In-Lieu Fee Program Prospectus for Indiana Stream & Wetland Mitigation Program

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Prepared for:

INDIANA DEPARTMENT OF NATURAL RESOURCES

AND

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DEFINITIONS

ADVANCE CREDITS- any credits of an approved in-lieu fee program that are available for sale prior to being fulfilled in accordance with an approved mitigation project plan (Mitigation Rule p. 19671 §332.2).

BUFFER- an upland, wetland, and/or riparian area that protects and/or enhances aquatic resource functions associated with wetlands, rivers, streams, lakes, marine, and estuarine systems from disturbances associated with adjacent land uses (Mitigation Rule p. 19671 §332.2).

COMPENSATORY MITIGATION- the restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved (Mitigation Rule p. 19671 §332.2).

COMPENSATORY MITIGATION PROJECT- compensatory mitigation implemented by an in-lieu fee program (Mitigation Rule p. 19671 §332.2).

CREDIT- a unit of measure (e.g., a functional or areal measure or other suitable metric) representing the accrual or attainment of aquatic functions at a compensatory mitigation site (Mitigation Rule p. 19671 §332.2).

ENHANCEMENT- the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area (Mitigation Rule p. 19671 §332.2).

ESTABLISHMENT- the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site which results in a gain in aquatic resource area and functions (Mitigation Rule p. 19671 §332.2).

FUNCTIONS- the physical, chemical, and biological processes that occur in ecosystems (Mitigation Rule p. 19671 §332.2).

IMPACT- adverse effect (Mitigation Rule p. 19671 §332.2).

IN-LIEU FEE PROGRAM- a program involving the restoration, establishment, enhancement, and/or preservation of aquatic resources through funds paid to a governmental or non-profit natural resources management entity to satisfy compensatory mitigation requirements for Corps permits. An in-lieu fee program sells compensatory mitigation credits to permittees whose obligation to provide compensatory mitigation is then transferred to the in-lieu program sponsor (Mitigation Rule p. 19671 §332.2).

IN-LIEU FEE PROGRAM INSTRUMENT- the legal document for the establishment, operation, and use of an in-lieu fee program (Mitigation Rule p. 19671 §332.2).

INTERAGENCY REVIEW TEAM (IRT)- an interagency group of federal, tribal, state, and/or local regulatory and resource agency representatives that reviews documentation for, and advises the district engineer on, the establishment and management of an in-lieu fee program (Mitigation Rule p. 19671 §332.2).

PERFORMANCE STANDARDS- observable or measurable physical (including hydrological), chemical and/or biological attributes that are used to determine if a compensatory mitigation project meets its objectives (Mitigation Rule p. 19672 §332.2).

PERMITTEE-RESPONSIBLE MITIGATION- an aquatic resource restoration, establishment, enhancement, and/or preservation activity undertaken by the permittee (or an authorized agent or contractor) to provide compensatory mitigation for which the permittee retains full responsibility (Mitigation Rule p. 19672 §332.2).

PRESERVATION- the removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions (Mitigation Rule p. 19672 §332.2).

RE-ESTABLISHMENT- the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions (Mitigation Rule p. 19672 §332.2).

REHABILITATION- the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area (Mitigation Rule p. 19672 §332.2).

RELEASE OF CREDITS- a determination by the district engineer, in consultation with the IRT, that credits associated with an approved mitigation plan are available for sale or transfer, or in the case of an in-lieu fee program, for fulfillment of advance credit sales. A proportion of projected credits for a specific mitigation bank or in-lieu fee project may be released upon approval of the mitigation plan, with additional credits released as milestones specified in the credit release schedule are achieved (Mitigation Rule p. 19672 §332.2).

RESTORATION- the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource.

For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation (Mitigation Rule p. 19672 §332.2).

RIPARIAN AREAS-lands adjacent to streams, rivers, lakes, and estuarine-marine shorelines. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality (Mitigation Rule p. 19672 §332.2).

STREAM RESTORATION- the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. (Mitigation Rule p. 19672 §332.2).

STREAM PLAN- the horizontal alignment of a channel; view is perpendicular to the Earth's surface.

STREAM PROFILE- the longitudinal profile of the stream showing the slope of the stream.

STREAM CROSS SECTION- the cross section of the stream, typically taken at pool and riffle stations along the stream profile.

SERVICE AREA- the geographic area within which impacts can be mitigated within through the in-lieu fee program, as designated in its instrument (Mitigation Rule p. 19672 §332.2).

SERVICES- the benefits that human populations receive from functions that occur in ecosystems (Mitigation Rule p. 19672 §332.2).

SPONSOR- any public or private entity responsible for establishing, and in most circumstances, operating an in-lieu fee program (Mitigation Rule p. 19672 §332.2).

WATERSHED- a land area that drains to a common waterway, such as a stream, lake, estuary, wetland, or ultimately the ocean (Mitigation Rule p. 19672 §332.2).

WATERSHED APPROACH- an analytical process for making compensatory mitigation decisions that support the sustainability or improvement of aquatic resources in a watershed. It involves consideration of watershed needs, and how locations and types of compensatory mitigation projects address those needs. A landscape perspective is used to identify the types and locations of compensatory mitigation projects that will benefit the watershed and offset losses of aquatic resource functions and services caused by activities authorized by Corps permits. The watershed approach may involve consideration of landscape scale, historic and potential aquatic resource conditions, past and projected aquatic resource impacts in the watershed, and terrestrial connections between aquatic resources when determining compensatory mitigation requirements for Corps permits (Mitigation Rule p. 19672 §332.2).

WATERSHED PLAN- a plan developed by federal, tribal, state, and/or local government agencies or appropriate non-governmental organizations, in consultation with relevant

stakeholders, for the specific goal of aquatic resource restoration, establishment, enhancement, and preservation. A watershed plan addresses aquatic resource conditions in the watershed, multiple stakeholder interests, and land uses. Watershed plans may also identify priority sites for aquatic resource restoration and protection. Examples of watershed plans include special area management plans, advance identification programs, and wetland management plans (Mitigation Rule p. 19672 §332.2).

WOUS- Waters of the United States.

INDIANA STREAM AND WETLAND MITIGATION PROGRAM PROSPECTUS

Indiana Department of Natural Resources (IDNR) is proposing to sponsor a statewide In-Lieu Fee (ILF) Program for the State of Indiana encompassing 11 Service Areas. The development of this program is being facilitated by a grant received by the Indiana Department of Transportation (INDOT) from the Federal Highway Administration (FHWA) to provide an additional alternative for wetland and stream mitigation within the State of Indiana.

GENERAL

The Indiana Stream and Wetland Mitigation Program (IN SWMP) will be used for compensatory mitigation for unavoidable impacts to waters of the United States and isolated wetlands in the State of Indiana. Permits are required by the U.S. Army Corps of Engineers (Corps) through Section 404 of the Clean Water Act (CWA) for the discharge of dredged or fill materials within "waters of the U.S.," through Section 10 of the Rivers and Harbors Act for structures or work in or affecting navigable waters of the U.S., and by the Indiana Department of Environmental Management (IDEM) under Section 401 Water Quality Certification of the CWA and Indiana's State Isolated Wetlands law (Indiana Code 13-18-22). The goal of these regulatory programs is to protect and restore the aquatic resources of the United States and the State of Indiana, while allowing reasonable development through fair, flexible, and balanced permit decisions. The regulations are intended to maintain the chemical, physical, and biological integrity of aquatic resources waters and to ensure no net loss of these resources. Compensatory mitigation is a requirement for authorized impacts to Indiana's wetlands and streams. All restored, established, enhanced or preserved aquatic resources on completed IN SWMP projects will be jurisdictional Section 404 aquatic resources.

This prospectus describes the IN SWMP's objectives, establishment, operation, service areas and need; the ownership and long term management of IN SWMP project sites; the IN SWMP account; and the qualifications of the sponsor, IDNR.

This document also contains a compensation planning framework, which will guide the selection and implementation of compensatory mitigation activities undertaken by the IN SWMP.

OBJECTIVES OF THE IN SWMP

The objectives for the IN SWMP are as follows:

- Provide an alternative to permittee-responsible compensatory mitigation that will effectively replace functions, values, and services lost through permitted direct and secondary impacts.

- Function as an option for resolution of enforcement cases of Section 401 and 404 of the CWA and Indiana's Isolated Wetland Permit requirements.
- Meet current and expected demand for mitigation credits.
- Achieve ecological success on a watershed basis by providing wetland and stream functions and values that are appropriate to the service area and by integrating IN SWMP projects with other conservation activities whenever possible.

ESTABLISHMENT AND OPERATION OF THE IN SWMP

Establishment

Inter-Agency Review Team

The Corps will form an Interagency Review Team (IRT) that will advise the Corps on the establishment and management of the IN SWMP. The IRT will be comprised of the Corps (Louisville District (Chair), Chicago District and Detroit District), US Environmental Protection Agency (USEPA), US Fish and Wildlife Service (USFWS), IDEM, US Department of Agriculture Natural Resource Conservation Service (NRCS), and representatives invited by the Corps from other federal, state, tribal, and local resources agencies that would have a substantive interest in the establishment and management of the IN SWMP sponsored by IDNR. The Corps may designate different representatives of the agencies listed above and may invite additional members to serve on the IRT for individual mitigation projects (Mitigation Rule p. 19680 §332.8(b)).

In-Lieu Fee Program Instrument

This prospectus initiates the process to develop an In-Lieu Fee Program Instrument for the IN SWMP. The Instrument will be the legal document for the establishment, operation, and use of the in-lieu fee program. The compensation planning framework will be a part of the instrument and will guide site selection to select projects that appropriately compensate for impacted aquatic resources. The Instrument and Compensation Planning Framework will be developed following the process outlined in Mitigation Rule p. 19681 §332.8(d). The Final Instrument will be approved by the District Engineer and IDEM in consultation with the IRT.

Program Account

The Indiana Natural Resources Foundation (INRF) will serve as the fiscal agent for the IN SWMP.

The INRF was founded in 1990 by legislation (I.C. 14-12-1) passed by the Indiana General Assembly to support the Indiana DNR programs and policies. The INRF is considered a quasi-governmental not-for-profit under Section 115 of the IRS Code and is subject to audit as if it were a state agency. The INRF is governed by a twelve member board appointed by the Governor; nine from each of the Congressional Districts and three at-large board members.

The INRF also acts as the fiscal agent for over 20 DNR programs including the Bicentennial Nature Trust. The Bicentennial Nature Trust is a land acquisition initiative launched in 2012. A $30 million dollar fund was created ($20 million provided by the State of Indiana and $10 million by the Lilly Endowment) to preserve and protect important conservation and recreation areas throughout Indiana by leveraging matching donations of land or dollars. The INRF holds the fund in a restricted account and provides funds as needed to fulfill the intent of the program. Serving as the fiscal agent for the Indiana Stream and Wetland Mitigation Program is a familiar role for the INRF and fits directly into its mission.

The INRF will open new accounts at an FDIC member financial institution upon approval of the IN SWMP and prior to the sale of any advance credits. These accounts will be used solely for the IN SWMP and will be tracked separately for each service area. Only funds specifically designated for IN SWMP will be deposited into or expended from these accounts. Any interest and earnings accruing to the program account will remain in that account exclusively for use by IN SWMP. IN SWMP expenses may include but are not limited to the administration of the program, project selection, design, acquisition, construction, monitoring and management of ILF projects (Mitigation Rule p. 19684 §332.8(i)). In addition to the required federal audit by District Engineer, per Indiana Code, monies in the accounts will be subject to state audit. Per I.C. 14-12-1-11 these funds will remain in the account at the end of a state fiscal year and will not revert to any other fund.

Operation

Advance Credits

The number of advance credits available for each service area will be proposed in the draft program instrument (Mitigation Rule p. 19682 §332.8(d)(6)(iv)(B)).

Upon approval of the IN SWMP, IDNR will be permitted to sell advance credits. Once IDNR has sold all the advance credits, no more advance credits may be sold until they have been fulfilled by an equivalent number of credits released in accordance with the approved credit release schedule outlined in an IN SWMP project specific mitigation plan. Once advance credits are fulfilled they are again available for sale.

Sold advanced credits will be fulfilled with released credits when milestones and performance standards specified in an IN SWMP project specific mitigation plan are achieved. Credit production and performance goal achievements will be detailed in IN SWMP project specific mitigation plans which are approved by the DE in consultation with the IRT. Credit release schedules may vary by project specific monitoring period timelines and will vary between restoration, establishment, enhancement and preservation.

IDNR will complete land protection and initial physical and biological improvements for an IN SWMP project in a service area by the end of the third full growing season after the sale of the first advance credit in a service area. If IDNR fails to meet this deadline, the DE must either make a determination that more time is needed to plan and implement an in-lieu fee project or direct IDNR to disperse funds from the IN SWMP program account to provide alternative compensatory mitigation to fulfill those compensation obligations.

Advance Credit Fees

The fee schedule for advance credits will be proposed in the draft program instrument (Mitigation Rule p. 19682 §332.8(d)(6)(iv)(B)).

Fees for the IN SWMP will be determined solely by IDNR and will be adjusted at their discretion to match current and projected costs. They will be based on a full cost accounting analysis of the expected costs associated with the restoration, establishment, enhancement, and/or preservation of aquatic resources in the service areas described in this prospectus. Some of the program costs in this analysis include land acquisition, project planning and design, construction, plant materials, labor, legal fees, monitoring, adaptive management measures, program implementation, contingency costs over the life of the project, establishment of a long-term management and protection fund, financial assurances, and an administrative fee.

Program Accounting

The Sponsor will maintain detailed records of all financial transactions, permits of projects that utilized the IN SWMP, credit transactions, and other information required by the DE. The financial transaction ledger will include all income received, disbursements, and interest earned by the program account. The permit ledger will include a list of all permits for which ILF program funds were accepted including the following data: Corps permit number, IDEM permit number, service area of authorized impacts, amount of authorized impacts, type of authorized impacts, amount of required compensatory mitigation, amount paid to the IN SWMP, and the date the funds were received from the permittee. A ledger of program expenditures will be maintained and will include: costs of land acquisition, planning, construction, monitoring, maintenance, contingencies, adaptive management, long term stewardship, long term maintenance, and administration. The credit ledger will include: authorized advance credits, advance credits sold, advance credits fulfilled, credits released, released credits sold, and credits available [Mitigation Rule p. 19684 §332.8(i)(3)]. Detailed annual reports of the IN SWMP program accounting will be submitted to the Corps and IRT.

IN SWMP Project Approval

Each IN SWMP project will be reviewed by the DE in consultation with the IRT and added through amendment to the IN SWMP instrument. Project specific mitigation plans will be developed and implemented in accordance with Mitigation Rule p. 19670-19687 §332 and in consultation with the IRT. Project specific mitigation plans will include a ledger connecting the mitigation credits to the permits that provided funding to the program. Project specific mitigation plans will include the following elements:

1. Project objectives
2. Site selection factors
3. Site protection instrument
4. Baseline information
5. Determination of credits
6. Mitigation work plan
7. Maintenance plan
8. Performance standards
9. Monitoring requirements
10. Long-term management plan
11. Adaptive management plan
12. Financial Assurances
13. Other Information required by the DE

Wetland and stream delineations and functional assessments will be completed using Corps-approved techniques before and after project implementation to help guide mitigation plan development and evaluate success. IDNR will be responsible for the implementation of project specific mitigation plans under the IN SWMP, whether performed by IDNR staff or others and report to the Corps and the IRT on the work conducted programmatically. Legal responsibility for providing the compensatory mitigation lies with the IDNR as the program sponsor once a permittee secures credits from the IN SWMP. Monitoring reports will be submitted to the Corps and IRT as required by each project specific mitigation plan.

SERVICE AREAS

The IN SWMP will operate in 11 service areas listed below (Figure 1). The 8-digit hydrologic unit code (HUC) was used as the basic unit for constructing the service areas. Two of these service areas are sized at an 8-digit HUC scale; the remaining service areas were configured by combining multiple 8-digit HUC watersheds. The following service areas were chosen based on a combination of watershed boundaries and the likelihood of future wetland and stream impacts and potential mitigation opportunities. Ecoregions were considered, but used as a secondary priority in determining service area boundaries as most ecoregion boundaries do not match up with watershed boundaries. Maps have been included that show the service areas overlaid on the 8-digit HUCs (Figure 2), Level III Ecoregions (Figure 3), Corps District Boundaries (Figure 4), and the Indiana County Map (Figure 5).

1. Calumet-Dunes (HUCs 04040001, 07120003)
2. Kankakee (HUCs 0712001, 0712002)
3. St. Joseph River (Lake Michigan, HUC 0405001)
4. Maumee (HUCs 04010003, 04010004, 04010005, 04010007)

5. Upper Wabash (HUCs 05120101, 05120102, 05120103, 05120104, 05120105, 05120106, 05120107)
6. Middle Wabash (HUCs 05120108, 05120109, 05120110, 05120111, 05120113, 05120203)
7. Upper White (HUC 05120201)
8. Whitewater-East Fork White (HUCs 05080001, 05080002, 05080003, 05120204, 05120205, 05120206, 05120207)
9. Lower White (HUCs 05120202, 05120208, 05120209)
10. Upper Ohio (HUCs 05090203, 05140104, 05140101)
11. Ohio-Wabash Lowlands (HUCs 05120113, 05140201, 05140202)

The IDNR will provide mitigation credits for aquatic resource loss within the service areas by completing projects in the same service area where the impact occurred. Mitigation credits for a given service area may be fulfilled in an adjacent service area if ecologically preferable mitigation is unavailable within the service area and authorization is granted by the DE in consultation with the IRT. The Compensation Planning Framework (CPF) will guide IN SWMP project selection, plan development, and implementation.

STATEMENT OF NEED

The majority of the State of Indiana only has Permittee-Responsible Mitigation (PRM) available. The addition of an ILF program to the State of Indiana will provide an additional mitigation option and reduce the regulatory burden on the public. Federal regulations recognize that ILF programs are an environmentally preferable option over PRM based on several factors. ILF program projects target larger, more ecologically valuable parcels that have been prioritized on a landscape or watershed scale. ILF programs include thorough scientific analysis, planning, implementation and monitoring for each project. The structure of an ILF program facilitates site selection, mitigation plan development, and provides for rigorous scientific and technical analysis, and financial assurances which translates to reduction of project success uncertainty [Mitigation Rule p. 19672-3 §332.3 (a) (1)].

Numerous studies have shown that many past compensatory mitigation projects throughout the U.S. had sub-optimal outcomes and a high rate of failure. Many past mitigation projects either fell short of or failed to meet performance standards and had significant information gaps regarding conservation goals, planning considerations, design features and monitoring data (Wilkinson and Thomas 2005; Minkin and Ladd 2003; NRC 2001; Kusler and Kentula 1990). Mitigation failure rates and poor outcomes were linked to several specific issues that can be addressed by developing an ILF program that incorporates landscape and watershed planning, well-defined project goals and success criteria, baseline data, proven site selection criteria and restoration techniques, and effective monitoring and management plans as required by the 2008 Federal Compensatory Mitigation Rule.

IDNR obtained 2006 – 2011 aquatic resources impact data from the Corps (Section 10 and Section 404) and IDEM (Section 401 and the Isolated Wetland Program) regulatory programs. This data was analyzed and used to guide the development of the proposed statewide IN SWMP service areas (Figure 6). The data analysis consisted of importing point and shape files into GIS and clipping the data by service area. The attributes of the data were exported to excel where duplicate entries were deleted. The amount of historic compensatory mitigation demand in each service area indicates that the proposed service areas should be economically feasible (Table 1). Table 1 represents a summation of the data analysis. IDNR recognizes that this data may be incomplete and mitigation requirements may be duplicated between IDEM and the Corps.

