Recovery Potential Screening:
Innovative Assessments in State "Laboratories of Democracy"

Douglas J. Norton[1], Tatyana DiMascio[2], Molly MacGregor[3], Peter Vincent[4], Jane Peirce[5], Corey Godfrey[6], Paul Zeph[7], Jim George[8], Lee Currey[8], Mike Kline[9] and Tim Clear[9]

NWQMC – Portland, OR – May 2012

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1: EPA; 2: ORISE; 3: MN; 4: MI; 5: MA; 6: Cadmus; 7: PA; 8: MD; 9: VT
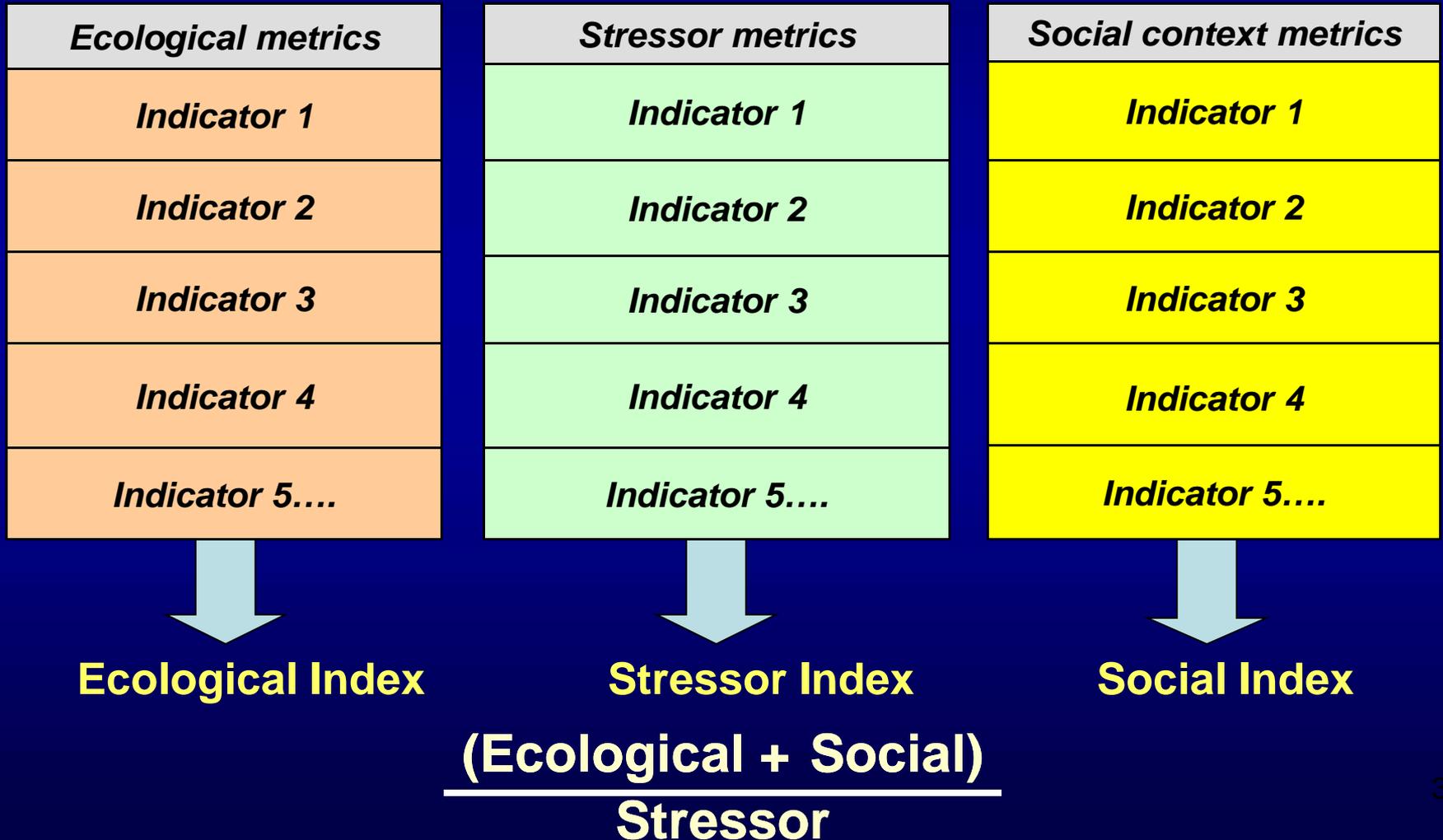
What is Recovery Potential Screening?

A method to compare differences in restorability and identify the underlying factors that explain them

- Origins in impaired waters program (TMDLs, 303(d) listing)
- Systematic, comparative, and very flexible approach
- Science-based, indicator-driven

Recovery potential is the likelihood of an impaired water to reattain WQS or other desired condition, given its

    - ***ecological capacity***,

    - ***exposure to stressors***, *and*

    - *the **social context** affecting efforts to improve its condition.*
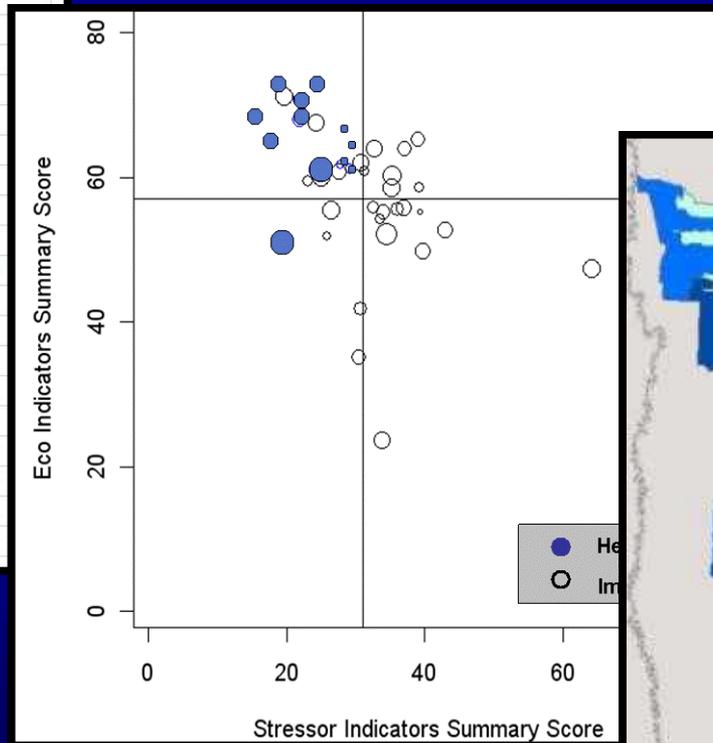
Recovery Potential Screening - Basic Concept

Ecological metrics	Stressor metrics	Social context metrics
Indicator 1	Indicator 1	Indicator 1
Indicator 2	Indicator 2	Indicator 2
Indicator 3	Indicator 3	Indicator 3
Indicator 4	Indicator 4	Indicator 4
Indicator 5….	Indicator 5….	Indicator 5….

