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Mike Fuhr

State Director, The Nature Conservancy

The Nature Conservancy

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Ecological Flows

- *The amount and timing of water flows required to maintain the species, functions, and resilience of freshwater ecosystems and the livelihoods of human communities that depend on those healthy ecosystems*

Ecological Flows

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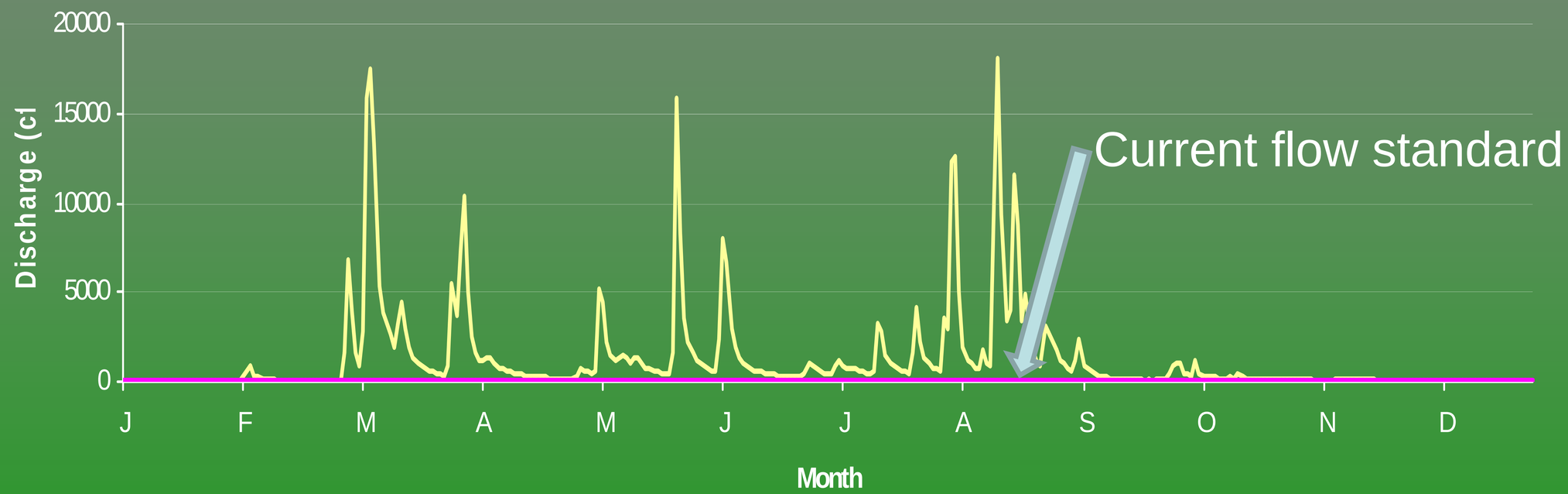
What are instream flows?



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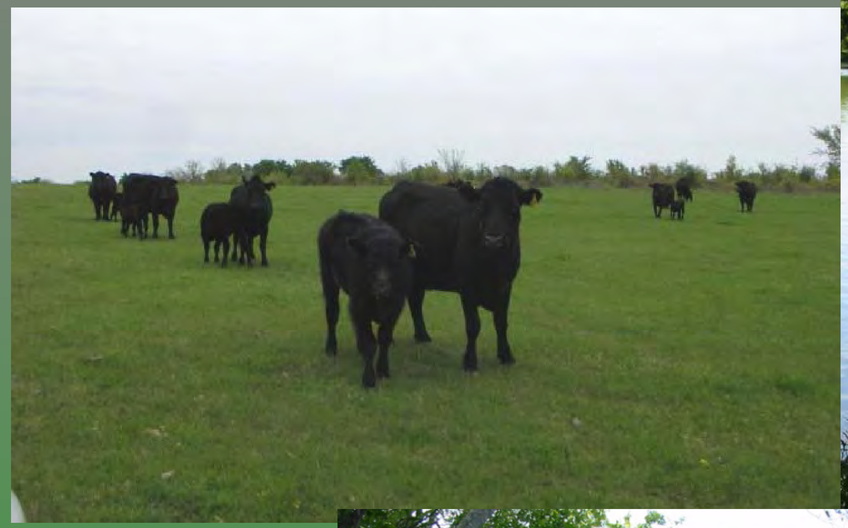
Economic Sustainability

- Agriculture
  - Irrigation
  - Livestock
- Recreation
  - Fishing
  - Kayaking
  - Swimming
- Aesthetics
- Waste dilution



