INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live.

Mitchell E. Daniels, Jr.
Governor

Thomas W. Easterly
Commissioner

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July 2, 2007

VIA CERTIFIED MAIL 7002 0510 0003 8209 9707

Mr. James Townsend
U.S. Army Corps of Engineers
Louisville District
P.O. Box 59
Louisville, Kentucky 40201-0059

Dear Mr. Townsend:

Re: Section 401 Water Quality Certification – Modification
Project: 2007 Reissuance of Nationwide Permits and Renewal of Regional General Permit for Indiana

Office of Water Quality staff has reviewed your application for Section 401 Water Quality Certification (WQC) published in the Federal Register March 12, 2007. You propose to reissue certain Nationwide Permits (NWPs), modify several existing NWPs, and introduce six new NWPs. Nationwide Permits are intended to authorize categories of activities that are similar in nature and cause minimal individual and cumulative impacts to the aquatic environment.

The Louisville and Detroit Districts of the Corps developed the existing Indiana Regional General Permit No. 1 (RGP 1) to replace several NWPs. As a consequence of this action, the following NWPs have been, and will continue to be, suspended and will not be in effect for the State of Indiana. You propose to continue the suspension of the following:

NWP 7 Outfall Structures and Associated Intake Structures
NWP 11 Temporary Recreational Structures
NWP 13 Bank Stabilization
NWP 14 Linear Transportation Projects
NWP 15 U.S. Coast Guard Approved Bridges
NWP 18 Minor Discharges
NWP 19 Minor Dredging
NWP 25 Structural Discharges
NWP 29 Residential Developments
NWP 36 Boat Ramps
NWP 39 Commercial and Institutional Developments
NWP 40 Agricultural Activities
NWP 41 Reshaping Existing Drainage Ditches
NWP 42 Recreational Facilities
NWP 43 Stormwater Management Facilities
NWP 44 Mining Activities

Since the aforementioned NWPs are suspended in Indiana, no WQC decision is required. We are reauthorizing our WQC for RGP #1 at this time in order to maintain consistency.

It is the judgment of this office that RGP #1 and NWPs 1, 2, 3, 4, 5, 6, 9, 10, 12, 16, 21, 22, 24, 27, 28, 30, 33, 37, 45, 46, 47, 49, and 50 will comply with the applicable provisions of state law (including 327 IAC 2) and Sections 301, 302, 303, 306, and 307 of the Clean Water Act if the recipient of the certification complies with the conditions set forth below. Therefore, subject to the following conditions, the Indiana Department of Environmental Management (IDEM) hereby grants WQC for these NWPs. Any changes in the language or scope of any NWP not detailed in the aforementioned Federal Register, or as modified by the conditions below, are not authorized by this certification.

Section 401 Water Quality Certification Decisions for NWPs in effect for the State of Indiana - 2007

NWP	Activity	Decision	Conditions
1	Aids to Navigation	Approve	General
2	Structures in Artificial Channels	Approve	General
3	Maintenance	Approve	General & specific
4	Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities	Approve	General
5	Scientific Measurement Devices	Approve	General
6	Survey Activities	Approve	General
8	Oil and Gas Structures on the Outer Continental Shelf	Deny	N/A
9	Structures in Fleeting and Anchorage Areas	Approve	General
10	Mooring Buoys	Approve	General
12	Utility Line Activities	Approve	General & specific
16	Return Water from Upland Contained Disposal Areas	Approve	General
17	Hydropower Projects	Deny	N/A
20	Oil Spill Cleanup	Deny	N/A
21	Surface Coal Mining Operations	Approve	General
22	Removal of Vessels	Approve	General
23	Approved Categorical Exclusions	Deny	N/A
24	Indian Tribe or State Administered Section 404 Program	Approve	General
26	Reserved	N/A	N/A
27	Aquatic Habitat Restoration, Establishment, and Enhancement Activities	Approve	General & specific
28	Modifications of Existing Marinas	Approve	General
30	Moist Soil Management for Wildlife	Approve	General
31	Maintenance of Existing Flood Control Facilities	Deny	N/A
32	Completed Enforcement Actions	Deny	N/A
33	Temporary Construction, Access, and Dewatering	Approve	General
34	Cranberry Production Activities	Deny	N/A
35	Maintenance Dredging of Existing Basins	Deny	N/A
37	Emergency Watershed Protection and Rehabilitation	Approve	General & specific
38	Cleanup of Hazardous and Toxic Waste	Deny	N/A