Ecological Index   **Stressor Index**   **Social Index**

$$\frac{(Ecological + Social)}{Stressor}$$

3

Indicator Selection and Weighting: Flexibility within Common Themes

Ecological	Stressor	Social
watershed natural structure	watershed disturbance & sources	leadership, organization, engagement
corridor condition	corridor or shorelands disturbance	protective ownership or regulation
flow and channel dynamics	flow or channel alteration	level of information, planning, certainty
biotic community integrity	biological stressors	cost, complexity
aquatic connectivity	severity, complexity of pollution	socio-economic factors
ecological history	land use legacies	human health, uses, incentives

Three Types of Recovery Potential Screening Products
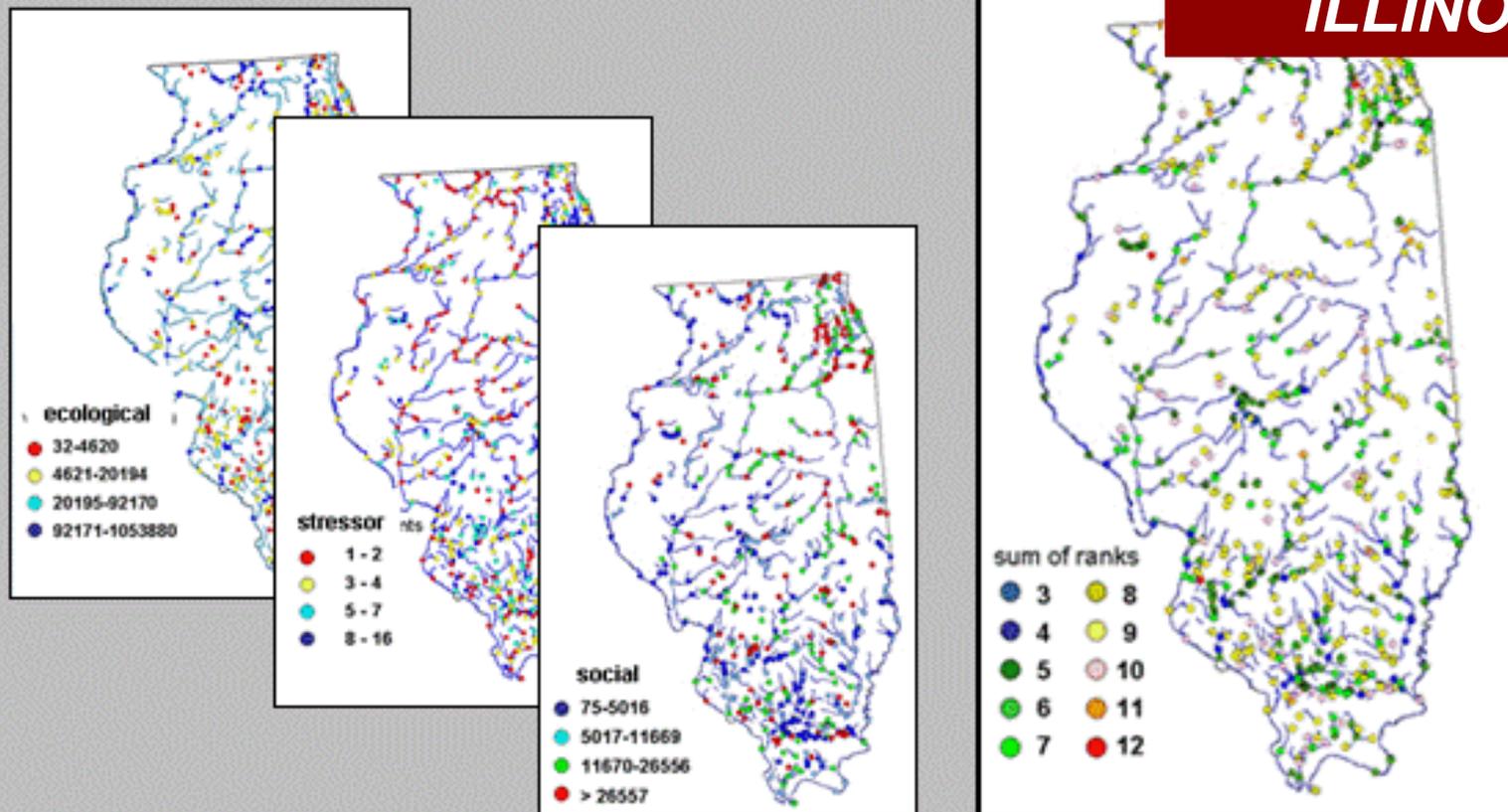