Table 1: Mitigation required based on IDEM (Section 401 and Isolated Wetlands Program) and Corps (Section 10 and Section 404) Permits, 2006-2011.

Proposed Service Area (SA)	No. Permits		Mitigation Acres		Mitigation Linear Feet	
	IDEM	Corps	IDEM	Corps	IDEM	Corps
Calumet-Dunes	58	25	111	111	9720	16568
Kankakee	53	15	30	208	13901	11754
St. Joseph River	34	10	31	12	7878	2270
Maumee	41	25	44	54	23951	10077
Upper Wabash	37	35	73	62	21427	33160
Middle Wabash	55	21	125	112	22618	119860
Upper White	161	46	256	102	52052	30320
Whitewater-East Fork White	42	13	114	29	21591	8667
Lower White	84	54	6930	309	585123	291491
Upper Ohio	34	14	43	49	14359	7580
Ohio-Wabash Lowlands	65	35	138	482	94727	317774

INDOT has provided IDNR with its current estimate of projected aquatic resource impacts from anticipated major projects and routine projects. The data for the routine projects are shown in Table 2. The anticipated impacts of these routine projects are distributed statewide across the INDOT districts, indicating a base credit demand that is anticipated to be present in each proposed service area. The anticipated major project is Section 6 of the I-69 project, which will have impacts across districts. The anticipated impacts from this major project and those shown in Table 2 will be used during development of the Instrument as a factor in the allocation of advance credits for each of the service areas.

Table 2: INDOT Estimated Impacts by CY of Credit Purchase

	2015		2016		2017		2018		2019	
	Stream lf	Wetland ac	Stream lf	Wetland ac	Stream lf	Wetland ac	Stream lf	Wetland ac	Stream lf	Wetland ac
LaPorte District		1	1000	1	1000	1	1000	1.5	2500	1.5
Ft Wayne District			500		500		500		500	
Greenfield District	1000	12	1000	1	1000	3	1000	1.5	1500	1.5
Crawfordsville District	1500	15	500	1	500	1	500	1	500	1
Seymour District	500	10	500	1	500	1	500	1	500	1
Vincennes District	2500	12	1800	7	1000	1	1000	1.5	1500	1.5
Total	**5500**	**50**	**5300**	**11**	**4500**	**7**	**4500**	**6.5**	**7000**	**6.5**

OWNERSHIP AND LONG TERM MANAGEMENT OF IN SWMP PROJECT SITES

IDNR shall be responsible for developing and implementing a long-term protection and management plan for each IN SWMP project. The primary focus of the program is to replace lost functions and values of permitted wetland and stream impacts. Additional benefits such as connectivity of habitat, cumulative improvements to watershed health, and non-destructive public use may be realized by locating projects on or adjacent to existing publicly owned property or securing property for inclusion to the public trust. Projects shall be protected with a real estate instrument approved by the DE in consultation with the IRT that meets the requirements of Mitigation Rule p. 19679 §332.7(a) prior to the release of credits.

IN SWMP projects will be designed, to the maximum extent practicable, to require minimal long-term management once performance standards have been achieved. The long-term management plan for each IN SWMP project will be approved by the DE in consultation with the IRT. The approved plan shall identify the responsible party for long-term management of the project. The long-term management responsibilities may be transferred from the Sponsor to another party after review and approval of the DE in consultation with the IRT. The long-term management plan developed for each IN SWMP project will include a description of anticipated management needs with annual cost estimates and an identified funding mechanism. The final long-term management plan and its funding mechanism shall be in place prior to the final release of credits.

Upon achieving its performance standards, IDNR will request that the Corps issue written "closure certification," documentation stating that the project has been released from additional monitoring, and the Corps has closed the project file.

QUALIFICATIONS OF SPONSOR

Indiana Department of Natural Resources

The mission of the IDNR is to protect, enhance, preserve, and wisely use natural, cultural, and recreational resources for the benefit of Indiana's citizens through professional leadership, management, and education.

To satisfy such a broad and diverse responsibility, the Department is divided into two distinct areas of responsibility: the Regulatory Management Bureau and the Land Management Bureau. The Land Management Bureau consists of the land holding divisions of IDNR including: State Parks and Reservoirs; Nature Preserves; Land Acquisition; Fish and Wildlife; Outdoor Recreation; and Forestry. Combined these divisions own and/or manage over 500,000 acres of land across the State of Indiana. This includes 33 state park and/or reservoir properties, 14 state forests, 25 fish and wildlife areas, 250 nature preserves, 3 state recreation areas, and 12 state museum and historic sites.

The properties owned and managed by the IDNR include important wetland and stream resources for the State of Indiana, particularly within the dedicated state nature preserve system of protected lands. This nature preserve system includes acres owned and managed by divisions throughout IDNR.

The Indiana Department of Natural Resources has a long history of managing natural area enhancement and restoration at many scales, from very small to very large. This includes site selection, planning, design, implementation, stewardship, and monitoring of restoration and enhancement of an array of natural habitats at all positions in the landscape.

The Department has a deep reservoir of experience and success in working within interagency-public-private partnerships including NGO’s and the land trust community. This includes a lengthy history of complex land acquisitions. The Department has also demonstrated large capacity in operations that includes specifying, bidding, and completion of contracts with firms of many professions, including local, regional, and international environmental consultants.

The Indiana Department of Natural Resources has direct and pertinent expertise in administering and locating high conservation value restoration and enhancement projects for compensatory mitigation. These projects include mitigation for wetland and stream impacts and restoration required under settlements for contaminant releases. The following projects are two examples that have been implemented on both newly acquired land, and existing protected lands.

1. **Prophetstown State Park, Tippecanoe County**

   In 2010 IDNR and INDOT formed a partnership to complete a landscape scale wetland and stream restoration as mitigation for impacts associated with Indiana SR25 improvements.

   This project involved the reconstruction of a historic stream and wetland complex consisting of 7 mitigation zones and 18 subzones. An inter-agency workgroup led by IDNR and INDOT was formed to guide the process. The work group selected a consultant, oversaw the mitigation plan development, restoration design, construction document development, contractor selection and oversaw the initial restoration work. The work group is now managing the monitoring and adaptive management.

   The project included restoration of the Wabash River riparian zone including bank stabilization and riparian corridor restoration, establishment of ephemeral stream channels, forested wetland restoration, sedge meadow restoration, emergent marsh restoration and upland buffer establishment. In total approximately 94 acres of streams, riparian areas, wetlands and upland buffers were restored.

   In addition, in 2008 IDNR and INDOT partnered to provide mitigation for impacts associated with Indiana SR43. This project restored 18 acres of prairie fen and sedge meadow wetlands. IDNR staff performed the site selection and groundwater hydrology restoration. IDNR staff developed the plans and specifications for the vegetative restoration and managed the restoration contractor. The restoration work was completed in 2010 and IDNR is continuing to monitor and provide adaptive management.

2. **Burr Oak Bend, Hamilton County**

   In 2002, IDNR partnered with the Central Indiana Land Trust, Inc. (CILTI) to restore 53 acres of forested wetlands as compensatory mitigation for impacts to the White River through the Guide Corporation NRDA settlement.

   The CILTI acquired the marginal croplands, which were prone to flooding and resulting low yields and granted IDNR a conservation easement on the project site. IDNR nature preserve biologists developed the restoration plan approved by the Trustee Council, and oversaw the restoration work performed by contractors and volunteers. Monitoring and stewardship of the project site is conducted by CILTI staff with assistance of IDNR.

The IDNR has a staff of over 1200 employees agency-wide spread out across the state that range from regional ecologists and botanists in the Division of Nature Preserves, to engineers in the Divisions of Engineering and Water, to laborers and operators of heavy construction equipment, to land acquisition, grants, budget and accounting staff in the central office in Indianapolis.

The mission, vision, and staff of the IDNR ensure that as the program sponsor, IDNR is qualified and capable of delivering the IN SWMP effectively and efficiently.

COMPENSATION PLANNING FRAMEWORK

The Compensation Planning Framework is attached as Appendix A to this document and details the approach and prioritization for mitigation projects within each service area as well as the historic loss and current status of aquatic resources in the State of Indiana. The Compensation Planning Framework will be used to guide site selection for mitigation projects.

FIGURES

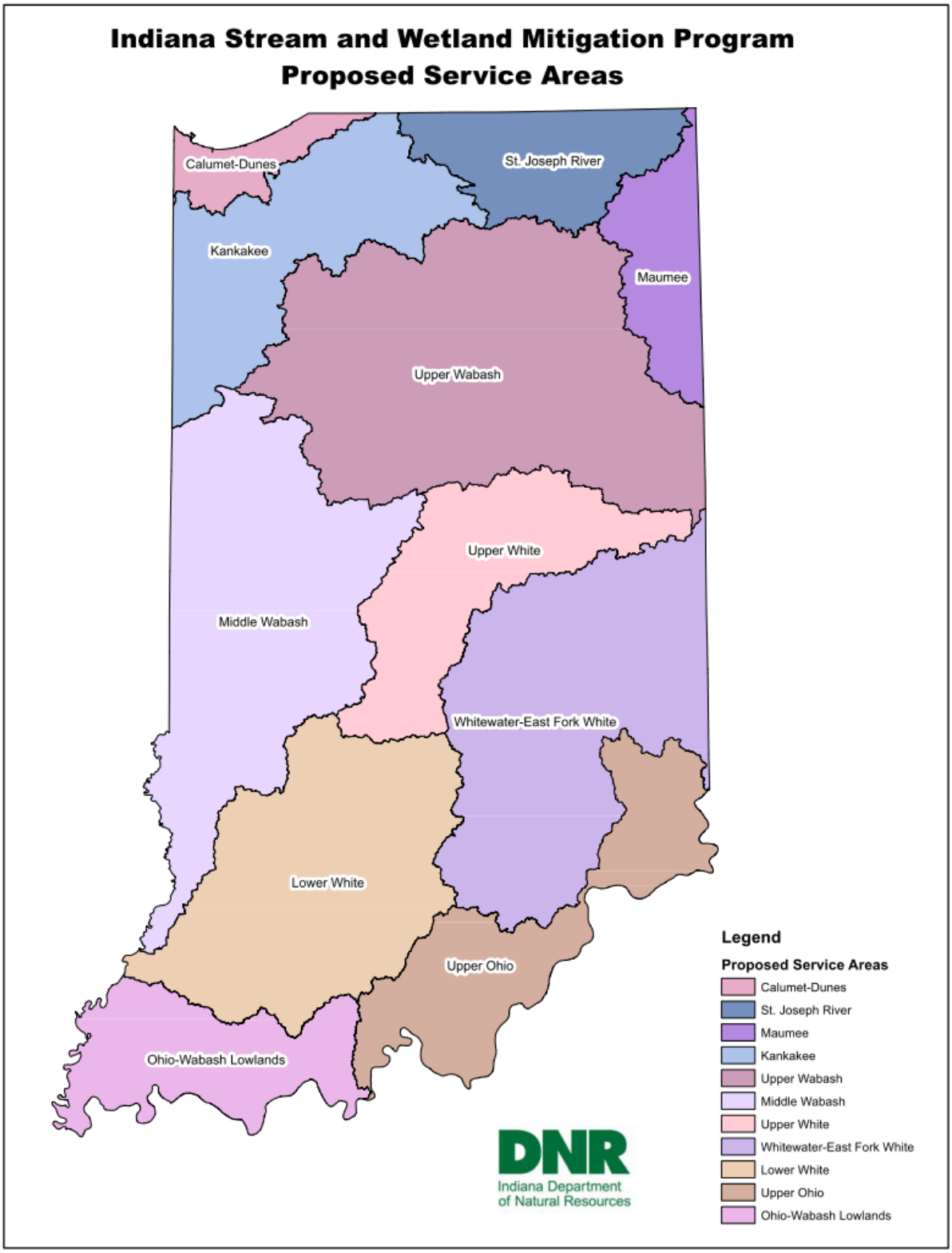

Figure 1: IN SWMP service areas.

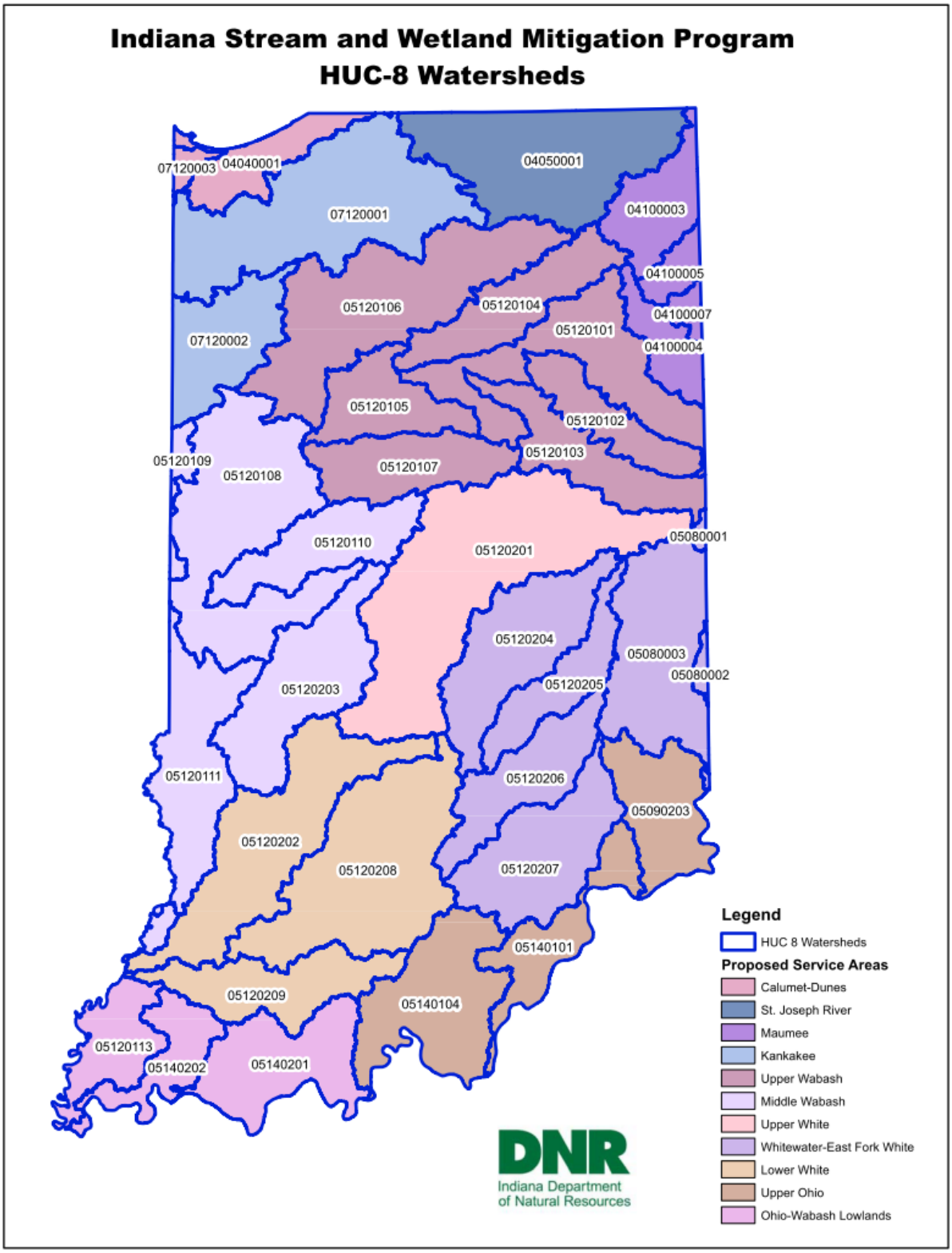

Figure 2: Indiana HUC-8 Watersheds.

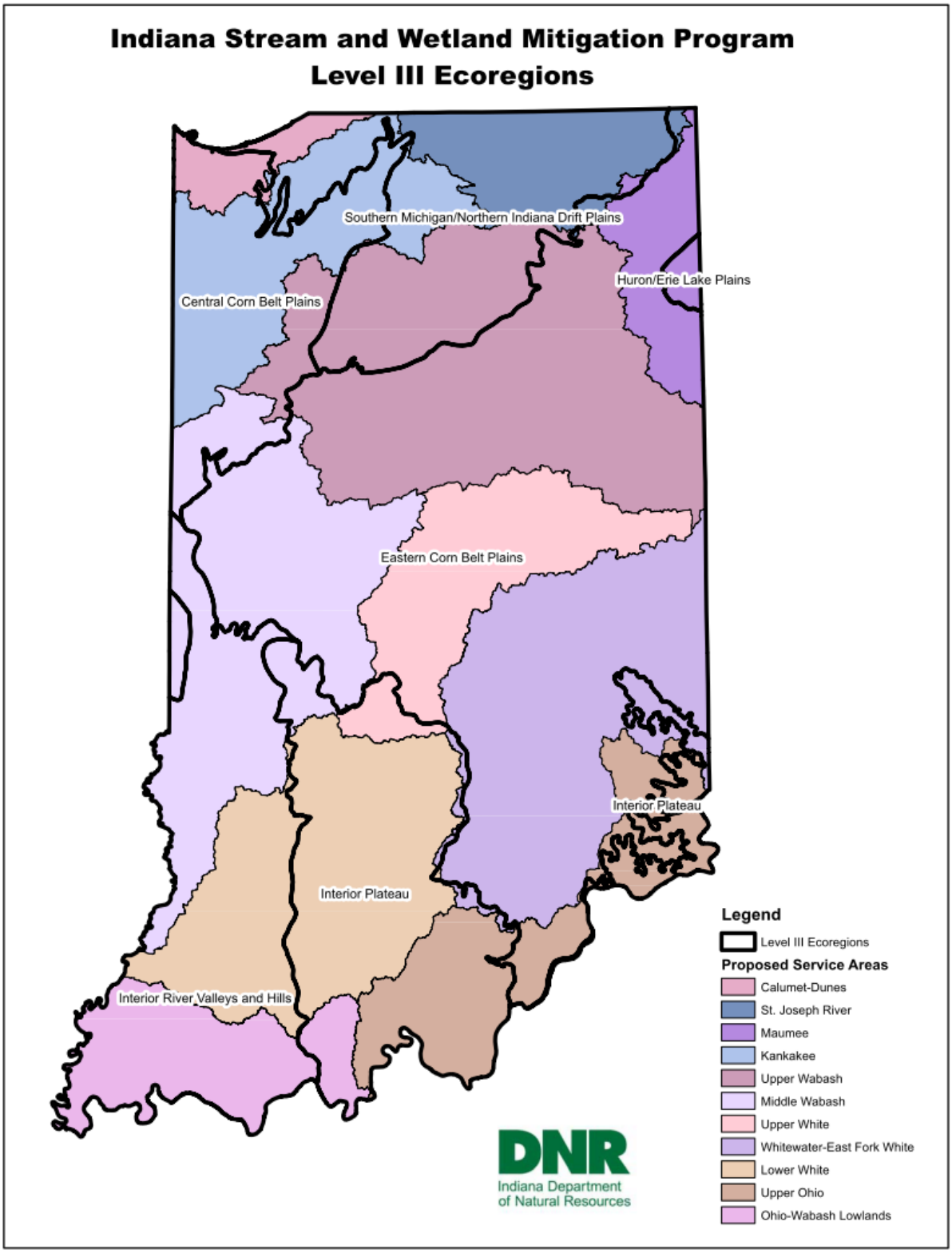

Figure 3: Indiana Level III Ecoregions.

