

***Recovery Potential Screening:
Comparing Restorability
in New England Waters***

*Doug Norton, EPA Office of Water
Jane Peirce, Massachusetts DEP
Sandra Fancieullo, EPA Region 1 NPS Program*

*22nd Annual Nonpoint Source Conference
May 17-18, 2011 Saratoga, NY*



What is Recovery Potential Screening?

A method to help states and watershed restoration planners compare restorability

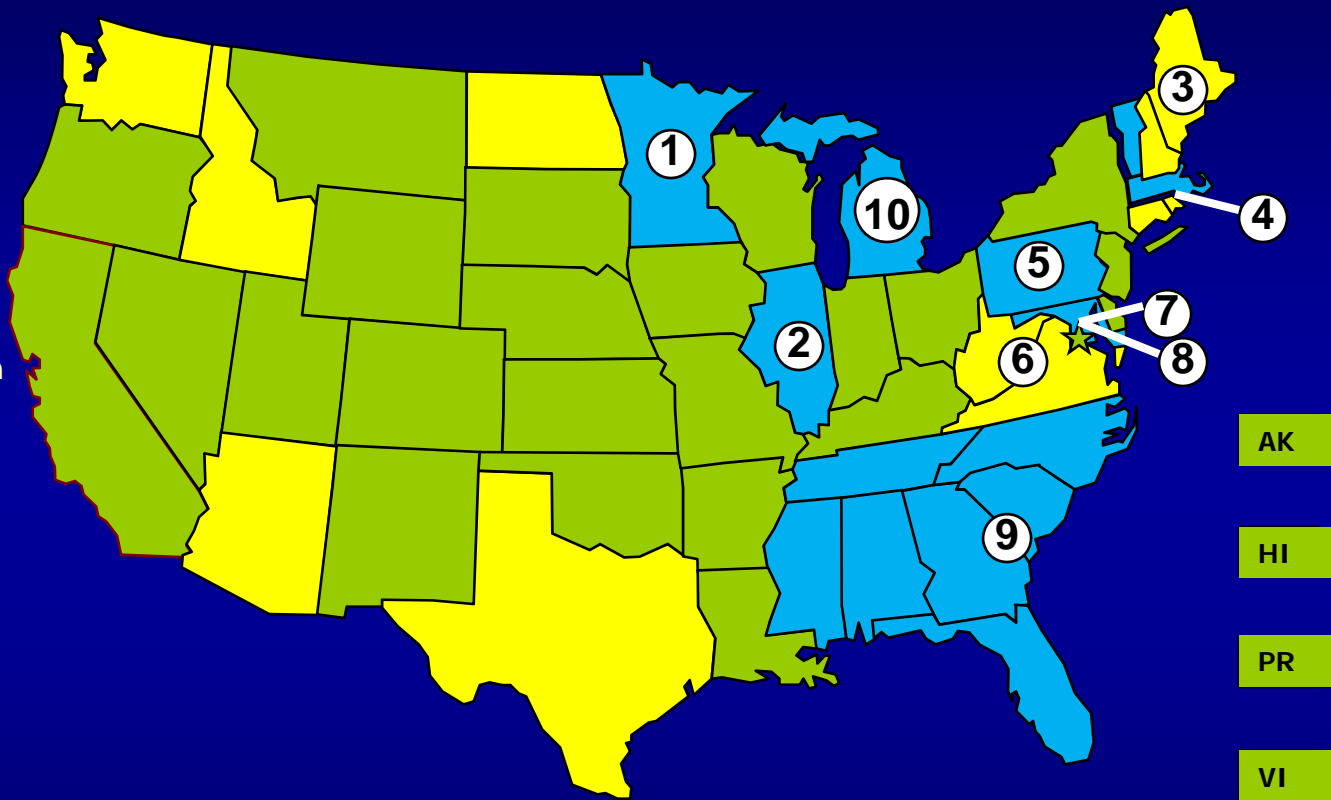
Recovery potential is the likelihood of an impaired water to reattain WQS or other desired condition, given its

- *ecological capacity,*
- *exposure to stressors, and*
- *the social context affecting efforts to improve its condition.*

(presented at 2010 Annual NPS Conference)

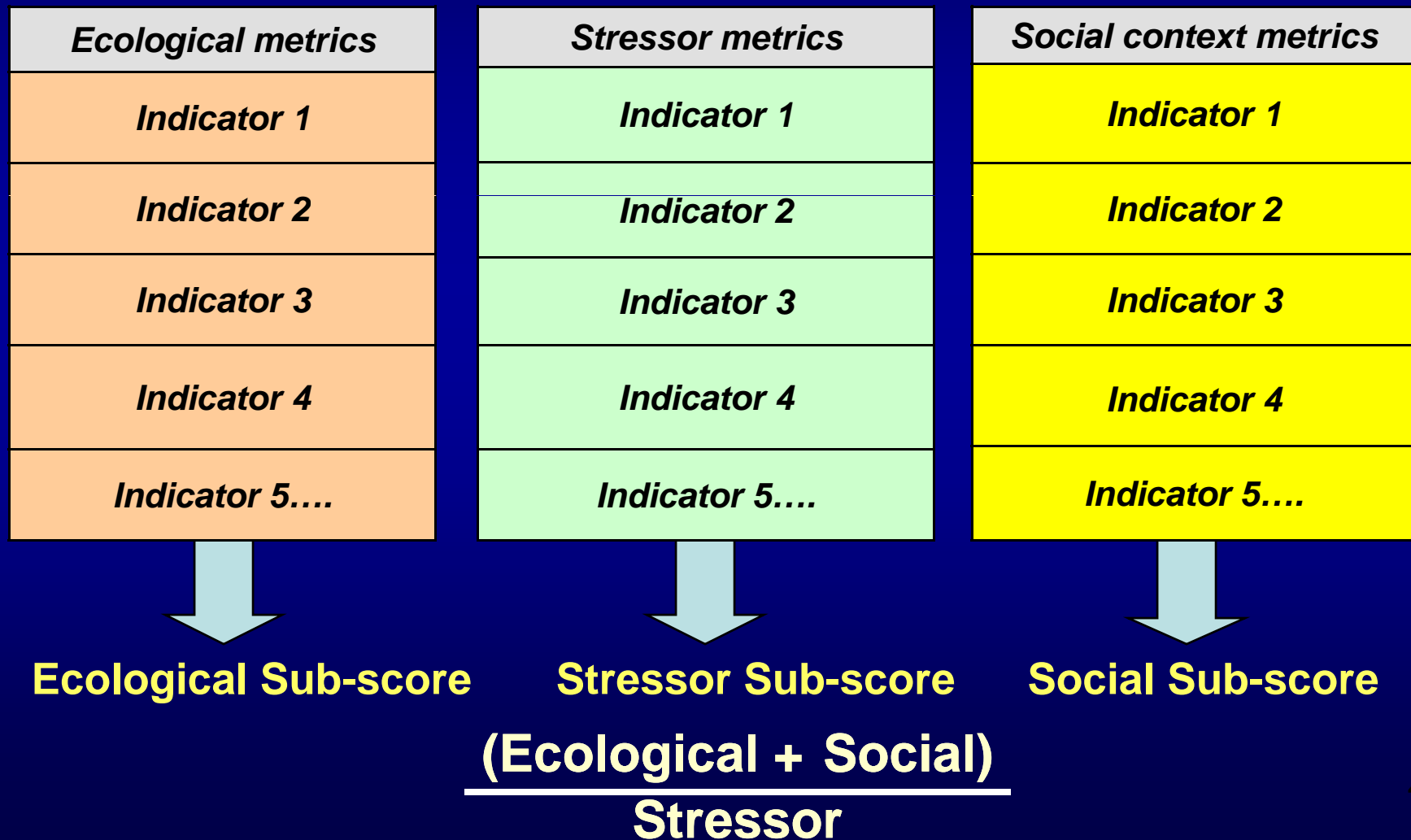
Recovery Potential Screening Projects: thru FY2011

