EPA Support for Watershed Planning and Prioritizing: Data, Tools, and Services

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State Workshop on 303(d) and TMDLs
May 2014

Part 1:

Recovery Potential Screening and Watershed Index Online

Part 2:

WATERSCAPE

What is Recovery Potential Screening?

A method to help states and restoration planners compare restorability across watersheds

- Science-based, indicator-driven (GIS and field monitoring data)
- Scores and compares watersheds relative to their:

ecological condition,
exposure to stressors, *and*
social context *affecting restoration efforts*

How Recovery Potential Screening Is Used to Prioritize

- **impaired waters prioritization**: *which watersheds (in a river basin or statewide) are more restorable and might recover quickly?*

- **revealing level of difficulty**: *how do waters differ in recovery potential, and what factors are responsible? What am I up against?*

- **TMDL implementation**: *how do waters with TMDLs appear to differ in restorability? which TMDLs are good prospects?*

- **nonpoint source program strategies**: *how can considering restorability factors help watershed plans or statewide strategies?*

- **scenario-specific projects**: *e.g., how does restorability differ across all nutrient impaired waters? across all urban waters? for fish restoration? among healthy but threatened watersheds?*

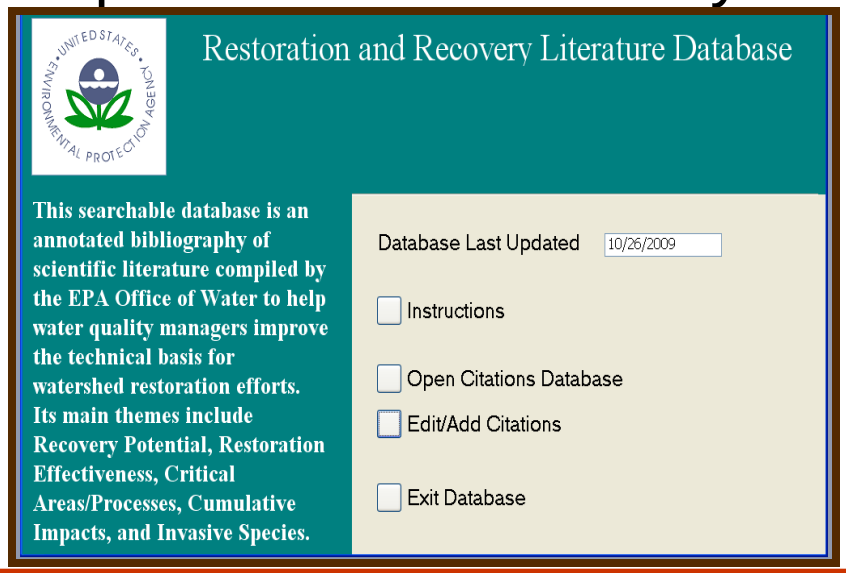
Where it started (2004)…

- **Numerous ecological and social factors are associated with the relative ability to recover from impairment**

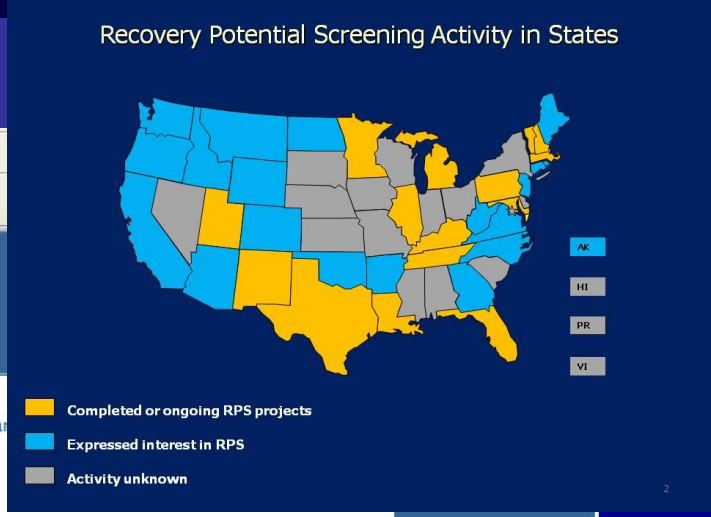
- Data… available for measuring many factors (monitoring, GIS data)
- Analyzing multiple factors reveals…
- A system…
- Rapid, flexible…
- (vs. a single out…
- Systematic co… judgment in info…

Recovery Literature Review

- Over 1700 published papers
- Identification of factors influencing or associated with impaired waters recovery
- In literature
- In practice



www.epa.gov/recoverypotential/



File Edit View Favorites Tools Help

Recovery Potential Screening | Re...

EPA United States Environmental Protection Agency

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Water: Recovery Potential

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Recovery Potential Screening

Tools for Comparing Impaired Waters Restorability

Monitoring programs under the Clean Water Act have identified tens of thousands of US water bodies that do not meet Water Quality Standards and are in need of restoration. This website provides technical assistance for restoration programs to help them consider where to invest their efforts for greater likelihood of success, based on the traits of their own geographic area's environment and communities. There are three main website components. Step-by-step instructions in recovery potential screening provide watershed managers with a methodology for comparing restorability differences among their waters. The steps in the methodology link to several online tools and resources that are used in recovery potential screening. A library of recovery potential indicators offers technical information on specific recovery-related factors (ecological, stressor, and social), how they influence restorability, and how to measure them.
More ...

