Civil & Environmental Consultants, Inc.

Southwestern Pennsylvania Commission

Wetland/Stream and Floodplain Regulations and Implications for Routine Maintenance Practices

PREPARED BY:
Jonathan R. Farrell
Civil & Environmental Consultants (CEC)
412-977-1456
jfarrell@cecinc.com

May 2017

Agenda

20 minutes	Overview of PA Chapter 105 and Clean Water Act Regulations and Permitting Triggers
20 minutes	Stream and wetland jurisdictional limits and exemptions
40 minutes	Basic field identification of potentially jurisdictional waters
20 minutes	Common permitting pitfalls and best practices for routine maintenance/management
20 minutes	Floodplain management regulations
30 minutes	Questions & Answer Session

Civil & Environmental Consultants, Inc.

Why is a permit needed?

- Most channels, wetlands, and waterbodies can be regulated as shared resources under state or federal jurisdiction
- Sediment runoff / discharges from construction sites are regulated pollution sources
- Maintenance can involve work in streams / wetlands
- Lack of maintenance can lead to expanded jurisdiction

CEC
Civil & Environmental Consultants, Inc.

What for and When is a Permit Needed?

More often than you'd prefer to think

CEC
Civil & Environmental Consultants, Inc.

No Permit Needed

- **If you can stay out of regulated wet areas**

  Hard to do!

- **If you can claim a waiver**

  Difficult to tell!

  Must document a defensible position

Civil & Environmental Consultants, Inc.

Lessons Learned on the Street

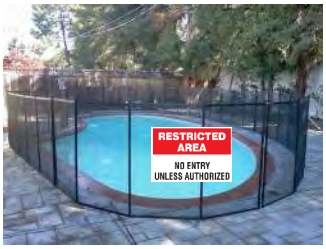
- Document pre-construction conditions
- Minimize activities within streams, wetlands, and floodways
- Smart stormwater design to control drainage, build-in O&M flexibility, and eliminate unintended consequences
- Carefully design green infrastructure BMPs (riparian buffer, floodplain restoration, vegetated swales, rain gardens, etc.) so they allow for maintenance of potentially jurisdictional buffer areas
- Keep operations and maintenance (O&M) records
- Perform post-construction drainage control inspections, maintenance dredging, and vegetation control
- Know the BMPs and exemptions, know when to push your case with regulators
- DEP and Corps will almost always defer to restrictive interpretation of situation and claim oversight as precaution
- Keep friendly with your conservation districts

Civil & Environmental Consultants, Inc.

Regulatory Authority

- Three main legislative acts:
  - 1978 Dam Safety and Encroachments Act
  - 1978 Flood Plain Management Act
  - 1937 Clean Streams Law (PA Chapters 93 and 102)

- Codified in PA Chapters 93, 102, 105



CEC Civil & Environmental Consultants, Inc.

Pennsylvania Chapter 105

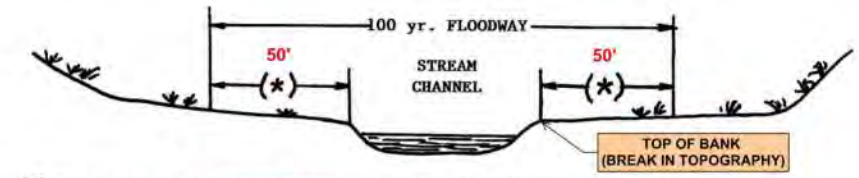
- Enforced by PA Department of Environmental Protection (DEP) Regional Offices, or delegated Conservation Districts

- **Chapter 105 Water Obstruction and Encroachment Permit** required for any structure or activity which changes, expands or diminishes the course, current or cross section of a watercourse, floodway, or body of water.

- **Watercourse** = channel or conveyance of surface water having defined bed and banks, whether natural or artificial

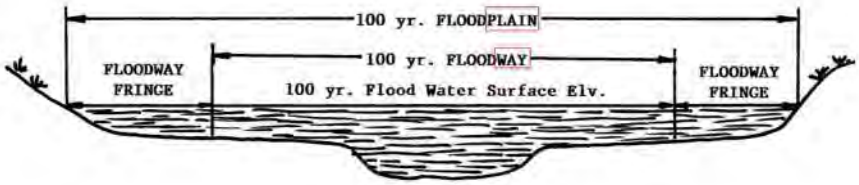
- **Floodway** = channel during 100-year flood (no backwater)

CEC Civil & Environmental Consultants, Inc.



(*) = DISTANCE FROM TOP OF BANK TO LIMIT OF FLOODWAY AS DETERMINED BY FEMA FLOOD INSURANCE STUDY. IF NO FEMA STUDY HAS BEEN COMPLETED, THIS DISTANCE WILL BE 50 FEET. **

** acceptable "evidence to contrary" 50-foot assumed floodway is typically hydrologic modeling or channel morphological studies, even for small headwater intermittent or ephemeral streams



Civil & Environmental Consultants, Inc.

Federal Clean Water Act (CWA)

- **1972 Federal Water Pollution Control Act Amendments**
  - "Clean Water Act"
  - Section 402 established National Pollution Discharge Elimination System (NPDES)

- **<u>Section 404</u> of CWA regulates discharge of dredged or fill material into "waters of the United States"**
  - Wetlands, navigable waterways, interstate waters, AND their tributaries or impoundments
  - Avoid, Minimize, and Compensate

Civil & Environmental Consultants, Inc.

Types of 105 / 404 Authorizations

DEP and Corps issue "General" and "Individual" Permits

- General permits
  - routine, activity-specific, minimal impacts
- Individual permits
  - significant or non-routine impacts, require public notice and comment period, and have longer review times (6-18 months)
- Programmatic agreements between USACE and DEP defines but complicates overlapping jurisdiction

CEC Civil & Environmental Consultants, Inc.

