MUNICIPAL ROADWAY PROJECTS IN WISCONSIN

PERMITS, EXEMPTIONS & BEST MANAGEMENT PRACTICES

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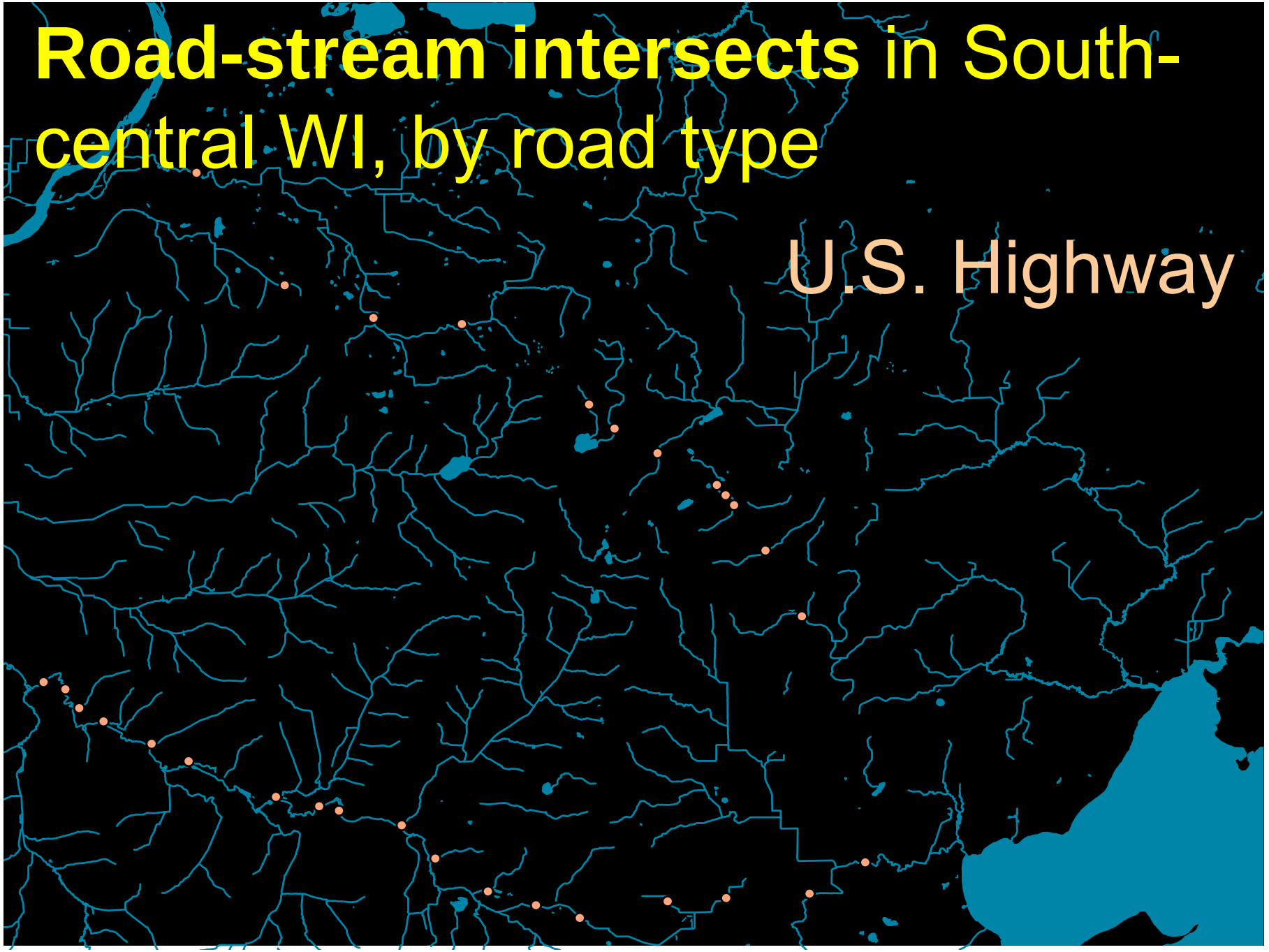
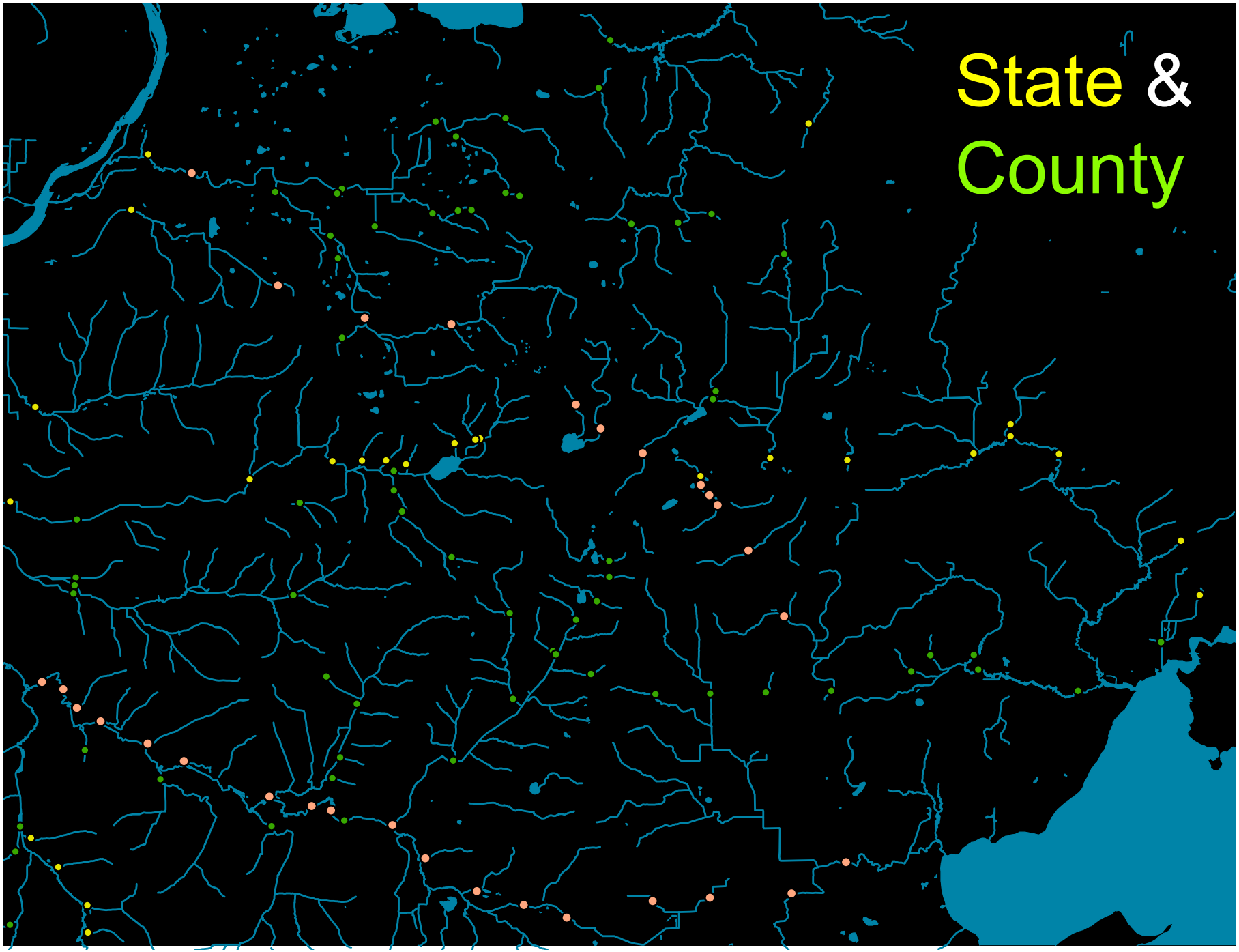
Wisconsin Waters Belong to Everyone

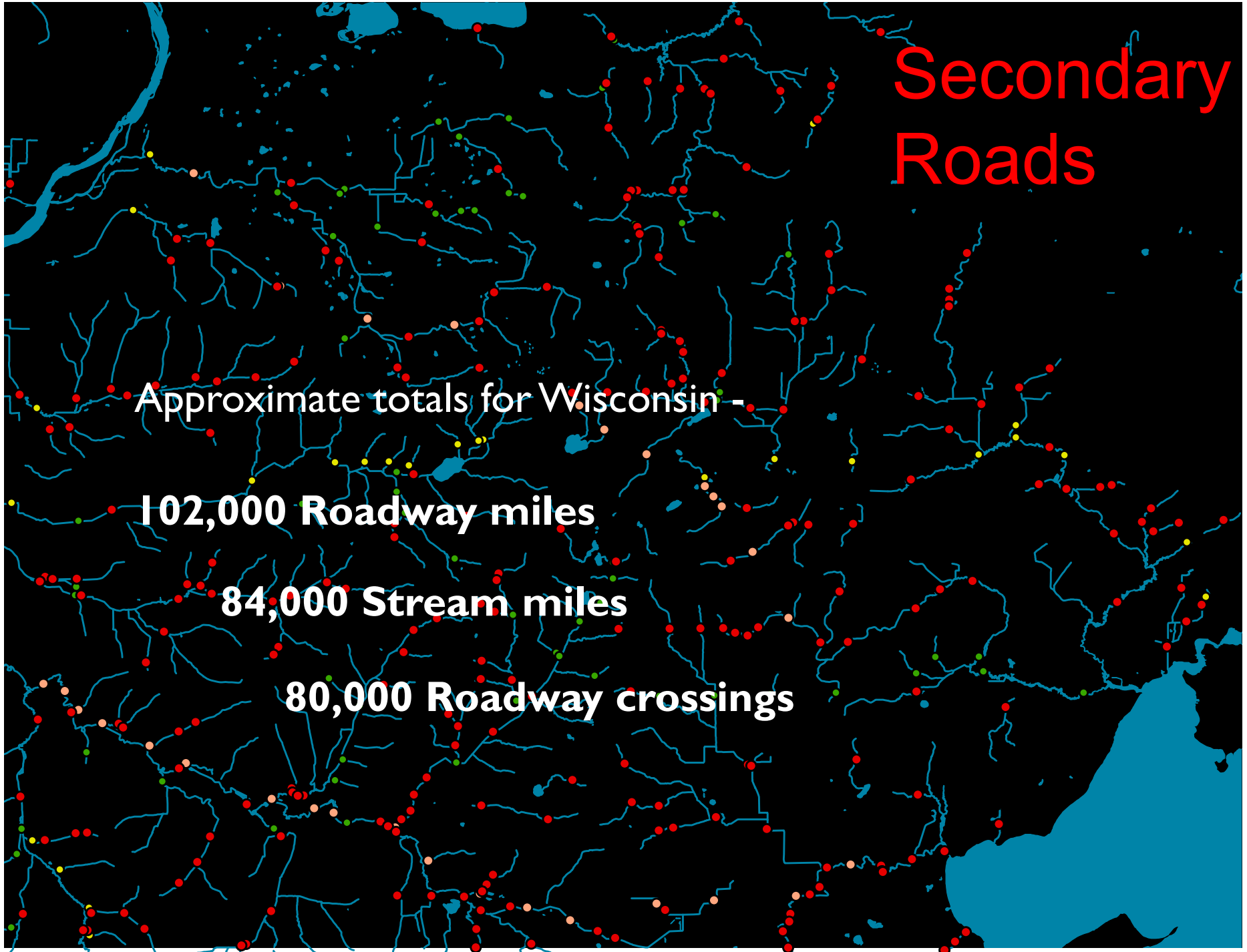
The Wisconsin Constitution declares that all **navigable waters** ***"shall be common highways and forever free"***, and held in trust by the Department of Natural Resources.

