

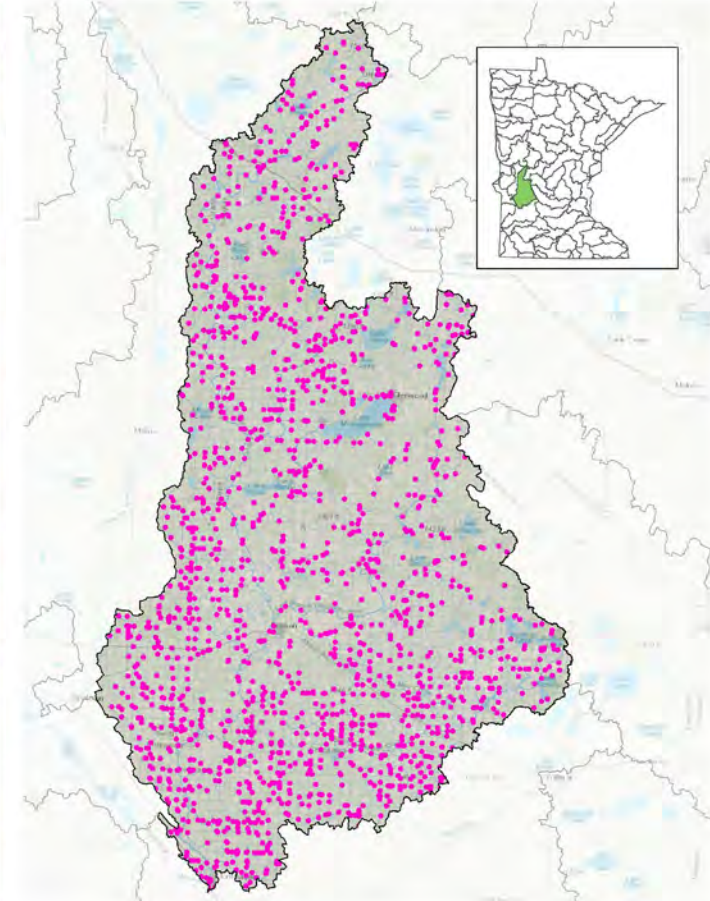
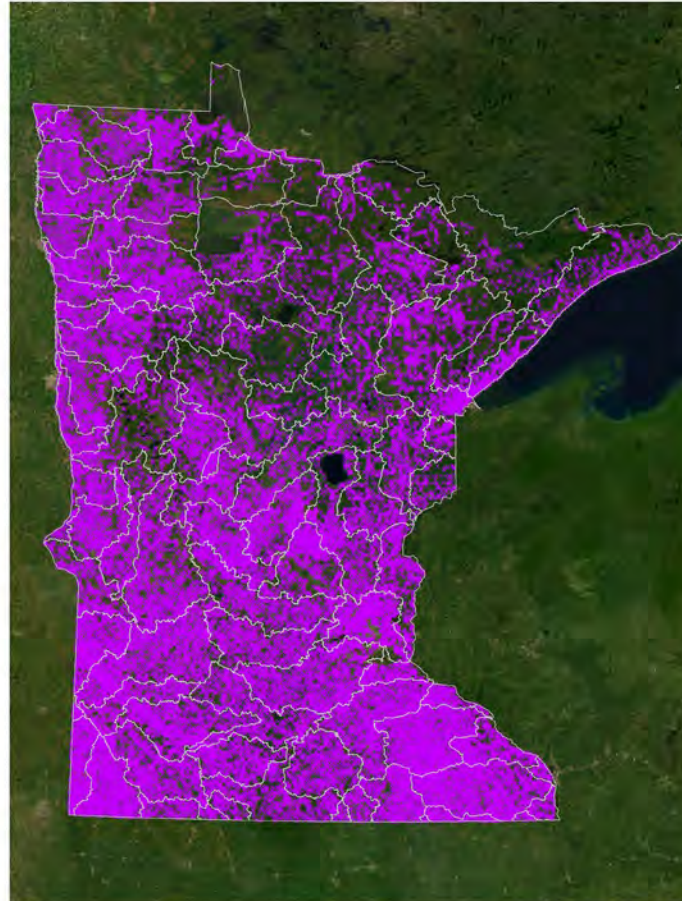


MESBOAC applications to Aquatic Organism Passage

Brady Swanson | Stream Habitat Specialist

Stream/Road Intersections

- MN 92,000 miles of rivers/streams & 142,000 miles of roads
- 10's of thousands of stream/road intersections
- Many barriers to aquatic organism passage
- Passage needed for range of organisms
- Organisms need access to different parts of watershed during different life stages



Important Species

- Federally Endangered: Topeka Shiner, Higgins Eye, Sheepnose, Snuffbox, Spectaclecase, Winged Mapleleaf
- Fish: 4 Endangered, 5 Threatened, 25 Species of Concern
- Mussels: 13 Endangered, 11 Threatened, 9 Special Concern. 33 of 50 native species

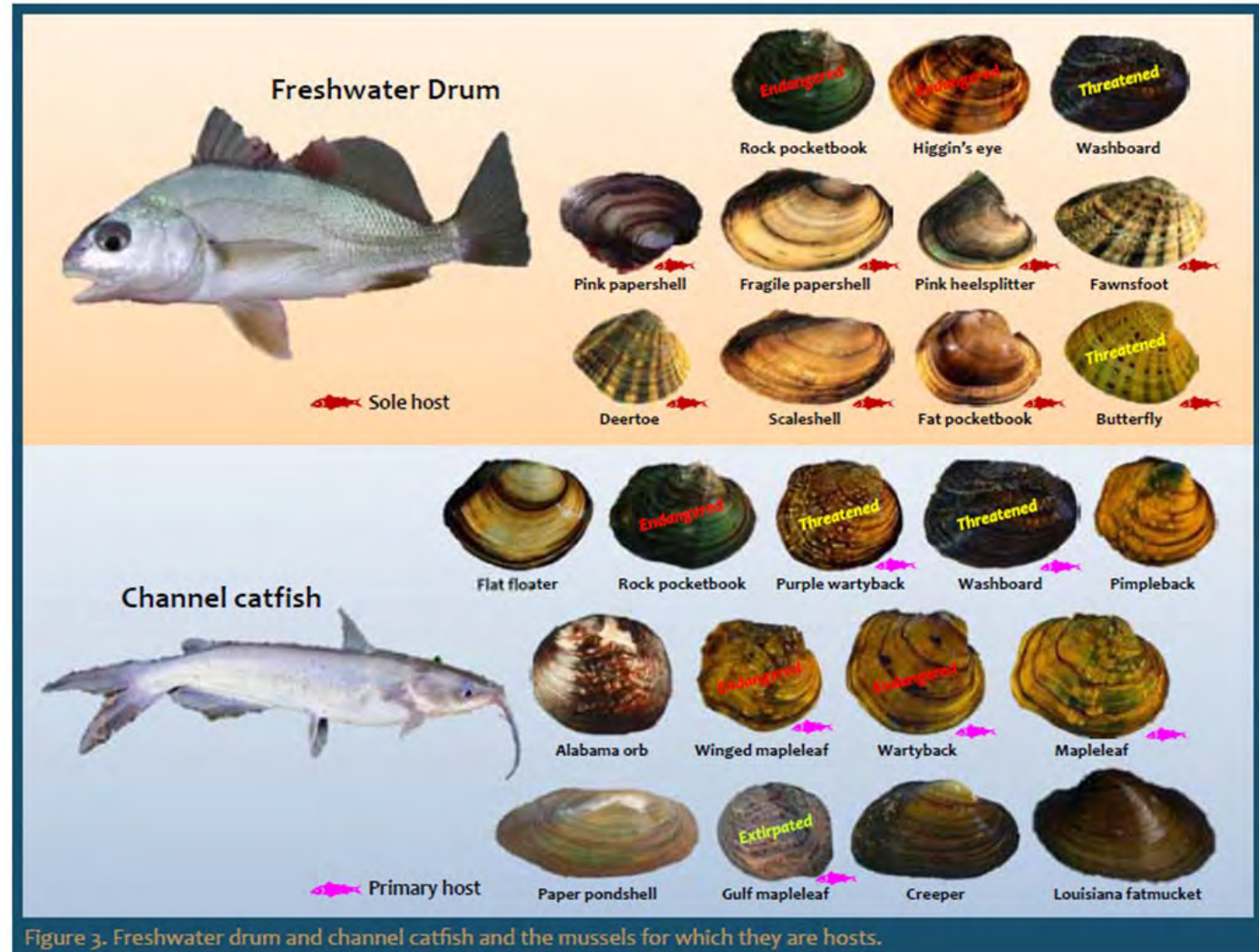
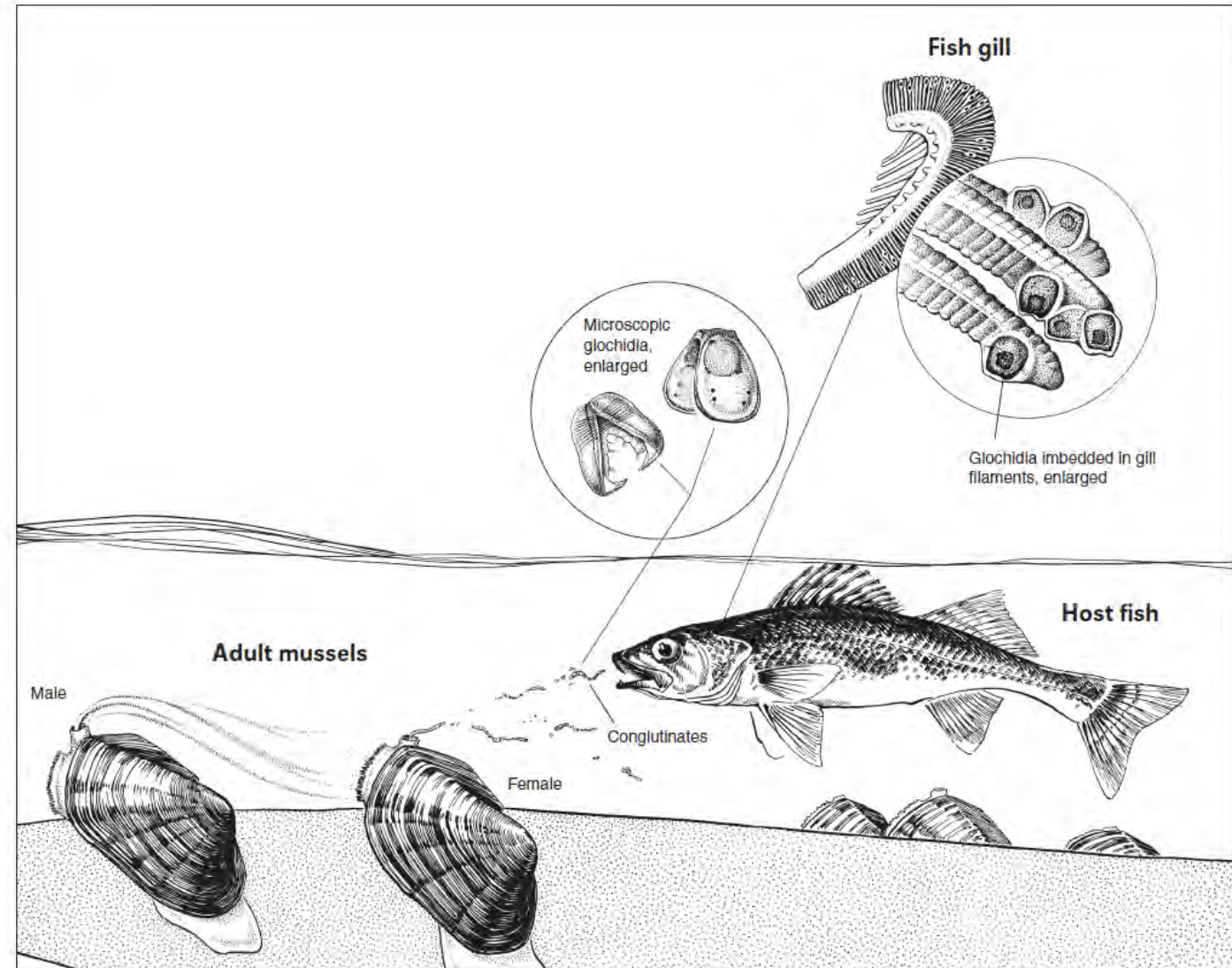


Figure 3. Freshwater drum and channel catfish and the mussels for which they are hosts.

Figure courtesy of Luther Aadland and MNDNR River Ecology Unit

Mussel Life Cycle

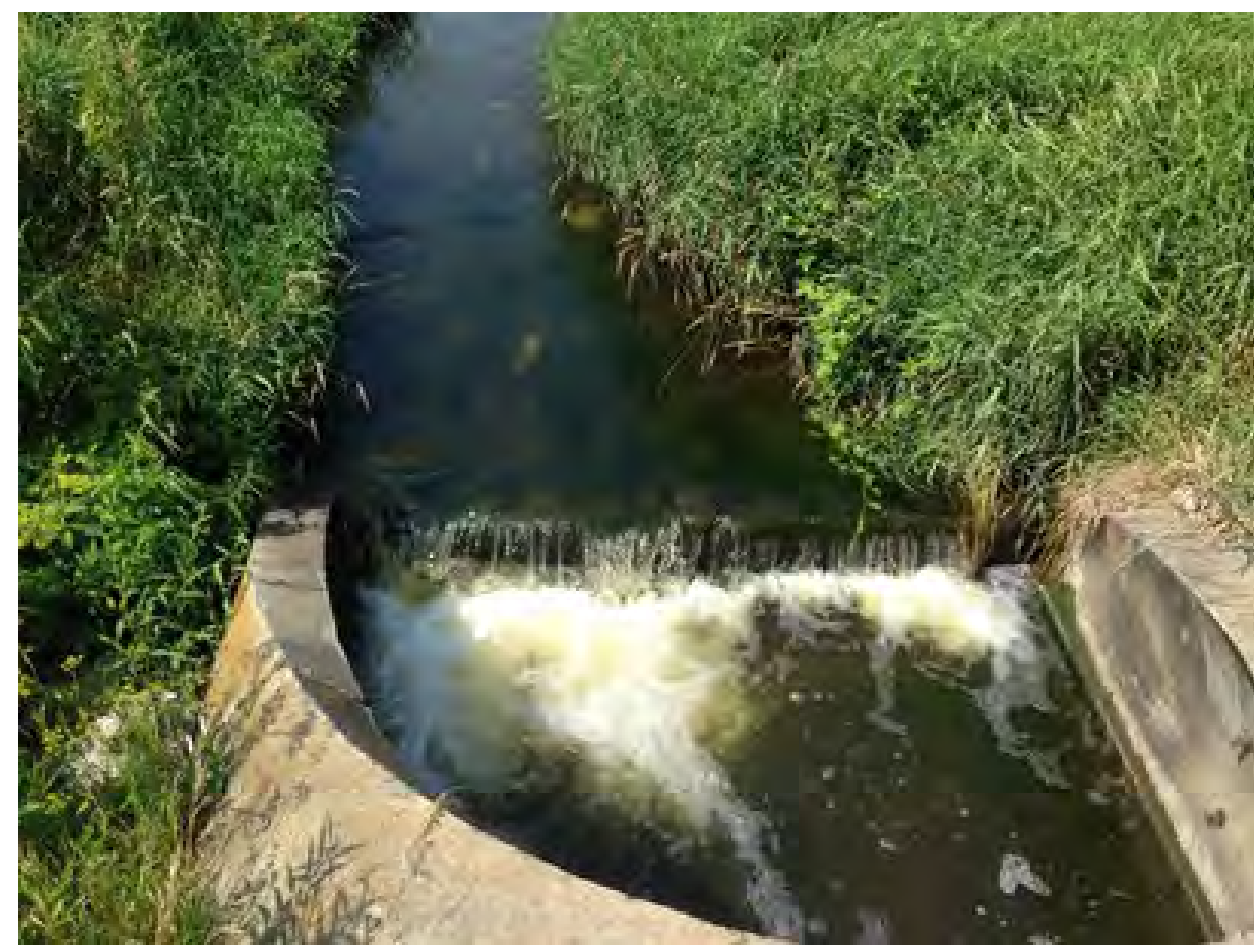
- Mussels live for decades to a century
- Young develop into glochidia
- Glochidia attach to gills or skin
- Develop into juvenile mussels in weeks to months
- Distribution directly related to fish distribution and connectivity
- Zebra Mussels form free living larvae (veligers)



- Drop Structure
- Perched Culvert
- Under Sized/Velocity Barrier
- Insufficient Flow Depth
- Excessive Length
- Excess or Lack of Substrate
- Poor Placement/Alignment
- Combination/Multiple Problems



Drop Structures



Drop Structures



Perched Culverts



Undersized Velocity Barriers



Undersized Velocity Barriers



Excessive Length/Insufficient Flow



Excess or Lack of Sediment



Excess sediment



Lack of sediment

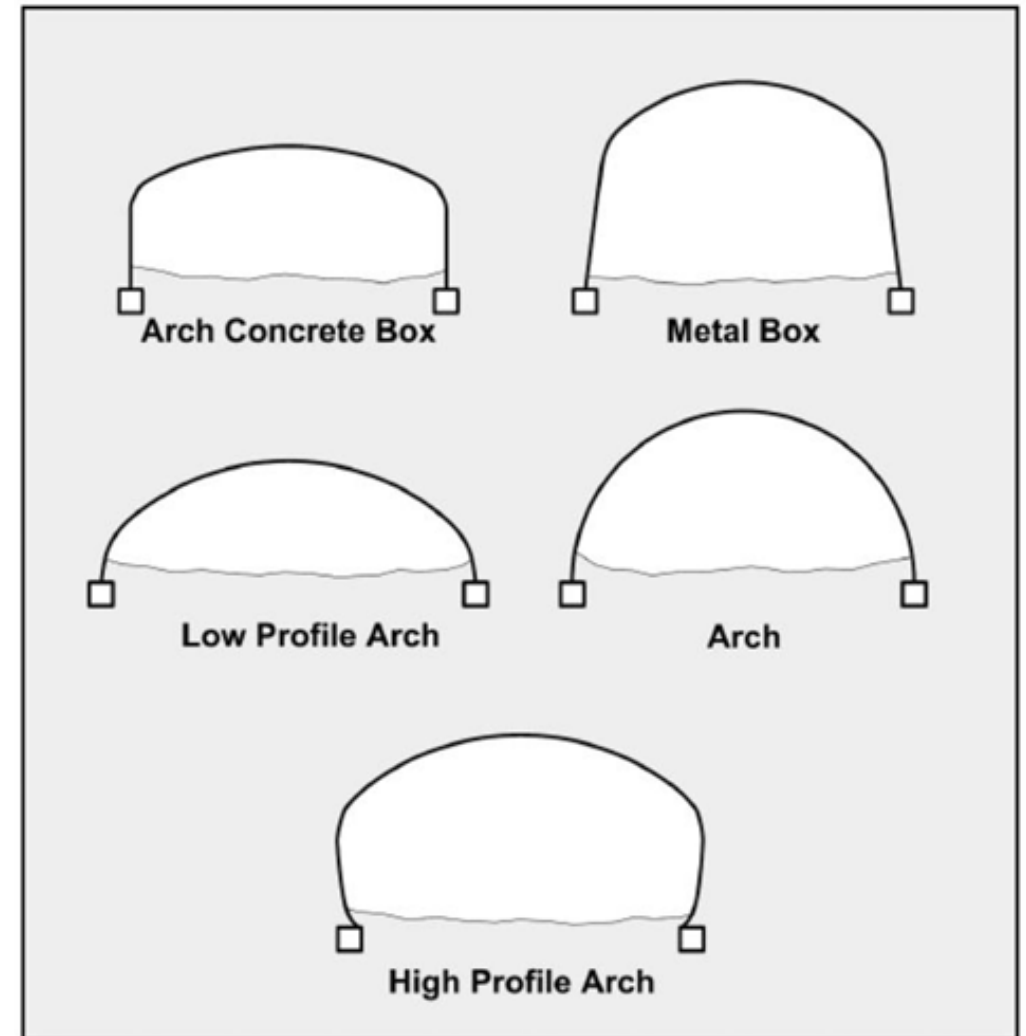
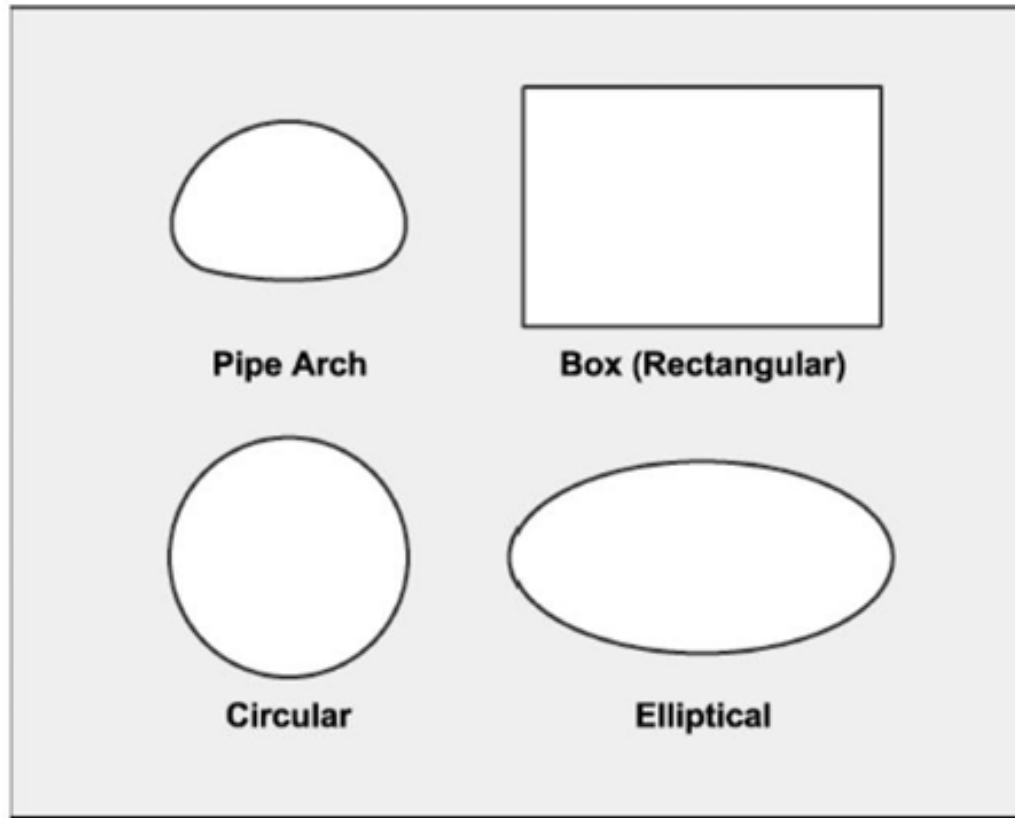
Poor Placement or Alignment



Multiple Problems



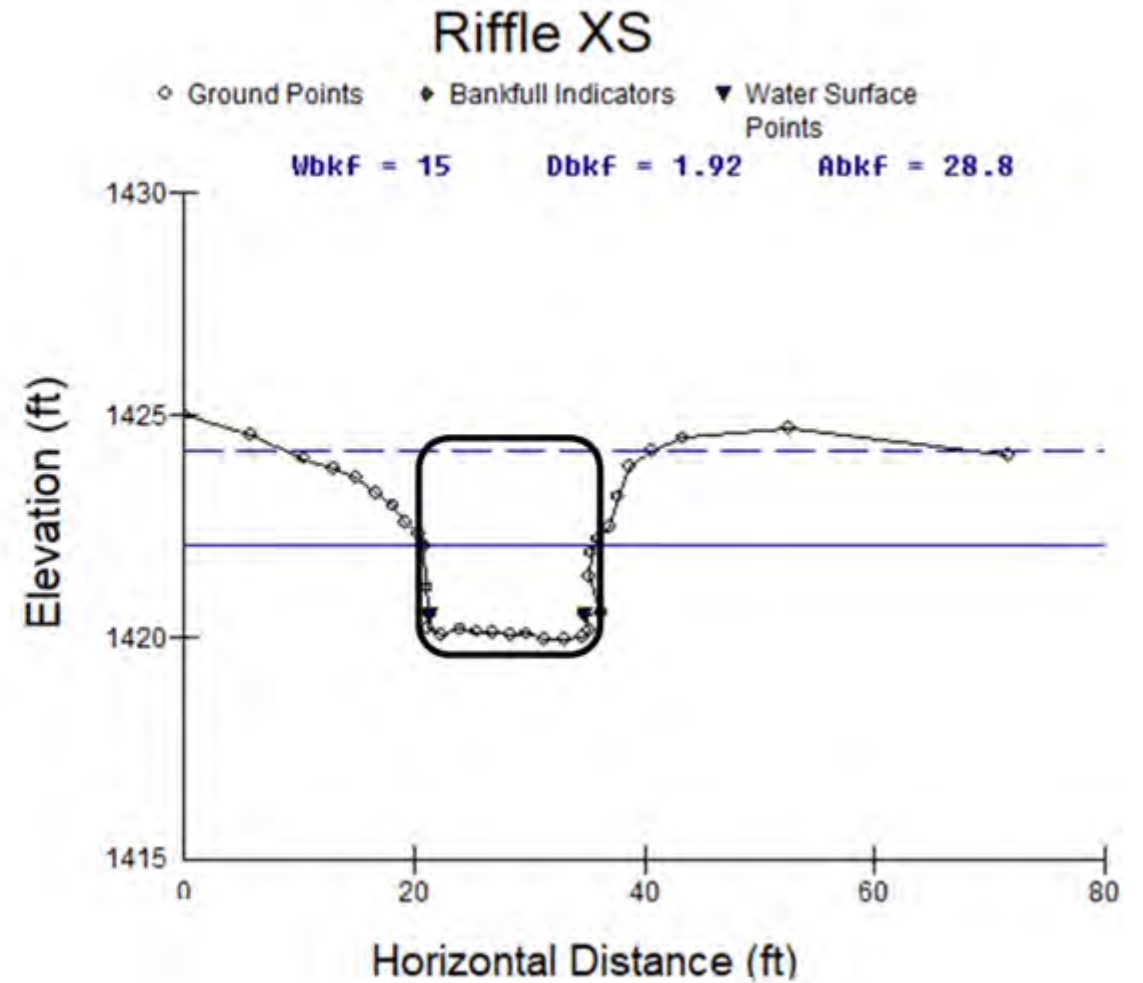
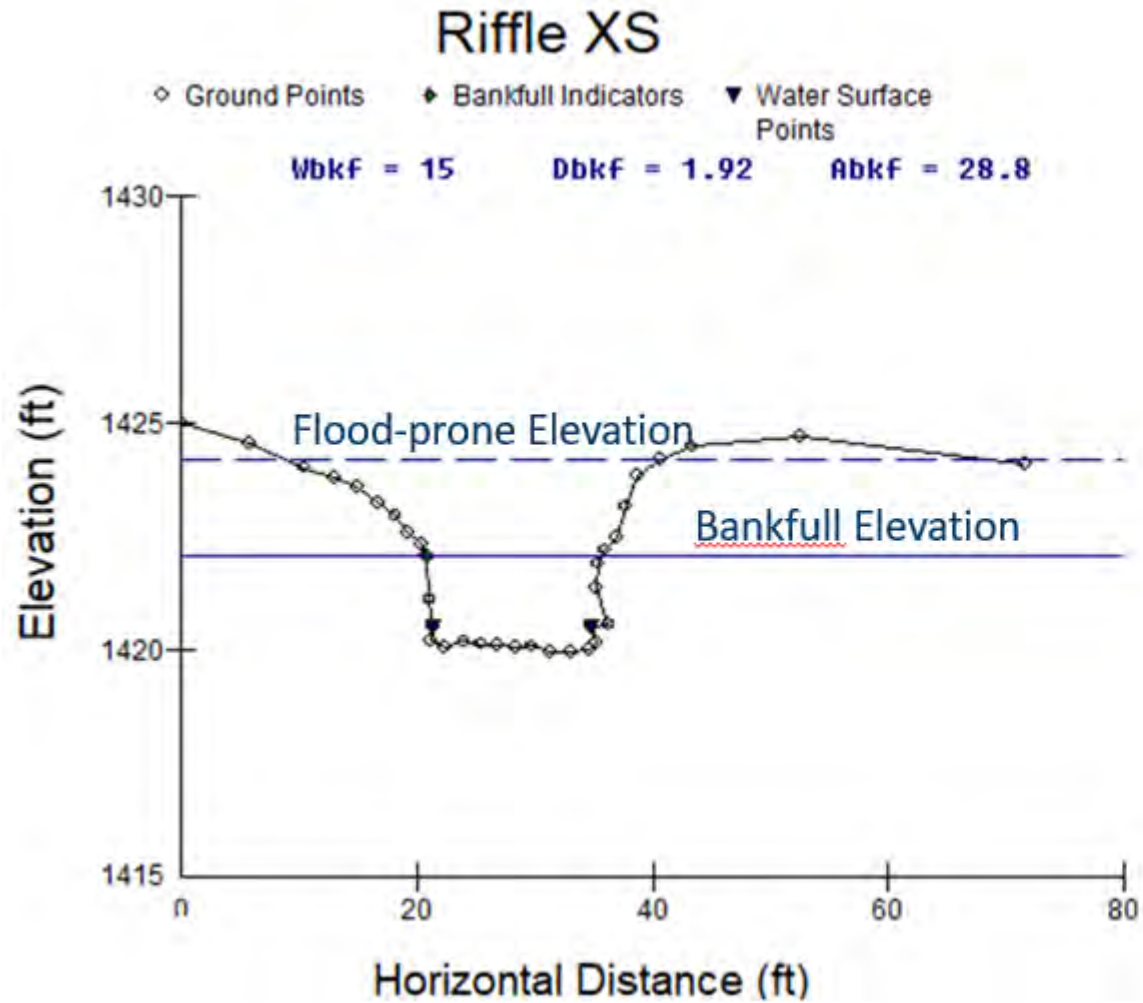
Culvert Shape and Material



