
Michigan's Water Withdrawal
Assessment Process
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- Why does Michigan, the "*water wonderland*", regulate water withdrawals?

- One main reason

  - **Diversions** of water from the Great Lakes Basin

There are also areas with conflicts between water users, areas with relatively little available water, and many rivers and streams that are national treasures.

History

- 1985- Great Lakes Charter
  - Call to manage large withdrawals and provide water use information
- 2001- Annex to the Great Lakes Charter- commitments:
  - Develop simple, efficient water management system that protects, conserves, restores, and improves Great Lakes Basin waters and water-dependent resources
  - No significant individual or cumulative adverse impacts on water quality or quantity
  - Improve information sources and tools to assess impacts of water withdrawal
- 2006- Michigan legislation (first regulation of water withdrawals in Michigan)
- 2008- Michigan passes laws implementing Great Lakes – St. Lawrence River Basin Water Use Compact

Decision-Making Standard

- 2006 Legislation

  "Adverse Resource Impact": "Stream's ability to support characteristic fish populations is functionally impaired"

- Goal: Quantify

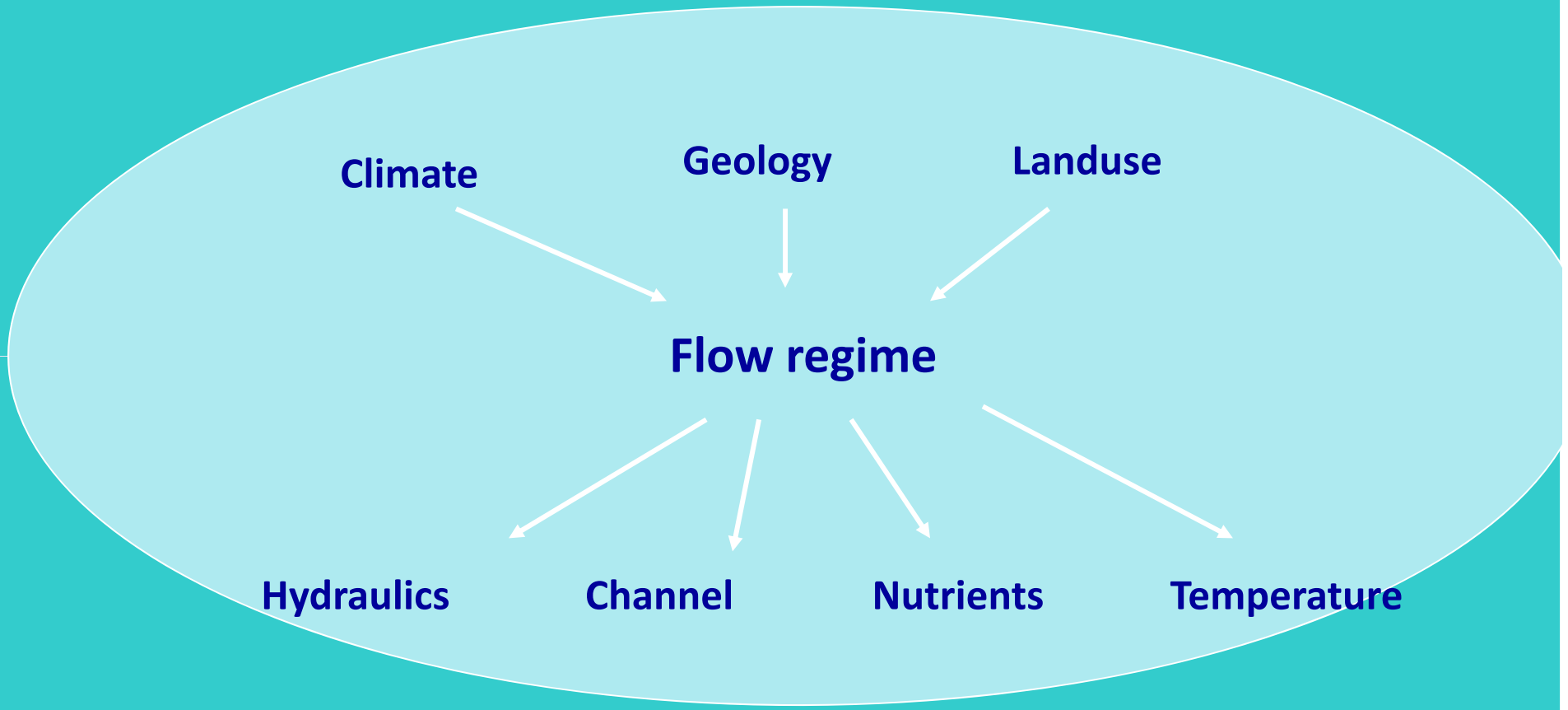
  Consistency

  Predictability

The Philosophy behind the Water Withdrawal Assessment Process

- Integrated, science-based approach
- Develop new thinking in integrating existing science
- Use a National Scientific Peer Review Panel
- Base the approach on Michigan data and State modeled relationships
  - Science team: USGS, MDEQ, MDNR, UM, MSU
- Run an open shop - inclusive, seek participation, communication:
  - Council & guests (across all sectors)
    - Technical and Legal and Mitigation Subcommittees
  - MDA, MDEQ & MDNR on Council

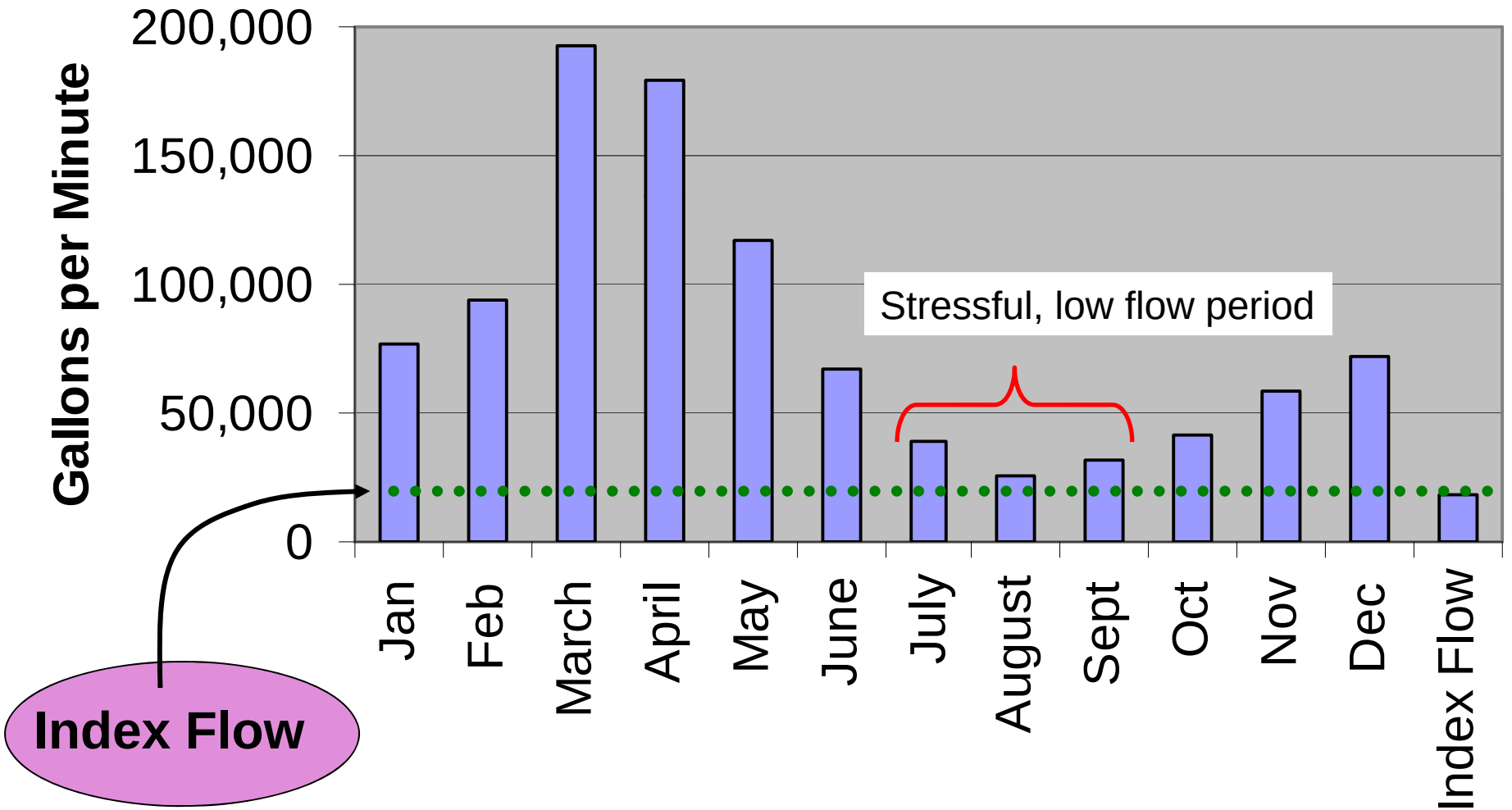
The Flow Regime Paradigm



-- There is a geography of flow regimes

-- Fish species are adapted to habitats controlled by certain quantities of, and variability in, river flows