(Wisconsin Constitution, Article IX, Section 1)

Road / Stream Crossings in WI


Road-stream intersects in South-central WI, by road type
U.S. Highway

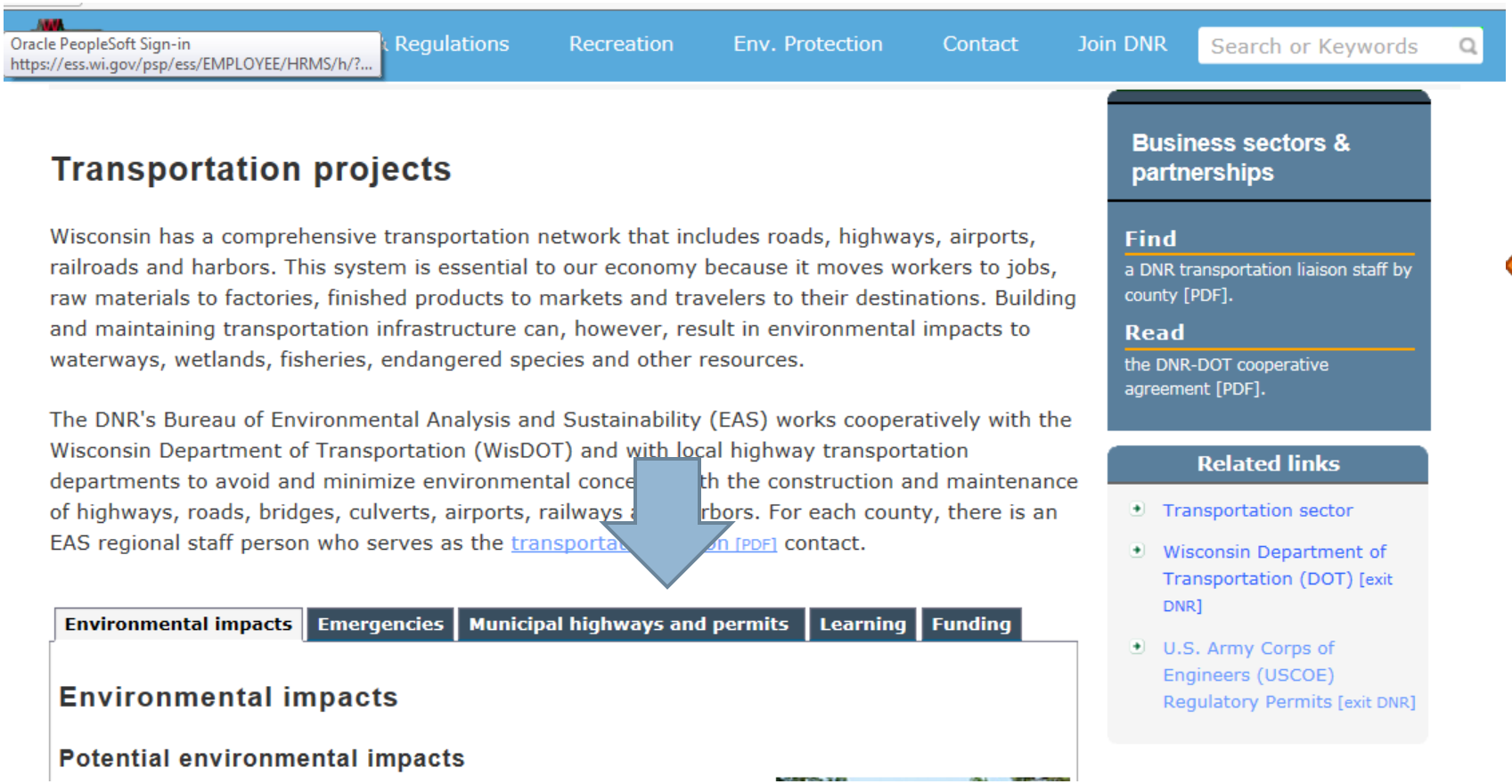

State &
County


Secondary Roads
Approximate totals for Wisconsin -
102,000 Roadway miles
84,000 Stream miles
80,000 Roadway crossings

Where do we begin?

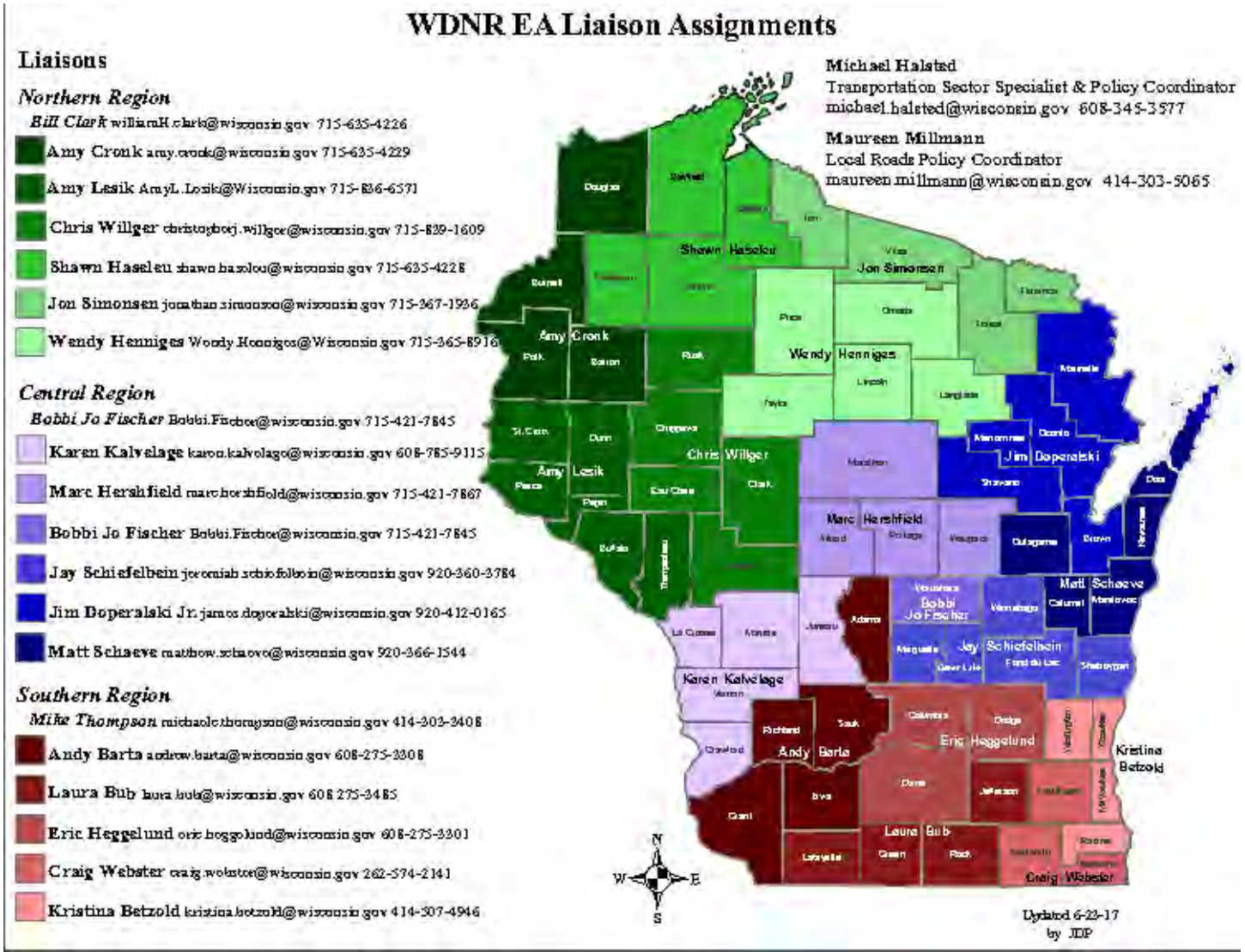
Where to find information on the WDNR web site:

dnr.wi.gov - Keyword "Transportation"



Municipalities should contact WDNR FIRST!

Every county has a Transportation Liaison and contact information can be found on the DNR web page – dnr.wi.gov.



Who else do you need to be contact before you begin your project?

- Local / County Shoreland Zoning (Floodplain Zoning)
- US Army Corps of Engineers
- The WDNR Transportation Liaison can help your determine if you will need a WDNR Stormwater permit

General Permit and Information

Business | Licenses & Regulations | Recreation | Env. Protection | Contact

permit.

Municipal Transportation General Wetland & Waterway Permit (GP)

The WDNR-GP2-2012 General Permit for Municipal Bridges, Arches & Culverts [PDF] is a general permit (GP) that is available for a discharge to waters and wetlands of no more than 10,000 square feet that is necessary for the construction, reconstruction or maintenance of a roadway, bridge, arch or culvert that is being carried out under the direction and supervision of a city, village, town or county, under s. 30.123, Wis. Stats.

See WDNR-GP2-2012 General Permit Application Checklist [PDF] for detailed instructions. A complete application for the GP includes information about the applicant, project plans, maps, photos, and an analysis narration that describes what alternatives were considered during the planning process.

Municipal Transportation general permit applications can use the WRAPP or the Information Worksheet to begin the process.

All application materials can be sent to the transportation liaison [PDF] for your county.

Information Worksheet

INFORMATION WORKSHEET for Municipal Transportation Projects (rev 2015)

Contact your DNR Transportation Liaison BEFORE filling out this information. For more information and to find your DNR Transportation Liaison, go to https://dnr.wi.gov (search key word "transportation").

Applicant/ Road Owner (Town, Village, City or County):	Road Name:
Municipal Representative's Name:	Stream Name:
Address, City, State, Zip Code:	County:
	Legal Description: _____ 1/4, _____ 1/4, Section _____ Township _____ North, Range _____ East West
Telephone Number:	Project Start Date: Project End Date:
E-mail Address:	Project Start and End Location (attach map if necessary):
Contractor / Consultant Contact Information (if available):	

General Project Information (check all that apply)

	Wetlands present
	Streams/ lakes present
	Stream culvert(s) replacement
	Bridge replacement
	New culvert or bridge *(currently no crossing present)*
	Riprap placement
	Road surface / mill & overlay

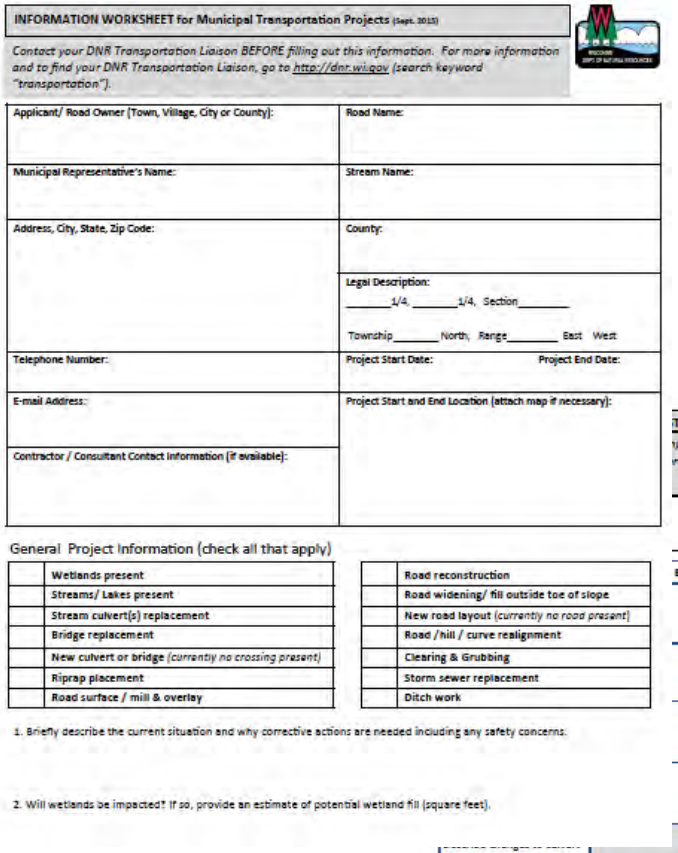
	Road reconstruction
	Road widening/ fill outside toe of slope
	New road layout *(currently no road present)*
	Road / hill / curve realignment
	Clearing & Grubbing
	Storm sewer replacement
	Ditch work

1. Briefly describe the current situation and why corrective actions are needed including any safety concerns.

2. Will wetlands be impacted? If so, provide an estimate of potential wetland fill (square feet)

What is the Information Worksheet?

- Provides **contact information** to WDNR
- Describes the **what, where** and **why** of a project
- Can be used in place of the **WRAPP** (*Water Resources Application for Project Permits*) if a WDNR general permit is needed for a project
- **Can be used by WDNR to determine if a replacement culvert project is exempt from WDNR permitting**



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	Storm sewer replacement
	Ditch work

1. Briefly describe the current situation and why corrective actions are needed including any safety concerns.

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TREAM CULVERT— EXEMPTION INFORMATION / RECORDS

ption from DNR permits under chapter 30.123(6)(r)(a) Wis. Stats. DNR staff rt may be vulnerable to flood failure, maintenance problems, and/or oa-

	Existing Road	Proposed Road
elevation or slope.	NA	
Will the road surface elevation over the culverts be raised?	NA	Yes No

Mark the appropriate box below if any of the following problems exist at the current culvert	
	The culvert is perched above the streambed *(i.e. waterfall at the outlet)*
	There is a scour pool at the outlet
	There is water pooling on the upstream side of the road
	Water can overtop the road during flood events
	The culvert can get blocked with debris or there are beaver problems

Completion of this Information Worksheet will provide the WDNR with information to evaluate the proposed project. The Department will review the project proposal and site specific conditions to determine if the project is exempt from DNR culvert replacement permits. Depending on specific site conditions, your liaison may request further information. It is the applicant's responsibility to obtain all necessary local, state and federal permits and approvals from the appropriate entities prior to construction. By signing below you are acknowledging that you have read this information and understand that further reviews may be needed to proceed with your project. The signer of this document is acknowledging they have the authority to represent the constructing municipality.

Signature & Title:_____ Date_____

Information Worksheet helps with **record keeping**, especially in case of an **emergency**!

