WISCONSIN'S HEALTHY WATERSHEDS INITIATIVE

• • • • • • (how healthy is your watershed?) • • • • • •

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Outline

- What is the Healthy Watersheds Initiative?
- The process
- The metrics
- Developing the index
- Potential uses

Healthy Watersheds Initiative (HWI)

National EPA effort
to help states:

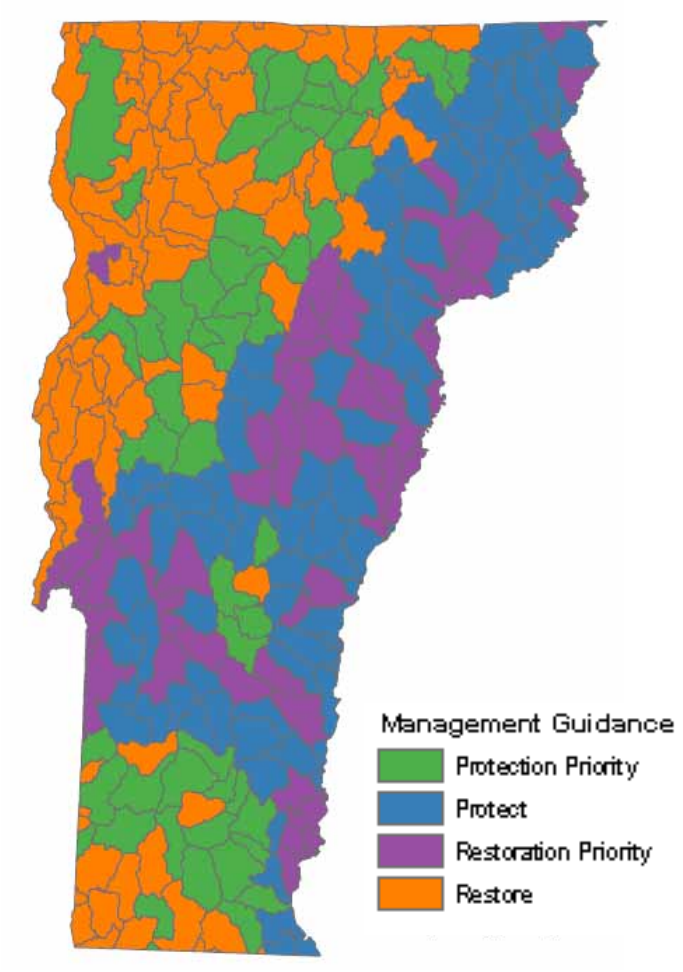
- Rank watersheds based on their level of "health" and "vulnerability"
- Use a range of metrics (science-based indicators)
- Screening level assessment using long-term conditions
- Make strategic decisions for protection

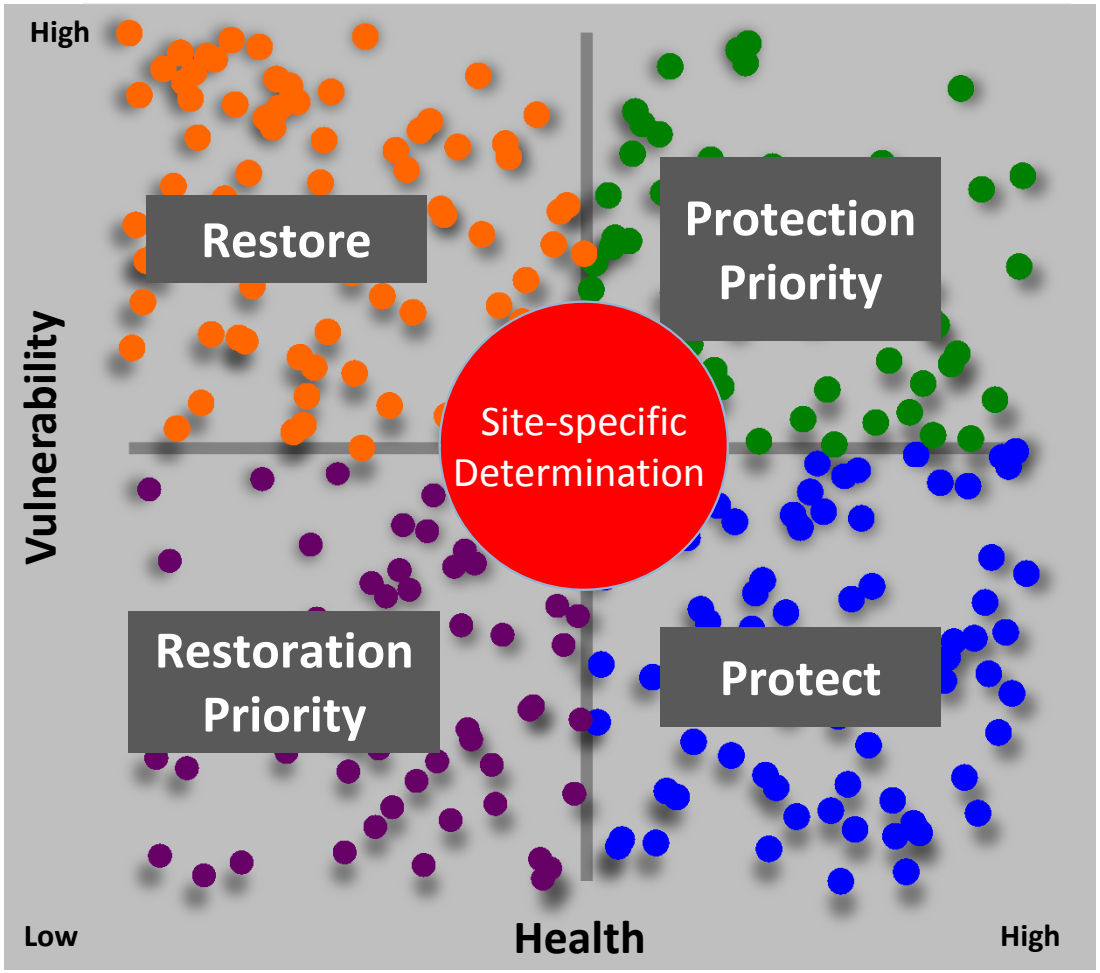
➡ Wisconsin is one of the early states to adopt this
  - Expected completion: Fall 2013

Benefits & Outcomes

- Prioritize individual watersheds for targeted assessments and protection efforts
- Encourage protection strategies that are coordinated, multi-agency, and statewide
- Increase communication between programs & partners
- Increase understanding of the connection between landscapes and aquatic system health