Implication of Non-Compliance

- **Work stoppages**
- **Violation of MS4 Minimum Control Measure (MCM) for Runoff Control**
- **After-the-fact permits**
- **Penalties proportionally based on unknowing/negligent/ knowing violations $100-50,000 and extent of impacts**
- **Permit review delays or probation for serial violations**
- **Federal agency involvement and compliance audits**

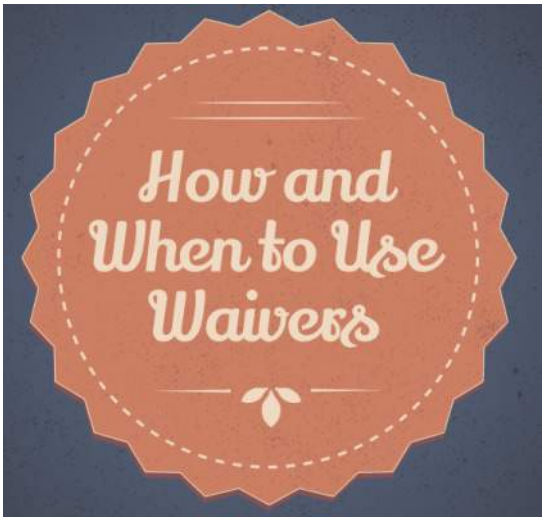
CEC Civil & Environmental Consultants, Inc.

State vs. Federal Jurisdictional Limits

- **Pennsylvania DEP jurisdiction for Chapter 105:**
  - Area within tops of stream banks
  - FEMA-delineation floodways
  - Assumed floodway within 50 feet of stream banks
  - All wetlands
- **Federal USACE jurisdiction for Section 404:**
  - Area within Ordinary High Water Marks in stream channel
  - Wetlands connected to streams
- **Also maybe…**
  - Basins or ponds not covered by stormwater or industrial permit
  - Ditches/channels/pipes that convey flow to/from stream and wetlands

CEC Civil & Environmental Consultants, Inc.

WAIVERS!!!



CEC Civil & Environmental Consultants, Inc.

PA Chapter 105.12 Waivers

- Some Waivers are automatic and does not require prior DEP approval. Any person using such waivers *"must develop and retain such information as will verify their qualification to use a waiver. This information would be made available to DEP if requested as a result of a general inquiry or in the investigation of a complaint."*
- If the Department upon complaint or investigation finds that a structure or activity which is eligible for a waiver, has a *"significant effect upon safety or the protection of life, health, property or the environment,"* it is possible that they would request a permit or additional information in dispute of this opinion of waiver eligibility.

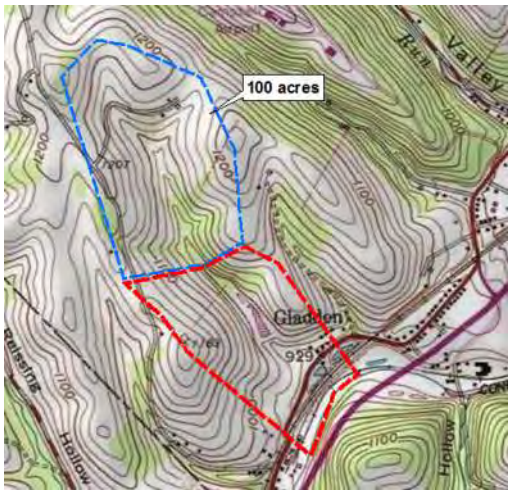
Civil & Environmental Consultants, Inc.

PA Chapter 105.12 Waivers

- Waiver 1 = dam not exceeding 3 feet in height in a stream not exceeding 50 feet in width
- Waiver 2 = water obstruction in a stream or floodway with a drainage area of 100 acres or less
- Waiver 3 = aerial single pole crossing of a non-navigable stream or wetland by electric, telephone or communications
- Waiver 4 = stormwater management or erosion and sedimentation pollution control facility which meets the requirements in Chapter 102 if the facility was constructed and continues to be maintained for the designated purpose
- Waiver 7 = field drainage systems for crop production.
- Waiver 9 = ford stream crossings for individual private personal use
- Waiver 11 = removal of abandoned dams, water obstructions and encroachments

Civil & Environmental Consultants, Inc.

Waiver 2



- **Significant effect upon safety or the protection of life, health, property or the environment?**
- **Stream bioassessments? Adjacent landowners? BMPs?**

Civil & Environmental Consultants, Inc.

Waiver 4 Jurisdiction for Stormwater Management Facilities

- "*Stormwater management facilities*" are waived <u>if</u> they are "constructed and maintained for the designated purpose" in compliance with approved Chapter 102 permits

  <u>Stormwater management facilities</u> = *"manmade measures designed and constructed to convey stormwater runoff away from structures or improved land uses, or to control, detain or manage stormwater runoff to avoid or reduce downstream damages"*

- *Similar but different exemptions in federal Clean Water Act*

Unless we can provide documentation that a feature is part of a stormwater management facility and is maintained for intended purpose, it may be considered jurisdictional by PA DEP or USACE

Civil & Environmental Consultants, Inc.

Federal Clean Water Act Exemptions
Man-made Ponds, Pools & Pits

- Artificially irrigated areas
- Constructed basins/ponds/pits in dry land
- Water-filled depressions
- Erosional gullies, rills, without defined bed and bank or water marks
- Non-wetland swales and grassed waterways
- Puddles
- Groundwater and subsurface drainage

Civil & Environmental Consultants, Inc.

Determining What Permit or if a Permit is Needed

"Permitting Pathway"

Civil & Environmental Consultants, Inc.

Scenario 1: Debris Removal of a Blocked Culvert

- Is it a captured natural stream or just a drainage pipe/channel?
- Is it covered by a stormwater management plan or prior permit?
- Is it a Special Protection Watershed?
- Just clearing or structural repairs/replacements/modifications?

CEC
Civil & Environmental Consultants, Inc.

DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATERSHED MANAGEMENT
DIVISION OF WATERWAYS, WETLANDS AND STORMWATER MANAGEMENT

STANDARDS FOR CHANNEL CLEANING AT BRIDGES AND CULVERTS

1. A work schedule which includes a written description of each structure, a description of the proposed work and a map showing each project location shall be submitted concurrently to the Department of Environmental Protection, the Pennsylvania Fish and Boat Commission, and the Conservation District of the county in which the project is located not less than 30 days in advance of initiating work. The work

5. Work in the stream channel shall be limited to 50 feet upstream and 50 feet downstream from the bridge or culvert. In addition, work should be accomplished by working from the stream banks. In those cases where this is not possible, the operation of equipment in the water is to be minimized.

6. Channels may be excavated to a width no greater than the width of the normal low flow channel immediately upstream and downstream of the bridge or culvert. The remainder of the channel width shall be maintained as an elevated flood plain and may be excavated only to six inches above water level at the time of work.

7. Material removed shall be disposed of at a location which precludes re-entry into the stream and in a manner which does not obstruct flood flows in the floodway. If material removed from the stream is needed for backfill or bank restoration, it should be faced to the ordinary high water level with riprap suitably sized according to the anticipated stream velocity. All disturbed areas above the level of the riprap must be stabilized or seeded. Excess excavated material shall not be deposited in any wetland, river, lake, water course, floodway, or other regulated waters of the Commonwealth without first applying for and receiving the written permit of the Department of Environmental Protection.

13. Any repairs or maintenance involving modification of the structure from its original specifications and any repairs or reconstruction or replacement involving a substantial portion of the structure shall require the prior written permit of the Department.

CEC
Civil & Environmental Consultants, Inc.

Emergency Permits PA Chapter § 105.64

- ***"Immediate remedial action is necessary to alleviate an imminent threat to life, property or the environment"***
- **60-day expiration**
- **Engineer's opinion of risk, alternatives discussion, and thorough justification why urgent**
- **Harder to get from PADEP in timely fashion (depending on Regional Office)**
- **Can you remove obstructions causing flooding...**
  - By working from the banks (not from in the streambed)
  - And not over-excavate the stream bed
  - And not place fill (including excavated debris) within floodway
  - And avoid wetlands

CEC Civil & Environmental Consultants, Inc.

Scenario 2: Dredging of Stormwater Basin of Accumulated Sediment/Vegetation

- Stormwater Plan and NPDES Permit?
- Overdue maintenance or fugitive drainage?

CEC Civil & Environmental Consultants, Inc.

"Abandoned" Stormwater Detention Basin in Demo Site to be Re-developed

- Project occurred prior to new WOTUS rule, when USEPA has not explicitly outlined stormwater exemptions existed
- Poorly maintained parking lot stormwater basin and drainage ditches claimed as jurisdictional wetlands on basis that they were not functioning for intended use per CWA Section 402 NPDES guidelines
- Historical plans or maintenance records not available, and schedule did not allow to dispute, so owner relented and paid to mitigate as wetland

CEC
Civil & Environmental Consultants, Inc.

Vegetation and sediment in permitted BMP parking lot detention pond, claimed as jurisdictional wetland by Corps

CEC
Civil & Environmental Consultants, Inc.

Wetland formed within containment berm around storage tanks, claimed by DEP as jurisdictional wetland

CEC
Civil & Environmental Consultants, Inc.

Scenario 3: Vegetation Removal and Grading of Drainage Ditches

- **Scenario 3: Vegetation Removal and Grading of Drainage Ditches**
  - are captured/channelized natural streams or excavated in wetland
  - have a defined bed and bank and ordinary high water mark
  - connect or convey water from stream or wetland

CEC
Civil & Environmental Consultants, Inc.

Scenario 3: Vegetation Removal and Grading of Drainage Ditches (Continued)

- **Dredging ditched in uplands to improve drainage during wet weather?**
- **Document pre-construction conditions before you start!**

Civil & Environmental Consultants, Inc.

Scenario 4: Temporary Access Road Across a Stream or Wetland

- Using existing ford crossing without improvement or significant impact to stream bed?
- Using crane mat to span or flume pipe with gravel cover?

Civil & Environmental Consultants, Inc.

How to Identify Potentially Jurisdictional Waters of Commonwealth or United States

Civil & Environmental Consultants, Inc.

Federal WOTUS Legalese

- **"Waters of the United States" means:**
  - (i) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
  - (ii) All interstate waters, including interstate wetlands;
  - (iii) The territorial seas;
  - (iv) All impoundments of waters otherwise identified as waters of the United States under this section;
  - (v) All tributaries, as defined in paragraph (3)(iii) of this section, of waters identified in paragraphs (1)(i) through (iii) of this section;
  - (vi) All waters adjacent to a water identified in paragraphs (i) through (v) of this section, including wetlands, ponds, lakes, oxbows, impoundments, and similar waters;

Civil & Environmental Consultants, Inc.

Jurisdictional Limits in Practice

- How do we determine if a feature meets the definition of a "waters of U.S."?

CEC
Civil & Environmental Consultants, Inc.