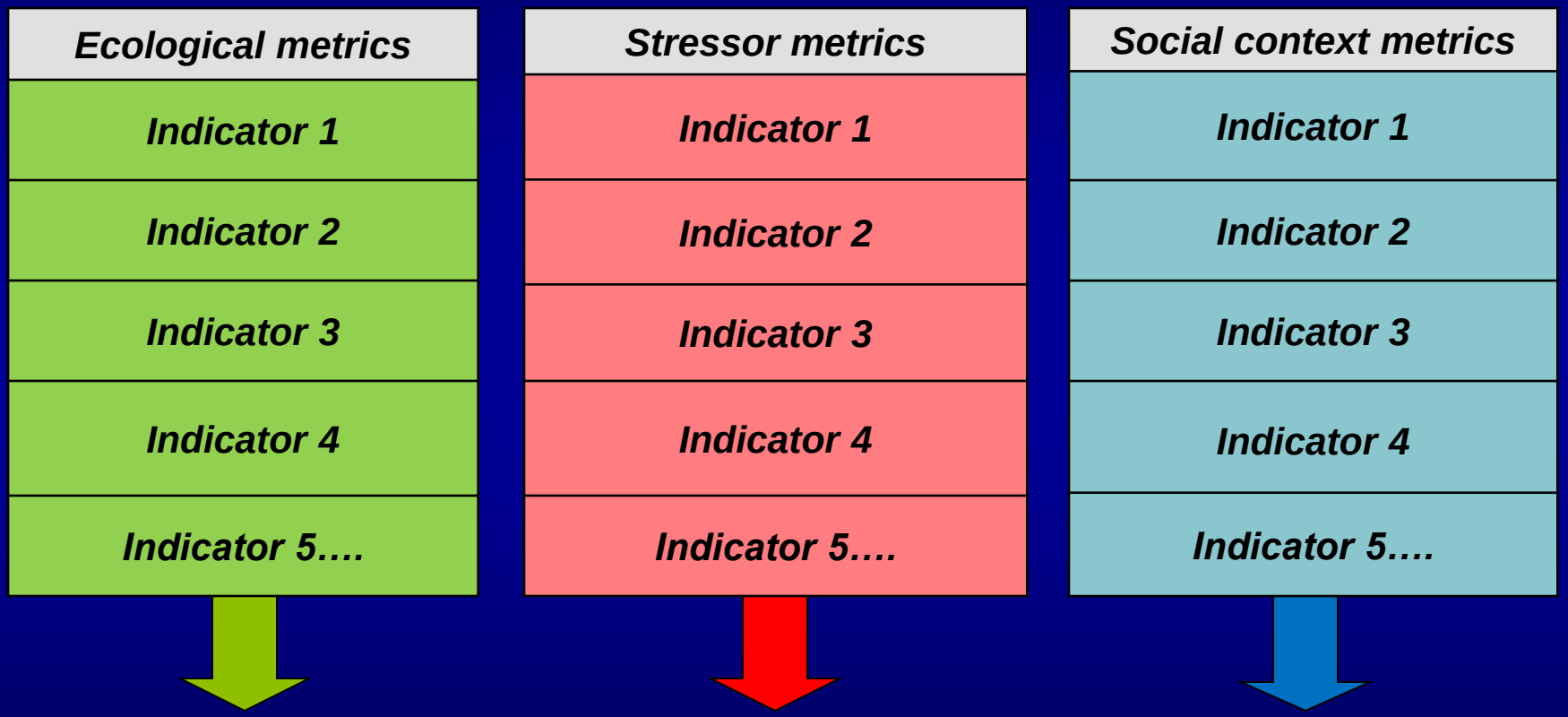
Quick Links

Home
Overview
Screening methodology
Step-by-step screening example
Example projects

Recovery tools & resources
Literature database
Indicators & reference sheets
Scoring techniques
Displaying screening results

How does it work?

Recovery Potential Screening - Basic Concept



$$\frac{\text{Ecological} + \text{Social} + (100 - \text{Stressor})}{3}$$

Recovery Potential Screening: Example Indicator Selections

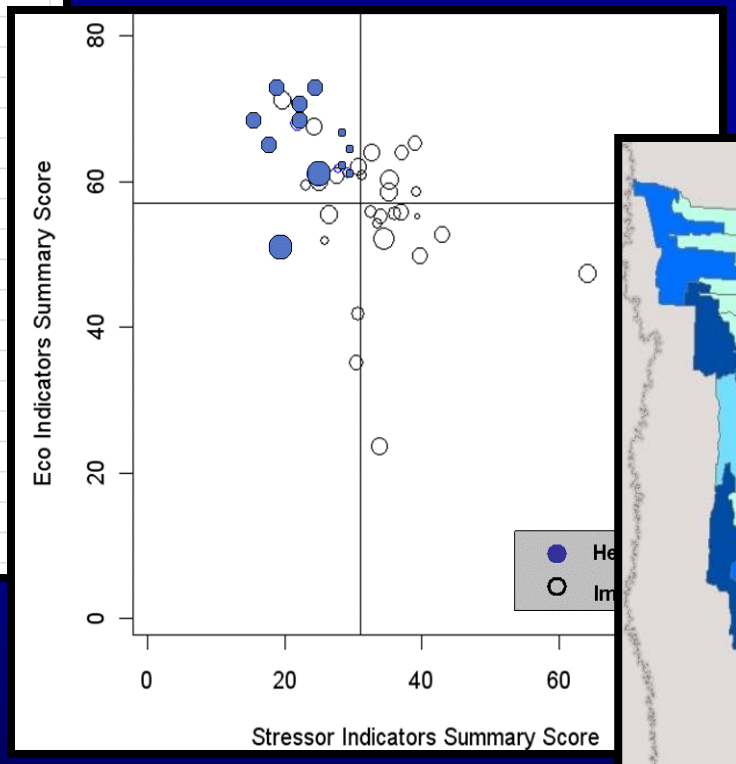
RPS Indicator selection for screening based on prioritizing pathogen TMDLs		
ECOLOGICAL	**STRESSOR**	**SOCIAL**
Percent natural cover	Percent pasture in watershed	Jurisdictional complexity
Percent forest in corridor	Percent impervious in watershed	TMDL count
Stream density	Percent septic in stream corridor	Percent protected lands
Stream order	Percent sewered	Active volunteers
Change in natural cover	Impairments count	

RPS Indicator selection for screening based on development risks to watersheds		
ECOLOGICAL	**STRESSOR**	**SOCIAL**
Percent_NaturalCover	Percent_Sewered	Percent_Stressors_Known
Percent_Forest_In_Corridor	Percent_Impervious	Percent_Length_Assessed
Percent_Wetlands	Percent_Impervious_>5_In Corridor	Percent_Watershed_Protected_Lands
Topo_Complexity	Percent_Length_Impaired	Low_Jurisdictional_Complexity
NFHAP_HCI_Condition	Road_Density	Low_Landuse_Complexity
Combined_Natural_Habitat_Index	Percent_Septic_In_Corridor	Active_Volunteers_Count
Percent_Change_Natural_Cover	Population_In_Corridor_With_Septic	Percent_Source_Water_Protection_Area
Percent_Natl_Eco_Framework	Population	Other_Priority_Recognition
	Stressor_Count	

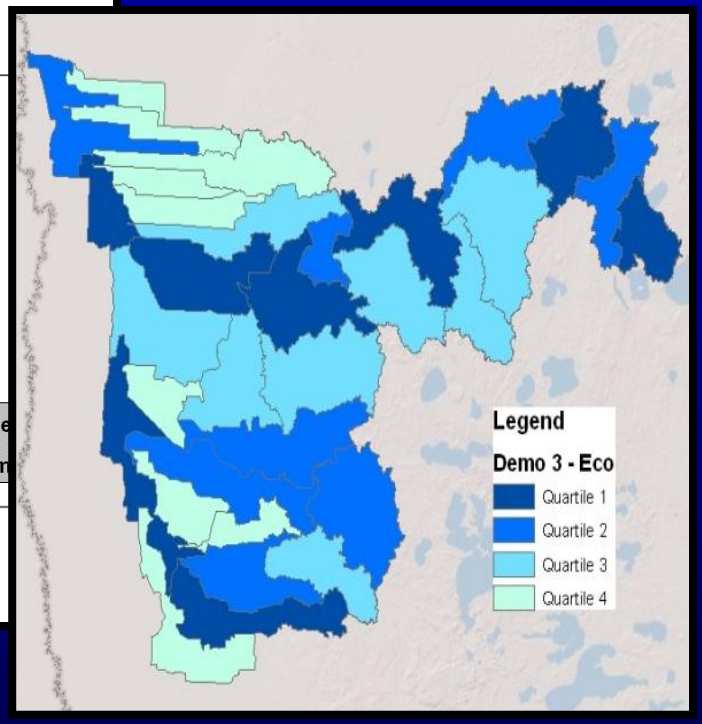
Three Types of Recovery Potential Screening Products (from the indicator scoring)

	A	B	C	D
1	HUC12ID	NAME	SUMFORMULA	SUMRANK
2	010802040205	Ware River-Barre F	35.31	1
3	011000050203	Hubbard Brook	3.84	2
4	010900020206	Sagamore groundw	3.74	3
5	010802040102	East Branch Swift F	3.74	4
6	010802070204	West Branch Farmi	3.63	5
7	010802060101	Westfield River-hea	3.56	6
8	010700040205	Nashua River-Catac	3.44	7
9	010900020203	Chequesset ground	3.43	8
10	010802060103	Dead Branch Westf	3.39	9
11	010802040202	East Branch Ware F	3.38	10
12	010802060202	West Branch Westf	3.37	11
13	010802060201	West Branch Westf	3.35	12
14	010900020301	Sippican River	3.25	13
15	011000050105	Housatonic River-V	3.23	14
16	010802020206	Millers River-Orcut	3.23	15
17	010802070201	Otis Reservoir	3.23	16
18	011000050204	Housatonic mainst	3.21	17
19	010802020203	Tully River	3.21	18
20	010802040206	Muddy Brook	3.18	19

Rank Ordering



Bubble Plotting



Mapping

RPS Scoring Tool

Contains all the statewide data on indicators, watersheds
Creates rank-ordering, maps, and bubble plots in minutes

CREATE PROJECT

RESET WORKSHEETS Click the *Reset Worksheets* button to clear workbook contents and I restart your project.

