

# **Wetland Ecology, Stream Continuity, and Maps**

-

**Rhode Island Envirothon  
April 13, 2007**

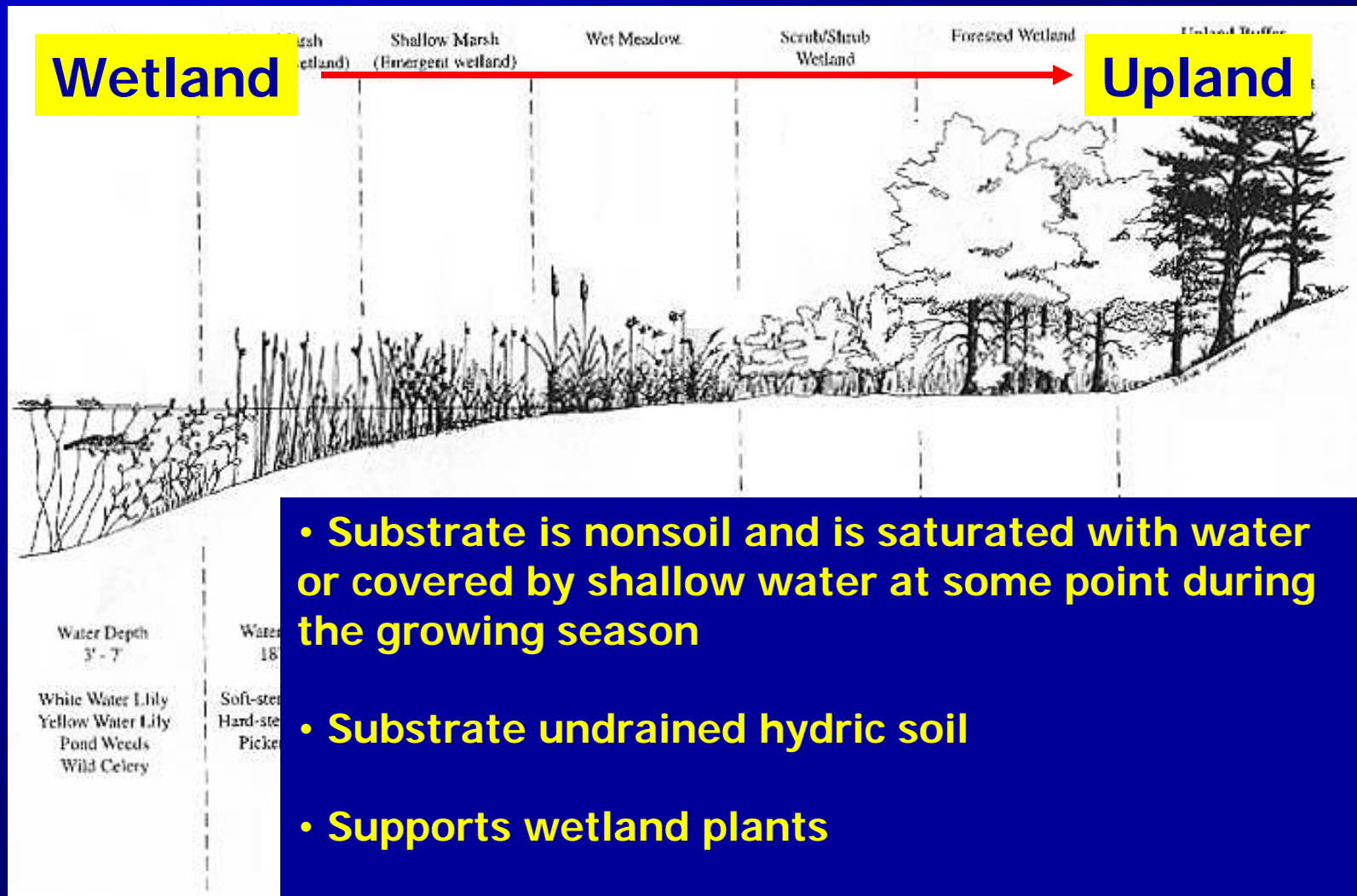
-

**Presented by:  
Jessie Dyer and Meaghan Shaffer  
USDA-NRCS**

# Purpose of the Workshop

- To present ecological information on major wetland systems.
- To identify various functions and values of wetland systems.
- To demonstrate the utilization of maps to achieve conservation goals.
- To present examples of 2 conservation on the ground projects.

# What is a Wetland?



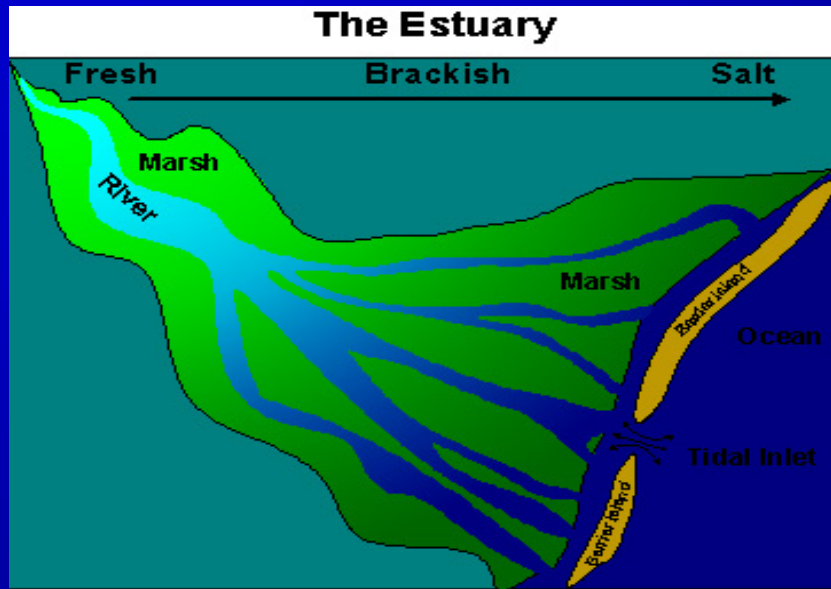
- Substrate is nonsoil and is saturated with water or covered by shallow water at some point during the growing season
- Substrate undrained hydric soil
- Supports wetland plants
- 5 Major wetland systems

# Marine System

- Open ocean over the continental shelf and the high-energy coastline
- Salinity  $> 30$  ppt
- Waves and ocean currents
- Subtidal and intertidal areas



# Estuarine System



- Open ocean water access
- Partially enclosed by land
- Low energy system
- Freshwater dilution from surrounding land runoff





# Lacustrine System

- Located in a depression
- > 20 acres in size
- Lacking standing plants
- 2 areas
  - **Limnetic** (deep water > 2 m deep or 6.6 feet deep)
  - **Littoral** (shore to < 2 m deep)



# Riverine System

- Located within a channel
- Limits to the system include the channel bank or wetlands with plants



