Draft Instrument Amendment
to add the
Yazoo Backwater Preserve Project to the Ducks Unlimited Mississippi Delta In-Lieu Fee Program
Prepared by:

DUCKS UNLIMITED

To be considered by:
United States Army Corps of Engineers and
The Interagency Review Team

Vicksburg District
4155 Clay Street Room 233
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1) Introduction

The purpose of this Draft Instrument Amendment is to establish criteria and responsibilities for the establishment, use, operation, and maintenance of this ILF Site under the DU Mississippi Delta ILF Program (Program). DU established the Program to provide a third-party compensatory mitigation option for unavoidable wetland impacts in this priority landscape. DU has developed a suite of GIS-planning tools to aide in the identification of wetland restoration and protection opportunities within this Service Areas. DU thoroughly evaluated wetland restoration opportunities in areas of anticipated development pressure in the southern portion of the Mississippi Delta Service Area prior to selecting sites for inclusion in this draft Instrument Amendment. We highlight the utility of these planning and site identification tools in Appendix A, where Supplemental Figure 1 shows the initial focal area where we together with partners studied the landscape for suitability for in-kind offsets to mirror anticipated offset needs in the Service Area. Additional figures show the currently included Sites in relation to a range of background variables. DU's top-down prioritization of landscapes and significant wetland features within this landscape enables DU to identify priority areas for wetland conservation and mitigation activities on a watershed-scale.

1.1 Sponsor

Ducks Unlimited (DU) is the administrator and the sole Sponsor of the Program. The accounting including fund allocation, reporting procedure requirements, and default and closure provisions are described in the Program's Enabling Instrument, and can be accessed through RIBITS cyber repository (*access instructions in References Section*).

This section describes the qualifications of the sponsor to successfully complete the mitigation work proposed. Ducks Unlimited (DU) is recognized as the world's largest private wetlands conservation organization and has over 85 years of experience restoring and protecting habitat, especially aquatic resources. Since its founding, Ducks Unlimited has protected over 19-Million acres through direct conservation actions. DU has worked with partners in Mississippi delivering wetland and upland conservation through land protection, restoration, and enhancement, including past and ongoing large scale wetland restoration projects for the past 34 years. DU is familiar with reference-quality bottomland hardwood sites that will inform this project and is experienced restoring the associated systems (See Appendix A).

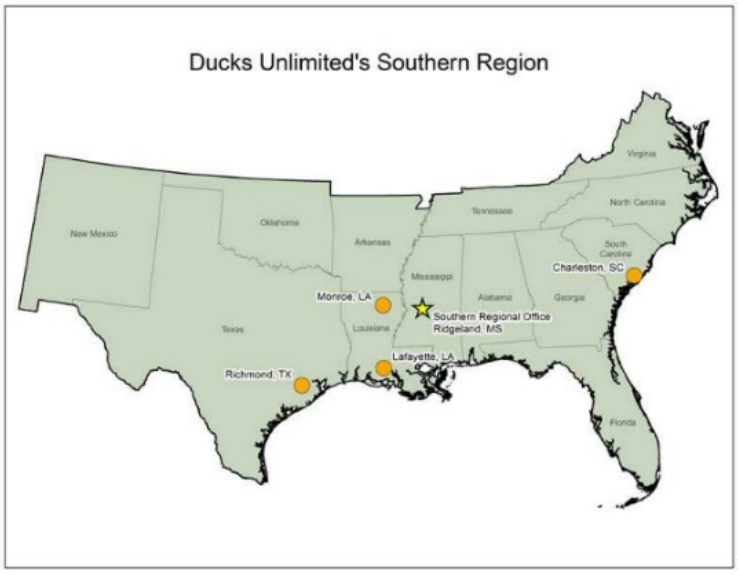


Figure 1. Ducks Unlimited Southern Regional Office Locations.

Moreover, DU's Southern Regional Office (SRO) is located in the vicinity of this project (Ridgeland, Mississippi). The DU SRO services a 13-state region in the southeastern U.S. SRO is one of four DU regional headquarter offices in the U.S., which coordinate and facilitate all aspects of DU's habitat conservation programs in the U.S. – transforming ideas, science and wildlife ecology into completed projects. The SRO has over 30 full-time conservation staff including biologists, engineers, mitigation and land protection specialists, CAD technicians, construction managers, GIS specialists, project coordinators, accountants, contract compliance managers, legal representation, and administrative assistants. The SRO is supported by additional national capacity, and a full suite of accounting specialists, legal, and real estate support distributed among other DU offices, and headquartered out of Memphis, Tennessee.

DU delivers turn-key wetland and stream mitigation projects throughout the country and works extensively with regulatory staff, permittees, partners, landowners, and land managers to deliver high quality compensatory mitigation projects that span all types of wetlands, streams, riparian buffer, and upland habitats in freshwater and tidal settings. DU applies a science-based watershed approach to natural resource conservation that focuses on protecting enhancing and restoring ecologically important habitat within landscapes that are critical to waterfowl. This focus results in corollary benefits for plant and wildlife conservation spanning the continent. Our mission supports delivery of high-quality mitigation projects and allows us to use our expertise and our network with partners, landowners, and land managers to pair mitigation funds with lands that are best suited for wetland, stream, and upland restoration and protection as required by compensatory mitigation policies. Nationally DU operates more than 48 ILF projects, mitigation banks and conservation banks (*ranging from in long-term protection to newly acquired*).

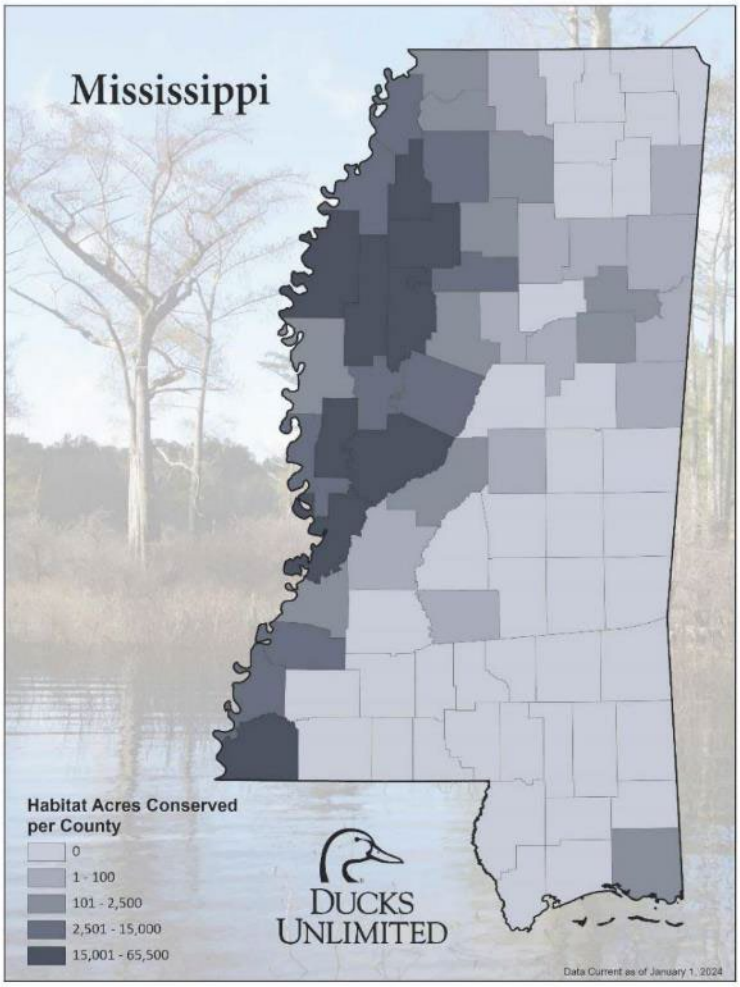


Figure 2. Ducks Unlimited Conservation Activity in Mississippi.
DU together with its conservation partners have performed 363,347 acres of conservation related activities in Mississippi.

1.2 Site Location

The proposed Yazoo Backwater Preserve ILF Project is located within the Mississippi Delta Service Area, as shown in Figures 3 and 4. The coordinates for the Project centroid are 32.767606° N, 90.837966°" W. The watershed is within the Mississippi Alluvial Valley (MAV), one of the most important wintering areas for migratory waterfowl on the continent. DU and its partners The Nature Conservancy (TNC) and Delta Wildlife (DW) have been involved in a collaborative process to initially identify a 1,429 square mile Study Area that falls within a similar Hydrogeologic setting to anticipated impacts within this Service Area (Appendix A, Supplemental Figure 1). Within this area, DU and partners utilized conservation planning tools contained in a geographic information system (GIS) to identify tracts suitable for mitigation activities that aligned with the Programs' Compensation Planning Framework. Using relevant datasets indicating suitability for wetland restoration (e.g., cropland, hydric soils, floodplain position, proximity to protected lands), DU, TNC and DW engaged in a collaborative landowner outreach campaign within a 27,000-acre focal area that met program and compensation planning framework requirements (Appendix A) to identify landowners willing to provide the land basis for wetland and aquatic resource restoration under this project. Our project team secured interest from owners of 6,181.1 acres in suitable areas as show in in Figure 4.

The Yazoo Backwater Preserve ILF Site consists of several tracts located in the Southern Portion of the Mississippi River Delta in Sharkey and Issaquena Counties (Figure 4). Tracts to be included in the Yazoo Backwater Preserve ILF Site are privately owned and will be secured upon project funding authorization by either fee-simple acquisition by The Nature Conservancy and or by conservation easements held by the Sponsor's supporting land trust Wetlands America Trust (WAT). WAT will hold easements on both privately held lands incorporated into the project, and those acquired by TNC.

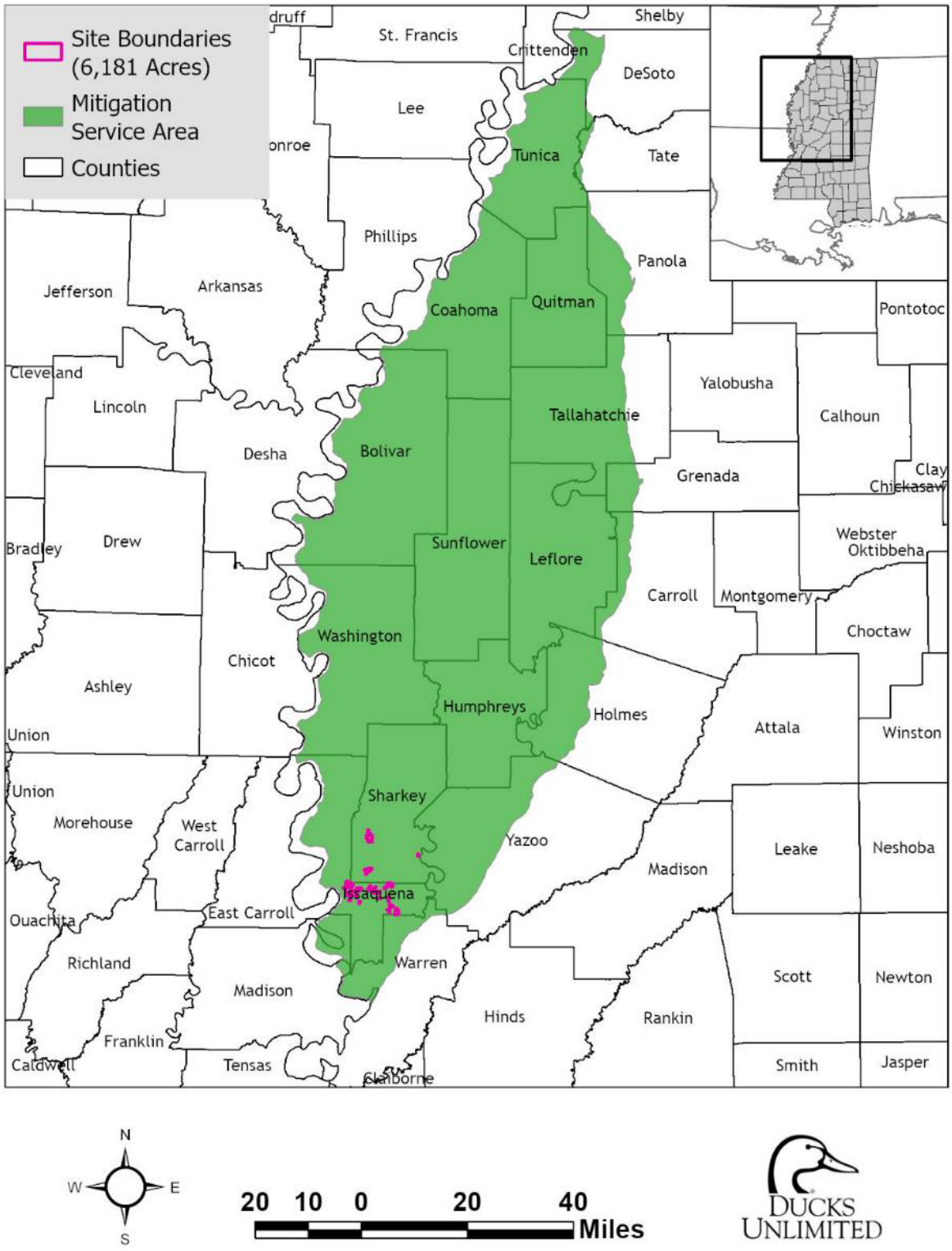


Figure 3. Service Area.
The Mississippi Delta (ILF) Service Area is shown in green and Project Sites in pink.

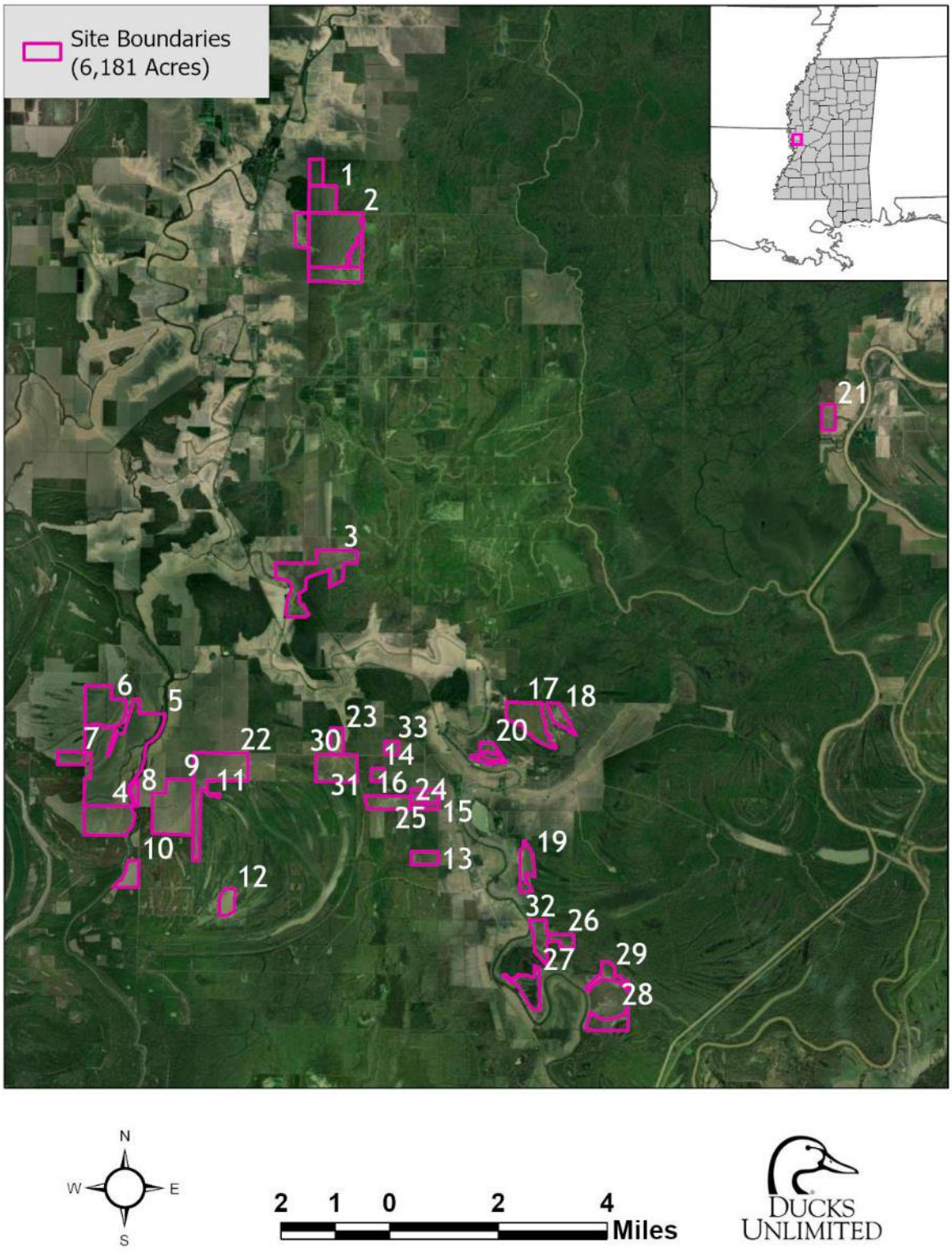


Figure 4. Map of Mitigation Sites.
Pink polygons show the mitigation project sites where landowners have expressed interest in participating in the project.

2) Project Goals and Objectives

The primary goals of the Draft Instrument Amendment are to provide the IRT with information necessary to determine if this project has the potential to provide compensatory mitigation for watershed scale impacts anticipated in the Mississippi Delta Service Area. The Final Instrument Amendment will provide additional details on Site conditions and engineering design, long-term protection and stewardship. The Sites are expected to provide wetland offsets totaling at least 27,897 Average Annual Functional Capacity Units (AAFCUs) for replacement of wetlands through vegetative and hydrologic restoration activities (Table 5). A goal of this project is to be able to serve either traditional regulatory projects or civil works projects, and as such, wetland credits sold will be able to be sold interchangeably as either AAFCU's or Charleston Credits in non-duplicative manner. The Project Sponsor estimates the project has the capacity to produce an equivalent 27,897 AAFCUs or 25,396 Charleston Credits as shown in Tables 5 and 6. More specifically the Sponsor anticipates both direct impacts (>27,354 AAFCUs to offset impacts to wetlands and indirect impacts (1,884 AAFCUs for direct impacts + 25,470 AAFCUs for indirect impacts), this project is projected to supply more than sufficient AAFCU's at 27,879 total.

The project will take into account the hydrologic regime anticipated within the post two- and five-year Yazoo Backwater Area Water Management Project floodplain (Appendix A, Supplemental Figure 1). Because this landscape is anticipated to by hydrologically influenced by this project, we have selected sites expected to be in suitable landscape position to support wetlands under further modified hydrologic regimes, encompassing a range of hydroperiods and connectivity with areas expected to flood frequently enough to provide habitat for fish and other aquatic species. As described in Appendix F, 352 Average Annual Habitat Units (AAHUs) for shorebird habitat replacement will be provided through contractual agreements with private landowners performing moist-soil management.

More specifically this mitigation project will provide an opportunity to:

- Restore and preserve sites that occur in riverine backwater wetlands post two- and five-year Yazoo Backwater Area Water Management Project floodplain (Appendix A, Supplemental Figure 1), and that support communities' fish and wildlife species similar to those that may be impacted in the Service Area.
- Reestablish, rehabilitate and enhance wetland habitat ranging from riparian and deep water to intermittently flooded, to more mesic sites.
- Reestablish habitat suitable for rare species including alligator snapping turtle, pondberry, bald eagle, chimney swift, Henslow's sparrow, Kentucky warbler, lesser yellowlegs, little blue heron, prothonotary warbler, red-headed woodpecker, wood thrush.
- Provide habitat for wading birds through moist soil unit management
- Improve flood attenuation capacity
- Retain sediment and nutrients
- Protect and restore areas that remain connected to Rivers that experience backwater seasonal flooding as spawning habitat for fish.

- Areas adjacent to large tracts of high-value habitat (*WMAs, FWS lands*)
- Increase size and/or improve connectivity between existing protected lands
- Re-establish floodplain connectivity to enhance aquatic resources, fisheries, and spawning habitat.
- Preserve large, contiguous tracts.

The Project Sponsor anticipates the restoration activities to be undertaken by this project will improve habitat in fully aquatic settings (riverine, backwater, oxbow settings) to frequently flooded forested palustrine wetlands along a range of hydrologic conditions from wet to more intermediately flooded, in addition to mudflat and marsh habitats. The Sponsor is incorporating forested wetlands, emergent wetlands, and upland buffers, where necessary, into the design to maximize habitat utilization by a range of neotropical migrant, shorebird and migratory birds. Given the scale of this project –habitat for the full range of species guilds ranging from fully aquatic species such as migratory fish and turtles, to wetland dependent species including migratory waterfowl (e.g., mallards, wood ducks), species dependent on early successional habitats such as wading birds will be intentionally incorporated into the design elements of the site in close collaboration with USFWS, and other regulatory agencies. We further describe how these habitat elements will be incorporated in Section 6.

3) General Need and Technical Feasibility

3.1 General Need

This project is expected to provide offsets for development and impact projects in the Mississippi River Delta. Ongoing discussions with the USACE suggest there is substantial need for mitigation concentrated in the southern portion of the Service Area.

3.2 Technical Feasibility

DU does not obligate itself to execute any portion of the project without a reasonable degree of certainty that said approvals, financing and contracting authorities are secured to the satisfaction of DU. Acceptable approvals, financing and contract authority will be the responsibility of the credit purchaser prior to the establishment of any project responsibility. DU recognizes that this approval and financing to offset any impacts to USACE Civil Works projects would be bound to Congressional action and DU will accept an approved appropriation to secure credits.

The largest factors affecting the technical feasibility of this mitigation project are the qualifications of the Sponsor, and project funding to carry out the work. This Project is situated in a landscape setting that floods periodically, contains majority hydric soils, and in the absence of regular management for agriculture would quickly revert to wetlands, backwaters, and oxbows. DU anticipates the project will follow the general workflow identified in Figure 5, and follow the schedule identified in Table 1. External

factors that may affect the workflow and timetable include timing of project funding authorization, mitigation contracting, agency review timelines, and changes to scope.

DU has performed similar work through the WRE program and a budding Flyways Forest Carbon Program that has resulted in substantial coordination with nursery growers, and planting teams (See Appendix A). Our partners TNC and DW are also active in this geography and partnering with them on land acquisition and aspects of site protection, as well as providing input on final mitigation plan design elements improves the overall feasibility and likely the quality of the project. We estimate this project will require approximately two million trees to be planted. Overall, the project is technically feasible and falls with the scope of services DU typically provides in this geography. We have an actively engaged community of partners, technical experts, and contractors ready and able to deliver the mitigation offsets required for this project.

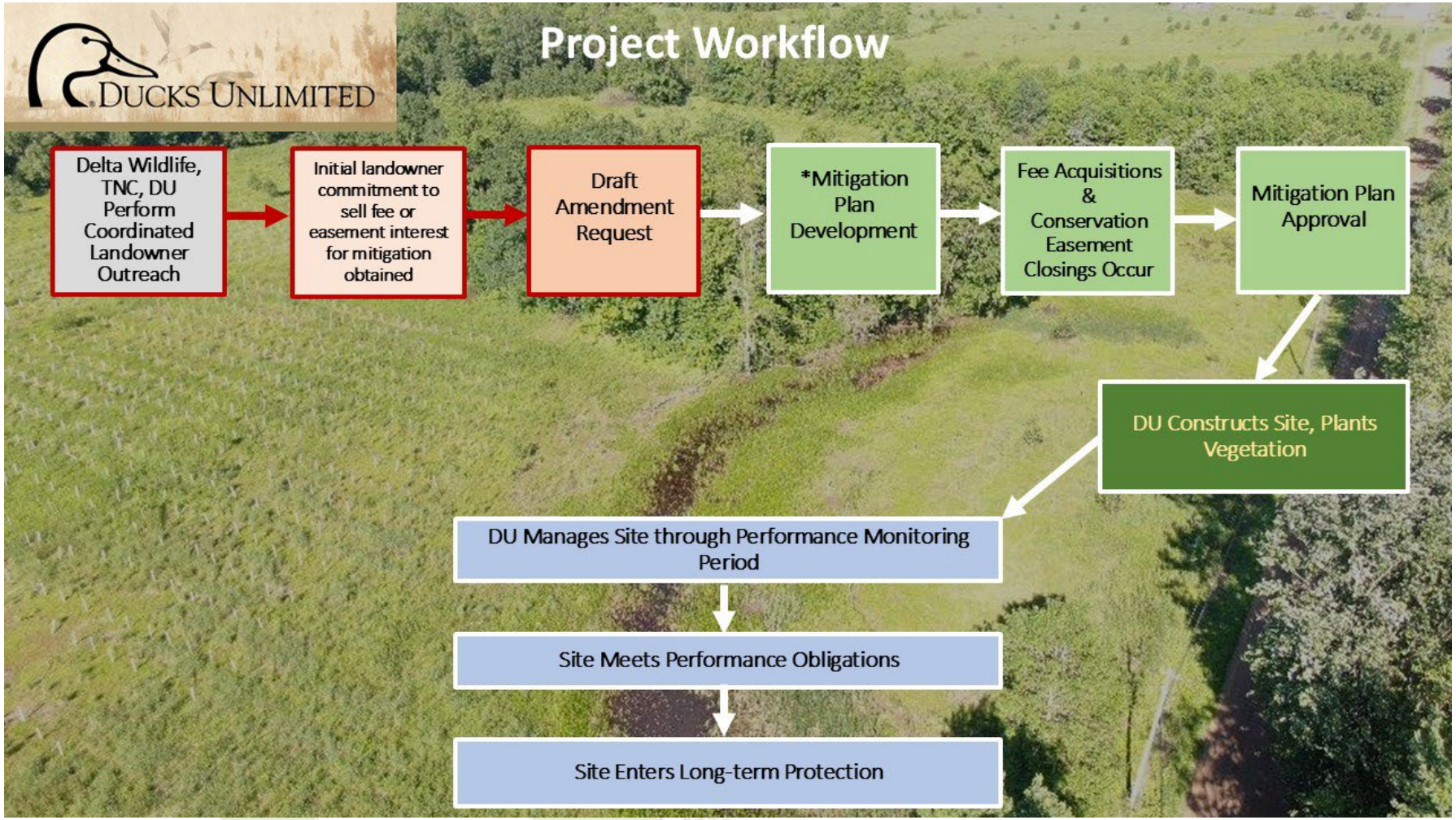


Figure 5. Project Workflow.
The Project Sponsor has coordinated with Delta Wildlife, and The Nature Conservancy to identify land suitable and available or potentially available for mitigation activities in the lower portion of the Mississippi Delta Service Area. Provided project funding authorization is attained, TNC in agreement with DU will secure a portion of the land basis through fee title acquisition. DU as the sole Sponsor of the ILF Program is responsible for coordinating among partner organizations, and implementing the project, and ensuring the project's success.

Table 1. Project Timeline and Workflow

Project timeline and sequencing is subject to change following IRT feedback, and project authorizations.

Project Sequencing and Timeline														
Credit Release Percent			**30%**	**30%**	**10%**		**10%**		**10%**		**5%**			**5%**
Calendar Year:	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**
Years of Monitoring:					1	2	3	4	5	6	7	8	9	10
Site Identification														
Option/ Long-term Purchase Agreement														
Planning														
Due Diligence/Survey														
Close on properties / site protection instruments filed														
Construction & Planting														
As-built														
Monitoring														
Adaptive Management														
Project Enters Long-term Management Phase														

4) Baseline Ecological Characteristics: Ecological Suitability of the Project

In this Section we describe the physical, chemical, & biological characteristics of the Project based on a combination of initial desktop and field analyses and how selected sites for incorporation into the project will support the planned types of aquatic resources and functions.

4.1 Historic and Existing Plant Communities, Including Wetlands

The Sites are dominated by previously drained wetlands presently in agricultural use. The hydrology of this alluvial landscape is highly modified, by a system of levees, ditches, with active agricultural practices (e.g., tillage), mowing preventing reversion to wetland conditions. The Sites remain hydrologically influenced by regular flooding of remnant bottomland hardwood swamps and agricultural lands. The hydrologic gradient included in the focal area ranges from permanent streams and rivers to bottomland hardwood swamps that flood regularly to intermittently. DU intends to incorporate site-level hydrological data into future design processes, as depth and duration of flooding are the primary factors affecting plant community structure in this region. Historic site conditions and general landscape features are shown in Figures 6-13.

4.2 Summary of Current Site Condition and Current Land Uses:

From a review of aerial photography dating back to 1985, the target properties have largely been under continous utilization for farming (Figure 6). DU to a large degree has prioritized tracts that historically were wetlands, the analyses undertaken in the site selection process and review of site conditions, strongly suggest that the areas identified as our Focal Region were historically wetlands. The Sites are predominantly agricultural lands in soybeans, corn, and cotton typified by sparse cover of native vegetation and altered hydrology. Remnants of natural habitats, including small patches of bottomland hardwood forests and seasonal wetlands in low-lying areas. These areas may experience saturation during certain times of year but are otherwise impacted by edge effects (e.g., reduced diversity, habitat and nesting bird quality) due to the fragmented surrounding land use.

Predominantly these sites are in row crops, however, some tracts are recreational hunitng properties where open tracts are actively maintained. Existing stands of bottomland hardwoods appear to be unmanaged, with some areas setup for irrigation. In their current condition, past alterations of thesites fragmented habitat and reduced the value for wildlife, especially those dependent on bottomland hardwoods and emergent wetlands.

Direct field observations are described in Appendix C and D, and indicated that desktop analyses reflected field conditions relatively well for an initial site assessment. Current site conditions and land use have been confirmed on one site (Property 1: 1,123 acres) through spot wetland determinations (Appendix D). For the remaining sites, similar conditions are assumed based on analysis of aerial imagery, remote sensing, geospatial data, and landowner feedback, as well as our understanding of the broader landscape and ecological characteristics of the Mississippi Delta. Future itereations will include formal wetland delineations.

4.3 Soil Descriptions

The target Sites are distributed across Issaquena and Sharkey counties. According to the spatial SSURGO soils data series obtained for the Project Focal Area, the target Sites occur almost entirely in soil classes mapped as at least partially or completely hydric. Maps of soil series are provided in Figure 9 and hydric soil classes in Figure 10. Subsequent drafts will

include complete descriptions on the soil series encountered in Sites included in the project, as well as narratives describing soil properties from the perspective of suitability for associated wetland construction or restoration.

Bowdre. The Bowdre series consists of deep, somewhat poorly drained soils that are nearly level to undulating on the flood plains of the Mississippi River and its tributaries in the Southern Mississippi Valley Alluvium Major Land Resource Area. Permeability is slow in the surface layers and moderate in the underlying material. These soils formed in layered alluvium that is clayey in the upper layers and loamy in the lower layers. Levees protect or reduce the frequency and duration of flooding on most areas. Slopes range from 0 to 8 percent. The upper horizons are very dark grayish brown silty, clay and firm. The mid-horizons are mottled brown to mottled brown, light to dark brownish gray silt and sandy loam. The deepest horizon is grayish brown loamy sand with mottling. Bowdre soils are recognized for their agricultural productivity thanks to their favorable texture and nutrient availability, but they also support bottomland hardwood forests.

Commerce. The Commerce series consists of deep, somewhat poorly drained soils that formed in loamy alluvial sediments primarily found in the Mississippi River Valley and its tributaries. These soils typically occur on nearly level to gently undulating landscapes, with slopes generally less than 1 percent but can reach up to 5 percent in some areas. The profile is characterized by a surface layer of dark grayish-brown silt loam that is friable, transitioning to darker clay loam layers as depth increases. Commerce soils are known for their moderate permeability, which allows for some drainage while retaining moisture, making them suitable for agricultural practices. However, certain areas may experience flooding, particularly during heavy rainfall, thus these soils are important for wetland ecosystems, often supporting hydrophytic vegetation.

Dowling. The Dowling series consists of deep, poorly drained, clay soils that formed in loamy alluvial sediments. These soils are primarily found in the floodplains of the Mississippi River and its tributaries. The slope is typically less than 1 percent, with a high susceptibility to flooding. In a typical profile, the surface layer is dark gray clay, about 8 inches thick, which is firm and sticky. Below this, from 8 to 30 inches, the soil remains dark gray clay, dense and sticky. The layer from 30 to 60 inches is light gray clay, also firm, showing evidence of prolonged saturation. Below 60 inches, the soil transitions to light gray clay with a high degree of clay content, indicating low permeability and moisture retention.

Mhoon. The Mhoon series consists of very deep, poorly drained soils formed in loamy sediments deposited by the Mississippi River. These soils are predominantly found in level or nearly level alluvial plains, typically with slopes less than 1 percent, although some areas can reach slopes of up to 5 percent. The soil profile features a dark gray silty clay loam surface horizon, underlain by several gray silty clay loam and silt loam horizons characterized by mottling, weak structures, and neutral pH. The Mhoon soils exhibit slow permeability and are prone to ponding, particularly during the winter and spring when the water table is often at or near the surface. These soils are primarily used for agricultural production, supporting crops such as cotton, soybeans, and sugarcane, and are distributed throughout the lower Mississippi River Delta.

Sharkey. The Sharkey series consists of very deep, poorly drained soils formed in clayey alluvial sediments in the Mississippi Delta. These soils are primarily found in level to nearly level landscapes, typically with slopes of less than 1 percent, although some areas can reach slopes of up to 5 percent. The soil profile is characterized by dark gray to gray colors, often exhibiting mottles of brown, yellow, and red. The surface layer is a dark gray clay that becomes increasingly dense with depth, leading to very slow permeability and significant water retention. Sharkey soils develop large cracks during dry periods, highlighting their expansive clay properties. They are classified as prime farmland due to their high agricultural productivity, supporting a variety of crops such as soybeans, rice, cotton, and wheat. Additionally, Sharkey

soils are recognized as hydric, which underscores their importance in wetland ecosystems and their role in regional hydrology. These soils play a crucial role in both agricultural and ecological contexts within the Mississippi Delta.

Alligator. The Alligator series consists of very deep, poorly drained soils formed in clayey alluvial sediments within the bottomlands of the Mississippi Delta. These soils are typically found on nearly level landscapes, with slopes generally less than 1 percent. The profile is characterized by a dark gray to black clay surface layer, which is highly plastic and sticky when wet. Below this, the soil remains clayey, with a texture that may vary slightly but retains its low permeability and high moisture retention capabilities. Alligator soils are notable for their hydric characteristics, making them important for wetland ecosystems. They often support a diverse array of plant species, including hydrophytic vegetation, and are crucial for wildlife habitats. These soils are also recognized for their agricultural potential; however, their poor drainage limits their use in some contexts. They are commonly associated with areas subject to seasonal flooding.

Tunica. The Tunica series consists of very deep, well-drained soils formed in clayey alluvial sediments, primarily located in the Mississippi Delta region. These soils are typically found on nearly level to gently sloping landscapes, with slopes generally less than 2 percent. The soil profile features a dark brown to grayish-brown surface layer, which transitions into lighter-colored subsoil layers characterized by a clayey texture that retains good moisture-holding capacity. Tunica soils are often associated with agricultural lands due to their favorable drainage characteristics and nutrient-rich composition. Additionally, these soils may exhibit seasonal ponding in certain areas, which can influence the types of vegetation present and contribute to local wetland habitats.

Forestdale. The Forestdale series consists of deep, well-drained soils formed in loamy sediments derived from alluvial deposits, typically found in the floodplains of the Mississippi Delta region. These soils are generally located on nearly level to gently sloping landscapes, with slopes commonly less than 2 percent. The soil profile features a dark brown to brown surface layer, underlain by a loamy subsoil that retains good moisture and nutrient availability. Forestdale soils are characterized by their suitability for agriculture due to their rich organic matter content and favorable drainage conditions. While these soils are productive for farming, they also support diverse plant communities, including both upland and wetland species. In terms of hydrology, Forestdale soils are less prone to flooding compared to other soil series in the area.

4.4 Description of Hydrology and Water Rights.

The Sponsor will ensure that water rights are intact and convey as part of the title review process for both fee title acquisitions and secured conservation easements. Generally, properties in this geography have intact water rights. The Sponsor also performs hydrological analysis in all projects to ensure that hydrological modifications will not extend onto neighboring properties and are restricted to only the properties that are included in this project.

4.5 Wetland Status

The large majority of the sites are working agricultural lands that do not appear to meet the 3 parameter standards of wetlands based on preliminary field determinations, and review of aerial imagery. The project sponsor will provide a wetland delineation with subsequent draft plans. We estimate that approximately 1,865 acres of existing wetlands occur on the sites primarily as small degraded emergent marshes and bottomland hardwood stands embedded within agricultural fields, as well as ditches and bayous. Review of aerial imagery across the project sites reveals small, isolated areas with potential wetland conditions, although the majority of the project sites are actively farmed. Hydrologic features such as drainage patterns, low-lying areas, and signs of ponding are visible, suggesting that portions of the sites may experience periodic wetland conditions. Additionally, vegetative patterns indicate the presence of persistent hydrophytic vegetation in unmanaged or less actively farmed areas. Timeseries analysis of aerial imagery also reveals seasonal flooding and changes

in vegetative cover. Some connectivity between these degraded wetlands, ditches, and nearby bayous exists, which could enhance hydrologic restoration potential and support reestablishment and rehabilitation of wetland functions across the project sites. Project sites 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, and 18 occur adjacent to, within proximity, or have direct connections to several waterways, including Coon Bayou, Deer Creek, Newsom Bayou, 15 Mile Bayou, and oxbows.

4.6 Existing Ecological Value

The Sites ecological value lies primarily as open space suitable for seasonal wildlife foraging, however plant diversity and wetland functions and values are severely limited by past drainage, ditching, and other manipulations typical of active agricultural lands. Enabling these sites to return to a more natural state through a combination of cessation of agricultural operations and active planting and physical manipulation is expected to result in increased ecological value as wildlife and wetlands habitats.

4.7 Adjacent Land Use

Adjacent land use is primarily undeveloped agricultural, fragmented natural habitats, and conservation lands. Large expanses of farmland, primarily used for row crops such as soybeans, corn, and cotton, are interspersed with remnants of bottomland hardwood forests and seasonally emergent wetlands. Several of the individual tracts lie adjacent or within proximity to state managed lands, USFWS National Wildlife Refuges, and U.S. Forest Service National Forests, including Twin Oaks Wildlife Management Area (WMA), Howard Miller WMA, Mahannah WMA, Theodore Roosevelt National Wildlife Refuge complex, Delta National Forest, and Natural Resources Conservation Service Conservation Reserve Program and Wetland Reserve Easement properties.

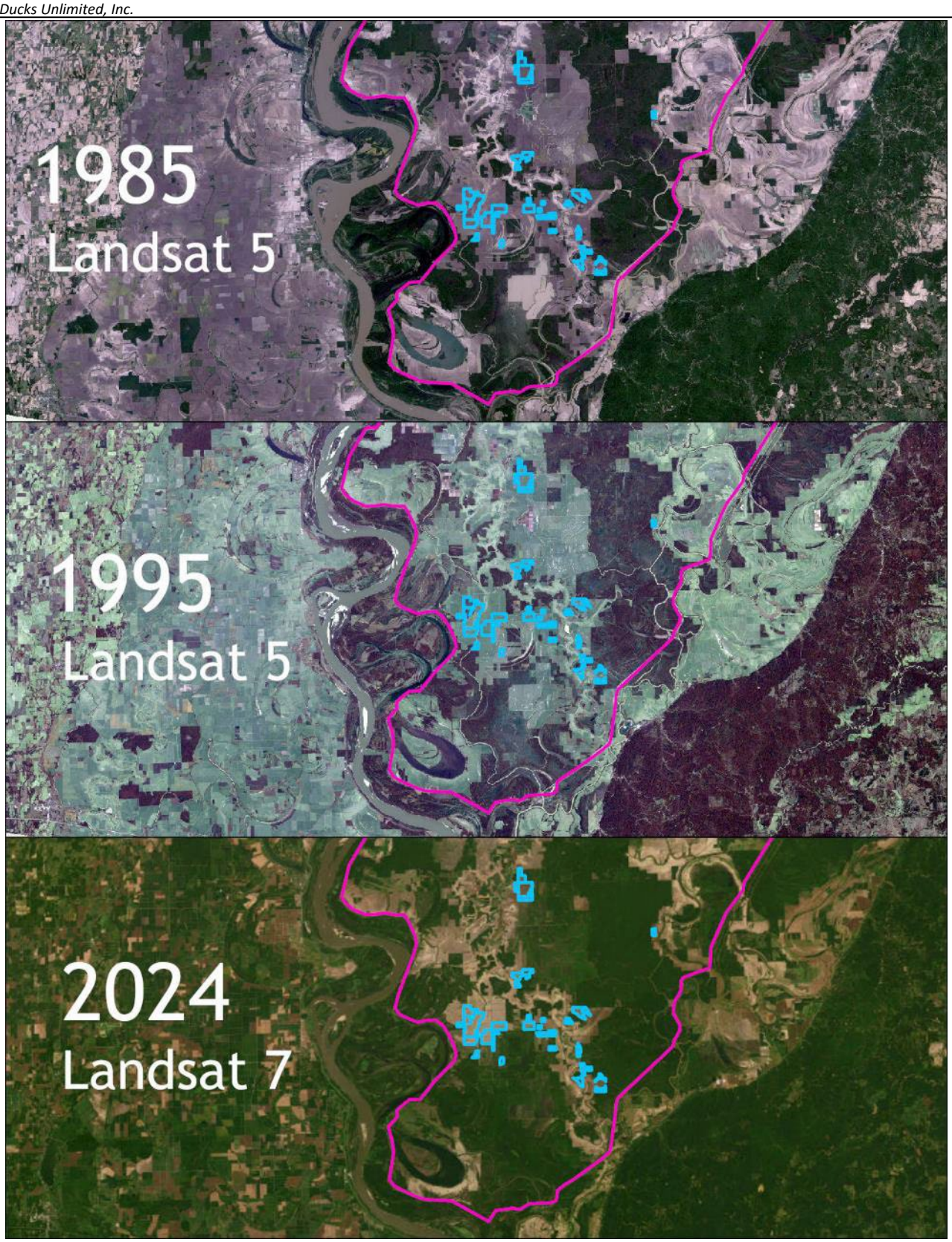


Figure 6. Historical Aerial Photographs Map.

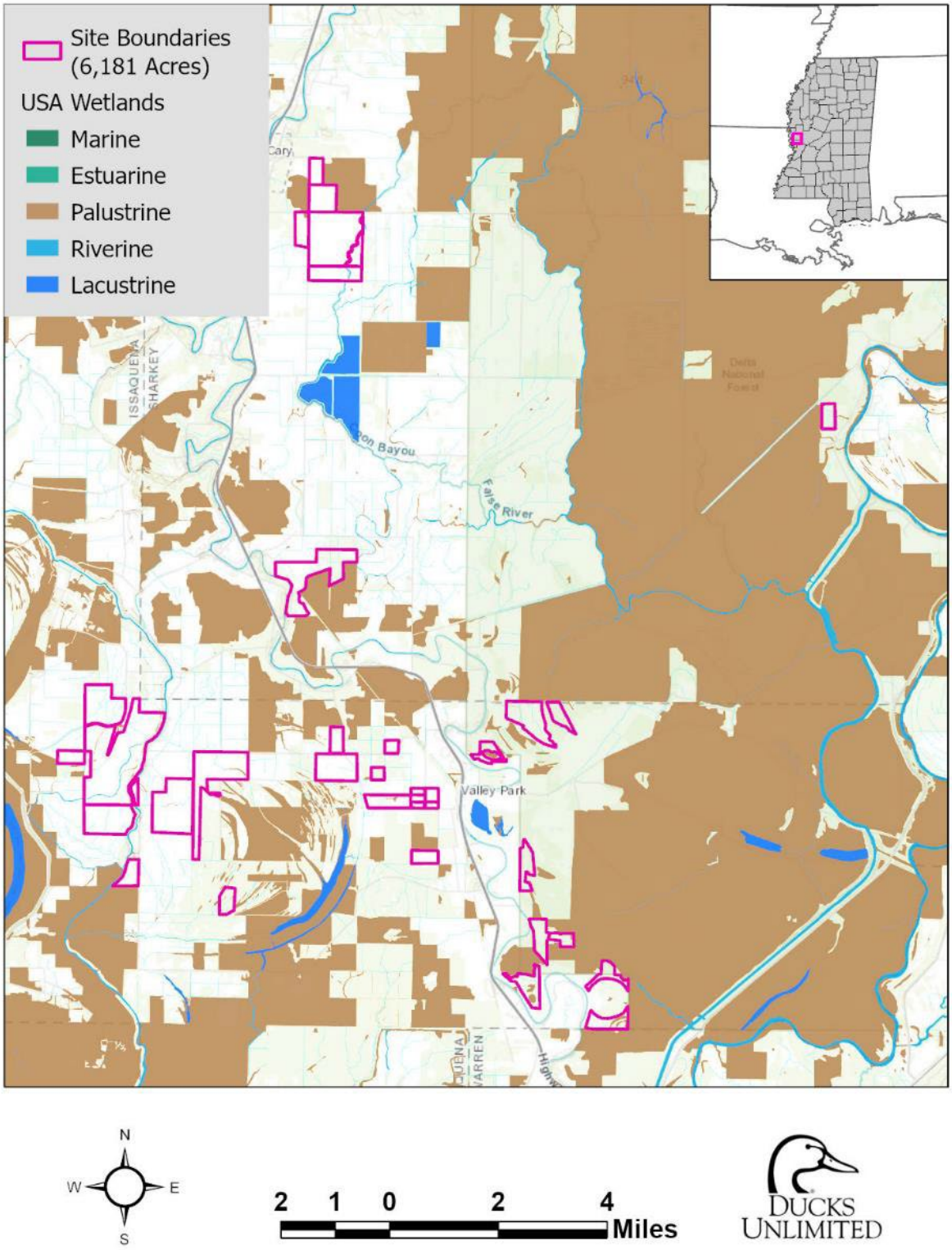


Figure 7. National Wetlands Inventory Map.
(NWI- USFWS Updated 2022)

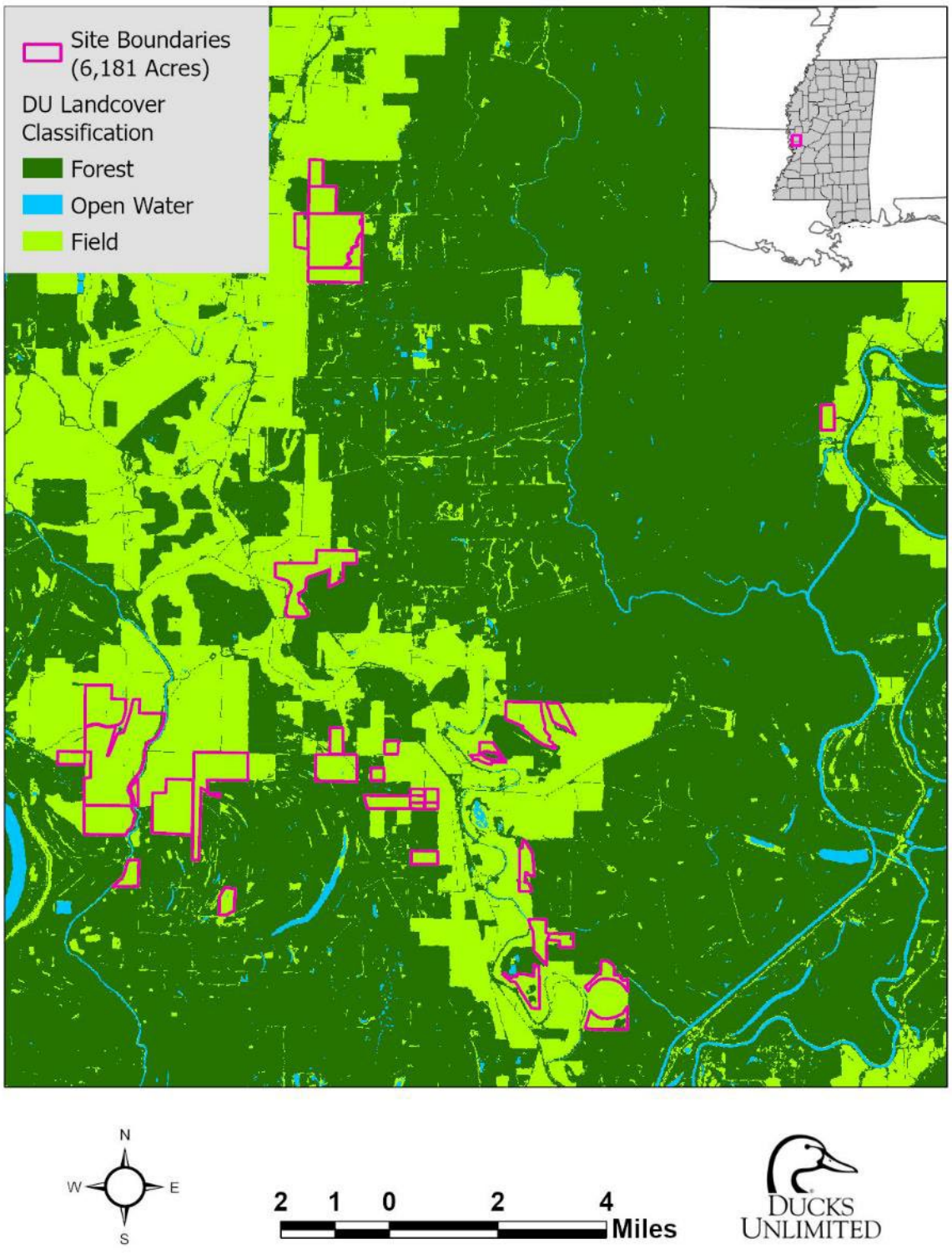


Figure 8 Land Cover Map.
Project focus areas (purple polygons) overlaid on landcover classifications (From a Random Forest Model).