NWP	Activity	Decision	Conditions
45	Repair of Uplands Damaged by Discrete Events	Approve	General
46	Discharges to Ditches	Approve	General & specific
47	Pipeline Safety Program Designated Time Sensitive Inspections and Repairs	Approve	General & specific
48	Existing Commercial Shellfish Aquaculture Activities	Deny	N/A
49	Coal Remining Activities	Approve	General
50	Underground Coal Mining Activities	Approve	General

GENERAL CONDITIONS

The following conditions shall apply to any permittee whose project qualifies under RGP #1 or any NWP approved under this certification. All activities that do not meet these conditions require an individual WQC from the IDEM and are not authorized under this WQC.

1) The permittee shall deposit any dredged material in a contained upland disposal area to prevent sediment runoff to any waterbody. The discharge of return water from upland contained disposal areas is not authorized by this WQC. Such discharges are regulated by the IDEM's National Pollutant Discharge Elimination System Permitting Program. Persons qualifying for this NWP are advised to contact the IDEM regarding the possible need for additional permits or authorizations.

2) This WQC does not authorize the discharge of storm water or the discharge of pollutants (such as sediment) associated with storm water. This WQC incorporates the conditions at 327 IAC 15-5-7 as general conditions of this WQC. Compliance with the general permits at 327 IAC 15-5, or 327 IAC 15-6 (commonly referred to as a Rule 5 and Rule 6 respectively) is sufficient to demonstrate compliance with this condition of the WQC.

3) The permittee shall allow the commissioner or an authorized representative of the commissioner (including an authorized contractor), upon the presentation of credentials to:
   a) Enter upon the permittee's property;
   b) Have access to and copy at reasonable times any records that must be kept under the conditions of these permits or this certification;
   c) Inspect, at reasonable times, any monitoring or operational equipment or method; collection, treatment, pollution management or discharge facility or device; practices required by this certification; and any mitigation site; and
   d) Sample or monitor any discharge of pollutants or any mitigation site.

4) This granting of WQC does not relieve the recipient of the certification from the responsibility of obtaining any other permits or authorizations that may be required for this project or related activities from the IDEM or any other agency or person.

5) This certification does not:
   a) Authorize impacts or activities outside the scope of this certification;
   b) Authorize any injury to permittees or private property or invasion of other private rights, or any infringement of federal, state or local laws or regulations;
   c) Convey any property rights of any sort, or any exclusive privileges;
   d) Preempt any duty to obtain federal, state or local permits or authorizations required by law for the execution of the project or related activities; or

e) Authorize changes in the plan design detailed in the application.

6) This WQC does not authorize point source discharges of pollutants other than clean fill[1] and uncontaminated dredged material.

7) This WQC does not authorize activities on or in any of the State's waters that have been designated by the Water Pollution Control Board as: salmonid waters (cold water streams), Outstanding State and/or National Resource Waters, and Exceptional Use waters. *(see Attachment #1).*

8) This WQC does not authorize activities on or in any critical wetland or critical special aquatic site (see *Attachment #2*).

9) This WQC does not authorize activities on or in any tributary of salmonid waters within a two river mile reach upstream from the confluence with the salmonid water between April 1 and June 30 or between August 1 and November 15 unless the Indiana Department of Natural Resources (IDNR) has granted a waiver for that activity.

10) This WQC does not authorize activities on or in any non-salmonid stream between April 1 and June 30 unless the IDNR has granted a waiver for that activity.

11) The permittee must demonstrate, via letter from the IDNR, Division of Nature Preserves, that no state endangered, threatened, or rare species is documented on a permanent or seasonal basis within a 1/2-mile radius of the proposed project site by the Indiana Natural Heritage Data Center, or must provide documentation from the IDNR stating that the proposed activities will not constitute a violation of state laws protecting these species.

12) This WQC does not authorize activities associated with the establishment of a mitigation bank.

13) This WQC allows the use of multiple RGPs and NWPs on the same project. However, if any of the permits contain acreage or linear footage thresholds then the cumulative acreage and linear footage of effect on waters of the U.S. must be equal to or less than the most restrictive thresholds specified in each permit. For example, a road project may include several stream and wetland crossings. If the cumulative effect of these crossings is less than 0.1 acre and 300 linear feet and each crossing meets the other requirements of the permit and this WQC, then each crossing can qualify for a separate RGP #1. If, however, the cumulative effect of these crossings is greater than 0.1 acre or 300 linear feet then the activities are not authorized by this WQC and an individual WQC is required. The IDEM may certify several federal permits or licenses under one individual WQC.

