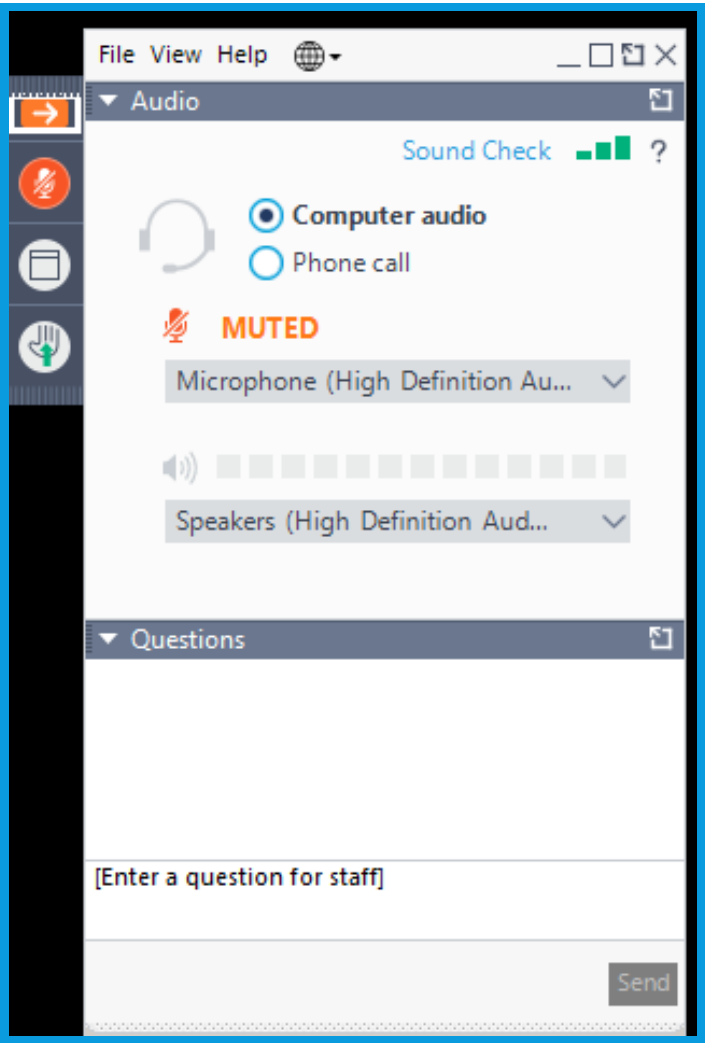
Cooperating Technical Partners Information Exchange

North Carolina No-Rise Review



ASFPM Flood Science Center **March 12, 2020**

Audio and Web Settings



- Open and hide your webinar control panel using the orange arrow button at top left corner
- Choose “Computer audio” to use speakers or headphones
- Choose “Phone call” to dial in using the information provided

Submit questions and comments using the “Questions” panel

Webinar Participation

- All lines will be automatically be muted.



Use the "Questions" window in the webinar control panel to submit any questions or comments to the moderator.

- Selected questions will be read to the presenter and answered on the live webinar.

- Submitted questions not asked during the webinar will be answered by the presenters and posted as a document on the webinar event page at floodsciencecenter.org

Continuing Education Credits

- Certified Floodplain Managers and Certified Planners are eligible for 1 CEC for participating in this webinar.
- You must have registered individually and indicated you are a CFM and/or AICP at time of registration.
- Eligibility for CEC is dependent on your time spent viewing the webinar, as determined by the webinar software.



Attending this webinar in a group setting or only viewing the recording is NOT eligible for CEC.

Additional Logistics

- To suggest future CTP webinar topics, please contact Alan Lulloff at *alan@floods.org* or type a suggested topic into the Questions panel today.



ASFPM CFM CECs will be automatically applied.



Certificates of Attendance will be emailed. Processing will take a few weeks. Please contact *cfm@floods.org* with any certificate issues only after a few weeks have elapsed.

- A follow-up email with link to slides and recording will be sent **in about week or so.**

Thank You for Joining Us!

ASFPM Mapping and Engineering Standards Committee
Cooperating Technical Partners Subcommittee

Co-chairs:

- Brooke Seymour, P.E., CFM - *bseymour@udfcd.org*
  Mile High Flood District
- Maria Lamm, CFM - *coxm@dnr.sc.gov*
  South Carolina Department of Natural Resources

Goals:

- *Identify common concerns*
- *Provide opportunities for information exchange*
- *Identify training needs*
- *Promote and document the value of CTPs*

Agenda

- **Introduction** - *Alan Lulloff, P.E., CFM, ASFPM Flood Science Center*
- **Floodway Surcharge: History and Impacts** - *Alan Lulloff*
- **The North Carolina No-Rise Guidance and Review Program** – *Dan Brubaker, P.E., CFM, North Carolina NFIP Coordinator/Engineer, NC Emergency Management*
- **City of Brevard, NC – No Adverse Impact Higher Standard** - *Alan Lulloff*
- **Questions/Discussion**

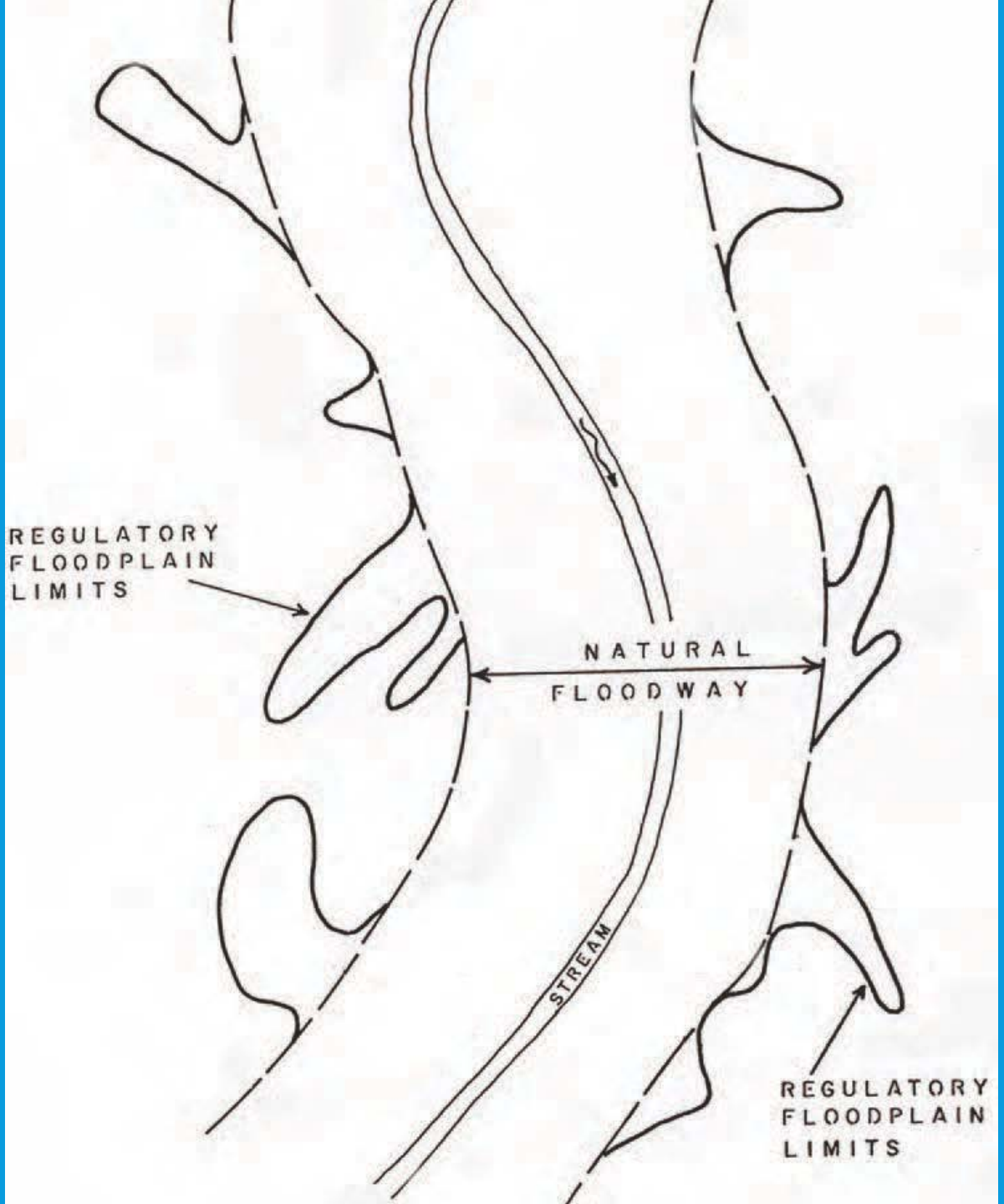
Floodways
The Original Intent

Presented by:

Alan R. Lulloff, P.E., CFM

One-foot surcharge floodway

- What is this thing called surcharge?
- What was the original intent?


REGULATORY
FLOODPLAIN
LIMITS
NATURAL
FLOODWAY
STREAM
REGULATORY
FLOODPLAIN
LIMITS

Addressing Cumulative Impacts

Title 44 CFR Part 60, Section 59.1

"A floodway is defined as the channel of a river or other watercourse and the adjacent land areas that **must be reserved** in order to discharge the base flood without **cumulatively increasing the water-surface elevation by more than a designated height.**"

NFIP Floodway Definition

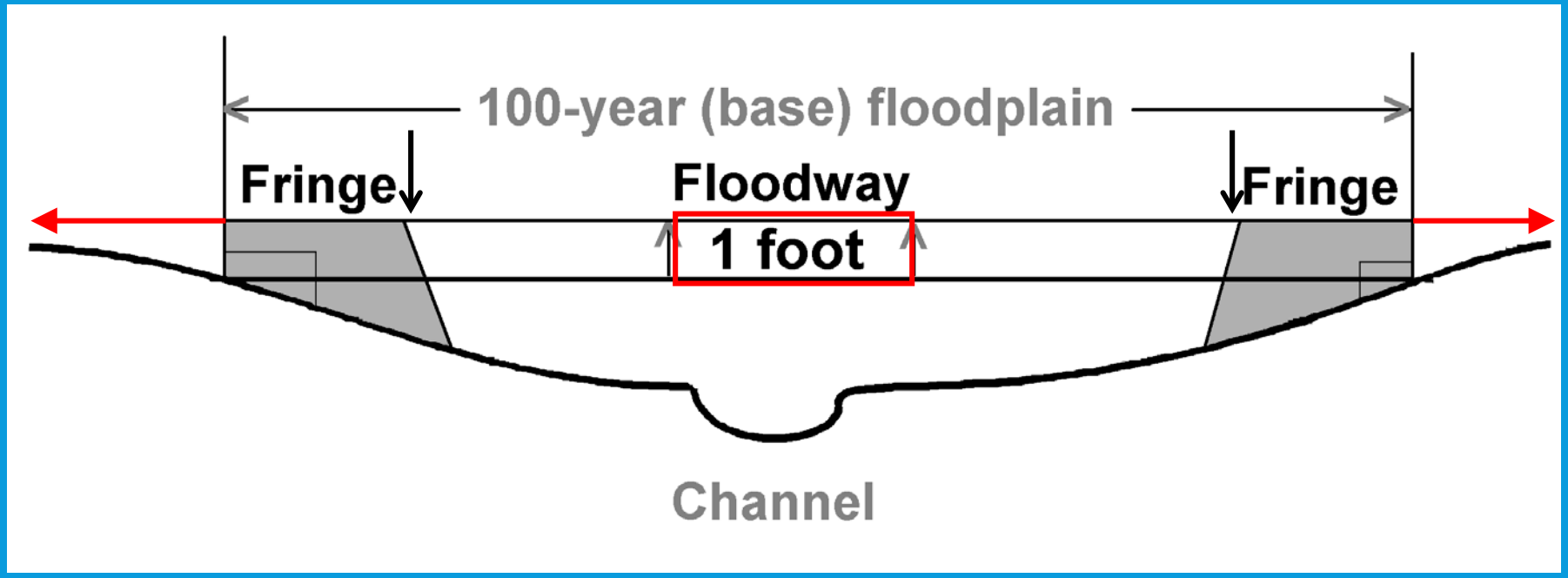
Title 44 CFR Part 60, Section 60.3

… the community shall

60.3 (d) (2) **Select** and adopt a regulatory floodway based on the principle that the area chosen for the regulatory floodway must be designed to carry the waters of the base flood, **without increasing the water surface elevation of that flood more than one foot** at any point;

Equal Degree of Encroachment – Cumulative Impacts

Floodway Surcharge



Why was FW surcharge concept established?

James Goddard
1978 Report:

Origin and Rationale of Criterion Used in Designating Floodways

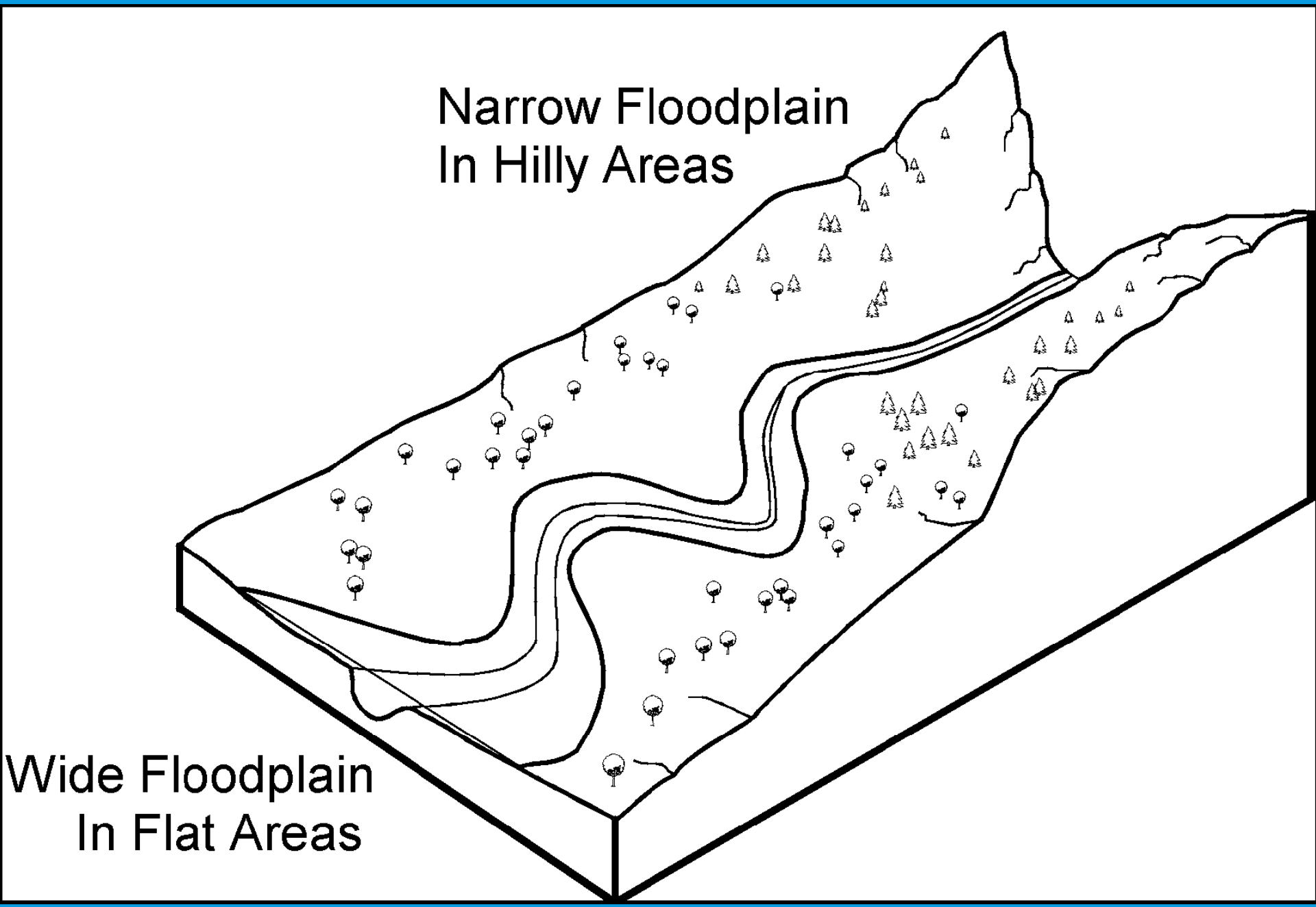




Why was FW surcharge concept established?

According to Goddard:

"It was to be a minimum criterion intended as a regional standard, recognizing that there were urbanizing areas … (with) existing development where … a much smaller rise might be appropriately considered."


Narrow Floodplain
In Hilly Areas
Wide Floodplain
In Flat Areas

States that allow less of a surcharge

Wisconsin	0.00
Illinois	0.1 (measureable amt.)
Indiana	0.1 (measureable amt.)
Michigan	0.1 (measureable amt.)
New Jersey	0.2
Minnesota	0.5
Montana	0.5
Colorado	0.5

Quotes from some states that do not allow a measureable surcharge

Illinois –

"the overbank fp of most streams in state quite flat. A small increase can significantly expand the width of the fp. Unreasonable economically to allow any increase that subjects previously 'safe' structures to flood waters."

Quotes from some states that do not allow a measureable surcharge

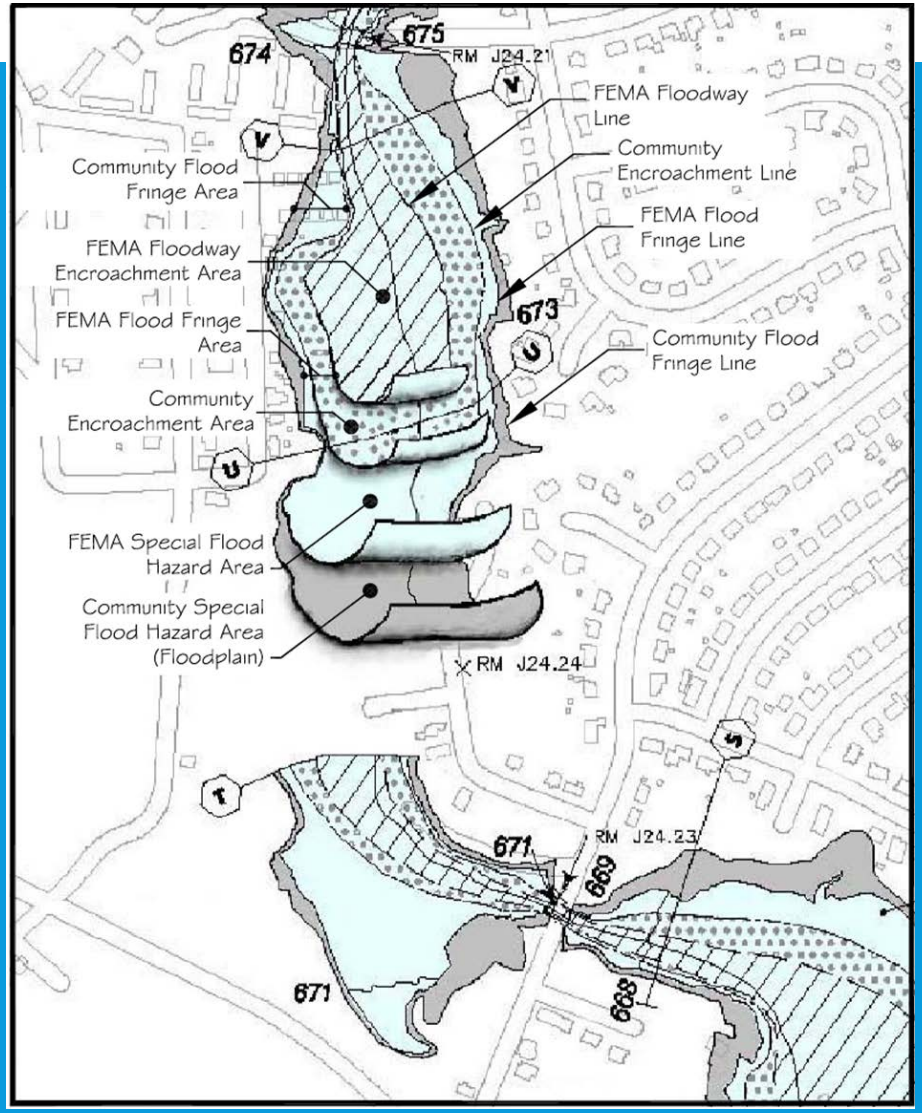
Indiana –

"there are few topographic restraints on development in Indiana, so there is no real need to view floodplains as the only developable area."