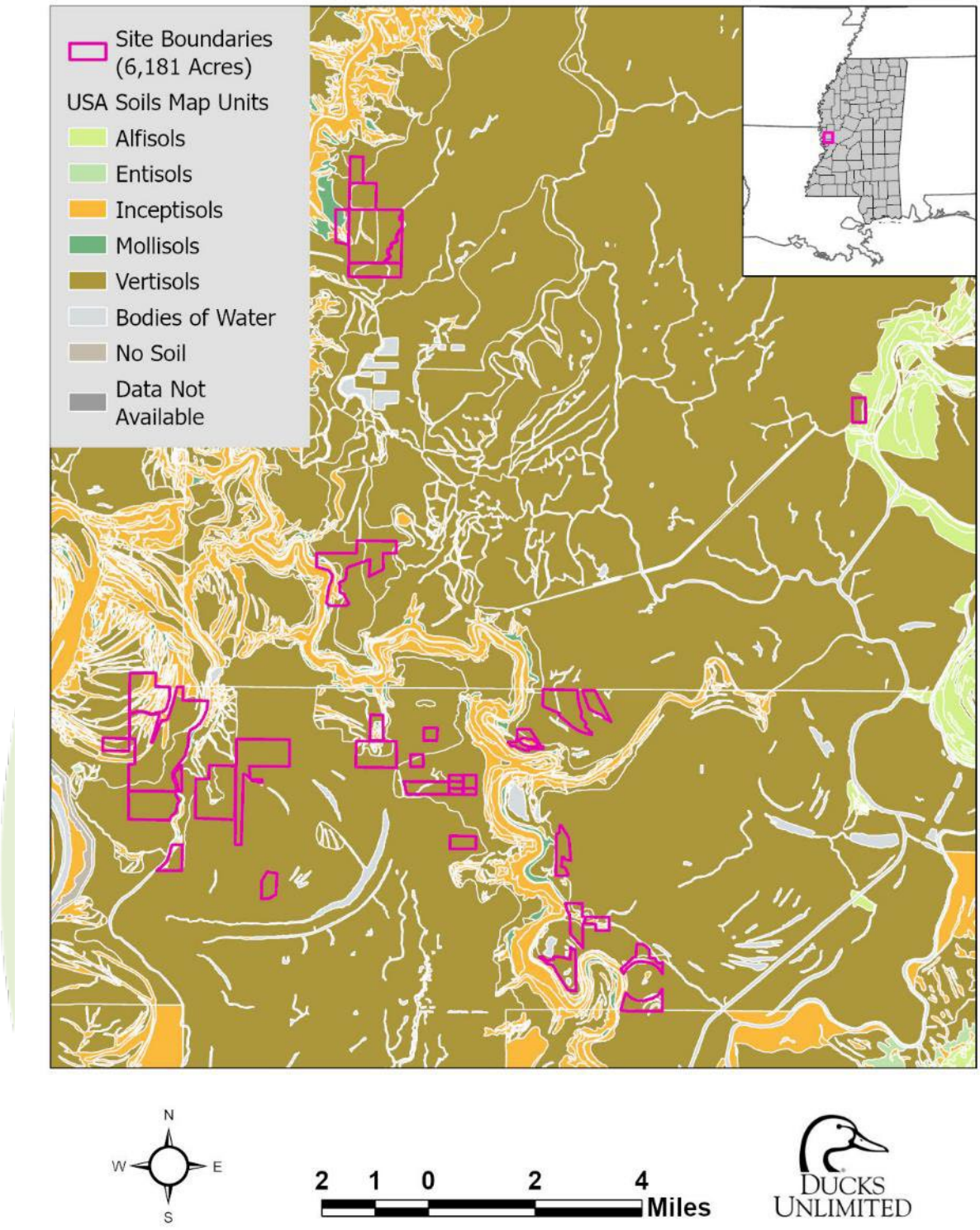


Figure 9. SSURGO Soil Series Map.

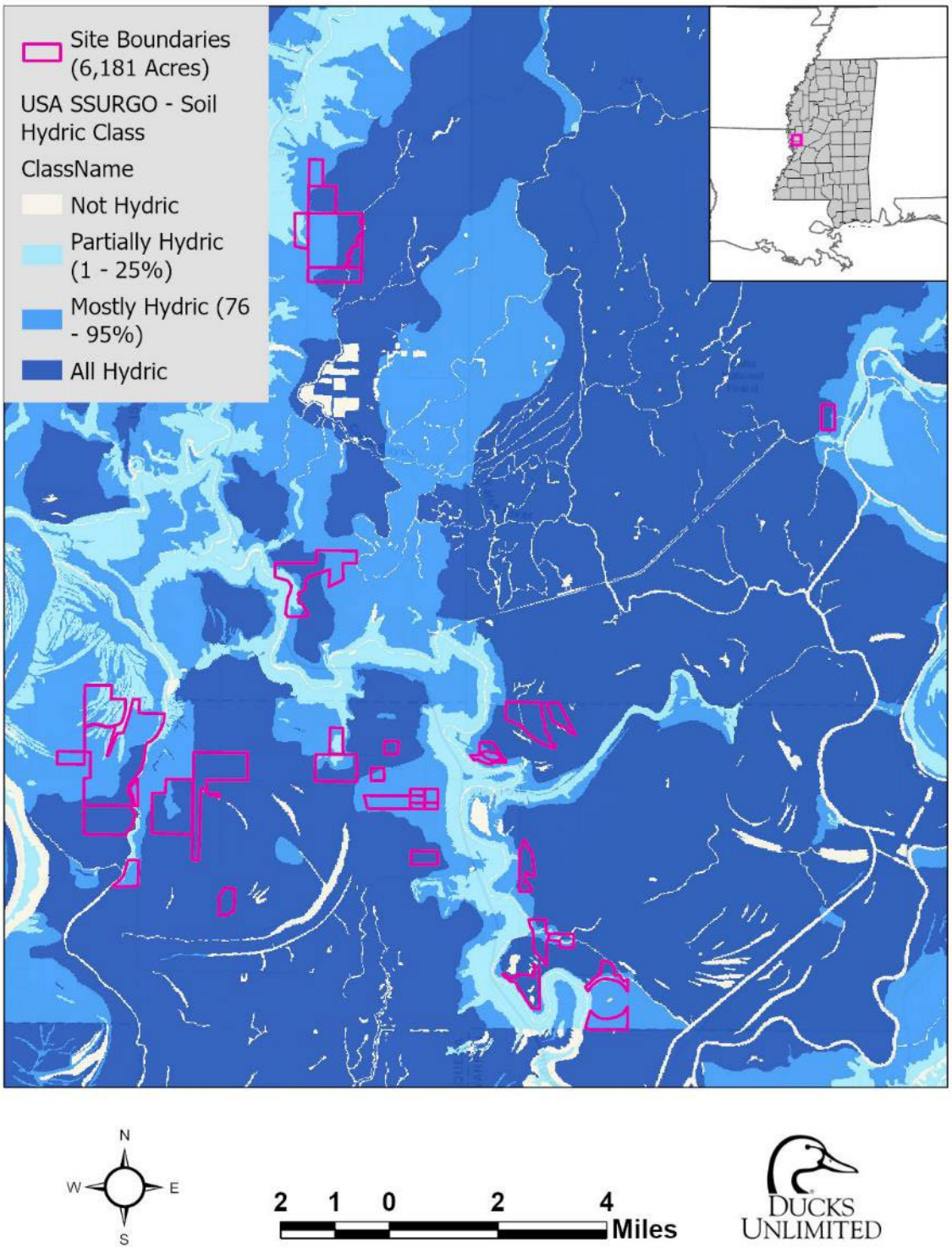


Figure 10. SSURGO Hydric Soils Classes.

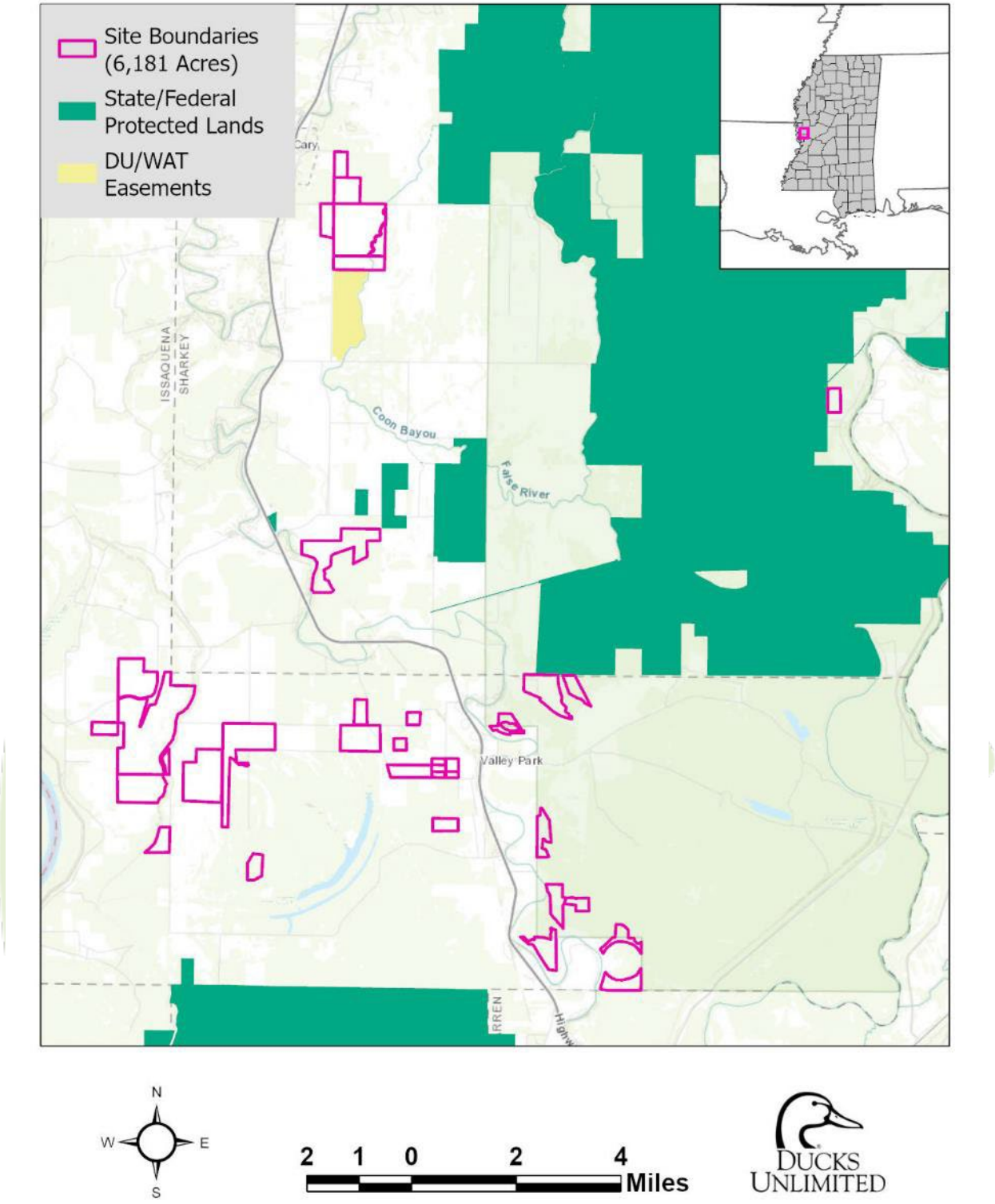


Figure 11. Protected Areas Database.
Yellow polygons show current Ducks Unlimited/Wetlands America Trust Easements in the Focal Area. DU may be able to provide some of the mitigation need on those sites.

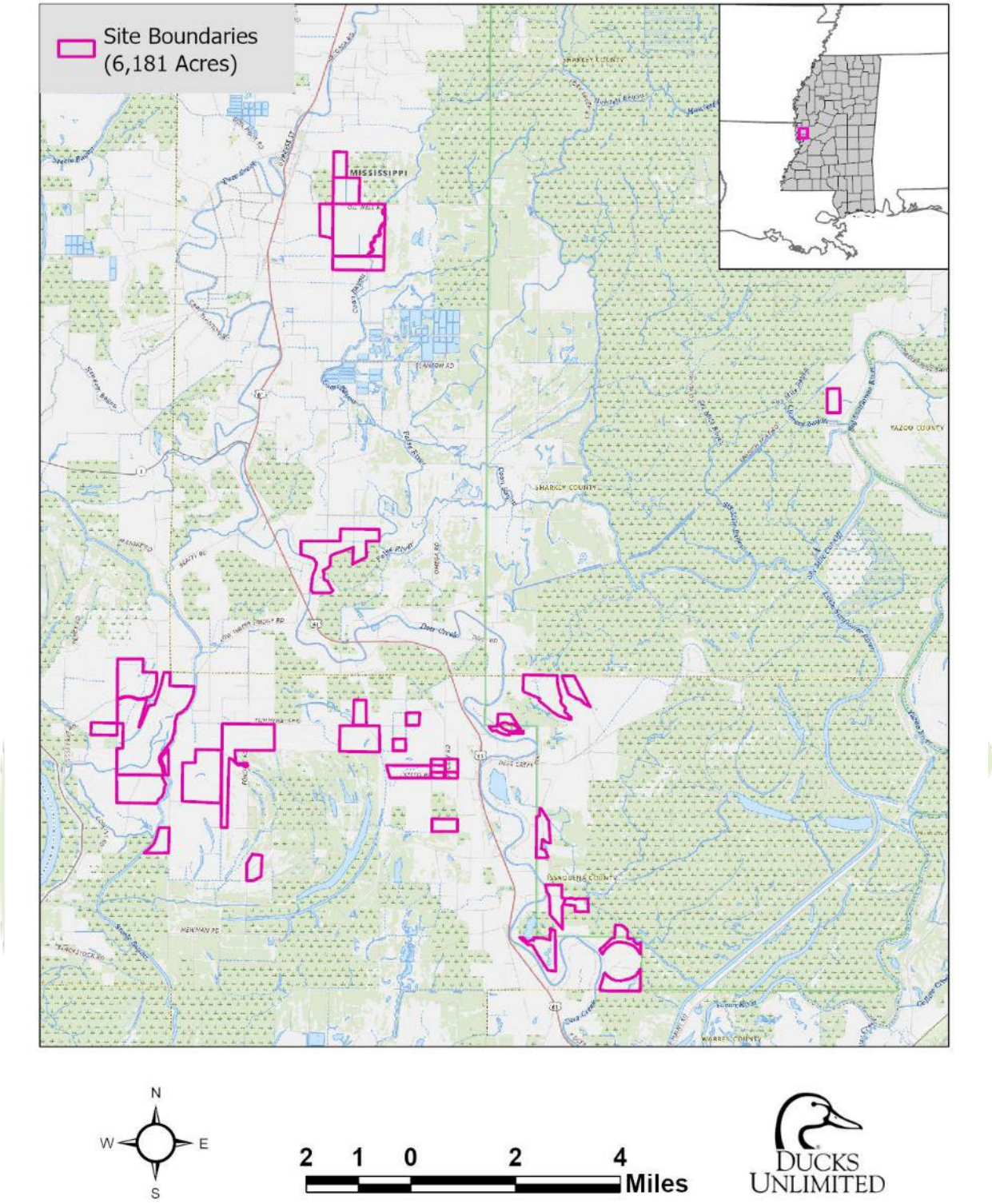


Figure 12. USGS Topographic Map.

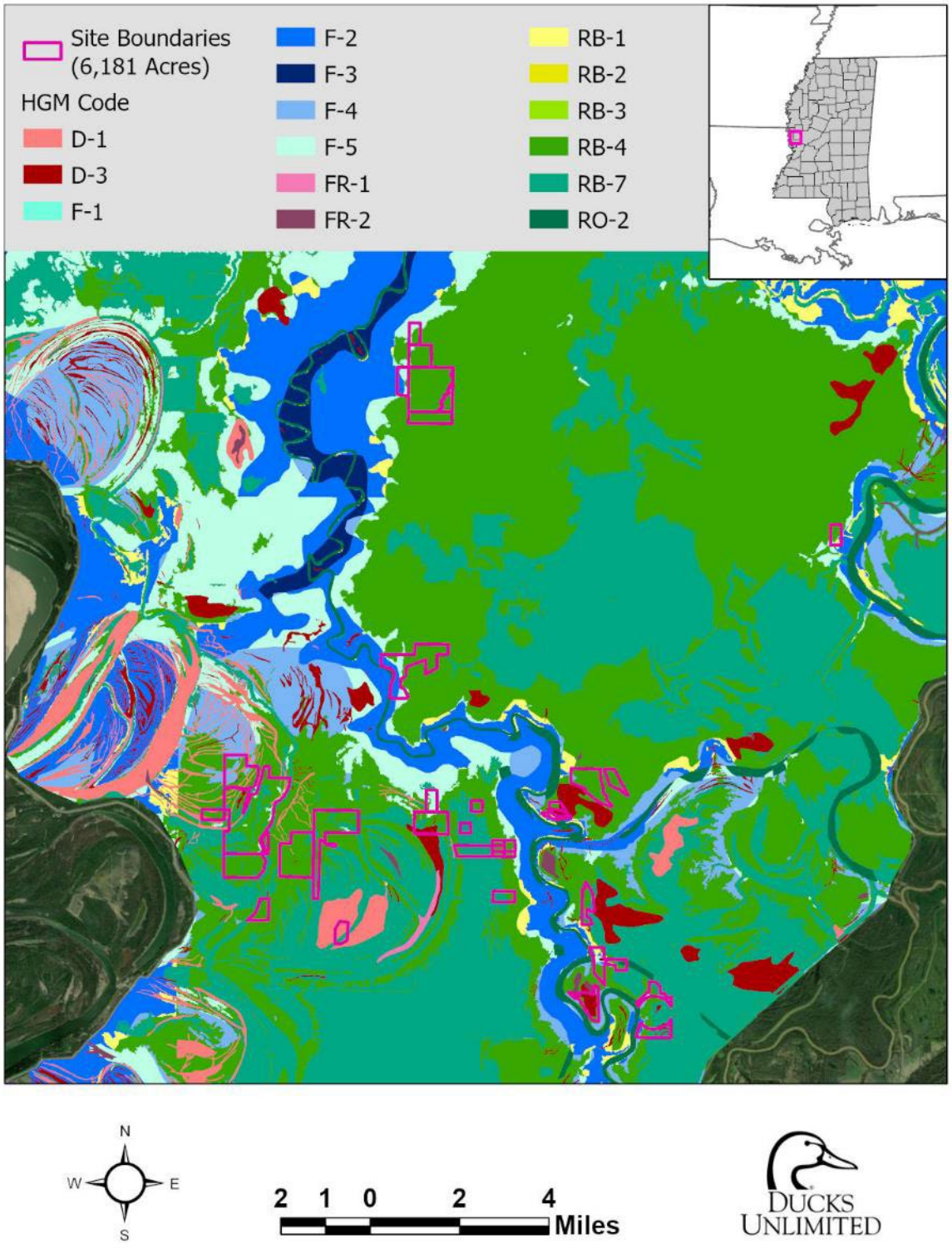


Figure 13. HGM Wetland Subclass Map.
See Table 2 below for descriptions of subclasses. The Sites are expected to function as riverine backwater and stream connected depressions primarily.

Table 2. Potential Natural Vegetation in the Focal Area based on hydrogeomorphic (HGM) models.

Hydrogeomorphic (HGM) Subclasses	Hydrogeomorphic HGM Class	General Site Characteristics	Specific Site Descriptions	Principal Dominant Species
D-1	Connected and Unconnected Depressions	Wetlands and Depressions	Stream Connected depressions in abandoned channels	Bald Cypress, Water Tupelo
D-2			Stream-connected depressions on Pleistocene outwash terraces	
D-3			Unconnected depressions in abandoned channels	
D-4			Unconnected depressions on Pleistocene outwash terraces	
F-1	Flat	Wetlands maintained by precipitation	High natural levees	Cotton-wood-Wateroak-Sugarberry
F-2			Well drained recent alluvial lowlands	Cherrybark-WaterOak-Sweetgum
F-3			Well drained older alluvium in lowlands	Cherrybark-WaterOak-Cow-oak
F-4			Moderately drained lowlands	Sugarberry-Green Ash-American Elm
F-5			Poorly drained Mississippi River Sediments	Willow Oak-Cedar Elm
F-7			Poorly drained undulating topography on Pleistocene outwash terraces	Willow Oak-Water Oak-Cherrybark Oak
F-011			Alkali prairie/savanna	Three Awn-Littfe Bluestem-Delta Post Oak
FR-1	Connected and unconnected fringe	Wetlands fringing waterbodies	Stream Connected Lake and Pond fringe wetlands	Baldcypress-Buttonbush-Emergents
FR-2			Unconnected lake and pond fringe	
RB-1	Riverine backwater	Wetlands maintained by riverine backwater flooding	Occasionally flooded wetlands and drained lowlands	Nuttal Oak-Willow-Oak-WaterOak
RB-2				Willow Oak-Water Oak-Sweetgum
RB-3				Willow Oak-Sweetgum
RB-4				Nuttal Oak-Sweetgum
RB-5			Occasionally flooded flats	Willow Oak-Nuttal Oak
RB-6			Frequently flooded Pleistocene deposits	Overcup Oak-Bitter Pecan-Green Ash
RB-7			Frequently Flooded lowlands	Overcup Oak-Bitter Pecan
RO-2	Riverine Overbank	Wetlands maintained by riverine overbank and headwater flooding	River swamp in underfit channels	Bald Cypress, Water Tupelo
U-2	Upland	Non-wetlands/Uplands	Well-drained soils on alluvial fans	Mixed Hardwoods

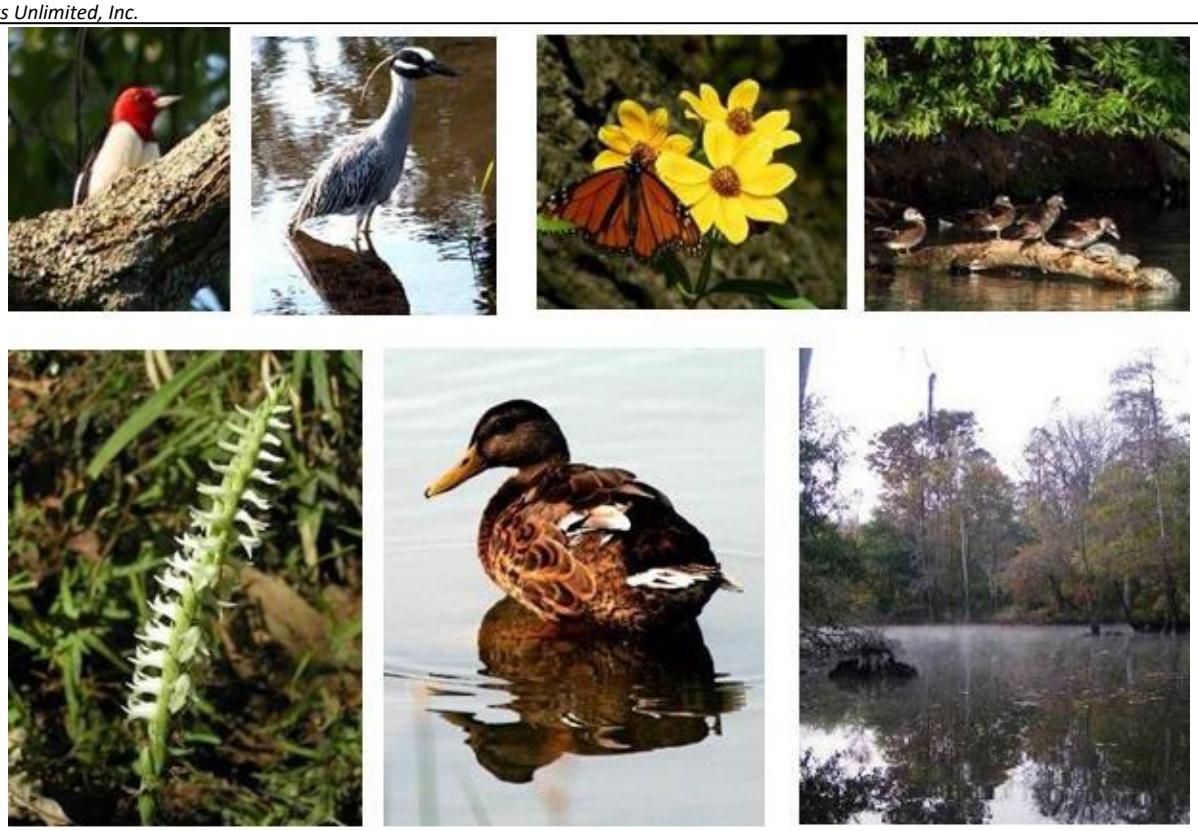
5) Animal and Plant Species Including Endangered Species

The Sites currently include 4,670 acres and are expected to encompass approximately ≥5,722 +/-acres by the Final Instrument Amendment. The final configuration of the Site is expected to provide: wetland offsets (≥25,470 AAFCUs), waterfowl offsets (≥196,648 DUDs); great blue heron offsets (≥ AAHUs), and fisheries offsets (≥3,851 ADFAs). Table 5 and 6 outlines the estimated offsets the initial 4670 acres can provide. Additionally, the Instrument Amendment will indirectly support habitat improvements threatened and endangered species that may be impacted development and impact pressure in the Service Area, described further in Section 5.

When the project Sites are finalized, a USFWS consultation will be performed using the IPAC process. Preliminary consultations indicated that at least two federally listed species may occur within the Project Focal Area including Northern Long Eared Bat (*Myotis septrionalis*) and Pondberry (*Lindera melissifolia*) as well as a candidate species – Monarch Butterfly (*Danaus Plexippus*), and two proposed endangered species Alligator Snapping Turtle *Macrochelys temminckii*), and Tricolored Bat (*Perimyostis subflavus*). DU anticipates this project will improve habitat quantity and quality for these species vs. baseline ecological conditions (agriculture).

Section 2 (Objectives), and 6 (Mitigation Work Plan) describe in greater detail how the restoration work will take into account ensuring that the habitat requirements of both federally listed, and species of greatest conservation need will be taken into account in the restoration planning and implementation process. Table 3 summarizes anticipated species guilds to be taken into account in the final project design.

Several species of greatest conservation need (SGCN), and guilds of species have been documented in the vicinity of the Project Focal Area or may benefit from the habitat provided through this mitigation project (Table 3). For example, our potential mitigation sites are not currently identified as hotspots for current Great Blue Heron habitat due to their agricultural use; however, they are located in close proximity to both known heron rookeries and areas of highly suitable habitat. Once restored, our sites have the potential to significantly enhance and expand habitat availability to support Great Blue Heron populations within the Yazoo Backwater Preserve.



The project is expected to benefit a range of species guilds, including those identified in Table 3.

Table 3. Species / Species Guilds Expected to Benefit from this Project.

Species or Species Guild	Mitigation Objectives
Migratory Songbirds	Reestablishing a range of successional cover types including mature BLH
Wading Birds	Inclusion of properties within 1km of rookeries or known foraging areas. Incorporation of flooded timber into design.
Shorebirds	Mitigation for loss of shorebird habitat should include acquisition of open land (e.g., agricultural land) with water management capabilities that maintain open wet substrate with sparse vegetation.
Waterfowl	Restore and enhance BLH forests to offset loss of foraging habitat for wintering waterfowl in the MSD. Mitigation lands that are reforested with at least 50% desirable red oak species and lands that are converted to moist soil units will provide anywhere from 56,203-254,700 DUDs for mallards and other dabbling ducks. They will likely also utilize Shorebird habitat.

Fish, Turtles and Aquatic Species	Selected sites for BLH forest mitigation should ensure that lands are flooded at depths of at least 1-ft over an 8-day period during part of the spawning season

The current restoration plan emphasizes bottomland hardwood habitats, as additional tracts are secured, design elements in those areas are expected to focus to a greater degree on more aquatic settings with linkage to riverine systems. Additional hydrological analysis will be incorporated in the design to meet wildlife lifecycle needs in addition to the wetland mitigation requirements.

6) Mitigation Work Plan

Ducks Unlimited's restoration planning efforts align with the Compensation Planning Framework and Site Selection Process, emphasizing ecological restoration focus on bottomland hardwood reforestation, and reestablishment of natural flooding regimes where they have been previously manipulated. Where necessary, drainage ditches or other hydrological modifications that reduce flood duration and depth will be disabled. DU will screen all incorporated Sites to ensure that hydrologic modifications on site improve rather than impeded flood storage capacity and duration. Restoration efforts will focus on re-establishing wetland hydrology on degraded lands and prior converted farm ground, promoting the growth of energetically valuable wetland vegetation. Techniques may include the construction or enhancement of low berms, installation of water control structures, and strategic earthwork to emulate wetland hydrology and promote connectivity to the floodplain, where feasible or necessary. These actions will create a mosaic of habitats that support a variety of plant and animal species, contributing to the overall biodiversity and ecological function of the landscape. Based on the hydrogeomorphic setting of the Focal Area (Figure 13), we anticipate cessation of agricultural practices will likely result in the hydrologic conditions necessary to support wetlands in most cases.

Generally, DU has had success with planting of trees in December – February, weather permitting, to ensure optimal establishment during the dormant season. Based on past projects DU anticipates establishing 300-400 trees per acre to establish the necessary stand density to achieve canopy closure at project maturity. Tree seedlings will be sourced from registered nurseries and will be healthy, viable trees that have a minimum root collar diameter of 3/8 and a minimum of 8" root length below the root collar. Tree species planted will include those characteristic of Bottomland Hardwood stands (Table 4). Per the LMVJV Desired Forest Conditions recommendations the planted areas will contain small 1-1.5 acre sparse or un-planted areas to increase suitability for wildlife habitat at an approximately 1:30 ratio.

The restored wetlands will be primarily passively managed to maintain optimal water levels, promoting the growth of moist-soil plants that produce seeds, tubers, and invertebrates—vital food sources for waterfowl that should offset the loss of DUDs caused by impact projects in this Service Area.

Conceptual restoration plans are provided in Figures 15 and 16. This plan largely calls for reforestation of previously drained wetland bottomland hardwood sites. As additional acres are enrolled, DU anticipates emphasizing wetter tracts subject to seasonal flooding where PEM and PFO communities on wetter ends of the hydrologic gradient, as well as moist soil management units.

6.1 Informing the Planting Plan

In subsequent planning phases, LiDAR derived digital elevation models and USACE derived hydrological monitoring well data together with supplemental monitoring wells will be used to document baseline hydrologic characteristics and inform target plant community distribution and acreage by subtype (e.g., riparian, deepwater, PEM, PSS, PFO). Like many plant communities, depth of hydrology and timing of flooding are critical elements shaping plant community composition as illustrated by Connor (1994) in Figure 14.

From past planting efforts, we have identified species likely to be commercially available and suited to the hydrologic conditions in our Focal Area. The species listed in Table 4 excludes species likely to be commercially unavailable, and those from drier settings that are not well represented in the Sites. While available resources generally describe the primary constituent plant species, on-site reference information will be used to further tailor the species composition and additional species to be emphasized in plantings at individual sites. Similarly, NRCS recommends developing site-specific plantings on Wetlands Reserve Easements (WRE) projects in the region.

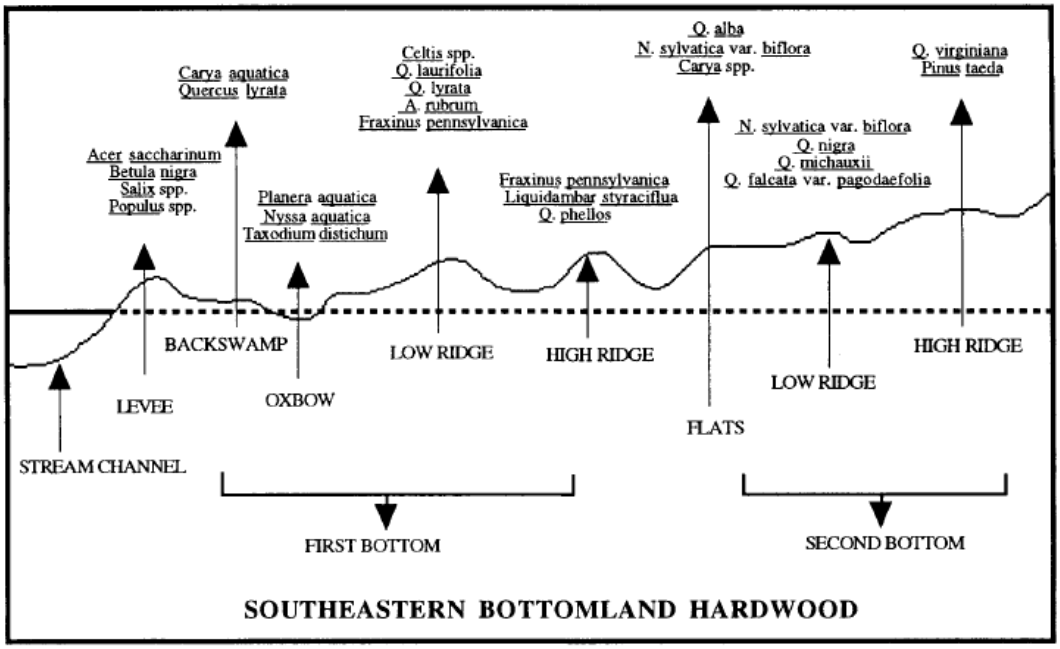


Figure 1. Idealized profile of species associations in southeastern bottomland forests (after Wharton 1978).

Figure 14. Idealized Plant Community Profile in Bottomland Forests. Developed by Connor 1994, after Wharton 1978.

Table 4. Planting List

Site specific planting plans will be developed based on site conditions in the field. Percentages of species composition will likely vary by site, based on reference communities. Given the abundance of red maple in this geography, this species will be a minor component in the plantings and may be excluded in specific sites altogether.

Target Area	Common Name	Scientific Name	Wetland Indicator Status	Notes
PEM	Pennsylvania smartweed	*Polygonum pensylvanicum*	FACW	
	broadleaf arrowhead	*Sagittaria latifolia*	OBL	
	redroot flatsedge	*Cyperus erythrorhizos*	OBL	
	barnyard grass	*Echinochloa crus-galli*	FACW	
	bearded sprangletop	*Leptochloa fusca*	FACW	
	fall panicgrass	*Panicum dichotomiflorum*	FACW	
	blunt spikerush	*Eleocharis obtuse*	OBL	
	rice cutgrass	*Leersia oryzoides*	OBL	
	seedbox	*Ludwigia alterniflora*	OBL	
PSS	buttonbush	*Cephalanthus occidentalis*	OBL	
	Dahoon	*Ilex cassine*	FACW	
	Eastern baccharis	*Baccharis halimifolia*	FAC	
	Eastern swamp privet	*Forestria acuminata*	OBL	
	Possumhaw	*Ilex decidua*	FACW	
	Wax Myrtle	*Morella cerifera*	FAC	
PFO	American Elm	*Ulmus americana*	FAC	
	Bald Cypress	*Taxodium distichum*	OBL	
	Blackgum	*Nyssa sylvatica*	FAC	
	Cedar Elm	*Ulmus crassifolia*	FAC	
	Eastern Cottonwood	*Populus deltoides*	FAC	
	Green Hawthorn	*Crataegus viridis*	FACW	
	Nuttall Oak	*Quercus texana*	FACW	
	Planertree	*Planera aquatica*	OBL	
	Overcup Oak	*Quercus lyrata*	OBL	
	Red Maple	*Acer rubrum*	FAC	<15% of plantings
	River Birch	*Betula nigra*	FACW	
	Sugarberry	*Celtis laevigata*	FACW	
	Swamp Chestnut Oak	*Quercus michauxii*	FACW	
	Sweetgum	*Liquidambar styraciflua*	FAC	
	Water Hickory	*Carya aquatica*	OBL	
	Water Oak	*Quercus nigra*	FAC	
	Water Tupelo	*Nyssa aquatica*	OBL	
	Western Mayhaw	*Crataegus opaca*	OBL	
	Willow Oak	*Quercus phellos*	FACW	

*Species list adapted from USACE Draft EIS Compensatory Mitigation Plan Yazoo Backwater Area Water Management Project - Compensatory Mitigation Plan (Appendix J) - Potential Natural Vegetation in the Project Area and Preliminary Planting List, 2015 MS SWAP, and experience from reforestation efforts in the MAV. Some species were excluded from our list based on being drier site species, and lack of commercial availability. (e.g., persimmon, honey locust, delta post oak).

7) Determination of Credits

All potential project sites with interested landowners were preliminarily prioritized based on scoping criteria discussed in previous sections (Sections 4 and 5). Project site boundaries were established with agreement from the landowner and projects were evaluated using the Hydrogeomorphic Approach (Smith and Klimas 2002) with updates based on Smith and Lin 2007. The Hydrogeomorphic (HGM) assessment included calculating wetland tract size (Vtract), core area (Vcore), and habitat connections (Vconnect) for each project using National Land Cover Database (NLCD) and Cropland Data Layer (CDL) data layers. Frequency of flooding (Vfreq) was calculated based on the projected post-project 2-year and 5-year floodplain established by the USACE for Alternative 3. Updates to the HGM assessment (Smith and Lin 2007) included incorporating flood duration (Vdur) into the assessment which is considered 5% for the Yazoo Study Area (YSA; USACE Yazoo Backwater Area Water Management Project Appendix F-3 – Wetlands 2024). Vdur was incorporated into models for "Export Organic Carbon" and "Provide Fish and Wildlife Habitat" functions. Additionally, as indicated by Smith and Lin 2007, "Removal of Elements and Compounds" was separated into "Physical Removal of Elements and Compounds" and "Biological Removal of Elements and Compounds" with both functions including Vdur in their calculations.

The HGM assessment method is appropriate to evaluate functionality of several wetland subclasses. However, the assessment for mitigation needs related to this civil works project assumed all areas classified as wetlands were within the "Riverine Backwater" subclass (Yazoo Backwater Area Water Management Project Appendix F-3 – Wetlands). To be consistent with the assessment of impacts from this project, our determination of credits using the HGM assessment also assumed all areas classified as wetlands were within the "Riverine Backwater" subclass. This was done to ensure that assumptions used to evaluate the mitigation need were consistent with the assumptions to evaluate the value of mitigation efforts.

For each project site, metric values for Vtract, Vcore, Vconnect and Vfreq were used along with estimated metric values for the remaining variables incorporated from the Yazoo Backwater Area Water Management Project Appendix F-3 – Wetlands (pages 55-60) according to the appropriate target year to calculate functional capacity index (FCI) scores. FCI calculations were performed for Year 0, Year 5, Year 10, Year 20, Year 35, and Year 50. Functional capacity units (FCU) between years were calculated based on equation 1 (Appendix F-3-Wetlands, page 26) and then summed over the 50-year period. Average annual functional capacity units (AAFCU) were then calculated based on equation 2 (Appendix F-3-Wetlands, page 26). AAFCUs were summed for all functions to determine AAFCUs per acre and then multiplied by the wetland acreage to be restored. See Table 5 for the restoration value determined for each project site based on the HGM assessment.

It is anticipated all credits produced by individual tracts will be utilized to produce HGM AAFCU credits to fulfill the Yazoo Backwater Pump compensatory mitigation requirements as detailed above. However, for each individual tract DU may also submit a set of proposed wetland mitigation credits calculations using the Modified Charleston methodology as detailed in Appendix C of the Vicksburg District's Guidelines for Preparing a Compensatory Mitigation Plan (USACE MVK, October 2010) for each aquatic resource type restored or enhanced on the individual tract. Charleston method credit determination is shown in Tables 6). Credits generated by the two distinct credit calculation methodologies will not be stacked but available only from spatially distinct individual tracts or portions of such.

In addition, some tracts may contain the opportunity to conduct stream restoration or enhancement activities such as stream channel restoration, bank stabilization, in-stream habitat, or structure removal that could generate stream credits calculated using the methodology detailed in Appendix D of the Vicksburg District's Guidelines for Preparing a

Compensatory Mitigation Plan (USACE MVK, October 2010). DU may request credit generation for these activities, which again would not be stacked with HGM AAFCU credits but available only from spatially distinct individual tracts or portions of such.

Table 5. Estimated AAFCU's by Tract.
Geographic setting and anticipated lift of tracts included.