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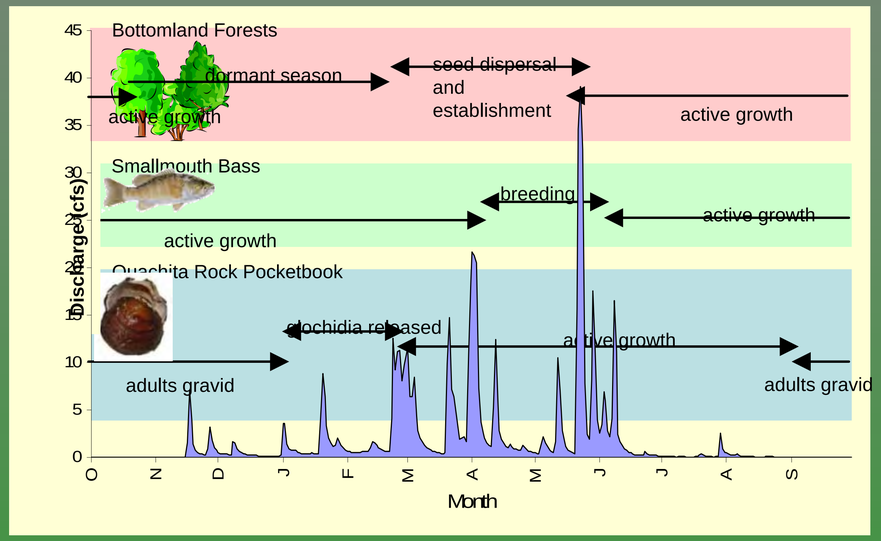
What are instream flows?

- Variability in element of the flow regime
  - Magnitude
  - Timing
  - Duration
  - Frequency
  - Rate of Change



- How much can flow regimes be altered before having an appreciable affect on ecosystem function?

USGS science for a changing world

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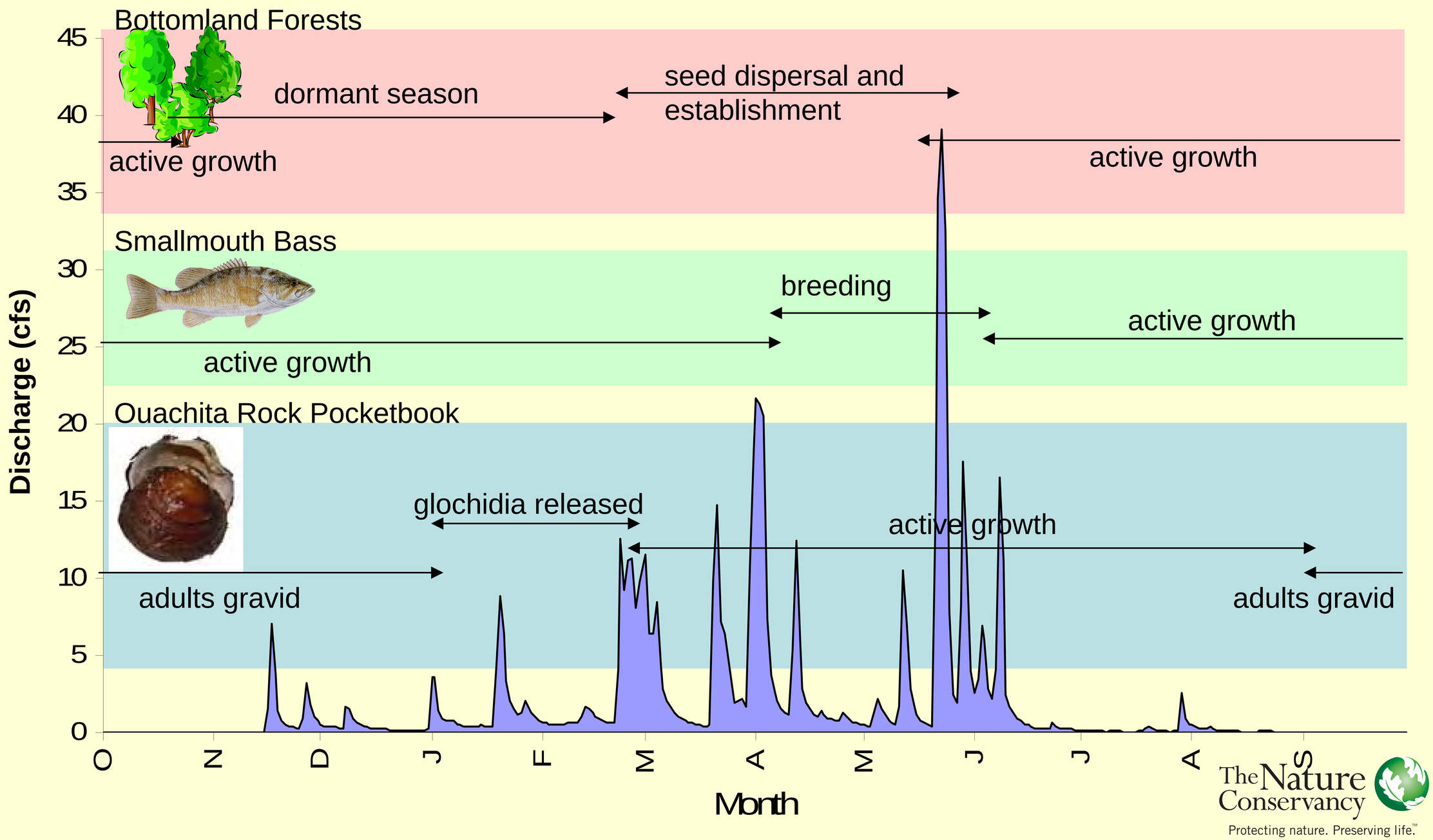
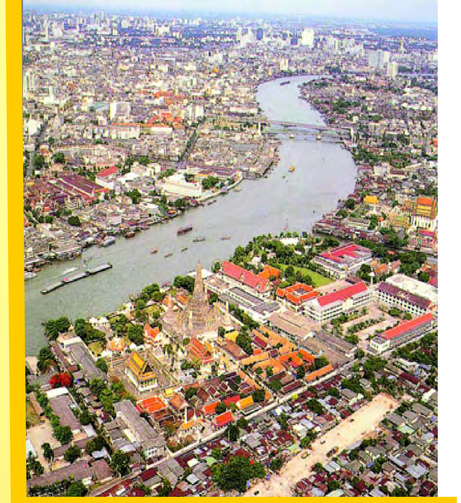
Freshwater biodiversity relationship to flow – Kiamichi River



