The RI River and Stream Continuity Project

Follow Up Meeting

April 18, 2007

Project Partners

RIRC&D

USDA NRCS Natural Resources Conservation Service

TROUT UNLIMITED

Wood-Pawcatuck Watershed Association
203b Arcadia Road, Hope Valley, RI, 02832
phone: 401-539-9017
info@wpwa.org

Commonwealth of Massachusetts
RIVERWAYS PROGRAM
Building Partnerships, Protecting Rivers

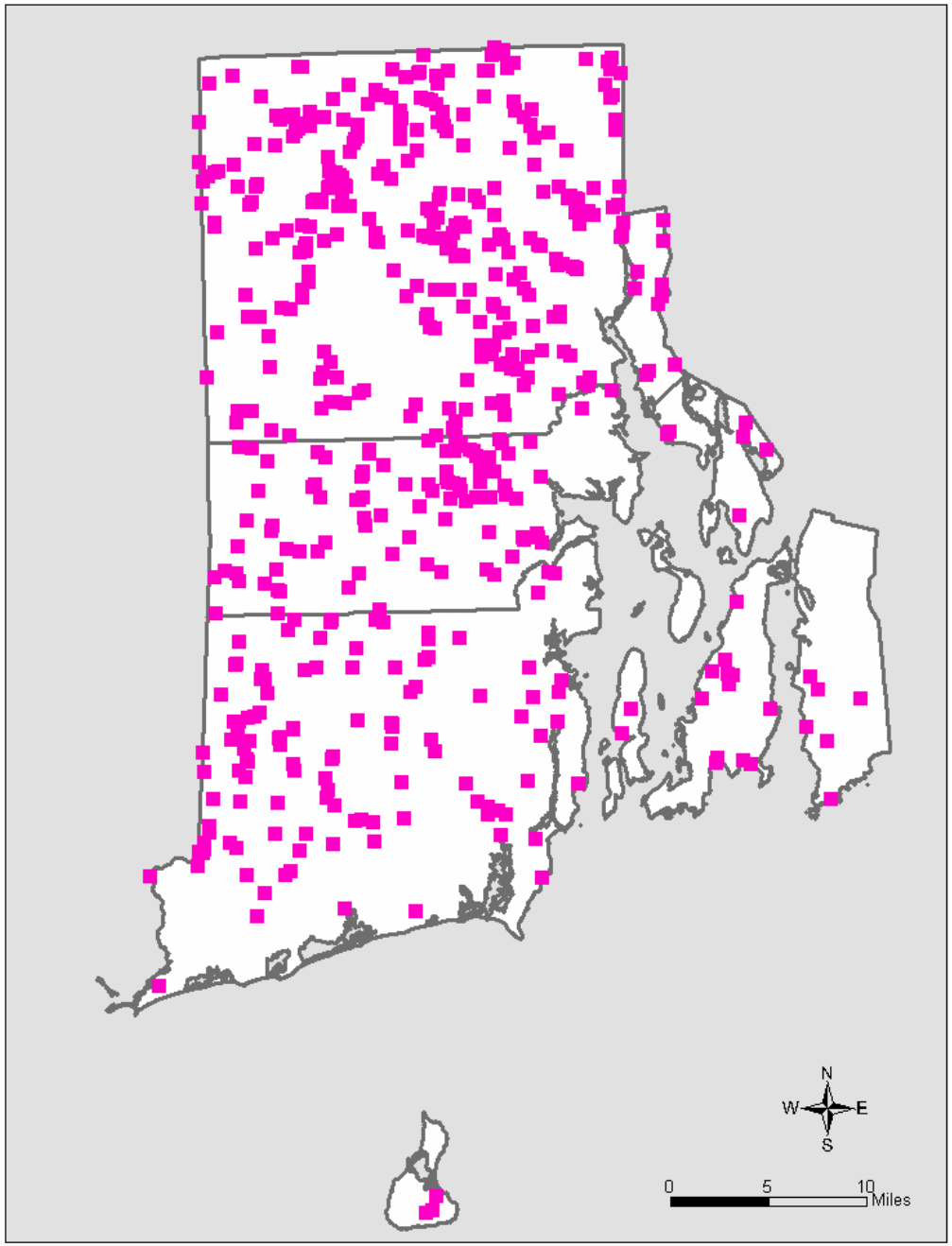
UMASS EXTENSION

Purpose of the Meeting

- To present methods to evaluate culverts as potential barriers.
- To demonstrate how data collection of stream crossings can be performed by different watershed groups.
- To obtain feedback from other groups, organizations, and individuals on the project.
- To identify other partners interested in making this a statewide effort.

Dams

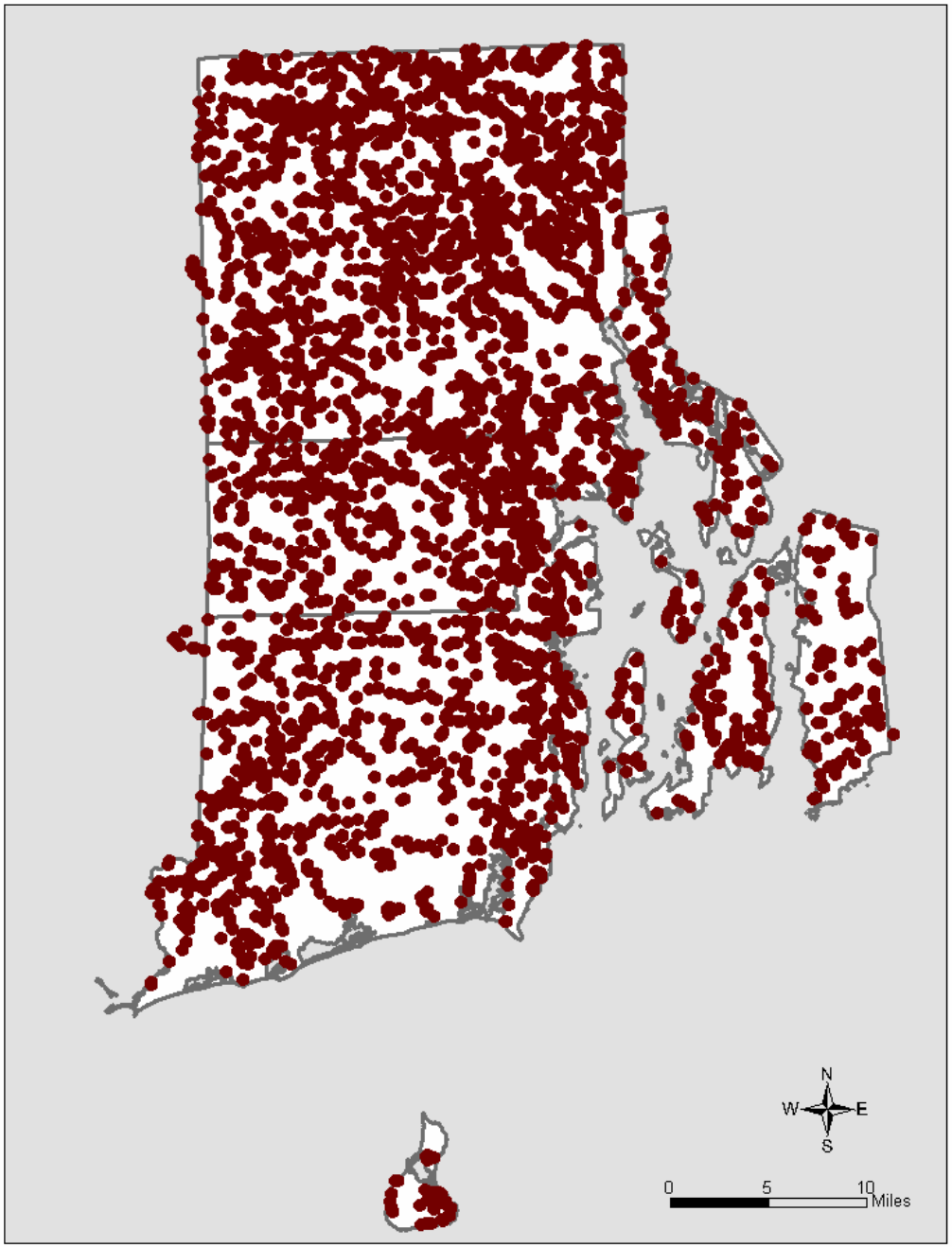
Location of Dams in RI



Over 500 dams

RIGIS

Location of Road and Stream Crossings in RI



Over 4300 road and stream crossings

RIGIS

Sub-standard Culverts

Photos by Lawson Cary

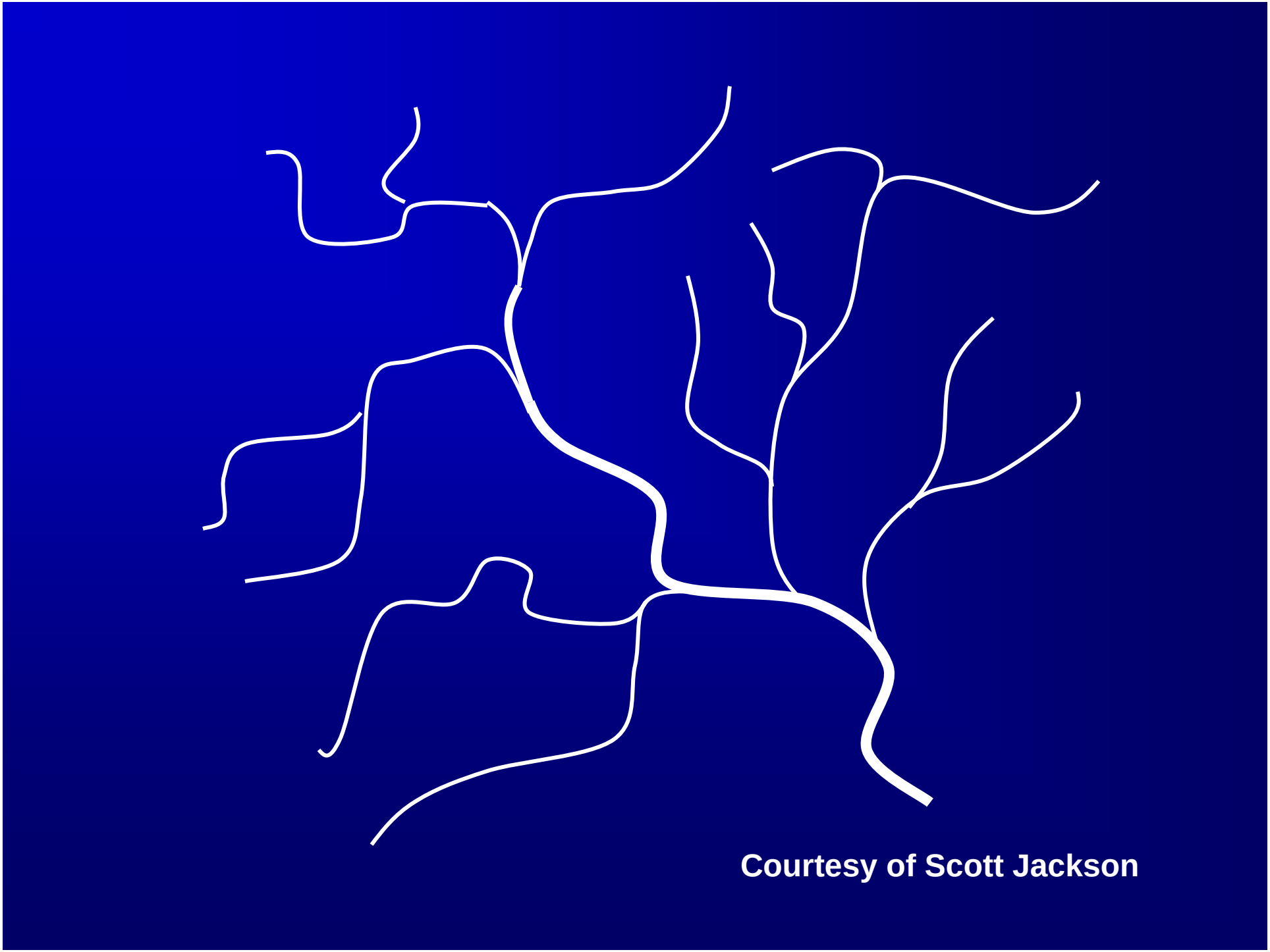
Impacts

- Habitat loss and degradation
- Alteration of ecological processes
- Road kill leading to population losses
- Population fragmentation and isolation
- Reduced access to vital habitats
- Disruption of processes that maintain regional populations