Example: Vermont



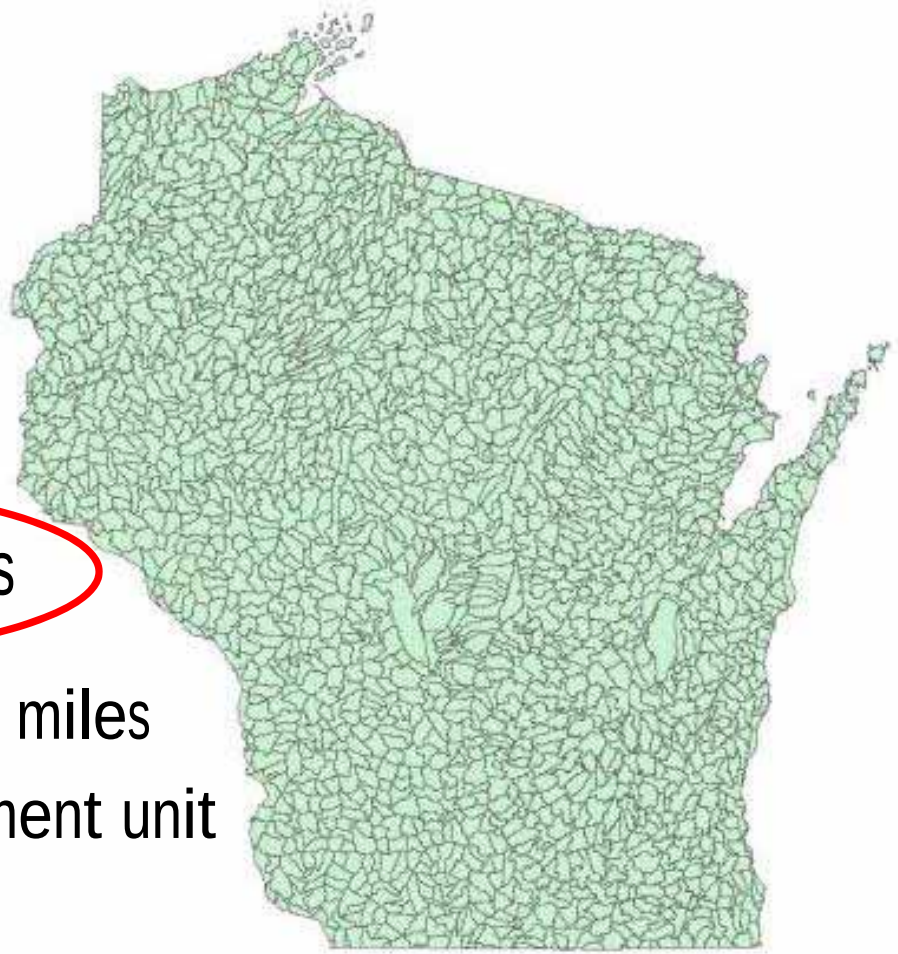


Our HWI Team:

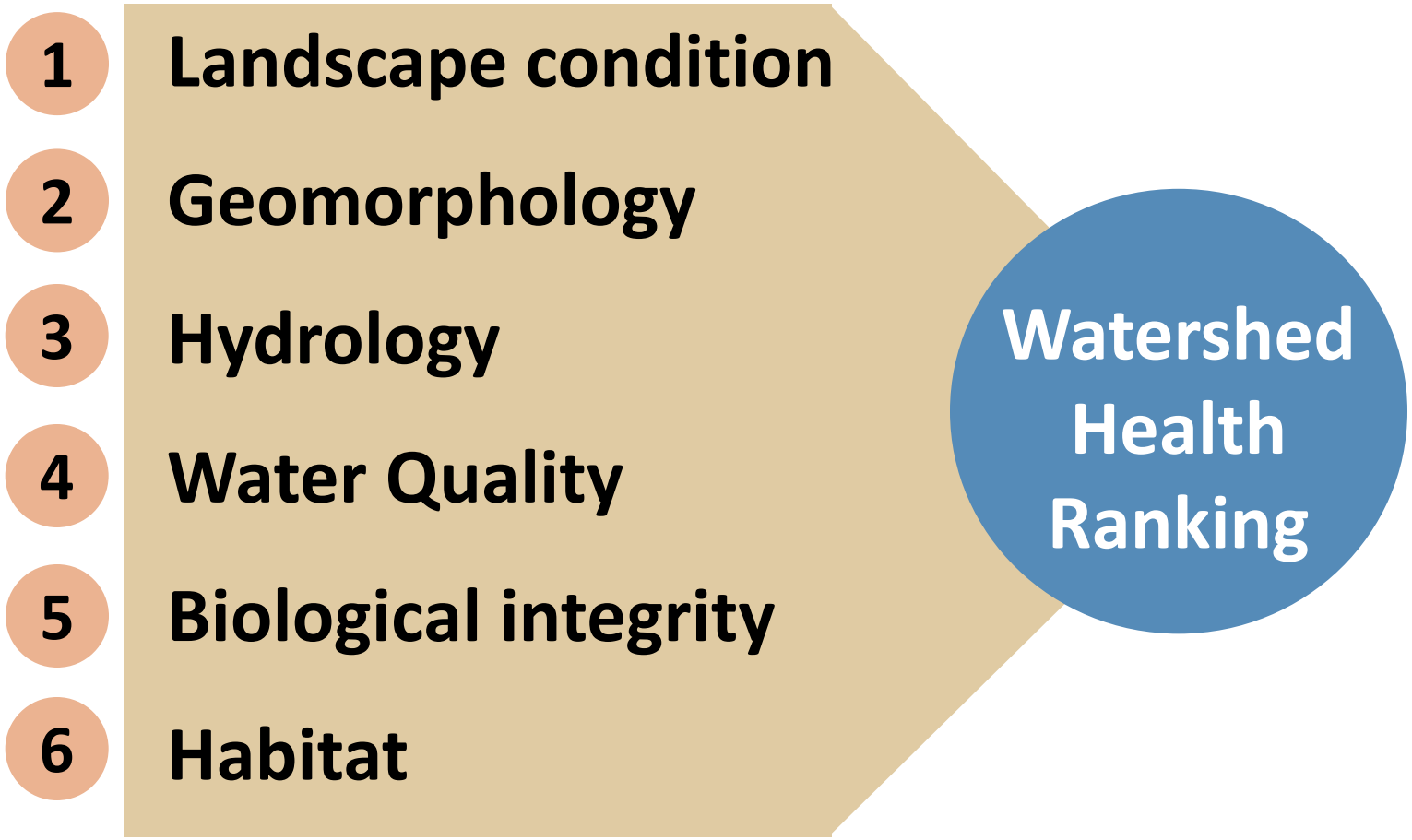
EPA, DNR, Cadmus, TNC

Spatial Scale: Nested Watersheds

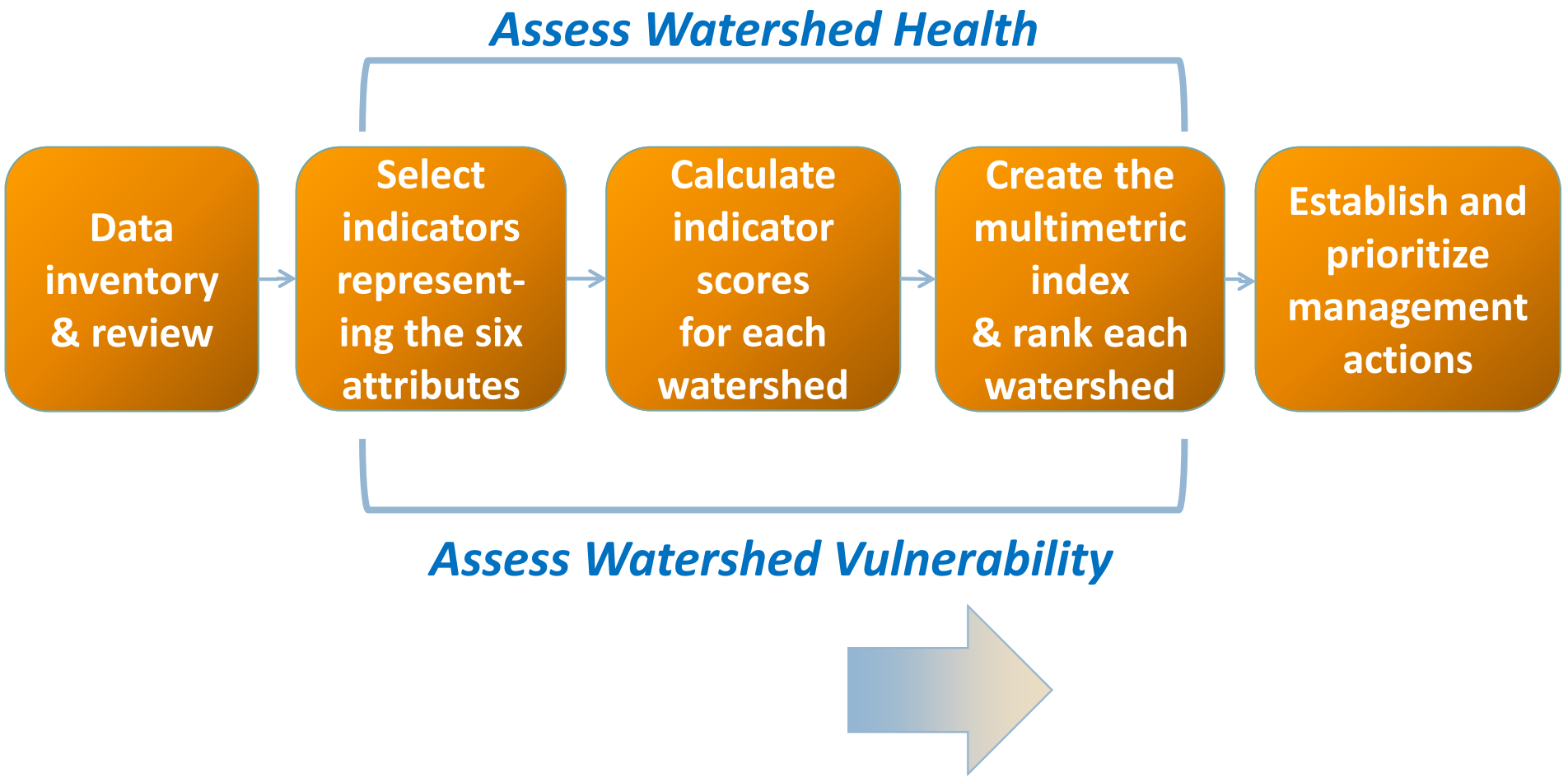
- 3 Major Basins
- 24 Basins
- 334 Watersheds
- 1853 Subwatersheds
  - Average 30 square miles
  - Preferred management unit