Regulatory Wetland Definition

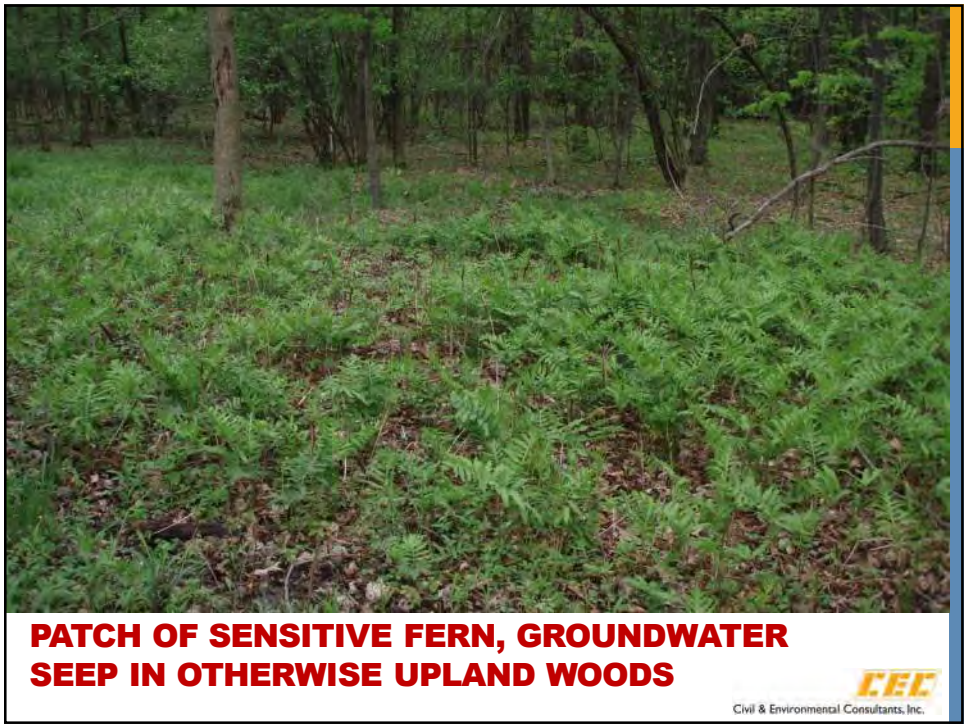
Wetlands are…

- **"areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of [hydrophytic] vegetation"**
  - — 33 Code of Federal Regulations 328
  - — PA Code § 105.1

CEC Civil & Environmental Consultants, Inc.

HARDWOOD SWAMP WITH SKUNK CABBAGE INDICATING SHALLOW WATER TABLE

CEC Civil & Environmental Consultants, Inc.



PATCH OF SENSITIVE FERN, GROUNDWATER SEEP IN OTHERWISE UPLAND WOODS

CEC
Civil & Environmental Consultants, Inc.

SEDGE-DOMINATED HEADWATER MARSH

CEC
Civil & Environmental Consultants, Inc.

SEASONALLY INUNDATED AREAS, VERNAL POOLS

Wetland Determination

Under normal circumstances, a wetland must have 3 things:

1. Wetness at or within 12” of surface during the growing season
2. Predominance of wetland vegetation (hydrophytes)
3. Hydric soils (lacking oxygen in upper part)

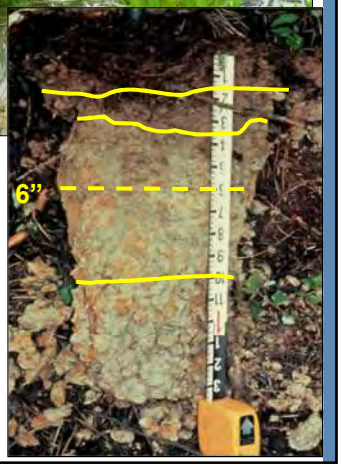
Except in special cases, all three indicators must be present.

CEC
Civil & Environmental Consultants, Inc.

Wetland Determination Cont.

3-part criteria for wetlands:

- VEGETATION
- HYDROLOGY
- SOILS



Wetland Identification

Identification based on 3 criteria, but long shopping list of indicators per new “Regional Supplements”:

PARAMETER	CRITERION	INDICATORS (EXAMPLES)
Wetland Hydrology	Area must be inundated or have saturated soil for >5% of the growing season (>10 days)	- hydrologic monitoring data - inundation - saturated soil - water stain lines on trees - drainage patterns
Hydric Soils	Area must have hydric soil (as defined by the USDA-NRCS) or characteristics associated with reducing soil conditions	- gleyed soil - sulfidic (rotten egg) odor - grey soil with orange mottles
Hydrophytic (water-loving) vegetation	Area must have a prevalence of plants that are adapted to live in saturated soil conditions	- >50% of vegetative cover is hydrophytic - special morphological or physiological characteristics

CEC
Civil & Environmental Consultants, Inc.

Wetland Hydrology

- Hydrology is the driving force in wetlands:

Hydrology (inundation/ saturation within 12")	→	**anaerobic soil condition (hydric soil)**	→	**adapted plants (hydrophyte)**

- Hydrology can also the most difficult criteria to evaluate, especially during abnormally wet/dry seasons and in wetlands with altered or temporary hydrology.

Civil & Environmental Consultants, Inc.

Wetland Hydrology

- **Primary Hydrology Indicator: Surface Water**

Civil & Environmental Consultants, Inc.

Wetland Hydrology

- Primary Hydrology Indicator: High Water Table

Civil & Environmental Consultants, Inc.

Wetland Hydrology

- Primary Hydrology Indicator: Saturated Soil

Civil & Environmental Consultants, Inc.

Wetland Hydrology

- Primary Hydrology Indicator: Oxidized Root Channels with Living Roots

Civil & Environmental Consultants, Inc.

Wetland Hydrology

- Secondary Hydrology Indicator: Drainage Pattern

Civil & Environmental Consultants, Inc.

Wetland Vegetation

- A wetland must have a prevalence of plants that are adapted to live in saturated soil conditions.
- Wetland Vegetation Criteria:
  - > 50% of the dominant plant species are classified as wetland plants by National Wetland Plant List; or
  - Dominated by plants with special morphological or physiological characteristics for living in saturated soil

Civil & Environmental Consultants, Inc.

Plant Indicator Status

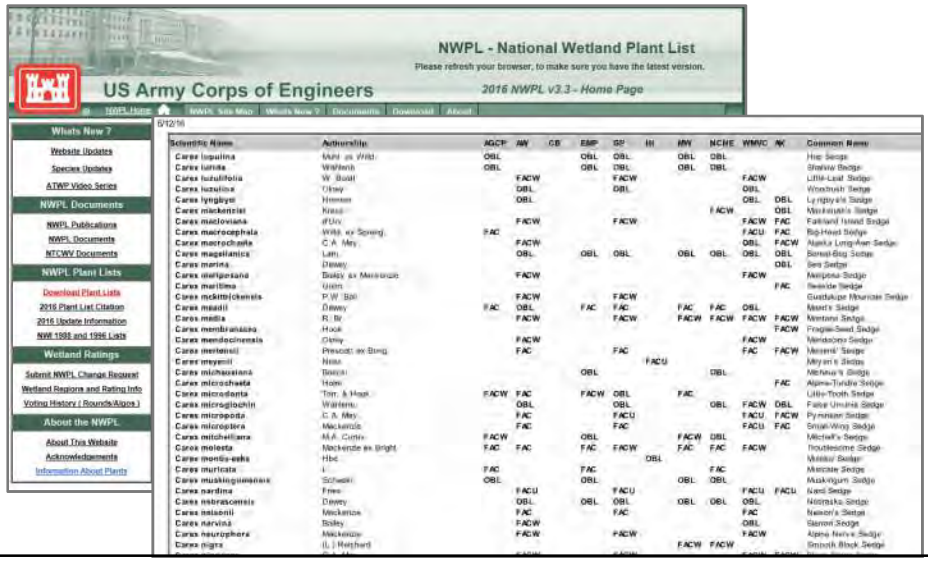
- **National Wetland Plant List**
  http://rsgisias.crrel.usace.army.mil/NWPL/