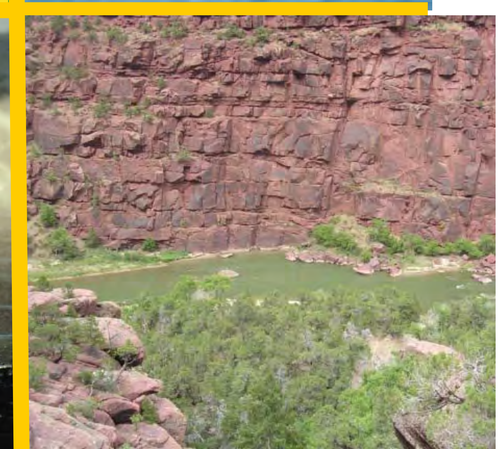
Several Options for Moving Forward:

- o Status Quo – Assume domestic set-aside will provide coverage
- o Be Proactive – work together to find a collaborative solution

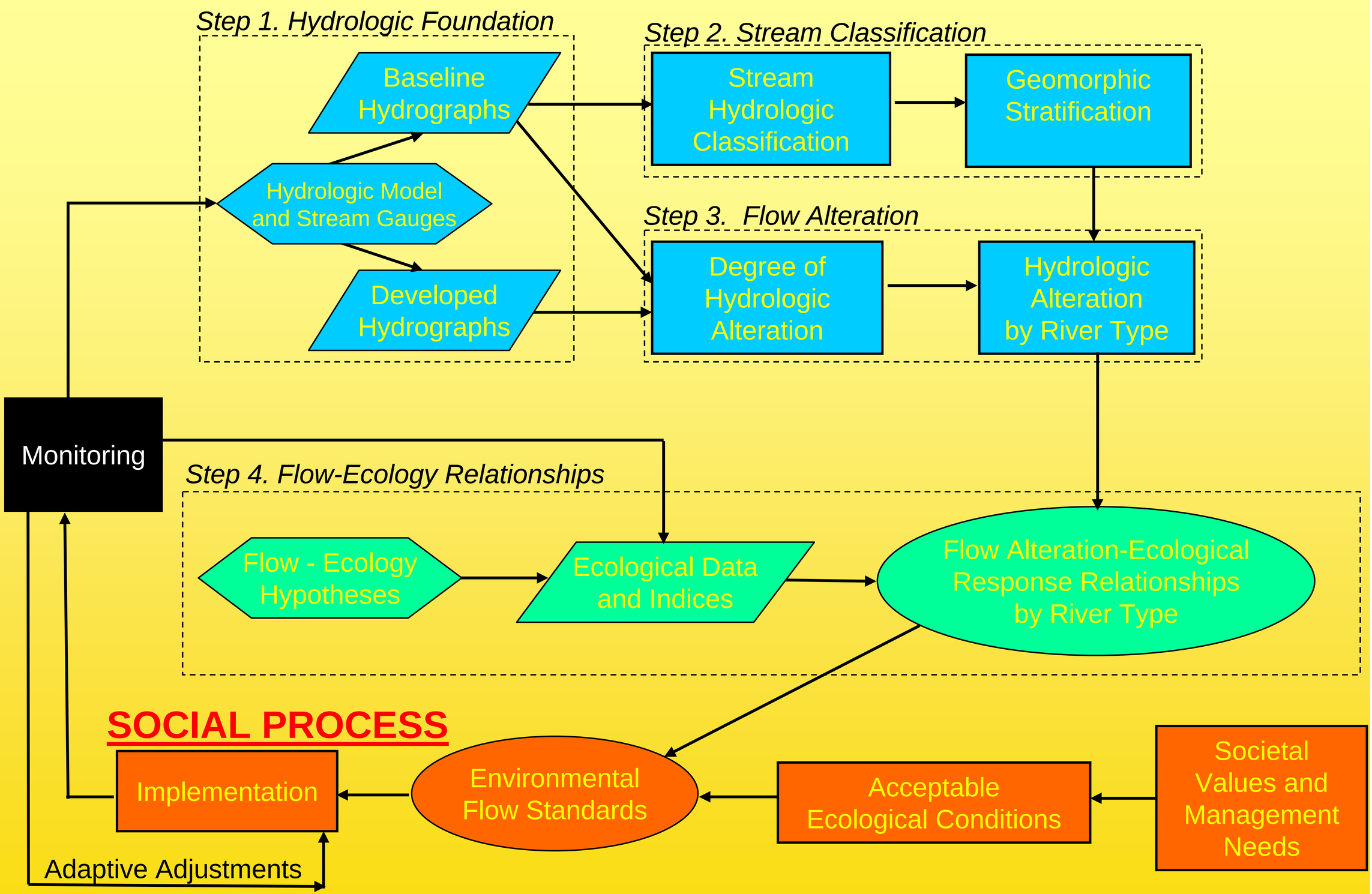
Ecological Limits of Hydrologic Alteration (ELOHA)