Rank Ordering

Bubble Plotting
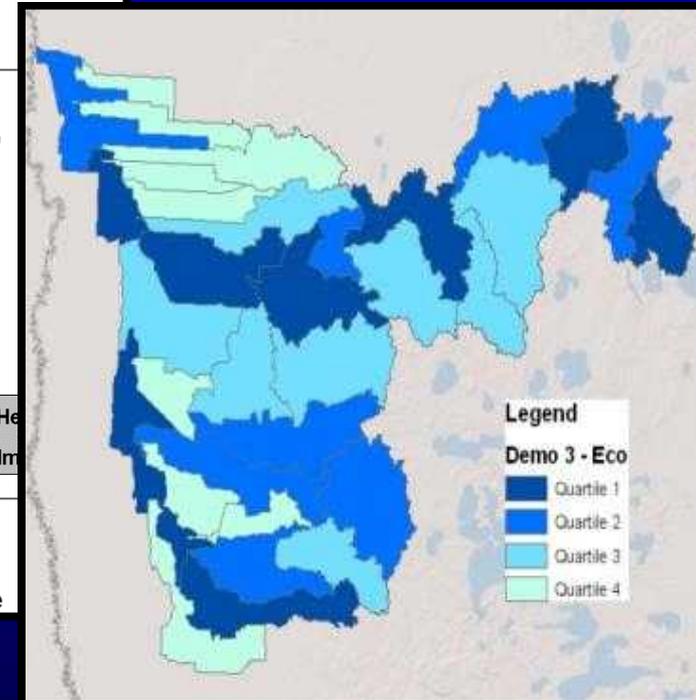
Mapping
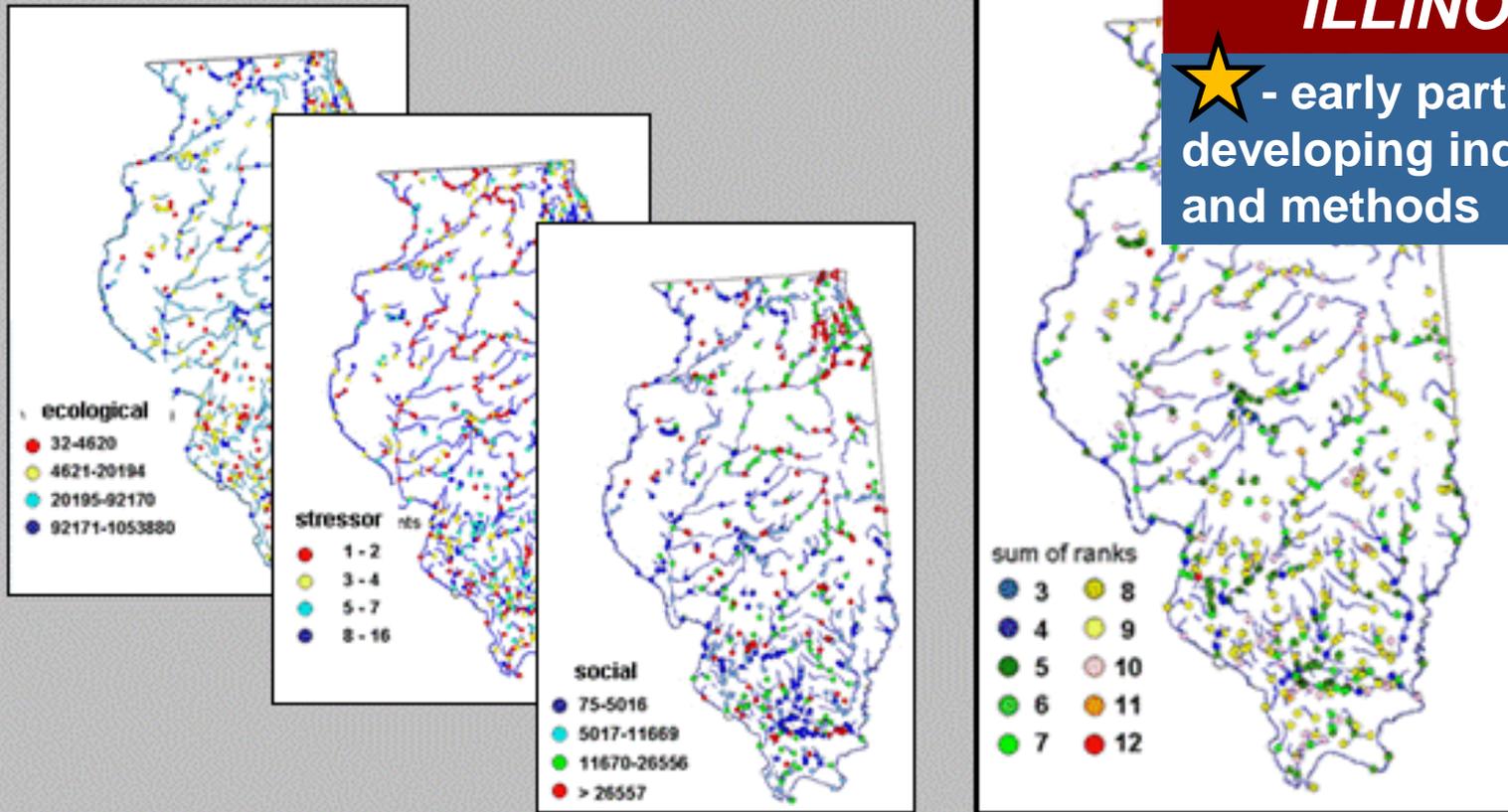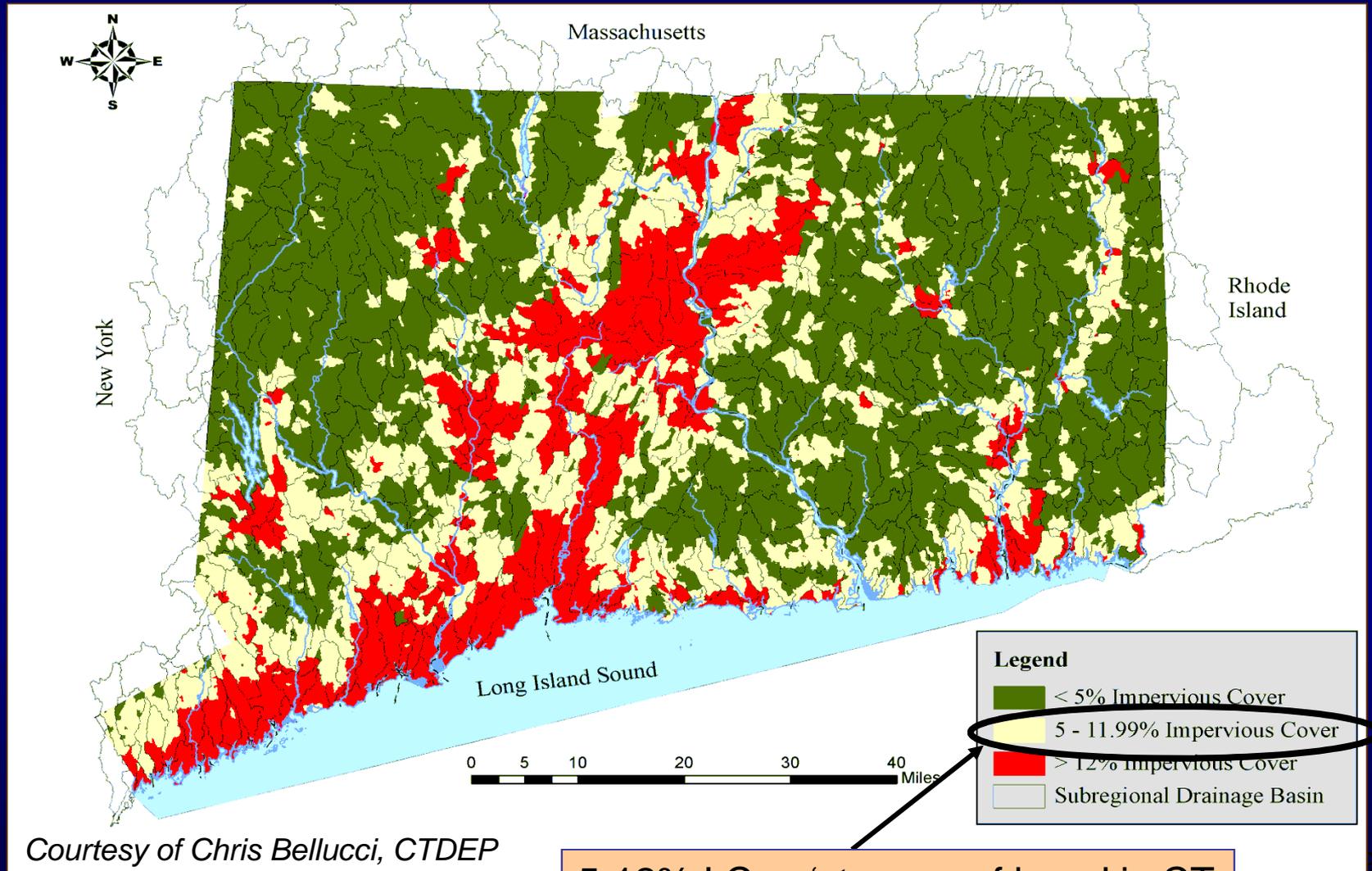
State Examples