Community established higher floodway standards

Charlotte/ Mecklenburg, NC

- **0.1 ft Surcharge Non Encroachment Area**



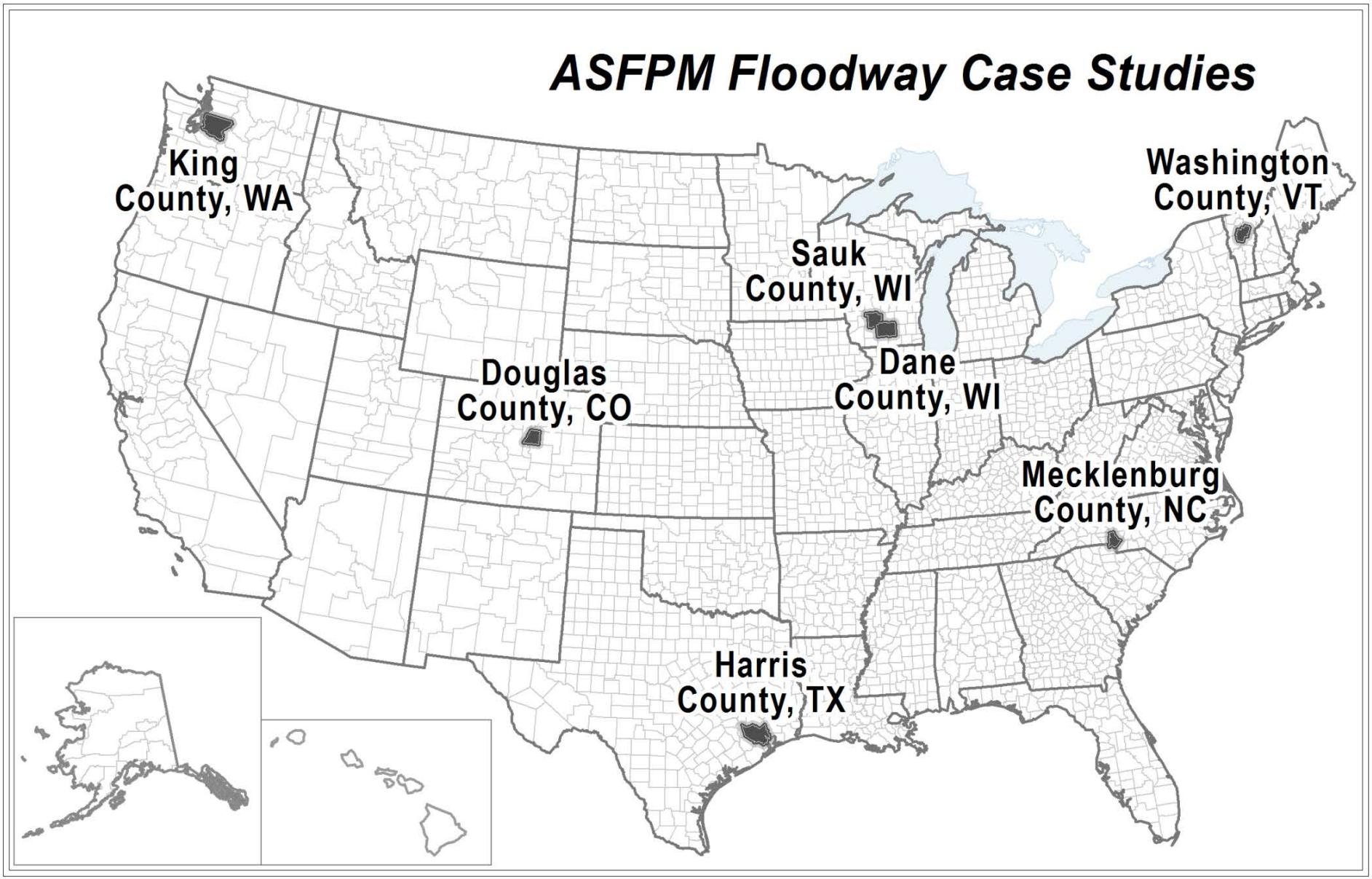


The Floodway Encroachment Standard: Minimizing Cumulative Adverse Impacts





June 2013

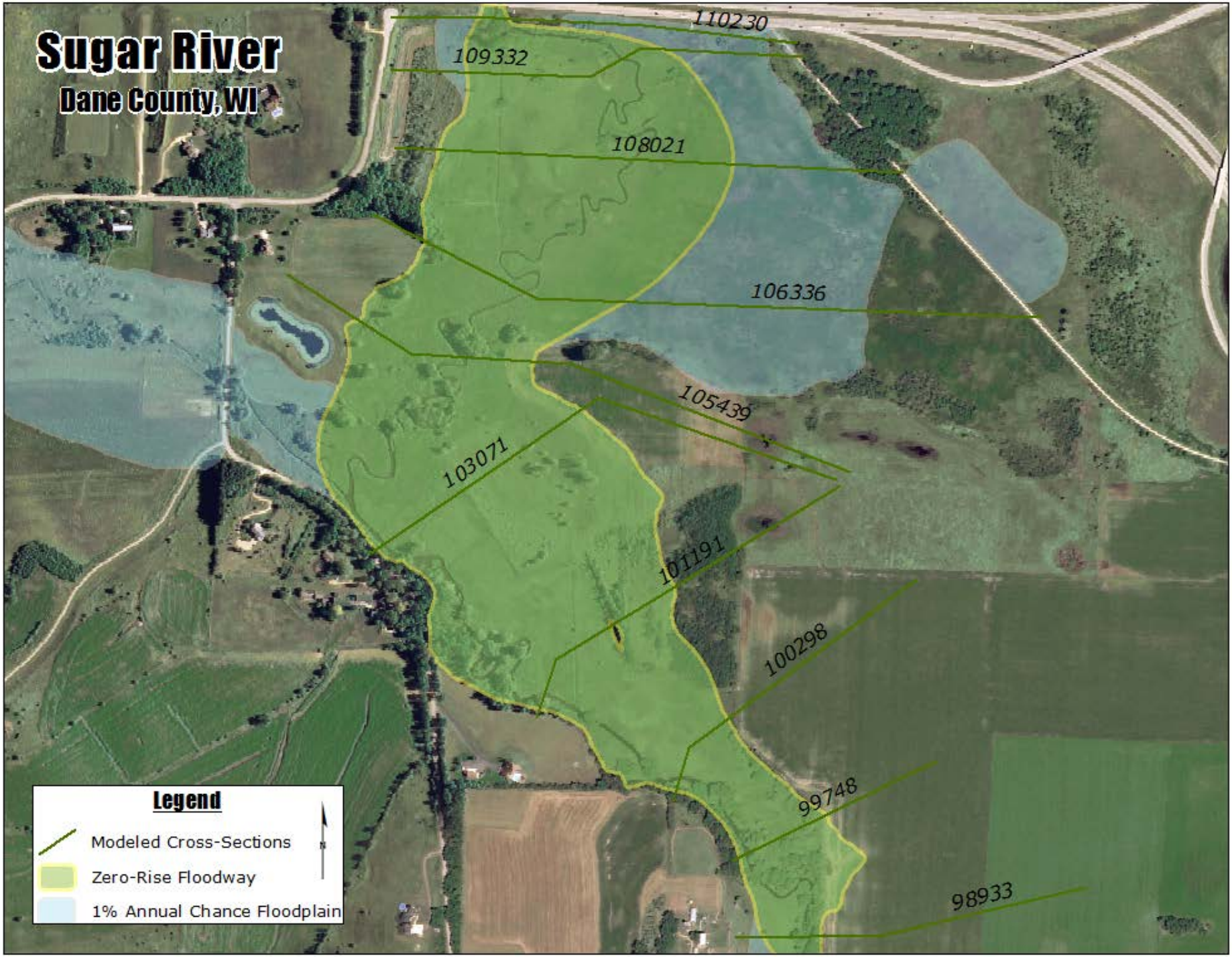

ASFPM Floodway Case Studies
King
County, WA
Douglas
County, CO
Sauk
County, WI
Dane
County, WI
Washington
County, VT
Mecklenburg
County, NC
Harris
County, TX

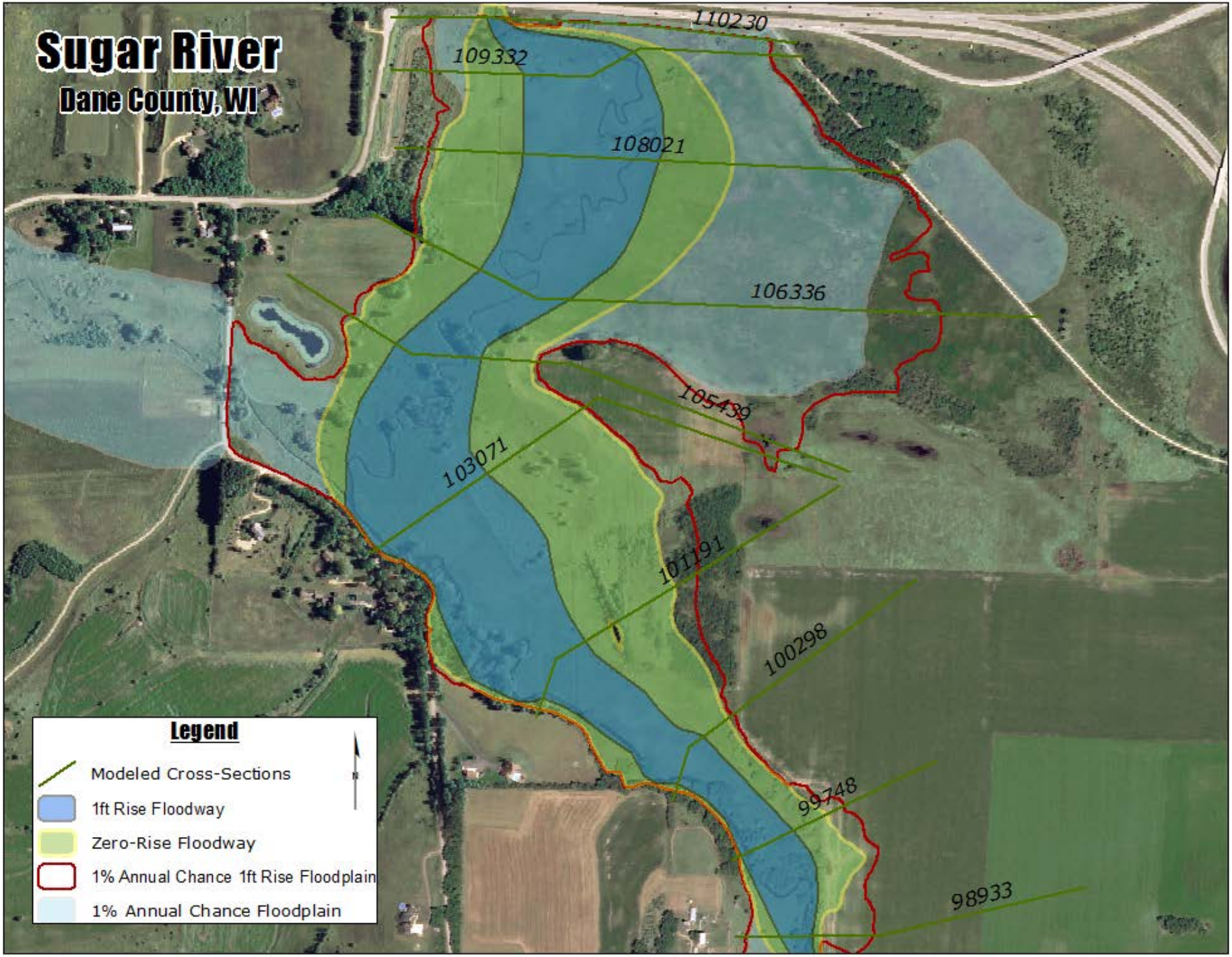
Comparison between 1 ft & 0 surcharge

Stream	Avg. width Decrease (%)	Velocity Increase (ft/sec)	Average Velocity Inc. (%)	Increase floodplain (%)
Pine Creek	59	2.28 to 3.69	62	6
Patterson Creek	68	1.11 to 1.61	45	
Stevens Branch	39	4.98 to 5.82	18	
Sugar River	50	1.57 to 2.07	32	14
Four Mile Creek	43	2.58 to 3.25	26	
Cypress Creek (100)	48	1.92 to 2.46	22	
Cypress Creek (172)	64	1.18 to 1.71	45	
Plum Creek	32	7.15 to 8.31	16	
Avg. all 8 reaches	50	2.85 to 3.62	33	10

Comparison between 1 ft & 0 surcharge

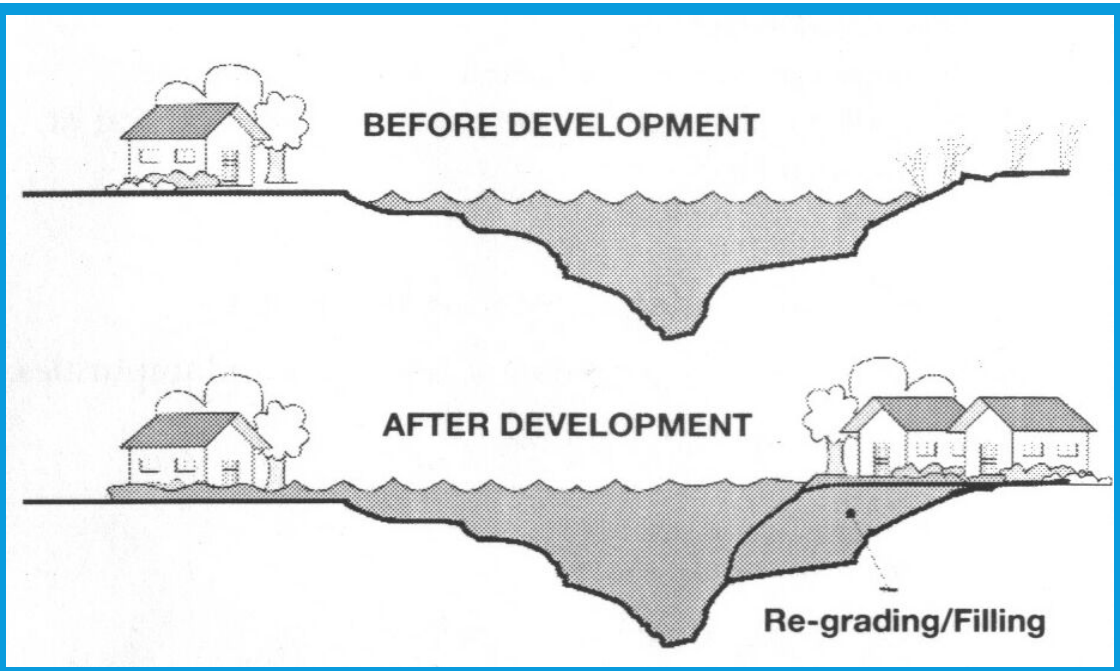
Stream	Avg. width Decrease (%)	Average Velocity Inc. (%)	Increase floodplain (%)
Avg. all 8 reaches	50	33	10


Sugar River
Dane County, WI
110230
109332
108021
106336
105439
103071
101191
100298
99748
98933
Legend
Modeled Cross-Sections
Zero-Rise Floodway
1% Annual Chance Floodplain


Sugar River
Dane County, WI
110230
109332
108021
106336
105439
103071
101191
100298
99748
98933
Legend
Modeled Cross-Sections
1ft Rise Floodway
Zero-Rise Floodway
1% Annual Chance 1ft Rise Floodplain
1% Annual Chance Floodplain

Effects of Encroachment due to Surcharge

- Floodwaters rise to higher levels causing properties that were once flood-free to now be flood-prone
- Rise in floodwaters increases velocity of flood waters and therefore increases the potential to erode stream banks



