004). Artifacts diagnostic of the period include shell-tempered pottery, effigy pipes, and triangular points, as well as Nodena and Cahokia hafted biface forms (Justice 1987).

Historical Overview of Putnam County, Indiana

Putnam County was created through an act of the General Assembly in 1821. Based on information attained from a 1940 survey, Putnam County ranked fourteenth in over-all size, forty-ninth in population, and sixty-ninth in overall population density per square mile. A major natural resource that is abundantly present within the southern portion of the county is limestone. This natural resource has prompted the development of many commercial enterprises that continue to operate throughout the county (Historic Landmarks Foundation of Indiana [HLFI] 1982: xviii–xx; Indiana County History Preservation Society [ICHPS] 1982).

Settlement of the area that would later become Putnam County began in the southwestern portion of the county in 1818. Settlers in the area originated primarily from Virginia, the Carolinas, Tennessee, southern Indiana, and Kentucky. The county is believed to have received its name from Revolutionary War General Israel Putnam, although this fact cannot be substantiated. Life in the new county followed the typical frontier settlement pattern, with the clearing of land for pastoral use and agricultural production. However, despite the efforts of many early Hoosier families, their efforts went unrewarded, and for that reason, it has been noted that many early farming families left the area for more profitable endeavors. In the small holdings and

towns that did prosper in Putnam County, most were situated around a mill, a crossroads, and log stores (HLFI 1982: xvii).

Between 1827 and 1834, the National Road linked Putnam County with Indianapolis in the east and Vandalia, Illinois, to the west. The road served as a major artery for the transportation of commodities and the movement of people in and out of the burgeoning county. With the advent of the developing road system in the area, cities, towns, and other small communities began to develop along the county's road system. Even more important for the development of the county was the arrival of the railroad. In 1852, the east–west Indianapolis and Terre Haute Railroad arrived, followed two years later by the north–south Louisville, New Albany, and Chicago Railroad in 1854. It was the arrival of the railroad that helped fully develop the county's manufacturing potential. Prior to the arrival of the rail system the county had relied primarily on the Grist Mills, pork packing plants, and brickyards. However, after its arrival, iron nails, pump and shovel handles, carriages, furniture, and pottery, all became important commodities for sale to a more national consumer (HLFI 1982: xix).

With increased mechanization and the establishment of more industrialized jobs, the vast majority of Putnam County's population in the twentieth-century became employed in local factories. While agriculture still played a prominent role in the county's continued growth, fewer families used farming as a sole means of economic subsistence. In addition to these industrial and agricultural jobs, stores, government, schools, grain storage, medical services, building contractors, garages, and many more, have served as key industries and means of support for the county throughout the twentieth-century (HLFI 1982: xix).

The pottery production industry has been well established in west-central Indiana since the early nineteenth century. In a regional examination conducted by John R. McGregor, a member of the faculty at the Department of Geography and Geology at Indiana State University, potteries were found to have been

present across the landscape, with the first recorded one established in 1820 in Prairie Creek, Vigo County, Indiana. McGregor notes that redware was the first pottery type produced in the area. However, in 1840, stoneware potters are noted to have migrated from Ohio, bringing the techniques for stoneware production with them. It was with the introduction of the higher quality stoneware that many of the area potteries switched production methods and began almost exclusively manufacturing the new material (McGregor 1988).

While the distribution of potteries across the landscape was widespread, they occurred most frequently in the areas around Annapolis and Brazil. While there is some indication that these areas were shipping clays to local potteries for production purposes, it is more likely that most potteries were providing for their clay needs through locally sourced clays, which are known to be abundant throughout this portion of west-central Indiana (McGregor 1988).

The Indiana State Farm, now known as the Putnamville Correctional Facility, was established in Putnam County near the town of Putnamville on March 13, 1913. The facility originally served as a minimum security, misdemeanor work camp. Beginning in the first half of 1915, the camp began receiving court ordered offenders. The facility developed into a farming facility that was capable of not only providing for its own needs, but also providing a cheap alternative for other state and federal organizations in the region. Over time, the Indiana State Farm developed an extensive dairy farm, brick production facility, livestock holdings, and other various facilities. Based on the expansive size of the Indiana State Farm, originally consisting of 3,500 acres, the farm was significant to the early-twentieth-century history of Putnam County. In 1977, the facility developed into a medium security operation capable of handling convicted felons. It was also at this time that the Farm became known as the Putnamville Correctional Facility. In 2009, 917 acres of the original 3,500 were

allocated to the IDNR (Indiana Department of Corrections [IDOC] 2015).

Map Data

In addition to the file search, a review of available maps and aerial imagery was initiated to help identify potential historic properties (structures) or historic archaeological site locations within the proposed project area. The following maps were reviewed:

1876 Atlas of Indiana (Baskin, Forster & Company 1876);

1939 Aerial Photo Single Frame. (USGS 1939);

1946 Aerial Photo Single Frame. (USGS 1946);

1958 Aerial Photo Single Frame. (USGS 1958);

1967 Aerial Photo Single Frame. (USGS 1967);

1975 Aerial Photo Single Frame. (USGS 1975);

1956 Cloverdale, Indiana, 7.5-minute series topographic quadrangle (USGS);

1970 (Photorevised 1986) Cloverdale Indiana, 7.5-minute series topographic quadrangle (USGS).

An outbuilding was recorded on the 1970 topographic map at Site 12Pm433. No other structures were recorded within the project area.

Survey Predictions

Considering the known distribution of sites in the county, the available information on site types recorded, and the nature of the present project area, certain predictions were possible regarding the kinds of sites that might be encountered within the project area. Very little inference could be made about the potential number and site types based on the records review. Based on the county-wide data, prehistoric camps/lithic scatters of an unknown temporal period were the sites most likely to be found during the current inventory.

IV. METHODS

This section describes the methods used during the survey. Site-specific field methods are discussed in further detail in the Site Description section of this report.

Field Methods

Prior to the survey, CRA was provided with a map of the project area that depicted the project boundaries and natural and cultural topographic features. The limits of the survey area were determined by using the GPS Kit HD application for Apple iPad. The project area was investigated primarily through pedestrian survey with limited shovel testing.

Shovel Testing

All portions of the project area with less than 30 percent ground surface visibility were subjected to systematic shovel testing. This included portions of the wooded area that were not situated along sloping terrain. Shovel test grids were also placed around all archaeological sites in order to test for cultural material. In all cases shovel test probes (STPs) measured no less than 35.0 cm (13.8 in) in diameter and extended well into the subsoil. All fill removed was screened through a .64 cm (.25 in) mesh hardware, and the sidewalls and bottoms were examined for cultural materials and features. General soils characteristics (e.g. texture and Munsell colors) were recorded by individual level.

Pedestrian Survey

All portions of the project area that were situated on steep slope or in areas where the ground surface visibility was greater than 30 percent were subjected to intensive pedestrian survey. The pedestrian survey consisted of walking parallel transects spaced 10.0 m (32.8 ft) apart and inspecting the ground surface for cultural materials within plow strips. Plow strips within the agricultural field were placed at 10 m (32.8 ft) intervals, with the space between containing tall grasses and weeds. Since the distance between plow strips did not

exceed 10 m (32.8 ft), pedestrian survey was an acceptable means of survey.

Laboratory Methods

All cultural material recovered from the project was transported to CRA for processing and analysis. Initial processing of the recovered artifacts involved washing all artifacts, sorting the artifacts into the major material classes (i.e., historic, and lithic) for further analysis, and assigning catalog numbers. Catalog numbers consisted of the site number and a unique number for each provenience lot or diagnostic specimen. Historic artifacts received a unique catalog number for each material group and class by provenience.

The artifacts and results of the subsequent analysis are discussed in each of the specific artifact sections of this report. All cultural materials, field notes, records, and site photographs will be curated at the Indiana State Museum in Indianapolis under Accession Number 71.19.1396.

Historic Artifact Analysis Methods

The historical analysis was conducted by Kevin Cupka Head. The historic assemblage includes artifacts classified and grouped according to a scheme originally developed by Stanley South (1977). South believed that his classification scheme would present patterns in historic site artifact assemblages that would provide cultural insights. Questions of historic site function, the cultural background of a site's occupants, and regional behavior patterns were topics to be addressed using this system.

Stewart-Abernathy (1986), Orser (1988), and Wagner and McCorvie (1992) have subsequently revised this classification scheme. In this report, artifacts were grouped into the following categories: domestic, architecture, and industrial.

Information on the age of artifacts as described in the artifact tables is derived from a variety of sources cited in the discussion of

the materials recovered from each site. The beginning and ending dates cited need some clarification. Usually, an artifact has specific attributes that represent a technological change, an invention in the manufacturing process, or simple stylistic changes in decoration. These attribute changes usually have associated dates derived from historical and archaeological research. For example, bottles may have seams that indicate a specific manufacturing process patented in a certain year. The bottle then can be assigned a “beginning,” or incept, date for the same year of the patent. New technology may eliminate the need for the same patent and the bottle would no longer be produced. The “ending,” or terminal, date will be the approximate time when the new technology took hold and the older manufacturing processes are no longer in use.

A summary of the artifacts recovered from each site is presented in the individual site description sections. An overview of the functional groups and associated classes and diagnostic attributes used during the historic artifact analysis is included in Appendix A. A complete inventory of the historic artifacts can be found in Appendix B.

Lithic Analysis Methods

The lithic analysis was conducted by Joseph Miller. Lithic artifacts recovered were analyzed by flake size, weight, raw material type, presence of cortex, and probable stage of lithic reduction during which the flake was produced. Reduction stage follows Magne’s (1985) definitions and was determined by the number of facets on the platform or the number of flake scars on the dorsal surface. Early stage reduction is defined as core reduction, middle stage as the first half of tool production, and late stage as the second half of tool production and subsequent maintenance. For flakes that retain platforms, zero to one facet on the platform indicates early stage; two facets indicate middle stage; and three or more facets indicate late stage. Biface thinning is a specialized form of late stage reduction.