Great for **keeping records** as described in Ch. 30.123(9)

****

RECORDS. A city, village, town, or county that replaces a culvert and that is exempt from the permitting requirements under sub. (6) shall make and retain a record of the replacement of the culvert. The record shall include all of the following information:

*30.123(9)(a) **(a)** The date on which the replacement culvert was constructed or placed.*

*30.123(9)(b) **(b)** The dimensions of the replacement culvert.*

*30.123(9)(c) **(c)** The location of the replacement culvert.*

Learning to navigate the permit process

Public Roads:

WDNR Transportation Liaison

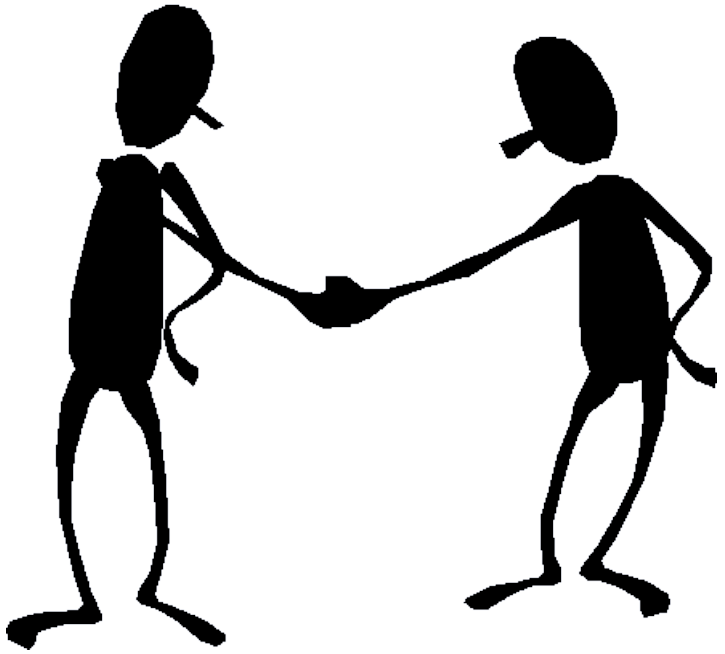
Private roads, driveways, trails:

DNR Water Management Specialist

WisDOT – WDNR Coordination

Cooperative Agreement Between WDNR and WisDOT

- **WisDOT contacts WDNR** during the scoping of a transportation project.
- **WDNR reviews projects** for impacts to wetlands, waterways, wildlife, NHI hits, protected lands.
- **WDNR is involved throughout the planning and construction of the WisDOT project**



WHEN does a municipality need a permit?

- WDNR-GP2-2012 applies to wetland and waterway impacts associated with **construction, reconstruction and maintenance** of a highway, bridge, arch or culvert that is part of a ***municipal transportation*** project.
- If the municipal road project impacts ***wetlands*** or a ***waterway***, they **may need a permit.**
- If the impacts to wetlands and waterways are less than 10,000 square feet, **they may be eligible for a general permit (GP).**
- If a permit is needed, the project needs to meet all (29) eligibility standards of the local roads general permit

If total impacts are equal to one acre or more, you may need a WDNR Stormwater permit.

Stormwater permitting

The Wisconsin Pollutant Elimination Discharge System (WPDES) Notice of Intent Permit process is used to regulate all stormwater discharges that result from disturbing one or more acres of land. This permit is needed for both transportation and non-transportation related projects. See Construction site stormwater permits for more information.

Federal permitting

United States Army Corps of Engineers wetland permits [exit DNR] are required for discharges to federal wetlands. For public transportation projects, the U.S. Army Corps of Engineers has issued general permit GP-003-WI [PDF exit DNR]. This federal general permit may be used for activities whose purpose is to construct, expand or improve transportation projects (e.g., roads, highways, railways, airport runways and taxiways) in waters of the United States.

A link to the US Army Corps of Engineers can be found on our web site. **Applicants need to check with the USACE to see if they need a federal permit.**

Culvert exemption language from Wisconsin Act 55, signed July 12, 2015

> The construction or placement and the maintenance of a replacement culvert that is placed in substantially the same location as the culvert being replaced if the replacement culvert is constructed or placed using best management practices to comply with water quality standards under subchapter II of chapter 281 [exit DNR].

Best Management Practices = BMPs

Wisconsin's best management practices for water quality are intended to provide *simple* and *cost-effective methods* for protecting water quality in lakes, streams and wetlands **before, during** and **after** construction activities.

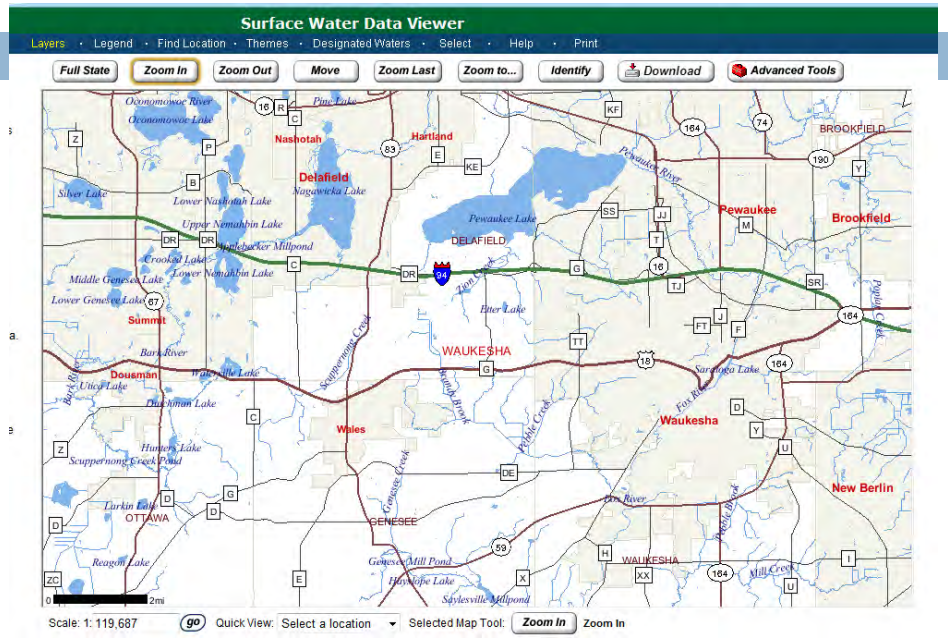
BEFORE Construction, get to know your project area!

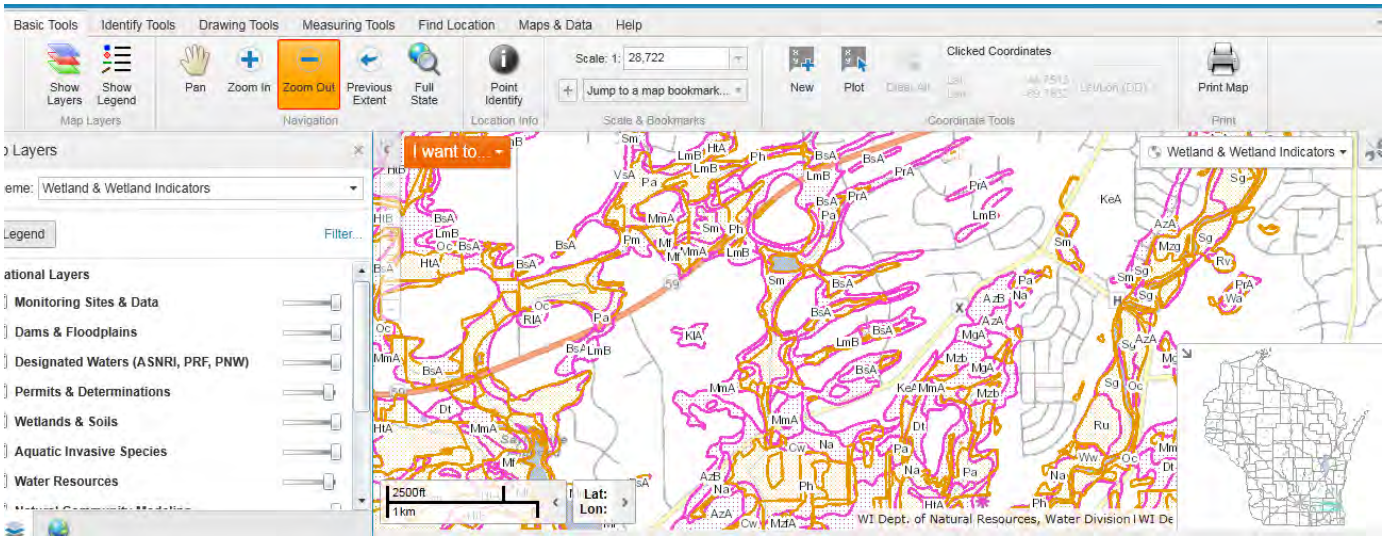
Look at your project area online

http://dnr.wi.gov/maps

Is there a waterway?

Are there wetlands that might be impacted by the project?

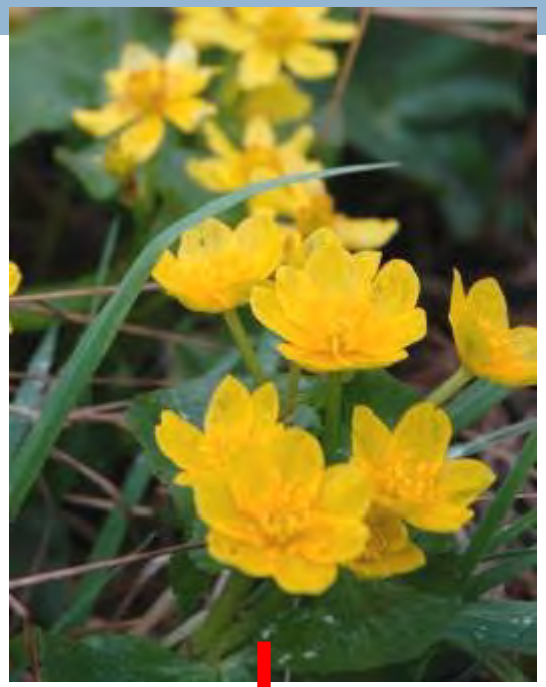




Do I need a permit?

Is it a wetland??

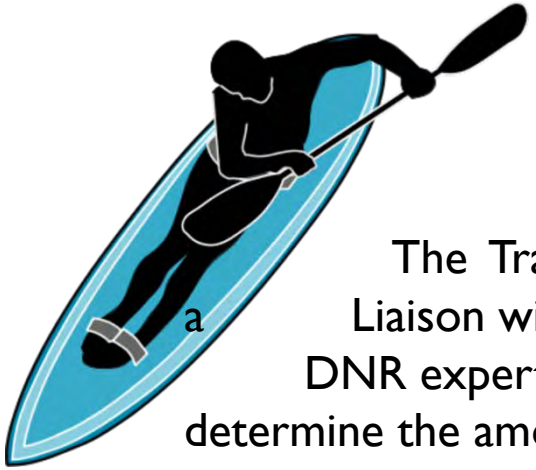
The presence of water at or near the ground surface for a portion of the year.



The presence of plants adapted to living in wet conditions.

The presence of hydric soils, which develop under wet conditions.


Look out for….
Wetlands next to the road
11.16.2010 15:24



The Transportation Liaison will work with DNR experts to determine the amount and type of boating use in at the project location.

Navigation requirements based on use of the waterway.

Projects need to consider wildlife (including Threatened and Endangered Resources) Impacts & Passage

Sometimes a ditch....

....is not a ditch! Sometimes it's a stream!