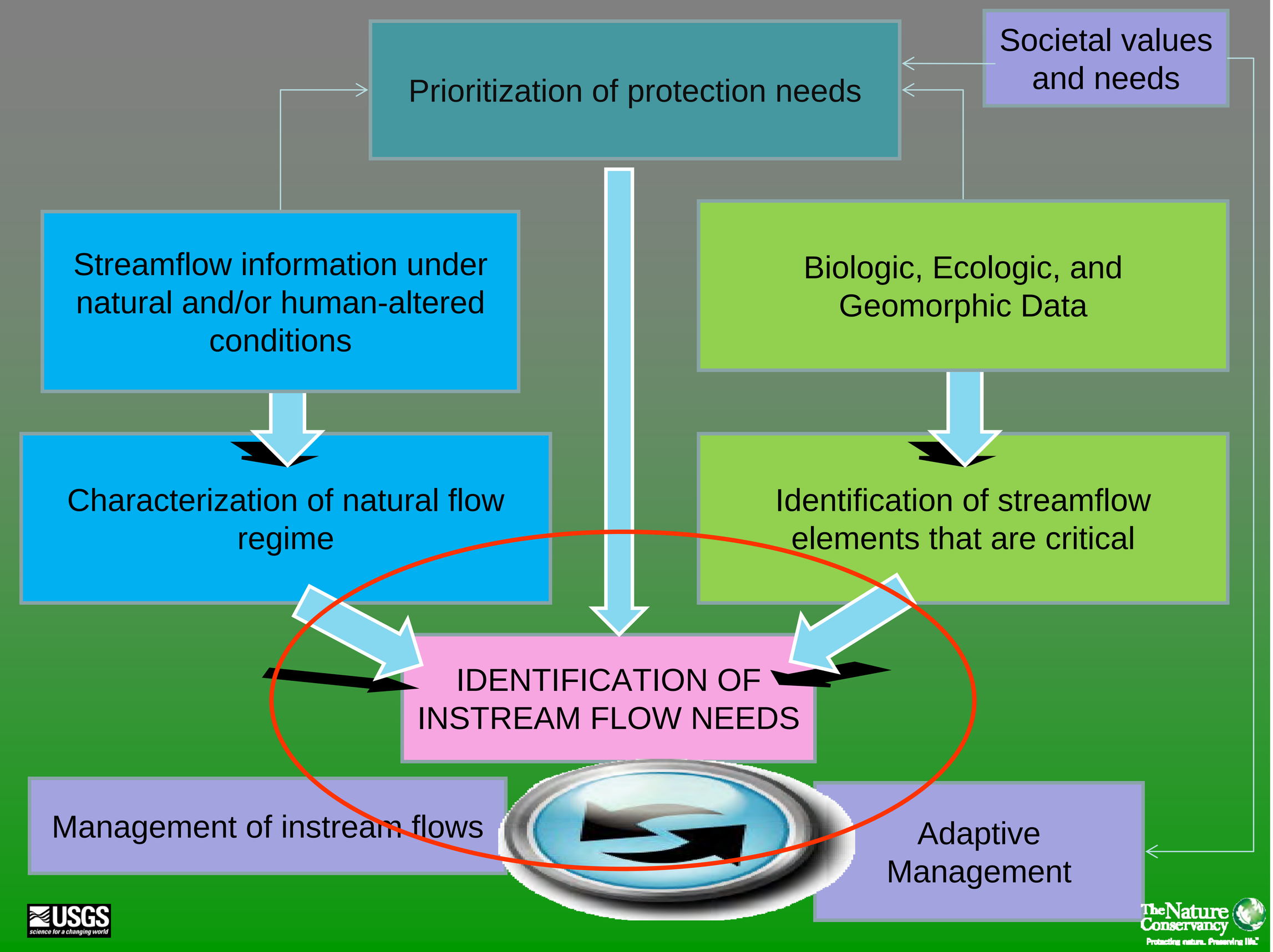


- Quantifies trade-offs between streamflow alteration and ecological degradation
- Informs the determination of environmental flow targets
- Integrates environmental flows into a computerized DSS



SCIENTIFIC PROCESS




Prioritization of protection needs
Societal values and needs
Streamflow information under natural and/or human-altered conditions