14) In order to verify that a given project will qualify under the terms and conditions of this certification, the IDEM may require additional information from the applicant. If the applicant fails to provide any information requested by the IDEM, then the project is not authorized.

15) The IDEM, for any project that qualifies under the terms and conditions of this certification, may choose to require an individual WQC if it determines that the project would have more than minimal impacts to water quality, either viewed individually or collectively with other projects that may affect the same waterbody affected by the proposed project.

[1] Clean fill, for the purpose of this WQC, means uncontaminated rocks, bricks, concrete, road demolition waste materials, or dirt.

REGIONAL GENERAL PERMIT #1 SPECIFIC CONDITIONS

The following conditions apply to RGP #1. All activities that do not meet these conditions require an individual WQC from the IDEM and are not authorized under this WQC.

1) The permittee notifies the IDEM at least 30 days prior to the activity.
2) The activity will permanently affect one-tenth (0.1) of an acre or less of waters of the United States.
3) The activity will not permanently change the sinuosity, flow path, velocity, cross sectional area under the bank full elevation or the slope of a stream[2].
4) The activity will permanently affect 300 linear feet or less of stream channel, streambank or lake shoreline.
5) In the case of bank stabilization activities or new lake and reservoir shoreline stabilization activities, the permittee demonstrates that the bank or shoreline in question is unstable.
6) Encapsulation activities meet the following limitations:
   a) Must be for the purpose of constructing a crossing;
   b) Must not exceed 150 feet;
   c) The cross sectional area of the encapsulation is at least twenty percent (20%) larger than the bank full area of the stream immediately up and downstream of the encapsulation;
   d) The cross sectional area of the encapsulation is in the form of a single opening (double culverts are not authorized unless at least one of the culverts meets the cross sectional area requirement);
   e) Encapsulations either have no bottom (e.g., three sided culvert) or are twenty percent (20%) imbedded into the streambed (note that the area imbedded must be subtracted from the cross sectional area for the cross section area requirement above); and
   f) The slope of the bed within the encapsulation matches the slope of the bed both immediately upstream and downstream.
7) The activity will not result in a permanent secondary effect to waters of the U.S. (e.g., dredging, excavation, damming, creation of in-channel ponds) that, when combined with the primary effect, exceeds the area and length thresholds specified above.

NATIONWIDE PERMIT #3, MAINTENANCE, SPECIFIC CONDITIONS

The following conditions apply to NWP #3. All activities that do not meet these conditions require an individual WQC from the IDEM and are not authorized under this WQC.

1) For activities involving the replacement of a stream encapsulation:
   a) The replacement will not reduce the cross-sectional area under bank full elevation;
   b) The replacement will not increase the length of the total encapsulation to over 150 feet;
   c) The replacement will have either the same slope as the existing encapsulation, or will more closely match the slope of the stream immediately upstream and downstream of the encapsulation;
   d) The type of replacement encapsulation is the same as the existing type of encapsulation;
   e) Bank stabilization and channel bottom stabilization do not exceed either one bankfull width upstream and downstream of the replacement encapsulation or ten linear feet whichever is greater; and
   f) Any channel bottom stabilization is flush with the existing grade of the stream bottom.
2) For all other maintenance activities:

[2] Stream, for the purpose of this Water Quality Certification, means waters of the U.S. that have a defined bed and bank and convey water ephemerally, intermittently or perennially. This term includes natural streams, relocated streams, channelized streams, artificial channels, encapsulated channels and ditches.

a) The activity will permanently affect one-tenth (0.1) of an acre or less of waters of the United States;
b) The activity will not permanently change the sinuosity, flow path, velocity, cross sectional area under the bank full elevation or the slope of a stream;
c) The activity will permanently affect 300 linear feet or less of stream channel, streambank or lake shoreline;
d) In the case of bank stabilization activities, the permittee demonstrates that the bank or shoreline in question is unstable; and
e) The activity will not result in a permanent secondary effect to waters of the U.S. (e.g., dredging, excavation, damming, creation of in-channel ponds) that, when combined with the primary effect, exceeds the area and length thresholds specified above.

NATIONWIDE PERMIT #12, UTILITY LINE ACTIVITIES, SPECIFIC CONDITIONS

The following conditions apply to NWP #12. All activities that do not meet these conditions require an individual WQC from the IDEM and are not authorized under this WQC.