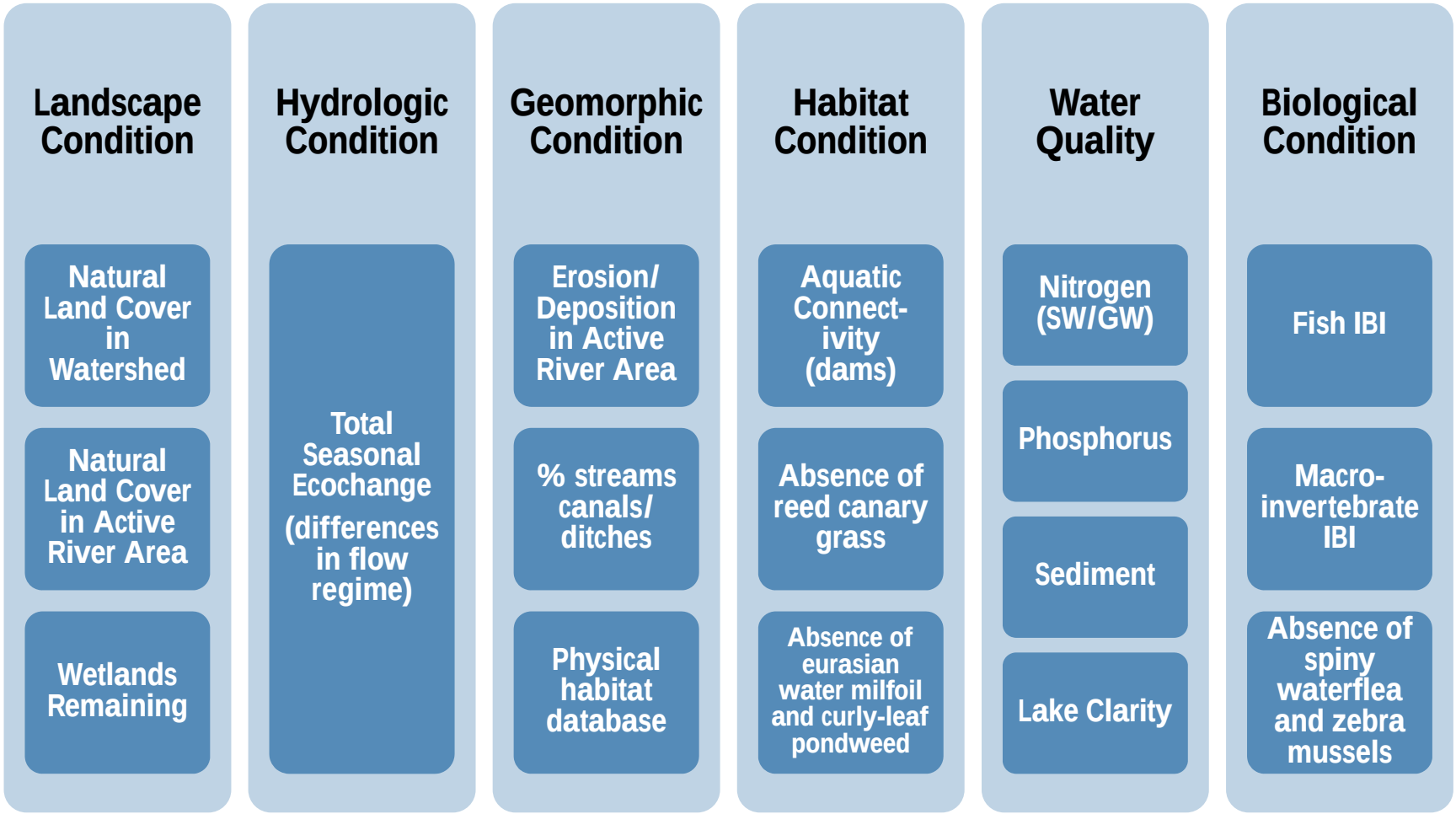
Six Categories Used for Health Ranking



Process Steps



Indicators of Watershed Health

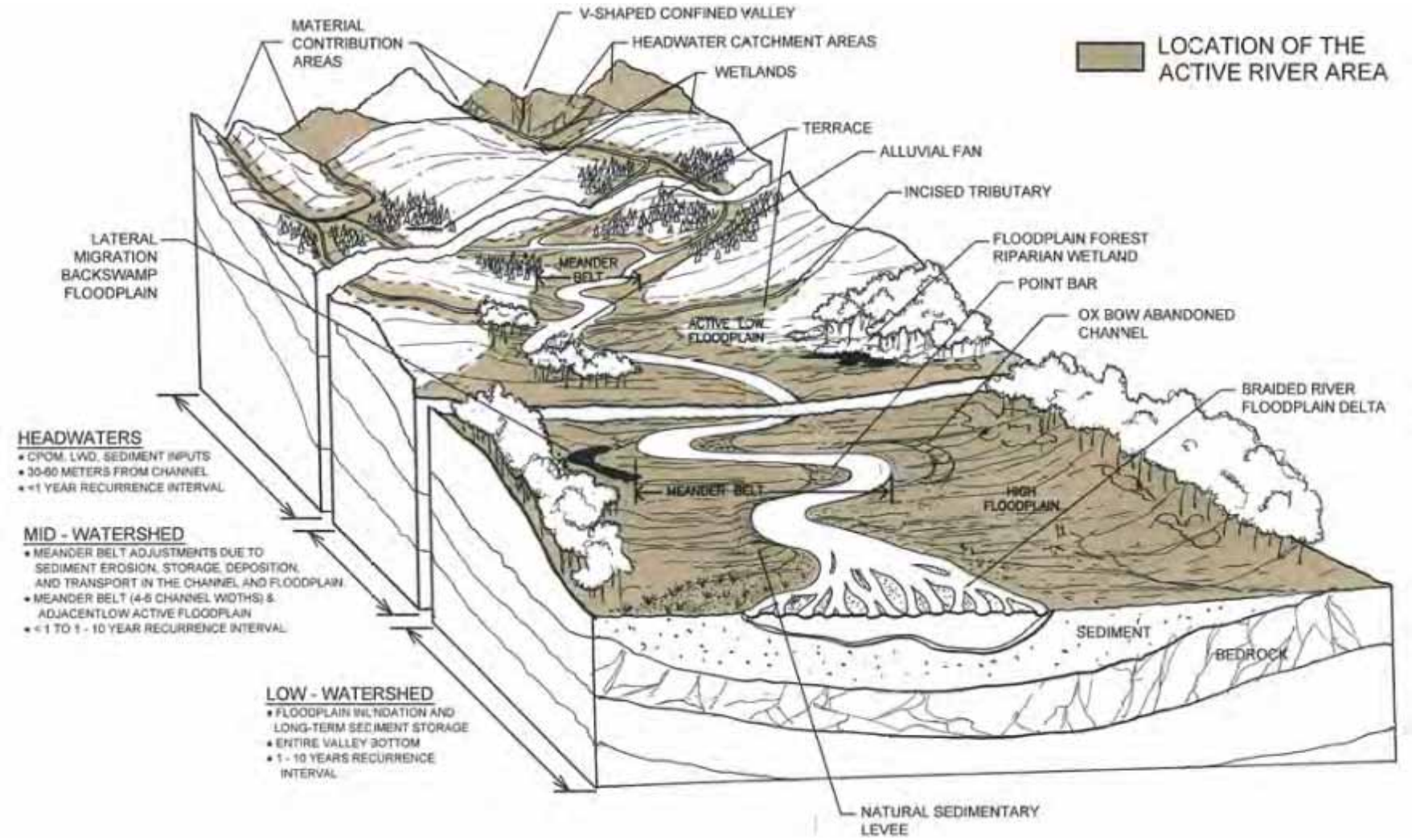


1. Landscape Condition

Natural vegetative cover stabilizes soil, regulates watershed hydrology, and provides habitat to terrestrial and riparian species.

- Indicators:
  - Percent natural land cover in the watershed.
  - Percent natural land cover in the Active River Area.
  - Percent wetlands remaining in watershed.