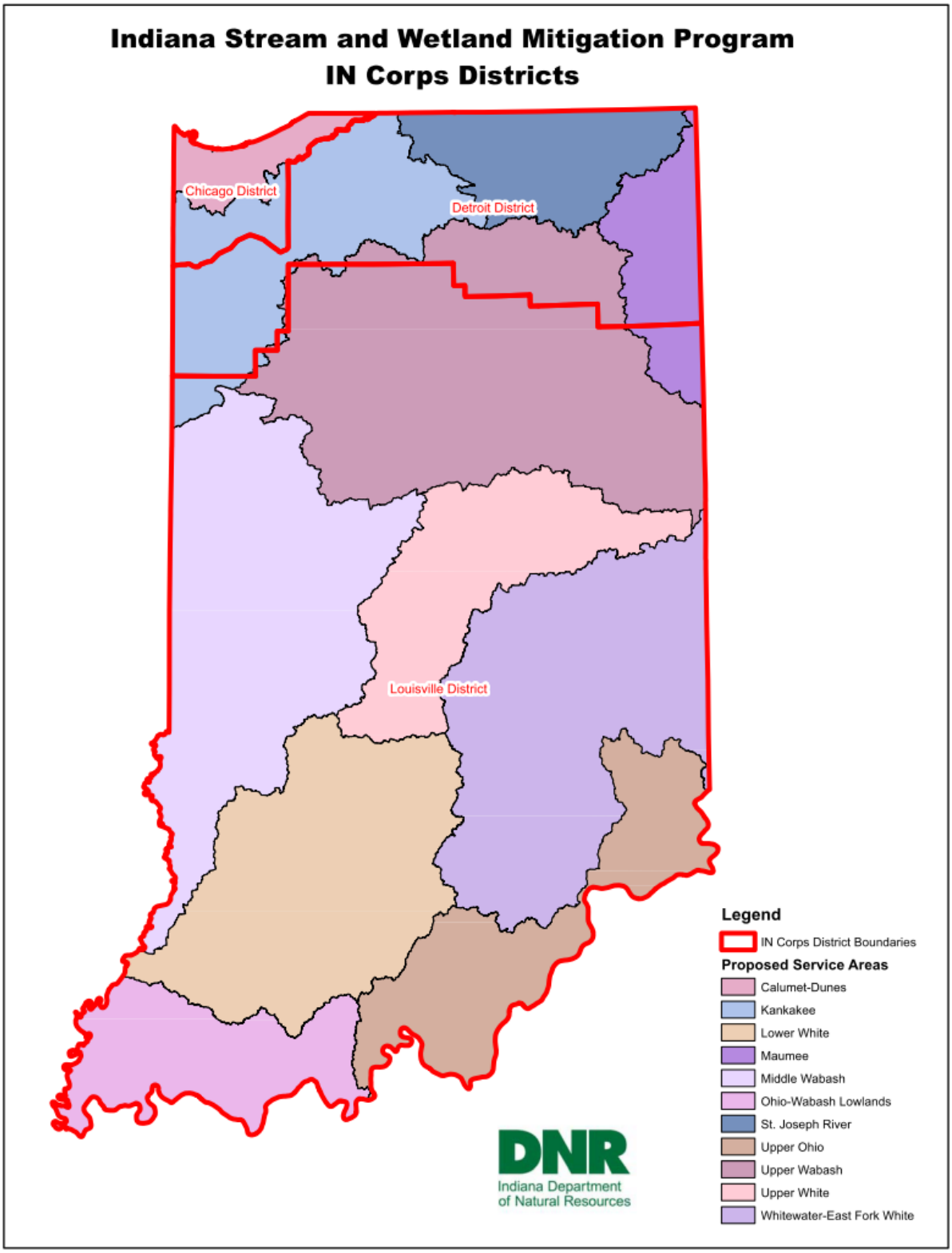

Figure 4: Indiana Corps District Boundaries.

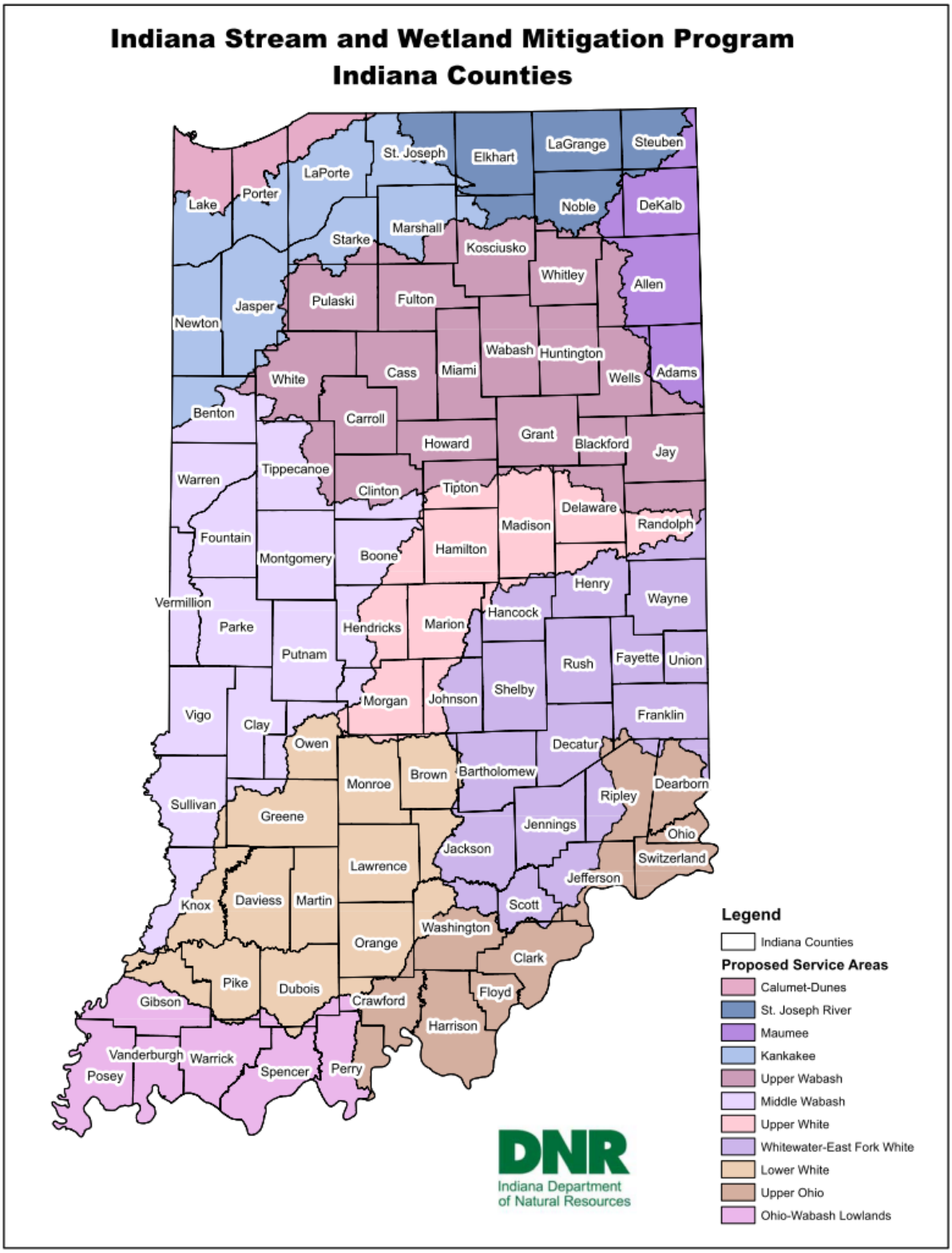

Figure 5: Indiana Counties.

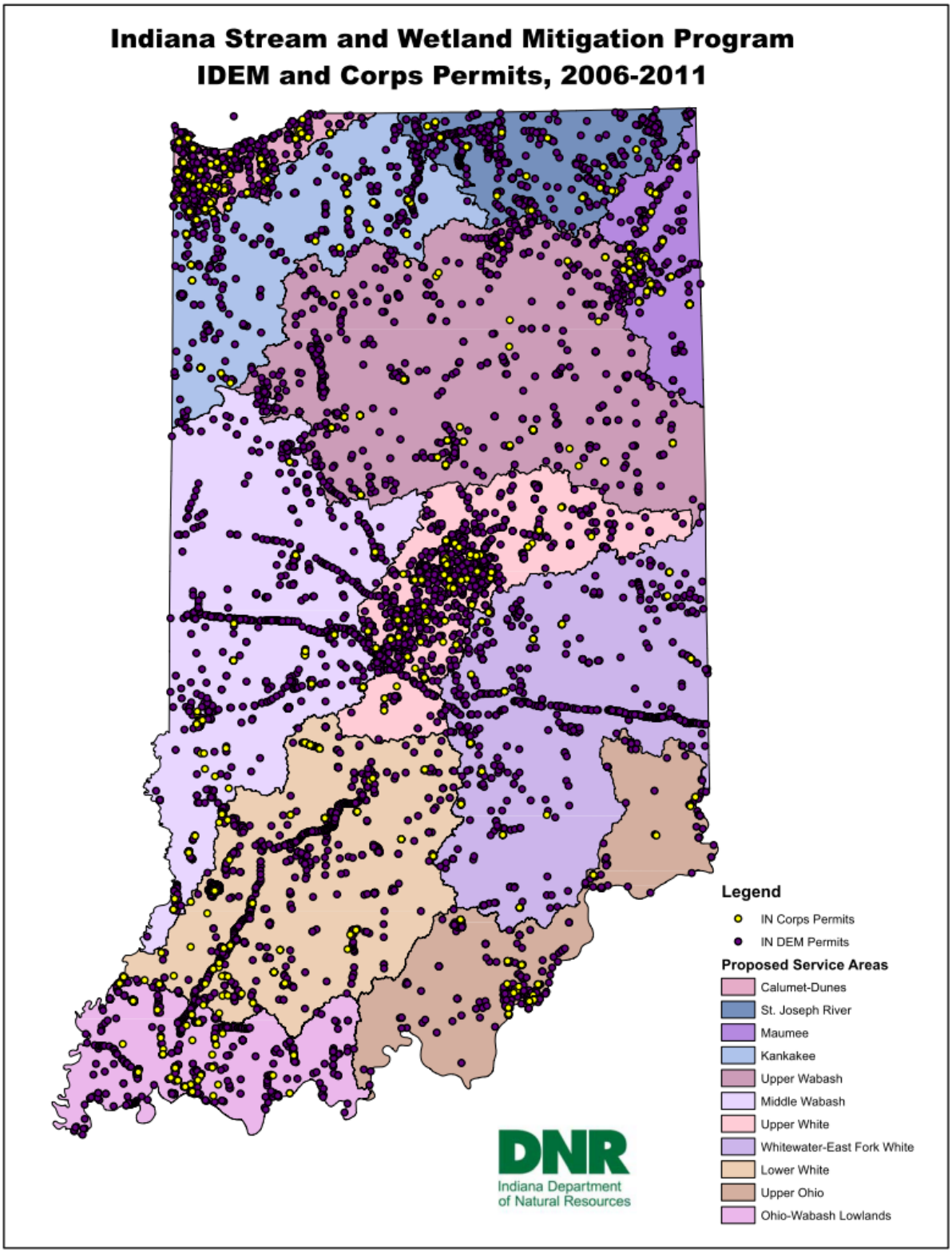

Figure 6: Indiana Department of Environmental Management (IDEM) and Corps Permits, 2006-2011.

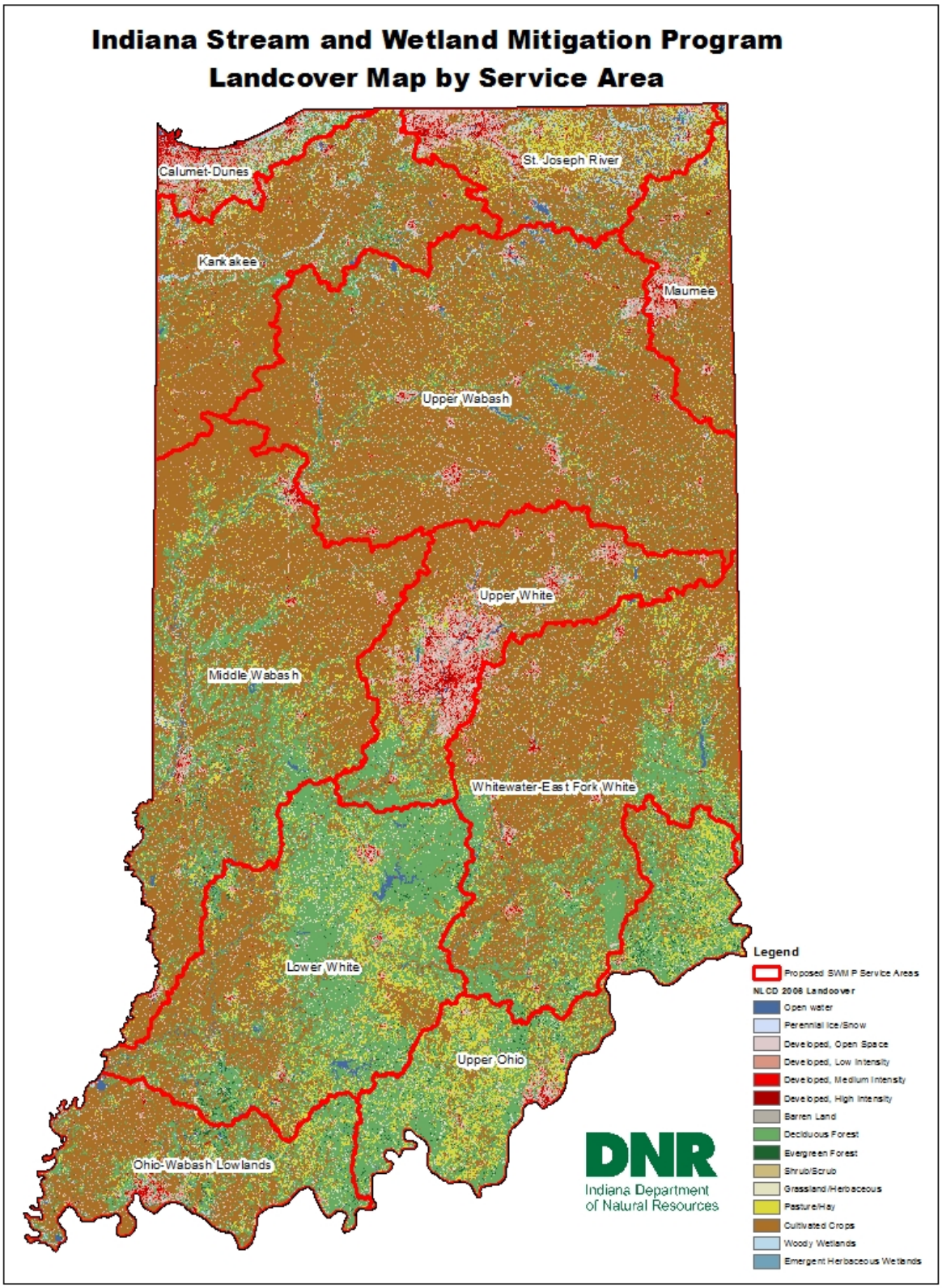

Figure 7: Indiana Land Cover types per service area.

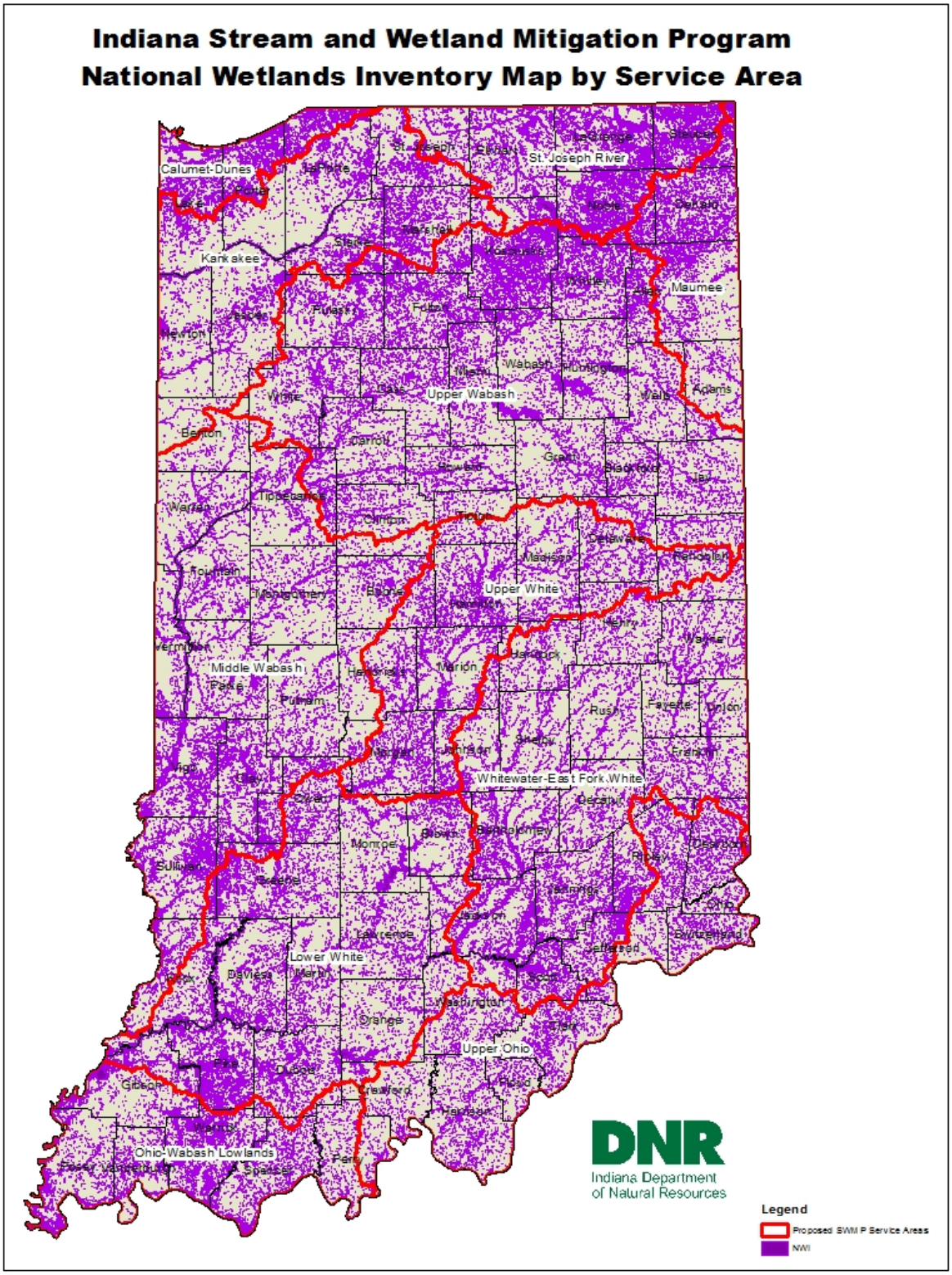

Figure 8: National Wetlands Inventory Map by IN SWMP service area.