Ditch Maintenance:

If you are proposing to change the **depth, width**, or **direction of flow** in an existing ditch through a wetland or near a waterway, *please contact the local WDNR Transportation Liaison.* **Ditching in wetland areas….**

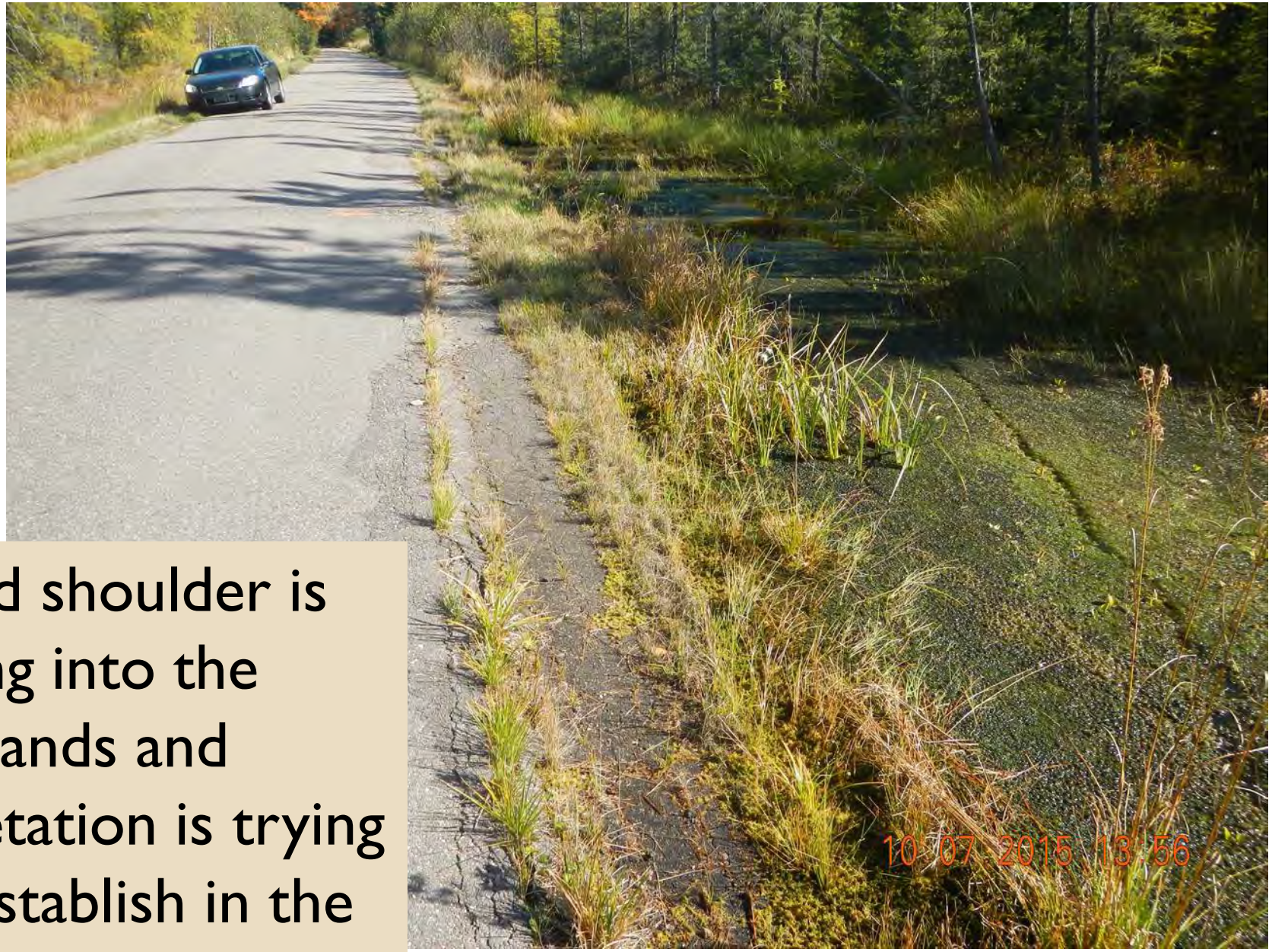
- Rarely provides the desired drainage
- Can result in water pooling at the base of the road.
- The outcome could be a **saturated road base**
  - More **road maintenance**
  - More **cost**

Work with DNR and USACE to find a solution!

Sometimes cross-culverts or raising the road and improving the road base will help.

In 2010, ditching was completed in a wetland next to a town road to improve drainage.

2015 - The culvert installed to improve drainage is popping up in the roadway



Road shoulder is falling into the wetlands and vegetation is trying to establish in the cracks on the road

Early Coordination with DNR may include an onsite meeting.

Something to consider:

Is the stream or road taking a beating?

Get to know your stream!

How do you know if there is a problem with the existing culvert?

- Does road overtop during flood events?
- Is there a plunge pool on down stream end of culvert?
- Is the stream constricted at the upstream end of the culvert?
- Is culvert perched?
- Is there a velocity barrier?

Consider the factors that may influence structure options

Structure options may be limited in areas with minimal road fill.

If you have a road that is over-topping at a stream, you may want to consider **multiple structure types** to determine which **size, shape and elevation** is appropriate at that location.

ROAD-STREAM CROSSINGS AS BARRIERS TO FISH AND WILDLIFE MOVEMENT

Barrier to fish due to high velocity due to under-sized and incorrectly placed culvert

Culvert placed too high causing leap barrier

Culvert placed too high and too much rip rap

Improperly placed culverts may become perched culverts over time

Culvert in 1979

Same culvert in 1998

Culverts that collect debris

need more maintenance

…and may attract beavers!

Culverts need to allow for the natural movement of water as if the culvert were not there.

More Benefits of Properly Sized and Placed Culverts

- Structure will be **more resilient** to floods
  - **Reduced closures and safer roads**
- **Less debris** getting stuck at the culvert
  - **Less maintenance costs**
- **Improved** stream connectivity
  - **Healthier fish and wildlife populations**
  - **Improved water quality**
  - **Increased recreation and tourism benefits**
- **Longer** structure **life =** **$$$ Saved!**

How to determine proper size and placement

Get to know your stream!

NEXT:

- **Measure Bankful Width**
- Do a stream profile survey

What is Bankfull Width?

- **Bankfull width** is the maximum **width** the stream attains and is typically marked by a change in vegetation, topography, or texture of sediment

Structure type and size

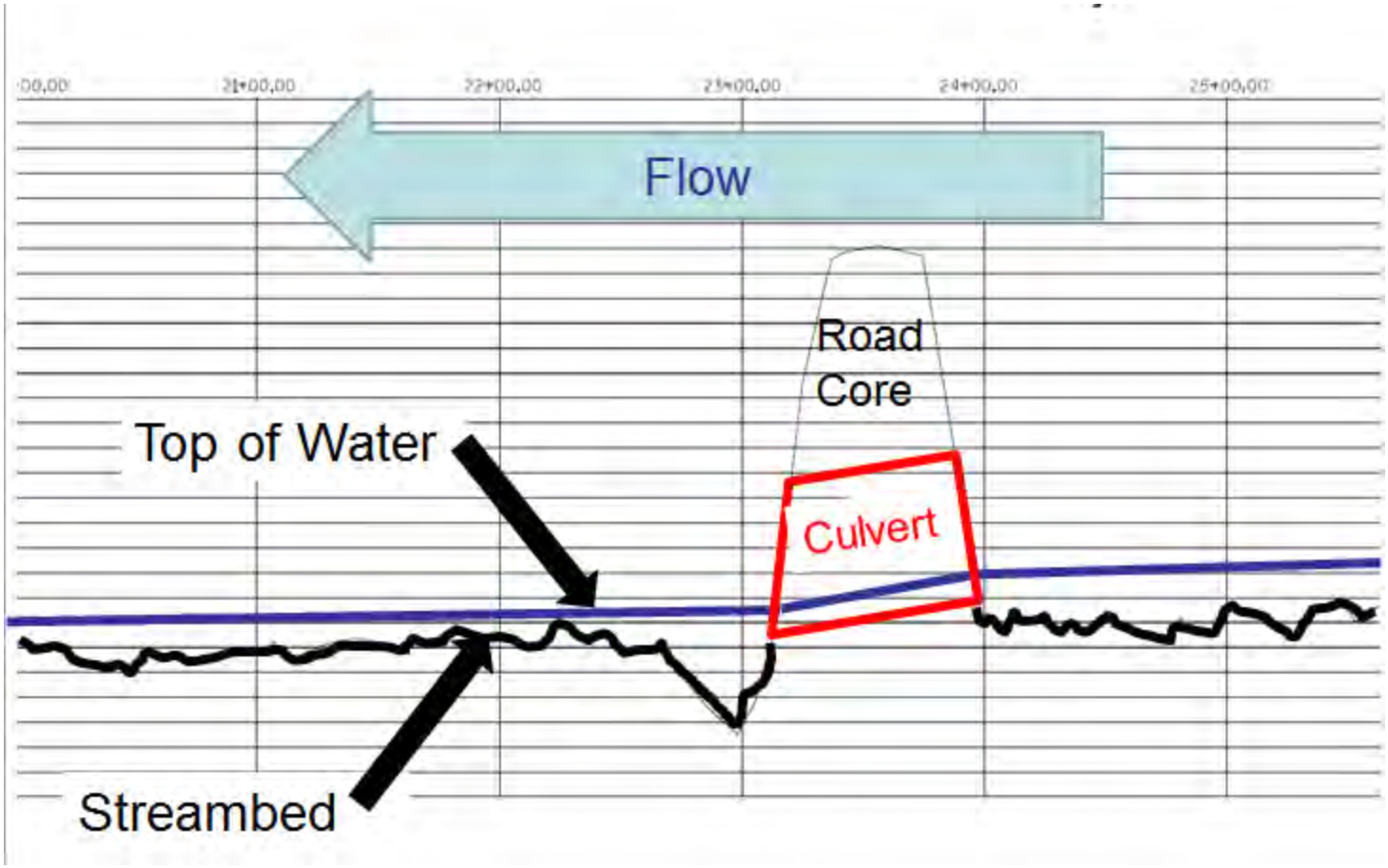
The structure must wrap around a design channel that is bankfull width, has stable banks and is capable of handling vertical adjustments, flood flows, debris, sediment transport and floodplain conveyance!

Do a Stream Profile Survey

- Survey the thalweg (lowest elevation in the stream)
- Survey water surface elevation upstream and downstream

- Gather survey points of structure
- Survey road at crossing

Stream Profile Survey



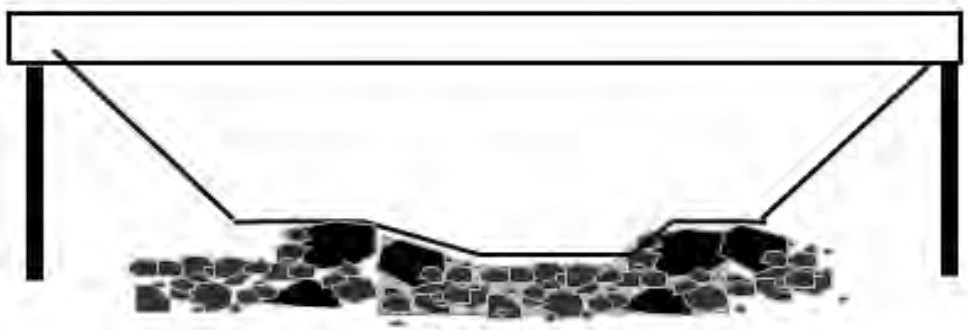
Structure design steps

- Choose a structure width based on:
  - Bankfull width, minimum bank width, floodplain requirements
  - Other passage requirements – Fish, wildlife, people, boats
- Select an initial structure:
  - Type and size – Culvert? Bridge? Bottomless?
- Identify min & max cover requirements for road
- Select an elevation for the invert or bottom of culvert
- Determine structure length taking into account:
  - Side-slope
  - End treatments
- Check
  - Hydraulic capacity ($HW/D<0.8$ for Q_{100}),
  - Bed mobility
  - Stability
- **Repeat as needed**

Culvert size & type factors based on site conditions and engineering constraints

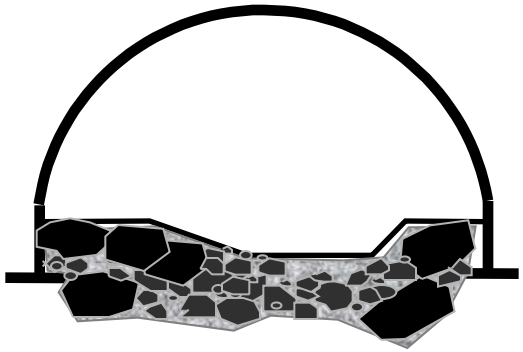
- Alignment of channel to road
- Ice plugging in severe cold climate
- Large bed material relative to culvert width
- High water level stage during floods
- Soft foundations or shallow bedrock
- High conveyance across flood plain
- Height of road and load requirements
- Access for equipment and materials
- Utilities