Tract	Project acres	Restoration acres	2 Yr Floodplain Acreage	2 Yr Floodplain AAFCUs	Additional Acreage 5 Yr Floodplain	5 Yr Floodplain AAFCUs	Total Project AAFCUs	AAFCU value per Restoration Acre	FBBDSM mean
1	238	230	78.5	429	134.8	630	1059	4.6	8.5
2	885	863	722.8	3950	67.8	317	4267	4.89	8.1
3	455	450	208	1137	23	107	1244	2.73	9.7
4	301.2	298	174	951	122.5	572	1523	5.05	9
5	1044.8	957	814	4448	118	551	4999	5.12	9.5
6	302	295	90	492	167	780	1272	4.19	10
7	74.5	74	61	333	13	61	394	5.23	10
8	27.8	21	15	81	5	23	104	4.81	8.9
9	437	436	402	2197	34	159	2356	5.33	9.2
10	88.6	78	75	409	3	14	423	5.4	8.1
11	5.8	5	5	27	0	0	27	5.2	10
12	79.1	77	76	413	0	0	413	5.27	7.8
13	75	73	69	376	3	14	390	5.26	6
14	34.8	34	34	185	0	0	185	5.32	7.5
15	17.7	17	7	38	9	41	79	4.47	6.7
16	19.3	19	19	102	0	0	102	5.26	6.7
17	251.5	243	209	1142	21	98	1240	5.1	5.8
18	78.8	78	78	425	0	0	425	5.38	5.1
19	113.2	112	46	250	47	218	468	4.18	6
20	67.7	67	52	276	10	45	321	4.79	5.8
21	72.5	72	10	55	56	261	316	4.35	9
22	453.6	441	422	2306	18.6	87	2393	5.28	6.9
23	73.8	71	8.4	46	38.7	178	224	3.04	9
24	17.3	16	16.2	87	0	0	87	5.03	6.7
25	38.4	37	3.3	18	33.6	156	174	4.53	6.4
26	55.8	44	18.4	99	10	46	145	2.6	7
27	146.6	118	0	0	102.2	464	464	3.17	6.8
28	120.8	83	46.6	253	8.1	38	291	2.41	6.8
29	85.2	79	39.6	215	4.7	22	237	2.78	7
30	239.6	228	157.2	859	61.5	287	1146	4.78	9
31	125.1	122	119	650	2.8	13	663	5.3	7.4
32	117	112	13.6	74	41.9	195	269	2.3	6.9
33	39	36	36.3	197	0	0	197	5.05	7
Totals	**6,182**	**5,886**	**4,126**	**22,520**	**1,156**	**5,377**	**27,897**		

Table 6. Estimated Charleston Credits

**Credit estimate only includes reestablishment, rehabilitation areas, preservation and upland buffer work was excluded from this preliminary determination.*

Project Number	Net Improvement	Upland Buffer	Credit Schedule	Temporal Loss	Kind	Location	Sum of Factors (M)	Total Area	Mitigation Activity Area (A)	PEM Preservation	PEM Rehabilitation	PEM Reestablishment	PFO Preservation	PFO Rehabilitation	PFO Reestablishment	Stream Preservation	Upland Buffer Preservation	Upland Buffer Rehabilitation	Credits (M x A=)
1	3		0.5	0	0.4	0.4	4.3	238	238	0	0	0	0	0	238	0	0	0	1024
2	3		0.5	0	0.4	0.4	4.3	885	838	0	0	30	7	2	807	6	1	33	3606
3	3		0.5	0	0.4	0.4	4.3	455	455	0	0	0	0	14	441	0	0	0	1957
4	3		0.5	0	0.4	0.4	4.3	301	301	0	0	0	0	0	301	0	0	0	1295
5	3		0.5	0	0.4	0.4	4.3	1045	919	0	12	0	84	0	907	42	0	0	3954
6	3		0.5	0	0.4	0.4	4.3	302	294	0	0	0	0	0	294	7	1	0	1264
7	3		0.5	0	0.4	0.4	4.3	75	75	0	0	0	0	0	75	0	0	0	320
8	3		0.5	0	0.4	0.4	4.3	28	24	0	0	0	4	0	24	0	0	0	102
9	3		0.5	0	0.4	0.4	4.3	437	434	2	0	0	0	0	434	1	0	0	1867
10	3		0.5	0	0.4	0.4	4.3	89	84	0	0	0	5	0	84	0	0	0	360
11	3		0.5	0	0.4	0.4	4.3	6	6	0	0	0	0	0	6	0	0	0	25
12	3		0.5	0	0.4	0.4	4.3	79	79	0	0	0	0	0	79	0	0	0	340
13	3		0.5	0	0.4	0.4	4.3	75	75	0	0	0	0	0	75	0	0	0	322
14	3		0.5	0	0.4	0.4	4.3	35	35	0	0	0	0	0	35	0	0	0	150
15	3		0.5	0	0.4	0.4	4.3	18	18	0	0	0	0	0	18	0	0	0	76
16	3		0.5	0	0.4	0.4	4.3	19	19	0	0	0	0	0	19	0	0	0	83
17	3		0.5	0	0.4	0.4	4.3	252	249	1	0	0	0	0	249	2	0	0	1072
18	3		0.5	0	0.4	0.4	4.3	79	78	0	0	0	0	0	78	1	0	0	336
19	3		0.5	0	0.4	0.4	4.3	113	111	0	0	0	2	0	111	0	0	0	479
20	3		0.5	0	0.4	0.4	4.3	68	67	0	1	0	1	0	65	0	0	0	287
21	3		0.5	0	0.4	0.4	4.3	73	71	2	0	0	0	0	71	0	0	0	305
22	3		0.5	0	0.4	0.4	4.3	454	452	0	2	60	1	0	390	0	0	0	1944
23	3		0.5	0	0.4	0.4	4.3	74	74	0	0	0	0	0	74	0	0	0	318
24	3		0.5	0	0.4	0.4	4.3	17	17	0	0	0	0	0	17	0	0	0	73
25	3		0.5	0	0.4	0.4	4.3	38	38	0	0	0	0	0	38	0	0	0	163
26	3		0.5	0	0.4	0.4	4.3	56	49	1	0	1	5	0	48	0	0	0	211
27	3		0.5	0	0.4	0.4	4.3	147	122	0	0	0	24	0	122	1	0	0	525
28	3		0.5	0	0.4	0.4	4.3	121	86	0	0	7	34	0	79	0	0	0	370
29	3		0.5	0	0.4	0.4	4.3	85	85	0	0	0	0	0	85	0	0	0	366
30	3		0.5	0	0.4	0.4	4.3	240	231	5	8	0	1	0	223	1	0	0	993
31	3		0.5	0	0.4	0.4	4.3	125	125	0	6	0	0	0	119	1	0	0	538
32	3		0.5	0	0.4	0.4	4.3	117	117	0	0	0	0	0	117	0	0	0	503
33	3		0.5	0	0.4	0.4	4.3	39	39	0	0	0	0	0	39	0	0	0	168
							Total	**6185**	**5905**										**25396**

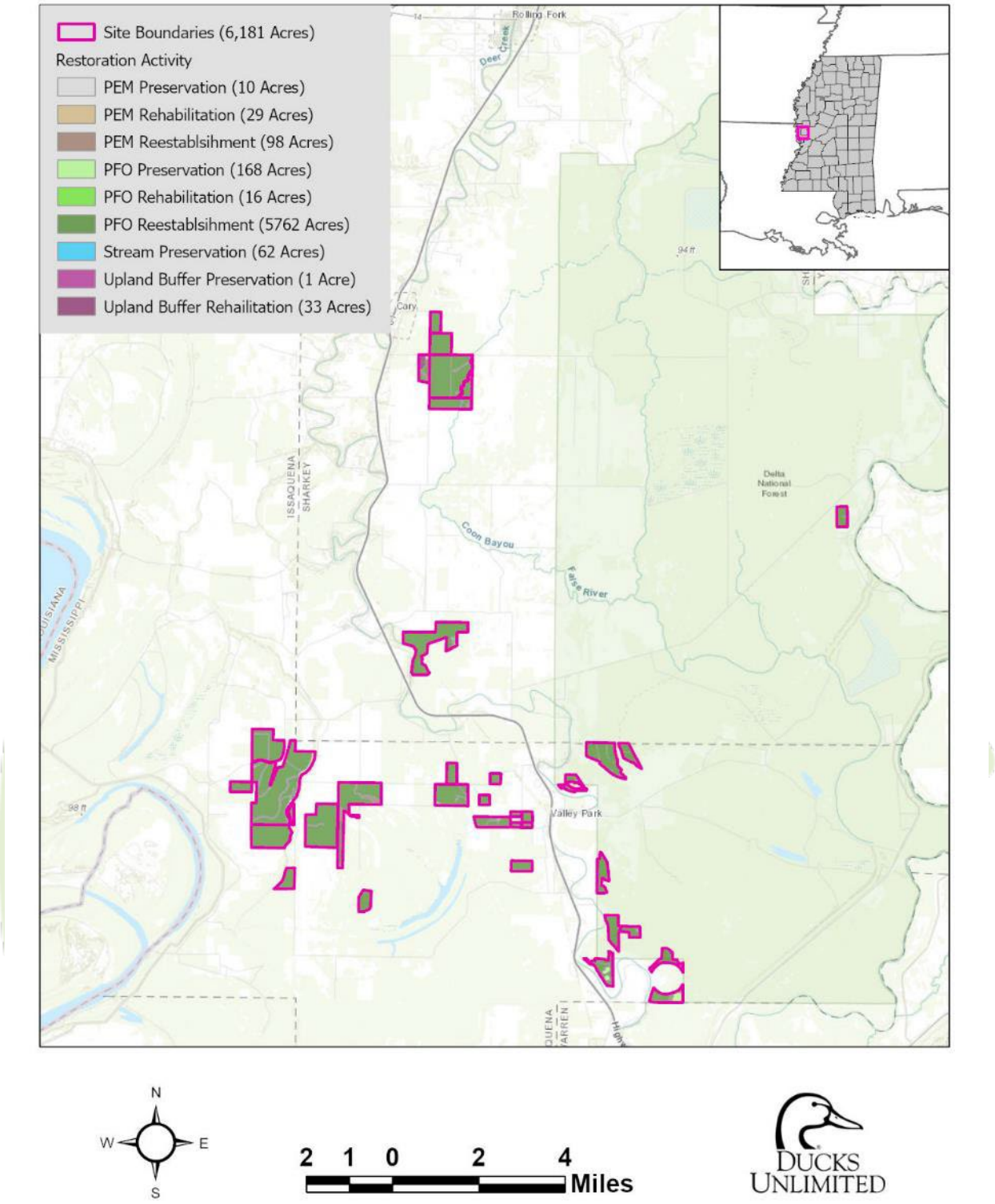


Figure 15. Restoration Activity Map.

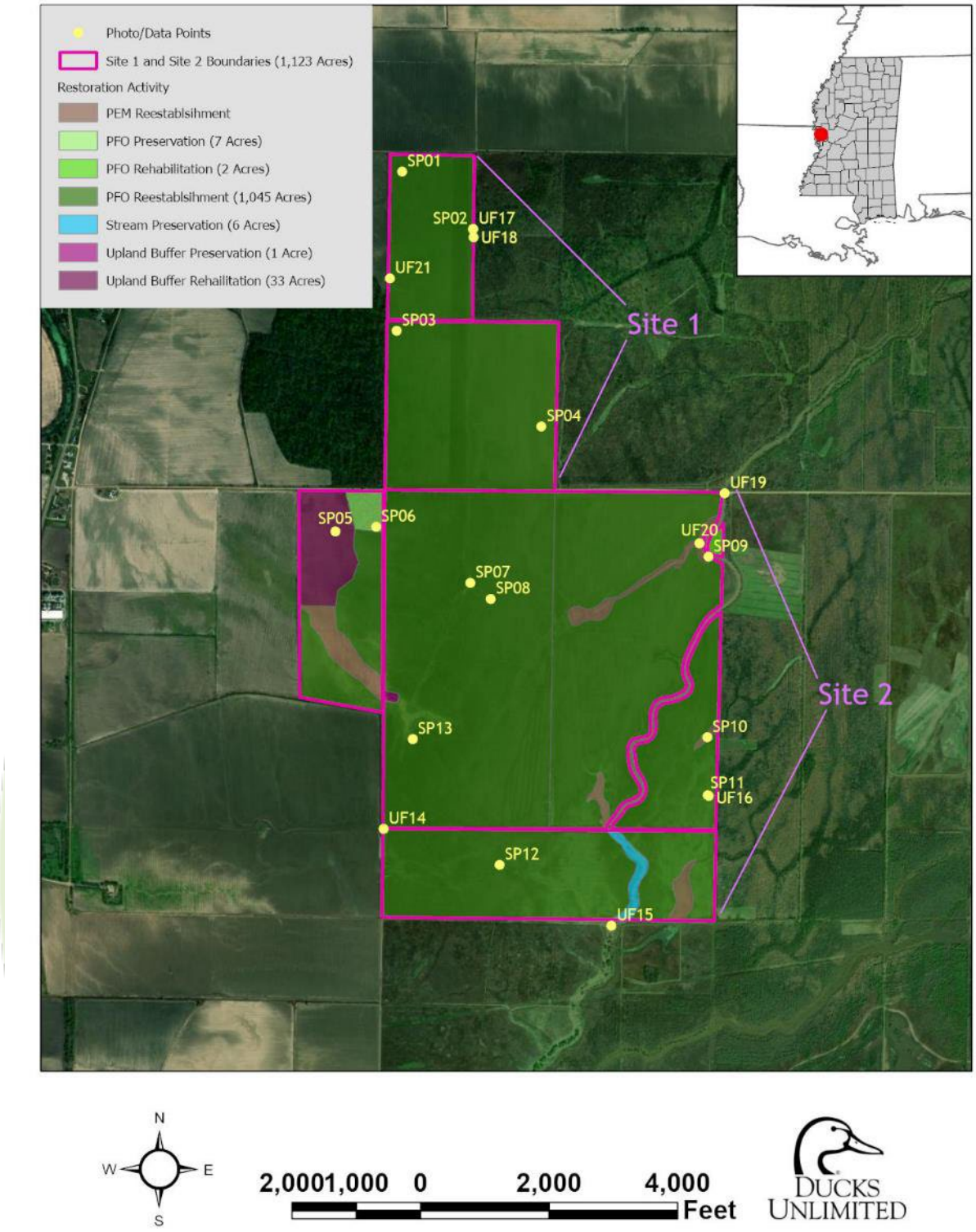


Figure 16. Project Site Level Restoration Map.
Shows Site 1 and 2 including locations of field investigations. Corresponding Photographs and Datasheets are included in Appendix C and D. Complete wetland delineations of all Sites will be performed in later phases.

7.1 Credit Release Schedule

The Corps, in consultation with the IRT, will determine credits based on wetland and upland buffer acres that meet or exceed performance standards, established for the project, and the credit ratios established. Provided the financial assurances and conservation easements are in place, and the site is progressing towards meeting the performance standards outlined in Section 8, we anticipate the project will follow the credit release schedule identified in Table 7.

Table 7. Credit Release Schedule

Monitoring will occur in each year prior to final Credit Release, regardless of whether a monitoring report is due. Year indicates reporting year number. Credit releases are subject to financial assurances and site protection instruments being in place to the satisfaction of the District Engineer.

Activity	Description	Year	Credit Release %
Plan Approval			30%
As-built Report	To be submitted following completion of construction and planting	0	30%
1st Monitoring Report	1st Interim Credit Release	1	10%
2nd Monitoring Report	2nd Interim Credit Release	3	10%
3rd Monitoring Report	3rd Interim Credit Release	5	5%
4th Monitoring Report	4th Interim Credit Release	7	5%
Final Report	Final Credit Release	10	5%

8) Performance Standards

Success within the planned wetland re-establishment and enhancement portions of the Site is based on meeting the USACE criteria for the three parameters described in the 1987 Corps of Engineers Wetlands Delineation Manual and Atlantic & Gulf Coast Regional Supplement, or any subsequent versions or updates thereto, and attainment of interim and final performance standards. These parameters require sufficient:

1. *wetland hydrology* to support adequate
2. *hydrophytic vegetation*, ultimately forming
3. *hydric soils*, all of which describe a functioning wetland.

Upon Project authorization, the Sponsor will perform all necessary work to monitor the Mitigation Site to demonstrate compliance with the performance criteria developed by the USACE, Vicksburg District, for jurisdictional areas and associated upland buffers as established in the Final Mitigation Plan (Instrument Amendment). The Sponsor will be responsible for completing monitoring reports at a frequency agreed upon with the Corps of Engineers in consultation with the IRT. The following performance standards will be described in monitoring reports.

The performance standards criteria described below will be monitored over a five-year term that begins following the submittal of a post-construction as-built; the monitoring term includes three interim goals, and the final success criteria. The Success Criteria will follow those outlined in the Vicksburg as outlined below:

Wetland:

- **Wetland Hydrology.** The hydrology monitoring should display wetland hydrology which is defined as whether the site is inundated (flooded or ponded) or the water table is ≤12 inches below the soil surface for ≥14 consecutive days during the growing season at a minimum frequency of 5 years in 10 (≥50% probability) (ERDC TN-WRAP-05-2). Any combination of inundation or shallow water table is acceptable in meeting the 14-day minimum requirement. Short-term monitoring data may be used to address the frequency requirement if the normality of rainfall occurring prior to and during the monitoring period each year is considered. A site must be inundated or saturated typical of a reference condition for the same HGM hydrology classification. A site must meet wetland hydrology criteria as described in the USACE Wetland Delineation Method, 1987 Manual /or Atlantic/Gulf Coast Regional Supplement.

- **Wetland vegetation.** The site should display a dominance of wetland vegetation, defined as a vegetation community of species where more than 50% of all dominant species are facultative (FAC), facultative-wetland (FACW) or wetland (OBL), excluding FAC- plants, using routine delineation methods as described in the USACE Wetland Delineation Method, 1987 Manual and/or Atlantic/Gulf Coast Regional Supplement.

- **Hydric soils.** The ILF Site should display hydric soils, which are soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (United States NRCS Version 7.0, 2010).

Streams:

- Must exhibit a dimension/ pattern/ profile within 15% of designed channel and meet stream stability metrics.

9) <u>Monitoring and Reporting Requirements</u>

An as-built report shall be submitted to the IRT within 90 days of completion of each Phase of mitigation activities depicted in the bank Restoration Plan. The as-built report is submitted to meet the requirements of the Post Construction credit release. The report shall include:

1. The georeferenced locations for all required monitoring plots, soil reduction tubes and water level monitoring devices or stations.

2. A plan view map of the constructed/restored wetlands, streams, and adjacent buffers with location of all permanent sampling stations, monitoring wells, in-stream and stream bank structures, and all permanent cross-Sections and profiles;

3. A description and map of vegetation monitoring plots established at the time of planting. Vegetation monitoring plots will:

    a. Be distributed throughout the sites

    b. Cover at least 10% of the ILF Site and represent each of the vegetative community types (e.g. cypress

sloughs, bottomland hardwoods, wet pine savannah, etc.).

c. Be at least 1/10-acre randomized circular plots established using a randomly selected, evenly distributed grid approach.

4. The establishment of a photo point at the center of each monitoring plot, with four photos taken facing outward toward each of the four cardinal directions (north, south, east and west).

5. [When needed, as determined by the IRT] The installation of soil reduction (IRIS) tubes to provide evidence of soil saturation at selected fixed vegetative monitoring plots. The soil reduction tubes will:

   a. be displayed on a map (including coordinates) and presented to the IRT for approval prior to field establishment

   b. be evenly distributed throughout the ILF Site, to the maximum extent practicable,

   c. be installed at a rate of cluster of tubes per for every 200 acres of restored (Berkowtiz. 2009. Using IRIS Tubes to Monitor Reduced Conditions in Soils- Project Design. ERDC TN-WRAP-09-1) bank area, at selected fixed vegetative monitoring plots,

   d. be painted with one coat of ferrihydrate paint and installed to a minimum depth of 20 inches below the surface leaving a minimum of ½ inch of coating above the surface,

   e. be considered as providing a positive indicator of sufficient anaerobic and saturation conditions if most of the ferrihydrate paint coating is dissolved,

6. [When needed, as determined by the IRT through the Instrument Amendment] The installation of appropriate hydrologic monitoring devices, groundwater wells or piezometers. Hydrology monitoring wells will: [Include reference conditions if appropriate.]

   a. be displayed on a map (including GPS coordinates) and presented to the IRT for approval prior to field establishment

   b. be evenly distributed throughout the ILF Site, to the maximum extent practicable,

   c. be installed at a rate of one monitoring well for every 200 acres of restored bank area,

   d. be evaluated to collect pertinent data at least daily throughout the growing season, including the collection of information to substantiate whether the site exhibits the appropriate hydrology for the wetland community types being restored [include reference conditions if appropriate],

7. A baseline HGM Functional analysis of the site prior to planting and restoration utilizing an appropriate HGM approved by the IRT.

8. [For Stream ILF Sites] Profile of in-stream structures, stream cross-Sections, longitudinal stream profiles from permanent monitoring locations, and other relevant baseline information for stream success metrics. Please see required data in restoration plan.

9. Description regarding invasive species prevalence and composition.

10. Professional stamped survey of mitigation area.

Monitoring reports shall be provided to USACE no later than October 15th following the growing seasons in Years 1, 3, and 5, 7, 10 so that any corrective measures by the Sponsor may be undertaken. USACE will distribute the report to the members of the IRT. In the event monitoring reveals that initial standards have not been met, the Sponsor shall take measures to achieve the performance standards the following year. Monitoring, reporting and adaptive management/remedial action shall be conducted in accordance with the following:

1. The Sponsor shall provide a written report to USACE by October 15th to allow for the Sponsor to complete vegetative chemical control, if needed. Reports shall be submitted following the growing seasons in years 1, 3, and 5, documenting the results of the monitoring conducted above. The report shall include, at minimum, the following:

    a. A United States Geological Survey topographic quadrangle with the Mitigation Site indicated.

    b. A detailed narrative that summarizes the condition of the Mitigation Site and all maintenance activities.

    c. Appropriate site maps that show the locations of all sampling plots, permanent photographic stations, soil reduction tubes, and hydrologic monitoring devices or stations.

    d. Data and interpretation regarding the hydrology of the Mitigation Site (e.g., hydroperiod, extent and depth of inundation, groundwater monitoring results, precipitation records, etc.). Additionally, during each monitoring event, all primary and secondary hydrology indicators will be observed and documented for each monitoring plot, as currently defined in the USACE Delineation Manual, Environmental Laboratory, 1987, Corps of Engineers' Wetlands Delineation Manual (and Supplemental Guidance), Technical Report Y-87-1, USACE of Engineers Waterways Experiment Station, Vicksburg, Mississippi.

    e. Results and interpretation of vegetation surveys, including the following: The Sponsor shall conduct surveys of living seedlings on the tract at each monitoring location. Sampling shall be done between April 15th and September 15th. Planted seedling survival shall be documented by performing monitoring at the vegetative plots indicated in a Restoration Plan. A table will be provided which documents the following for each monitoring plot: monitoring plot identification, latitude, longitude, count of planted trees per plot, height of trees, count of volunteer tree species per plot, hard mast and soft mast percent, and tree per acre value for each plot. Provide averages over entire site for tree per acre, hard mast/ soft mast ratio. A table should be provided which shows invasive species information for each plot and an estimate of invasive or exotic species over the entire site. Visual estimates of overall percent cover and of percent cover within each stratum of vegetation over the entire Site; species composition; hard mast to soft mast ratio; indices of species diversity; estimates of percent cover of exotic species within each stratum of vegetation present; composition of plant community (wetland indicator status); calculations of survival, density of all trees within the monitoring plots (including natural recruitment),diameter or DBH, and height of all planted trees; and estimates of natural recruitment.

    f. Results of surveys of wildlife usage of the site (e.g., observations of amphibians, reptiles, mammals, birds and macro invertebrates on or near the Mitigation Site).

    g. Descriptions of the condition of applicable drainage ditch plugs, low water crossings, and water control

structures (including but not limited to cross vanes, j-hook vanes, etc.).

h. A discussion of likely causes of observed tree mortality within those plots or areas that did not achieve specified performance standards at Years 1, 3, and 5, or note plots in monitoring reports for Years 1 and 3 which are candidates for corrective measures.

i. A completed HGM functional assessment of each planting zone utilizing the appropriate HGM Regional Guidebook. The HGM assessment will be utilized to assess the ecological functional lift of the restoration effort. The HGM score for each monitoring event will be compared to the original baseline pre-restoration score, and to the score of the previous monitoring event to determine both overall ecological functional lift and ecological functional lift between monitoring events. The HGM Assessment shall determine a score for the Functional Capacity Indices required in the appropriate HGM regional guidebook.

j. A drawing based upon the grading plans of the site that depicts topography, sampling plots, cross-Sections, longitudinal profile, and permanent photo stations. Survey data and comparison to as-built data will be included.

k. Data regarding the hydrology of the Site (e.g. hydroperiod, extent and depth of inundation, precipitation records, etc.). [Include well and other hydrology monitoring as necessary to demonstrate success of hydrology restoration goals, if appropriate.]

l. Monitoring reports shall present yearly data in tabular and graphical format comparing as-built, target, current and previous years monitoring data, and shall include a discussion of any deviation from as-built, target, or previous year's data. For stream Sites with in-stream work, metrics measured should reflect metrics in restoration plan.

2. The Sponsor shall provide funding information on financial assurance mechanisms.

3. If survival (as determined by sampling or observing high mortality rates within any planting zone) is less than indicated performance standards, the Sponsor shall take appropriate actions, as recommended by the IRT, to address the causes of mortality and shall replace all dead trees with new seedlings of the appropriate species during the following non-growing season. Replanting, in accordance with this paragraph, and monitoring and reporting, as described in paragraphs 1 and 2 of this Section, shall occur thereafter as needed to achieve and document the minimum required survival density for five consecutive years.

4. If tree survival or any other corrective measure is required for the site to meet restoration goals (as documented in monitoring reports), the Sponsor shall develop and implement an adaptive management plan. This adaptive management plan will be submitted to USACE for approval. Upon approval, any replanting will require the site to be monitored according to monitoring and reporting guidance above until success criteria are met.

5. The Sponsor shall continue monitoring and reporting of each planting effort, in accordance with the Restoration Plan for a minimum of five (5) years for wetlands and stream work. Annual reports will be provided to USACE for distribution to the IRT members.

10) Long-Term Management Strategy

This Section describes first the requirements of the Sponsor its heirs or assigns, and then we describe the strategy that will be employed at this project. The Sponsor, its heirs, assigns or successors, shall be responsible for maintaining and protecting lands contained within the restored portions of the Mitigation Site, unless the lands are transferred to a state or federal resource agency or non-profit conservation organization or this responsibility is contractually conveyed to another person, subject to approval by the IRT. DU anticipates serving as the conservation easement holder and serving as the long-term steward until a suitable alternative is approved. The IRT shall not unreasonably withhold authorization of transfer of long-term maintenance and protection to another entity.

1. The Sponsor shall develop a Long-Term Management and Maintenance Plan. The Long-Term Management and Maintenance Plan must be consistent with the guidelines and objectives specified of the Instrument Amendment authorizing the use of the Site, and approved by the District Engineer, in consultation with the other members of the IRT. The Sponsor may only deviate from the approved Plan upon written approval of the District Engineer, following consultation with the IRT.

2. The Sponsor may assign its long-term management and maintenance responsibilities to a third-party assignee, who will then serve as Long-Term Steward in place of the Sponsor. The identity of the assignee and the terms of the long-term management and maintenance agreement between the Sponsor and the assignee must be approved by the District Engineer, following consultation with the IRT, in advance of assignment.

3. Upon site closure, the Long-Term Steward shall be responsible for managing the Site in perpetuity in accordance with the terms of the Long-Term Management and Maintenance Plan, the Site Development Plan, and real estate provisions, including the terms of the recorded conservation easement. If the Long-Term Steward, or its successor, declines to accept stewardship responsibility for the Site and the associated Long-Term Management Fund, the Sponsor shall then transfer stewardship responsibility for the Site and the associated Long-Term Management Fund to a public resource agency or non-profit agency engaged in conservation activities, subject to written approval of the receiving entity by the IRT. If no public resource agency or nonprofit agency engaged in conservation activities is willing to accept management responsibility for the Site lands, then the Sponsor will be the Long-Term Steward until another party acceptable to the IRT agrees to accept management responsibility for the Site lands.

4. If the Sponsor elects to assign responsibility for the Long-Term Management and Maintenance Plan to a Long-Term Steward, the assignment agreement will reflect that the assignee has assumed the obligation, owed to the IRT, of accomplishing the Long-Term Management and Maintenance Plan. In exchange for the assignee's commitment to implement the Long-Term Management and Maintenance Plan, contemporaneously with the assignment of long-term management and maintenance responsibilities the Sponsor will direct disbursement of the full amount of funds in the Long-Term Management Fund to the Long-Term Steward. In the event the responsibility for executing the Long-Term Management and Maintenance Plan is not assigned to a third-party assignee, upon closure of the Site in accordance with Instrument Amendment, the full amount of funds in the Long-Term Management Fund will be disbursed to the Sponsor.

Properties for the project will fall into two tracks 1) lands protected by Ducks Unlimited through easements held by their Land Trust Arm, Wetlands America Trust (WAT). WAT is a wholly owned subsidiary of Ducks Unlimited and is an accredited land Trust through the Land Trust Alliance. 2) a portion of the lands for the project will be acquired through fee-title acquisition by The Nature Conservancy and or Delta Wildlife. It is intended that these properties will ultimately

end up in public ownership (e.g., additions to State Wildlife Management Agency holdings and or locally accredited land trust(s). In most cases, where required, WAT will be the conservation easement holder. Long-term management plans describing financial and long-term stewardship requirements, adaptive management triggers, techniques and funding mechanisms will be developed for properties incorporated into the mitigation site. The Long-term Management Strategy will be implemented once the site has successfully completed the mitigation requirements described in an approved plan, and long-term protections are in place. It will describe the specific needs for optimal conservation of the individual site and also provide a general discussion of positive and negative attributes of the surrounding watershed that should be taken into account for long-term site protection.

DU intends to serve as long-term steward on private lands protected by conservation easement, and will serve as the stand in for lands acquired by partners until a Long-term Steward acceptable to the USACE, in consultation with the IRT is identified.

DU estimated long-term stewardship costs and easement costs based on adapted versions of The Nature Conservancy's Stewardship Endowment Calculator. The Sponsor intentionally establishes endowments for stewardship and easements separately as separate entity's may ultimately be responsible for the different tasks. DU has established and operational distinct accounts for easement endowments and long-term stewardship accounts. These estimates will continue to be revised as more information on site-specific tasks become available.

11) Adaptive Management Strategy

DU will take appropriate measures after initial construction to ensure continued site maturation. DU will be responsible for monitoring and coordinating the execution of maintenance activities. Monitoring will occur regularly throughout the growing season from approximately April through September of each year. Regular inspections include but are not limited to inspection of site hydrology, plant community development including diversity, percent cover and presence of invasive species, and functioning of constructed features. Maintenance activities may be triggered by:

- During yearly monitoring, management concerns (e.g., deer herbivory, unauthorized all-terrain vehicle (ATV) use, dumping) and appropriate adaptive management strategies will be reviewed and implemented as necessary. These include but are not limited to establishment of fencing, placement of barriers to prohibit unauthorized ATV use, contacting local authorities. Plant community management may take on the form of mechanical removal, mowing, and herbicide application to control invasive plant species.
- Unforeseen environmental conditions may affect the success of the project, but their effects can generally be managed through early detection. Invasive species, site degradation, erosion, and vandalism are examples of some adverse conditions that can be managed.
- Routine maintenance checks, for example, on plant health and vigor, unwanted plant species, trash, herbivores, and areas with chronic erosion.
- Deer herbivory will be monitored. Supplemental plantings, fencing, etc. may be required as adaptive management techniques.
- Supplemental plantings may be added, especially to overcome adverse weather conditions early within site establishment phases.
- Corrective measures may include adding or removing plants as conditions warrant, modifying local topography to ensure wetland hydrology, and additional mulching and seeding as needed.
- Routine checks of low embankments to look for erosion and to make sure that the outlets are clear of debris. Any eroded areas will be repaired and reseeded.

- Routine checks of signs and associated maintenance will be performed.
- Because shorebird habitats require periodic drawdown and discing cycles to ensure the presence and adequate abundance of ≥403 acres shorebird habitat in a given year, the final mitigation plan will include a detailed management plan for those habitats. Typically, this type of active control over moist soil units is done by drawing units down using installed water control structures, followed by discing, and potential cover crop introduction.
- Per the LMVJV Desired Forest Conditions, management actions may be undertaken early in the development of the forest stands (e.g. circa year 15 post-planting) to ensure areas of sunlight penetration to the forest floor.

12) Financial Assurances

Financial assurances for the construction and performance of the Project will be provided by DU in the form of a casualty insurance policy. DU evaluated the various financial assurance structures available for this project including letter of credit, performance bond, and casualty insurance. Given the size of this project and the amount of financial assurances required, letter of credit was not feasible given the amount of capital that would need to be held in reserve. Additionally, if bond were to be called upon as the method of financial assurance, DU would be responsible for repaying the bond-issuing entity – a risk our organization is not prepared to take. Both of these options would necessitate substantial increases in credit price to adequately capitalize risk. Based on our review, we find casualty insurance (hereafter insurance) to be the clear choice for this project, given its fixed, up front pricing profile, and ability to pay out, without drawing additional organization financial resources if called upon.

The insurance will extend sufficient financial resources to completely cover the full cost of construction and replanting of the Project, if necessary, to achieve success. We estimate construction, planting and associated staffing costs at $22,105,610.60. Financial assurances shall no longer be required once the compensatory mitigation project has been determined by the District Engineer to be successful in accordance with its performance standards. The financial assurances will not be called upon unless DU has exhausted the existing project budget, including all money set aside for contingency and wetland maintenance, excluding the funds to be utilized for the Long-term Stewardship Endowment and Conservation Easement.

The Sponsor shall provide financial assurances in the form of a casualty insurance policy to ensure a high level of confidence that the compensatory mitigation project will be successfully completed, in accordance with the performance standards and obligations set forth in the Instrument Amendment, and in accordance with items (a) through (i) below.

a. The casualty insurance policy must contain the information described in 33 CFR 332.3(n) and must be submitted to the USACE for review and approval prior to execution.
b. The original, executed casualty insurance policy document(s) shall be provided to the USACE at the following address after approval of the Instrument Amendment, prior to the release of any credits from the Mitigation Site, and prior to commencing activities authorized by any Department of Army permit associated with implementation of the Instrument Amendment: USACE Vicksburg District, Regulatory Branch, Attn: Kristina Hall, US Army Corps of Engineers, 4155 Clay St, Vicksburg, MS 39183.
c. Once executed, the casualty insurance policy will be incorporated into and made part of the Instrument Amendment.
d. The MECHANISM amount(s) and schedule shall be as follows:
   A casualty insurance policy in the amount of Twenty-Four-Million Dollars ($22,105,610.60) shall be maintained until final performance standards are achieved and the Corps has released the financial assurance obligation in writing.

e. The sponsor must notify the USACE at least 120 days in advance of any termination, revocation, or modification of the casualty insurance policy. Modification of the casualty insurance policy, including the amount, terms, and holder, requires prior written USACE approval.

f. The sponsor shall ensure that the casualty insurance policy does not lapse.

g. In the event that the USACE determines that the sponsor is in noncompliance with or has defaulted on obligations set forth in the Instrument Amendment, and the sponsor has failed to remedy the noncompliance in a timely manner, the USACE may make a claim on the casualty insurance policy by providing written notice to the sponsor and the casualty insurance provider.

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14) Appendix A. Site Selection Process

This Section describes how DU progresses from identifying landscapes as priorities for conservation, prioritizes focal areas within those landscapes, and ultimately aligns conservation objectives with targeting and securing individual properties. This is a tiered approach.

Landscape Scale Prioritization

DU utilizes a scientific approach to prioritize its conservation and mitigation activities. At a high-level, conservation priorities are identified by a team of international biologists made up of waterfowl and conservation experts spanning government, academia, and NGO sectors as described in the North American Waterfowl Management Plan (NAWAMP; United States Fish and Wildlife Service 1986, 2012). DU's applied version of this plan, The International Conservation Plan identifies portions of Mississippi as priority landscapes for waterfowl conservation (Ducks Unlimited, 2005, 2019). Roughly sixty percent of North America's waterfowl utilize the Mississippi Alluvial Valley (MAV) during their lifecycle, and this area is the continent's most important wintering habitat area for mallards (LMVJV 2024). Bottomland hardwoods and associated wetland complexes provide habitat for vast array of other migratory bird species, including waterfowl, shorebirds and neo-tropical migrants.

Within Landscape Prioritization

Within priority landscapes, DU also makes use of the best available science to help steer conservation and mitigation activities. DU has developed and continues to compile a suite of Geographic Information Systems (GIS)-planning tools and data layers incorporating:

- protected areas databases (PADUS)
- restorable wetlands areas (DU model)
- priority reforestation areas (LMVJV)
- hydrology data (NHD)
- soils (SSURGO)
- landcover (NLCD)
- crop-cover (Crop-scape)
- topography
- natural communities & species occurrence related data (MS Natural Heritage)
- USFWS National Wetland Inventory (NWI)

The Lower Mississippi Valley Joint Venture (LMVJV) provided several of the site selection prioritization tools (e.g., MAV Forest Breeding Bird Decision Support Model – which prioritizes areas for reforestation) included in the Ducks Unlimited Mississippi Delta In Lieu Fee Program Instrument and remains one of the chief repositories of conservation planning layers.

Cumulatively these GIS databases, in addition to identifying priority areas for wetland restoration and reforestation, enable the Project Sponsor and partners to ensure that the sites ultimately included in the project include habitat parameters similar to anticipated impact sites. DU strongly emphasized the

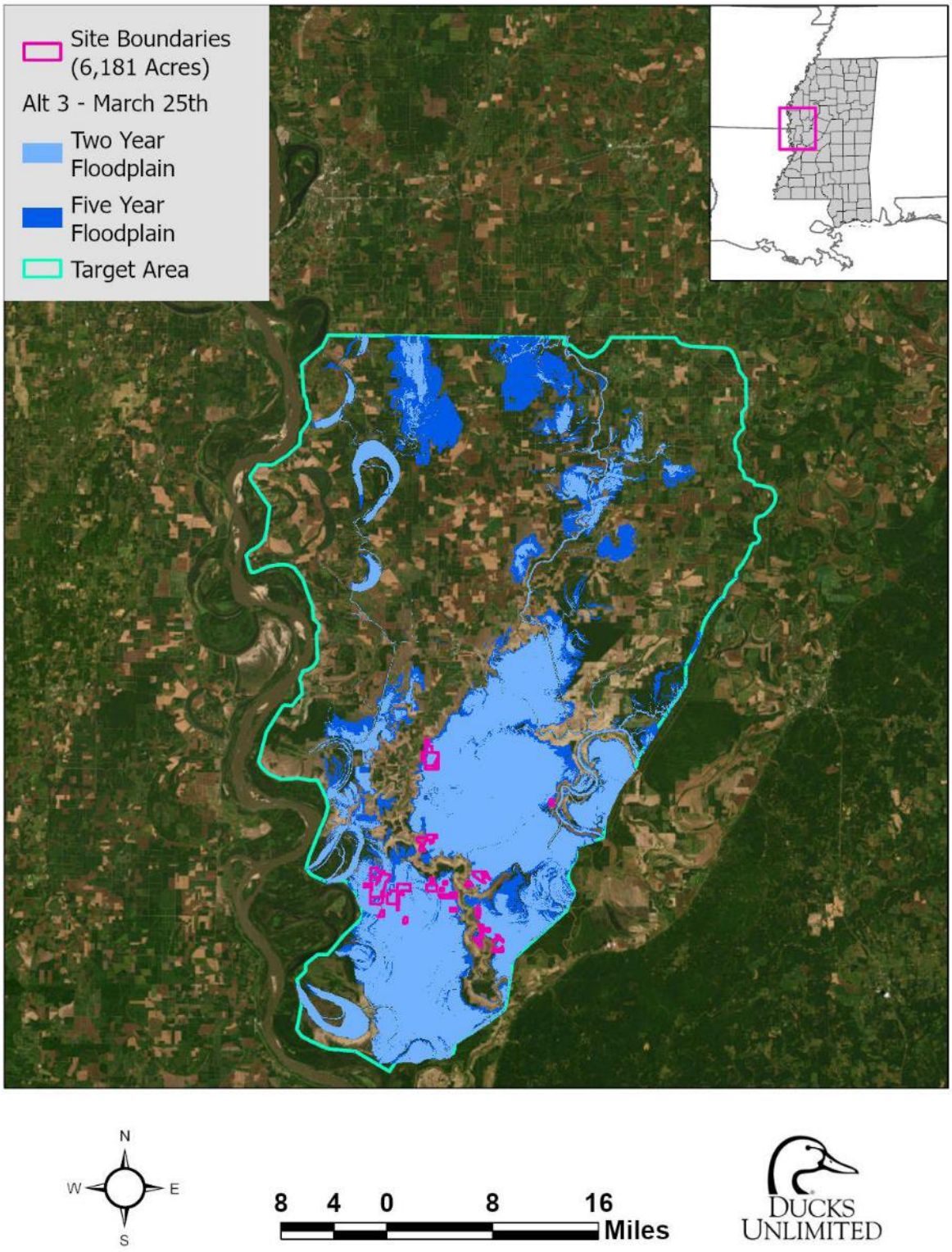
prioritization of tracts that were historically wetlands, and adjacent to large contiguous blocks of wetlands as these areas reduce energy expenditure required for vagile organisms (e.g., fish, waterfowl, shorebirds) to access the restoration areas that will be included in the project (see NWI map; Figure 7)

The National Hydrography Dataset for instance, and floodplain maps (Figures 6, 11) will be used to target incorporation of restoration projects with the flooding regimes necessary to periodically support flooding of bottomland hardwood swamps and utilization by aquatic species including fish.

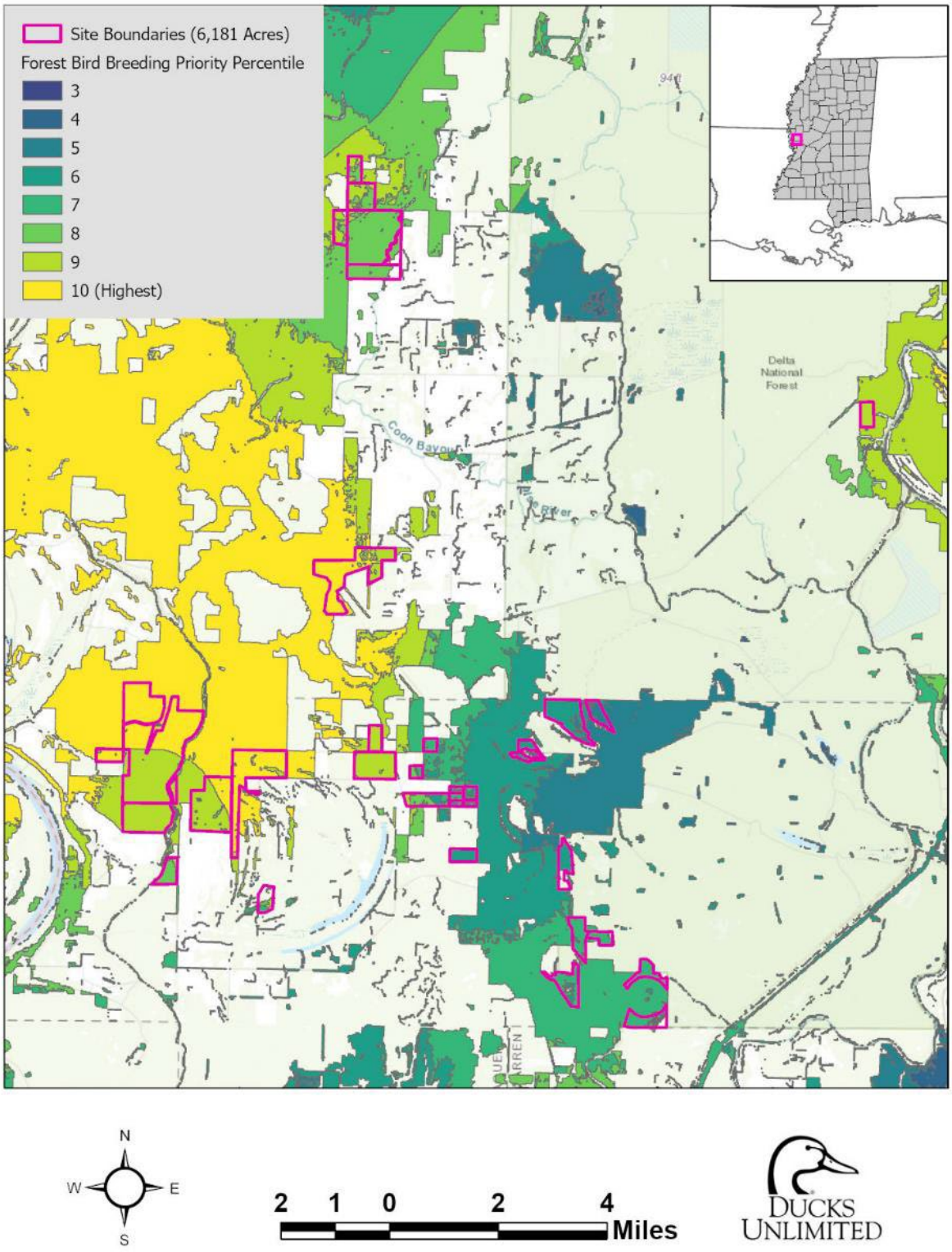
Our site selection process was a science-based, top-down approach to ensure alignment with anticipated impacts in the Service Area, corresponding largely with the two and five year floodplains in the southern reaches of the Service Area. Using GIS proxies, including elevation (USGS 3D EP), land cover types (NLCD), crop cover (USDA CDL), wetlands (NWI), hydric soils (SSRUGO), and HGM models (USACE), and models of wetland suitability (DU), we pinpointed candidate sites suitable for providing in-kind offsets. Candidate areas were then cross-referenced with parcel data. From these identified sites, we engaged in a landowner outreach campaign, to identify those landowners interested in selling their property or easements to enable the work.

Together, these screening tools, along with habitat prioritization models obtained from the Lower Mississippi Valley Joint Venture (e.g., Water Quality and Reforestation Priorities, Protected Areas Database) along with data layers describing feature proximity (e.g., Protected Lands, Stream locations, Heron habitat suitability) enabled us to progress in our landowner outreach process from higher to lower value sites. This top-down GIS approach enabled us to address the compensation planning framework objectives identified in the Program Instrument – while using updated datasets and meet the objectives of habitat restoration identified in Section 5 of this document. This document includes properties that identified as interested being available for mitigation either through fee sale or easement.

DU and its partners The Nature Conservancy and Delta Wildlife have initially identified a 1,429 square mile Study Area that falls within a similar Hydrogeologic setting to the impact site within the two and five year floodplain from which to identify prospective sites for further evaluation for wetland restoration suitability (Supplemental Figure 1; teal outline). DU used a GIS screening procedure to narrow this area to 27,000 acres that has the potential to yield the 5,722 (+/-) acres to provide offsets for the anticipated impacts in the Service Area (Supplemental Figure 1). These tools enabled us to ensure that potential sites we engaged in a landowner outreach campaign aligned with providing offsets for the types of impacts we could expect in the Service Area, and that the areas chosen had a high likelihood of being in settings suitable for wetland restoration.