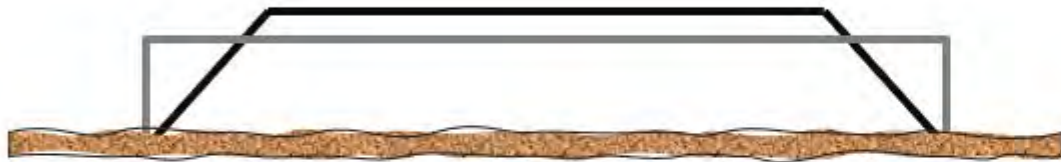
From Figure 1.5, FHWA HDS5 (Schall et al. 2012)

- **M**atch Culvert width to bankfull stream width
- **E**xtend Culvert length through side slope toe
- **S**et Culvert slope same as stream slope
- **B**ury Culvert into substrate of stream
- **O**ffset Multiple culverts (1' offset, consider floodplain culverts)
- **A**lign Culvert with stream (consider stream adjustment)
- **C**onsider Head cuts or cut-offs

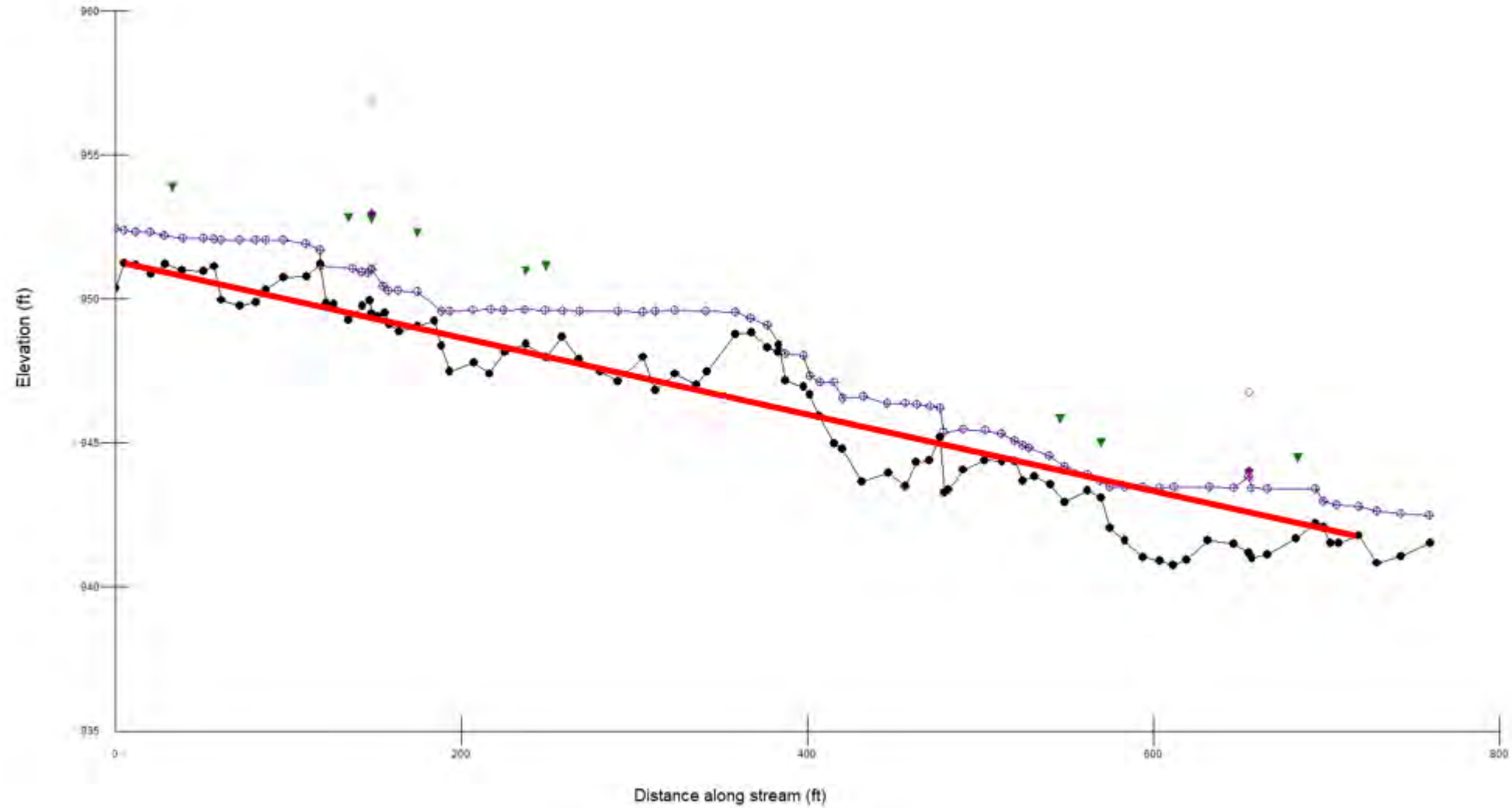
Match Bankfull Width



Extend Through Toe

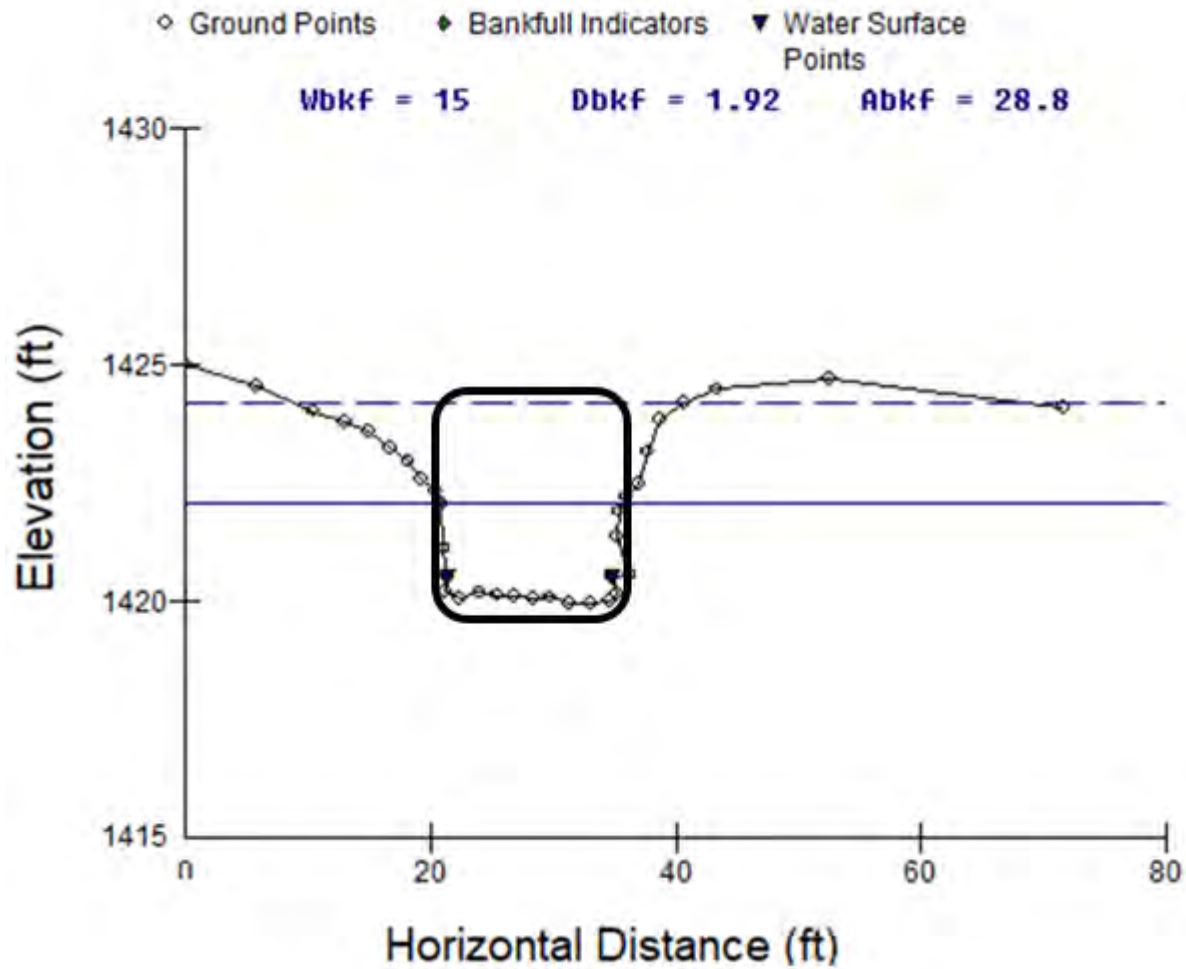


Culvert Slope = Stream Slope

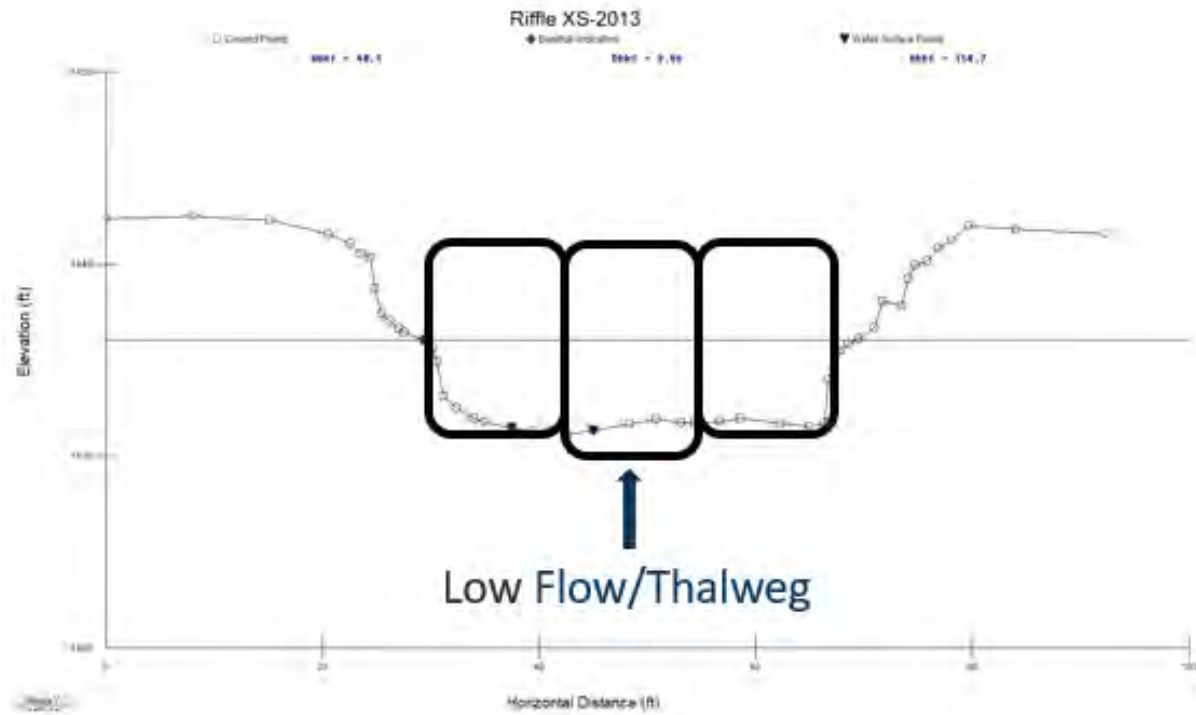


Bury Culvert

Riffle XS



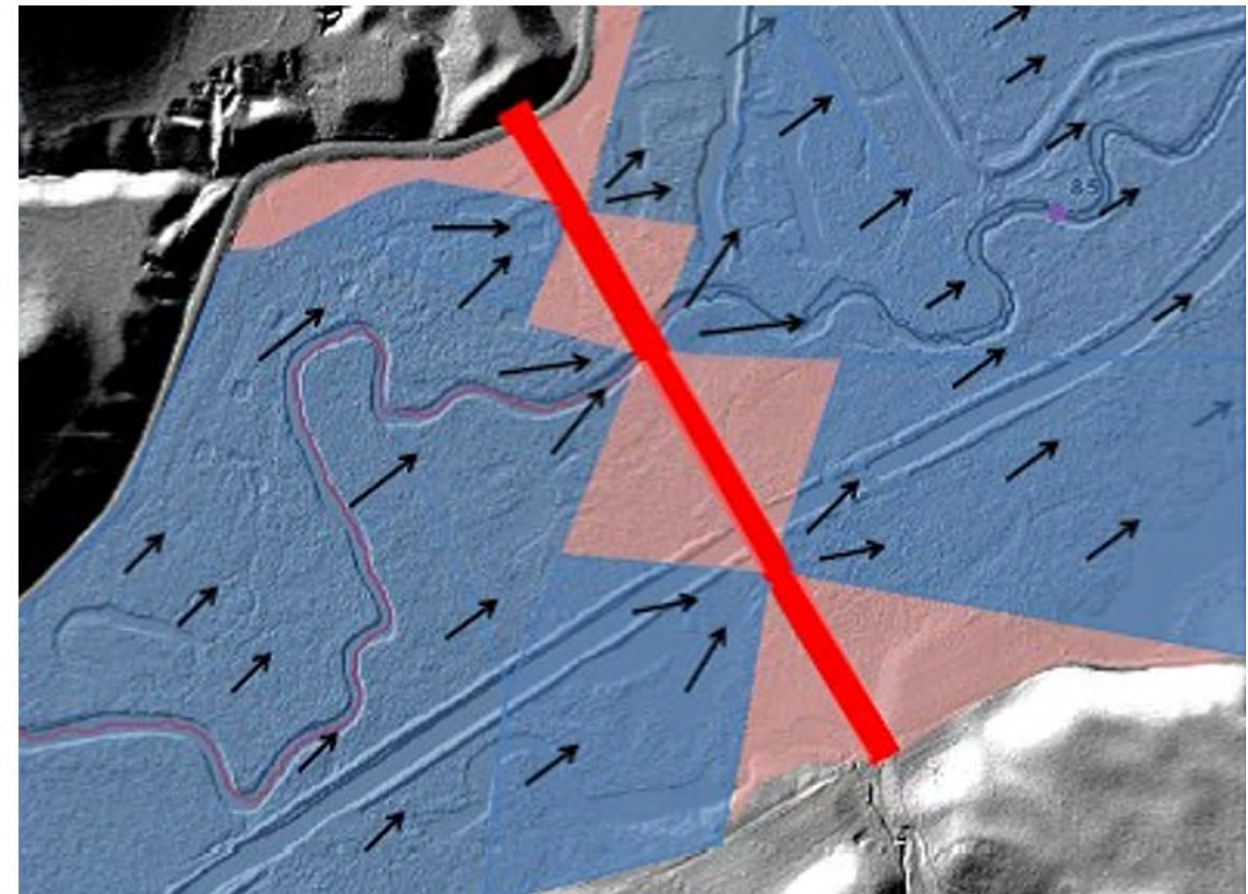
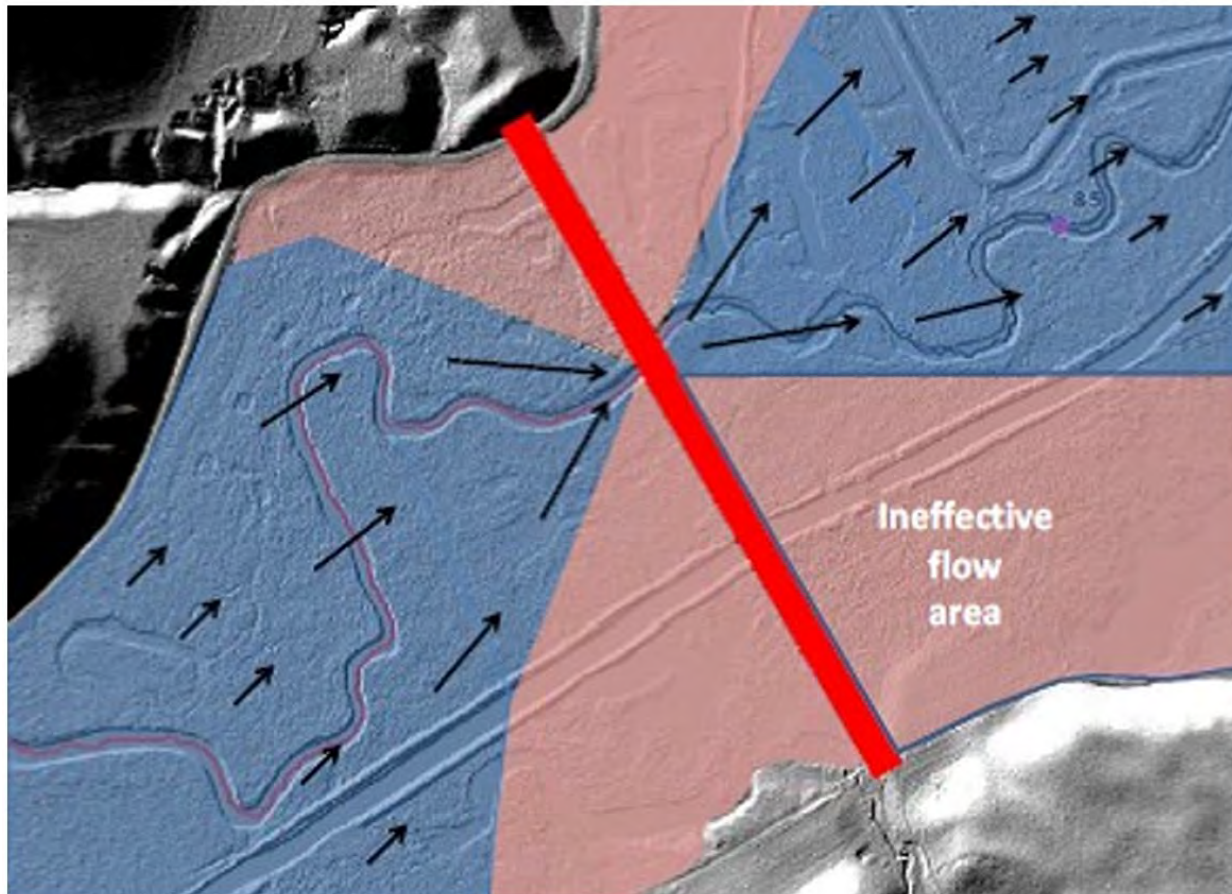
Offset Multiple Culverts



Offset Multiple Culverts – Floodplain Culverts



Offset Multiple Culverts – Floodplain Culverts

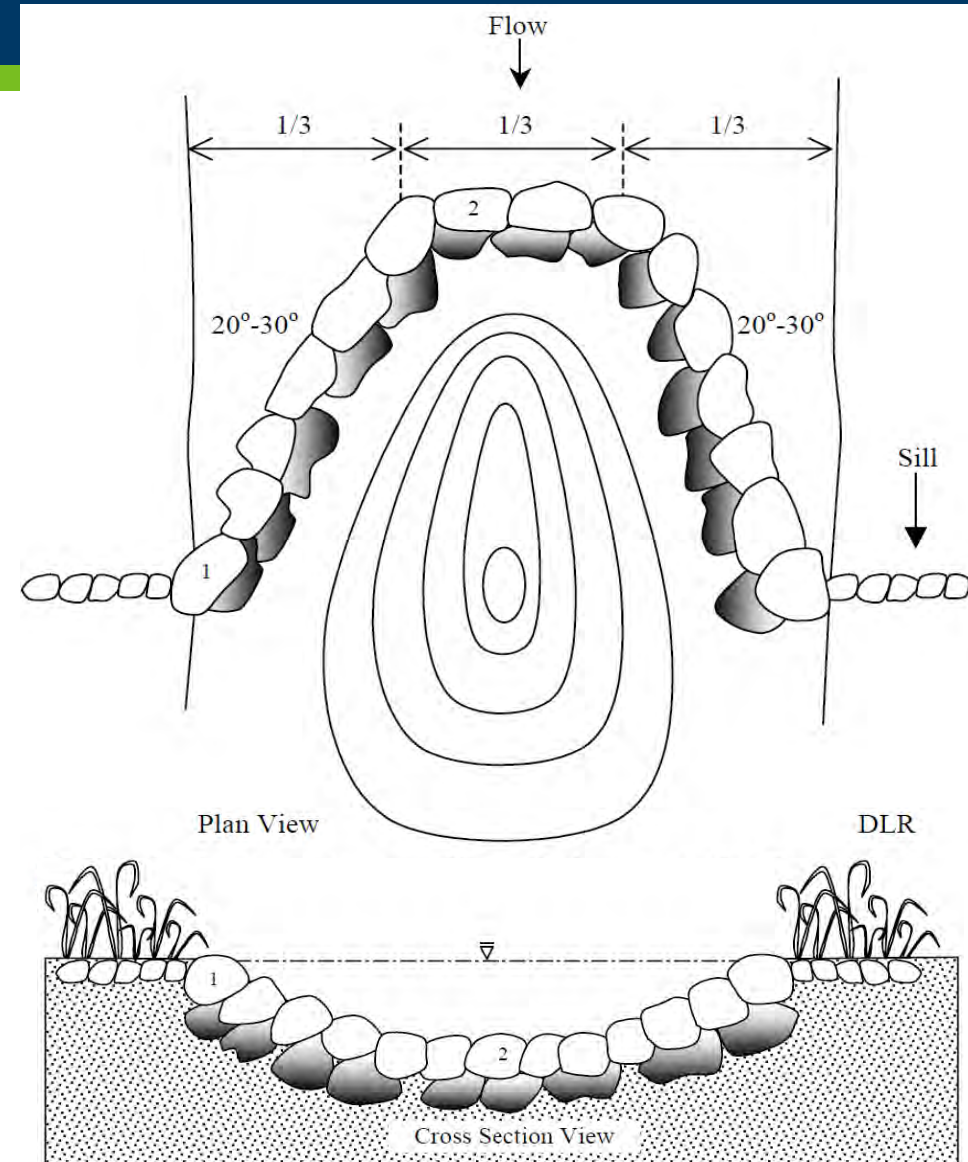


Adapted from figures 50 & 51, Zytkovicz and Murtada 2013

Align with stream



Consider Head Cuts & Cutoffs



New culverts provide climate resiliency to fish and people on Lake Superior's North Shore

September 5, 2024



Photo courtesy of Minnesota Pollution Control Agency article

Increased Resiliency

- Increased culvert capacity and decreased velocities equals increased flood resiliency
- Reduced # of culvert failures
- Reduced maintenance and debris removal
- Reduced long term costs

Questions?



Brady Swanson - Stream Habitat Specialist

brady.swanson@state.mn.us

218-203-4320



How culverts affect stream stability

Amy Childers | Training and Outreach Coordinator

Rivers are dynamic

Flowing water



Moving sediment



Dynamic equilibrium

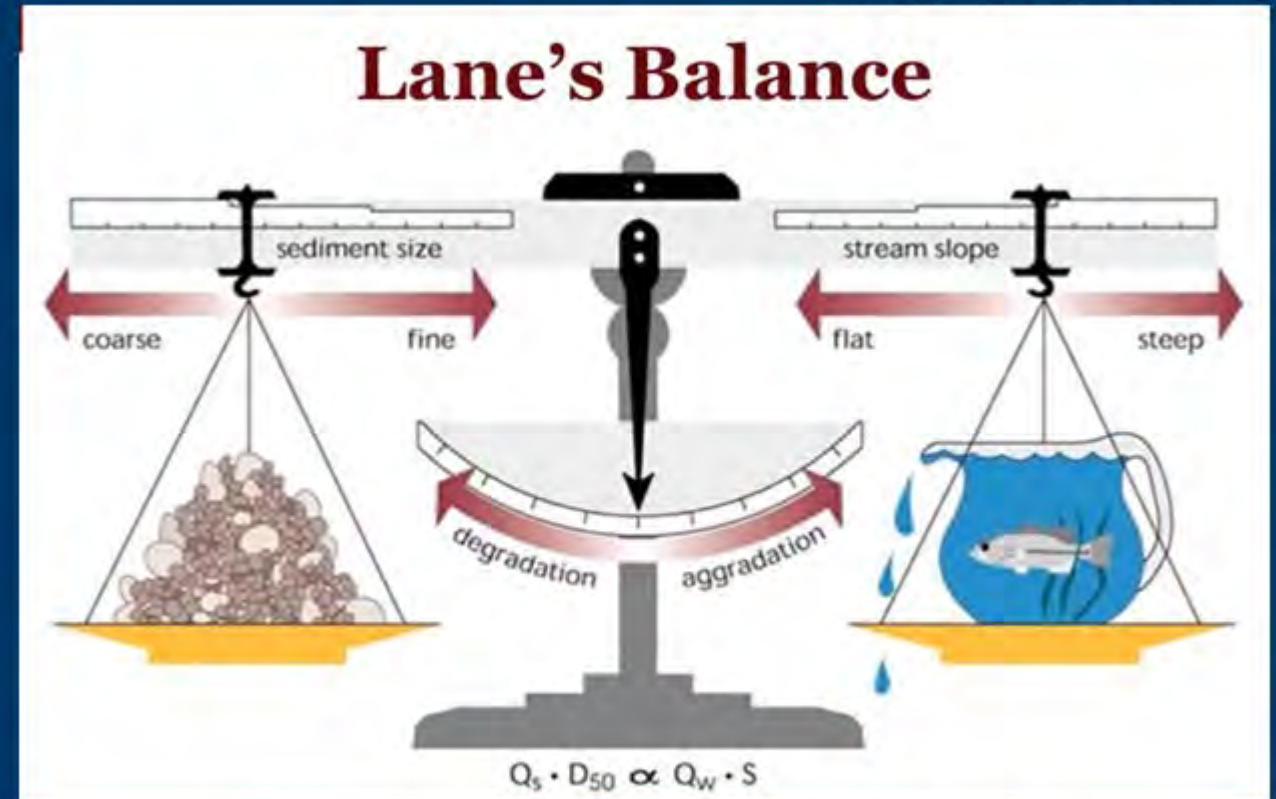
Stable streams are in a state of *dynamic equilibrium*, where the streams are able to maintain a stable shape over time without excessive erosion or sedimentation.