1. Red River Basin Screening, MN (2010)
2. Statewide 303(d) list screening, IL (2005)
3. RPS training course, Reg 1 (2010)
4. Statewide watershed screening, MA , VT (2011)
5. Abandoned mines/303(d)/ fish screening, PA (2007)
6. Abandoned mines/303(d), WV/VA/MD (2007)
7. Statewide 303(d) list screening, MD (2009)
8. Priority watersheds sub-screening, MD (2009)
9. HUC12 watershed indexing, Reg 4 (2010)



- Recovery potential screening assessments (completed, active or scheduled)
- Considering recovery potential screening (technical design, assessment, or training)

Recovery Potential Screening - Basic Concept



Recovery Potential Screening Tools: Auto-Scoring Spreadsheet

spreadsheet [Compatibility ... M_ X

Home Insert Page Layout Formulas Data Review View

A1 In this sheet you will enter your raw baseline data and indicators data in the space

1 In this sheet you will enter your raw baseline data and indicators data in the space provided below.

2 Copy and paste each column of raw numerical data individually from your database file to the appropriate column below.

3 Pasting in numerical data should always use the following Excel commands: Edit / Paste Special / Values

4 Note that an R has been automatically added to each indicator name you assigned. This flags the data as Raw values.

Please, don't change the name of any indicators or baseline fields in this worksheet -- use the "Set Up Parameters" worksheet.

CALCULATE ←

HUC12	HUC12 Name	RWatershed Shape	RWatershed % Wetland	RWatershed % Forest	RCorridor % Woody Veg	RConfluence C
90201060101	Tamarac Lake	0.579	0.958121109	0.947047553	0.241	0.000
	Buffalo Lake	0.505	0.464629315	1	0.346	0.000
	Big Sugar Bush Lake-Buff	0.764	0.357102434	0.847413343	0.635	0.500
	Hotterchaud Lake-Buffalo	0.649	0.583474816	0.112523951	0.191	0.500
	Marshall Lake-County Ditch	0.531	0.425580079	0.280090577	0.294	0.000
	County Ditch No 15	1.000	0.507640068	0.136561575	0.164	0.000
	Weyer Lake-Buffalo River	0.573	0.465761177	0.093711897	0.163	1.000
	County Creek	0.768	0.203735144	0.212854903	0.157	0.000
	County Ditch	0.401	0.409734012	0.038495036	0.221	0.300
	County of Hay	0.863	0.48500283	0.120013935	0.369	0.300
	County of Glynn			0.034837136	0.606	0.400
				0.149625501	0.078	0.300
90101060301	Upper Deerhorn Creek				0.086	0.300
90101060302	Lower Deerhorn Creek				0.406	0.100
90101060401	Upper Whiskey Creek				0.081	0.000
90101060402	County Ditch No 54				0.124	
90101060403	Lower Whiskey Creek	0.482	263723826		0.152	
90101060501	Upper Stony Creek	0.601	428409734		0.100	
90101060502	Upper Hay Creek	0.870	433503113	0.2628461	0.132	
90101060503	Lower Hay Creek	0.721	456706282	0.0264762	0.350	
90101060504	Lower Stony Creek	0.510	072439162	0.0116704		
90101060601	Upper South Branch B	0.537	541595925	0.0404110	0.109	1.000
90101060602	Judicial Ditch No 3-1	0.360	549518959	0.0205533	0.097	0.000
90101060603	County Ditch No 13	0.478	451612903	0.0320501	0.059	0.000
90101060604	Middle South Branch B	0.474	098471986	0.0094060	0.213	1.000
90101060605	Lower South Branch B	0.809	18336163	0.0137606	0.225	0.000
90101060701	County Ditch No 2	0.563	566157329	0.039546	0.194	0.000
90101060702	County Ditch No 2	0.280	442752122	0.0499400	0.098	0.000