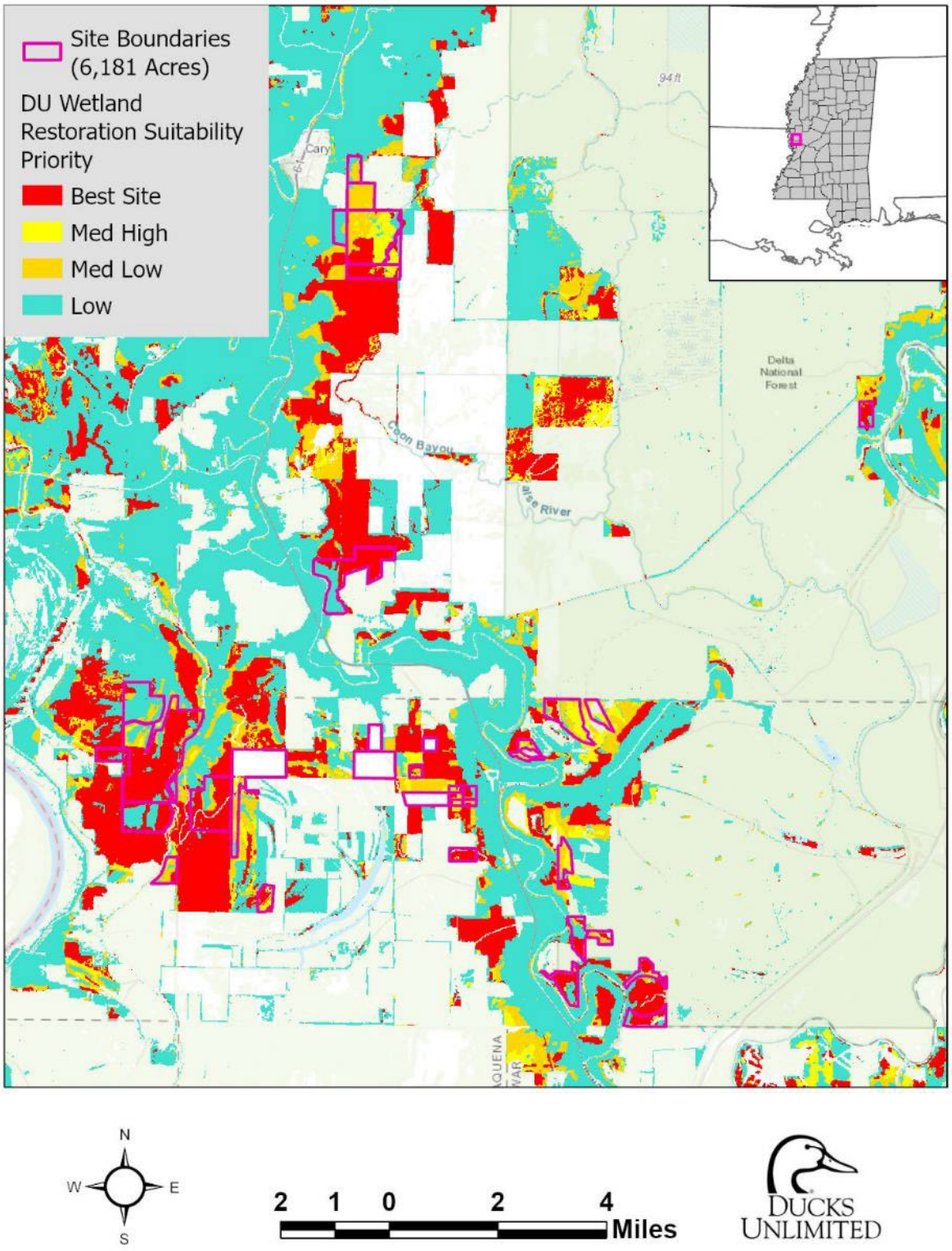


Supplemental Figure 1. Two and Five-Year Floodplain

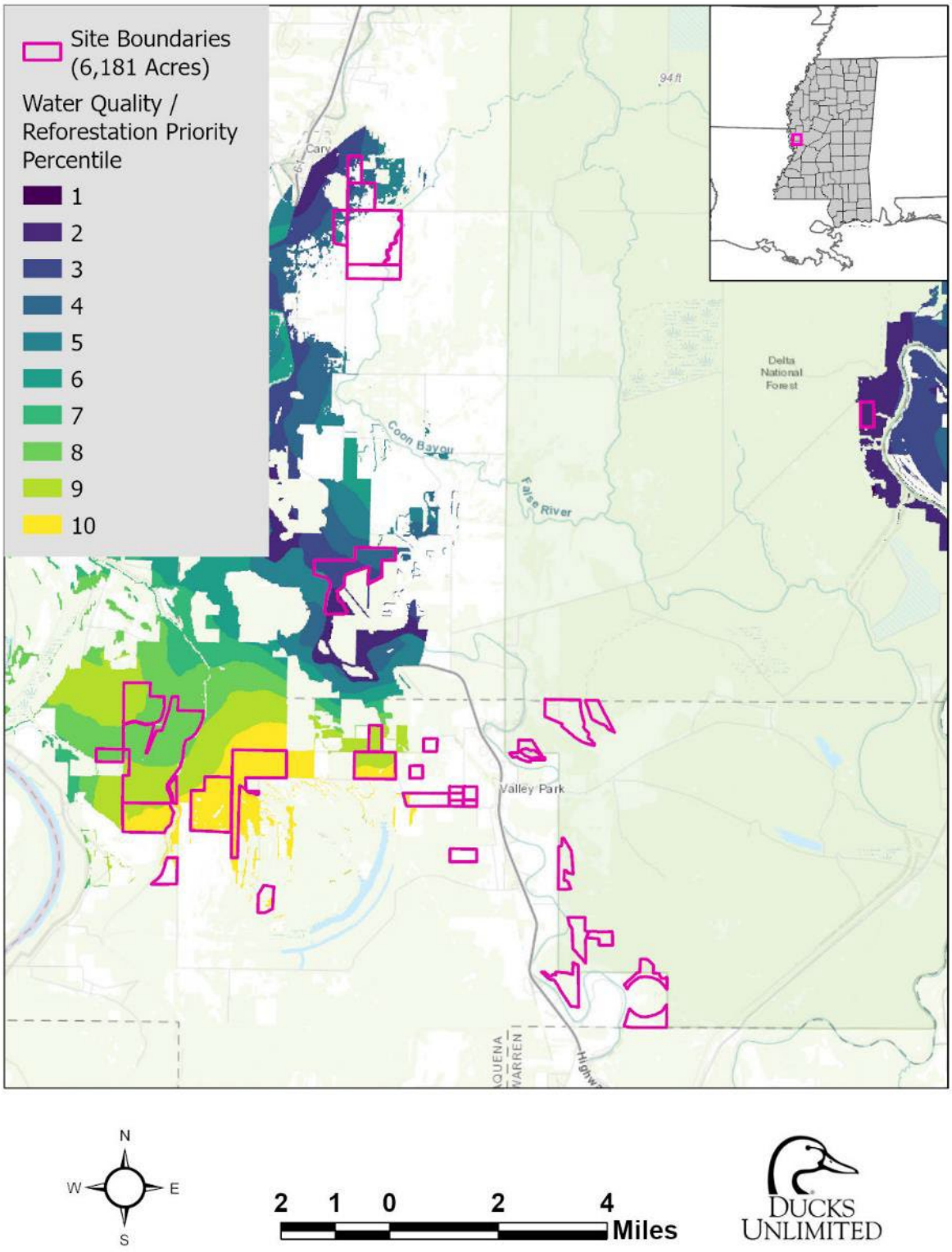


Supplemental Figure 2. Reforestation Priorities Map.

LMVJV MAV Forest Breeding Bird Reforestation Priorities Decision Support Tool)

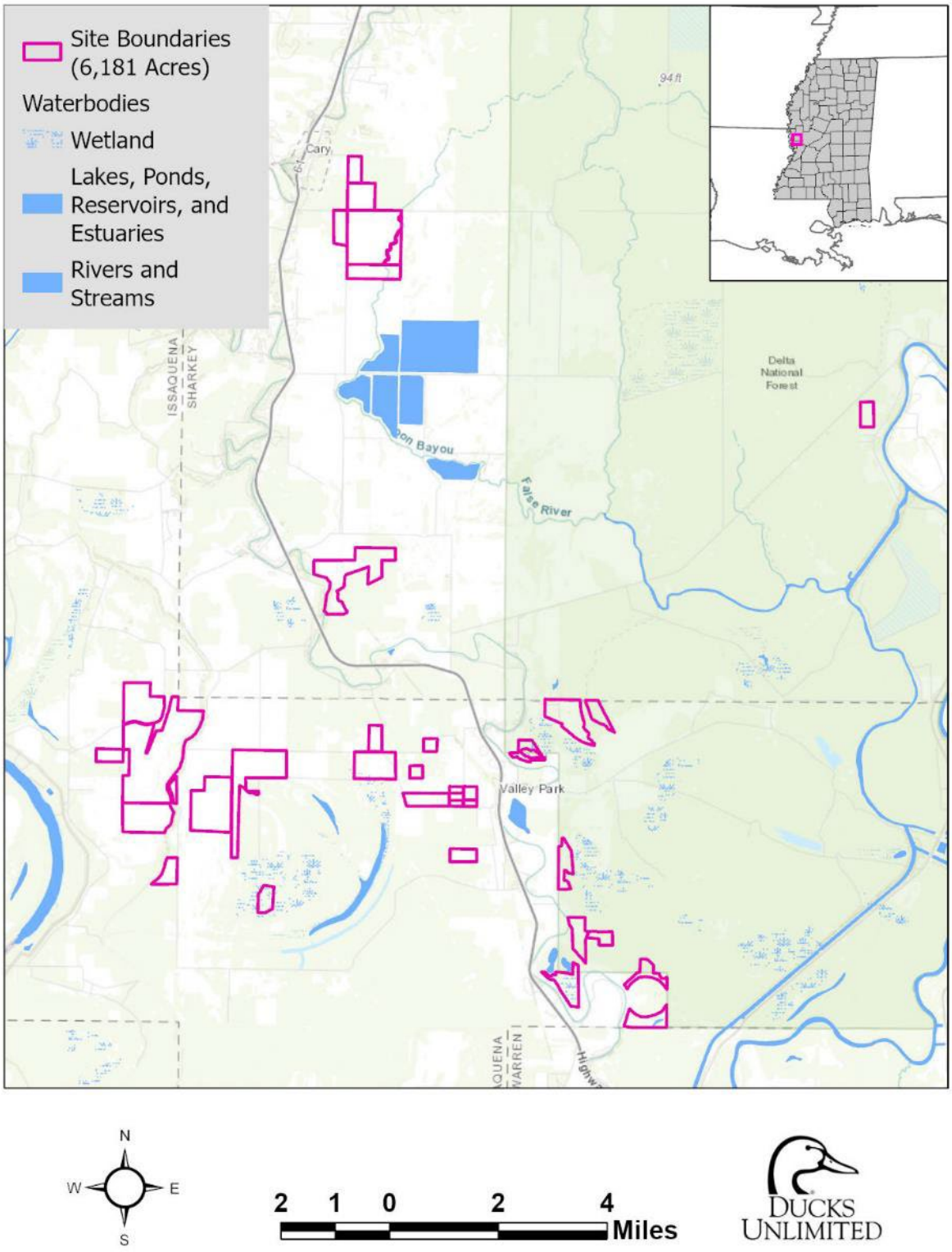


Supplemental Figure 3. DU Wetland Restoration Suitability Model.

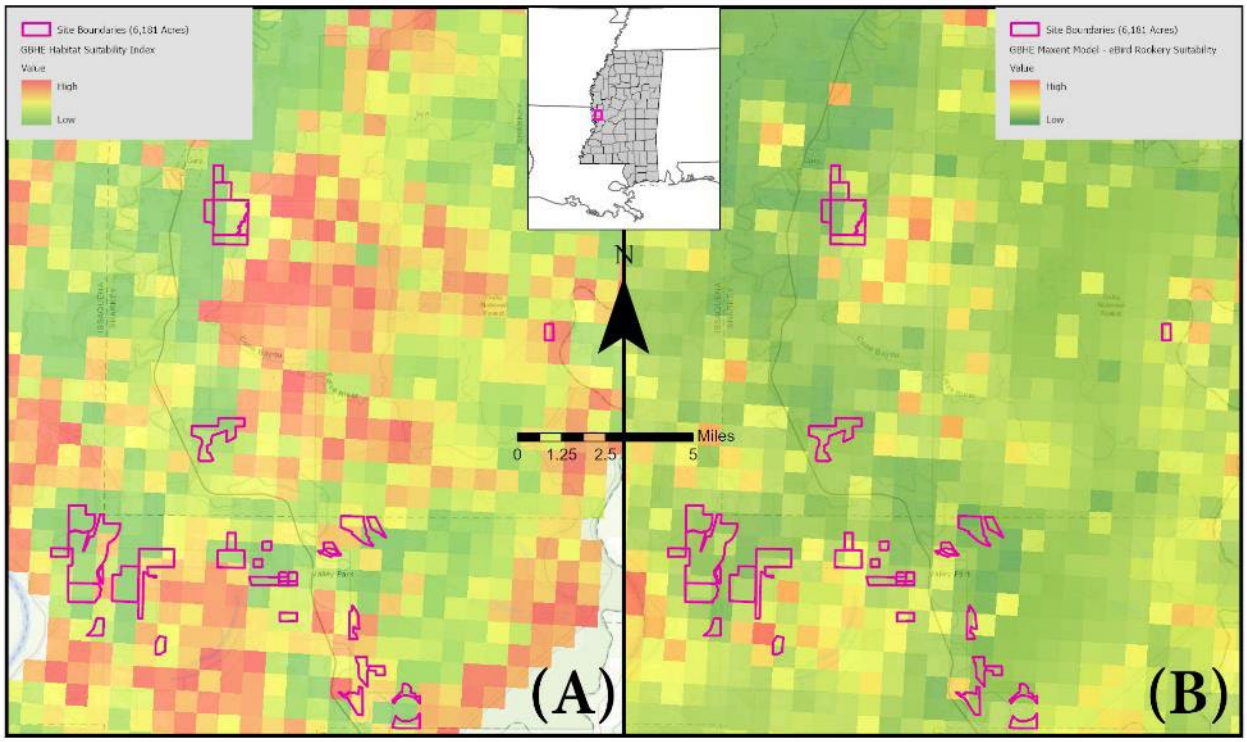


Supplemental Figure 4. Water Quality and Reforestation Priority Model

(Lower Mississippi Valley Joint Venture and Walton Family Foundation)



Supplemental Figure 5. National Hydrography Dataset showing Rivers and Streams in the Focal Area



Supplemental Figure 6 Maxent models of Great Blue Heron Habitat Suitability (A), and Rookery Occurrence Probability (B).

15) Appendix B. Past Ecological Restoration Performed in Target Geography

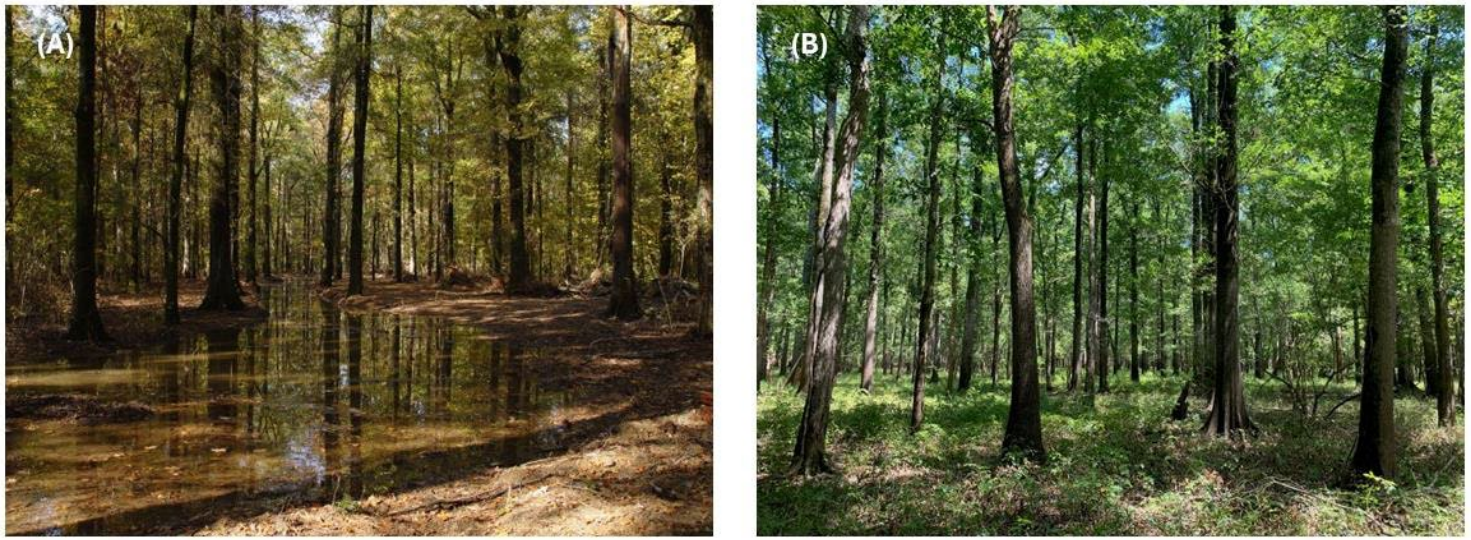
Supplemental Figure 1 Tree Planting in the MAV.

Wetland reforestation projects in the MAV undertaken by Ducks Unlimited.

(A) Ground view of a reforestation project in Yazoo County
(B) Aerial view of a reforestation project in Yazoo County
(C) Site preparation by ripping ahead of a WRP tree planting
(D) Tree planting effort in the MAV

Supplemental Figure 2. Ducks Unlimited Hydrological Restoration in the MAV.

(A) MS WRP wetland construction – panned earth (2024), (B) MS WRP wetland construction – excavation (2022), (C) MS WRPE wetland construction – structure installation (2023).

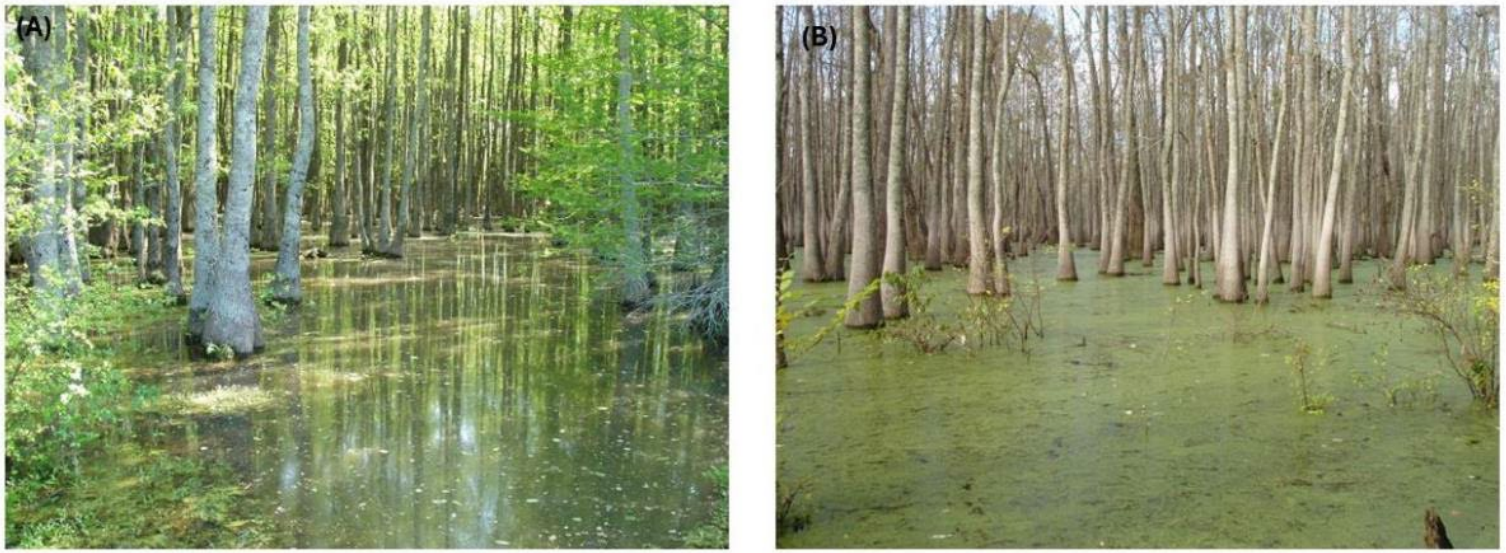


Supplemental Figure 3. Reference Conditions in Seasonally Flooded Bottom Land Hardwoods.

(A) Bottomland hardwood forest on DU's Irby Woods CE in the Mississippi Delta, (B) Bottomland hardwood forest at Mahannah WMA (2024) – dry now but will backwater flood

Supplemental Figure 4. Moist Soil Unit Management.

(A) Dry moist soil unit at Mahannah Wildlife Management Area (July 2018), (B) Wet moist soil unit with ducks at Twin Oaks WMA (April 2004), (C) Wetter moist soil unit at Twin Oaks WMA (April 2004)



Supplemental Figure 5. Wet Backwater Sloughs.

Tupelo Slough – Oxbow at Panther Swamp NWR, (B) Tupelo Slough – Oxbow at Panther Swamp NWR

16) Appendix C. Site Photographs

Sample Point 01 soil core. Primary wetland indicators include surface soil cracks and the presence of hydric soils, as indicated by a depleted matrix. Photo taken October 15, 2024.

Sample Point 01 looking north. Vegetation, soil, and hydrology are significantly disturbed. The field was combined the day prior to this photo being taken. Photo taken October 15, 2024.

Sample Point 01 looking south. Vegetation was dominated by Cuban jute (*Sida rhombifolia*) and American buckwheat vine (*Brunnichia ovata*). Photo taken October 15, 2024.

Sample Point 02 soil core. Primary wetland indicators include surface soil cracks and the presence of hydric soils, as indicated by a depleted matrix and depleted below dark surface. Photo taken October 15, 2024.

Sample Point 02 looking north. Vegetation, soil, and hydrology are significantly disturbed. The field was harvested the day prior to this photo being taken. Photo taken October 15, 2024.

Sample Point 02 looking south. Vegetation was dominated by Cuban jute (*Sida rhombifolia*). Photo taken October 15, 2024.

Sample Point 03 soil core. Primary wetland indicators include surface soil cracks and the presence of hydric soils, as indicated by a depleted matrix and depleted below dark surface. Photo taken October 15, 2024.

Sample Point 03 looking north. Vegetation, soil, and hydrology are significantly disturbed. The field was combined the day prior to this photo being taken. Photo taken October 15, 2024.

Sample Point 03 looking south. Vegetation was dominated by Cuban jute (*Sida rhombifolia*). Photo taken October 15, 2024.

Sampel Point 04 soil core. Primary wetland indicators include surface soil cracks and the presence of hydric soils, as indicated by a depleted matrix and depleted below dark surface. Photo taken October 15, 2024.

Sample Point 04 looking north. Vegetation, soil, and hydrology are significantly disturbed. Agricultural field of soybeans. Photo taken October 15, 2024.

Sample Point 04 looking south. Vegetation was dominated by Cuban jute (*Sida rhombifolia*), tall morning-glory (*Ipomoea purpurea*), American buckwheat vine (*Brunnichia ovata*), and soybean (*Glycine max*). Photo taken October 15, 2024.

Sample Point 05 soil core. No indicators of wetland hydrology, vegetation, or soils. Sample point was taken in an upland area. Photo taken October 14, 2024.

Sample Point 05 looking north. Vegetation, soil, and hydrology are significantly disturbed. Photo taken October 14, 2024.

Sample Point 05 looking south. No vegetation. Field had been freshly tilled. Photo taken October 14, 2024.

Sample Point 06 soil core. Primary wetland indicators include drift deposits, FAC-neutral test, presence of hydrophytic vegetation, and presence of hydric soils, as indicated by a depleted matrix and depleted below dark surface. Photo taken October 14, 2024.

Sample Point 06 looking north. Sample point was taken in an existing bottomland hardwood stand. Delineation indicates that this is a wetland area. Photo taken October 14, 2024.

Sample Point 06 looking south. Dominant vegetation included bitternut hickory (*Carya cordiformis*), laurel oak (*Quercus laurifolia*), pin oak (*Quercus palustris*), sugarberry (*Celtis laevigata*), river birch (*Betula nigra*), dwarf palmetto (*Sabal minor*), and eastern poison ivy (*Toxicodendron radicans*). Photo taken October 14, 2024.

Sample Point 07 soil core. No indicators of wetland hydrology, vegetation, or soils, though distinct redox concentrations were noted in the soil core. Photo taken October 14, 2024.

Sample Point 07 looking north. Vegetation, soil, and hydrology are significantly disturbed. Sample point located within corn field. Photo taken October 14, 2024.

Sample Point 07 looking south. Vegetation was dominated by Cuban jute (*Sida rhombifolia*), balloon vine (*Cardiospermum halicacabum*), bigpod sesbania (*Sesbania herbacea*), bulltongue arrowhead (*Sagittaria lancifolia*), mile a minute vine (*Ipomoea cairica*), and whitesar (*Ipomoea lacunosa*). Photo taken October 14, 2024.

Sample Point 08 soil core. Primary wetland indicators include surface soil cracks and presence of hydric soils, as indicated by a depleted matrix and depleted below dark surface. Photo taken October 14, 2024.

Sample Point 08 looking north. Vegetation, soil, and hydrology are significantly disturbed. Sample point taken in harvested corn field. Photo taken October 14, 2024.

Sample Point 08 looking south. Vegetation was dominated by Cuban jute (Sida rhombifolia), balloon vine (Cardiospermum halicacabum), bigpod sesbania (Sesbania herbacea), bulltongue arrowhead (Sagittaria lancifolia), mile a minute vine (Ipomoea cairica), and whitesar (Ipomoea lacunosa). Photo taken October 14, 2024.

Sample Point 09 soil core. Primary wetland indicators include inundation visible on aerial imagery, geomorphic position, FAC-neutral test, presence of hydrophytic vegetation, and presence of hydric soils, as indicated by a depleted matrix, redox dark surface, and depleted below dark surface. Photo taken October 14, 2024.

Sample Point 09 looking west. Sample point was taken in an existing wetland located on the west bank of Coon Bayou. Delineation confirms that this is a wetland area. Photo taken October 14, 2024.

Sample Point 09 looking east. Vegetation was dominated by Nuttall oak(*Quercus texana*), common buttonbush (*Cephalanthus occidentalis*), fall panicgrass(*Panicum dichotomiflorum*), Pennsylvania smartweed (*Polygonum pensylvanicum*), seedbox (*Ludwigia alternifolia*), Cuban jute (*Sida rhombifolia*), balloon vine (*Cardiospermum halicacabum*), and halberdleaf rosemallow (*Hibiscus laevis*). Photo taken October 14, 2024.

Sample Point 10 soil core. Primary wetland indicators include surface soil cracks, FAC-neutral test, presence of hydrophytic vegetation, and presence of hydric soils, as indicated by a depleted matrix. Photo taken October 14, 2024.

Sample Point 10 looking north. Sample point was taken in an agricultural field, though natural vegetation was re-establishing. Delineation confirms that this is a wetland area. Photo taken October 14, 2024.

Sample Point 10 looking south. Vegetation was dominated by marsh flatsedge (*Cyperus pseudovegetus*), climbing false buckwheat (*Fallopia scandens*), balloon vine (*Cardiospermum halicacabum*), tall morning-glory (*Ipomoea purpurea*), bearded sprangletop (*Leptochloa fusca*), blunt spikerush (*Eleocharis obtusa*), bulltongue arrowhead (*Sagittaria lancifolia*), and pigweed (*Amaranthus*). Photo taken October 14, 2024.

Sample Point 11 soil core. There was no wetland indicators present. The presence of hydric soils was indicated by a depleted matrix, and prominent redox concentrations were noted. Photo taken October 14, 2024.

Sample Point 11 looking north. Sample point was taken in an agricultural field, though natural vegetation was re-establishing. Photo taken October 14, 2024.

Sample Point 11 looking south. Vegetation was dominated by redroot flatsedge (*Cyperus erythrorhizos*), Pennsylvania smartweed (*Polygonum* pensylvanicum), black bindweed (*Polygonum convolvulus*), Cuban jute (*Sida rhombifolia*), balloon vine (*Cardiospermum halicacabum*), and tall morning-glory (*Ipomoea purpurea*). Photo taken October 14, 2024.

Sample Point 12 soil core. Primary wetland indicators include surface soil cracks and presence of hydric soils, as indicated by a depleted matrix, deleted below dark surface, and redox dark surface. Photo taken October 14, 2024.

Sample Point 12 looking northwest. Sample point was taken in an agricultural field, though natural vegetation was re-establishing. Photo taken October 14, 2024.

Sample Point 12 looking southeast. Vegetation was dominated by black bindweed (*Polygonum convolvulus*), Cuban jute (*Sida rhombifolia*), tall morning-glory (*Ipomoea purpurea*), pigweed (*Amaranthus sp.*), bigpod sesbania (*Sesbania herbacea*), and soybean (*Glycine max*). Photo taken October 14, 2024.

Sample Point 13 soil core. Primary wetland indicators include surface soil cracks and presence of hydric soils, as indicated by a redox dark surface. Photo taken October 14, 2024.

Sample Point 13 looking northeast. Sample point was taken in an agricultural field. Vegetation, soils, and hydrology were significantly disturbed. Photo taken October 14, 2024.

Sample Point 13 looking southwest. Vegetation was dominated by Cuban jute (*Sida rhombifolia*), spotted sandmat (*Euphorbia maculata*), and bigpod sesbania (Sesbania *herbacea*). Photo taken October 14, 2024.

Unique Feature 14. Culvert and drainage ditch looking east on Property 1.

Unique Feature 15. Culvert and defunct water control structure located on Coon Bayou at the southernmost property boundary of Property 1.

Unique Feature 16. Moist soil plant community located adjacent to sample point 11, dominated by Pennsylvania smartweed *(Polygonum pensylvanicum*), red-root flatsedge (*Cyperus erythrorhizos*), and marsh flatsedge (*Cyperus pseudovegetus*).

Unique Feature 17. View of existing bottomland hardwoods and deer stand on neighboring property, looking east.

Unique Feature 18. Drainage feature extending from Property 1 into neighboring property, looking east.

Unique Feature 19. View of Coon Bayou looking south, bordering east side of Property 1.

Unique Feature 20. Drainage feature running east to west, draining into Coon Bayou to the east.

17) Appendix D. Datasheets From Preliminary Field Investigations

Datapoint and photo point locations correspond with Figure 15 locations.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-10-20; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Yazoo Pump Station City/County: Cary/Sharkey Sampling Date: 10/15/2024

Applicant/Owner: Ducks Unlimited State: MS Sampling Point: SP 01

Investigator(s): William Gray, PWS #3579 Section, Township, Range:

Landform (hillside, terrace, etc.): None Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR O, MLRA 131A Lat: 32.80634 Long: -90.91169 Datum:

Soil Map Unit Name: Sharkey clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?** **Yes** **No X**
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes	No X	

Remarks:
Agrigultural field. All categories are significantly disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- 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)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15) **(LRR U)**
- 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)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Field combined day before 10/14/2024. Mowed soybeans.

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: SP 01

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Sida rhombifolia*	2	Yes	FACU
2. *Brunnichia ovata*	1	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	3 =Total Cover		
50% of total cover: 2	20% of total cover: 1		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of 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: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	1	x 2 =	2
FAC species	0	x 3 =	0
FACU species	2	x 4 =	8
UPL species	0	x 5 =	0
Column Totals:	3 (A)		10 (B)
Prevalence Index = B/A =			3.33

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: SP 01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/1	99	10YR 5/4	1	C	M	Loamy/Clayey	Distinct redox concentrations
6-16	10YR 4/1	90	10YR 5/6	10	C	M	Loamy/Clayey	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-10-20; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Yazoo Pump Station City/County: Cary/Sharkey Sampling Date: 10/15/2024

Applicant/Owner: Ducks Unlimited State: MS Sampling Point: SP 02

Investigator(s): William Gray, PWS #3579 Section, Township, Range:

Landform (hillside, terrace, etc.): None Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR O, MLRA 131A Lat: 32.8039 Long: -90.90809 Datum:

Soil Map Unit Name: Sharkey clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Agrigultural field. All categories are significantly disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ 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)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ 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)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: SP 02

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Sida rhombifolia*	8	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	8 =Total Cover		
50% of total cover: 4	20% of total cover: 2		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of 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: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	8	x 4 =	32
UPL species	0	x 5 =	0
Column Totals:	8 (A)		32 (B)
Prevalence Index = B/A =			4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: SP 02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/1	100					Loamy/Clayey	
6-16	10YR 4/1	85	10YR 5/6	15	C	M	Loamy/Clayey	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-10-20; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Yazoo Pump Station City/County: Cary/Sharkey Sampling Date: 10/15/2024

Applicant/Owner: Ducks Unlimited State: MS Sampling Point: SP 03

Investigator(s): William Gray, PWS #3579 Section, Township, Range:

Landform (hillside, terrace, etc.): None Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR O, MLRA 131A Lat: 32.79953 Long: -90.91192 Datum:

Soil Map Unit Name: Sharkey clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Agrigultural field. All categories are significantly disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ 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)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ 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)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Field was combined day before (10/14/2024). Dead soybeans.

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: SP 03

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Sida rhombifolia*	3	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	3 =Total Cover		
50% of total cover: 2	20% of total cover: 1		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of 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: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	3	x 4 =	12
UPL species	0	x 5 =	0
Column Totals:	3 (A)		12 (B)
Prevalence Index = B/A =			4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: SP 03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	98	10YR 5/8	2	C	M	Loamy/Clayey	Prominent redox concentrations
6-16	10YR 4/1	92	10YR 5/8	8	C	M	Loamy/Clayey	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-10-20; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Yazoo Pump Station City/County: Cary/Sharkey Sampling Date: 10/15/2024

Applicant/Owner: Ducks Unlimited State: MS Sampling Point: SP 04

Investigator(s): William Gray, PWS #3579 Section, Township, Range:

Landform (hillside, terrace, etc.): None Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR O, MLRA 131A Lat: 32.79547 Long: -90.90457 Datum:

Soil Map Unit Name: Sharkey clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Agrigultural field. All categories are significantly disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ 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)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ 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)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: SP 04

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Sida rhombifolia*	30	Yes	FACU
2. *Ipomoea purpurea*	1	No	UPL
3. *Brunnichia ovata*	5	No	FACW
4. *Glycine max*	15	Yes	UPL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	51 =Total Cover		
50% of total cover: 26	20% of total cover: 11		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of 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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	30	x 4 =	120
UPL species	16	x 5 =	80
Column Totals:	51 (A)		210 (B)
Prevalence Index = B/A =			4.12

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: SP 04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	98	10YR 5/4	2	C	M	Loamy/Clayey	Distinct redox concentrations
5-16	10YR 5/1	92	10YR 5/8	8	C	M	Loamy/Clayey	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-10-20; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Yazoo Pump Station City/County: Cary/Sharkey Sampling Date: 10/14/2024

Applicant/Owner: Ducks Unlimited State: MS Sampling Point: SP 05

Investigator(s): William Gray, PWS #3579 Section, Township, Range:

Landform (hillside, terrace, etc.): None Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR O, MLRA 131A Lat: 32.79092 Long: -90.91497 Datum:

Soil Map Unit Name: Bowdre silty clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area within a Wetland?** **Yes** **No** X
Hydric Soil Present?	Yes	No X	
Wetland Hydrology Present?	Yes	No X	

Remarks:
Agrigultural field. All categories are significantly disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- 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)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15) **(LRR U)**
- 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)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Freshly tilled; vegetation non-existant

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: SP 05

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
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[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: SP 05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					Loamy/Clayey	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-10-20; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Yazoo Pump Station City/County: Cary/Sharkey Sampling Date: 10/14/2024

Applicant/Owner: Ducks Unlimited State: MS Sampling Point: SP 06

Investigator(s): William Gray, PWS #3579 Section, Township, Range:

Landform (hillside, terrace, etc.): None Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR O, MLRA 131A Lat: 32.79114 Long: -90.91291 Datum:

Soil Map Unit Name: Sharkey clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area within a Wetland?** **Yes** X **No**
Hydric Soil Present?	Yes X	No	
Wetland Hydrology Present?	Yes X	No	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- X Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15) **(LRR U)**
- 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)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes	No	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No	Depth (inches):

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: SP 06

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Carya cordiformis*	18	Yes	FACU
2. *Quercus laurifolia*	15	Yes	FACW
3. *Quercus palustris*	10	No	FACW
4. *Celtis laevigata*	7	No	FACW
5. *Betula nigra*	6	No	FACW
6.			
	56	=Total Cover	
50% of total cover: 28		20% of total cover:	12

Sapling Stratum (Plot size: 15)			
1. *Celtis laevigata*	10	Yes	FACW
2.			
3.			
4.			
5.			
6.			
	10	=Total Cover	
50% of total cover: 5		20% of total cover:	2

Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 5)			
1. *Sabal minor*	5	Yes	UPL
2. *Quercus laurifolia*	1	No	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	6	=Total Cover	
50% of total cover: 3		20% of total cover:	2

Woody Vine Stratum (Plot size: 15)			
1. *Toxicodendron radicans*	4	No	FAC
2.			
3.			
4.			
5.			
	4	=Total Cover	
50% of total cover: 2		20% of total cover:	1

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	49	x 2 =	98
FAC species	4	x 3 =	12
FACU species	18	x 4 =	72
UPL species	5	x 5 =	25
Column Totals:	76 (A)		207 (B)
Prevalence Index = B/A =			2.72

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: SP 06

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	98	10YR 5/4	2	C	M	Loamy/Clayey	Distinct redox concentrations
4-16	10YR 4/1	96	10YR 5/6	4	C	M	Loamy/Clayey	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-10-20; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Yazoo Pump Station City/County: Cary/Sharkey Sampling Date: 10/14/2024

Applicant/Owner: Ducks Unlimited State: MS Sampling Point: SP 07

Investigator(s): William Gray, PWS #3579 Section, Township, Range:

Landform (hillside, terrace, etc.): None Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR O, MLRA 131A Lat: 32.78875 Long: -90.90812 Datum:

Soil Map Unit Name: Dowling Clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Agrigultural field. All categories are significantly disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ 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)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ 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)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: SP 07

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Sida rhombifolia*	65	Yes	FACU
2. *Cardiospermum halicacabum*	3	No	FAC
3. *sesbania herbacea*	7	No	FACW
4. *Sagittaria lancifolia*	2	No	OBL
5. *Ipomoea cairica*	10	No	FACU
6. *Ipomoea lacunosa*	1	No	FAC
7.			
8.			
9.			
10.			
11.			
	88 =Total Cover		
50% of total cover: 44	20% of total cover: 18		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of 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: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	2	x 1 =	2
FACW species	7	x 2 =	14
FAC species	4	x 3 =	12
FACU species	75	x 4 =	300
UPL species	0	x 5 =	0
Column Totals:	88 (A)		328 (B)
Prevalence Index = B/A =			3.73

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: SP 07

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	97	10YR 5/4	3	C	M	Loamy/Clayey	Distinct redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-10-20; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Yazoo Pump Station City/County: Cary/Sharkey Sampling Date: 10/14/2024

Applicant/Owner: Ducks Unlimited State: MS Sampling Point: SP 08

Investigator(s): William Gray, PWS #3579 Section, Township, Range:

Landform (hillside, terrace, etc.): None Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR O, MLRA 131A Lat: 32.78807 Long: -90.90709 Datum:

Soil Map Unit Name: Sharkey clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Agrigultural field. All categories are significantly disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ 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)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ 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)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: SP 08

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Zea mays*	2	Yes	UPL
2. *Sida rhombifolia*	3	Yes	FACU
3. *Ipomoea purpurea*	2	Yes	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	7 =Total Cover		
50% of total cover: 4	20% of total cover: 2		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of 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: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	3	x 4 =	12
UPL species	4	x 5 =	20
Column Totals:	7 (A)		32 (B)
Prevalence Index = B/A =			4.57

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: SP 08

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/2	98	10YR 5/4	2	C	M	Loamy/Clayey	Distinct redox concentrations
7-16	10YR 4/1	95	10YR 5/6	95	C	M	Loamy/Clayey	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-10-20; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Yazoo Pump Station City/County: Cary/Sharkey Sampling Date: 10/14/2024

Applicant/Owner: Ducks Unlimited State: MS Sampling Point: SP 09

Investigator(s): William Gray, PWS #3579 Section, Township, Range:

Landform (hillside, terrace, etc.): Terrace Local relief (concave, convex, none): concave Slope (%): 0-1

Subregion (LRR or MLRA): LRR O Lat: 32.78993 Long: -90.89607 Datum:

Soil Map Unit Name: Sharkey clay NWI classification: R2UBH

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ 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)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ 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)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: SP 09

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus texana*	3	No	FACW
2.			
3.			
4.			
5.			
6.			
	3	=Total Cover	
50% of total cover: 2		20% of total cover: 1	

Sapling Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Shrub Stratum (Plot size: 15)			
1. *Cephalanthus occidentalis*	15	Yes	OBL
2.			
3.			
4.			
5.			
6.			
	15	=Total Cover	
50% of total cover: 8		20% of total cover: 3	

Herb Stratum (Plot size: 5)			
1. *Panicum dichotomiflorum*	35	Yes	FACW
2. *Polygonum pensylvanicum*	60	Yes	FACW
3. *ludwigia alternifolia*	1	No	OBL
4. *Sida rhombifolia*	4	No	FACU
5. *Cardiospermum halicacabum*	3	No	FAC
6. *Hibiscus laevis*	2	No	OBL
7.			
8.			
9.			
10.			
11.			
	105	=Total Cover	
50% of total cover: 53		20% of total cover: 21	

Woody Vine Stratum (Plot size: 15)			
1. *Vitis aestivalis*	10	Yes	FACU
2.			
3.			
4.			
5.			
	10	=Total Cover	
50% of total cover: 5		20% of total cover: 2	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	18	x 1 =	18
FACW species	98	x 2 =	196
FAC species	3	x 3 =	9
FACU species	14	x 4 =	56
UPL species	0	x 5 =	0
Column Totals:	133 (A)		279 (B)
Prevalence Index = B/A =			2.10

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: SP 09

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	96	7.5YR 5/8	4	C	M	Loamy/Clayey	Prominent redox concentrations
4-16	10YR 4/1	92	2.5YR 5/8	8	C	M	Loamy/Clayey	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-10-20; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Yazoo Pump Station City/County: Cary/Sharkey Sampling Date: 10/14/2024

Applicant/Owner: Ducks Unlimited State: MS Sampling Point: SP 10

Investigator(s): William Gray, PWS #3579 Section, Township, Range:

Landform (hillside, terrace, etc.): None Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR O, MLRA 131A Lat: 32.78221 Long: -90.89608 Datum:

Soil Map Unit Name: Sharkey clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Agrigultural field. While natural vegetation is re-establishing, all categories are significantly disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ 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)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ 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)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: SP 10

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Cyperus pseudovegetus*	30	Yes	FAC
2. *Fallopia scandens*	15	Yes	FAC
3. *Cardiospermum halicacabum*	10	No	FAC
4. *Ipomoea purpurea*	2	No	UPL
5. *Leptochloa fusca*	1	No	FACW
6. *Eleocharis obtusa*	5	No	OBL
7. *Sagittaria lancifolia*	3	No	OBL
8. *Amaranthus*	8	No	
9.			
10.			
11.			
	74 =Total Cover		
50% of total cover: 37	20% of total cover: 15		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of 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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	8	x 1 =	8
FACW species	1	x 2 =	2
FAC species	55	x 3 =	165
FACU species	0	x 4 =	0
UPL species	2	x 5 =	10
Column Totals:	66 (A)		185 (B)
Prevalence Index = B/A =			2.80

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: SP 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 4/1	98	10YR 5/4	2	C	M	Loamy/Clayey	Distinct redox concentrations
5-16	10YR 4/1	95	10YR 5/6	5	C	M	Loamy/Clayey	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-10-20; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Yazoo Pump Station City/County: Cary/Sharkey Sampling Date: 10/14/2024

Applicant/Owner: Ducks Unlimited State: MS Sampling Point: SP 11

Investigator(s): William Gray, PWS #3579 Section, Township, Range:

Landform (hillside, terrace, etc.): None Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR O, MLRA 131A Lat: 32.77973 Long: -90.89605 Datum:

Soil Map Unit Name: Sharkey clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Agrigultural field. While natural vegetation is re-establishing, all categories are significantly disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ 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)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ 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)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: SP 11

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Polygonum pensylvanicum*	10	No	FACW
2. *Cyperus erythrorhizos*	15	Yes	OBL
3. *Sida rhombifolia*	35	Yes	FACU
4. *Polygonum convolvulus*	4	No	FACU
5. *Ipomoea purpurea*	2	No	UPL
6. *Cardiospermum halicacabum*	3	No	FAC
7.			
8.			
9.			
10.			
11.			
	69 =Total Cover		
50% of total cover: 35	20% of total cover: 14		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of 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: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	10	x 2 =	20
FAC species	3	x 3 =	9
FACU species	39	x 4 =	156
UPL species	2	x 5 =	10
Column Totals:	69 (A)		210 (B)
Prevalence Index = B/A =			3.04

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: SP 11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 5/1	95	10YR 5/6	5	C	M	Loamy/Clayey	Prominent redox concentrations
6-16	10YR 5/1	92	10YR 5/6	8	C	M	Loamy/Clayey	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-10-20; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Yazoo Pump Station City/County: Cary/Sharkey Sampling Date: 10/14/2024

Applicant/Owner: Ducks Unlimited State: MS Sampling Point: SP 12

Investigator(s): William Gray, PWS #3579 Section, Township, Range:

Landform (hillside, terrace, etc.): None Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR O, MLRA 131A Lat: 32.7767 Long: -90.90657 Datum:

Soil Map Unit Name: Sharkey clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Agrigultural field. While natural vegetation is re-establishing, all categories are significantly disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ 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)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ 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)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: SP 12

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Glycine max*	25	Yes	UPL
2. *Sida rhombifolia*	35	Yes	FACU
3. *Ipomoea purpurea*	3	No	UPL
4. *Polygonum convolvulus*	2	No	FACU
5. *Amaranthus*	1	No	UPL
6. *Sesbania herbacea*	1	No	FACW
7.			
8.			
9.			
10.			
11.			
	67 =Total Cover		
50% of total cover: 34	20% of total cover: 14		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of 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: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	1	x 2 =	2
FAC species	0	x 3 =	0
FACU species	37	x 4 =	148
UPL species	29	x 5 =	145
Column Totals:	67 (A)		295 (B)
Prevalence Index = B/A =			4.40

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: SP 12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	100					Loamy/Clayey	
4-9	10YR 3/2	92	10YR 4/6	8	C	M	Loamy/Clayey	Prominent redox concentrations
9-16	10YR 4/1	90	10YR 5/8	10	C	M	Loamy/Clayey	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-10-20; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp: 11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Yazoo Pump Station City/County: Cary/Sharkey Sampling Date: 10/14/2024

Applicant/Owner: Ducks Unlimited State: MS Sampling Point: SP 13

Investigator(s): William Gray, PWS #3579 Section, Township, Range:

Landform (hillside, terrace, etc.): None Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR or MLRA): LRR O, MLRA 131A Lat: 32.78206 Long: -90.91099 Datum:

Soil Map Unit Name: Sharkey clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Agrigultural field. All categories are significantly disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ 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)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ 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)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: SP 13

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Sida rhombifolia*	45	Yes	FACU
2. *Euphorbia maculata*	8	No	FACU
3. *Sesbania herbacea*	1	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	54 =Total Cover		
50% of total cover: 27	20% of total cover: 11		
Woody Vine Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of 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: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	54	x 4 =	216
UPL species	0	x 5 =	0
Column Totals:	54 (A)		216 (B)
Prevalence Index = B/A =			4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL Sampling Point: SP 13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/2	99	10YR 5/8	1	C	M	Loamy/Clayey	Prominent redox concentrations
7-16	10YR 3/2	95	10YR 5/4	5	C	M	Loamy/Clayey	Distinct redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