Looking Glass River near Eagle
Mean Monthly Flows



The Water Withdrawal Assessment Process

Groundwater **Feeds** Stream Flow **Supports** Fish Populations

- Three models interact within the impact assessment model

  Withdrawal Model - How much water is in the aquifer, is being withdrawn, and from where and how it will affect stream flow

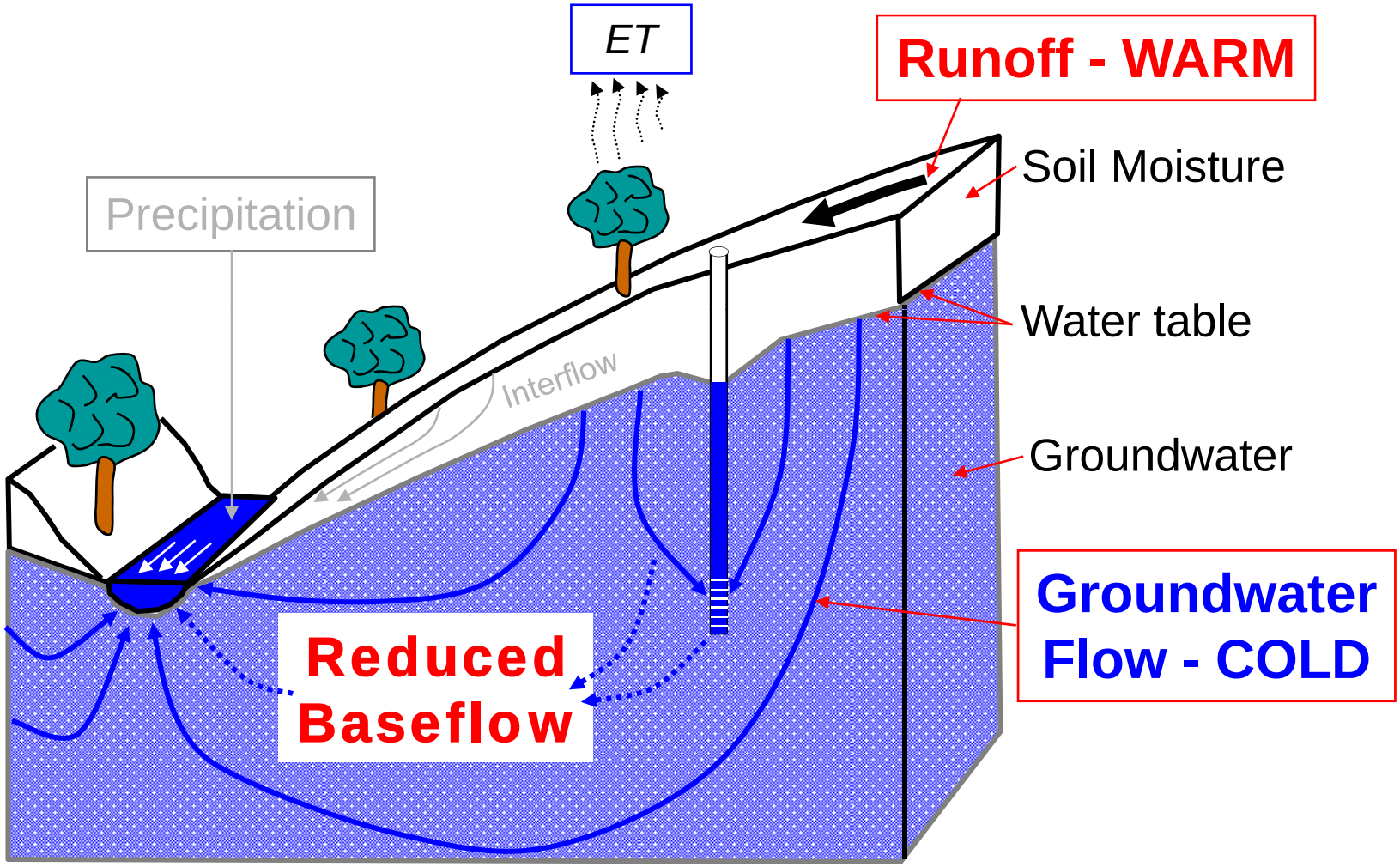
  Streamflow Model - How much water is flowing in the stream during summer low flow periods

  Fish Impact Model - What fish are in the stream and what is the likely effect of removing water on those groups of fish

Characteristics of the Withdrawal Model

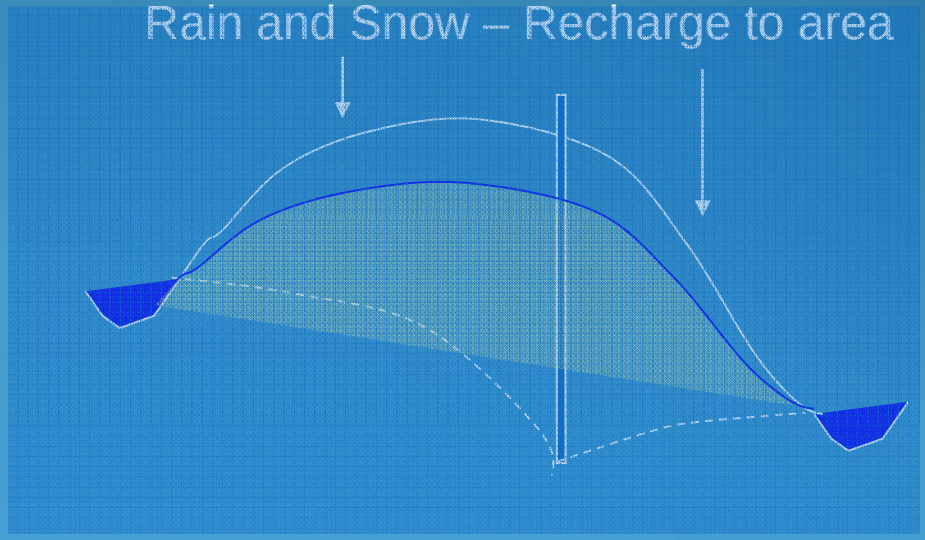
- Distance Matters
  - A well adjacent to a river will very quickly get water either from water that would have gone to the river or directly from the river
  - A well farther from a river will get more water from storage and require a longer time to affect the stream
- Geology and Soil Matters
  - Clay soils are “tight” and water does not move easily
  - Sandy soils are “porous” and water flows quickly

• Withdrawal Impacts on Rivers



The Withdrawal Model

- Aquifer properties are determined from the Michigan Groundwater and Map database.
- Automatically determines where the nearest streams are.
  - Apportions the withdrawal effect between streams.
- Calculates the likely reduction in flow due to the proposed withdrawal.