enter indicator names, weights

paste in raw data

auto-calculated

auto-calculated

auto-calculated

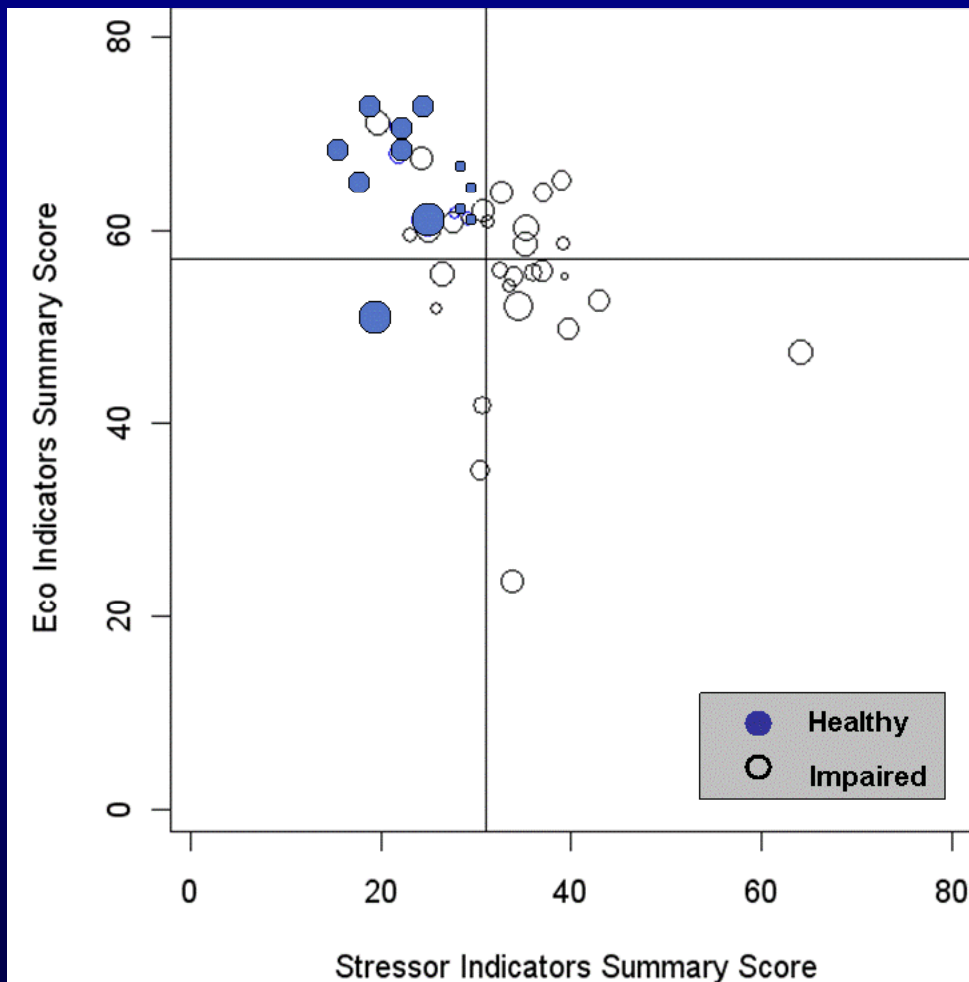
Set Up Parameters Indicator Data Entry Normalized Indicator Values Summary Scores Values Only Summary

Functions of a Recovery Potential Screening Method:

Informing plans and decisions

Bubble-Plotting

Rank-Ordering



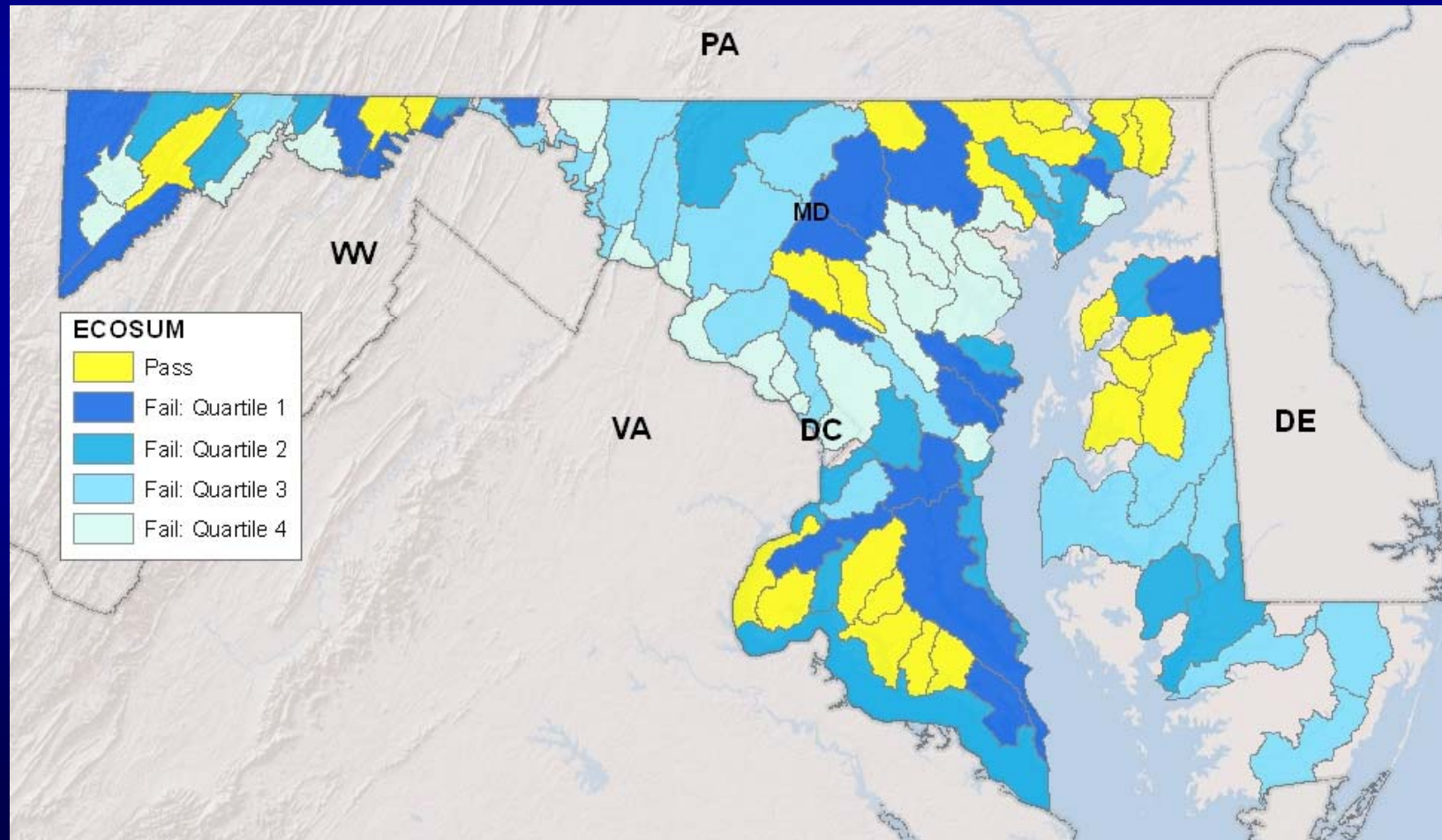
A	B	C	D	E	F
NAME	SUMFORMULA	RANK	ECOSUM	RANK	STRES
Broad Creek	7.28	1	61.45	11	19.
Deer Creek	5.86	2	67.09	2	20.
Furnace Bay	5.67	3	67.87	1	20.
Octoraro Creek	5.31	4	63.50	8	20.
Bush River	5.24	5	57.94	17	18.
Little Gunpowder	4.50	6	65.33	4	23.
Rocky Gorge Da	4.38	7	63.48	9	24.
Prettyboy Reser	4.02	8	66.20	3	25.
Brighton Dam	3.94	9	63.88	6	27.
Lower Winters R	3.44	10	58.99	15	32.
Cabin John Cree	3.39	11	40.20	26	21.
Northeast River	3.38	12	65.28	5	27.
S Branch Pataps	3.31	13	63.18	10	30.
Middle Patuxent	3.26	14	58.97	16	30.
Swan Creek	3.22	15	61.45	12	31.
Loch Raven Res	3.03	16	61.32	13	32.
Atkisson Reservo	2.93	17	60.48	14	34.
Liberty Reservoir	2.71	18	63.52	7	37.
Lower Gunpowd	2.64	19	48.27	22	32.
Rock Creek	2.51	20	55.21	19	37.
Bynum Run	2.38	21	50.59	20	39.
L Susquehanna F	1.96	22	57.11	18	41.
Jones Falls	1.87	23	47.97	23	39.
Patapsco River L	1.87	24	48.77	21	47.
Little Patuxent Ri	1.87	25	47.03	24	47.