1) The permittee notifies the IDEM at least 30 days prior to the activity unless the only regulated activity is the construction of a stream crossing where the crossing is constructed using directional boring or other related technique that does not involve the placement of fill materials within a regulated waterbody. Other forms of crossings, such as trenching, pipeline armoring, etc., require notification to IDEM;
2) Notification to the IDEM is required for any pipeline project that involves crossing wetlands and will involve restoring the wetlands to pre-construction grade and contours. A copy of the restoration plan must be submitted with the Notification Form;
3) The activity will permanently affect one-tenth (0.1) of an acre or less of waters of the United States;
4) The activity will not permanently change the sinuosity, flow path, velocity, cross sectional area under the bank full elevation or the slope of a stream;
5) The activity will permanently affect 300 linear feet or less of streambank or lake shoreline;
6) In the case of bank stabilization activities or new lake and reservoir shoreline stabilization activities, the permittee demonstrates that the bank or shoreline in question is unstable; and
7) The activity will not result in a permanent secondary effect to waters of the U.S. (e.g., dredging, excavation, damming, creation of in-channel ponds) that, when combined with the primary effect, exceeds the area and length thresholds specified above.

NATIONWIDE PERMIT #27, AQUATIC HABITAT RESTORATION, ESTABLISHMENT, AND ENHANCEMENT ACTIVITIES, SPECIFIC CONDITIONS

This WQC authorizes activities under NWP #27 when they have a minimal effect on water quality, are a component of a restoration program previously approved by the IDEM, or involve certain activities undertaken by the Abandoned Mine Land (AML) Program administered by the IDNR. All activities that do not meet these conditions require an individual WQC from the IDEM and are not authorized under this WQC.

1) An activity qualifies for this NWP because it will have a minimal effect if:
   a) The activity will permanently affect one-tenth (0.1) of an acre or less of waters of the United States;
   b) The activity will permanently affect 300 linear feet or less of streambank or lake shoreline; and
   c) The activity will not result in a permanent secondary effect to waters of the U.S. (e.g., dredging, excavation, damming, creation of in-channel ponds) that, when combined with the primary effect, exceeds the area and length thresholds specified above.

2) An activity qualifies for this NWP because it is a component of a restoration program previously approved by the IDEM if:
   a) The activity occurs within the same sub-watershed[3] as a water that the IDEM has identified as impaired; and
   b) The IDEM identified the activity as beneficial for reducing or eliminating the impairment in a Total Maximum Daily Load (TMDL), an IDEM approved Watershed Plan or a Memorandum of Agreement or Memorandum of Understanding with the agency sponsoring the restoration or enhancement activities.
3) An activity qualifies for this NWP because it is a qualifying AML project if:
   a) The activity is undertaken by the IDNR, Division of Reclamation, AML Program;
   b) The activity is designed to improve water quality in an impaired water of the State where the source of impairment is acid mine contamination;
   c) The activity facilitates the treatment of acid mine drainage or covers a source of impairment[4]; and
   d) The activity does not result in the discharge of dredged or fill material into any wetland, stream or other waters of the U.S. that are unimpaired by acid mine drainage unless that discharge qualifies under specific condition #1 above.

NATIONWIDE PERMIT #37, EMERGENCY WATERSHED PROTECTION AND REHABILITATION, SPECIFIC CONDITIONS

The following conditions apply to NWP #37. All activities that do not meet these conditions require an individual WQC from the IDEM and are not authorized under this WQC.

1) The activity is consistent with a Memorandum of Agreement or Memorandum of Understanding between the IDEM and the Natural Resources Conservation Service, the United States Forest Service, the Department of the Interior, the Farm Service Agency, or the IDNR. This agreement must be in place prior to the emergency situation and must ensure that the emergency activities authorized under NWP #37 will not cause or contribute to permanent water quality degradation or impairment.

NATIONWIDE PERMIT #46, DISCHARGES TO DITCHES, SPECIFIC CONDITIONS

The following condition applies to NWP #46. All activities that do not meet this condition require an individual WQC from the IDEM and are not authorized under this WQC.

1) The activity will not permanently change the velocity, cross sectional area under the bank full elevation or the slope of the ditch.

NATIONWIDE PERMIT #47, PIPELINE SAFETY PROGRAM DESIGNATED TIME SENSITIVE INSPECTIONS AND REPAIRS, SPECIFIC CONDITIONS

The following conditions apply to NWP #47. All activities that do not meet these conditions require an individual WQC from the IDEM and are not authorized under this WQC.