Raw material type for the lithic artifacts was determined by comparison with a sample collection housed at CRA and published references (Cantin 2008).

V. RESULTS

During the course of the current survey, three archaeological sites (12Pm431, 12Pm432, and 12Pm433) were documented. Each site is discussed in detail below, and the locations are depicted on Figure 2.

12Pm431

Elevation: 221 m (725 ft) AMSL
Component(s): Unknown temporal affiliation; mid-nineteenth-century
Site type(s): multicomponent
Size: 56.0 sq m (602.7 sq ft)
Distance to nearest water: 5.7 km (3.5 mi)
Direction to nearest water: Northwest (Big Walnut Creek)
Type and extent of previous disturbance: Agricultural, logging, extent unknown
Topography: Slight rise in agricultural field
Vegetation: Tall grasses and weeds
Ground surface visibility: Greater than 30 percent
Aspect: Southwest
Recommended NRHP status: Not eligible

Site Description

Site 12Pm431 consists of a single lithic artifact of unknown temporal association and a single mid-nineteenth-century historic ceramic sherd. The site is located 214.3 m (703.0 ft) north of SR 243. The site was identified by the presence of cultural materials on the ground surface within the agricultural field at an elevation of 221 m (725 ft) AMSL. The nearest natural water source was the Big Walnut Creek, located approximately 5.7 km (3.5 mi) northwest of the site. Site dimensions were established by the limits of the artifact scatter on the ground surface. The site measured approximately 8.0 m (26.2 ft) north-south by 7 m (23 ft) east-west, and covered approximately 56.0 sq m (602.7 sq ft).

Vegetation at the time of the survey consisted of tall grasses and weeds, as well as unharvested soy beans (Figure 8). Because of recent strip plowing within the project area, ground surface visibility was good (greater than 30 percent).

Investigation Methods

The site was primarily investigated through intensive pedestrian survey supplemented with systematic shovel testing. Ground surface visibility was good within the plow strips; therefore, the portion of the site within the plow strips was subjected to intensive pedestrian survey using a 5 m (16 ft) transect interval. All artifacts observed on the ground surface were flagged and collected as a single general surface collection (GSC 1). An STP was placed within GSC 1 to assess the depositional context of the site and to determine the potential for intact subsurface deposits.

STP 1 was negative for cultural material, and was recorded as the site datum using a GPS HD application on an Apple iPad.

Additional STPs were excavated at 5 m (16 ft) intervals, extending in each of the cardinal directions until two negative STPs were encountered. In total, 9 STPs were excavated; all were negative for cultural material. The location of all STPs, GSC, and natural features were placed on a site plan map (Figure 9).

Depositional Context

Site 12Pm431 is located on topography mapped as Alford series silt loam. A representative soil profile taken from STP 1 at the site revealed a dark yellowish brown (10YR 4/4) silty clay loam that extended approximately 22.0 cm (8.6 in) bgs. This was underlain by brownish yellow (10YR 6/8) silty clay loam that extended to a depth of at least 32.0 cm (12.5 in) bgs (Figure 10). This profile conformed to the range of characteristics attributed to Alford series soils. All artifacts were recovered from the ground surface and the site had been disturbed by long-term agricultural use. Therefore, Site 12Pm431 is considered to have poor depositional context.



Figure 8. Overview of Site 12Pm431, facing south.

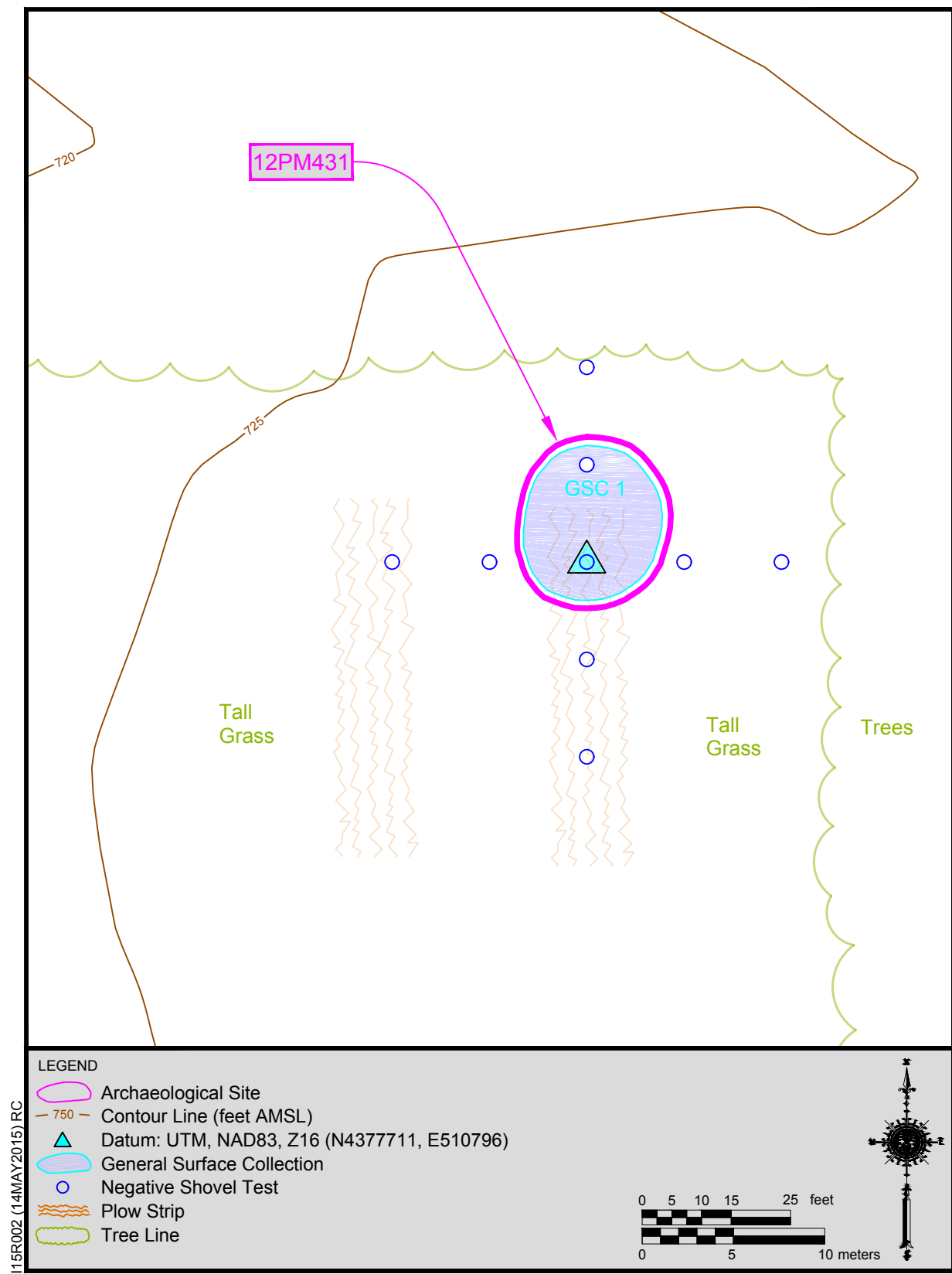


Figure 9. Site 12Pm431 schematic map.

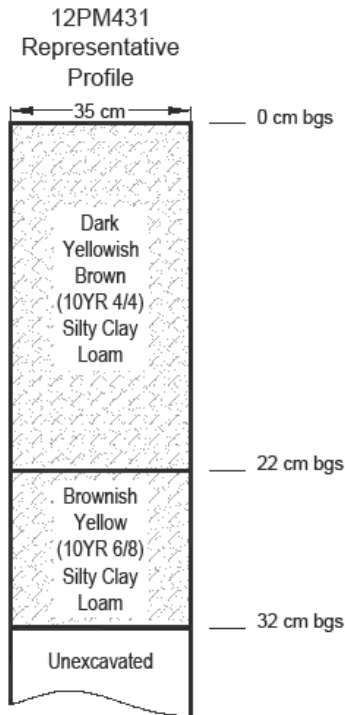


Figure 10. Representative soil profile from Site 12Pm431.

Artifacts

A single sherd of polychrome hand-painted whiteware was recovered from Site 12Pm431 during the current survey. This sherd dated from 1830 to 1870 (Lange and Carlson 1985). No mapped structures were depicted in the vicinity of this site on any of the reviewed historic maps, and it is likely that this artifact represents an isolated episode of dumping dating to the mid- to late-nineteenth century. Little more may be inferred from this single artifact.

The prehistoric artifact recovered from Site 12Pm431 consisted of one early stage flake (1.3 g) of non-local Allens Creek chert. No temporally diagnostic artifacts were recovered from the site. The artifact was not heat treated or thermally altered. Since the site consisted of an isolated find, little more may be inferred other than the site may have served as the location of a short-term occupation where lithic tool manufacture or maintenance occurred.

Features

No evidence of intact subsurface features or deposits was encountered during shovel testing.

Summary and NRHP Evaluation

Site 12Pm431 consisted of a single prehistoric lithic, as well as a single mid-nineteenth-century historic ceramic fragment. This site does not satisfy the criteria for listing on the NRHP. All materials were recovered from the ground surface. There is no evidence for the presence of intact deposits. It is unlikely that further work at the site would produce any information beyond that which has already been gathered, and this site does not have the potential to make significant contributions to the history of the regions. Therefore, Site 12Pm431 is recommended as not eligible for listing on the NHRP, and no further work is recommended for the site.