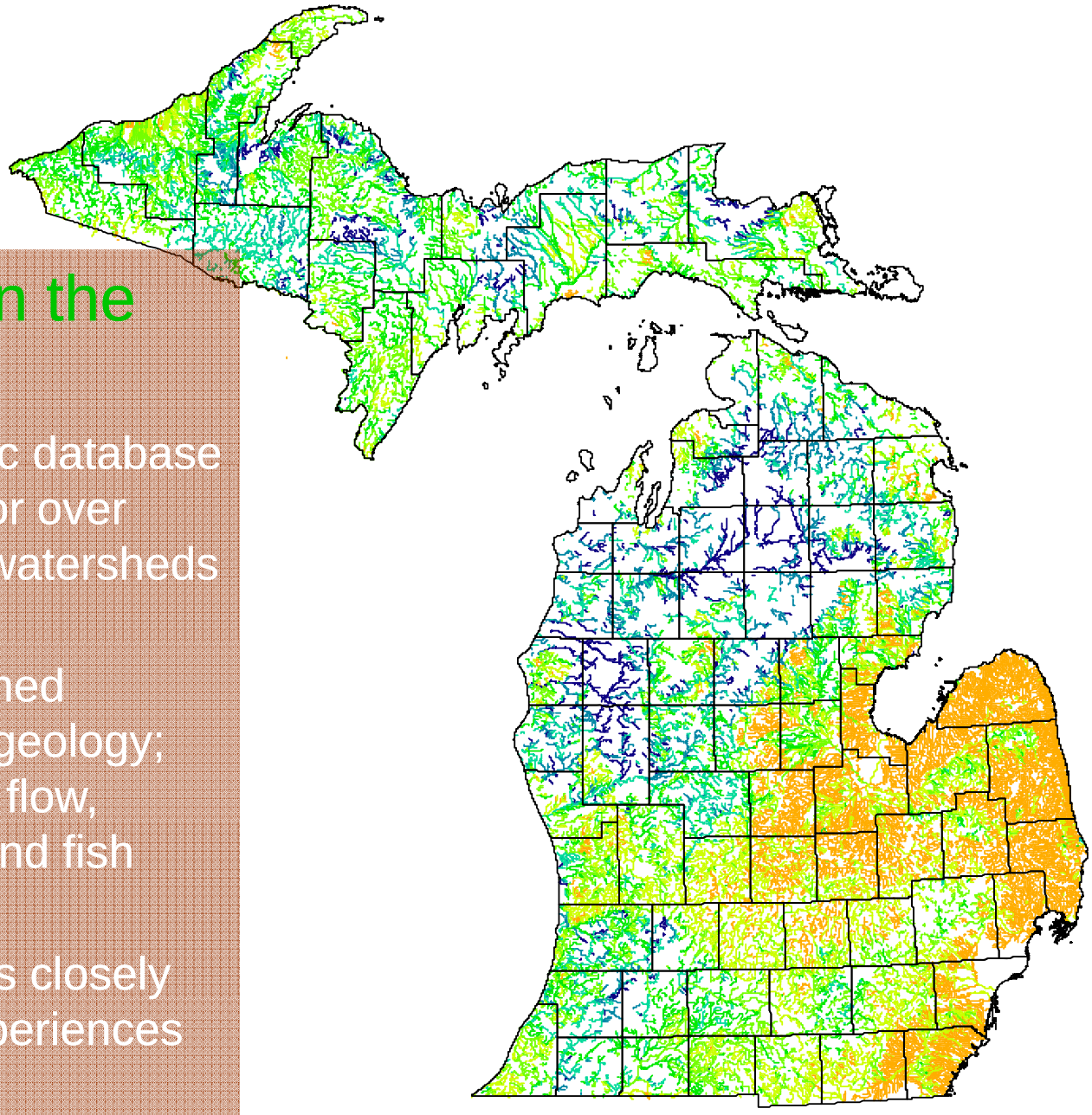
The Streamflow Model

- Need to Know How Much Flow is in **any** Stream Segment
- "Index flow"; low flow period in the year
- Look at the segments where we know the flow (147 stream gauges in the State) and extrapolate these to the streams that are not gauged

- Major Factors Used
  - Drainage Basin Size
  - Forest Cover
  - Geology and Soils
  - Precipitation

Major Factors in the Analysis

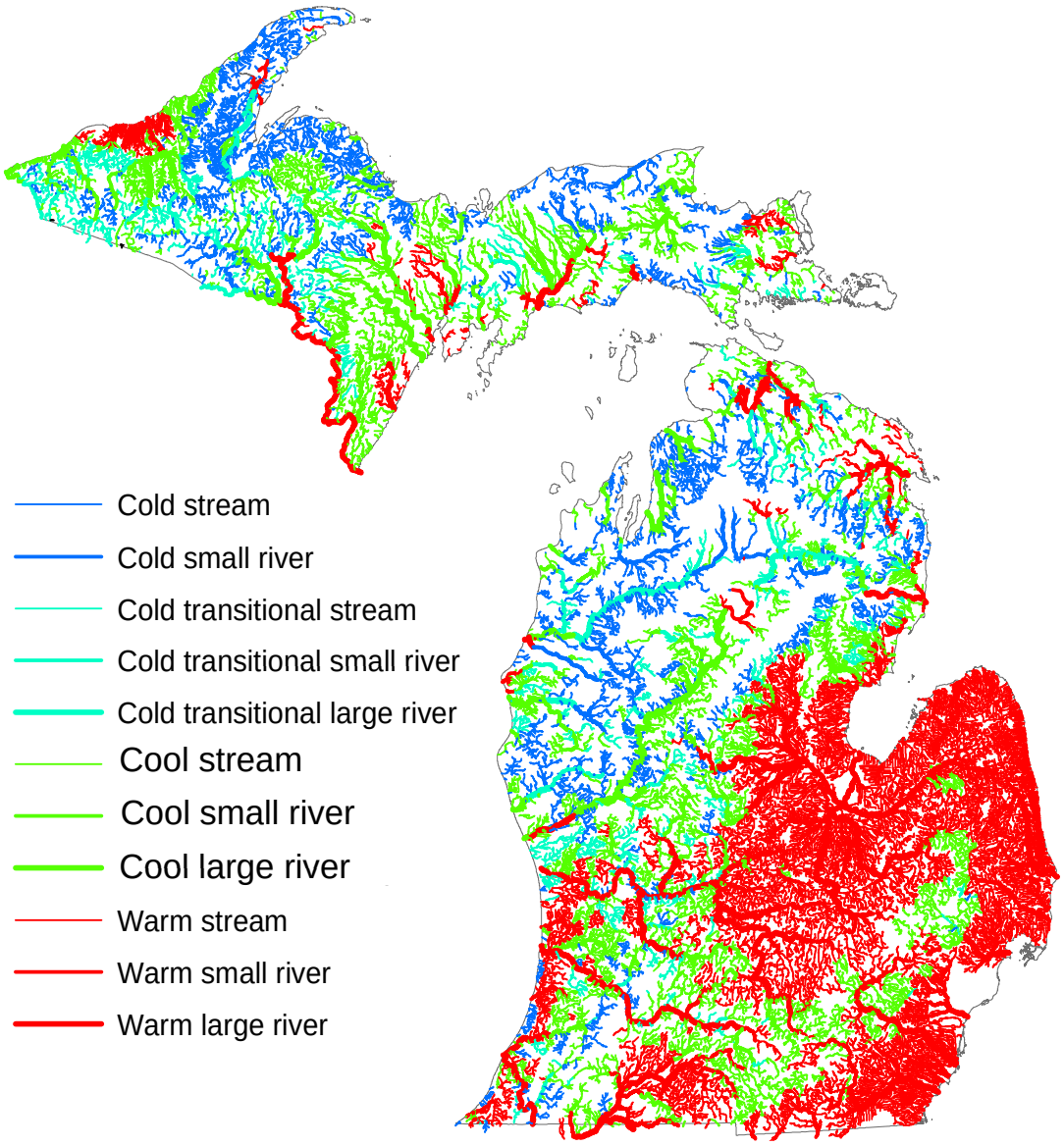
- The geographic database contains info for over 5,000 distinct watersheds and streams
- Info on watershed location, size, geology; and on stream flow, temperature, and fish populations
- Resulting maps closely match field experiences



Fish Response Model

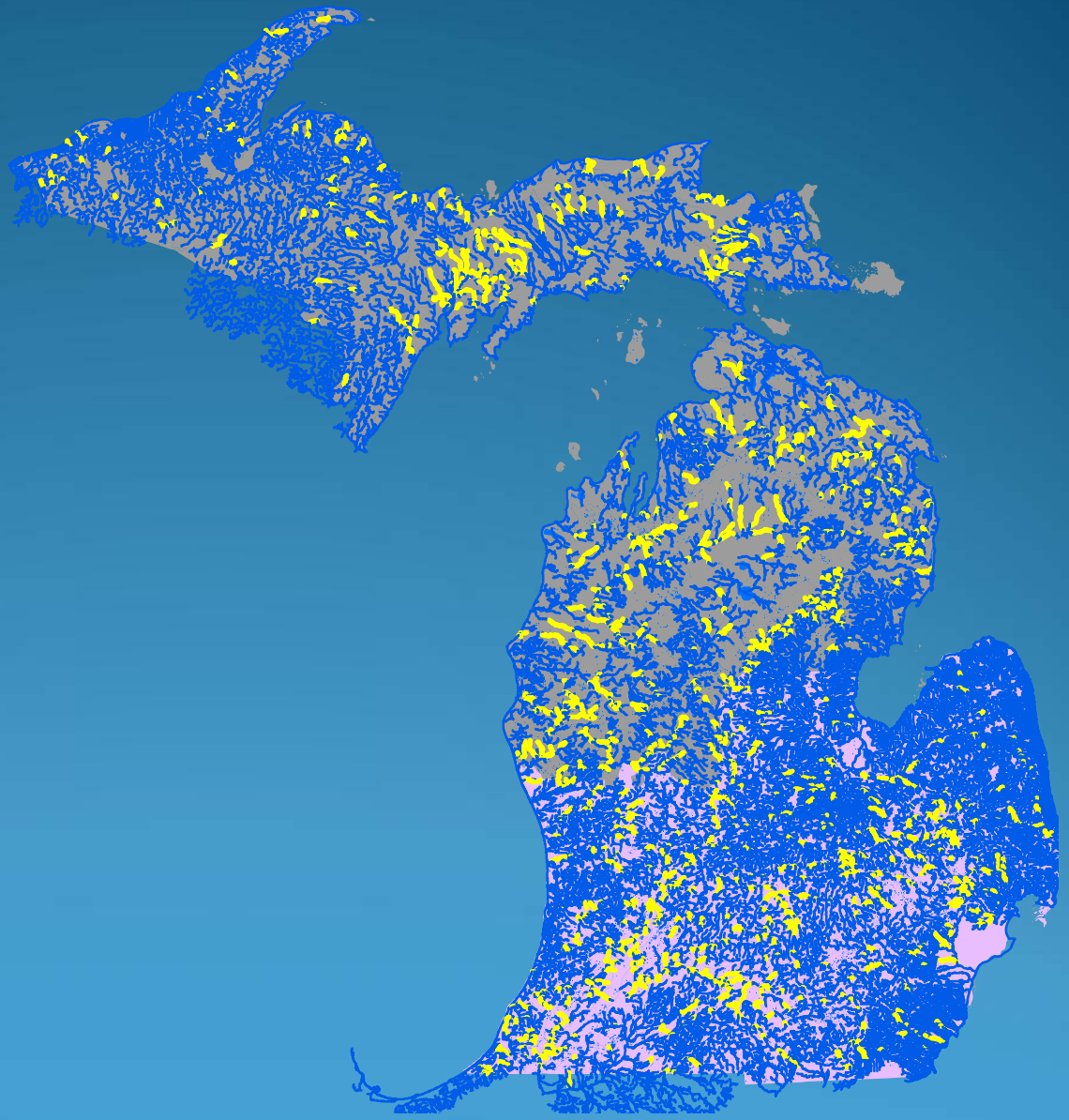
- What fish populations live where in the streams of the State and how do they respond to flow reductions in the summer (at low flow)
- Two Key Issues to Review
  - Defining Stream Types and “Characteristic Fish Populations”
  - Defining “Functional Impairment” to Characteristic Fish Populations due to water withdrawals