# Palustrine System



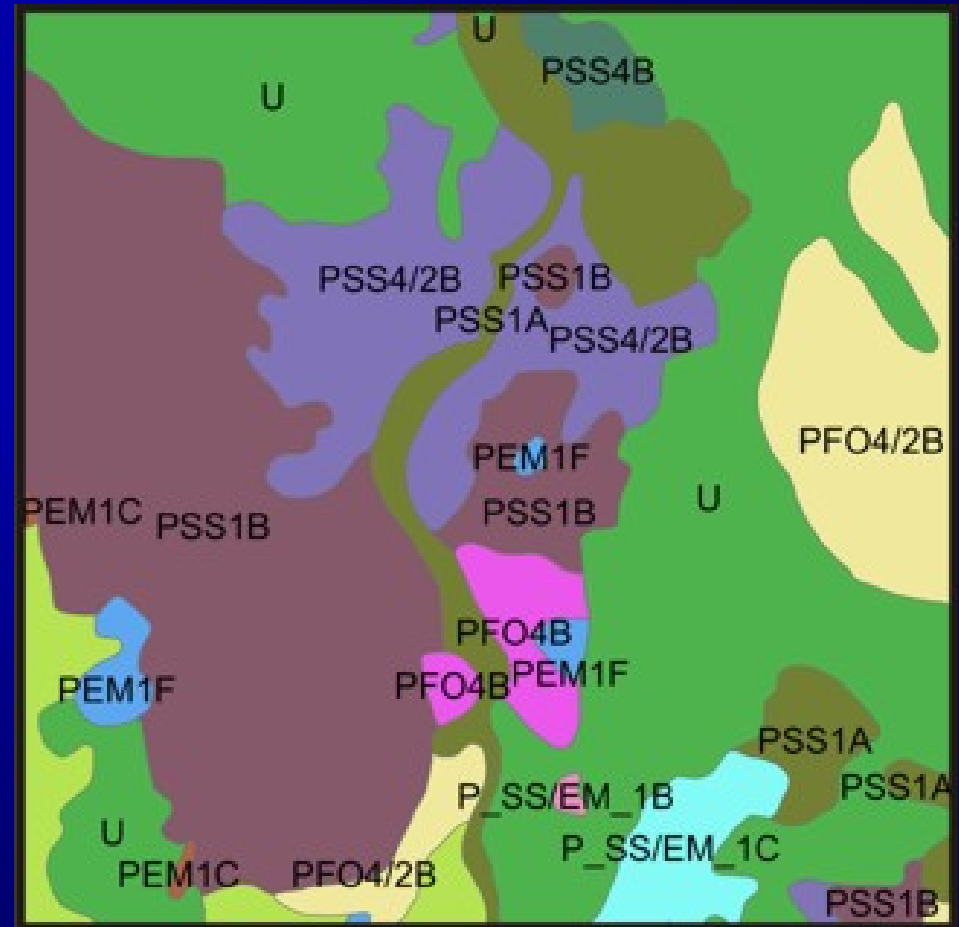
- Nontidal wetlands
- Dominated by trees, shrubs, and emergents (non-woody plants such as grasses, sedges, flowers)
- Also includes open water bodies < 20 acres in size (ponds)



# National Wetland Inventory Maps



- Identifies size, shape, and type of wetland with a coding system using letters and numbers
- Identifies wetland types and relative length of time water is on the ground's surface



# Fish and Wildlife Functions and Values



Larry Ditto



© 2005 BKatzung

# Environmental Quality Functions and Values



## Maintain water quality

- Remove sediments
- Filter pollution
- Recycle nutrients
- Absorption of chemicals and nutrients