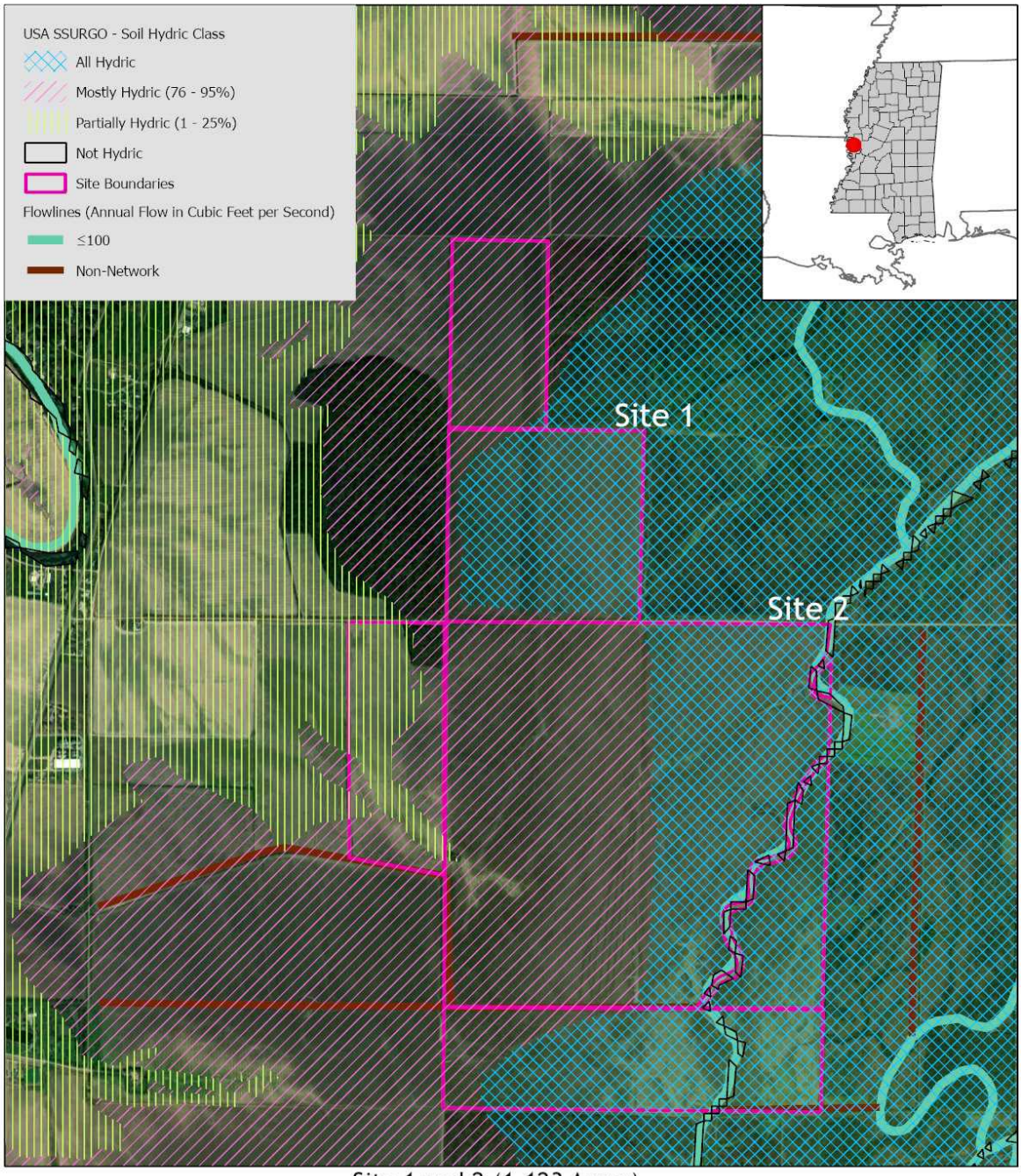
Type: _____

Depth (inches): _____

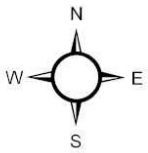
Hydric Soil Present? **Yes** X **No** ___

Remarks:

18) Appendix E. Project Level Site Maps



Site 1 and 2 (1,123 Acres)



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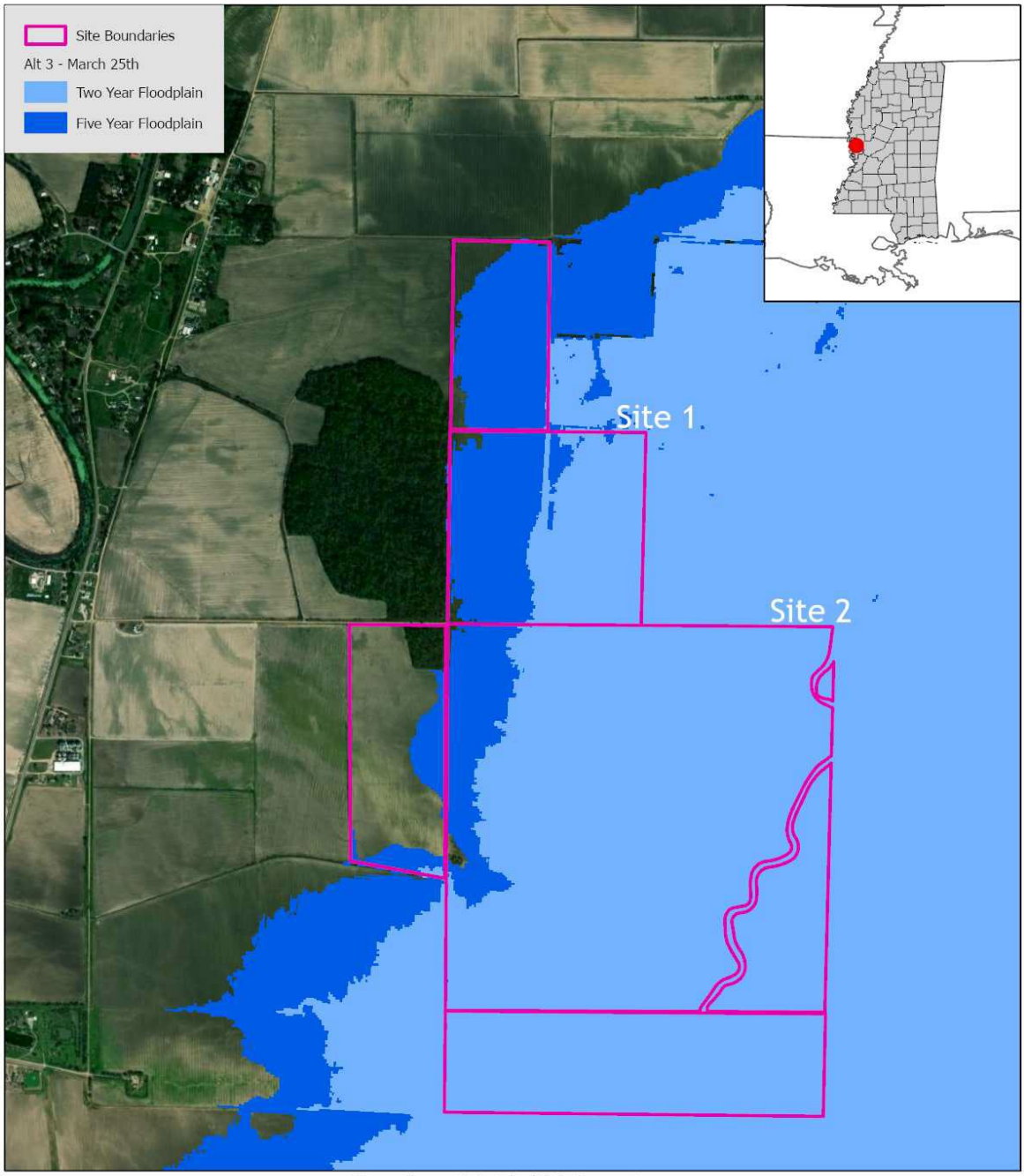

Site 1 and 2 (1,123 Acres)

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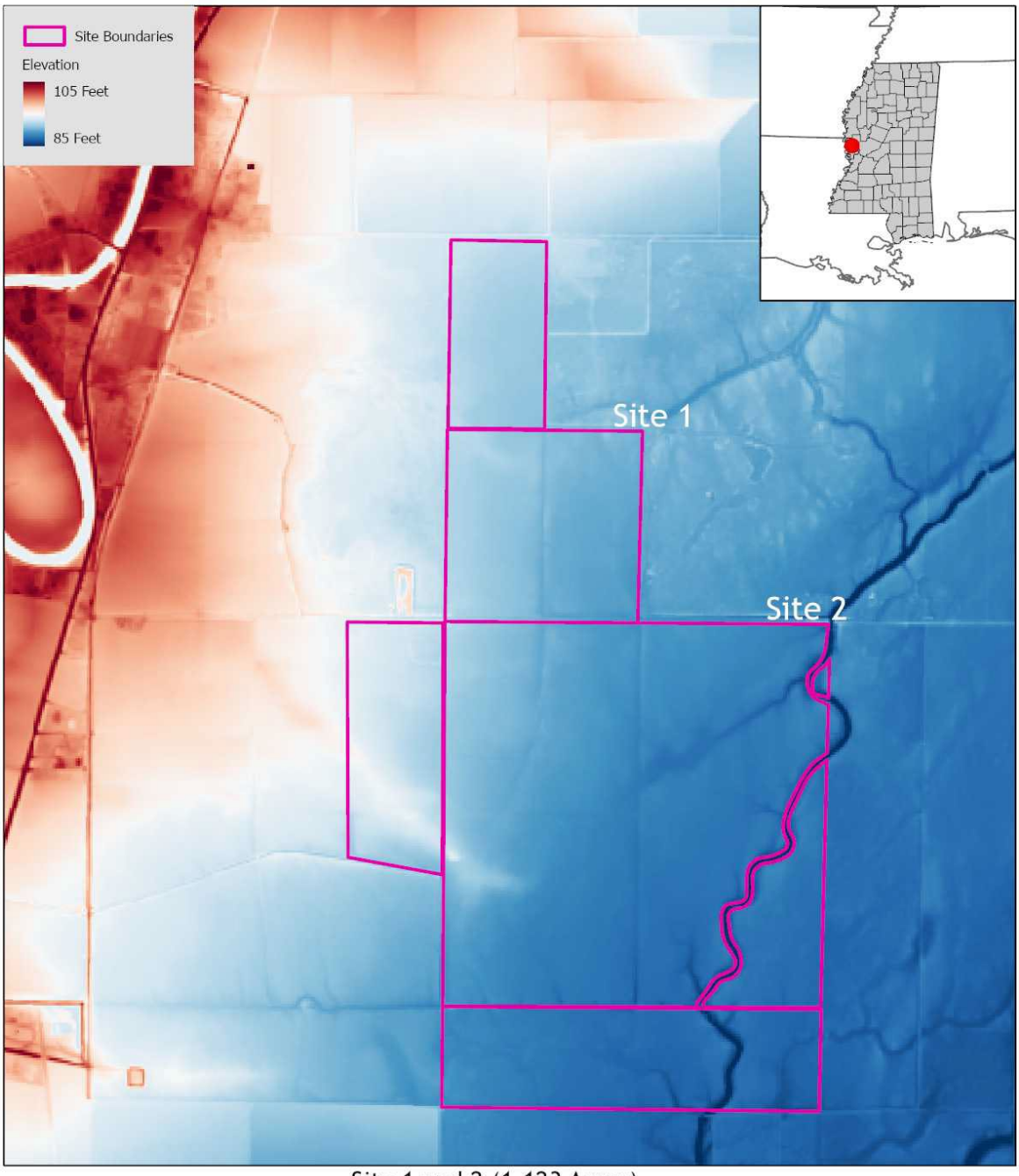
2,000 0 2,000 4,000 Feet

DUCKS UNLIMITED



Site 1 and 2 (1,123 Acres)

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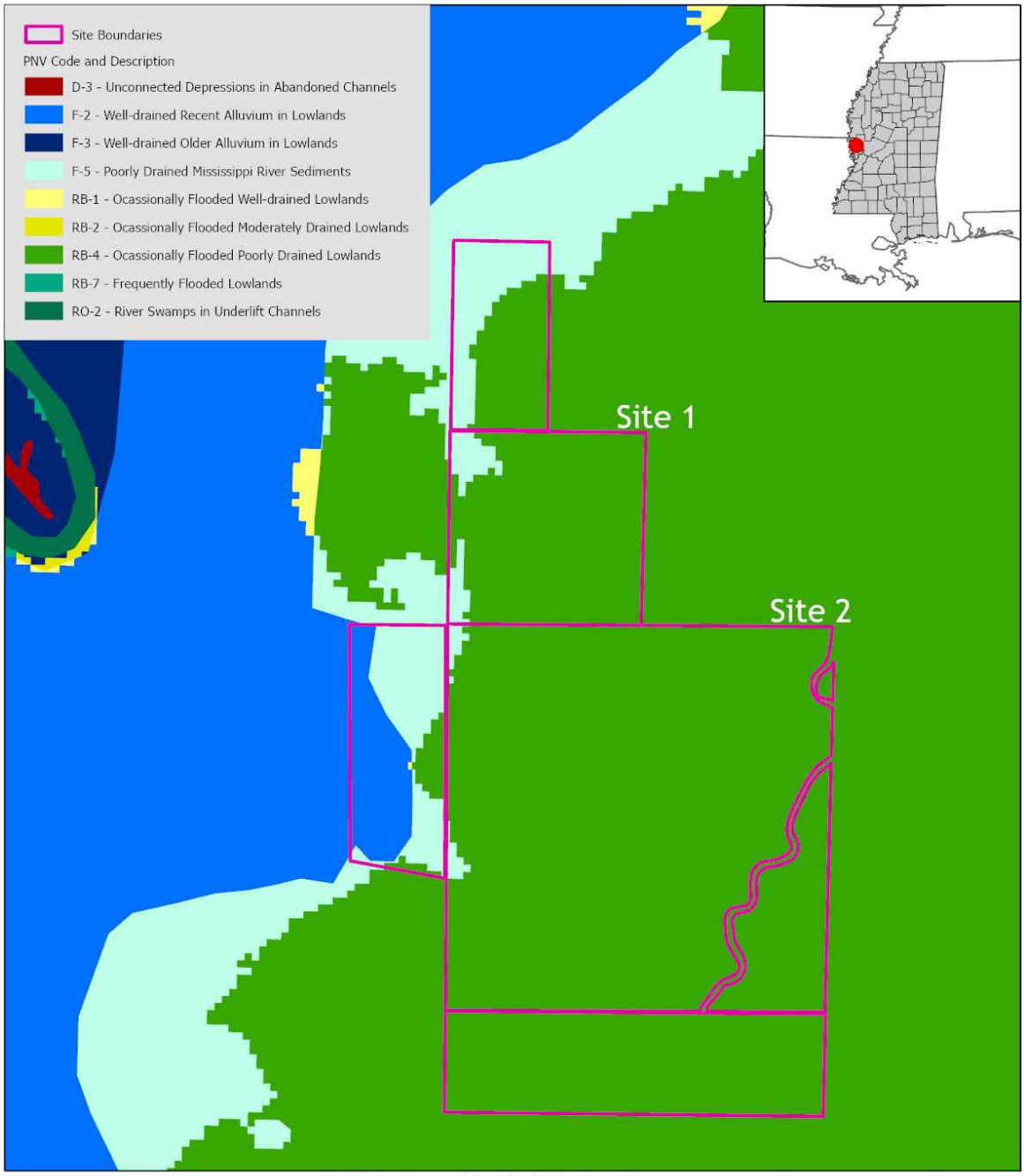

Site 1 and 2 (1,123 Acres)

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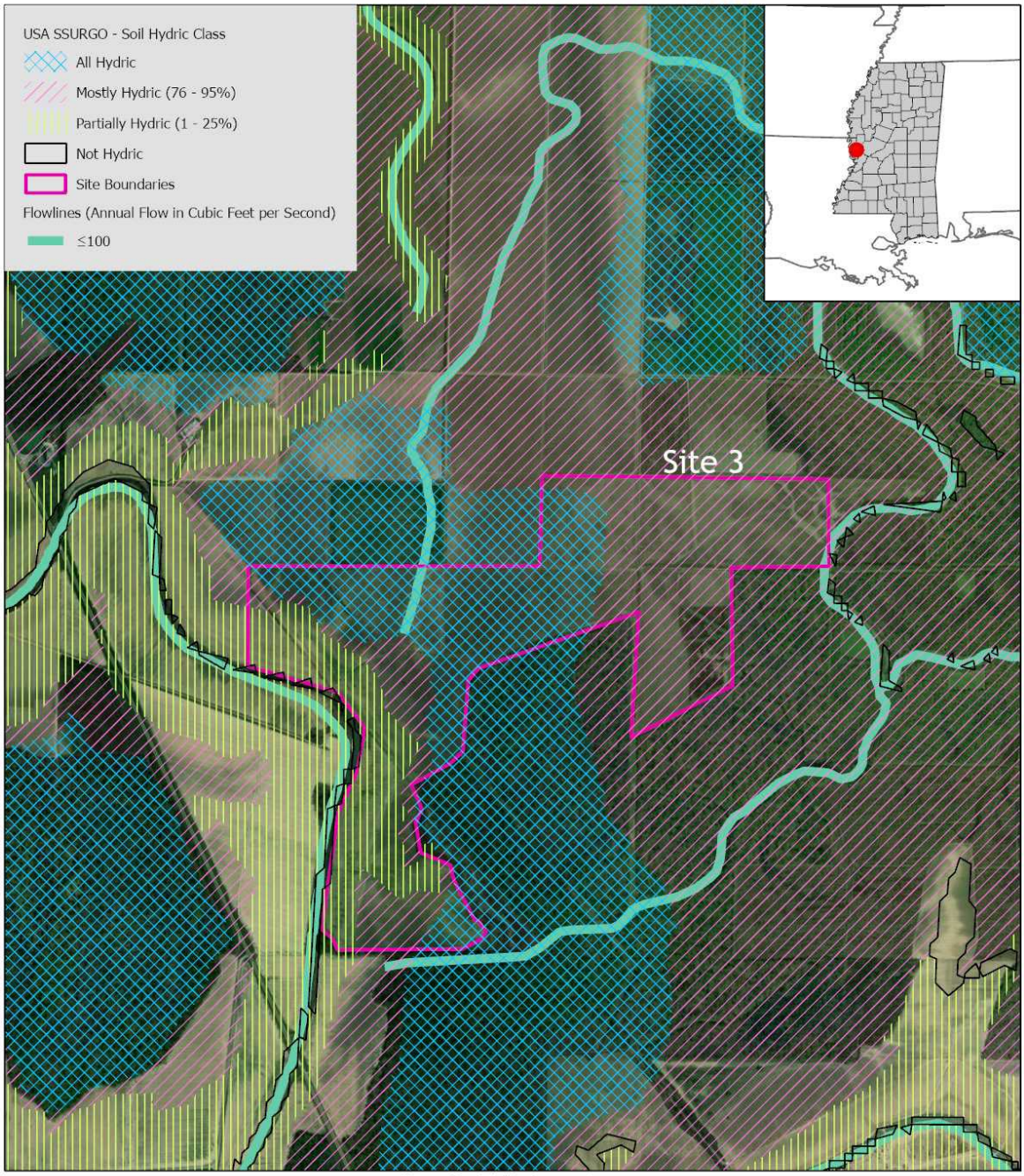
DUCKS UNLIMITED



Site 3 (455 Acres)

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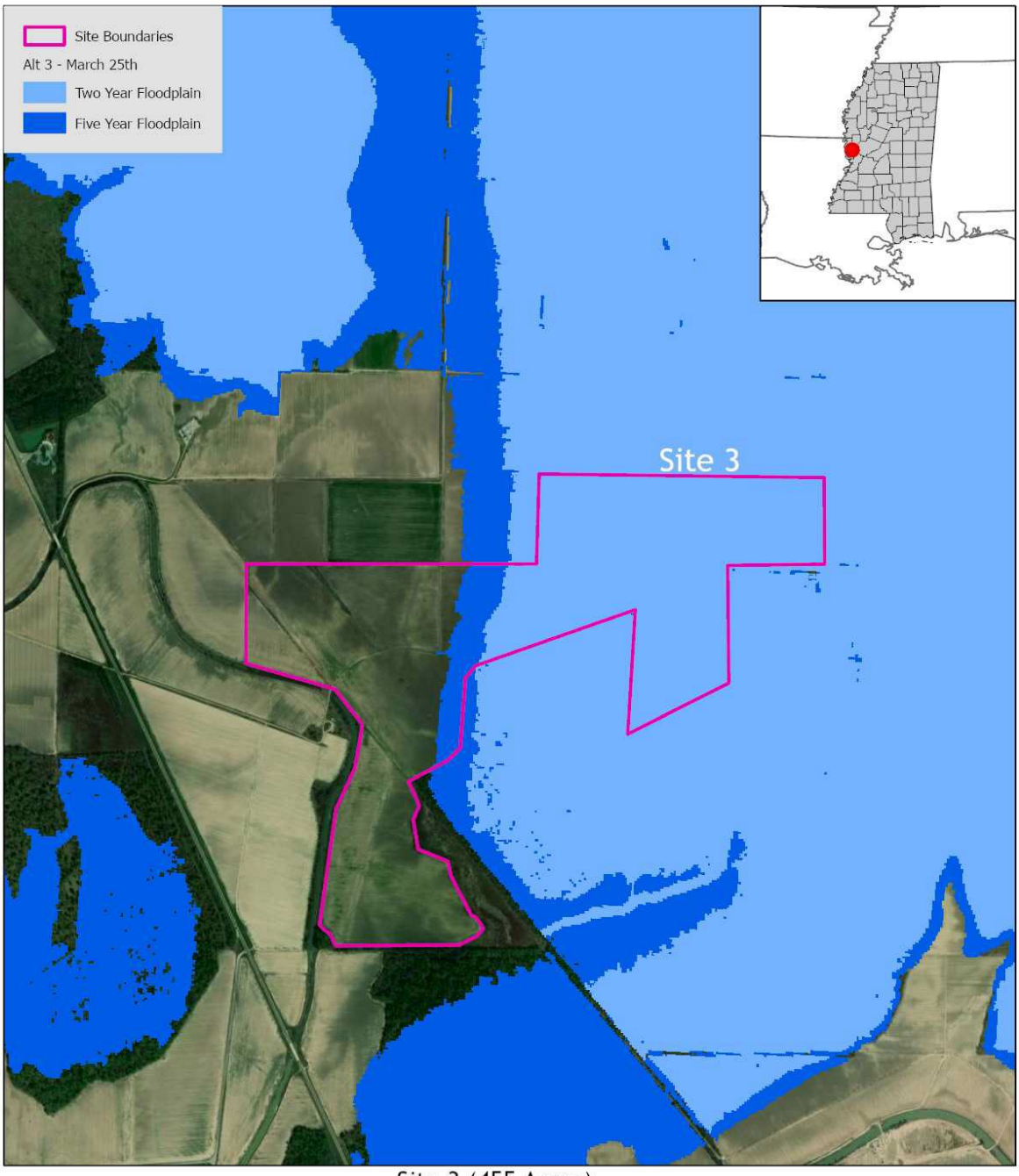
DUCKS UNLIMITED



Site 3 (455 Acres)

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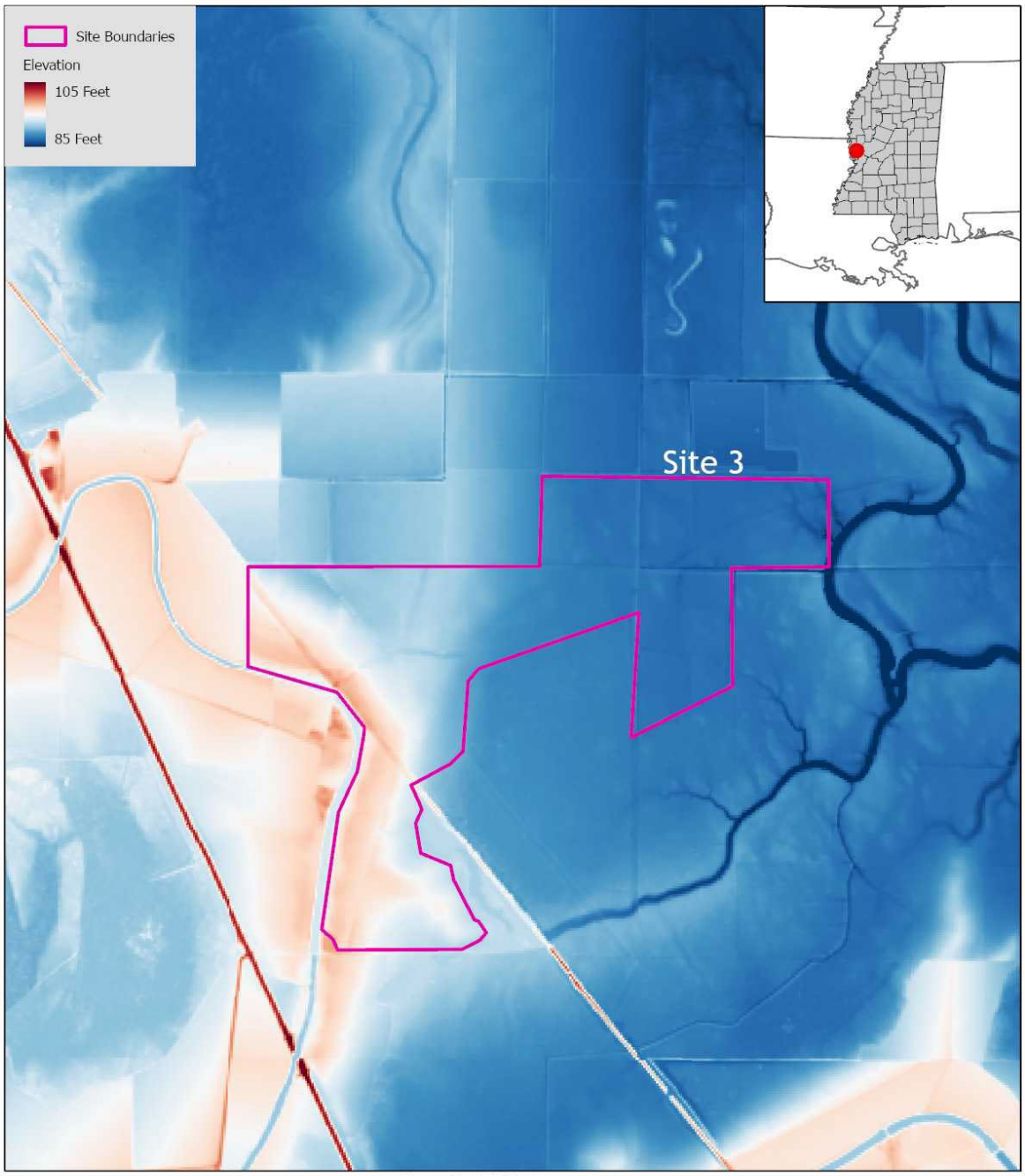
DUCKS UNLIMITED



Site 3 (455 Acres)

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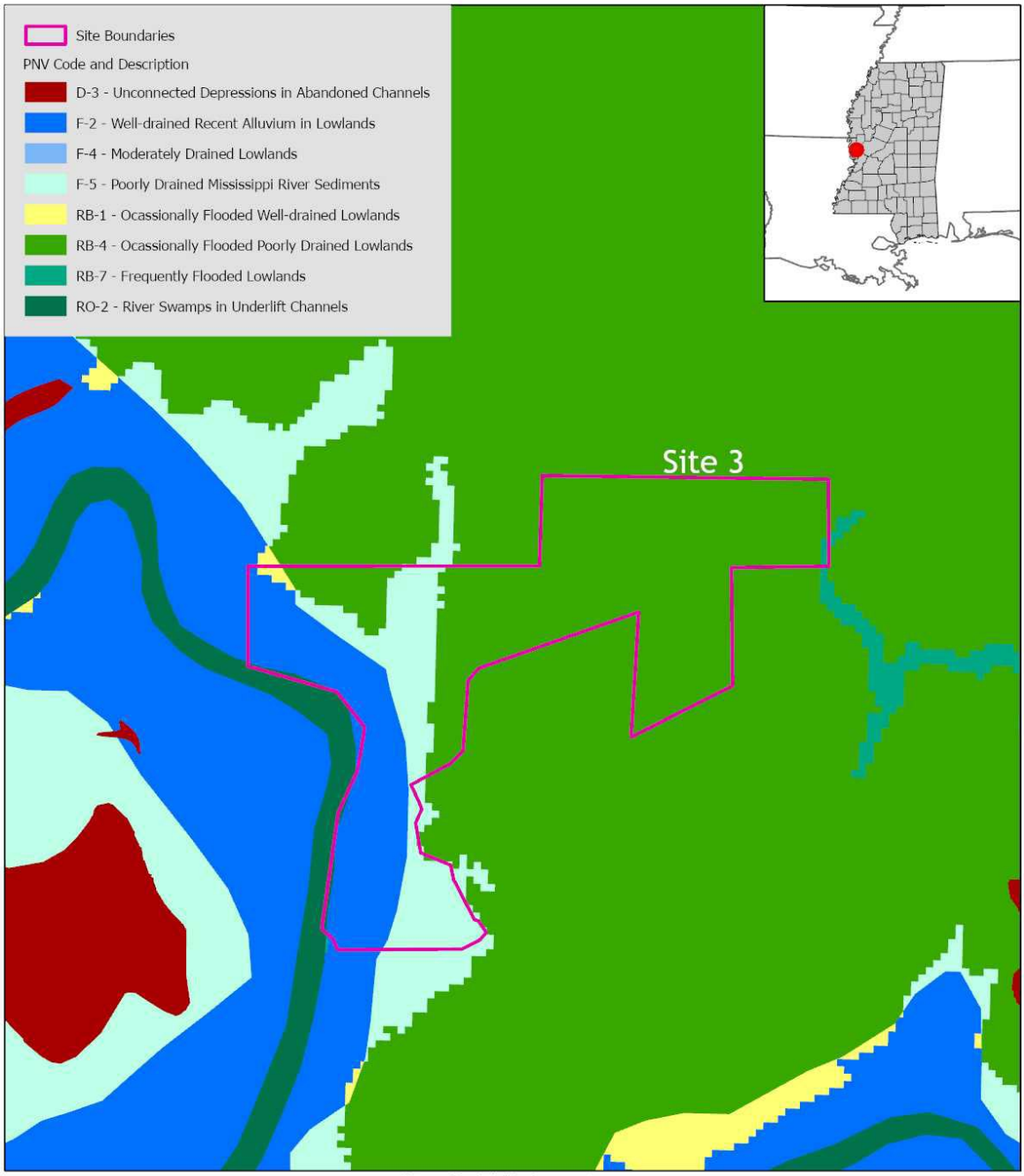

Site 3 (455 Acres)

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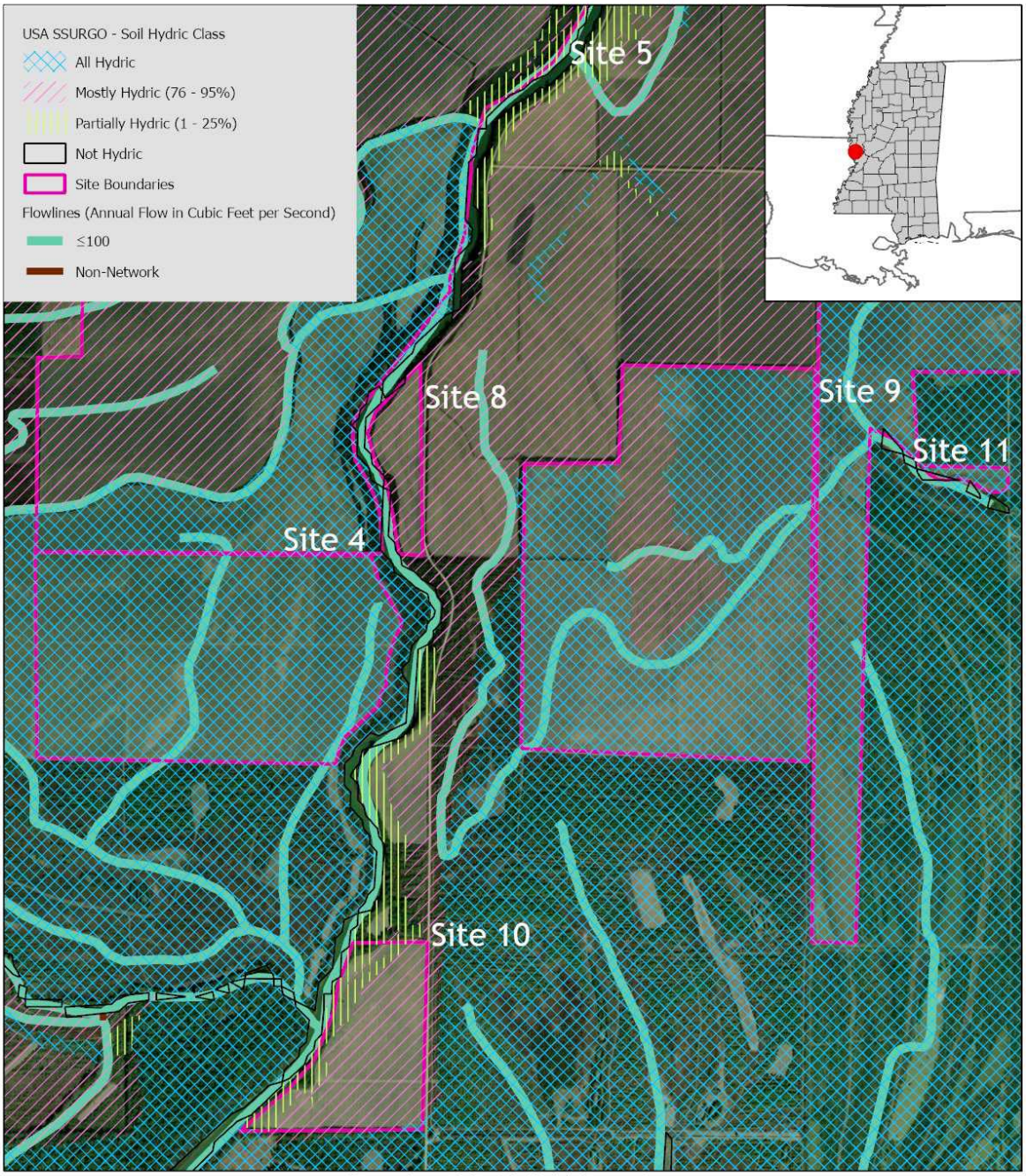
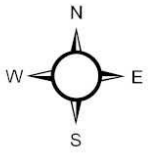


Site 4 and 8-11 (861 Acres)



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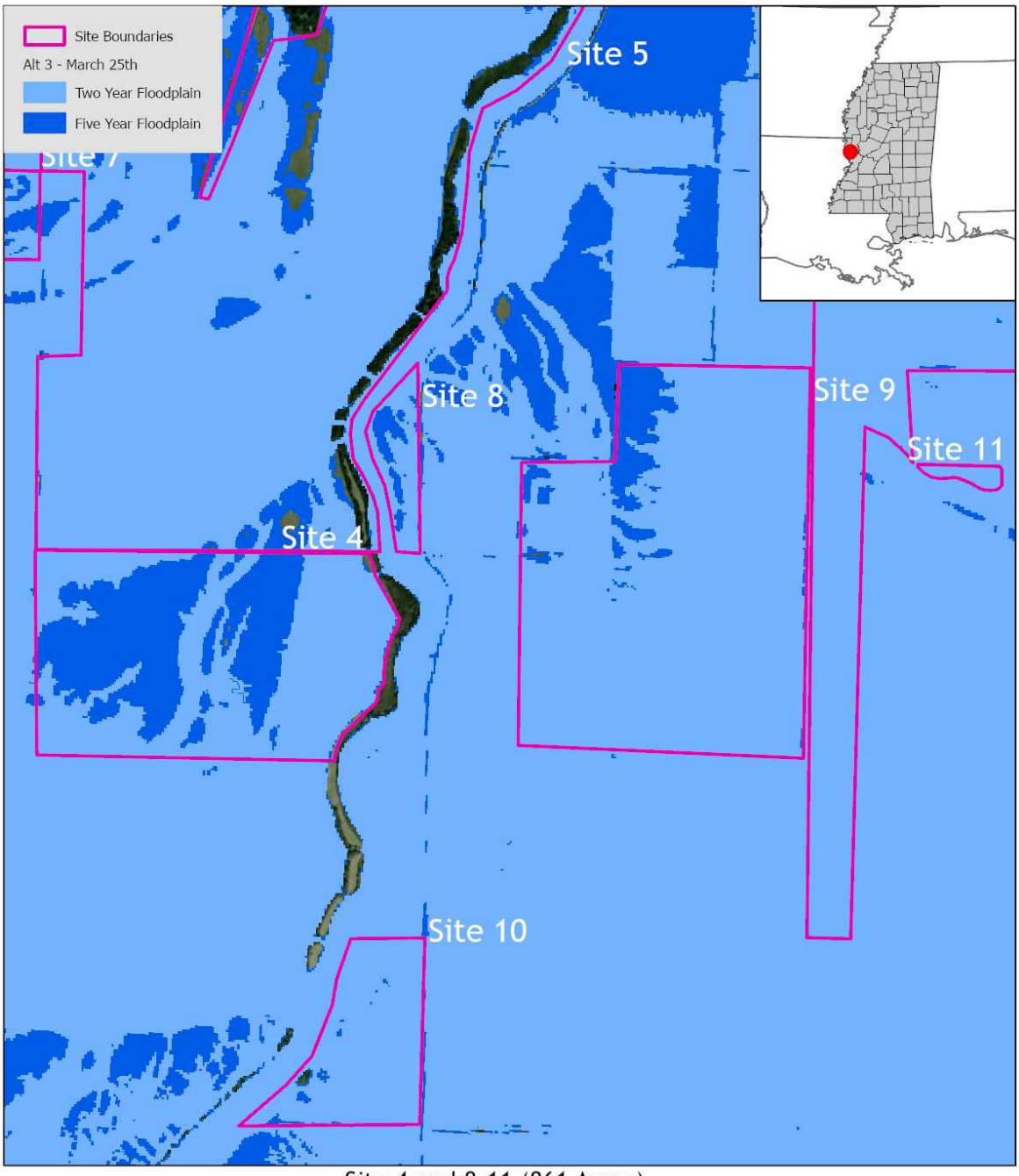

Site 4 and 8-11 (861 Acres)

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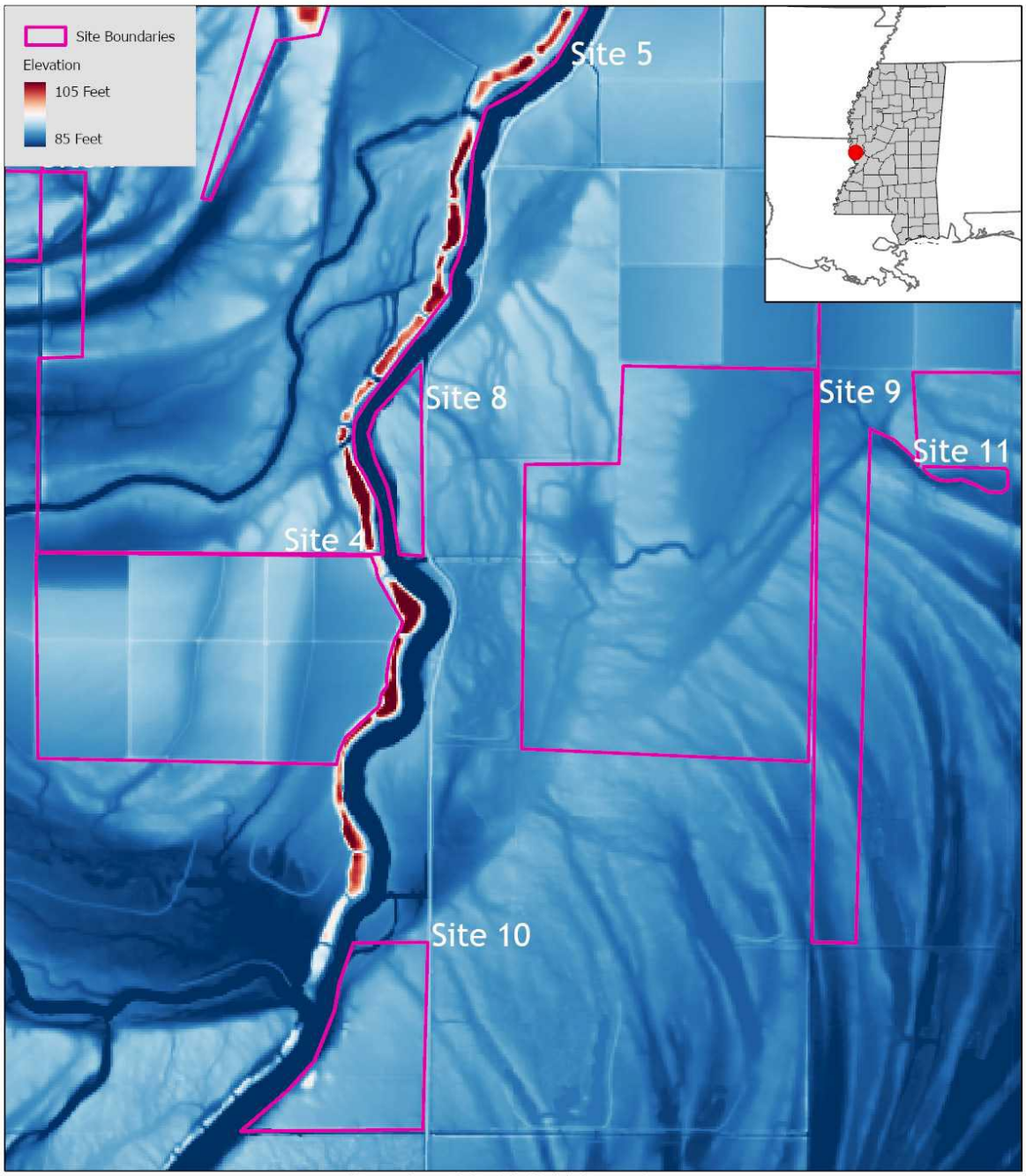

Site 4 and 8-11 (861 Acres)

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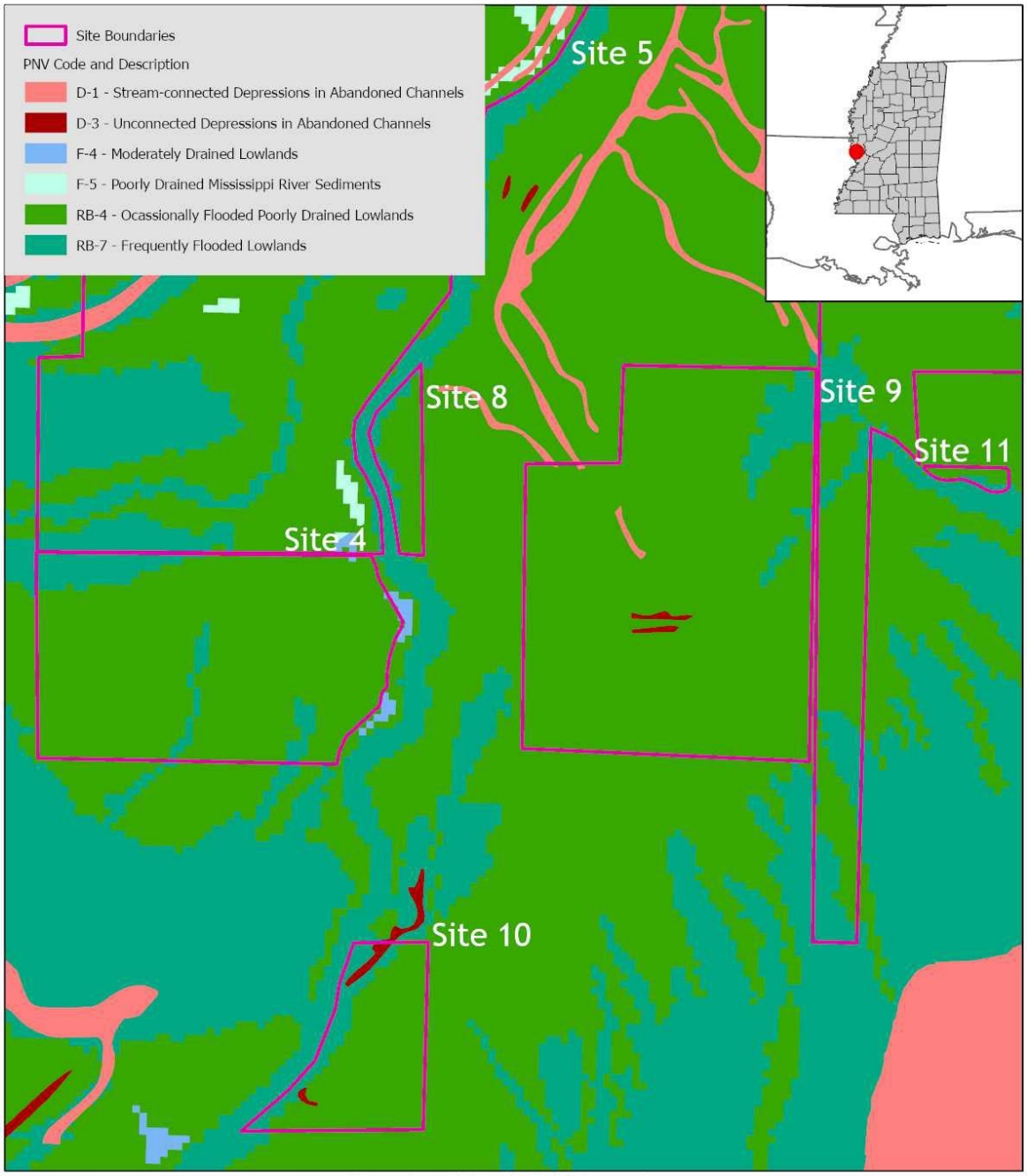

Site 4 and 8-11 (861 Acres)

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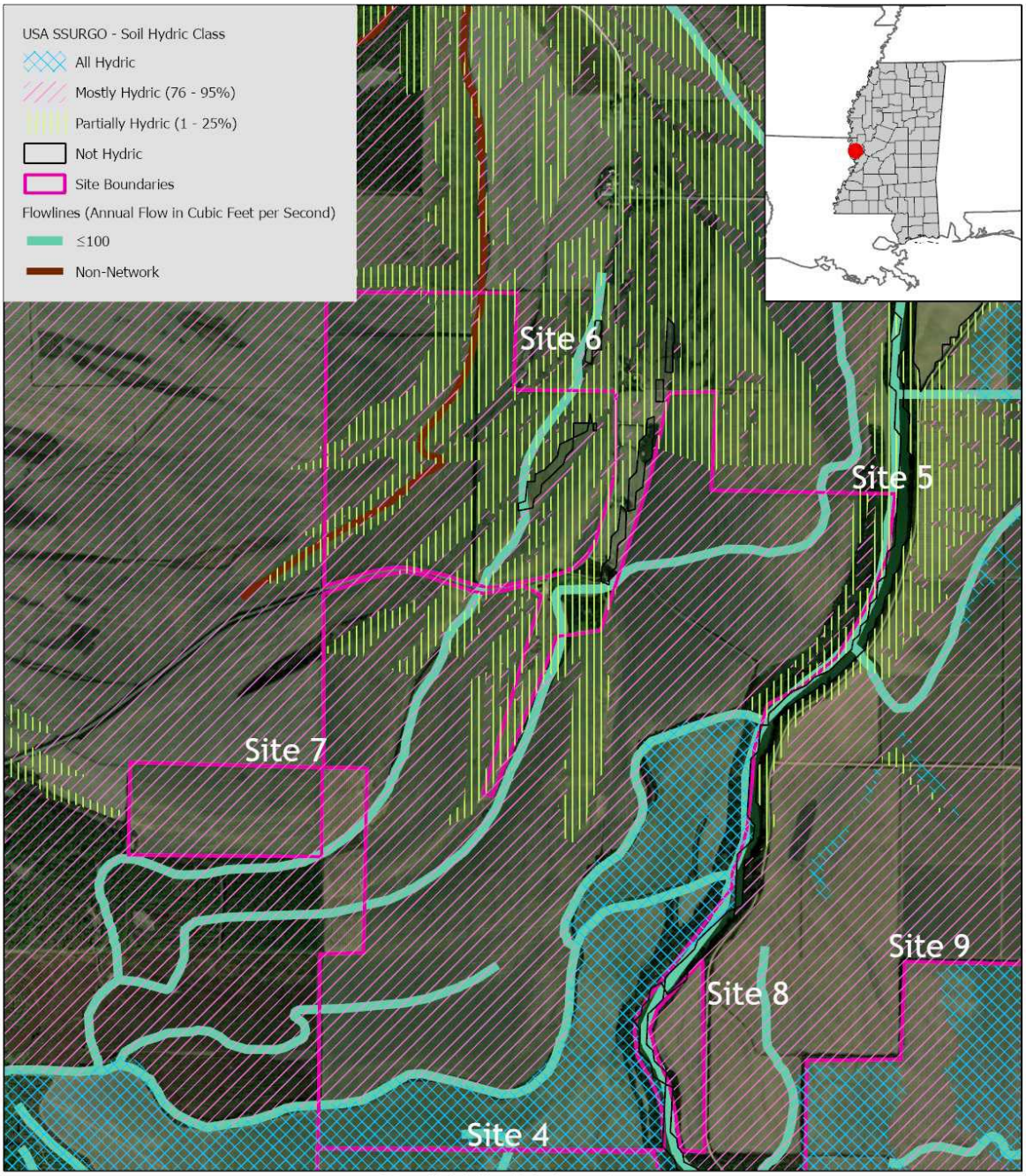