Stream Classification in Michigan

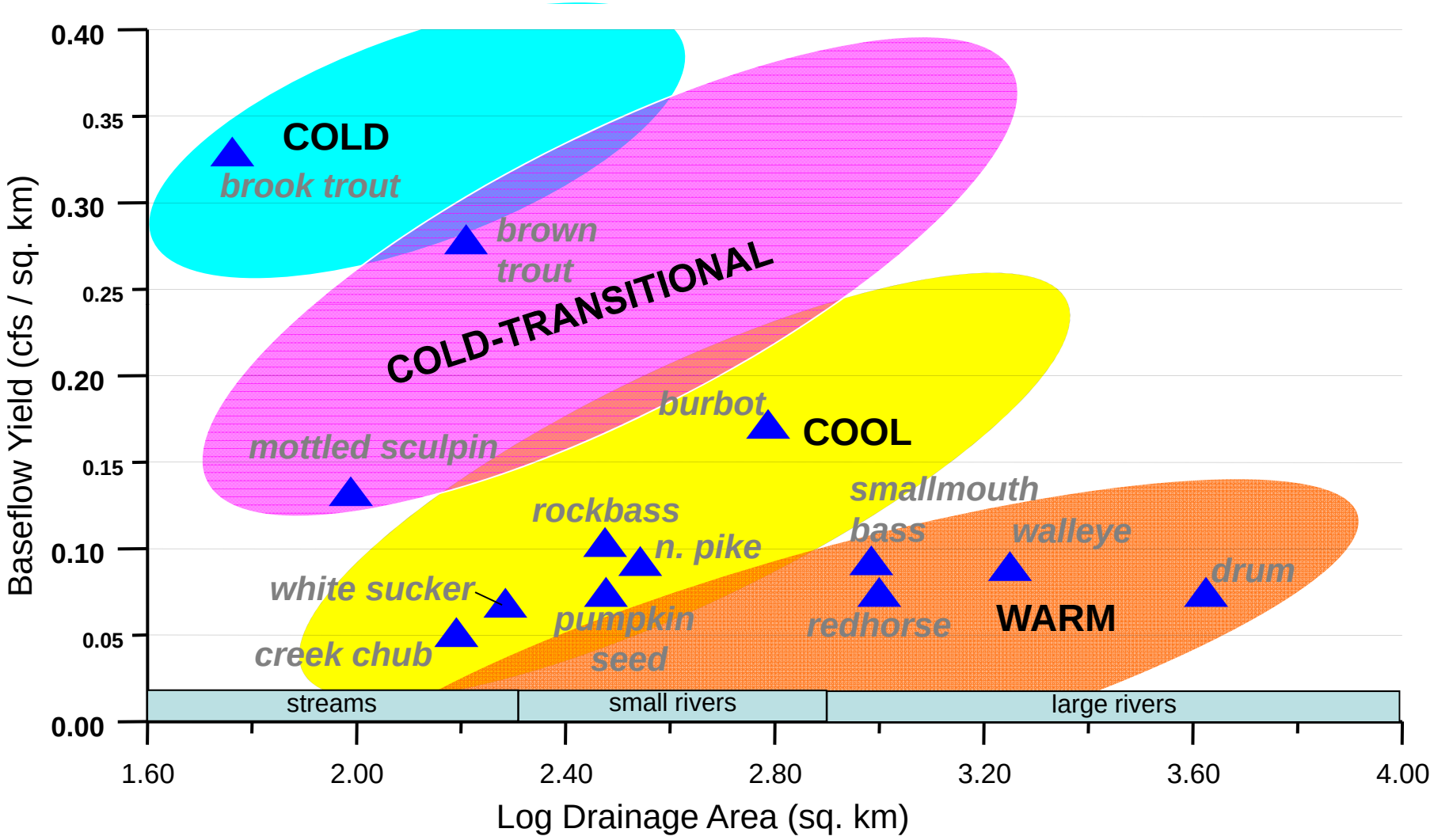


Fish Surveys

- 1,389 sites with fish assemblage surveys



Fish Species Distribution



Fish assemblage response curves

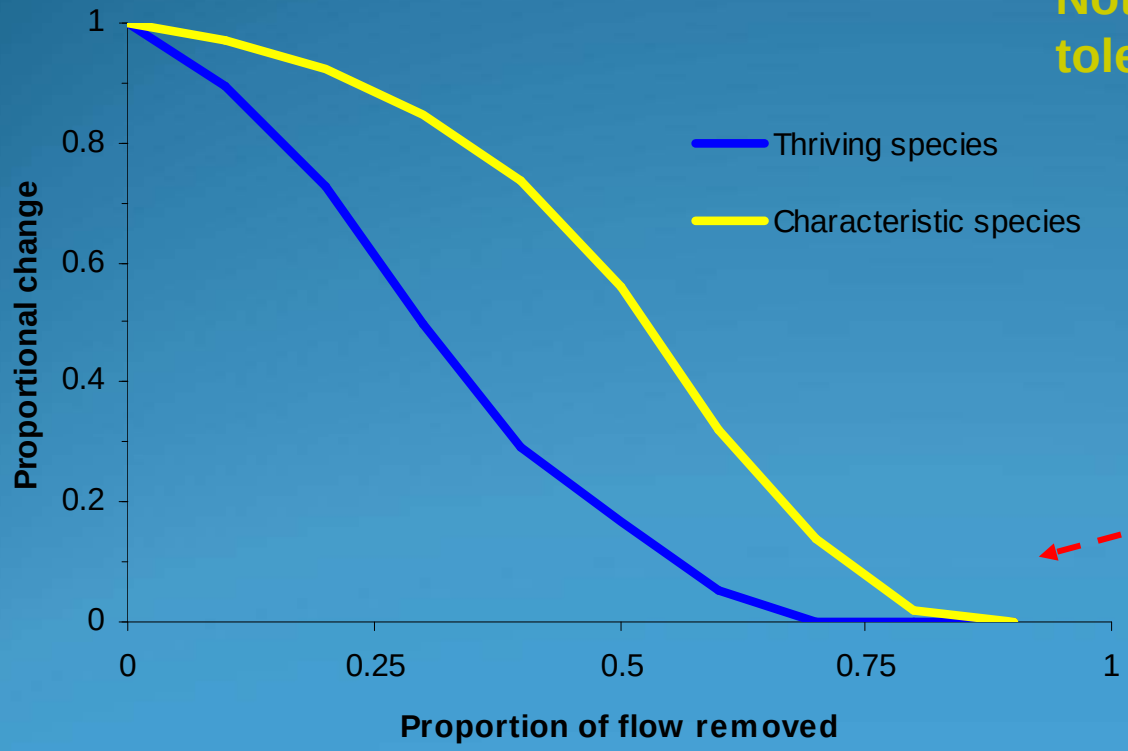
- Interpretive criteria from Davies and Jackson 2006