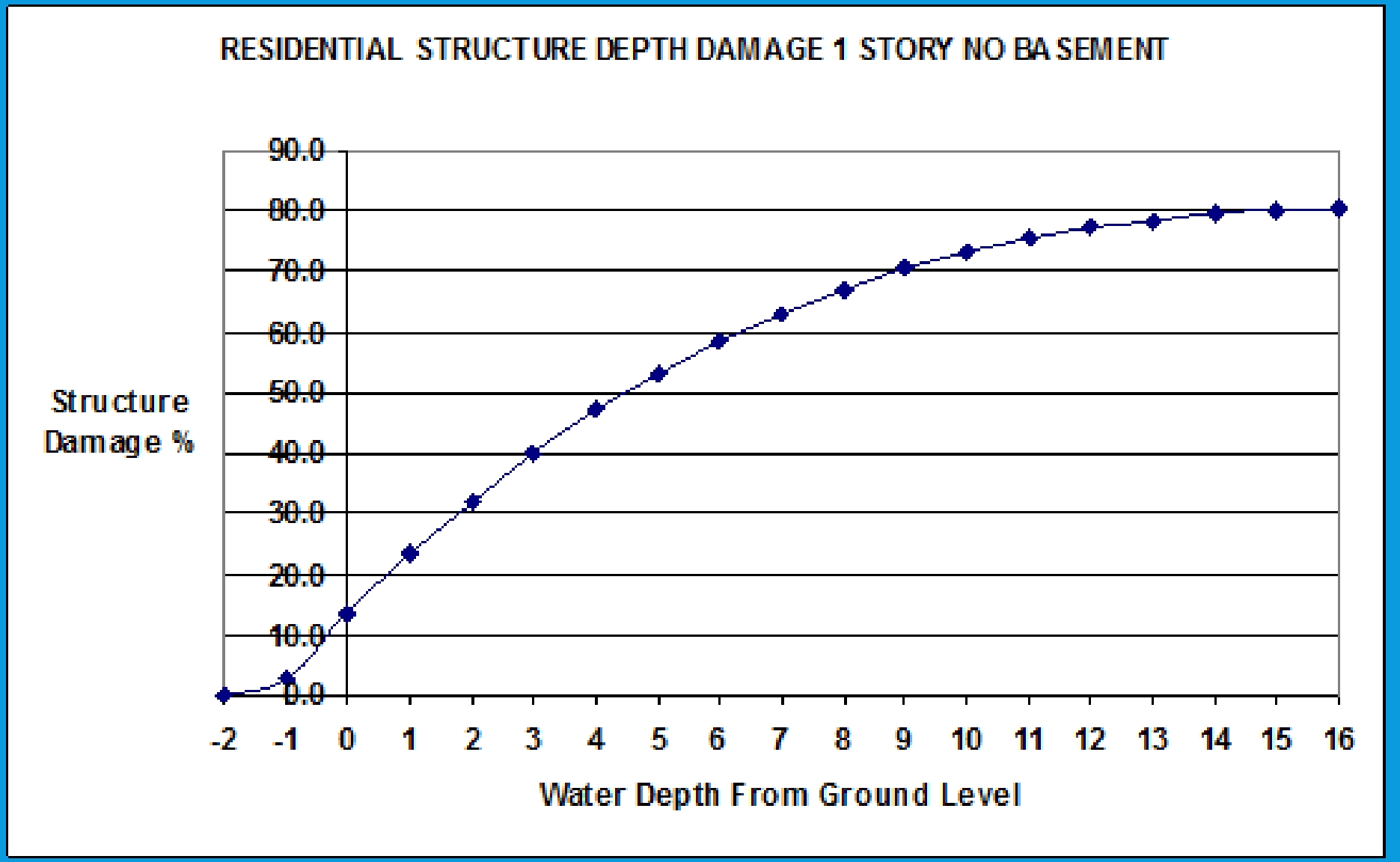
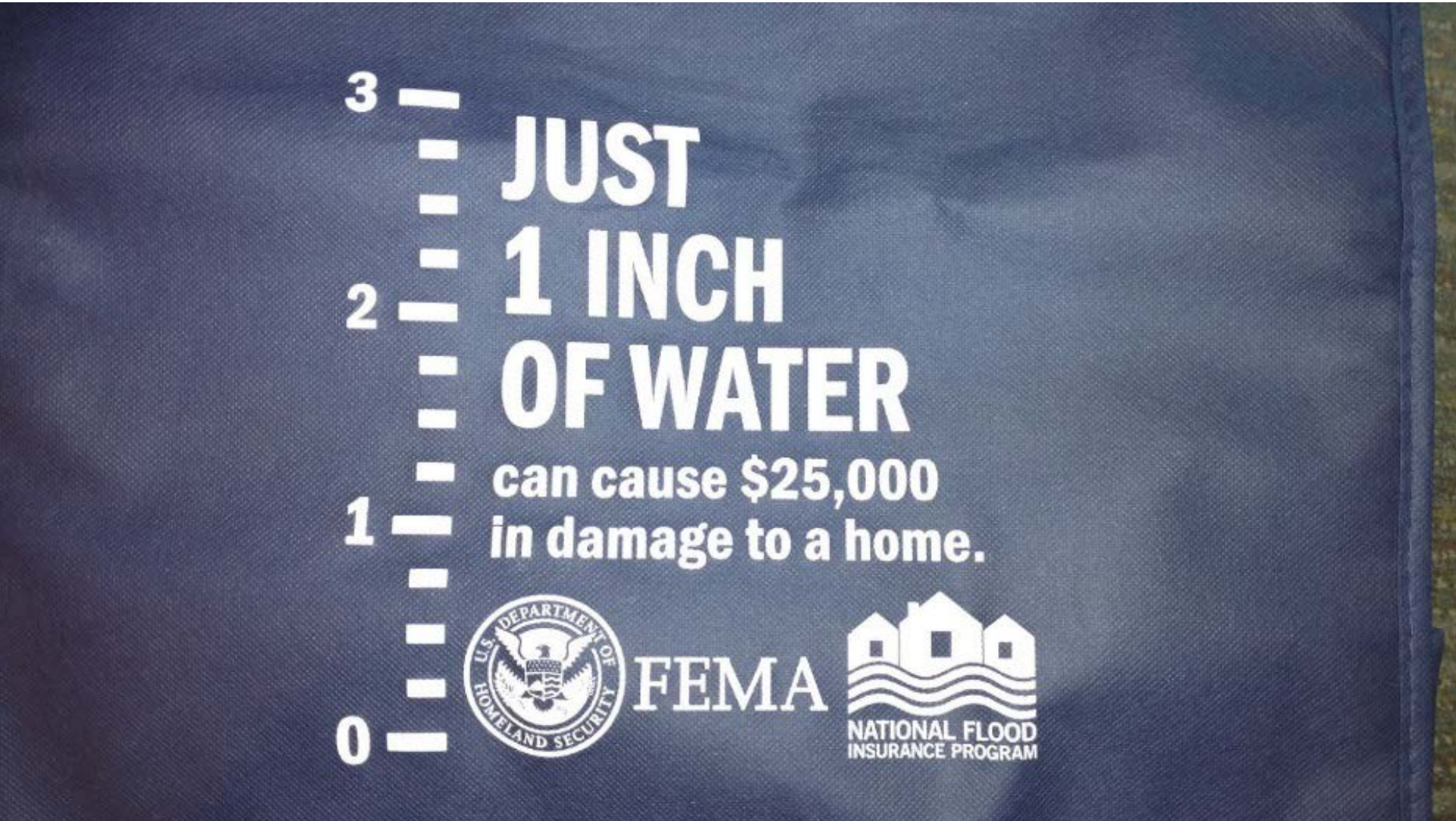


Figure 3 – Flood Depth-Damage Curve for a Single-Story Residential Structure with No Basement at Ground Level. (Source: U.S. Army Corps of Engineers Floodplain Inventory Tool (CEFIT)

FEMA tote at ASFPM in Cleveland



Review of guidelines and CFR

- Guidelines – FEMA Nov 2016

  Floodway Coordination Meeting

- CFR – 60.3 (d) (2) the community shall select and adopt a regulatory floodway

  (Minnesota best practice)

North Carolina No-Rise Guidance Document

North Carolina
National Flood Insurance Program
ASFPM Webinar: February 2020

Dan Brubaker, PE, CFM
NFIP Coordinator / Engineer
(919) 825-2300
Dan.Brubaker@ncdps.gov

DEPARTMENT OF PUBLIC SAFETY

North Carolina Emergency Management
Risk Management Section

NORTH CAROLINA EMERGENCY MANAGEMENT

Purpose

Provide guidance for No-Rise preparation

- Engineers

Provide guidance for No-Rise reviews

- Permitting agencies (engineers)

Provide guidance for No-Rise screening prior to forwarding to NCDPS or another engineer for review

- Permitting agencies (non-engineers)

Summary

Floodway Review

Floodway Encroachment Options

Community Responsibilities

Hydraulic Modeling Requirements

Other Submittal Requirements

Modeling Hints

Special Considerations

Stream Restoration Projects

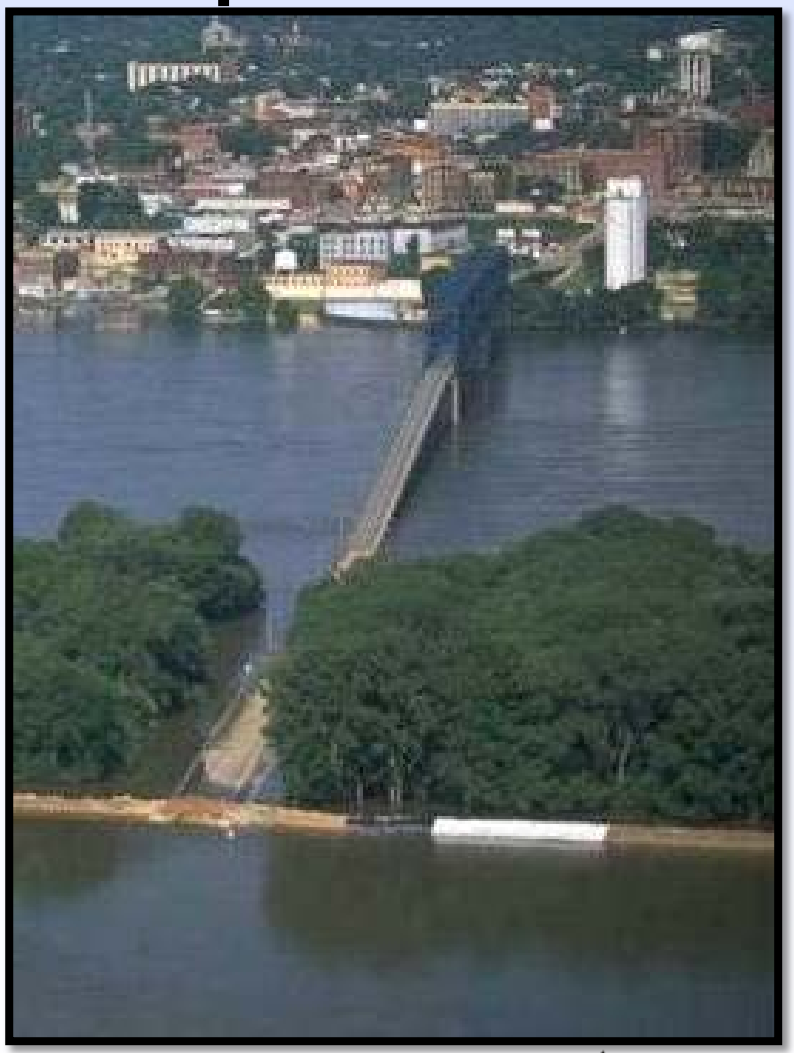
LOMR / CLOMR Requirements

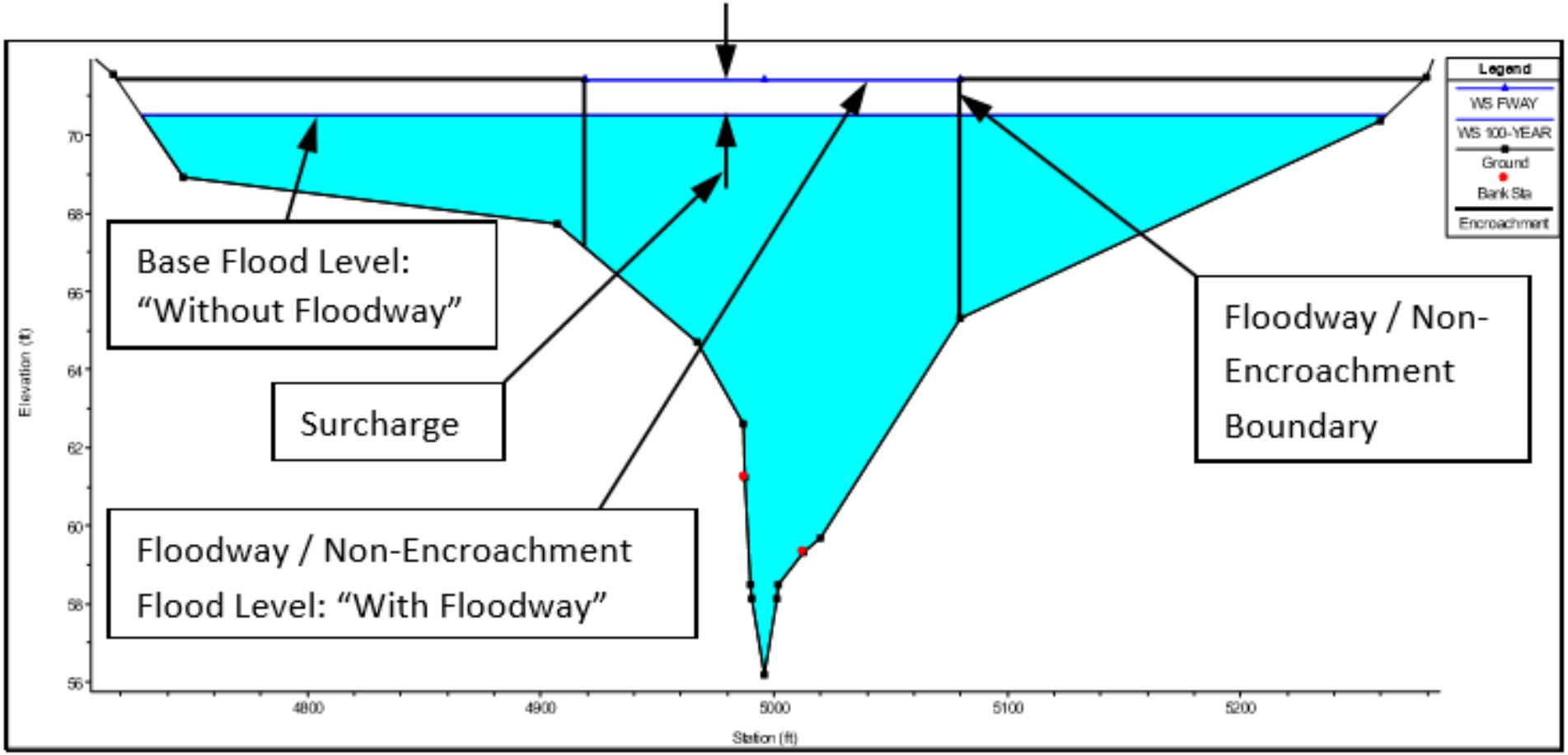
Floodway Concept

Allows for part of the floodplain to be developed while preserving the areas of hazardous velocities & deep flooding.

Preserves ability to convey base flood discharge.

Provides a compromise between no development & unfettered development.




Legend
WS FWAY
WS 100-YEAR
Ground
Bank Sta
Encroachment
Elevation (ft)
70
68
66
64
62
60
58
56
4800
4900
5000
5100
5200
Station (ft)
Base Flood Level: "Without Floodway"
Surcharge
Floodway / Non-Encroachment Flood Level: "With Floodway"
Floodway / Non-Encroachment Boundary

Floodway & Non-Encroachment Area





DEPARTMENT OF PUBLIC SAFETY

North Carolina Emergency Management

Risk Management Section

NORTH CAROLINA

44 CFR 60.3(d)(3)

A community shall prohibit encroachments, including fill, new construction, substantial improvements, and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base (100-year) flood discharge.

Flood Levels

How many **flood levels** are there associated with the **base flood discharge**?

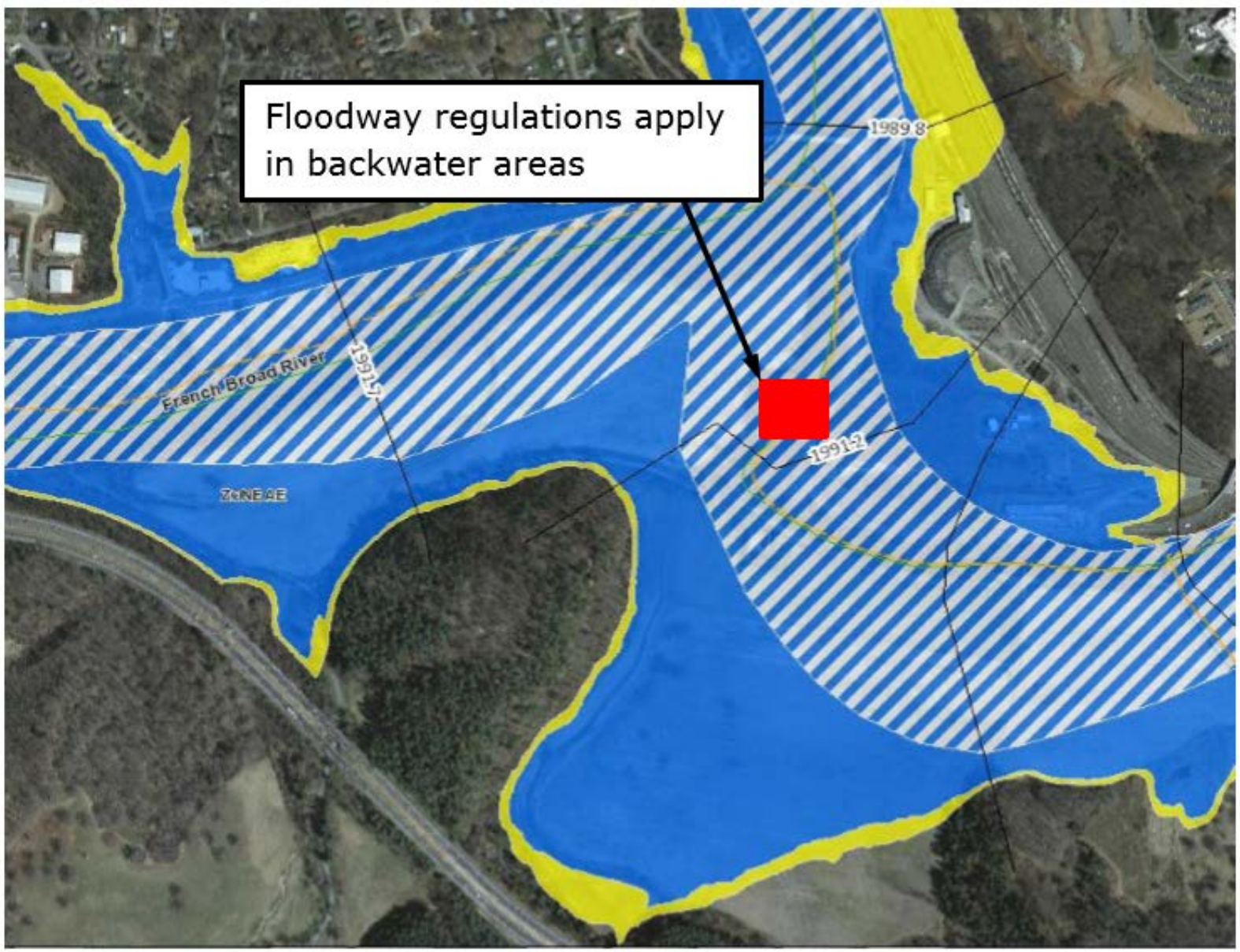
Floodway Source		Floodway			Water Surface Elevation			
Cross Section	Distance	Width (Feet)	Section Area (Square Feet)	Mean Velocity (Feet Per Second)	Regulatory	Without Floodway	With Floodway	Increase
Little Beaver Creek								
074	7,386	325	1,384	1.8	238.0[1]	234.0	235.0	0.9
081	8,098	400	1,960	1.2	238.0[1]	235.6	236.6	1.0
086	8,594	450	1,749	1.4	238.0[1]	236.5	237.5	1.0
092	9,189	240	940	2.6	238.5	238.5	239.3	0.8
100	9,971	180	965	2.5	241.4	241.4	242.4	1.0
108	10,800	270	1,635	1.4	242.9	242.9	243.9	1.0
123	12,310	325	1,894	1.2	246.5	246.5	247.5	1.0
129	12,915	250	788	3.0	247.4	247.4	248.2	0.8

Poll Question

Which flood levels should be checked in a No-Rise Analysis?