12Pm432

Elevation: 214 m (702 ft) AMSL

Component(s): mid-nineteenth century

Site type(s): Industrial dump

Size: 1,316 sq m (14,165 sq ft)

Distance to nearest water: 5.5 km (3.4 mi)

Direction to nearest water: Northwest (Big Walnut Creek)

Type and extent of previous disturbance:

Agricultural, logging, extent unknown

Topography: Gentle slope

Vegetation: Tall grasses and weeds

Ground surface visibility: Greater than 30 percent

Aspect: South

Recommended NRHP status: Not eligible

Site Description

Site 12Pm432 consists of a moderate density scatter of historic ceramic manufacturing refuse associated with one of at least three known potteries historically located outside the project area. The site is located 347.8 m (1,413 ft) northwest of SR 243. The site was identified by the presence of cultural materials on the ground surface within the

agricultural field at an elevation of 214 m (703 ft) AMSL. The nearest natural water source was the Big Walnut Creek, located approximately 5.5 km (3.4 mi) northwest of the site. Site dimensions were established by the limits of the positive shovel tests. The site measured approximately 47 m (154 ft) north–south by 28.0 m (91.8 ft) east–west, and covered approximately 1,316 sq m (14,165 sq ft).

Vegetation at the time of the survey consisted of tall grasses and weeds (Figure 11). Because of recent strip plowing within the project area, ground surface visibility was good (greater than 30 percent).

Investigation Methods

The site was primarily investigated through pedestrian survey supplemented with systematic shovel testing. Ground surface visibility was good (greater than 30 percent).

The portion of the site situated within the plow strips was subjected to intensive pedestrian survey using a 5 m (16 ft) transect interval. All artifacts observed on the ground surface were flagged and a 50 percent sample was collected from two separate general surface collections (GSC 1 and 2). An STP was placed within GSCs 1 and 2 to assess the depositional context of the site and to determine the potential for intact subsurface deposits.

STP 1 was positive for cultural material, and was recorded as the site datum using a GPS HD application on an Apple iPad. Additional STPs were excavated at 5 m (16 ft) intervals, extending in each of the cardinal directions until two negative STPs were encountered. In total, 31 STPs were excavated; 8 were positive for cultural material. The location of all STPs, GSC, and natural and cultural features were placed on a site plan map (Figure 12).



Figure 11. Overview of Site 12Pm432, facing south.

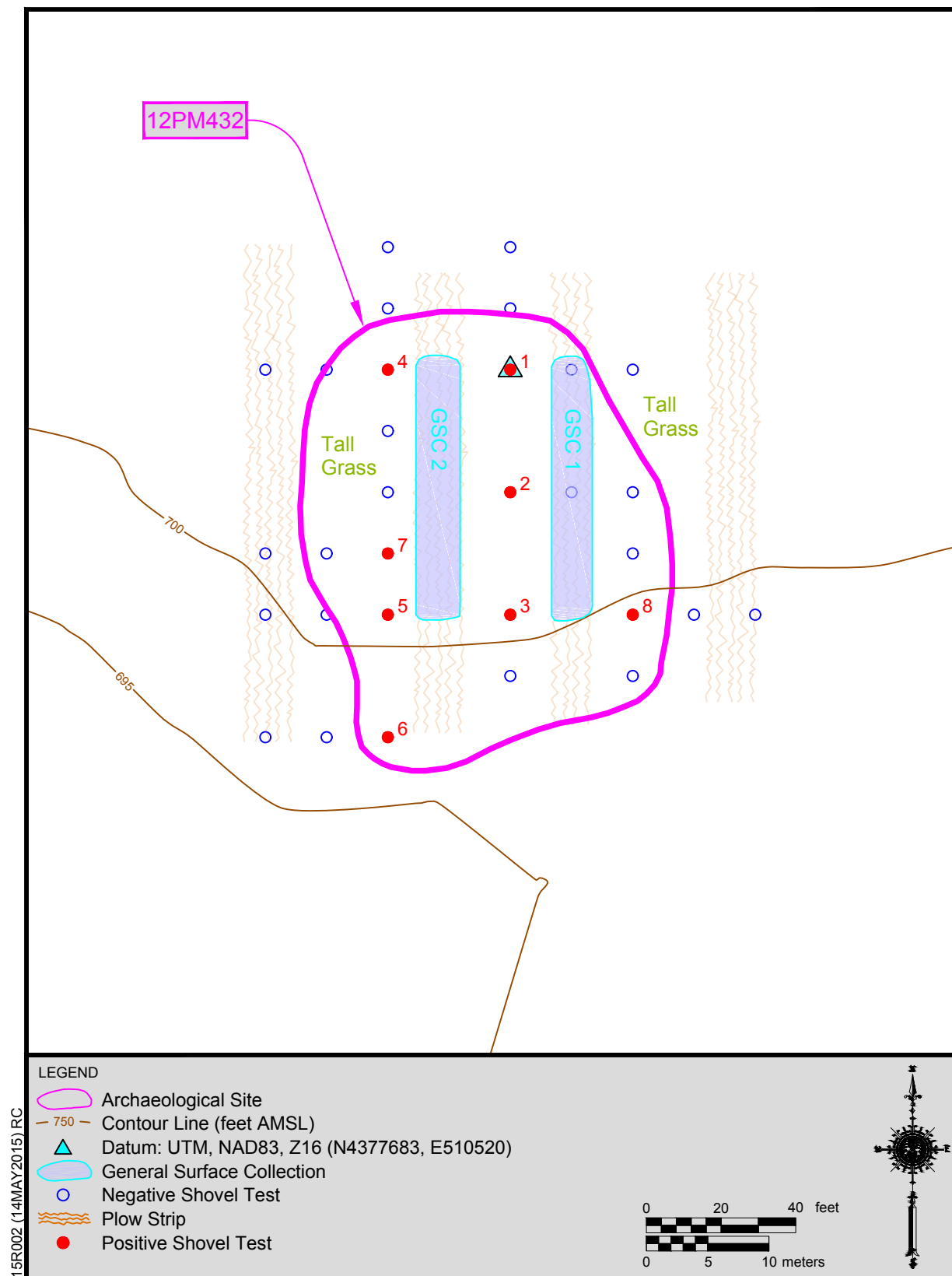


Figure 12. Site 12Pm432 schematic map.

Depositional Context

Site 12Pm431 is located on topography mapped as Iva silt loam. A representative soil profile taken from STP 1 at the site revealed a dark yellowish brown (10YR 4/4) silty clay loam that extended approximately 15 cm (6 in) bgs. This was underlain by a light yellowish brown (10YR 6/4) silty clay loam that contained Fe/Mn inclusions throughout (Figure 13). This profile varied only slightly from the range of characteristics attributed to Iva series soils. A typical Iva series soil consists of a brown (10YR 4/3) silt loam that extends to a depth of approximately 20.0 cm (7.8 in) bgs and is underlain by a pale brown (10YR 6/3) silt loam. All artifacts were recovered from the ground surface and the site had been disturbed by long-term agricultural use. Site 12Pm432 is considered to have poor depositional context.

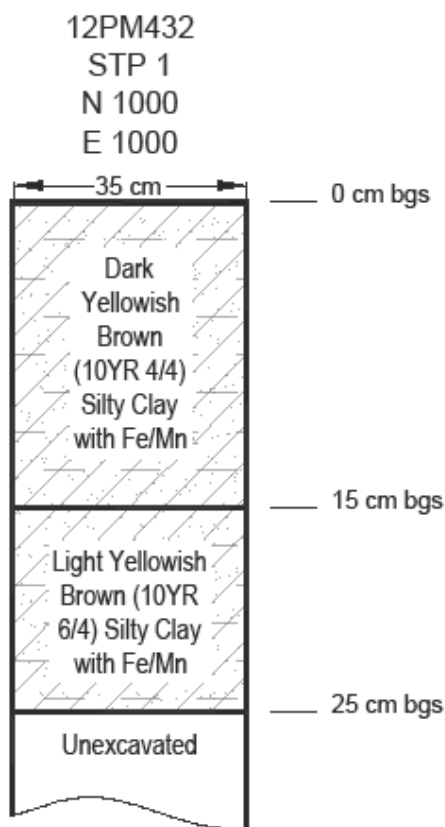


Figure 13. Representative soil profile from Site 12Pm432.

Archival Data

A variety of archival records and historic maps were consulted in an effort to establish the historic context of the site. Deed records for the property were available at the Putnam County Recorder's Office (PCRO) in Greencastle, Indiana, from the mid-nineteenth century. Federal census records were consulted in an effort to determine the identities of any individuals who may have owned or occupied the site. When available, other documents, including marriage records and death records, were also examined in order to supplement the limited data provided by the census records. Additionally, historic topographic maps were inspected in order to explore the historic architectural landscape at the site. At the time of this survey, no information was available pertaining to the ownership history of the site prior to 1846. A summary of the ownership history is presented in Table 2.

Table 2. Summary of Ownership History of Site 12Pm432.

Years	Owner/s	Occupation of Owner/s
?-1847	Garland Harris	unknown
1847-1848	Will D. Miller	unknown
1848-1881	David A. McClure	Sawyer/Farmer
1881-1882	Elijah Grantham	Farmer
1882-1892	Jennie Love	unknown
1892-1895	Marion O'Neal	Farmer
1895	William Wright	Farmer
1895-1900	Unknown trustee	unknown
1895-1914	Martitia Lucas	unknown
1900-1909	Andrew S. Wright	Farmer
1909-1914	Dora J. Wright	unknown
1914-Present	State of Indiana	n/a

The earliest recorded landowner associated with Site 12Pm432 is Garland Harris. Census data relating to Garland Harris could not be located. However, a land grant dated November 10, 1840, for 120 acres was issued for Garland Harris near the current location of Site 12Pm432. It seems likely that Garland Harris obtained the land for farming purposes.