ILLINOIS

Illinois impaired waters prioritization pilot study

• originated to develop 303(d) list 'prioritized schedule' support tool

• developed and mapped 104 ecological, stressor and social indicators

• trial application of one statewide index, multiple scenarios and combinations

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State pioneers in RPS:
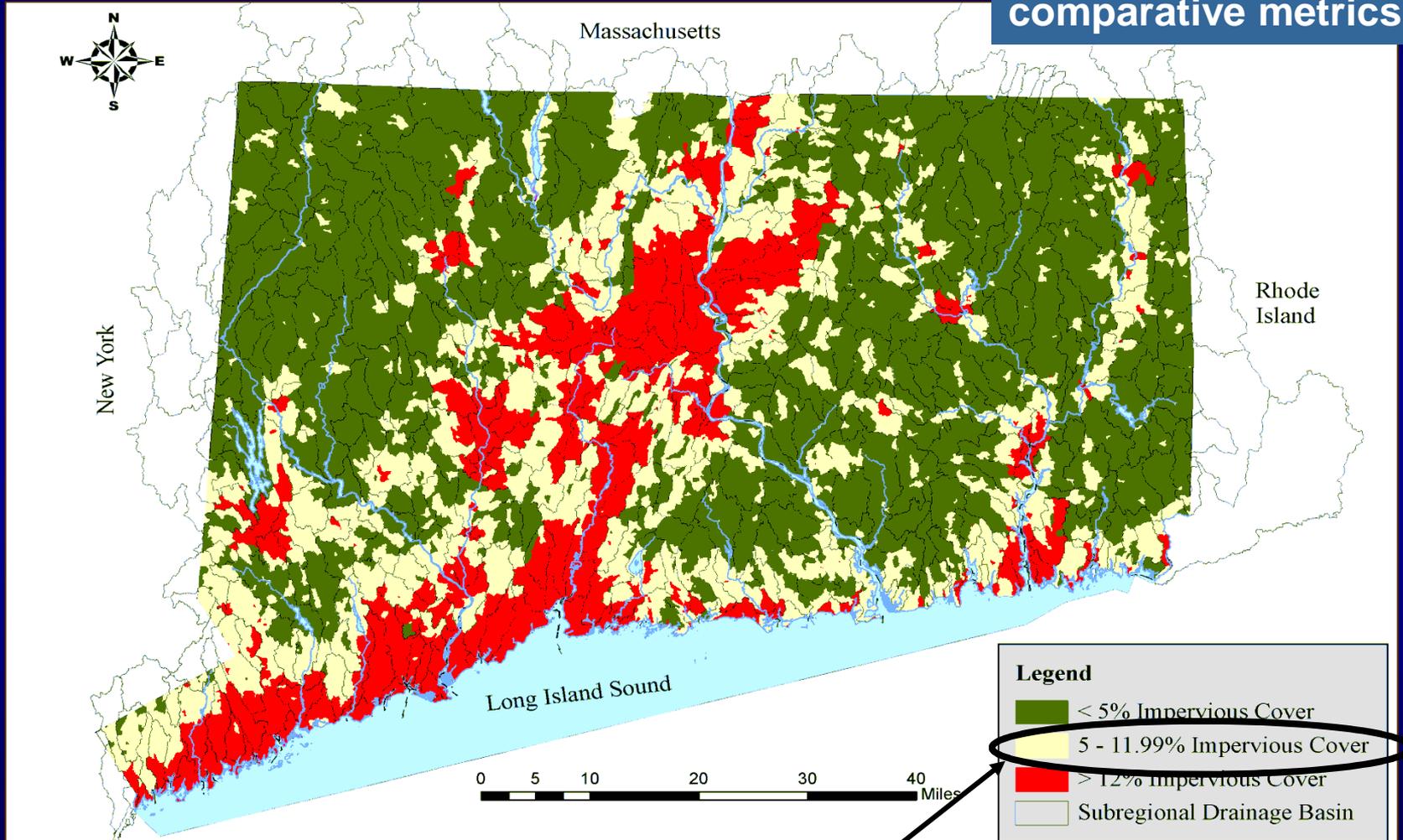## impervious cover x biotic index

CONNECTICUT

Legend
- < 5% Impervious Cover
- 5 - 11.99% Impervious Cover
- > 12% Impervious Cover
- Subregional Drainage Basin

Courtesy of Chris Bellucci, CTDEP

5-12% I.C. = 'streams of hope' in CT

State pioneers in RPS:
impervious cover x biotic index

Massachusetts

New York

Rhode Island

Long Island Sound

| 0 | 5 | 10 | 20 | 30 | 40 |
Miles

Courtesy of Chris Bellucci, CTDEP

Legend
- ◼ < 5% Impervious Cover
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- ◻ Subregional Drainage Basin