Site 5-7 (1,422 Acres)

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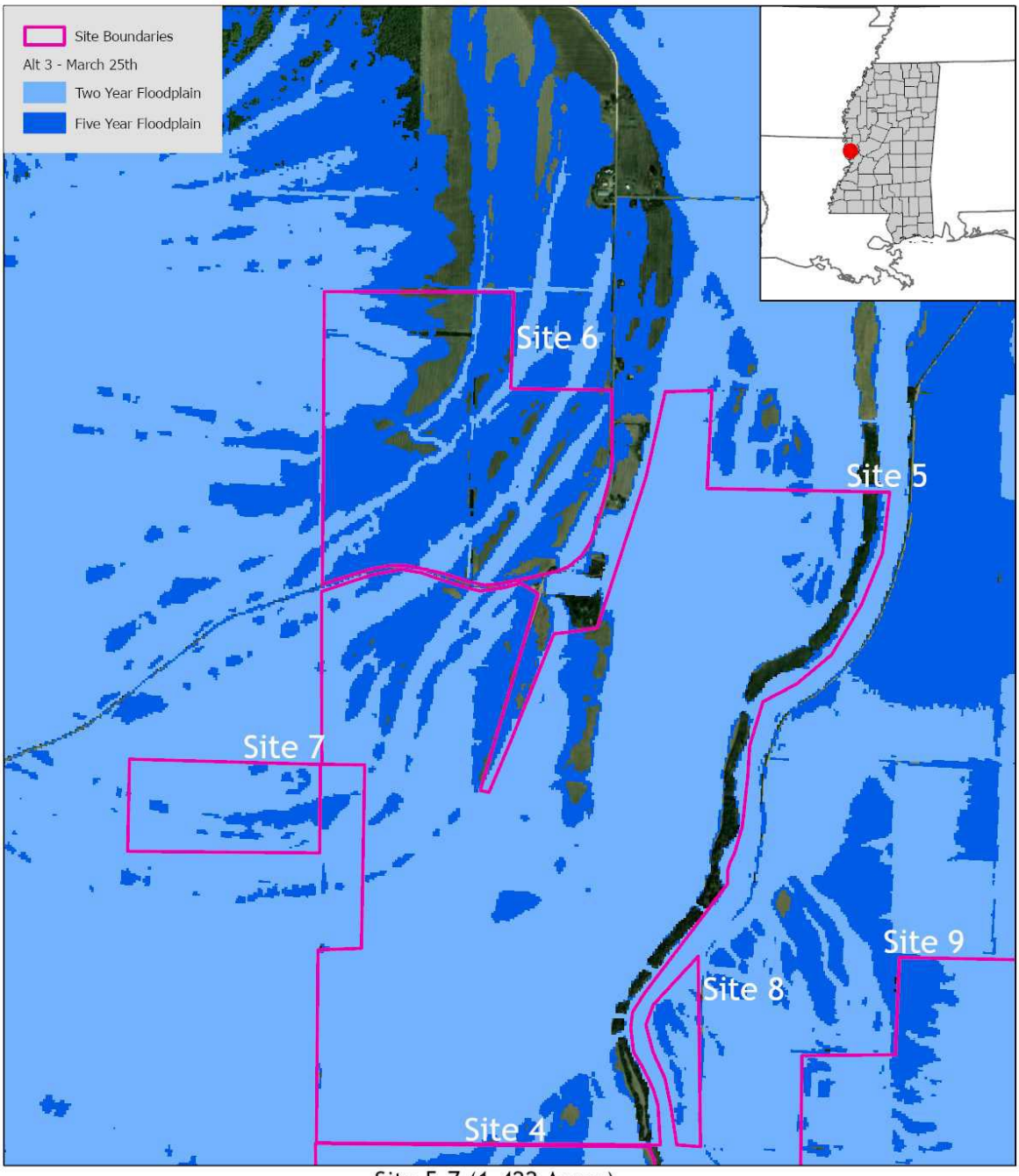

Site 5-7 (1,422 Acres)

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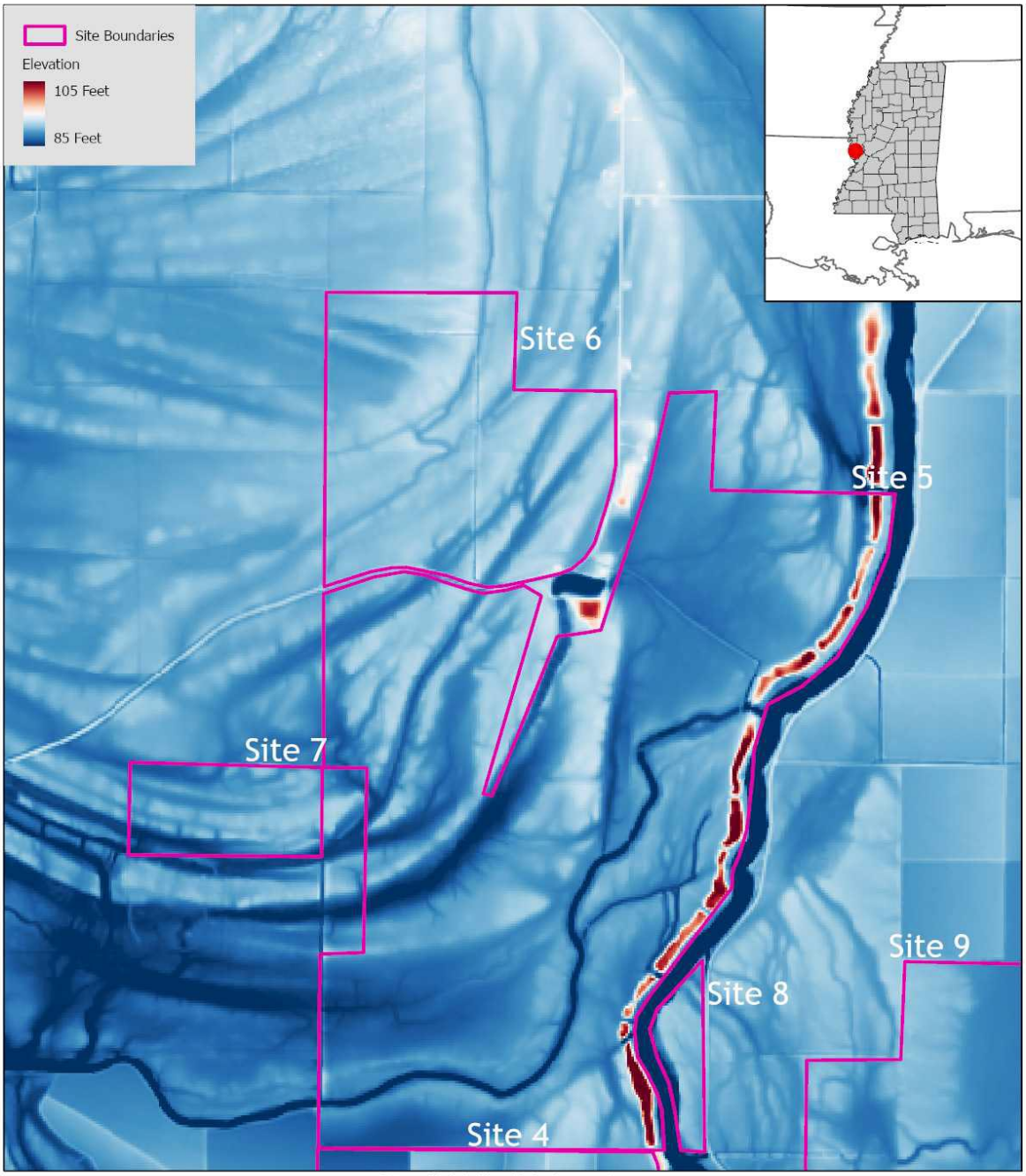

Site 5-7 (1,422 Acres)

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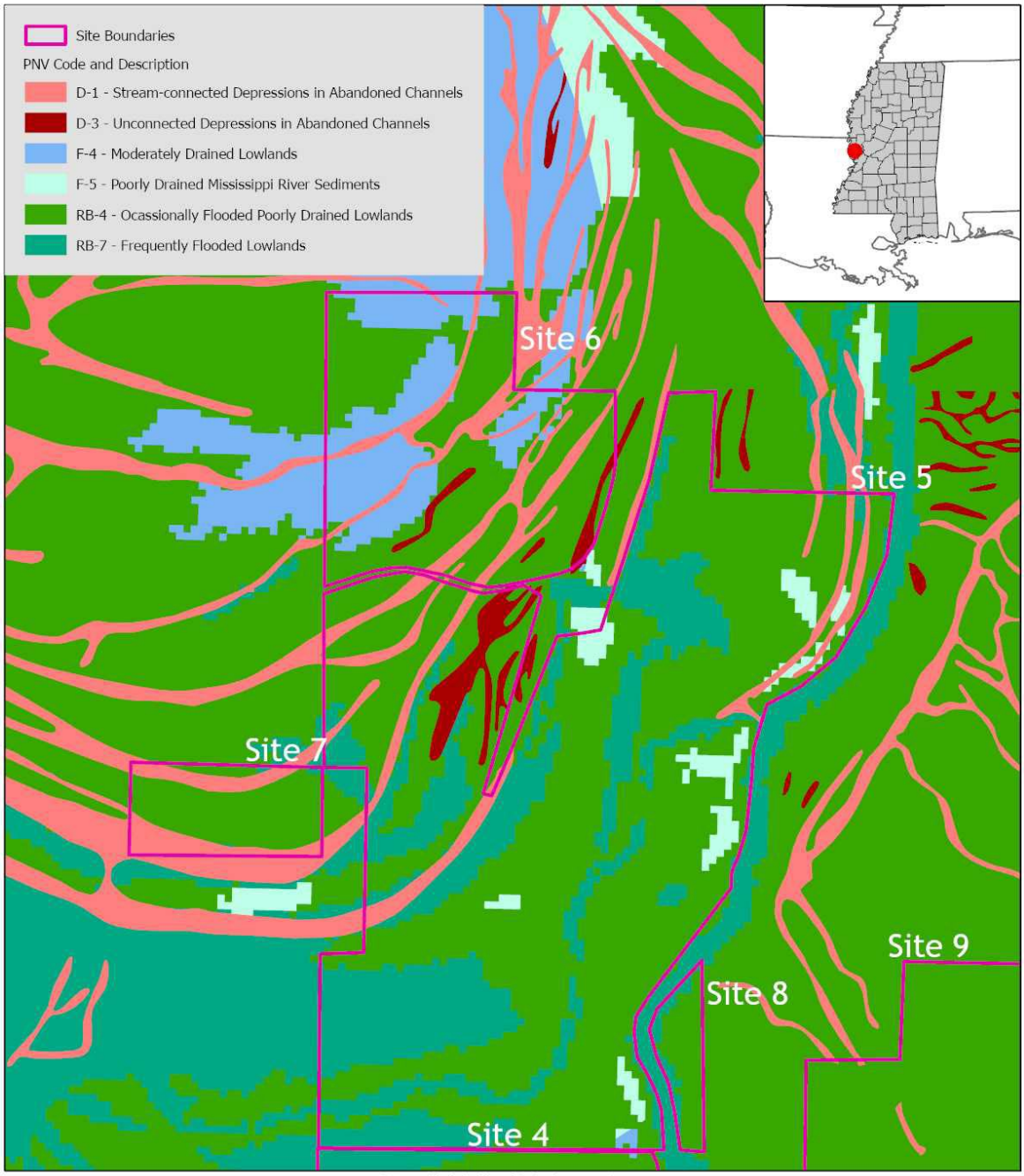
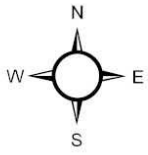


Site 5-7 (1,422 Acres)



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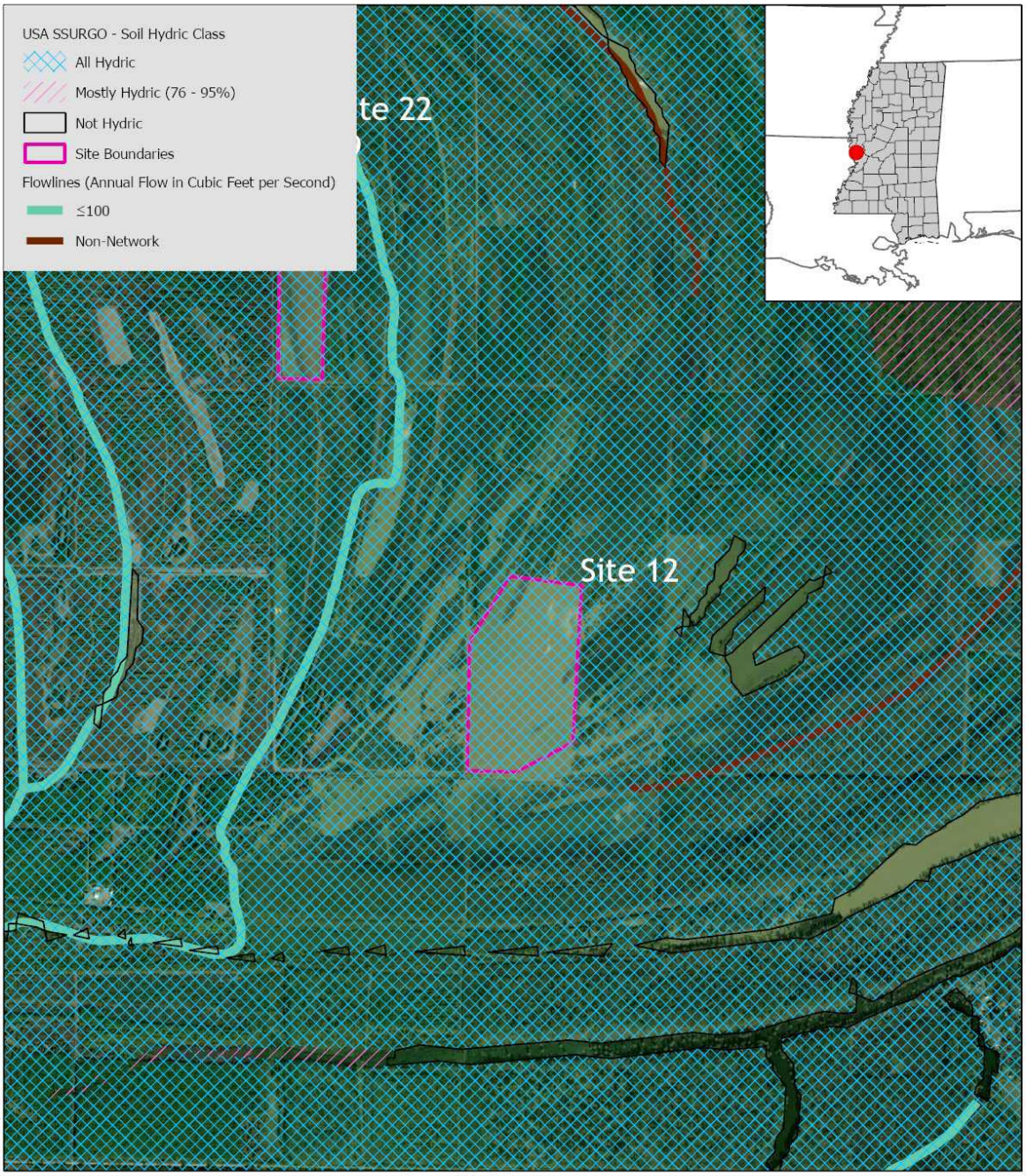

Site 12 (79 Acres)

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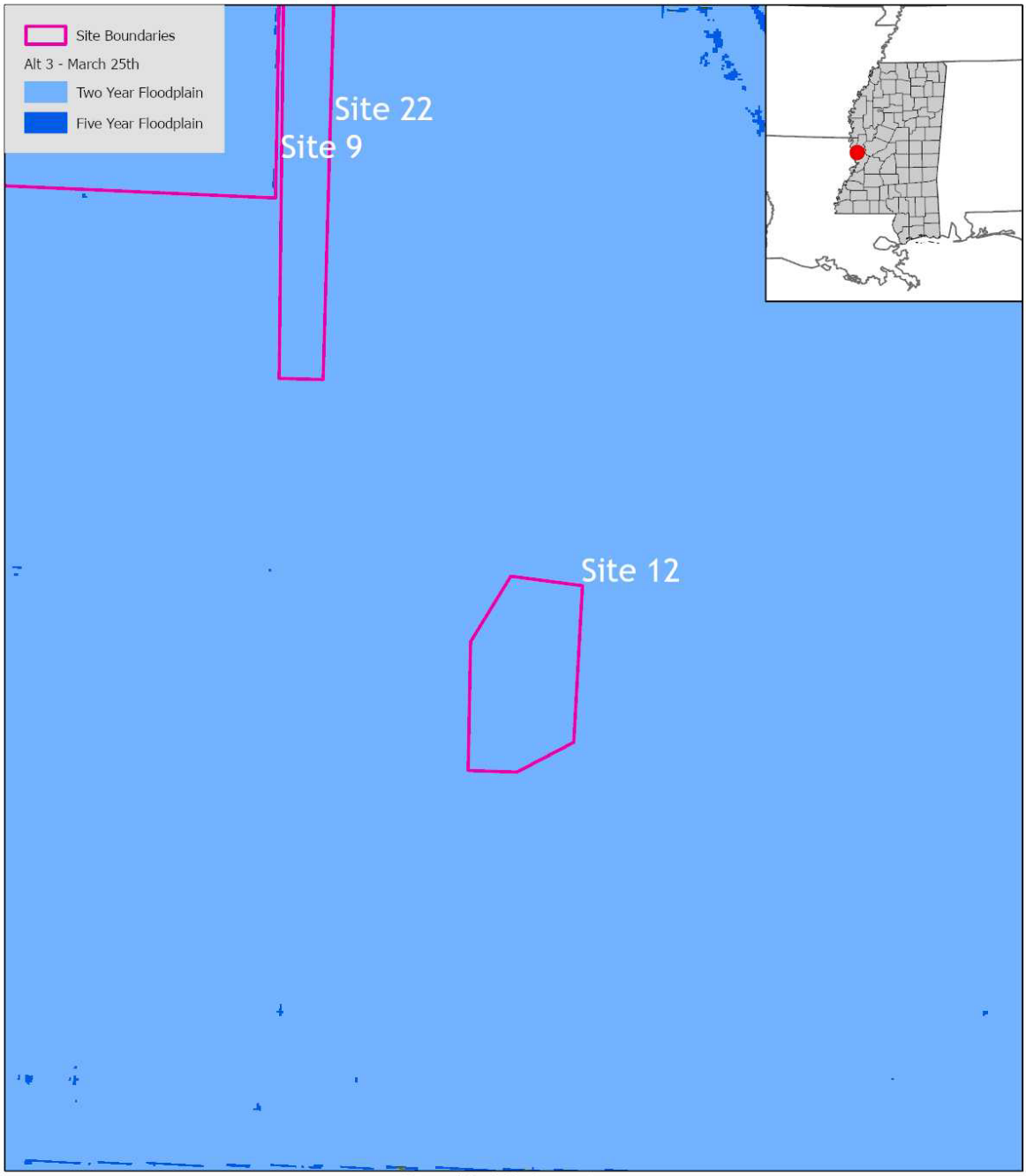
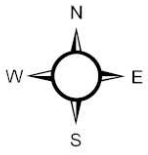


Site 12 (79 Acres)



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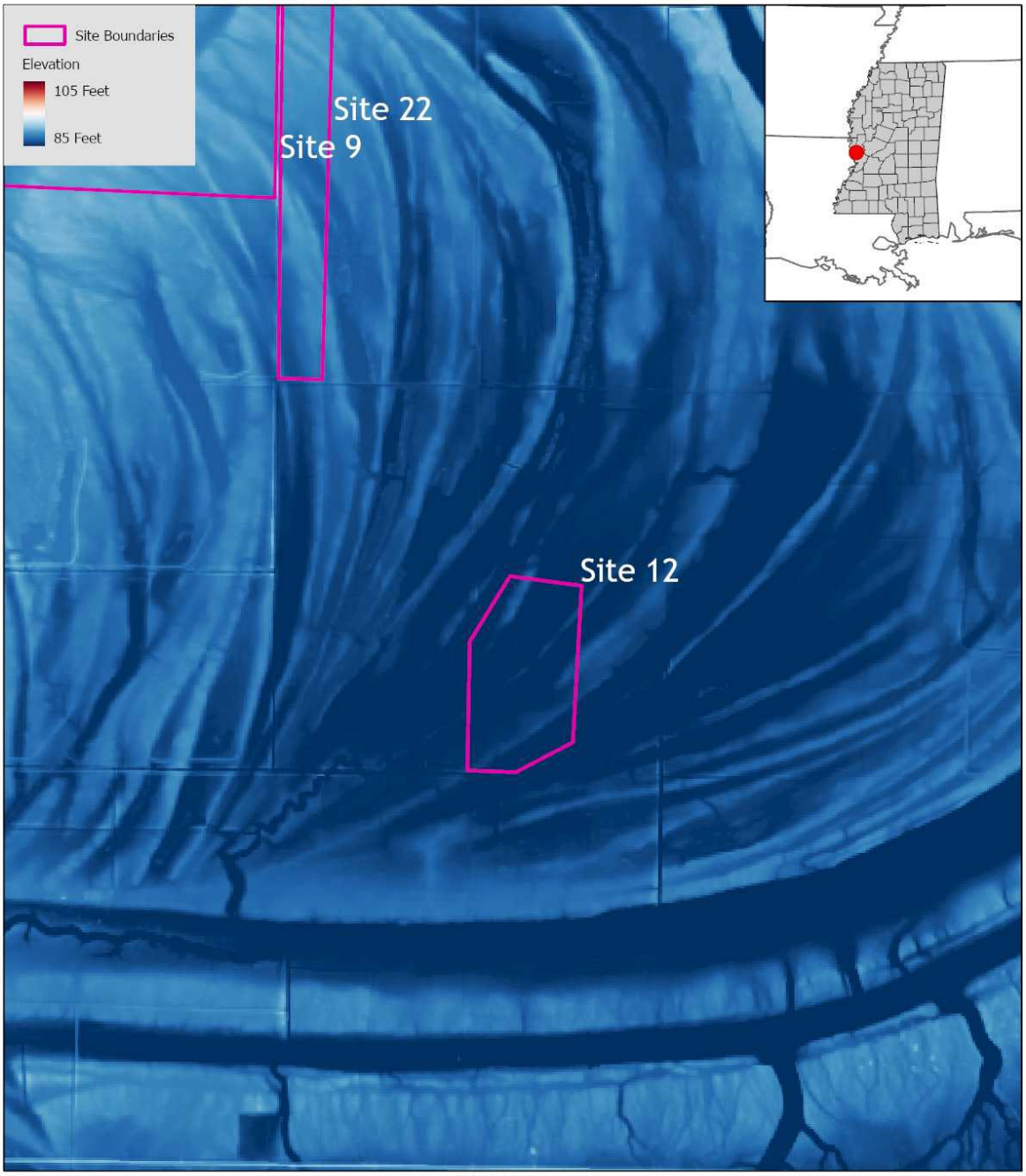

Site 12 (79 Acres)

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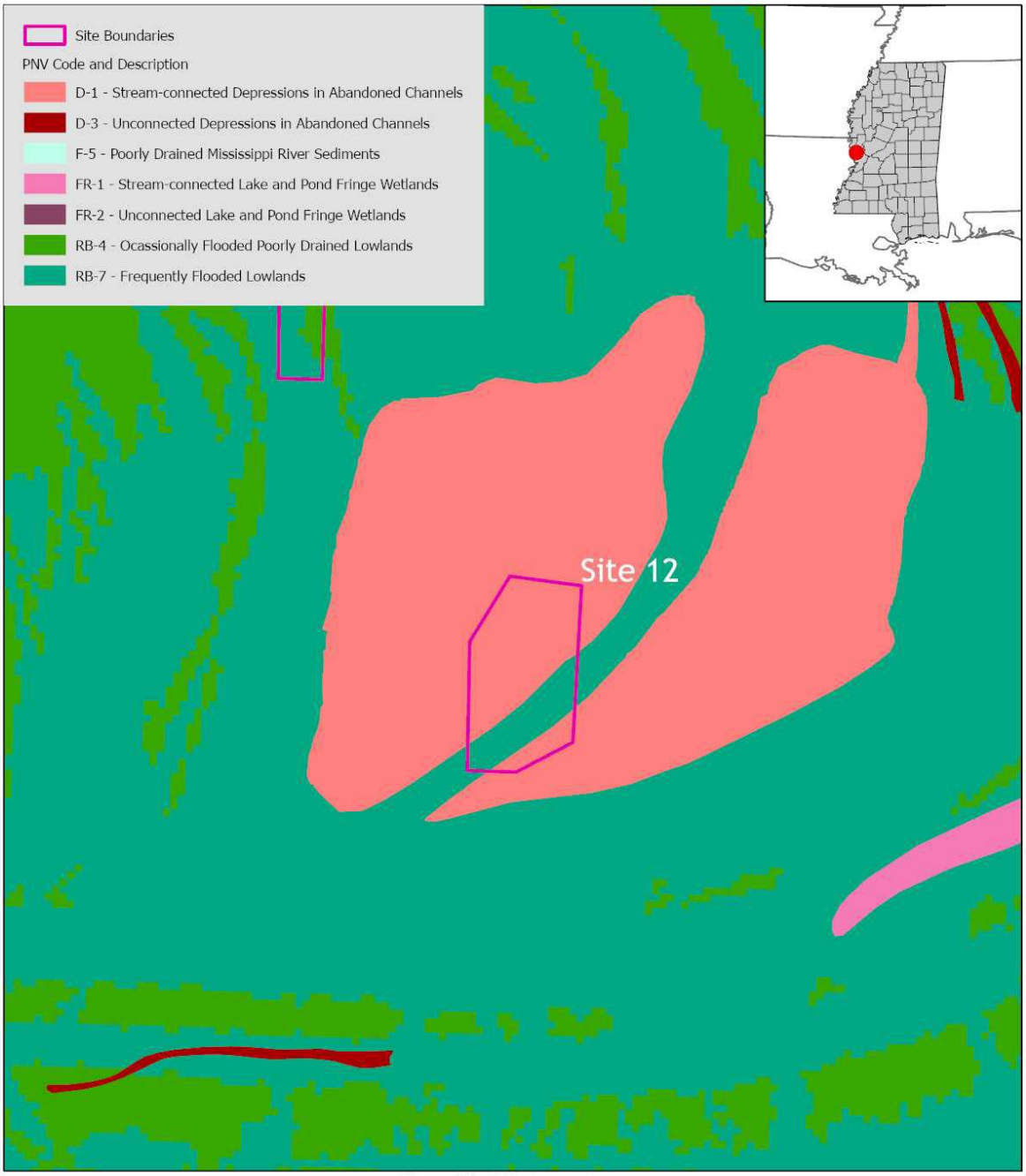
DUCKS UNLIMITED



Site 12 (79 Acres)

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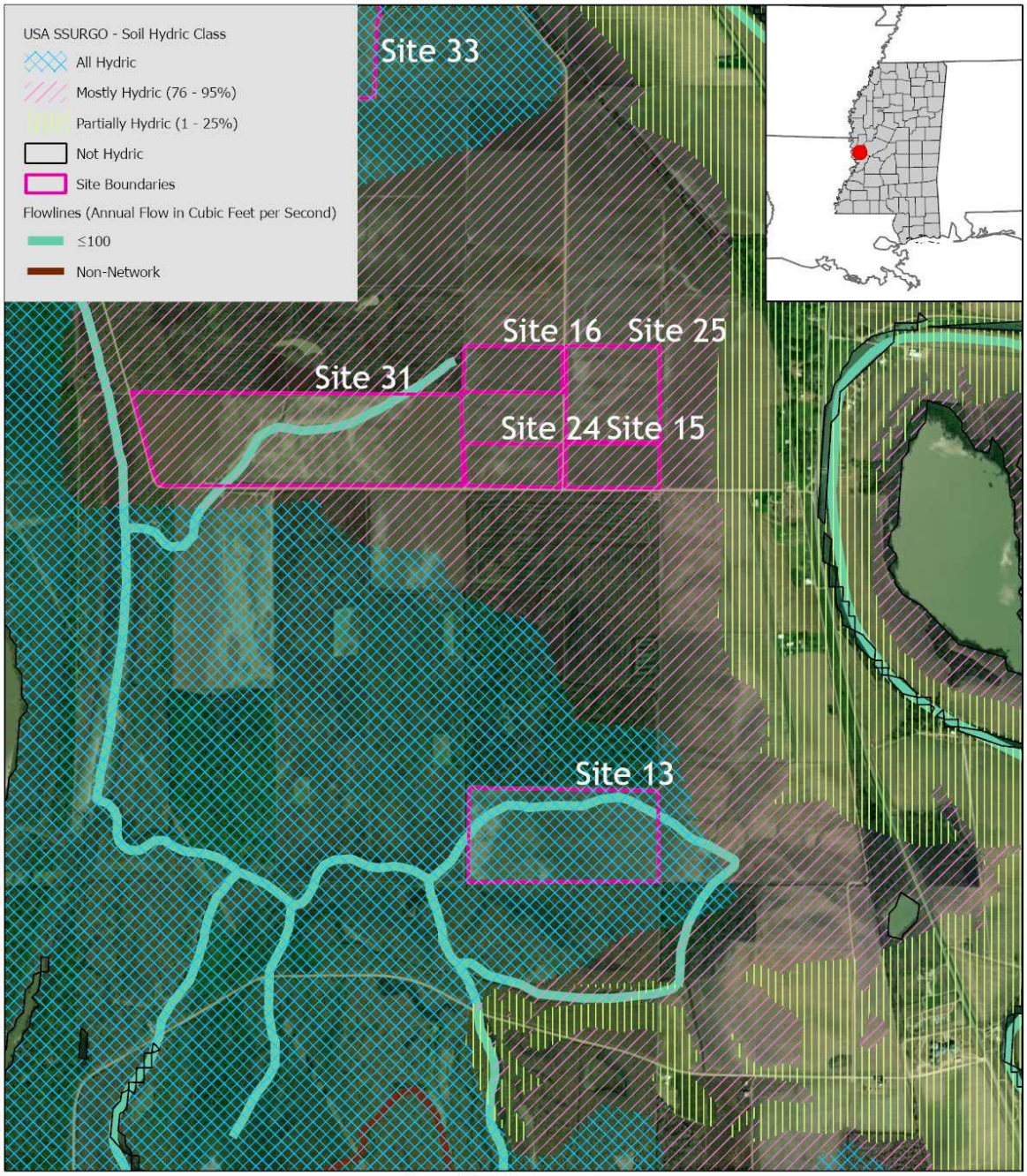
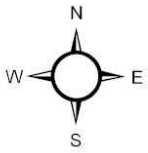
DUCKS UNLIMITED



Site 13 (75 Acres)



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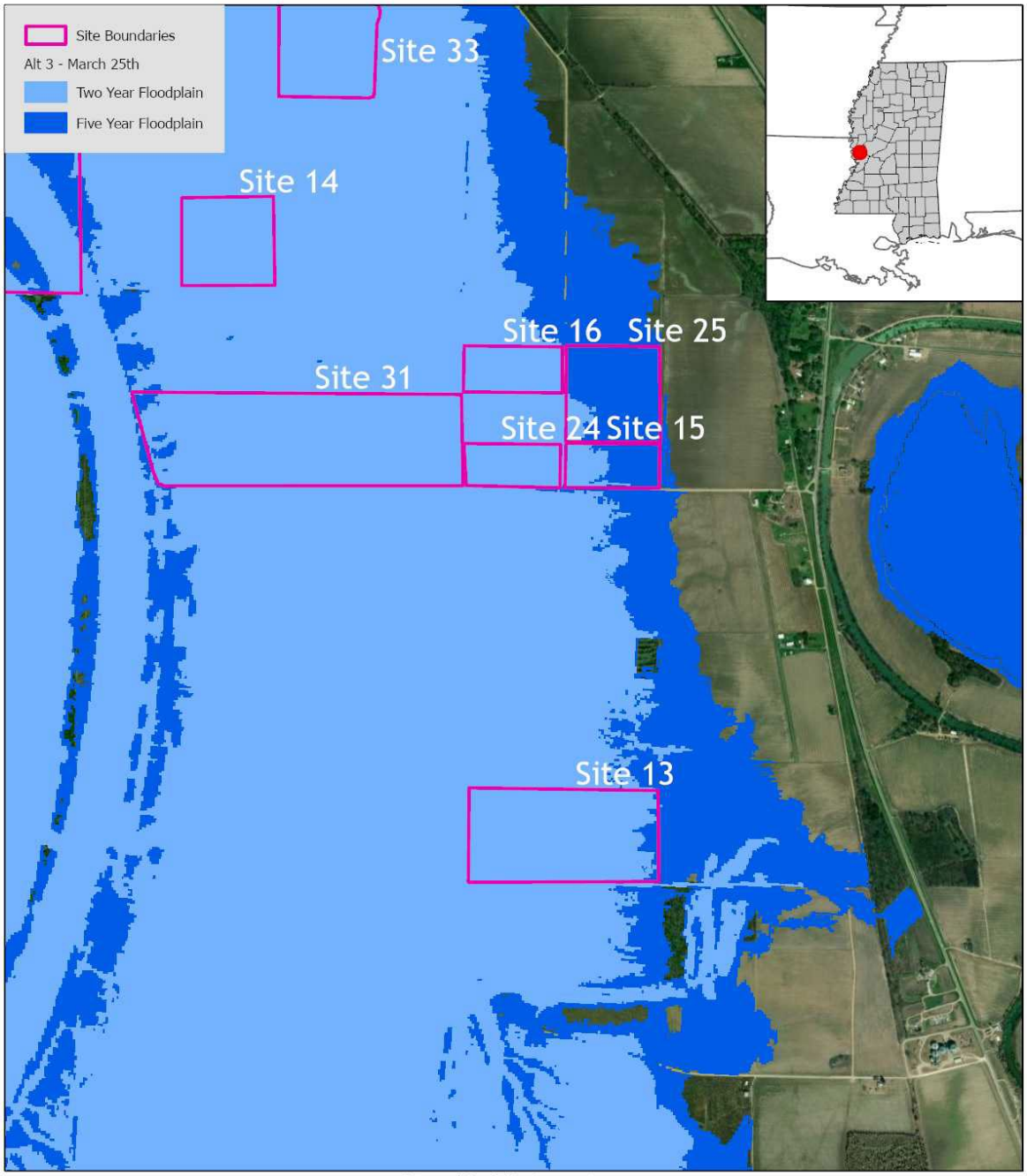

Site 13 (75 Acres)

N
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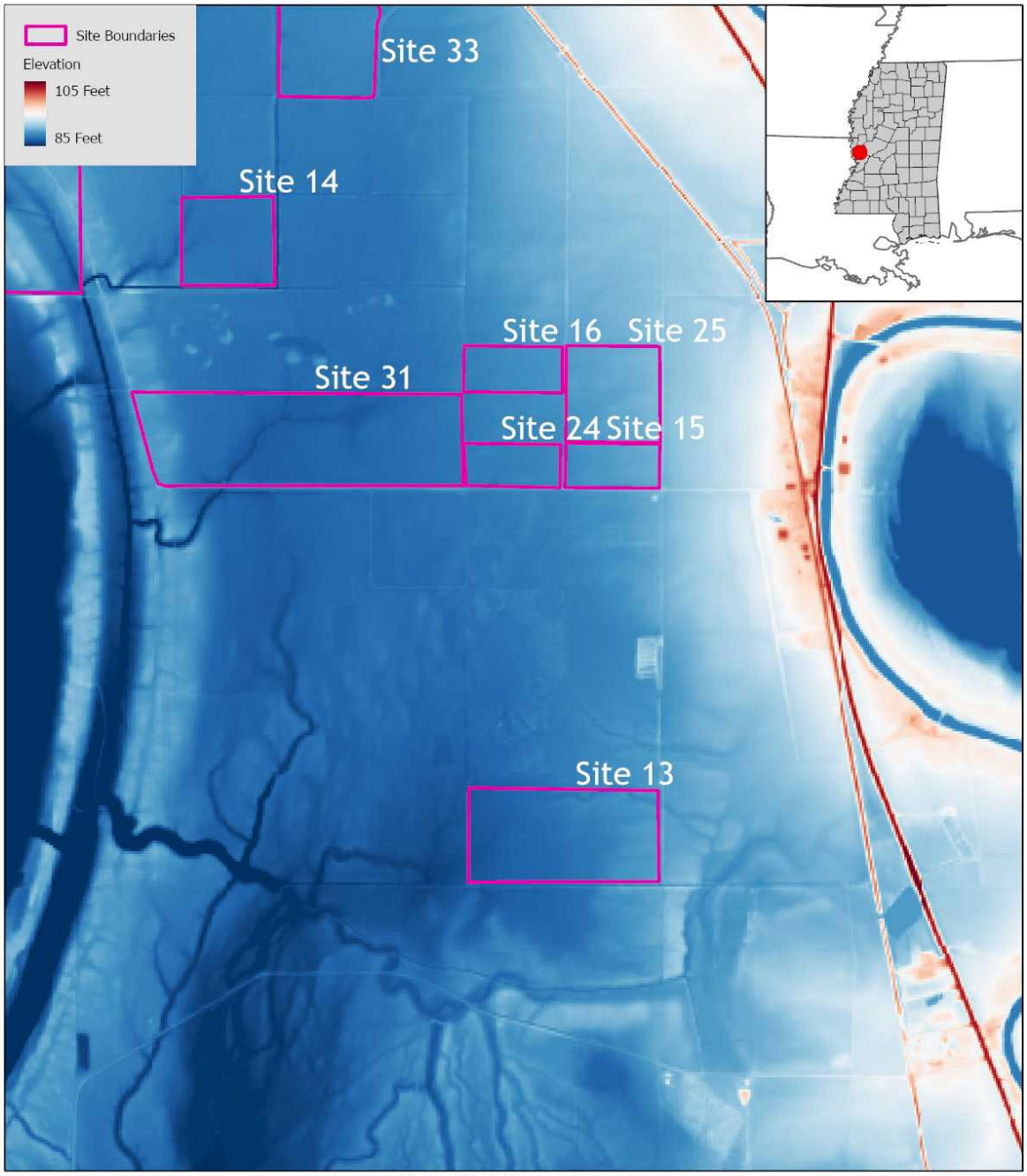
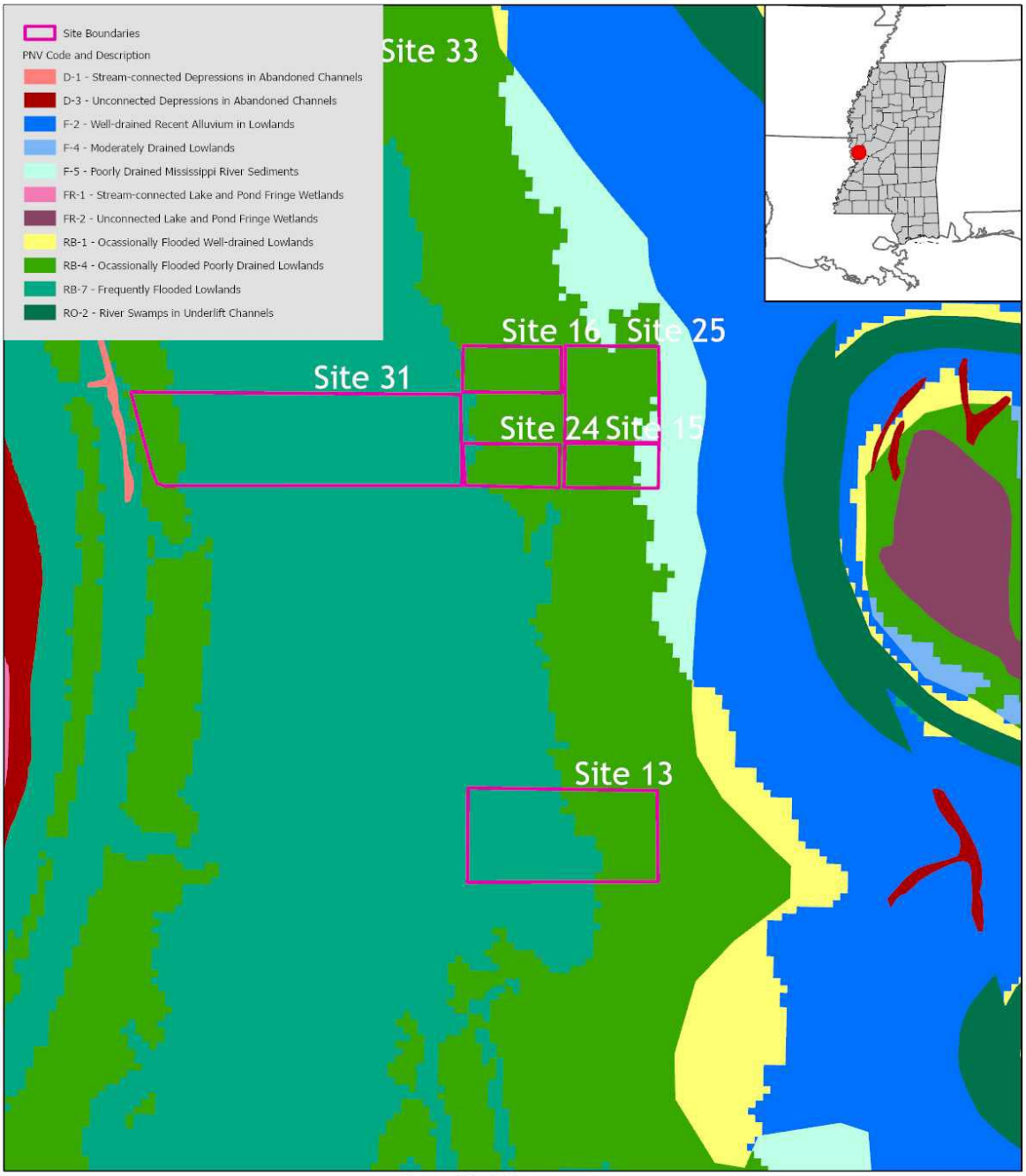
2,000 0 2,000 4,000 Feet

DUCKS UNLIMITED



Site 13 (75 Acres)



Site 13 (75 Acres)

N
W E
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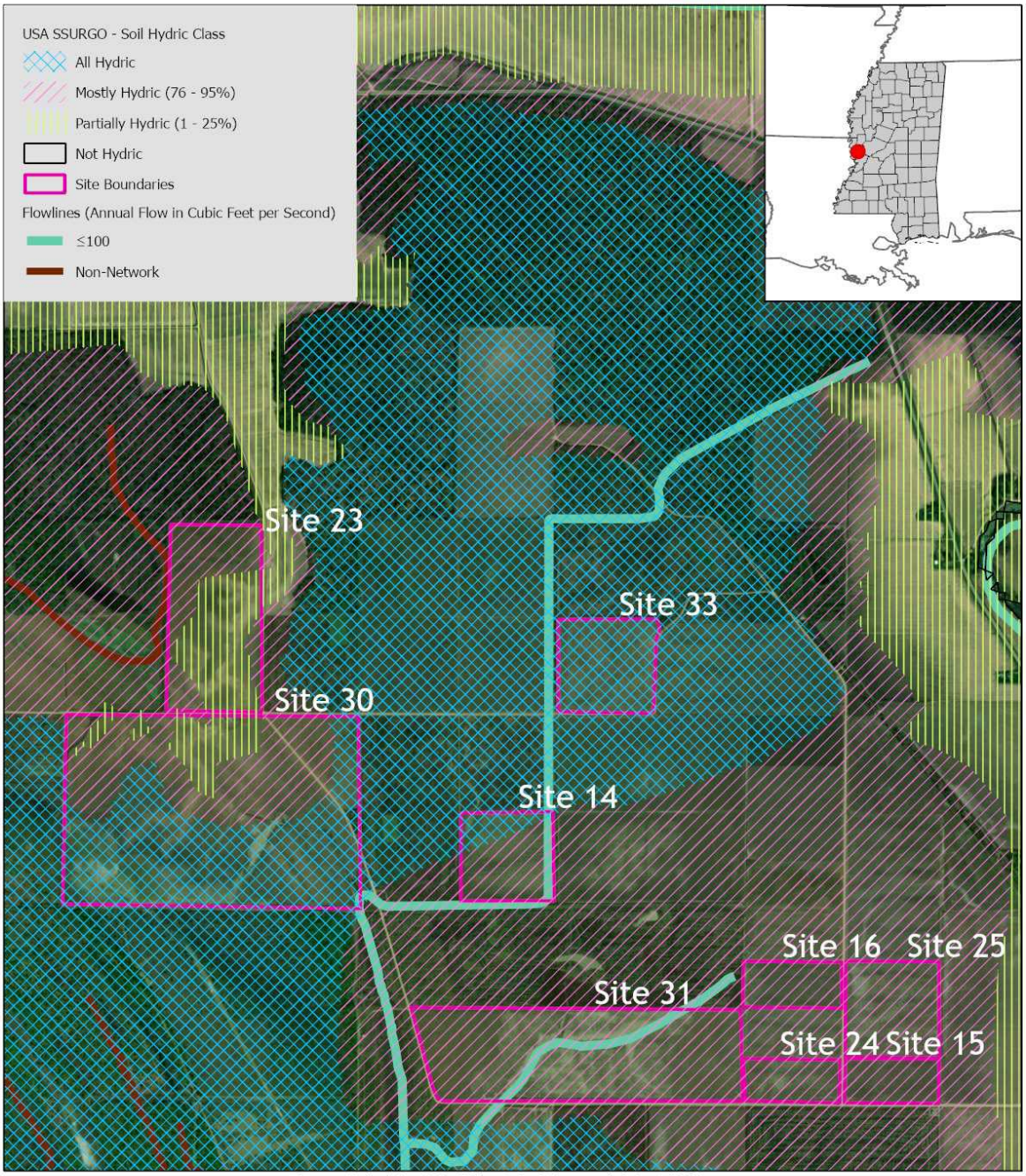
2,000 0 2,000 4,000 Feet