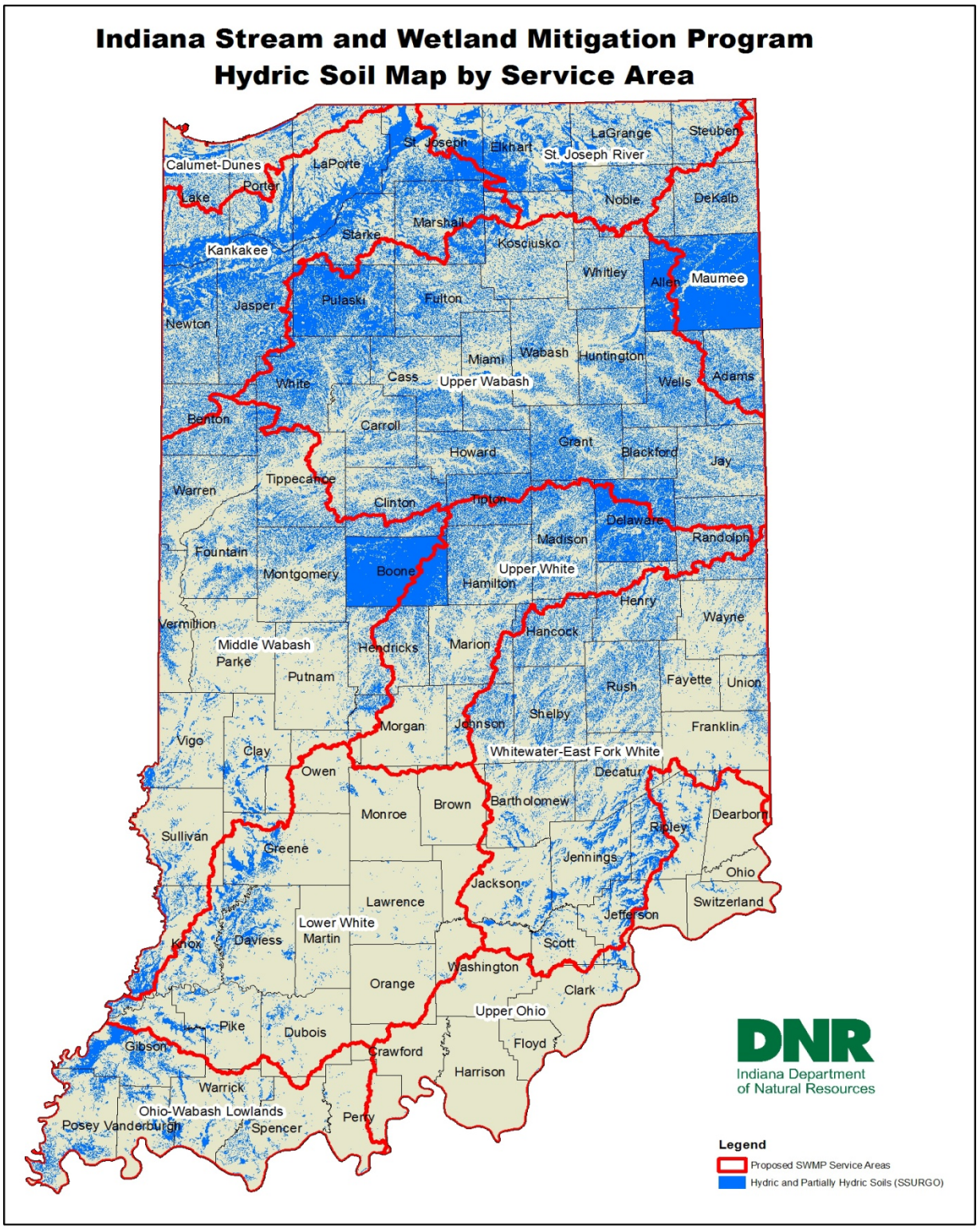

Figure 9: Indiana hydric and partially hydric soils. Note: data was compiled using the spatial data from NRCS SSURGO data joined with NRCS National List of Hydric soils by a concatenated field of Area Sym and MUKEY. This process cannot differentiate component percentages, nor hydric percentages of said components.

APPENDIX A: COMPENSATION PLANNING FRAMEWORK (CPF)

CPF APPLICABILITY AND MITIGATION RULE COMPONENTS

The compensation planning framework adopts a landscape-watershed approach to selecting and implementing IN SWMP mitigation projects that restore, enhance, establish or preserve aquatic resources under the IN SWMP program. This framework will be used to identify, evaluate, and screen potential IN SWMP mitigation projects and will be referenced in future Project Mitigation Plans. The compensation planning framework includes the following required ten elements [Mitigation Rule p. 19681, §332.8 (c)]:

1. The geographic service areas, including a watershed-based rationale for the delineation of each service area;
2. A description of the threats to aquatic resources in the service areas, including how the ILF program will help offset impacts resulting from those threats;
3. An analysis of historic aquatic resource loss in the service areas;
4. An analysis of current aquatic resource conditions in the service areas;
5. A statement of aquatic resource goals and objectives for each service area, including a description of the general amounts, types and locations of aquatic resources the program will seek to provide;
6. A prioritization strategy for selecting and implementing compensatory mitigation activities;
7. An explanation of how any preservation objectives satisfy the criteria used in preservation;
8. A description of any public and private stakeholder involvement in plan development and program implementation;
9. A description of the long-term protection and management strategies for activities conducted by the ILF program sponsor;
10. A strategy for periodic evaluation and reporting on the progress of the program, including a process for revising the planning framework as necessary.

A.1.0 SERVICE AREAS

Description

The IN SWMP will operate in 11 service areas listed below. The 8-digit HUC was used as the basic unit for constructing the service areas. Two of the service areas are sized at an 8-digit HUC scale; the remaining service areas were configured by combining multiple 8-digit HUC watersheds. The following service areas were chosen based on a combination of watershed boundaries and the likelihood of future wetland and stream impacts and potential mitigation opportunities. Ecoregions were considered, but used as a secondary priority in determining service area boundaries as most ecoregions do not match up with watershed boundaries. A map of the service area boundaries is shown in Figure 1.

1. Calumet-Dunes
2. Kankakee
3. St. Joseph River (Lake MI)
4. Maumee
5. Upper Wabash
6. Middle Wabash
7. Upper White
8. Whitewater-East Fork White
9. Lower White
10. Upper Ohio
11. Ohio-Wabash Lowlands

The IDNR will provide mitigation credits for aquatic resource loss within the service areas by completing projects in the same service area where the impact occurred. Mitigation credits for a given service area may be fulfilled in an adjacent service area if ecologically preferable mitigation is unavailable within the service area and authorization is granted by the DE in consultation with the IRT. The types of impacts and priorities within each service area will guide IN SWMP project selection, plan development, and implementation.

Rationale

The IN SWMP seeks to establish an option for mitigation that is environmentally preferable to permittee responsible mitigation. This will be accomplished by consolidating mitigation projects and resources, providing financial planning and scientific resource expertise and reducing uncertainty over project success. To achieve these results the amount of fees collected by the IN SWMP must be sufficient to finance viable mitigation projects in each service area.

The State of Indiana is divided into 39 different 8-digit HUCs. The IDNR believes, based upon historical impact data (Figure 6), that proposing a service area for each 8-digit HUC would result in numerous small service areas that would not experience enough impacts and therefore collect enough fees from the sale of credits over a period of three years to finance required mitigation projects.

IDNR believes that the eleven service areas proposed will result in effective compensation for adverse environmental impacts across the entire service area. The service areas, except the St. Joseph River and Upper White, are comprised of multiple 8-digit HUCs which IDNR biologists and conservation planners believe have similar aquatic habitat systems and similar watershed characteristics.

The Calumet-Dunes Service Area includes two (2) 8-digit HUCs. This service area is defined by the great array of geologic and natural features related through their association with Lake Michigan and its origins. This includes morainal forests and prairies, lake plain wetlands, sand savannas, sand prairies, swamps, and the sand dune and beach topography of the lake border. Northern wetland types characterize entire area, especially associated with the Little and Grand Calumet Rivers. This service area has a relatively dense concentration of impacts, but has limited opportunities for wetland and stream restoration in each HUC. The Chicago HUC has a significant amount of impacts, but urbanization has reduced the accessibility to quality restoration opportunities. The Little Calumet-Galien HUC has significantly less historical impacts, but provides for greater opportunity to restore and rehabilitate wetlands and streams.

The St. Joseph River Service Area is a single 8-digit HUC. This service area has a distinctly different watershed outlet (the eastern shore of Lake Michigan) from the other 8-digit HUCs in Indiana. Complex glacial topography of moraines, kettles, kames characterize the service area which contains many of the highest quality wetland areas in the state, including lakes, peat lands, swamps, wet prairies as well as rich upland forests and prairies. Due to the large size of this HUC, the distinct drainage outlet, and the largely congruous northern lakes region occurring there, this single 8-digit HUC will be a distinct service area.

The Maumee Service Area includes parts of four (4) 8-digit HUCs (State of Indiana portions). The 8-digit HUCs in this service area all drain to Lake Erie. This service area captures the entire drainage basin of the Maumee River in Indiana: clearly distinguished from all other Indiana drainages by a continental divide. The natural communities are similarly related by headwaters streams draining forested morainal areas surrounding the flat Maumee lake plain (the Black Swamp). Due to the small size of the watersheds and the common outlet, the partial 8-digit HUCs were combined to form this service area. The watersheds included in this service area are all headwater watersheds for the Maumee River.

The Kankakee Service Area includes two (2) 8-digit HUCs. These HUCs were combined to ensure sufficient credit sales within the service area. The HUCs individually have not sustained sufficient historical impacts to sell enough credits to be financially viable. The unifying feature of this service area is the Kankakee River. The natural features and topography share many affinities, primarily due to the extensive flat and sandy Kankakee drainage. This vast area is bordered to the west by the prairie plains and moraines of the Iroquois River, to the east, the northern wetlands and forested moraines of the Plymouth area. The two HUCs of this service area are mostly included in the Central Corn Belt Plains Ecoregion and both drain into the Illinois River.

The Upper Wabash Service Area is a combination of seven (7) 8-digit HUCs. These HUCs are largely rural, experiencing population declines, have had relatively few historical impacts

requiring mitigation, and are primarily headwater watersheds. While a relatively large geographic area, this service area is characterized throughout by the forested tributaries of the upper Wabash River. These HUCs drain the plains and landscape features that are all of Wisconsin glaciation origin. This service area is divided between the Eastern Corn Belt Plains and the Southern Michigan/Northern Indiana Drift Plains Ecoregions but the ecology of the HUCs is similar across the service area. Dividing this service area would create smaller service areas that are less likely to sell enough credits to be financially viable for the program.

The Middle Wabash Service Area includes all or part of six (6) 8-digit HUCs. The Eel 8-digit HUC was included in the Middle Wabash Service Area due to the low volume of impacts within the remainder of the service area and the relatively higher volume of impacts in the Upper White Service Area and the Lower White Service Area. These HUCs were combined into one service area to ensure that it will be financially viable for the program. While a relatively large geographic area, it is unified physiographically by the many distinct and highly incised and dendritic tributaries draining into the Central Wabash Valley. It was an area dominated by mixed deciduous forests. This includes streams of the central tillplain, as well as the Wabash lowlands and geologically older plains to the south.

The Upper White Service Area was defined as a single 8-digit HUC. This service area includes the city of Indianapolis and the surrounding suburbs which have a relatively high volume of impacts based on the Corps and IDEM data from 2006 to 2011. The service area is a relatively uniform region of forested streams and a poorly drained, formerly forested, level tillplain (converted to agriculture).

The Whitewater-East Fork White Service Area includes all or parts of six (6) 8-digit HUCs. The southeast portion of the state has a particular low number of impacts. This service area has less opportunity for compensatory mitigation projects due to the topography and lack of drained wetlands. This service area included 8-digit HUCs that were included in the Eastern Corn Belt Plains Ecoregion. The area is characterized by the deeply incised Whitewater River valley to the east, and the flat, often poorly drained, headwaters of the White River, East Fork, including the Muscatatuck River. It was an area of similar types of largely forested plant and animal communities, including many wetlands associated with stream corridors.

The Lower White Service Area is a combination of three (3) 8-digit HUCs. Individually, each of these 8-digit HUCs within this service area has not shown enough historical impacts that required mitigation between 2006 and 2011 to have them stand alone as individual service areas; therefore, combining these three 8-digit HUCs creates what IDNR believes is a financially viable service area. While large, and overlapping two or more natural regions, this service area is defined by the drainages of the lower stretches of both the East and West Forks of the White River to their confluence with the Wabash River. This includes the rugged topography and bedrock hills of unglaciated south-central Indiana. Large areas of karst plain topography are also present. Further west in the drainages, the land abruptly transitions to the broad level plains of the Wabash River lowlands. The entire service area was forested, with many affinities to southern woodland types. The rugged uplands possess very few wetland soil types outside of those directly associated with stream channels. However, the western lowlands, especially along

the lower West Fork and Patoka River, contain significant areas of hydric soils and existing wetlands.

The Upper Ohio Service Area includes three (3) 8-digit HUCs. These HUCs were combined into this service area since all three watersheds drain through fairly short basins into the Ohio River. The Corps and IDEM impact data show a small area of concentrated impacts with relatively few impacts in the remainder of the service area. The HUCs outside of the concentrated impacts are less likely to sell enough credits to be financially viable without combining them with the HUC that contains the concentrated impacts. Additionally, these HUCs share some ecologic similarities, primarily being composed of southern forests, including barrens and glades, on hilly to very rugged topography. Significant areas of karst topography are also present. Wetland resources are generally scant throughout the service area.

The Ohio-Wabash Lowlands Service Area includes all or part of three (3) 8-digit HUCs. These HUCs drain into the Wabash and Ohio River and share many natural features. The extensive river bottom lowlands of this service area possess significant wetland resources. Many small streams drain the eastern hills region along short drainages directly into the Ohio River. The Corps and IDEM data show distributed impacts across the entire service area, however the IDNR does not believe there will be a sufficient number of impacts in each individual 8-digit HUC for them to stand alone as individual service areas and remain financially viable.

A.2.0 STATEWIDE AQUATIC RESOURCE THREATS

Mitigation projects under sections 401 and 404 of the Clean Water Act and Indiana's Isolated Wetland Program involve taking actions to compensate for impacts to wetlands and other water bodies (e.g. streams and rivers). Mitigation projects within Indiana will focus primarily on stream and wetland restoration. Stream and wetland restoration will be achieved by a variety of biological engineering techniques and methods, including the following examples:

Stream Restoration

- Restoration of naturalized stream channel
- Reconnection of channelized streams to natural floodplains
- Providing a forested buffer
- Streambank stabilization
- In-stream habitat structures

Wetland Restoration

- Tile/ditch disruption
- Installation of water control structures
- Water level management
- Seeding & planting of desirable vegetation
- Earth grading to retain hydrology
- Pothole excavation

Mitigation projects will help offset aquatic impacts by providing compensatory mitigation to the service area(s) in which the impact(s) occurred; compensatory mitigation will be used to re-establish, rehabilitate, and protect Indiana's aquatic systems.

A.2.1 Streams and Rivers

According to the 2006 Indiana Comprehensive Wildlife Strategy, the primary threats to Indiana's streams and rivers included:

- Stream channelization
- Habitat degradation
- Non-point source pollution
- Habitat conversion
- Commercial/residential development
- Change in land use

Results from IDEM's comprehensive use support assessments are provided in the 2012 Integrated Water Monitoring and Assessment Report; this report indicated that approximately 72% (17,461) of the 24,232 stream miles assessed for aquatic life use were found to be fully supporting. Approximately 23% (4,785) of the 20,804 stream miles assessed supported full-body contact, recreational use. Almost all of Indiana's 67 miles of Lake Michigan shoreline outside of the Indiana Harbor were found to fully support aquatic life use, while almost all of the shoreline waters have been assessed as impaired for recreational and fishable uses.

Pathogens were the top cause of stream impairments, impacting more than 16,000 miles of streams. Polychlorinated biphenyl (PCB) in fish tissue impacted more than 4,175 miles, while mercury in fish tissue impacted nearly 2,100 miles of streams. More than 4,649 stream miles also had biological communities with measurable adverse response to pollutants. Potential sources impacting Indiana waters included nonpoint sources that impacted almost 11,700 miles of streams, while unknown sources impacted nearly 6,600 miles of streams (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

A.2.2 Wetlands

The leading threats to Indiana's wetlands include habitat degradation, habitat fragmentation, habitat conversion, commercial/residential development, and nonpoint source pollution. Major threats to wildlife in wetlands include habitat loss, and bioaccumulation of contaminants (Indiana Comprehensive Wildlife Strategy, 2006). National Wetlands Inventory (NWI) maps for Indiana were produced in the 1980's by the U.S. Fish and Wildlife Service, indicating wetlands by type; a more recent update of this data was conducted by Ducks Unlimited in 2005.

Included in this framework is a prioritization strategy (§A.5.0) which will be used to select suitable mitigation project sites; these sites will be based on conservation habitats best suited to replace lost wetland and stream functions from unavoidable wetland impacts.

A.3.0 HISTORIC AQUATIC RESOURCE LOSS/CURRENT CONDITIONS

Since the beginnings of European settlement, the state of Indiana has suffered both a quantitative and qualitative loss in these aquatic systems. During European settlement, Indiana's waterways provided food, power, and transportation for settlers; as a result of population growth and expansion, Indiana's aquatic systems continue to be impacted by deforestation, agricultural establishment, urban development, industrial effluent, storm water management, channelization, and encroachment. Additionally, increased levels of pollution were reaching Indiana's aquatic systems, causing a major decline in water quality (Amlaner & Jackson, 2012).

The IDNR analysis of the 1980-1987 NWI database concluded that wetland habitats in Indiana totaled approximately 813,032 acres (Indiana Wetland's Conservation Plan: IDNR, 1996). Conversely, there were approximately 5.6 million acres of wetlands during the 1780s, or 24.1% of Indiana's total land area; this change represents an 85.6% decline. During the early 1800s, Indiana was comprised of roughly 90% forest (20.4 million acres) and 10% prairies (2 million acres), of which 25% were wetlands (5.6 million acres) (Amlaner & Jackson, 2012).

Approximately 54.8% of Indiana's land use is dominated by agriculture (Fry, et al., 2011), and a majority of wetlands were lost and continue to be lost due to drainage practices. Recent land use data indicates Indiana is composed mainly of agriculture, deciduous forest, pasture/hay, and developed, open land. Indiana has lost over 67% of its original forests since the years of pre-settlement. The most common wetland type within Indiana is freshwater forested/shrub (U. S. Fish and Wildlife Service, 2013). Wetlands of Indiana are being lost at a rate of approximately one to three percent each year, (Kim, Ritz, & Arvin, 2012).

For over 150 years, Indiana has been home to a vast network of surface and underground coal mines located in the southwest section of the state. In 2012, Indiana was the seventh greatest coal-producing state in the country and currently yields roughly 32-36 million tons of coal annually (Indiana Coal by the Numbers: IDNR). Prior to the passage of the Clean Water Act, wetlands and streams were dredged and filled as a result of coal mining because of their abundance of buried organic material. Acid mine drainage was and continues to be a concern for Indiana's wetlands and streams as acidic waters resulting from coal mining leached into the ground and downstream surface waters, degrading water quality and preventing the establishment and longevity of aquatic fauna and flora (Amlaner & Jackson, 2012). Abandoned mine reclamation has greatly improved this issue as restoration activities are ongoing to remedy these older, abandoned mines. Today, the Clean Water Act has rules and regulations regarding the discharge of fill or dredged material to Indiana's waters resulting from mining activities. Although these regulations focus on minimizing and avoiding aquatic resource impacts, mining continues to be a threat to Indiana's aquatic resources. Under the Surface Mining Control and Reclamation Act, coal mining industries are required to conduct studies to assess the impacts local waters would face as a result of coal mining activities as well as ensure that the discharge

of pollutants caused by mining activities does not violate Clean Water Act standards (Clean Water Act, Section 402: U.S. EPA).

In order to determine the amount of potentially restorable land within the state of Indiana, hydric soils from the Soil Survey Geographic Database, existing wetlands from the NWI Database, and potentially restorable land cover types (e.g., crop, pasture) from the National Land Cover Database were mapped. Based on these maps, it was estimated that out of the 23,141,478 acres of Indiana's total land, 5,573,991 acres (24.1%) were hydric or partially hydric, of which 4,351,258 acres (78.1%) have the potential of being restored. Of these soils, approximately 16,856 acres (0.4%) have the potential to be restored on IDNR-owned land. This data analysis is a good starting point for locating potential sites; site specific data will be verified during the development of mitigation project sites.