- even as changes occur in the watershed.

Stable streams are dynamic - gradually changing shape as they transport water and erode, transport, and deposit sediment.



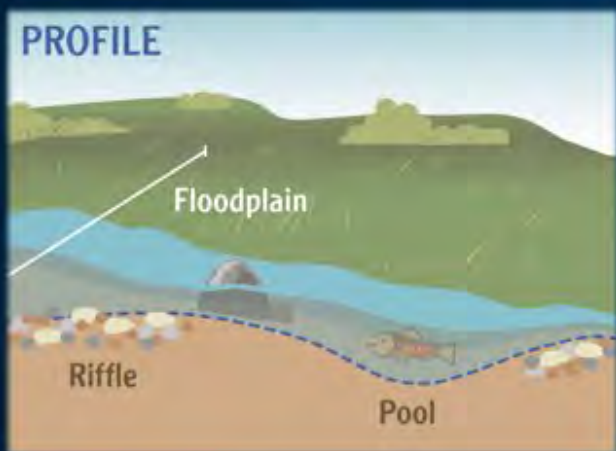
Stream Corridor Restoration Handbook



Q_s = sediment supply
 D = particle size

Q_w = water flow
 S = slope

Dynamic equilibrium



Proper shape

Connected floodplain

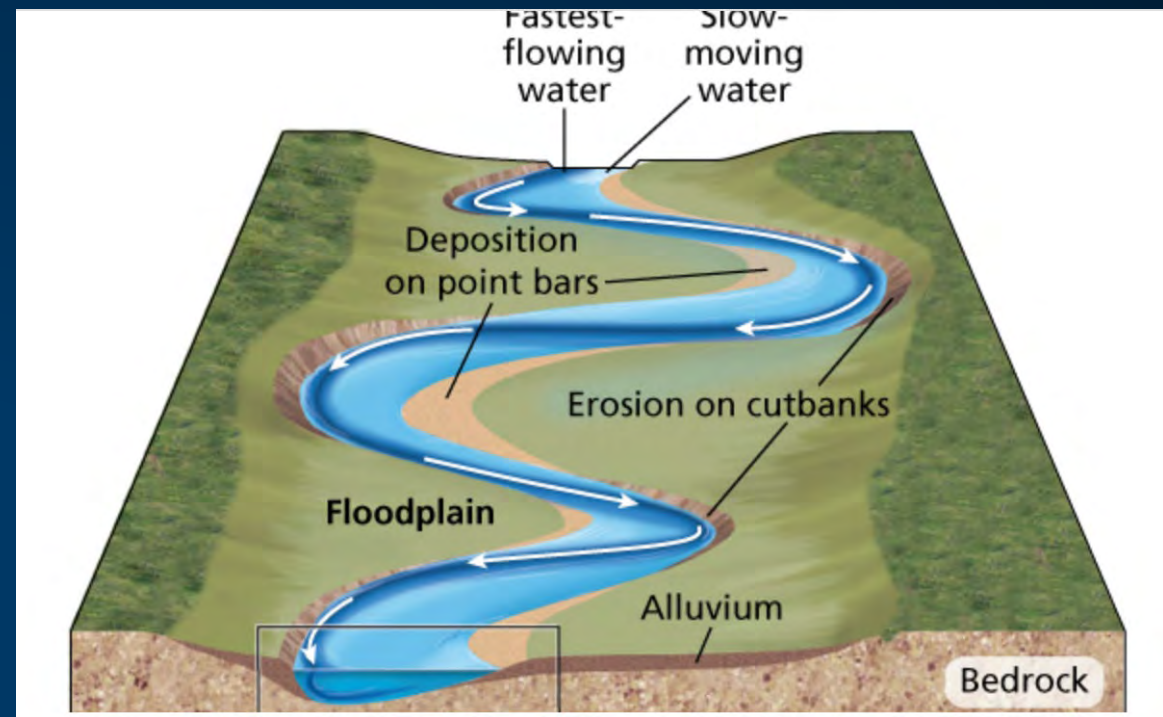
Vegetated riparian zone

Stable streams

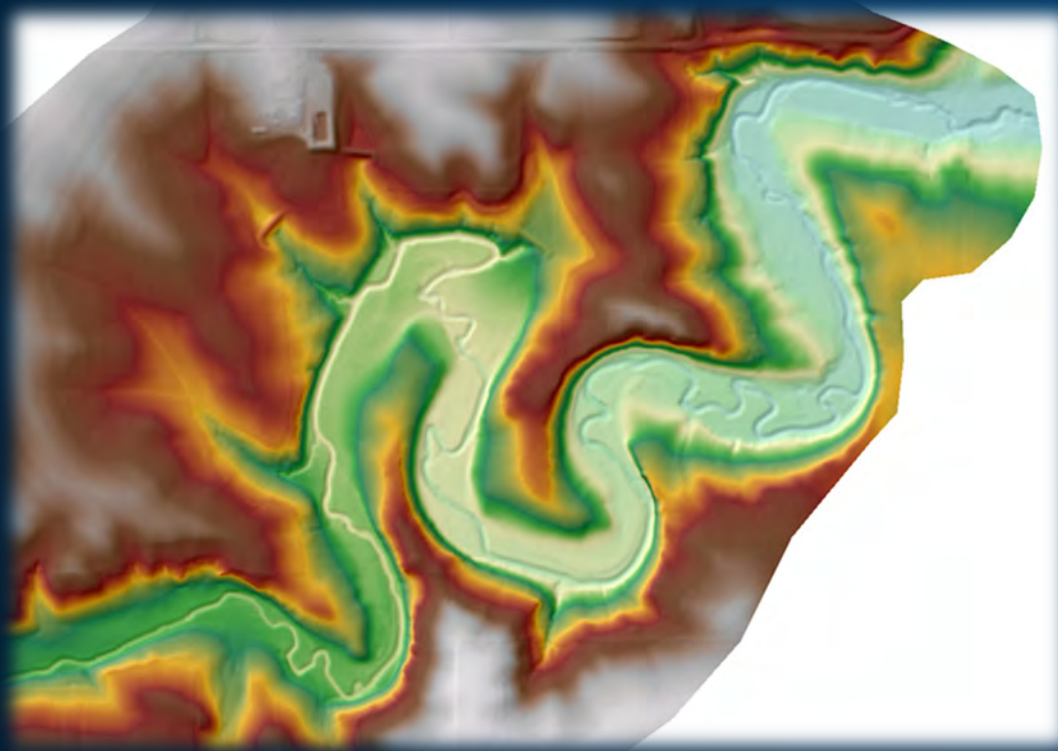
A stream's shape is determined over time through the continuous interaction between water and the landscape.

Rivers and streams of all shapes and sizes have a tendency toward *dynamic equilibrium*, where the energy of the system is expressed in its pattern, dimension, and profile.

Pattern



<https://gotbooks.miracosta.edu/geology/chapter11.html>

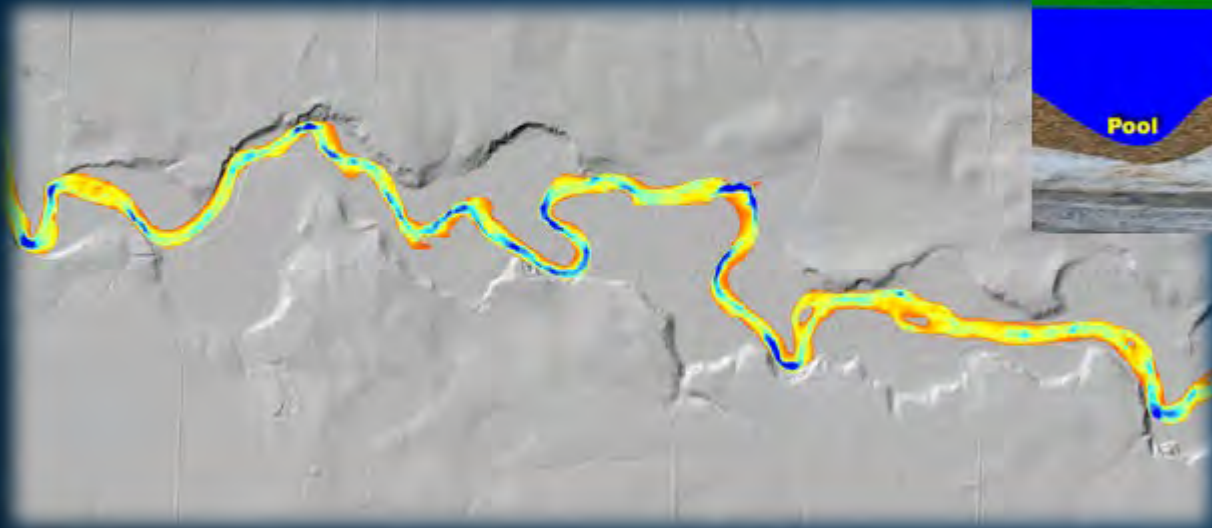


Pattern



Stream features are created and maintained:

- Riffles
- Pools



Riffles are natural grade control

Profile

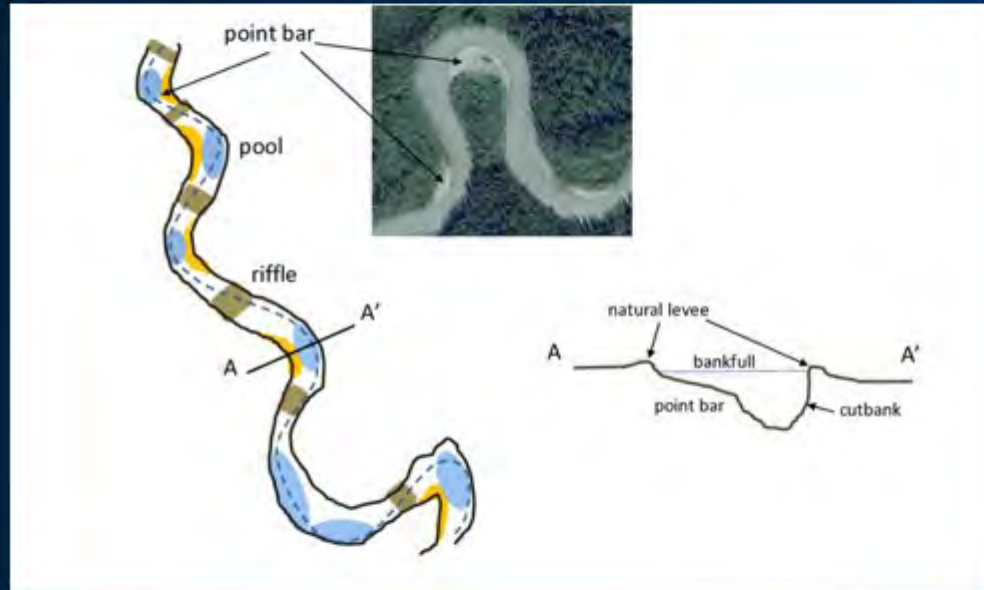
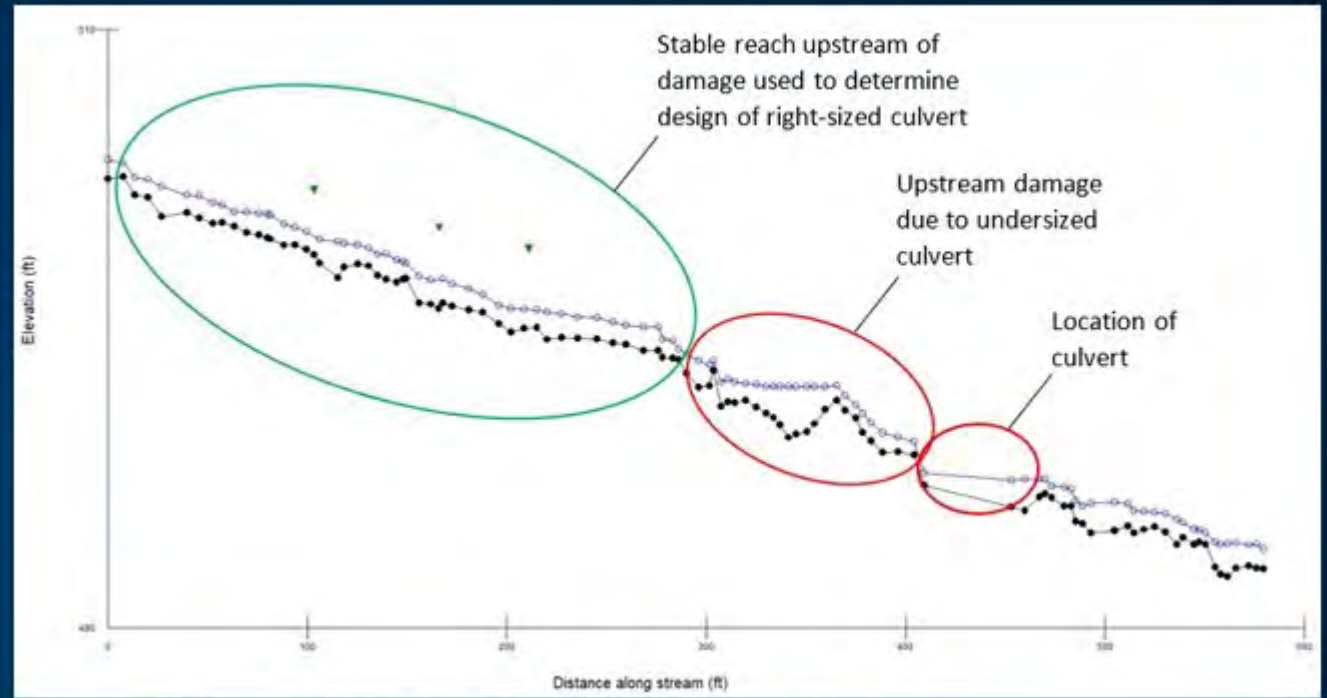
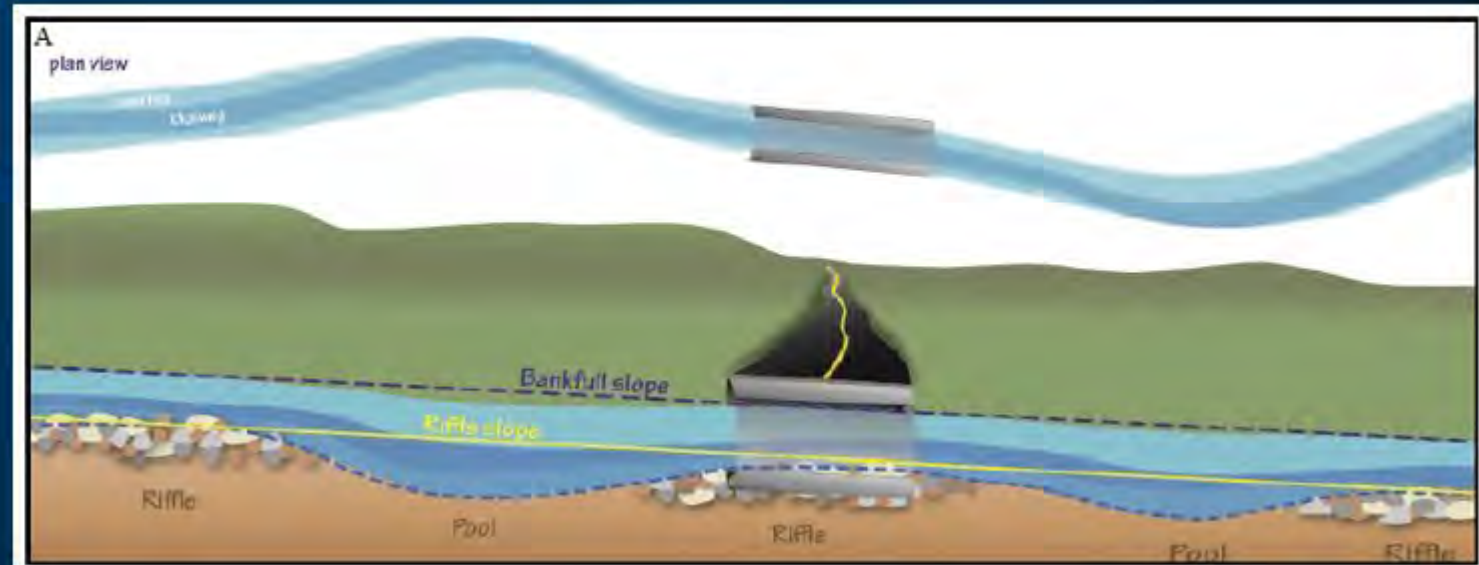


Illustration of locations of pools (blue shading), riffles (brown shading), point bars (orange shading), and thalweg (dashed line) in meandering channels. Cross-sectional view illustrates bend asymmetry. (Wohl et al, 2016)



www.ausabriver.org/blog/creating-climate-ready-culverts-part-1-survey



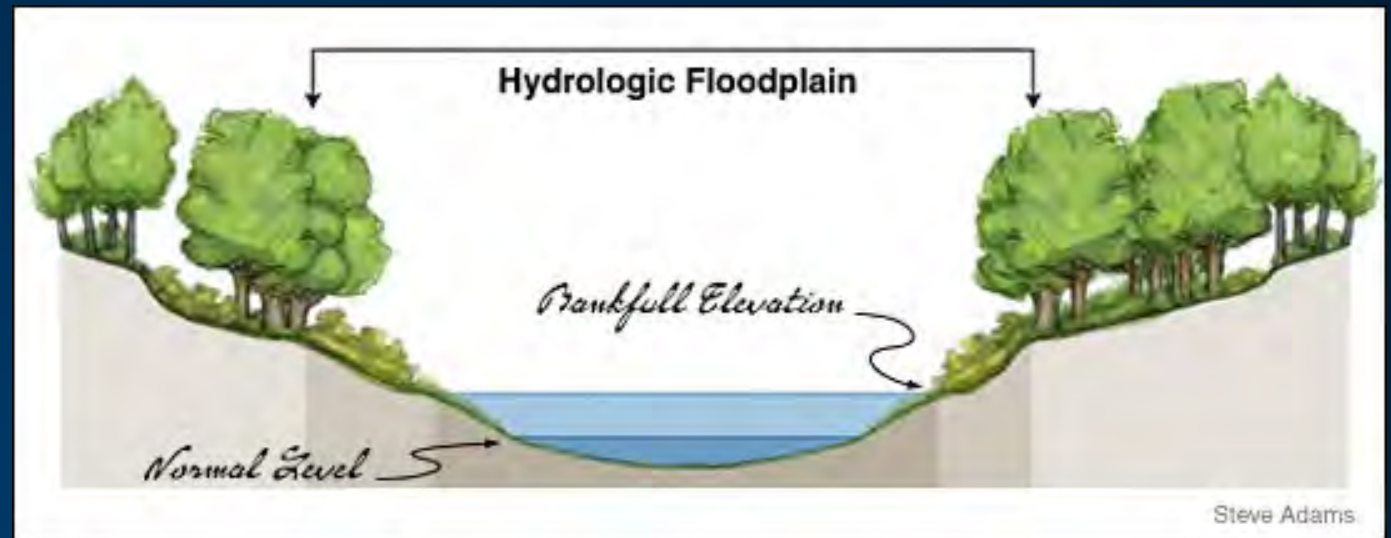
Width and Depth



Bankfull

What is bankfull?

- Water fills the channel and just begins to overflow onto the floodplain
- Is the predominant flood flow



Bankfull flows:

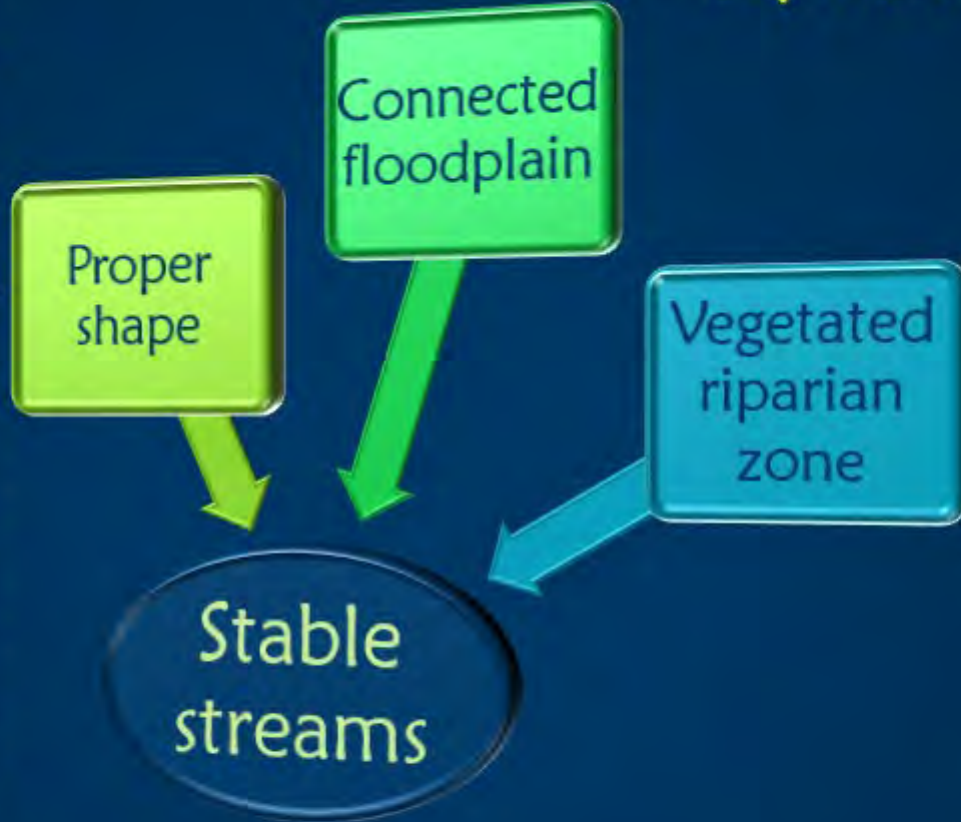
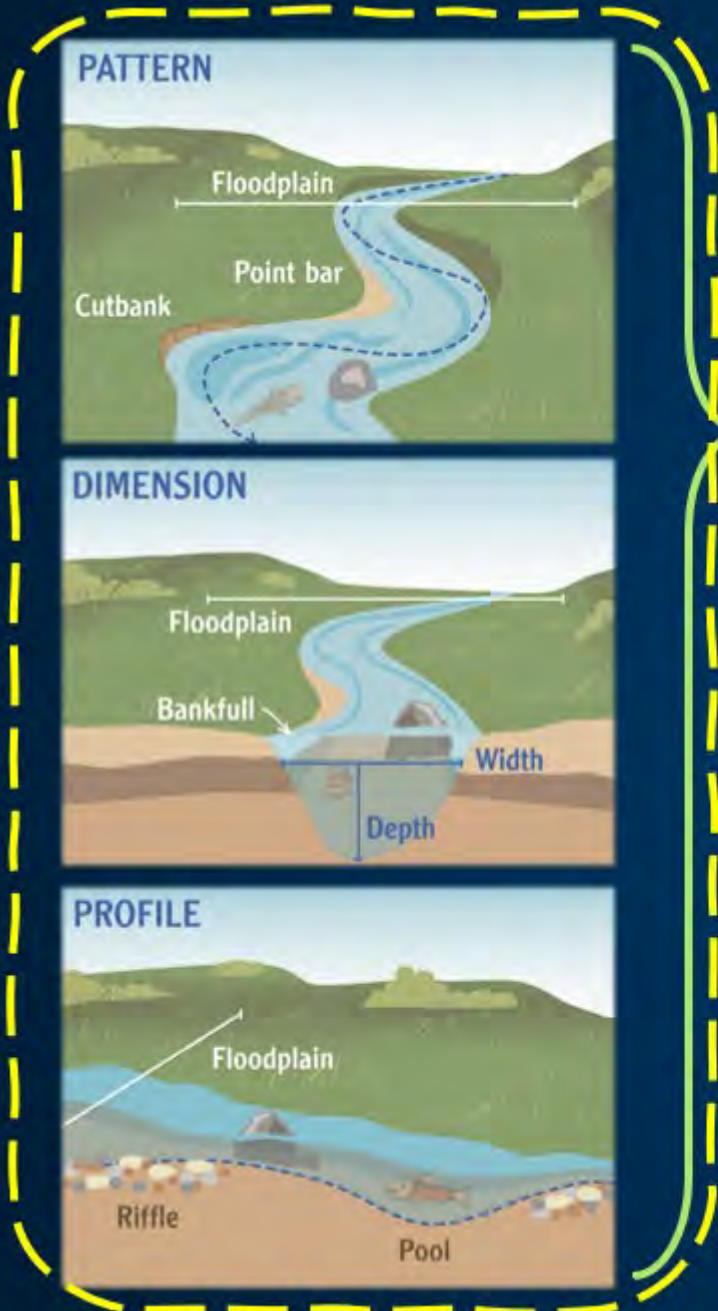
- form and maintain channel shape
- maintain features by
 - scouring fines from pools
 - depositing bedload in riffles
 - actively building depositional flats



www.fws.gov/alaska-culvert-design-guidelines



Dynamic equilibrium



A stream's shape is determined over time through the continuous interaction between water and the landscape.

Rivers and streams of all shapes and sizes have a tendency toward *dynamic equilibrium*, where the energy of the system is expressed in its pattern, dimension, and profile.