Functions of a Recovery Potential Screening Method:

Communicating findings

Mapping

Which impaired restorations would most help meet healthy watershed goals?

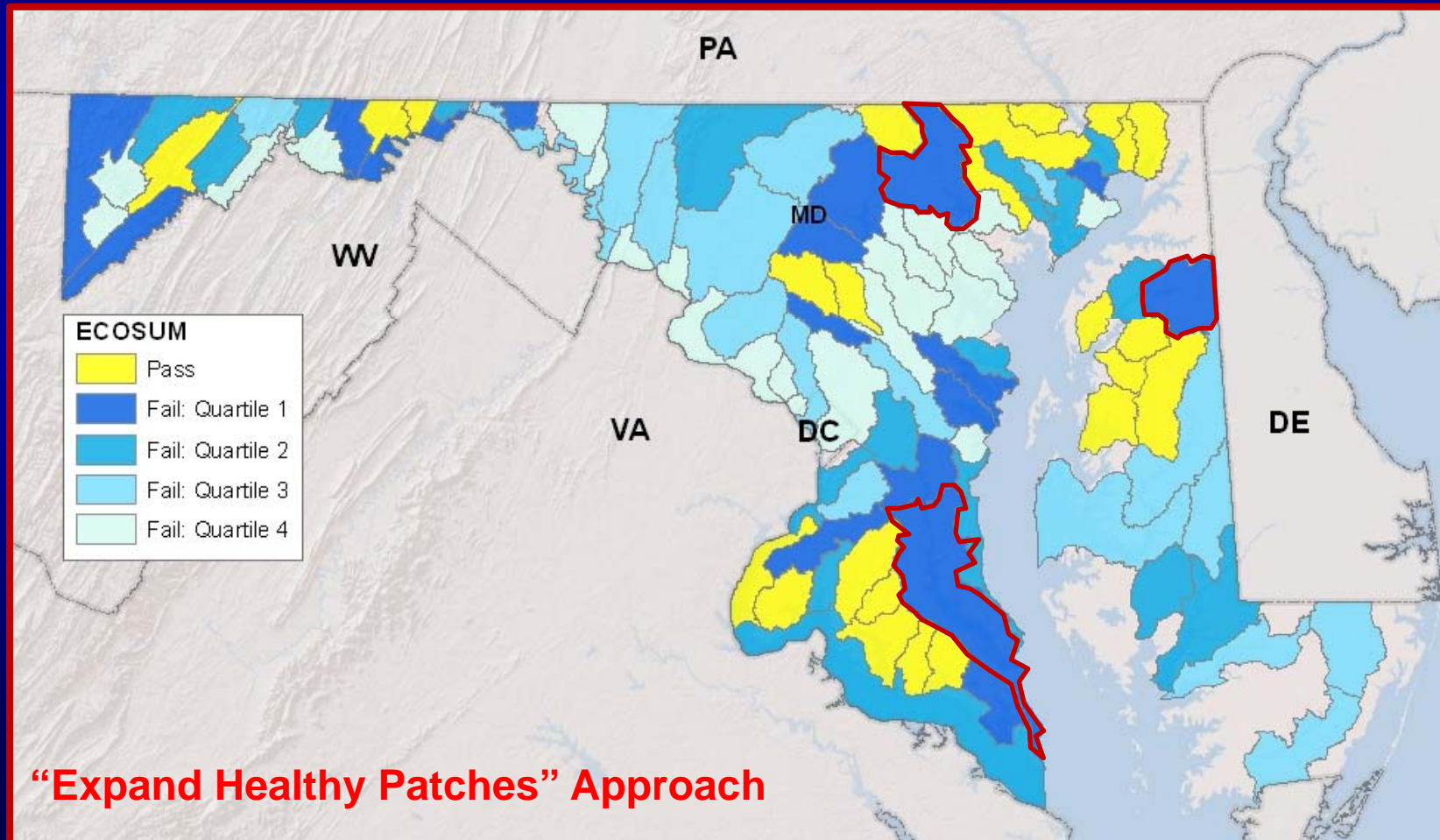


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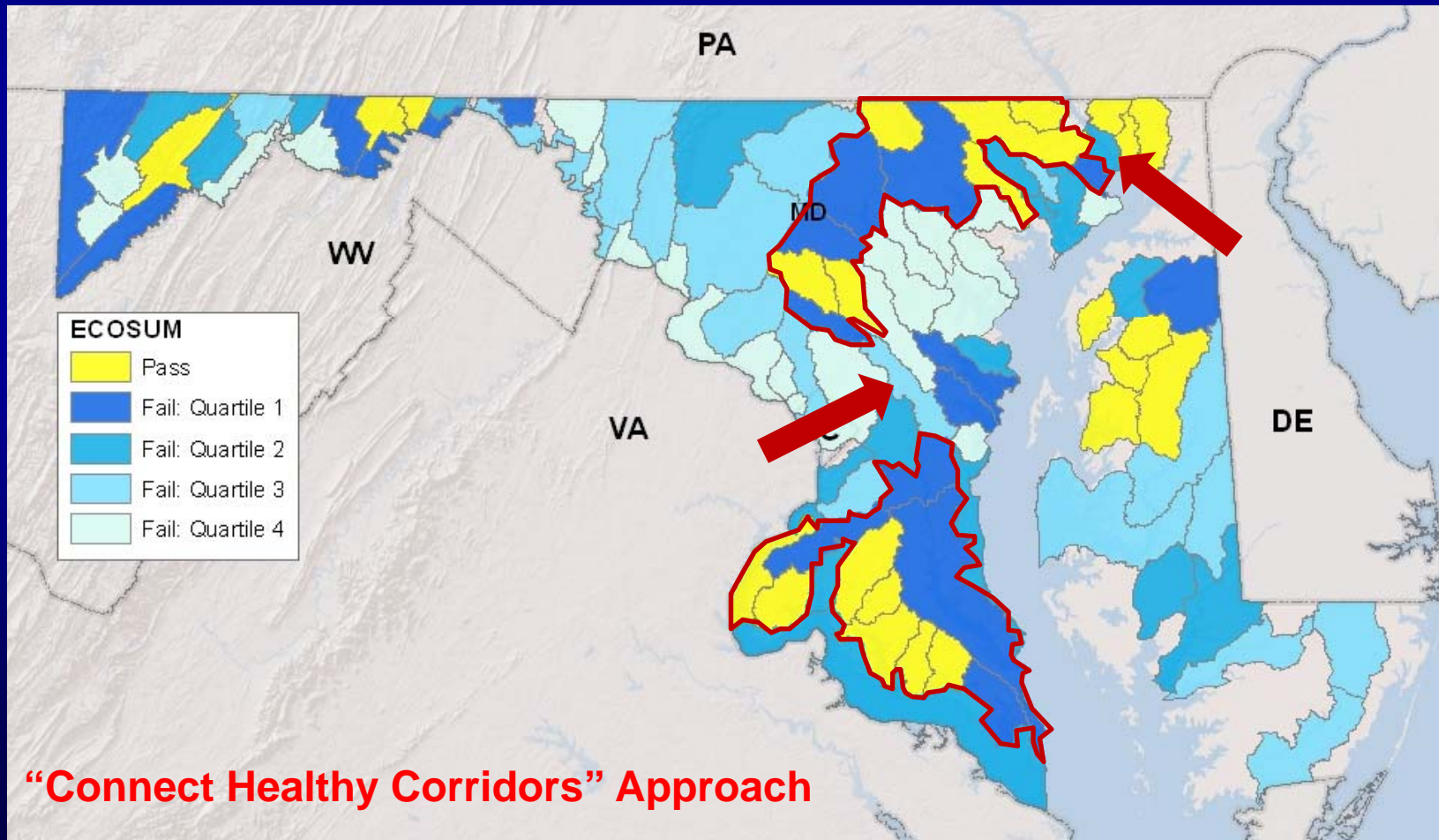


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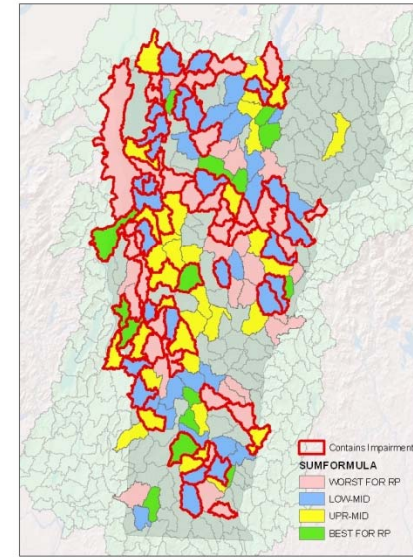


Applications of Recovery Potential Screening

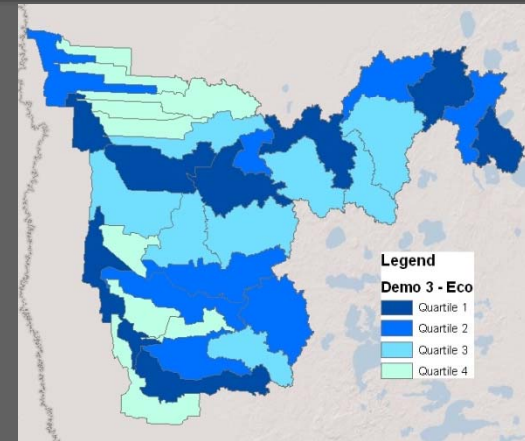
Highlights from current projects

Vermont

- *Unit: HUC12s and their subwatersheds*
- *Involvement: State TMDL/303(d) and River Management programs*
- *Purpose: evaluate restorability to inform priority setting*
- *Indicators: 36 candidates (15 eco, 11 stressor, 10 social)*
- *Unique features: applying river morphology and condition concepts to impaired waters restorability; helping modify statewide WQ planning process*