On March 19, 1847, Garland Harris sold an unspecified amount of property to Will D. Miller for the sum of \$400 (Putnam County Transfer Book [PCTB] M: 331). Information pertaining to Will D. Miller was not available. It is unclear whether Will D. Miller ever resided on the land associated with Site 12Pm432.

On March 23, 1848, Will D. Miller sold approximately 82 acres to David A. McClure for the sum of \$1,000 (PCTB N: 168). In 1860, David A. McClure, age 26, was recorded as a Sawyer who owned approximately \$2,300 worth of real-estate, along with \$700 in personal property (USBC 1870). A review of the 1864 atlas reveals the existence of two nearby potteries owned by separate landowners (Cowles and Titus 1864). The closest pottery listed is approximately 1.2 km (.7 mi) east of the McClure property and was owned by George E. Perry, whose occupation in 1870 is listed as potter (USBC 1870). Additionally, a second potter, A.W. Welker, is listed as a neighbor of the McClure property on the 1870 census. Welker's residence and pottery are depicted approximately 1.9 km (1.2 mi) northeast of the McClure property on the 1864 landowner atlas (Cowles and Titus 1864). A.W. Welker's son, James O. is listed as living with his father, and his occupation is also recorded as potter. It seems likely that artifacts recorded from Site 12Pm432 are a result of dumping related to one, or both, of these potteries.

On May 1, 1881, David A. McClure sold 82 acres to Elijah Grantham for the sum of \$2,500 (PCTB 24:304). On August 25, 1882, Elijah Grantham sold 82 acres to Jennie Love for the sum of \$1,000 (PCTB DB 36: unknown). Deed records relating to Jennie Love indicate that she was unmarried at the time of the land transfer. Census records relating to Jennie Love could not be located.

On November 2, 1892, Jennie Love sold 82 acres to Marion O'Neal for the sum of \$1,400 (PCTB 37: 378-379). On June 5, 1895, Marion O'Neal sold the 82 acre parcel to William Wright, for the sum of \$1,400 (PCTB 41: 367). It is unclear if the Wright family

ever resided on the property in question. However, in 1891, William Wright's oldest son, Andrew S., married Marion O'Neal's daughter Dora J.

On August 3, 1895, two months after he purchased the property, William Wright sold 42 acres of the 82-acre tract to an unidentified trustee for an unspecified sum (PCTB 37: unknown). Information pertaining to who or what this may indicate could not be located. The trustee sold the 42-acre property to Andrew S. Wright in 1900 for an unknown sum. In May of 1909, Andrew S. transferred ownership of the property to his wife, Dora J. for a sum of \$250 ((PCTB 37: unknown).

On August 10, 1895, William Wright sold the remaining 40 acres, of the original 82, to his daughter Martitia (Wright) Lucas and her husband for an unknown sum (PCTB 37: unknown). Information relating to Martitia and her husband was not located. The deed transfer only lists Martitia as the Grantee and later the Grantor.

In August 1914, Martitia Lucas sold 40 acres to the State of Indiana for an unspecified amount. The value of the property in 1903 was appraised for \$400, which may serve as an indication of the amount paid for the property (Putnam County Deed Book [PCDB] 73: 340). On August 8, 1914, Dora J. Wright sold the adjoining 42 acres to the State of Indiana for an unknown amount (PCDB 73: 340). The State of Indiana developed the property into what was then known as the Indiana State Farm.

The Indiana State Farm was organized in 1914, and served as a minimum security and misdemeanor work camp that allowed prisoners to contribute to the farm's extensive farming and manufacturing operations. The facility is noted for its self-sufficiency in connection with the vast agricultural undertakings taking place throughout the facility's 4,350 acres. In the second annual report, written to the governor in 1916, by the Farm's president GEO. A.H. Shideler, there is mention that "[t]he remains of an old Pottery is still in evidence suggesting the presence of clay suitable for the clay brick (Indiana State

Farm: Second Annual Report 1916).” The land purchased by the Indiana State Farm in 1914 did not include the properties that were previously owned by Welker or Perry and are noted to have housed potteries. This indicates the presence of an unmapped pottery somewhere on the Indiana State Farm’s property. It also seems that the ceramic artifact scatter found at Site 12Pm432 is likely not associated with any type of pottery production undertaken by the farm itself. The 1944 annual report to the governor lists the industries being undertaken on the farm’s property, and does not make mention of any type of pottery (Indiana State Farm: Annual Report 1944).

Artifacts

A total of 46 artifacts were recovered from Site 12Pm432 (Table 3) including architectural (n = 2), domestic (n = 4), and industrial (n = 39) group items. The recovered architectural items included two fragments of handmade brick that were not assigned a specific date. The recovered domestic group items included two sherds of undecorated whiteware dating to after 1830, one sherd of hand-painted polychrome whiteware dating from 1830 to 1870, and one sherd of lead-glazed redware dating from 1780 to 1850 (Lange and Carlson 1985; Majewski and O’Brien 1987; O’Malley 1997). The industrial items were all associated with ceramic manufacture and included 37 stoneware waster fragments and 2 ceramic separator bar fragments. Twenty-five of the stoneware waster fragments exhibited a salt glaze (Figure 14). The stoneware dated from 1780 to 1925 (Ketchum 1983).

The majority of the artifacts recovered from this site appear to represent at least one dumping episode associated with stoneware manufacturing. The salt-glazing and the presence of polychrome hand-painted whiteware is consistent with a mid-nineteenth-century date. According to the 1864 landowner atlas, two potteries were located within 1.2 miles of the site. It is likely that the site was used as a dump by one or both of these potteries at some point during the mid-

nineteenth century. Little more may be inferred from this homogenous assemblage.

Features

No evidence of intact subsurface features or deposits was encountered during shovel testing. There was no evidence for the presence of a kiln, kiln furniture, burnt earth, or any other structural remains that may be associated with historic pottery manufacturing.

Summary and NRHP Evaluation

Site 12Pm432 consisted of a moderately dense scatter of mid-nineteenth-century ceramic manufacturing refuse. The archival and archaeological data suggest that this site represents a dump associated with one of three known potteries historically located nearby, outside the project area. This site does not satisfy the criteria for listing on the NRHP. A 50 percent sampling of the surface artifacts was collected in two separate GSCs for analysis. There is no evidence for the presence of intact deposits, and the site demonstrated poor depositional integrity. It is unlikely that further work at the site would produce any information beyond that which has already been gathered, and this site does not have the potential to make significant contributions to the history of the regions. However, it should be noted that historic pottery sites located on nearby land outside of the project area would have potential to offer a better understanding of the areas early pottery production. Nevertheless, Site 12Pm432 is recommended as not eligible for listing on the NRHP, and no further work is recommended for the site.

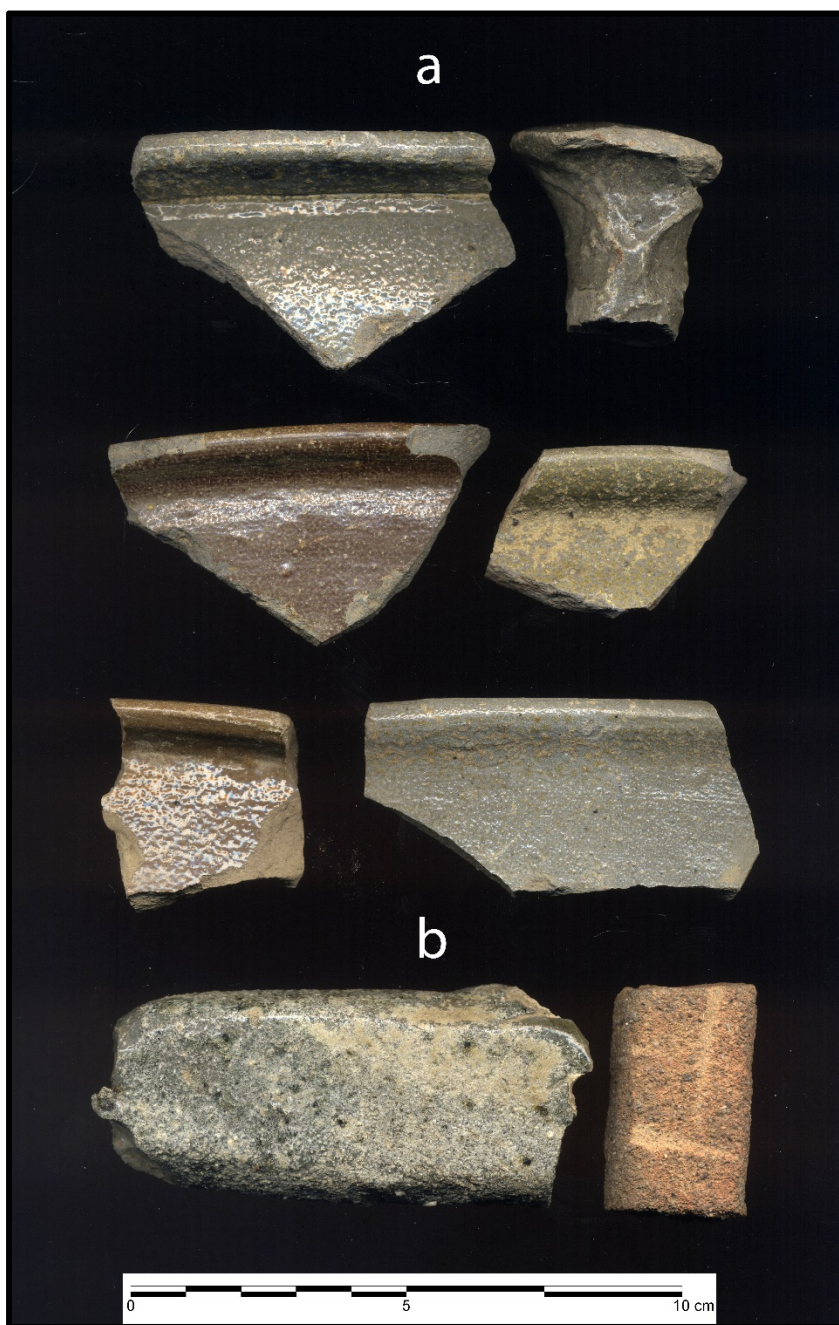


Figure 14. Ceramic manufacturing refuse recovered from Site 12Pm432: (a) salt-glazed stoneware waster fragments; (b) ceramic separator bar fragments.