Biologic, Ecologic, and Geomorphic Data
Characterization of natural flow regime
Identification of streamflow elements that are critical
IDENTIFICATION OF INSTREAM FLOW NEEDS
Management of instream flows
Adaptive Management
USGS
science for a changing world
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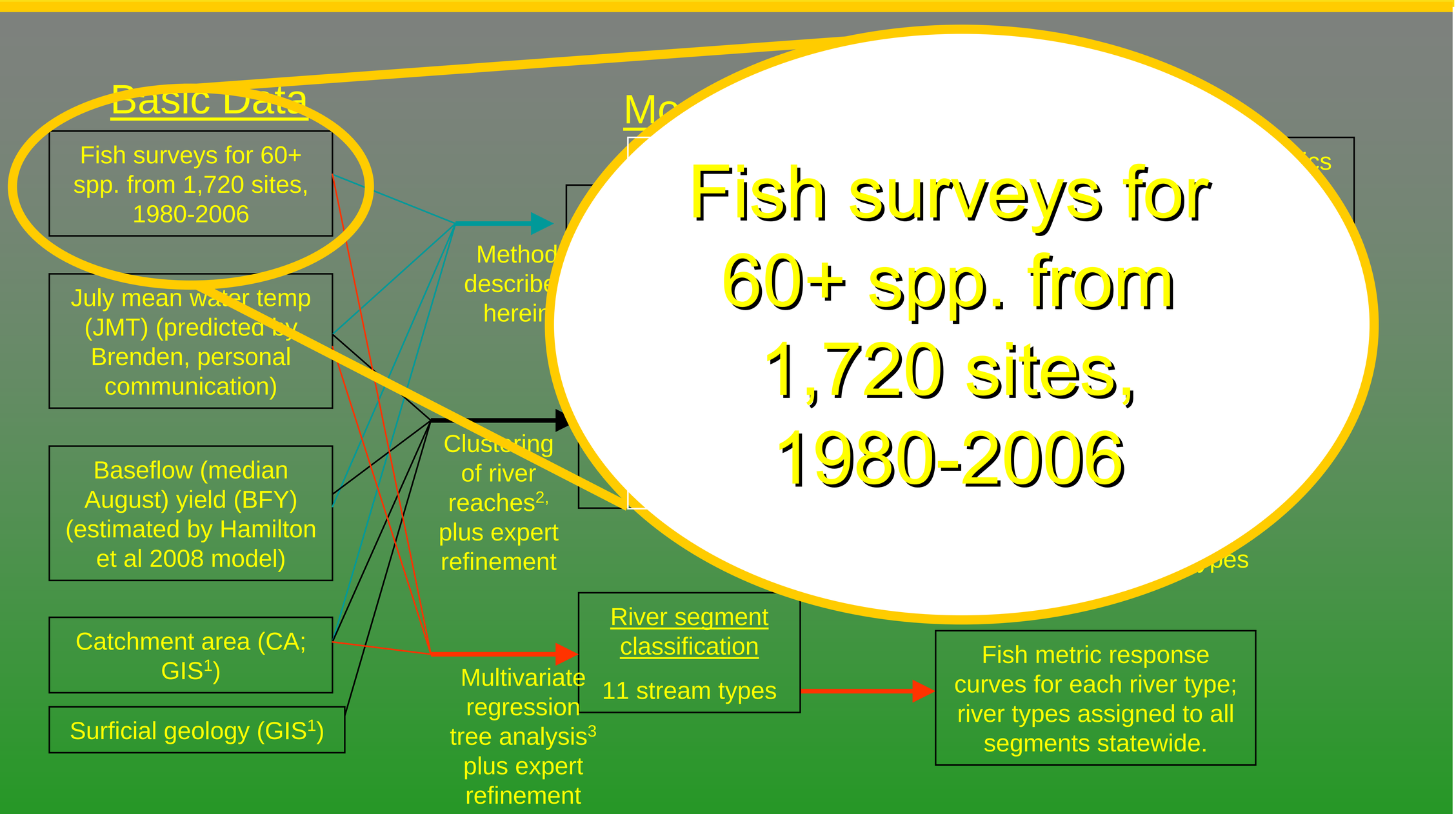
Flow Alteration - Ecological Response Curve

