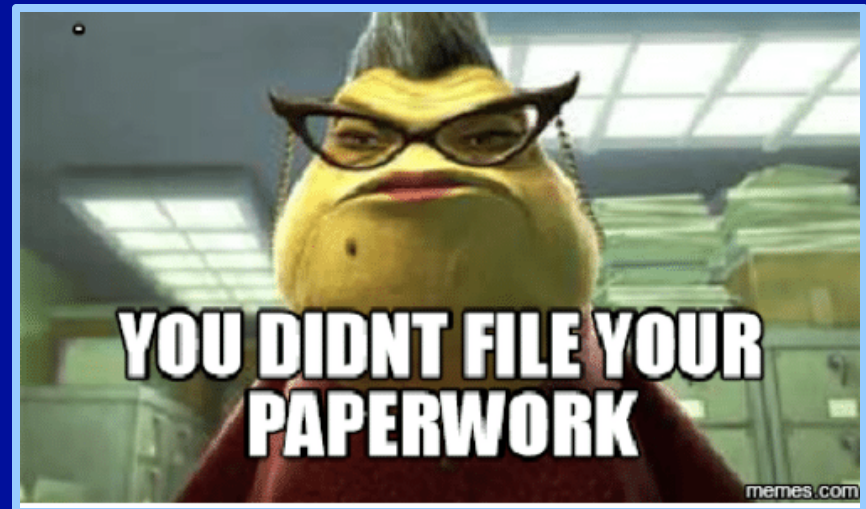


*Navigating the  
floodplain study  
approval process with  
WI DNR  
November 8, 2018*

**Chris Olds**  
Floodplain Engineer  
Wisconsin Department of Natural  
Resources



# When is a study required?



- Is the development in a mapped floodplain?
  - Is it below the BFE even though it is not in an adjacent floodplain?
- Is the development in the floodway?
  - Zone AE floodway 'OR' Zone A
- Does the development change the floodway/floodplain boundary?
  - LOMR or LOMR-F

# Who to contact



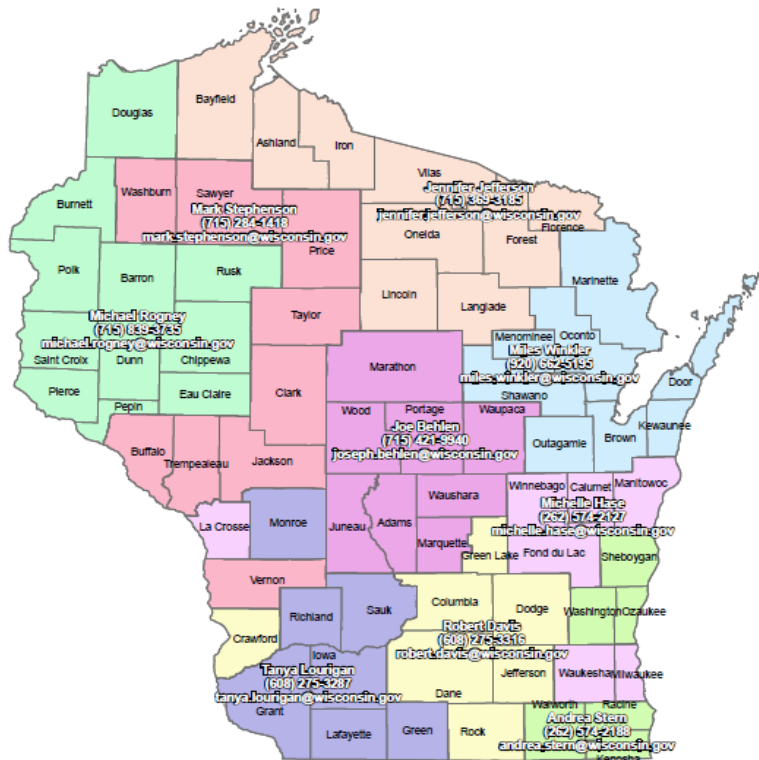
- Local ZA
- <https://www.wccadm.com/wcca-contacts>



# Who to contact



## WISCONSIN DEPARTMENT OF NATURAL RESOURCES DAM SAFETY / FLOODPLAIN CONTACTS



### CENTRAL OFFICE

Meg Galloway, Dams and Floodplain Section Chief, (608) 266-7014, [meg.galloway@wisconsin.gov](mailto:meg.galloway@wisconsin.gov)  
 Christopher Olds, Floodplain Engineer, (608) 266-5606, [christopher.olds@wisconsin.gov](mailto:christopher.olds@wisconsin.gov)  
 Konny Margovsky, Dam Safety / Floodplain Engineer, (608) 266-1925, [konstantin.margovsky@wisconsin.gov](mailto:konstantin.margovsky@wisconsin.gov)  
 Chad Heimerl, Floodplain Engineer, (608) 267-7571, [chad.heimerl@wisconsin.gov](mailto:chad.heimerl@wisconsin.gov)  
 Michelle Staff, State NFIP Coordinator, (608) 266-3083, [michelle.staff@wisconsin.gov](mailto:michelle.staff@wisconsin.gov)