Table 3. Artifacts Recovered from the Site.

Unit No.	Depth	Artifacts
GSC 1	0-0 cm bgs	1 Handpainted polychrome (early) whiteware, 1 undecorated whiteware, 6 Salt glazed exterior stoneware whiteware, 3 wasters
GSC 2	0-0 cm bgs	10 Salt glazed exterior stoneware, 1 waster, 1 other
STP 1	0-15 cm bgs	1 salt glazed stoneware
STP 2	0-28 cm bgs	1 handmade brick fragment, 3 salt glazed stoneware, 4 unglazed stoneware
STP 3	0-30 cm bgs	2 unglazed stoneware, 2 salt glazed stoneware, 1 waster
STP 4	0-21 cm bgs	1 salt glazed stoneware
STP 5	0-32 cm bgs	1 undecorated whiteware
STP 6	0-29 cm bgs	1 salt glazed stoneware
STP 7	0-25 cm bgs	1 coarse redware
STP 8	0-31 cm bgs	1 handmade brick fragment, 1 salt glazed stoneware, 1 waster

12Pm433

Elevation: 213 m (699 ft) AMSL
 Component(s): Mid- to late-twentieth century
 Site type(s): Historic outbuilding
 Size: 1,944 sq m (20,925 sq ft)
 Distance to nearest water: 5.4 km (3.4 mi)
 Direction to nearest water: Northwest (Big Walnut Creek)
 Type and extent of previous disturbance: Agricultural, logging, extent unknown
 Topography: Gentle slope
 Vegetation: Tall grasses and weeds, secondary growth.
 Ground surface visibility: Less than 30 percent
 Aspect: flat
 Recommended NRHP status: Not eligible

Site Description

Site 12Pm0433 consists of the remnants of a mid- to late-twentieth-century brick outbuilding. Map data indicates that an outbuilding was constructed here between 1954 and 1970. The function of the outbuilding is unknown, but it likely served as a support structure for the Indiana State Farm. 12Pm433 is located 471 m (1,545 ft) northwest of SR 243. The site was identified by the presence of cultural features on the ground surface within a grassy portion of the project area along the unimproved gravel road at an elevation of 213 m (699 ft) AMSL. The nearest natural water source is the Big Walnut Creek, located approximately 5.4 km (3.4 mi) northwest of the site. Site dimensions were established by the limits of the surficial features. The site measured approximately 36 m (118 ft) north–south by 54 m (177 ft) east–

west, and covered approximately 1,944 sq m (20,925 sq ft).

Vegetation at the time of the survey consisted of tall grasses and weeds (Figure 15). Ground surface visibility in and around the site was poor (less than 30 percent). The northern portion of the site, adjacent to the unimproved gravel road, was located within dense brush (see Figure 15). Because of the density of the brush here, and the high probability of disturbance associated with the brush, this area was not shovel tested.

Investigation Methods

Nine screened shovel tests were excavated within the site boundaries in order to determine the extent of the cultural deposit. Shovel tests were excavated using 10 m (32.8 ft) intervals along an east-west axis. The site datum was recorded using a GPS HD application on an Apple iPad. Distances to delineation shovel tests were paced. A hand-drawn site map recorded the location of the datum, shovel tests, surficial features, and pertinent features of the site landscape, such as roads, and topographic contour lines (Figure 16).

Depositional Context

Site 12Pm433 is located on topography mapped as Iva silt loam. A representative soil profile taken from STP 1 at the site revealed a very dark brown (10YR 2/2) silty loam that extended approximately 24.0 cm (9.4 in) bgs. This A-horizon contained a very high concentration of road gravels. This was underlain by a grayish brown (10YR 5/2)



Figure 15. Overview of Site 12Pm433, facing east.

mottled with dark yellowish brown (10YR 4/6) silty loam that contained redoximorphic features throughout and extended to a depth of at least 34 cm (13 in) bgs (Figure 17). This profile does not conform to the range of characteristics described for Iva series soils, and may serve as an indication of disturbance associated with the outbuilding construction or demolition. No artifacts were collected from Site 12Pm433.

Features

Evidence of a feature was encountered during shovel testing just below the surface within the southern portion of site. A flat brick surface was observed extending approximately 14 m (45 ft) north-south and 12 m (39 ft) east-west to an unknown depth (Figure 18). Brick observed within this feature appears to be machine-made and its ultimate function is unknown, though it likely represents a floor for the mapped outbuilding located at this

location. In addition to the buried brick surface, two mortared machine-made brick foundation remnants, six wooden fence posts, and three metal fence posts were recorded at the site (see Figure 16).

Summary NRHP Evaluation

Site 12Pm433 consists of the remnants of a mid- to late-twentieth-century outbuilding located along an unimproved gravel road. The exact function of the structure could not be determined, but it is likely associated with the Indiana State Farm. Aside from brick structural remnants and fence posts, no cultural materials were encountered at the site. This site does not satisfy the criteria for listing on the NRHP. There is no evidence for the presence of intact deposits, and the site demonstrated poor depositional integrity. It is unlikely that further work at the site would produce any information beyond that which has already been gathered, and this site does

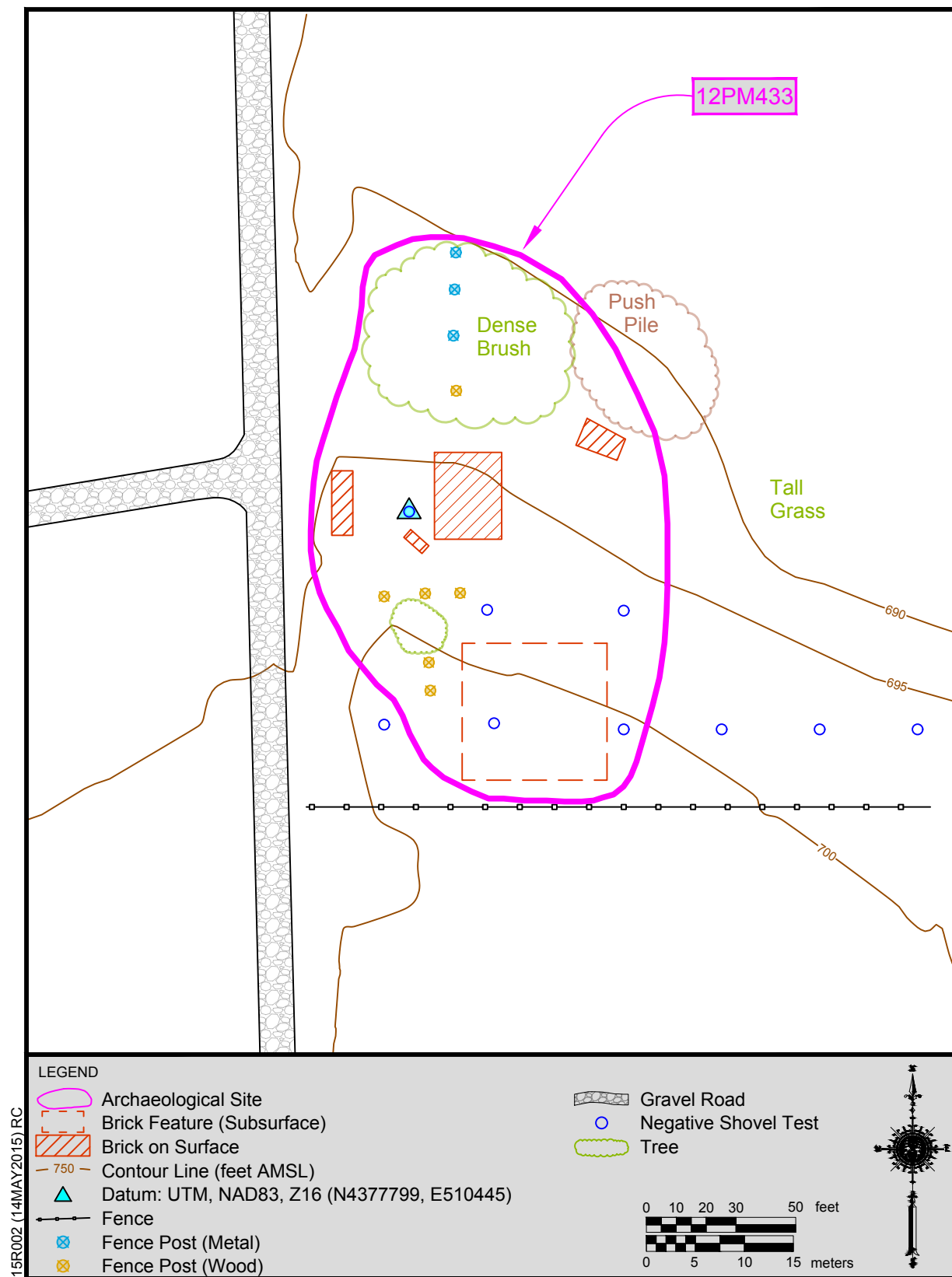


Figure 16. Site 12Pm433 schematic map.