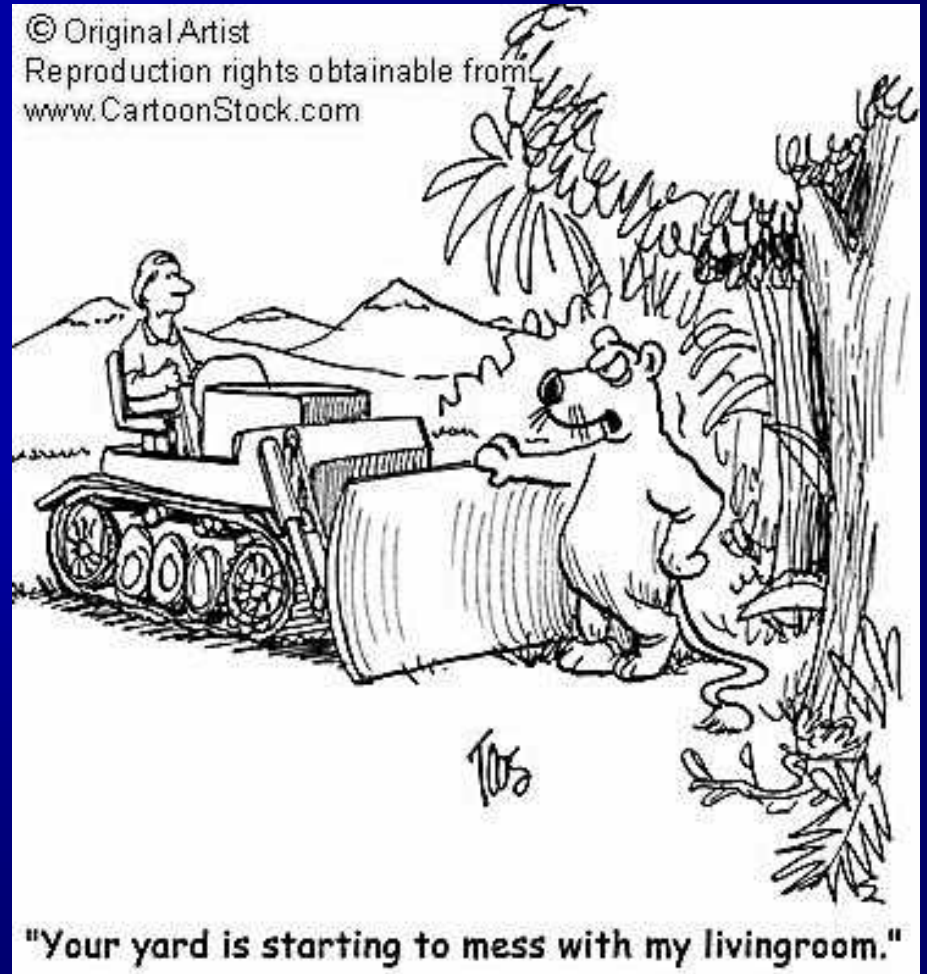
# Socio-economic Functions and Values





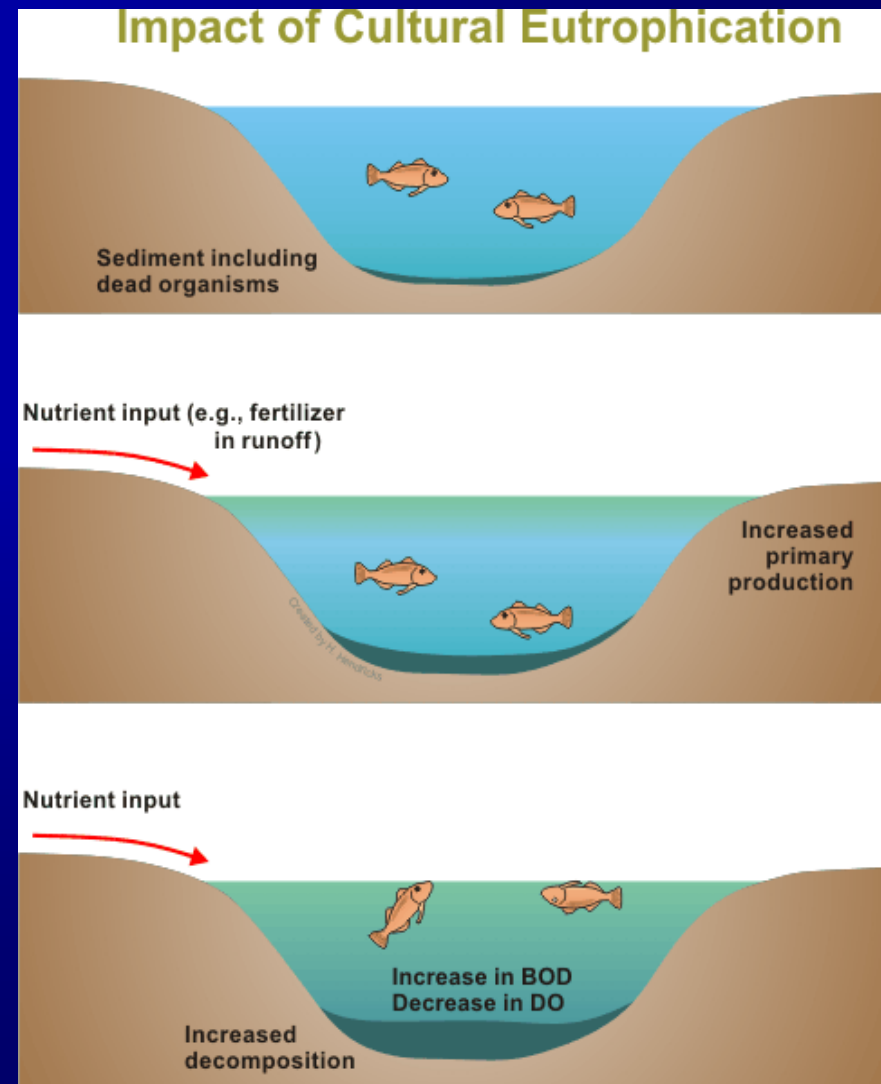
# Human Effects on Wetlands

- Altering **hydrology** (draining, ditching, damming, excavating, diverting water flow...)
- Developing and filling wetlands



# Example: Impacts / Threats to Lacustrine Systems

- These systems age naturally from **oligotrophic** to **mesotrophic** to **eutrophic**
- Artificial increase in limiting nutrients of system increases speed of aging- **Eutrophication**
- Main limiting nutrient in freshwater systems is **Phosphorus**, although leached **Nitrogen** can also cause Eutrophication
- Excess nutrients = algae bloom = increase bacteria population to consume dead algae = decrease of oxygen in water (**anoxia**) = fish kills



# Wetland Regulations

- Federal Laws
  - **Clean Water Act** (wetlands contiguous with all US waters)
  - **Safe Drinking Water Act** (protects drinking water and its sources: rivers, lakes, reservoirs, springs, and groundwater wells)
- RI State Laws
  - **DEM Freshwater Wetlands Act**
  - **RI Coastal Resources Mgmt. Council Program**