Bankfull dimensions



Too narrow
No floodplain connection

Channel width = 40-45 feet
Culverts: 24 feet

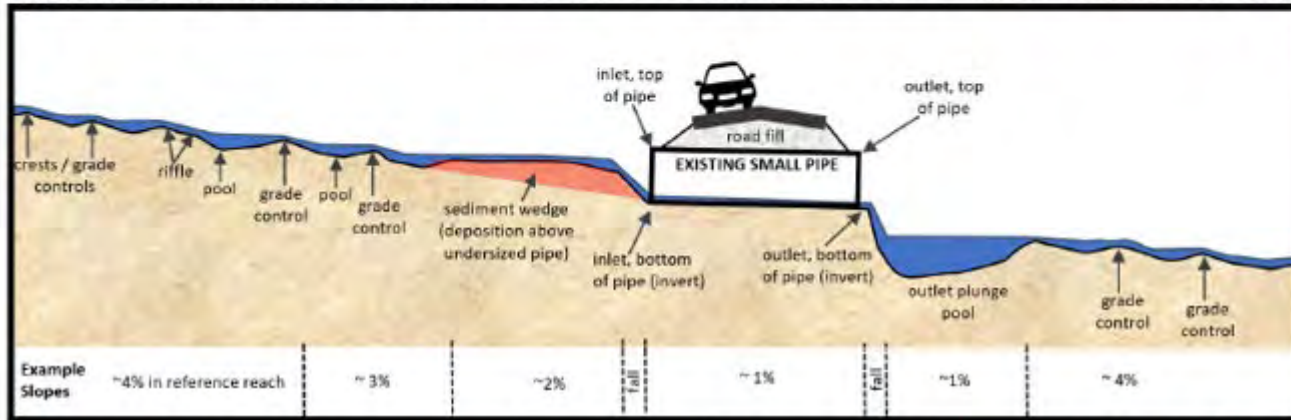
Replaced in 2017
Culverts: 40 feet

Bankfull dimension

Too narrow
No floodplain connection



Typical Existing Undersized Structure Pennsylvania's Dirt, Gravel, and Low Volume Road Maintenance Program, 2022



A "typical" undersized culvert will cause **Aggradation** (Sediment Wedge/ gravel deposition) upstream and a scour hole / plunge pool downstream. It will also alter the slope of the channel, making it flatter near the structure and often causing a vertical offset or drop at the outlet.



P. Leete photo, 2013

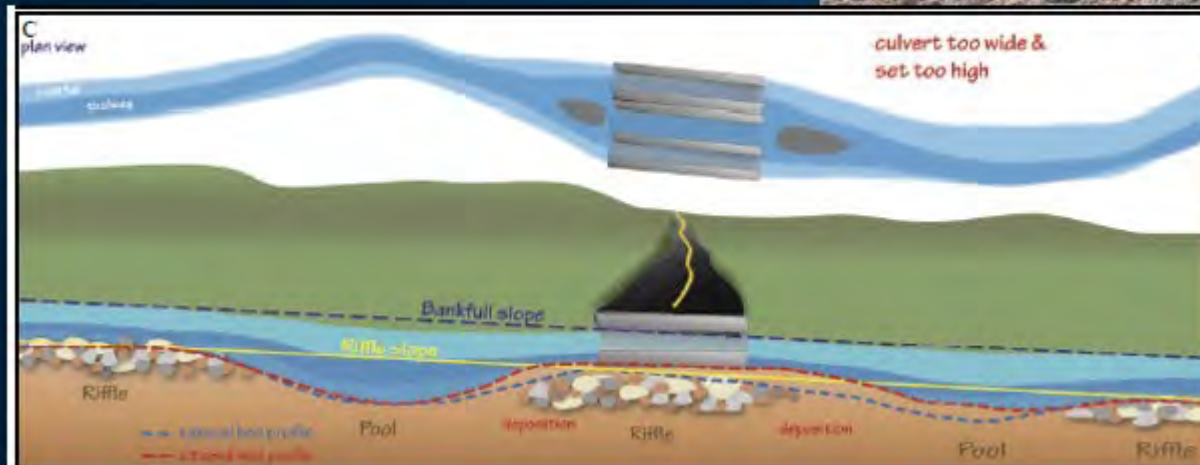


Bankfull width



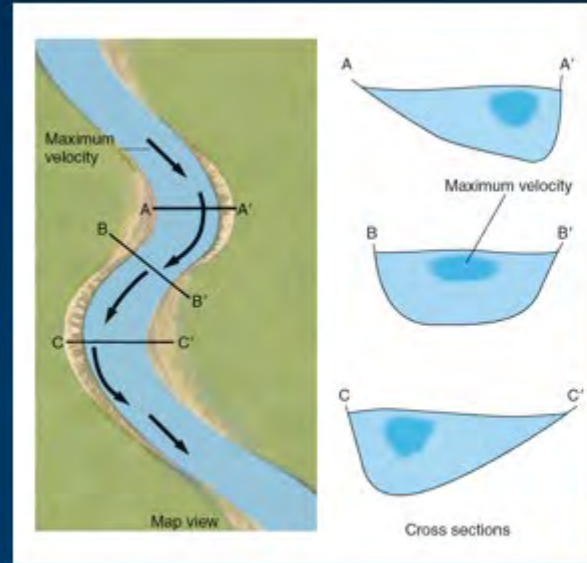
The culvert width is significantly wider than the channel width. (J. Kozarek photo).

Too wide



Channel shape

Thalweg culvert



worlddrivers.net



No low flow feature

Pattern



Alignment

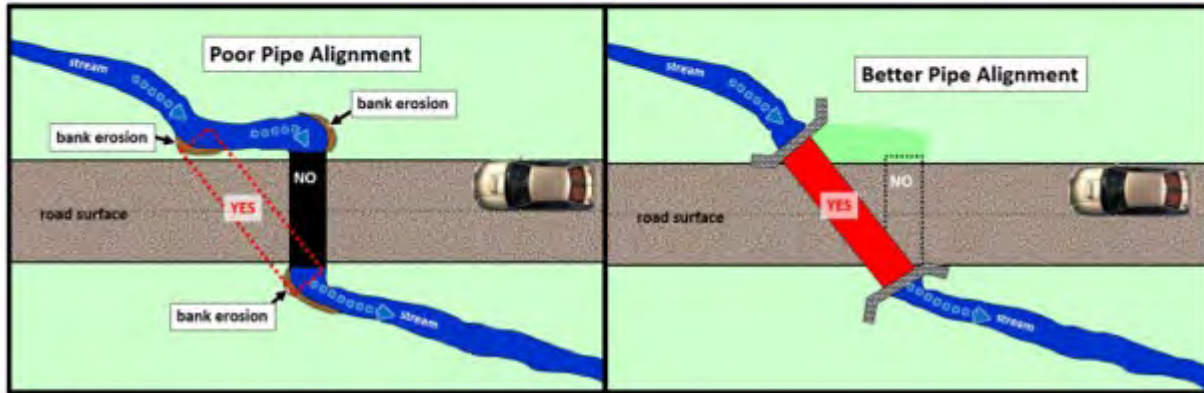
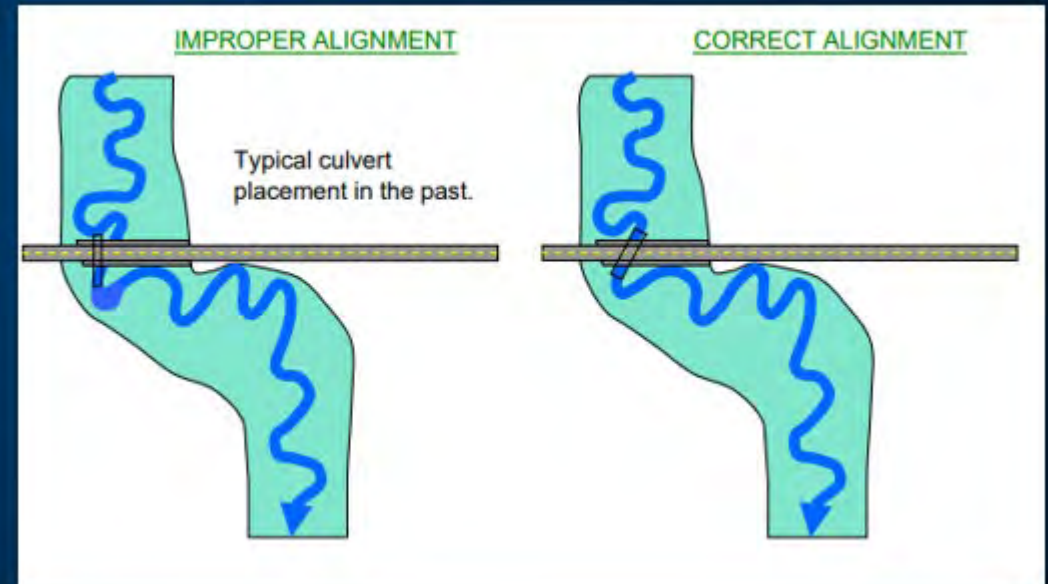


Figure 12.6 Structure Alignment

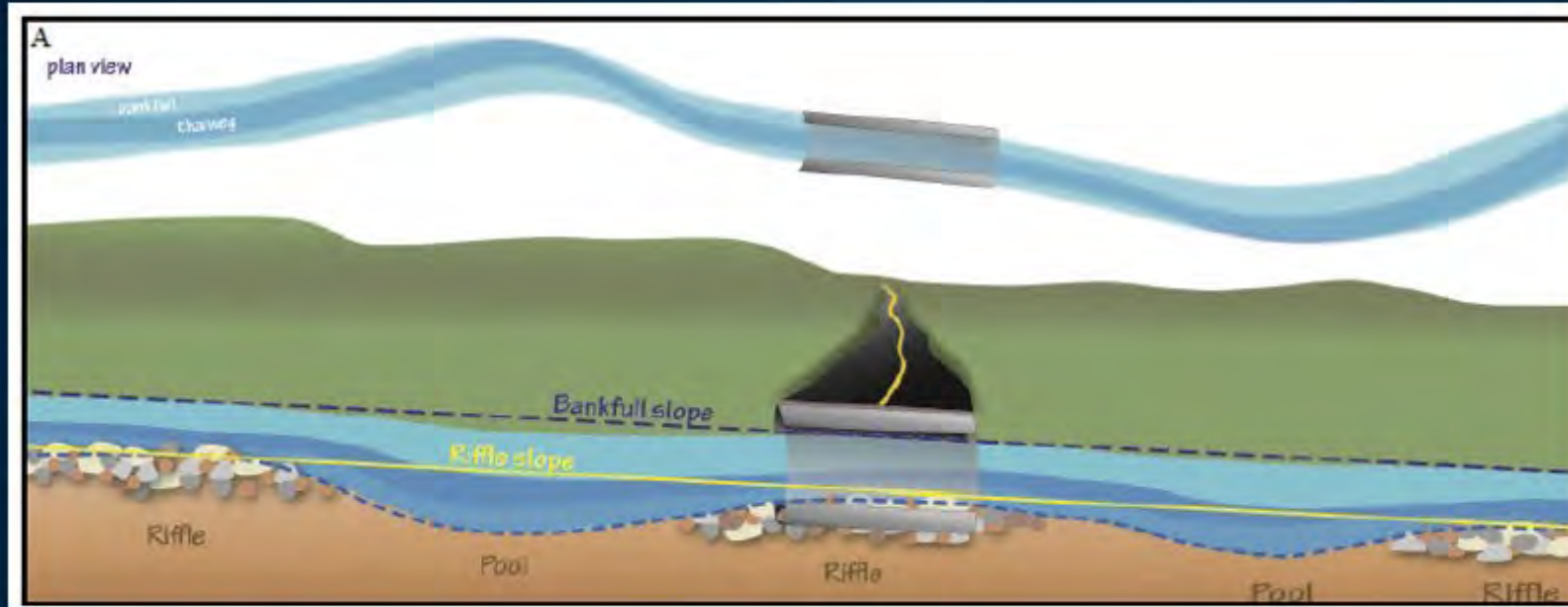
New crossings should be properly aligned with the stream channel if possible.

Pennsylvania's Dirt, Gravel, and Low Volume Road Maintenance Program, 2022

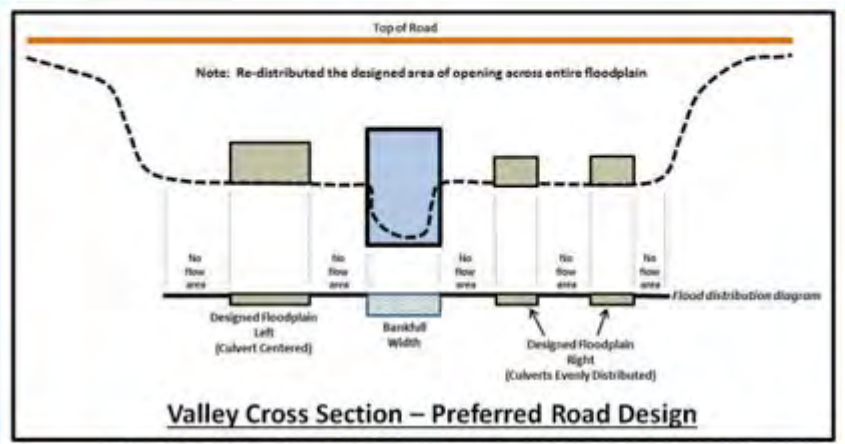


Profile

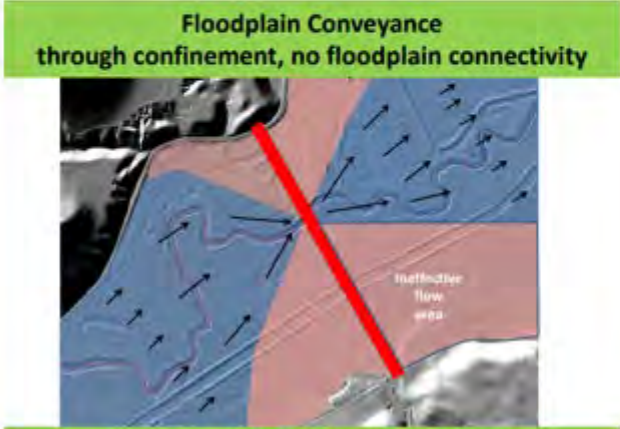
Riffle slope



Floodplain culverts

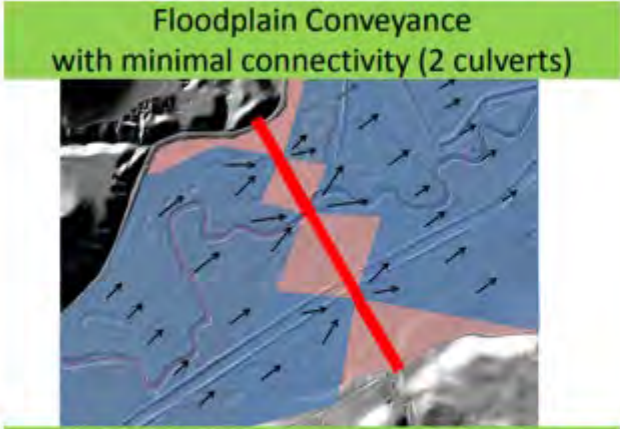


3. Floodplain Culvert Design: road bisecting the floodplain, but with floodplain culverts



Typical Approach to increasing conveyance

Figure 50: Present day Design promoting FFC. Blue depicts effective flow area.



Preferred Approach: address floods on floodplain

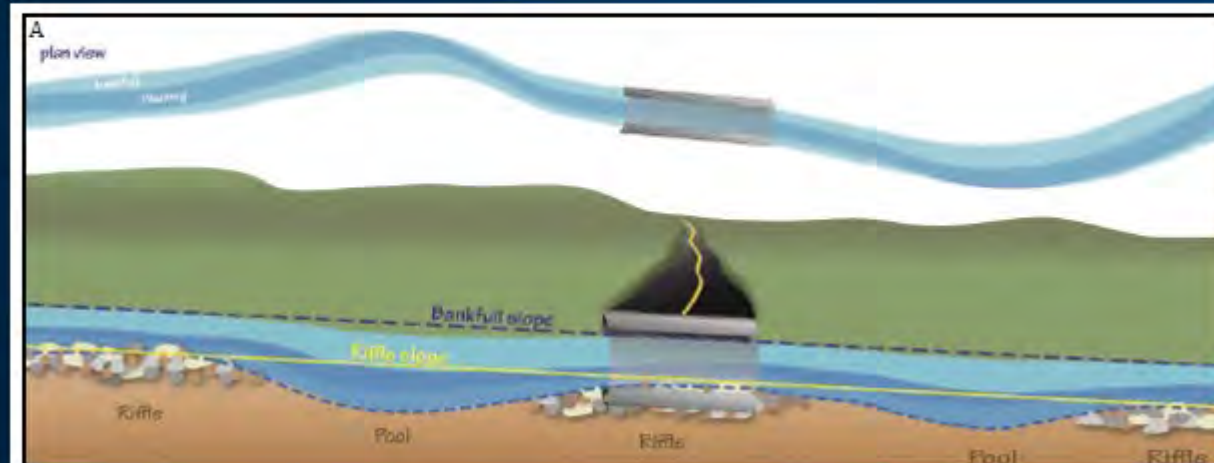
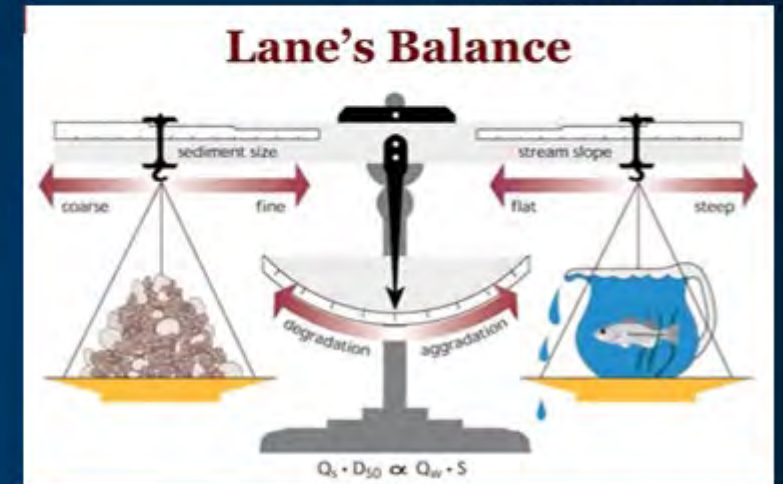
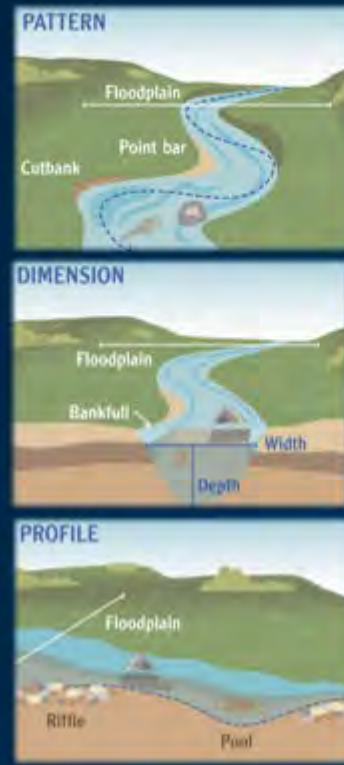
Figure 51: Preferred design to quantify and improve effective flow area (blue area)



Floodplain access

Dynamic equilibrium

Stream Corridor Restoration Handbook



Maintain continuity of channel shape: pattern, width & depth, and slope through the road crossing.



Culvert Fundamentals and Watershed Barrier Priority

Brian Mason | River Ecologist

Impacts from Fragmentation – Culverts

Connectivity

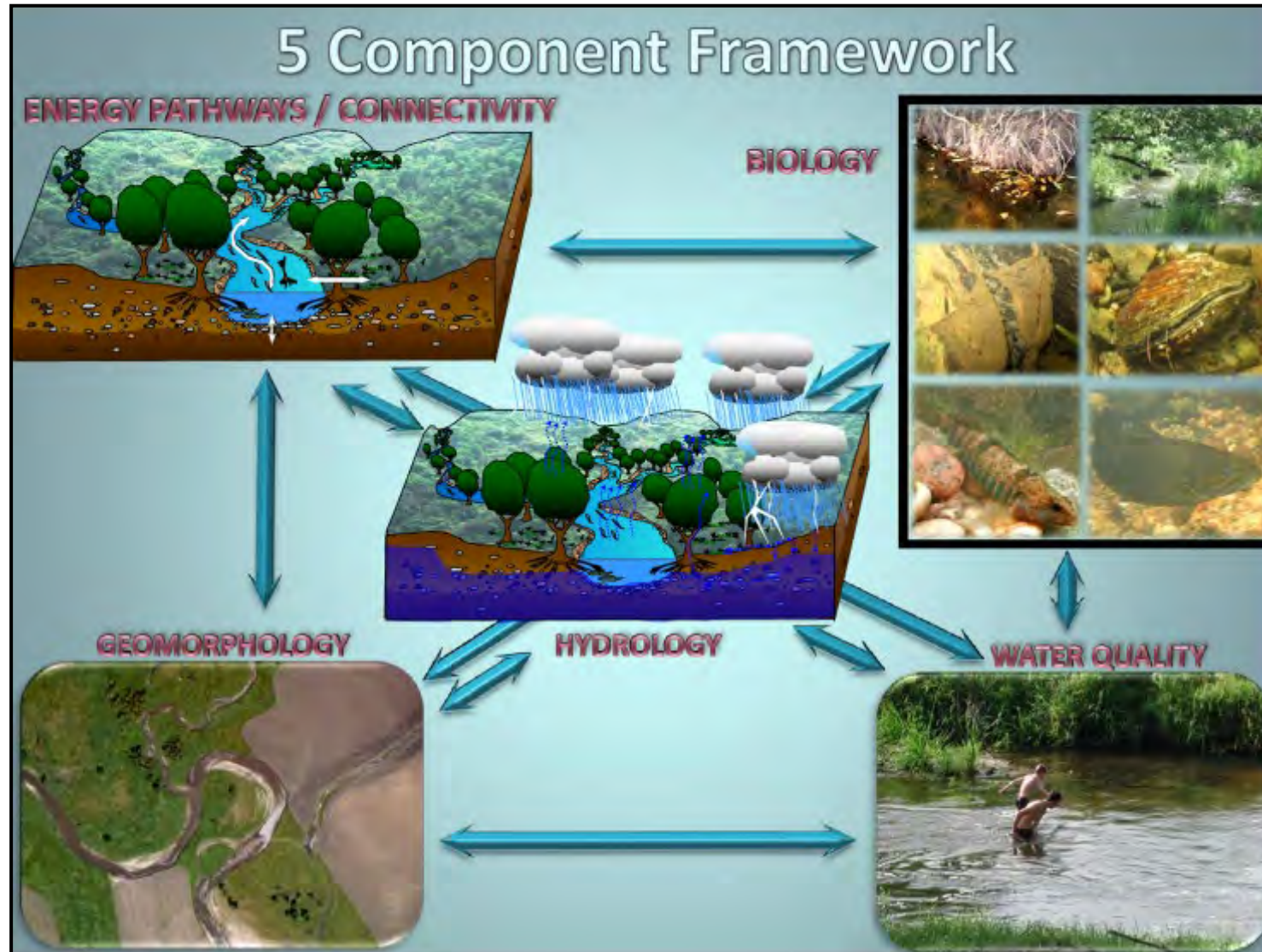
- Floodplain.
- Longitudinal fish passage.

Biology

- Inhibit life cycles.
- Alter gene flow.

Geomorphology

- Sediment transport.
- Erosion.



Water Quality

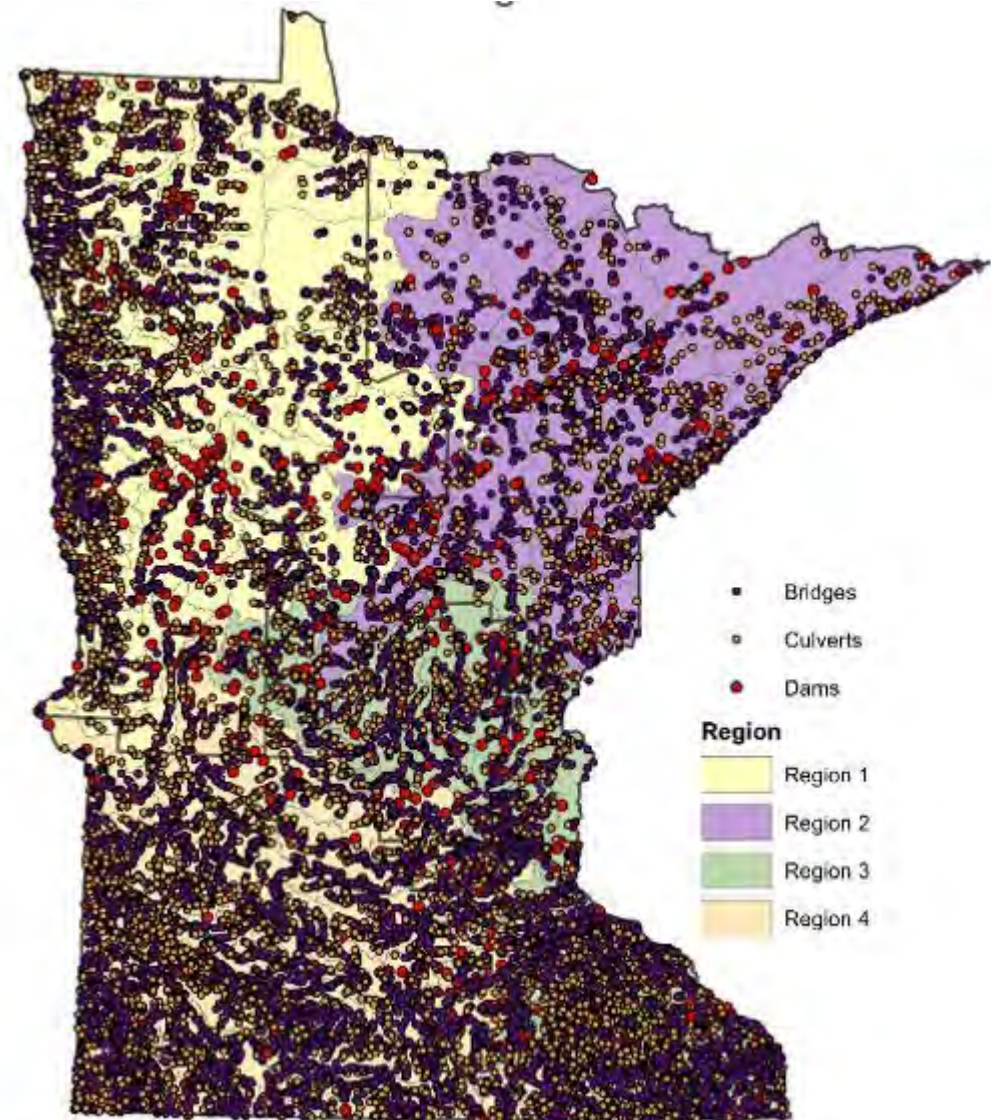
- Impact turbidity (Erode sediment or deposition basins).
- Increases temps (Backwater ponds).