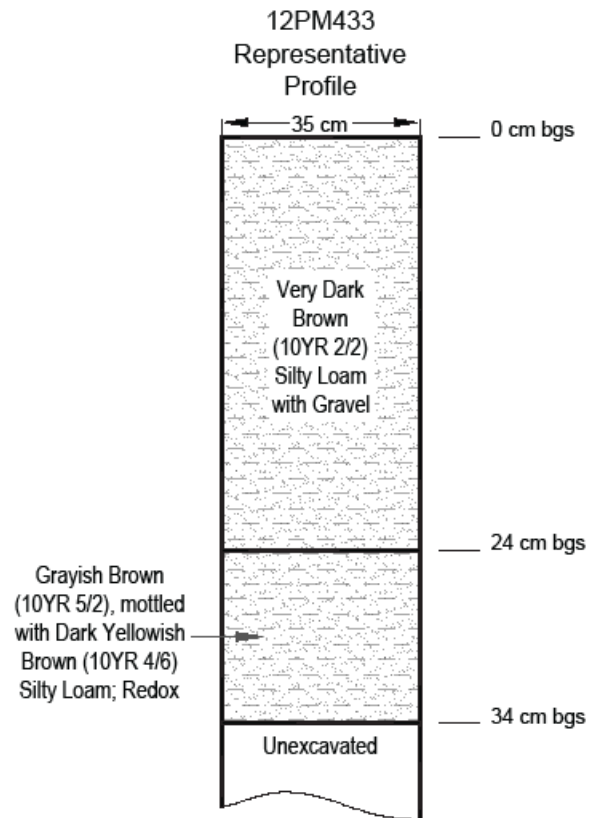


Figure 17. Representative soil profile from Site 12Pm433.



Figure 18. Overview of surficial brick feature from Site 12Pm433.

not have the potential to make significant contributions to the history of the regions. Based on disturbance associated the demolition of the mid-twentieth-century outbuilding, it is unlikely that Site 12Pm433 has the potential to contribute any further archaeological data. Therefore, Site 12Pm433 is recommended as not eligible for listing on the NHRP, and no further work is recommended for the site.

VI. CONCLUSIONS AND RECOMMENDATIONS

On May 5 and 6, 2015, CRA, personnel conducted a phase Ia archaeological survey for the proposed Deer Creek Shooting Range Environmental Assessment project in Cloverdale, Putnam County, Indiana. Prior to fieldwork, a records review was conducted at the Indiana DNR, IDHPA. The review indicated the project area had not been previously surveyed, and that no archaeological sites have been previously recorded within, or near, the project area boundaries. The project area is approximately 17.95 ha (44.30 acres) in size and was surveyed in its entirety. Field methods included pedestrian survey supplemented with systematic shovel testing.

The current survey resulted in the documentation of three previously unrecorded archaeological sites (12Pm431, 12Pm432, and 12Pm433). Site 12Pm431 consists of a single prehistoric lithic artifact as well as a single historic ceramic artifact that were located on the ground surface. Site 12Pm432 consists of a mid-nineteenth-century historic ceramic scatter, which appears to represent dumping activity associated with known potteries located outside the project area. Site 12Pm433 consists of mid- to late-twentieth-century outbuilding remnants. Due to a lack of archaeological integrity and research potential, Sites 12Pm431, 12Pm432, and 12Pm433 are recommended as not eligible for inclusion in the NRHP. Therefore, no archaeological sites recommended eligible for, or listed in, the

NRHP will be affected by this project, and project clearance is recommended.

REFERENCES CITED

- Anslinger, C. Michael
1990 *The Akers Site: A Late Woodland Albee Phase Burial Mound in Warren County, West Central, Indiana*. Technical Report No. 10. Anthropology Laboratory, Indiana State University, Terre Haute.
- Anslinger, C. Michael, Albert. M. Pecora, III, Charles M. Niquette, and Jonathan P. Kerr
1994 *Salvage Excavations at the Railway Museum Site (15JF630) Jefferson County, Kentucky*. Contract Publication Series 94-15. Cultural Resource Analysts, Inc., Lexington, Kentucky.
- Baskin, Forster & Co.
1876 *Illustrated Historical Atlas of the State of Indiana*. Baskin, Forster & Co. Chicago.
- Black, Glenn A.
1935 Excavation of a Blackford County site. *Indiana History Bulletin* 13(7).
- Braun, E. Lucy
2001 *Deciduous Forests of Eastern North America*. Reprinted. Blakiston, Philadelphia. Originally published 1950.
- Brown, James A., and Robert K. Vierra
1983 What Happened to the Middle Archaic? Introduction to an Ecological Approach to Koster Site Archaeology. In *Archaic Hunters and Gatherers in the American Midwest*, edited by James L. Phillips and James A. Brown, pp. 165–196. Academic Press, New York.
- Cameron, Elisabeth
1986 *Encyclopedia of Pottery and Porcelain, 1800–1960*. Facts on File Publications, New York.
- Cantin, Mark
2000 Comparative Analysis of Thebes and Kirk Lithic Technology and Home Range Implications in Southwestern Indiana. Unpublished Master's thesis,

- Department of Geography, Geology, and Anthropology, Indiana State University, Terre Haute.
- 2008 Provenience, Description, and Archaeological Use of Selected Chert Types of Indiana. Manuscript on file, Anthropology Laboratory, Indiana State University, Terre Haute.
- Cochran, Donald R.
1988 *The Heshner Site: A Late Albee Cemetery in East Central Indiana*. Reports of Investigation No. 24. Archaeological Resources Management Service, Department of Anthropology, Ball State University, Muncie, Indiana.
- Collins, Michael B.
1979 *Excavations at Four Archaic Sites in the Lower Ohio Valley, Jefferson County, Kentucky*. 2 vols. Occasional Papers in Anthropology No. 1. Department of Anthropology, University of Kentucky, Lexington.
- Dodd, Arthur Edward
1964 *Dictionary of Ceramics*. Philosophical Library Inc., New York.
- Duffy, John
1978 Social Impact of Disease in the Late Nineteenth Century. In *Sickness and Health in America: Readings in the History of Medicine and Public Health*, edited by Judith Walzer Leavitt and Ronald L. Numbers, pp. 395–402. University of Wisconsin Press, Madison.
- Environmental Protection Agency
2013 Surf Your Watershed. Available URL: <http://cfpub.epa.gov/surf/state.cfm?statepostal=IN>, accessed September 6, 2013. United States Environmental Protection Agency, Washington D.C.
- Faulkner, Charles H.
2000 Historical Archaeology Laboratory Manual. Department of Anthropology, University of Tennessee, Knoxville.
- Garrow, Patrick H., and Thomas R. Wheaton, Jr. (editors)
1986 *Oxon Hill Manor Archaeological Site Mitigation Project*. Prepared for Maryland State Highway Administration, Baltimore, Maryland. Garrow and Associates, Inc., Atlanta, Georgia.
- Gray, H. H.
2000 *Physiographic Divisions of Indiana*. Indiana Geological Survey Special Report 61, Plate 1.
- Greaser, Arlene and Paul H. Greaser
1967 *Homespun Ceramics: A Study of Spatter Ware*. 3rd ed. A.B.E. Company, Allentown, Pennsylvania.
- Griffin, James B.
1978 The Midlands and Northeastern United States. In *Ancient Native Americans*, edited by Jesse D. Jennings, pp. 221–280. W. H. Freeman, San Francisco.
- Historic Landmarks Foundation of Indiana
1982 *Historic Sites and Structures Inventory: Putnam County Interim Report*. Historic Landmarks Foundation of Indiana, Indianapolis, Indiana.
- Indiana Department of Corrections
2015 Putnamville Correctional Facility History. Electronic document, <http://www.in.gov/idoc/3166.htm> accessed May 20, 2015.
- Indiana Geological Survey
2002 PHYSIOGRAPHY_SR61_IN: Physiographic Regions of Indiana (1:500,000 scale Polygon Shapefile). Electronic document, <http://igs.indiana.edu/arcims/statewide/download.html>, accessed December 2012. Indiana Geological Survey, Bloomington, Indiana.
- Justice, Noel D.
1987 *Stone Age Spear and Arrow Points of the Midcontinental and Eastern United States: A Modern Survey and Reference*. Indiana University Press, Bloomington, Indiana.

- Keller, James H. and Cheryl Ann Nunson
1984 *An Archaeological Reconnaissance of the Proposed Water Systems Improvements for the Reelsville Water Company, Inc., In Putnam County, Indiana (MEI Project #78045)*. Glenn A. Black Laboratory of Archaeology, Bloomington, Indiana.
- Ketchum, William C., Jr.
1983 *Pottery and Porcelain*. Alfred A. Knopf, New York.
- Lake, D.J.
1864 Map of Putnam County, Indiana. Cowles & Titus. Philadelphia.
- Lange, Frederick W., and Shawn B. Carlson
1985 Distributions of European Earthenwares on Plantations on Barbados, West Indies. In *The Archaeology of Slavery and Plantation Life*, edited by Teresa A. Singleton, pp. 97–120. Academic Press, New York.
- Lewis, Griselda
1950 *English Pottery*. Pellegrini and Cudahy, New York.
- McCord, Beth Kolbe, and Donald R. Cochran
1994 *Morell-Sheets: An Albee Phase Habitation*. Report of Investigation 38. Archaeological Resources Management Service, Ball State University, Muncie.
- 2003 The Morell-Sheets Site: Refining the Definition of the Albee Phase. In, *Facing the Final Millennium: Studies in the Late Prehistory of Indiana, A.D. 700 to 1700*. Edited by Brian G. Redmond and James R. Jones III. Indiana Department of Natural Resources, Division of Historic Preservation and Archaeology, Indianapolis.
- McCullough, Robert G.,
2000 The Oliver Phase in Central Indiana: A Study of Settlement Variability as a Response to Social Risk. Unpublished Ph.D. dissertation, Department of Anthropology, University of Southern Illinois, Carbondale.
- McCullough, Robert G., Andrew W. White, Michael R. Strezewski, and Dorothea McCullough
2004 *Frontier Interaction during the Late Prehistoric Period: A Case Study from Central Indiana*. Indiana University-Purdue University at Fort Wayne (IPFW) Archaeological Survey, Indiana University-Purdue University at Fort Wayne, Fort Wayne, Indiana.
- McGregor, John R.
1988 Analysis of Stoneware Pottery of West Central Indiana. *Ohio Valley Historical Archaeology* 6: 97-100.
- Magne, Martin P.R.
1985 *Lithics and Livelihood: Stone Tool Technologies of Central and Southern Interior B.C.* Archaeology Survey of Canada, Mercury Series No. 133, Ottawa.
- Majewski, Teresita, and Michael J. O'Brien
1987 The Use and Misuse of Nineteenth-Century English and American Ceramics in Archaeological Analysis. In *Advances in Archaeological Method and Theory*, Volume 11, edited by Michael J. Schiffer, pp 97–209. Academic Press, New York.
- Mankowitz, Wolf, and Reginald G. Haggard
1957 *The Concise Encyclopedia of English Pottery and Porcelain*. Hawthorne Books, New York.
- Munson, Cheryl A., and Thomas G. Cook
1980 The Late Archaic French Lick Phase: A Dimensional Description. In *Archaeological Salvage Excavations at Patoka Lake, Indiana: Prehistoric Occupations of the Upper Patoka River Valley*, edited by Cheryl A. Munson, pp. 721–740. Research Reports No. 6. Glenn A. Black Laboratory of Archaeology, Indiana University, Bloomington.
- Mohow, James
1992 A Brief Overview of Early Archaic Settlement in East Central Indiana. In *Native American Cultures in Indiana, Proceedings of the First Minnestrista*