Select Watersheds

Add All Tennessee Watersheds

HUC12 ID
051301050101 (Headwaters East Fork Obey River)
051301050102 (Hurricane Creek)
051301050103 (Little Indian Creek-East Fork Obey River)
051301050104 (Big Piney Creek)
051301050105 (Big Laurel Creek-East Fork Obey River)
051301050106 (Buffalo Cove Creek)
051301050107 (Poplar Cove Creek)
051301050108 (Big Indian Creek-Little Crab Creek)
051301050109 (Big Indian Creek-East Fork Obey River)
051301050201 (Upper West Fork Obey River)
051301050202 (Middle West Fork Obey River)
051301050203 (Lower West Fork Obey River)
051301050301 (Franklin Creek-Obey River)
051301050302 (Big Eagle Creek)
051301050303 (Ashburn Creek-Obey River)
051301050401 (Delk Creek-Wolf River)
051301050402 (Rotten Fork Wolf River)
051301050403 (Lick Creek-Wolf River)
051301050406 (Sulphur Creek-Wolf River)
051301050502 (Mitchell Creek)
051301050503 (Irons Creek-Obey River)
051301050504 (Neely Creek-Obey River)

Select Ecological Indicators

Select the Ecological Indicators of interest below:

Ecological Indicator	Weight
Unimpaired Stream Length (mi.)	1
% Forest	1
Stream Corridor - % Natural Cover	1

Select Stressor Indicators

Select the Stressor Indicators of interest below:

Stressor Indicator	Weight
# of 303(d) listed causes	1
% Agriculture	1
Stream Corridor - % Impervious	1
Stream Corridor - Road Density (mi / sqmi)	1
Empower Density	1

Select Social Indicators

Select the Social Indicators of interest below:

Social Indicator	Weight
Ratio of TMDLs to Impairments	1
% of Waterbodies Assessed	1
# of Water Withdrawals	1
# of Surface Water Intakes	1

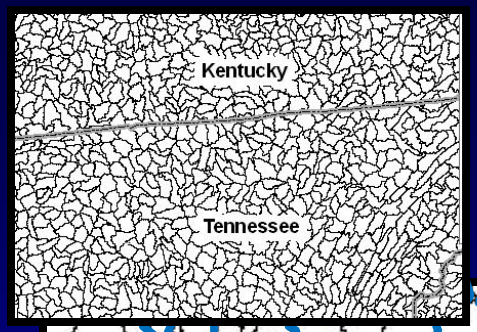
2014: RPS state-specific tools for ALL states are now being developed

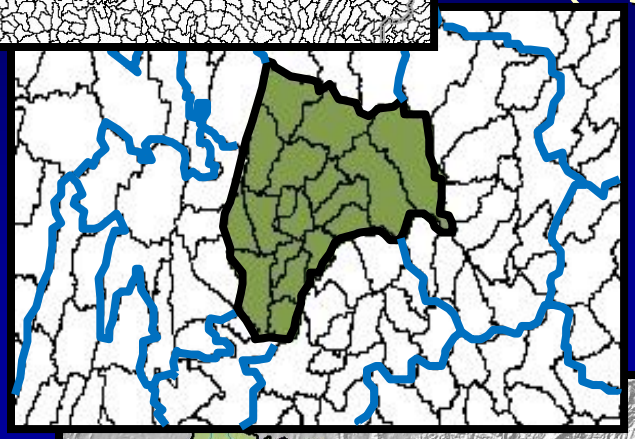
INSTRUCTIONS | Setup | Summary_Scores | Bubble_Plot | Bubble_Plot_Options | HUC12_Map | Indicator_Values | Normalized_Indicator_Map | Indicator_Values | Normalized_Indica

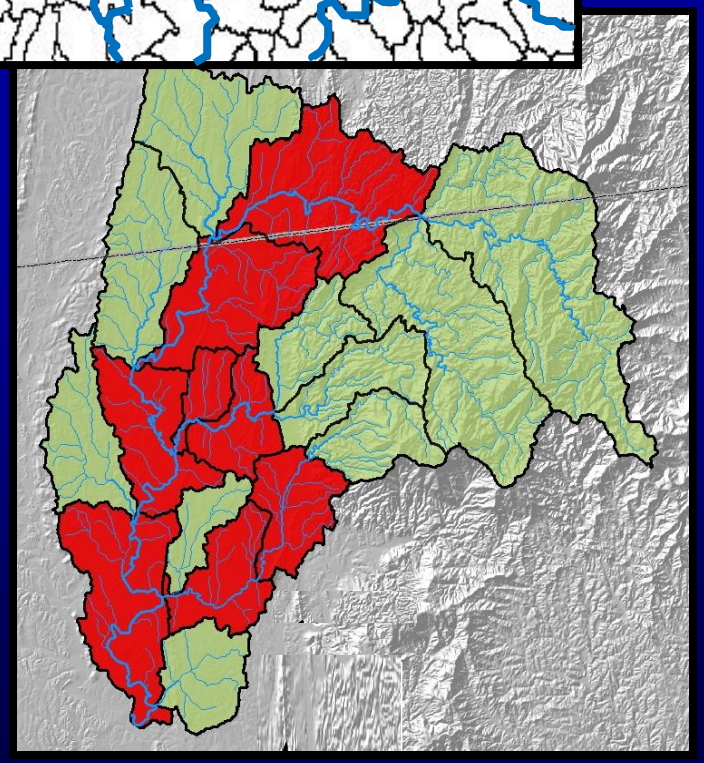
Requires only spreadsheet skills to run screenings, create RPS products

Applying RPS in State Programs

Nutrients RPS Two-Stage Approach







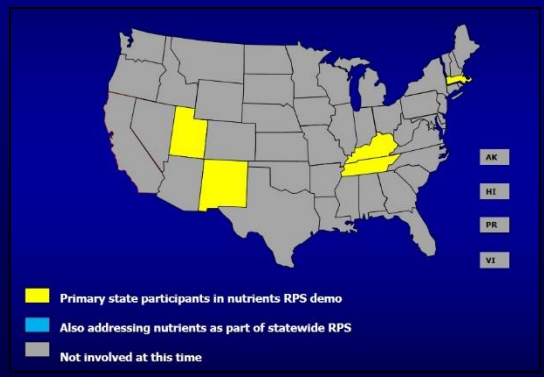
- State defines Nutrient Scenarios
(e.g., rural/agr watersheds, urban watersheds)

(Stage 1: targeting)

- RPS Targeting stage: priority HUC8s in scenario
(moderate-high loads, good RP prospects)

(Stage 2: implementing)