	Indicator Code	Indicator Status	Comment
HYDROPHYTIC	**OBL**	Obligate Wetland	Almost always is a hydrophyte, rarely in uplands
	FACW	Facultative Wetland	Usually is a hydrophyte but occasionally found in uplands
	FAC	Facultative	Commonly occurs as either a hydrophyte or non-hydrophyte
	FACU	Facultative Upland	Occasionally is a hydrophyte but usually occurs in uplands
	UPL	Obligate Upland	Rarely is a hydrophyte, almost always in uplands

Civil & Environmental Consultants, Inc.

National Wetland Plant List

- http://wetland-plants.usace.army.mil/nwpl_static/index.html



Wetland Sedges, Rushes, Grasses, Ferns

Civil & Environmental Consultants, Inc.

Hydric Soils

- "A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part" (59 Fed. Reg. 35680, 7/13/94)
  - upper 12" show:
    - gray coloration (high value, low chroma)
    - iron or manganese redoximorphic features (mottles)
    - organic matter accumulations (muck)
  - at a depth…
  - of certain thickness…

Civil & Environmental Consultants, Inc.

Hydric Soils

- **Soils that are reduced from anaerobic conditions have the bluish, greenish, grayish color known as gleying. Soils that are oxidized have a rust color.**

Civil & Environmental Consultants, Inc.

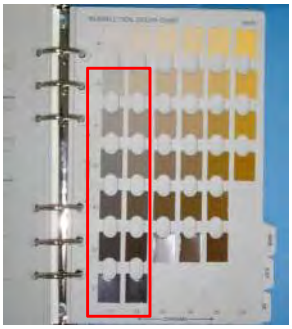
Hydric Soils

- Soils often develop mottles or oxidized spots from fluctuating water levels in wetlands

Civil & Environmental Consultants, Inc.

Hydric Soils

- Need to "draw a line" between hydric and non-hydric soils.
- Color chips similar to those at a paint store are used to assign a numerical color category based upon the hue, chroma and value of the soil.



Civil & Environmental Consultants, Inc.

Wetland Delineation

- **The boundary of a wetland is delineated where one of three indicators is absent.**

Civil & Environmental Consultants, Inc.

Stream Jurisdictional Limits

- **How to tell if a channel is a "Waters of U.S.":**
  - Defined channel bed and bank
  - Discernible Ordinary High Water Marks (OHWM)
  - Flow concentrated, not sheet or groundwater flow, can be ephemeral, intermittent, or perennial

Civil & Environmental Consultants, Inc.

Defining Bed and Banks

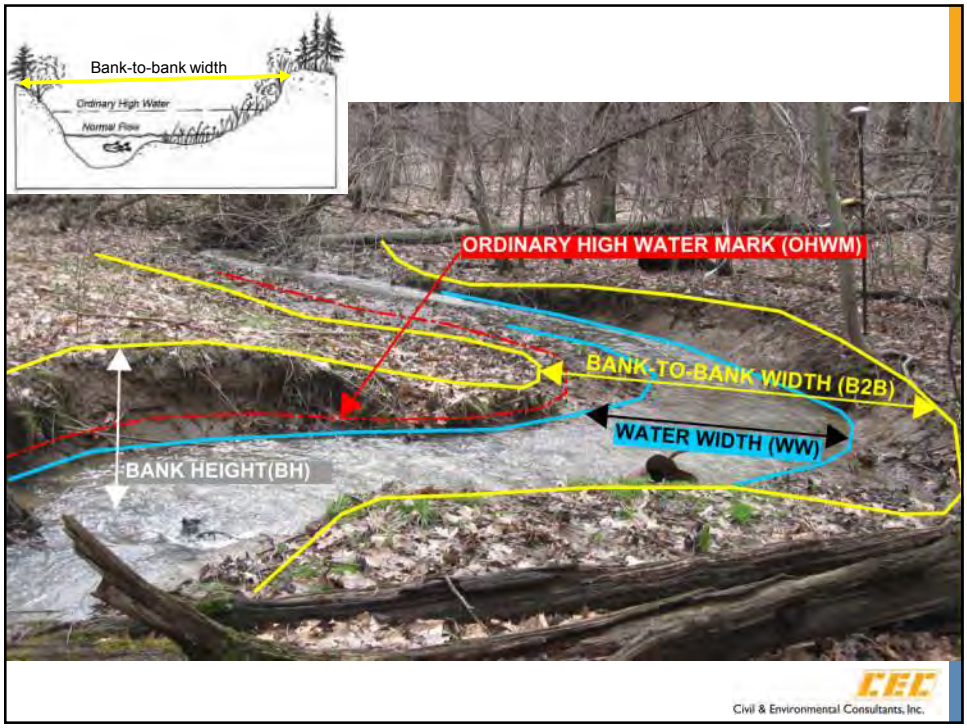
- **What makes a "defined/discernable" bed and bank?**
  - *"Substrate and sides of a channel between which flow is confined. The banks constitute a break in slope between the edge of the bed and the surrounding terrain, and may vary from steep to gradual"*
  - Channel morphology
  - Drains a convergent slope, has a watershed, not just rill/gully
  - Downcutting and scouring
  - Alluvial vs. colluvial substrate

Civil & Environmental Consultants, Inc.