Structure types

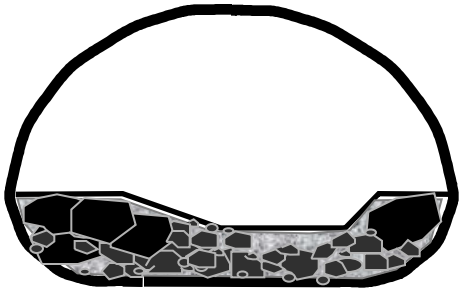


Bridge

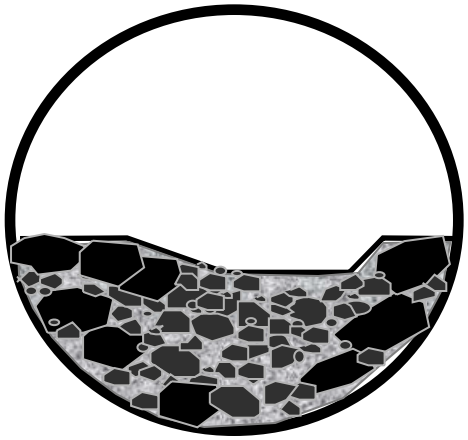
Box



Bottomless Arch



Pipe Arch



Embedded Round

Structure examples


12’ wide ellipse

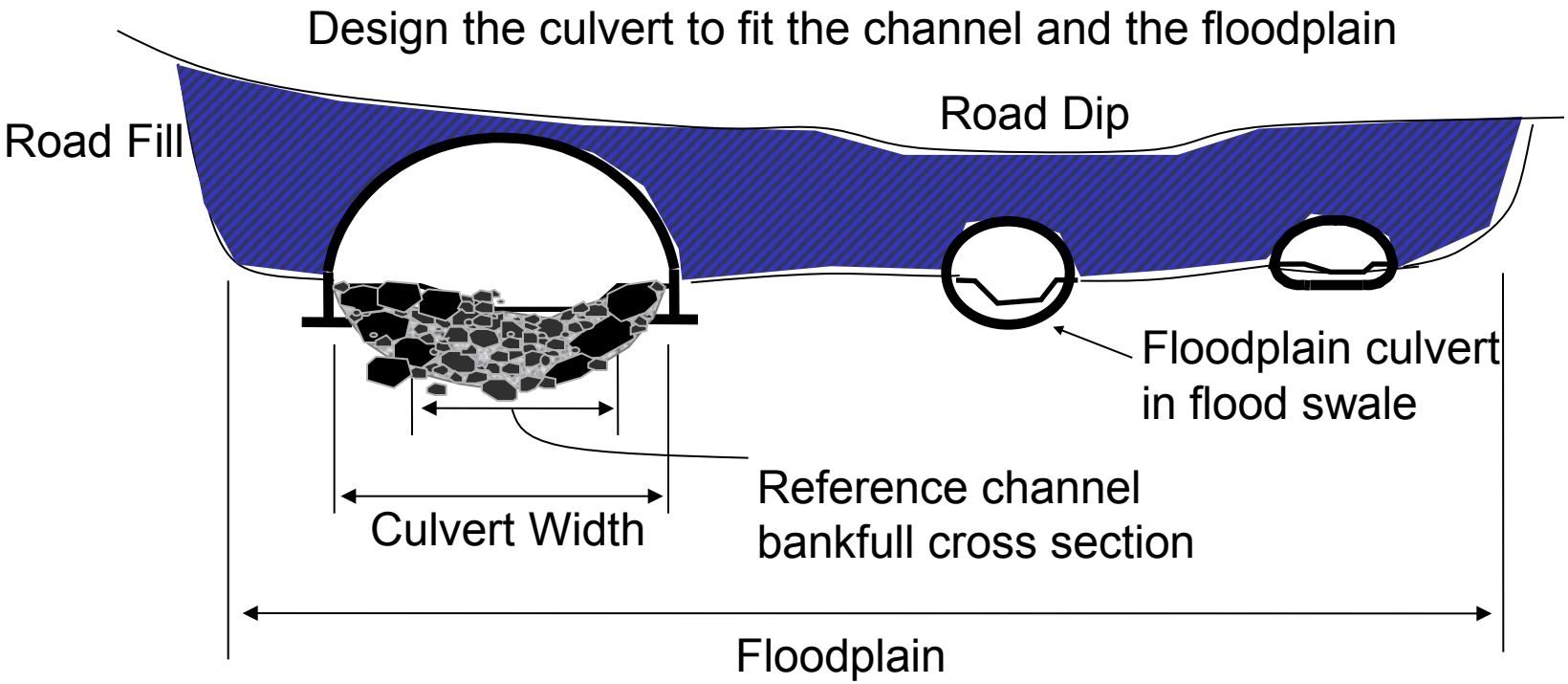

25’ wide alum box


24’ wide conc arch

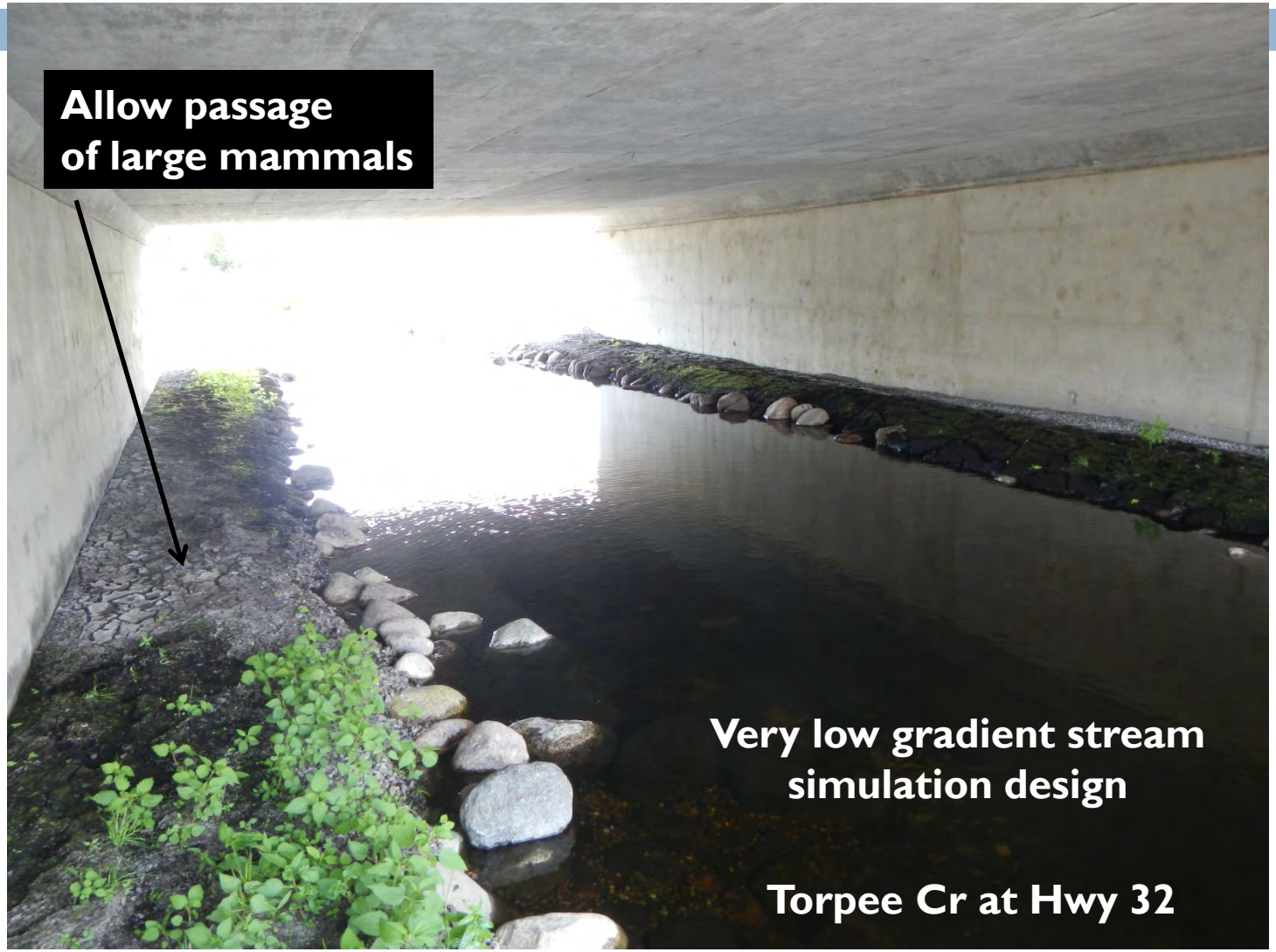

12’ wide pipe-arch


30’ wide bridge


20’ wide conc box


Design the culvert to fit the channel and the floodplain
Road Fill
Road Dip
Floodplain culvert
in flood swale
Reference channel
bankfull cross section
Culvert Width
Floodplain

Floodplain considerations



Final Design (example)

- Replace 5 foot round corrugated metal pipe (1949) with 24 foot side bridge
- Riprap designed for wildlife/human passage
- Riprap installed to create sinuosity
- Stream habitat restoration 2016 (DNR)