Baseline or existing condition

Some density changes in fish

Some replacement of sensitive species

Notable replacement by tolerant species

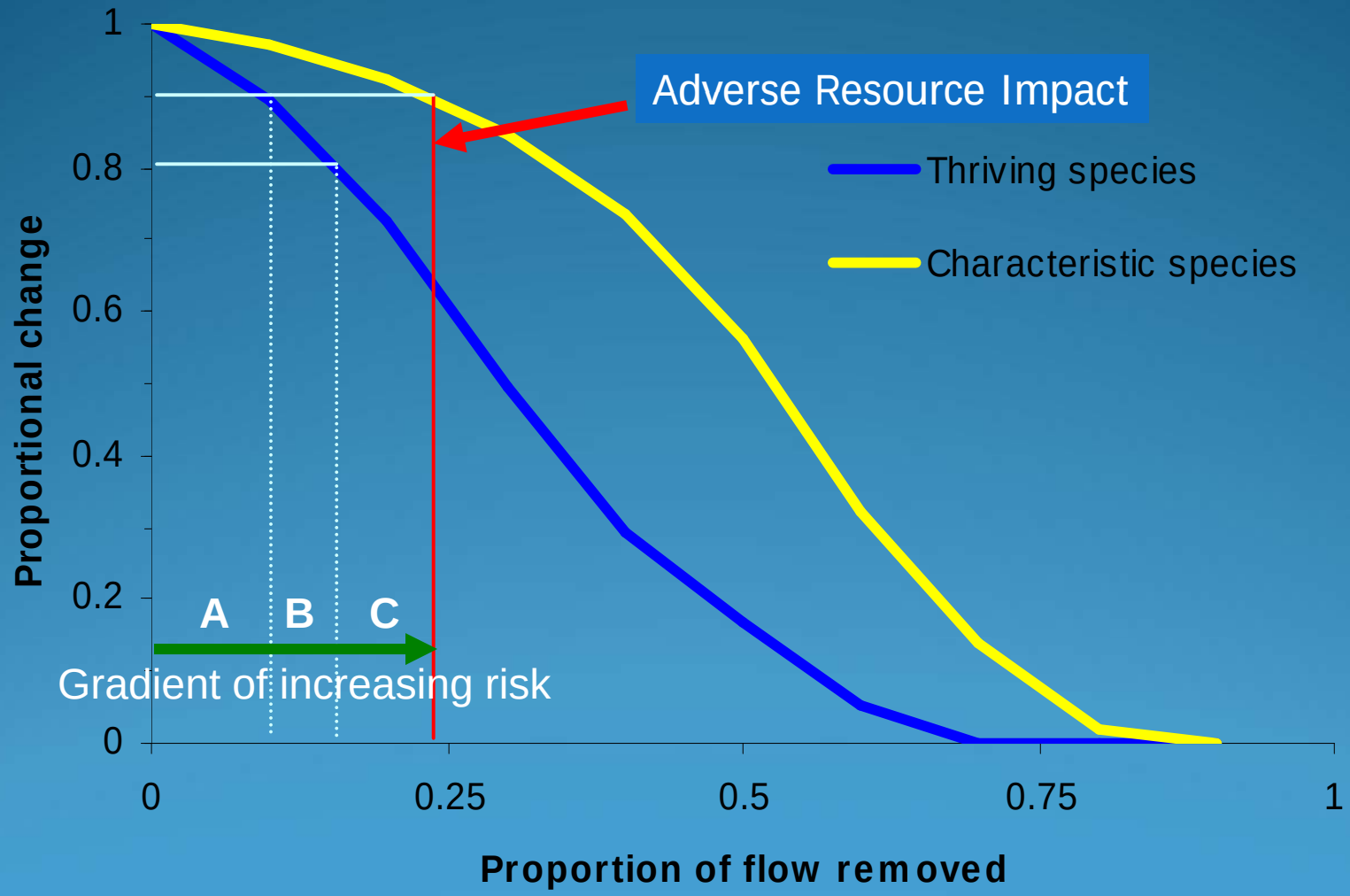


Tolerant species dominant; ecological functions altered

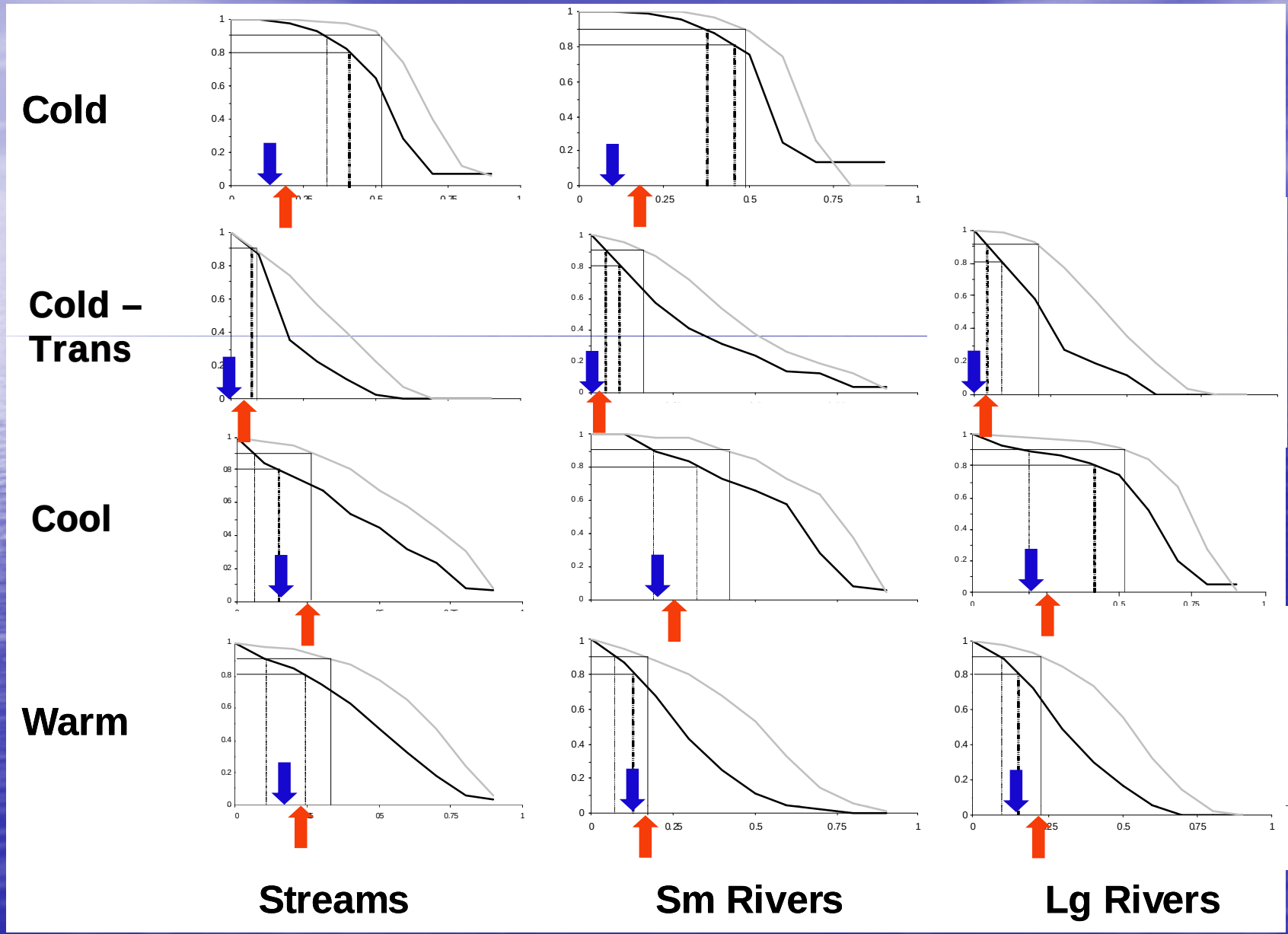
Severe alteration of ecological structure and function