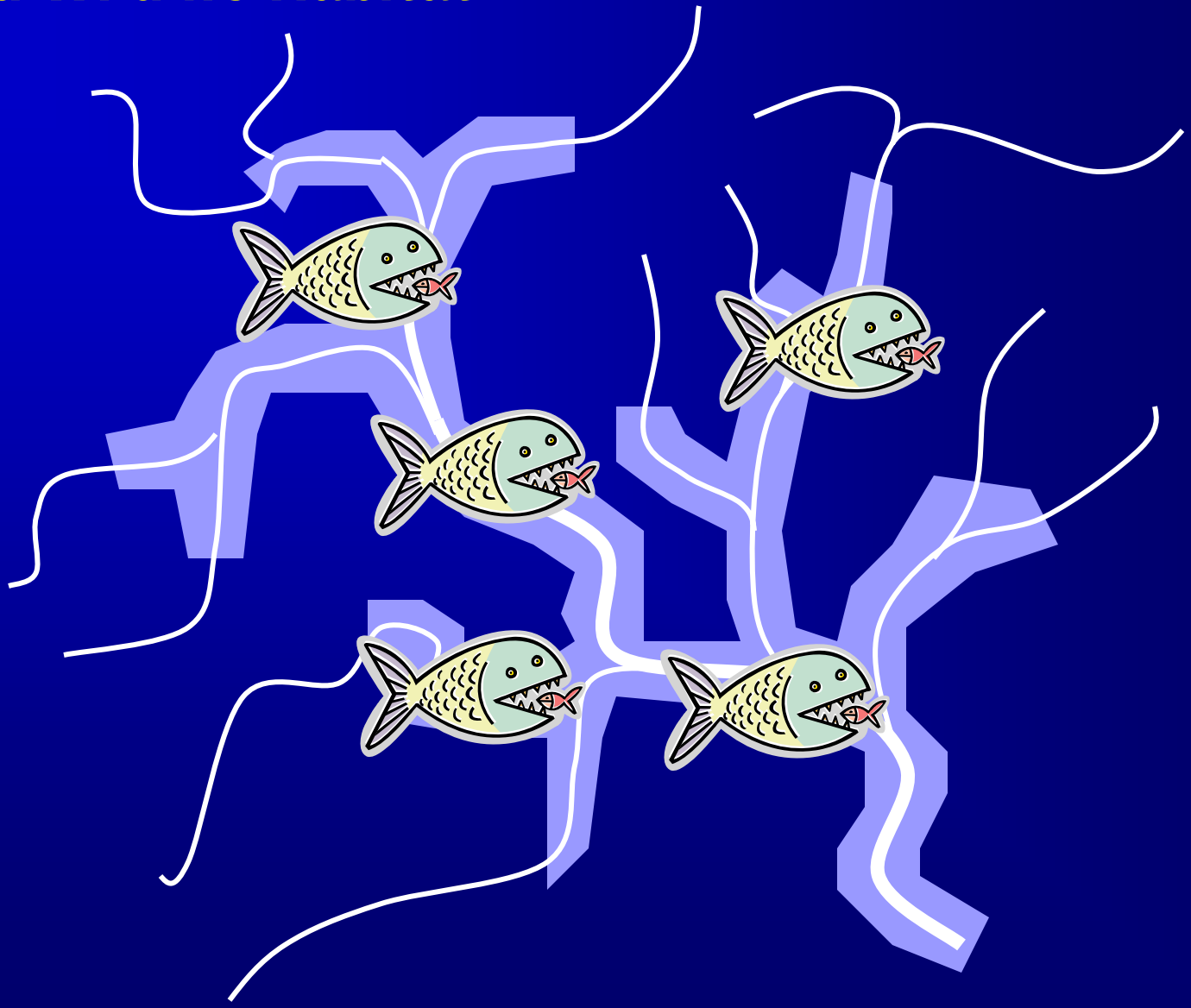
Population Fragmentation and Isolation

- Barriers to movement subdivide or isolate populations

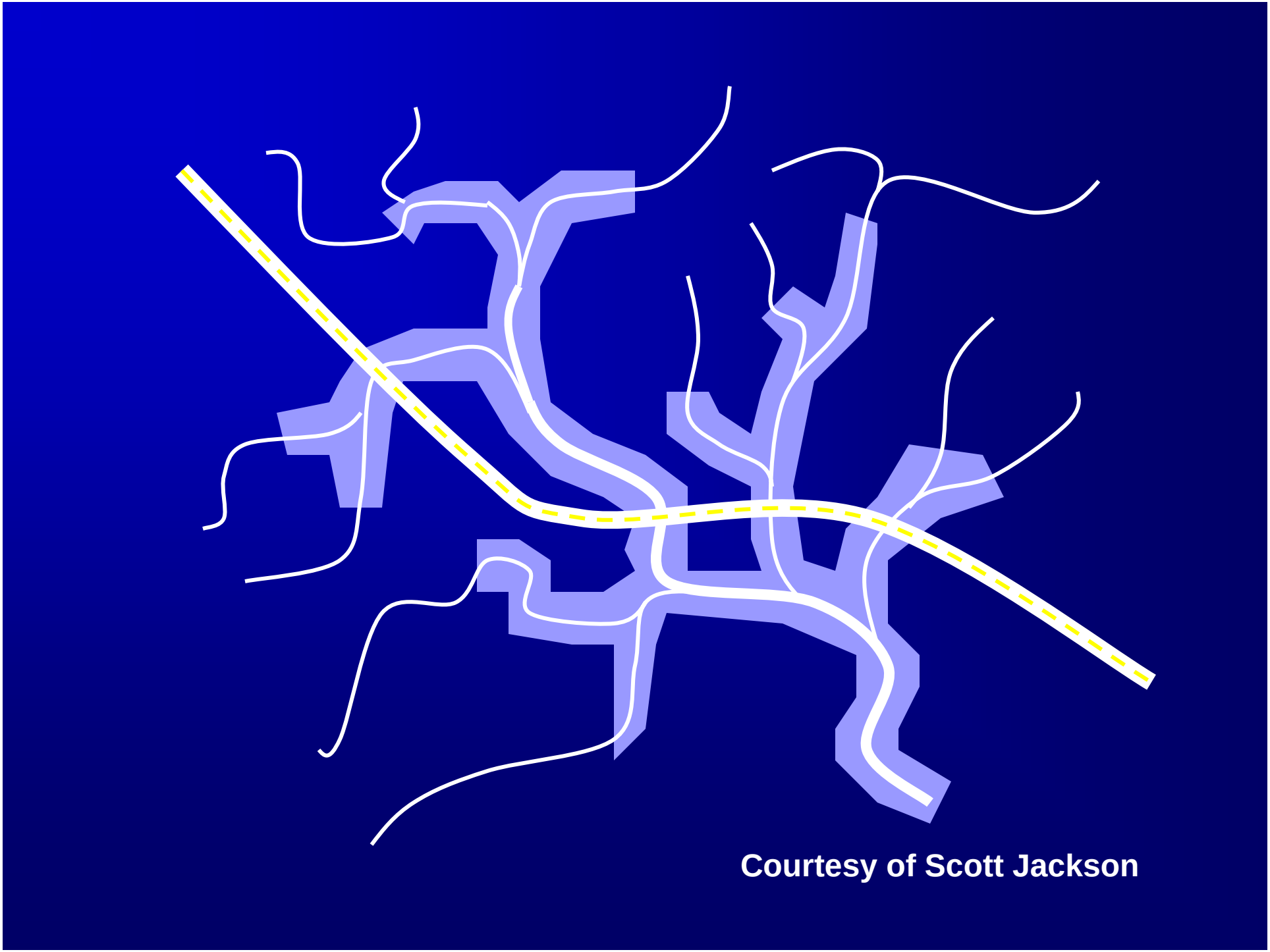
- Smaller and more isolated populations are more vulnerable to:
  - extinction due to chance events
  - genetic changes