- Council for Great Lakes Native American Studies*, edited by R. Hicks, pp. 15–22. Minnetrista Cultural Center and Ball State University, Muncie.
- National Park Service
1983 Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines. *Federal Register* 48(190): 44716–44742. United States Department of the Interior, Washington, D.C.
- O'Malley, Nancy
1997 The Early Redware Industry in Kentucky. Paper presented at "Kentucky Clay": A Symposium on Kentucky Potters and Potteries. Hopewell Museum, Paris, Kentucky.
- Orser, Charles E.
1988 *The Material Basis of the Postbellum Tenant Plantation*. The University of Georgia Press, Athens, Georgia.
- Price, Cynthia R.
1979 *Nineteenth-Century Ceramics in the Eastern Ozark Escarpment Region of Southeast Missouri*. Paper presented to the 35th Annual Meeting of the Southeast Archaeological Conference, Knoxville, Tennessee.
1981 Early to Mid-Nineteenth Century Refined Earthenwares. In *A Guide for Historical Archaeology in Illinois*, edited by Charles E. Orser, Jr., pp. 24–48. Mid-American Research Center Research Paper Number 1. Loyola University, Chicago.
- Redmond, Brian G. and Robert G. McCullough
2000 The Late Woodland to Late Prehistoric Occupations of Central Indiana. In *Late Woodland Societies: Transformation across the Midcontinent*. Edited by T. Emersen, D. McElrath and A. Fortier. University of Nebraska Press, Lincoln.
- Robards, Mac
1981 *Soil Survey of Putnam County, Indiana*. United States Department of Agriculture, Soil Conservation Service, Washington, D.C.
- Report of Investigations 94-15. Glenn A. Black Laboratory of Archaeology. Indiana University, Bloomington.
- SHAARD
2015 State Historic Architectural and Archaeological Research Database (SHAARD) Archaeological Sites. Electronic Document, <https://secure.in.gov/apps/dnr/shaard/welcome.html>, accessed July 2014. Indiana Department of Natural Resources, Division of Historic Preservation and Archaeology, Indianapolis, Indiana.
- Soil Survey Staff
1999 *Soil Taxonomy, A Basic System of Soil Classification for Making and Interpreting Soil Surveys*. 2nd ed. Agricultural Handbook Number 436. United States Department of Agriculture, Natural Resource Conservation Service, Soil Survey Division, Washington, D.C.
2015 Web Soil Survey. Electronic document, <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>, accessed April 15, 2014. Natural Resources Conservation Service, United States Department of Agriculture, Lincoln, Nebraska.
- South, Stanley
1977 *Method and Theory in Historical Archaeology*. Academic Press, New York.
- Stafford, C. Russell, C. Michael Anslinger, Mark Cantin, and R. E. Pace
1988 *An Analysis of Data Center Surveys in Southwestern Indiana*. Technical Report No. 3. Anthropology Laboratory, Indiana State University, Terre Haute.
- Stafford, C. Russell
1994 Structural Changes in Archaic Landscape Use in the Dissected Uplands of Southwestern Indiana. *American Antiquity* 59:219–237.

- Stafford, C. Russell, Ronald L. Richards, and C. Michael Anslinger
2000 The Bluegrass Fauna and Changes in Middle Holocene Hunter-Gatherer Foraging in the Midwest. *American Antiquity* 65:317–336.
- Stafford, C. Russell, C. Michael Anslinger, Mark Cantin, and R. E. Pace
1988 *An Analysis of Data Center Surveys in Southwestern Indiana*. Technical Report No. 3. Anthropology Laboratory, Indiana State University, Terre Haute.
- Stewart-Abernathy, Leslie C.
1986 *The Moser Farmstead, Independent But Not Isolated: The Archeology of a Late Nineteenth Century Ozark Farmstead*. Arkansas Archeological Survey Research Series No. 26, Fayetteville, Arkansas.
- Stillwell, Larry N.
2005 *An Archaeological Field Reconnaissance of a Proposed Utility Line Corridor in Clay and Putnam Counties, Indiana*. Archaeology Consultants of Ossian, Muncie, Indiana.
- Swartz, Benjamin K., Jr.,
1982 *The Commissary Site: An Early Late Woodland Cemetery in East Central Indiana*. Contributions to Anthropological History No. 3. Department of Anthropology, Ball State University, Muncie, Indiana.
- United States Department of Agriculture
2006 *Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin*. Agricultural Handbook 296. Natural Resources Conservation Service, Washington, D.C.
- United States Geological Survey
1956 Cloverdale, Indiana, 7.5-minute series topographic quadrangle map. United States Geological Survey, Washington, D.C.
- 1939 Aerial Photo. United States Department of the Interior, Geological Survey, Washington, DC.
<http://igs.indiana.edu>
- 1946 Aerial Photo. United States Department of the Interior, Geological Survey, Washington, DC.
<http://igs.indiana.edu>
- 1958 Aerial Photo. United States Department of the Interior, Geological Survey, Washington, DC.
<http://igs.indiana.edu>
- 1967 Aerial Photo. United States Department of the Interior, Geological Survey, Washington, DC.
<http://igs.indiana.edu>
- 1975 Aerial Photo. United States Department of the Interior, Geological Survey, Washington, DC.
<http://igs.indiana.edu>
- 1970 (Photorevised 1986) Cloverdale, Indiana, 7.5-minute series topographic quadrangle map. United States Geological Survey, Washington, D.C.
- Wagner, Daniel P., and Joseph M. McAvoy
2004 Pedoarchaeology of Cactus Hill, a Sandy Paleoindian Site Southeastern Virginia, U.S.A. *Geoarchaeology* 19(4):297–322.
- Wetherbee, Jean
1980 *A Look at White Ironstone*. Wallace-Homestead Book Company, Des Moines, Iowa.
- Winters, Howard D.
1967 *An Archaeological Survey of the Wabash Valley in Illinois*, Revised ed. Reports of Investigations No. 10. Illinois State Museum, Springfield.

APPENDIX A. HISTORIC MATERIALS CLASSIFICATION

Architecture Group

The architecture group is comprised of artifacts directly related to buildings, as well as those artifacts used to enhance the interior or exterior of buildings. These artifacts consisted entirely of brick. Classes present within the architectural assemblage are discussed below.

Construction Materials

Construction materials refer to all elements of building construction. Brick was the only construction material recovered during the current project.

Domestic Group

The domestic group primarily includes artifacts used for the preparation, consumption, and storage of foods. For this project, domestic group items included ceramics.

Ceramics

The ceramics recovered were grouped into two major ware types: whiteware and redware. Ceramics within each of these ware groups were separated into decorative types that have temporal significance. Each of these ware groups is reviewed below, followed by discussions of associated decorative types.

Whiteware

As a ware type, whiteware includes all refined earthenware that possesses a relatively non-vitreous, white to grayish-white clay body. Undecorated areas on dishes exhibit a white finish under clear glaze. This glaze is usually a variant combination of feldspar, borax, sand, nitre, soda, and china clay (Wetherbee 1980:32). Small amounts of cobalt were added to some glazes, particularly during the period of transition from pearlware to whiteware and during early ironstone manufacture. Some areas of thick glaze on whiteware may, therefore, exhibit bluish or greenish-blue tinting. Weathered paste surfaces are often buff or off-white and vary considerably in color from freshly exposed paste (Majewski and O'Brien 1987).

Most whiteware produced before 1840 had some type of colored decoration. These decorations are often used to designate ware groups (i.e., edgeware, polychrome, and colored transfer print). Most of the decorative types are not, however, confined to whiteware. Therefore, decoration alone is not a particularly accurate temporal indicator or actual ware group designator (Price 1981).

The most frequently used name for undecorated whiteware is the generic "ironstone," which derives from "Ironstone China" patented by Charles Mason in 1813 (Mankowitz and Haggard 1957). For purposes of clarification, ironstone will not be used when referring to whiteware. Ironstone is theoretically harder and denser than whiteware produced prior to circa 1840. Manufacturer variability is, however, considerable and precludes using paste as a definite ironstone identifier or as a temporal indicator. Consequently, without independent temporal control, whiteware that is not ironstone is difficult to identify, as is early vs. later ironstone. For our analysis, the primary determining factor in classification of a sherd as whiteware was the hardness and porosity of the ceramic paste. Decorative types observed on the whiteware sherds in our assemblage are summarized and defined in the following discussions.