1) The activity will permanently affect one-tenth (0.1) of an acre or less of waters of the United States;
2) The activity will not permanently change the sinuosity, flow path, velocity, cross sectional area under the bank full elevation or the slope of a stream;

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[3] For the purposes of this WQC, sub-watershed means the U.S. Geological Survey's 14-digit Hydrologic Unit Code (HUC).

[4] AML projects that qualify generally consist of damming or relocating waters carrying acid mine contamination to divert flow into constructed treatment systems.

3) The activity will permanently affect 300 linear feet or less of streambank or lake shoreline;
4) In the case of bank stabilization activities or new lake and reservoir shoreline stabilization activities, the permittee demonstrates that the bank or shoreline in question is unstable; and
5) The activity will not result in a permanent secondary effect to waters of the U.S. (e.g., dredging, excavation, damming, creation of in-channel ponds) that, when combined with the primary effect, exceeds the area and length thresholds specified above.

The IDEM retains the right to review, modify, terminate, replace or amend this certification as needed to ensure that the federal permits or licenses certified do not result in violations of Indiana's Water Quality Standards or other applicable state laws. In the absence of another action by the IDEM that would alter the termination date of this certification, this certification shall expire with the expiration of the federal permits it certifies.

This certification does not relieve the recipient of the responsibility of obtaining any other permits or authorizations that may be required for this project or related activities from the IDEM or any other agency or person. You may wish to contact the IDNR at 317-232-4160 (toll free at 877-928-3755) concerning the possible requirement of natural freshwater lake or floodway permits. In addition, you may wish to contact the IDEM's Storm Water Permits program at 317-233-1864 concerning the possible need for a 327 IAC 15-5 (Rule 5) permit if you plan to disturb greater than one (1) acre of soil during construction.

This certification does not:
(1) Authorize impacts or activities outside the scope of this certification;
(2) Authorize any injury to persons or private property or invasion of other private rights, or any infringement of federal, state or local laws or regulations;
(3) Convey any property rights of any sort, or any exclusive privileges;
(4) Preempt any duty to obtain federal, state or local permits or authorizations required by law for the execution of the project or related activities; or
(5) Authorize changes in the plan design detailed in the application.

Failure to comply with the terms and conditions of this WQC may result in enforcement action against the recipient of the certification. If an enforcement action is pursued, the recipient of the certification could be assessed up to $25,000 per day in civil penalties. The recipient of the certification may also be subject to criminal liability if it is determined that the WQC was violated willfully or negligently.

This certification is effective eighteen (18) days from the mailing of this notice unless a petition for review and a petition for stay of effectiveness are filed within this 18-day period. If a petition for review and a petition for stay of effectiveness are filed within this period, any part of the certification within the scope of the petition for stay is stayed for fifteen (15) days, unless or until an Environmental Law Judge further stays the certification in whole or in part.

This decision may be appealed in accordance with IC 4-21.5, the Administrative Orders and Procedures Act. The steps that must be followed to qualify for review are:

1. You must petition for review in writing that states facts demonstrating that you are either the person to whom this decision is directed, a person who is aggrieved or adversely affected by the decision, or a person entitled to review under any law.

2. You must file the petition for review with the Office of Environmental Adjudication (OEA) at the following address:

Office of Environmental Adjudication
100 North Senate Avenue
IGCN Room N1049
Indianapolis, IN 46204

3. You must file the petition within eighteen (18) days of the mailing date of this decision. If the eighteenth day falls on a Saturday, Sunday, legal holiday, or other day that the OEA offices are closed during regular business hours, you may file the petition the next day that the OEA offices are open during regular business hours. The petition is deemed filed on the earliest of the following dates: the date it is personally delivered to OEA; the date that the envelope containing the petition is postmarked if it is mailed by United States mail; or, the date it is shown to have been deposited with a private carrier on the private carrier's receipt, if sent by private carrier.

Identifying the certification, decision, or other order for which you seek review by number, name of the applicant, location, or date of this notice will expedite review of the petition.

Note that if a petition for review is granted pursuant to IC 4-21.5-3-7, the petitioner will, and any other person may, obtain notice of any prehearing conferences, preliminary hearings, hearings, stays, and any orders disposing of the proceedings by requesting copies of such notices from OEA.

If you have procedural questions regarding filing a petition for review you may contact the Office of Environmental Adjudication at 317-232-8591.

If you have any questions about this certification, please contact Mr. James Robb, Wetland and Storm Water section chief, at 317-233-8802, or you may contact the Office of Water Quality through the IDEM Environmental Helpline (1-800-451-6027).