Zones trigger management action

- **B- Locals notified**
- **C- Users committee form**



ARI flow reductions defined in Michigan law



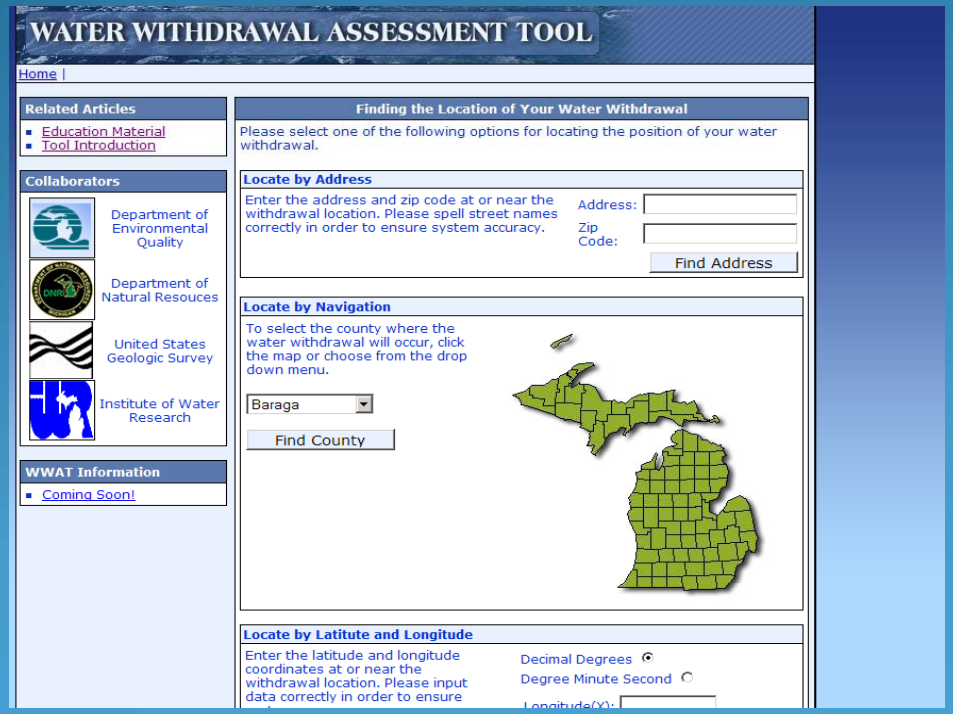
Water Withdrawal

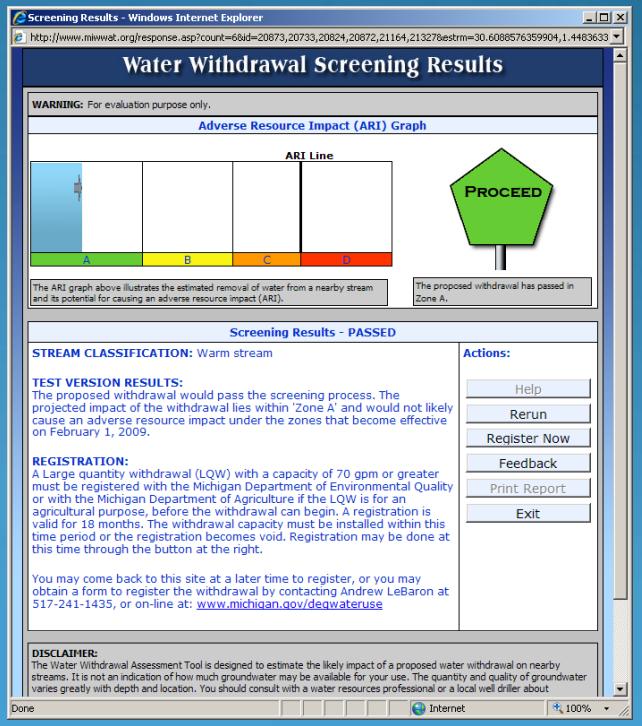
- Surface Water
  - 100% removed from stream
- Ground Water
  - Impact on stream can be less than 100%
  - Impact can include nearby streams
  - Impact can be spread over a relatively large area

Michigan's New Water Management Process

Provides great efficiency to the public

Step 1 is Internet-based Screening Tool; automatic calculations based on statewide models; if proposal approved can self-register online in minutes; comprehensive and transparent look at state's water use data and aquatic resources.





Michigan's New Water Management Process

Provides great efficiency to the public

Step 2 is Site-Specific Revew by agency staff; uses best available site hydrogeologic data and expert knowledge to calculate Index Flow and stream depletion, and confirm stream classification; completed within 10 days of application. Applicant may provide additional data and analysis.

First Year Statistics:

- 84% of registrations/SSRs are for agricultural use.

First Year Statistics:

- 172 registrations were automatically approved and recorded through the WWAT (80% of total).
- There were 44 SSR requests finalized and recorded in the database.
- Total LQW through process = 216.

Michigan's Water Withdrawal Assessment Process

National Awards:

- 2009 Council of State Governments: Innovations Award
- 2010 Environmental Council of States: Innovative State Program
- 2010 Renewable Natural Resources Foundation: Outstanding Achievement Award

Registration Requirement

- New or increased > 100,000 gpd capacity
  Same as 2006 legislation
- New requirement: Demonstrate no ARI
- Screening tool or site-specific review
- 18 months to begin withdrawal

Zone A

Zone B

Zone C

Zone D

- Zones are set by law
- Numerical values are different for each stream type

Zone A Withdrawal

- Register and proceed

Zone B Withdrawal

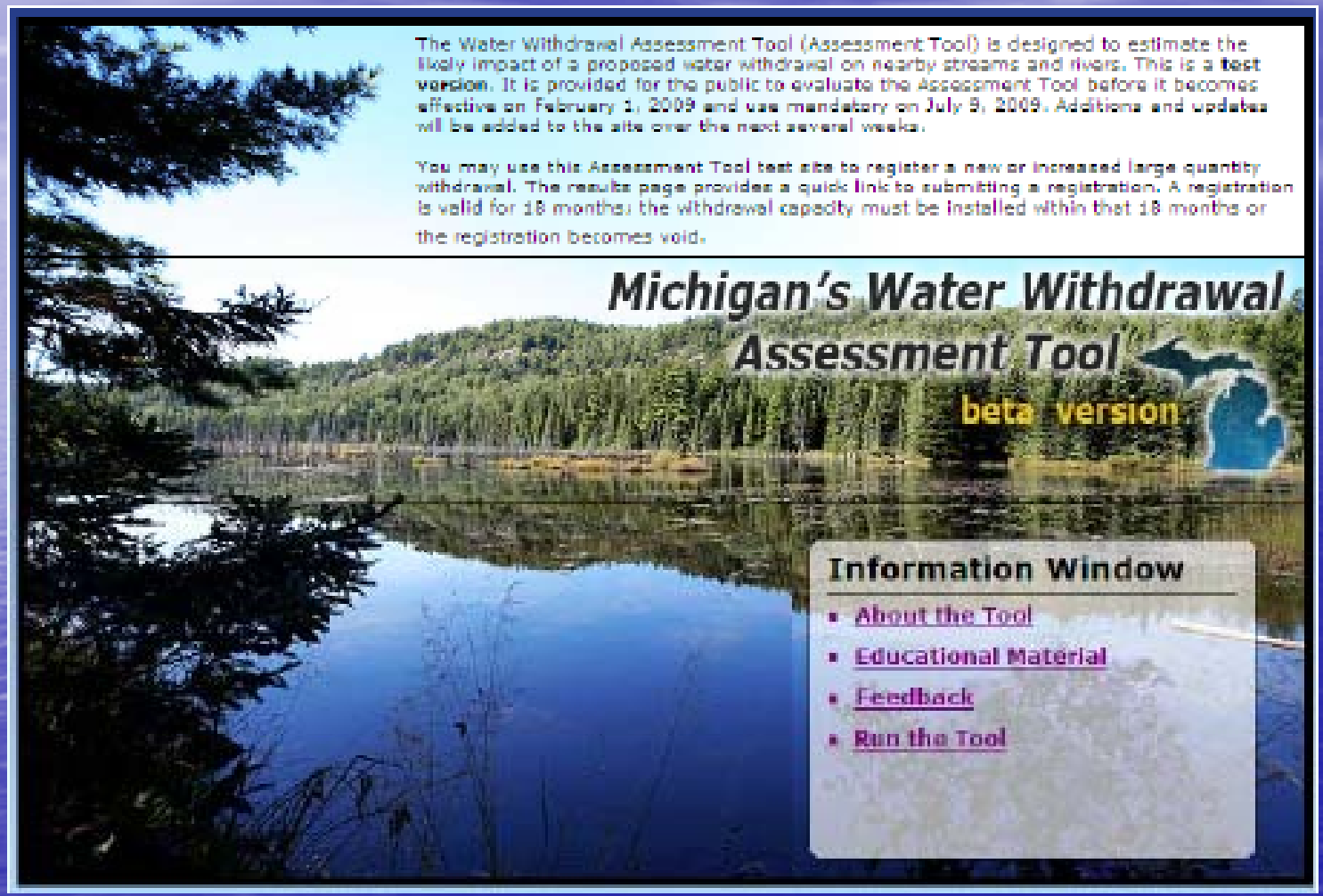
- Register and proceed
- Cold-transition system: site-specific review required
- DEQ notification: groups that have requested notification, such as: conservation district, regional planning agency

Zone C

- Site-specific review required
- Certify use of environmentally sound and economically feasible conservation measures
- DEQ notifies: large quantity users (of the same water source); and local governments and groups that have requested notification.

Zone D

- Site-specific review required
- Cannot proceed if confirmed in Zone D
- Potential for “preventative measures”


The Water Withdrawal Assessment Tool (Assessment Tool) is designed to estimate the likely impact of a proposed water withdrawal on nearby streams and rivers. This is a test version. It is provided for the public to evaluate the Assessment Tool before it becomes effective on February 1, 2009 and use mandatory on July 9, 2009. Additions and updates will be added to the site over the next several weeks.
You may use this Assessment Tool test site to register a new or increased large quantity withdrawal. The results page provides a quick link to submitting a registration. A registration is valid for 18 months; the withdrawal capacity must be installed within that 18 months or the registration becomes void.
Michigan's Water Withdrawal Assessment Tool
beta version
Information Window
About the Tool
Educational Material
Feedback
Run the Tool

WATER WITHDRAWAL ASSESSMENT TOOL

Home |

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 Navigation

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

Tuscola

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

WATER WITHDRAWAL ASSESSMENT TOOL

GIS Tools

Zoom In	Zoom Out
Address	Move Map
Back	Erase
Identify	Toggle Legend
Measure	Set Scale
Overview Map	Print
Query Builder	Help
New Withdrawal	