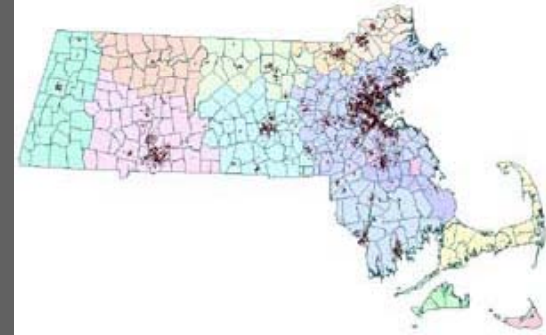


Minnesota



- *Unit: HUC12s in a priority river basin*
- *Involvement: 303(d), NRCS, and natural resources mgt agency programs*
- *Purpose: evaluate restorability to inform priority setting*
- *Indicators: 41 candidates (13 eco, 12 stressor, 16 social) currently focusing on 6, 4, and 7 metrics*
- *Unique features: exploring screening of unlisted waters; exploring collaboration with NRCS watershed planning*

Massachusetts



- *Unit: HUC12 and smaller subwatershed screening*
- *Involvement: 319, 303(d), CZM, and natural resources mgt agency programs*
- *Purpose: compare restorability in different ways for each participating program and factor into priority setting*
- *Indicators: 46 candidates (22 eco, 16 stressor, 10 social)*
- *Unique features: exceptional data on departure from natural flow regime and related impacts; sustainability theme*

Massachusetts Recovery Potential Screening

Example Indicators

<i>Ecological metrics</i>	<i>Stressor metrics</i>	<i>Social context metrics</i>
% forest and % wetlands per corridor, watershed	Hydrologic alteration and barriers	Protected landownership % by watershed
Biotic community integrity	% impervious cover per corridor, watershed	Existing TMDLs & watershed plans
Aquatic connectivity, recolonization access	% cropland and pasture per corridor, watershed	Complexity: watershed ownership, jurisdictions
Flow dynamics	Land cover change trajectory	Applicable regulatory tools
Areas of critical environmental concern (ACECs)	# of 303(d) impairment causes	Incentives: funding eligibility, recreation, recognition

**MASSACHUSETTS
RECOVERY POTENTIAL
SCREENING**

**Draft data,
for concept demo only**

RANK-ORDERED WATERSHEDS (4 OPTIONS)