Sincerely,

Marylou Poppa Renshaw, Chief
Watershed Planning Branch
Office of Water Quality

cc: Amy Babey, USACE-Louisville
Charlie Simon, USACE-Detroit
Mike Litwin, USFWS
Mike Molnar, IDNR
Wendy Melgin, USEPA Region 5

Attachment 1 – Indiana Waters Designated for Special Protection

Designated Salmonid Waters:

- West Branch, Little Calumet River and its tributaries, downstream from the dam at 29th Avenue (Deep River) to Lake Michigan via Burns Waterway, Lake and Porter County.
- Galena River and its Tributaries, LaPorte County.
- Trail Creek and its tributaries, downstream to Lake Michigan, LaPorte County.
- East Branch, Little Calumet River and its tributaries, downstream to Lake Michigan, via Burns Waterway, Porter and LaPorte counties.
- Kintzele Ditch (Black Ditch) from Beverly Drive downstream to Lake Michigan, Porter County
- Salt Creek and its tributaries upstream of its confluence with the Little Calumet River, Porter County.
- St. Joseph River and its tributaries from Twin Branch dam downstream to the Indiana/Michigan state line, St. Joseph County,
- Waters designated by IDNR for put-and-take trout fishing.

Waterbodies which have been designated all or partially as Outstanding State Resource Waters:

- The Blue River in Washington, Crawford, and Harrison counties
- Cedar Creek in Allen and DeKalb counties
- The North Fork of Wildcat Creek in Carroll and Tippecanoe counties.
- The South Fork of Wildcat Creek in Tippecanoe County.
- The Indiana portion of Lake Michigan.
- All waters incorporated in the Indiana Dunes National Lakeshore.

Streams which have been designated all or partially as Exceptional Use Streams:

- Big Pine Creek in Warren County.
- Mud Pine Creek in Warren County.
- Fall Creek in Warren County.
- Indian Creek in Montgomery County.
- Clifty Creek in Montgomery County.
- Bear Creek in Fountain County.
- Rattlesnake Creek in Fountain County.
- The small tributary to Bear Creek in Fountain County within the Portland Arch Nature Preserve which enters Bear Creek at the sharpest bend and has formed the small natural bridge called Portland Arch.
- Blue River from the confluence of the West Middle Forks of the Blue River in Washington County.
- The South Fork of the Blue River in Washington County.
- Lost River and all surface and underground tributaries upstream from the Orangeville Rise (T2N, R1W, Section 6) and the Rise of Lost River (t2N, R1W, Section 7) and the mainstream of the Lost River from Orangeville Rise downstream to its confluence with the East Fork of the White River.

Attachment 2 – Critical Wetlands and Critical Special Aquatic Sites

In the interest of maintaining consistency with the State Regulated Wetland program established at 327 IAC 17, the Indiana Department of Environmental Management (IDEM) defines Critical Wetlands and Critical Special Aquatic Sites to be synonymous with Rare and Ecologically Important Wetland Types under 327 IAC 17-1-3(3)(B):