**DNR WME**

## engineer contact information

County	Name of WME	DNR Office
Adams	<a href="#">Joe Behlen</a>	<a href="#">Wisconsin Rapids</a>
Ashland	<a href="#">Jennifer Jefferson</a>	<a href="#">Rhineland</a>
Barron	<a href="#">Mike Rogney</a>	<a href="#">Eau Claire</a>
Bayfield	<a href="#">Jennifer Jefferson</a>	<a href="#">Rhineland</a>
Brown	<a href="#">Miles Winkler</a>	<a href="#">Green Bay</a>
Buffalo	<a href="#">Mark Stephenson</a>	<a href="#">Black River Falls</a>
Burnett	<a href="#">Mike Rogney</a>	<a href="#">Eau Claire</a>
Calumet	<a href="#">Michelle Hase</a>	<a href="#">Waukesha</a>
Chippewa	<a href="#">Mike Rogney</a>	<a href="#">Eau Claire</a>
Clark	<a href="#">Mark Stephenson</a>	<a href="#">Black River Falls</a>
Columbia	<a href="#">Rob Davis</a>	<a href="#">Fitchburg</a>
Crawford	<a href="#">Rob Davis</a>	<a href="#">Fitchburg</a>
Dane	<a href="#">Rob Davis</a>	<a href="#">Fitchburg</a>
Dodge	<a href="#">Rob Davis</a>	<a href="#">Fitchburg</a>
Door	<a href="#">Miles Winkler</a>	<a href="#">Green Bay</a>
Douglas	<a href="#">Mike Rogney</a>	<a href="#">Eau Claire</a>
Dunn	<a href="#">Mike Rogney</a>	<a href="#">Eau Claire</a>
Eau Claire	<a href="#">Mike Rogney</a>	<a href="#">Eau Claire</a>
Florence	<a href="#">Jennifer Jefferson</a>	<a href="#">Rhineland</a>
Fond du lac	<a href="#">Michelle Hase</a>	<a href="#">Waukesha</a>
Forest	<a href="#">Jennifer Jefferson</a>	<a href="#">Rhineland</a>
Grant	<a href="#">Tanya Lourigan</a>	<a href="#">Fitchburg</a>
Green	<a href="#">Tanya Lourigan</a>	<a href="#">Fitchburg</a>
Green Lake	<a href="#">Rob Davis</a>	<a href="#">Fitchburg</a>
Iowa	<a href="#">Tanya Lourigan</a>	<a href="#">Fitchburg</a>



# Floodplain Ordinance



## (c) HYDRAULIC AND HYDROLOGIC STUDIES TO ANALYZE DEVELOPMENT

All hydraulic and hydrologic studies shall be completed under the direct supervision of a professional engineer registered in the State. The study contractor shall be responsible for the technical adequacy of the study. All studies shall be reviewed and approved by the Department.

### 1. Zone A floodplains:

#### a. Hydrology

- i. The appropriate method shall be based on the standards in ch. NR 116.07(3), Wis. Admin. Code, *Hydrologic Analysis: Determination of Regional Flood Discharge*.

#### b. Hydraulic modeling

The regional flood elevation shall be based on the standards in ch. NR 116.07(4), Wis. Admin. Code, *Hydraulic Analysis: Determination of Regional Flood Elevation* and the following:

- i. determination of the required limits of the hydraulic model shall be based on detailed study information for downstream structures (dam, bridge, culvert) to determine adequate starting WSEL for the study.
- ii. channel sections must be surveyed.
- iii. minimum four foot contour data in the overbanks shall be used for the development of cross section overbank and floodplain mapping.
- iv. a maximum distance of 500 feet between cross sections is allowed in developed areas with additional intermediate cross sections required at transitions in channel bottom slope including a survey of the channel at each location.
- v. the most current version of HEC\_RAS shall be used.
- vi. a survey of bridge and culvert openings and the top of road is required at each structure.
- vii. additional cross sections are required at the downstream and upstream limits of the proposed development and any necessary intermediate locations based on the length of the reach if greater than 500 feet.
- viii. standard accepted engineering practices shall be used when assigning parameters for the base model such as flow, Manning's N values, expansion and contraction coefficients or effective flow limits. The base model shall be calibrated to past flooding data such as high water marks to determine the reasonableness of the model results. If no historical data is available, adequate justification shall be provided for any parameters outside standard accepted engineering practices.
- ix. the model must extend past the upstream limit of the difference in the existing and proposed flood profiles in order to provide a tie-in to existing

studies. The height difference between the proposed flood profile and the existing study profiles shall be no more than 0.00 feet.

### c. Mapping

A work map of the reach studied shall be provided, showing all cross section locations, floodway/floodplain limits based on best available topographic data, geographic limits of the proposed development and whether the proposed development is located in the floodway.

- i. If the proposed development is located outside of the floodway, then it is determined to have no impact on the regional flood elevation.
- ii. If any part of the proposed development is in the floodway, it must be added to the base model to show the difference between existing and proposed conditions. The study must ensure that all coefficients remain the same as in the existing model, unless adequate justification based on standard accepted engineering practices is provided.

### 2. Zone AE Floodplains

#### a. Hydrology

If the proposed hydrology will change the existing study, the appropriate method to be used shall be based on ch. NR 116.07(3), Wis. Admin. Code, *Hydrologic Analysis: Determination of Regional Flood Discharge*.