# Case Study of Riverine Systems and their Associated Uplands (Buffers).....



# Riparian Buffer Functions and Values

**SOURCE**  
of energy  
and  
materials



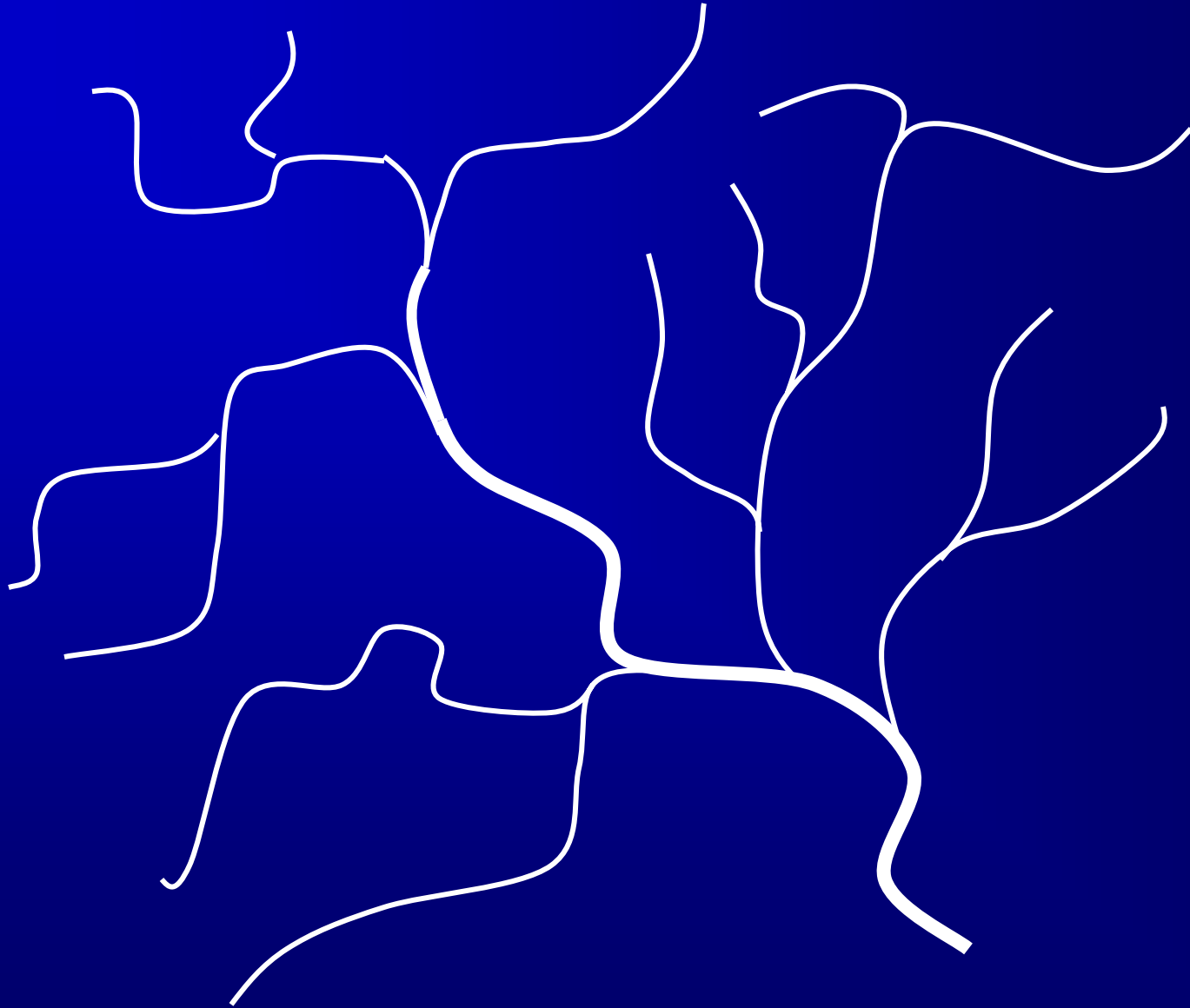
**FILTER** for  
contaminants

**SINK** for  
nutrients

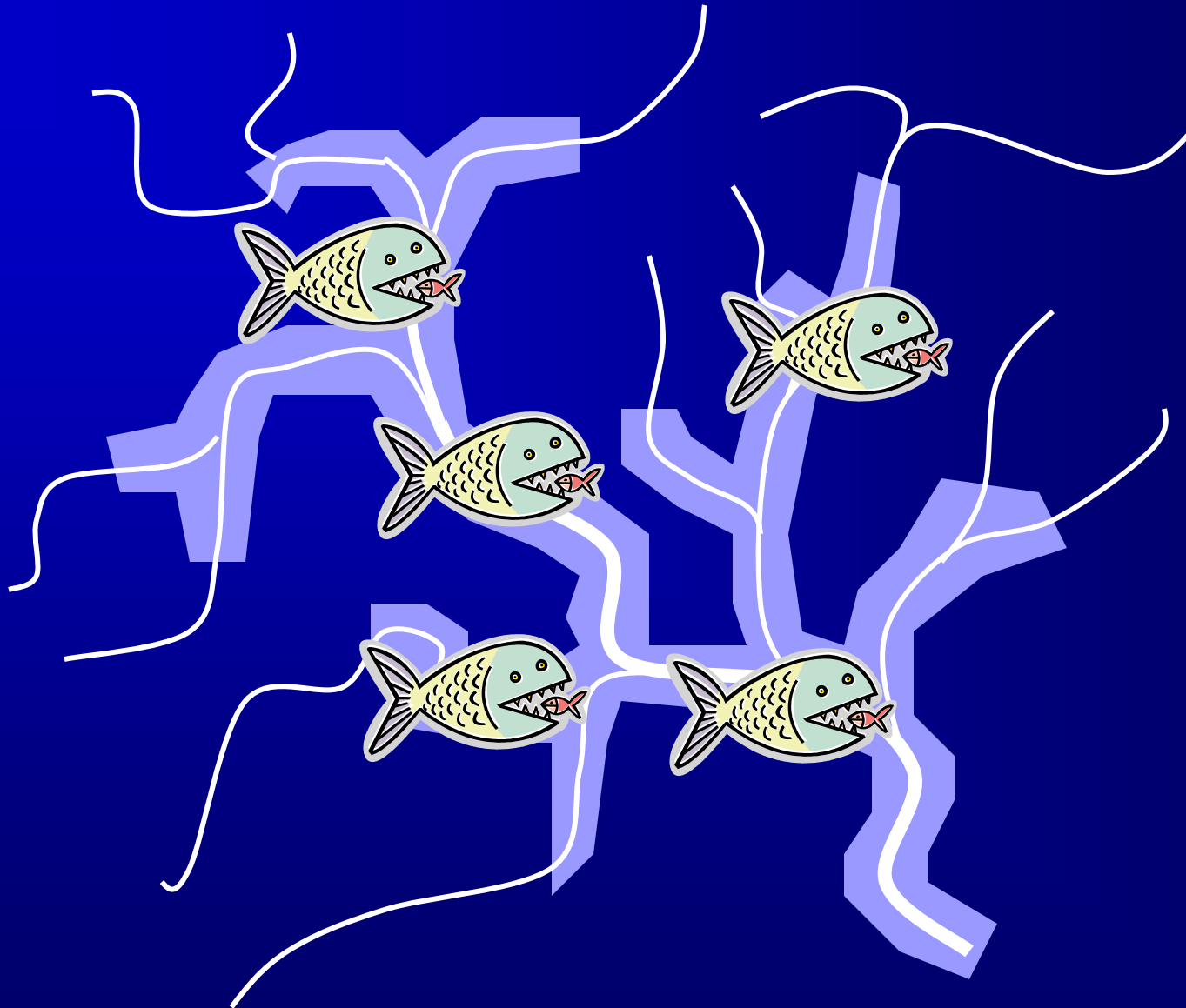
**HABITAT**  
components for  
riparian and  
aquatic species

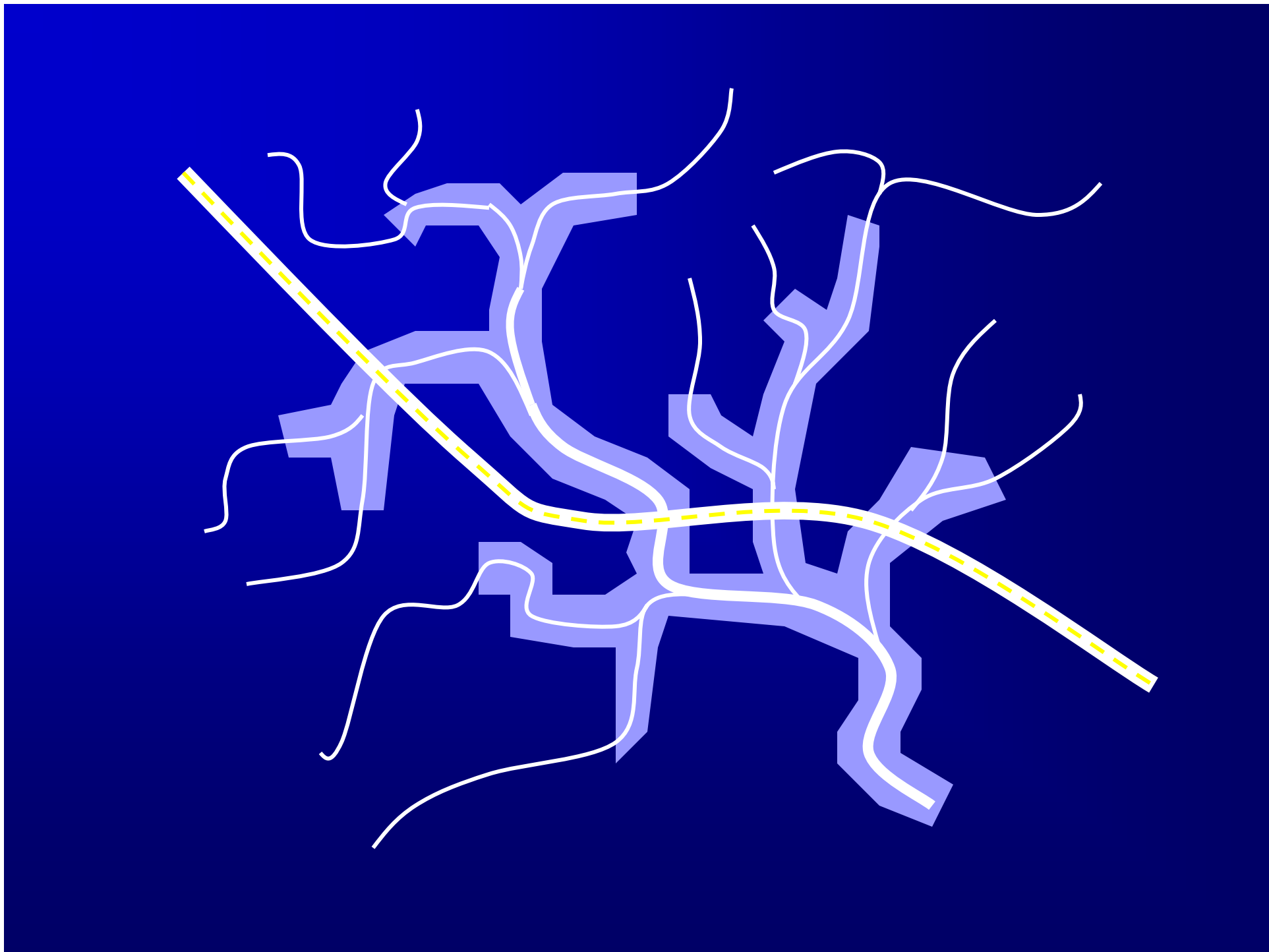
**TRANSFORMER**  
of chemical  
compounds,  
such as nitrates