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GIS data reveal the common interest areas:
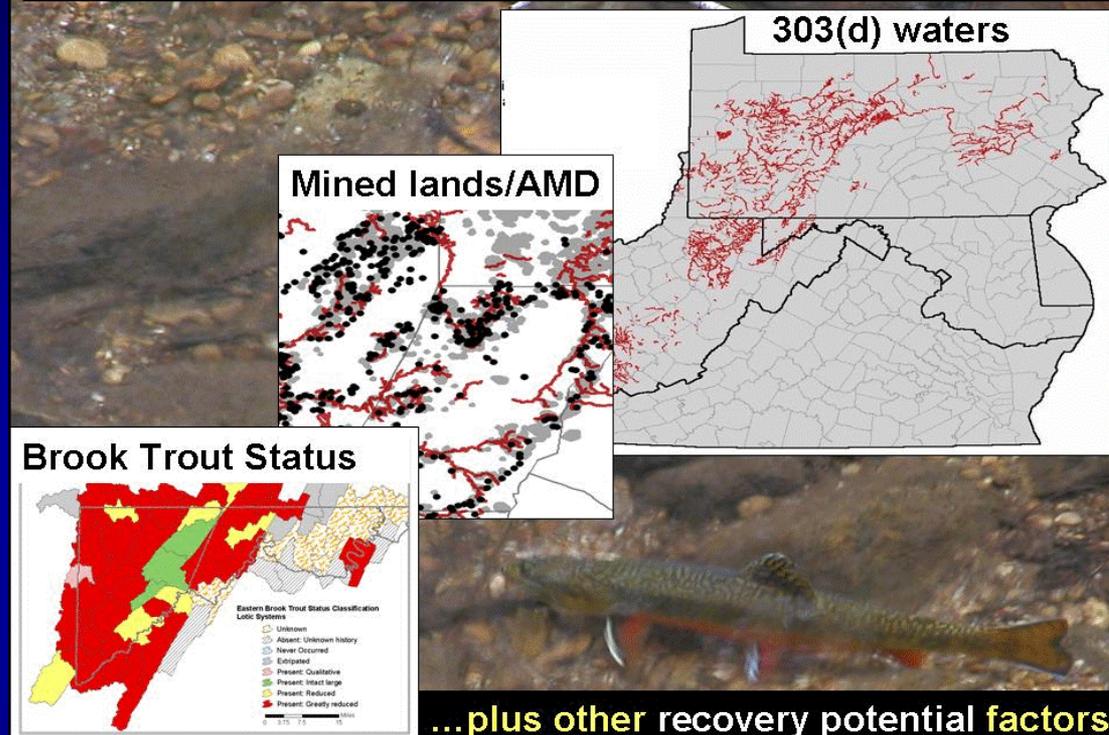
303(d) waters

Mined lands/AMD

Brook Trout Status

...plus other recovery potential factors

PENNSYLVANIA

Mid-Atlantic states recovery screening

- narrowly focused on native trout recovery factors
- rapidly completed by states, EPA Region 3
- priority waters have won new restoration funds in PA

GIS data reveal the common interest a
PENNSYLVANIA
⭐ - rapid analysis;
cross- program focus;
expanded user base
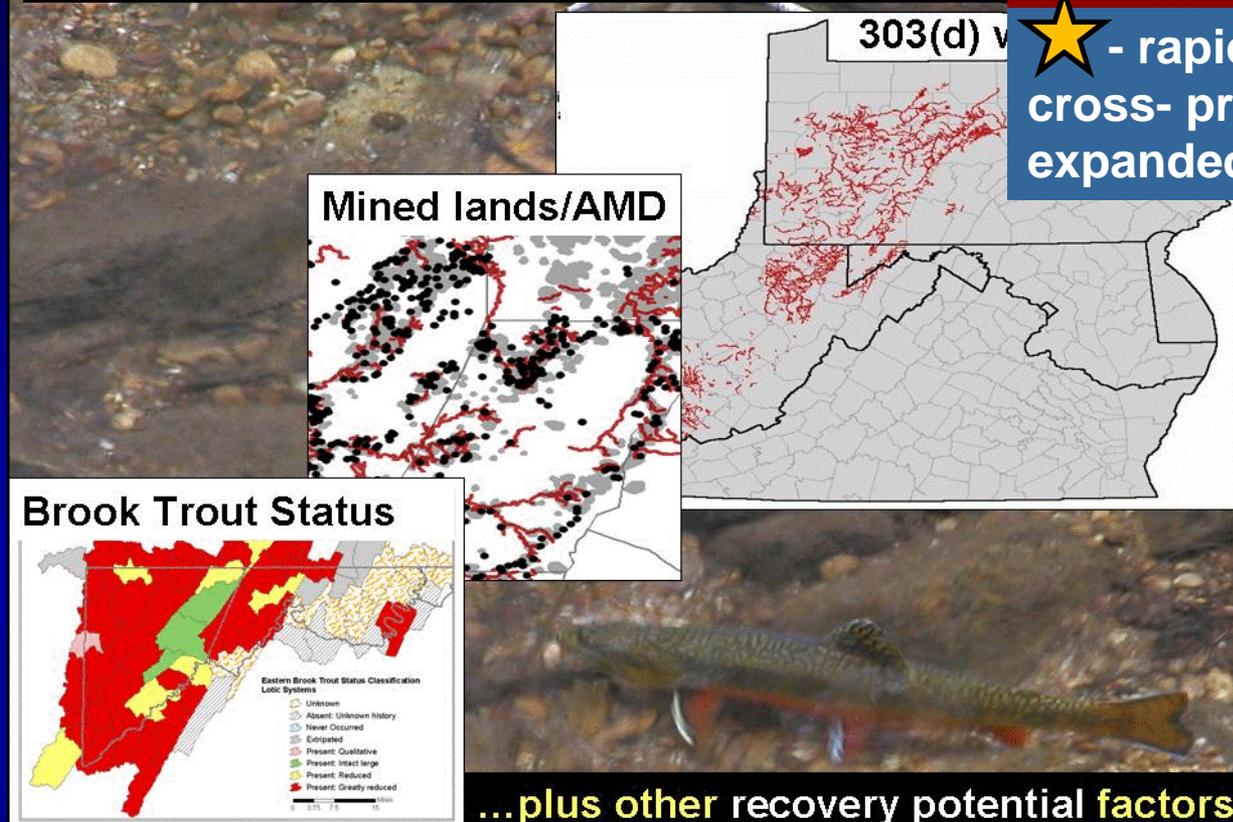
303(d) v