- Regulatory BFE
- Without Floodway
- With Floodway
- Both With and Without Floodway

Backwater


Floodway regulations apply in backwater areas
French Broad River
19898
19917
19912
ZoNE AE

Floodway Encroachments



Encroachments = Development, fill, or other obstructions to flow.

Prohibited under 44 CFR §60.3(d) unless engineering analyses demonstrate no increase in flood levels.

If the encroachment increases the flood levels, then 44 CFR §60.3(d)(4) requires a CLOMR.



Floodway Encroachment Options

No-Impact: No change in WSEL, FWE, & FW Width from Effective FIS

No-Rise Study: Comparing Existing & Proposed

< 0.10 ft. drop in WSEL & FWE, no change in FW width

LOMR required for >0.10 ft. drop or change in FW/NEA

CLOMR: Any increase in WSEL or With Floodway Elevation

Floodway Encroachment Options

No Study Needed:

- Demolish existing building;
- Single pole, Mailbox, Pitcher's mound;
- Existing easement;
- Existing footprint;
- Span above & across the floodway; or
- Conveyance shadow.

Still need a certified statement from the engineer making that determination and the justification.

Community Responsibilities

Communities are required to review & approve or reject the submittals

Can request technical assistance from NC NFIP

- Must be done in writing (e-mail is OK)

NC NFIP does not “approve” a submittal

- “Concur” or “Not Concur”

Local ordinances may be more restrictive – we need to know:

- Velocity
- Any rise

Submittal Checklist

Hydraulic Models (On disk – paper is not necessary)

- Effective
- Duplicate Effective
- Corrected Effective (if necessary)
- Existing Conditions
- Proposed Conditions

Submittal Checklist

Hard Copy or PDF

(CAD or Microstation as supplemental info)

Project Narrative

Topographic Work Map

Cross-Section Plots

Property Survey (or Plat)

No-Rise Certification Statement

Effective Model

Request to NC NFIP: http://fris.nc.gov/fris/

Request to FEMA

FIS Data Request & Payment Information Form

http://www.fema.gov/plan/prevent/fhm/st_order.shtm

FEMA Engineering Library
847 S. Pickett Street
Alexandria, VA 22304
Phone: 1-877-336-2627
Facsimile: 1-703-212-4090

Duplicate Effective Model

Effective Model run on modeler's hardware & software

HEC-RAS Version 4.1 or 5.0.7 preferred

Can be HEC-RAS 3.1.1 or higher

Other models are acceptable

> https://www.fema.gov/hydraulic-numerical-models-meeting-minimum-requirement-national-flood-insurance-program

Encroachments are set using Method 1

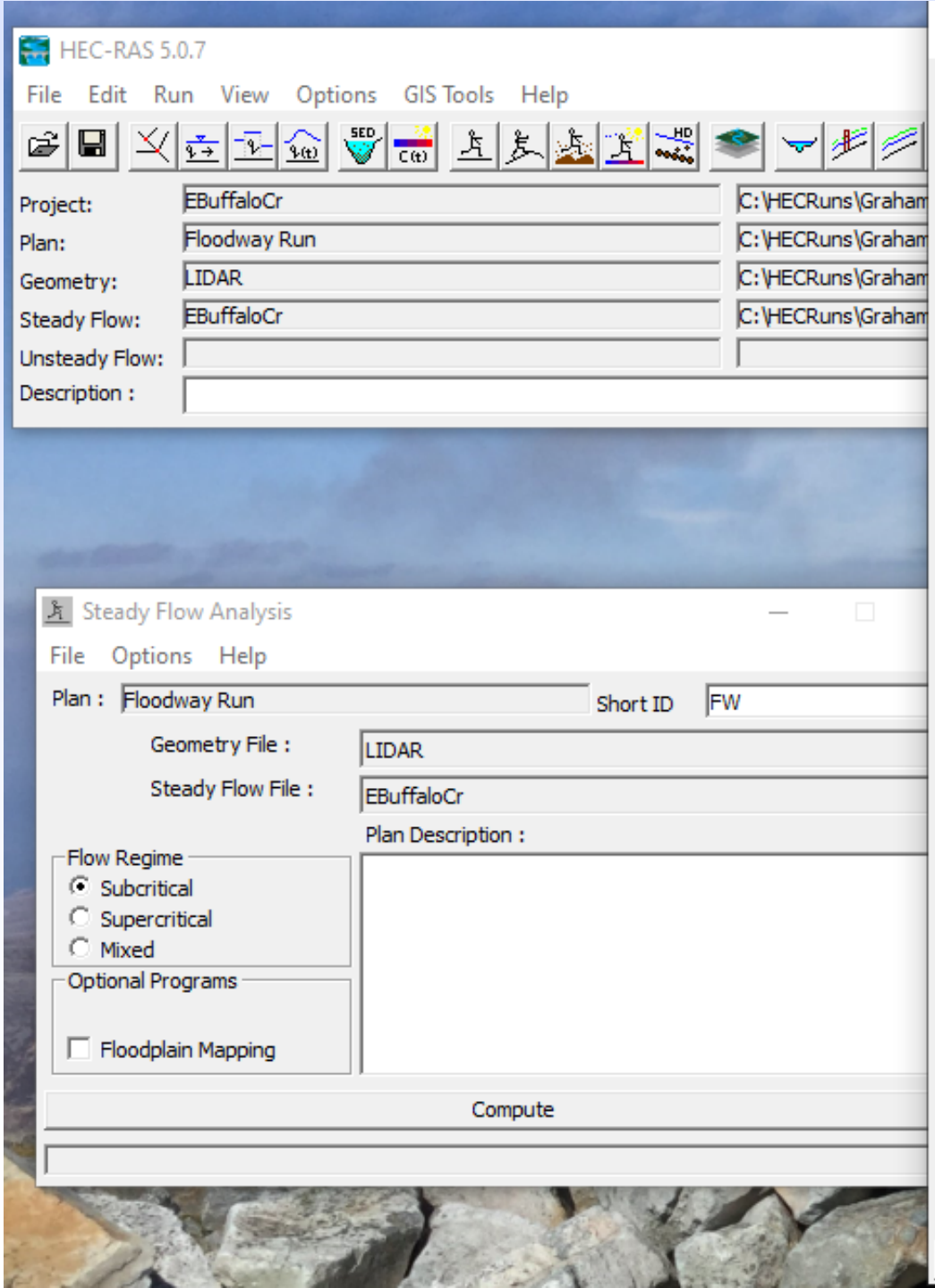
Encroachment Stations

Profile Output Table - Encroachment 1

File Options Std. Tables User Tables Locations Help

HEC-RAS Plan: PC River: Taylor Swamp Reach: Reach-1 Profile: 100-FW

Reach	River Sta	Profile	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
			(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Reach-1	27265	100-FW	40.01	0.61	40.06	127.44	70.65	81.17	216.18	4975.74	4998.00	5002.00	5103.18
Reach-1	27006	100-FW	39.61	0.59	39.63	143.31	153.49	70.70	143.81	4893.91	4998.00	5002.00	5037.22
Reach-1	26693	100-FW	39.13	0.61	39.22	107.44	44.23	112.40	211.37	4980.00	4998.00	5002.00	5087.44
Reach-1	26518	100-FW	38.88	0.62	38.92	119.95	49.41	85.77	232.81	4980.85	4998.00	5002.00	5100.80
Reach-1	26211	100-FW	38.49	0.42	38.55	178.31	206.53	229.73	20.75	4841.69	4994.00	5006.00	5020.00
Reach-1	26136		Culvert										
Reach-1	26006	100-FW	38.30	0.78	38.35	178.31	209.41	227.65	19.93	4841.69	4994.00	5006.00	5020.00
Reach-1	25423	100-FW	37.57	0.74	37.60	174.32	80.55	81.09	295.36	4955.16	4998.00	5002.00	5129.48
Reach-1	25249	100-FW	37.41	0.73	37.43	233.81	95.68	55.11	306.21	4949.67	4998.00	5002.00	5183.48
Reach-1	24975	100-FW	37.28	0.73	37.29	271.88	43.10	38.50	375.40	4979.09	4998.00	5002.00	5250.97
Reach-1	24453	100-FW	37.11	0.72	37.12	322.22	120.04	32.24	304.72	4920.87	4998.00	5002.00	5243.09
Reach-1	24142	100-FW	37.04	0.72	37.05	358.25	70.42	24.92	361.66	4947.84	4998.00	5002.00	5306.09
Reach-1	23717	100-FW	36.94	0.71	36.94	299.48	173.64	32.79	371.56	4895.30	4998.00	5002.00	5194.78
Reach-1	23331	100-FW	36.67	0.67	36.70	151.19	392.16	68.34	117.50	4893.22	4998.00	5002.00	5044.41
Reach-1	23105	100-FW	36.32	0.63	36.35	140.43	455.09	62.31	60.60	4878.03	4998.00	5002.00	5018.46
Reach-1	22926	100-FW	35.98	0.58	36.01	142.30	376.87	68.73	132.40	4892.48	4998.00	5002.00	5034.78
Reach-1	22744	100-FW	35.80	0.57	35.81	277.28	252.40	34.27	291.33	4863.20	4998.00	5002.00	5140.48
Reach-1	22553	100-FW	35.71	0.55	35.71	294.42	277.66	27.76	272.57	4856.99	4998.00	5002.00	5151.41
Reach-1	22340	100-FW	35.64	0.55	35.64	276.32	222.87	24.64	330.48	4889.48	4998.00	5002.00	5165.80
Reach-1	21768	100-FW	35.34	0.51	35.36	251.56	571.74	62.88	95.38	4779.45	4997.50	5002.50	5031.01
Reach-1	21479	100-FW	35.19	0.45	35.22	235.23	6.94	382.41	340.64	4975.00	4980.00	5020.00	5210.23



Encroachments

Equal Conveyance Reduction

Left bank offset: 5. Right bank offset: 5.

River: EBuffaloCr Profile: 1pct_FW

Reach: Main Import to Method 1 ...

Set Range of Values

Upstream RS: 21233.26 Method: none

Downstream RS: 1228.469 Value 1:

Set Selected Range Value 2:

	River Sta	Method	Value 1	Value 2
1	21233.26	1	565.1	593.22
2	20696.73	1	520	660.46
3	20352.38	1	490	576.3
4	20077.22	1	435	485
5	20052.86Culv			
6	20023.52	1	335	383
7	19741.71	1	189.44	324.41
8	19459.53	1	186	223
9	19266.14	1	183	260
10	19231.27Culv			
11	19175.47	1	232	305
12	18909.77	1	153.13	192.33
13	18702.38	1	148.67	177.22
14	18174.97	1	176.23	228.67
15	18012.59	1	220.14	256.6
16	17941.94	1	238.43	315.39
17	17921.94Culv			
18	17897.95	1	237.87	317.98
19	17749.11	1	211.88	248.54
20	17343.04	1	280.22	397.06
21	17110.17	1	389.25	506.52
22	17081.84BR			
23	17053.68	1	342.4	533.3
24	16829.9	1	356.75	560
25	16719.13	1	218.39	384.8

OK Cancel Clear Profile Clear All Profiles

Corrected Effective Model

If necessary to fix errors in the model, such as:

- Expansion / contraction coefficients
- Datum
- Bridge modeling: Momentum, coefficients, piers
- Culvert modeling: Size, materials, entrance/exit losses
- Ineffective Flow locations & elevations
- Manning's roughness coefficients – supporting documentation is required (photographs)
- Topography at existing sections
- Negative surcharges & surcharges over 1.00 ft.

Existing Conditions Model

Model the locations that are to be modified

Add sections in the area of the modification

Do not duplicate or interpolate cross-sections

Make sure enough sections are added to adequately model the changes (2 or more)

Existing Conditions Model

Set floodway (encroachment) widths

- Normally interpolated
- Can be adjusted based on site conditions
- Should match Corrected Effective floodway WSEL

Non-permitted post-FIRM changes should not be included in the Existing Conditions model

Add sections upstream to tie-in between Existing Conditions model and Proposed Conditions model

Proposed Conditions Model

Revise the Existing Conditions model

No changes in floodway widths from the Existing Conditions model

No increase in “Without Floodway” or “With Floodway” (Encroached Profile)

What to include?

- All elements in the floodway
- Elements in the fringe required for the encroachment

Precision

No Rise means NO RISE

- None
- Nada
- Zip
- Zilch
- Zeee-rowww
- 0.00’

Defined in 1985.

Refer to MT-2 form.

FAQs for Engineers is INCORRECT.

Truncation / Extension

Do not truncate the model until Proposed WSEL, Velocity, & Top Width match Existing model.

Do not truncate model until it ties within 0.5’ of the Effective model.

The model should extend at least 1 mile in each direction.

Changes in velocity &/or energy grade may require additional upstream cross-sections to assure there will not be a rise farther upstream.

Project Narrative

All modifications to the Effective model must be documented.

Provide the source of additional cross-section topographic data.

Methodology

Issues with the Effective model

Unusual parameters explained

Copies of floodway data tables & flood profiles or LDS table from the FIS

Project Narrative

Copy of FIRM / FIRMette

Supporting documentation & calculations

Photographs

Conditions of the No-Rise

- Plant types
- Mowing height
- Landscaping fill
- Cleared easements / conveyance easements

Topographic Work Map

Floodplain & Floodway Limits

Topography

Locations & labels on effective & new cross-sections

Site location

Existing & proposed features / structures

Also include a separate certified property survey

A scaled plat may be acceptable

Cross-Section Plots

Include all of the cross-sections in the area of the project, including added sections & effective sections

Features & changes should be labeled

Grid and/or elevations are needed

Certification

Sealed by a Professional Engineer

Addresses flood elevations, floodway elevations, & floodway widths

No qualifying language

- “I think”, “I believe”, or “In my judgement”
- “No significant impact” or “Minor impacts”
- “No increase in published BFE”

Community sign off

- Can be on the certification or separate letter

NO-RISE CERTIFICATION

This document is to certify that I am duly qualified engineer licensed to practice in the State of North Carolina. It is to further certify that the attached technical data supports the fact that the proposed [Project] will not increase the base flood elevations or floodway elevations, or impact the floodway widths, on [Stream] at published cross-sections in the Flood Insurance Study for [Community], dated [Date] and will not increase the flood elevations or floodway elevations, or impact the floodway widths at unpublished cross-sections in the area of the proposed development.