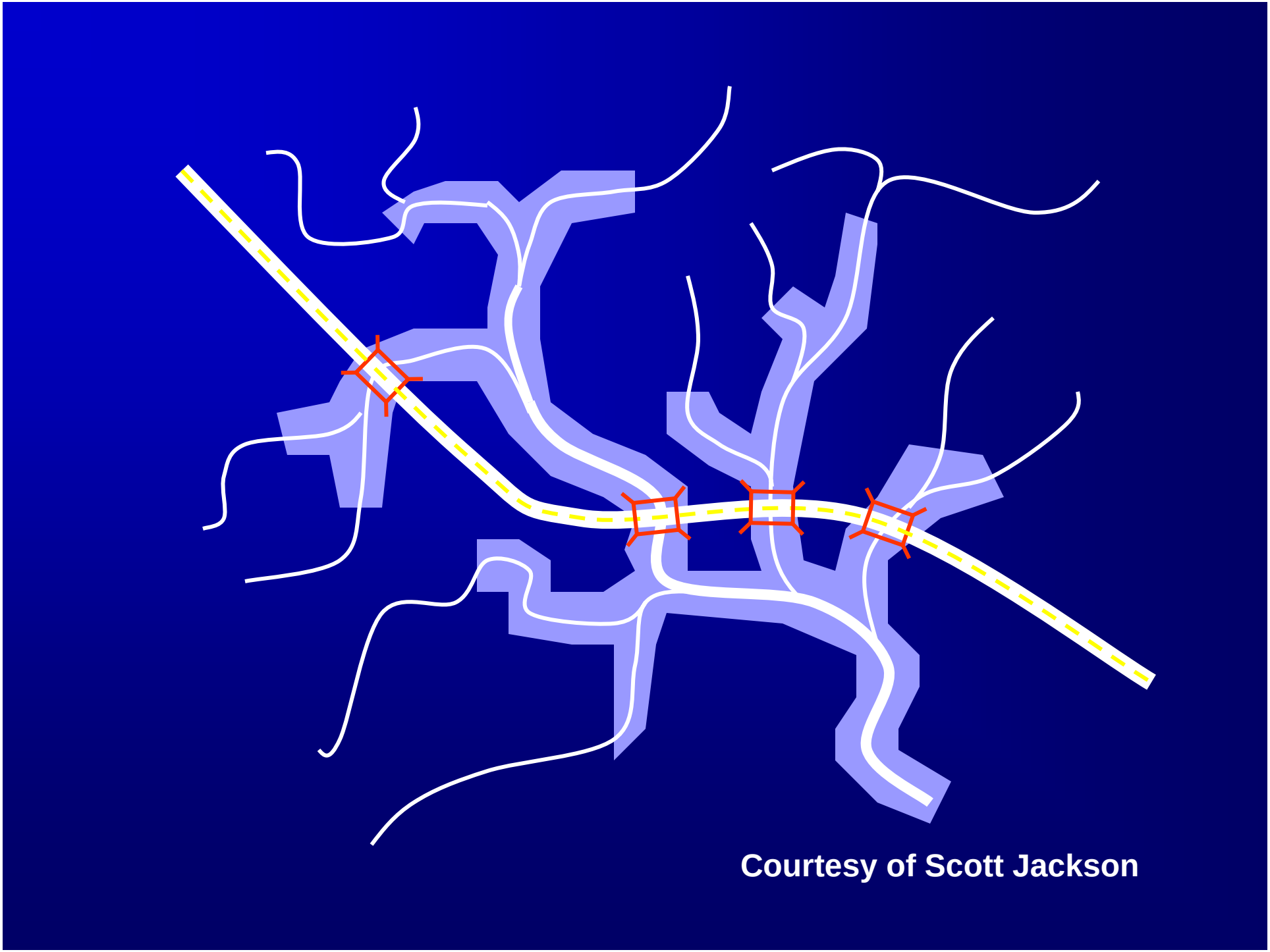

Courtesy of Scott Jackson

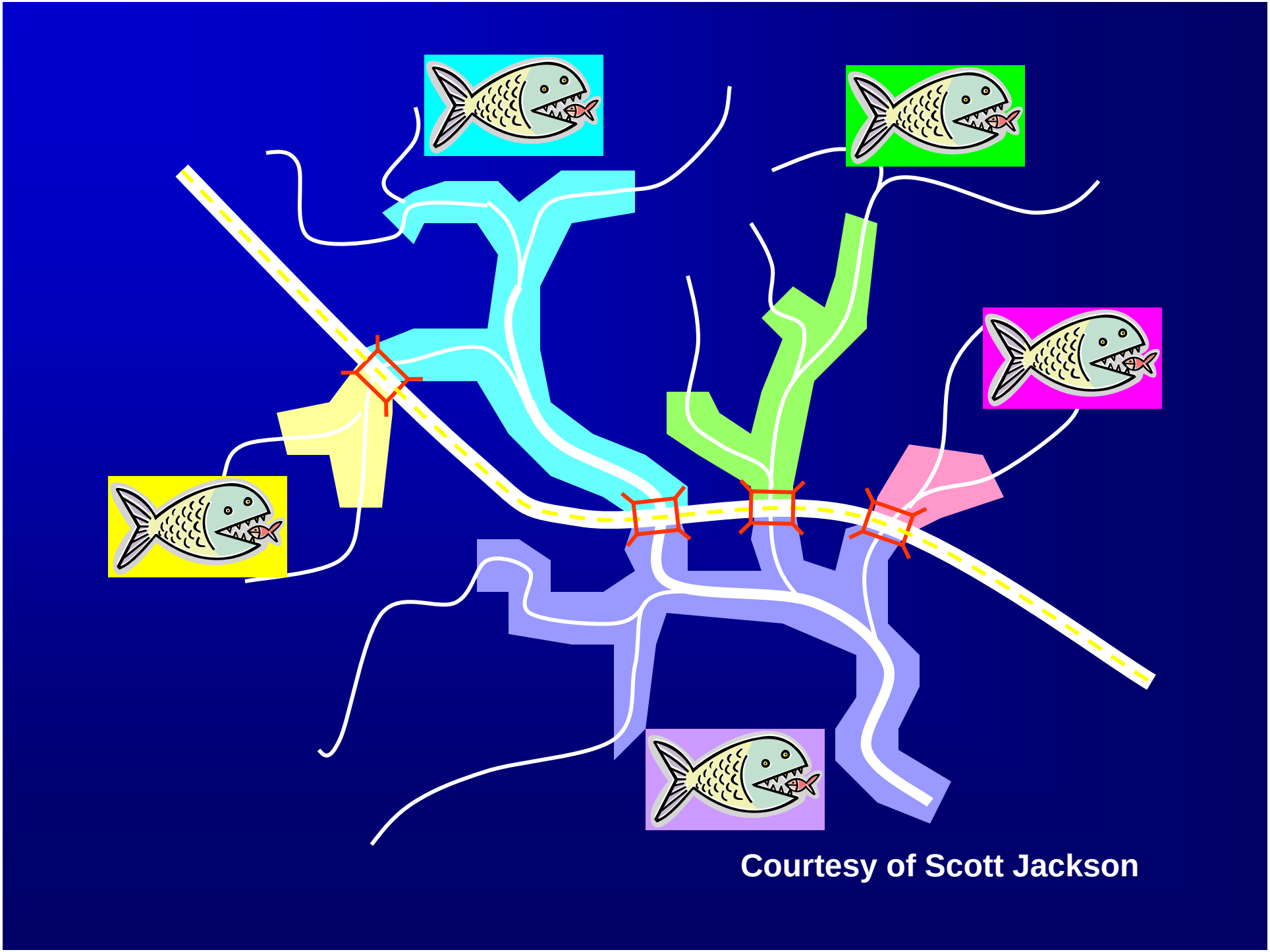
Fish and Wildlife Habitat

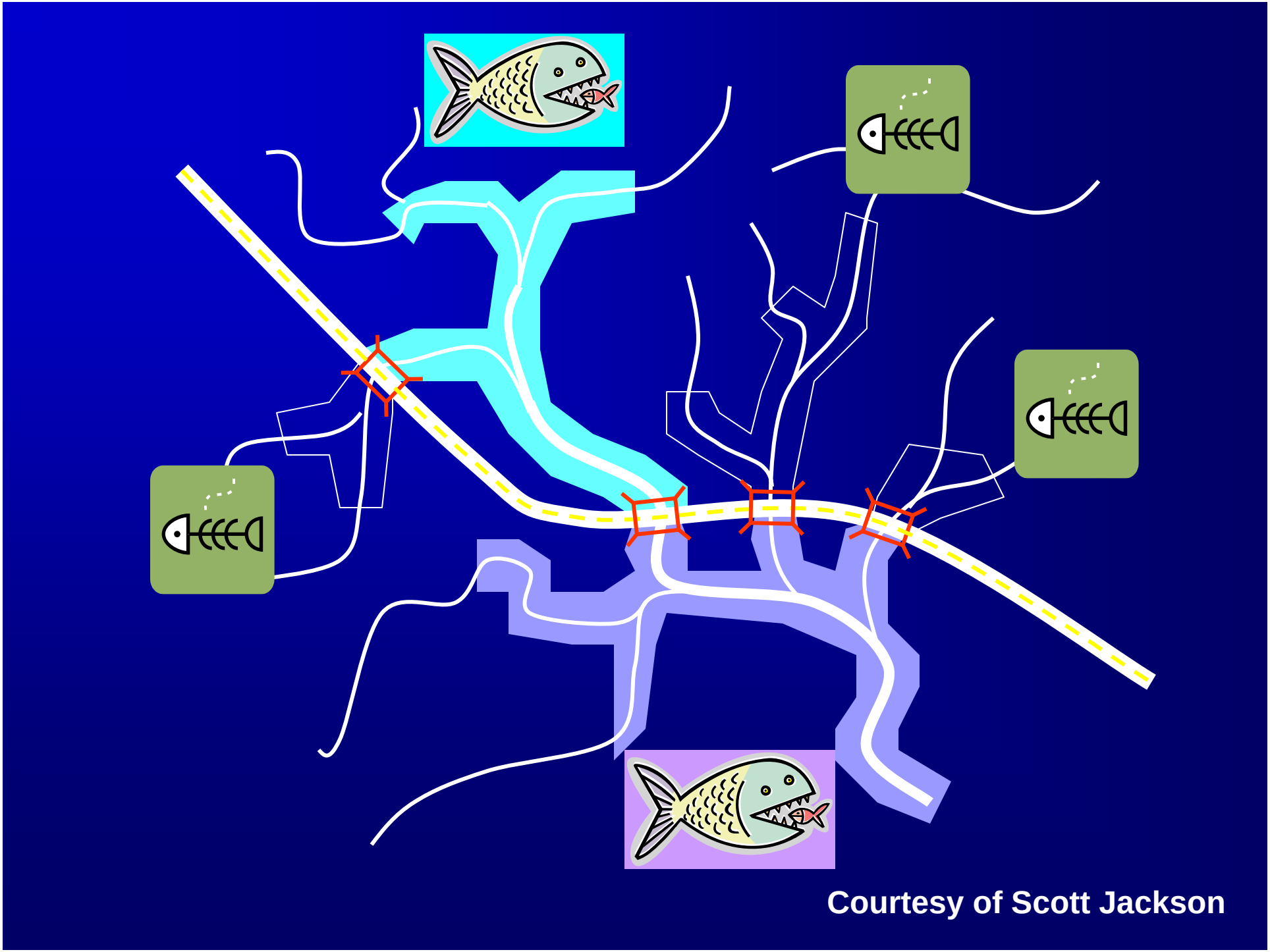


Courtesy of Scott Jackson


Courtesy of Scott Jackson


Courtesy of Scott Jackson


Courtesy of Scott Jackson


Courtesy of Scott Jackson

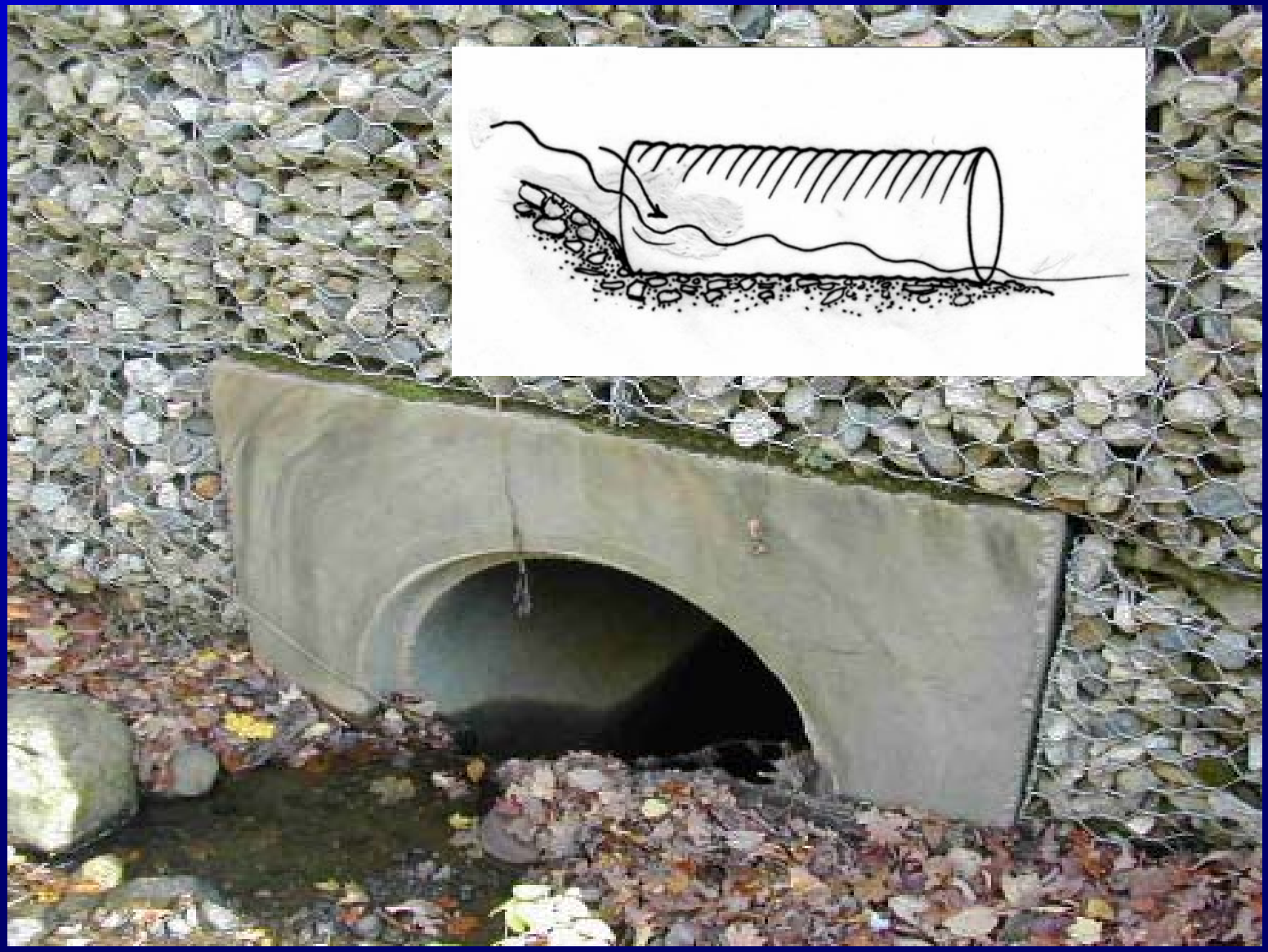
Sub-standard Culverts

Photos by Lawson Cary

Culvert Problems

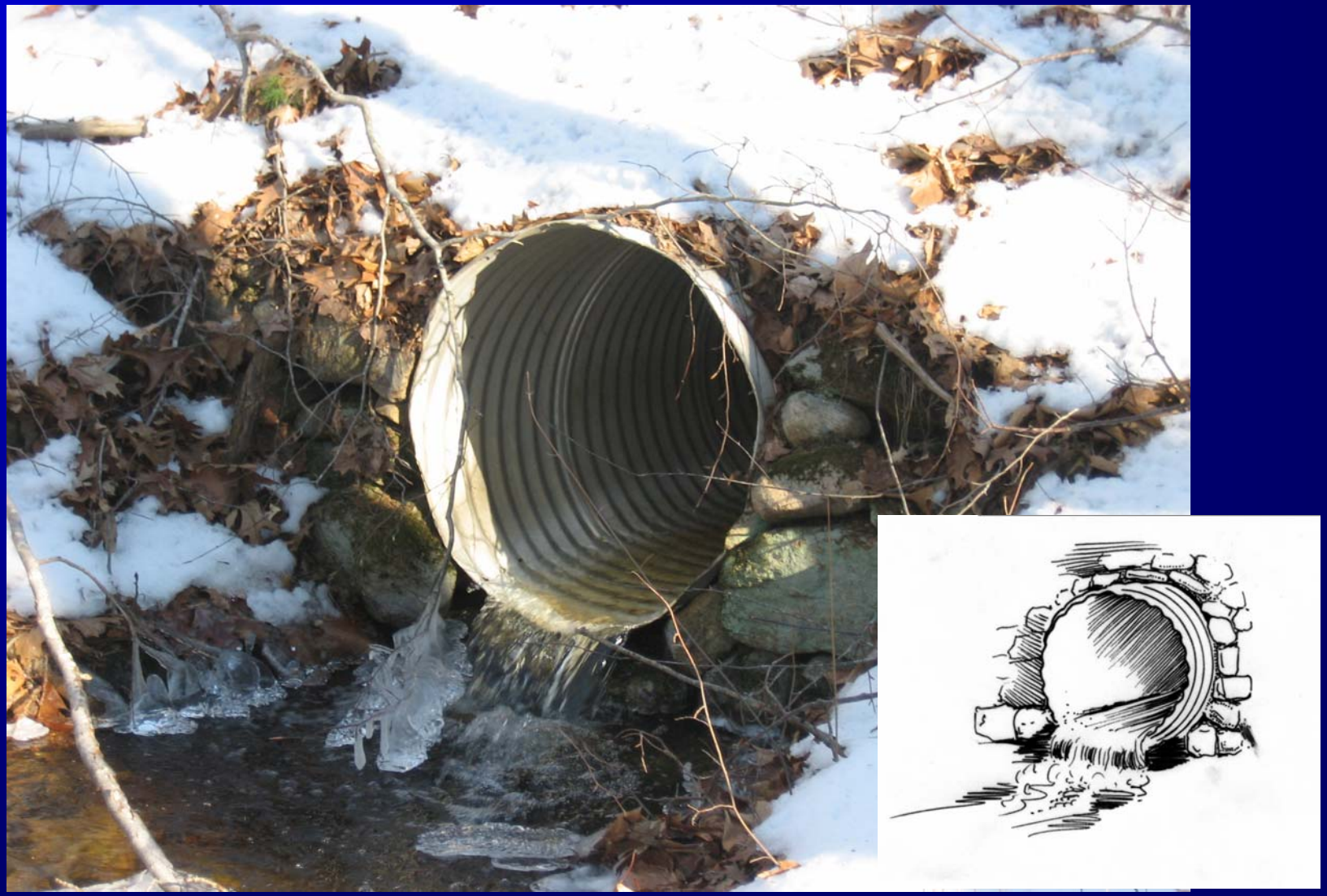
- Inlet or outlet drop
- Physical barriers
- Debris accumulation
- Excessive velocities
- Absence of bank edge areas
- Flow contraction (turbulence)
- Insufficient water depth
- Discontinuity of channel substrate