File Home Insert Formulas Data Review View

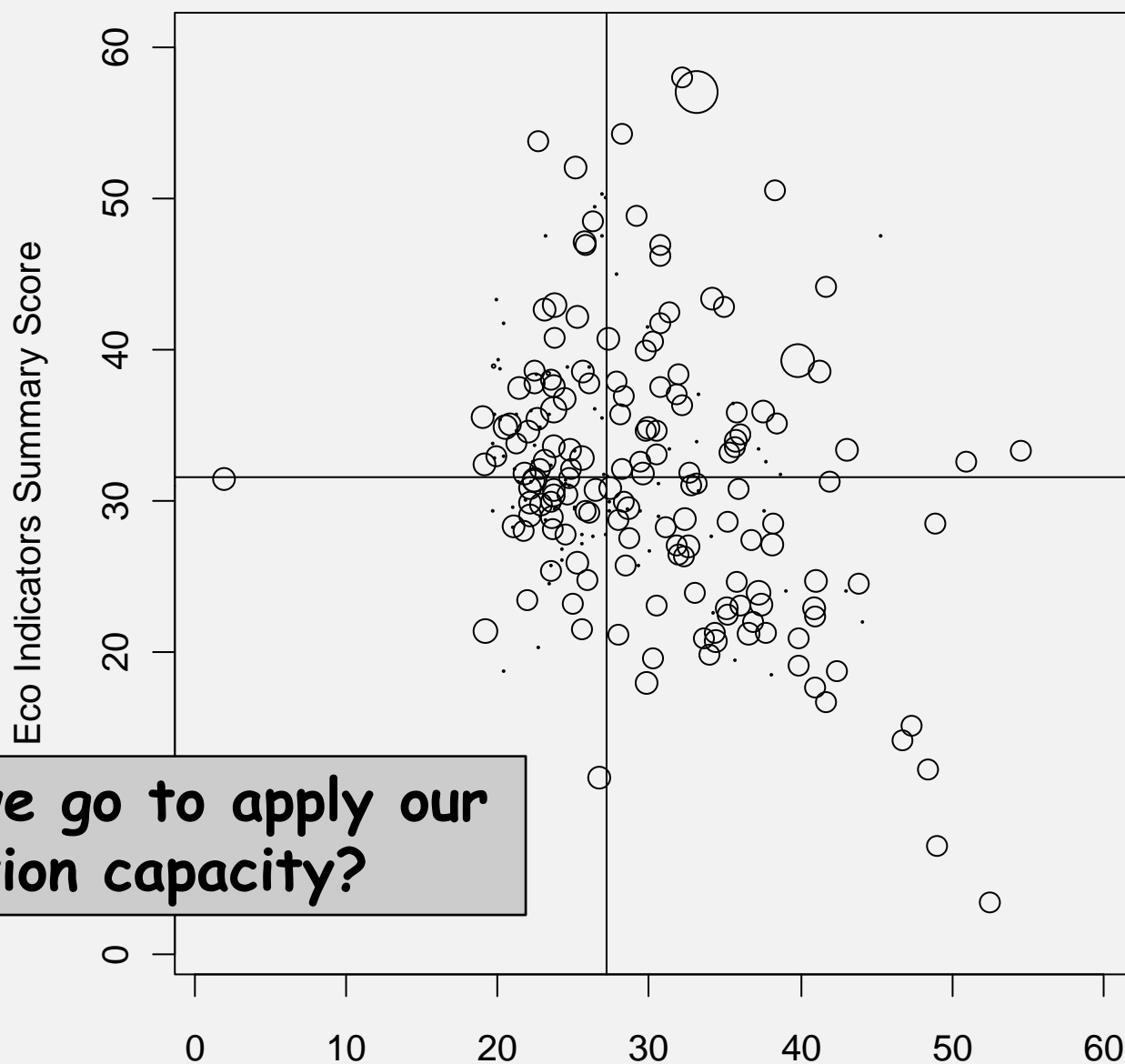
fx HUC12ID

	A	B	C	D	E	F	G	H	I	J
1	HUC12ID	NAME	SUMFORMULA	SUMRANK	ECOSUMSCORE	ECORANK	STRESSUMSCORE	STRESSORRANK	SOCIOSUMSCORE	SOCIORANK
2	010802040205	Ware River-Barre F	35.31	1	31.52	125	1.89	1	35.11	43
3	011000050203	Hubbard Brook	3.84	2	53.72	4	22.77	53	33.74	119
4	010900020206	Sagamore groundw	3.74	3	57.00	2	33.20	180	67.22	1
5	010802040102	East Branch Swift F	3.74	4	35.62	73	19.07	2	35.70	28
6	010802070204	West Branch Farmi	3.63	5	34.80	80	20.53	22	39.63	4
7	010802060101	Westfield River-hea	3.56	6	32.44	112	19.19	5	35.89	26
8	010700040205	Nashua River-Cata	3.44	7	52.07	5	25.20	97	34.74	59
9	010900020203	Chequesset ground	3.43	8	42.96	23	23.82	78	38.84	7
10	010802060103	Dead Branch Westl	3.39	9	35.13	77	20.78	23	35.25	39
11	010802040202	East Branch Ware F	3.38	10	37.46	56	21.45	31	35.07	46
12	010802060202	West Branch Westl	3.37	11	32.93	104	20.01	14	34.56	67
13	010802060201	West Branch Westl	3.35	12	42.69	25	23.13	58	34.76	58
14	010900020301	Sippican River	3.25	13	38.56	45	22.49	46	34.51	68
15	011000050105	Housatonic River-V	3.23	14	47.17	15	25.76	106	36.05	25
16	010802070206	Millers River-Orcut	3.23	15	34.64	82	22.00	37	36.42	20
17	010802070201	Otis Reservoir	3.23	16	36.07	64	23.75	76	40.55	3