_____
Name

_____
Title

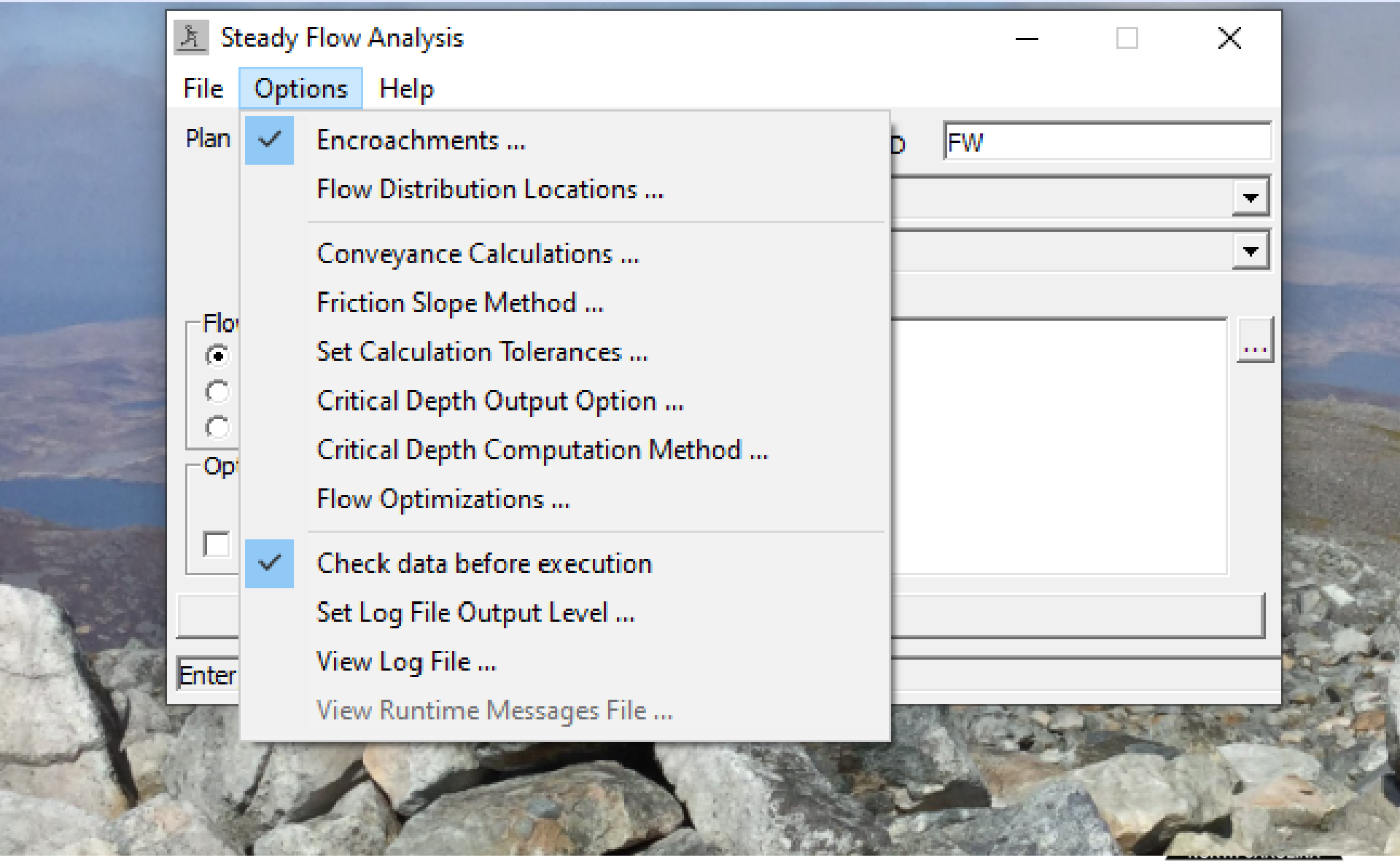
_____

_____
Address

_____
Date

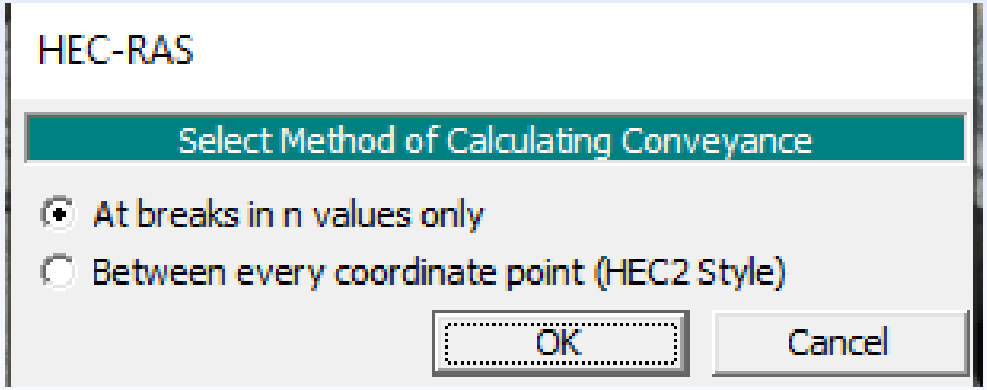
SEAL

Steady Flow Parameters



Steady Flow Parameters

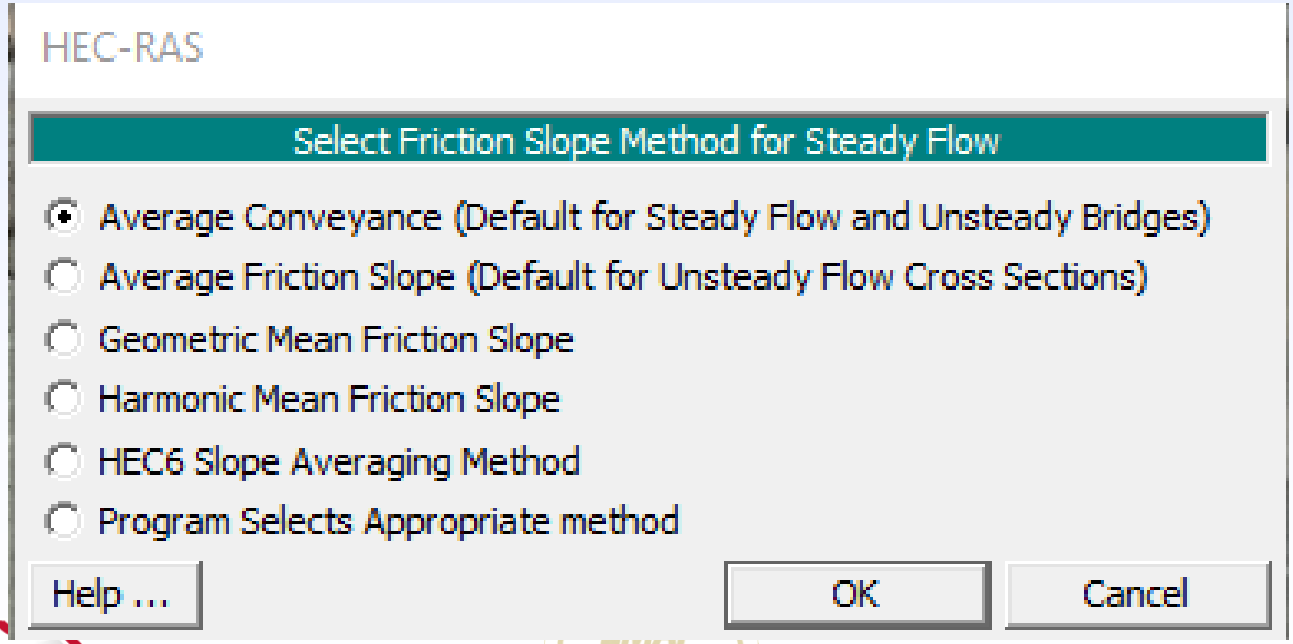
Conveyance breaks at n-values



Steady Flow Parameters

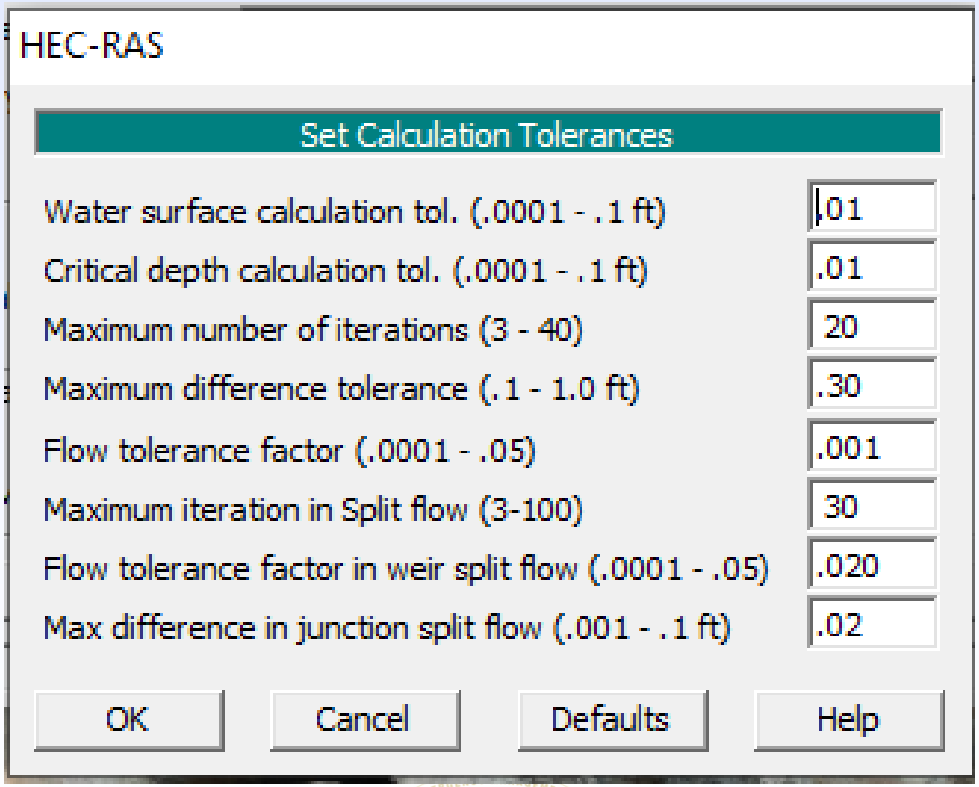
Friction Slope Method

- Average Conveyance or Program Selects
- Be Consistent!



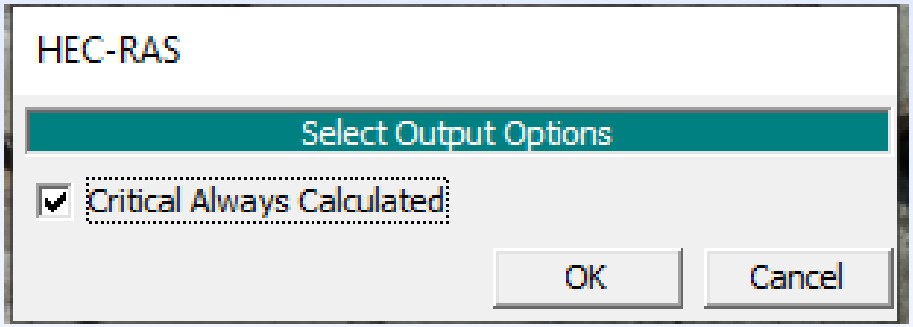
Steady Flow Parameters

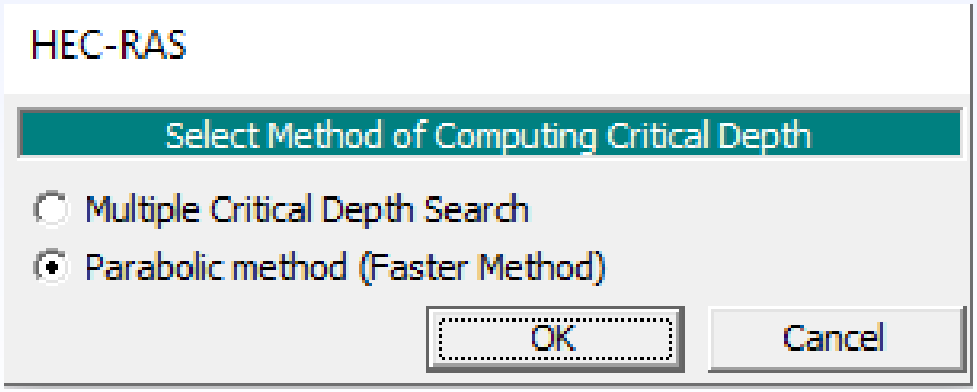
Tolerances: Defaults or Tighter



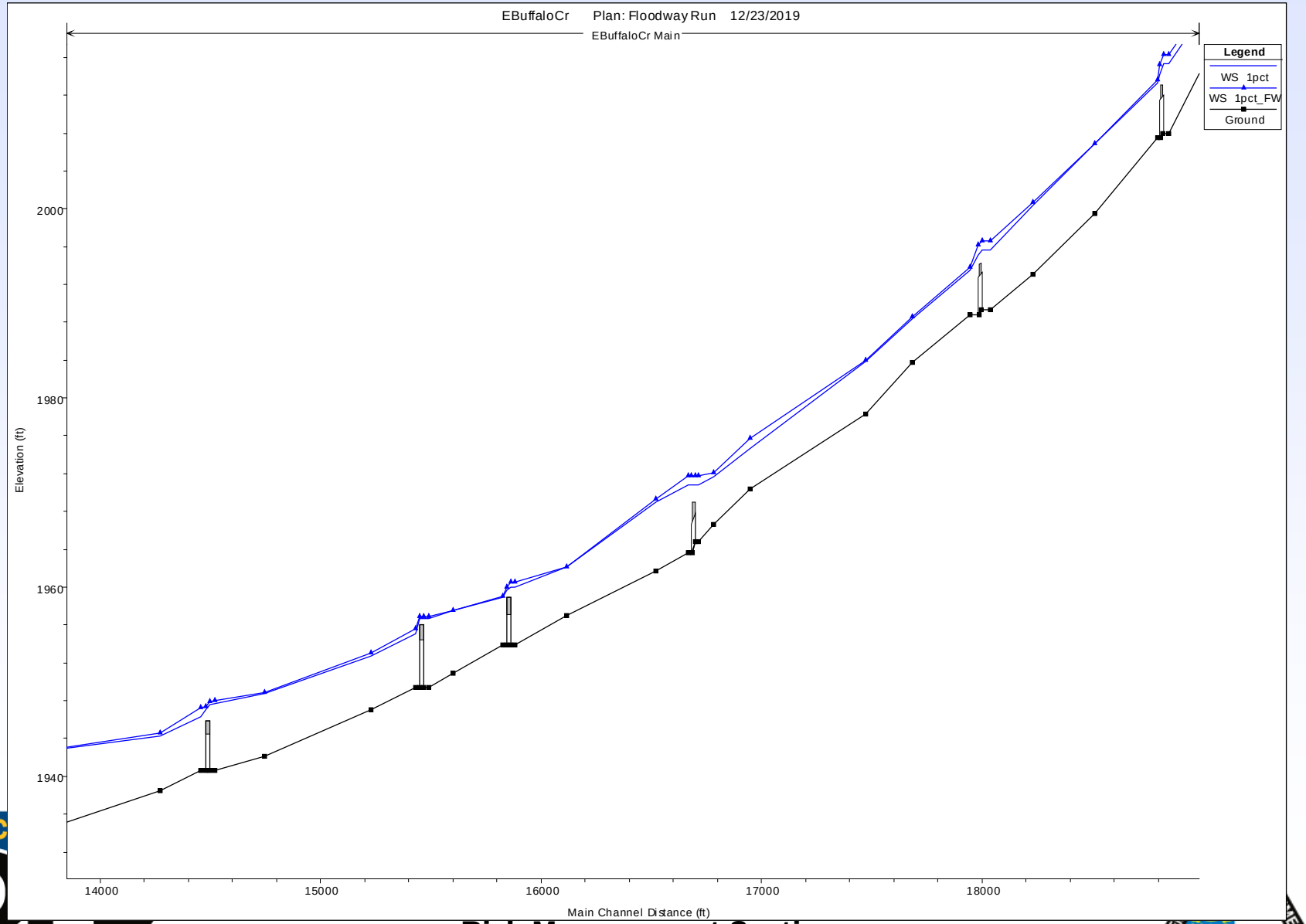
Steady Flow Parameters

Critical Depth Calculations: Be Consistent





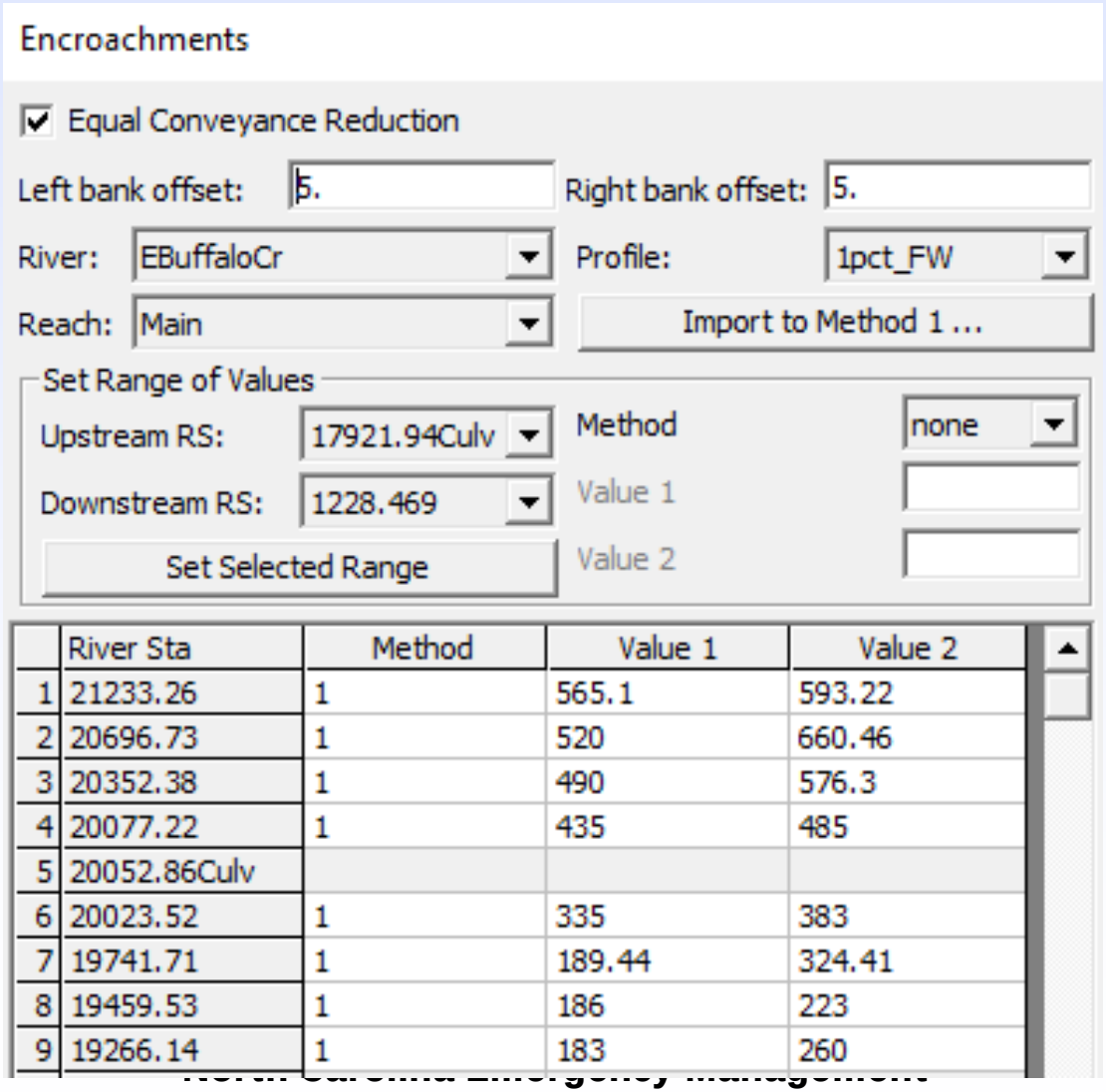
Check for Drawdowns in the Profile



Floodway & Non-Encroachment Widths

- Floodway widths at NEW cross-sections are set to MAINTAIN the effective floodway WSEL
- Do not change floodway widths at effective cross sections unless there is an error
- Do not optimize the floodway in a No-Rise
- Floodway adjustment based on new topography and new sections may be expected
- Changes in floodway widths will require a LOMR

Floodway & Non-Encroachment Widths



	River Sta	Method	Value 1	Value 2
1	21233.26	1	565.1	593.22
2	20696.73	1	520	660.46
3	20352.38	1	490	576.3
4	20077.22	1	435	485
5	20052.86Culv			
6	20023.52	1	335	383
7	19741.71	1	189.44	324.41
8	19459.53	1	186	223
9	19266.14	1	183	260