Inlet Drop



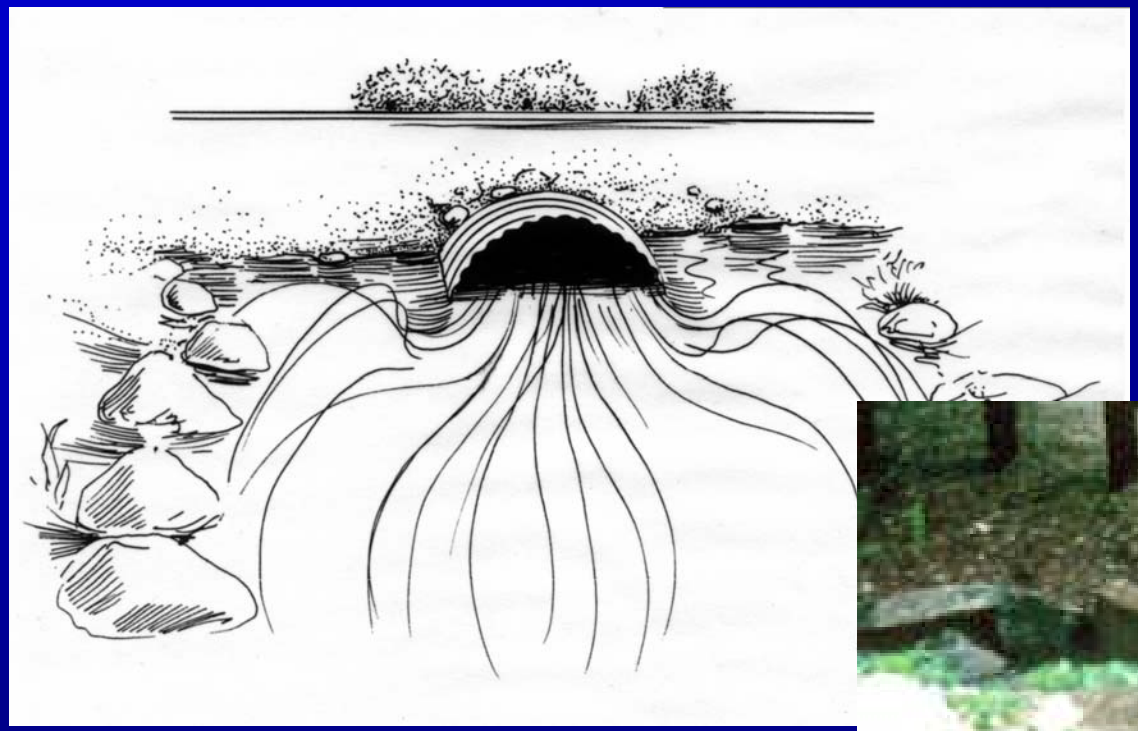
Photos courtesy of Scott Jackson

Outlet Perch

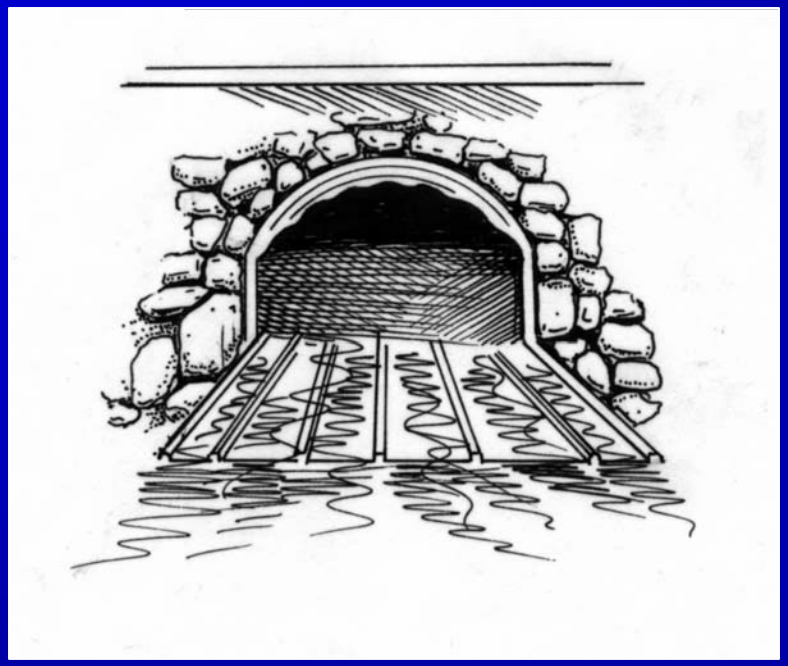


Photos courtesy of Scott Jackson

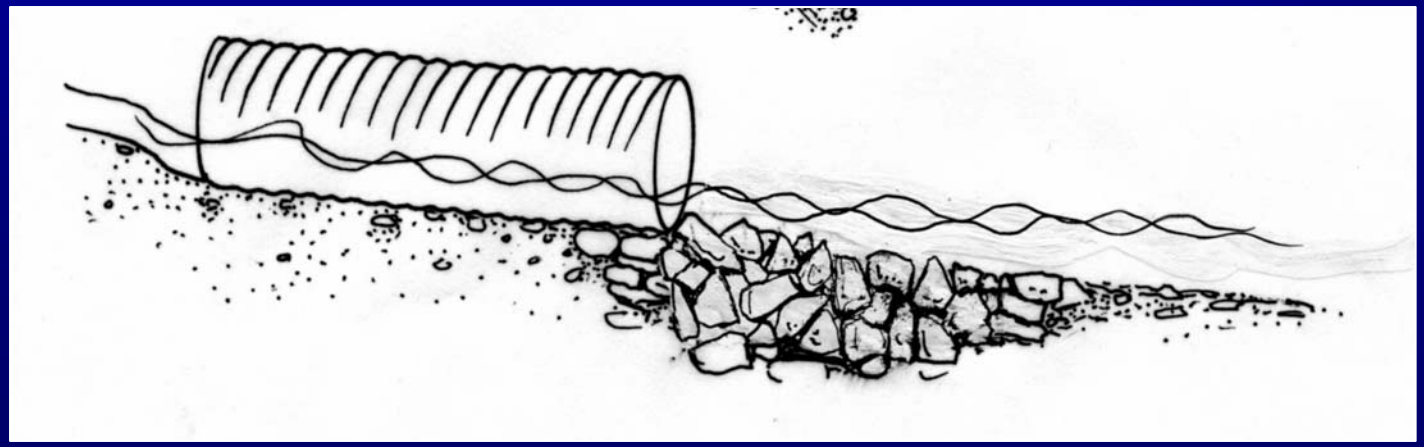
Flow Contraction



Photos courtesy of Scott Jackson



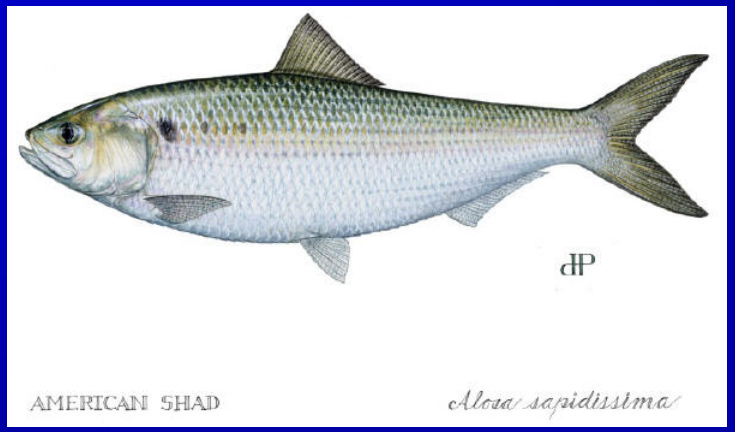
Tailwater Armoring



Photos courtesy of Scott Jackson

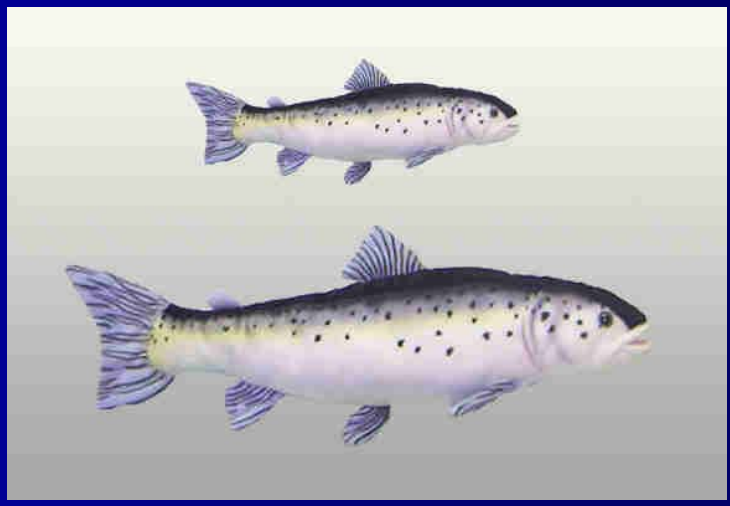
Affected Species: Anadromous

American shad



http://upload.wikimedia.org/wikipedia/

Atlantic salmon



http://www.tjgeneralstore.com

Blueback herring

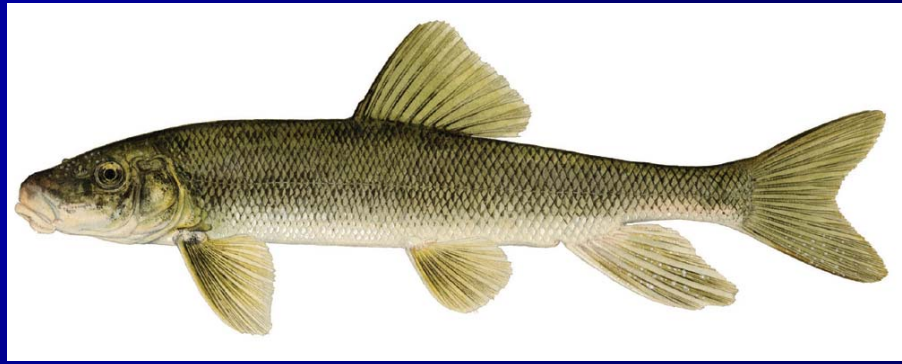
http://www.newsday.com/media/photo/

Affected Species: Freshwater

Brook trout

http://www.smokyonthefly.com/images/brooktrout.jpg

White Sucker