Ordinary High Water Marks (OHWM) Federal Definition

- **What makes an OHWM?**
  - "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas."
- **Visual indicators USACE Jurisdictional Determination Form:**
  - clear, natural line impressed on the bank
  - sediment deposition
  - sediment sorting
  - changes in the character of soil
  - water staining
  - scour
  - shelving
  - litter and debris along banks
  - observed / predicted flow events
  - vegetation matted down, bent, or absent
  - destruction of terrestrial vegetation
  - abrupt change in plant community
  - leaf litter disturbed or washed away
  - the presence of wrack line

Civil & Environmental Consultants, Inc.



Civil & Environmental Consultants, Inc.

Stream Determinations

- **Ephemeral Stream** – flows during or shortly after precipitation, streambed above water table, groundwater not source
- **Intermittent Stream** – seasonal non-permanent flow, streambed sometimes above water table
- **Perennial Stream** – flows year-round during a typical year, streambed normally below groundwater table

Civil & Environmental Consultants, Inc.

You Serious? Yes

Unnamed Intermittent Tributary

Civil & Environmental Consultants, Inc.

Ephemeral Stream through Uplands

Civil & Environmental Consultants, Inc.

Recognizing Ephemeral Streams


Ephemeral Stream: Spring after hard rain


Ephemeral Stream: Summer


Ephemeral Stream: Autumn


Ephemeral Stream: Winter

CEC
Civil & Environmental Consultants, Inc.

Recognizing Ephemeral Streams

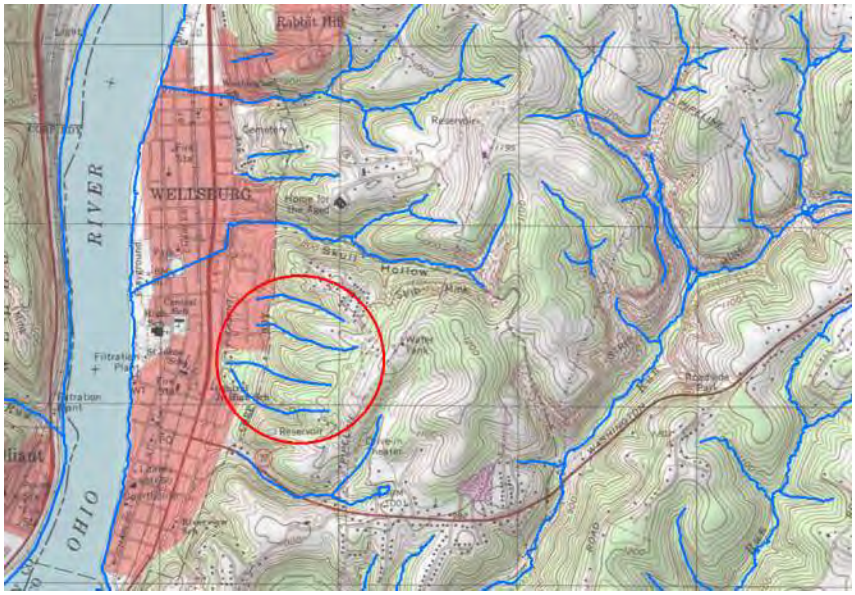
CONSTRUCTED GRASSED SWALES, IF MAINTAINED, ARE NOT JURISDICTIONAL.

NON-JURISDICTIONAL EROSIONAL GULLY OR EPHEMERAL STREAM?

MAYBE, NEED TO LOOK FOR SUBSTRATES, LATERAL EROSION, DOWNCUTTING, WRACKLINES, WATER-STAINING…

CEC
Civil & Environmental Consultants, Inc.

Ephemeral Streams in the Landscape



Civil & Environmental Consultants, Inc.

GROUNDWATER SEEP EXPOSED ON CUTSLOPE

Civil & Environmental Consultants, Inc.

COMPACTED, POORLY DRAINED PIPELINE RIGHT-OF-WAY, REVEGETATES WITH HYDROPHYTES, CAN QUALIFY AS WETLAND

CEC
Civil & Environmental Consultants, Inc.

CATTAILS IN ROADSIDE DITCH?

CEC
Civil & Environmental Consultants, Inc.

GROIN DITCH CHANNELS?

Civil & Environmental Consultants, Inc.

Best Management Practices

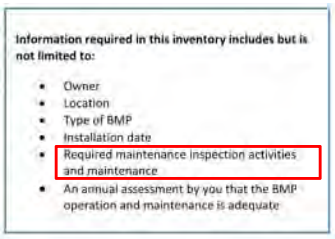
Common Pitfalls

Civil & Environmental Consultants, Inc.

SPC/DEP MS4 Quick Reference Guide

- **PCSM inspection BMPs**

BMP #6 – Ensure adequate operation and maintenance of all post-construction stormwater management BMPs installed at all qualifying development or redevelopment projects (including those owned or operated by the permittee). Within the first year of permit coverage, permittees should develop and implement a written inspection program to ensure that BMPs are properly operated and maintained. An inventory of BMPs should be developed and updated regularly. The inventory should include all BMPs installed since 3/10/2003 that discharge to your regulated MS4.


Information required in this inventory includes but is not limited to:

- Owner
- Location
- Type of BMP
- Installation date
- Required maintenance inspection activities and maintenance
- An annual assessment by you that the BMP operation and maintenance is adequate

CEC
Civil & Environmental Consultants, Inc.

Field Inspection

- **Build-in flexibility to O&M plan to account for wetland vegetation, sediment removal, erosion remediation treatment (e.g. rock armoring), debris clearing, etc. to avoid regulatory conflicts**

Field Inspections

During the field inspection, BMPs may be inspected to verify their functionality. Previous and active construction sites may also be inspected. Physical operations may be inspected, such as outfalls and maintenance facilities. Stomwater facilities that have been constructed from 2003 on, such as ponds, must be maintained and functioning as originally designed. Common issues to look for may include:

- Erosion may be occurring; remove as needed
- Check DEP and/or the United States Army Corps of Engineers (USACE) about removal of wetland vegetation if not part of original design
- Overflow structures need to function as designed
- Clear trash and debris
- Remove sediment buildup; maintain as designed

CEC
Civil & Environmental Consultants, Inc.