## Fish and Wildlife Habitat

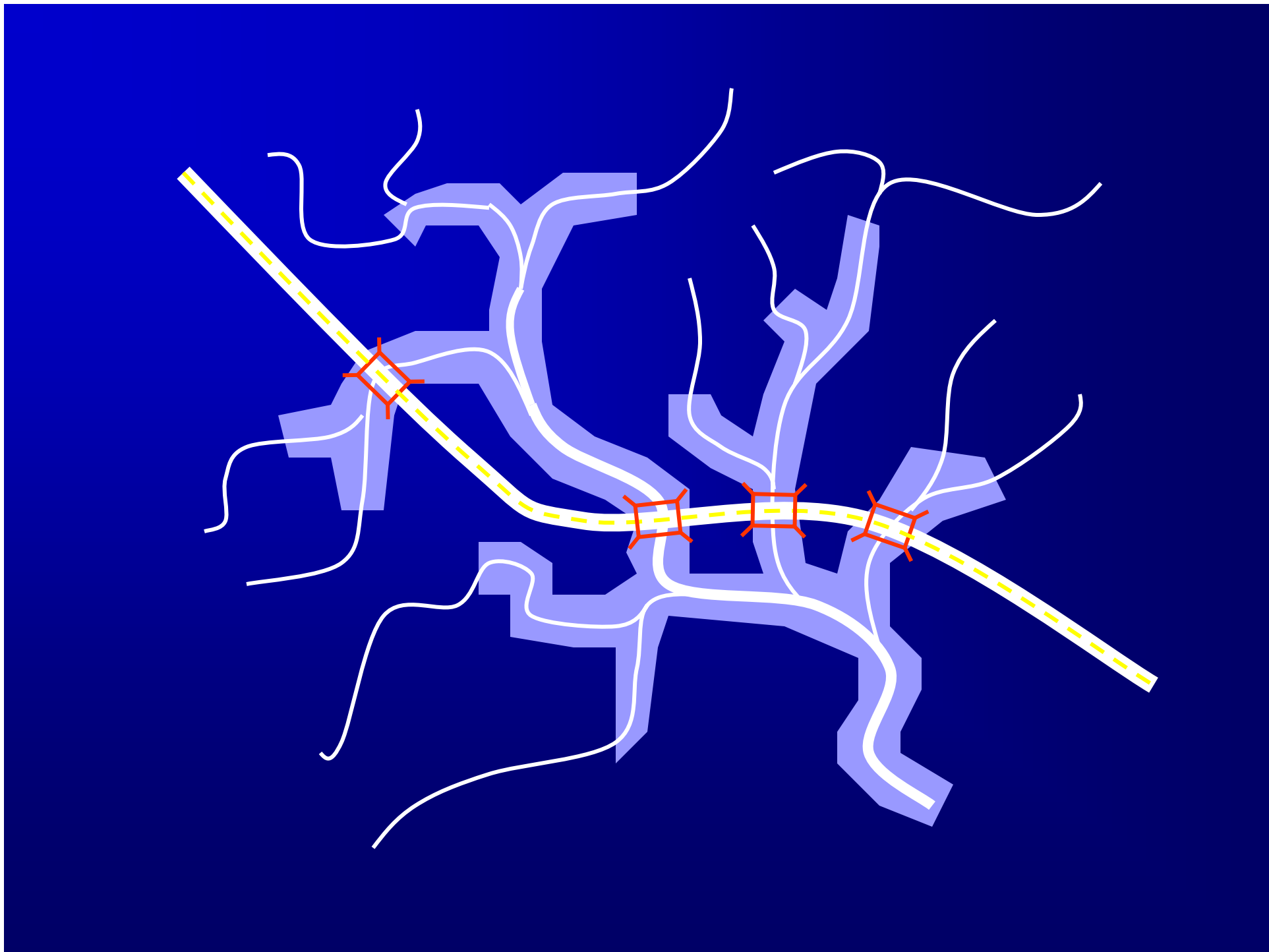


# Fish and Wildlife Habitat



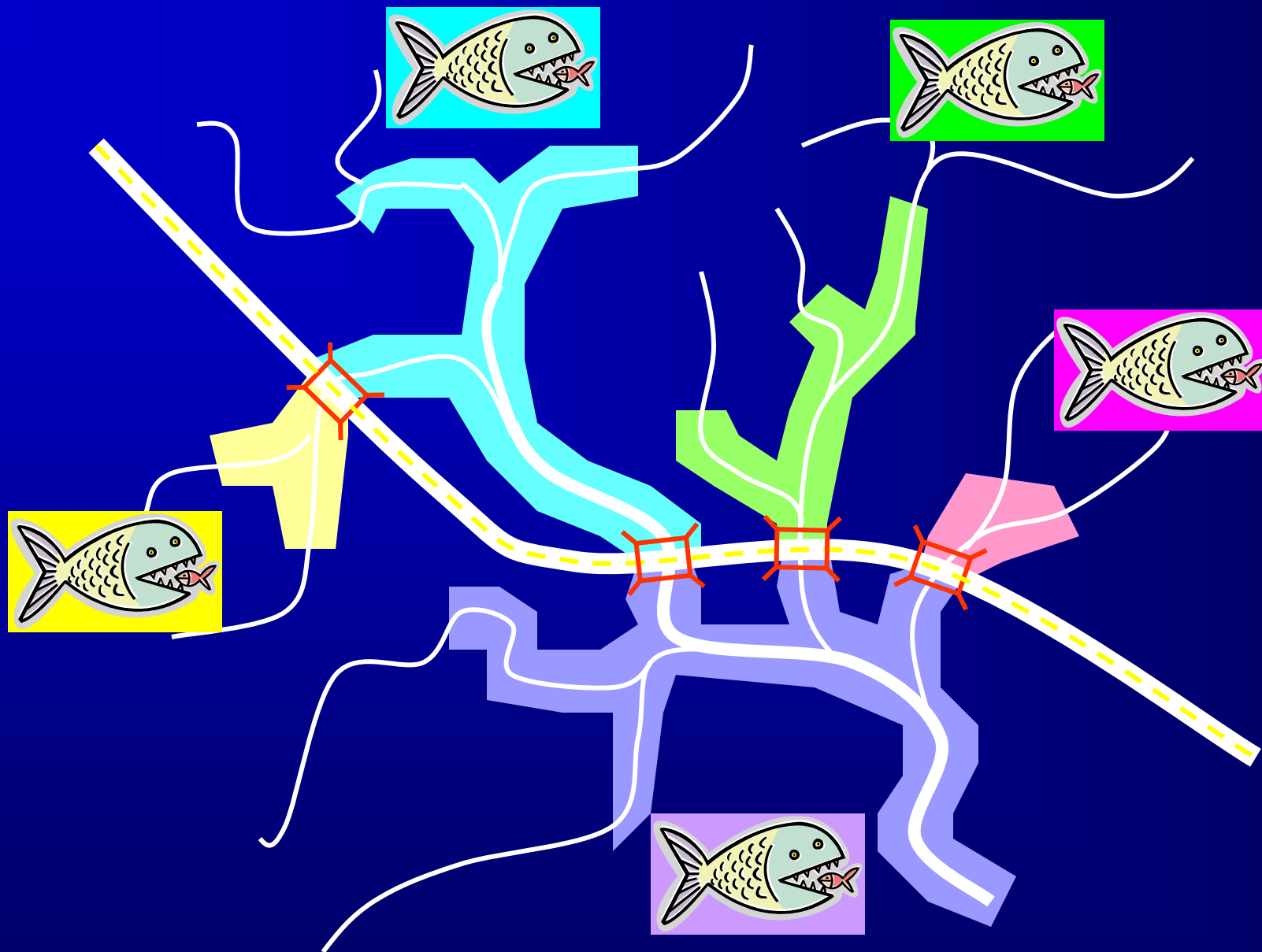


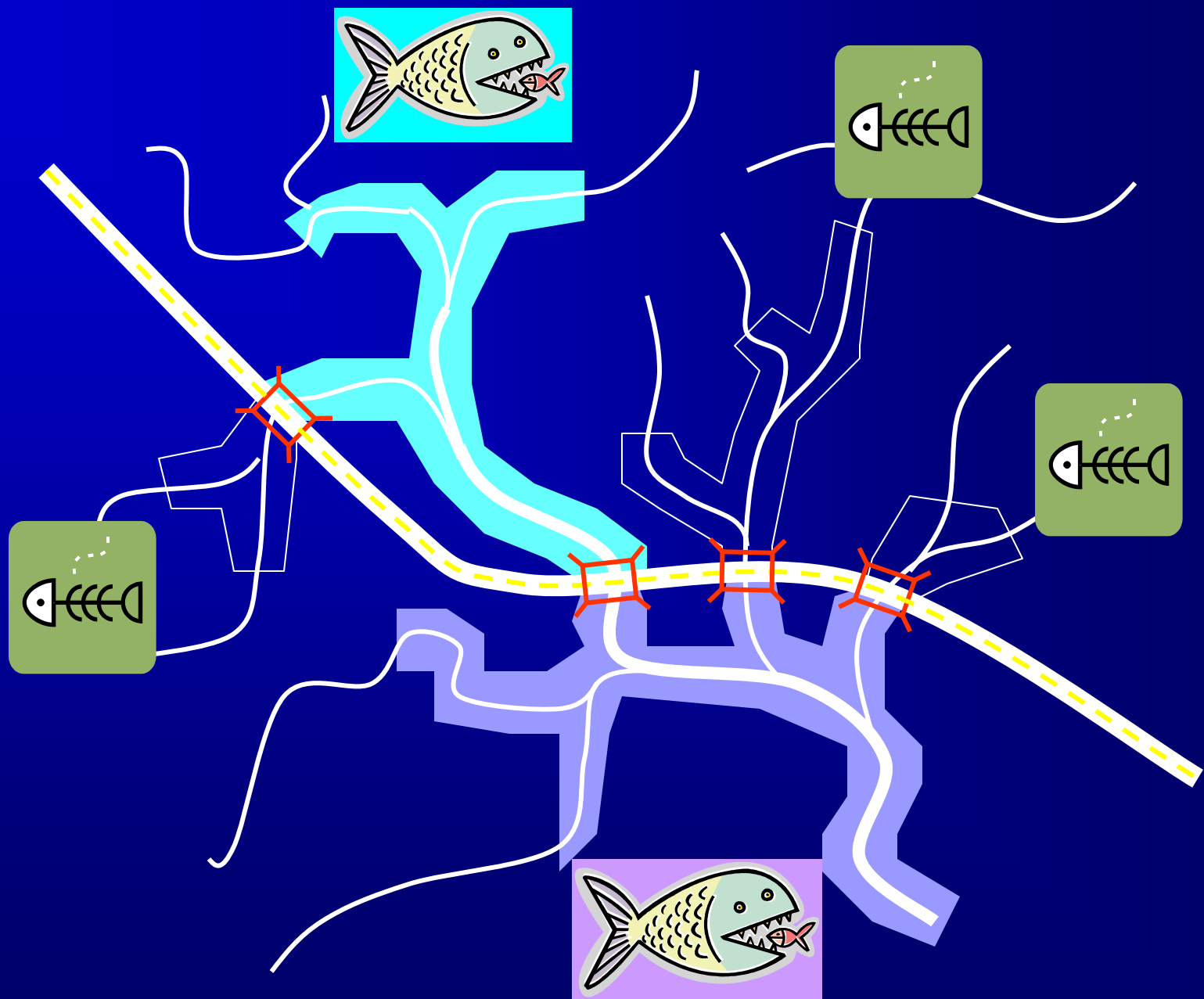




# Sub-standard Culverts









# **Impacts of Sub-standard culverts**

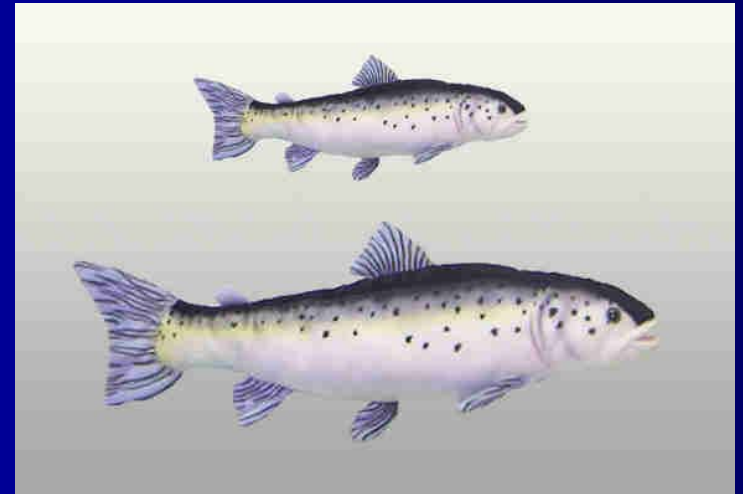
- **Habitat loss and degradation**
- **Road kill leading to population losses**
- **Population fragmentation and isolation**
- **Reduced access to vital habitats**
- **Disruption of processes that maintain regional populations**