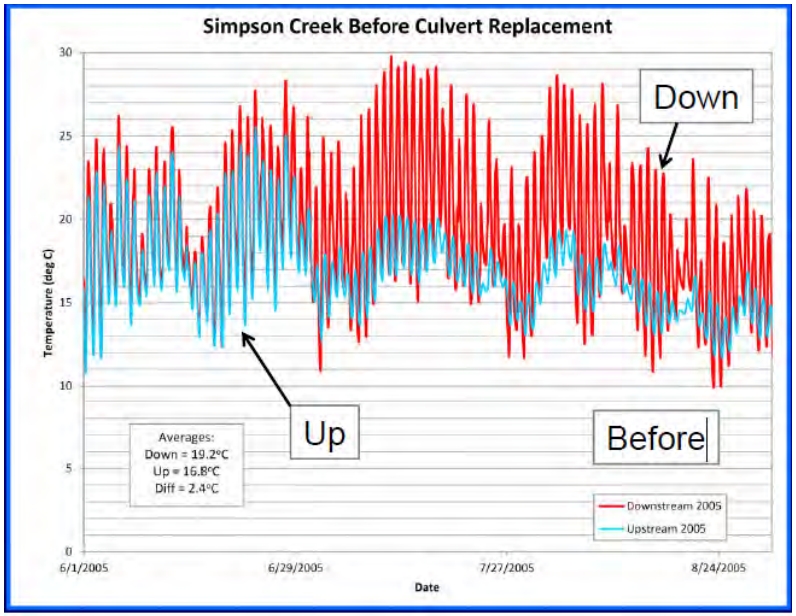
STH 21 in Waushara County

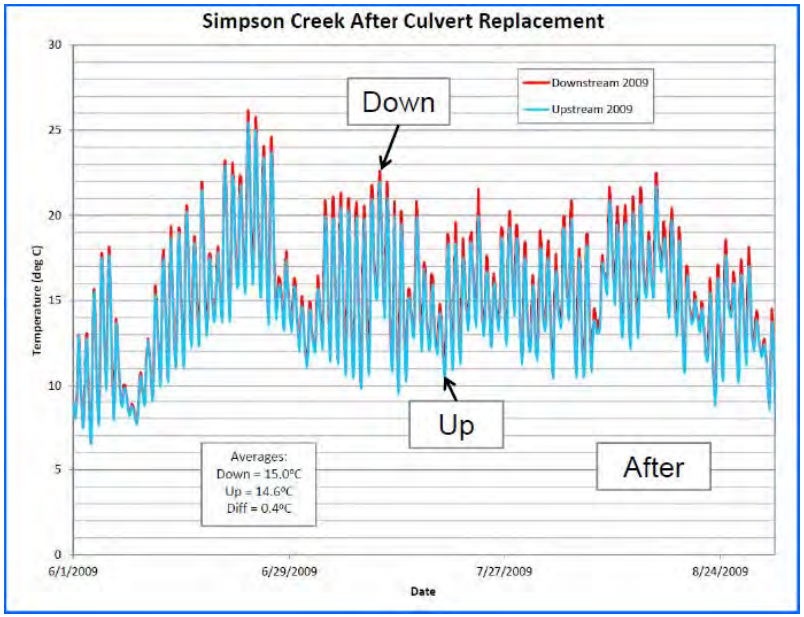
Before & After

Upstream

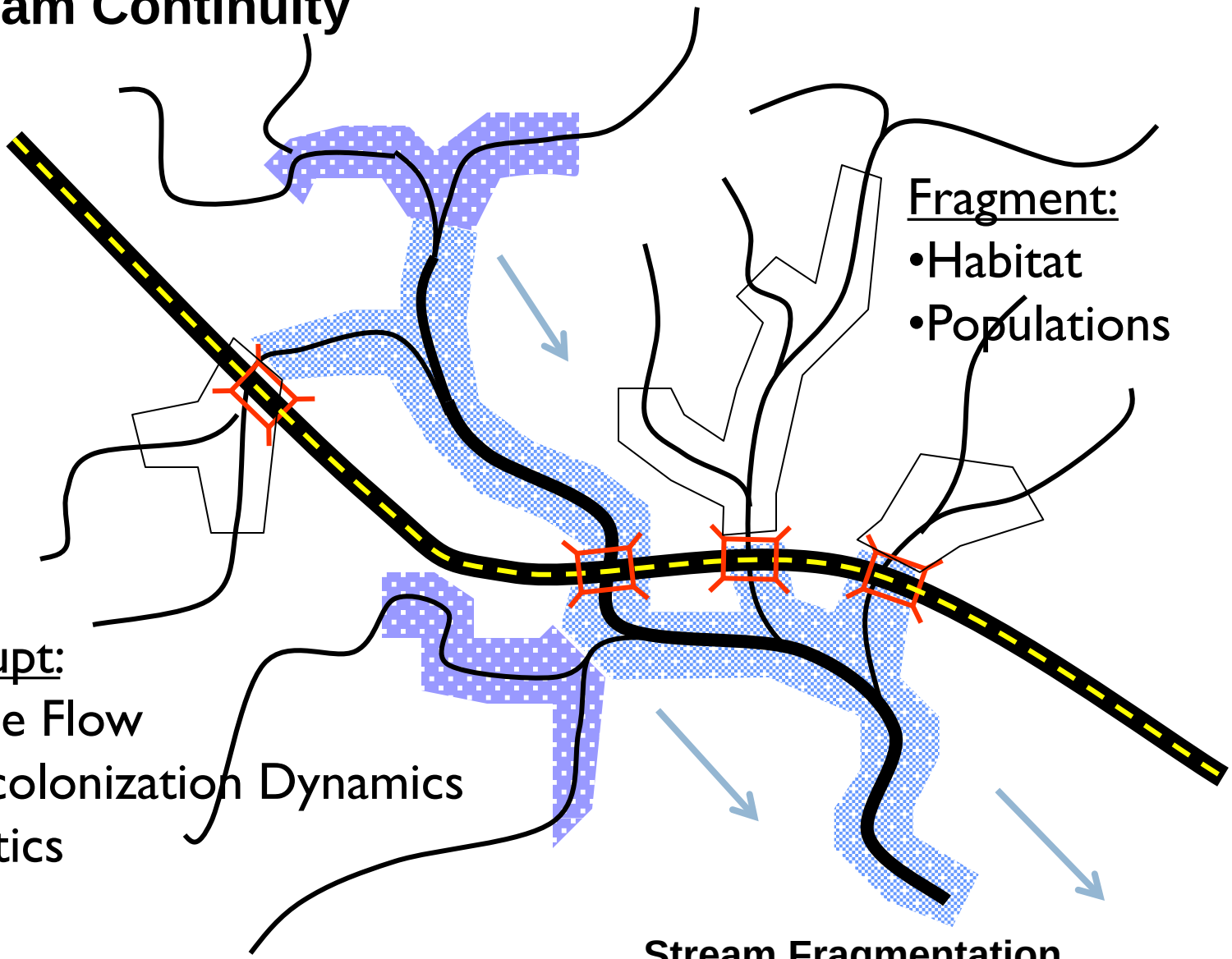
Before & After—Downstream

Simpson Creek Culvert Replacement at Forest Road 2388

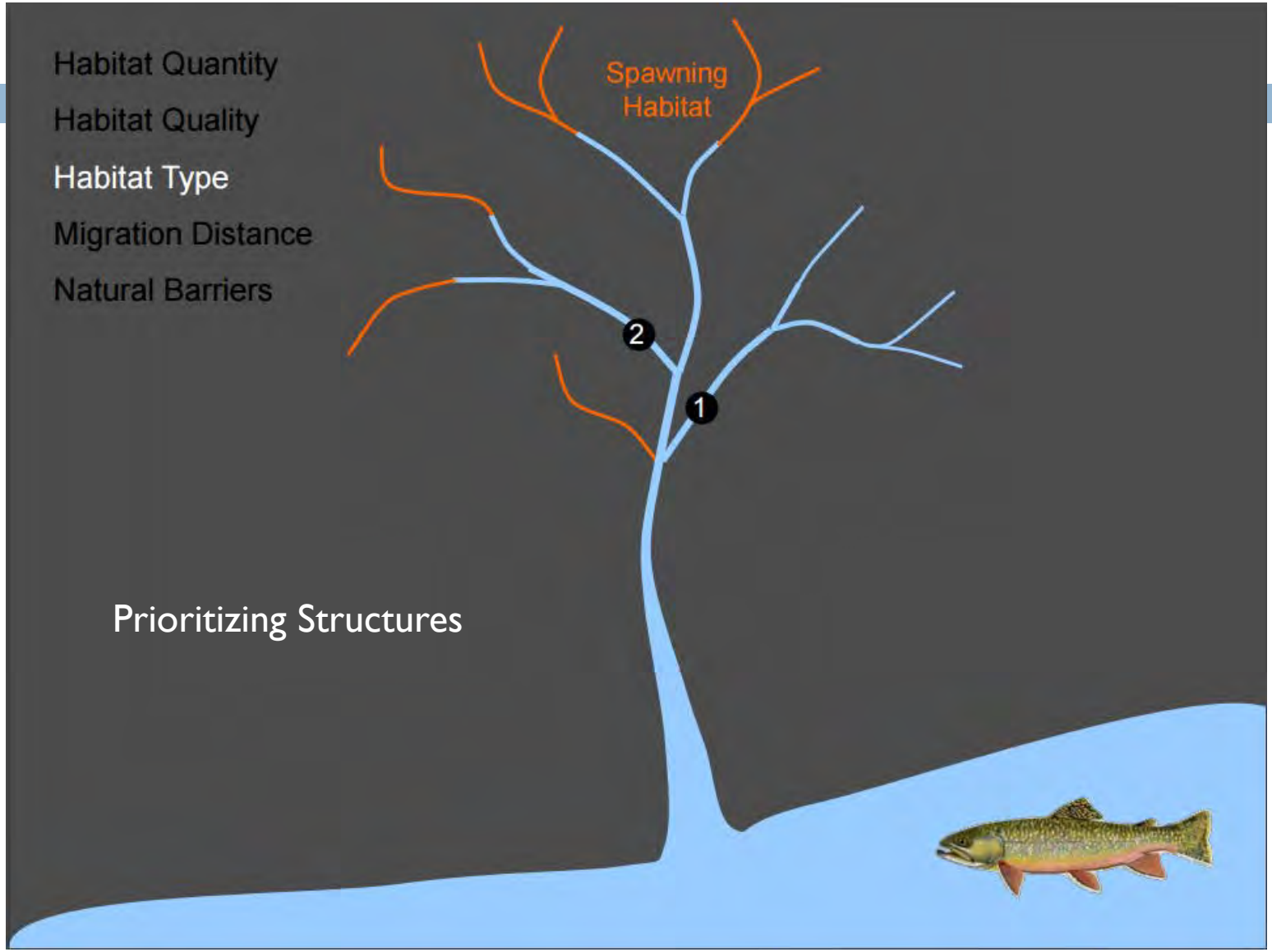


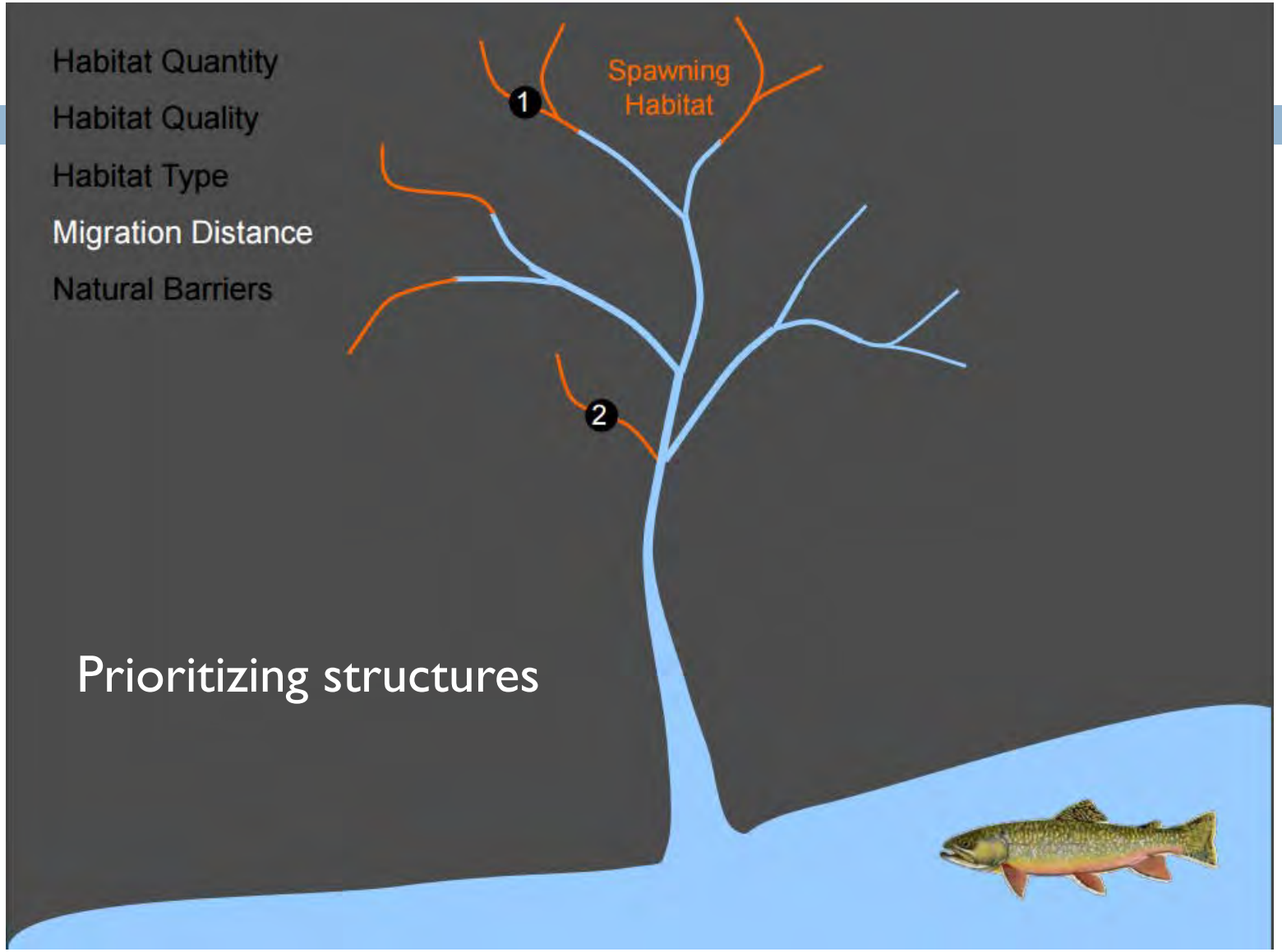


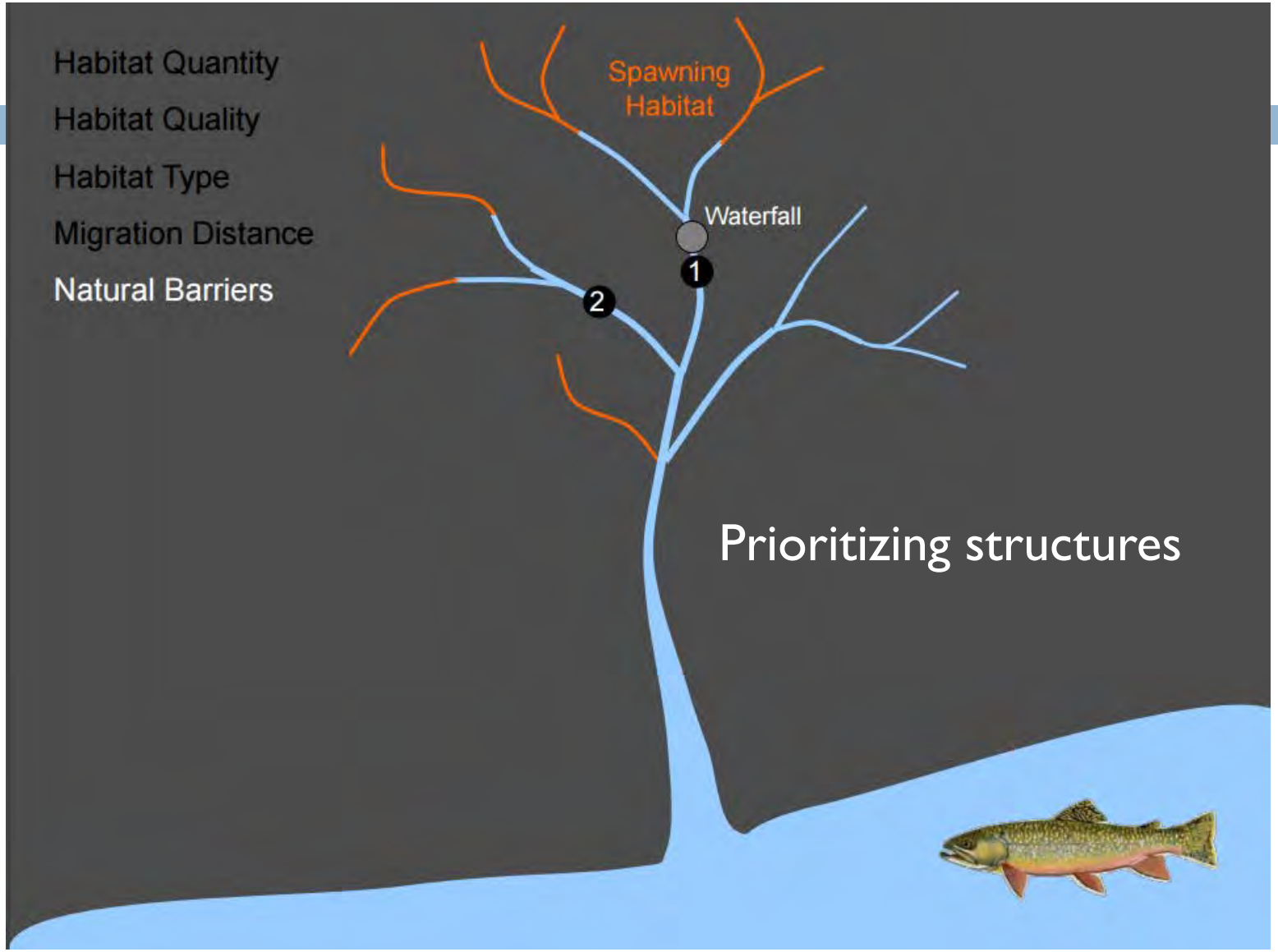
Stream Continuity



Source: Massachusetts Riverways Program
Massachusetts Department of Fish and Game
U.S. Forest Service


Habitat Quantity
Habitat Quality
Habitat Type
Migration Distance
Natural Barriers
Spawning Habitat
2
1
Prioritizing Structures


Habitat Quantity
Habitat Quality
Habitat Type
Migration Distance
Natural Barriers
Spawning Habitat
1
2
Prioritizing structures


Habitat Quantity
Habitat Quality
Habitat Type
Migration Distance
Natural Barriers
Spawning Habitat
Waterfall
1
2
Prioritizing structures

Best Management Practices = BMPs

Wisconsin's best management practices for water quality are intended to provide *simple* and *cost-effective methods* for protecting water quality in lakes, streams and wetlands **before, during** and **after** construction activities.