http://fish.dnr.cornell.edu/nyfish/Catostomidae/white_sucker.jpg

Affected Species

Wood turtle

http://www.mass.gov

Freshwater mussels

www.eeb.uconn.edu

Freshwater crayfish

http://www.teara.govt.nz

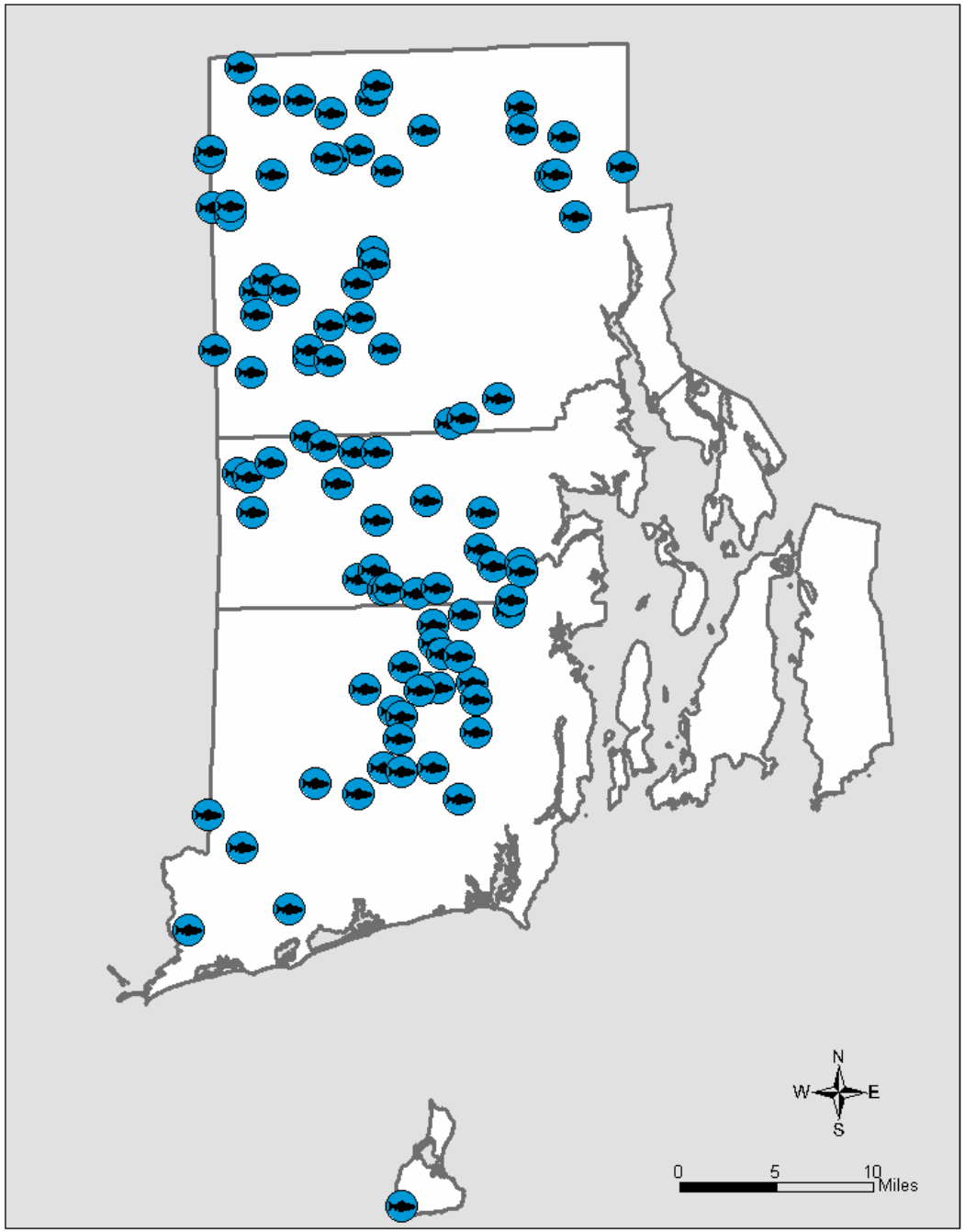
2-lined salamander

http://www.geocities.com/

Photo by Lawson Cary

Location of Brook Trout in RI

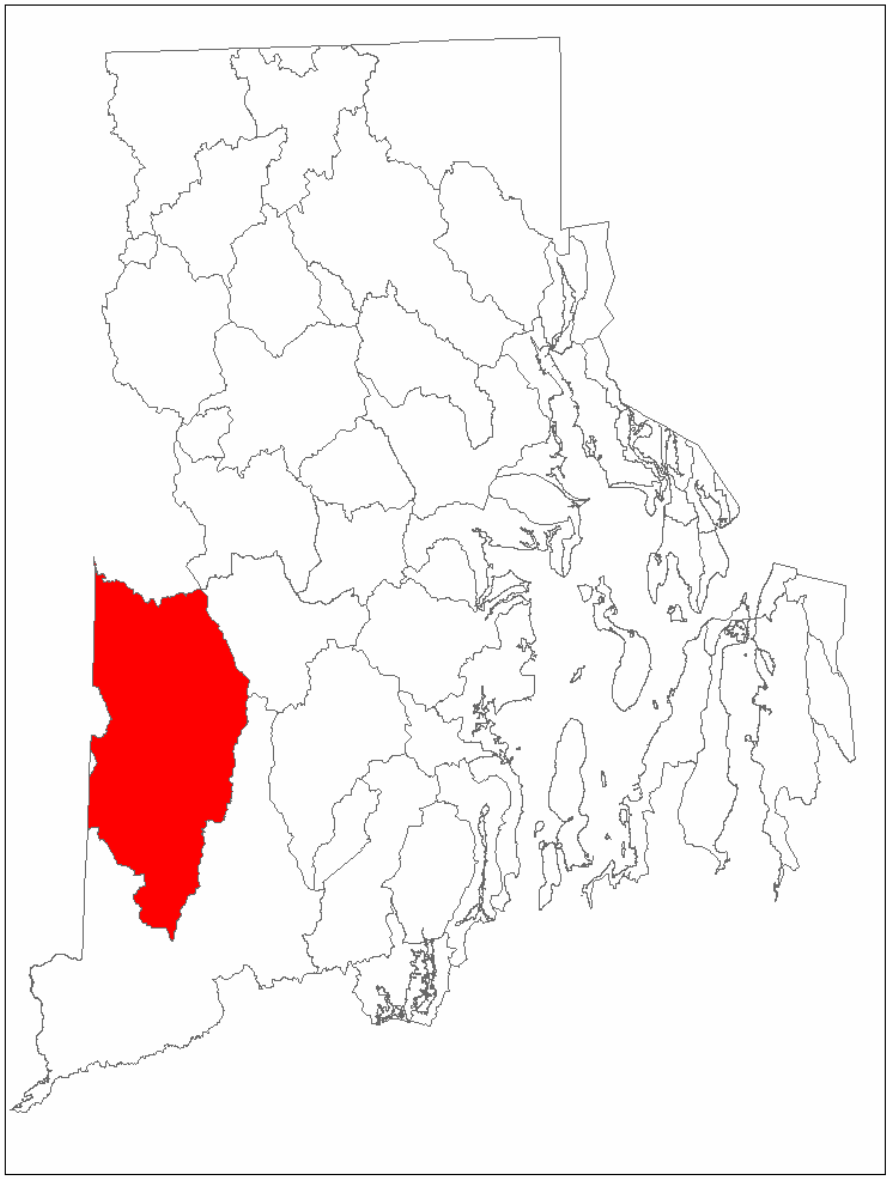
Data Courtesy of Alan Libby: RIDEM Division of Fish and Wildlife



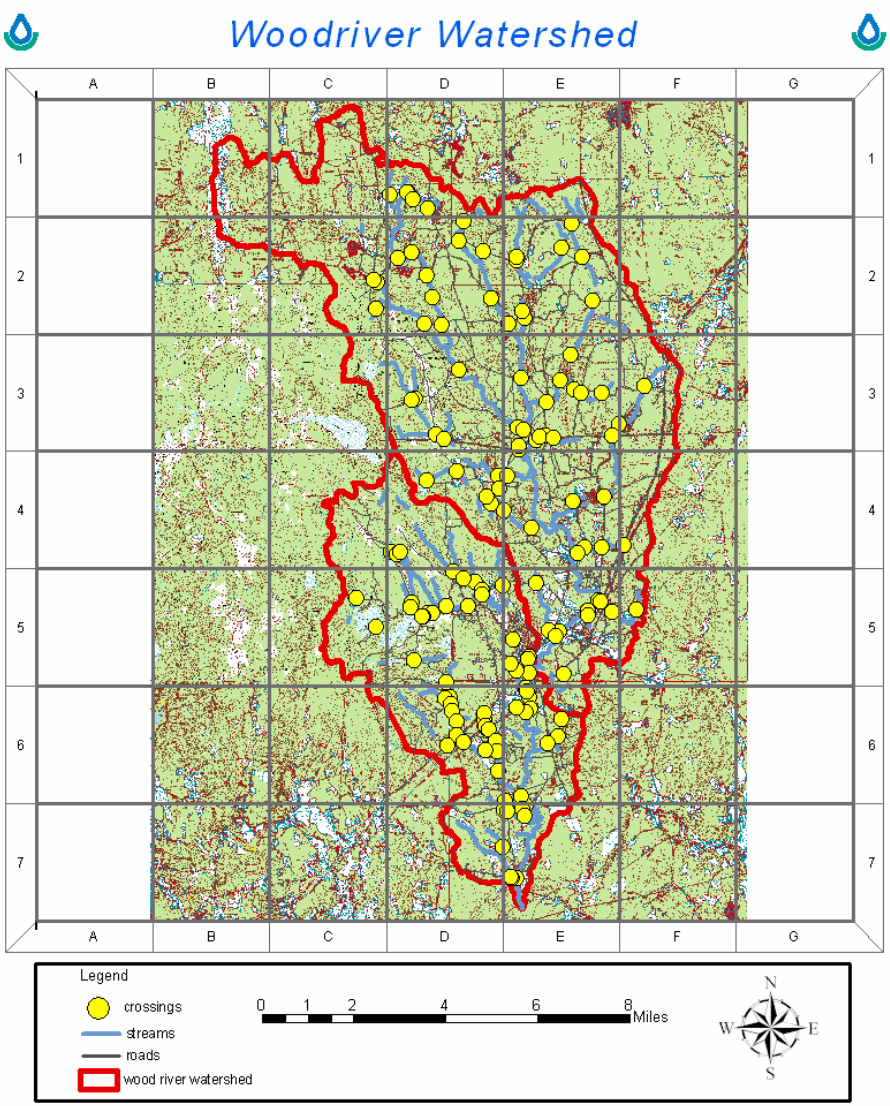
Purpose of Pilot Project
Upper and Lower Wood Rivers

- To respond to a conservation need identified by local partners.
- To identify potential barriers to fish passage in the Upper and Lower Wood River watersheds.
- To utilize local volunteer groups and organizations to locate potential restoration projects.