Mined lands/AMD

Brook Trout Status

Eastern Brook Trout Status Classification
Lotic Systems

...plus other recovery potential factors

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Town Creek MBSS Recovery Potential X DNR buffer potential

(3 sites high RP + DNR land + stream)

MARYLAND

Statewide means
BOTH pass
ONE fails
BOTH fail
No data

Eco Indicators Summary Score

Stressor Indicators Summary Score

Circle size increases with Social Context summary score value

TOWN CREEK DNR LANDS X RECOVERY POTENTIAL			
MBSS fails	Recovery Potential	% DNR-admin lands	NHD stream x DNR
TOWN-101-R-2000	high	1%	N
TOWN-102-R-2000	high	15%	Y
TOWN-105-R-2000	high	0	N
TOWN-108-R-2002	high	6%	N
TOWN-113-R-2000	high	100%	Y
TOWN-116-R-2002	high	26%	Y
TOWN-201-R-2002	high	4%	N

Town Creek MBSS Recovery Potential X DNR buffer potential

(3 sites high RP + DNR land + stream)

MARYLAND

⭐ - dual-scale usage; 303d/319 partnering; healthy w'shed ref sites; improved tools; Bio Restoration initiative; USDA priority watersheds

Legend:
- Statewide means
- BOTH pass (green)
- ONE fails (orange)
- BOTH fail (red)
- No data (black)

Y-axis: Eco Indicators Summary Score (0–100)
X-axis: Stressor Indicators Summary Score (0–80)

Circle size increases with Social Context summary score value

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A Comparative Analysis of Recovery Potential for Impaired Waters in the Buffalo River Watershed

Pete Knutson, MPCA
Peter Mead, NRCS

Recovery Potential Integrated Score (RPI Score) for Buffalo River, Minnesota sub-watersheds
[courtesy of Minnesota Pollution Control Agency]
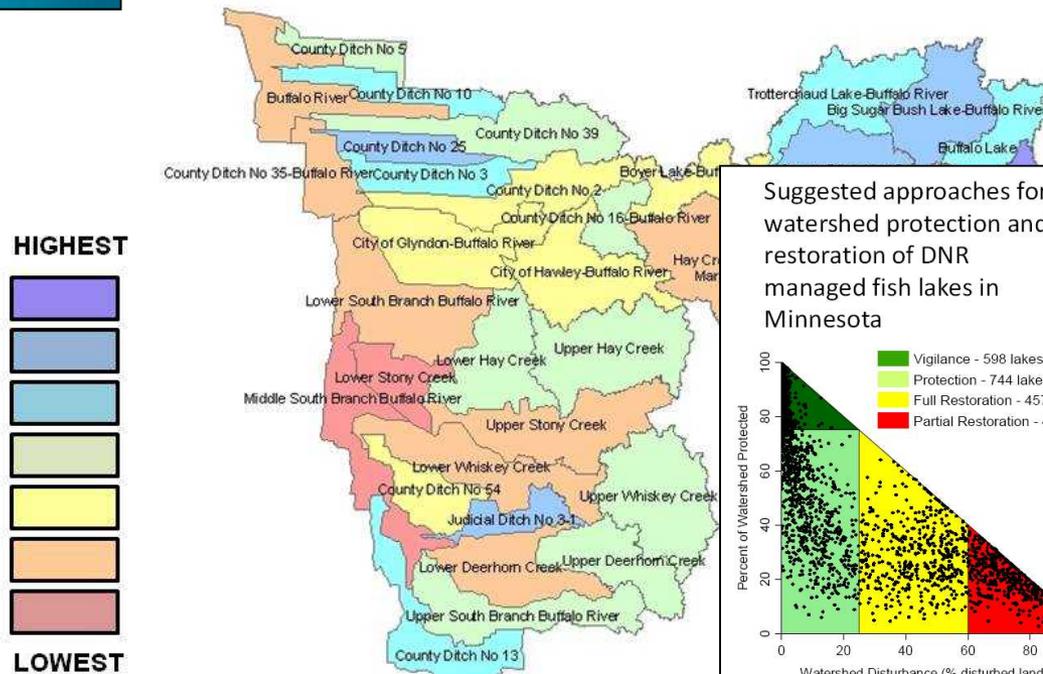
HIGHEST

LOWEST

Suggested approaches for watershed protection and restoration of DNR managed fish lakes in Minnesota

Vigilance - 598 lakes
Protection - 744 lakes
Full Restoration - 457 lakes
Partial Restoration - 471 lakes
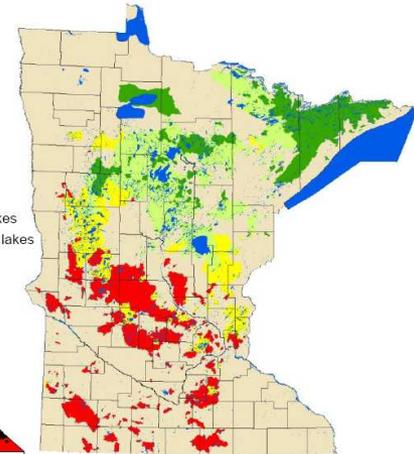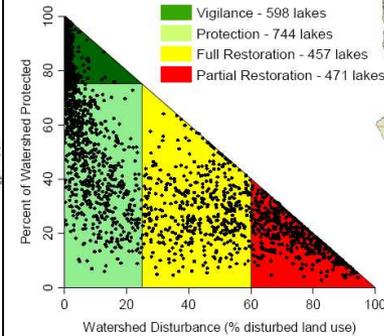
- *Evaluate restorability to inform dialogue on priority setting*
- *USDA, EPA, MPCA, MDNR involvement*

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Recovery Potential Integrated S...
or Buffalo River, Minnesota sub-...
[courtesy of Minnesota Pollution Cont...