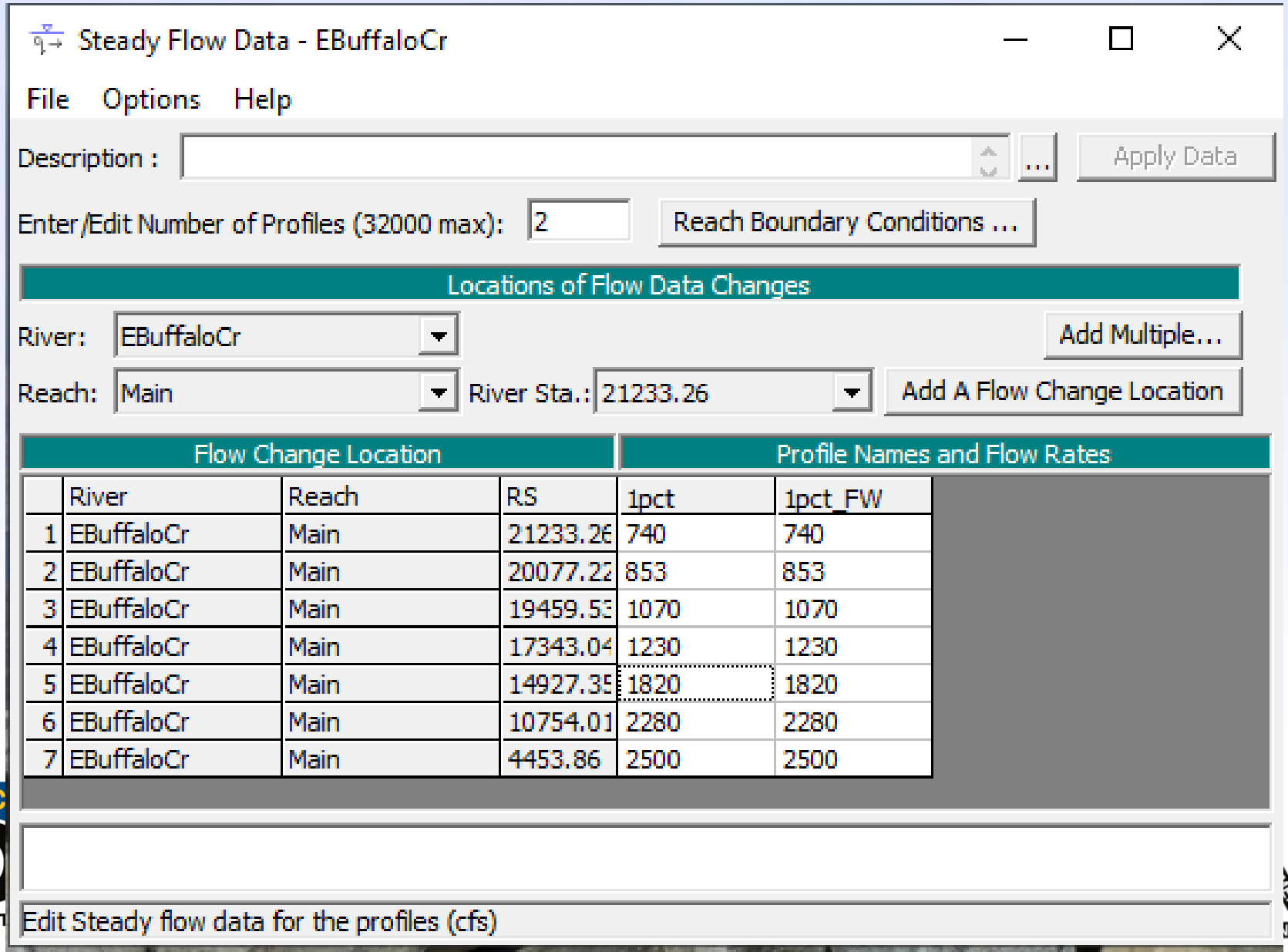
Hydrology

No changes in hydrology unless there is obvious, significant error

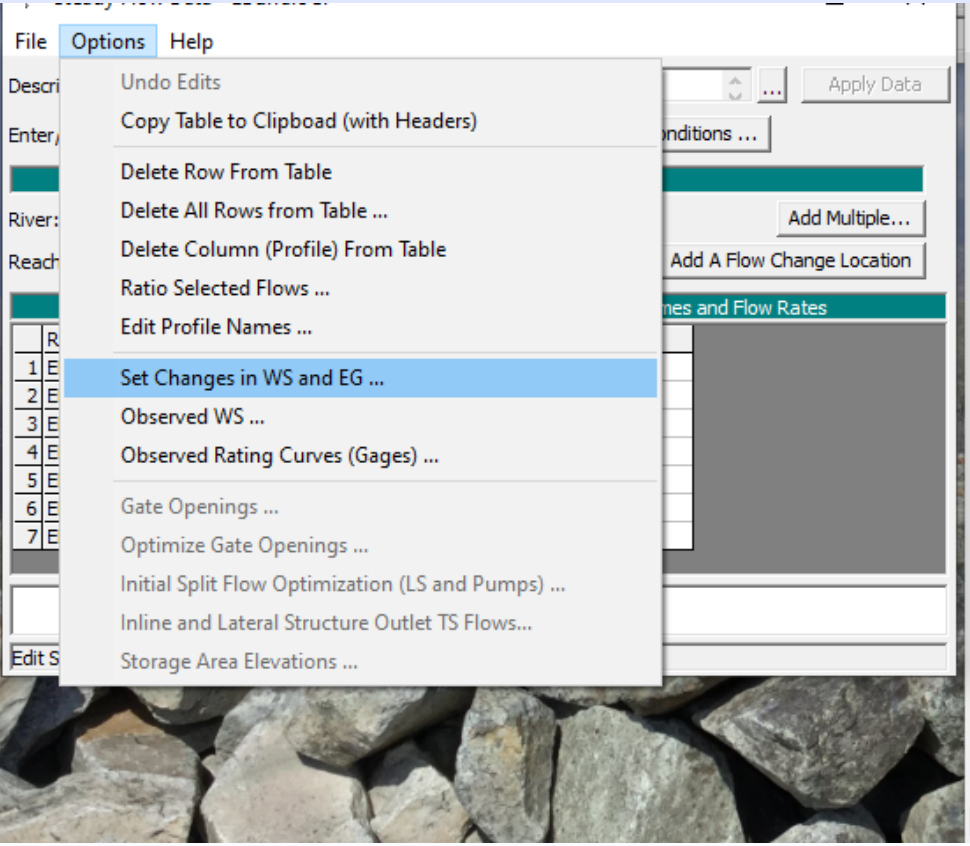
- Example: Flow is constant in effective model across a 50% change in drainage area

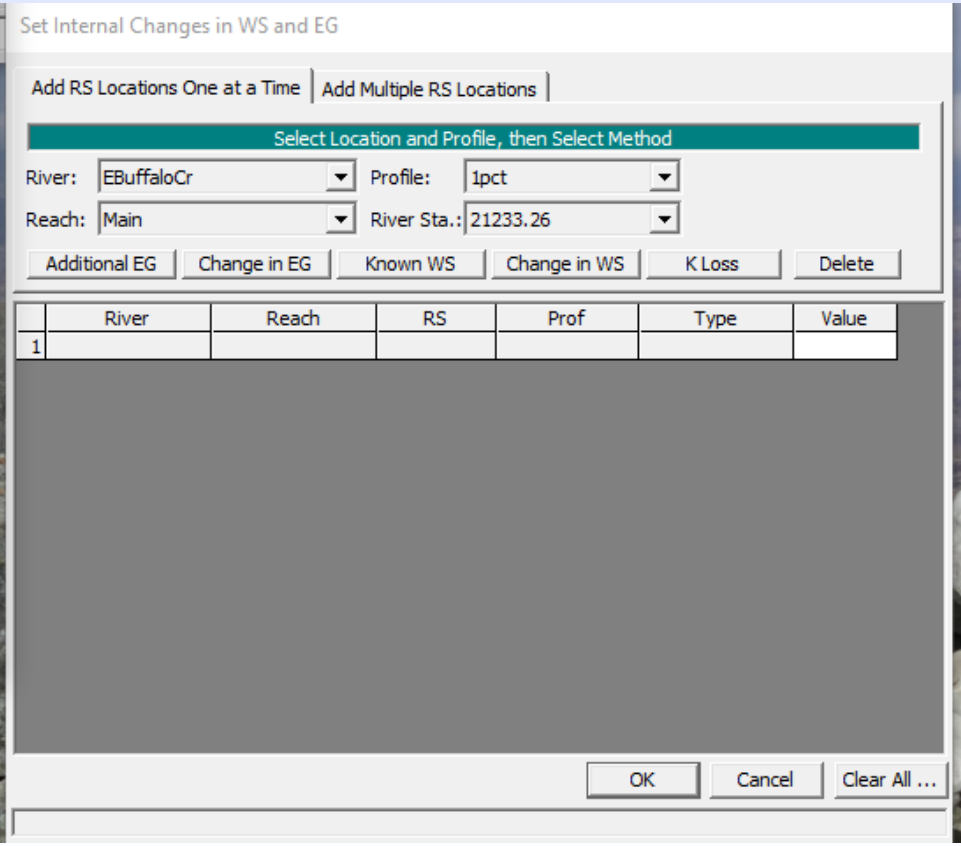
Methodology to determine hydrology cannot be challenged

Hydrology


Steady Flow Data - EBuffaloCr
File Options Help
Description :
Apply Data
Enter/Edit Number of Profiles (32000 max): 2
Reach Boundary Conditions ...
Locations of Flow Data Changes
River: EBuffaloCr
Add Multiple...
Reach: Main
River Sta.: 21233.26
Add A Flow Change Location
Flow Change Location
Profile Names and Flow Rates
River Reach RS 1pct 1pct_FW
1 EBuffaloCr Main 21233.26 740 740
2 EBuffaloCr Main 20077.22 853 853
3 EBuffaloCr Main 19459.53 1070 1070
4 EBuffaloCr Main 17343.04 1230 1230
5 EBuffaloCr Main 14927.35 1820 1820
6 EBuffaloCr Main 10754.01 2280 2280
7 EBuffaloCr Main 4453.86 2500 2500
Edit Steady flow data for the profiles (cfs)

Set Changes in WS and EG



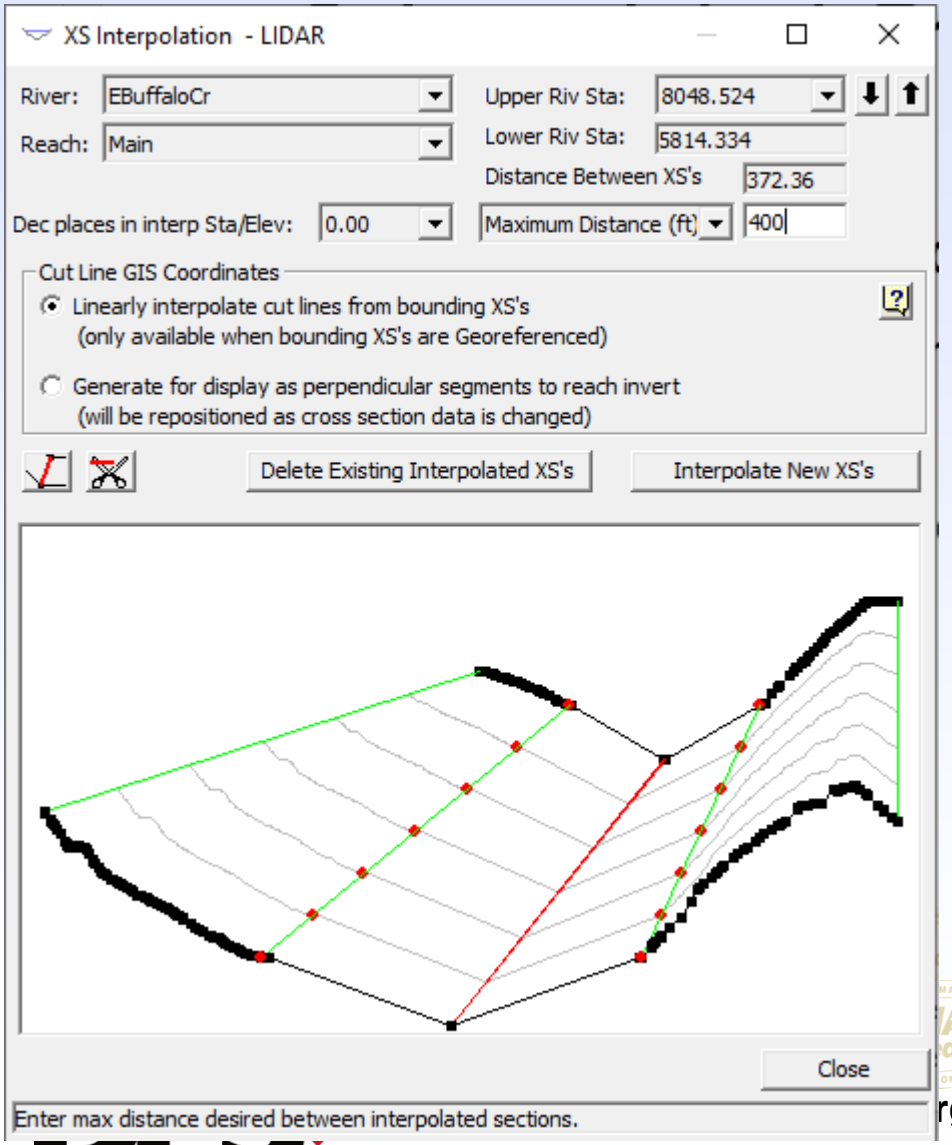


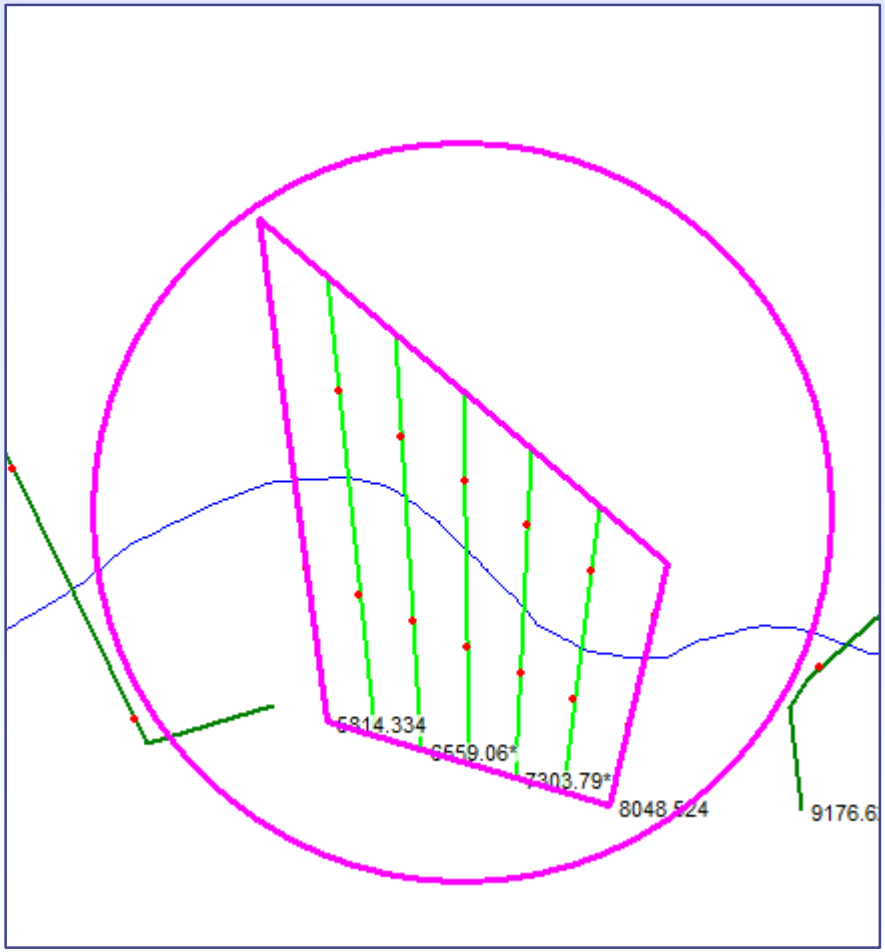
Interpolated Cross-Sections

Interpolated Cross-Sections

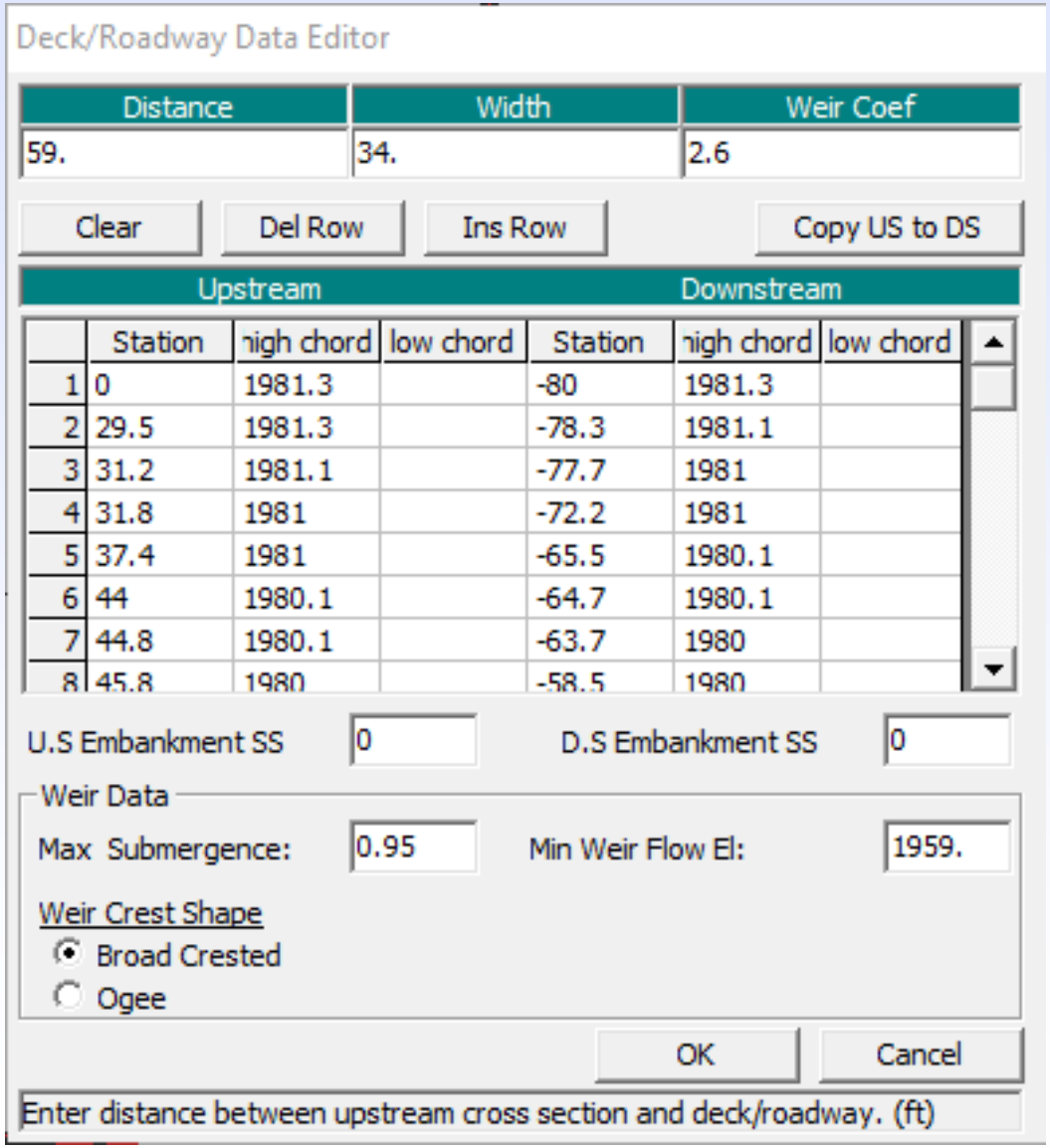
- Use LiDAR or field survey to add cross-sections
- Can use interpolated cross-sections to increase precision when approaching critical depth outside of the project area