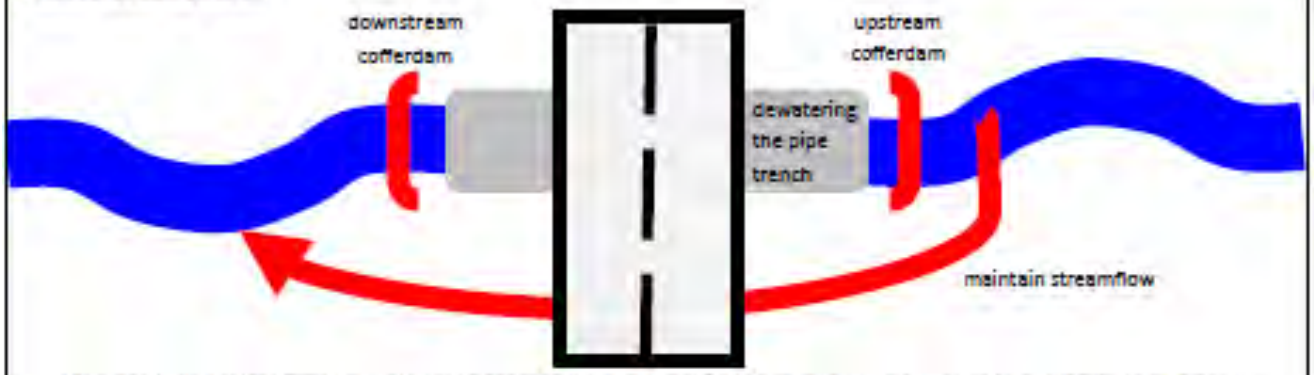
DNR has summarized BMPs for culverts and municipal transportation projects. They are divided into before, during and after construction so they are easy to understand and use.

STREAM CULVERTS (NAVIGABLE WATERWAYS)—BEST MANAGEMENT PRACTICES (Sept. 2015)

The following example describes typical best management practices that are needed to protect water quality at culvert replacement projects.

BEFORE Construction: Devise an erosion control plan for the project site. Be sure the plans include stockpile protection. Further, be sure all stockpiles and borrow/waste sites are setback from waterways, wetlands, and floodplains. Begin to install erosion control items before any ground is disturbed. *Common methods include: construction site diversion, silt fence, ditch checks, vegetative buffers, inlet protection, sediment traps, and tracking pads.*

DURING Construction:



- **Non-erodible coffer dams** up and downstream to isolate the pipe during excavation. *Common methods include sand bags wrapped in plastic sheeting, other reinforced plastic sheeting, steel sheeting, and water bladder barrier.*
- **Treat water from the culvert trench** to prevent cloudy water from reaching waterways or wetlands. *Common methods include temporary settling basin, infiltration basin, filtration bag, sediment tank. Water applied polymer may be needed in conjunction with these methods.*
- **Maintain streamflow downstream** to protect aquatic life. *Common methods include by-pass pumping, plastic and rock/rock bag lined channel, by-pass culvert, and diverting water to one culvert (at sites with 2 or more culverts only).*

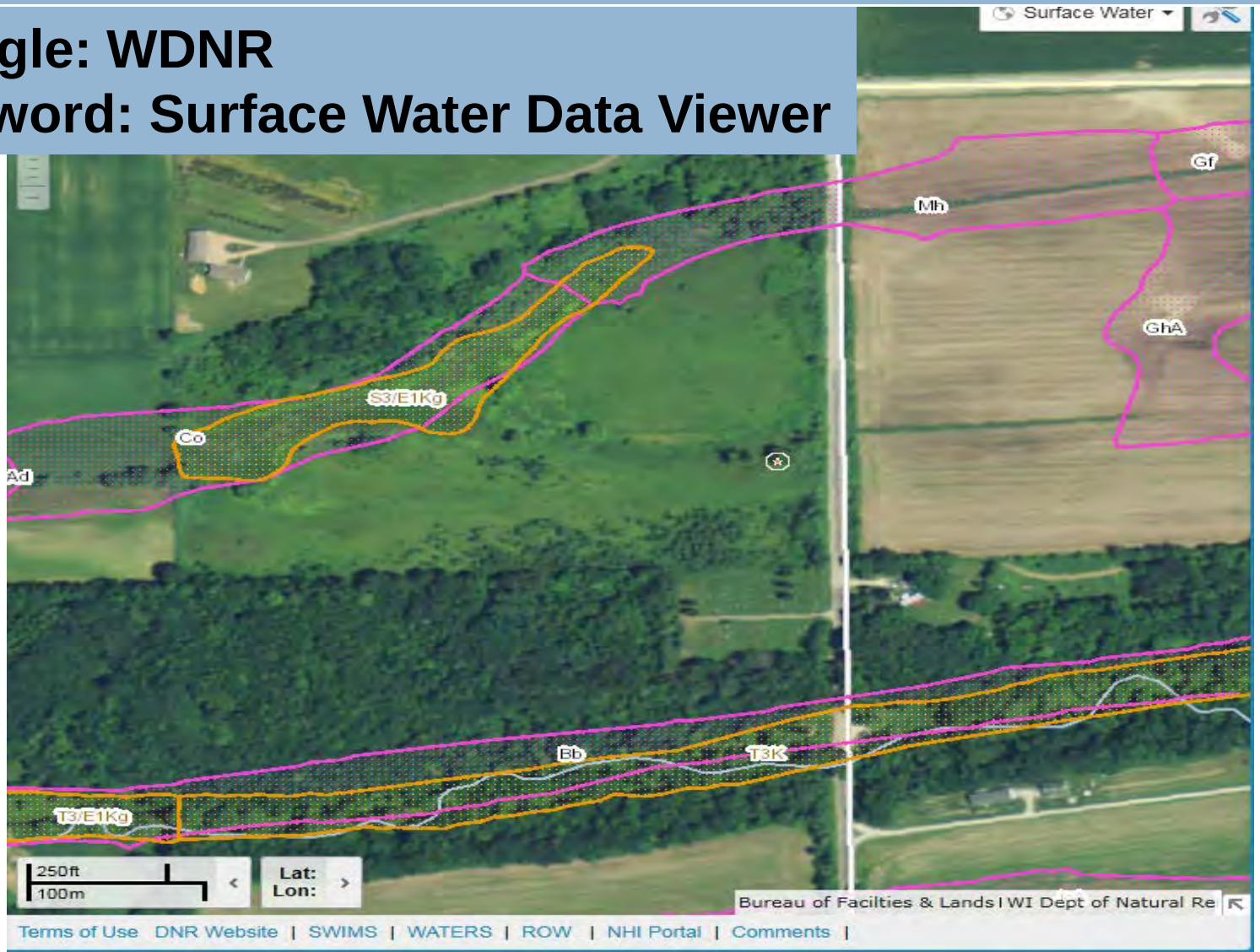
BMP's Before Construction

- Are there waterways? Wetlands? Check-in with DNR!
- Size road-stream crossings to fit waterway & road
- Follow in-stream restrictions protecting fish spawning and movement
- Prepare erosion control plan
- Initial erosion control installation prior to ground disturbance

BMP's Before Construction

Waterway or Wetland Present?

Google: WDNR
Keyword: Surface Water Data Viewer



BMP's Before Construction

Fish Spawning & Movement

March 1st through June 15th for all non-trout streams

Northern Pike

Spawning Channel

BMP's Before Construction

Fish Spawning & Movement

Trout

September 15th through May 15th for all trout streams

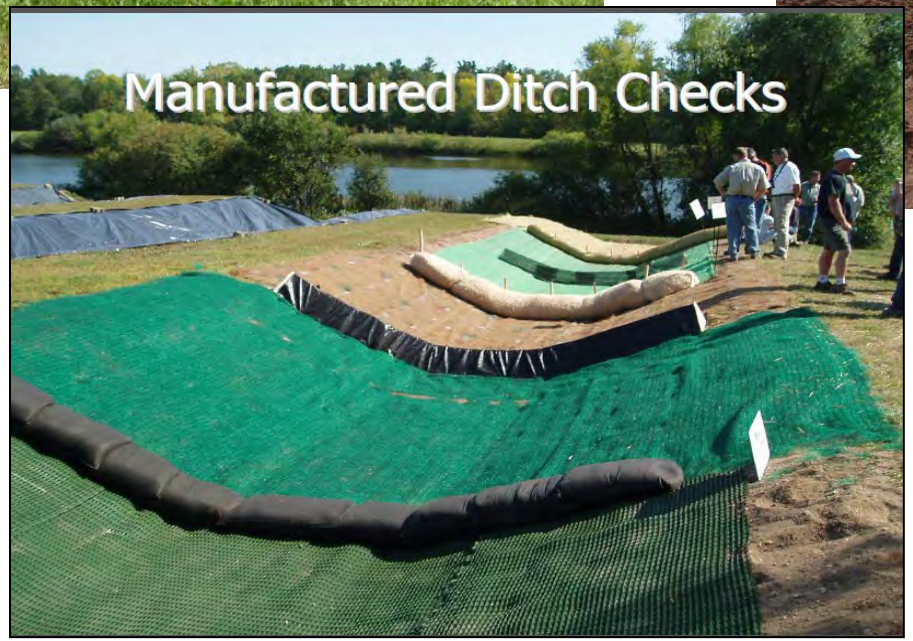
BMP's Before Construction

Prepare an Erosion Control Plan

- Plan for BMP's that will protect the wetlands and waterway not impacted by the project
- Helps establish a budget
- Communicates expectations with the contractor
- Consider consulting with county or state road-building authorities

BMPs Before Construction

Initial Erosion Control For Bridges and Culverts - Ditch Checks



BMPs Before Construction

Initial Erosion Control For Bridges and Culverts

Inlet Protection

Before construction

Temporary Erosion Control For Bridges and Culverts –

Silt Fence

BMPs During Construction

- Non-erodible cofferdams/barriers to isolate work area
- Treat water from within the work area
- Maintain streamflow downstream

For Detailed Technical Standards Visit:
http://dnr.wi.gov/topic/Stormwater/standards/const_standards.html