DUCKS UNLIMITED



Site 14-16, 23-25, 30-31 and 33 (605 Acres)

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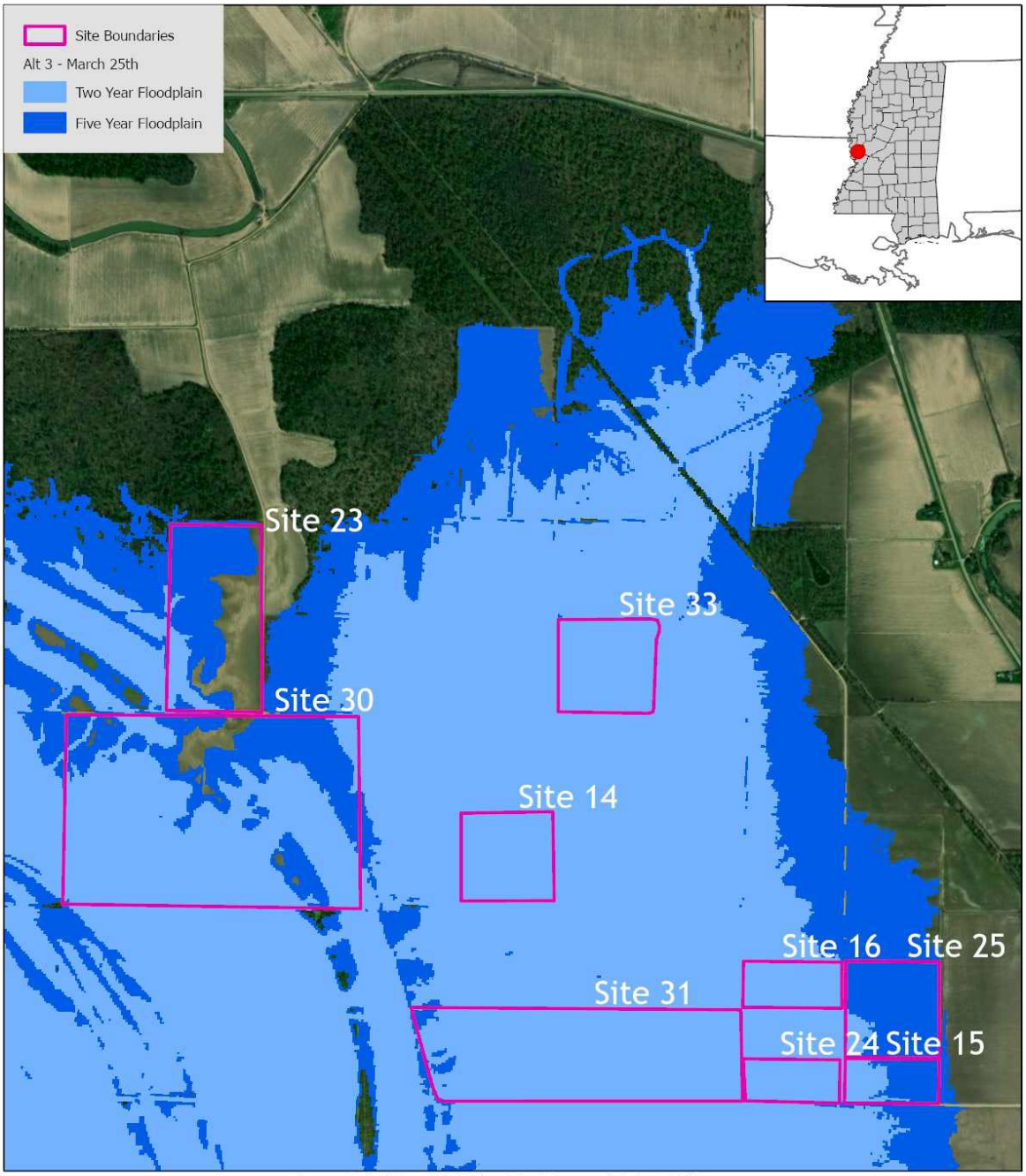
2,000 0 2,000 4,000 Feet

DUCKS UNLIMITED



Site 14-16, 23-25, 30-31 and 33 (605 Acres)

N
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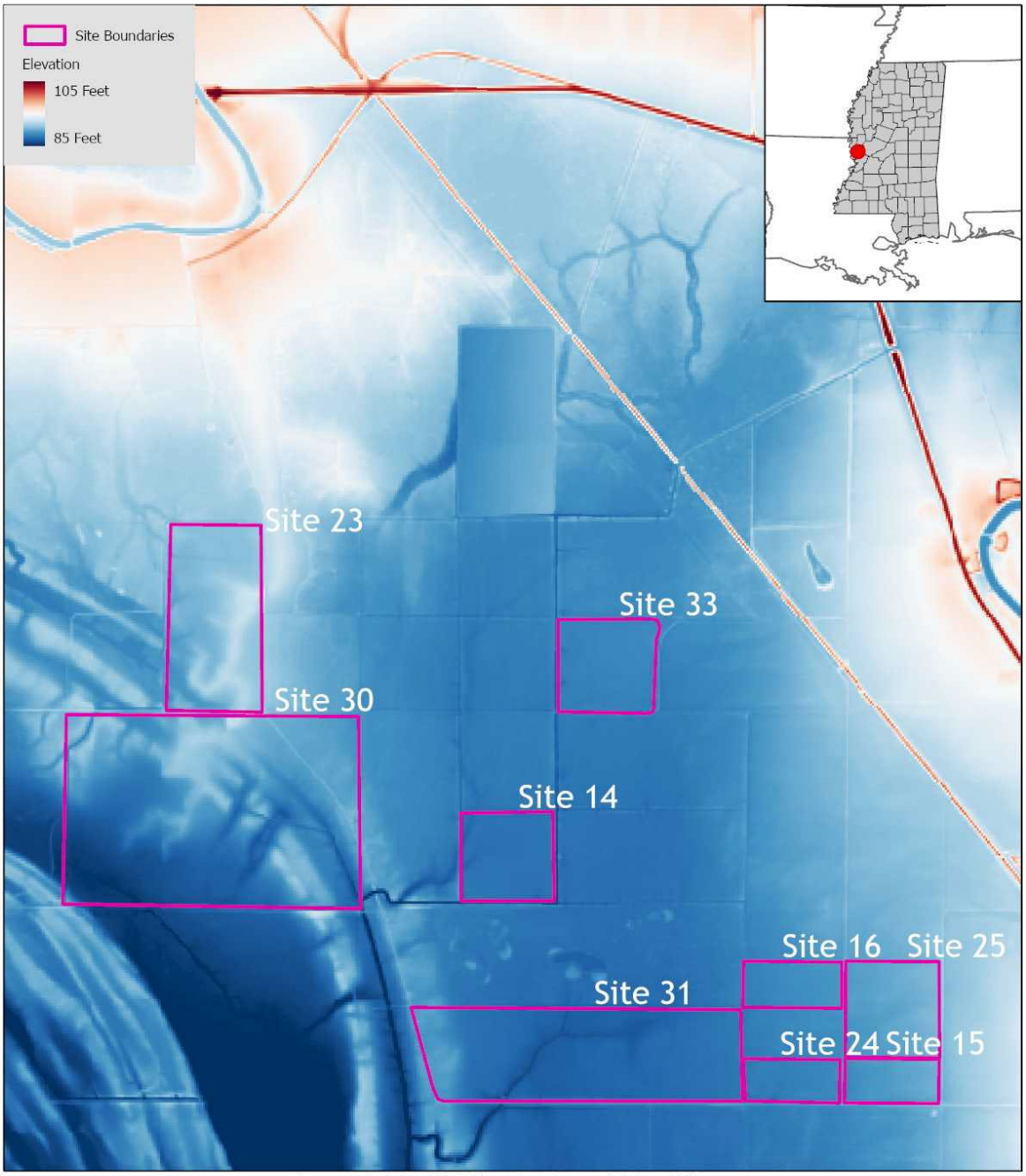
DUCKS UNLIMITED

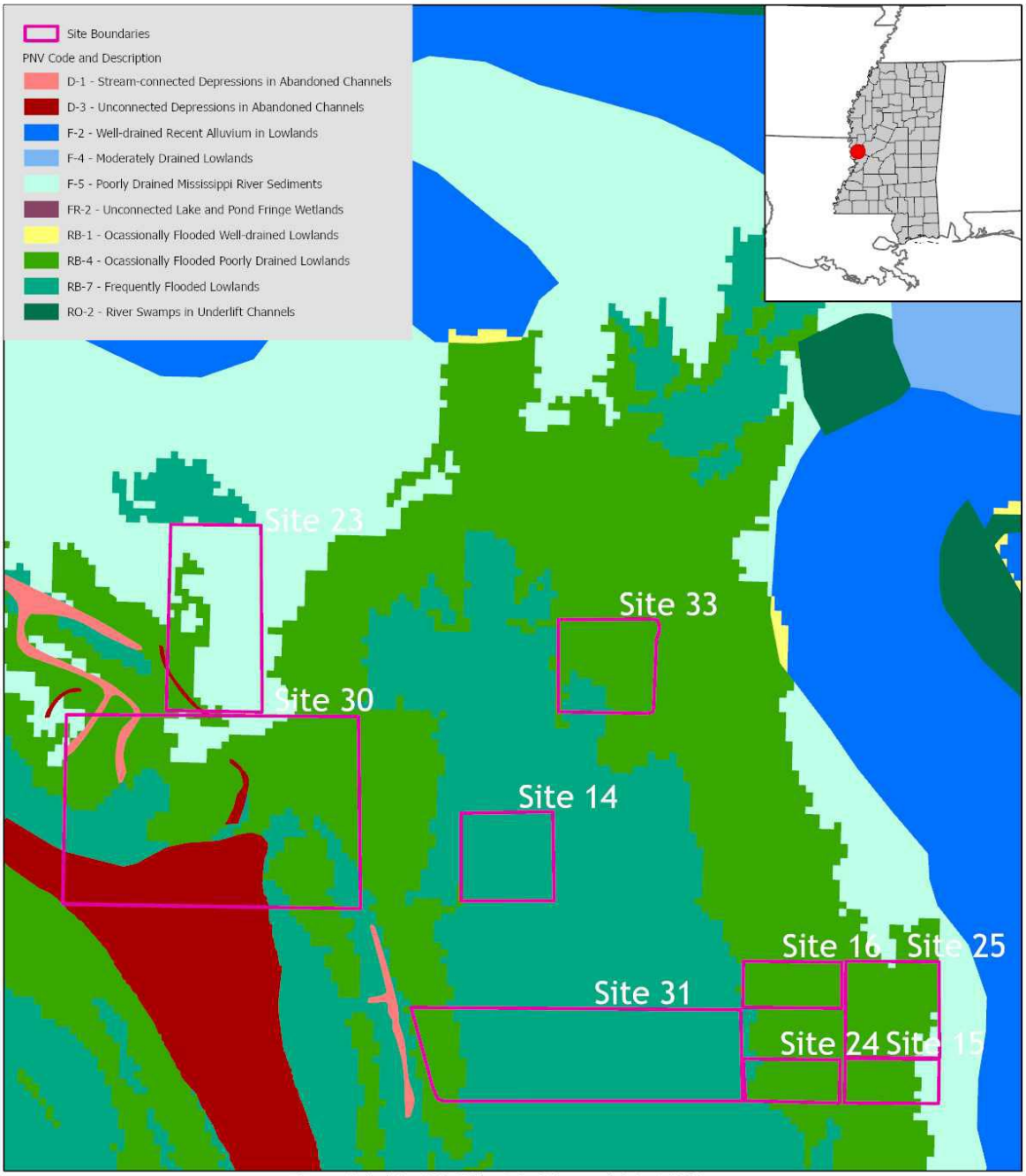


Site 14-16, 23-25, 30-31 and 33 (605 Acres)

N
W E
S

2,000 0 2,000 4,000 Feet

DUCKS UNLIMITED



Site 14-16, 23-25, 30-31 and 33 (605 Acres)

N
W E
S

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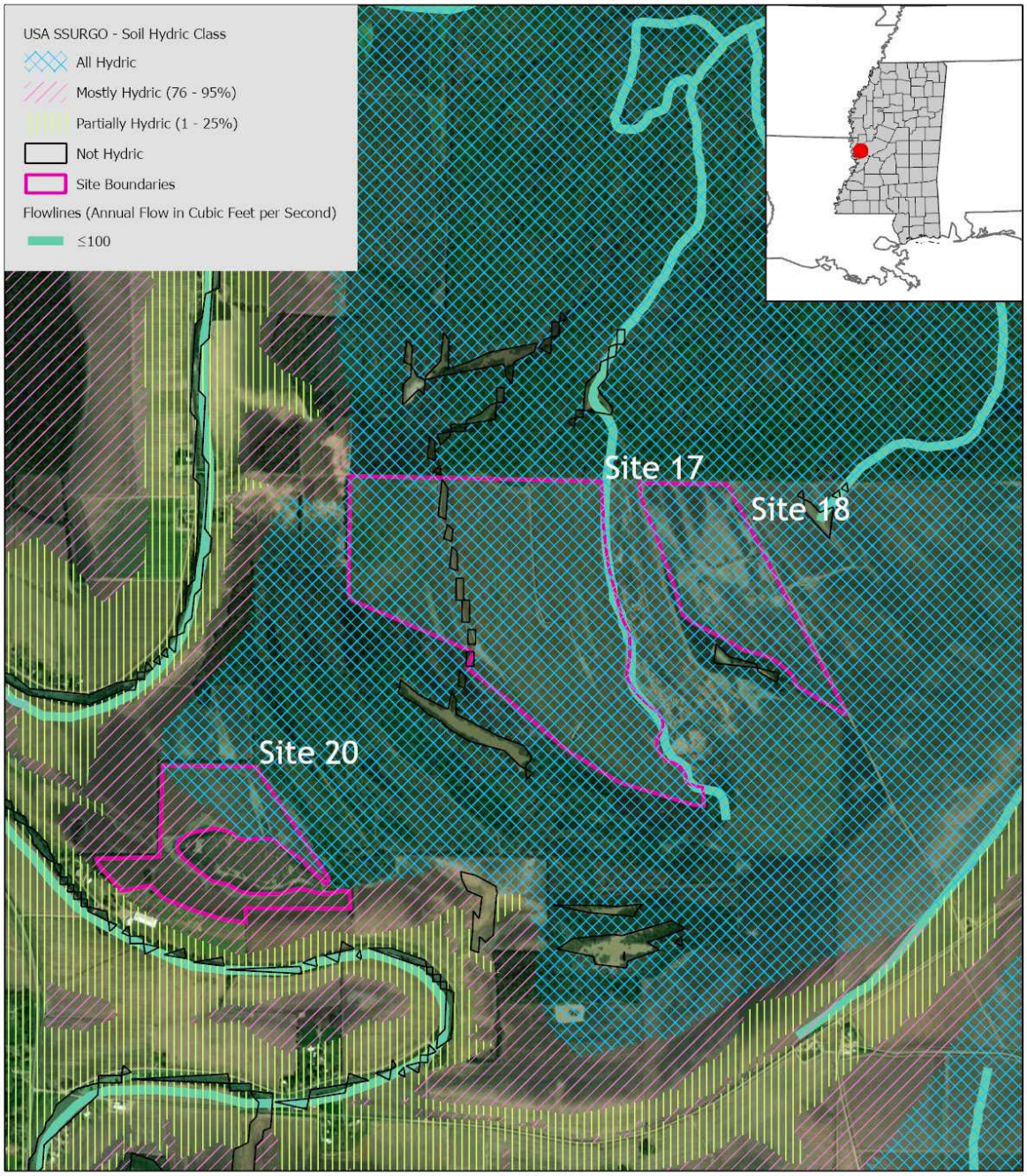
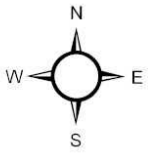
DUCKS UNLIMITED



Site 17, 18, and 20 (399 Acres)



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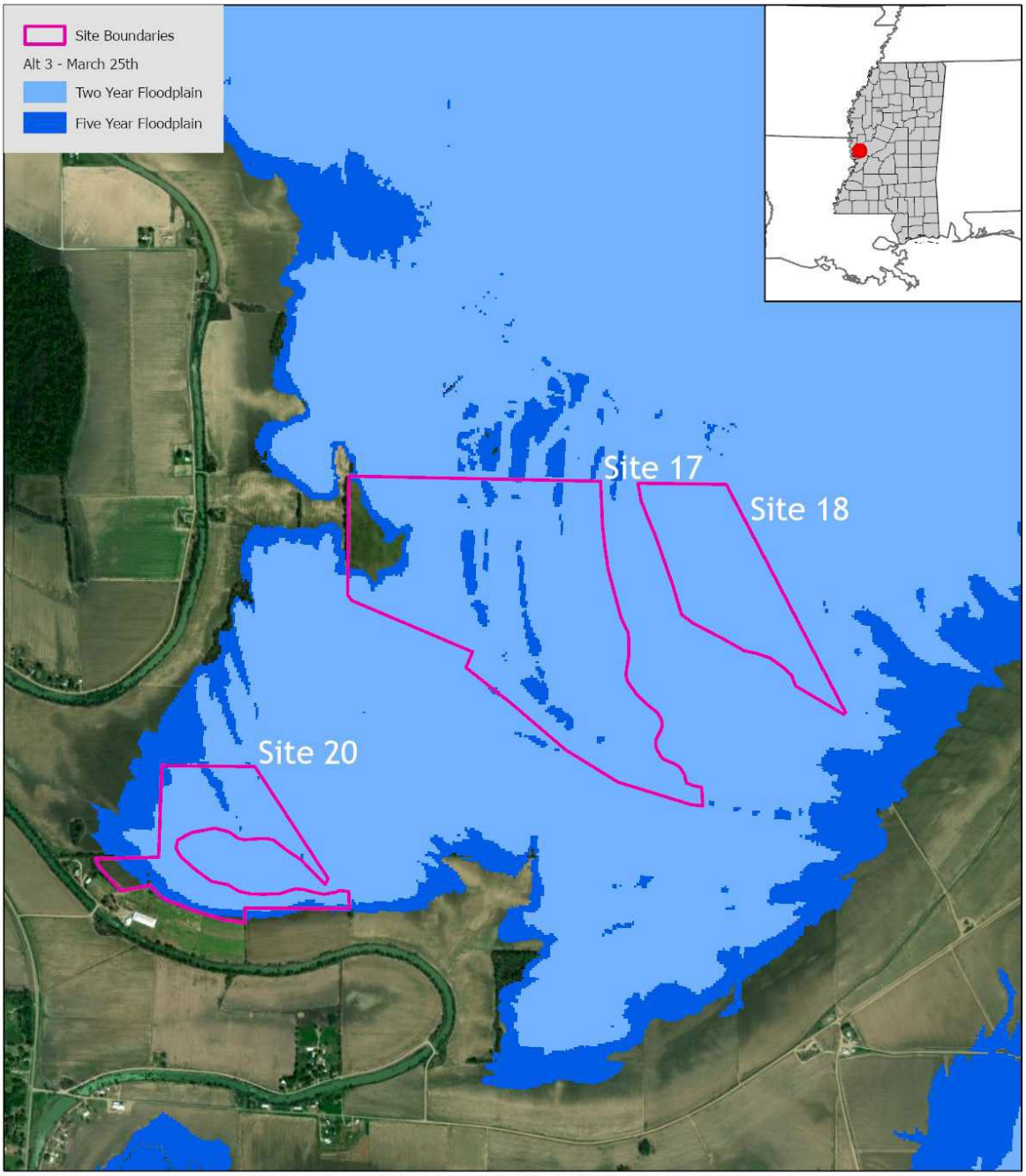

Site 17, 18, and 20 (399 Acres)

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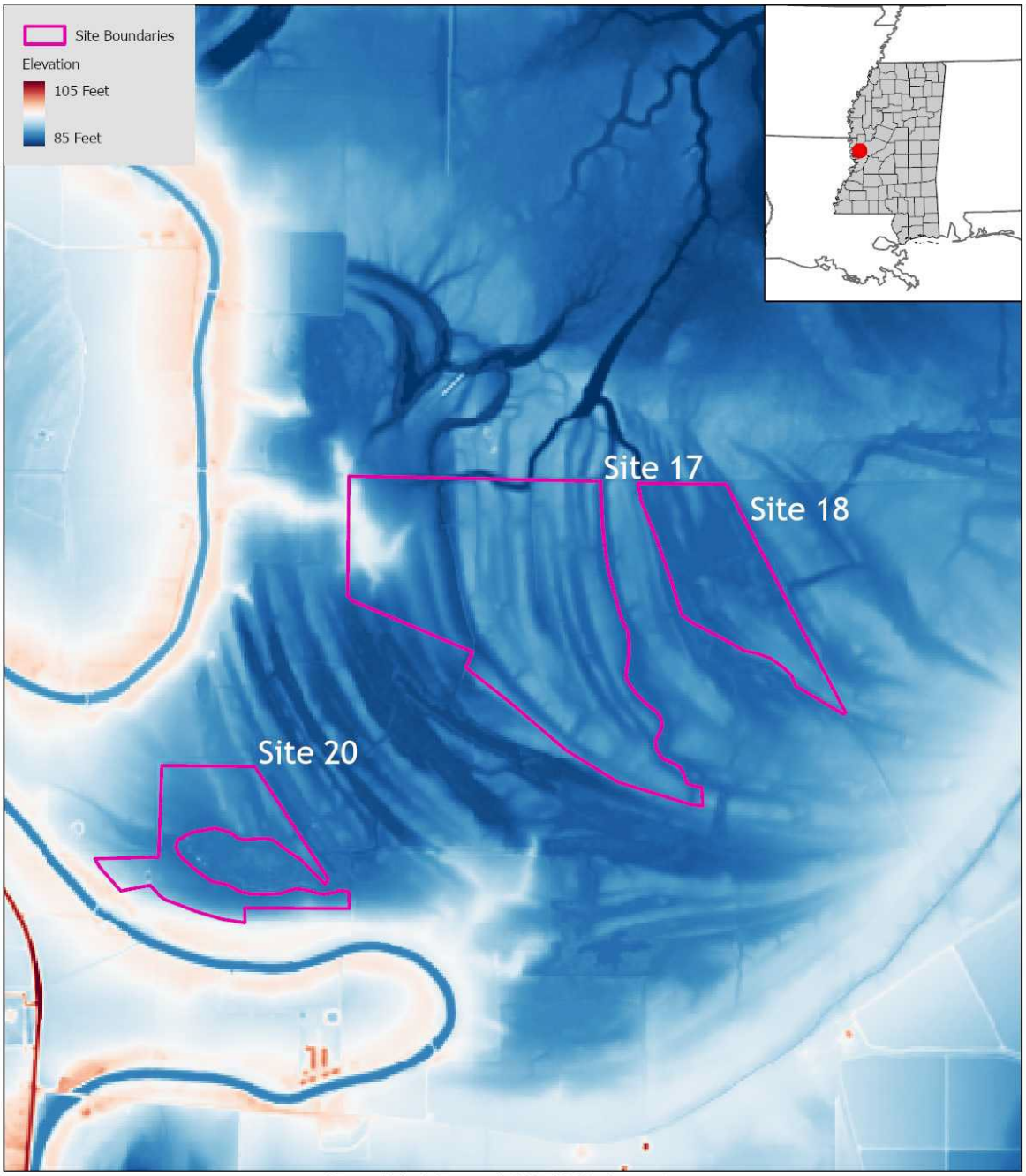

Site 17, 18, and 20 (399 Acres)

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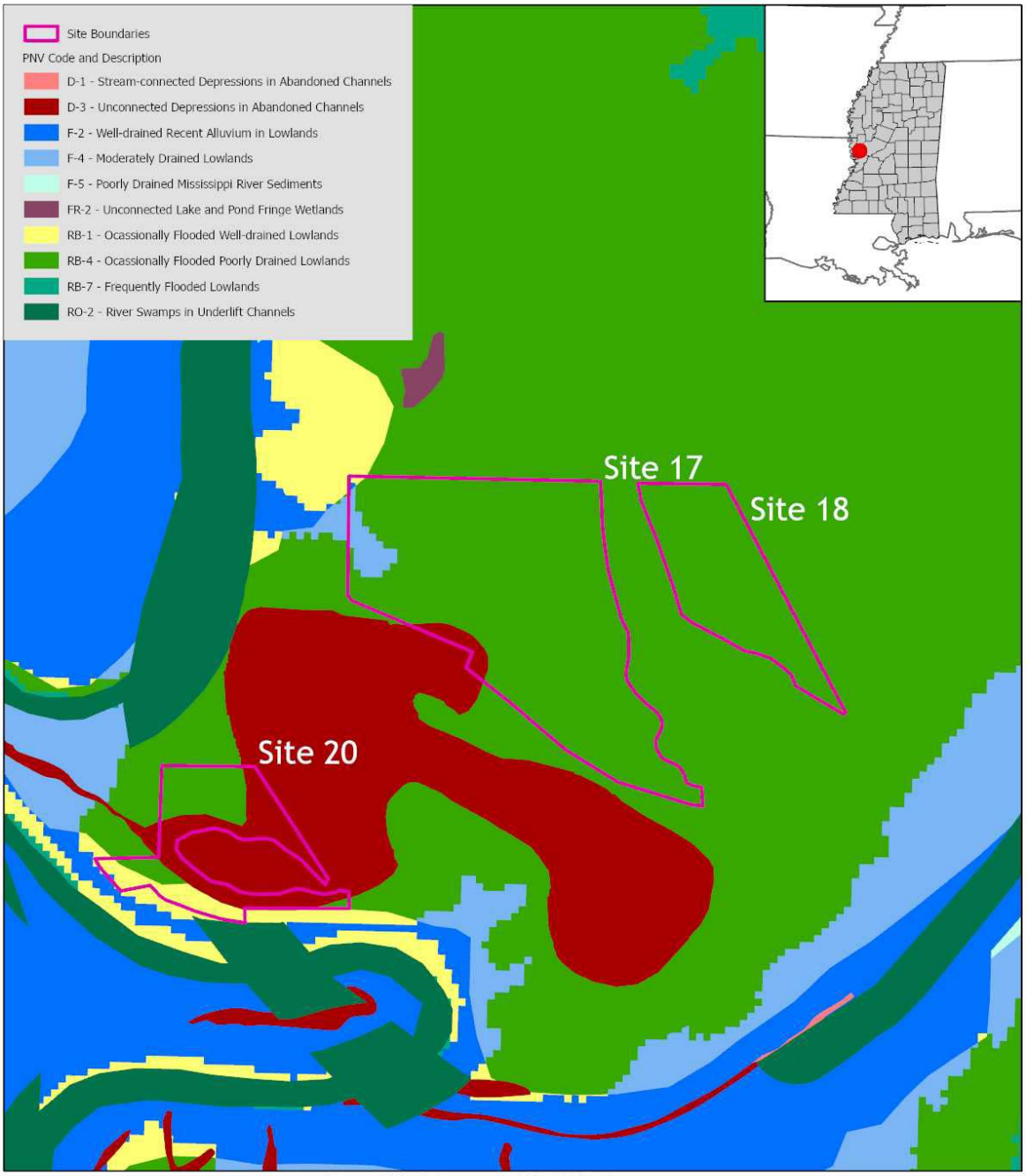

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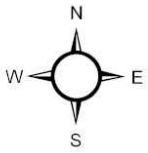

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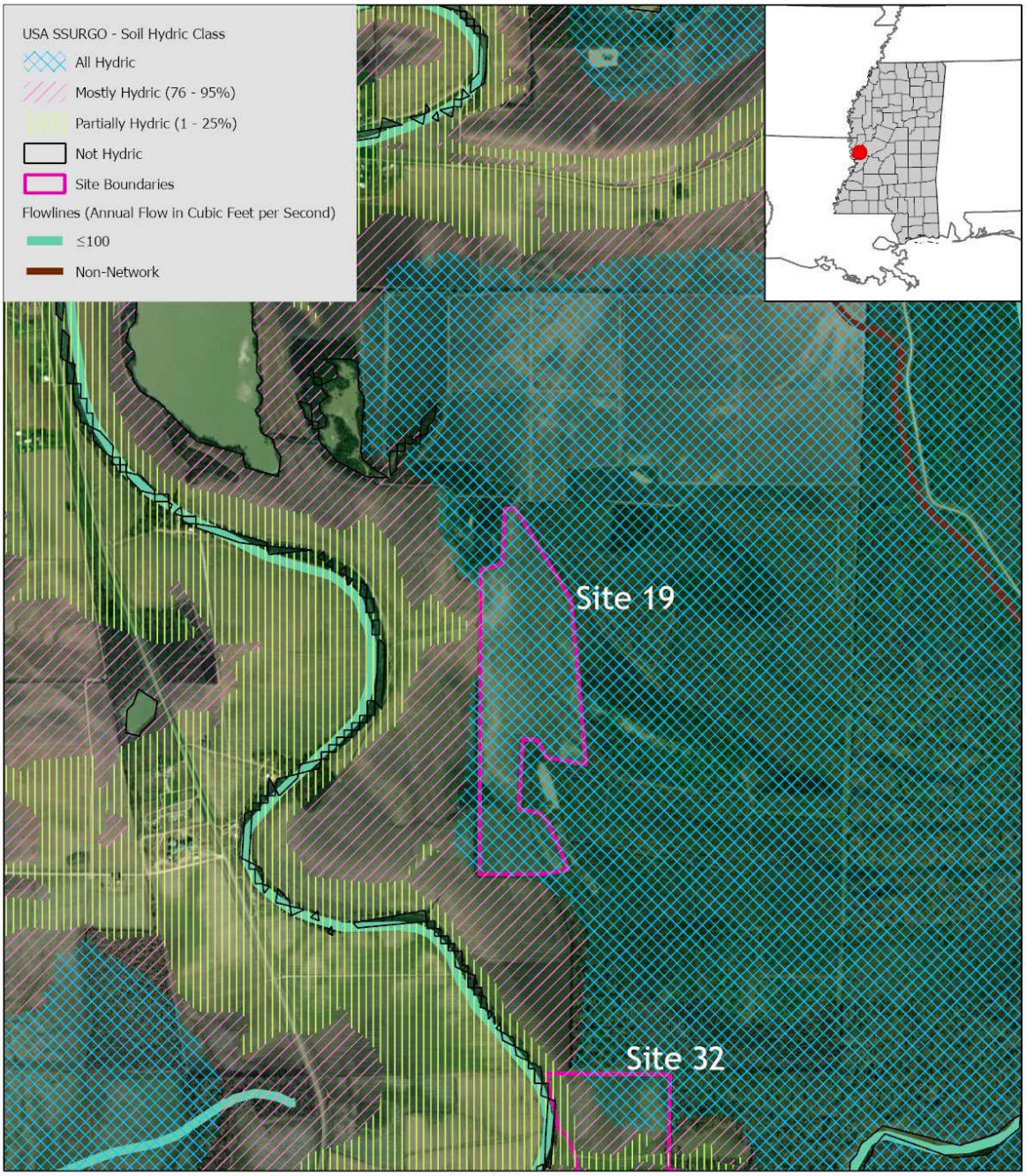
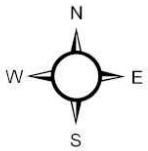


Site 19 (113 Acres)



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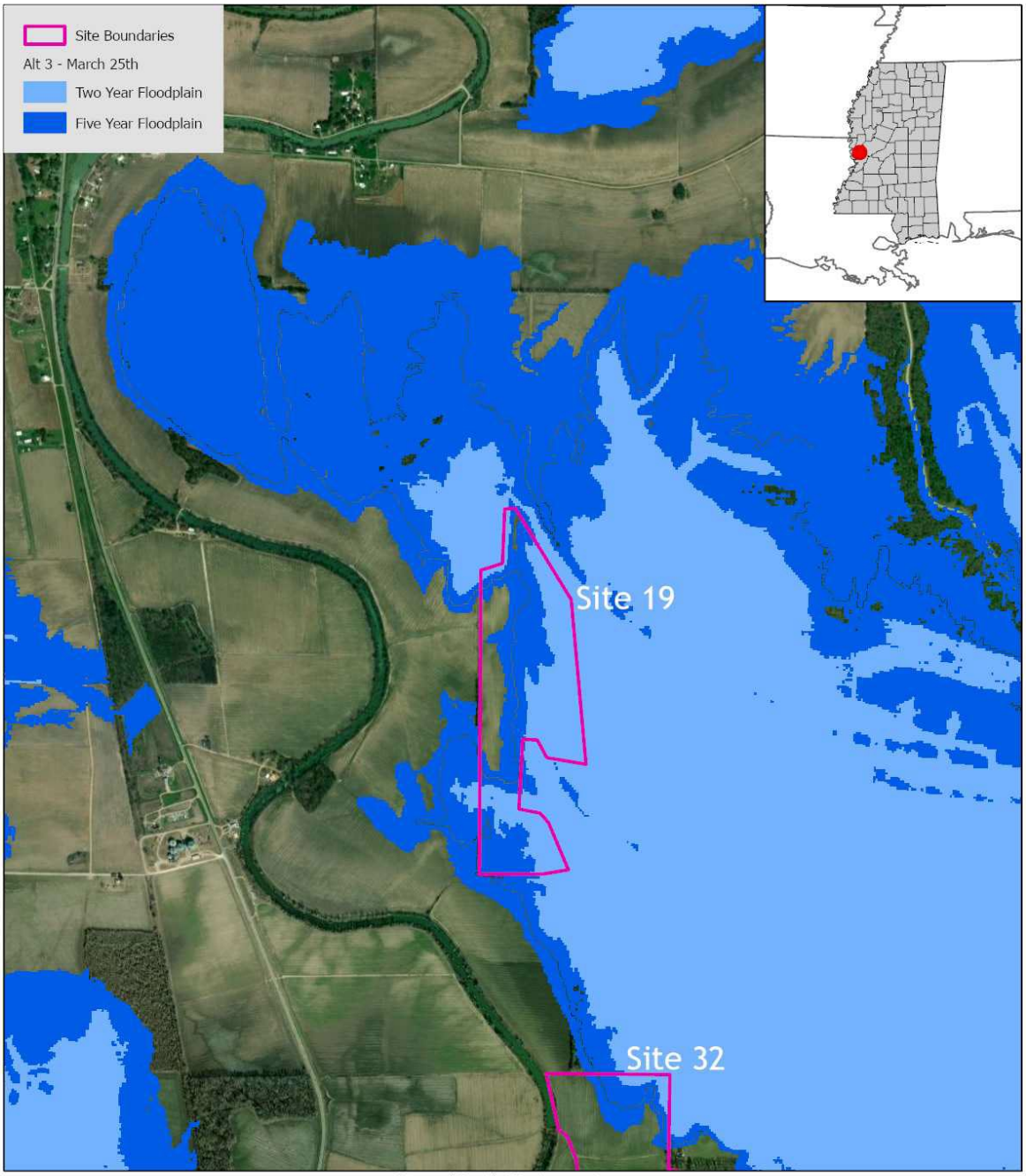

Site 19 (113 Acres)

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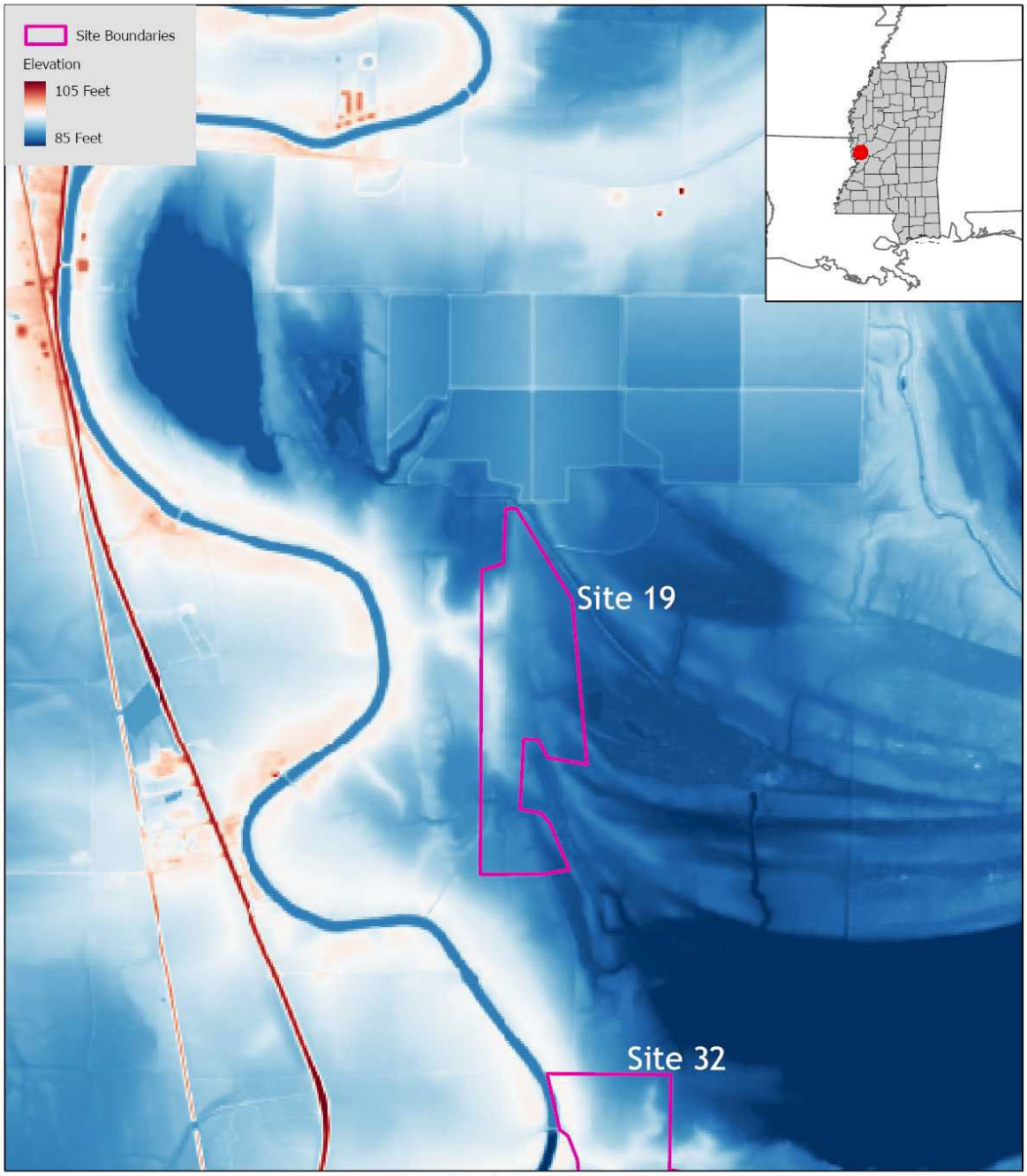

Site 19 (113 Acres)

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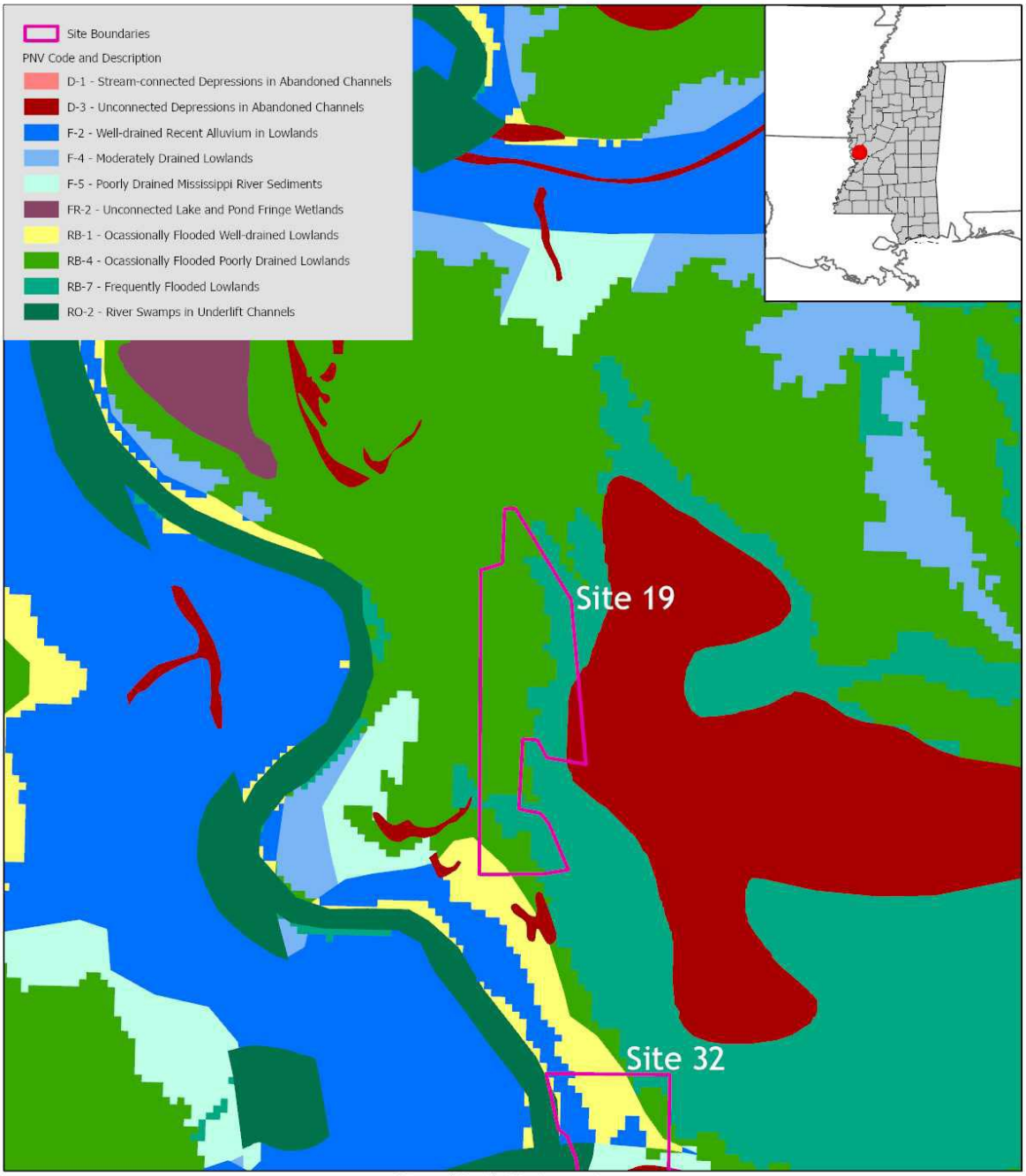

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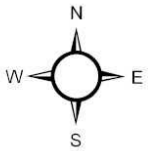

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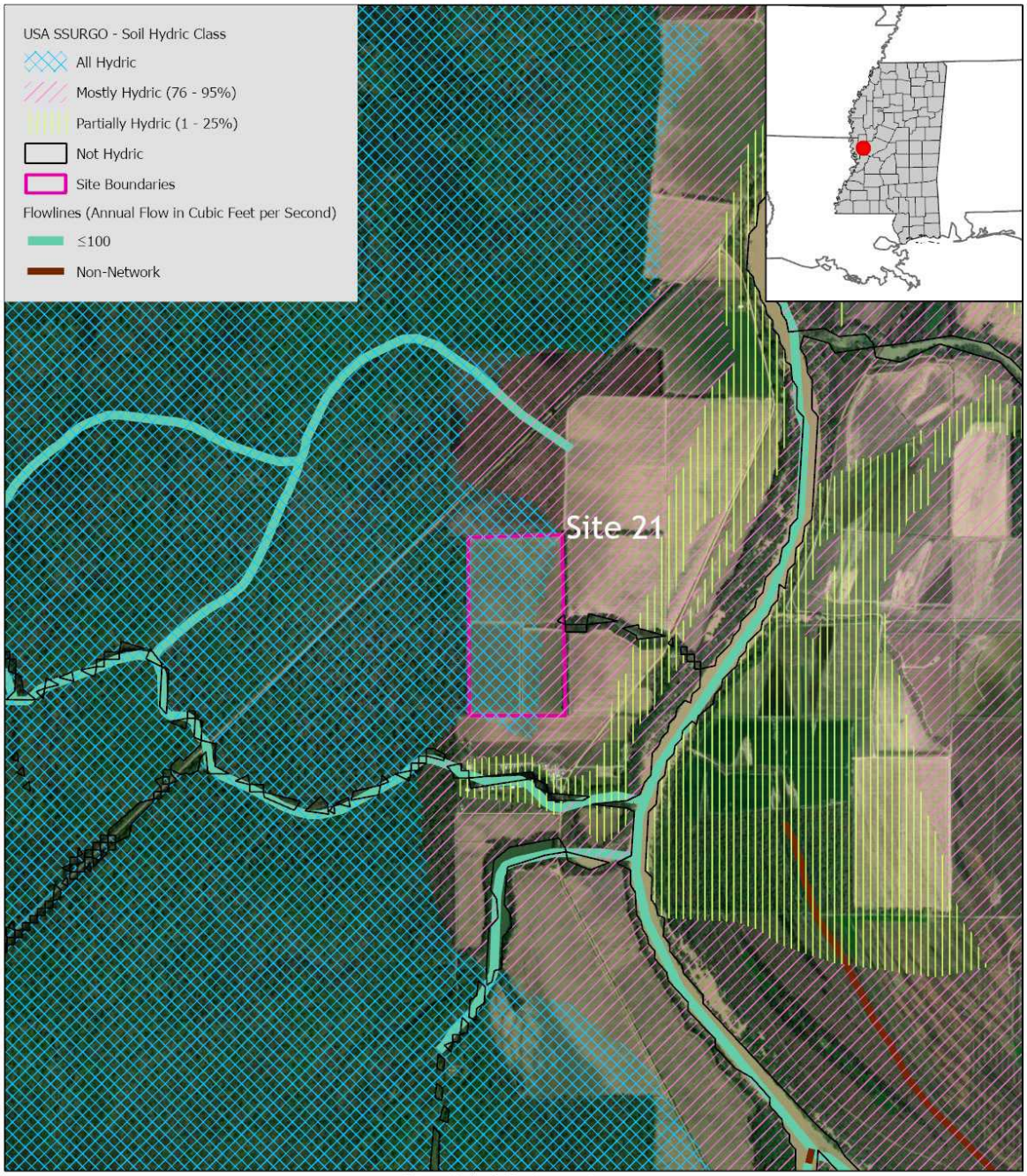
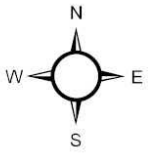


Site 21 (72 Acres)