Hydrology

- Alter flow regimes, velocity and depth of the stream.
- Act as a dam (Backwater).

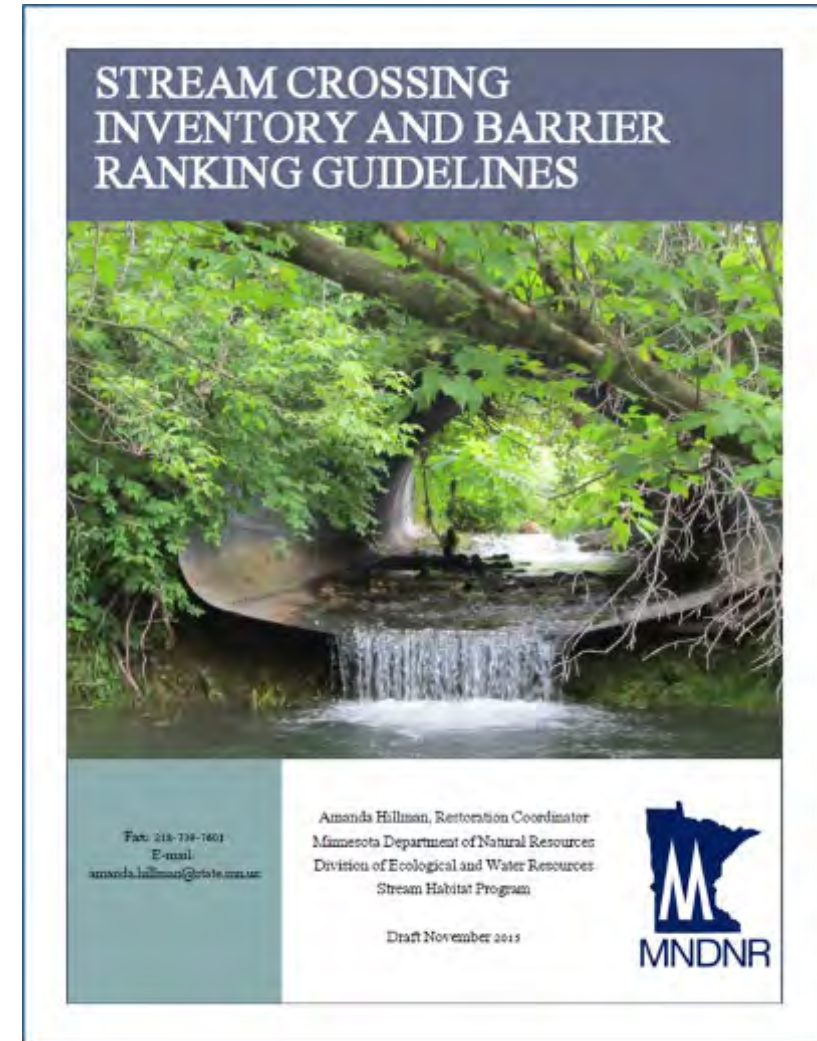
Statewide Barrier Inventory Program

- Crossings in Minnesota:
 - Bridges (DOT) – 9,540
 - Culverts (DOT) – 8,150
 - Dams (NDI) – 1,329
- Limited comprehensive database.
- No information on private crossings.
- Limited info on barrier or impairment status.



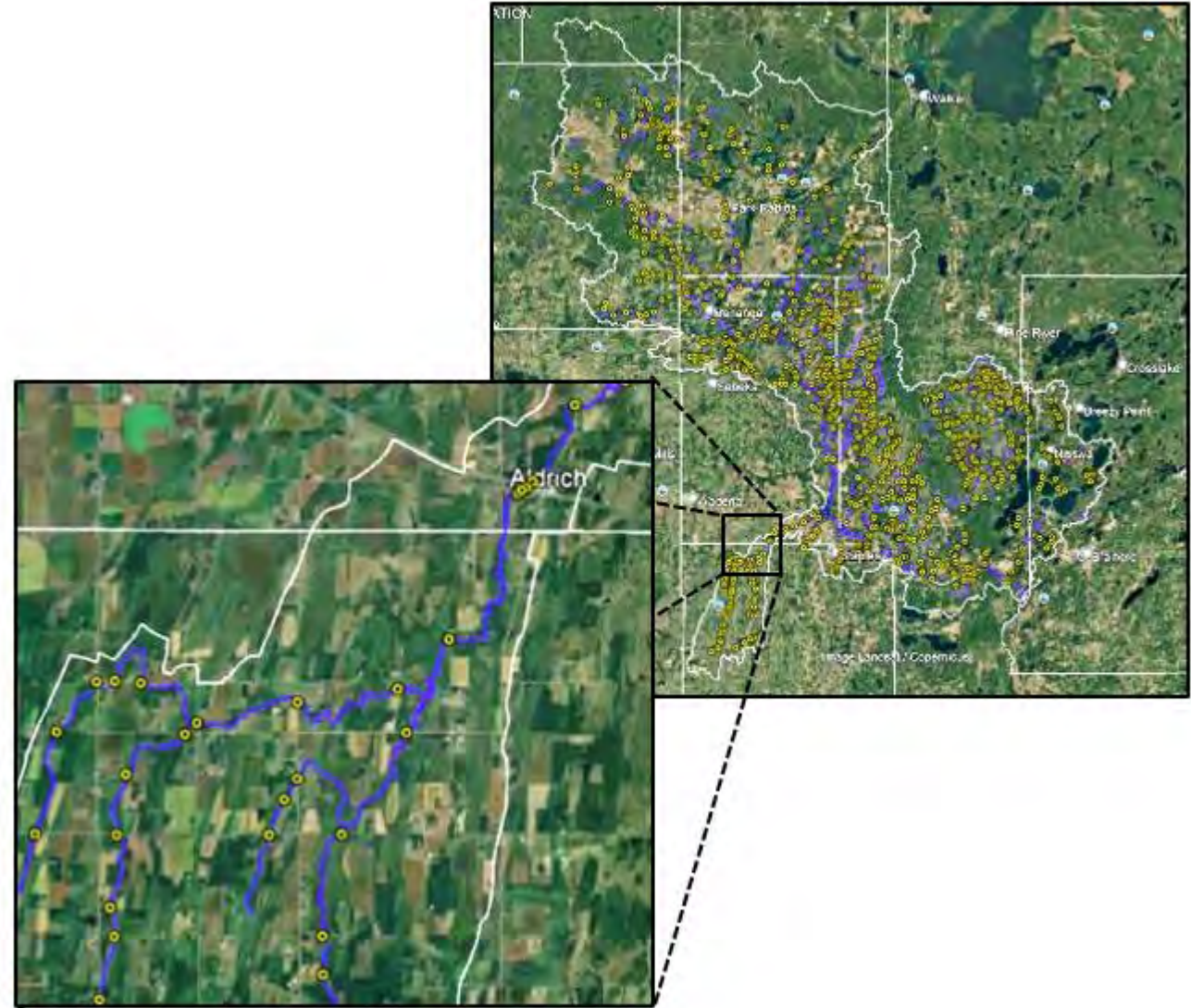
Statewide Barrier Inventory Program

- **Objective 1:** Create a statewide inventory of stream crossings/barriers.
- **Objective 2:** Collect the data necessary to rank crossings based on severity of impairment.
- **Objective 3:** Establish a priority list for replacement and/or renovation projects.



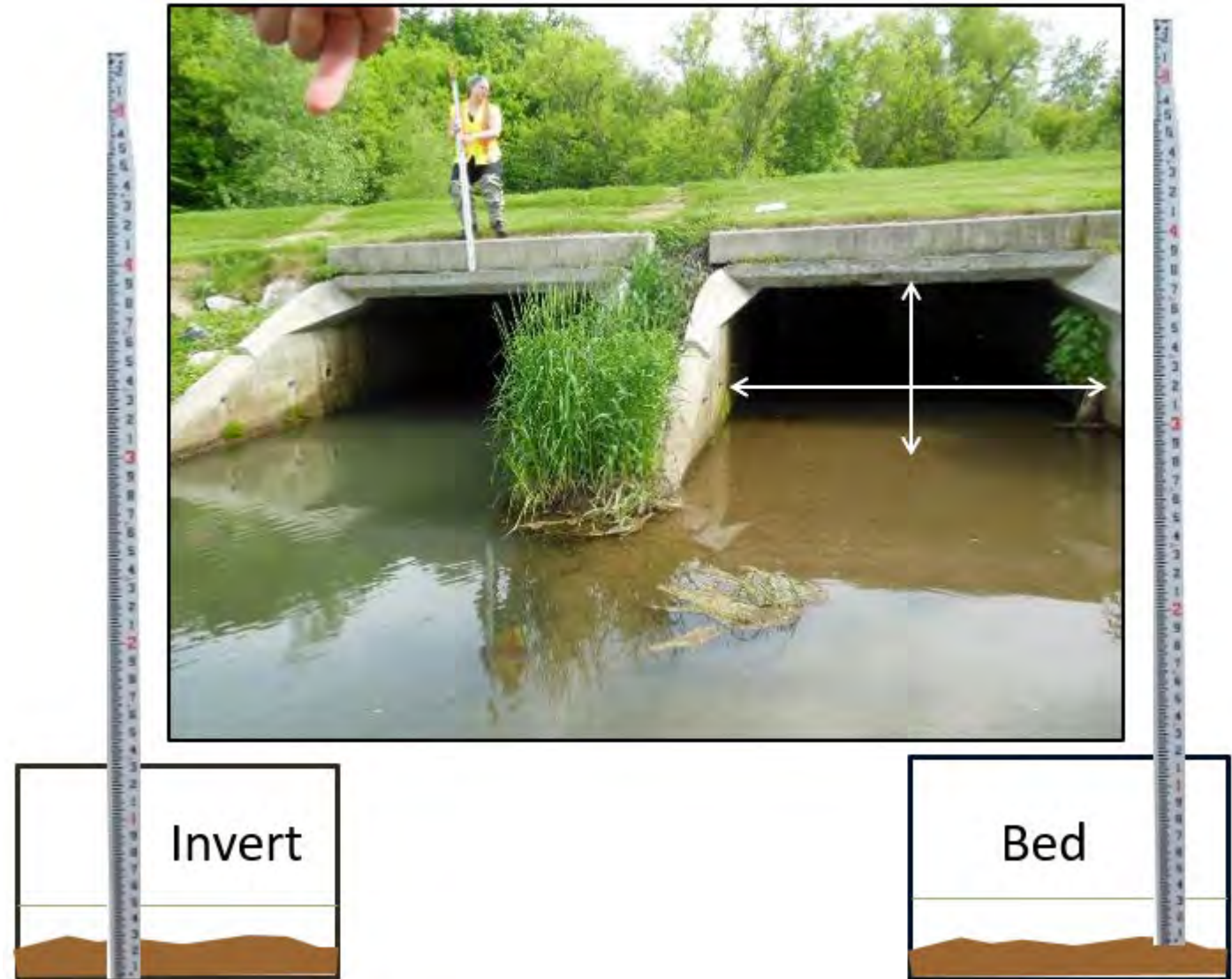
Statewide Barrier Inventory Program – Methods

- Site digitization done largely by hand.
- Use stream road crossing inventory to start.
- Private crossings determined via aerial imagery (google earth at 1:2500 scale).



Statewide Barrier Inventory Program – Methods

- Thing recorded during surveys.
 - Culvert type, material, opening design.
 - Length, width, height.
 - Upstream and downstream inverts and sediment elevations.
 - Water elevations upstream and downstream.
 - Bankfull width (aerial imagery).
 - Pictures of the crossing.



Statewide Barrier Inventory Program – Methods

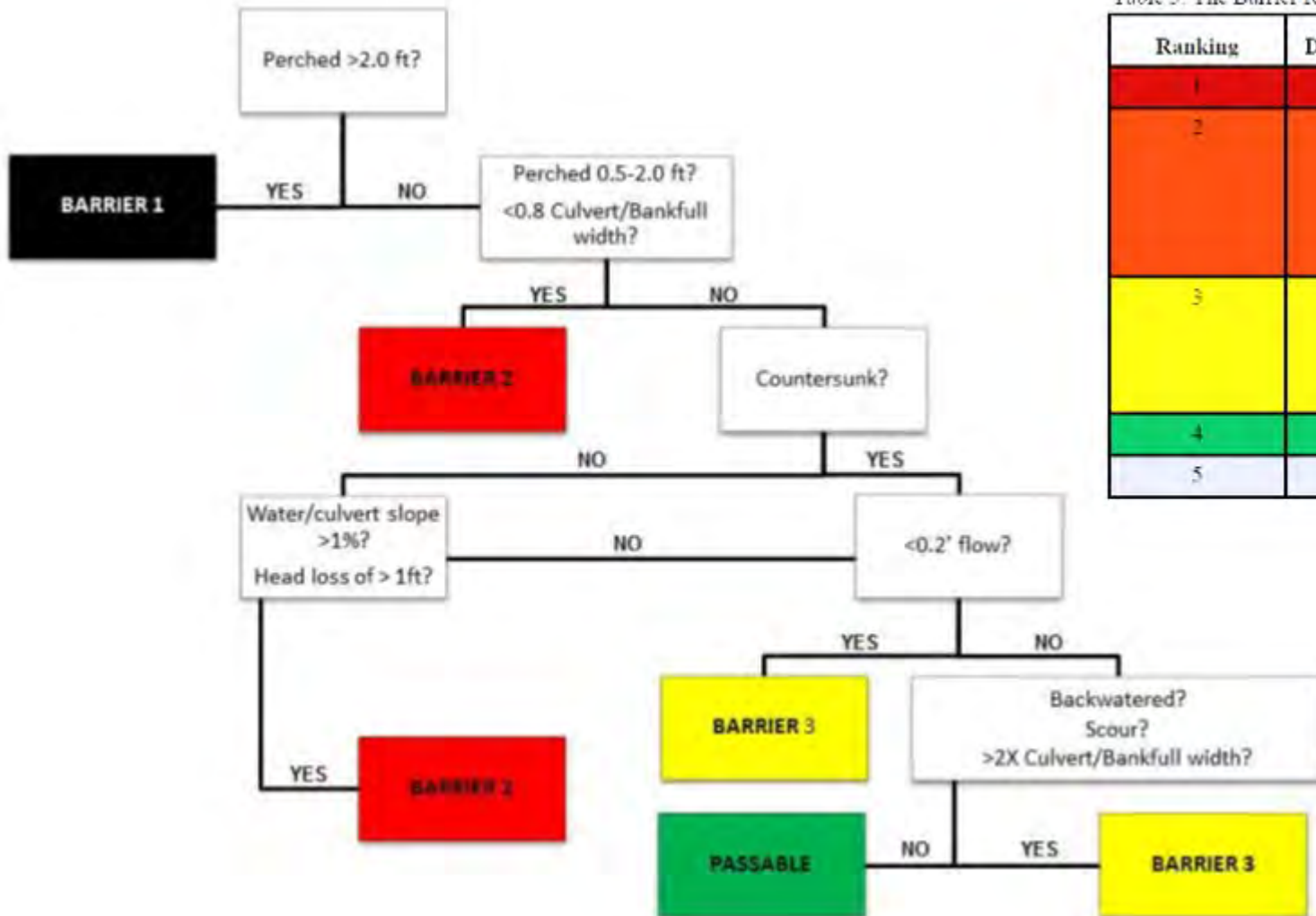


Table 3: The Barrier Ranking Categories and Parameters used for each level

Ranking	Degree of Barrier	Parameters Characterizing Barrier Type
1	Complete	>2.0 ft perched (Asifland, personal communications, September 9th, 2014)
2	Significant	0.5-2.0 ft perched (WDFW 2000, USFS et al. 2011) <0.8 sizing width ratio (constricted) Not countersunk and one or both: •Water/Culvert Slope >1% (WDFW 2000) •Headloss of > 1.0 ft
3	Partial-Seasonal	Water depth <0.2 ft (USFS et al. 2011) Upstream Pool or evidence of backwatering (USFS et al. 2011, Verry 2011) Downstream scour pool (USFS et al. 2011) >2.0 sizing width ratio (overwide)
4	Passable	No parameters exceed set limits
5	Dry	No data collected at dry crossings

Problem Culverts - Perched Culverts

Complete Barrier:

- Perched 2 feet or higher.

Significant Barrier:

- Perched less than 2 feet.

Creates artificial waterfall

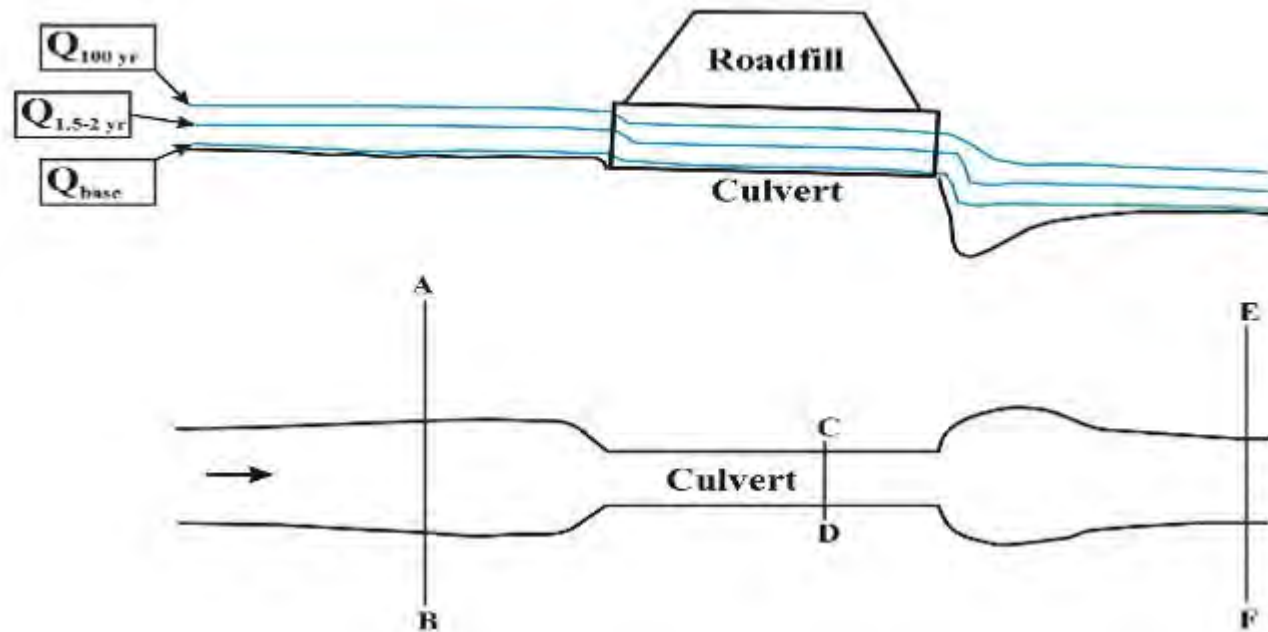
- Can be severe or mild.
- Almost always a fish passage issue for some species.



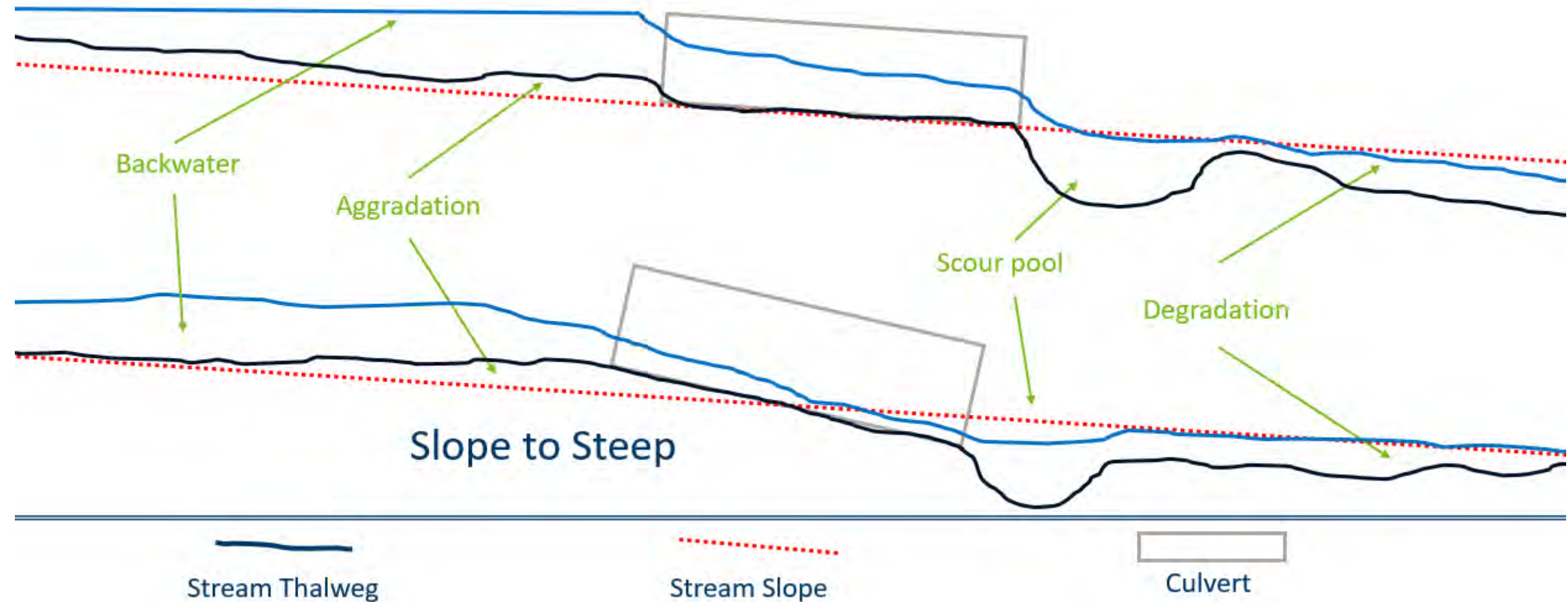
Problem Culverts - Too Narrow

Significant Barrier:

- Total span less than 50% estimated Bankfull width.
 - Often causes backwater and scour pools.
 - Creates velocity barrier for fish.



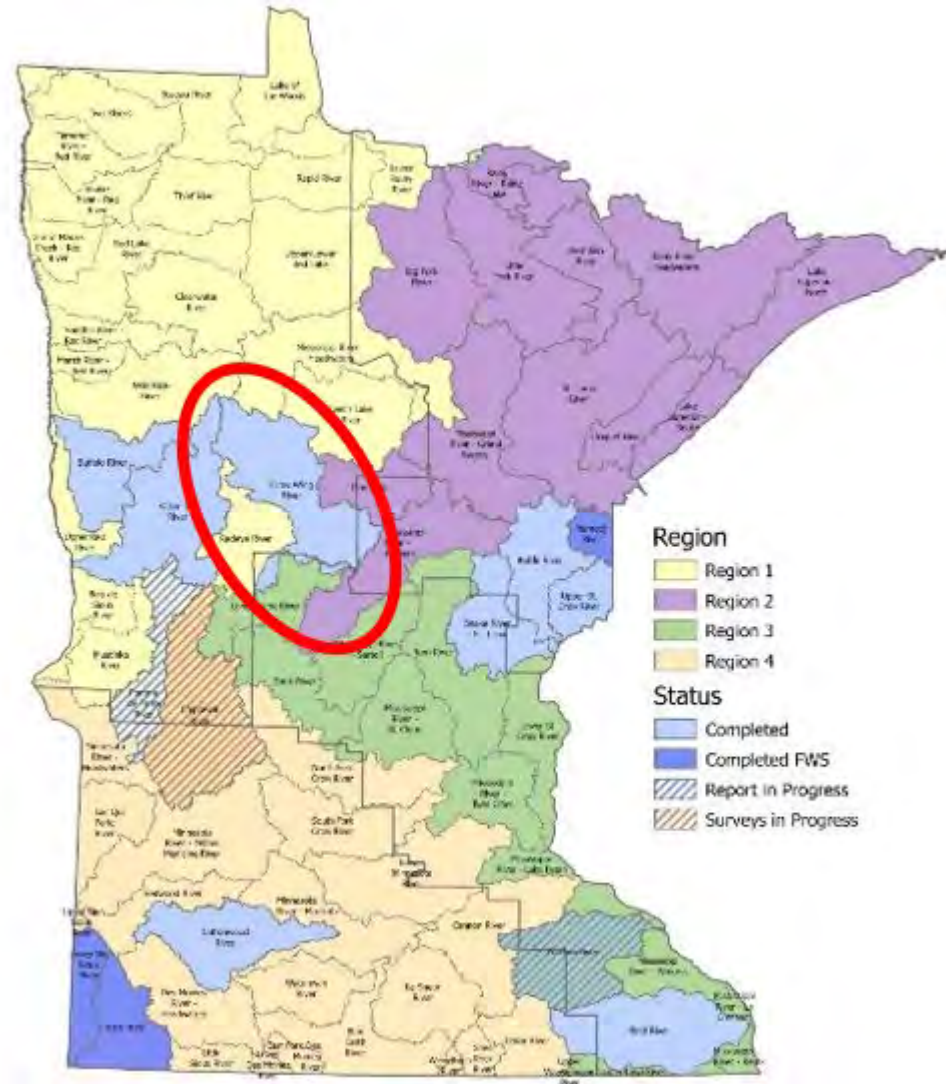
Problem Culverts – Size and Slope



Problem Culverts - Velocity Barrier



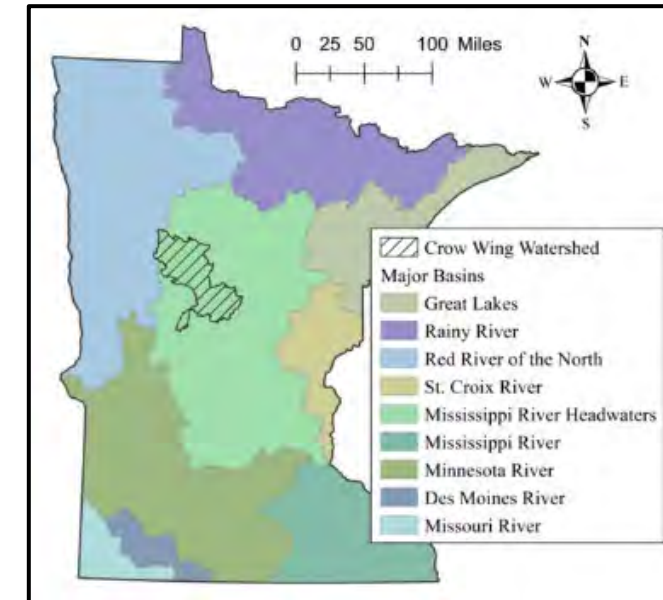
Statewide Culvert Inventory – Watersheds Surveyed