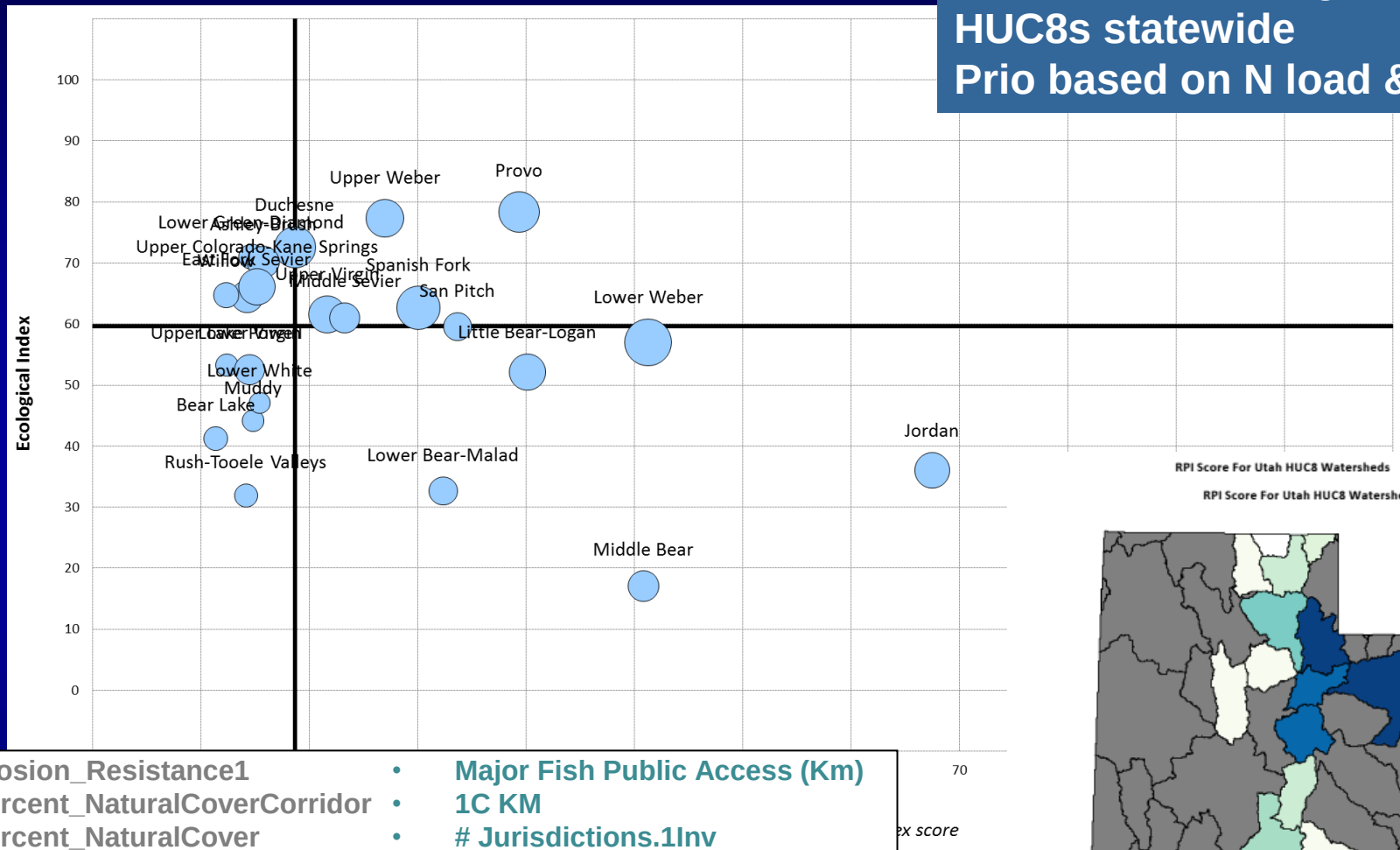
- RPS Implementing stage: HUC12s in HUC8
(where to take action within priority 8's)