Interpolated Cross-Sections

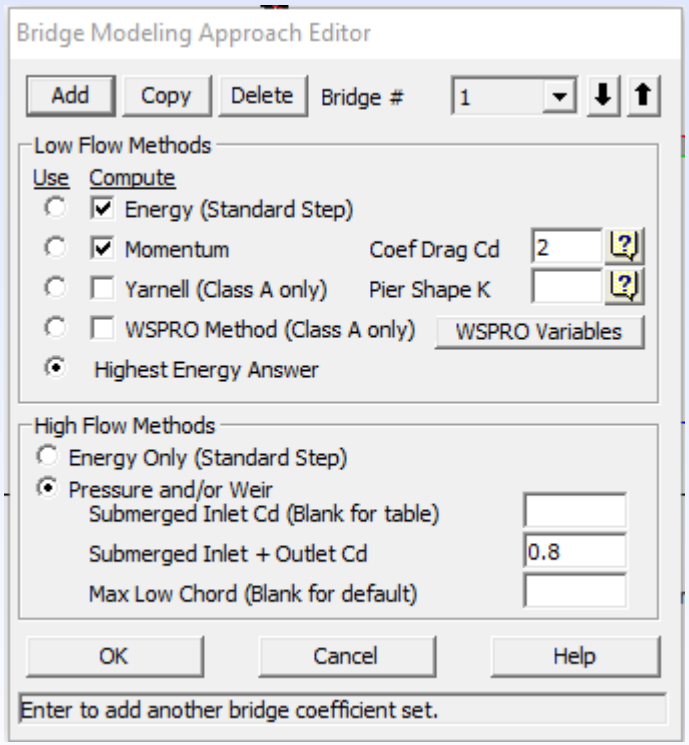


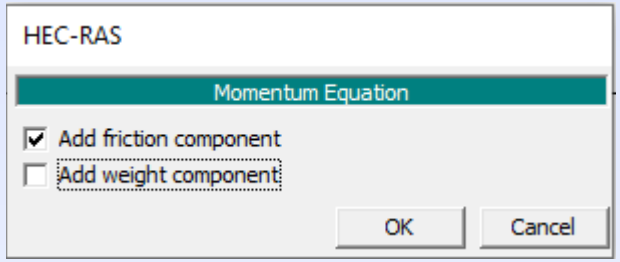


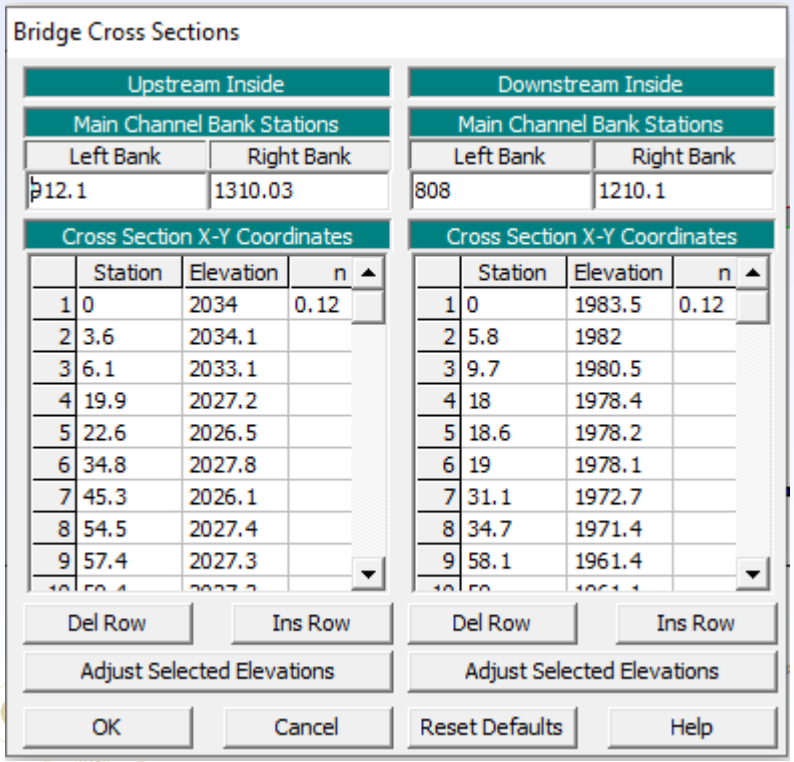
Bridges


Deck/Roadway Data Editor
Distance
Width
Weir Coef
59.
34.
2.6
Clear
Del Row
Ins Row
Copy US to DS
Upstream
Downstream
Station
high chord
low chord
Station
high chord
low chord
1 0 1981.3 -80 1981.3
2 29.5 1981.3 -78.3 1981.1
3 31.2 1981.1 -77.7 1981
4 31.8 1981 -72.2 1981
5 37.4 1981 -65.5 1980.1
6 44 1980.1 -64.7 1980.1
7 44.8 1980.1 -63.7 1980
8 45.8 1980 -58.5 1980
U.S Embankment SS
0
D.S Embankment SS
0
Weir Data
Max Submergence:
0.95
Min Weir Flow El:
1959.
Weir Crest Shape
Broad Crested
Ogee
OK
Cancel
Enter distance between upstream cross section and deck/roadway. (ft)

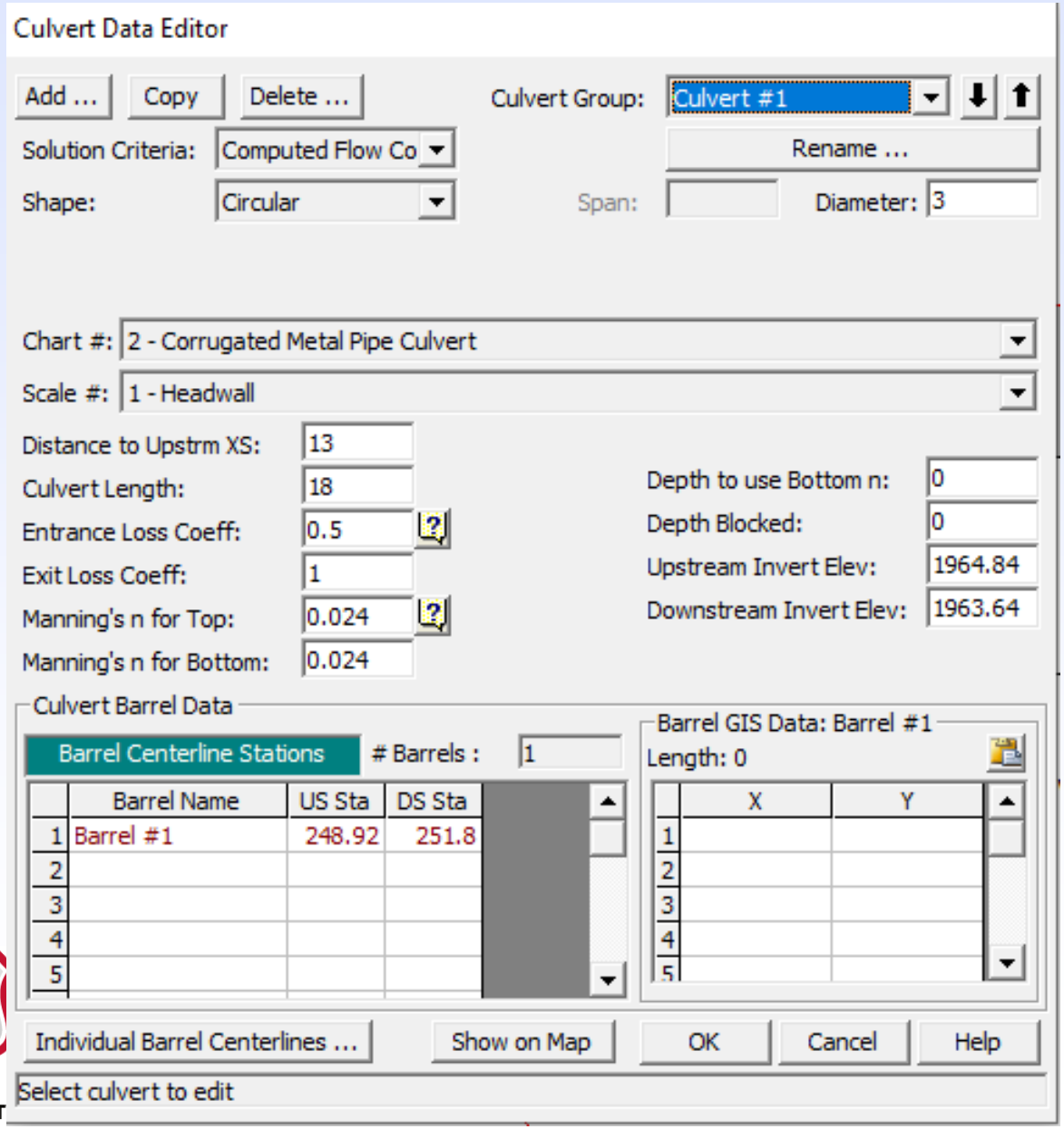
Bridges


Bridge Modeling Approach Editor
Add
Copy
Delete
Bridge #
1
Low Flow Methods
Use
Compute
Energy (Standard Step)
Momentum
Coef Drag Cd
2
Yarnell (Class A only)
Pier Shape K
WSPRO Method (Class A only)
WSPRO Variables
Highest Energy Answer
High Flow Methods
Energy Only (Standard Step)
Pressure and/or Weir
Submerged Inlet Cd (Blank for table)
Submerged Inlet + Outlet Cd
0.8
Max Low Chord (Blank for default)
OK
Cancel
Help
Enter to add another bridge coefficient set.


HEC-RAS
Momentum Equation
Add friction component
Add weight component
OK
Cancel

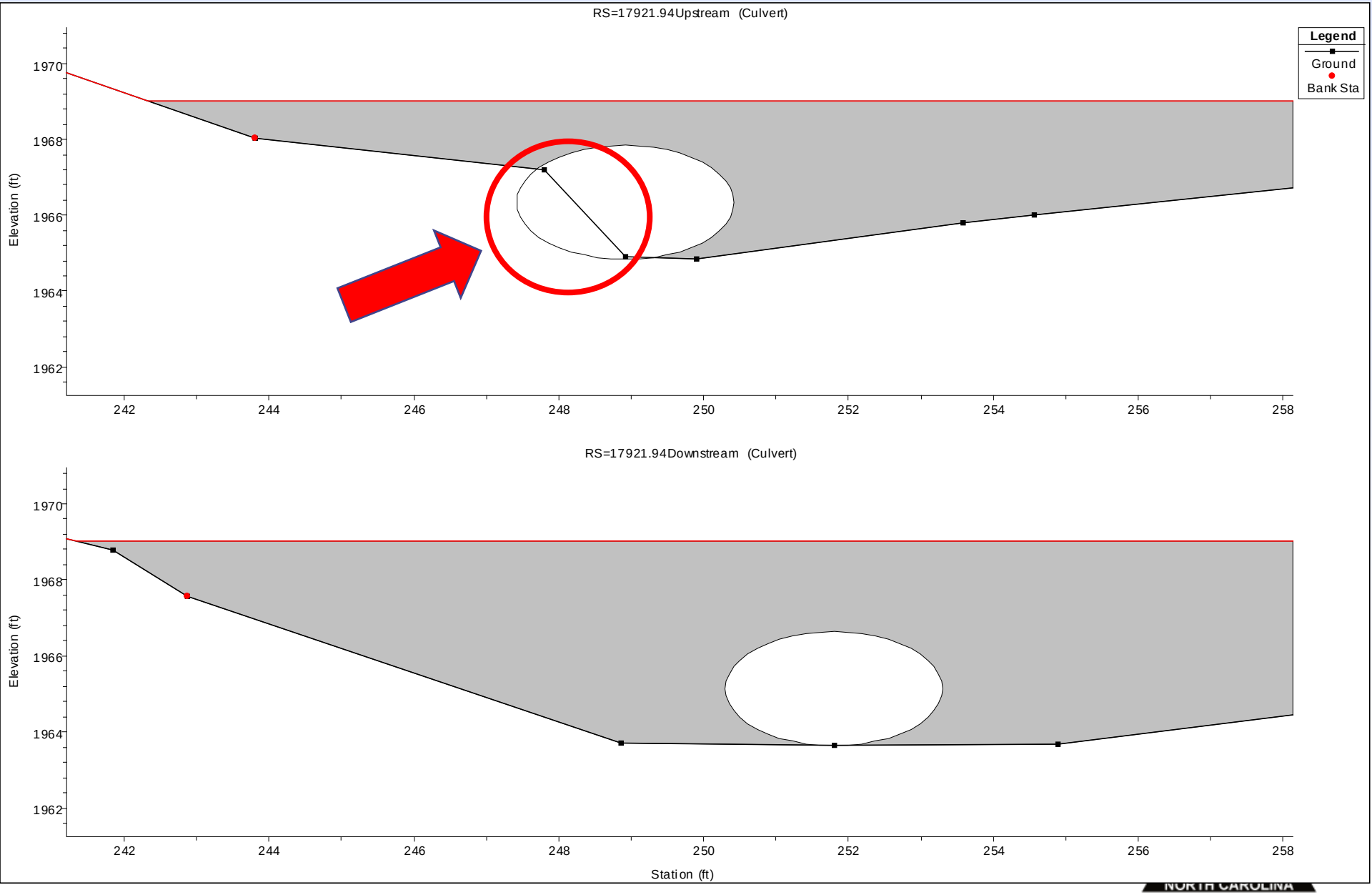

Bridge Cross Sections
Upstream Inside
Main Channel Bank Stations
Left Bank
Right Bank
812.1
1310.03
Cross Section X-Y Coordinates
Station
Elevation
n
1 0 2034 0.12
2 3.6 2034.1
3 6.1 2033.1
4 19.9 2027.2
5 22.6 2026.5
6 34.8 2027.8
7 45.3 2026.1
8 54.5 2027.4
9 57.4 2027.3
Downstream Inside
Main Channel Bank Stations
Left Bank
Right Bank
808
1210.1
Cross Section X-Y Coordinates
Station
Elevation
n
1 0 1983.5 0.12
2 5.8 1982
3 9.7 1980.5
4 18 1978.4
5 18.6 1978.2
6 19 1978.1
7 31.1 1972.7
8 34.7 1971.4
9 58.1 1961.4
Del Row
Ins Row
Adjust Selected Elevations
OK
Cancel
Reset Defaults
Help

Culverts

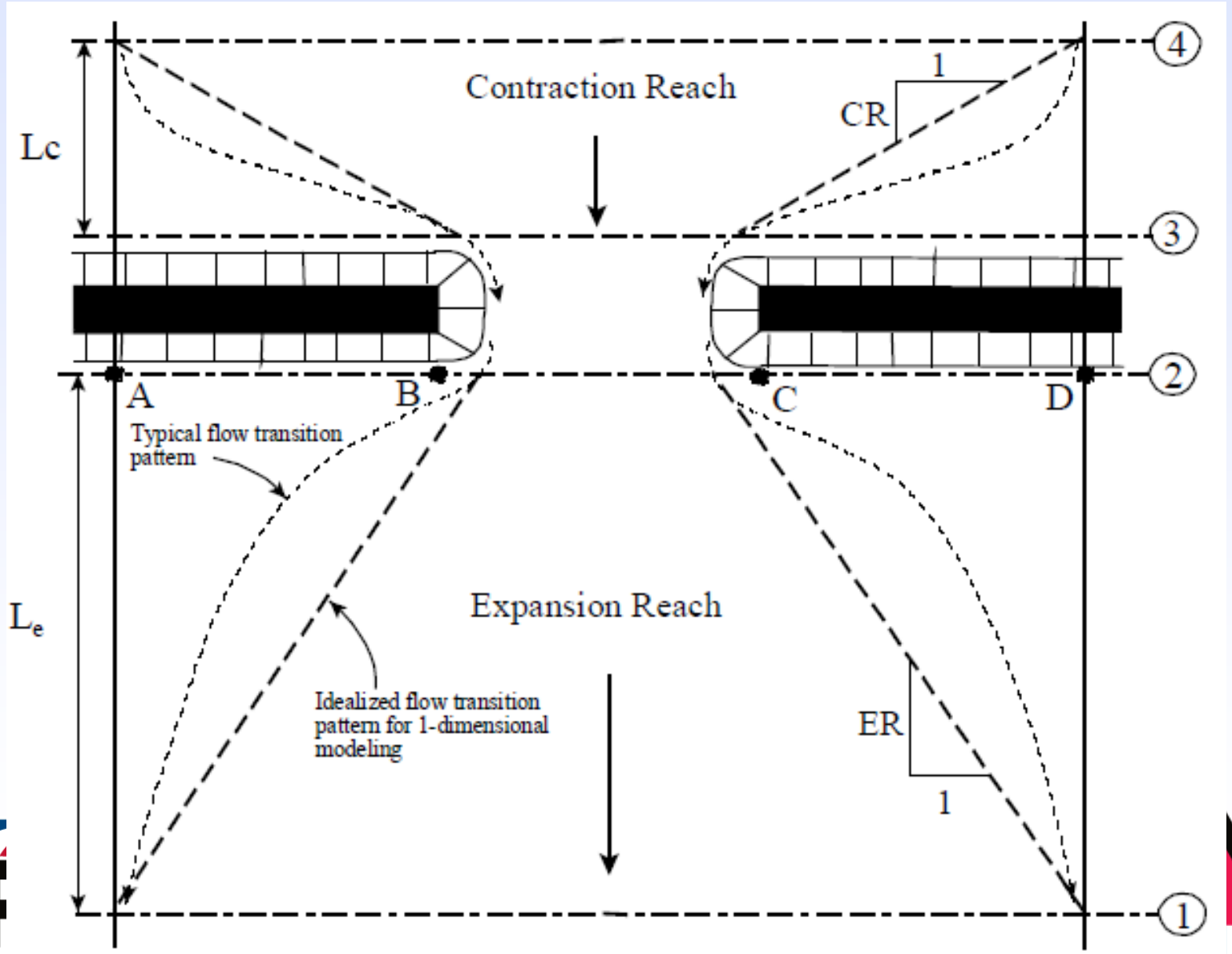


DEPARTMENT OF PUBLIC SAFET

Culverts


RS=17921.94Upstream (Culvert)
Legend
Ground
Bank Sta
Elevation (ft)
1970
1968
1966
1964
1962
242
244
246
248
250
252
254
256
258
RS=17921.94Downstream (Culvert)
Elevation (ft)
1970
1968
1966
1964
1962
242
244
246
248
250
252
254
256
258
Station (ft)

Cross-Sections



DEPARTMENT

MANAGEMENT

Poll Question

At a minimum, how many cross-sections are necessary for a culvert or bridge analysis in HEC-RAS?

- Three
- Four
- Six
- Eight

Specifications

Conditions should include specifications so the local administrators will know how to enforce the regulations

- Plant types and maintenance
- Mowing height
- Landscaping fill

Other Points Addressed

Document changes in ROUGHNESS with field and/or aerial photographs.

NCDPS does not charge a FEE for a No-Rise review.

TIME for a review: No time specified, usually 1-4 weeks.