Active River Area

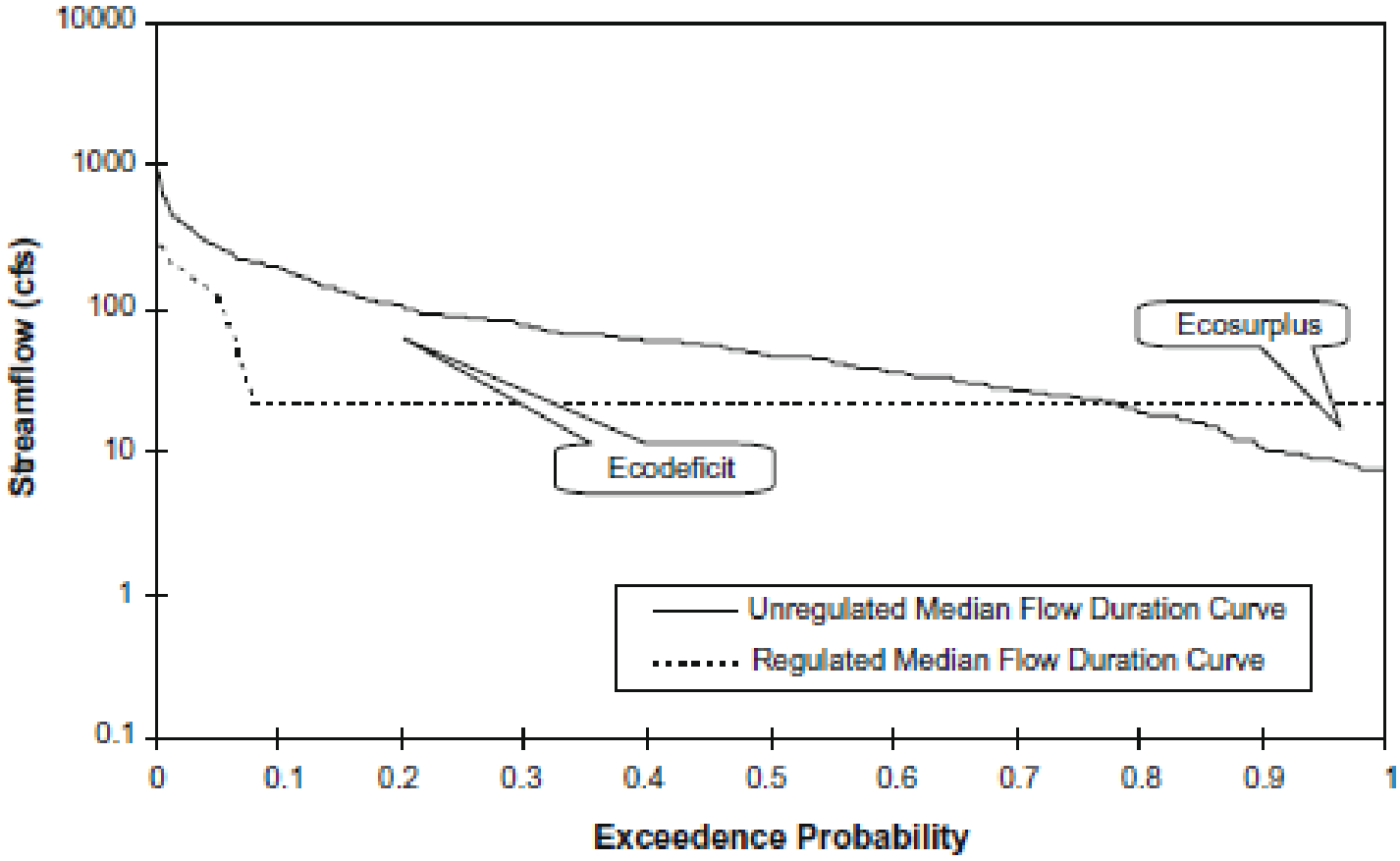


2. Hydrologic Condition

The Natural Flow Regime organizes and defines river ecosystems.

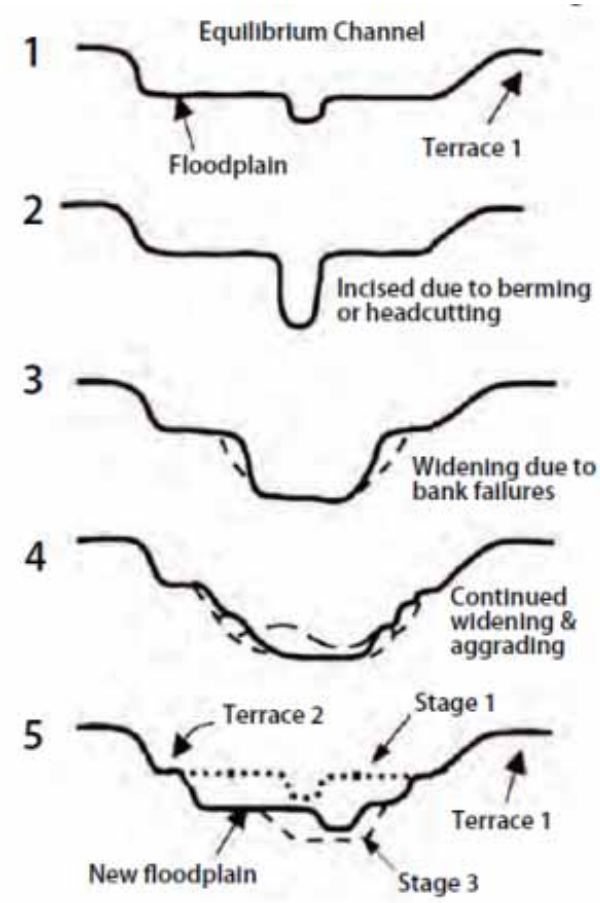
- Indicator:
  - Total Seasonal Ecochange – Difference between pre-development and current flow duration curves.
- Statistical modeling will be used to estimate pre-development and current flow duration curves for all streams in the state.

Total Seasonal Ecochange



Gao, Y., Vogel, R., Kroll, C., Poff, N., & Olden, J. (2009). Development of Representative Indicators of Hydrologic Alteration. Journal of Hydrology, 136–147.