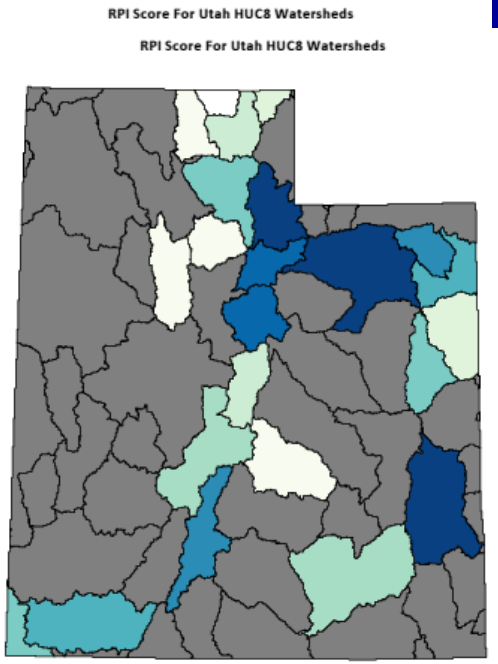


UT: a N-based scenario selection identifies 23 possible target HUC8s

UTAH

Nutrients RPS Stage 1:
HUC8s statewide
Prio based on N load & RPS

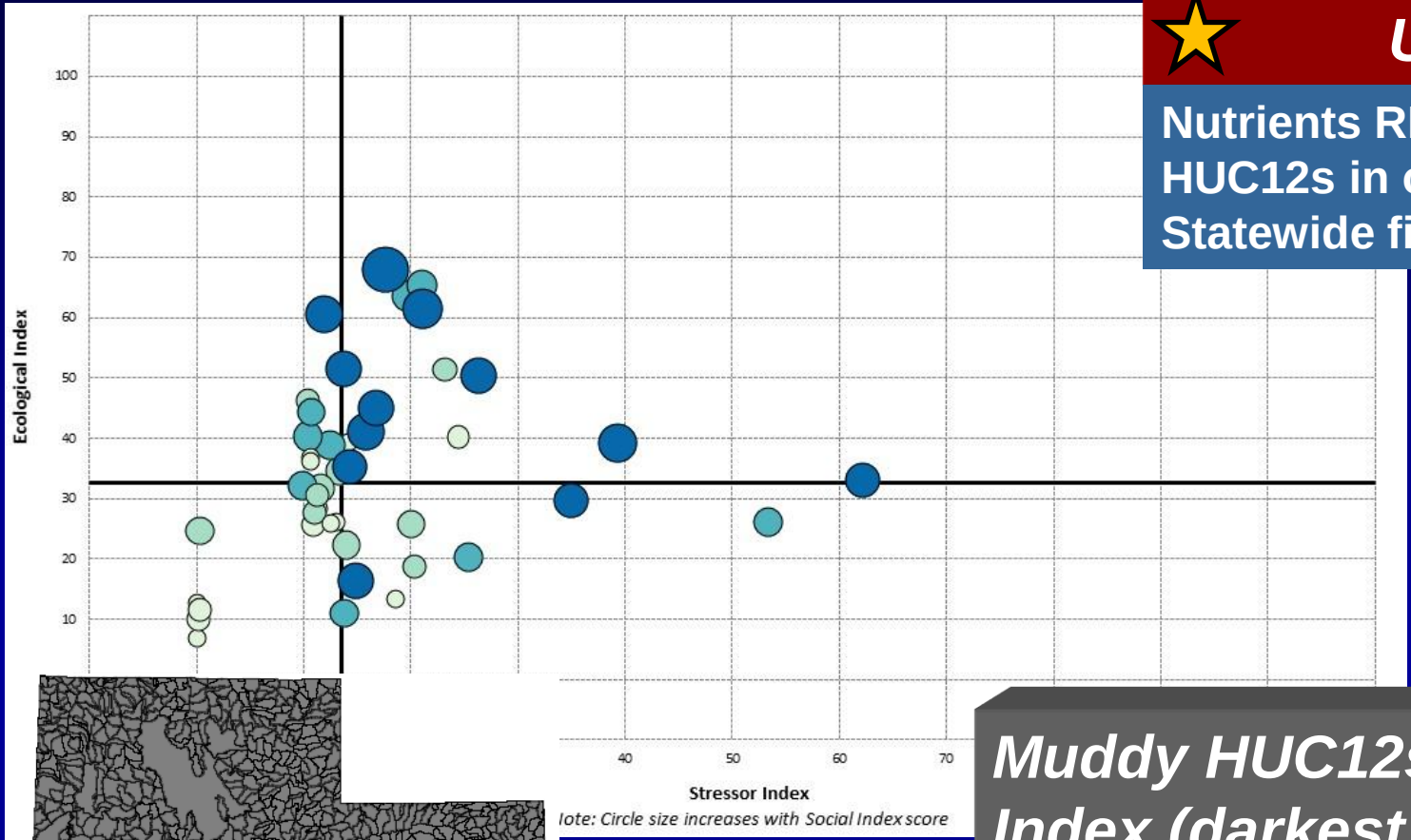


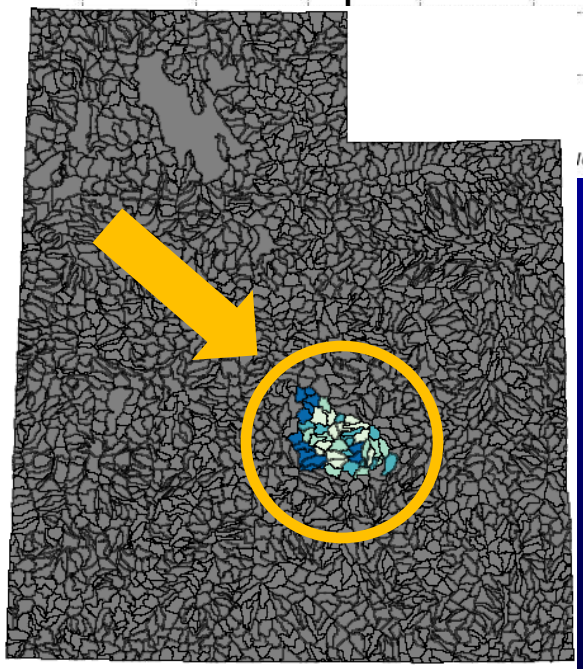


- Erosion_Resistance1
- Percent_NaturalCoverCorridor
- Percent_NaturalCover
- #UPDES
- percentUrban
- #Diversions
- percentCropland
- ReNANIAB
- # T&E spp
- Major Fish Public Access (Km)
- 1C KM
- # Jurisdictions.1Inv
- TMDLRatio
- EducationPercent

UTAH

Nutrients RPS Stage 2:
HUC12s in one HUC8
Statewide fine-tuned locally





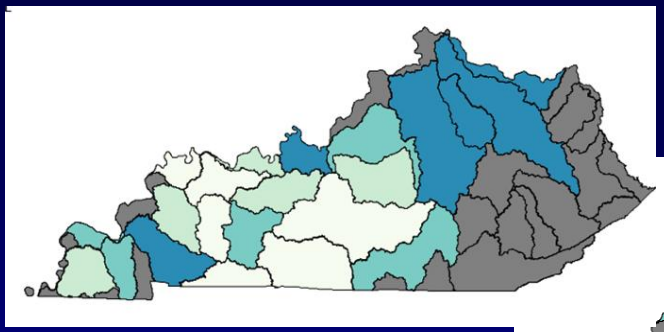
Muddy HUC12s by Social Index (darkest = highest)

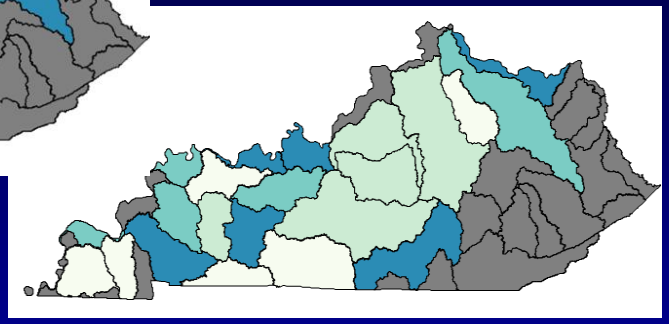
<u>Compare HUC12s to each other for specific N&P management actions</u>

(e.g., importance of social metrics and community support)

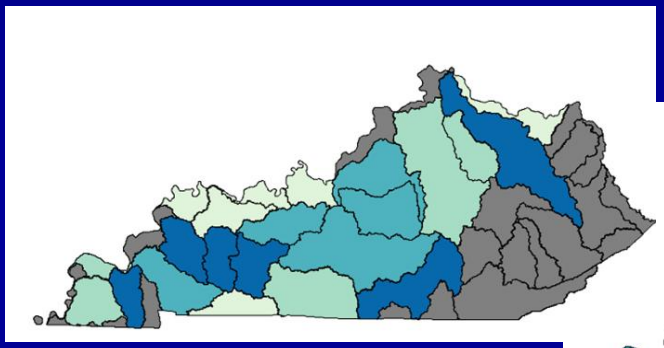
KENTUCKY

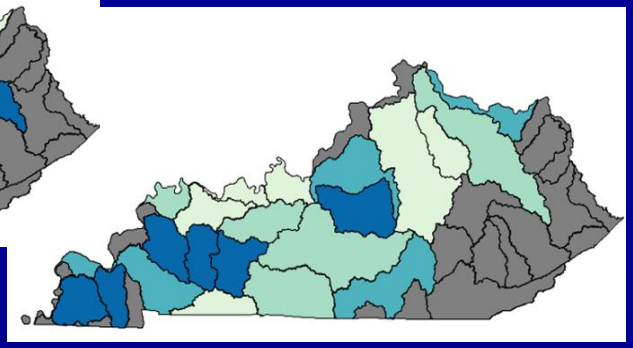
Stage 1
Rural Nutrients Scenario
(> mean load, hi agr %)