Special Considerations

- Conveyance easements
  - Deed restrictions may be needed
  - If not enforced, will be a CAV violation
- Internal Bridge Sections
  - Is the rise due to an increase in the low chord elevation?
- No Floodway or NEA (C 10)
  - Minimum standard is no more than 1.00 ft. rise
  - Cumulative development

Special Considerations

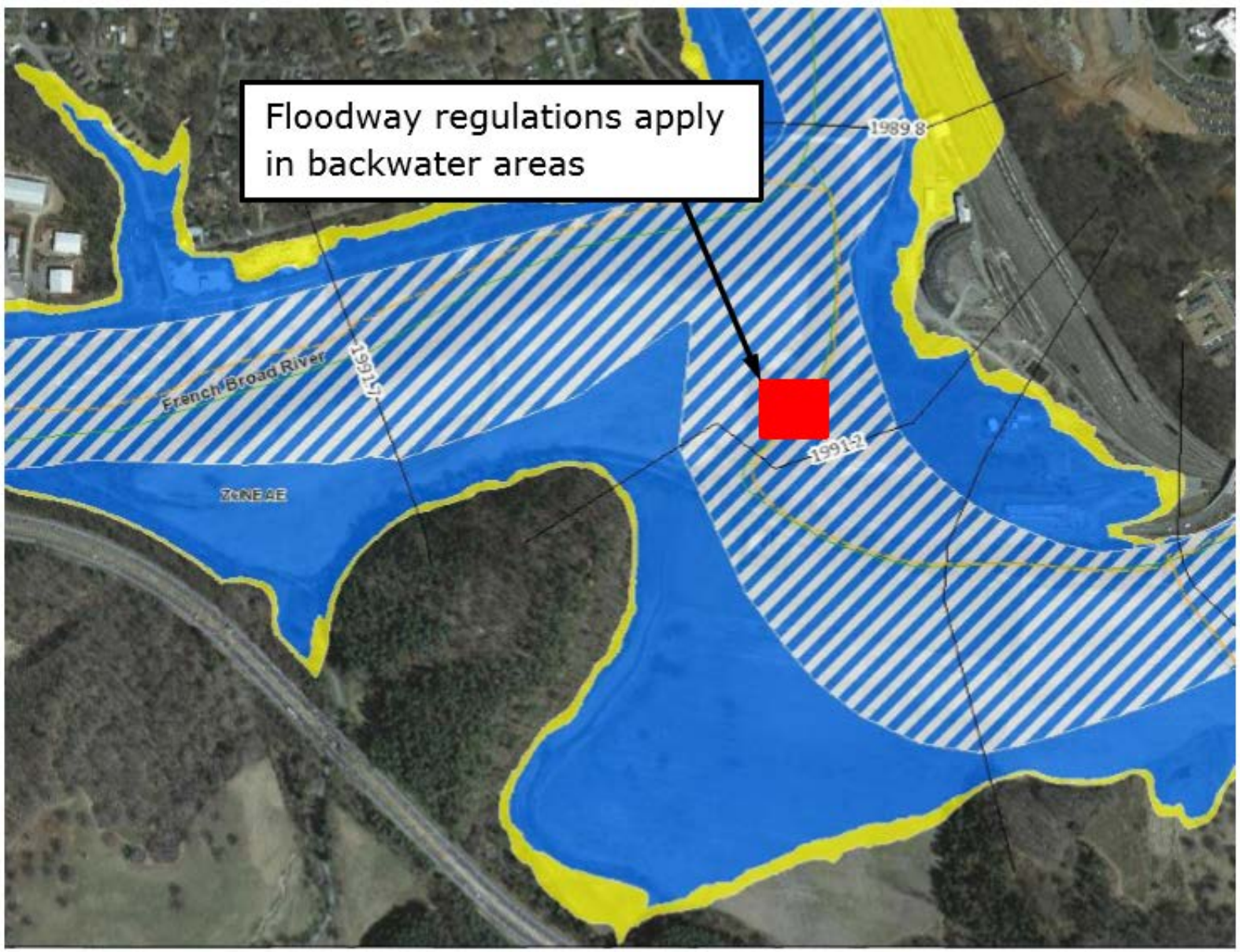
Project should be consistent with other regulations (DEQ, COE, ESA).

The outline presented here reflects only the MINIMUM standards for a No-Rise Certification.

Communities can have higher standards

- Velocity
- Community Floodway
- Entire Floodplain is Regulated

Backwater


Floodway regulations apply in backwater areas
French Broad River
19898
19917
19912
ZoNE AE

Stream Restoration

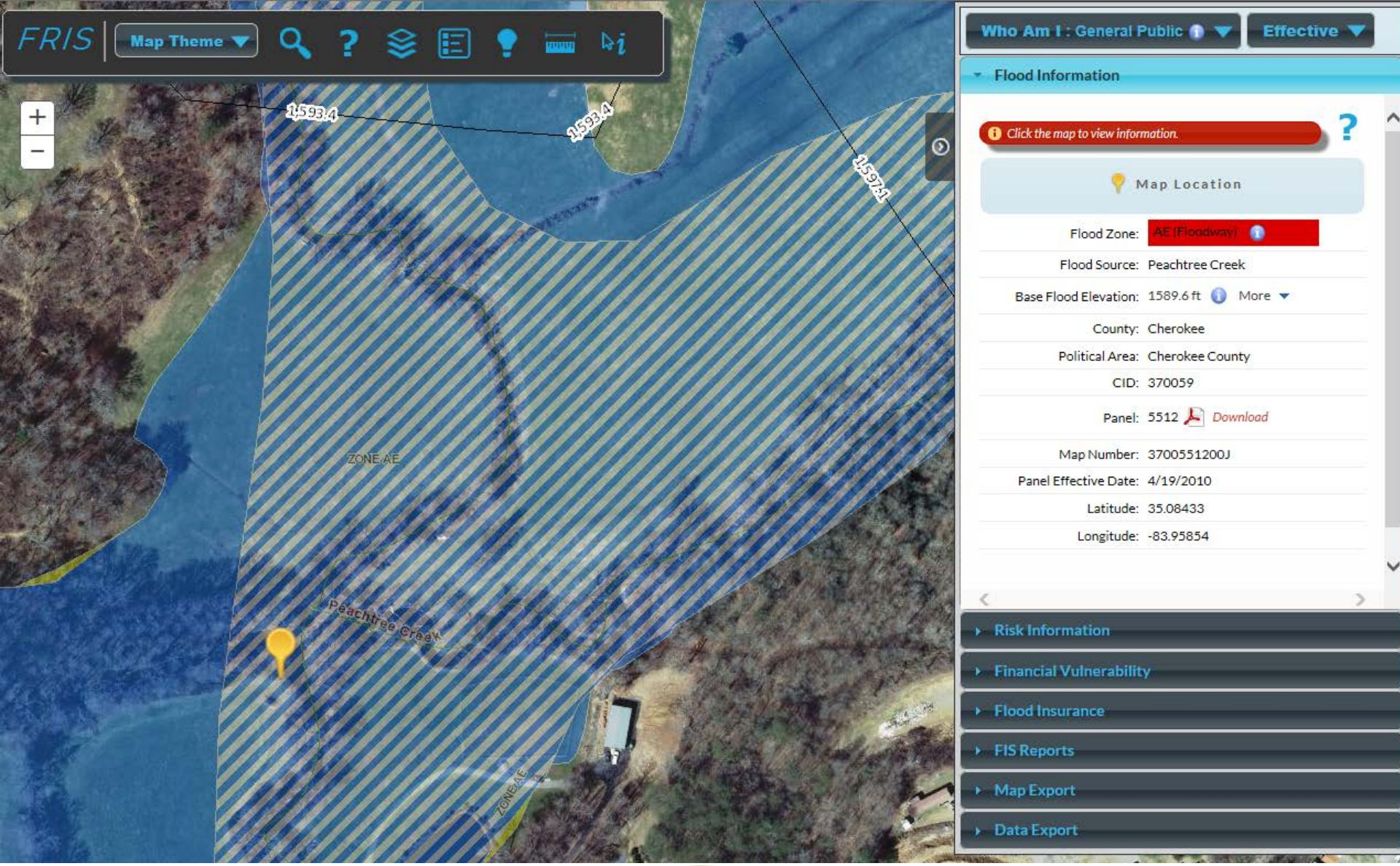
Standard Engineering Practice

- The project is located in a rural area with no potential impact to structures, culverts, or bridges (any potential impacts will require a detailed analysis);
- The project covers a relatively short reach of stream (500’ and/or no more than one model cross-section);
- There are no new structures associated with the project (weirs, root wads, etc) or obstructions;
- There will be a net reduction in obstructions (by laying back the banks and/or removing fallen trees or other structures);

Stream Restoration

Standard Engineering Practice

- The project will maintain the effective modeling parameters (including channel dimensions and roughness values).
- **In no case would an exception be made if there is a potential impact to structures or risk to life and property.**
- **An Engineer's certification will still be required.**



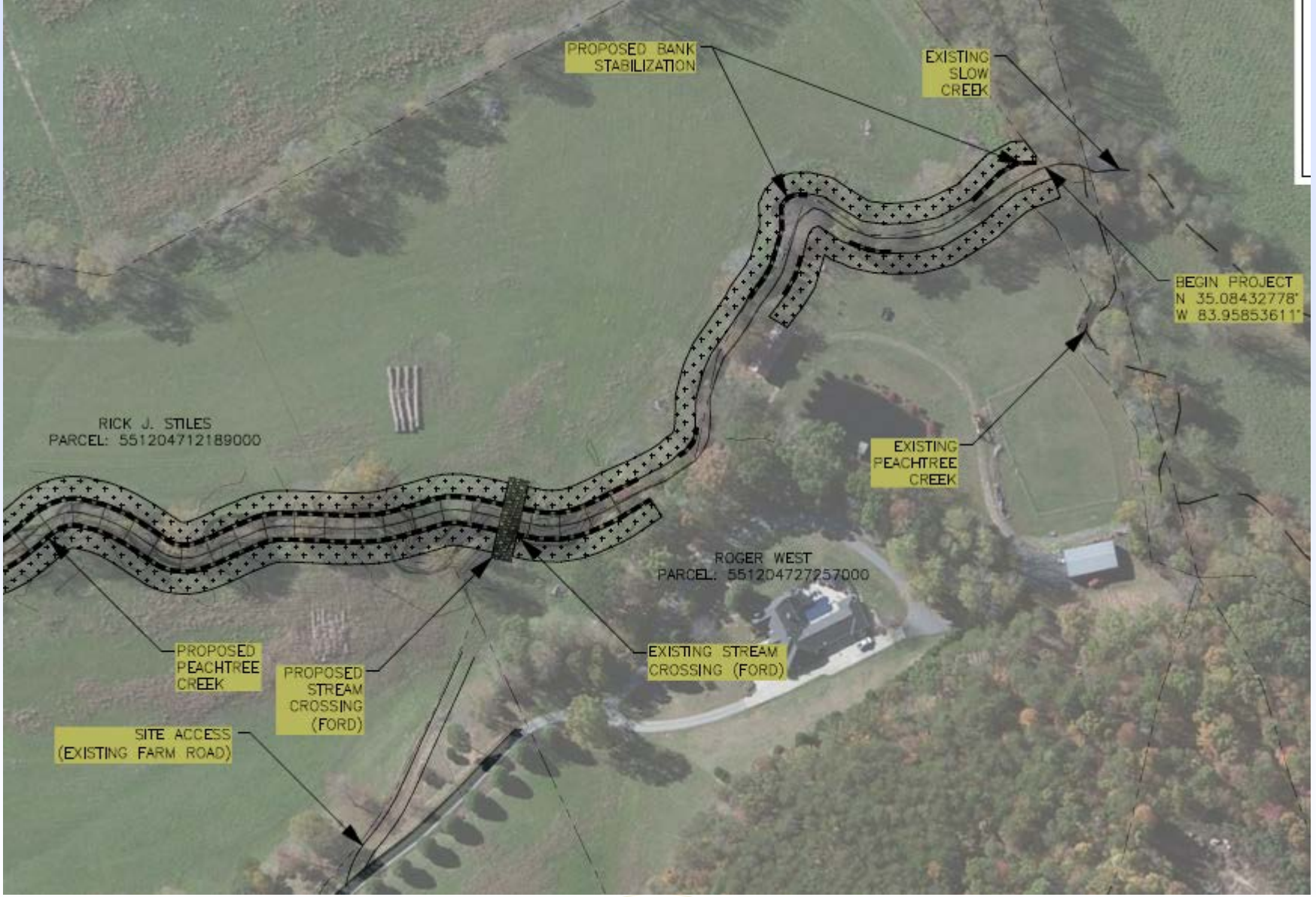
DEPARTMENT OF PUBLIC SAFETY

EMAP Accredited

North Carolina Emergency Management

Risk Management Section

EMERGENCY MANAGEMENT NORTH CAROLINA



DEPARTMENT OF PUBLIC SAFETY

EMAP Accredited

North Carolina Emergency Management

Risk Management Section

EMERGENCY MANAGEMENT NORTH CAROLINA



N★C DPS
DEPARTMENT OF PUBLIC SAFETY

EMERGENCY MANAGEMENT EMAP Accredited ACCREDITATION PROGRAM

North Carolina Emergency Management
Risk Management Section

EMERGENCY MANAGEMENT N★C NORTH CAROLINA



Who Am I : General Public

Effective

Flood Information

Click the map to view information.

Map Location

Flood Zone:	AE
Flood Source:	Little Bear Creek
Base Flood Elevation:	777.6 ft More
County:	Davie
Political Area:	Davie County
CID:	370308
Panel:	5800 Download
Map Number:	3710580000J
Panel Effective Date:	9/17/2008
Latitude:	35.94757
Longitude:	-80.62377

Risk Information

Financial Vulnerability

Flood Insurance

FIS Reports

Map Export

Data Export

Engineering Guidance

No-Rise Guidance Document

https://flood.nc.gov

Flood models should meet both FEMA and North Carolina Standards:

North Carolina Riverine Hydrologic & Hydraulic Engineering Guidelines and Standards, September 25, 2015

FEMA Guidelines and Standards for Flood Risk Analysis & Mapping

LOMR Will Be Required

When the base flood elevation decreases by more than 0.1 feet.

Where there is a change in the floodway width or location.

Note: Changes in floodway width due to increased detail in the model at new or updated cross-sections will not require a LOMR.

Changes in hydrology (flow).

CLOMR Will Be Required

Where there is any increase in flood elevation:

- Base Flood Elevation
- Surcharge Elevation

No structures are impacted by the increase in flood level.

Prior approval is mandatory.

Endangered Species

ESA Compliance is ALWAYS required!

See FEMA Fact Sheet on ESA Compliance: https://www.fema.gov/compliance-endangered-species-act-letters-map-change#

CLOMR and CLOMR-F require ESA compliance documentation prior to issuance.

Other LOMC requests require independent ESA compliance.

Community ensures compliance with permitting requirements for a No-Rise.

Closing Thoughts

There are life-safety, property, & legal implications of a No-Rise Certification.

Modelers should understand that the modeling effort in a No-Rise study is at least as comprehensive as the effort in a Map Revision.

Clients should understand that a No-Rise is not guaranteed.

Hydraulic modeling should only be performed by knowledgeable and experienced engineers with a strong understanding of the modeling software.

City of Brevard, NC
No Adverse Impact Certification

- **No Adverse Impact certification** instead of a No Rise certification
- **No increase in elevation, velocity or erosion**



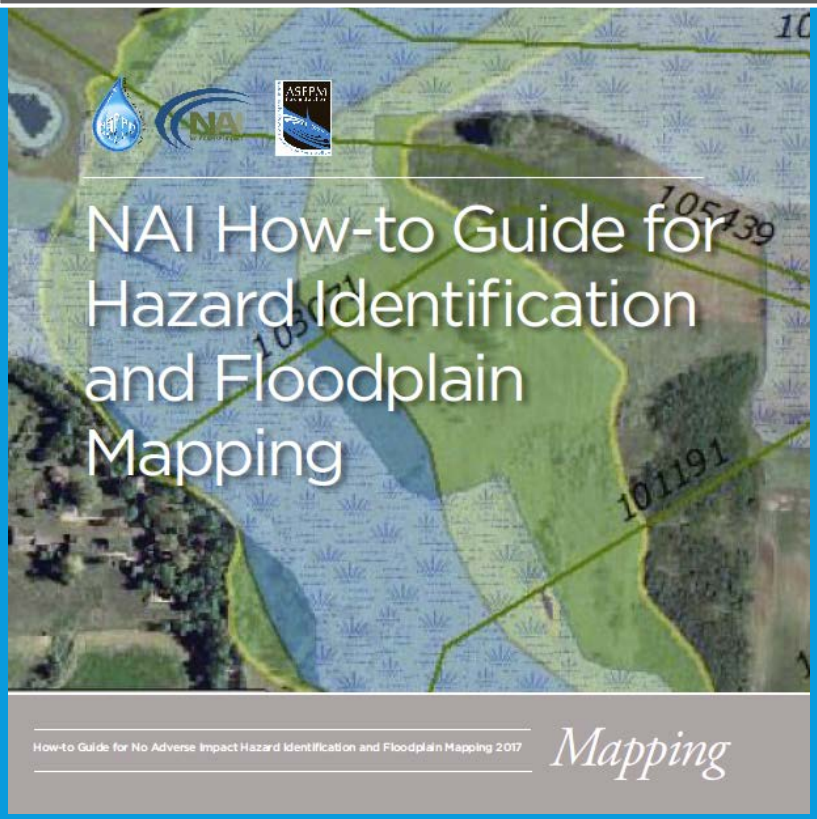
Best Practice:

City of Brevard,
Transylvania County, NC

ASFPM No Adverse Impact How-to Guides

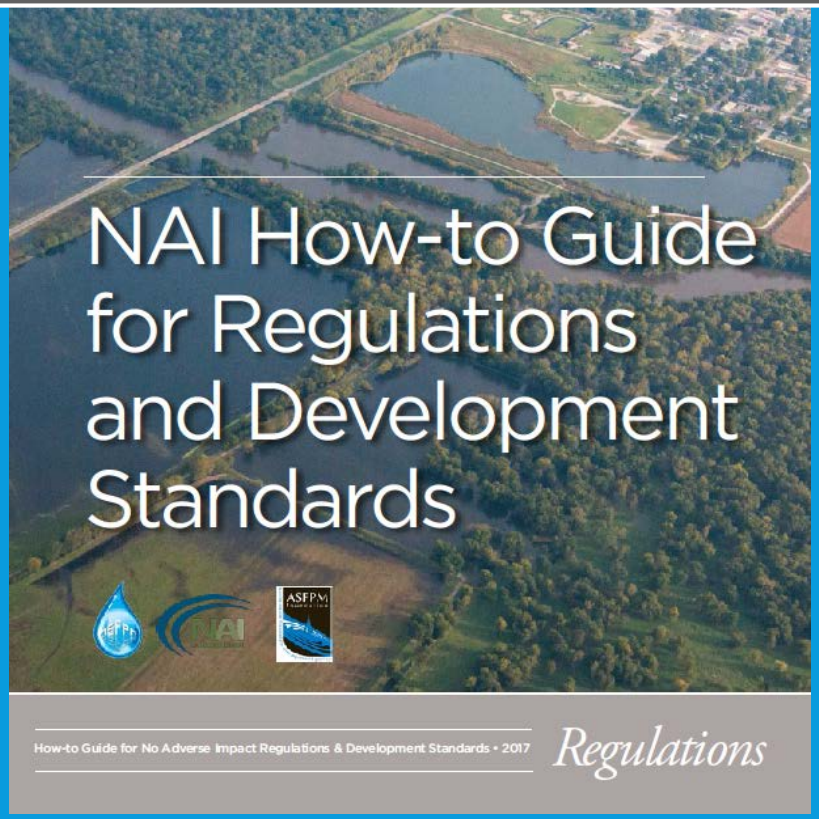


no.floods.org/NAI-Mapping





no.floods.org/NAI-Regulations



Questions & Discussion



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alan@floods.org

Dan Brubaker, P.E., CFM
dan.Brubaker@ncdps.gov

Cooperating Technical Partners Information Exchange

CTP COOPERATING TECHNICAL PARTNERS

Association of State Floodplain Managers ASFPM

ASFPM Flood Science Center

Poll Question

Please rate this webinar.

Continuing Education Credits

- Certified Floodplain Managers and Certified Planners are eligible for 1 CEC for participating in this webinar.
- You must have registered individually and indicated you are a CFM and/or AICP at time of registration.
- Eligibility for CEC is dependent on your time spent viewing the webinar, as determined by the webinar software.



Attending this webinar in a group setting or only viewing the recording is NOT eligible for CEC.

Closing Comments

- To suggest future CTP webinar topics, please contact Alan Lulloff at *alan@floods.org* or type a suggested topic into the Questions panel today.



ASFPM CFM CECs will be automatically applied.



Certificates of Attendance will be emailed. Processing will take a few weeks. Please contact *cfm@floods.org* with any certificate issues only after a few weeks have elapsed.

- A follow-up email with link to slides and recording will be sent **in about week or so.**

Thank You for Joining Us!