Borderline Features

If appropriate, document occurrences of the below and note why they may or may not be jurisdictional:

- **Actively maintained or permitted stormwater controls**
  - Diversion/riprap channels
  - Detention, sedimentation, settling, or infiltration ponds/basins
  - Culverts and outfalls
- **Water-filled depressions created incidental to construction activity**
- **Channel-like erosional features (rills, gullies)**
- **Ephemerally inundated drainageways without defined bed or banks**
- **Vegetated swales or grass-lined conveyances**

Remember the exemptions!

CEC Civil & Environmental Consultants, Inc.

Best management practices to keep your ditches non-jurisdictional

- Retain documentation that ditches were purposely designed for stormwater, irrigation, etc. AND were excavated in uplands
- Perform routine maintenance to keep ditches clear and flowing
- Don't let wetlands form along or around the ditch UNLESS specified in design

CEC Civil & Environmental Consultants, Inc.

Lessons Learned on the Street

- Document pre-construction conditions
- Minimize activities within streams, wetlands, and floodways
- Smart stormwater design to control drainage, build-in O&M flexibility, and eliminate unintended consequences
- Carefully design green infrastructure BMPs (riparian buffer, floodplain restoration, vegetated swales, rain gardens, etc.) so they allow for maintenance of potentially jurisdictional buffer areas
- Keep operations and maintenance (O&M) records
- Perform post-construction drainage control inspections, maintenance dredging, and vegetation control
- Know the BMPs and exemptions, know when to push your case with regulators
- DEP and Corps will almost always defer to restrictive interpretation of situation and claim oversight as precaution
- Keep friendly with your conservation districts

CEC Civil & Environmental Consultants, Inc.

Floodplain Management

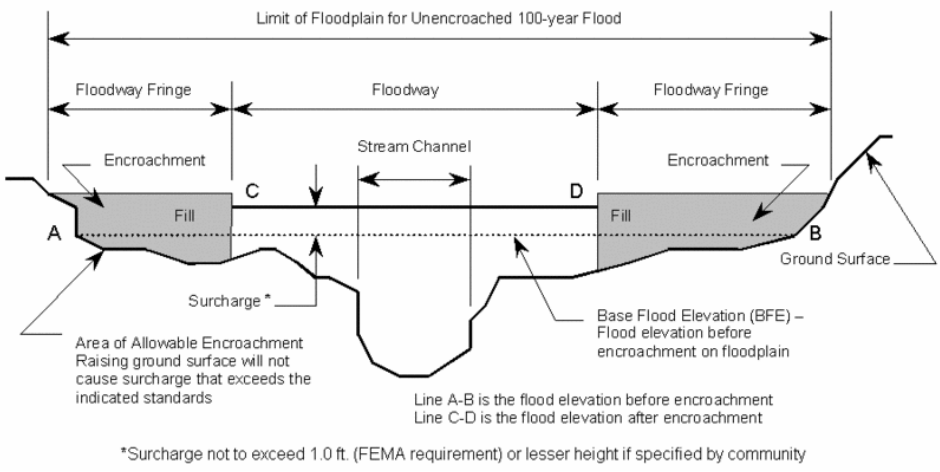
FEMA

PA pennsylvania DEPARTMENT OF COMMUNITY & ECONOMIC DEVELOPMENT

- **FEMA and DCED administering agencies, but enforced by municipalities**
- **PA Flood Plain Management Act of 1978 (Act 166) and Municipalities Planning Code enable and requires municipalities enrolled in the federal National Flood Insurance Program (NFIP) to establish:**
  - **permit process for developing hospitals, nursing homes, jails, and mobile home parks in a flood plain**
  - **standards for flood plain storage of construction materials and substances that have been determined to be dangerous to human life**
  - **building permit process requiring applicants to certify that the lowest floor of a new or substantially-improved structure is 1.5 feet above the 100-year flood elevation**
- **DEVELOPMENT is defined in the NFIP regulations as "any manmade change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations." Not just construction—any excavation or fill placement.**

CEC Civil & Environmental Consultants, Inc.

Floodplain Encroachment Cross-Section Example



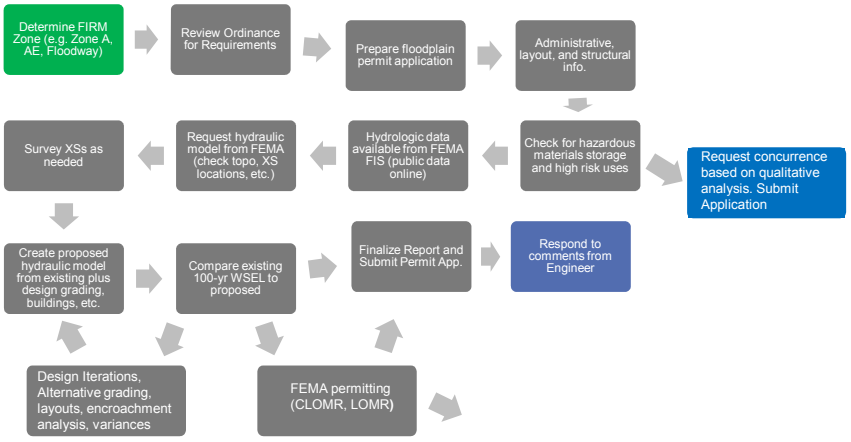
Civil & Environmental Consultants, Inc.

PA Floodplain Regulation Tie-In

- **Act 166 - Flood Plain Management Act of 1978**
  - Mandates municipal participation in and compliance with the NFIP
  - Adopts minimum requirements of the NFIP by reference
- **Chapter 105 - Dam Safety And Waterway Management**
  - Defines waters, dams, encroachments, obstructions, watercourse, floodplain, and floodway.
- **Chapter 106 - Floodplain Management**
  - Planning and development regulations for floodplains
  - Applies to highway obstructions or obstructions when located in floodplains must meet the requirements of this chapter:
    - (1) Any highway obstruction or obstruction constructed, owned or maintained by the Commonwealth or a political subdivision of the Commonwealth; and
    - (2) Any obstruction constructed, owned or maintained by a public utility.