The Upper Wabash, Middle Wabash, and Kankakee Service Areas contain the greatest amount of potentially restorable land; the Lower White, Kankakee, and Upper Wabash Service Areas contain the greatest amount of potentially restorable IDNR-owned land. Table 1 displays the total potentially restorable wetland acres within each service area and the potentially restorable linear stream miles located within 100 feet of agriculture within each service area.

Service Area Name	Potentially Restorable Wetland Acres	Potentially Restorable Linear Stream Miles
Calumet-Dunes	24,507	120
Kankakee	670,629	3,853
St. Joseph River (Lake MI)	206,156	820
Maumee	171,908	1,117
Upper Wabash	1,358,330	6,303
Middle Wabash	682,439	2,744
Upper White	440,492	1,447
Whitewater-East Fork White	484,524	3,896
Lower White	142,869	3,072
Upper Ohio	36,702	1,007
Ohio-Wabash Lowlands	132,702	2,744

Table 1: Total potential wetland and stream restoration numbers at a glance (values are estimations).

A.4.0 RESOURCE GOALS AND OBJECTIVES

A.4.1 General Approach

The main goals of the IN SWMP mitigation site selection shall be to restore the quality of Indiana's aquatic resources by strategically selecting suitable mitigation sites; compensate for permanent losses of aquatic habitat; and ensure long-term protection and sustainability of these mitigation sites described in Mitigation Rule p. 19679 §332.7.

In order to meet these goals, available data and information contained in the most current versions of the following Indiana plans will be utilized:

1. Regional Watershed Management or restoration plans and data
2. Local Watershed Management plans or initiatives
3. IDNR Lake and River Enhancement (LARE) Program information and data
4. IDEM's 303(d) list and 305(b) reports
5. Indiana State Wildlife Action Plan (SWAP)
6. Indiana Comprehensive Wildlife Strategy (CWS) Indiana Natural Heritage Database
7. U.S. Fish & Wildlife Service plans, reports, or studies
8. U.S. Department of Agriculture (USDA) programs
9. U.S. Geological Survey (USGS) studies and data
10. Other public sources of information

A.4.2 Site Selection Limitations

Site selection will be based on conditions that favor the success of mitigation projects. Sites with conditions that hinder success of mitigation projects will not be selected for compensatory mitigation projects, as stated by Mitigation Rule p. 19674, §332.3 (c)(3)(i). Possible site selection limitations, which will not automatically exclude a site from being chosen for compensatory mitigation, include:

1. Sites where water quality problems and/or environmental problems that could restrain or negatively impact the survival of a native community of aquatic organisms that would not be addressed by the mitigation project.

2. Sites where projected or on-going land-use impacts or changes would threaten a mitigation project unless reasonable assurances are provided that future, anticipated impacts would not affect the mitigation project.

3. Sites where federal restrictions on IDNR-owned or other land prevent mitigation site selection.

4. Sites where the mineral/oil/gas rights and surface rights are separated and could potentially interfere with the mitigation project.

5. Sites downstream from areas where the mineral/oil/gas rights and surface rights are separated and could potentially interfere with the mitigation project, unless reasonable assurances are provided that future, anticipated impacts from extraction would not affect the mitigation project.

6. Sites where mitigation efforts were previously performed.

7. Sites containing regulated drains which would interfere with the goals and success criteria established in the project's mitigation plan.

A.5.0 PRIORITIZATION STRATEGY

A.5.1 Statewide Project Prioritization

IN SWMP projects in all service areas will effectively replace lost aquatic resource functions due to permitted physical impacts. The main goal of mitigation projects within each service area is to restore streams and wetlands as compensation for impacts to aquatic resources permitted through Section 401 and 404 of the Clean Water Act (CWA) and Indiana's Isolated Wetland Program.

Mitigation projects in all service areas will utilize a watershed approach to address the goals listed in watershed management plans within the service area in which the impact(s) occurred; this approach will have the greatest likelihood in being able to most effectively replace lost aquatic resource functions resulting from permitted impacts. In addition, the type of compensatory mitigation will relate to the type of impact which occurred.

Priority will be given to sites that have the greatest increase of ecological functions and values. These sites shall be further prioritized by the following activities in order: re-establishment, rehabilitation, establishment, enhancement, and preservation.

In situations where multiple sites have the equivalent ability to restore lost functions and values, priority for mitigation projects will be given to sites that have little to no land acquisition costs. Priority will also be given to lands near existing, protected lands; restoring impaired streams on public land is highly recommended since these areas are used and viewed by the public.

For service areas containing an approved mitigation bank(s), priority will be given to projects that will restore wetland types which differ from those that can be supplied by the approved mitigation bank(s).

Projects to mitigate for stream impacts will be identified in part by coordinating with IDEM Office of Water Quality (OWQ) Watershed Assessment and Planning Branch staff, when necessary, and consulting local watershed planning documents as well as their priority rankings for 303(d) listed waters which take into account the severity of the impairments for designated uses of the waters of Indiana. Mitigation projects in priority waters could address sources of impairments and, in turn, the priority water could be removed from the 303(d) list. Water quality data may be considered when selecting mitigation sites and focus will be given to aquatic systems suffering from water quality issues for which the mitigation project will be able to positively impact. Mitigation projects that can address water quality issues and promote watershed health will be given priority.

The IDNR staff will make an effort to build partnerships and communicate with stakeholders to receive recommendations to manage, protect, and enhance at-risk ecological communities. Priority will be given to mitigation projects that serve the needs of multiple stakeholders.

A.5.2 General Criteria for Mitigation Site Identification and Selection

Numerous criteria are involved in the identification of mitigation sites including hydric soils and characteristics, topography, land use trends, ecological benefits, population/growth and development trends, wetland inventory data, protected lands, surrounding geography and landscapes, and physiographic regions.

The list below displays the prioritization criteria for mitigation site identification and selection. This prioritization strategy will be used for project selection within each service area. In addition to this list, information from conservation partners, landowners and additional stakeholders may also be used during the site selection process as they may have knowledge or a pre-existing list of priority restoration lands. Current data supporting Figures 7- 9 may also be utilized when identifying potential restoration sites on a landscape planning scale; however, these figures and their corresponding data have inaccuracies associated with them and can contain much error. Ground investigations will be required to confirm or dismiss these datasets and determine the location of mitigation project sites.

The following criteria, in addition to evaluating whether a site will adequately compensate for permitted impacts, will be included for site selection determination:

1. Ecological Functions and Values
    a. Restoration of the proposed mitigation project site will realize an increase of ecological functions and values compared to existing conditions. The ecological needs of the watershed will help determine the most important functions and values.
    b. Sites that have greater increases to ecological functions and values will rank higher than sites that provide less of an increase in ecological functions and values.

2. Probability of Success
    a. The proposed mitigation project site will be evaluated based on its ability to successfully compensate for the physical loss of aquatic habitat; the project will ensure a quantitative net gain in aquatic systems area and/or qualitative gain in aquatic systems functions. Therefore, mitigation project sites should be selected based on their probability of success within an area, or whether the mitigation site will be able to perform according to its desired scope set forth in the mitigation plan.
    b. The proposed mitigation project site should meet the following criteria and guidelines:
        i. The proposed site shall contain hydric soils;
        ii. Restoration work shall not disturb high quality habitats or threatened and endangered species;
        iii. Buffers shall be established around the site to protect the site from potentially incompatible land use areas (e.g., roads, residential/commercial areas) as appropriate;

iv. Site shall contain adequate hydrology to sustain itself during and after project completion (e.g., floodplain, high groundwater table)

3. Proximity
    a. The proposed mitigation project site shall be within the same service area in which the impact occurred unless approved by the DE in consultation with the IRT.
    b. Proposed mitigation project sites that provide connectivity to existing resources (e.g., adjacent wetlands) will be given higher priority in the site selection process over areas without connectivity to existing habitat; priority will be given to sites which will yield high quality wetlands.

4. Functionality and Compatibility
    a. Mitigation projects will be evaluated based on their ability to provide numerous functions including: water quality improvement, native and rare species support, and aquatic fauna and flora habitat improvement.
    b. Mitigation project sites will be sized relative to their water source(s) and the reliability of their water source(s).

5. Regional Conservation Plans Support
    a. Watershed Management Plans will be utilized per service area as a guide and resource in selecting IN SWMP projects by locating projects in areas of greatest need for restoration.
    b. The Indiana Comprehensive Wildlife Strategy (CWS) and State Wildlife Action Plan (SWAP) will be used to further help select mitigation projects by providing information on the ancillary benefits and functions the site will provide to the community; these plans have the potential to help determine sites which will yield high quality wetlands. The Indiana CWS will aid in identifying regional conservation needs and existing partners and resources for addressing these needs within the state of Indiana (Indiana Comprehensive Wildlife Strategy, 2006). The Indiana CWS provides species ranges, relative abundance, and status in the state; this includes federally endangered and threatened as well as state endangered species.
    c. The Indiana Natural Heritage Database will be used as a tool in identifying beneficial information for mitigation site selection; this includes information about high quality natural communities, natural areas, landscape features, and records of federally endangered and threatened species as well as state listed species.
    d. Local land trust conservation plans will be utilized to help identify potential mitigation project sites. Land trusts have priority landscapes and could provide accessibility to potential sites.
    e. Other sources of data, including unpublished IDNR staff data.

A.6.0 PRESERVATION OBJECTIVES

According to the federal mitigation rule (33 CFR 332.3 (h)), preservation is defined as the removal of a threat to, or preventing the decline of, aquatic resources; this includes activities associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms and does not result in a gain of aquatic resource area or functions.

Under the IN SWMP, preservation actions will be consistent with the watershed approach to protecting aquatic resources. The main objective of preservation mitigation projects is to permanently protect existing waters having a significant contribution to conservation needs within a service area.

Reference to Indiana's current CWS and SWAP should be made when identifying habitat threats and management goals; these plans will help determine where greatest preservation and conservation efforts are needed in the state. Consultation with local land trust organizations will be conducted to locate preservation opportunities. Preservation strategies will be based on their ability to relieve these threats and the importance of the resource to the watershed and/or State. Preservation will be used to provide compensatory mitigation when the following criteria are satisfied (33 CFR 332.3(f) (3) (h)):

1. The resources to be preserved provide important physical, chemical, or biological functions for the watershed;
2. The resources to be preserved contribute significantly to the ecological sustainability of the watershed;
3. Preservation is determined by the District Engineer in consultation with the IRT to be appropriate and practicable;
4. The resources are under threat of destruction or adverse modifications;
5. The preserved sites will be permanently protected though an appropriate legal instrument.

A.7.0 PRIVATE AND PUBLIC STAKEHOLDER INVOLVEMENT

The IDNR will work diligently with private landowners, federal and state agencies, other conservation organizations, non-governmental organizations, academic institutions, local governments, watershed councils and associations, professional societies, universities, and public land agencies to meet the requirements of the Instrument. Individual mitigation projects will be implemented on private and public lands. The IDNR will work closely with volunteers and partners to deliver mitigation projects. Since the majority of land in Indiana is privately owned, there will need to be a cooperative effort between private land owners and public agencies.

Potential partners and stakeholders include:

Federal Agencies

- U.S. National Park Service
- U.S. Army Corps of Engineers
- U.S. Department of Agriculture (NRCS)

- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- U.S. Geological Survey
- U.S. Department of Transportation

State Agencies

- Indiana Department of Environmental Management
- Indiana Department of Natural Resources
- Indiana Department of Transportation

Other Organizations

- Conservation organizations (Local land trusts, Ducks Unlimited, and similar conservation organizations)
- Local municipalities
- Universities
- Private landowners

In addition to these agencies, IDNR will participate in public outreach activities to educate the public regarding the mitigation program and to seek local involvement in identifying mitigation projects. The public will also have an opportunity to comment on IN SWMP projects during the public comment period laid out in 33 CFR 332.8(d) 4 when mitigation plans are submitted to the District Engineer; participation by the public in this process will be greatly encouraged by the IDNR during each public comment period.

Partners will be able to not only provide knowledge of the local area, but they will also be able to help locate and identify areas for mitigation projects, assist with the development and implementation of monitoring programs, provide long-term management, potentially provide protection to mitigation sites after implementation, and provide additional key contacts.

A.8.0 LONG-TERM PROTECTION AND MANAGEMENT

IDNR shall be responsible for developing and implementing a long-term protection and management plan for each IN SWMP project. IDNR may utilize existing publicly owned property or secure property for inclusion to the public trust. Projects implemented on publicly owned property or property that will be transferred to public ownership shall be protected and managed through facility management plans, integrated natural resource management plans, or deed restrictions as necessary. IDNR may also utilize privately-owned properties and will record real estate instruments to guarantee protection of privately-owned properties. Long term management of privately-owned properties will be transferred to the landowner or a private natural resource management entity with a plan approved by the District Engineer in consultation with the IRT.

The IN SWMP projects will be designed, to the maximum extent practicable, to require minimal long-term management efforts once performance standards have been achieved. IDNR shall be responsible for maintaining IN SWMP program projects consistent with the mitigation plan to

ensure long-term viability as functional aquatic resources. IDNR shall retain responsibility unless and until the long-term management responsibility is formally transferred to a long-term manager with Corps approval. The long-term management plan developed for each IN SWMP project will include a description of anticipated management needs with annual cost estimates and an identified funding mechanism (such as non-wasting endowments, trusts, contractual arrangements with future responsible parties, or other appropriate financial instruments). For projects that do not require long-term management activities, other voluntary management activities may be included as long as no detrimental effects to the mitigation project are realized. Reference to Mitigation Rule p. 19680 §332.7 (d) shall be made when determining the long-term management plan for each mitigation project.

The final mechanism for long-term protection and management shall be submitted to the IRT for review, and approval will be made by the District Engineer in consultation with the IRT prior to the release of mitigation project credits. Upon achieving its performance standards and an approved mechanism for long-term protection and management, IDNR will request that the Corps issue written "closure certification," documentation stating that the project has been released from additional monitoring, and the Corps has closed the project file.

A.9.0 PERIODIC EVALUATION STRATEGY

Every 5 years, the IDNR will submit a program findings/evaluation report to District Engineer and the IRT as a supplement to the Annual Program Report; this report will address how the goals and objectives set forth in the Instrument are being met in terms of site selection and project implementation.

The report may also include any proposed changes to the Compensation Planning Framework. A review of the resources used to create the Compensation Planning Framework will be conducted during the evaluation. Requested changes to the Compensation Planning Framework will be submitted as an amendment to the Instrument for approval by the District Engineer in consultation with the IRT.

A.10.0 CALUMET-DUNES SERVICE AREA

A.10.1 Service Area Description

The Calumet-Dunes Service Area is located in the most northwestern portion of Indiana and borders Lake Michigan. It includes all or portions of the following 8-digit HUCs:

- **04040001 – Little Calumet-Galien**
- **07120003 - Chicago**

The Calumet-Dunes Service Area includes portions of the four Indiana counties listed below in the Lake and Northern Moraine physiographic region. A fraction of Lake, Porter, and LaPorte Counties are also split with the Kankakee Service Area.

Lake	LaPorte	St. Joseph
Porter		

The Calumet-Dunes Service Area is located in two ecoregions; the western portion is located in the Central Corn Belt Plains; the eastern portion is located in the Northern Indiana Drift Plains. The western portion of the service area is characterized by its beach ridges, marshy swales, and sand dunes; the eastern portion of the service area contains higher dunes, greater woodlands, lower relief, and less urban-industrial activity than the western portion of the service area. In addition, the eastern portion is characterized by its sandy coastal strip with beaches, beach ridges, and swales (Ecoregions of Indiana: U.S. EPA).

The Little Calumet-Galien Watershed (HUC-04040001) within Indiana drains approximately 512 square miles (327,680 acres) into Lake Michigan (Northwestern Indiana Regional Planning Commission), while the Chicago Watershed (HUC-07120003) drains 90 square miles (57,600 acres) into the Illinois River; in total, the Calumet-Dunes Service Area spans approximately 602 square miles, or 385,280 acres.

The Calumet-Dunes Service Area is currently dominated by developed, low intensity land use, cultivated crops (agriculture), and deciduous forest; woody wetlands are also prominent in this area.

A.10.2 Resource Status (historic impacts, current conditions, and threats)

In addition to the previous discussion of historical impacts in Indiana waters, a report from the IDNR has provided information from the mid-1900s on the status and impacts to aquatic ecosystems near the shore of Lake Michigan as well as stream resources in the Calumet-Dunes area (IDNR Division of Water, 1994). This report noted sources of impacts which affected recreational uses of rivers included oil, grease, floating debris, and odors; sources of impacts which made these waters unfit for body contact included high coliform bacteria counts. Beaches on Lake Michigan were often closed due to high bacteria counts, and water purification facilities reported excessive ammonia concentrations near intake cribs and taste and odor problems. The causes of these impacts resulted from urban sewage disposal, channel dredging, and effluent from oil refineries and steel mills (IDNR Natural Resources Commission, 1996). Additional impacts reported were related to industrial development and urbanization.

Prior to 1900, the Grand and Little Calumet Rivers of Indiana drained into Lake Michigan and deposited sewage and other contaminants directly into the lake. The Grand Calumet River (GCR) has been significantly altered since the early 1900s from hydromodification activities including channelization, dredging, and damming; primary impacts to the river included habitat loss and degradation due to these alterations as well as residential and industrial development. Remediation and restoration efforts in the GCR AOC over the last decade and over the next several years has resulted in the USEPA targeting the GCR for potential delisting as early as 2018.

The Little Calumet River has also suffered similar impacts from industrial pollution and residential establishment which have reduced the river's ecological services provided to its watershed. Hydromodifications to the Little Calumet River changed flow characteristics of the river which affected the life stages of aquatic organisms and reduced the suitability of stream habitat for fish and wildlife (Little Calumet River WMP).

More recently, IDEM reported E. coli, impaired biotic communities, and nutrients as the leading causes of stream impairments within the service area (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

The Calumet-Dunes Service Area contains rare dune and swale ecosystems which provide important habitat for wildlife and is characterized by upland dune ridges and low-relief wetlands. Prior to settlement, dune and swale ecosystems covered an area of roughly 10,000 acres; today, only 1,000 acres remain as a result of habitat alteration and contamination by various sources (USFWS, 2001).

Wetland acreage within the Calumet-Dunes Service Area totals approximately 42,671 acres, or 11.1% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 24,272 acres, or 4.0% total land cover; wetlands have been lost due to habitat alterations.

A.10.3 Compensatory Mitigation Approach & Priorities

Urbanization and industrialization are common causes of aquatic resource impairments in the Calumet-Dunes Service Area. Mitigation projects will improve channel structure and reduce sedimentation that has resulted from stream bank erosion and channel alteration. The expansion of restoration on the Grand Calumet River could be a potential source for mitigation projects within the service area.

Additional sources of projects that could be investigated will be located in the rare dune and swale habitats along the Lake Michigan Shoreline. These habitats are home to various fauna and flora communities; however, impacts resulting from industrialization and urbanization have caused habitat loss and have impacted aquatic fauna and flora. Mitigation projects will aim at potentially restoring and preserving these rare habitat types. Restoration of globally rare dune and swale habitats will be a priority in this service area; a supplemental goal will be the preservation of dune and swale topography.

Currently, the following land trusts exist within the service area: the Shirley Heinze Land Trust, Inc. and the Woodland Savanna Land Conservancy. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Deep River-Turkey Creek WMP, NIRPC WMP, Dunes Creek WMP, Galena River WMP, Little Calumet WMP, Salt Creek WMP, and Trail Creek WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 105,087 acres, or 27.3% land cover, within the service area, out of which 24,507 acres have the potential to be restored this was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located in the service area. Approximately 120 linear miles of stream are located within 100 feet of agricultural fields; these linear miles of stream could provide opportunities for re-habilitation.