MINNESOTA

⭐ **- first entirely remote RPS users; social indicators; partnering with USDA; more to come**
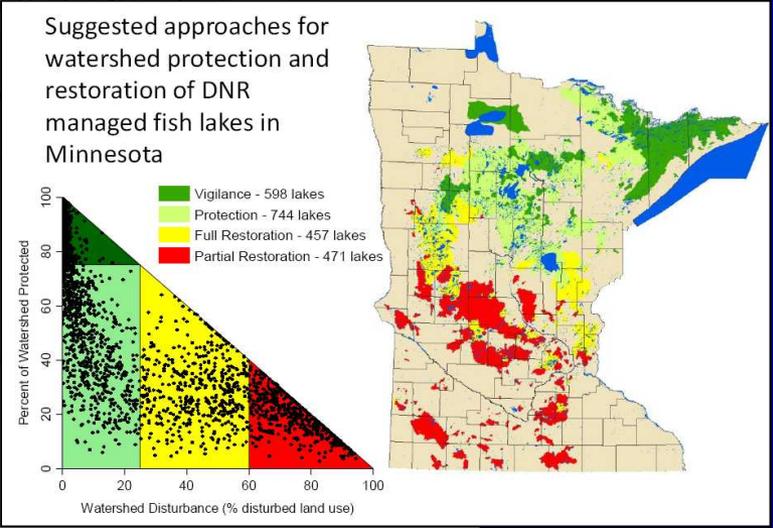
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Priority Agricultural Watersheds for Nutrient TMDL Development
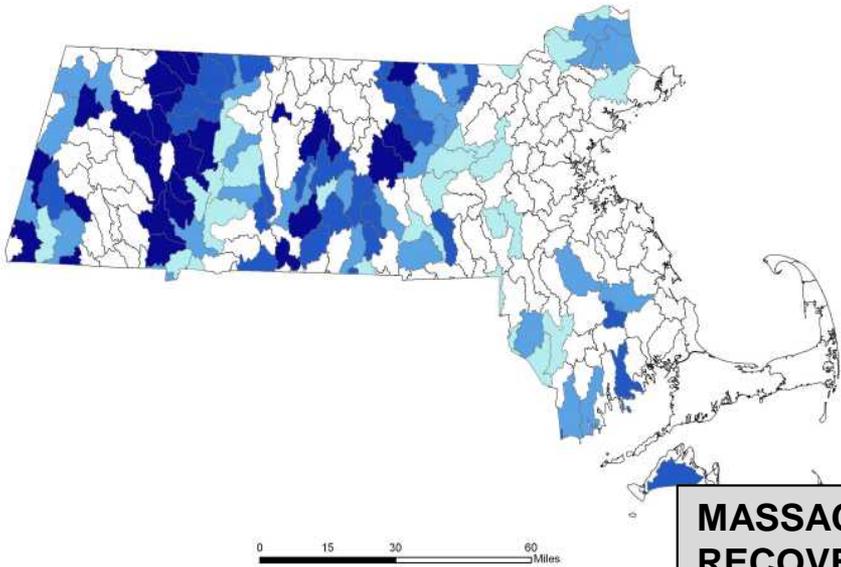
MASSACHUSETTS
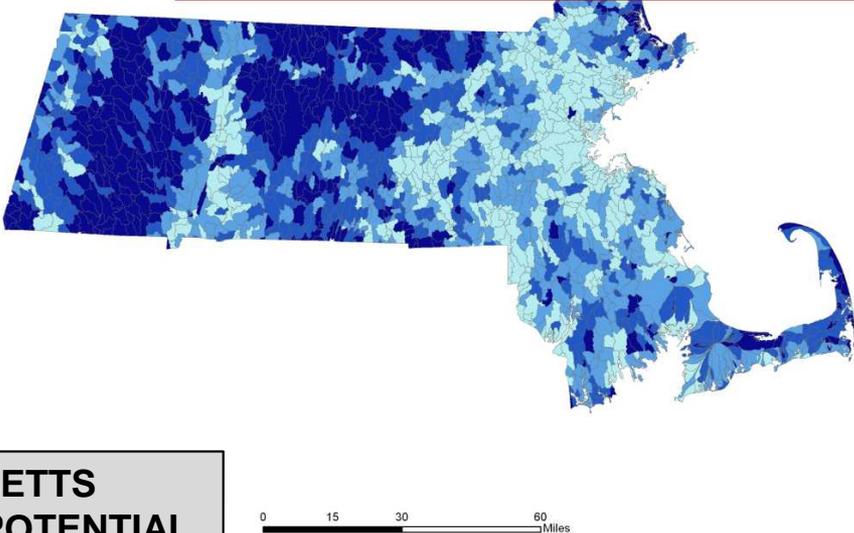
MASSACHUSETTS
RECOVERY POTENTIAL
SCREENING
Draft data
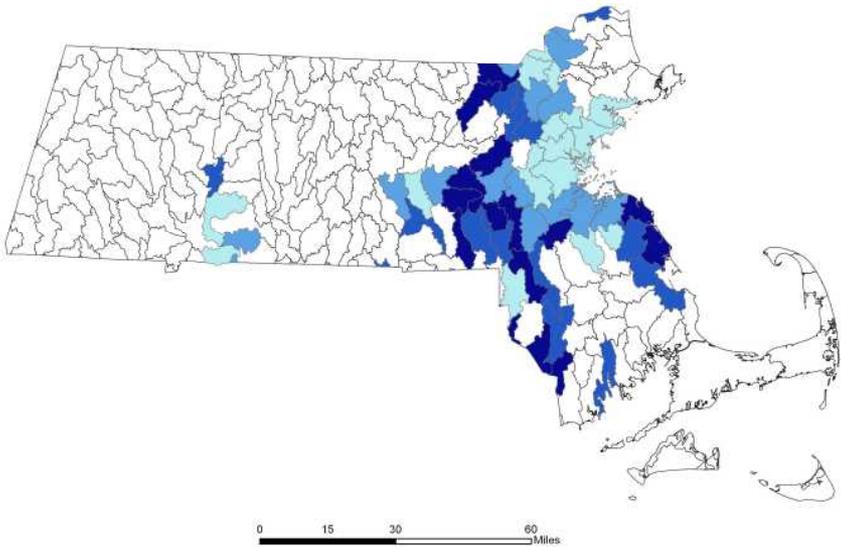
319 Target Watersheds

Priority Urban Watersheds for Nutrient TMDL Devel

Priority Agricultural Watersheds for Nutrient TMDL Development

Priority Urban Watersheds for Nutrient TMDL Devel[...]