#### b. Hydraulic model

The regional flood elevation shall be based on the standards in ch. NR 116.07(4), Wis. Admin. Code, *Hydraulic Analysis: Determination of Regional Flood Elevation* and the following:

##### i. Duplicate Effective Model

The effective model shall be reproduced to ensure correct transference of the model data and to allow integration of the revised data to provide a continuous FIS model upstream and downstream of the revised reach. If data from the effective model is available, models shall be generated that duplicate the FIS profiles and the elevations shown in the Floodway Data Table in the FIS report to within 0.1 foot.

##### ii. Corrected Effective Model.

The Corrected Effective Model shall not include any man-made physical changes since the effective model date, but shall import the model into the most current version of HEC-RAS for Department review.

##### iii. Existing (Pre-Project Conditions) Model.

The Existing Model shall be required to support conclusions about the actual impacts of the project associated with the Revised (Post-Project) Model or to establish more up-to-date models on which to base the Revised (Post-Project) Model.

##### iv. Revised (Post-Project Conditions) Model.

The Revised (Post-Project Conditions) Model shall incorporate the Existing Model and any proposed changes to the topography caused by the proposed development. This model shall reflect proposed conditions.

# WI DNR SWDV



GIS <https://dnrmaps.wi.gov/H5/?Viewer=SWDV> Wisconsin DNR

File Edit View Favorites Tools Help

## Surface Water Data Viewer

Search... Sign in

Maps & Data Basic Tools Locate & Identify Draw & Measure Additional Resources

Home Show Layers Show Legend Pan Zoom In Zoom Out Previous Extent Next Extent Full Extent Bookmarks Point Identify Print

Home Map Layers Navigation Identify Print

### Home

Welcome to the Surface Water Data Viewer (SWDV), a Wisconsin DNR data delivery system that provides interactive web mapping tools for a wide variety of datasets including chemistry (water, sediment), physical, and biological (macroinvertebrate and fish) data.

### Toolbar

- Click on the "Show Layers" button above to view map data in the Layers panel
- Use Pan, Zoom In/Out, and Previous/Next/Full Extent buttons to navigate around map
- Click anywhere on the map for information about features at that location
- Click the Print button to generate a custom map

### Map Layers

- Click the plus sign (+) to expand the data content in the layers
- Turn a map layers on/off by clicking the checkbox next to the layer name
- If layers are gray in color, zoom in closer until text turns black for layer to turn 'on'

### Find Locations

- To locate a specific feature, use tools from the Locate & Identify tab or enter text into the Search Box

Visit [DNR Maps](#) and [Aerial Photography](#) for additional maps and information

Wisconsin DNR | WiDNR, USGS, and other data | Wisconsin Department of Natural Resources

[DNR Website](#) [SWIMS](#) [WATERS](#) [NHI Portal](#) [Comments](#) [Terms of Use](#)

# WI DNR SWDV



## Surface Water Data Viewer

[Sign in](#)

Maps & Data Basic Tools Locate & Identify Draw & Measure Additional Resources

[Home](#)[Show Layers](#)[Show Legend](#)[Pan](#)[Zoom In](#)[Zoom Out](#)[Previous Extent](#)[Next Extent](#)[Full Extent](#)[Bookmarks](#)[Point Identify](#)[Print](#)[Home](#)[Map Layers](#)[Navigation](#)[Identify](#)[Print](#)

Identify Results (9)



**Waukesha**  
County



**FAD ID: 20125 - Case by Case Analysis for Development in Floodplain - WIDNR Approved, FEMA Not Required**  
Floodplain Analysis  
[Metadata](#)  
[Input File](#)  
[FIS File](#)



**FAD ID: 10536 - Flood Insurance Study - WIDNR Approved, FEMA Not Required**  
Floodplain Analysis  
[Metadata](#)  
[Input File](#)  
[FIS File](#)



**Pewaukee River (WBIC 771700)**  
River or Stream

[Metadata](#) | [About the Water](#)



**SFHA / Flood Zone Boundary**  
Flood Hazard Boundary

Displaying 1 - 9 (Total: 9)