18	011000050204	Housatonic mainst	3.21	17	37.73	53	22.52	47	34.65	61
19	010802020203	Tully River	3.21	18	33.73	90	21.29	29	34.61	64
20	010802040206	Muddy Brook	3.18	19	35.42	75	22.67	51	36.58	19
21	010700061201	Salmon Brook	3.14	20	40.75	32	23.87	80	34.11	94
22	010700040302	Squannacook River	3.13	21	48.42	11	26.31	113	33.82	113
23	010700040402	Nashua mainstem-	3.12	22	46.83	17	25.84	107	33.80	115
24	010802040104	Quabbin Reservoir-	3.12	23	21.35	222	19.32	6	38.90	6
25	010802030201	Deerfield River-She	3.12	24	31.33	128	22.52	48	38.92	5
26	010900010102	Parker River-Jackm	3.11	25	54.26	3	28.29	135	33.62	129
27	010802020101	Whitney Pond	3.08	26	37.56	54	23.66	72	35.34	38
28	010802010601	Sawmill River	3.06	27	31.84	119	21.81	34	34.87	53
29	011000050107	Housatonic River-H	3.05	28	42.20	27	25.31	99	35.05	48
30	010900040802	Assonet River	3.04	29	37.95	50	23.58	68	33.80	114
31	010802040106	Swift River, includir	3.03	30	28.35	174	21.04	25	35.43	34
32	010802040101	Middle Branch Swif	3.00	31	33.65	91	23.67	73	37.29	10

MASSACHUSETTS RECOVERY POTENTIAL SCREENING

FIRST DEMO PLOT

- 247 HUC12s
- 9 INDICATORS (3 each in eco, stressor, social)
- unweighted indicators
- for concept demo only



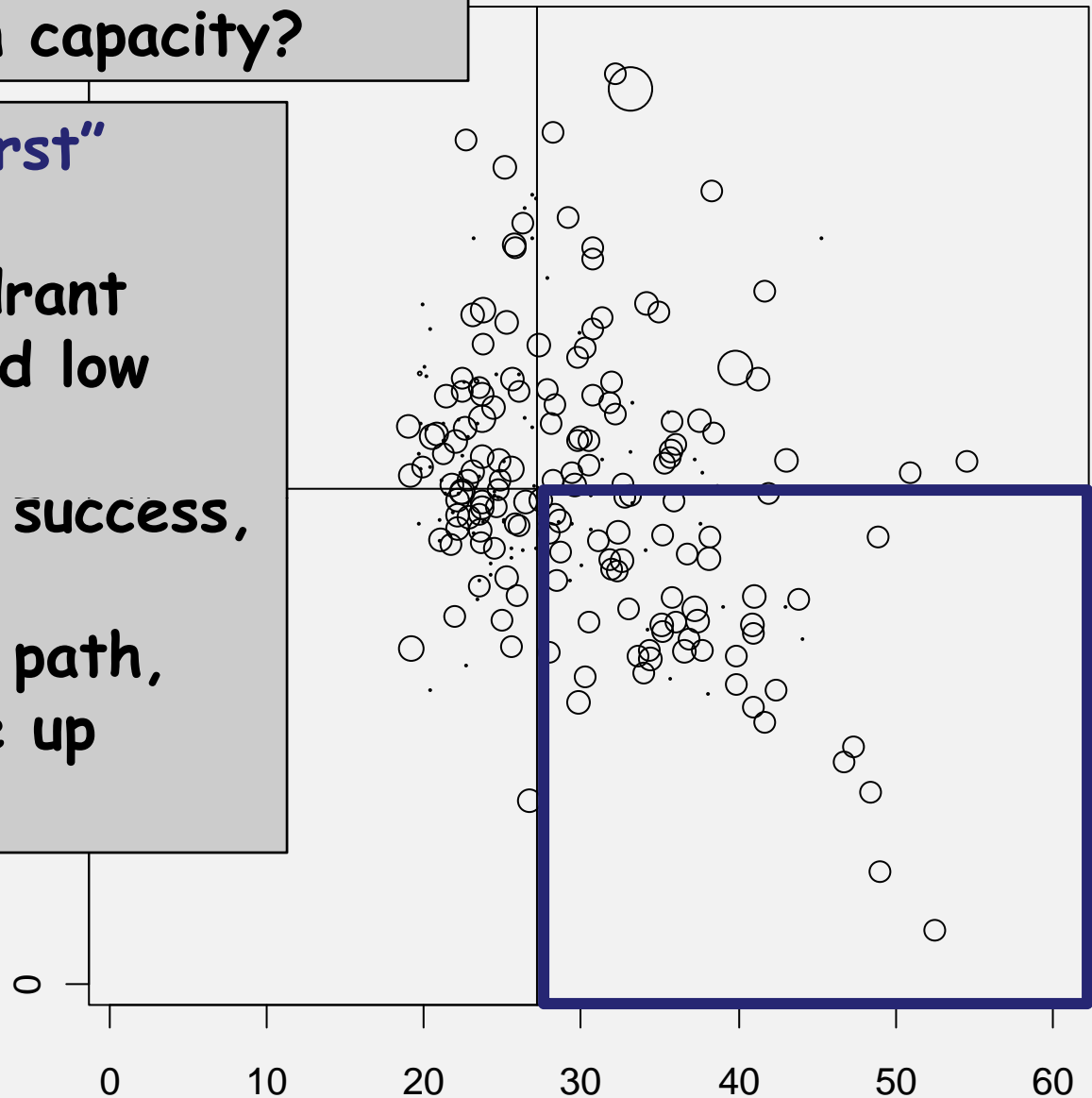
Where should we go to apply our limited restoration capacity?