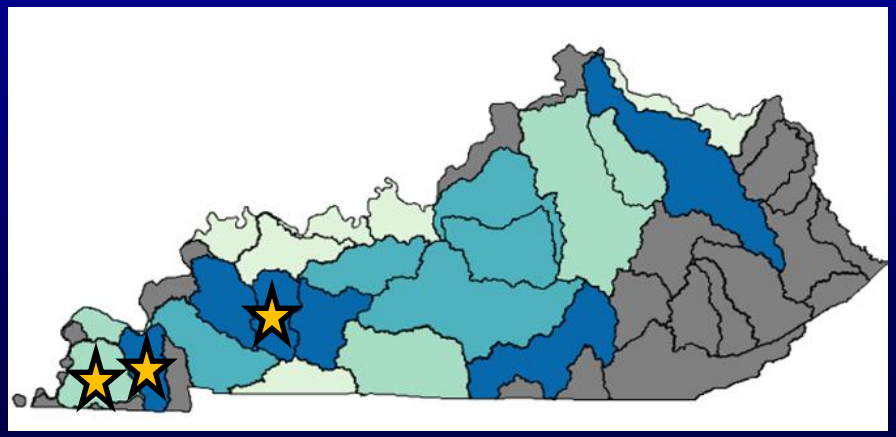


SPARROW N and P





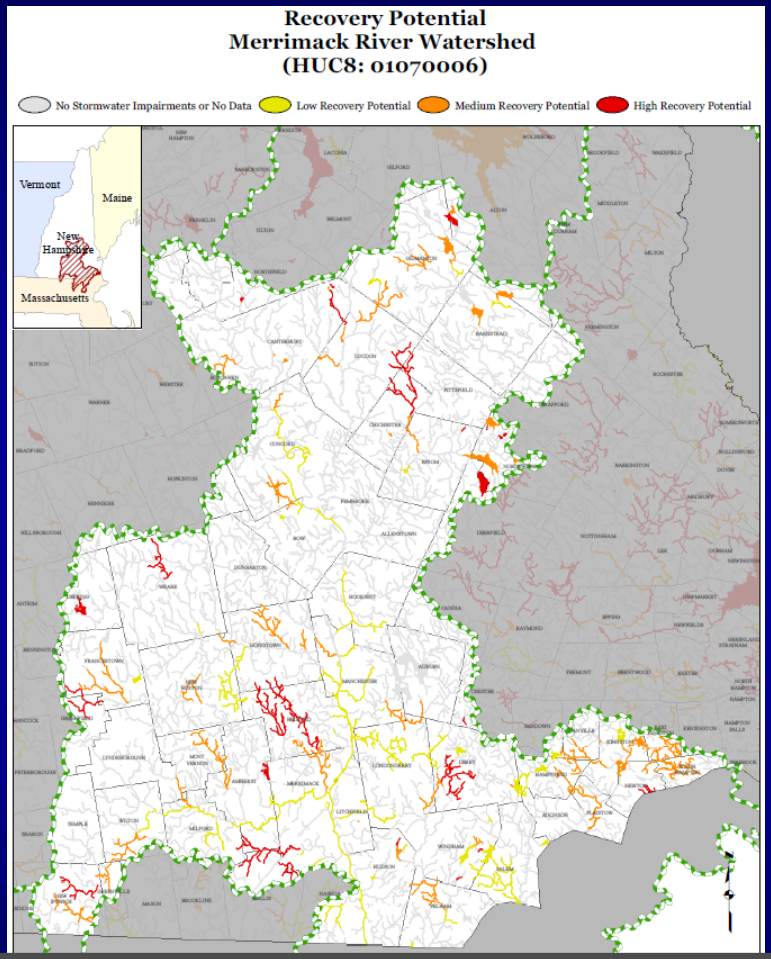
High RPI and riparian veg

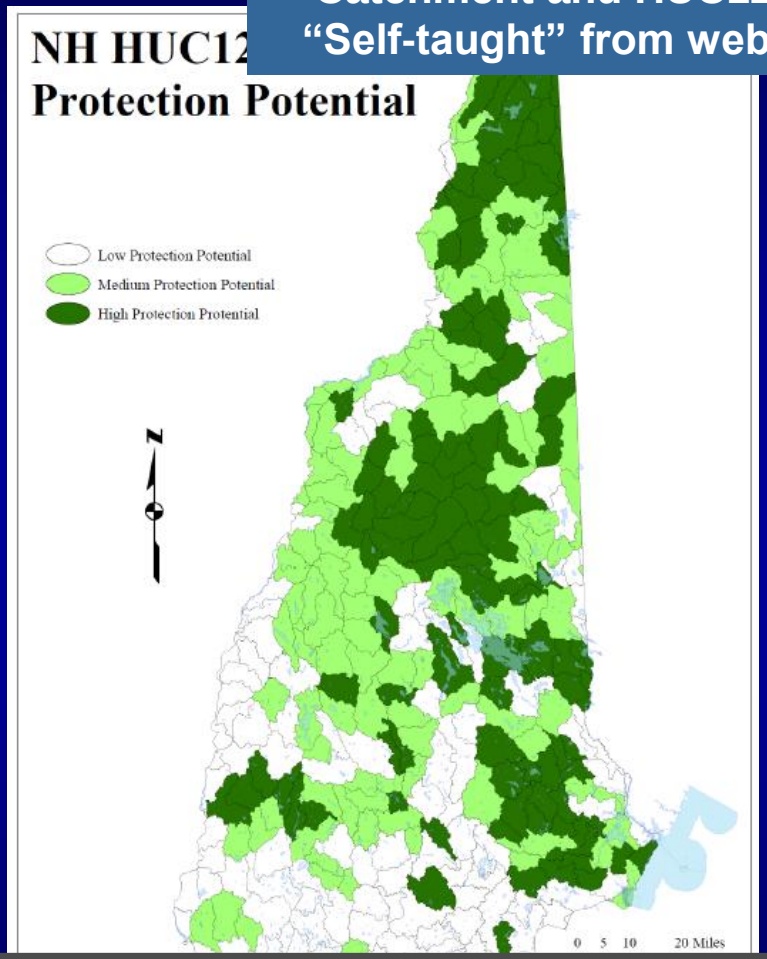


High N or P loads X good RPI or veg (★)

NEW HAMPSHIRE

Restoration and protection
Catchment and HUC12 scale
"Self-taught" from website





- *RPS at catchment scale for restoration priority setting*
- *RPS at HUC12 scale for healthy watersheds protection*

Using all four RPS Indices in three Scenarios

KENTUCKY

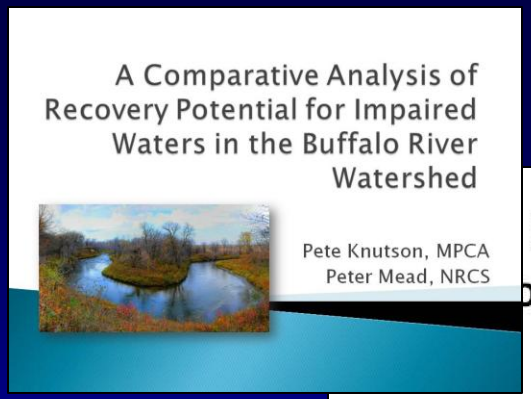
Healthy Watersheds Comparison by Rank Ordering