Page 1 of 1

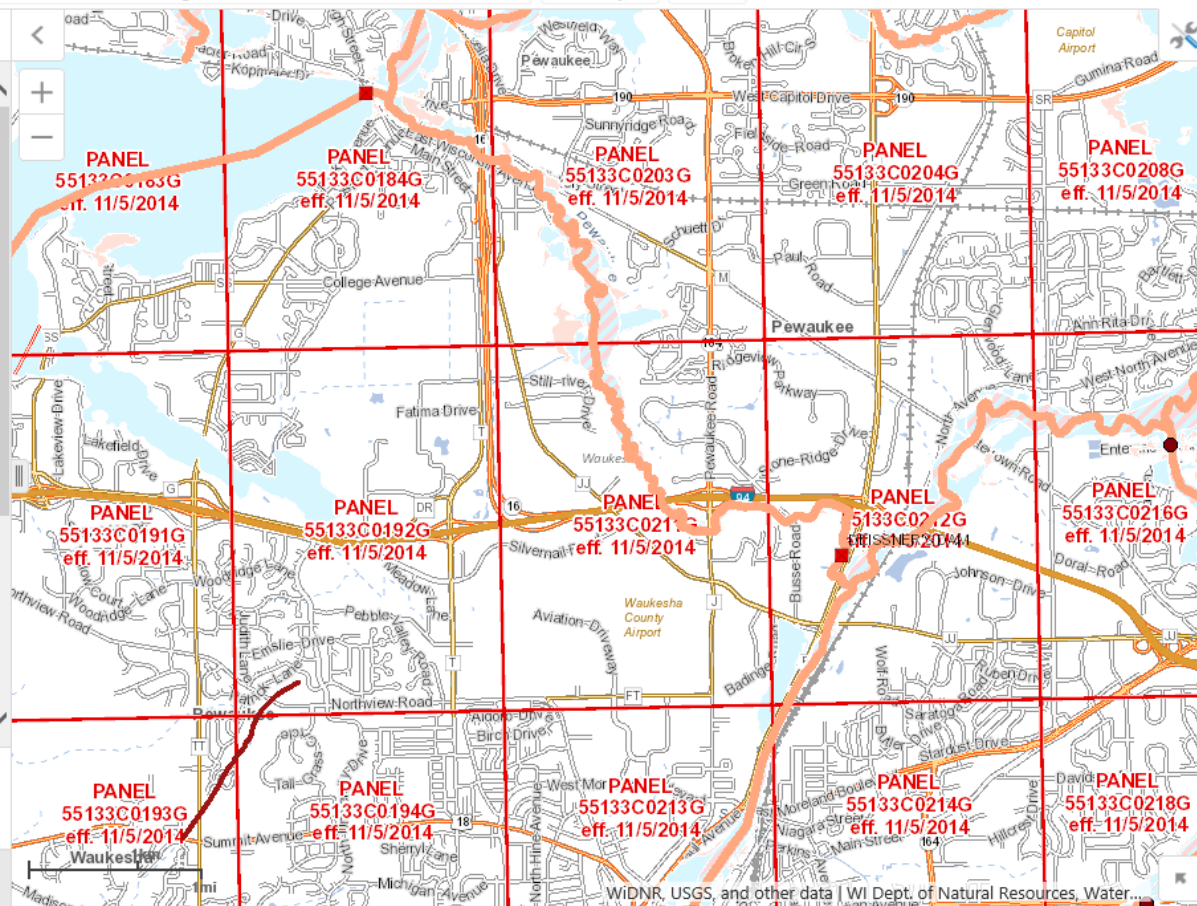
[Home](#)[Layers](#)[Identify Result...](#)

WKID: 4326 Lat/Long

Lat: 43.08938° N  
Lon: 88.29924° W



Scale 1: 47,520

[Go](#)

[DNR Website](#) [SWIMS](#) [WATERS](#) [NHI Portal](#) [Comments](#)

[Terms of Use](#)

# Who to contact



https://www.fema.gov/engineering-library



Engineering Library | FEMA.... x



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> Change my Flood Zone Designation

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Info for Community Officials

Info for Engineers, Surveyors, & Architects

Info for Real Estate, Lending, Insurance Professionals

> Success Stories

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Risk MAP Projects

Regional Contact Information

▼ Engineering Library

How to Order Technical & Administrative Support Data

> Flood Mapping Products

> Status of Map Change Requests

## Engineering Library

The FEMA Engineering Library is responsible for the archival and maintenance of all technical and administrative support data and related publications associated with the National Flood Insurance Program. This page is intended for mapping professionals and contractors and engineers looking to obtain these data and publications and learn more about the FEMA Engineering Library.

For information on how to order the available products visit [How to Order Technical and Administrative Support Data](#).

> Expand All Sections

> Forms And Fee Schedule

> Online Search And Download Using FEMA's Flood Risk Studies Engineering Library (FRISSEL)

> Frequently Asked Questions (FAQ)

> Hours Of Operation

> For More Information

Last Updated: 06/01/2018 - 11:13

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# Who to contact



<https://dnr.wi.gov/topic/floodplains/> Floodplain Management - ... x

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## Floodplain management and mapping

View

 interactive floodplain maps.

Understand

 the mapping process.

Learn

 about regulating floodplains.

Find

 floodplain and dam customer assistance.

**The goals of the Wisconsin floodplain management program are:** to protect life, health and property; to minimize costs for flood control projects; to reduce tax dollars spent for rescue, relief and repair of flood damage; to shorten business interruptions caused by flooding; to prevent future flood blight areas; to discourage victimization of unwary land and home buyers; and to prevent increased flood levels caused by unwise floodplain development.

**Mapping**  

- [Mapping process](#)
- [Risk MAP](#)
- [Find a Map](#)
- [LOMC](#)
- [Engineering and Modeling](#)

**Ordinances**  

- [Regulations](#)
- [What is regulated?](#)
- [Ordinance adoption](#)
- [Definitions and acronyms](#)

**Overview**  

- [Definitions](#)
- [Standards](#)
- [Staff](#)
- [Resources](#)

**Flood Insurance**  

- [NFIP](#)
- [Community rating system](#)
- [Resources](#)

**Grants**  

- [Mitigation](#)

**Resources**  

- [Model ordinances](#)
- [Newsletters/Subscribe](#)
- [Publications/Presentations](#)
- [Fact sheets](#)

[Latest "Floodplain and Shoreland Management Notes"](#)

**Emergency information**

For reporting dam emergencies:  
STATE WARNING CENTER  
1-800-943-0003  
Press 1, Ask for DNR Duty Officer

**Customer Service**

Find where to go with your dam or floodplain question!

[Customer Service](#)

**Contact information**

For more information, contact:

[DNR Floodplains](#)

<https://dnr.wi.gov/topic/FloodPlains/fad.html>

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Floodplain engineering dat...