A.11.0 ST. JOSEPH RIVER (LAKE MICHIGAN) SERVICE AREA

A.11.1 Service Area Description

The St. Joseph River Service Area is located in northeastern Indiana. It includes the following 8-digit HUC watershed:

- **04050001 - St. Joseph River**

The St. Joseph River Service Area includes all or portions of the seven Indiana counties listed below in the Northern Moraine and Lake Region physiographic region.

St. Joseph	Kosciusko	LaGrange	Steuben
Elkhart	Noble	DeKalb	

The St. Joseph River drains to Lake Michigan at St. Joseph, MI. Approximately 42 miles of the 210 mile long St. Joseph River reside within two counties of Indiana, Elkhart and St. Joseph; a majority of the river travels through farmland (Our Watershed: Friends of the St. Joe River Association, Inc., 2013). Major tributaries discharging to the St. Joseph River within Indiana include the Fawn River, Elkhart River, and Little Elkhart River.

Approximately 1,685 square miles of the 4,685 square mile St. Joseph Watershed is located in northeastern Indiana; the remainder is located in southwestern Michigan. The St. Joseph River Service Area is located in the Northern Indiana Drift Plains and is characterized by pothole lakes, ponds, marshes, and bogs; land cover is dominated by corn, soybean, wheat, and livestock farming (Ecoregions of Indiana: U.S. EPA). Currently, the St. Joseph River Service Area is dominated by a mix of agriculture, pasture/hay, and woody wetlands.

A.11.2 Resource Status (*historic impacts, current conditions, and threats)*

Prior to European settlement over 200 years ago, the St. Joseph River Service Area was covered by deciduous forests, and the landscape was home to a diversity of fish and wildlife species. In addition to the previously discussed historical impacts in Indiana waters, the St. Joseph River Watershed Management Plan identified sediment, habitat and natural systems losses, and hydrological modifications as impairments to water resources of the service area. Sources of sedimentation included cropland, construction sites, and

eroding banks with causes being construction sites, road/stream crossings, and lack of riparian buffer strips. Habitat and natural systems loss resulted from land use alterations and the spread of invasive species, and hydrological alterations were caused by stream channelization, the removal of vegetation from stream banks, and urban development (DeGraves, 2006).

More recently, IDEM reported that the leading causes of impairment to the streams of the St. Joseph River Service Area were E. coli, impaired biotic communities, and nutrients. Additional causes included, chloride, PCBs and mercury in fish tissue, and ammonia (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

Shorelines of the natural lakes within the St. Joseph River Service Area have been altered by humans throughout history, resulting in the loss of important lacustrine wetland areas. These alterations were caused by a variety of activities such as road construction and residential development. As a result of these alterations, natural areas have been fragmented and biodiversity has been significantly reduced. This decrease in diversity and productivity has ultimately caused a decrease in the health of aquatic ecosystems existing within lacustrine wetlands; human activities have proven to be primarily responsible for the degradation of plant communities, wildlife habitat, and water quality of these wetlands (Price, 2009).

Wetlands were once prominent in the area but were altered as the population increased; most recent NWI data shows that approximately 10% of the land cover in the St. Joseph Watershed is wetlands which are home to many migratory birds and the federally-endangered Indiana Bat (DeGraves, 2006). The St. Joseph River Service Area contains four Indiana counties containing the greatest densities of wetlands within the entire state; these counties are LaGrange, Steuben, Noble, and Kosciusko (The Status of Wetlands in Indiana: IDNR, 1996). Total wetland acreage within the St. Joseph River Service Area is approximately 108,390 acres; the most prominent wetland type within the service area is freshwater forested/shrub wetland totaling 51,622 acres, or 4.7% total land cover.

A.11.3 Compensatory Mitigation Approach & Priorities

Habitat conversion is a common cause of aquatic resource impairments in the St. Joseph River Service Area. Restoration of wetlands and streams that are important to lake water quality will be a primary priority within this service area. Wetland restoration will focus on returning agricultural land to emergent or forested wetlands. A secondary priority of preservation is the protection of existing habitats that will ensure the quality of downstream lakes, as well as the preservation of bogs.

Impacts to freshwater lakes caused by a variety of alterations such as agriculture establishment and urbanization have resulted in habitat loss and have impacted aquatic fauna and flora. Mitigation projects will focus on restoring and preserving areas within the St. Joseph River Service Area which will provide benefits and alleviate threats to these lakes. Coordination with the St. Joseph River Basin Commission (SJRBC) for restoration and/or enhancement projects as well as the preservation of important resources within the

St. Joseph River Service Area will also be pursued. The SJRBC has completed the following watershed plans in the service area: Baugo Creek-Wisler Ditch, Elkhart River, Hesston-Stock Ditch Headwaters (including Pleasant and Riddles Lakes), Juday Creek, Little Elkhart River, Pigeon Creek, and Pigeon River.

Currently, the following land trusts exist within the service area: Trillium Land Conservancy, Wood-Land-Lakes RC&D Council, Clear Lakes Township Land Conservancy, Blue Heron Ministries, Wawassee Area Conservation Fund, and ACRES Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Baugo Creek WMP, St. Joseph River (MI) WMP, Elkhart River WMP, Elkhart River-Yellow Creek (lower) WMP, Five Lakes Area WMP, Little Elkhart River WMP, Pigeon Creek WMP, and Puterbaugh Creek-Heaton Lake WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 362,532 acres, or 33.3% land cover, within the service area, out of which 206,156 acres have the potential to be restored; this was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) within the service area. Obtaining a rough estimate of potential restoration sites for permitted stream impacts, approximately 820 linear miles of streams in the St. Joseph River Service Area are located within 100 feet of agricultural fields; these linear miles of stream could provide opportunities for re-habilitation.

A.12.0 MAUMEE SERVICE AREA

A.12.1 Service Area Description

The Maumee Service Area is located in northeastern Indiana and is composed of the following four 8-digit HUCs:

- **04100003 - St. Joseph**
- **04100005 - Upper Maumee**
- **04100007 - Auglaize**
- **04100004 - St. Marys**

The Maumee Service Area includes portions of the six Indiana counties listed below in the Maumee Lake Plain Region as well as the Northern Moraine and Lake Region physiographic regions. The Maumee Lake Plain Region is contained within Allen County only.

Steuben	Noble	Wells
DeKalb	Allen	Adams

Major rivers and streams of the Maumee Service Area include the St. Marys, St. Joseph, and Maumee Rivers. The St. Marys River begins in northwestern Ohio where it flows north to Fort Wayne, Indiana and converges with the St. Joseph River to form the Maumee River; the Maumee River flows 150 miles northeast where it drains to Lake Erie.

Draining approximately 821,671 acres of northeastern Indiana, the Maumee Service Area is mainly located within the Eastern Corn Belt Plains ecoregion and is characterized by rolling till plains where original beech forests and scattered elm-ash swamp forests have been replaced by farming; soils in this ecoregion are good for cropland. A smaller section of the service area located within Allen County is part of the Huron/Erie Lake Plains ecoregion, more specifically the Maumee Lake Plains sub-region, and is characterized by broad plains interspersed by sand dunes, end moraines, and beach ridges; the Maumee Lake Plains are poorly-drained and contain fertile soil. Elm-ash and beech forests have been replaced by drained farmland, and agricultural activities as well as ditching have greatly degraded the habitats and water quality of the Upper Maumee's aquatic systems (Ecoregions of Indiana: U.S. EPA).

The Maumee Service Area is dominated by agriculture, deciduous forest, and developed, open land. Woody wetlands and emergent, herbaceous wetlands make up approximately 2.8% of the Maumee Service Area (Fry, et al., 2011).

A.12.2 Resource Status (*historic impacts, current conditions, and threats*)

Prior to European settlement, portions of the Upper Maumee Watershed (HUC-04100005) and Auglaize Watershed (HUC-04100007) were positioned within the region of the Great Black Swamp which was a combination of marshland and forested swamps covering over 9,000 acres. By the beginning of the twentieth century, less than 4% of the Great Black Swamp remained due to drainage practices (Mitsch & Gosselink, 2007). Agriculture is the predominant land use in the Great Black Swamp area today.

In addition to the previously discussed historical impacts in Indiana waters, a report from the mid-1990s by the St. Joseph River Watershed Initiative recognized sedimentation, pesticides, pathogens, and nutrients as target water quality issues within the St. Joseph River Watershed (HUC-04100003) (St. Joseph River Watershed Initiative: U.S. EPA, 1996). Causes of impairments to the remaining watersheds within the service area included impaired biotic communities caused by ammonia, nutrients, and E. coli. More recently, IDEM reported that the leading causes of impairment to the streams of the Maumee Service Area were E. coli, impaired biotic communities, and nutrients. Additional causes included PCBs and mercury in fish tissue (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

Total wetland acreage within the Maumee Service Area is approximately 35,144 acres, or 4.3% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 17,099 acres, or 2.1% total land cover within the service area.

A.12.3 Compensatory Mitigation Approach & Priorities

Habitat conversion is the primary cause of aquatic resource impairments in the Maumee Service Area. This results in negative impacts to aquatic fauna and flora as well as water quality degradation. Multiple mitigation goals will be considered for projects within the Maumee Service Area, for example, mitigation projects will promote the development and protection of wetland complexes, including connecting wetland habitats. A priority for this service area will be restoring wetlands and streams near and adjacent to the Great Black Swamp. Wetland restoration will focus on replacing impacted wetlands as well as returning forested wetlands to the landscape. The wetlands in this service area were once dominated by forested wetlands; therefore this will be a priority for this service area. Stream restoration activities will be focused on reconnecting the stream to the floodplain and establishing a riparian buffer.

Coordination with the Maumee River Basin Commission (MRBC) for restoration and/or enhancement projects within the Maumee Service Area will also be pursued. Currently, the MRBC has a voluntary agricultural land-use conversion program that includes wetland

restoration. Coordination with this program and their local landowner contacts could provide added value in this service area.

Currently, the following land trusts exist within the service area: Wood-Land-Lakes RC&D Council, Blue Heron Ministries, Steuben County Lakes Council Land Trust, and ACRES Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Cedar Creek WMP, St. Joseph River (Maumee) WMP, Lower St. Joseph River-Bear Creek WMP, St. Joseph River Watershed Initiative WMP, and St. Marys WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 236,280 acres, or 28.8% land cover, within the service area, out of which 171,908 acres have the potential to be restored; this was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. Approximately 1,117 linear miles of stream within the Maumee Service Area are located within 100 feet of agricultural fields; these linear miles of stream could provide opportunities for re-habilitation.

A.13.0 KANKAKEE SERVICE AREA

A.13.1 Service Area Description

The Kankakee Service Area is located in northwestern Indiana and is composed of the following two 8-digit HUCs which form the Kankakee River Basin:

- **07120001 - Kankakee**
- **07120002 - Iroquois**

The Kankakee Service Area includes all or portions of thirteen Indiana counties listed below in the Lake Region and Northern Moraine physiographic region.

Lake	Kosciusko	White
Porter	Marshall	Benton
LaPorte	Starke	Newton
St. Joseph	Pulaski	Jasper
Elkhart		

The Kankakee River Basin drains 1,913,059 acres within northwestern Indiana and is located in the Central Corn Belt Plains and Northern Indiana Drift Plains ecoregions. The western portion of the service area is located in the Central Corn Belt Plains and is predominantly rural. The eastern portion is located in the Northern Indiana Drift Plains and is characterized by greater woodlands, lower relief, and less urban-industrial activity than the western portion of the service area (Ecoregions of Indiana: U.S. EPA). The basin as a whole is characterized by its flat to rolling landscape and the channel of the Kankakee River valley which includes man-made drainage ditches and small areas of natural lakes and wetlands (IDNR Division of Water, 1990).

The primary major rivers within the service area are the Kankakee, Yellow, and Iroquois Rivers. Originating near South Bend, the Kankakee River flows southwest toward Illinois where it is joined with the Iroquois River, traveling west where it then converges with the Des Plaines River in Illinois to form the Illinois River.

The Kankakee Service Area is dominated by agriculture (72%) and deciduous forest (9.5%); in addition, woody wetlands and emergent herbaceous wetlands make up approximately 2.9% of the Kankakee Service Area (Fry, et al., 2011).

A.13.2 Resource Status (*historic impacts, current conditions, and threats*)

Existing within the Kankakee River Basin is the Grand Kankakee Marsh which was once home to one of the richest wildlife sources in North America (Everglades of the North- The Story of the Grand Kankakee Marsh, 2013). Prior to European settlement over 200 years ago, the Grand Kankakee Marsh spanned across nearly 500,000 acres and eight counties of Indiana and was one of the largest wetlands in the continental United States (Grand Kankakee Marsh: U.S. FWS Division of Conservation Planning, 2011). The Kankakee River Basin provides habitat for migrating and breeding waterfowl as well as other wetland-associated wildlife species; numerous threatened and endangered species, both state and federal, depend upon the Kankakee River Basin which provides refuge to these species (Upper Mississippi River & Great Lakes Region Joint Venture, 1998).

Following the Civil War, agriculture was in high demand, and the Grand Kankakee Marsh was drained for its fertile soil; ditches were excavated and wetlands were drained to the Kankakee River (Kankakee River: IDNR). By 1923, nearly 250 miles of the Kankakee River were straightened and dredged into what is now a 90 mile long ditch; these draining practices drastically decreased the migratory bird population within the United States (Everglades of the North- The Story of the Grand Kankakee Marsh, 2013). Today, less than 30,000 acres, or 6%, of the Grand Kankakee Marsh exists within the Kankakee

Watershed due to human alterations (The Kankakee River Valley: IDNR, 1997). Approximately 87% of the Grand Kankakee Marsh has been lost to draining and farmland conversion alone (Schoon, 2013), and of the 1.9 million acre Kankakee River Basin within Indiana, 1.6 million acres (84%) are currently being utilized as farmland (Kankakee River Basin Commission, 2012).

Historically, sedimentation was the main cause of water quality issues within the Kankakee River Basin, especially within the Kankakee River. Hydromodification was the primary source of impairments, causing streambank erosion, reduction in aquatic fauna diversity, loss of habitat, and growth suppression. The results from stream channelization within the Kankakee River Basin are still evident today (Ivens, Bhowmik, Brigham, & Gross, 1981).

More recently, IDEM reported that the leading causes of impairment to the streams of the Kankakee Service Area were impaired biotic communities, dissolved oxygen, E. coli, and PCBs and mercury in fish tissue. Additional causes included nutrients and chloride. Common causes of impairments to freshwater lakes within the service area were pH and phosphorus (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

Total wetland acreage within the Kankakee Service Area is approximately 86,988 acres, or 4.6% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 43,685 acres, or 2.3% total land cover within the service area.

A.13.3 Compensatory Mitigation Approach & Priorities

Habitat alteration is a common cause of aquatic resource impairments in the Kankakee Service Area, often resulting in biodiversity loss, impacts to aquatic fauna and flora, and water quality degradation. Wetland restoration will focus on restoring land currently used for agriculture to forested wetlands and the historical large emergent wetlands. Stream restoration will focus on connecting streams to floodplains with riparian buffers. This service area has a significant amount of regulated drains that will make this a more difficult priority. Coordination with the Kankakee River Basin Commission may be a beneficial resource since it has a wide range of representation on the Commission from other local agencies and organizations.

Currently, the following land trusts exist within the service area: Woodland Savanna Land Conservancy, Trillium Land Conservancy, Wood-Land-Lakes RC&D Council, LaPorte County Conservation Trust, ACRES Land Trust, and NICHES Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Flat Lake (subwatershed) WMP, NIRPC WMP, and Upper Iroquois WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are

updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 819,101 acres, or 42.8% land cover, within the service area, out of which 670,629 acres have the potential to be restored; this was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. Approximately 3,853 linear miles of streams in the Kankakee Service Area are located within 100 feet of agricultural fields these linear miles of stream could provide opportunities for re-habilitation.

A.14.0 UPPER WABASH SERVICE AREA

A.14.1 Service Area Description

The Upper Wabash Service Area is located in northern Indiana and is composed of the following seven 8-digit HUCs:

- **05120106 - Tippecanoe**
- **05120105 - Middle Wabash-Deer**
- **05120107 - Wildcat**
- **05120104 - Eel**
- **05120101 - Upper Wabash**
- **05120102 - Salamonie**
- **05120103 - Mississinewa**

The Upper Wabash Service Area includes all or portions of twenty-eight Indiana counties listed below and is located primarily in the Central Till Plain physiographic region.

Kosciusko	Delaware	Pulaski
Noble	Madison	Starke
Whitley	Tipton	Marshall
Allen	Clinton	
Adams	Tippecanoe	Fulton
Jay	Benton	Cass
Randolph	White	Carroll
Blackford	Jasper	Howard

Miami	Huntington	Wells
Wabash	Grant	

The Upper Wabash Service Area is the largest of the eleven service areas having an area of 6,915 square miles; this area accounts for over 22% of the entire state of Indiana. The service area is located primarily in the Eastern Corn Belt Plains ecoregion; the eastern portion is within the Clayey, High Lime Till Plains sub-region and is characterized by soils which are less productive and more artificially drained than the western portion of the service area located in the Loamy, High Lime Till Plains sub-region. The Loamy, High Lime Till Plains area is characterized by soils that developed from limy, loamy, glacial deposits. Currently, both sub-regions are dominated by corn, wheat, soybean, and livestock farming. The northwestern-most portion of the service area is located in the Northern Indiana Drift Plains ecoregion; the land is flat to rolling and is characterized by its dunes, end moraines, and lacustrine deposits with its tributaries being fed by a significant amount of groundwater. In addition, the northernmost portion of the service area is characterized by pothole lakes, ponds, marshes, bogs, and clear streams; the area is dominated by corn, soybean, and livestock farming (Ecoregions of Indiana: U.S. EPA).

Primary rivers flowing through the Upper Wabash Service Area are the Wabash River and its many tributaries, including the Mississinewa, Eel, Tippecanoe, White, and Vermilion Rivers as well as Sugar Creek and Wildcat Creek. The Wabash River originates as a drainage ditch in Ohio and enters Indiana in Jay County. It flows northwest towards the Little Wabash River near Huntington County and continues west and converges with the Eel River in Cass County. An additional confluence of this river occurs in Tippecanoe County with the Tippecanoe River; from here, the Wabash River flows through the Middle Wabash Service Area in Tippecanoe County, eventually confluences with the Ohio River.

The Upper Wabash Service Area is dominated by agriculture (77%), deciduous forest (8.6%), and developed, open land; woody wetlands and emergent herbaceous wetlands compose less than one percent of the land cover within the Upper Wabash Service Area (Fry, et al., 2011).

A.14.2 Resource Status (*historic impacts, current conditions, and threats)*

Shorelines of the natural lakes within the Upper Wabash Service Area, more specifically within the Tippecanoe Watershed (HUC-05120106), have been altered by humans throughout history, resulting in the loss of important lacustrine wetland areas. These alterations were caused by a variety of activities such as road construction and residential development. As a result of these alterations, natural areas have been fragmented and biodiversity has been significantly reduced. This decrease in diversity and productivity has ultimately caused a decrease in the health of aquatic ecosystems existing within lacustrine wetlands; human activities have proven to be primarily responsible for the degradation of plant communities, wildlife habitat, and water quality of these wetlands (Price, 2009).

Historically, sedimentation by hydromodification and nutrients from agricultural and urban runoff were the main causes of water quality issues within the Upper Wabash Service Area, especially along the Wabash River and its major tributaries. Hydromodification frequently

causes streambank erosion, and sedimentation reduces aquatic habitat, spawning, and feeding areas for aquatic organisms. The Upper Wabash has the greatest amount of hydromodification of the service areas due to impoundments such as the Huntington, Salamonie, and Mississinewa Reservoirs as well as impoundments on the Tippecanoe River such as Lake Shafer and Freeman Lake. These impoundments have modified the natural flow regime of streams within the service area, often resulting in the degradation of stream banks and beds in addition to habitat alterations which significantly altered habitat for aquatic biota and decreased biodiversity.