Plain

This decorative type includes vessels with no decoration. While some researchers such as Wetherbee (1980) include molded designs with "plain" whiteware, we agree with Majewski and O'Brien (1987:153) that molded vessels should be grouped on their own. Plain whiteware vessels became very popular following the Civil War and continued in popularity throughout the late nineteenth and early twentieth centuries (Faulkner 2000). Bacteriological research emerged after the Civil War, and it was not long before it became widely known that there is a link between bacteria and disease (Duffy 1978:395). Since

bacteria could not be seen with the naked eye, it was commonly thought that plain, undecorated wares were best suited for maintaining and serving clean, bacteria-free food. Hence, bacteriological research helped spur the rise in popularity of undecorated vessels, which resulted in increasing competition between whiteware and ironstone manufacturers.

Hand painted

Hand-painted decorations began to appear on whiteware vessels immediately after their introduction in the first quarter of the nineteenth century. In the early-nineteenth century, blue was the most frequently used color. Only colors capable of withstanding the heat of the glaze firing could be applied. Greaser and Greaser (1967) reported that children were utilized by some Staffordshire potteries to hand paint ceramics.

Pink, green, yellow, and red were commonly used from approximately 1830 through the mid-nineteenth century. The most common decorative motif on hand-painted ceramics was some type of floral design (Majewski and O'Brien 1987:157). There are several varieties of hand-painted floral decoration including fine line, broad line, or a combination of the two. Floral decorations were applied in many different ways. These designs were applied either freehand using brushes, by stencil, or by the turn of the twentieth century by filling in printed outlines (Majewski and O'Brien 1987:157).

The term "polychrome" refers to the use of more than one color in hand painting, while the term "monochrome" is used to refer to the use of only one color. Majewski and O'Brien (1987) suggest that the peak popularity period for hand-painted whiteware vessels was 1840–1860; however some were produced as early as 1830. Price (1979:31) suggested a circa 1830–1860 time frame for hand-painted whiteware ceramics recovered in Missouri, while Garrow and Wheaton (1986:Appendix 2) utilized an 1830–1875 manufacturing range. We generally agree with Lange and Carlson (1985) who suggested a date range of 1830–1870 for hand-painted wares such as whiteware, ironstone, and porcelain. When only one color was utilized, blue (cobalt oxide) was typically selected.

Coarse Redware

This ceramic type was regularly used as a utilitarian ware from approximately 1780 up until 1850, when its popularity was supplanted by stoneware (O'Malley 1997). Redware was generally manufactured from rather unrefined clays and fired at relatively low temperatures, and if glaze was used, then it was almost always lead-based. Most redware was made into hollowware vessels thrown on a wheel (O'Malley 1997), and since redware bodies tend to be quite porous, interior glazing was common on those vessels intended to hold liquids. Decorative types may take the form of colored slips, colored glazes, and incising.

Industrial Group

The industrial category includes artifacts usually associated with a variety of manufacturing and other activities. For this project, artifacts that could be confidently associated with the ceramic manufacturing industry were assigned to this category. These artifacts included stoneware "wasters" and separator bars. A brief discussion of stoneware follows.

Stoneware

Stoneware served as the "daily use" pottery of America, particularly rural America, after its introduction during the last decade of the eighteenth century. By 1850, this ware generally replaced coarse redware as the primary utilitarian ware used in American households. Stoneware is a semi-vitreous ware manufactured of a naturally fine, but dense, clay. The pottery was fired longer and to a higher temperature than earthenwares; a kiln temperature of at least 1,200 to 1,250 degrees celsius had to be obtained (Cameron 1986:319; Dodd 1964:274–275). As a result, stoneware generally exhibits a hard body

and a very homogeneous texture. The paste may vary from gray to brown, depending on the clay source, and length and intensity of the firing.

Because this ware is fired at such high temperatures, its body is nonporous and well suited to liquid storage. Stoneware, as mentioned, was not typically manufactured as a refined ware (such as its cousin, ironstone, or eighteenth-century refined white salt-glazed stoneware), and hence, it was, for the most part, utilized for utilitarian activities associated with jars, churns, crocks, tubs, jugs, mugs, pans, and pots. These vessels were typically glazed, with salt glazing and slip glazing most common.

Although refined salt glazing was practiced in England during the eighteenth century, by 1780, the production of English salt-glazed tableware had been virtually supplanted by the manufacture of cream colored earthenwares (Lewis 1950:29). The salt-glazing technique continued to be utilized for utilitarian vessels, however, and was eventually introduced to the United States in the early-nineteenth century. Salt glazing was accomplished by introducing sodium chloride into the kiln during the firing process, at which point the salt quickly volatilized. The vapor reacted with the clay to form a sodium aluminum silicate glaze (Dodd 1964:239). The surface of the glaze is typically pitted, having what is commonly known as an “orange peel” effect.

APPENDIX B. HISTORIC MATERIALS INVENTORY

Table B-1. Historic Materials Inventory.

Bag	Site	Unit .	Dep	Cat .	Group	Class Definition	Type Definition	Attr 1a Definition	Attr 2a Definition	Discard	Count	Weight	Vessel Part	MinDate	MaxDate	Comments
004	12Pm432	STP 3	0-30 cm bgs	5	I	Ceramic Mfg.	Stoneware	Salt glazed exterior	Unglazed interior	FALSE	1		Body	1780	1925	
004	12Pm432	STP 3	0-30 cm bgs	5	I	Ceramic Mfg.	Waster		-	FALSE	1		-	1780	1925	stoneware
004	12Pm432	STP 3	0-30 cm bgs	6	I	Ceramic Mfg.	Other		-	FALSE	1		-	0	0	separator bar
005	12Pm432	STP 4	0-21 cm bgs	7	I	Ceramic Mfg.	Stoneware	Salt glazed exterior	Salt glazed interior	FALSE	1		Rim	1780	1925	
006	12Pm432	STP 5	0-32 cm bgs	8	D	Ceramics	Whiteware	Undecorated	-	FALSE	1		Body	1830	0	
007	12Pm432	STP 6	0-29 cm bgs	9	I	Ceramic Mfg.	Stoneware	Salt glazed exterior	Salt glazed interior	FALSE	1		Body	1780	1925	
008	12Pm432	STP 7	0-25 cm bgs	10	D	Ceramics	Coarse Redware		Brown lead glazed interior	FALSE	1		Body	1780	1850	2 pcs
009	12Pm432	STP 8	0-31 cm bgs	11	A	Construction Material	Brick (measure in inches)	Handmade brick:non-vitrified	-	TRUE	1	6.6	-	0	0	
009	12Pm432	STP 8	0-31 cm bgs	12	I	Ceramic Mfg.	Stoneware	Salt glazed exterior	Salt glazed interior	FALSE	1		Body	1780	1925	
009	12Pm432	STP 8	0-31 cm bgs	12	I	Ceramic Mfg.	Waster		-	FALSE	1		-	1780	1925	stoneware
010	12Pm432	GSC 1	0-0 cm bgs	13	D	Ceramics	Whiteware	Handpainted polychrome (early)	-	FALSE	1		Body	1830	1870	
010	12Pm432	GSC 1	0-0 cm bgs	13	D	Ceramics	Whiteware	Undecorated	-	FALSE	1		Footring with base	1830	0	
010	12Pm432	GSC 1	0-0 cm bgs	14	I	Ceramic Mfg.	Stoneware	Salt glazed exterior	-	FALSE	6		Body	1780	1925	
010	12Pm432	GSC 1	0-0 cm bgs	14	I	Ceramic Mfg.	Waster		-	FALSE	3		-	1780	1825	stoneware
011	12Pm432	GSC 2	0-0 cm bgs	15	I	Ceramic Mfg.	Stoneware	Salt glazed exterior	-	FALSE	6		Rim	1780	1925	
011	12Pm432	GSC 2	0-0 cm bgs	15	I	Ceramic Mfg.	Stoneware	Salt glazed exterior	-	FALSE	1		Base	1780	1925	
011	12Pm432	GSC 2	0-0 cm bgs	15	I	Ceramic Mfg.	Stoneware	Salt glazed exterior	-	FALSE	3		Body	1780	1925	
011	12Pm432	GSC 2	0-0 cm bgs	15	I	Ceramic Mfg.	Waster		-	FALSE	1		-	1780	1925	stoneware
011	12Pm432	GSC 2	0-0 cm bgs	16	I	Ceramic Mfg.	Other		-	FALSE	1		-	0	0	separator bar
001	12Pm431	GSC 1	0-0 cm bgs	1	D	Ceramics	Whiteware	Handpainted polychrome (early)	-	FALSE	1		Rim	1830	1870	
002	12Pm432	STP 1	0-15 cm bgs	2	I	Ceramic Mfg.	Stoneware	Salt glazed exterior	Salt glazed interior	FALSE	1		Body	1780	1925	
003	12Pm432	STP 2	0-28 cm bgs	3	A	Construction Material	Brick (measure in inches)	Handmade brick: vitrified	-	FALSE	1	136.6	-	0	0	
003	12Pm432	STP 2	0-28 cm bgs	4	I	Ceramic Mfg.	Stoneware	Salt glazed exterior	Salt glazed interior	FALSE	3		Body	1780	1925	
003	12Pm432	STP 2	0-28 cm bgs	4	I	Ceramic Mfg.	Stoneware	Unglazed exterior	Unglazed interior	FALSE	4		Body	1780	1925	
004	12Pm432	STP 3	0-30 cm bgs	5	I	Ceramic Mfg.	Stoneware	Unglazed exterior	-	FALSE	2		Body	1780	1925	
004	12Pm432	STP 3	0-30 cm bgs	5	I	Ceramic Mfg.	Stoneware	Salt glazed exterior	Unglazed interior	FALSE	1		Base	1780	1925	