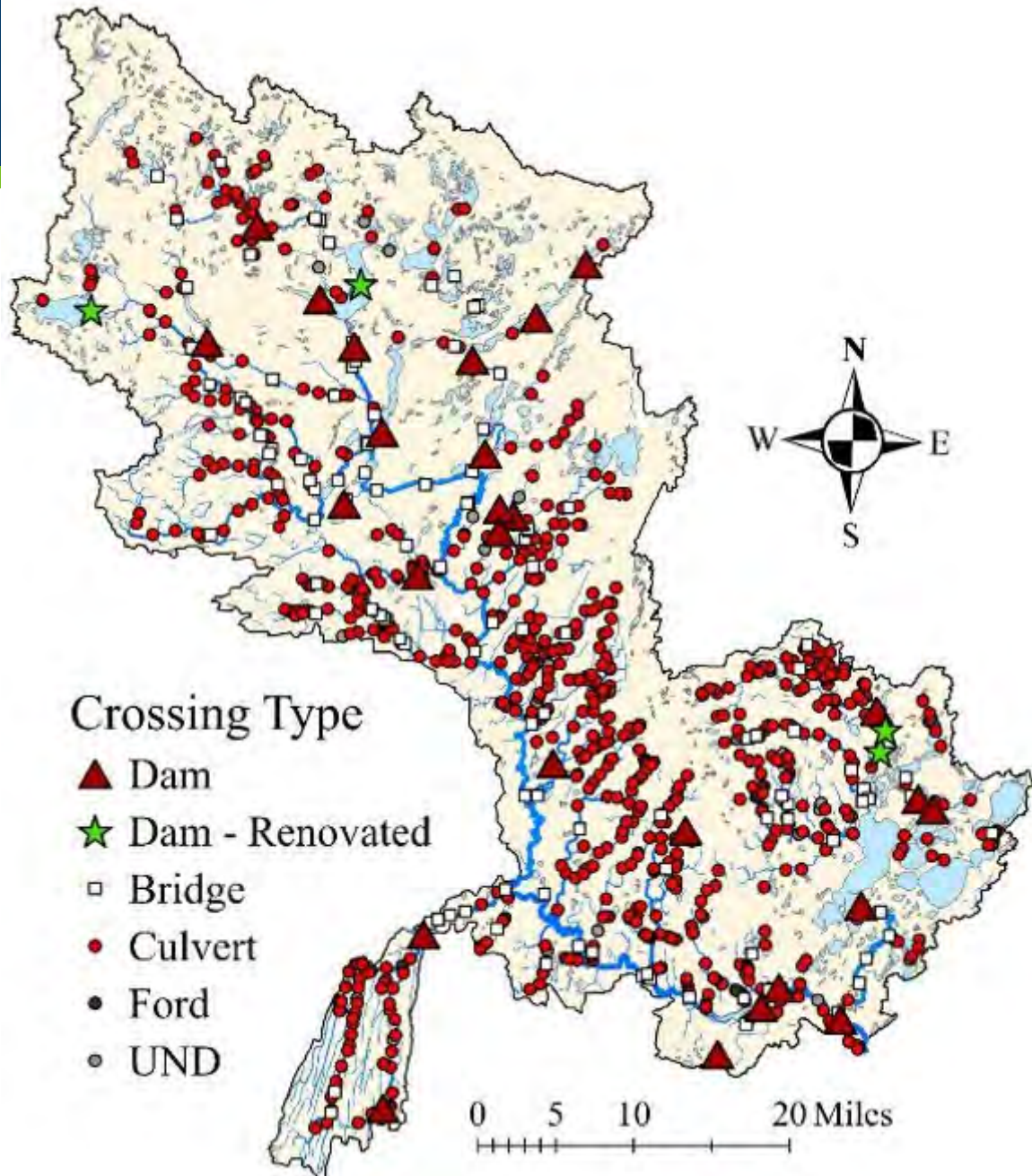
Crow Wing Watershed

Watershed Information

- Area: 1,964 sq. miles.
- The Crow Wing River and its tributaries make up a combined 1,653 river miles.
- Land use (2012): 40% forest, 24% Wetland, 11% pasture or hay, 11% cultivated, 6% open water and 5% developed.
- The Crow Wing River joins the Mississippi Southeast of Brainerd, MN near Crow Wing State Park.
- Data was collected from:
 - 2012-2024 DNR Fisheries
 - 2019 -2024 EWR staff



Crow Wing Watershed



- **Inventory of Crossings**

Crossing Type	Number of Sites	% of Total Sites (942)
Dams	26	2.8%
Renovated Dams	4	0.4%
Bridges	123	13.1%
Fords	15	1.6%
Culverts	723	76.8%
Insufficient Data (UND)	51	5.4%

Statewide Barrier Inventor Program

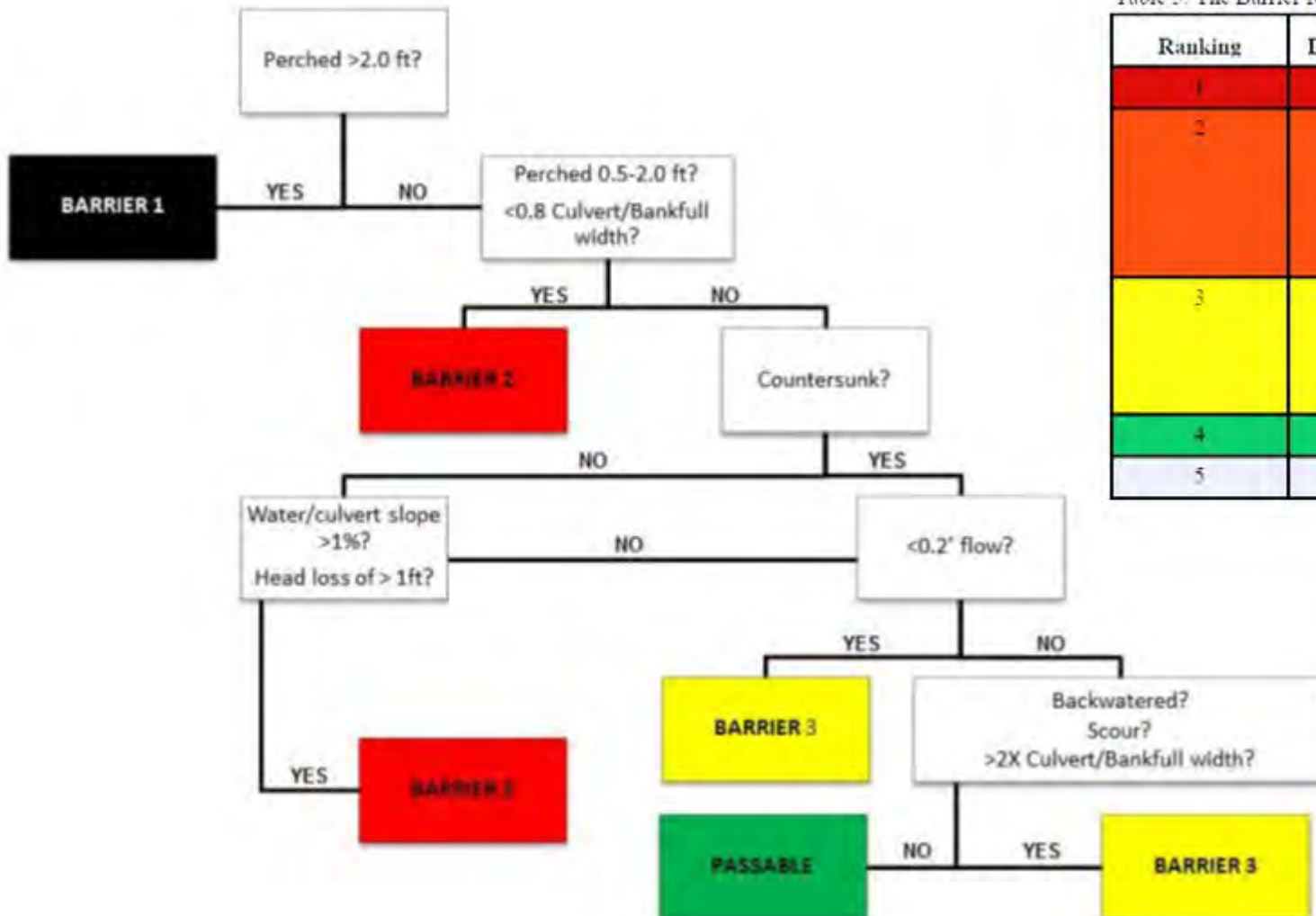
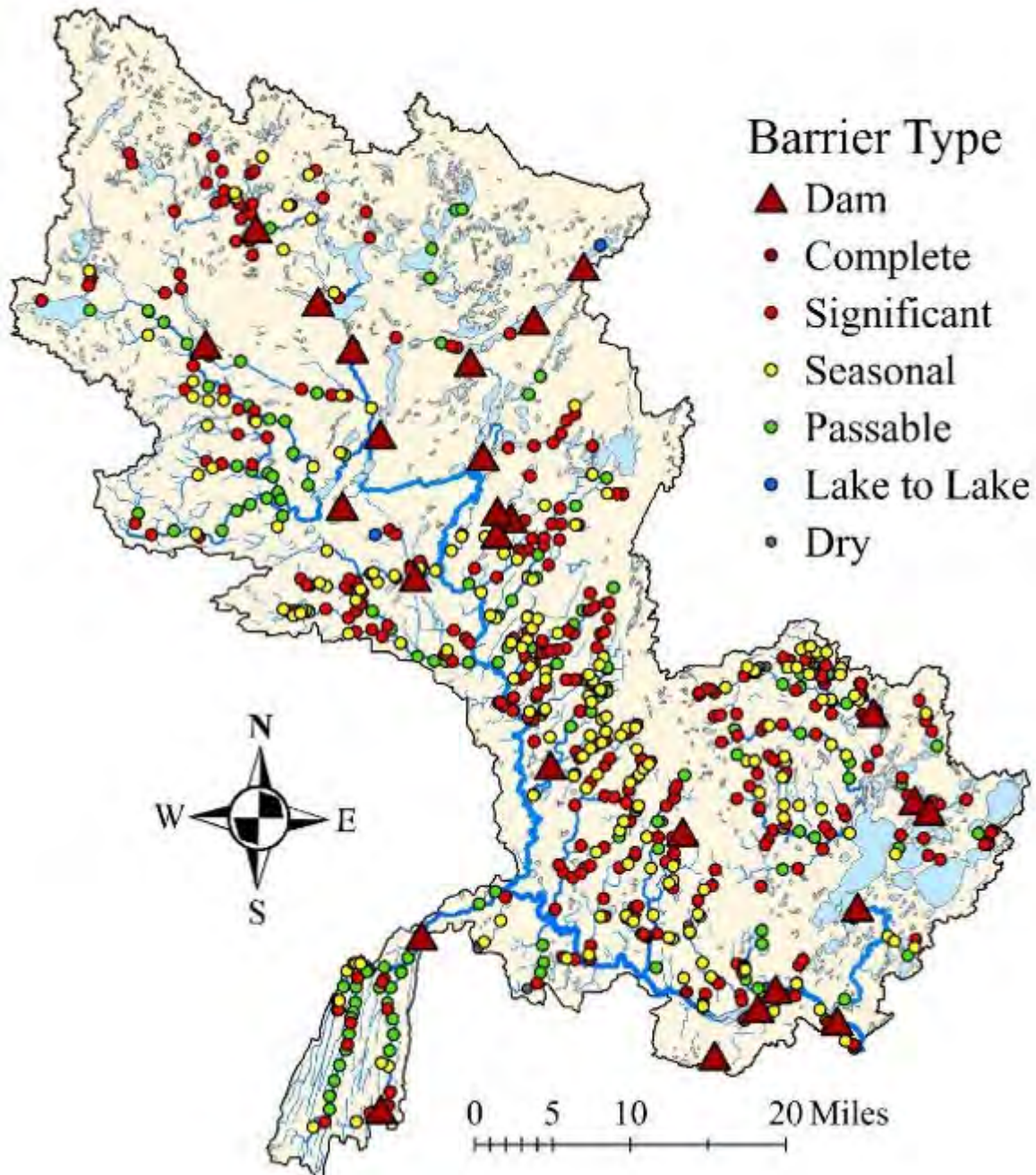


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3	Partial/Seasonal	Water depth <0.2 ft (USFS et al. 2011) Upstream pool or evidence of backwatering (USFS et al. 2011; Verry 2011) Downstream scour pool (USFS et al. 2011) >2.0 sizing width ratio (overwide)
4	Passable	No parameters exceed set limits
5	Dry	No data collected at dry crossings

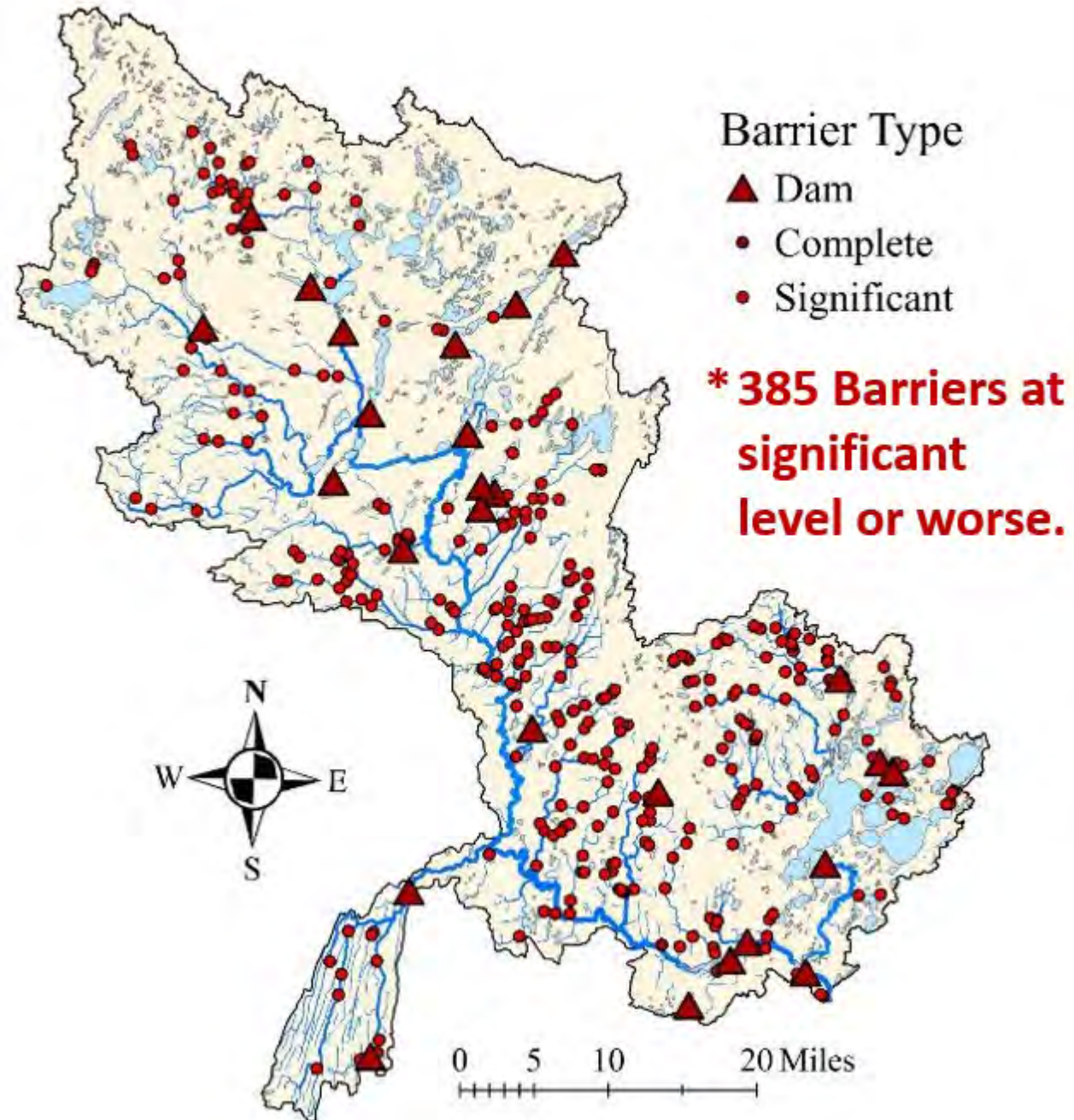
Crow Wing Watershed



• Barrier Severity Ranking

Ranking Level*	Number of Dam and Culvert (753) Sites	% of Total Crossings
Dams	26	3.5%
Level 1 (complete barrier)	2	0.3%
Level 2 (significant barrier)	357	47.4%
Level 3 (partial or seasonal barrier)	195	25.9%
Level 4 (passable)	157	20.8%
Lake to Lake	4	0.5%
Dry	12	1.6%

Crow Wing Watershed

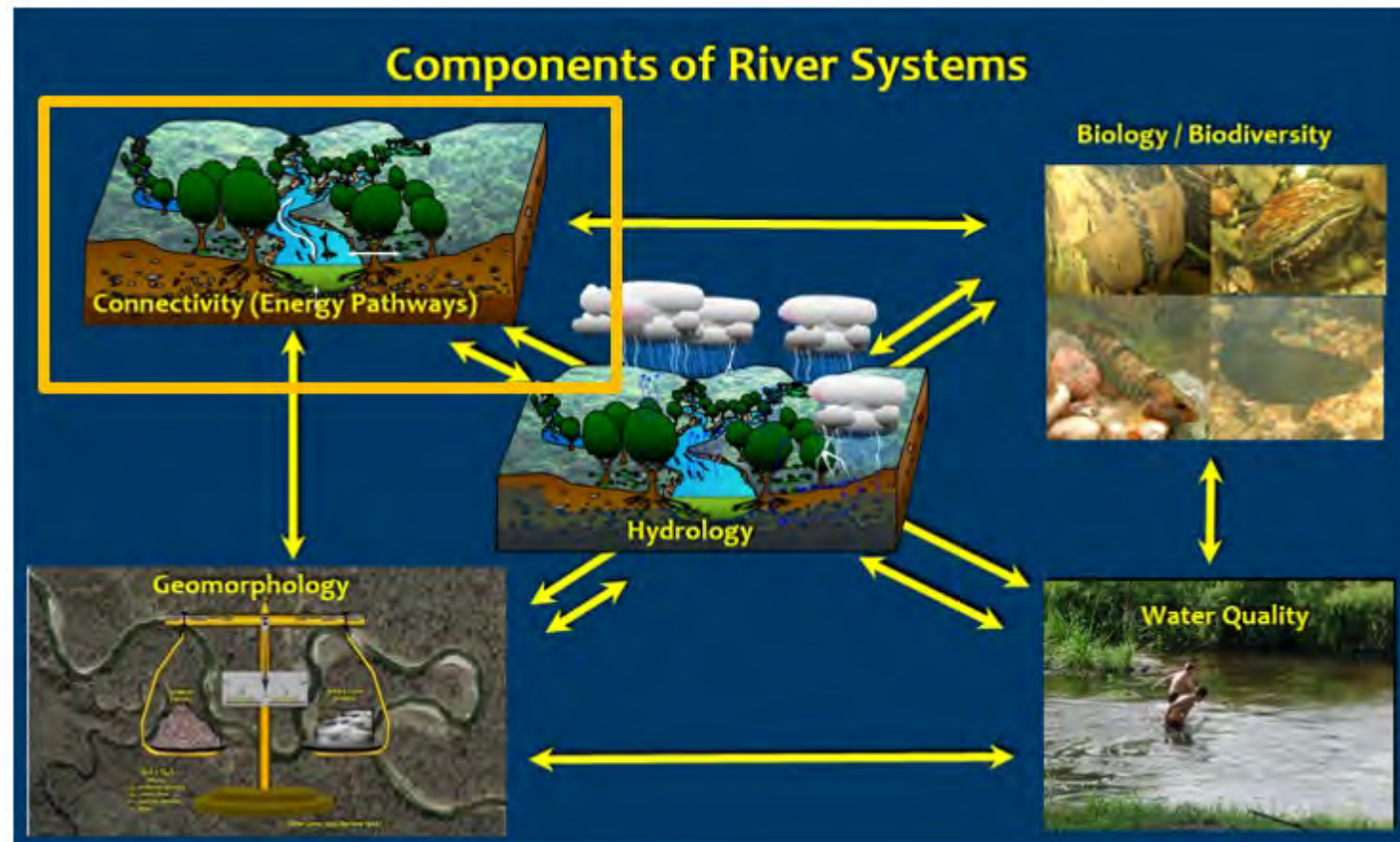


• Barrier Severity Ranking

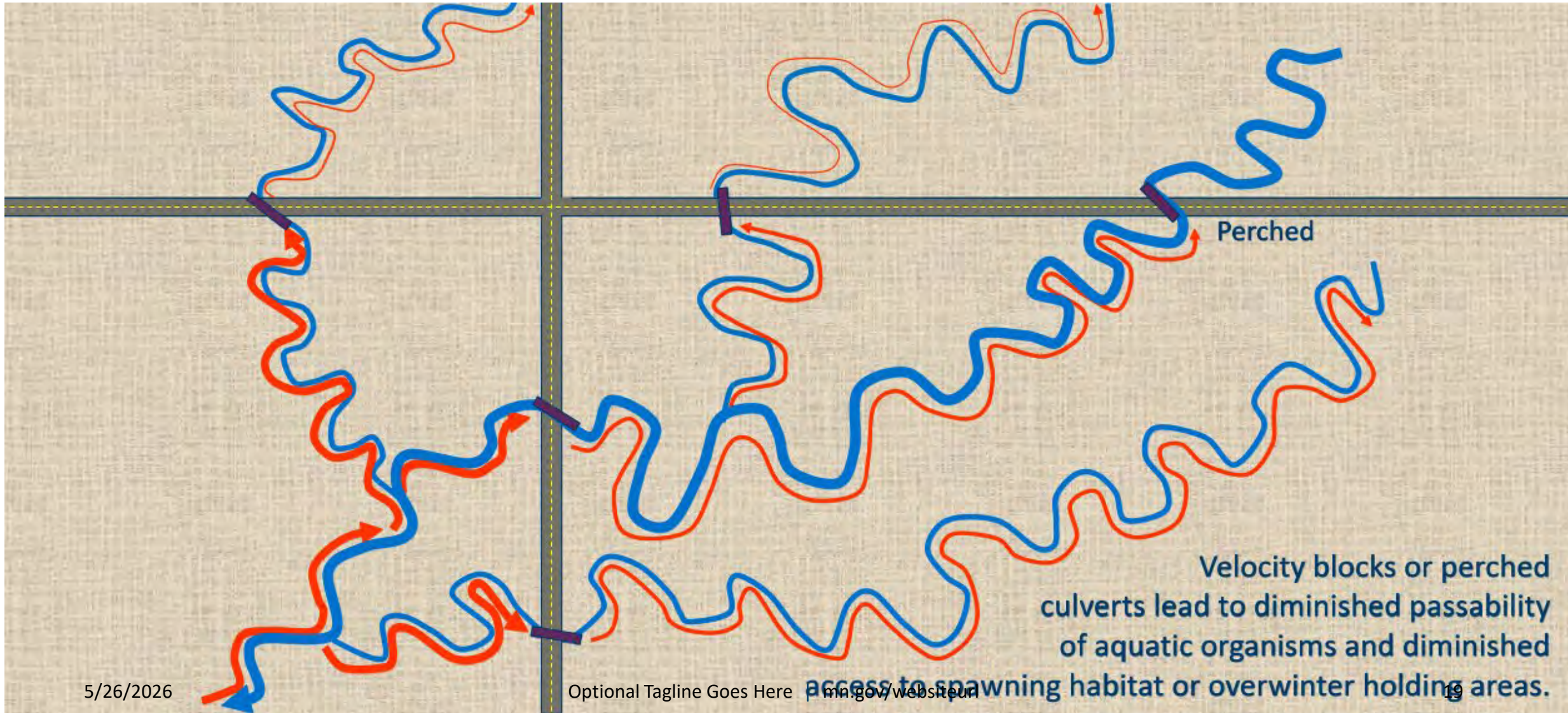
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Level 3 (partial or seasonal barrier)	195	25.9%
Level 4 (passable)	157	20.8%
Lake to Lake	4	0.5%
Dry	12	1.6%

How to Choose?

- What aspects should be prioritized when removing barriers in a watershed?

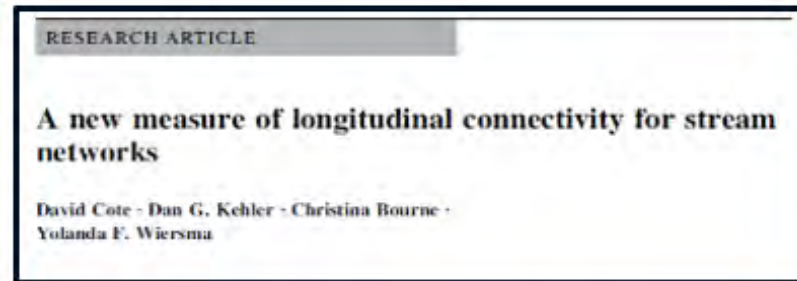


Fragmentation of the Landscape



How to Choose?

- Literature.



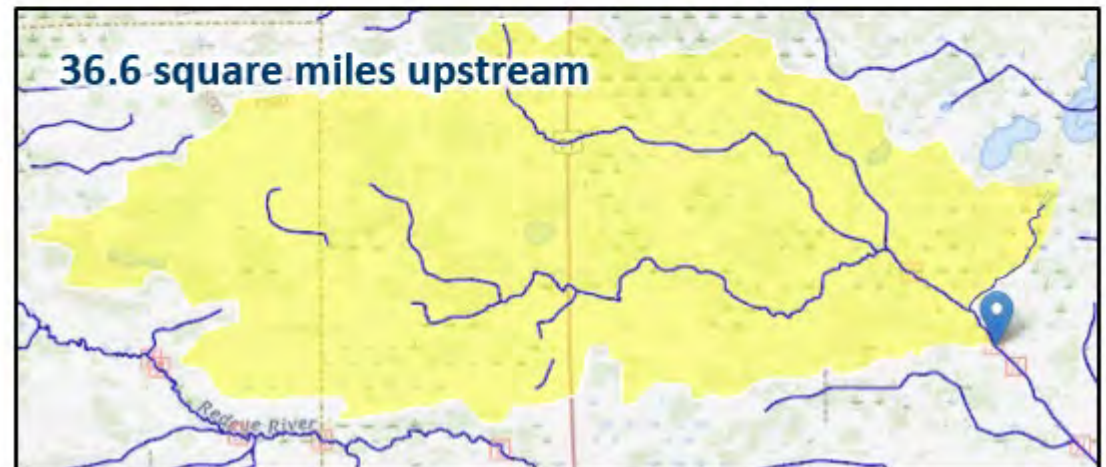
- “Projects which increased in-stream connectivity had the largest positive effect size on fish density and richness compared to in-stream habitat improvements.”

- “Barriers located near the river mouth have the greatest impact on fish with migratory life histories while those located near the center of the river network have the most impact on fish with patch to patch habitat use”

- “The removal of a single barrier chosen through prioritization had a greater overall connectivity increase than the random removal several of barriers.”