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## Floodplain engineering data

### Available data

The engineering data from the Flood Insurance Studies can be found on the department [Surface Water Data Viewer](#). If the effective model is not on the Surface Water Data Viewer, then staff can assist users in determining whether or not engineering data exists.

Staff can answer specific technical questions on studies related to the floodplain. For most engineering hydraulic studies, HEC-RAS is the accepted model. A free copy of HEC-RAS can be downloaded from the [US Army Corps of Engineers \[exit DNR\]](#).

### DNR study review

Department of Natural Resources staff reviews engineering studies for compliance with NR 116 Wis. Admin. Code. A [floodplain study checklist \[pdf\]](#) has been created to assist in preparing a floodplain study submittal to DNR for review. Please save this document locally and fill out digitally if possible, then include in your submittal package to DNR.

Hydrologic and hydraulic model revisions due to development should follow the local community's floodplain ordinance. Specifically, refer to section 7.1 (2) (c) of the [model ordinance \[pdf\]](#).

### Federal Emergency Management Agency review

Users should contact the FEMA Map Information Exchange at 1-877-336-2627 or [FEMAMapSpecialist@riskmapcds.com](mailto:FEMAMapSpecialist@riskmapcds.com) for questions related to Letter of Map Change submittals.

### Resources

More information on [floodplain management](#).

Last Revised: Wednesday May 02 2018

#### Floodplain management

- View**  
interactive floodplain maps.
- Understand**  
the mapping process.
- Learn**  
about regulating floodplains.
- Find**  
floodplain and dam customer assistance.

#### Related links

- + [Wisconsin Emergency Management \(WEM\) \[exit DNR\]](#)
- + [FEMA \[exit DNR\]](#)
- + [Chapter NR 116, Wis. Adm. Code. \[PDF exit DNR\]](#)
- + [Dam safety](#)

#### Contact information

For floodplain policy, zoning contact:

[DNR Floodplains](#)

#### TOPICS

- Environmental Protection
- Forest Management
- Lands and Activities

#### CONTACT

- Hotlines
- Staff Directory
- Office Locations

# Floodplain Checklist



## Checklist for Submitting a Floodplain Study

Wisconsin Department of Natural Resources



This outline for department review of floodplain studies may not contain all of the requirements of the administrative code. It is a general outline and detailed examination of the codes should be done to be assured that a submittal may meet department approval. Appropriate areas should be filled in by the engineer submitting the study for WDNR review.

Community/Zoning Authority: \_\_\_\_\_

Official Stream Name: \_\_\_\_\_

County: \_\_\_\_\_

Study Author: \_\_\_\_\_

Submission Date: \_\_\_\_\_

Submitted to: \_\_\_\_\_

Legal Description:

Upstream Limit \_\_\_\_ 1/4(QQ), \_\_\_\_ 1/4(Q), Section(s) \_\_\_\_\_, Township \_\_\_\_\_, Range \_\_\_\_\_

Downstream Limit \_\_\_\_ 1/4(QQ), \_\_\_\_ 1/4(Q), Section(s) \_\_\_\_\_, Township \_\_\_\_\_, Range \_\_\_\_\_

Study Type (circle): Bridge/Culvert   Channel Realignment   Enclosure   Filling/Grading   BFE determination

Other \_\_\_\_\_

## I) General Documentation

\_\_\_\_ Contact (Telephone Conservation) Reports

\_\_\_\_ Meeting Minutes/Reports

\_\_\_\_ General Correspondence

\_\_\_\_ Submittal letter or e-mail from zoning authority requesting review

## II) Narrative Report

\_\_\_\_ Purpose of the study

\_\_\_\_ Geographic location of the study

\_\_\_\_ Detailed description of the methodology used for hydrology, hydraulics and any special applications used in the study

\_\_\_\_ Description of the project location related to model river stations

\_\_\_\_ Documentation of the changes made between each model run

\_\_\_\_ Floodway Data Table

Note: Include at least one table with the following output variables:

'River Sta' 'Q Total' 'W.S. Elev' 'Top Width Act' 'Flow Area' 'Vel Total'

\_\_\_\_ Previous studies on the same watercourse – date/author/source of study

\_\_\_\_ Data collection methods

\_\_\_\_ Past flooding

\_\_\_\_ Benchmark identification and location

\_\_\_\_ Coordination with other agencies

\_\_\_\_ Other supporting documentation provided

(circle) Soils Maps   Watershed Maps   Photographs   Stream Flow Records

Other: \_\_\_\_\_

# Floodplain Checklist



## III) Engineering Analyses

### 1) Hydrologic Analysis (electronic input/output files)

\_\_\_ Is there an existing model?

Existing model input file name: \_\_\_\_\_

The two techniques used to determine the regional flood flow discharges:

\_\_\_ Log-Pearson Type III, described in Technical Bulletin #17B

\_\_\_ Regional Regression Equations (i.e. Congers)

\_\_\_ Synthetic hydrographs (i.e. HEC-HMS)

\_\_\_ Was floodplain storage explicitly taken into account to attenuate flood peak flow?

\_\_\_ If yes, have flood storage district maps been created for the community to adopt?

\_\_\_ Which rainfall distribution was used?

\_\_\_ If a distribution other than NRCS's MSE3/MSE4 was used, what duration was the critical duration when the critical duration analysis was performed to identify the peak storm duration?