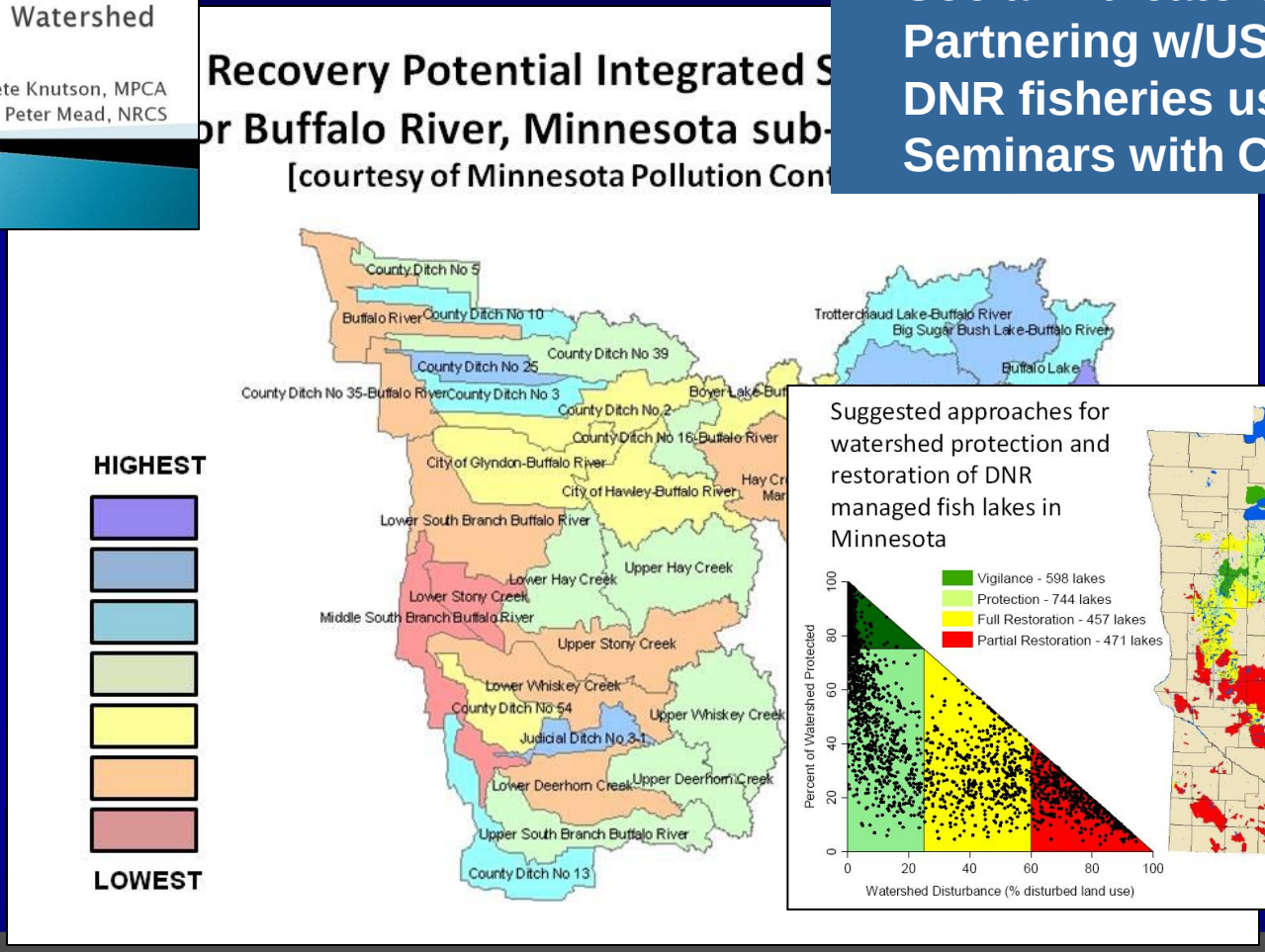
1st (top) quartile | 2nd quartile | 3rd quartile | 4th quartile

HUC ID	HUC12 NAME	TYPE	AGRICULTURE				MINING				POPULATION GROWTH				MEAN
			ECO	STR	SOC	RPI	ECO	STR	SOC	RPI	ECO	STR	SOC	RPI	RPIRANK
51100011301	Echo River-Green River	REFW	547	117	2	10	290	270	3	4	203	14	3	4	**3**
51001010509	Scott Creek-Licking River	REFW	17	194	5	1	9	833	4	8	7	105	4	3	**5**
51100010307	White Oak Creek-Green River	REFW	80	350	28	13	7	794	20	18	13	217	16	5	**17**
51301050303	Ashburn Creek-Obey River	REFW	477	80	57	61	1	1	34	1	1	39	41	1	**20**
50600021605	Carroll Run-Scioto River	REFW	837	233	53	192	29	5	31	2	17	491	31	10	**22**
51100011106	Conoloway Creek-Nolin River	REFW	153	79	85	34	26	13	69	5	38	13	74	6	**32**
51100010205	Wilson Creek-Robinson Creek	REFW	129	375	58	36	22	784	43	48	47	301	42	14	**40**
51100020207	Walnut Creek-Barren River	REFW	329	285	64	68	293	32	60	11	334	112	61	50	**42**
51302050703	Long Creek-Cumberland River	REFW	208	61	121	47	14	124	102	6	34	23	99	8	**45**
51301040701	Wolf Creek-Big South Fork Cumberland River	REFW	345	12	96	60	69	412	82	28	71	46	73	11	**45**
51002040503	Ross Creek-Kentucky River	REFW	87	67	96	26	157	377	88	41	123	41	91	19	**52**
51002040207	Upper Middle Fork Red River	REFW	76	67	68	12	163	514	55	39	179	454	57	55	**54**
51100020102	Trace Creek-Line Creek	REFW	308	513	71	98	318	165	54	20	368	315	56	79	**57**
51100010306	Lower Casey Creek-Green River	REFW	184	333	82	51	46	773	67	83	94	148	66	20	**62**
51002030103	Martins Creek-Goose Creek	REFW	503	149	46	69	335	668	27	76	240	682	29	81	**68**
51001010404	Leatherwood Creek-Beaver Creek	REFW	24	181	93	19	13	846	74	104	14	306	77	15	**71**
51301040505	Williams Creek-Big South Fork Cumberland River	REFW	5	14	200	28	36	379	153	47	35	8	162	16	**88**
51100020505	Lower Trammel Creek	PHW	351	390	116	124	449	173	100	62	423	168	97	100	**93**
60400051005	Bear Creek-Kentucky Lake	REFW	325	283	211	170	24	21	219	13	63	116	216	56	**93**
60102060403	Indian Creek	REFW	482	69	216	181	171	59	172	42	21	163	176	30	**96**
51100020905	Clifty Creek-Barren River	PHW	311	309	132	111	364	215	156	96	360	87	157	107	**112**
51002040501	Billey Fork	REFW	166	83	160	62	327	337	140	110	256	88	143	71	**114**