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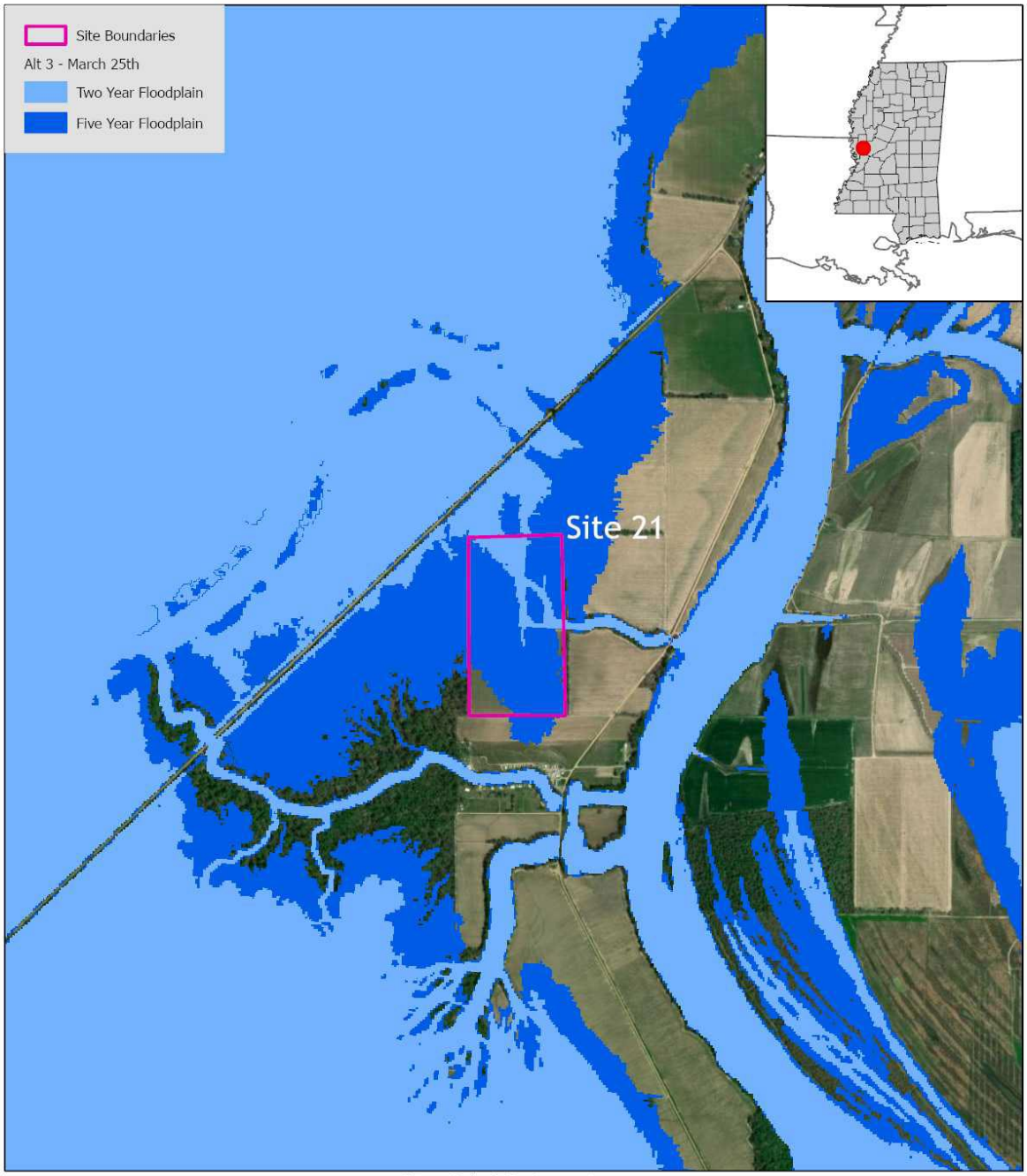

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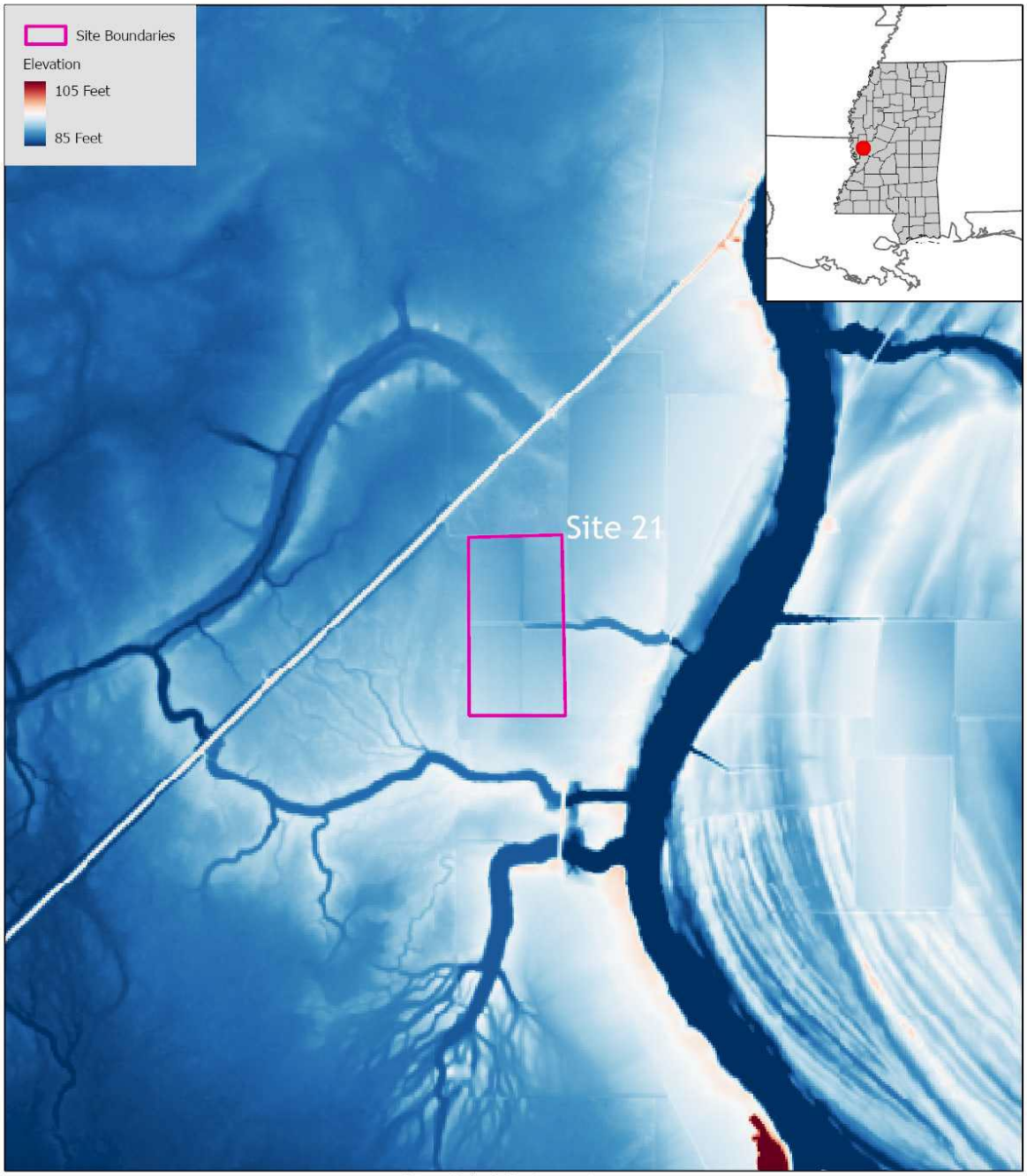

Site 21 (72 Acres)

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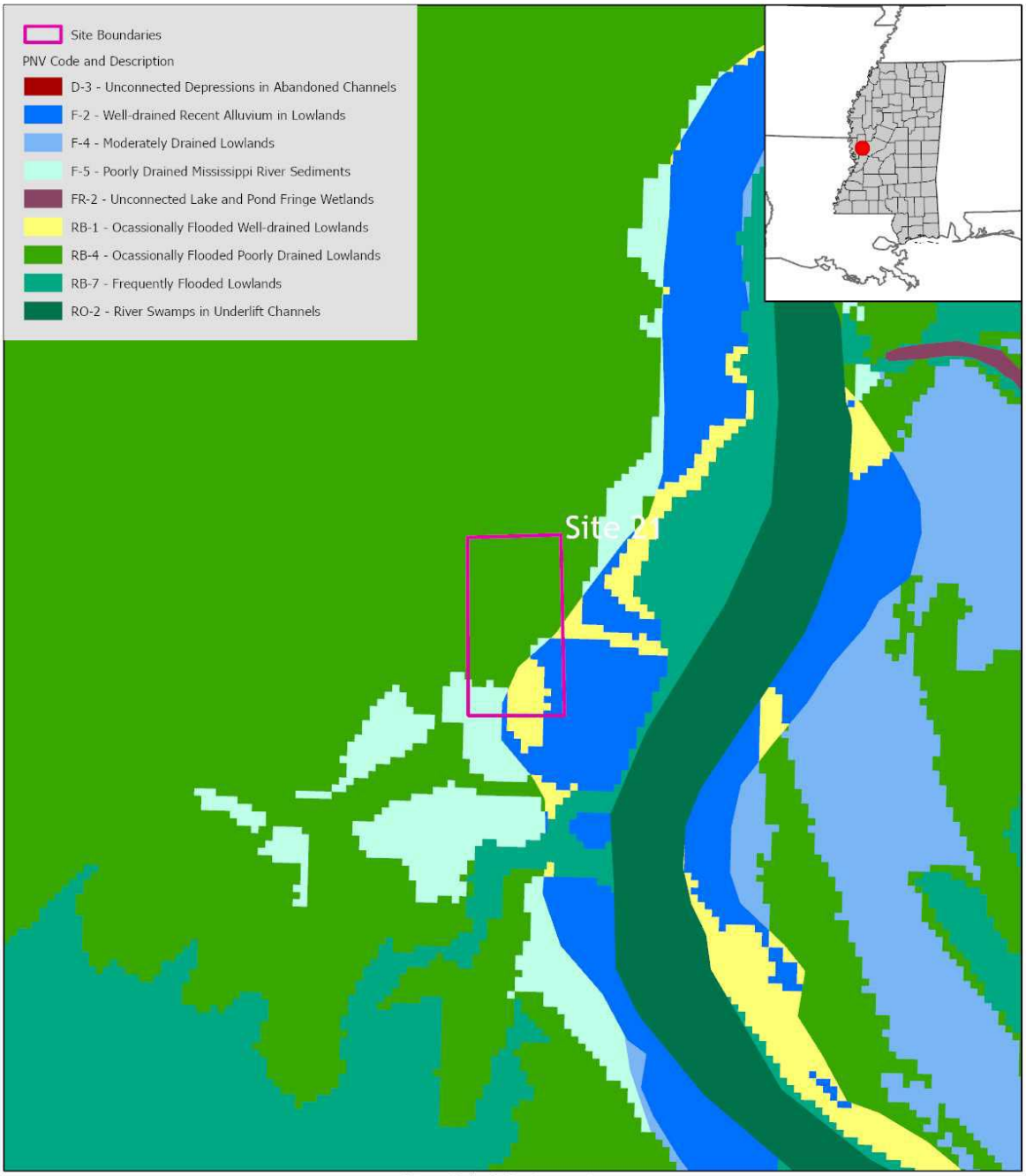
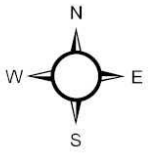


Site 21 (72 Acres)



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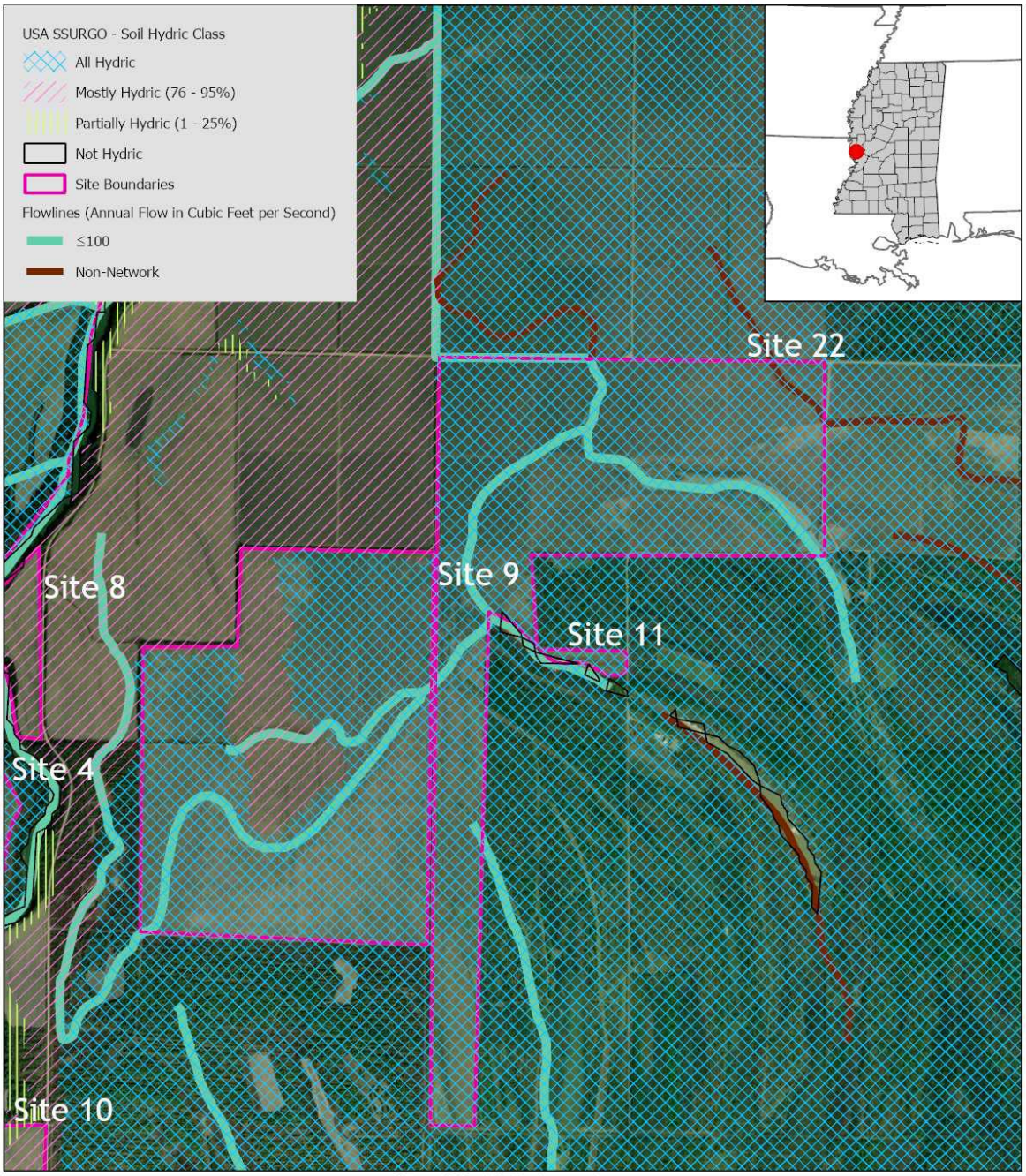
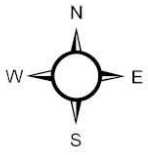


Site 22 (454 Acres)



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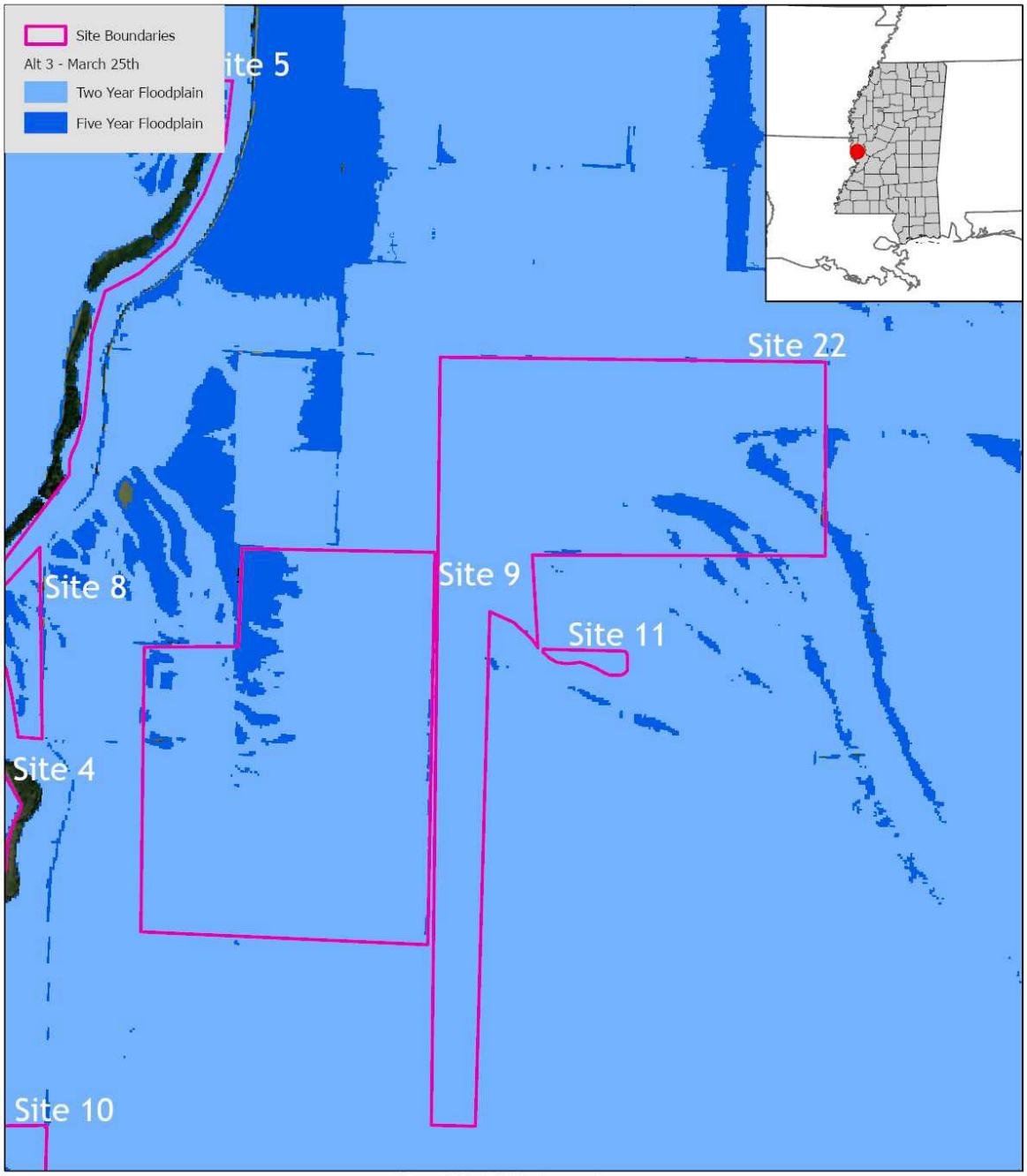

Site 22 (454 Acres)

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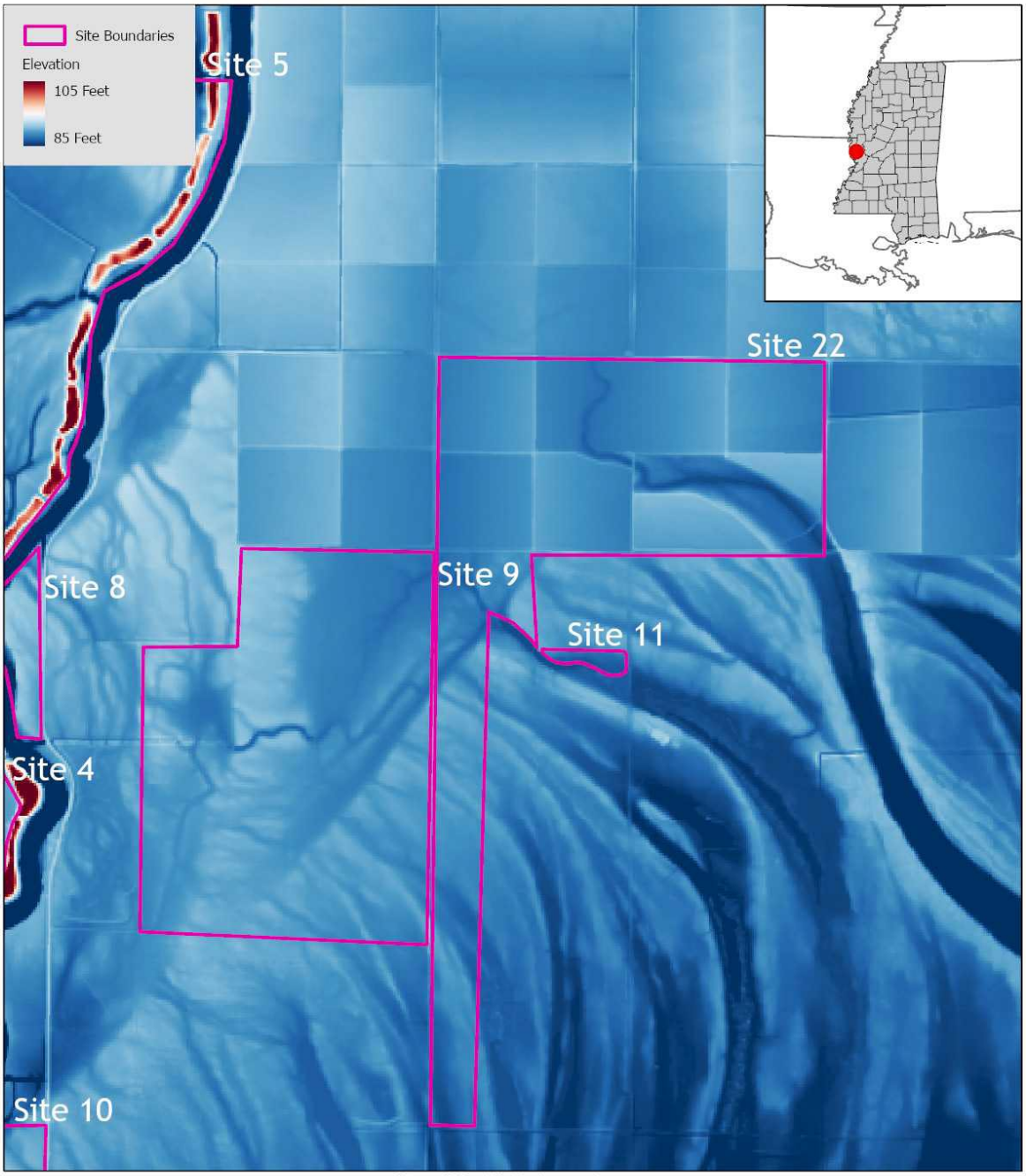

Site 22 (454 Acres)

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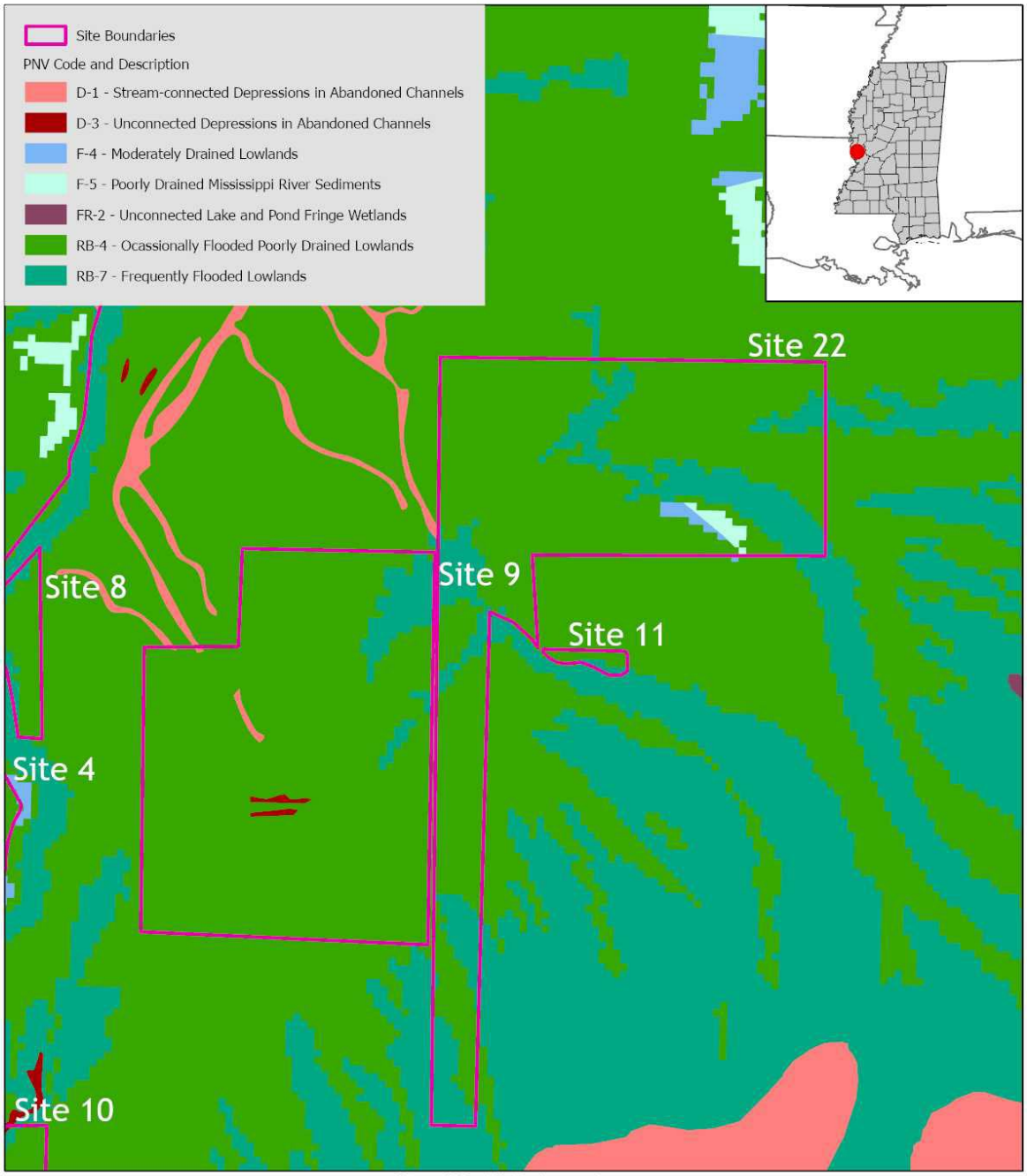
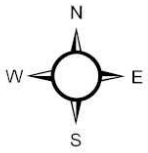


Site 22 (454 Acres)



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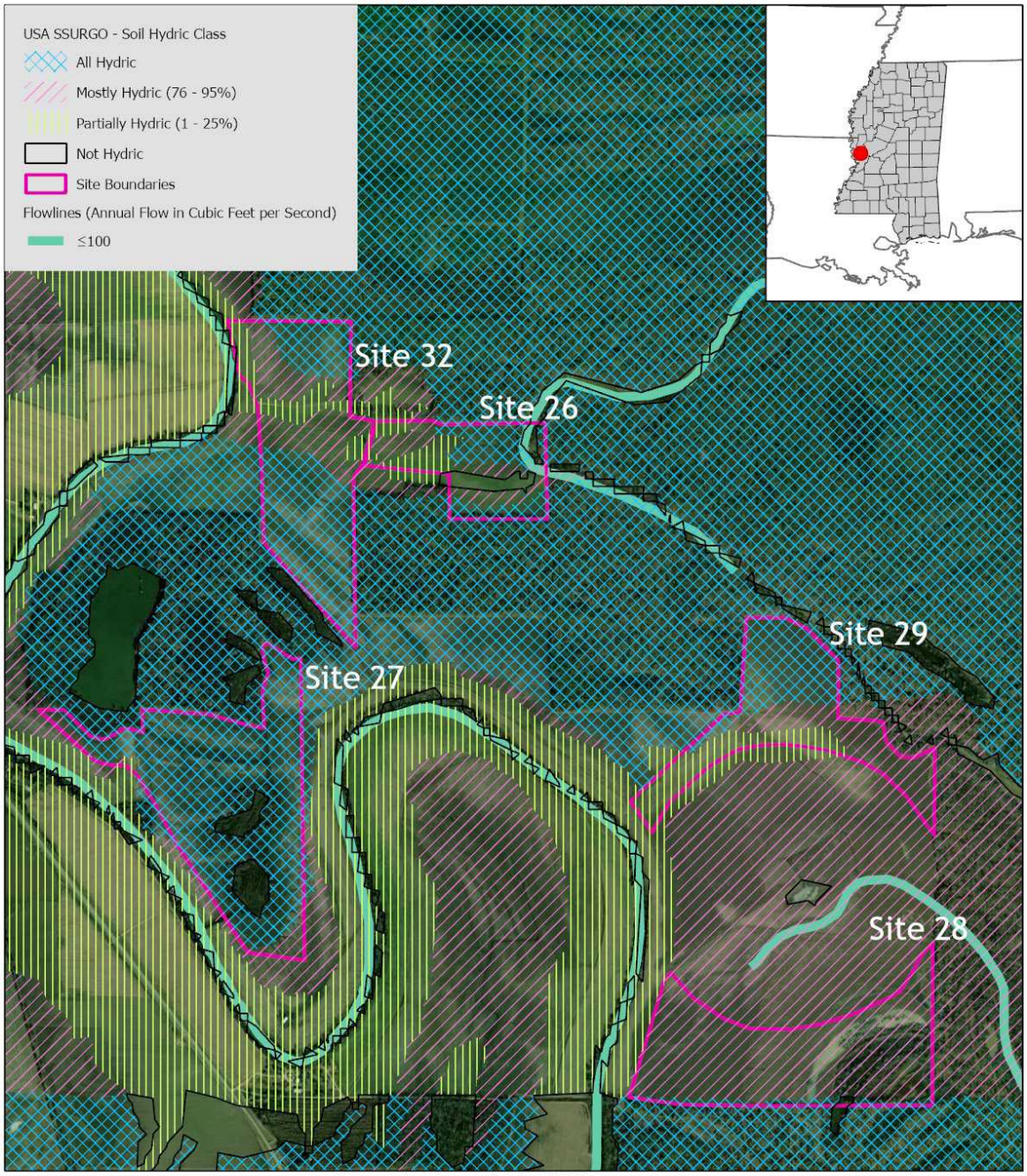

Site 26-29 and 32 (526 Acres)

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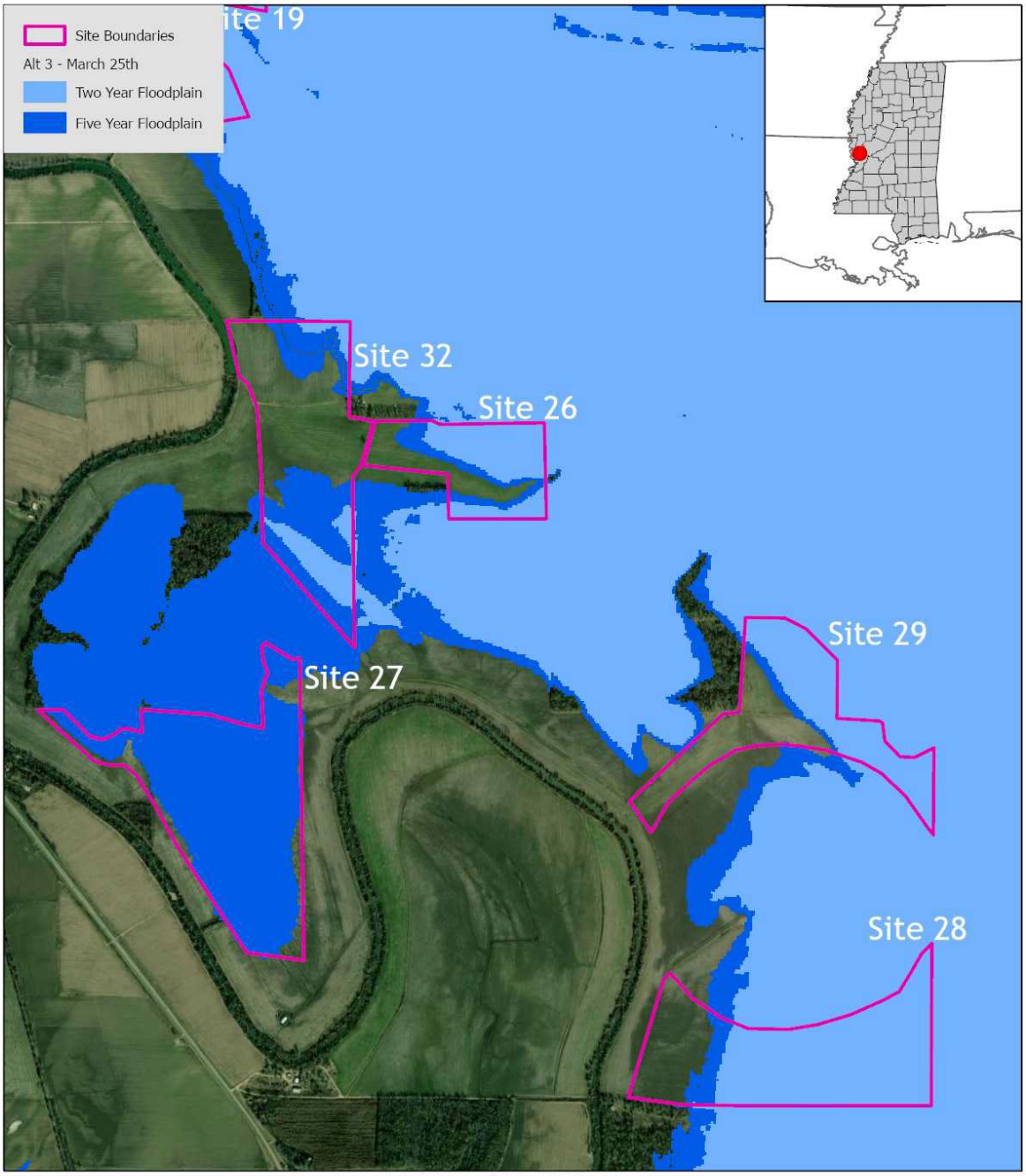

Site 26-29 and 32 (526 Acres)

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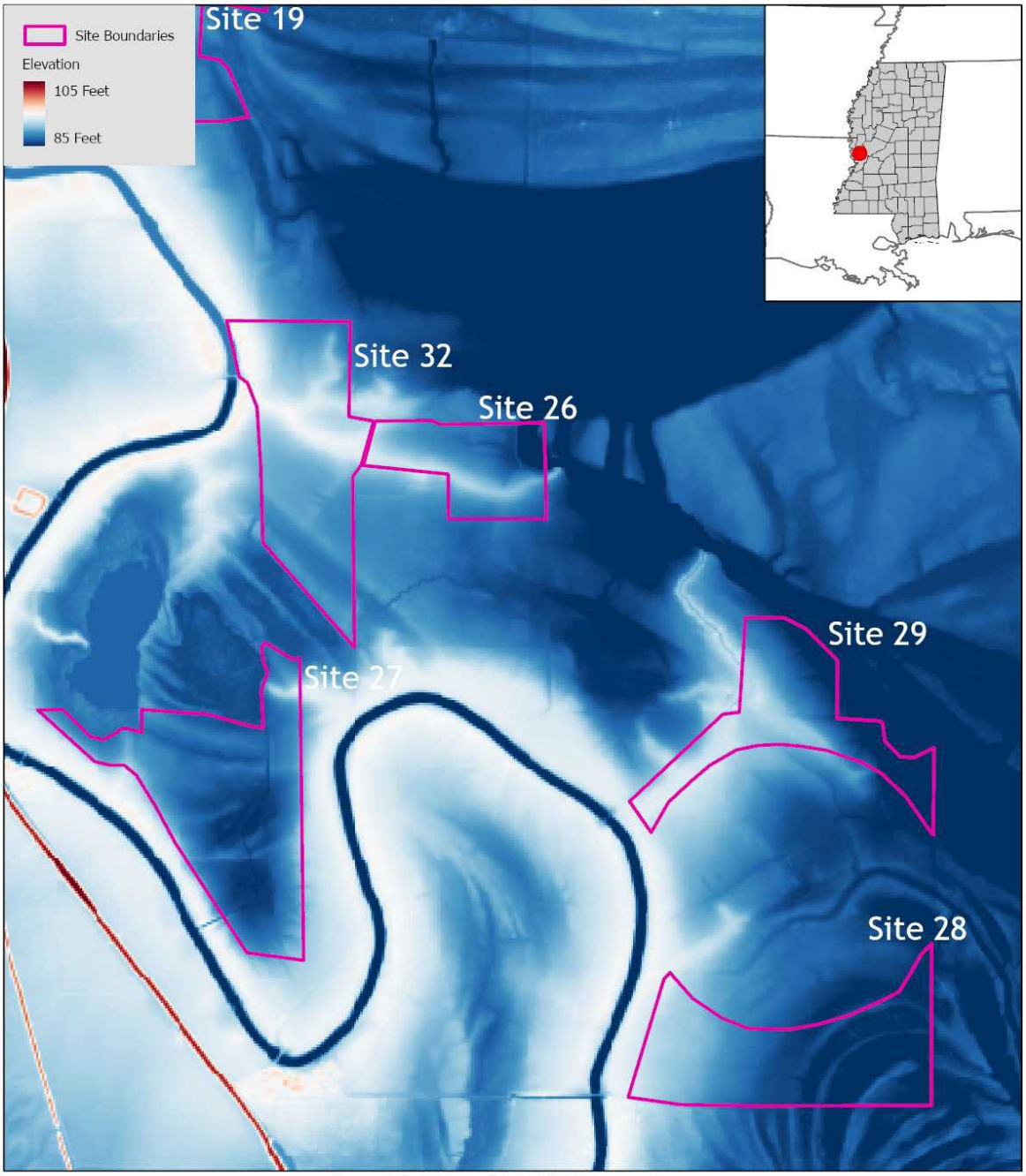

Site 26-29 and 32 (526 Acres)

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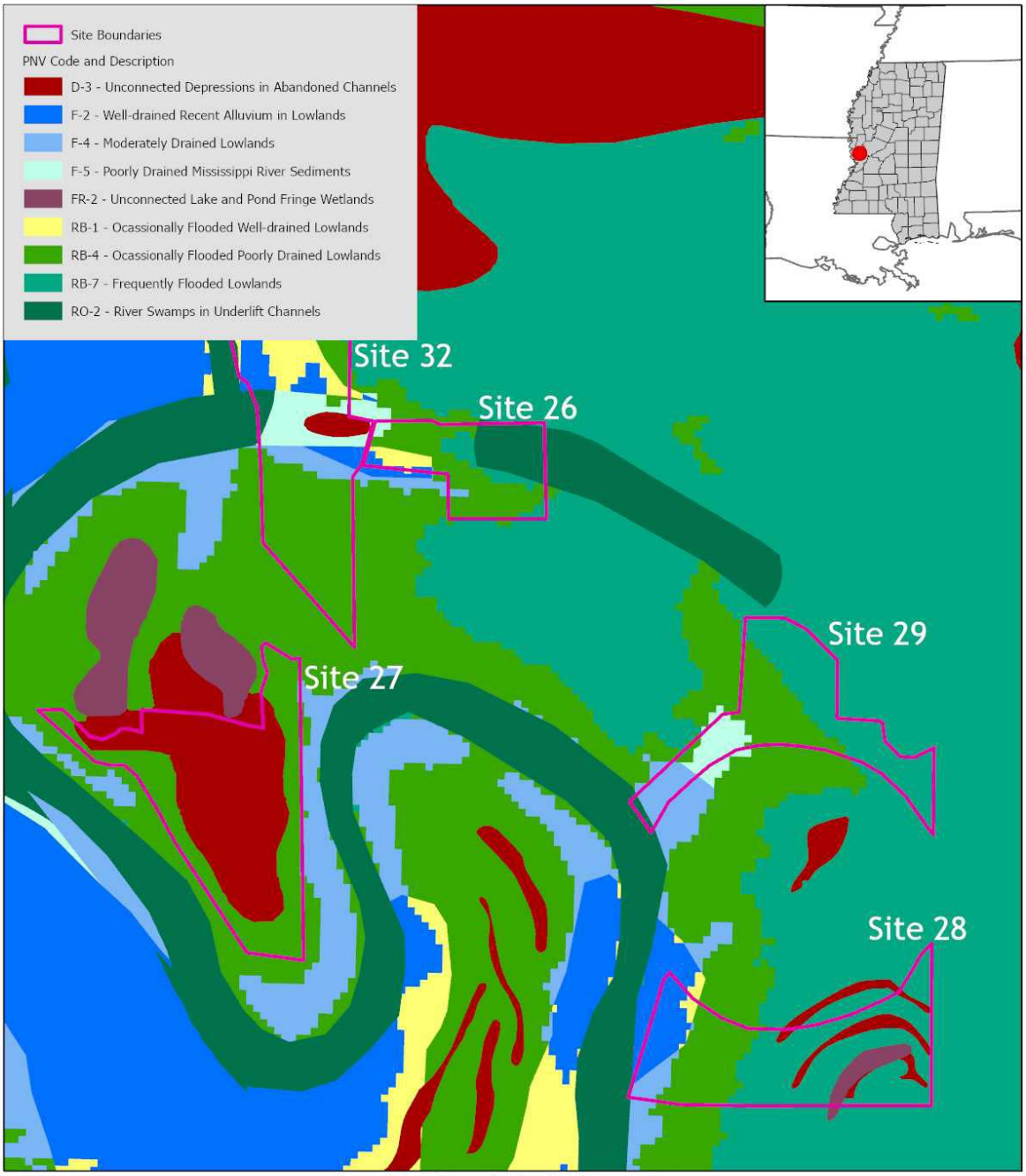

Site 26-29 and 32 (526 Acres)

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DUCKS UNLIMITED

19) Appendix F. Shorebird Habitat Project

The Sponsor proposes to implement a shorebird habitat project within the Mississippi Delta In-Lieu Fee Program service area. The objective of the project will be to provide ≥352 AAHUs of shorebird habitat during both the spring and fall critical migration periods. DU will use a similar landowner targeting process to that initiated for wetland site identification but will focus on agricultural lands with existing infrastructure. These lands will be located above the 5-year post Yazoo Backwater Area Water Management Project floodplain to ensure shorebird habitat is available annually.

DU will collaborate with local landowners to manage ≥403 acres of shorebird habitat through agreements to hold water at the most critical seasonal times to achieve a minimum of 352 AAHU's. DU will secure multi-year management agreements with farmers and hunt clubs that possess existing management infrastructure. In return for compensation, the agreements will require private landowners to hold water between Apr 15-Jun 15 and Jul 1 - Oct 15, focusing shorebird habitat during both spring and fall migration. Sites within the proposed shorebird habitat project will not have site protection instruments but will only be enrolled in annual or multi-year management agreements between the landowners and the Sponsor. The management plans will contain maps showing the specific lands to be included in the project and the HGM habitat classification of the fields and existing vegetation conditions. Field or remote sensing verified mapping of the individual sites and their performance will be used to determine the annual acreage included in the project for both the spring and fall migration periods.

Spring Migration: Farmers with existing management infrastructure will be incentivized to temporarily flood their properties to a level suitable for shorebirds from April 15th to June 15th. Shorebirds prefer water depths less than 10 centimeters and areas with less than 25% vegetation cover, making flooded agriculture a beneficial alternative to shallowly flooded freshwater wetlands (LMVJV Shorebird Plan 2019).

Fall Migration: Because farmers will have crops on in the fall that cannot be intentionally flooded, the focus will shift to partnering with hunt clubs, interested in assistance co-managing moist soil habitat in anticipation of waterfowl migration as a corollary benefit to shorebird habitat production. By leveraging existing infrastructure and ensuring practices provide appropriate co-benefits, habitat for shorebirds can be provided within active agricultural landscapes. Landowners will be incentivized to temporarily flood their properties to a level suitable for shorebirds from July 1st to October 15.

Implementation:

- DU will execute habitat management agreements with willing landowners with suitable properties and existing water management infrastructure to participate in seasonal water level management over the lifespan of the civil works project (50 years).
- The habitat management agreements will specify management practices to ensure shorebird habitat is available during both the spring and fall migration periods. These include both vegetation management and water levels management requirements.
    - In managed moist soil units, fine-tuned control of water levels can be achieved by shallow boards in a stop log structure. Flashboards that are 5 to 7.5 cm allow for more precise water level adjustments than the standard 10 cm flashboards. In managed moist soil units, dry fields should be shallowly flooded 10-15 cm for 2-3 weeks before fall migration, allowing invertebrates to proliferate newly created habitat. If units remained flooded through spring and early summer, slow drawdowns would make invertebrates available and concentrate prey for shorebirds. In agricultural fields, existing infrastructure in the form of irrigation, risers, and other types of water control structures (e.g., stop log, gates) can be used to create shallow water habitat. In the spring, many areas are naturally flooded or have been flooded through winter for waterfowl. A slow drawdown beginning in early April (for crops with a shorter growing season like soybeans) and retaining water through late May is recommended to ensure shallow water habitat is available during peak spring migration. (LMVJV Shorebird Plan 2019).
    - Land managers should consider temporal changes in site usability by shorebirds that is limited by the rapid colonization of emergent wetland plants in moist soil wetlands. Dense vegetation may be manipulated through practices like mowing, shallow disking, herbicide application, prescribed burning, and water level management to create foraging areas for shorebirds. Shallow disking is preferable for shorebird habitat so that plant biomass can be turned into detritus material for invertebrates. Vegetation should be manipulated before re-flooding in the spring and fall to ensure shorebird response. (LMVJV Shorebird Plan 2019).
- Management agreements will include annual incentive payments to landowners for implementing the projects.

Our strategy aligns with the Lower Mississippi Valley Joint Venture's Shorebird Plan (2019) which recognizes that Fall habitat is the most limiting factor for shorebirds in the Mississippi Alluvial Valley. The LMVJV Shorebird Plan also identifies shallowly flooded agricultural fields and moist soil wetlands as ideal habitat types for shorebirds. Site performance will be measured against the JV's plans recommendations of appropriate combination of water depth (<10 cm), vegetation cover (<25%), and timing that is crucial to meeting the needs of migrating shorebirds (LMVJV Shorebird Plan 2019).

Annual monitoring verification (field based and remote sensing) will provide quantitative assessment (extent and quality) of shorebird habitat on flooded agricultural fields and moist-soil impoundments. Following a similar protocol as the Gulf Coast Joint Venture, assessments may be conducted several times per year, during peak migration periods, Remote sensing assessments may include spectral indices derived from Landsat imagery, including the land-surface water index, the modified normalized water index, the enhanced normalized difference vegetation index, and the normalized difference built-up index to evaluate shorebird habitat (GCJV Waterfowl and Shorebird Habitat on Agricultural Lands 2017). Monitoring assessments will determine if habitat objectives are being met and ensure water level and vegetation management practices are implemented and inform adaptive management required (e.g., invasive species management / alterations to water level flooding, duration, timing). Findings will be compiled into an annual report. Long term management plans and financial assurances will not be implemented for this portion of the project.