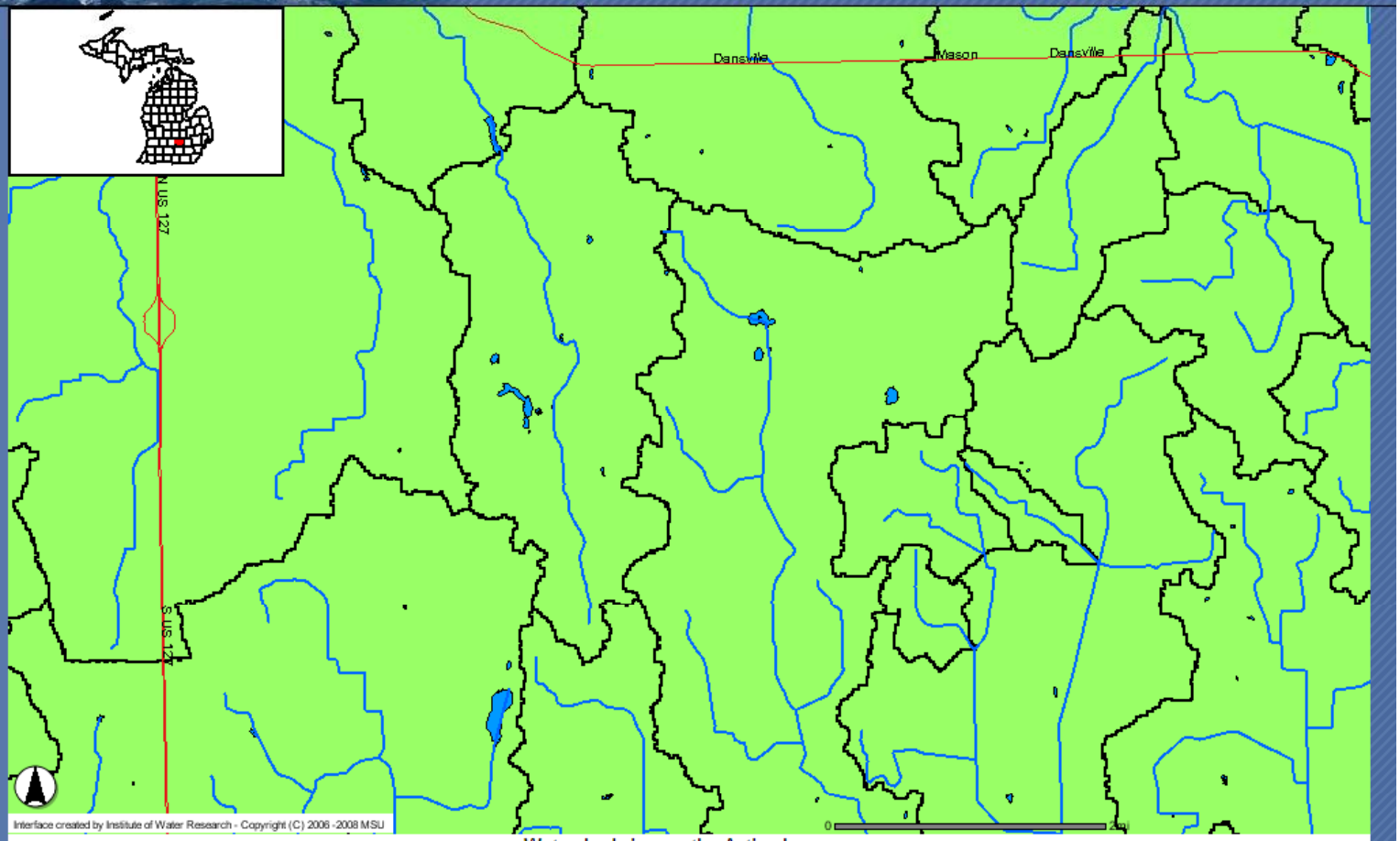
Data Layers

- All Layers
  - Roads
  - State Roads
  - Existing Wells
  - Streams
  - Lakes
  - Watersheds
  - Reach Watershed
  - County

Refresh Map

Auto Refresh

Data Layer Help?



Watersheds is now the Active Layer

Zoom In

WATER WITHDRAWAL ASSESSMENT TOOL

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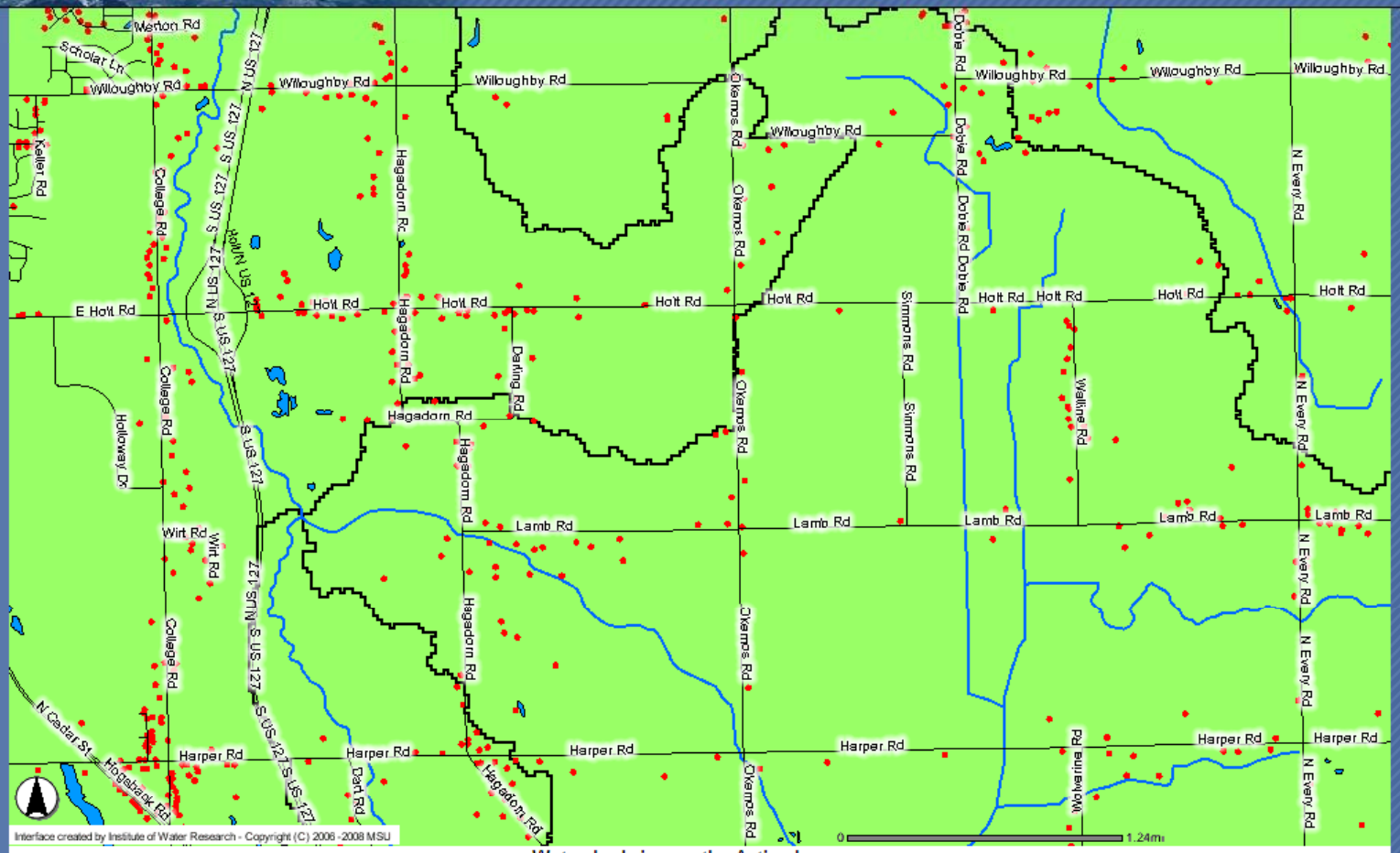


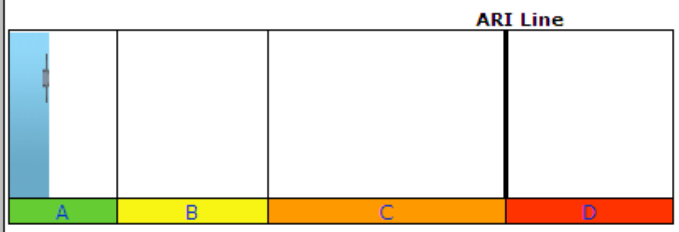
Watersheds is now the Active Layer

Pan

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: Warm stream

TEST VERSION RESULTS:
The proposed withdrawal would pass the screening process. The projected impact of the withdrawal lies within 'Zone A' and would not likely cause an adverse resource impact under the zones that become effective on February 1, 2009.

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 come back to this site at a later time to register, 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
- View Google Map
- 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.

Permitting

- Triggers:
  - > 2 million gpd capacity
  - > 1 million gpd capacity in Zone C
- Exemption: Less than 2 million gpd use over 90 day average
- Public involvement process

Specific Uses

- Municipal community system: ARI if no feasible and prudent alternative location
- Bottled Water: Permit threshold dropped to 200,000 gpd.