3. Geomorphic Condition



- Evaluate changes in elevation using satellite data from 2 time periods:
  - Erosion
  - Deposition
- % of streams that are canals/ditches
- Field indicators of physical habitat where available

Geomorphic Condition

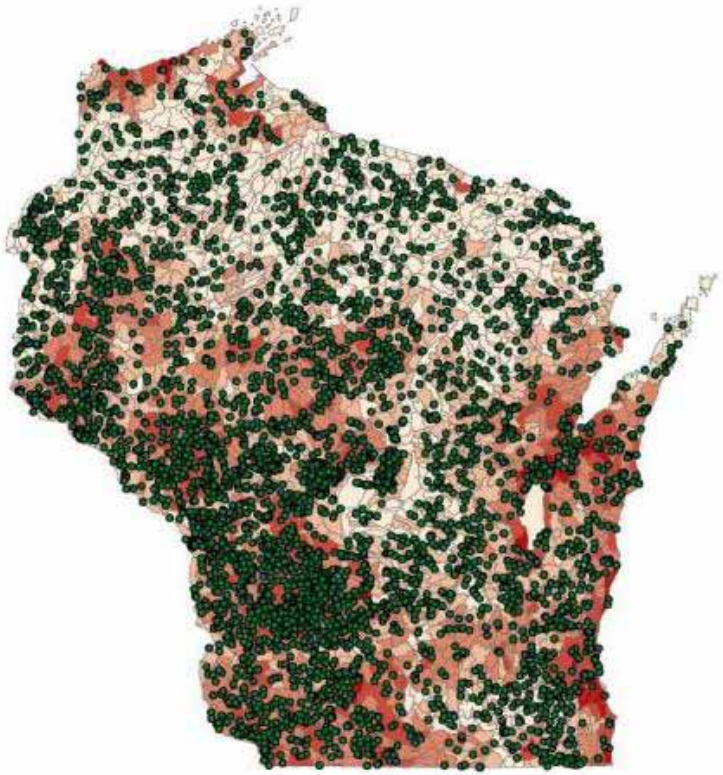
- Erosion/ Deposition in Active River Area
- % streams canals/ ditches
- Physical habitat database

4. Habitat Condition

Habitat Condition

- **Aquatic Connect-ivity (dams)**
- **Absence of reed canary grass**
- **Absence of eurasian water milfoil and curly-leaf pondweed**

- Stream habitat data
- Aquatic Connectivity
  - Road/stream crossings
  - Dams
- Absence of Aquatic Invasive Species that impact habitat:
  - Reed Canary Grass
  - Eurasian Water Milfoil
  - Curly-leaf Pondweed

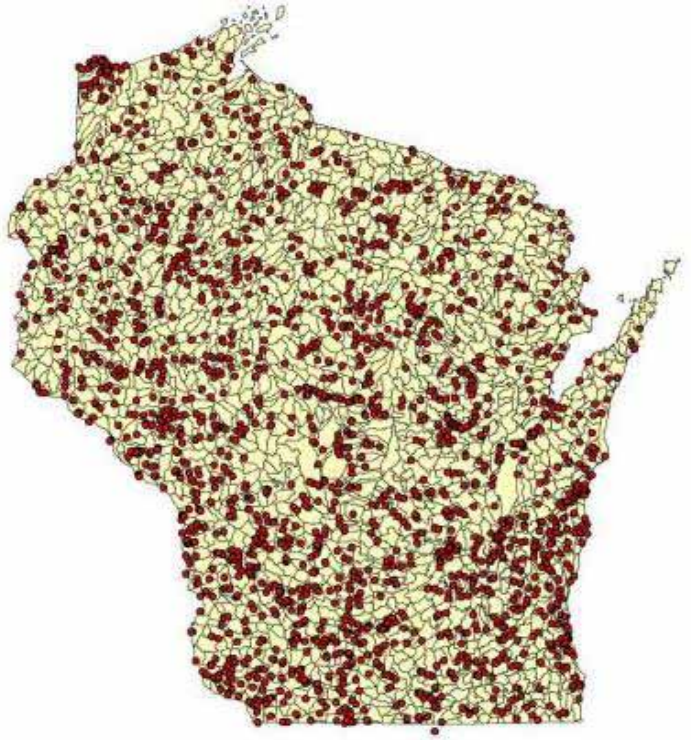


5. Water Quality

Water Quality

- Nitrogen (SW/GW)
- Phosphorus
- Sediment
- Lake Clarity

- Phosphorus – Streams
- Nitrogen – Streams and Groundwater
- Sediment – Streams
- Lake Clarity – via Remote Sensing data
- Statistical modeling to evaluate water quality statewide



6. Biological Condition

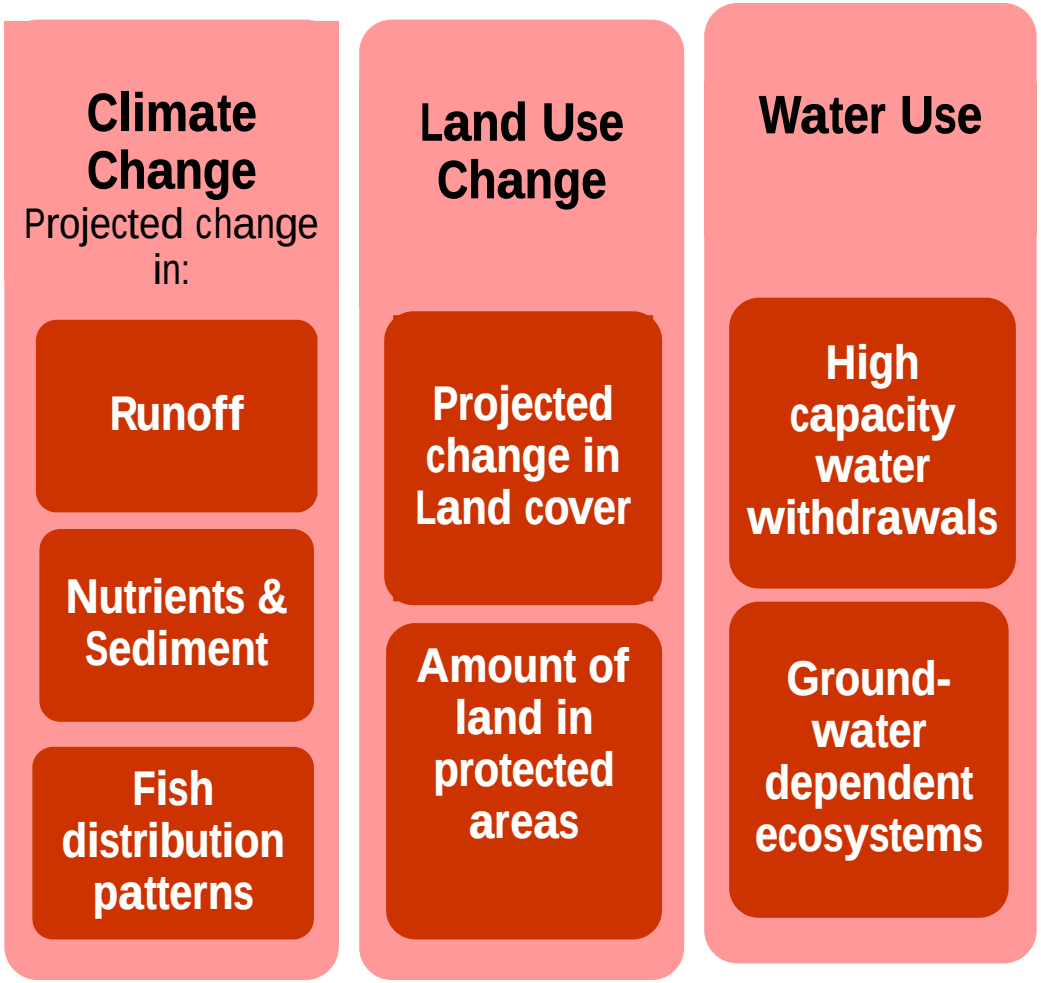
- Fish IBI
- Macroinvertebrate IBI
- Absence of aquatic invasive species that change trophic state of lakes:
  - Zebra mussel
  - Spiny waterflea