More recently, IDEM reported that the leading causes of impairment to the streams of the Upper Wabash Service Area were E. coli, impaired biotic communities, and PCBs and mercury in fish tissue (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012). Hydromodification and nonpoint source pollutants continue to threaten aquatic biota of the Wabash River and its tributaries.

Total wetland acreage within the Upper Wabash Service Area is approximately 196,173 acres, or 4.4% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 93,435 acres, or 2.1% total land cover within the service area. The southern and western areas of the service area contain the least amount of wetlands (The Status of Wetlands in Indiana: IDNR, 1996); a majority of the service area is dominated by agriculture.

A.14.3 Compensatory Mitigation Approach & Priorities

Habitat conversion has been and continues to be a common cause of aquatic resource impairments in the Upper Wabash Service Area. This conversion results in impacts to aquatic fauna and flora as well as water quality degradation. In addition, hydromodification has been a main source of stream impairments, often causing a decrease in biodiversity. Wetland restoration will focus on returning marsh systems to the landscape. A supplemental goal will be to restore groundwater seep wetlands and the preservation of bogs. Stream Restoration will focus on restoring stream plan and profile, connecting streams to floodplains and establish a riparian buffer.

Impacts to freshwater lakes caused by a variety of alterations such as agriculture establishment and urbanization have resulted in habitat loss and have impacted aquatic fauna and flora. Mitigation projects will focus on potentially restoring areas within the Upper Wabash Service Area which will provide benefits and alleviate threats to these lakes. Additionally, coordination with the Wabash River Heritage Corridor Commission for restoration of important aquatic resources within the Wabash River will also be pursued.

Currently, the following land trusts exist within the service area: Woodland Savanna Land Conservancy, Trillium Land Conservancy, Wawassee Area Conservation Fund, Little River Wetlands Project, Wood-Land-Lakes RC&D Council, ACRES Land Trust, NICHES Land Trust, Red-tail Conservancy, and Central Indiana Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust

organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Eel River-Tick Creek WMP, Eel River (middle) WMP, Limberlost-Loblolly WMP, Upper Wabash River WMP, Mud Creek Headwaters WMP, Pete's Run WMP, Stahl Ditch-Kitty Run WMP, Turkey Creek/Askren/Round Prairie Creek WMP, and Upper Tippecanoe River WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 1,631,938 acres, or 36.9% land cover, within the service area, out of which 1,358,330 acres have the potential to be restored; this was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. The Upper Wabash Service Area contains the greatest area of hydric and partially hydric soils and also has the greatest area of potential restorable land out of the service areas. Approximately 6,303 linear miles of streams within the Upper Wabash Service Area are located within 100 feet of agricultural fields; these linear miles of stream could provide opportunities for re-habilitation.

A.15.0 MIDDLE WABASH SERVICE AREA

A.15.1 Service Area Description

The Middle Wabash Service Area is located in western Indiana and is composed of all or part of the following six 8-digit HUC watersheds:

- **05120109 - Vermilion**
- **05120108 - Middle Wabash-Little Vermilion**
- **05120110 - Sugar**
- **05120111 - Middle Wabash-Busseron**
- **05120203 - Eel**
- **05120113 - Lower Wabash (small portion)**

The Middle Wabash Service Area includes all or portions of twenty Indiana counties listed below and is located primarily within both the Central Till Plain and Southern Hills and Lowlands physiographic regions.

Knox	Putnam	Clinton
Sullivan	Parke	Tipton
Greene	Hendricks	Tippecanoe
Owen	Vermilion	Warren
Clay	Boone	Benton
Vigo	Montgomery	White
Morgan	Fountain	

The Middle Wabash Service Area drains approximately 5,415 square miles of western Indiana and is located in a variety of ecoregions; the northernmost portion is located in Central Corn Belt Plains; the east-central portion is within Eastern Corn Belt Plains and Interior Plateau; the south-central portion of the service area is in Interior River Valleys and Hills. In the north, the land is characterized by dark, fertile soils; the land was once covered by prairie and oak-hickory forests but has been converted to agriculture. The southern area is composed of wide, flat-bottomed terraced valleys and dissected glacial till plains and contain loamy to sandy till deposits. The southern half of the Middle Wabash Service Area contains a large amount of Indiana's surface and underground mines, mainly in the Lower Wabash and Eel Watersheds. The remainder of the region in the east is primarily a level till-plain with broad bottomlands and is characterized by soils which developed from loamy, limy glacial deposits; the soils are productive for agricultural crops, and a majority of the land use is agricultural (Ecoregions of Indiana: U.S. EPA).

The Wabash River enters the Middle Wabash Service Area in Tippecanoe County after its confluence with the Tippecanoe River and Wildcat Creek. The Wabash River travels south through Warren and Fountain Counties where it flows along the Indiana/Illinois border beginning in Vigo County; primary tributaries of the Wabash River within this service area include Sugar Creek, the Vermilion and Little Vermilion Rivers, and Big Raccoon Creek.

The Middle Wabash Service Area is dominated by agriculture (63.6%) and deciduous forest (19.8%); woody wetlands and emergent herbaceous wetlands accounted for less than one percent of the total land cover (Fry, et al., 2011).

A.15.2 Resource Status (*historic impacts, current conditions, and threats*)

During the early 1900s, the Wabash River within the Middle Wabash Service Area was characterized as being brown and opaque with suspended sediments from Attica to Vermilion County. Reports from the mid-1990s identified sewage, mill and cannery waste, coal mine drainage, and dairy production wastes as sources of water quality impairments within the middle Wabash River, and increased flooding caused by an inadequate number of runoff channels and man-made landscape alterations; the Wabash River and its tributaries were polluted as a result of flood events. Up until the mid-1980s, the Wabash River continued to be degraded due to agricultural development and urbanization. Since

this time, major improvements to water quality have been made, such as point source pollution reductions; however, high nutrient concentrations and PCB and mercury levels in fish tissue continue to exist within areas of the river and its tributaries (Wabash River Enhancement Corporation, 2011).

Historically, a majority of mined land in the western region of the Middle Wabash Service Area was abandoned without any restoration efforts; acid mine drainage degraded many aquatic systems due to low pH to the point where aquatic areas were devoid of local flora and fauna. Historical impacts from coal mining activities in the area included seeping, acidic water and heavy metals contamination (IDNR Division of Reclamation, 2010).

Existing within the Middle Wabash Service Area is the Region of the Great Bend of the Wabash River near the city of Lafayette. Nearly 42% (200 square miles) of this area contains tile-drained soils, and many invasive species impact portions of the area (Wabash River Enhancement Corporation, 2011). There are several large areas of human-disturbed land in the service area, particularly in Vermillion, Vigo, Clay and Parke Counties. Siltation, nutrients, and rapid drainage due to field tiling are additional impacts of agricultural activities existing within the service area (USACE Louisville District, 2011).

More recently, IDEM reported that the leading causes of impairment to the streams of the Upper Wabash Service Area were E. coli, impaired biotic communities, PCBs and mercury in fish tissue, and dissolved oxygen. Freshwater lake impairments were caused by phosphorus and pH (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

Total wetland acreage within the Middle Wabash Service Area is approximately 148,707 acres, or 4.3% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 76,127 acres, or 2.2% total land cover within the service area. Wetlands are most prominent along the Wabash River and its tributaries; wetland densities are most scarce in the Central Corn Belt Plains and Eastern Corn Belt Plains ecoregions in counties such as Montgomery, Putnam, and Warren (The Status of Wetlands in Indiana: IDNR, 1996).

A.15.3 Compensatory Mitigation Approach & Priorities

Habitat conversion is the primary source of aquatic resource impairments in the Middle Wabash. Wetland restoration projects will focus on restoring forested and emergent wetland systems along the Wabash River. Stream restoration will focus on restoring plan and profile, connection to flood plains, and establishing riparian buffers along tributaries to the Wabash River.

Impacts to freshwater lakes caused by a variety of alterations such as agriculture establishment and urbanization have resulted in habitat loss and have impacted aquatic fauna and flora. Mitigation projects will focus on restoring areas within the Middle Wabash Service Area which will provide ecological benefits and alleviate threats to these lakes. Additionally, coordination with the IDNR Healthy Rivers Initiative and the Wabash River

Heritage Corridor Commission for restoration of important aquatic resources within the Wabash River will also be pursued.

Currently, the following land trusts exist within the service area: Ouabache Land Conservancy, Indiana Karst Conservancy, Four Rivers RC&D, NICHES Land Trust, Sycamore Land Trust, and Central Indiana Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Big Walnut-Deer Creeks WMP, Busseron Creek WMP, Lake Manitou WMP, Lake Maxinkuckee WMP, Little Sugar Creek WMP, Little Vermillion River WMP, Little Wildcat Creek WMP, Lower Eel River WMP, Region of the Great Bend of the Wabash River WMP, South Fork Wildcat WMP, Lauramie Creek WMP, Spring Creek-Lick Run WMP, and Turtle Creek WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 781,084 acres, or 22.5% land cover, within the service area, out of which 682,439 acres have the potential to be restored; this was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. Approximately 3,824 linear miles of stream within the Middle Wabash Service Area are located within 100 feet of agricultural fields; these linear miles of stream could provide opportunities for re-habilitation.

A.16.0 UPPER WHITE SERVICE AREA

A.16.1 Service Area Description

The Upper White Service Area is located in central Indiana and is composed of the following 8-digit HUC watershed:

- **05120201 - Upper White**

The Upper White Service Area includes all or portions of sixteen Indiana counties listed below and is located primarily within the Central Till Plain physiographic region; the entirety of the Upper White Watershed is within Indiana.

Madison	Johnson	Hendricks
Delaware	Morgan	Boone
Randolph	Brown	Hamilton
Henry	Monroe	Tipton
Hancock	Owen	Clinton
Marion		

The Upper White Service Area has a drainage area of approximately 2,720 square miles within Indiana and includes over 2,180 miles of streams (Tedesco, Hoffmann, Bihl, Hall, Barr, & Stouder, 2011). The majority of the service area is located in the Eastern Corn Belt Plains ecoregion and Central Till Plain natural region. The till plains are the most extremely farmed regions within the watershed consisting of generally impervious soils; these surfaces limit infiltration and promote surface runoff. The remainder of the watershed lies within the Interior Plateau ecoregion and the Highland Rim natural region; these areas tend to have poorly drained soils and are characterized by both hills and valleys in addition to a karst region in the southwestern most portion of the watershed (Ecoregions of Indiana: U.S. EPA).

Within the Upper White Service Area flows the West Fork of the White River and its numerous tributaries. Originating in Randolph County and traveling westward through the watershed, the West Fork of the White River passes through the state's capitol of Indianapolis. The river continues to travel southwest through Morgan County until it converges with the East Fork of the White River. From here, the White River travels southwest until joining the Wabash River at the Indiana/Illinois state border; the Wabash River confluences with the Ohio River and eventually drains to the Mississippi River.

A majority of the Upper White Service Area is dominated by agriculture (53.6%) and is most prominent in the northern and northeastern portions of the watershed. Moving toward the middle of service area into Indianapolis, the dominant cover type transitions from agriculture to developed land. Developed land accounts for 25.7% of the total land cover within the Upper White Service Area (Fry, et al., 2011). The major cover types of the southernmost section of the watershed are grasslands and deciduous forest.

A.16.2 Resource Status (*historic impacts, current conditions, and threats*)

Due to its highly urbanized central area and intersection of multiple highways, the Upper White Service Area has been subjected to vast amounts of wetland impacts as compared to a majority of the service areas. The bulk of these impacts were located in and around the state's greatest populated city and capitol, Indianapolis, and along its numerous, adjacent highways; these impacts have impaired a large portion of the aquatic systems within the service area.

Before the implementation of the Clean Water Act in the 1970s, point-source pollution of the White River and its tributaries came from sources such as waste-water treatment facilities, combined sewer outflows, and battery and transmission plants. Non-point sources of impairment to the waters of the Upper White Service Area included urban and agricultural runoff; a majority of these impairments still exist today. Stream banks within the service area have been eroded due to stream channelization, causing sedimentation; this has negatively impacted aquatic habitats as well as the natural flow regimes of streams (White River WMP, 2011).

According to the 2011 Upper White River Watershed Regional Watershed Assessment and Planning Report, agriculture, commonly found throughout headwaters of streams within the Upper White Service Area, has impacted streams due to nutrient loading; a recommended effort is the establishment of effective buffers. Urban areas within the service area have also impacted streams with organic pollutants due to combined sewer overflows and suspended sediment from erosion. Additional sources of impairments included failing septic systems, land use alterations, and road construction (Tedesco, Hoffmann, Bihl, Hall, Barr, & Stouder, 2011) .

More recently, IDEM reported E. coli, PCBs and mercury in fish tissue, and impaired biotic communities as causes of impairment to streams within the Upper White Service Area. Causes of impacts to freshwater lakes and reservoirs included algae, taste, and odor (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012). Wetlands in this service area have been lost due to agricultural conversion and urban development (Tedesco, Hoffmann, Bihl, Hall, Barr, & Stouder, 2011).

Total wetland acreage within the Upper White Service Area is approximately 60,254 acres, or 3.5% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 25,456 acres, or 1.5% total land cover within the service area. Wetland concentrations are greatest in Hamilton, Marion, and Morgan Counties.

A.16.3 Compensatory Mitigation Approach & Priorities

Habitat conversions by urbanization and agriculture are the primary sources of aquatic resource impairments in the Upper White Service Area. Wetland restoration will focus on restoring forested and emergent wetlands with buffers. Buffers around restored wetlands will help protect the wetlands from any negative impacts from existing and/or future urbanization. Stream restoration efforts will be focused on re-meandering stream channels, connecting streams to flood plains, and establishing a riparian buffer on headwater streams.

Additional potential projects that will be investigated will be located along the main stem of the White River as well as areas adjacent to existing projects and/or land acquired as part of the White River Restoration following the Guide Corporation fish kill. Coordination with the Upper White River Watershed Alliance and attending their meetings would provide benefits to the program by utilizing the most up to date watershed data and plans that exist within the service area that can assist in locating restoration projects.

Currently, the following land trusts exist within the service area: Mud-Creek Conservancy, Red-tail Conservancy, Sycamore Land Trust, and Central Indiana Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Bacon Prairie Ditch WMP, Morse Reservoir/Cicero Creek WMP, Buck Creek WMP, Cool Creek WMP, Duck Creek WMP, Lilly & Little Duck Creek WMP, Eagle Creek WMP, Geist Reservoir Upper Fall Creek WMP, Indian Creek WMP, Little Cicero Creek WMP, Lower Fall Creek WMP, Lower White Lick Creek WMP, Muncie Creek-Hamilton Ditch and Truitt Ditch-White River WMP, Pleasant Run WMP, Stony Creek WMP, Swanfeld Ditch WMP, Upper White River (Delaware Co.) WMP, and WMP for the White River Watershed in North Central Morgan Co. (Lambs Creek WMP). However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 593,843 acres, or 34.1% land cover, within the service area, out of which 440,492 acres have the potential to be restored; this was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. Approximately 1,447 linear miles of streams within the Upper White Service Area are located within 100 feet of agricultural fields; these linear miles of stream could provide opportunities for re-habilitation.

A.17.0 WHITEWATER-EAST FORK WHITE SERVICE AREA

A.17.1 Service Area Description

The Whitewater-East Fork White Service Area is located in southeastern Indiana and is composed of all or portions of the following seven 8-digit HUC watersheds:

- **05120204 - Driftwood**
- **05120205 - Flatrock-Haw**
- **05120206 - Upper East Fork White**
- **05120207 - Muscatatuck**

- **05080001 - Upper Great Miami**
- **05080003 - Whitewater**
- **05080002 - Lower Great Miami**

The Whitewater-East Fork White Service Area includes all or portions of twenty-three Indiana counties listed below and is located within the Central Till Plain and Southern Hills and Lowlands physiographic regions.

Madison	Rush	Brown
Randolph	Fayette	Jackson
Henry	Union	Jennings
Wayne	Franklin	Jefferson
Hancock	Dearborn	Scott
Marion	Ripley	Washington
Johnson	Decatur	Clark
Shelby	Bartholomew	

The Whitewater-East Fork White Service Area drains approximately 5,139 square miles of southeastern Indiana and is primarily located in the Eastern Corn Belt Plains ecoregion and its various sub-regions; these regions include the Loamy, High Lime Till Plains in the northwest, the Whitewater Interlobate Area in the northeast, and the Pre-Wisconsin Drift Plains in the south. Glaciers from the Wisconsin Stage over 50,000 years ago formed the northern portion of the Whitewater-East Fork White Service Area; the soils were developed from loamy, limy glacial deposits. The northeastern portion of the service area is defined by its coarse-bottomed streams fed by an abundance of groundwater and is where the Whitewater River flows. The southern portion of the Whitewater-East Fork White Service Area is characterized by acidic and extremely leached till and scattered sinkhole areas; prior to a majority of the land being converted to agriculture, beech forests and elm-ash swamp forests dominated the region. The remainder of the eastern portion of the Whitewater-East Fork White Service Area along the Indiana/Ohio border is part of the Interior Plateau ecoregion and Bluegrass natural region and is characterized by mosaic forests and its rugged terrain underlain by limestone and shale; this region has been extremely dissected by valleys and hills (Ecoregions of Indiana: U.S. EPA).

The Whitewater River is a significant river which flows through the Whitewater-East Fork White Service Area and is a main tributary of the Big Miami River of Ohio, draining into the Ohio River. The Whitewater River originates as two forks in Randolph and Wayne Counties in Indiana, flowing south toward Ohio and eventually converging in Franklin County; it is known for its steep gradient, falling at an average of six feet per mile (Whitewater River: IDNR).

The Whitewater-East Fork White Service Area is dominated by agriculture (56.9%) and deciduous forest (24.8%); woody wetlands and emergent herbaceous wetlands account for less than one percent in this service area (Fry, et al., 2011).

A.17.2 Resource Status (*historic impacts, current conditions, and threats*)

Throughout the 1900s, sedimentation and nutrient loading were main causes of impairments in the service area due to land-use conversion and stream-bank erosion. These impairments, as well as water contamination and pathogen transport from livestock stream access, significantly degraded aquatic habitats. Within the Whitewater River Basin of the service area, livestock with direct access to streams and rivers have caused stream-bank erosion and manure in the waterway can cause illnesses to humans and contributes to the impairments of these waters. In addition, agricultural runoff and failing septic systems carrying pollutants have drained into existing karst-area sinkholes, which have often been directly deposited into local water sources such as underground aquifers and streams (West Fork Watershed Steering Committee; Wayne County Soil and Water Conservation District, 2011).

More recently, IDEM reported E. coli, impaired biotic communities, dissolved oxygen, and PCBs and mercury in fish tissue as the main causes of impairments to streams within the Whitewater-East Fork White Service Area. Additional causes included free cyanide and nutrients. Algae, taste, and odor were reported causes of impairments to freshwater lakes and reservoirs within the service area (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

Total wetland acreage within the Whitewater-East Fork White Service Area is approximately 133,088 acres, or 4.0% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 90,190 acres, or 2.7% total land cover within the service area. Wetlands are most prominent in the southwest portion of the service area in Bartholomew, Jennings, Jefferson, Jackson and Scott Counties; land-use conversion is the main reason for the decline in Indiana's wetlands throughout history.

A.17.3 Compensatory Mitigation Approach & Priorities

Habitat conversion to agriculture is the primary cause of aquatic resource impairments in the Whitewater-East Fork White Service Area. Wetland restoration will focus on restoring forested wetlands, emergent wetlands and wetlands surrounding karst features. Protection of groundwater seep wetlands and headwater wetlands will be a secondary priority in this service area.