Water Withdrawal Assessment Tool

www.miwwat.org

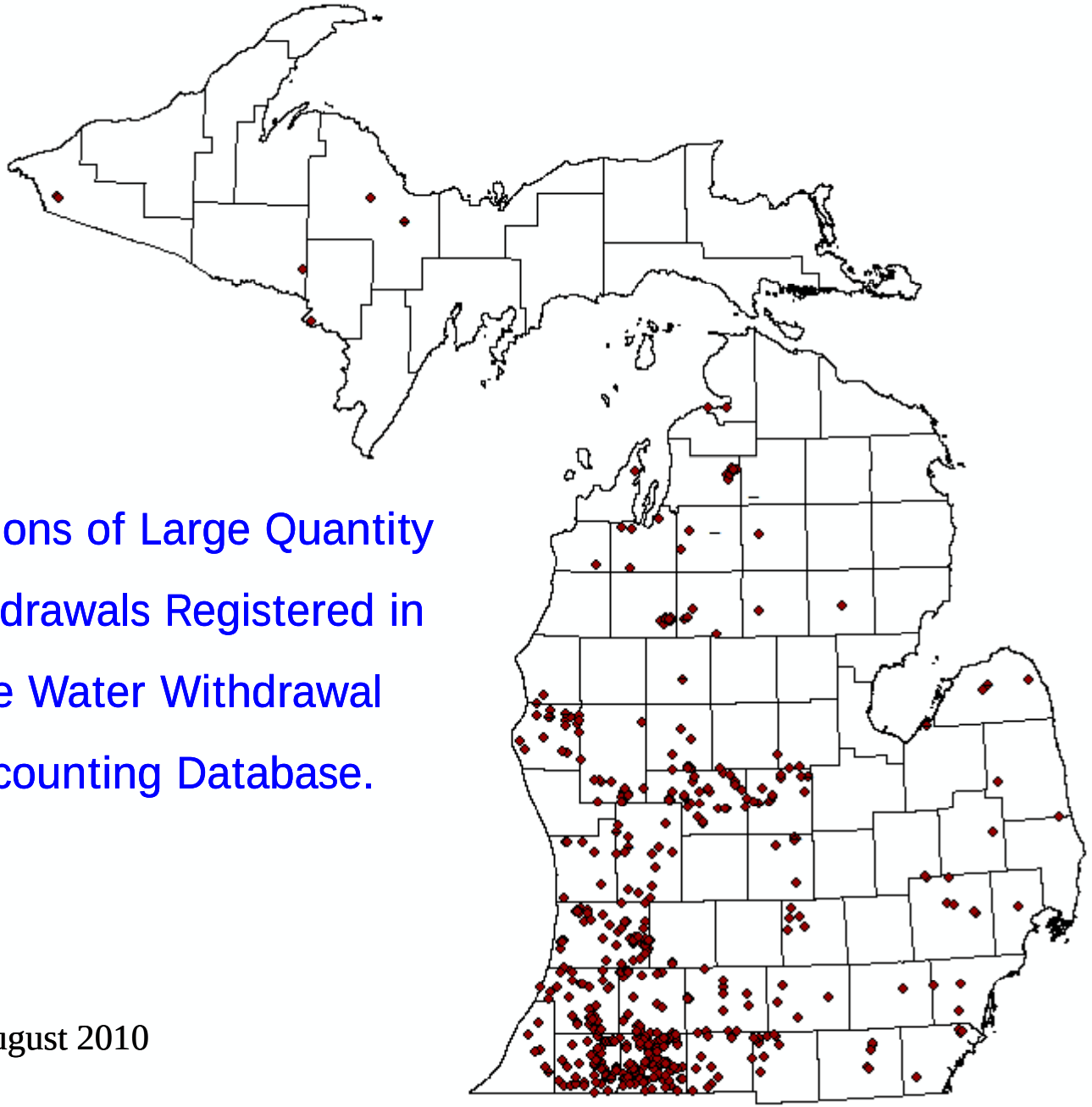
The Michigan Story: Players and Principles

Our experience suggests that the collaborative process is an essential, effective piece in the overall process of developing water management policy.

Collaboration does not erase the political or adversarial elements, but rather can provide a solid foundation that helps shape and constrain the overall process.

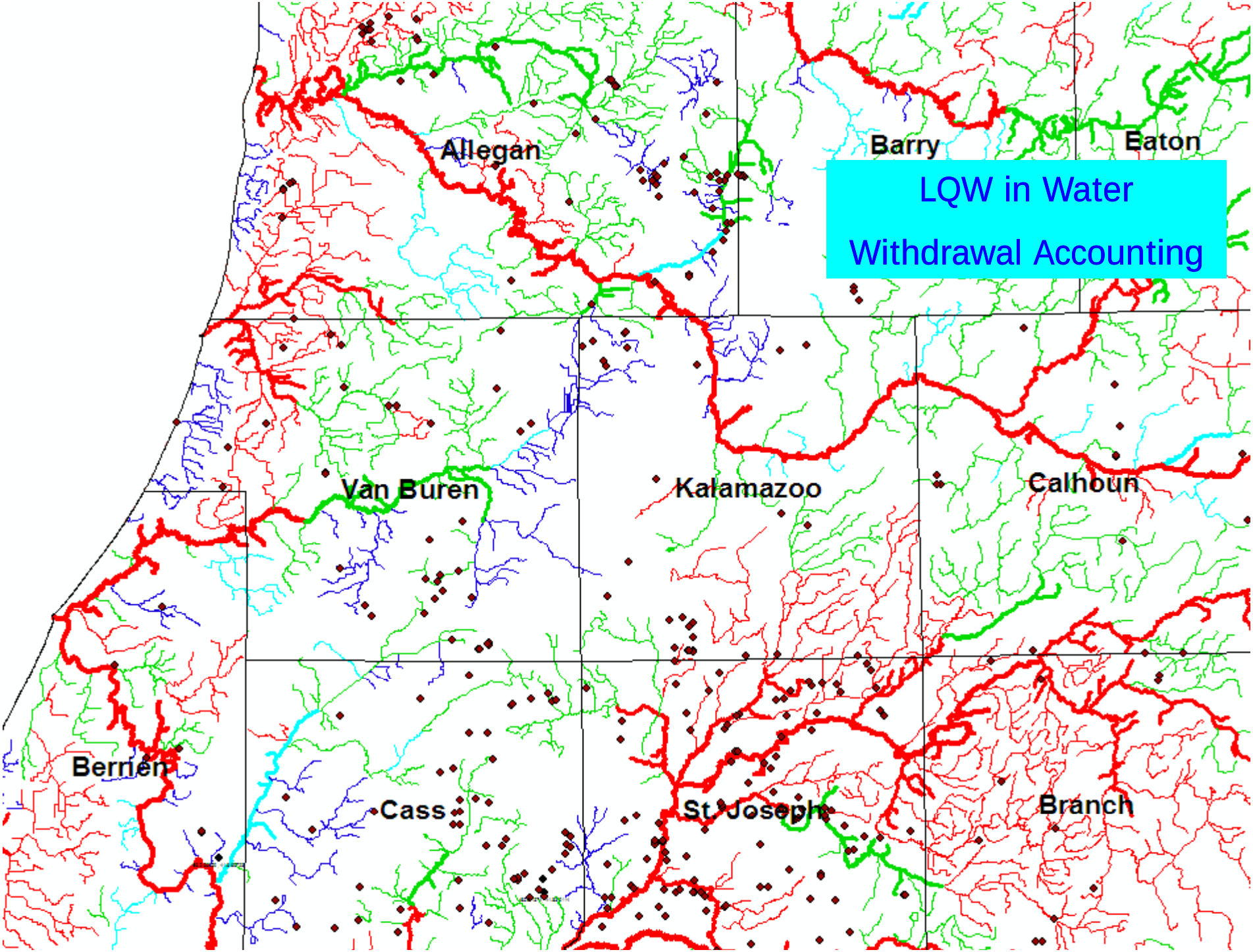
The number of LQWs processed in the first year of operation, the reasons for referral to SSR, the results from the SSR analysis, and the overall disposition of the proposed withdrawals.

	Number	Percent	SSR Results:			
Reasons Screening Tool refered to SSR:			Zone A	Zone B	Zone C	Zone D
Possible ARI	26	12%	14	8	1	3
Possible ARI in Cold Trans	2	1%		2		
Cold Transitional watershed	4	2%		4		
Zone C	12	6%	8	4		
Total	44	20%	22	18	1	3
LQWs authorized through:						
Screening Tool	172	80%				
SSR	41	19%				
Total	213	99%				
Likely ARI	3	1%				



Locations of Large Quantity Withdrawals Registered in the Water Withdrawal Accounting Database.

August 2010


Allegan
Barry
Eaton
LQW in Water
Withdrawal Accounting
Van Buren
Kalamazoo
Calhoun
Berrien
Cass
St. Joseph
Branch

Example of how SSR affects Accounting