Civil & Environmental Consultants, Inc.

Example of Municipal Permitting Process in PA



Notes:

- The permitting process varies depending on the municipality/ordinance.
- Evaluate the FIRM SFHAs as well as municipal zoning overlays where applicable. Some overlays may be more extensive than the FIRM SFHAs.

Civil & Environmental Consultants, Inc.

FEMA and NFIP Terminology

- **Federal Emergency Management Agency Definitions (Excerpt from the MT-2 Forms Appendix A)**

BFE	Base (1% annual chance) Flood Elevation. It is the height of the base flood, usually in feet, in relation to the datum used, or the depth of the base flood usually in feet, above the ground surface. The base flood is the flood that has a 1% probability of being equaled or exceeded in any given year (also referred to as the 100-year flood or the 1% annual chance flood).
CLOMR	Conditional Letter of Map Revision. A letter from DHS-FEMA commenting on whether a proposed project, if built as proposed, would meet the minimum standards of the National Flood Insurance Program.
FIRM	Flood Insurance Rate Map. An official map of a community, on which the Administrator has delineated both the special hazard areas and the risk premium zones applicable to the community.
FIS	Fl… flo… a … …identify …d risk data for
LOMR	Le… ch… …o show
NFIP	Na…
SFHA	Sp… or… …eing equaled
WSEL	W…
PMR	Ph… or… NF… …floodways, …distribute an …s.

Consult with a Certified Floodplain Manager (CFM) by Association of State Floodplain Managers (ASFPM)

Dan Fitzpatrick, CFM
DCED State NFIP Coordinator
Governor's Center for Local Government Services
888-223-6837
dafitzpatr@pa.gov

Civil & Environmental Consultants, Inc.

Flood Insurance Rate Map (FIRM)

THE FLOOD INSURANCE RATE MAP

The Federal Emergency Management Agency (FEMA) prepares Flood Insurance Rate Maps (FIRMs) to show areas that are predicted to flood after intense or major storms. The FIRMs estimate how high the water may rise, called the Base Flood Elevation.

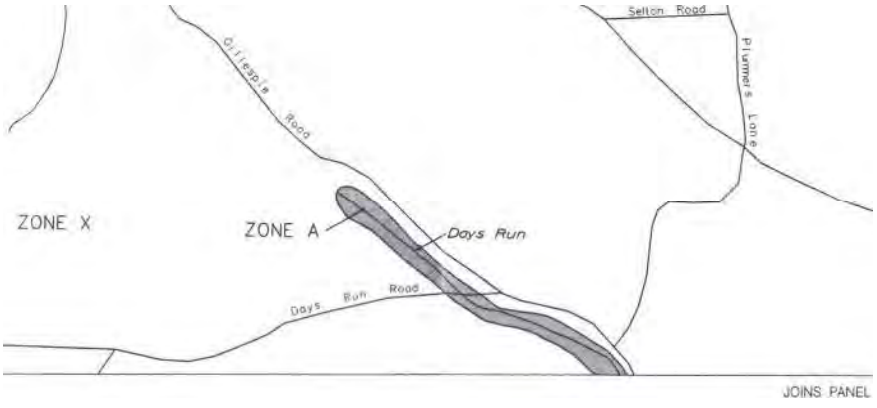
1. **Special Flood Hazard Area** (Shaded + Hatched)
   The land area covered by the floodwaters of the base flood
2. **Floodway** (Hatched)
   The channel of a watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surace elevation more than a designated height
3. **100-Year Floodplain** (Dark Gray Shaded)
   Land area subject to flooding by the 1% annual chance flood event
4. **500-Year Floodplain** (Light Gray Shaded)
   Land area subject to flooding by the 0.2% annual chance flood event
5. **Base Flood Elevation (BFE)** (Squiggly Line with # in Feet)
   Water surface elevation of the base flood at specific locations

Flood Hazard Zones

6. **Zone A, Zones A1-A30 + Zone AE**
   Flood hazard zones subject to flooding by the base or 100-year flood
7. **Zone X - Shaded**
   Flood hazard zone subject to flooding by the base or 500-year flood
8. **Zone X - Unshaded**
   All other zones with lower flood risk
9. **Elevation Reference Marks (RM)**
   Points for which ground elevation data have been established and recorded on the Flood Insurance Rate

CEC
Civil & Environmental Consultants, Inc.

Limited Detail FEMA FIRM Map



CEC
Civil & Environmental Consultants, Inc.

Design and Analysis Methodologies

JOINT PERMIT APPLICATION INSTRUCTIONS

FOR A

PENNSYLVANIA WATER OBSTRUCTION AND ENCROACHMENT PERMIT APPLICATION

AND A

U.S. ARMY CORPS OF ENGINEERS SECTION 404 PERMIT APPLICATION

Civil & Environmental Consultants, Inc.

Floodplain Permit Exemptions Take Aways

- **Consult with a Certified Floodplain Manager (CFM) by Association of State Floodplain Managers (ASFPM)**
- **Guidance in DCED's *Technical Information on Floodplain Management***
- **Permit Exemptions**
  - *"Activities, which have no direct bearing on increasing flood damage or aggravating flooding conditions, are excluded from the permit requirement."*
  - "Temporary" activities generally means 6 months
  - Staging or transient facilities
  - Minor repairs to existing structures as defined by International Building Code (IBC) or equivalent
  - Removal of vegetation or placement of small quantities of fill (except in the floodway)
  - Temporary storage of non-hazardous materials (except in the floodway)
  - Normal farming operations
- **Installation of drainage or diversion channels and storm water management facilities within FEMA floodplain are required to be permitted**

Civil & Environmental Consultants, Inc.


QUESTIONS?
Civil & Environmental Consultants, Inc.