\_\_\_ Technical Release No. 55 (TR-55)

\_\_\_ Comparison of similar drainage basins at gaged sites

\_\_\_ Historic flood data

\_\_\_ Other methods with department approval (comment on what method)

Input file name: \_\_\_\_\_

\_\_\_ New peak flows tie in with upstream and downstream published flows

### 2) Hydraulic Analyses (electronic input/output files)

Note: The same model must be used for both existing and proposed conditions for relative consistency

\_\_\_ Is there an existing model?

Existing model input file name: \_\_\_\_\_

\_\_\_ Existing model was not truncated from its original study reach

New hydraulic model type (i.e. HEC-RAS) \_\_\_\_\_

New input file name (project model name that has one or multiple runs):

\_\_\_\_\_

Model plan descriptions: \_\_\_\_\_

(ex. p.01 = effective, p.02 = corrected effective, p.03 = pre-project, p.04 = post-project...)

What is the vertical datum of the survey/geometric data (NAVD88, NGVD29...) \_\_\_\_\_

\_\_\_ Is there a dam with operable gates in the study reach?

\_\_\_ If yes, does the modeled operation represent the DNR approved Inspection, Operations, and Maintenance Plan (IOM)? The dam operator then assumes liability that the gates will be operated as outlined in the IOM.

If not, explain \_\_\_\_\_

\_\_\_ Is there a detailed study upstream of the submitted reach? (Y/N)

\_\_\_ If yes, do the profiles match within 0.5' at the boundary? (Y/N)

\_\_\_ Is there a detailed study downstream of the submitted reach? (Y/N)

\_\_\_ If yes, do the profiles match exactly at the boundary? (Y/N)

\_\_\_ Model shows increases due to development (proper legal arrangements required)

# Floodplain Checklist



## 3) Miscellaneous

\_\_\_\_\_ Supporting hand calculations, sketches and figures used in analyses

\_\_\_\_\_ Key to Cross-Section Labeling

\_\_\_\_\_ Key to Transect Labeling (coastal study only)

## IV) Mapping information

\_\_\_\_\_ Workmaps including floodway, floodfringe, cross sections, and stream centerlines

\_\_\_\_\_ Floodway Data Table

Note: Include at least one table with the following output variables:

'River Sta' 'Q Total' 'W.S. Elev' 'Top Wdth Act' 'Flow Area' 'Vel Total'

Digital mapping data provided:

(Circle) \_\_\_\_\_ ESRI shapefile(s)/database \_\_\_\_\_ CAD data \_\_\_\_\_ Other \_\_\_\_\_

Horizontal coordinate system used: \_\_\_\_\_

## V) Certification

\_\_\_\_\_ Signed, stamped, and submitted by a Professional Engineer registered in Wisconsin

Name \_\_\_\_\_ Registration # \_\_\_\_\_



# Model requirements AE zone



- **Hydraulics**
  - Existing/Duplicate effective (FIS model)
  - Corrected effective
  - Pre-project
  - Post-project
  - Encroachment (floodway run...necessary?)
  - Elevation to 2 decimals