# Affected Species

Brook trout



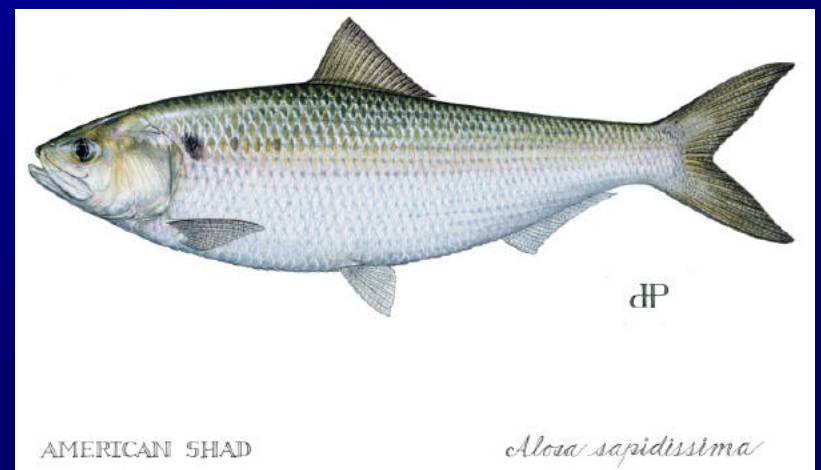
Atlantic salmon



Blueback herring



American shad



# Affected Species

Wood turtle



Freshwater mussels



Freshwater crayfish



2-lined salamander







**I can't jump  
through there!!**



# RI River and Stream Continuity Project





# Project Partners



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



*Commonwealth of Massachusetts*

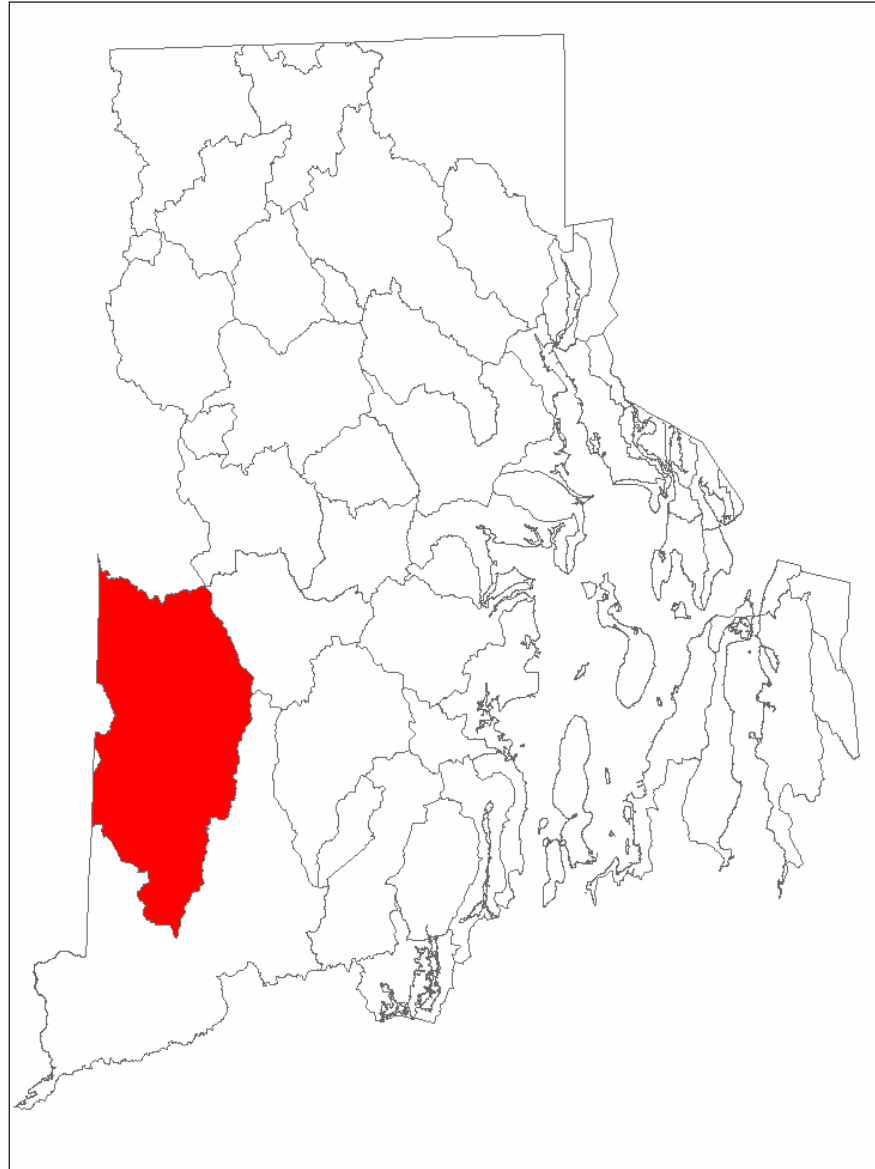
**RIVERWAYS PROGRAM**

*Building Partnerships, Protecting Rivers*

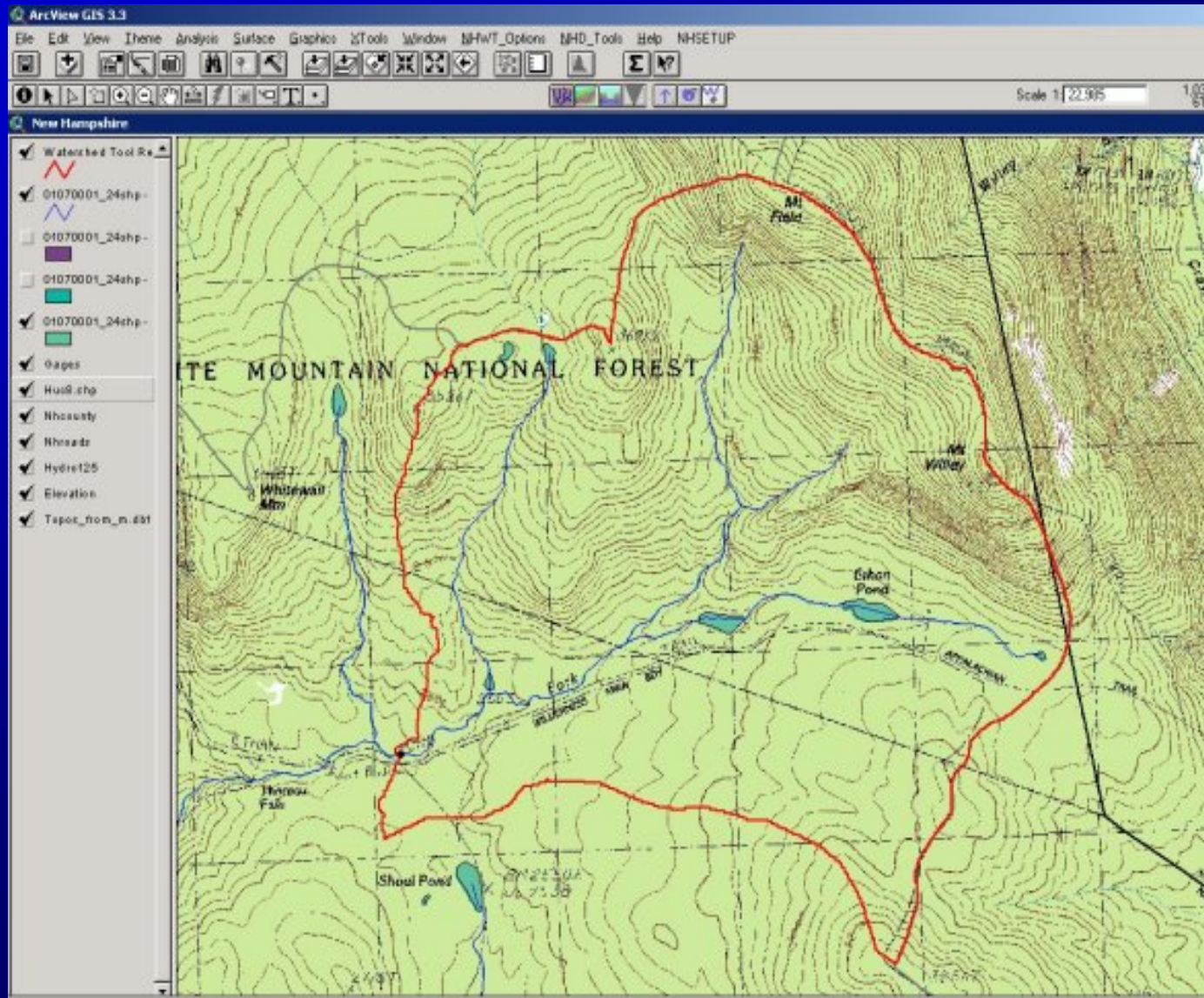


**UMASS  
EXTENSION**

# Study Site Location



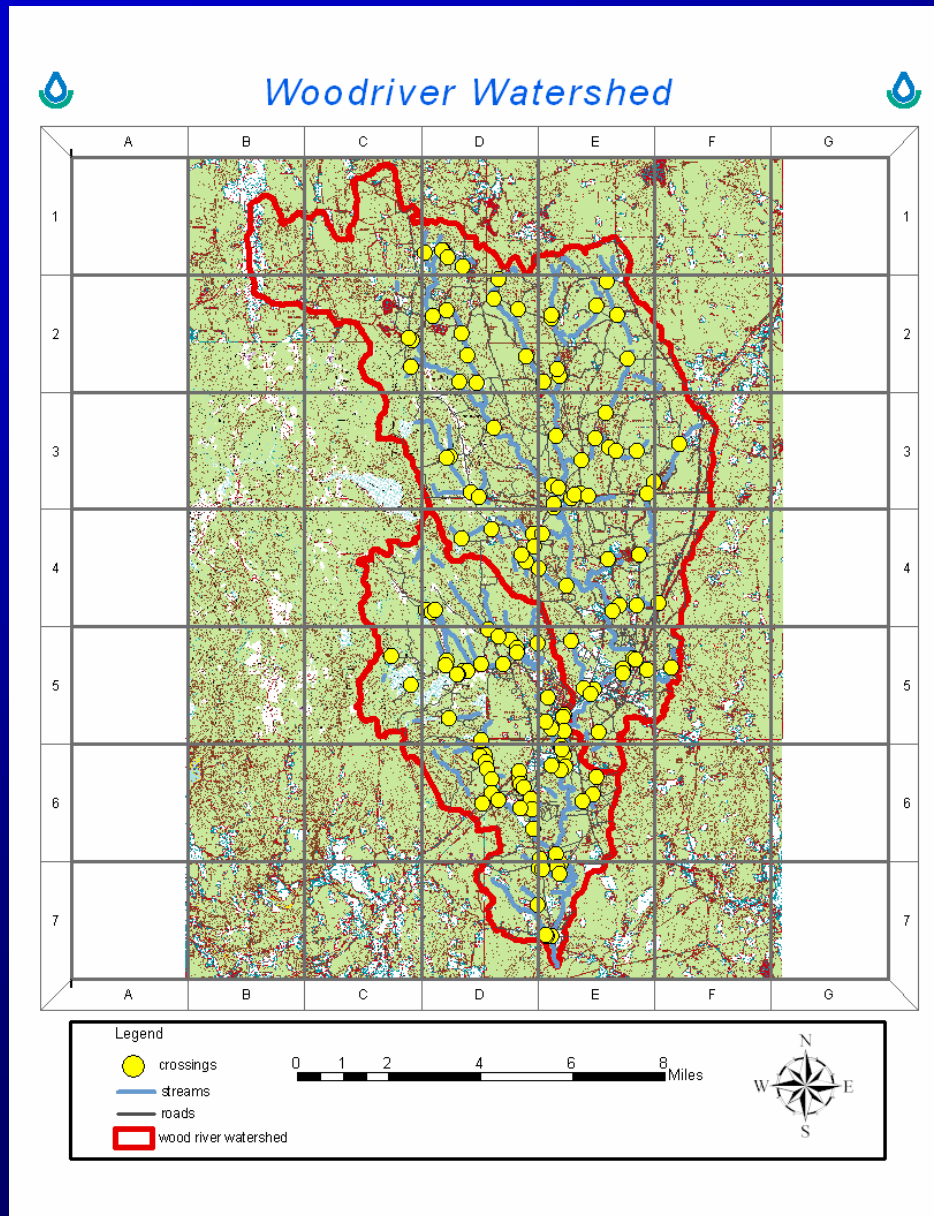
# Watershed Delineation



Contours