BMPs During Construction

Non-erodible Barriers = *Isolating the Work Area*

Turbidity Barrier

Coffer Dam

BMPs During Construction

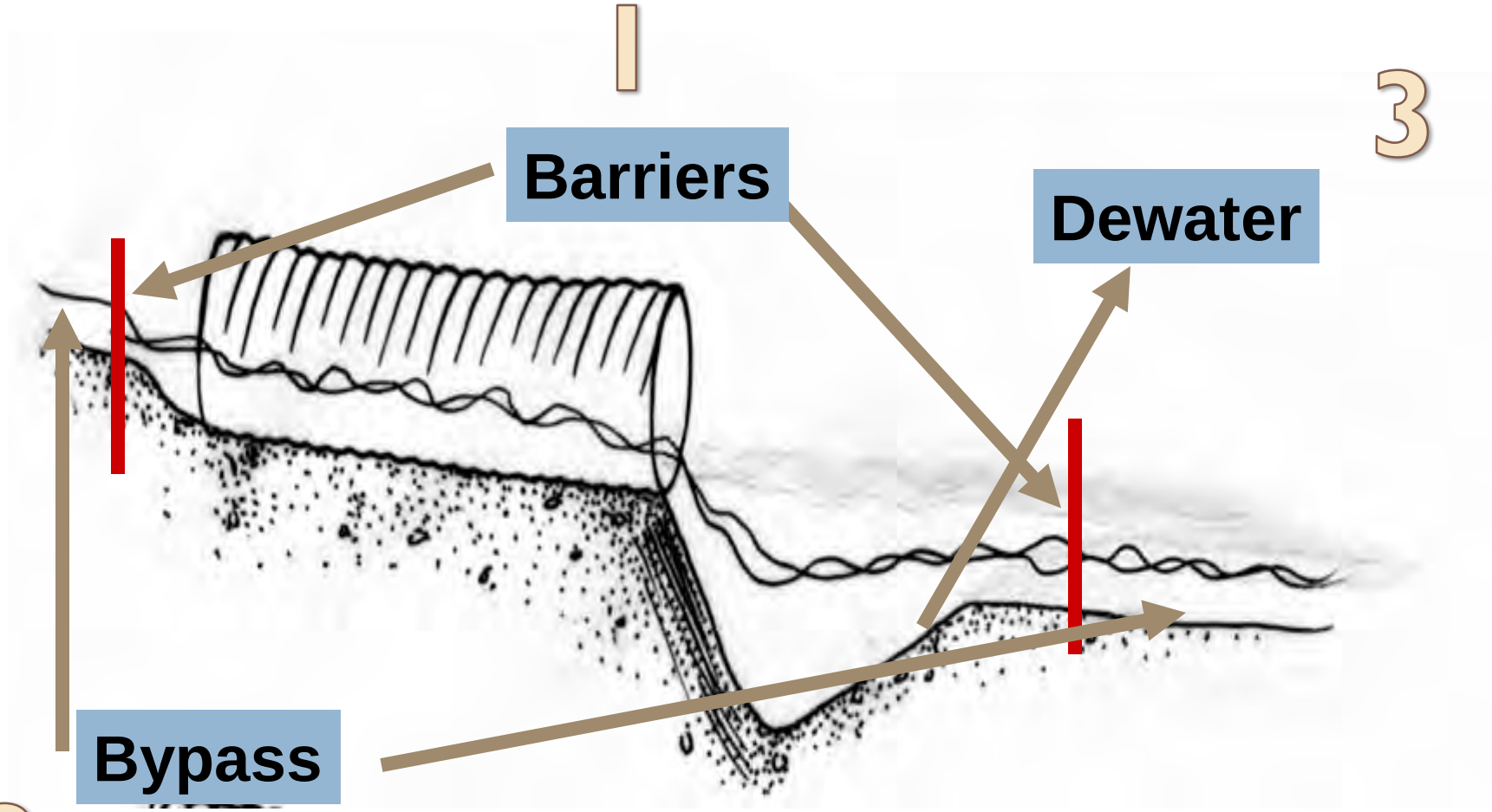
Dewatering & Water Applied Polymers

Filtration Basins & Polymer

****See Dewatering Matrix & Approved Water Applied Polymer list*

Sediment Control Practices For Bridges and Culverts - Stream Bypass—Channel

During Construction - Sediment Control Practices For Bridges and Culverts - **Dewatering**



Proper installation and maintenance

during construction is very important!

Pay close attention to all erosion control devices during construction so that they can work to their fullest potential.


CAT


04.23.2015 13:56

When erosion control devices are properly installed, the critters using the stream are able to move through the construction site unrestricted!

Happy ducks!

Proper set up for a sediment bag

If a sediment bag looks like this, it is not working and needs to be switched out, or you need to consider a different erosion control device.

Don’t forget about dust control!

Sandbags!

Silt screen installed and working properly!

BMPs After Construction

- Riprap
- Topsoil, Seed, Mat/Mulch
- Silt fence, fiber logs, etc.

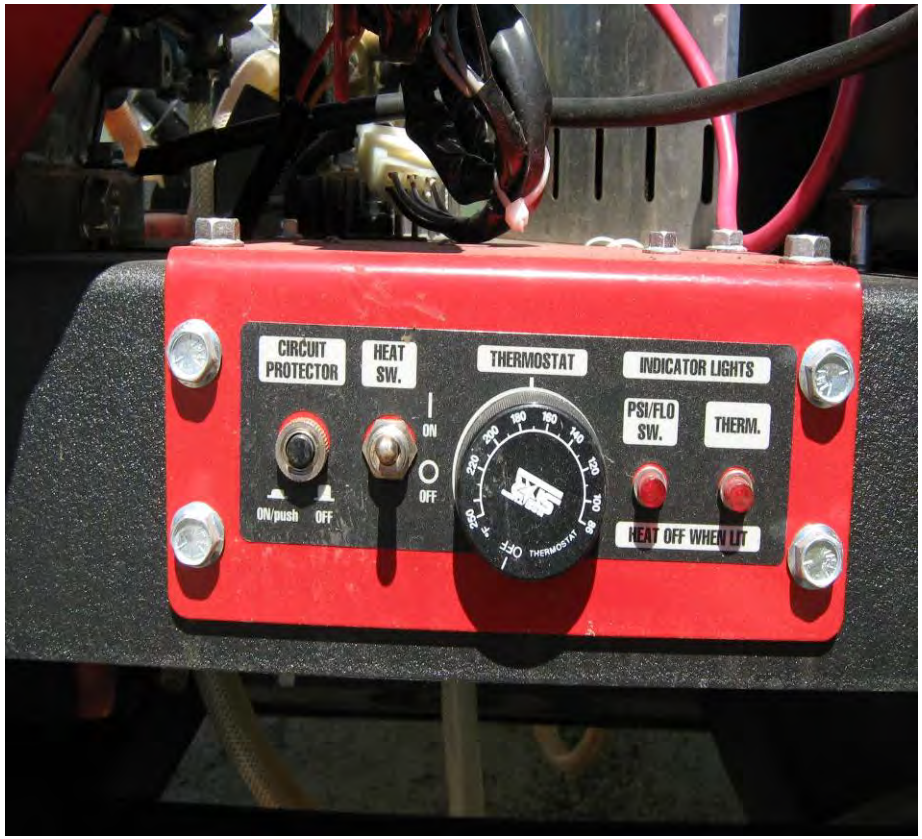
For Detailed Technical Standards Visit: http://dnr.wi.gov/topic/Stormwater/standards/const_standards.html

BMPs After Construction

Topsoil, Seed, and Mulch or Mat, & Silt Fence

Other Considerations

Cleaning Equipment for Invasive Species



Rip rap needs to be sized appropriately and placed appropriately for the stream. This rip rap is placed too high and is cutting off the stream.

Training Opportunities

and materials can be found under the "Learning" Tab on our website.

Road / Stream Crossings Workshop—Inventory, Assessment, Design and Construction

April 11 – 13, 2017

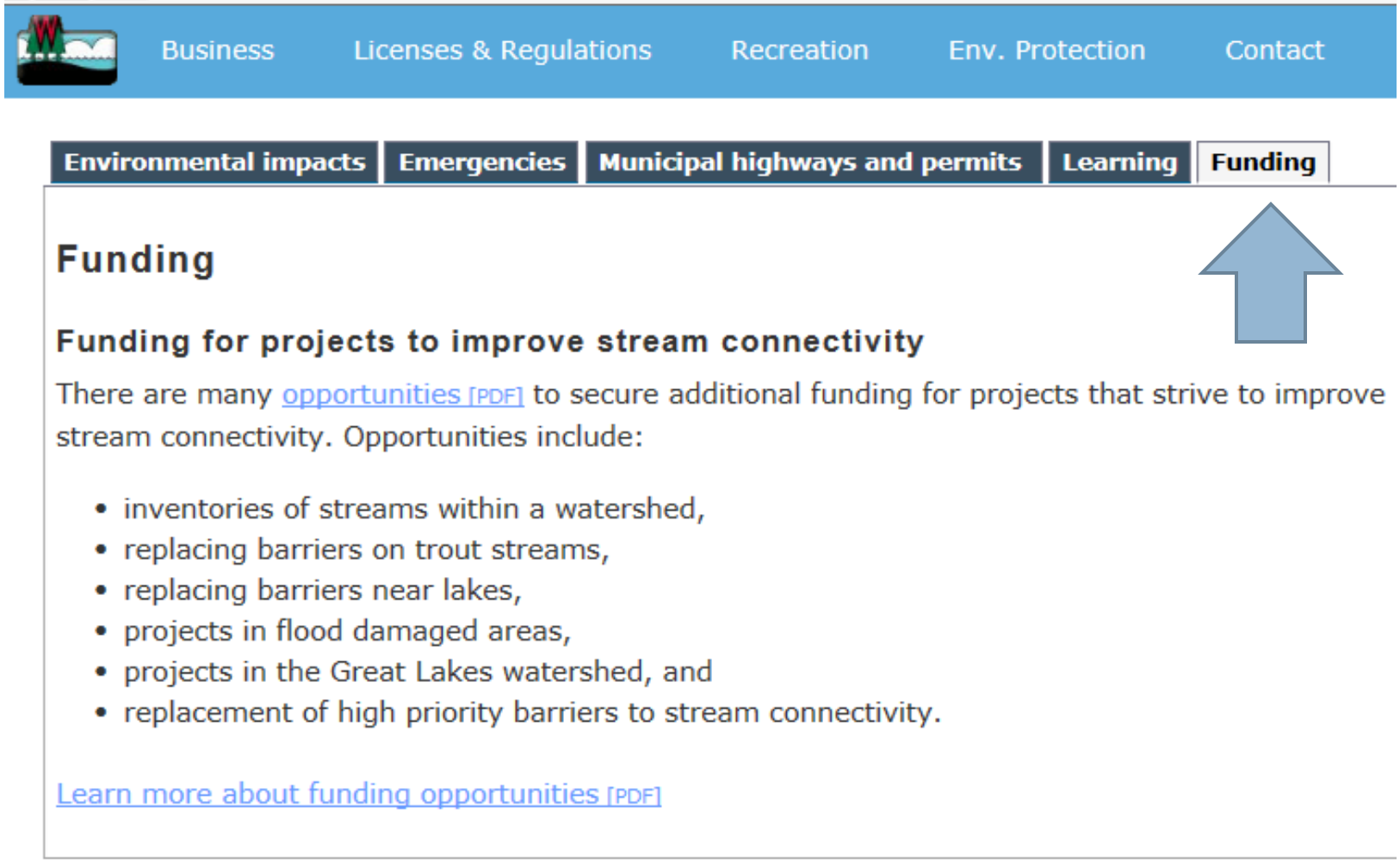
Markee Pioneer Student Center - University Room
University of Wisconsin-Platteville



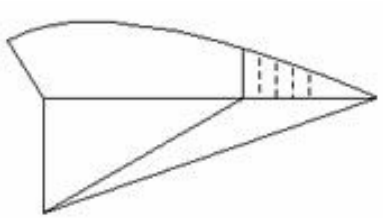
Summary of the 2017 Workshop

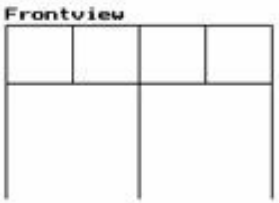
- Ecological Impacts of Stream Crossings
- Fisheries in the Driftless Region
- Inventory, Assessment and Prioritization of streams and projects
- Field reviews of local stream crossings
- Permitting and Construction
- Stream Crossing Design Exercises and Field work
- Long Term Cost Savings and Funding
- Lessons Learned from 2016 Flooding
- Computer Aids and Analysis for Aquatic Connectivity

Funding Opportunities

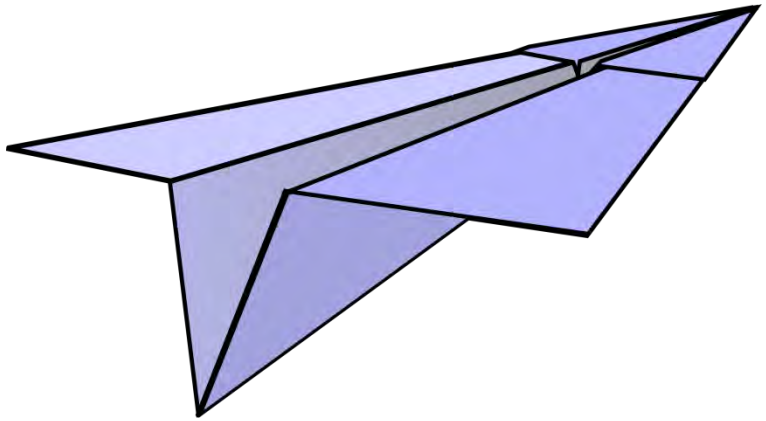


Remember!





- Contact WDNR early!
- **A good design leads to a good project**
- Read and understand the BMPs and the conditions of the permit or approval letter, if received
- Contact DNR if there is a discharge



Don't forget to check in with…..

- ✓ Local / County Shoreland Zoning (Floodplain Zoning)
- ✓ WDNR Stormwater
- ✓ US Army Corps of Engineers

If you have any questions,

please check out our web page at **dnr.wi.gov** – key word "Transportation"

OR

Contact me at Maureen.Millmann@wisconsin.gov