Biological Condition

- Fish IBI
- Macro-invertebrate IBI
- Absence of spiny waterflea and zebra mussels

And…Watershed Vulnerability

Changes that will increase over time, and are known to have widespread, long-term consequences for aquatic ecosystems and their watersheds



Multimetric Index

What is a multimetric index?

> "A dimensionless numeric combination of scores derived from ecological measures called metrics. A metric is a characteristic of the ecosystem that can be scored according to conditions."

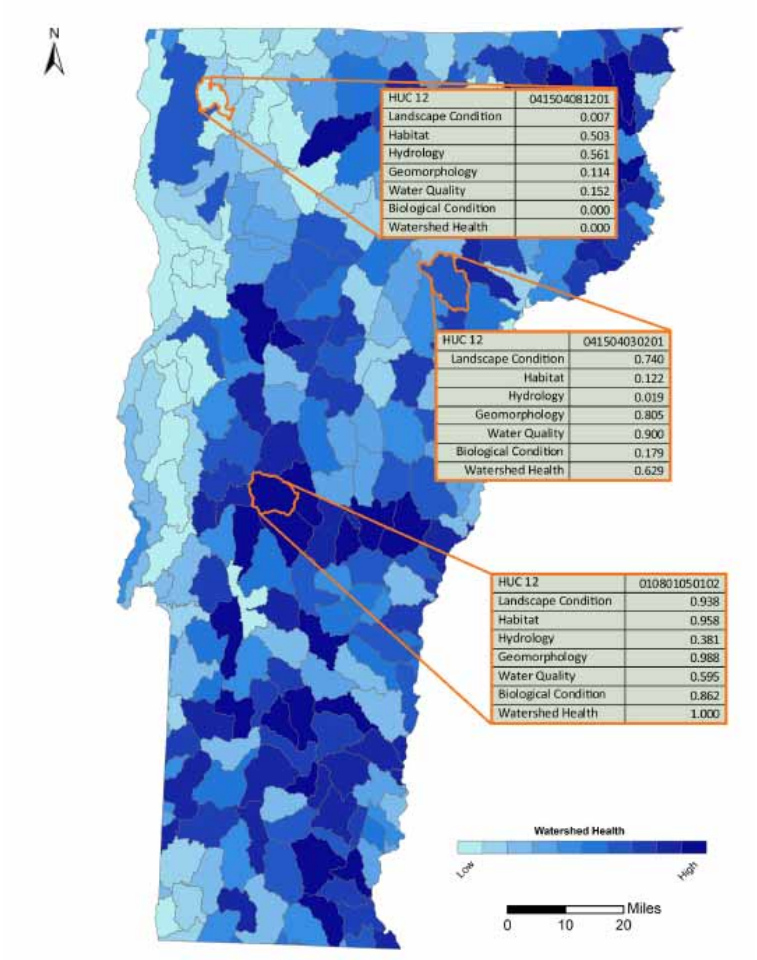
- Benefit: Summarizes complex information into one overall score.
- Drawback: Summarizes complex information into one overall score.
- Trying for the best of both worlds by calculating one broad overall score but having access to all the component scores.

Index Development

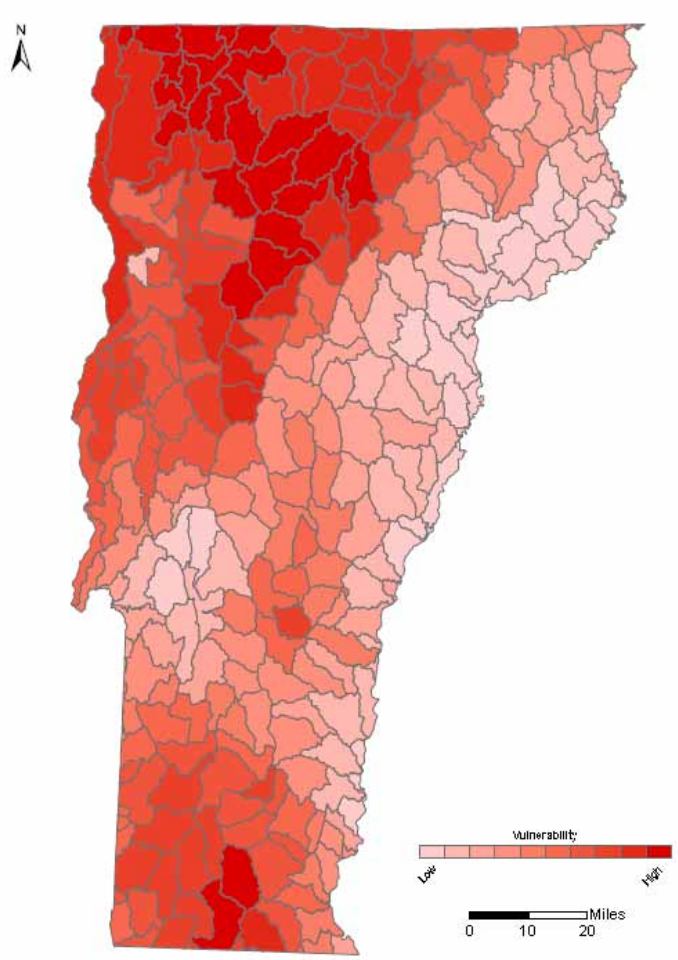
- Directionally align each indicator so that higher values equal greater health.
- Normalize each indicator so that they are all on the same scale (e.g., 0 – 100)
  - Define thresholds if appropriate (healthy/unhealthy)
- Determine whether weighting should be applied
- Calculate Index