- **Acid bog:** Acid bog is an acidic wetland of kettle holes in glacial terrain. Bogs can be graminoid (*Carex* spp. and *Sphagnum* spp.) or low shrub (*Chamaedaphne calyculata* and *Betula pumila*). The graminoid bog can be a floating, quaking mat. The soils in acid bogs are saturated and acidic peat. Bogs have non-flowing or very slow flowing water. The water level fluctuates seasonally. When a sphagnum mat floats, it rises and falls with the water table. Acid bogs can be found in northern Indiana.
- **Acid seep:** Acid seep is a bog-like wetland typically found in unglaciated hill regions. This community is a small groundwater-fed wetland located primarily in upland terrain. A thin layer of muck may lie over a mineral substrate. The soil reaction is acid. This seep community is characterized by flowing water during at least part of the year. Acid seeps are located primarily in southern Indiana.
- **Circumneutral bog:** Circumneutral bog is a bog-like wetland that receives groundwater. Circumneutral bogs can be a mosaic of tall shrub bog, graminoid bog, and other communities. The graminoid bog often occurs on a quaking or floating mat. Although a few bogs occur in unglaciated regions, most are found in glacial ice-block depressions. The soils in circumneutral bogs are usually peat, or other low nutrient organic substrates, which are saturated and circumneutral to slightly acid. Circumneutral bogs have non-flowing or very slow flowing water. The water level fluctuates seasonally. Circumneutral bogs are usually found in northern Indiana.
- **Circumneutral seep:** The circumneutral seep (or seep-spring) is a groundwater-fed wetland on organic soil. It is primarily herbaceous. Species typically include marsh marigold (*Caltha palustris*) and skunk cabbage (*Symplocarpus foetidus*) with a scattered tree canopy. Circumneutral seep is typically situated on or near the base of a slope. The soil is typically circumneutral muck. This seep community is characterized by slowly flowing water during at least part of the year. Circumneutral seeps can be found scattered throughout Indiana.
- **Cypress swamp:** Bald cypress swamps are seasonally to permanently inundated wetlands found in depressions and sloughs of large bottomlands associated with the Wabash/Ohio River system. Poorly to very poorly drained soils characterize this environment. Bald cypress (*Taxodium distichum*) is present, and green ash (*Fraxinus pennsylvanica*), silver maple (*Acer saccharinum*), and overcup oak (*Quercus lyrata*) are also usually present. This community is restricted to extreme southwest Indiana.
- **Dune and swale:** Dune and swale is an ecological system consisting of a mixture of upland (black oak sand savanna, dry to mesic sand prairie) and wetland (pond, panne, sedge meadow, marsh, wet prairie) natural communities. These communities occur in long, narrow, linear complexes, with the dry communities occupying sand ridges, and the wet communities occurring in the intervening swales. Black oak (*Quercus velutina*), paper birch (*Betula papyrifera*), jack pine (*Pinus banksiana*), and prairie vegetation typically occur on the ridges, and sedges, reeds, and marsh/aquatic vegetation line are found in the swales. Water levels are directly influenced by ground water, with the interdunal swales controlled largely by lateral flow through porous beach ridges. Dune and swale is restricted to extreme northwest Indiana, near Lake Michigan.
- **Fen**: Fen is a calcareous, groundwater-fed wetland. Fens are often a mosaic of grassy areas, sedgy areas, graminoid-shrubby cinquefoil, and tall shrub areas. The extent of the tall shrub component of fens may be determined by fire frequency and/or soil moisture. Drying of the soil increases the growth of shrubs. Fens typically occur in the vicinity of glacial moraines. Fens

typically have a muck or peat substrate. The water level fluctuates seasonally and is fed by groundwater. Fens can be found in central and northern Indiana.

- **Forested fen:** Forested fen is a tree-dominated wetland on organic soil which receives groundwater. Forested fens are often a mosaic of treed areas, tall shrub areas, and herbaceous areas. A tall shrub layer is often well developed in forested fens. Indicative species typically include tamarack (*Larix laricina*), black ash (*Fraxinus nigra*), yellow birch (*Betula alleghaniensis*), poison sumac (*Toxicodendron vernix*), and red maple (*Acer rubrum*). Forested fens occur in wet lowlands, where moraines meet outwash features or depressions. Forested fens have saturated, poorly to very poorly drained soils that are often muck, but some seasonal flooding can occur in forested fens that are especially level. This community is a late successional stage of fen or circumneutral bog. Forested fens occur in northern Indiana.
- **Forested swamp:** Forested swamp is a seasonally inundated to intermittently exposed wetland of large river bottoms. Forested swamps do not receive direct flow from river flooding except under exceptional circumstances. Forested swamps occur in depressions, sloughs and large bottomlands, typically dominated by tree species such as swamp cottonwood (*Populus heterophylla*), green ash (*Fraxinus pennsylvanica*), and swamp white oak (*Quercus bicolor*). In northern Indiana important tree species include black ash (*Fraxinus nigra*), yellow birch (*Betula alleghaniensis*), and red maple (*Acer rubrum*). Poorly to very poorly drained and aerated soils characterize the swamp environment. Soils usually are mineral not muck or peat. This community type is found throughout Indiana.
- **Marl beach:** Marl beach is a fen-like community located on the marly muck shorelines of lakes. Marl precipitate is evident. A thin layer of water is present in spring, but dries down in summer. Draw-down of a lake creates additional area for this community to develop on. Marl beaches can be found in extreme northern Indiana, primarily in the northeast.
- **Muck flat:** Muck flat is a shoreline and lake community possessing a unique flora of sedges and annual plants, many of which are also found on the Atlantic and Gulf Coastal Plains. This community is found at the margins of lakes or covering shallow basins. This community has a peat substrate. The muck flats can float on the water surface, but during high water periods are usually inundated. The water level of a basin fluctuates during a season or from year to year in response to the amount of precipitation. This exposes bare substrate needed for germination by species of the community. Muck flats are found in northern Indiana.
- **Panne**: Panne is a groundwater fed herbaceous wetland occupying interdunal swales near Lake Michigan. Pannes are located on the lee side of the first or second line of dunes from the lakeshore. The soil is wet, calcareous sand. Pannes are located in counties bordering Lake Michigan.
- **Sand flat:** Sand flat is a shoreline and lake community possessing a unique flora of sedges and annual plants, many of which are also found on the Atlantic and Gulf Coastal Plains. This community is found at the margins of lakes or covering shallow basins. This community has a sand substrate. During high water periods sand flats at the margins of lakes or ponds are inundated. The water level of a basin fluctuates during a season or from year to year in response to the amount of precipitation. This exposes bare substrate needed for germination by species of the community. Sand flats occur in northern Indiana, and in the Plainville Sand Section of southwest Indiana.
- **Sedge meadow:** Sedge meadow is an herbaceous wetland typically dominated by graminoid species such as flat sedge (*Cyperus* spp.), spike rush (*Eleocharis* spp.), rushes (*Juncus* spp.) and sedges (*Carex* spp.). Sedge meadow is an herbaceous wetland of stream margins and river floodplains, and lake margins or upland depressions. Streamside sedge meadows are frequently flooded in the spring and early summer. Sedge meadows of lake margins and depressions often contain standing water during wet months and after heavy rains; during dry periods, the water level is at or just below the substrate. Sedge meadow usually occupies the ground between a