319 Target Watersheds
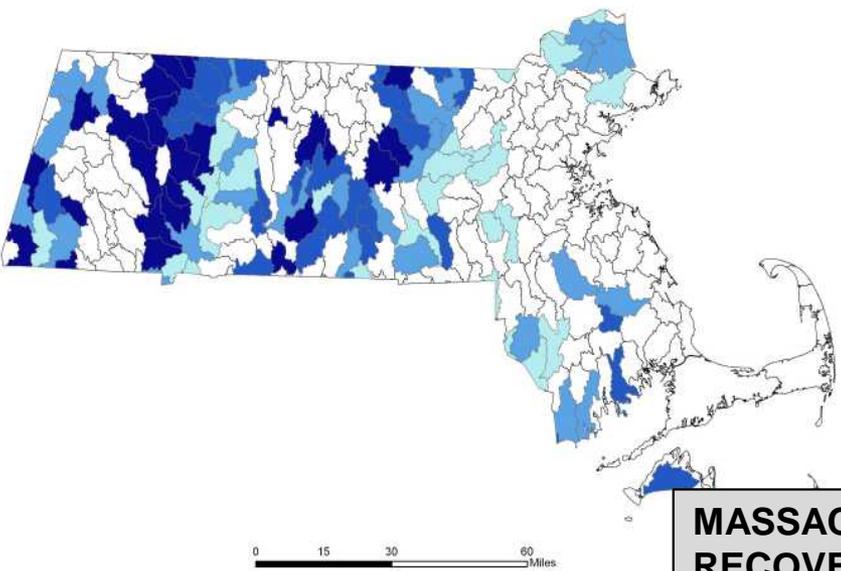
MASSACHUSETTS

⭐ **- exceptional flow data; NPS program lead; 12+ uses and counting; 'routine' tool use approach**
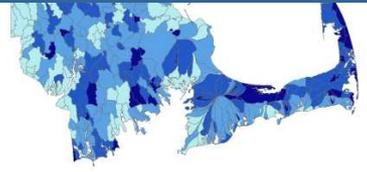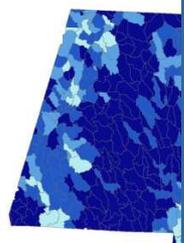
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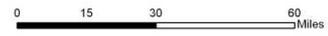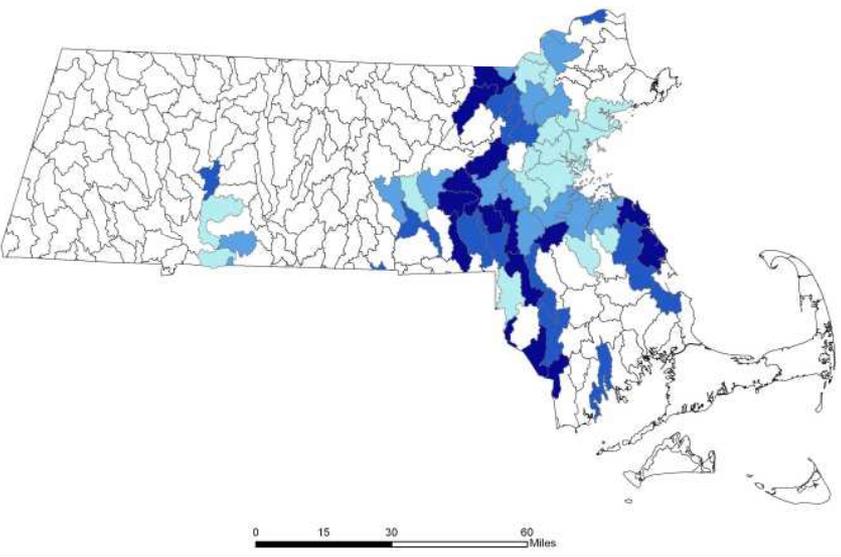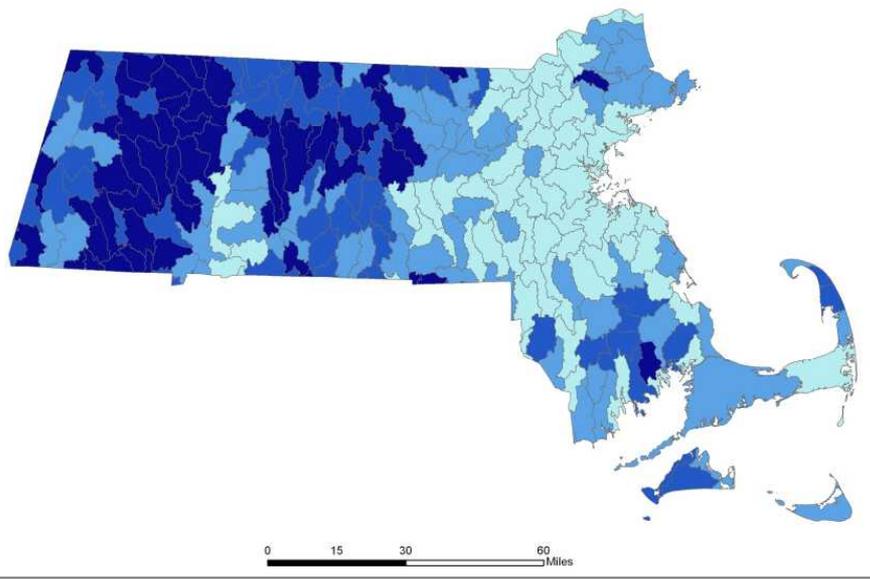
Other RPS *Rising Stars* Still in Progress…

⭐ **EPA REGION 4** — *watershed indexing tool, lower 48 states HUC12 data*

⭐ **VERMONT** — *river morphology indicators, poss. use in state WQ planning*

⭐ **MINNESOTA** — *advancing social indicators, relating RPS to HWI, BCG*

⭐ **KENTUCKY** — *new startup; 32 potential applications listed in kickoff*

⭐ **MICHIGAN** — *interactive prioritization between state and districts*

⭐ **TENNESSEE** — *new startup; synergies with HWI*

⭐ **Others TBD….** — *EPA assistance in watershed prioritization for nutrients, 2012*

...<u>congratulations</u> and <u>thank you</u> to our innovative state users!

www.epa.gov/recoverypotential/
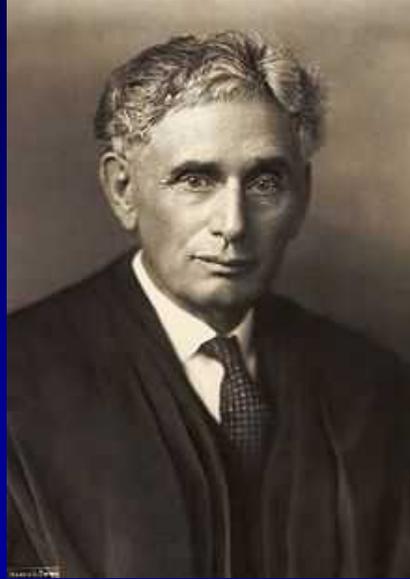
Supreme Court Justice Louis Brandeis envisioned the states as "laboratories of democracy" willing to tackle new and innovative approaches in meeting the needs of society