MICHIGAN

- **<u>Great Lakes Compact:</u>** "no significant individual or cumulative *adverse resource impact*" due to withdrawals

- **<u>Michigan 2006 Public Act 34:</u>** An "*adverse resource impact*" is defined as: "decreasing the flow of a stream by part of the index flow such that the stream's ability to support characteristic fish populations is functionally impaired."

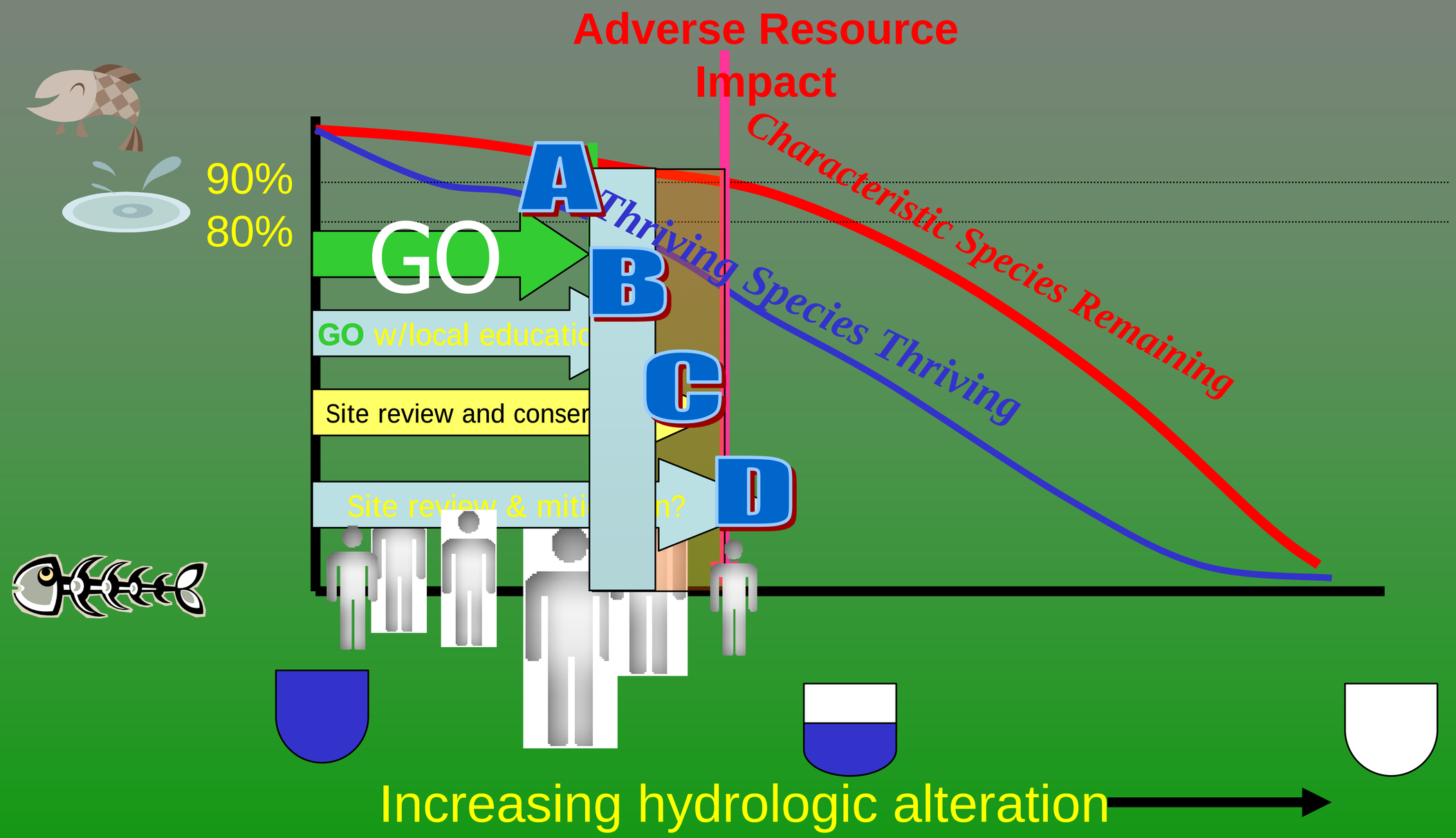
Michigan's Science Process



[1] Brenden et al. 2006
[2] Brenden et al. 2007b
[3] Brenden et al. 2008

Michigan fish response curves and river condition goals

Determining Impact For New & Expanding Uses



Michigan: Implementation

Related Articles

- Education Material
- Tool Introduction

Collaborators

Department of Environmental Quality

Department of Natural Resouces

United States Geologic Survey

Institute of Water Research

WWAT Information

- Coming Soon!

Finding the Location of Your Water Withdrawal

Please select one of the following options for locating the position of your water withdrawal.

Locate by Address

Enter the address and zip code at or near the withdrawal location. Please spell street names correctly in order to ensure system accuracy.

Address:

Zip Code:

Find Address

Locate by County

To select the county where the water withdrawal will occur, click the map or choose from the drop down menu.

Chippewa

Find County

Locate by Latitute and Longitude