Example Results: Vermont

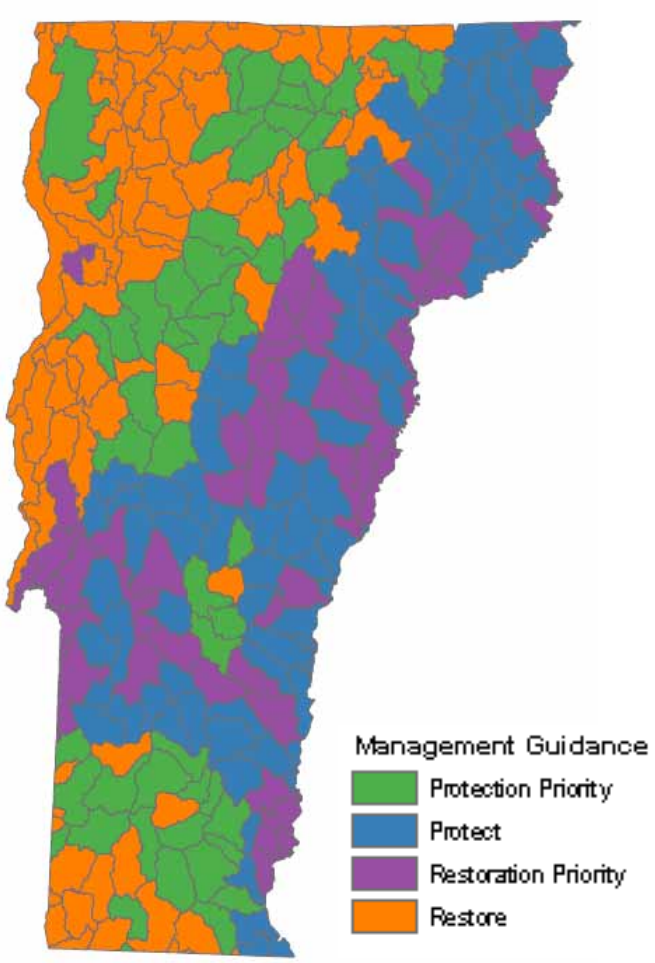
Watershed Health

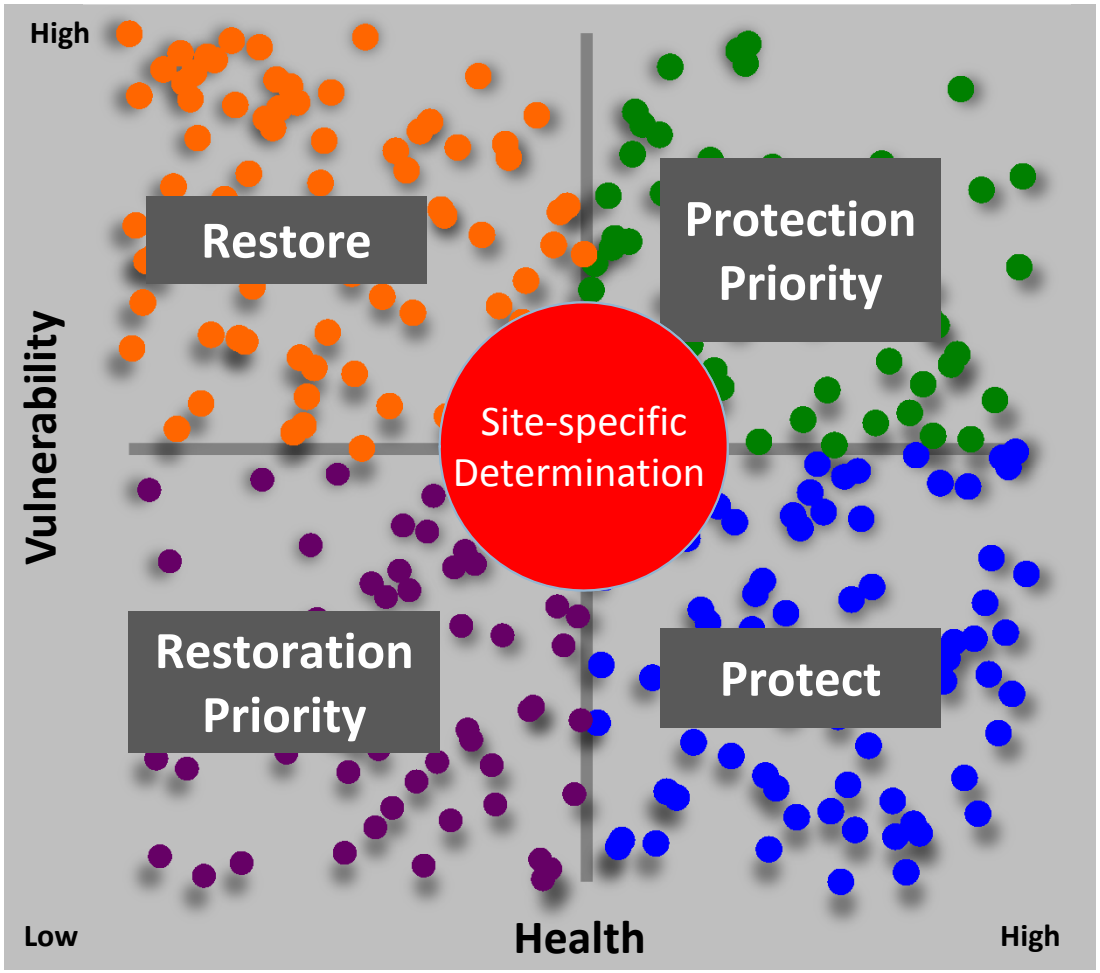


Watershed Vulnerability



Example Results: Vermont





Application Ideas: Program-Specific Uses

- Prioritize grant funding – e.g. Runoff grant scoring
- Target TMDL implementation efforts
- Inform land acquisitions
- Prioritize which watersheds need further monitoring
- Track trends over time
- Individual program uses (wetlands, drinking water, etc)

Application Ideas: Communication Uses

- Educate the public about specific programs:
  e.g. areas vulnerable to groundwater/well issues
- Use in interactions between DNR and county staff during county land and water management plan development
- Build public support for protection by informing people about vulnerabilities in certain watersheds
- Communicate economic benefits of protecting *healthy* watersheds & preventing degradation


Coming in Fall 2013!
Want to see the results?
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