marsh and the uplands, or a shrub swamp or wet forest. Periodic high water can kill trees and shrubs invading sedge meadows. Sedge meadows can be found in the northern half of the state.

- **Shrub swamp:** Shrub swamp is a shrub-dominated wetland that is seasonally inundated to intermittently exposed. This community occurs in depressions and the substrate in either mineral soils or muck, as opposed to peat which is characteristic of bogs. Shrub swamp is characterized by non-flowing or very slowly flowing water with levels that fluctuate seasonally. Shrub swamps are persistent, though considered successional. Two opportunistic native shrubs, sandbar willow (*Salix exigua*) and gray dogwood (*Cornus racemosa*), by themselves, are not indicative of shrub swamps. This community type is found throughout Indiana.
- **Sinkhole pond:** Sinkhole ponds are water-containing depressions in karst topography. Sinkhole ponds are found in the Mitchell Karst Plain in south-central Indiana.
- **Sinkhole swamp:** Sinkhole swamps are depressions in karst topography dominated by tree or shrub species. Sinkhole swamps are found in the Mitchell Karst Plain in south-central Indiana.
- **Wet floodplain forest:** Wet floodplain forest is a broadleaf deciduous forest of river floodplains. Wet floodplain forests occur in depressions and flats on narrow to wide floodplains and also on recently exposed substrates that are frequently flooded. Wet floodplain forests are frequently flooded and may have standing water seasonally to permanently present. Wet floodplain forests occur statewide.
- **Wet prairie:** Wet prairie is an herbaceous wetland typically dominated by graminoid species such as prairie cordgrass (*Spartina pectinata*), bluejoint (*Calamagrostis canadensis*), and sedges (*Carex* spp.). Vegetation height is often 2-3 m. The species diversity of wet prairies is lower than that of mesic prairies. Wet prairies occur in deep swales and the substrate ranges from very deep black mineral soils (which are high in organic matter) to muck. Ponding in spring lasts for several weeks prior to drainage. Wet prairies commonly occur in the Grand Prairie Natural Region, the Tipton Till Plain and the Bluffton Till Plain, with a few examples found in the Northern Lakes Natural Region.
- **Wet sand prairie:** Wet sand prairie is an herbaceous wetland typically dominated by graminoid species such as prairie cordgrass (*Spartina pectinata*), bluejoint (*Calamagrostis canadensis*), and sedges (*Carex* spp.). Vegetation height is often 2-3 m. The species diversity of wet prairies is lower than that of mesic prairies. Wet lowland prairies occur in deep swales and the substrate is sand, sometimes mixed with muck. Flooding is a regular springtime occurrence in wet sand prairie and may last several weeks. This community occurs in a mosaic with marsh and other wetlands, and with upland prairies and sand savannas. Fire was frequent occurrence, but more common in the fall when waters had receded. This community occurs in northwest Indiana and in the Plainsville Sands area.