# Model requirements A zone

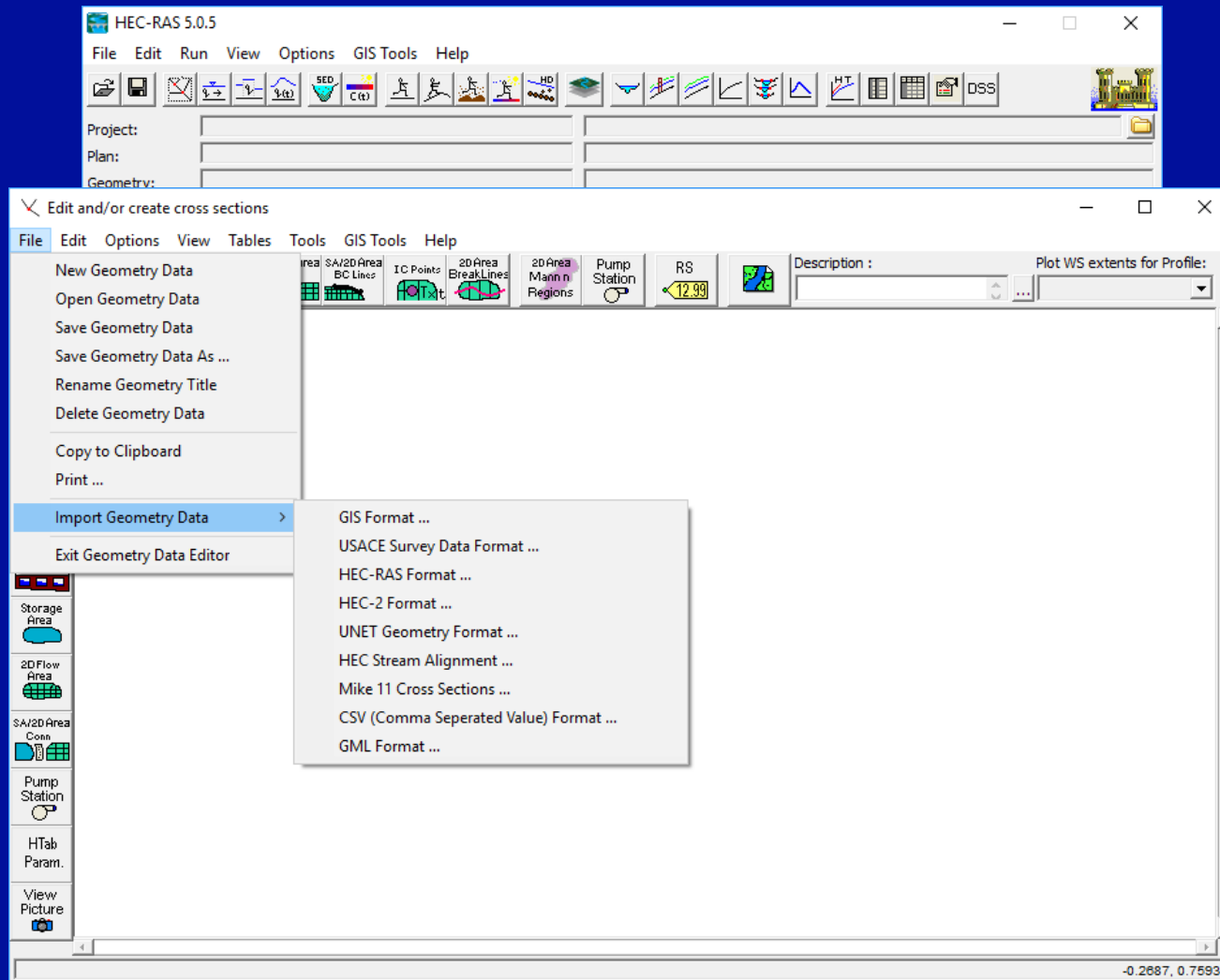


- Hydrology – 2 methods
- Hydraulics – HEC-RAS preferred
- Engineered A zones – there are many model backed A zones in WI, check with the regional engineer

# HEC-RAS 101



- Importing a HEC-2 into HEC-RAS



# HEC-RAS 101



- All plans in one project
- Clearly label plans

NO

YES

Open Plan File	
Selected File Title	Filename
Plan 05	D:\Data\Consultant\Bull_Junior_Creek\HEC-RAS (2017-06-16)\HEC-RAS\4900River.p0
Imported Plan 01	D:\Data\Consultant\Bull_Junior_Creek\HEC-RAS (2017-06-16)\HEC-RAS\4900River.p0
Imported Plan 02	D:\Data\Consultant\Bull_Junior_Creek\HEC-RAS (2017-06-16)\HEC-RAS\4900River.p0
Imported Plan 03	D:\Data\Consultant\Bull_Junior_Creek\HEC-RAS (2017-06-16)\HEC-RAS\4900River.p0
Plan 04	D:\Data\Consultant\Bull_Junior_Creek\HEC-RAS (2017-06-16)\HEC-RAS\4900River.p0
Plan 05	D:\Data\Consultant\Bull_Junior_Creek\HEC-RAS (2017-06-16)\HEC-RAS\4900River.p0
Plan 05 (Encroachment Model)	D:\Data\Consultant\Bull_Junior_Creek\HEC-RAS (2017-06-16)\HEC-RAS\4900River.p0
OK	Cancel Help

Open Plan File	
Selected File Title	Filename
Proposed Conditions	D:\Data\Consultant\Erickson_Park\Revised RAS Hydraulic Analysis\
Corrected Effective	D:\Data\Consultant\Erickson_Park\Revised RAS Hydraulic Analysis\
Proposed Conditions	D:\Data\Consultant\Erickson_Park\Revised RAS Hydraulic Analysis\
Duplicate Effective	D:\Data\Consultant\Erickson_Park\Revised RAS Hydraulic Analysis\
OK	Cancel Help