Study Site Location



Methods



Geographic Information Systems (GIS) analyses for both the Upper and Lower Wood River Watersheds

Data on roads and streams obtained from RIGIS

Methods: Data Collection

Road Characteristics

- Travel lanes
- Shoulder / breakdown lanes
- Road surface
- Steep embankments
- Retaining walls
- Jersey barriers
- Fencing

Photo by Lawson Cary

Methods: Data Collection

Crossing/Stream Characteristics

- Crossing type
- Culvert condition
- Presence of fish
- Flow conditions
- Culvert problems present
- Tailwater armoring
- Tailwater scour pool
- Physical barriers
- Culvert embedded
- Crossing substrate
- Water depth
- Water velocity
- Crossing span
- Minimum structure height at low water

Photo by Lawson Cary

Data Entry

1. **Number of Travel Lanes:** 2 **Shoulder/ Breakdown lanes:** No **Road Surface:** Paved
2. **Are any of the following conditions present that would significantly inhibit wildlife crossing over the road?**

High traffic volume (> 50 cars per minute) :	No
Steep embankments:	No
Retaining walls:	No
Jersey barriers :	No
Fencing:	No
Other (specify):	N/A

Crossing/Stream Characteristics (during generally low-flow conditions)

3. **Crossing type:** Multiple Culverts
4. **Condition of crossing:** Good
5. **Does the stream at the crossing contain fish?** Yes
6. **Is the stream flowing (in the natural channel)?** Yes
7. **Flow conditions during the survey are:** Average flow
8. **Are any of the following problems present? (see attached glossary and illustrations)**

Inlet drop:	No
Outlet perch:	No
Flow contraction:	No

9. **Tailwater armoring:** None
10. **Tailwater scour pool:** None
11. **Physical barriers to fish and wildlife passage:** None

Data Output

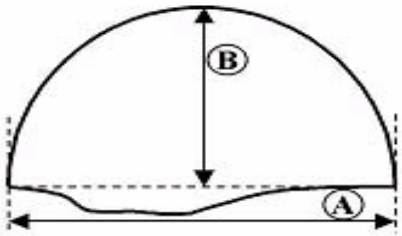
13.	**Crossing substrate:**	Comparable
14.	**Water depth matches that of the stream?**	Yes (comparable)
15.	**Water velocity matches that of the stream?**	Yes (comparable)
16.	**Crossing span:**	Constricts channel
17.	**Minimum structure height at low water?** (from water level to the roof inside the structure)	> 6 ft.
18.	**Comments**	

150 feet downstream are natural falls

Standard of this stream crossing is estimated as: SEVERE BARRIER

Total Number of Culverts: [1]

1.



Type of Culvert: Open bottom arch

Upstream Dimensions: A = 12; B = 14.17; C= 0; D = 0

Downstream Dimensions: A = 10.67; B = 14.17; C= 0; D = 0

Length of Stream Crossing Through: L = 14.17

Openness Ratio: 1.18220889203

Add image to this crossing (Image must be of JPG or GIF format and must not be bigger than 200KB)

Browse... Add Image

Add New Crossing | View Crossings

Massachusetts Road Stream Crossing Inventory 2005

Crossing Standards

Severe Barriers

Moderate Barriers

Minor Barriers

Meets General Standards

Meets Optimum Standards

Severe Barriers

Phillips Brook and Plain Meetinghouse Road

Wood River and Arcadia Road

Photos by Lawson Cary

Phillips Brook and Narrow Lane

Unnamed Brook and Hudson Pond Road

Moderate Barriers

Unnamed Brook and Hazard Road

Roaring Brook and Summit Road

Photos by Lawson Cary

Breakheart Brook and Plain Meetinghouse Road

Unnamed Brook and Ten Rod Road

Minor Barriers

Breakheart Brook and Austin Farm Road

Unnamed Brook and Nooseneck Hill Road

Parris Brook and Ten Rod Road

Baker Brook and Arcadia Road

Photos by
Lawson
Cary

Meets General Standards

Flat River and Austin Farm Road

Wood River and Skunk Hill Road

Photos by Lawson Cary

Meets Optimum Standards

Unnamed Brook and Matteson Road in the URI Alton Jones Campus

Photo by Lawson Cary

Meets Optimum Standards

Washington State

http://www.skagitfisheries.org/PastNews/images/AlderCulvert2.jpg

Michigan State

http://www.fws.gov/midwest/Fisheries/images/manisteeriver-mini.jpg

Results: Wood River Watershed

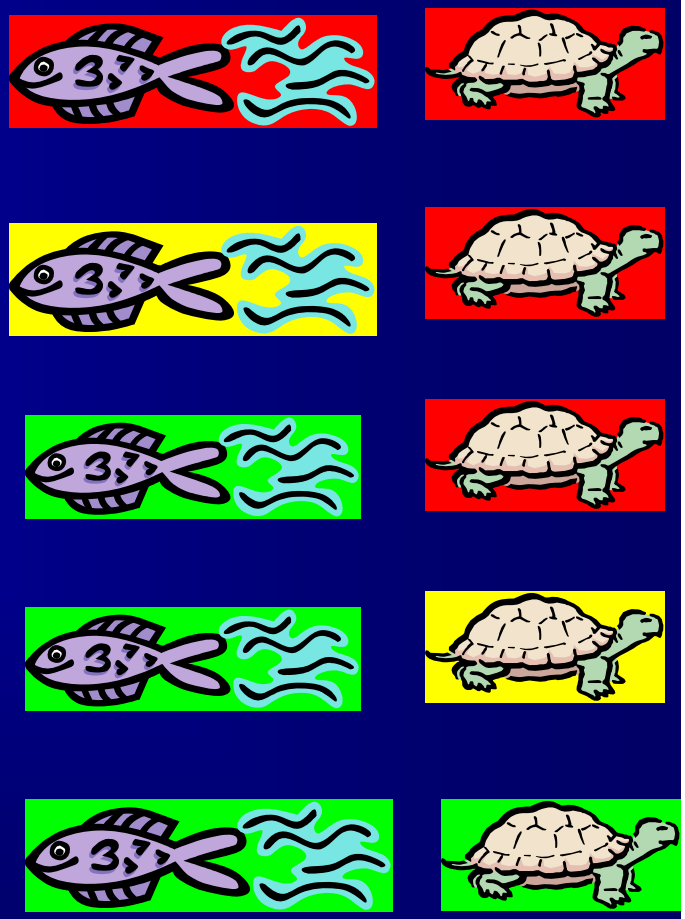
- 175 crossings in the Upper Wood River Watershed have been field checked for the 167 miles of streams

- 116 crossings in the Lower Wood River Watershed have been field checked for the 101 miles of streams

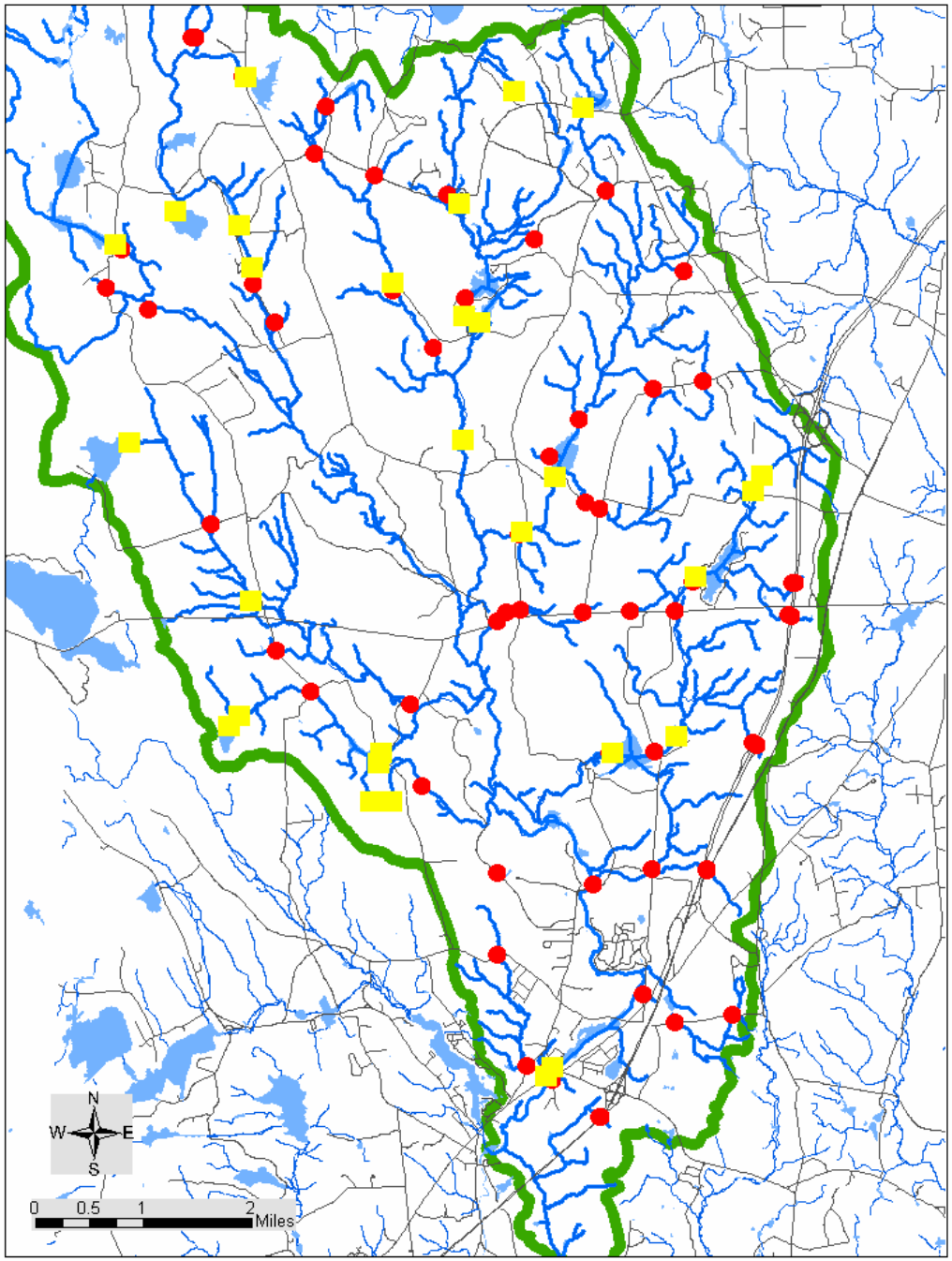
- Total for the Wood River Watershed:
  - 291 crossings
  - 268 miles of streams

Results: Upper Wood River Watershed

- **138** identified as actual road and stream crossings
  - 62 Severe Barriers
  - 53 Moderate Barriers
  - 19 Minor Barriers
  - 3 Meets General Standards
  - 1 Meets Optimum Standards