Enter the latitude and longitude coordinates at or near the withdrawal location. Please input data correctly in order to ensure system accuracy.

Decimal Degrees

Degree Minute Second

Longitude(X):

Latitude(Y):

Find Point | Clear

http://www.miwwat.org - Withdrawl Input File - Microsoft Internet Explorer

ENTER WITHDRAWAL INFORMATION

Pumping Source and Frequency

Withdrawal Source:

Surface Water (from stream)

Ground Water

Shallow Pond

Pumping Frequency: Continuous Intermittent

Pumping Parameters

Pumping Capacity (GPM): 70

Coordinates (X,Y): -84.84137 , 42.683384

Well Depth (FT): 25-50 ft

Aquifer Type: Bedrock Glacial

Current Stats at Location

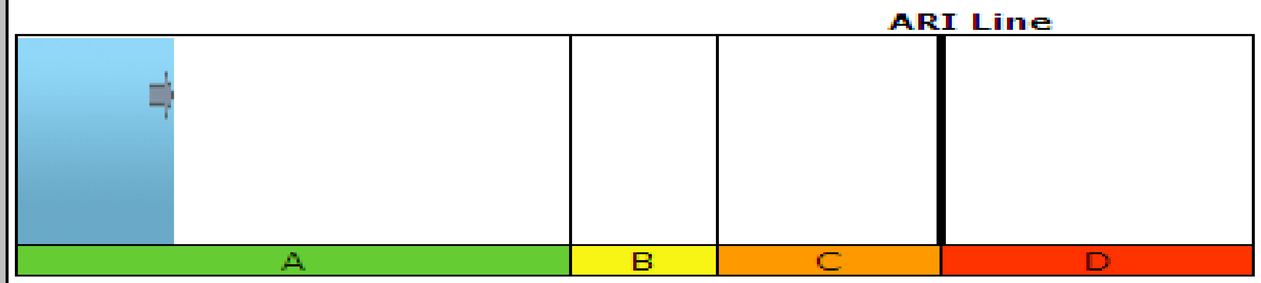
- Depth to Bedrock (FT): 130
- Average Well Depth (FT): 83
- Percent Wells in Glacial: 25
- Percent Wells in Bedrock: 64

Send to Model

Water Withdrawal Screening Results

WARNING: For evaluation purpose only.

Adverse Resource Impact (ARI) Graph



The ARI graph above illustrates the estimated removal of water from a nearby stream and its potential for causing an adverse resource impact (ARI).

The proposed withdrawal has passed in Zone A.

Screening Results - PASSED

STREAM CLASSIFICATION: Cool small river

TEST VERSION RESULTS:
The proposed withdrawal would pass the screening process. The projected impact of the withdrawal lies within 'Zone A' and is not likely to cause an adverse resource impact.