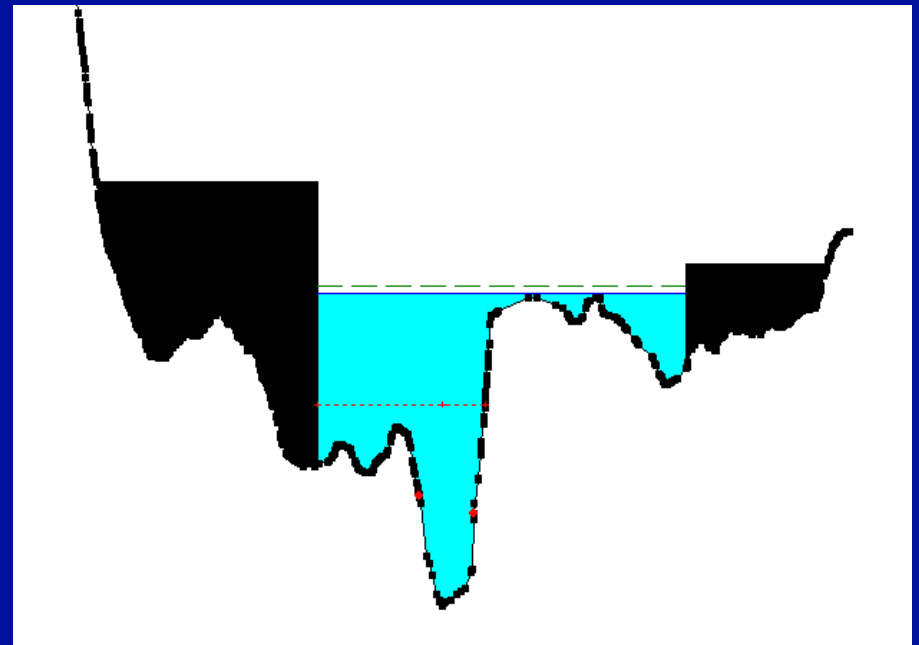
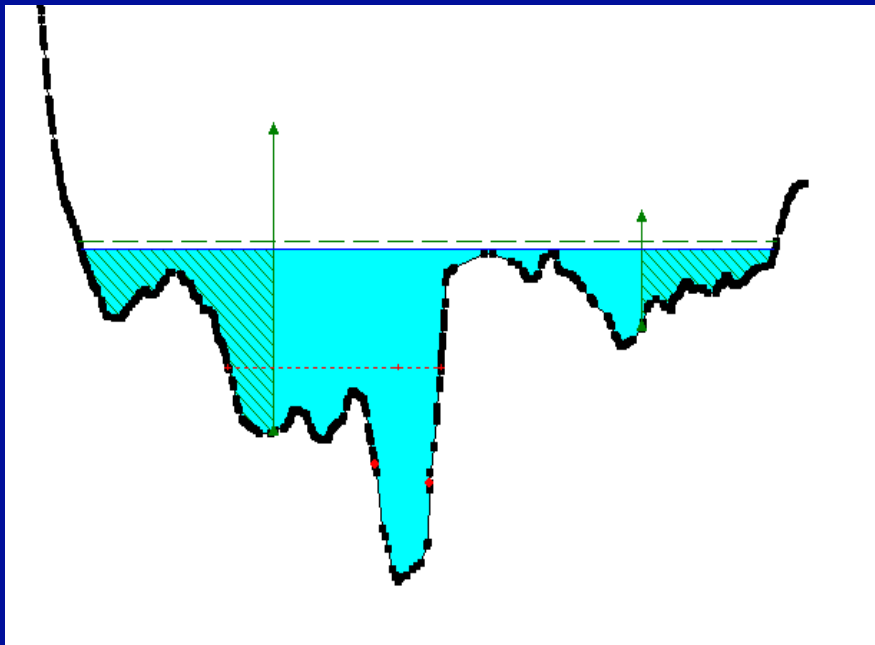
Open Plan File	
Selected File Title	Filename
Duck Creek Existing	D:\Data\Consultant\Duck\HECRAS\4456.p03
Rehab Condition	D:\Data\Consultant\Duck\HECRAS\4456.p01
Duck Creek Existing	D:\Data\Consultant\Duck\HECRAS\4456.p03
Plan 02	D:\Data\Consultant\Duck\HECRAS\4456.p02
Plan 04	D:\Data\Consultant\Duck\HECRAS\4456.p04
Plan 05	D:\Data\Consultant\Duck\HECRAS\4456.p05
Plan 06	D:\Data\Consultant\Duck\HECRAS\4456.p06
Plan 07	D:\Data\Consultant\Duck\HECRAS\4456.p07
OK	Cancel Help

Open Plan File	
Selected File Title	Filename
Pedestrian Bridges	D:\Data\Consultant\Fredonia_disc_golf\DiscGolfFloodStudy2017.p07
Existing FIS	D:\Data\Consultant\Fredonia_disc_golf\DiscGolfFloodStudy2017.p03
Current Exi condi no pedestrian bridge	D:\Data\Consultant\Fredonia_disc_golf\DiscGolfFloodStudy2017.p05
Pedestrian Bridges	D:\Data\Consultant\Fredonia_disc_golf\DiscGolfFloodStudy2017.p07
OK	Cancel Help

# HEC-RAS 101



- Floodway limits
  - Blocked obstruction vs. ineffective flow (sensitivity analysis)





# HEC-RAS 101



## • Check-RAS

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    - Additional Guidance
    - CHECK-2

cCHECK-RAS - a HEC-RAS Validation

cCHECK-RAS is a program developed by FEMA to verify the validity of U.S. Army Corps of Engineers (USACE) HEC-RAS hydraulic modeling how to download and run the latest version of cCHECK-RAS and receive program.

[Expand All Sections](#)

- [Summary And cHECK-RAS 2.0.1 Release](#)
- [Current Users](#)
- [New Users](#)
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cCHECK-RAS Version 2.0.1

HEC-RAS Project:  [Browse...](#)

HEC-RAS Info

Title:  HEC-RAS Version:

Plan:

Geometry:

Steady Flow:

Description:  Unit:

Profiles

Profile	Frequency

Surcharge

State	Surcharge
Ohio	0.5
Ohio	1
New Jer...	0.2
Michigan	0.1
Illinois	0.1
Indiana	0.149
Wisconsin	0.0
Montana	0.5

[Extract Data](#) [Checking](#) ☐ All Messages [View Report](#) [Edit Report](#) [Export To PDF](#)

Progress:  [Help](#)

# Mapping



- Include map (electronic) to scale with current & proposed floodplain/floodway, topo, and cross sections



# Mapping



- Tie-in (hydrology, hydraulics, and floodplain) upstream and downstream
- Mapped floodway topwidths match model
- ESRI products (shapefiles) preferred

# When is a CLOMR/LOMR required?



- CLOMR when risk (BFE/FW/fp) increases
- LOMR within 6 months of project completion
- Revisions based on FEMA comments require another WDNR review

# Questions?