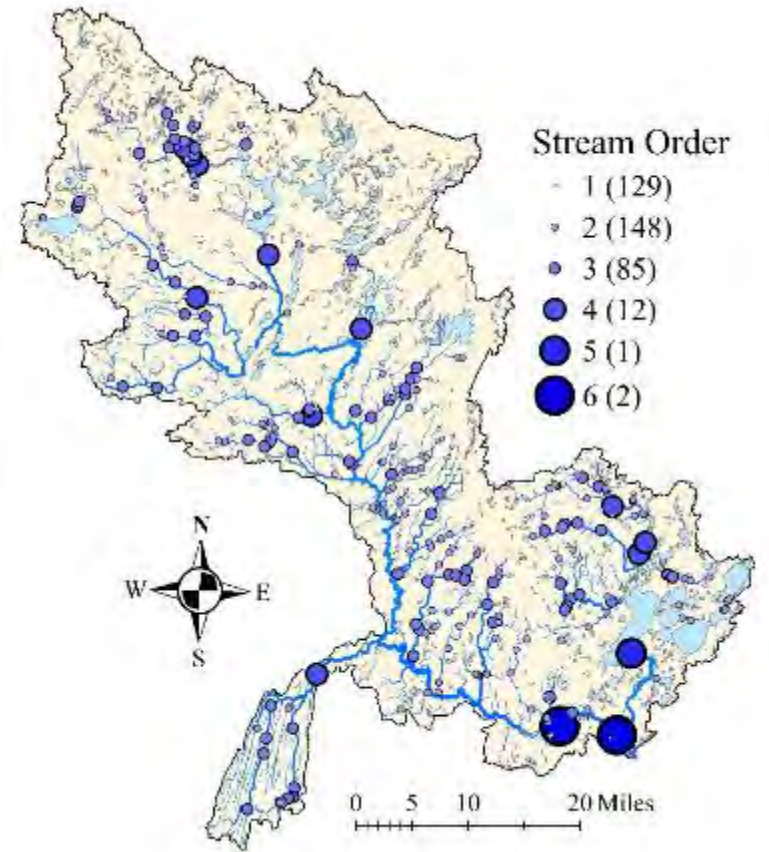
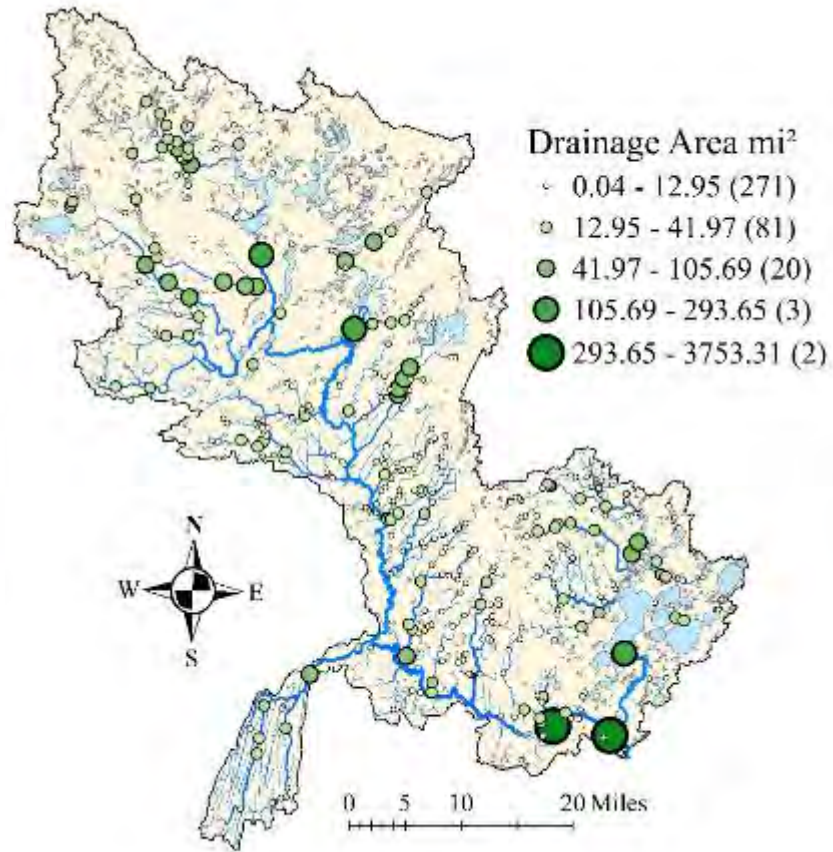
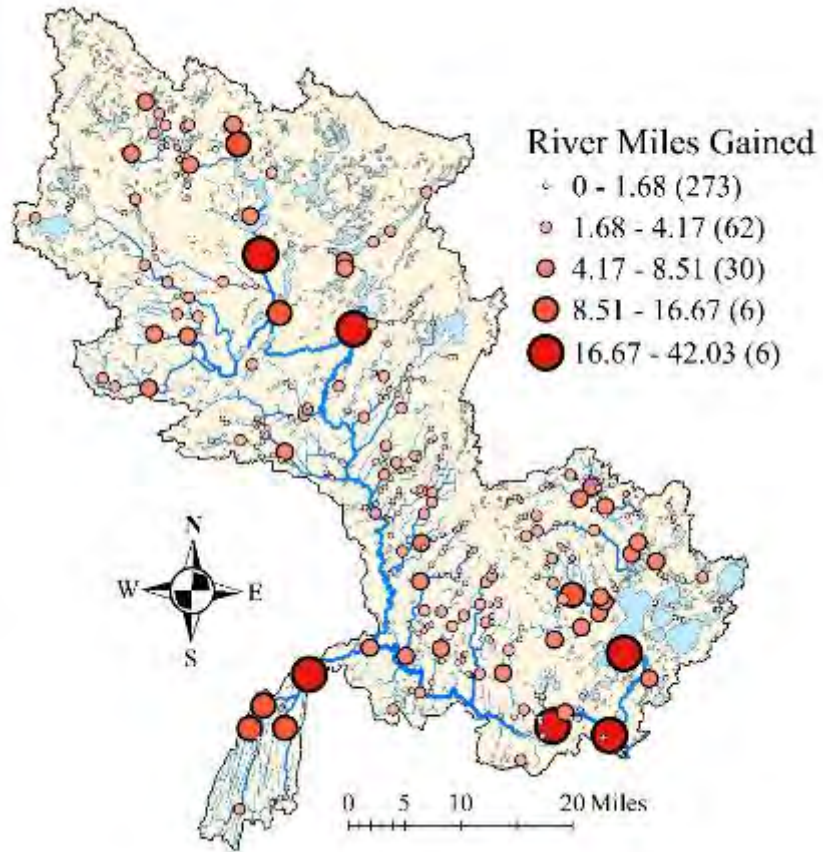
How to Choose?

- **Prioritized based on Connectivity**
 - **River Miles Gained**
 - Instant benefit of removal.
 - **Drainage Area Upstream**
 - Upstream reconnection potential.
 - **Stream Order**
 - Targets larger streams.
 - Benefits migratory life histories.

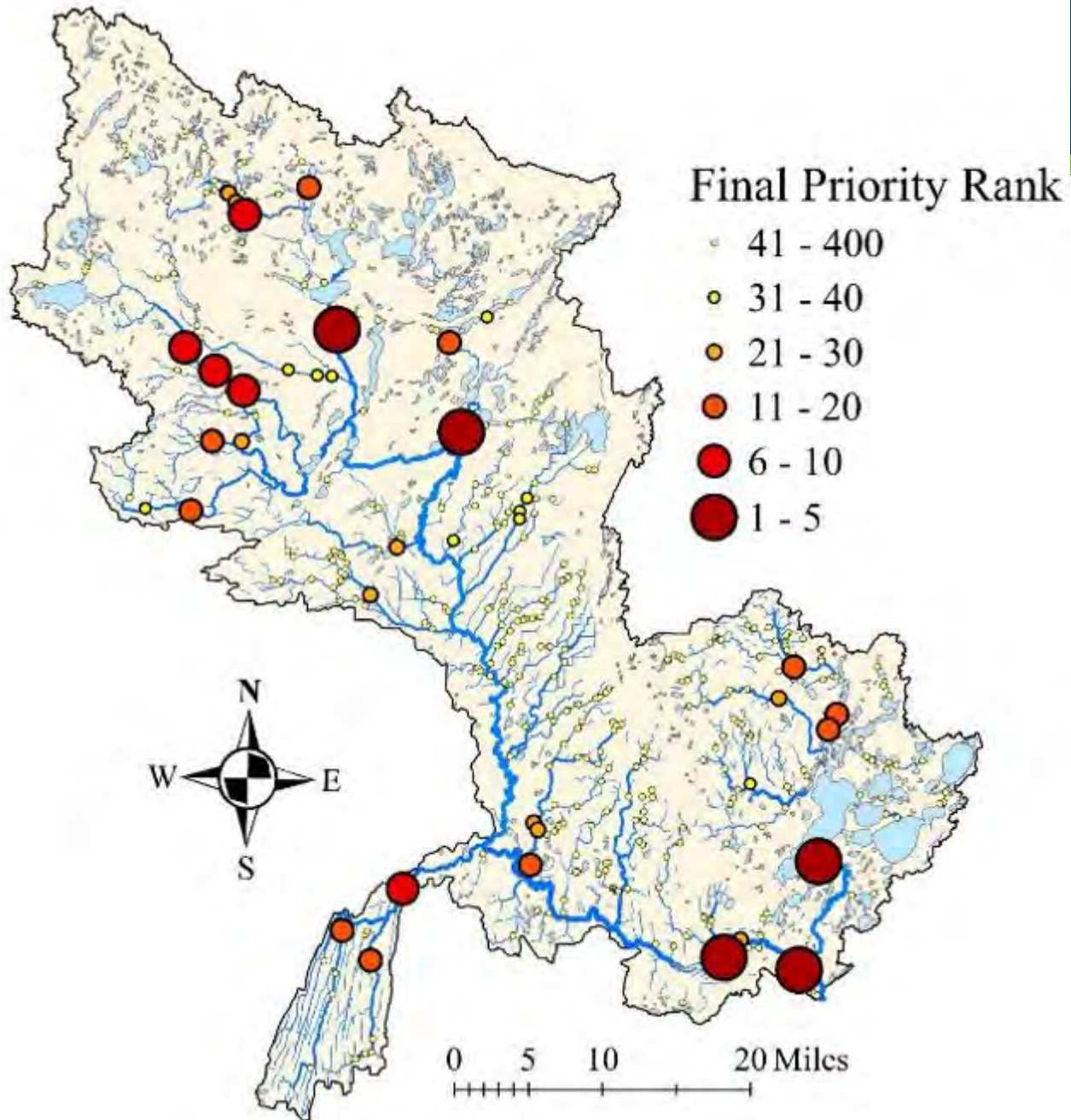


Crow Wing Watershed

- Each variable was divided into 5 score classes using Jenks Natural Breaks.
- Crossing scores were added up and any ties were broken using drainage area.
 - Miles Gained Score (1-5) + Drainage Area Score (1-5) + Stream Order Value = Final Rank



Crow Wing Watershed



- Removing barriers can benefit any part of the watershed.
- Other agencies may have different goals when prioritizing barriers.



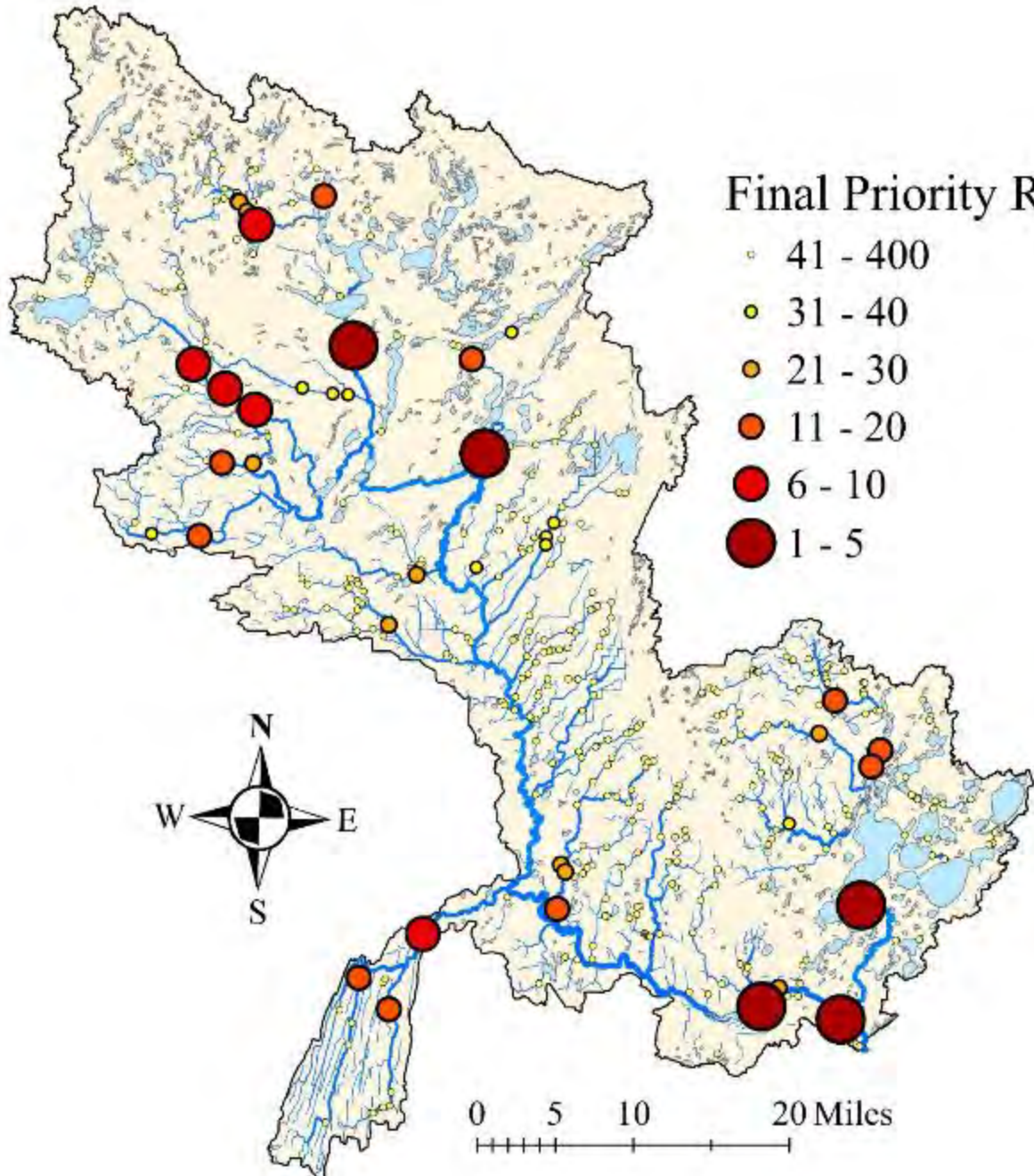
Crow Wing Watershed

1 Watershed 1 Plan - Connectivity goals



Final Priority Rank

- 41 - 400
- 31 - 40
- 21 - 30
- 11 - 20
- 6 - 10
- 1 - 5



SHORT-TERM GOAL

Replace **10 barriers** to fish passage (dams, road crossings, culverts) in 10 years.

DESIRED FUTURE

No culverts or dams impeding fish migration:

- 92 miles of the Crow Wing River
- 9 miles of the Fish Hook River
- 28 miles of Hay Creek
- 24 miles of Mayo Brook
- 30 miles of the Partridge River

Funding Opportunities

Clean Water Culvert Cost-Share Program

- 25% to help partners implement the **Geomorphic Approach** in culvert replacements.
- Contact: Geomorphicapproach.dnr@state.mn.us

Get Out More Funding

- Can cover full cost of the project (culverts, dams and channel restoration projects)
- Should be owned or managed by the state
- Contact: Amanda.hillman-roberts@state.mn.us

Lessard-Sams Outdoor Heritage Fund

- Can cover full cost of project (culverts, dams and channel restoration projects)
- **Request for proposals due** February 28th 2026
- Contact: Amanda.hillman-roberts@state.mn.us



Questions?





Geomorphic Approach

DNR-LGU Monthly Forum

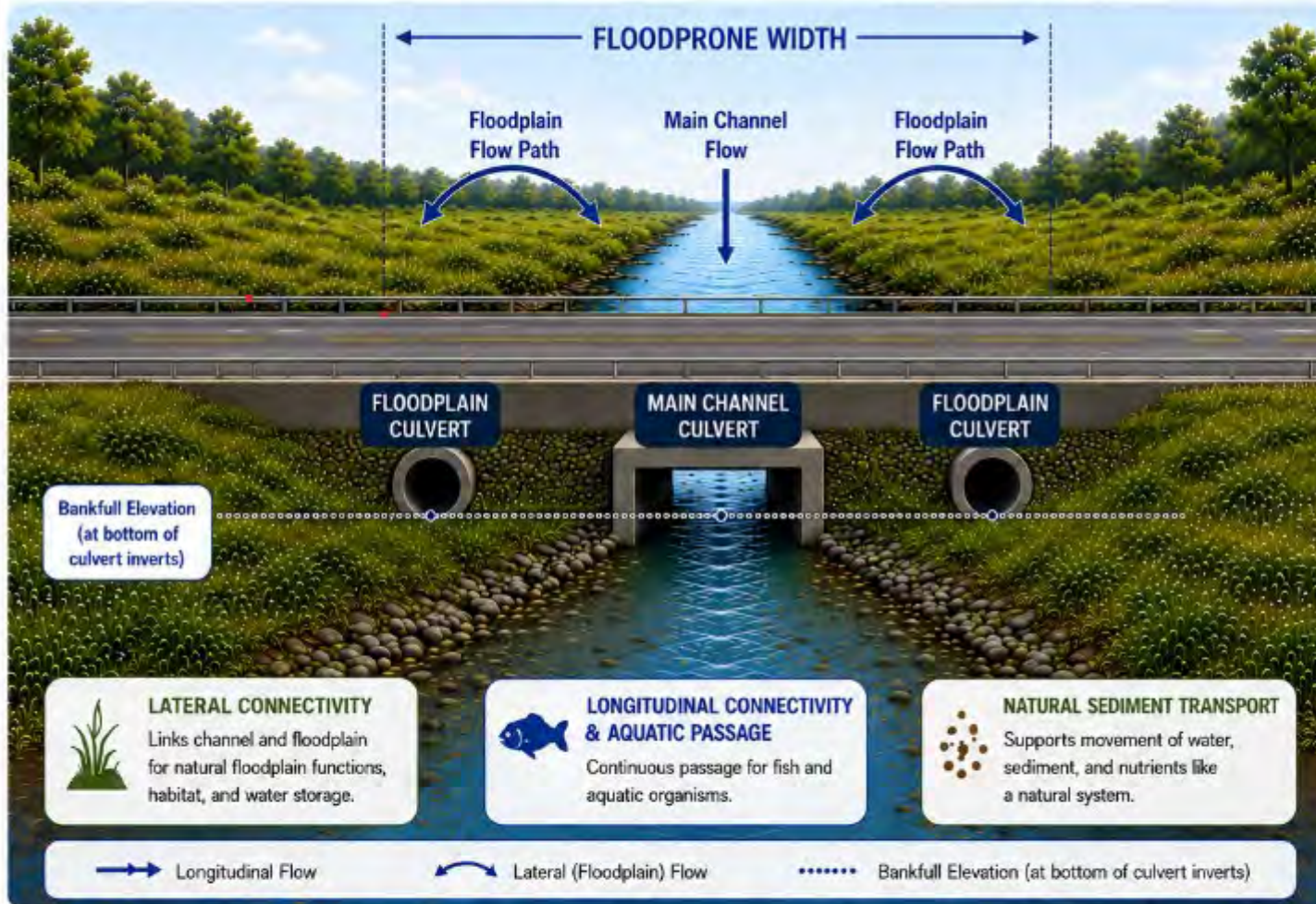
Salam Murtada, Ecologic and Water Resources MN, DNR
Kevin Zytovicz, Ecologic and Water Resources MN, DNR

Virtual Presentation
May 20th, 2026



Geomorphic Approach: A Nature-Based Crossing Design

Work with the river. Connect the system. Protect infrastructure. Save costs.



NATURE-BASED DESIGN

- ✓ Mimics natural river functions and processes
- ✓ Preserves channel and floodplain connectivity



IMPROVED RIVER FUNCTION

- ✓ Reduces flow velocities and shear stress
- ✓ Minimizes erosion and sediment deposition problems
- ✓ Maintains more natural hydraulic response during floods



ECOLOGICAL BENEFITS

- ✓ Improves aquatic organism passage
- ✓ Supports habitat continuity
- ✓ Enhances ecosystem resilience and biodiversity



INFRASTRUCTURE BENEFITS

- ✓ Increases resiliency during extreme events
- ✓ Reduces long-term maintenance and repair costs
- ✓ Extends infrastructure lifespan



A WIN-WIN SOLUTION

Protects natural river processes while improving infrastructure **performance**, **resiliency**, and long-term **cost savings**.

Geomorphic based approach

- Bankfull width = width of in-channel opening
- Bankfull depth = natural depth of stable channel
- Channel flowline elevation = invert of in-channel opening
- Road elevation = free board

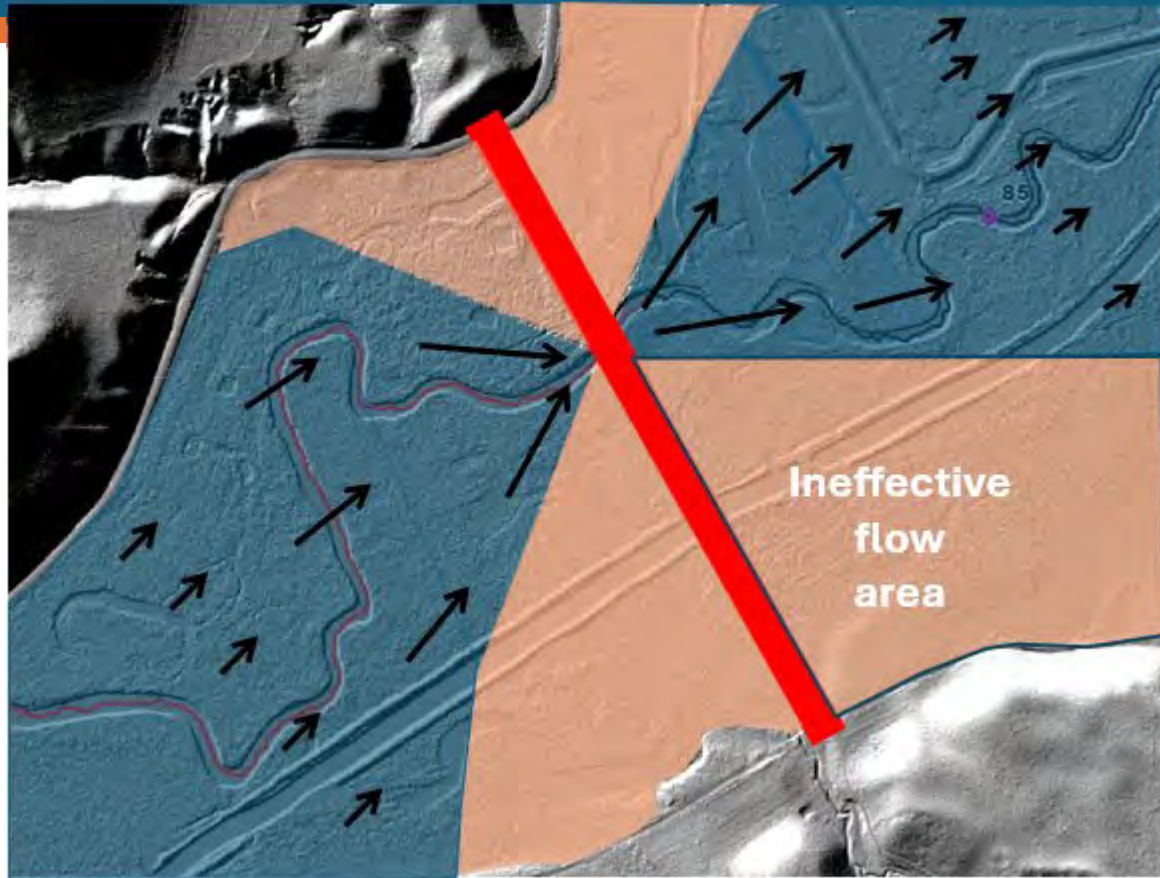


Whitewater State Park, ephemeral channel 92016)

Geomorphic Assessment at Road/River Intersection								
Site Name:	Huisken							
MPARS Number:	n/a							
Assessor(s):	Example							
Site Location:	UTM X: 251244.3	UTM Y: 4849973.8	Assessment date:	4/26/2016	Required Fill over floodplain culverts: 0.5			
Road/River Intersection Site Information		Notes:		Length of Culverts: 40				
Required Cross Sectional Area:	n/a	As per designer		Road Top Elev.: 1540.5				
Road Top Elev.:	1540.5	Top centerline of road at channel		Road Sag Elev.: 1539.2				
Road Sag Elev.:	1539.2	lowest roadtop elevation - within valley		Channel Flowline Elevation: 1532.2				
Channel Flowline Elevation:	1532.2	channel bottom elevation into culvert		Downstream Floodplain Elevation: 1535.1				
Downstream Floodplain Elevation:	1535.1	Avg. DS elevation of floodplain		Available Embankment Height: 4.9				
Drainage Area (Mi ²): 12.90								
Floodplain Determinations		Site Metrics		Ratio's / Estimates		Notes		
Floodplain Width:	250 - 650	Incoming watershed: 0.0010		0.0028		elevations obtained from 4/21/2010 Lidar		
Floodplain Slope:	0.0010	MN-Regional		West: 21.1				East: 15.6
Upstream Floodplain Elevation:	1535.3	1535.14		1.5				1.5
Bankfull Channel Determinations		Depth of incision:		1.6				
Width:	12.0	1.5		1.5				
Mean Depth:	3.1	0.0007		1.43				
Slope:	0.0007	1.40		1.43				
Sinuosity:	1.40	unknown						
Largest Particle:	unknown							
Channel Materials		Silt/Clay	Sand	Gravel	Cobble	Boulder	Bedrock	
Percentage of channel bed material							debris concern?	
USGS StreamStats or Madeled		Q1.5yr	Q2yr	Q5yr	Q10yr	Q25yr	Q50yr	
Discharge(cfs):		162	265	673	1080	1780	2440	
Slope (ft/mi):		14.9						

- Floodplain width (floodprone width) = spacing of floodplain culverts
- Upstream and downstream floodplain elevation = inverts for floodplain culverts

The geomorphic approach



Traditional Approach



Geomorphic Approach

Floodplain Connectivity



Figure 2: This highlights a scenario where a culvert has concentrated floodwaters, which will further destabilize the stream channel.