Upper Wood River Watershed

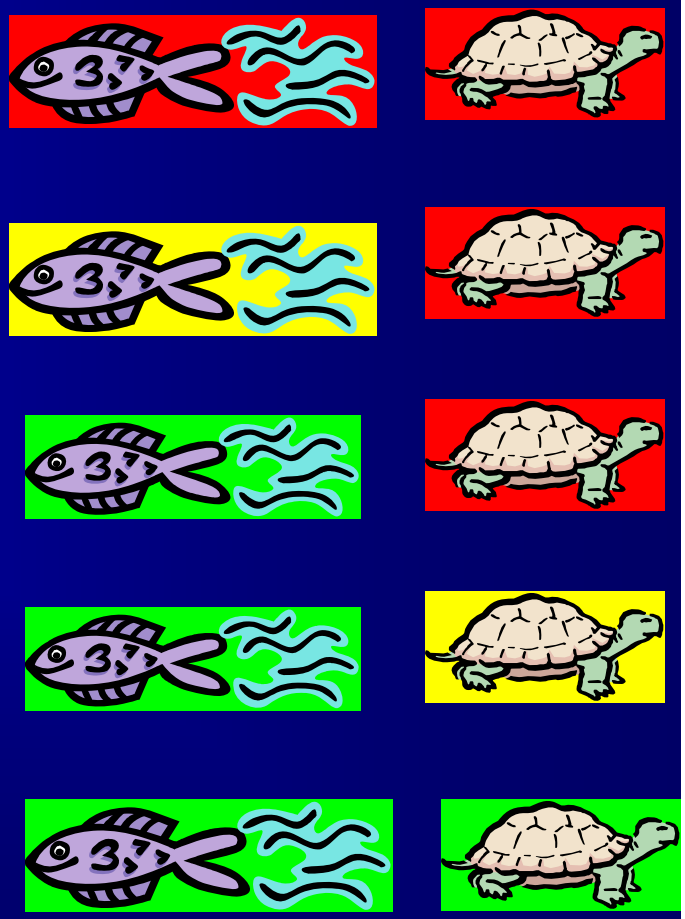


Severe Barriers

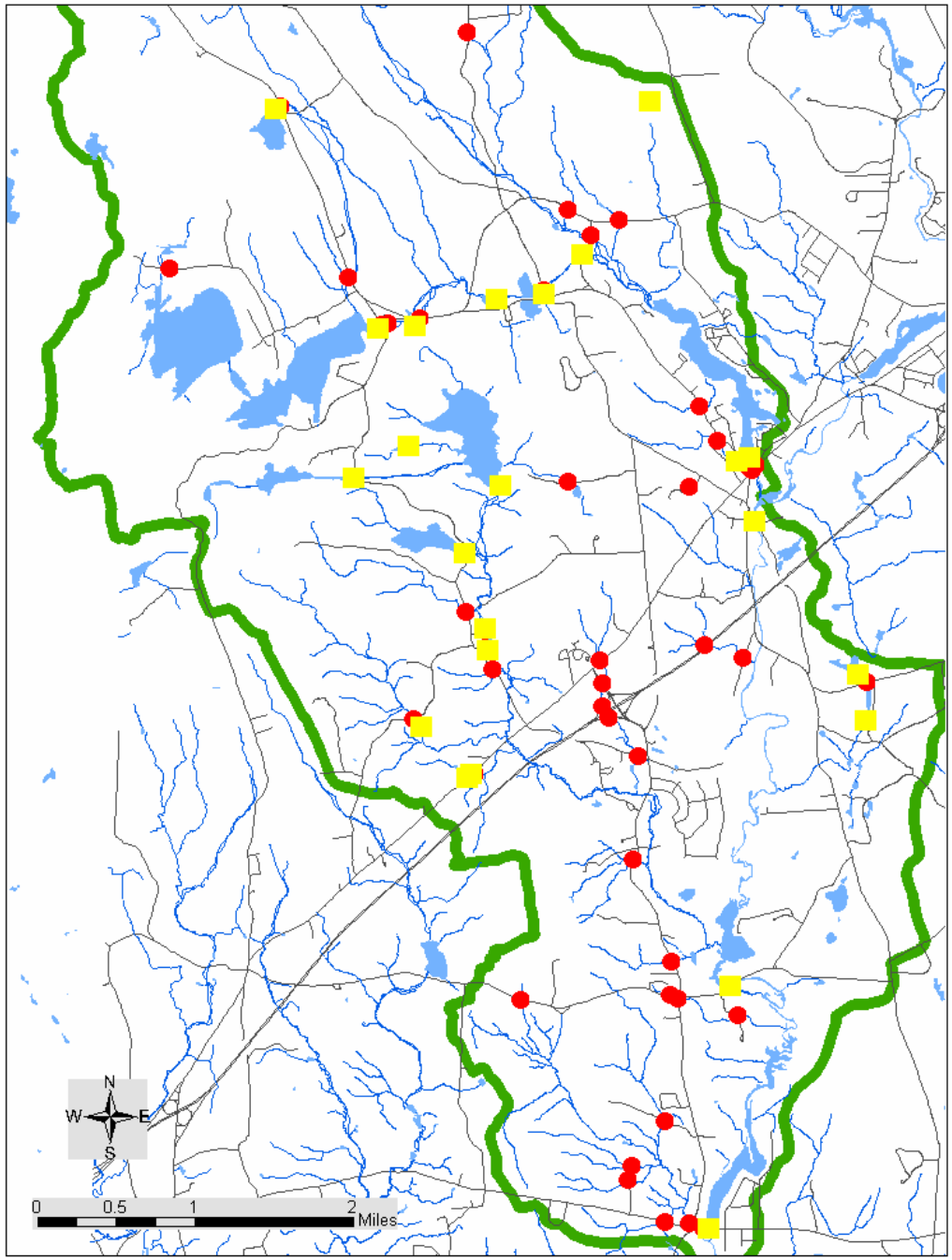
Dams

Results: Lower Wood River Watershed

- **92** identified as actual road and stream crossings
  - 45 Severe Barriers
  - 29 Moderate Barriers
  - 17 Minor Barriers
  - 1 Meets General Standards
  - 0 Meets Optimum Standards



Lower Wood River Watershed



Severe Barriers

Dams

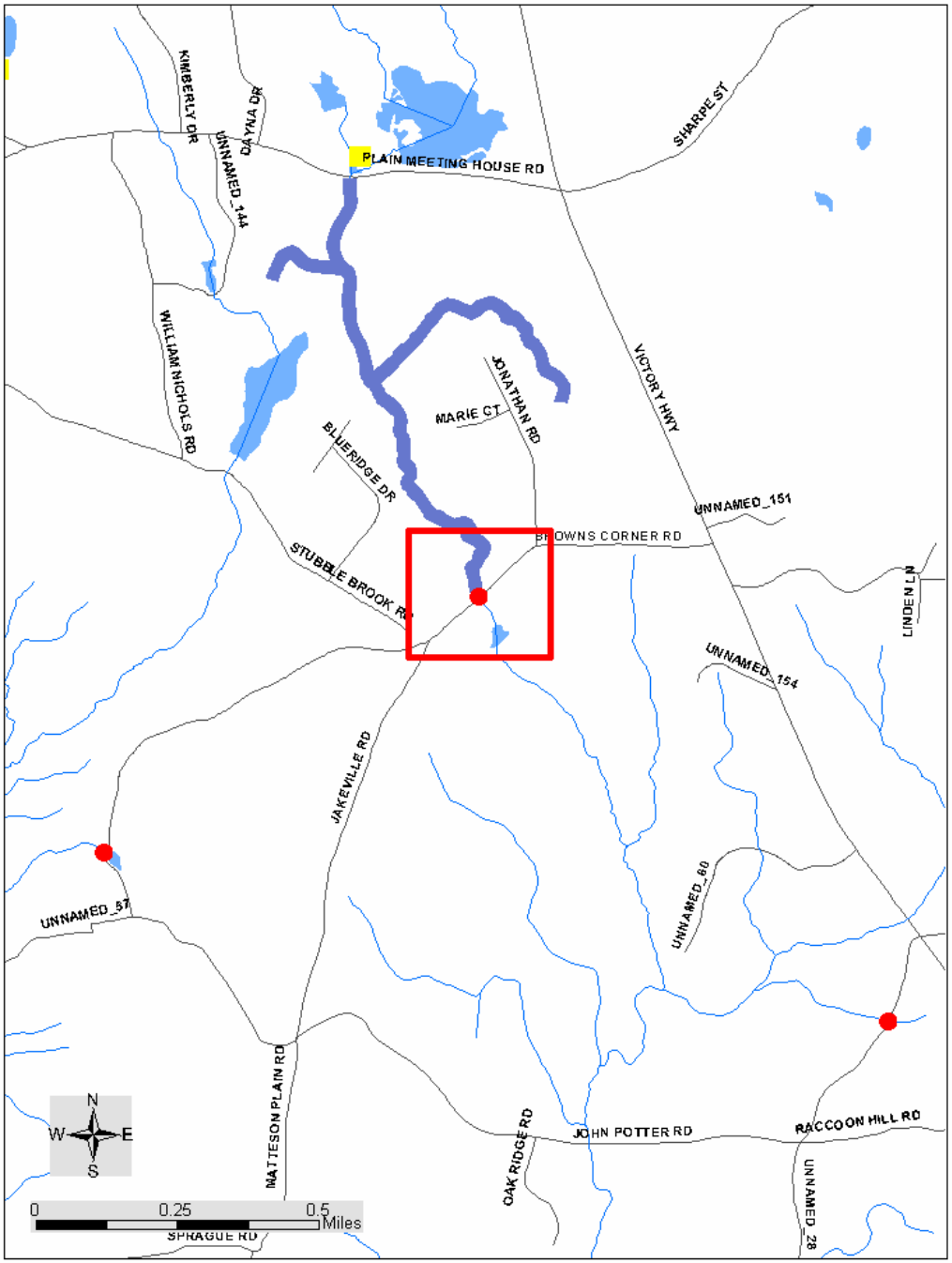
Prioritizing Crossing Restoration

- **Distance/length of stream US and DS from crossing**
- **Presence of RTE species**
- **Presence of multiple aquatic species**
- **Watershed size**
- **Size and type of road**
- **Landowner willingness**
- **Opinions, suggestions, and comments from experts**

Distance/length of Stream US and DS from Crossing

Assumptions:

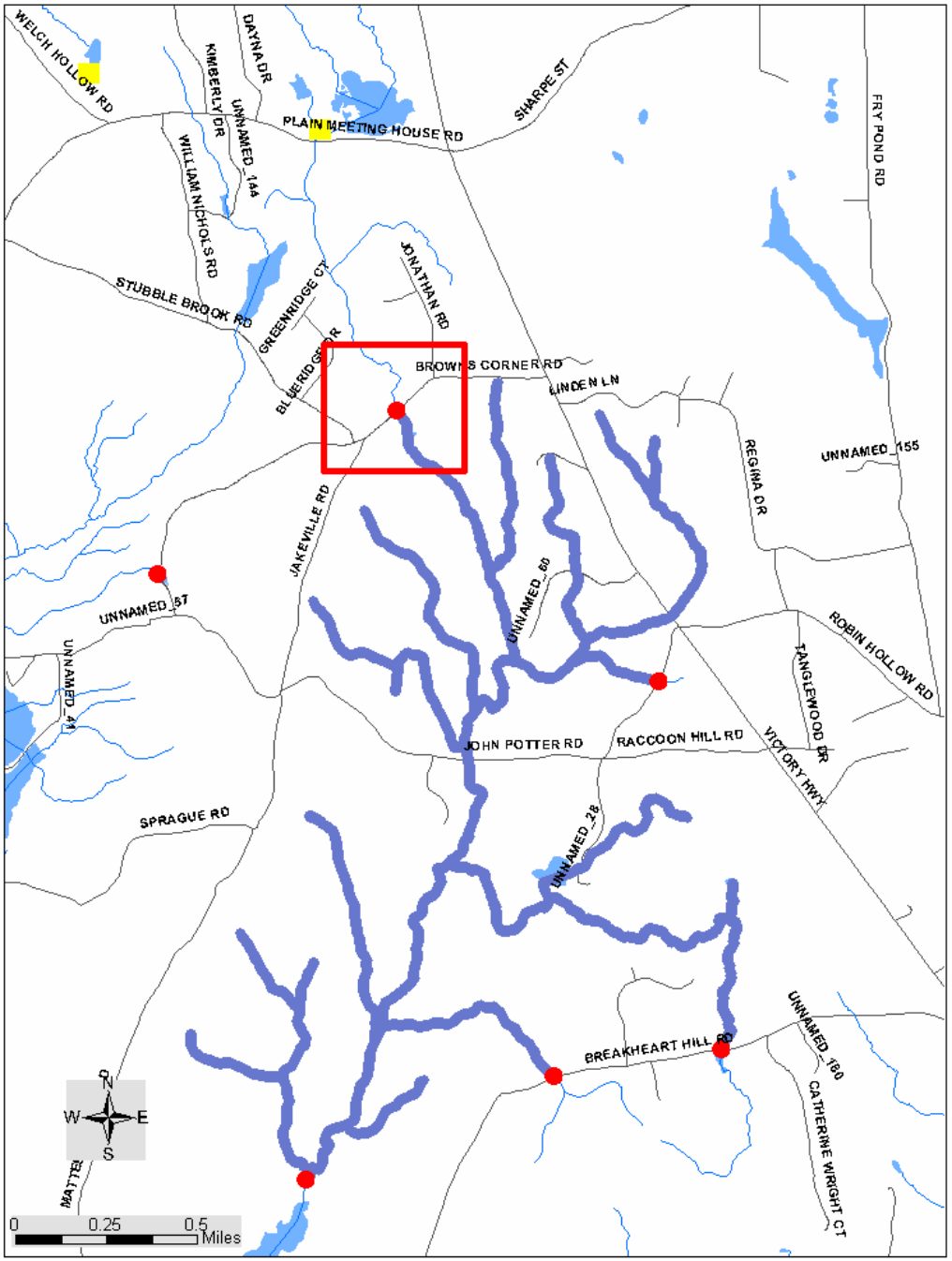
- Included Perennial and Intermittent streams in the analysis (so amount of stream is being over-estimated for fish habitat).
- Fish are able to pass through the moderate barriers.
- All dams are considered severe barriers.