REGISTRATION:
A Large quantity withdrawal (LQW) with a capacity of 70 gpm or greater must be registered with the Michigan Department of Environmental Quality or with the Michigan Department of Agriculture if the LQW is for an agricultural purpose, before the withdrawal can begin. A registration is valid for 18 months. The withdrawal capacity must be installed within this time period or the registration becomes void. Registration may be done at this time through the button at the right.

You may register at this time, or come back to this site at a later time, or you may obtain a form to register the withdrawal by contacting Andrew LeBaron at 517-241-1435, or on-line at:
www.michigan.gov/deqwateruse

Actions:

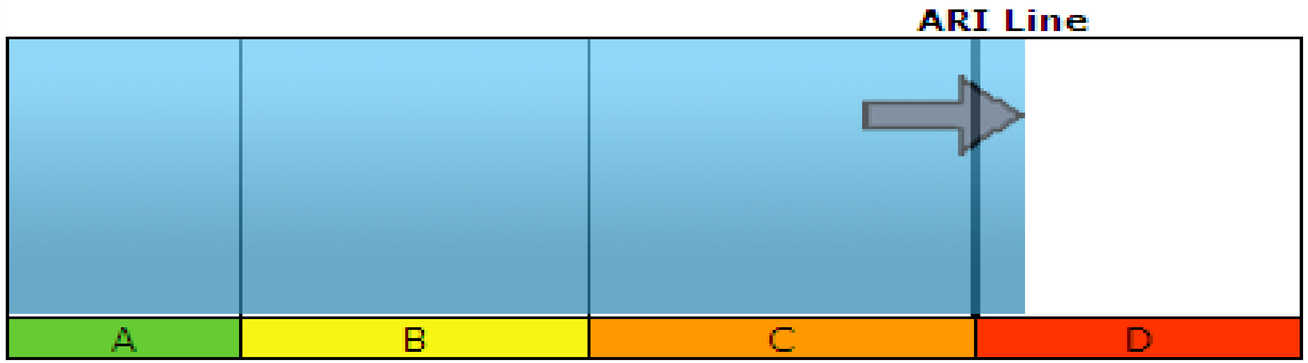
- Help
- Rerun
- Register Now
- Feedback
- Print Report
- Exit

DISCLAIMER:
The Water Withdrawal Assessment Tool is designed to estimate the likely impact of a proposed water withdrawal on nearby streams. It is not an indication of how much groundwater may be available for your use. The quantity and quality of groundwater varies greatly with depth and location. You should consult with a water resources professional or a local well driller about groundwater availability at your location.

WARNING:
This computer program is provided for the public to evaluate the water withdrawal assessment tool before it becomes effective on July 9th, 2009. It incorporates the zones and adverse resource impact lines defined in Part 327 of the Natural Resources and Environmental Projection Act. You may use it to register a new or increased large capacticy withdrawal, but the assessment results are not official until the tool is fully implemented on July 9th, 2009.

WARNING: For evaluation purpose only.

Adverse Resource Impact (ARI) Graph



The ARI graph above illustrates the estimated removal of water from a nearby stream and its potential for causing an adverse resource impact (ARI).

The proposed withdrawal is in Zone D, and is likely to have an adverse resource impact.

Screening Results - SITE SPECFIC REVIEW IS REQUIRED.

STREAM CLASSIFICATION: Cool stream

TEST VERSION RESULTS: The projected impact of the withdrawal lies within 'Zone D' and would likely cause an adverse resource impact. The withdrawal cannot be initiated without a site-specific review conducted by the Michigan Department of Environmental Quality. To pursue approval for the withdrawal as proposed, submit a request for a site-specific review through the button at the right.

MODIFYING A PROPOSED WITHDRAWAL:
Changing certain characteristics of the proposed withdrawal may decrease the flow taken from nearby river systems, thereby lessening the likelihood of an adverse resource impact. The following withdrawal characteristics may be altered in the screening process to reduce the potential impact to nearby river systems:

- Reduce the pumping frequency
- Reduce the pumping capacity
- Increase the well depth
- Relocate the withdrawal farther from nearby river systems

You can use the button at the right to rerun the Water Withdrawal Assessment Tool and change the proposed withdrawal characteristics.

Actions:

Help

Rerun

Site Specific Review

Feedback

Print Report

Exit

- *Water wars are exactly what we need to avoid in Oklahoma.*
  - Representative Tom Cole, U.S. House of Representatives
  - Oklahoma Governor's Water Conference, October 26th, 2010

- http://conserveonline.org/workspaces/eloha

For More Information:

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