“Addressing Floodplain Connectivity At Roadway River Crossings”, Water Talk, March 2016

Over-Sized Channel Culverts



45th Street on Cascade Creek



Upstream



Downstream

Under-Sized Channel Culverts



Some Common situations to consider using Geomorphic Approach

A culvert or bridge blown out

Road overtopping occurring during severe storm events

High maintenance culverts; ones that continually fill with sediment

Re-designing for higher flows as part of a community master plan

Any road project where sufficient embankments exist

Incised channel contributing excessive sediments from bank erosion

Road with a floodplain higher on the upstream side relative to downstream side

Stream with heavily eroded channel due to concentrated flows on downstream side of the road

Benefits of Geomorphic Approach

Maintains
channel stability

Reduces erosion

Improves aquatic
and terrestrial
passage in
stream corridors

Reduce risk of
infrastructure
damage

Safety and
prevention of
road overtopping

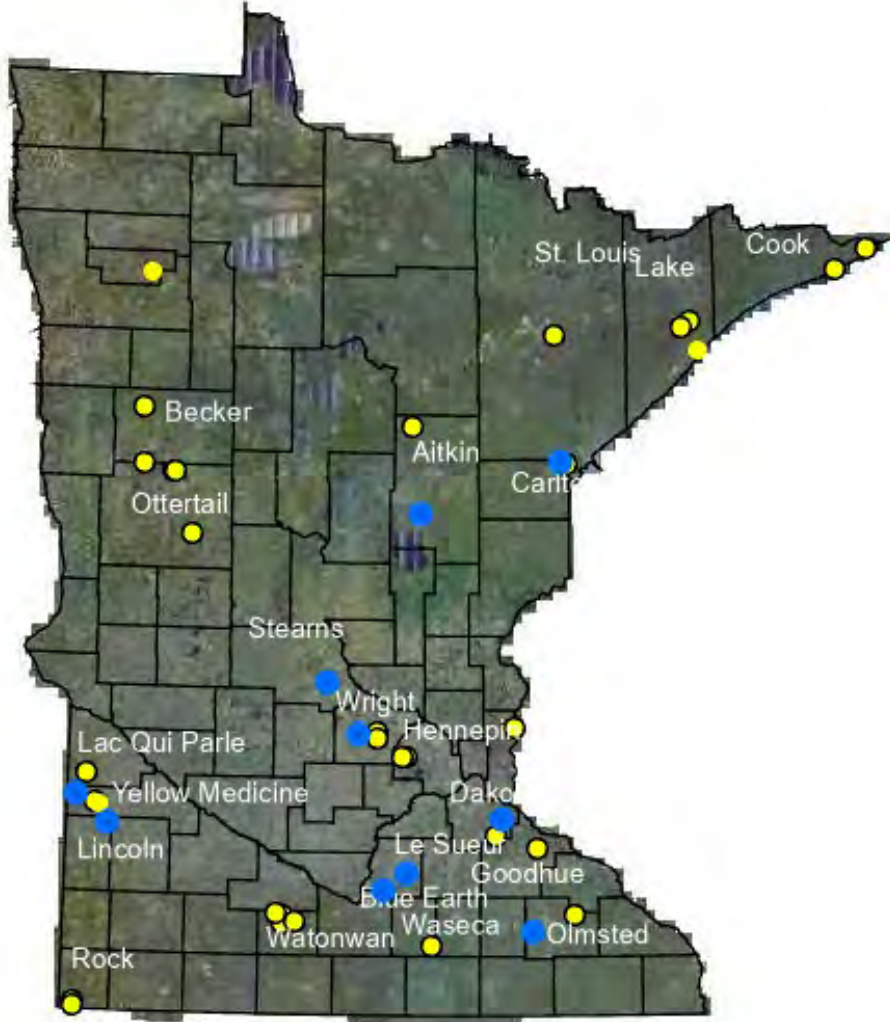
Reduce flooding

Compliance with
floodplain
ordinance

Improves climate
change
resiliency!

Projects

Cost-Share Program: 2023 to Present



- July 1st, 2023, cost-share program passed legislation and launched November 2023.
- 41 sites submitted to date
- ~ \$4 million in projects to date
- Up to 25 miles aquatic connectivity
- Ten projects approved (blue dots)



Traditional Design:

- Design to 1 Metric:
 - ✓ Stream Channel
- Pass the 100-year flood through the channel



Cascade Creek (Olmsted County) – Before



Geomorphic Approach:

- Design to 2 Metrics:
 - ✓ Stream Channel + Floodplain
- Pass the 100-year flood through the channel and the floodplain
- Critical Elements:
 - Reference reach + bankfull discharge



Geomorphic Assessment at Road/River Intersection

Site Name: Cascade Creek
 MPARS Number: [redacted]
 Assessor(s): [redacted]
 Site Location: [redacted]
 Assessment date: 4/9/2023

Road/River Intersection Site Information

Required Cross Sectional Area	As per design	Required Fit over floodplain culvert	6.5
Road Top Elev.	1021.1	Top elevation of road at channel	Length of Culvert
Road Sag Elev.	1018.7	Channel bottom elevation within valley	160
Channel Flowline Elevation	1016.0	Channel bottom elevation into culvert	6.1 Available Embankment Height
Downstream Floodplain Elevation	1014.5	Arg. 0.5 elevation of floodplain	

Drainage Area (M²): 62.00

Floodplain Determinations		Ratio's / Estimates		2019 version
Site Metrics				
Floodplain Width	440			
Floodplain Slope	0.0015	0.0015	0.0015	
Upstream Floodplain Elevation	1014.8	1014.6500	1014.6500	
Bankfull Channel Determinations		Ratio's / Estimates		2019 version
Site Metrics				
Width	20.0	South of center	43.1	28.6
Mean Depth	2.7		2.3	2.1
Slope	0.0014			
Smoothly	1.10		1.07	
Largest Particle				

Channel Materials	Silt/Clay	Sand	Gravel	Cobble	Boulder	Bedrock	Other/unknown?
Percentage of channel bed material							
USGS Stream Status or Modified	Q10yr	Q2yr	Q5yr	Q10yr	Q50yr	Q100yr	Q500
Discharge	400	900	1240	1600	2640	3300	4160 6370
Slope (ft/mi)	7.9						

Cascade Creek – After

Measurables:

- ✓ 35 ac Floodplain Reconnected
- ✓ 4.5 miles of stream reconnected
- ✓ 20% reduction in velocity (10-YR)
- ✓ 40% reduction in shear stress (10-YR)
- ✓ Synergy with downstream channel restoration



Project Benefits:

- ✓ Natural consistent and stable channel will form.
- ✓ A flat vegetated floodplain will form adjacent to channel (shaded area)
- ✓ Natural bedform should establish through roadway
- ✓ Fish passage
- ✓ Reduced maintenance

Cascade Creek – Benefits

Grant = \$185,635.00

Hoyt Ave and Tributary to Crow (Wright County) - Before



5/26/2026

Existing: 6-ft CMP Undersized Culvert

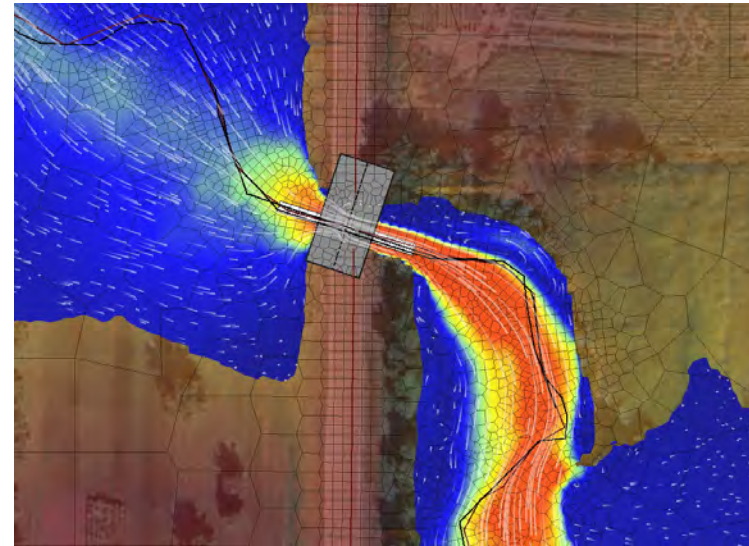
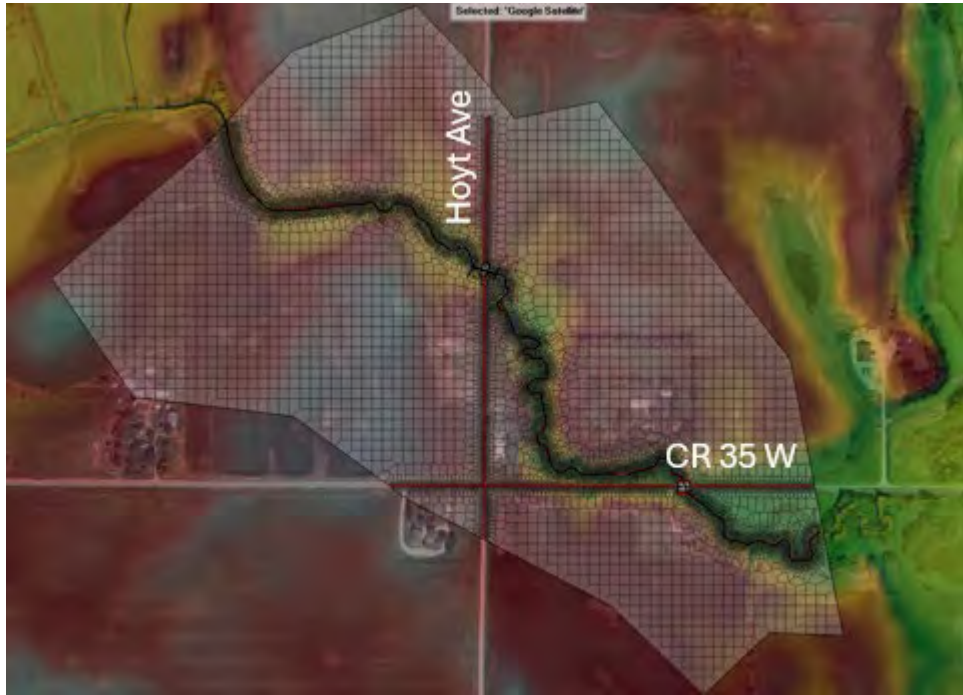
Second Grant Project (Hoyt Ave and Tributary to Crow) - After



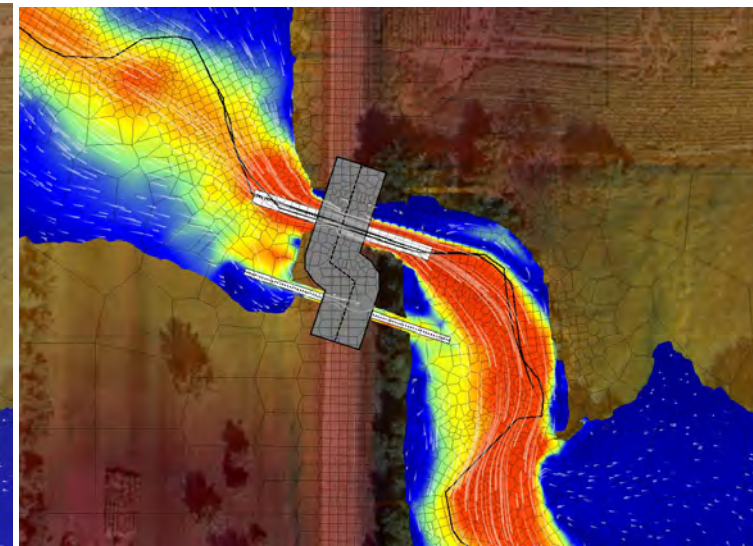
Proposed: 8 x 5 box culvert and 4-ft CMP



2D RAS Modeling

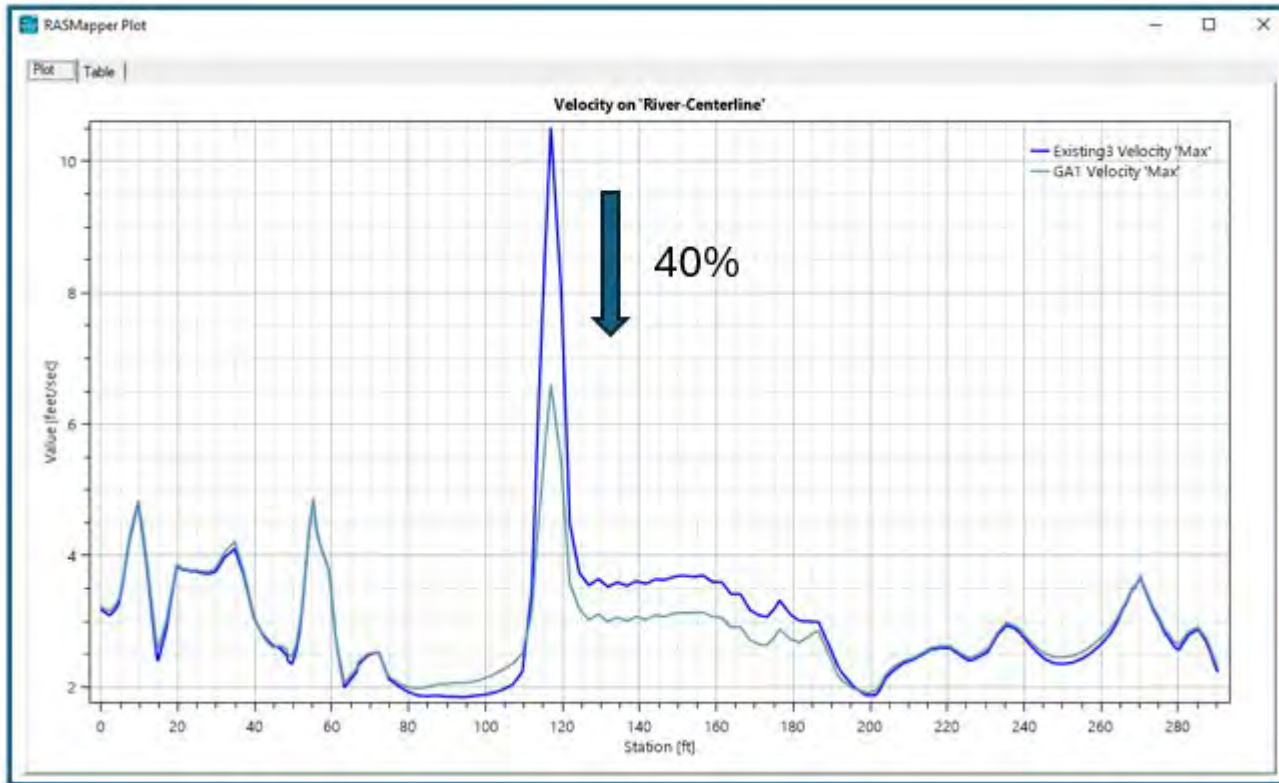


Existing

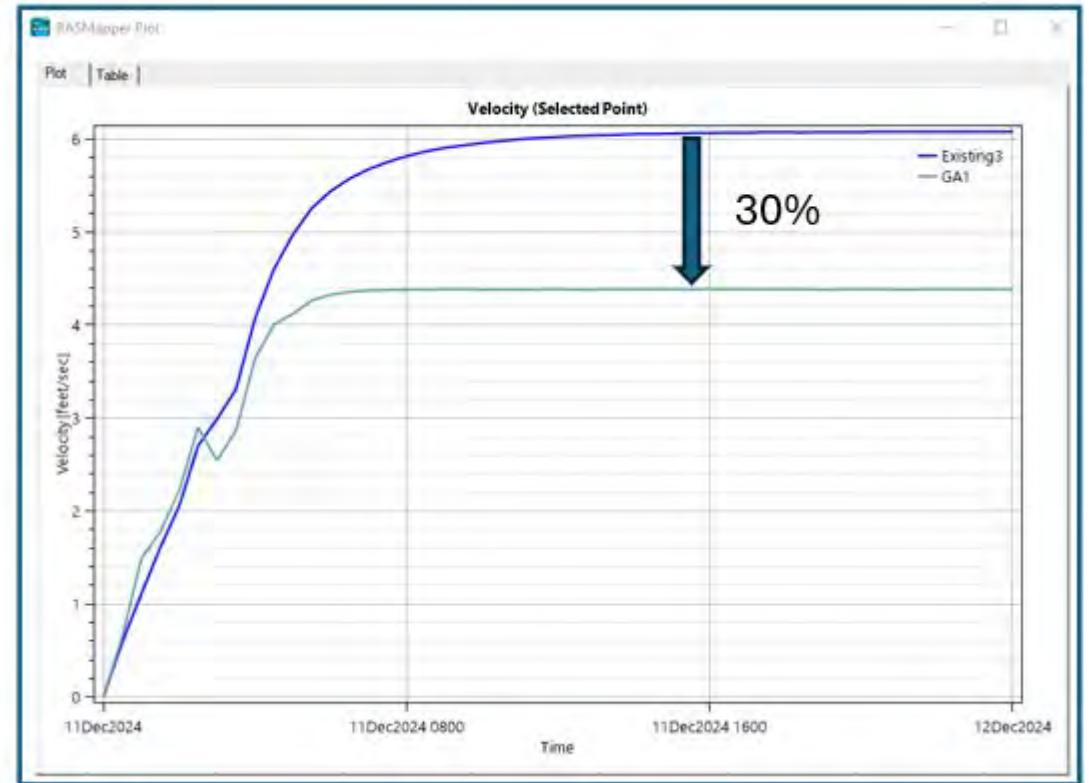


Constructed

More Output for velocity and water surface elevations



channel velocity (10-YR)



Velocity through structure (10-YR)

Bankfull Velocities decreased from 7.3 to 3.6 fps

Yellow Medicine River & CR 8, Lincoln County

North reach:

Existing: 10' x 6'

Proposed: two 16' x 6'

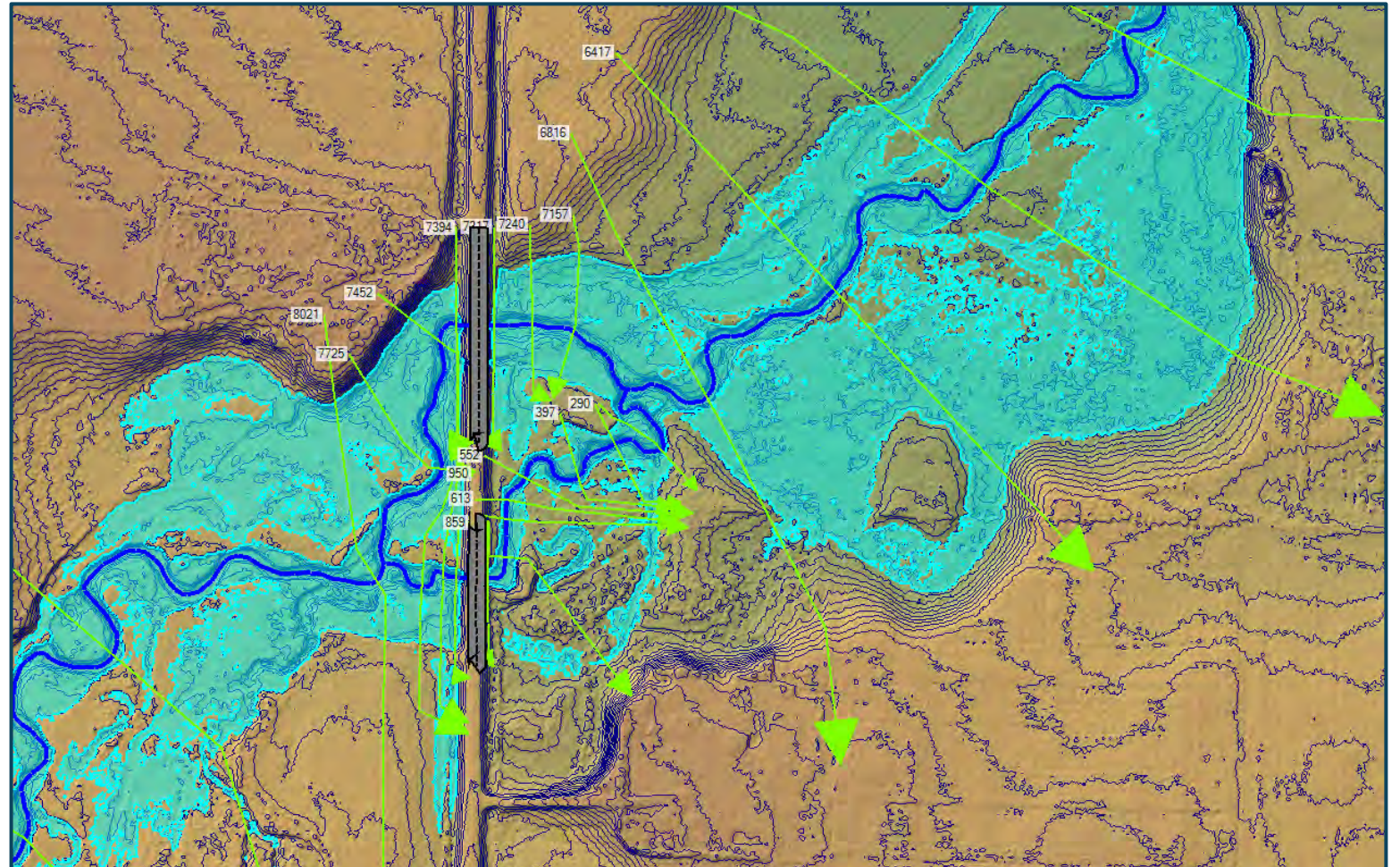
Floodplain culvert: 73" x 45"

South reach:

Existing: 10' x 6'

Proposed Floodplain culvert: 48" CMP

Bankfull Velocities down from 9 to 2.4 fps



Yellow Medicine River and CR8, Lincoln County



48" CMP

Two 16'x6' RBC & 73" x 45' Floodplain Culvert

Grant = \$119,356.73

Dry Run and 205th, Dakota County



Existing: 28-ft wide bridge

Proposed: Two 8 x 4 RBC and Three 2' RCPs

Bankfull Velocities decreased from 3.8 to 2.9 fps




Grant = \$65,677.56

Culvert Replacement Grant

FY 27/28 Grant Announcement

- Current grant funding tiers
 - Projects under \$25k: 100% covered by grant
 - \$25k-\$100k: \$25,000 grant
 - \$100k-\$800k: 25% covered by grant
 - Over \$800k: \$200,000 cap



Grant Announcement – Culvert/Bridge Replacement Incentive Program

Grant Description and Purpose
The DNR continues to make funding available from the Clean Water Legacy Fund in the form of cost-share grants to local units of government to replace culverts at stream-road crossings to address channel erosion, ecological connectivity (e.g., fish passage), and floodplain connectivity issues. Funding is intended to offset additional costs associated with adopting higher design standards based on a [geomorphic design approach](#).

Eligible Expenses
The grant will partially fund eligible construction costs related to the replacement of culverts and/or bridges in accordance with a tiered funding structure (see Section 5, *Grant Award*). Costs related to the design and planning aspect of the project are not eligible. However, DNR staff may provide technical assistance, including geomorphic surveys, hydrology & hydraulic modeling and design consultation.

Requirements

- Projects must address impairments, channel stability, and fish passage
- Projects design will be developed collaboratively with DNR
- Projects will incorporate the Geomorphic Approach (e.g. design for natural channel and floodplain)

Timeline
The DNR will use a continuous rolling application, making awards until available funds are spent.

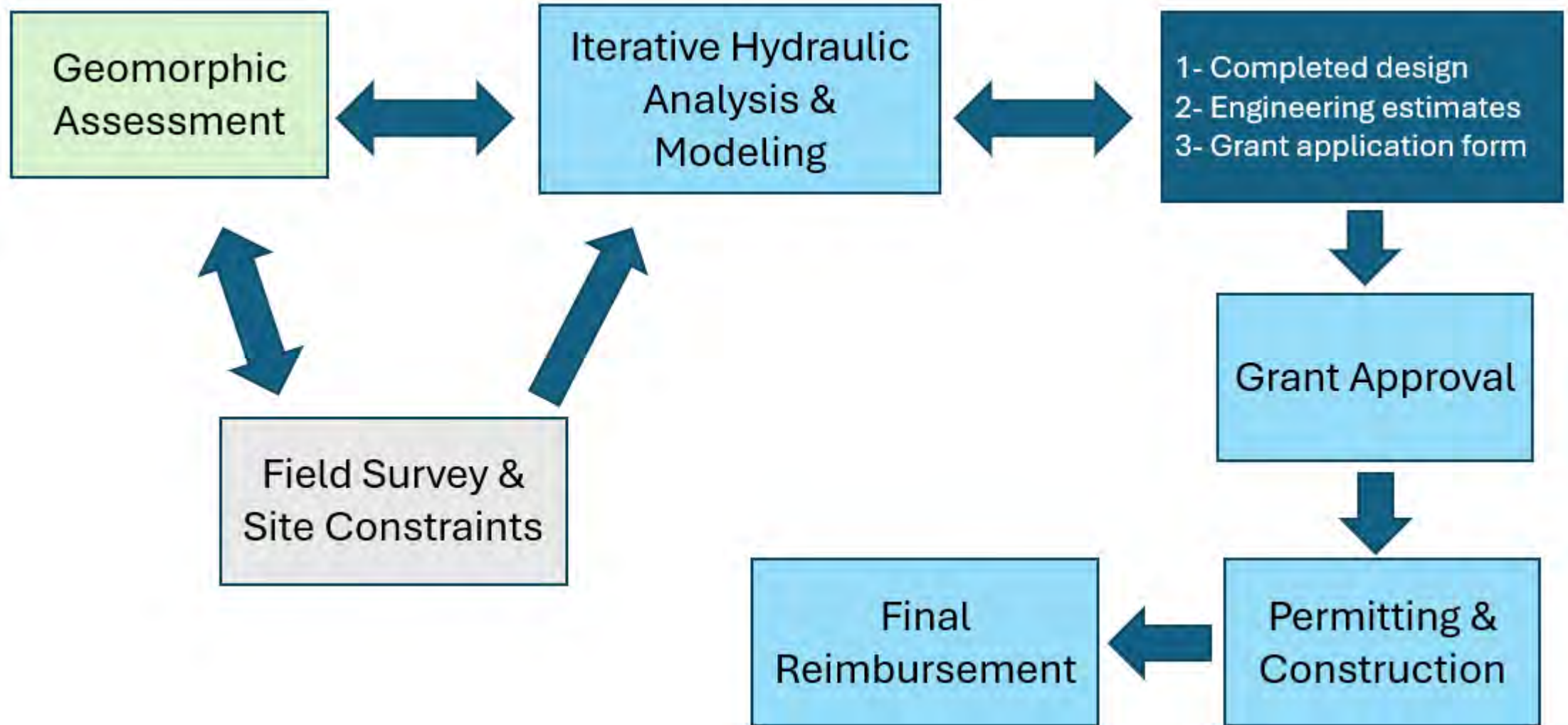
Process

- 1) [Submit Grant Application](#)

Interested applicants should complete and submit the [“application for cost-share grant”](#).

2) [Review](#)

Geomorphic Approach



Thank You!

Collaborators:

- Townships
- County Highway Departments
- Cities
- MNDOT
 - Bridge Office
- University of Minnesota
 - St. Anthony Falls Lab (SAFL)
- DNR Clean Water staff
- DNR Area Hydrologists
- DNR Climatology
- Private consultants
- FEMA
- SWCDs
- + Others

Area Hydrologists and Clean Water Staff:

- James Bedell
- Wes Saunders-Pearce
- Nicole Lehman
- Jacob Frie
- Kyle Jarcho
- Bri Speldrich
- Jon Lore
- Nicholas Kludt
- Katie Wigen
- Erynn Jenzen
- Tom Kresko
- Nicki Blake-Bradely
- Michael Kelly
- Kelly Condiff
- Kim Boland