Upstream Habitats

Photo by Lawson Cary

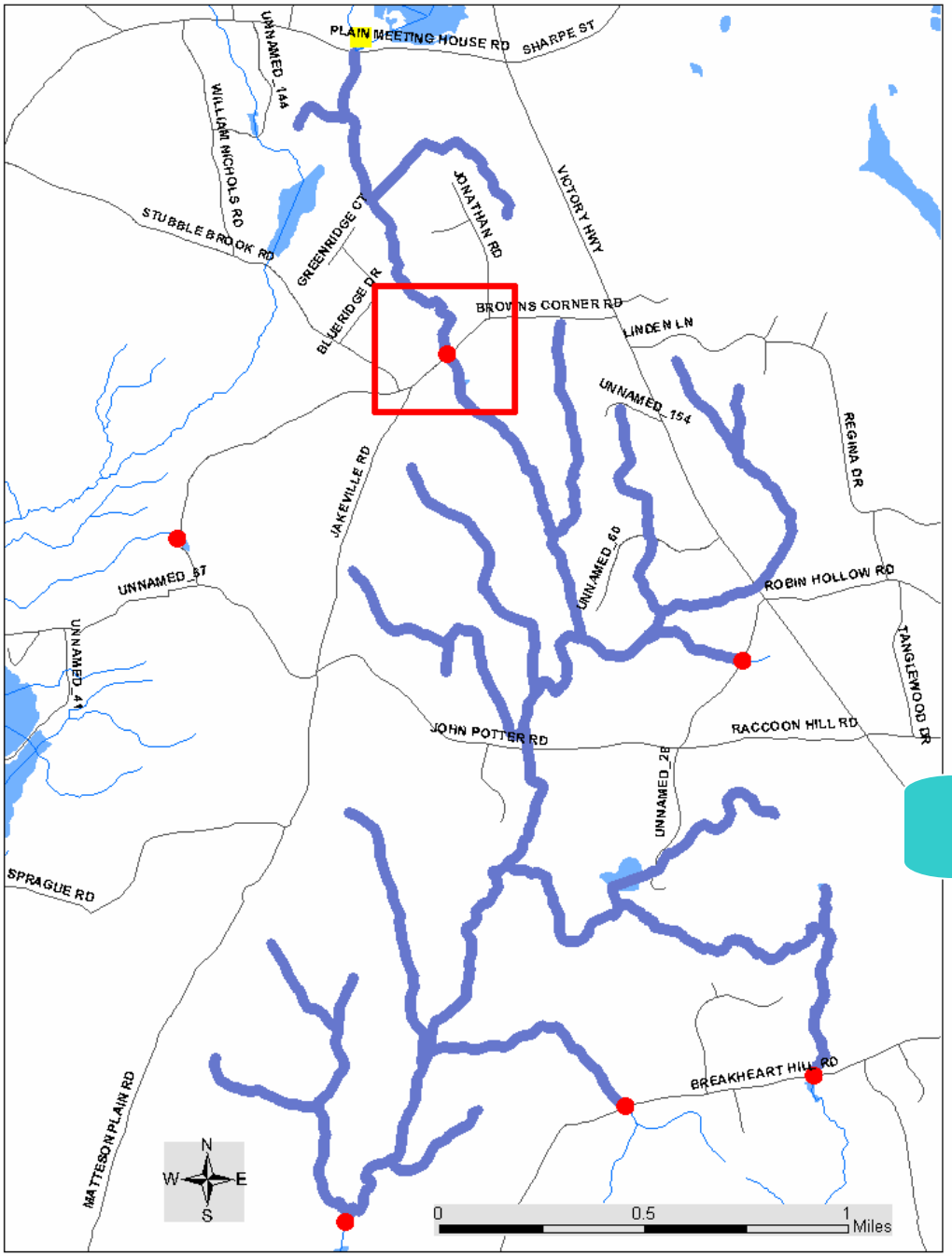
Over 1.5 miles of stream re-connected



Downstream Habitats

Photo by Lawson Cary

12 miles of stream re-connected



Total Habitat Re-opened:

17 Miles !!!!

http://www.waol.com/pages/images/34.JPG

Prioritizing SB Crossings in Upper Wood River

- 1. Preliminary focus was on state lands and town roads within the watershed.

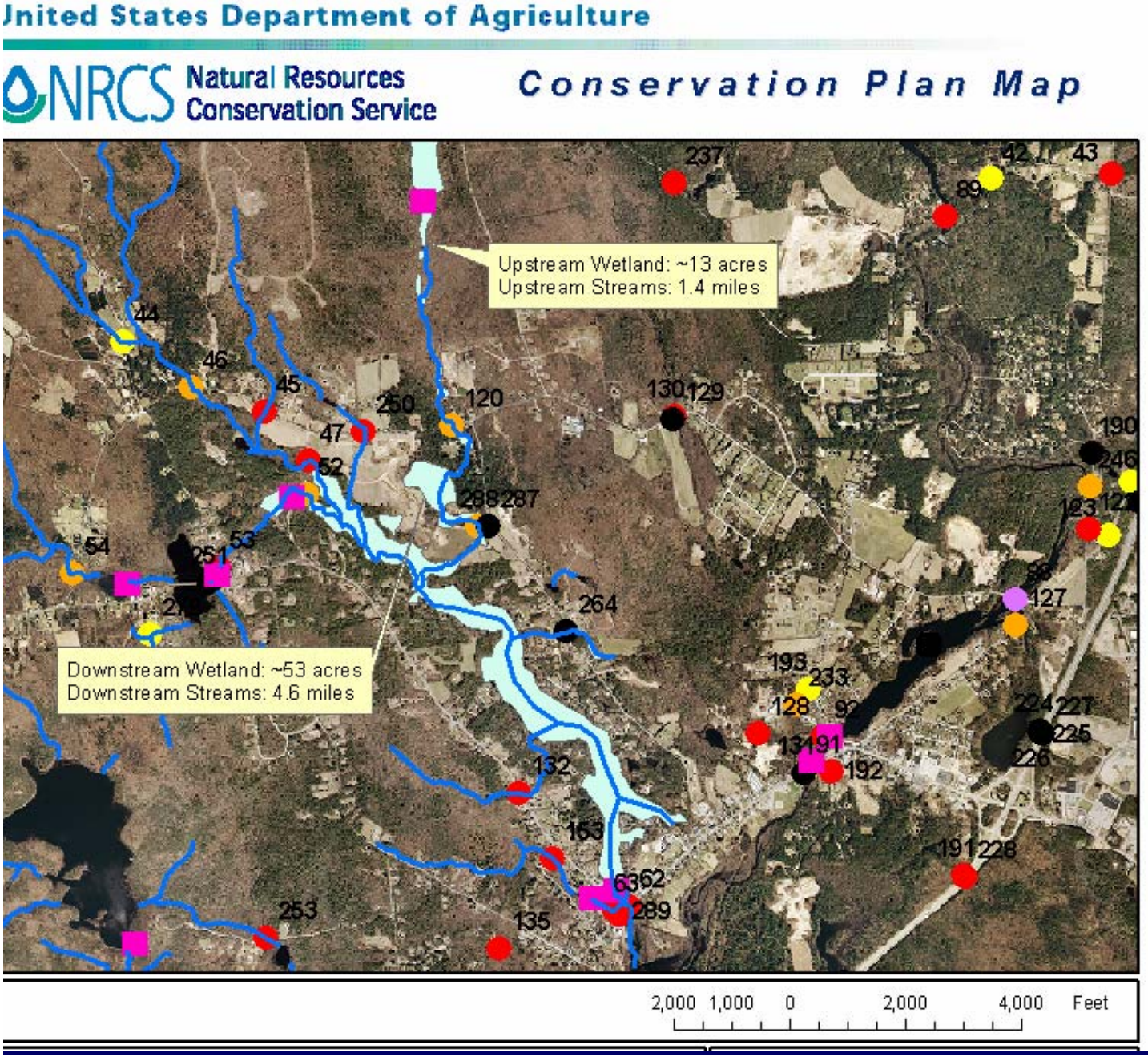
- 2. Preliminary focus was on fish bearing streams or streams which may contain fish
  - 62 SB crossings reduced to
    - 10 crossings containing fish
    - 20 crossings possibly containing fish

SB Crossings: Non-fish bearing streams

Photos by Lawson Cary

Prioritizing SB Crossings in Upper Wood River

- 3. Minimum US and DS mileage > 0.5 miles. ????
  - 30 SB crossings reduced to
    - 12 crossings identified as potential restoration projects
    - Field inspection of these sites conducted in November 2006



USDA-NRCS approach is to re-connect:

- **greatest mileage of stream corridor**

- **acreage of wetlands associated with the stream systems.**

Project Outreach

- Took results from the analysis and conducted outreach
- Mailed information packets to 4 towns where the 12 crossings were located
  - Packets included data on the Stream Continuity Project and specific stream crossings within the towns
  - USDA-NRCS WHIP Program information and application
- Worked with towns to apply for WHIP grants

Potential WHIP Projects

- Received 3 applications for USDA-NRCS WHIP grants
- Ranking in progress

Photos by Lawson Cary

Project Implementation Since Oct. 2006

- Completing Lower Wood River analysis
- Writing 2 areawide conservation plans: Upper and Lower Wood River
- Convening another partners meeting in mid-April 2007
- Fish sampling on potential WHIP projects

Photo by Lawson Cary

Fish Sampling: April 6, 2007

Photos by Lawson Cary

Hours Spent on Project

- Over 670 volunteer hours from TU-Narragansett Chapter
- Over 1,000 intern hours from USDA-NRCS (May 2006-present)
- Over 100 hours from other partners (NRCS, RC&D, WPWA, …)

Project Alternatives

- **Alt. 1: Continue in Queens River Watershed**
- **Alt. 2: Expand Program Statewide**
  - Form an advisory committee
  - Involve other agencies/organizations
  - Housing of project
  - Funding of project

Project Management: What's Involved.....

- Database management and entering data into UMass system
- Volunteer training and coordination
- Outreach
- Clearing house for crossing photos and paper documents
- Development of areawide conservation plans

Conclusions

- UMass model is transferable to other watersheds
- Volunteers are a viable and crucial component to the project
- Project is an example of habitat restoration being implemented on the ground

Additional Information

http://www.streamcontinuity.org/

Interested in Becoming a Volunteer?

- **Please Contact:**
  - **Chris Modisette, RC&D Coordinator, USDA-NRCS**
    - **chris.modisette@ri.usda.gov**
    - **401-822-8877**
  - **Michael Merrill, District Conservationist, USDA-NRCS**
    - **michael.merrill@ri.usda.gov**
    - **401-828-1300**

With Thanks

TU Volunteers:

Lawson Cary

Al Jaffa

Burt Strom

Wood-Pawcatuck Watershed Association
203b Arcadia Road, Hope Valley, RI, 02832
phone: 401-539-9017 info@wpwa.org

Denise Poyer

Commonwealth of Massachusetts
RIVERWAYS PROGRAM
Building Partnerships, Protecting Rivers

UMASS EXTENSION

Scott Jackson

Marie-Françoise Walk

Thank you!

May I answer any questions?

http://www.the-digital-picture.com/Images/Pic/2004-04-30_14-16-49.jpg

Next Steps

- Are there any additional factors we should be considering when prioritizing and ranking the stream crossings?
- Who is interested in partnering in this project? What resources can your organization provide?
- Where do we go next?