Contour  
Intervals =  
Distance  
between  
contours

# Methods



- Created maps with a computer program known as Geographic Information Systems (GIS)
- Obtained data on where roads and streams cross

RIGIS



# Methods: Data Collection

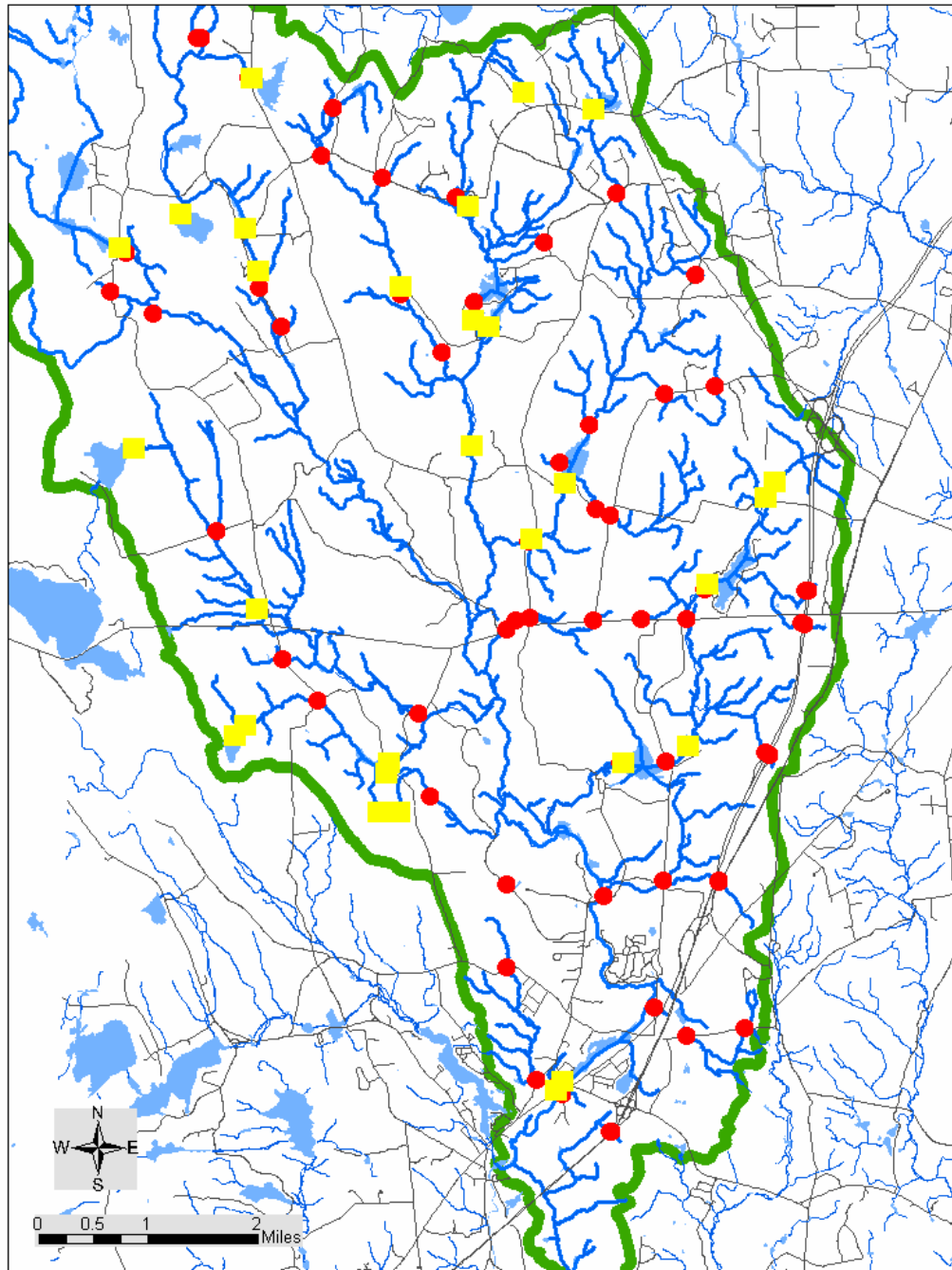
## Road Characteristics



## Crossing/Stream Characteristics







**Sub-standard  
Culverts**

**Dams**

# Solutions

## Embedded Culvert



Natural substrate

## Bridge



Wildlife can pass under bridge

# Another Case Study of Riverine Systems.....

# Dams



Barberville Dam

Atlantic Mills













# Dam Solutions



Denile Fish Ladder





**Brook trout**

**Thank you!**

**May I answer any  
questions?**