Coordination with the IDNR Healthy Rivers Initiative (HRI) within the Muscatatuck Watershed (HUC-05120207) for possible stream and wetland restoration projects will also be pursued as well as pursuing mitigation projects adjacent to existing HRI projects. Headwater streams as well as wetlands surrounding these headwater streams will be a priority for mitigation projects in this service area. Restoration activities for stream projects will focus on restoring the plan and profile, reconnecting flood plains and establishing riparian buffers with floodplain wetlands.

Currently, the following land trusts exist within the service area: Three Valley Conservation Trust, Whitewater Valley Land Trust, Inc., Oak Heritage Conservancy, Indiana Karst Conservancy, Red-tail Conservancy, Sycamore Land Trust, and Central Indiana Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Brandywine Creek WMP, Central Muscatatuck WMP, Clifty Creek WMP, Conns Creek WMP, Flatrock-Haw WMP, Garrison Creek WMP, Lick Creek WMP, Little Blue River WMP, Middle Fork-East Fork Whitewater WMP, Mud Creek WMP, Sand Creek WMP, Sugar Creek WMP, and Youngs Creek WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 617,142 acres, or 18.8% land cover, within the service area, out of which 484,524 acres have the potential to be restored; this was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. Approximately 3,896 linear miles of stream within the Whitewater-East Fork White Service Area are located within 100 feet of agricultural fields; these linear miles of stream could provide opportunities for re-habilitation.

A.18.0 LOWER WHITE SERVICE AREA

A.18.1 Service Area Description

The Lower White Service Area is located in southeastern Indiana and is composed of the following three 8-digit HUC watersheds:

- **05120202 - Lower White**
- **05120208 - Lower East Fork White**
- **05120209 - Patoka**

The Lower White Service Area includes all or portions of nineteen Indiana counties listed below and is located within the Southern Hills and Lowlands physiographic region.

Owen	Lawrence	Gibson
Sullivan	Knox	Pike
Greene	Daviess	Dubois
Monroe	Martin	Crawford
Brown	Washington	Warrick
Bartholomew	Orange	Spencer
Jackson		

Draining approximately 4,564 square miles of Indiana, the Lower White Service Area is located in both the Interior Plateau and Interior River Valleys and Hills ecoregions. The eastern half of the service area (Interior Plateau) is characterized by karst topography, containing a concentration of sinkhole areas as well as sinking stream basins in the south. The easternmost part of the Lower White Service Area is mostly forested and is distinguished by its narrow valleys and dissected high hills with silt loam soils. Moving west, sink holes and underground drainage dominate the area, especially within the Lower White Watershed, and the majority of soil here is leached; this area transitions to a more rugged, wooded area moving toward the western half of the service area (Interior River Valleys and Hills) (Ecoregions of Indiana: U.S. EPA).

The western half of the service area is characterized by lowlands formed in sedimentary rock, and till deposits which are common north of the White River. Valleys are widespread within the region, and some of the most distinguishing features are the historical and active mines in the southwest (Ecoregions of Indiana: U.S. EPA). A number of large-scale

wetland impacts have occurred near the surface mines in the Lower White Service Area bordering the Middle Wabash Service Area in addition to areas in the Patoka Watershed. Historically, a majority of mined land was abandoned without any restoration efforts; acid mine drainage degraded many aquatic systems in the past due to low pH to the point where the areas were devoid of local flora and fauna. The passing of the Surface Mining Control and Reclamation Act (SMCRA) by the United States government in 1977 has set strict reclamation rules for mining operations; the once degraded aquatic systems are now able to support aquatic life with their improved water quality (Watershed Management Plan: Lower Patoka River, 2008).

The Lower White Service Area contains many of Indiana's well-known aquatic systems including the White River (both the East Fork and West Fork), Monroe Lake, and the Patoka River. The East Fork of the White River enters the Lower White Service Area on the border of Washington and Jackson counties; both the East and West Forks of the White River travel southwest until their convergence at the Knox, Daviess, and Pike County borders; the White River joins with the Wabash River at the Indiana/Illinois border which eventually confluences with the Ohio River. Originating in the Hoosier National Forest, the Patoka River travels 138 miles westward and passes through one of Indiana's flood control reservoirs, Patoka Lake; the river confluences with the Wabash River in Gibson County. Formed from the forks of Salt Creek, Monroe Lake is Indiana's largest freshwater lake and is also one of Indiana's flood control reservoirs (Monroe Lake: U.S. Army Corps of Engineers, Louisville District).

The Lower White Service Area is dominated by deciduous forest (47%) and agriculture (30%); woody wetlands and emergent herbaceous wetlands account for less than one percent of the total land cover within the service area.

A.18.2 Resource Status (*historic impacts, current conditions, and threats*)

Similar to the Upper White Service Area, the Lower White Service Area contains both the East and West Forks of the White River; a significant amount of wetland impacts have occurred along the White River and its tributaries as well as numerous other areas scattered throughout the service area.

Throughout history, causes of impairments to water-bodies in the Lower White Service Area included sedimentation and nutrient loading; agriculture and urbanization were primary sources of nutrient-related impairments. Waste from farm animals and fertilizers from agricultural lands have both polluted ground and surface waters within the service area. Municipal industrial wastewater as well as overflows of combined sewers were often discharged directly into streams; this greatly and negatively impacted biota of streams (Martin, Crawford, Frey, & Hodgkins, 1996). Stream banks within the service area have also been eroded due to stream channelization by human alteration, causing sedimentation; this has negatively impacted aquatic habitats as well as the natural flow regimes of streams (White River WMP, 2011).

In addition to these historical impacts, acid mine drainage degraded many aquatic systems within the Lower White Service Area to the point where local fauna and flora could not survive; acid mine drainage heavily impacted aquatic resources caused by the seepage of highly acidic water and heavy metals to groundwater and surface water (IDNR Division of Reclamation, 2010).

More recently, IDEM reported the primary causes of impairments to the Lower White Service Area included E. coli, impaired biotic communities, PCBs and mercury in fish tissue, dissolved oxygen, and nutrients. Additional, but not prominent, causes of impairments included free cyanide, lead, mercury, sulfate, siltation, and pH. Common causes of impairments to freshwater lakes and reservoirs in this service area were taste, odor, and algae (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

A majority of IDNR-managed lands lie within the Lower White Service Area, more specifically near Monroe and Patoka Lakes and the Patoka and White Rivers. These lands provide valuable resources to wildlife and surrounding landscapes, for example, the Patoka National Wildlife Refuge was recognized as a focus area for waterfowl migration habitat. Objectives of the Upper Mississippi River & Great Lakes Region Joint Venture Implementation Plan drafted in 1998 for Indiana were to conserve acreage of breeding and migratory waterfowl habitat in addition to supporting annual duck breeding populations; the refuge provides some of the most productive wood duck nesting habitat in the state and is used by waterfowl during both fall and spring migration (Upper Mississippi River & Great Lakes Region Joint Venture, 1998).

Total wetland acreage within the Lower White Service Area is approximately 150,539 acres, or 5.2% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 70,084 acres, or 2.4% total land cover within the service area. Wetlands are greatest in the western portion of the service area in the Interior River Valleys and Hills ecoregion (The Status of Wetlands in Indiana: IDNR, 1996).

A.18.3 Compensatory Mitigation Approach & Priorities

Habitat conversion for agriculture is a common source of aquatic resource impairment in the Lower White Service Area. Wetland restoration will focus on a mix of forested and emergent wetlands along the White and Patoka Rivers. Stream restorations will focus on reconnecting streams to flood plains and establishing forested buffers along the White and Patoka Rivers.

Since portions of the Lower White Service Area contain subterranean karst systems, additional restoration goals in this service area includes restoration, re-establishment and/or rehabilitation of wetlands and streams near surface openings to subterranean systems, preservation of karst stream tributaries, and restoration of woodland buffers surrounding cave entrances.

Currently, the following land trusts exist within the service area: Ouabache Land Conservancy, Four Rivers RC&D, Oak Heritgae Conservancy, Indiana Karst Conservancy, and Sycamore Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Beanblossom Creek WMP, Kessinger Ditch WMP, Lost River WMP, Lower Patoka River WMP, Middle Patoka River Watershed Source Water Protection Plan, North Fork Salt Creek/Sweetwater Creek WMP, Owen County Watershed Initiative WMP, Patoka Lake Source Water Protection WMP, Patoka River (upper) WMP, Prairie Creek WMP, and Yellowwood Lake WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 186,599 acres, or 6.4% land cover, within the service area, out of which 142,869 acres have the potential to be restored; this was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. Approximately 3,072 linear miles of streams within the Lower White Service Area are located within 100 feet of agricultural fields; these linear miles of stream could provide opportunities for re-habilitation.

A.19.0 UPPER OHIO SERVICE AREA

A.19.1 Service Area Description

The Upper Ohio Service Area is located in southern Indiana on the Indiana/Kentucky and Indiana/Ohio borders and is composed of the following three 8-digit HUC watersheds:

- **05140104 - Blue-Sinking**
- **05140101 - Silver-Little Kentucky**
- **05090203 - Middle Ohio-Laughery**

The Upper Ohio Service Area includes all or portions of fifteen Indiana counties listed below and is located within the Southern Hills and Lowlands physiographic region.

Perry	Jefferson	Ohio
Crawford	Ripley	Switzerland
Orange	Decatur	Clark
Washington	Franklin	Floyd
Scott	Dearborn	Harrison

The Upper Ohio Service Area drains approximately 2,374 square miles of southern Indiana and is located in both the Interior Plateau and Interior River Valleys and Hills ecoregions. Resting below the Lower White and Whitewater-East Fork White Service Areas, the southern border of the Upper Ohio Service Area is the Ohio River. The western portion of the service area is characterized by its rugged terrain and upland forest types; a majority of the area is thinly populated with minor areas of barren land and sandstone and limestone glades (Homoya, Abrell, Aldrich, & Post, 1985). The middle portion of the service area is part of the Southern Bottomlands natural region consisting of neutral to acidic silt loam soils. Bottomland forests, swamps and ponds make up a majority of the natural communities within this region. The remainder of the Upper Ohio Service Area is within the Bluegrass natural region, characterized by dissected plateaus underlain by limestone and shale (Hill).

The westernmost portion of the Upper Ohio Service Area and along its border with the Ohio-Wabash Lowlands Service Area contains a noticeable fraction of Indiana state and federally-owned lands. The Blue-Sinking Watershed, the westernmost watershed in the

service area, also has the greatest karst region in the state and is denoted by its many sinkholes and caves (Hasenmueller, Powell, Buehler, & Sowder, 2011).

The Blue River is a popular river to the region originating in Washington County and traveling south to the Ohio River; it is part of the Indiana Natural, Scenic, and Recreational River System and is managed by the Blue River Commission (Blue River Commission). The river travels through one of the most scenic and diverse areas in the entire state of Indiana; features along the river include Indian sites, caves, and vast forests, to name a few. The Blue River provides many ecological benefits to its aquatic community, including biodiversity and pristine habitat.

The Upper Ohio Service Area is dominated by deciduous forest (50%) and pasture/hay (21%), with only a small fraction being developed land (7%) of which a majority is open space (Wittman Hydro Planning Associates, Inc., 2002). Woody wetlands and emergent herbaceous wetlands account for less than one percent of the total land cover in the service area.

A.19.2 Resource Status (*historic impacts, current conditions, and threats*)

During the mid-1990s, streambank erosion and water pollution were general causes of impairments to service area; this was commonly the result of livestock access to streams. Additional impairments included land-use conversions and siltation caused by runoff from surrounding agricultural areas (IDNR Division of Outdoor Recreation, 1974). Agricultural runoff containing pollutants have drained into existing karst-area sinkholes within the service area; groundwater in this region is easily contaminated due to connectivity with surface waters via sinkholes and the karst topography. Impairments to wetlands and streams of the service area were commonly the result of land-use changes such as the conversion of forests to urban and agricultural lands.

More recently, IDEM identified the primary causes of impairments to the Upper Ohio Service Area's streams as E. coli, impaired biotic communities, dissolved oxygen, and PCBs and mercury in fish tissue. Additional causes included free cyanide and nutrients. Common causes of impairments to freshwater lakes within the service area included algae, taste, and odor (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

Total wetland acreage within the Upper Ohio Service Area is approximately 38,120 acres, or 2.2% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 12,684 acres, or 0.7% total land cover within the service area. Wetlands are more commonly found in Jefferson and Ohio Counties; wetland impacts have primarily occurred in Floyd and Clark Counties along their border of the Ohio River.

A.19.3 Compensatory Mitigation Approach & Priorities

Habitat conversion and sedimentation are common causes of aquatic resource impairments, respectively, in the Upper Ohio Service Area. Wetland restoration will focus on restoring bottomland forested wetlands along the Ohio River floodplain. Restoration of emergent wetlands in the higher elevations of the service area will be considered when appropriate and practical. Stream restoration will focus on restoring flood plain connectivity and establishment of riparian buffers along the Ohio River. Stream restoration will also consider floodplain connection in the upper reaches of streams.

Since the western border of the Upper Ohio Service Area contains subterranean karst systems, additional restoration goals in this service area includes restoration, re-establishment and/or rehabilitation of wetlands and streams near surface openings to subterranean systems, preservation of karst stream tributaries, and restoration of woodland buffers surrounding cave entrances. Additional goals could be focused on restoration and rehabilitation of Ohio River oxbows and restoring impaired streams segments of the Blue River watershed.

Currently, the following land trusts exist within the service area: Oak Heritage Conservancy, Indiana Karst Conservancy, George Rogers Clark Land Trust, Oxbow, Inc., and Sycamore Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Hogan Creek WMP, Indian Creek WMP, Silver Creek WMP, South Laughery Creek WMP, and Tanners Creek WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 58,072 acres, or 3.3% land cover, within the service area, out of which 36,702 acres have the potential to be restored; this was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. Approximately 1,007 linear miles of stream within the Upper Ohio Service Area are located within 100 feet of agricultural fields; these linear miles of stream could provide opportunities for re-habilitation.

A.20.0 OHIO-WABASH LOWLANDS SERVICE AREA

A.20.1 Service Area Description

The Ohio-Wabash Lowlands Service Area is located in the most southwestern part of Indiana and is composed of all or portions of the following three 8-digit HUC watersheds:

- **05140202 - Highland-Pigeon**
- **05140201 - Lower Ohio-Little Pigeon**
- **05120113 - Lower Wabash**

The Ohio-Wabash Lowlands Service Area includes all or portions of nine Indiana counties listed below and is located within the Southern Hills and Lowlands physiographic region.

Gibson	Crawford	Warrick
Pike	Perry	Vanderburgh
Dubois	Spencer	Posey

The Ohio-Wabash Lowlands Service Area drains 2,101 square miles of southwestern Indiana and is located mainly in the Interior River Valleys and Hills, or Interior River Lowland ecoregion; it is bordered on three sides by the Patoka River, Wabash River, and Ohio River. Key features of this region include wide, shallow valleys with wind-blown silt deposits in the west and sandstone bedrock exposure in the east; the soils in this area are neutral to acidic. Prior to the area being cleared for agricultural use and surface mining, mesophytic and oak-hickory forests flourished (Ecoregions of Indiana: U.S. EPA).

A majority of state and federal lands within this service area are located in the easternmost portion of the service area, along its border with the Upper Ohio Service Area. Popular streams within this service area include Pigeon Creek, Little Pigeon Creek, and the Anderson River, all of which drain to the Ohio River.

Land use in the service area is mainly agricultural (48.9%) and deciduous forest (28.4%); woody wetlands and emergent herbaceous wetlands account for approximately two percent of the total land cover in the service area, while developed land cover is less than 10% (Fry, et al., 2011).

A.20.2 Resource Status (*historic impacts, current conditions, and threats*)

Historically, sedimentation and illegal discharges of residential wastewater to streams and ditches from straight pipe discharges have been common causes of impairments to aquatic systems in the area (Wittman Hydro Planning Associates, Inc., 2002). In addition, surface mining is most prominent in the Highland-Pigeon Watershed; underground mines also exist in the Lower Wabash Watershed within the service area. The Lower Ohio-Little Pigeon Watershed (HUC-05140201) has few surface mines along its border with the Highland Pigeon Watershed; widespread strip mining within these watersheds and habitat alterations throughout the entire service area have both negatively impacted the water quality of the streams and rivers within these areas throughout the 1900s.

More recently, IDEM identified the primary causes of impairments to the Ohio-Wabash Lowlands Service Area's streams as impaired biotic communities, dissolved oxygen, E. coli, and PCBs and mercury in fish tissue. Additional causes included pH, ammonia, and pesticides. Common causes of impairments to freshwater lakes in the service area included algae, taste, and odor (Indiana Integrated Water Monitoring and Assessment Report to the U.S. EPA: IDEM, 2012).

Multiple areas of the Ohio-Wabash Lowlands Service Area were recognized as focus areas for migration habitat; these areas included the westernmost counties of the service area, Gibson and Posey counties, as well as the Little Pigeon Creek. Gibson Lake and its adjacent wetlands are heavily used during fall and spring migration by waterfowl and various shorebirds and wading birds. Posey County contains numerous oxbow lakes, broad lowlands, and bottomland hardwood forests which are utilized by wood ducks as nesting habitat and is greatly used by migrating waterfowl during spring and fall. Its close proximity to the Ohio River allows large areas of Posey County to be flooded during late winter and spring; these areas provide some of the most productive shorebird habitat in Indiana. The Little Pigeon Creek serves as a valuable nesting habitat for wood ducks and also as important migratory habitat for waterfowl (Upper Mississippi River & Great Lakes Region Joint Venture, 1998).

Total wetland acreage within the Ohio-Wabash Lowlands Service Area is approximately 101,805 acres, or 7.6% land cover of the service area; the most prominent wetland type within the service area is freshwater forested/shrub wetland, totaling 52,338 acres, or 3.9% total land cover within the service area. Wetland density is greatest in Posey, Gibson, and Warrick Counties; the easternmost part of the service area within Perry County contains the smallest amount of wetlands (The Status of Wetlands in Indiana: IDNR, 1996).

A.20.3 Compensatory Mitigation Approach & Priorities

Habitat conversion and sedimentation are common causes of aquatic resource impairments in the Ohio-Wabash Lowlands Service Area. Wetland restoration will focus on restoring forested and emergent wetlands that provide connectivity to existing habitats. Wetland restoration will also be focused on restoring bottomland forested wetlands along the Ohio

River. Stream Restoration will focus on reconnecting streams to floodplains and establish riparian buffers in streams near the confluence with the Ohio River.

Since portions of the Ohio-Wabash Lowlands Service Area contain subterranean karst systems, additional restoration goals in this service area includes restoration, re-establishment and/or rehabilitation of wetlands and streams near surface openings to subterranean systems, preservation of karst stream tributaries, and restoration of woodland buffers surrounding cave entrances. Coordination with the IDNR-Abandoned Mined Lands Program for wetland restoration efforts to improve water quality from acid mine drainage that compliment the Abandoned Mined Lands Program will also be explored.

Currently, the following land trusts exist within the service area: Four River RC&D and Sycamore Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the service area. IDNR will work with the land trusts that exist in the service area over the life of the program

Currently, the following watershed plans exist within the service area: Big Creek WMP, Highland-Pigeon WMP, Pitcher Lake WMP, and Upper Anderson River WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this service area over the life of the program.

Hydric and partially hydric soils account for 182,313 acres, or 13.6% land cover, within the service area, out of which 132,702 acres have the potential to be restored; this was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture) located within the service area. Approximately 2,744 linear miles of stream within the Ohio-Wabash Lowlands Service area are located within 100 feet of agricultural fields; these linear miles of stream could provide opportunities for re-habilitation.

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