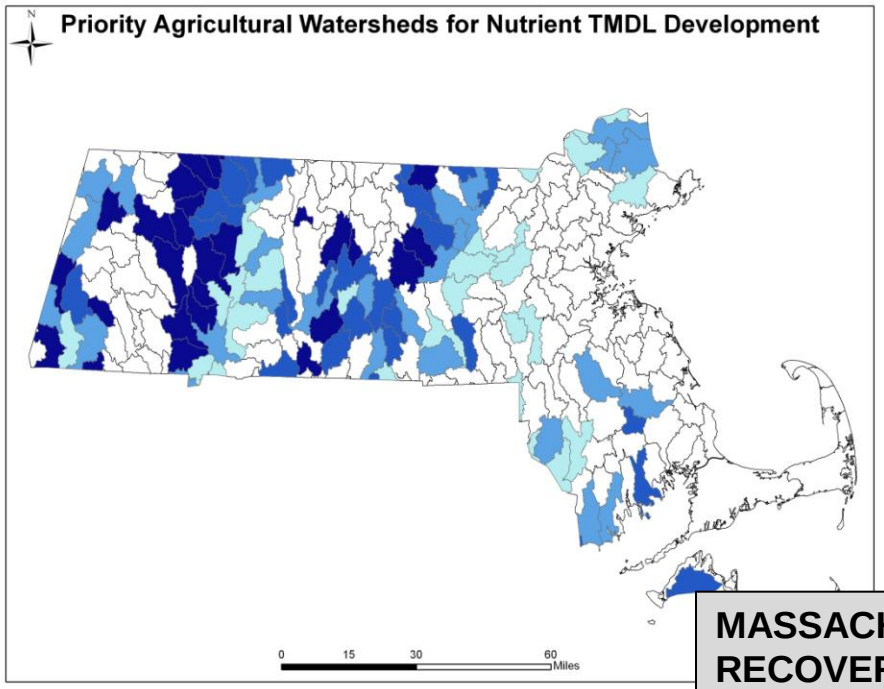
MINNESOTA

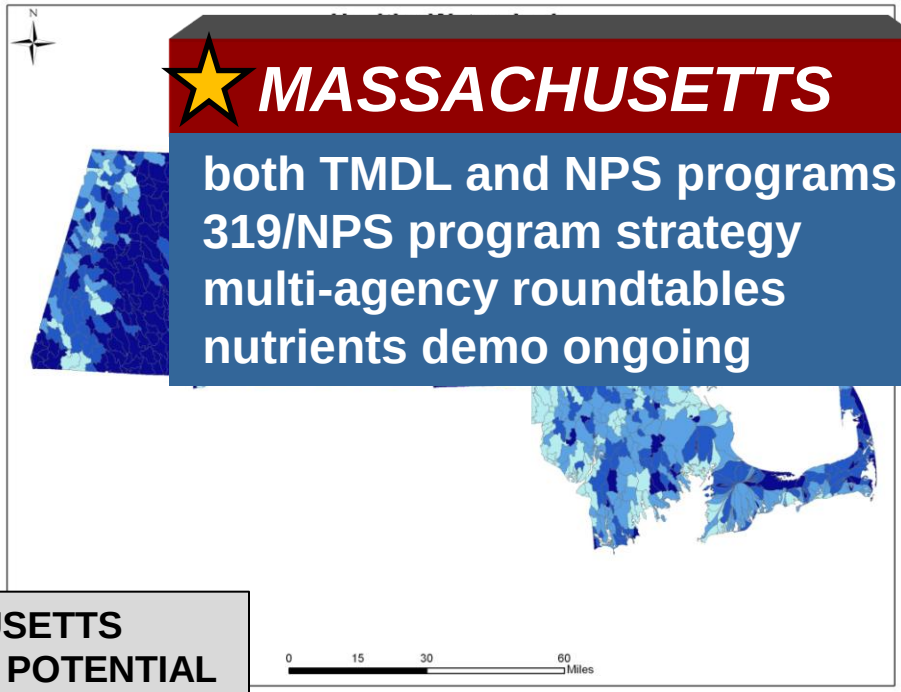
Social indicators focus
Partnering w/USDA
DNR fisheries usage
Seminars with CAN, ND





- *Evaluate restorability to inform dialogue on priority setting*
- *USDA, EPA, MPCA, MDNR involvement*

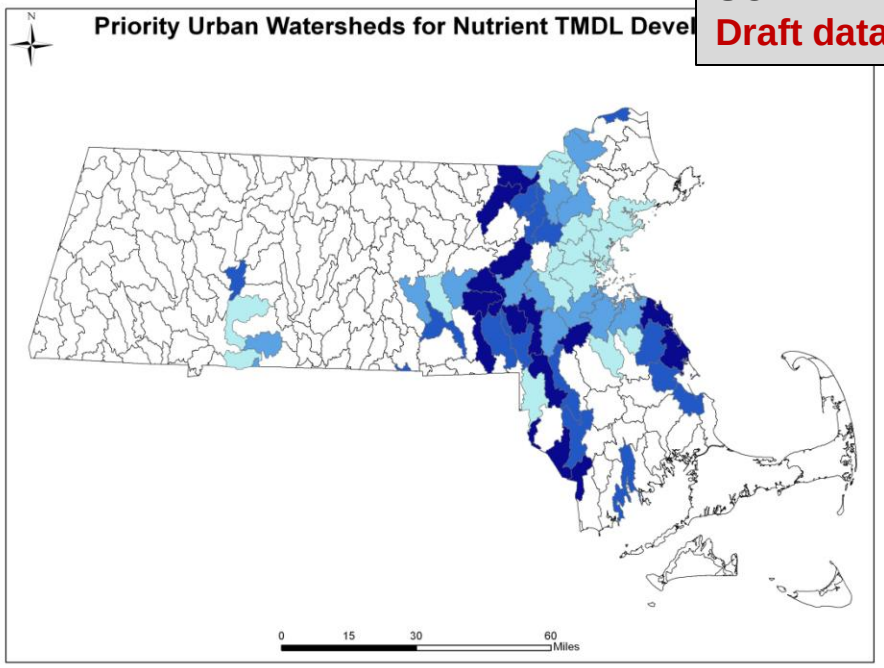


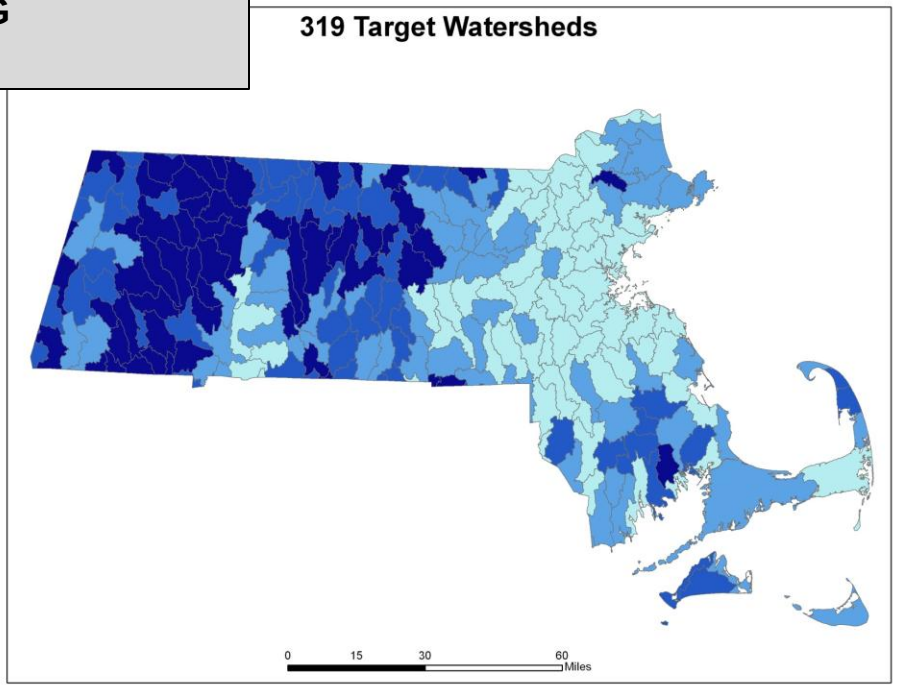


MASSACHUSETTS

both TMDL and NPS programs
319/NPS program strategy
multi-agency roundtables
nutrients demo ongoing

MASSACHUSETTS
RECOVERY POTENTIAL
SCREENING
Draft data





EPA/HQ's Recovery Potential Screening and EPA Region 4's Watershed Index: Teaming Up to Create

Watershed Index Online

- **TOOLS**: initially the RPS tool, others TBD
- **NATIONAL DATA**: HUC12 attributes library from WSI and others (300+ indicators)
- **PRE-COMPILED SCREENINGS**: examples showing the use of RPS on priority stressors
- **PROGRAMMATIC LINKS**: TMDL Vision Prio Support, HWI, 319 watershed prio, Measures

What to expect from

Recovery Potential Screening

- **Flexibility**
  - Adaptable to most prioritizing situations
  - User-controlled topics, indicators, weights
- **Speed**
  - Run numerous iterations in a few hours
- **Ease of Use**
  - Desktop excel tool
- **Transparency, repeatability**
- **Multi-format products**
  - Numeric indices
  - Maps, plots provide ‘discussion support’

Bottom line re. prioritizing

you **DO** have:

the need

the data

the tools

and the help....