Stressor Indicators Summary Score
Circle size increases with Social Context summary score value

Where should we go to apply our limited restoration capacity?

Option: "Worst-first" perspective

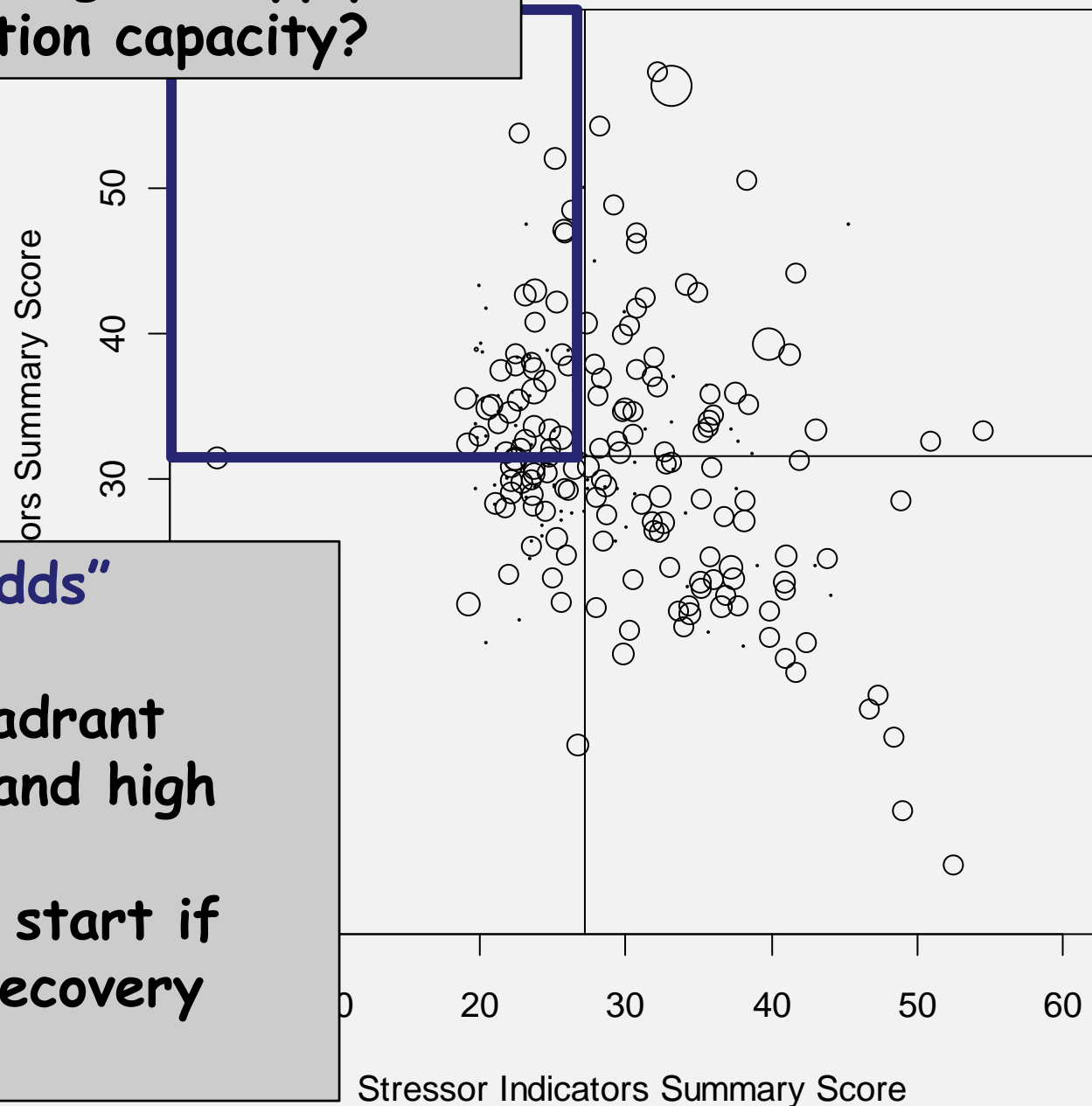
- Lower right quadrant
- High stressor and low eco scores
- Generally lowest success, highest expense
- If you take this path, know what you are up against



Stressor Indicators Summary Score

Circle size increases with Social Context summary score value

Where should we go to apply our limited restoration capacity?



Option: "Best odds" perspective

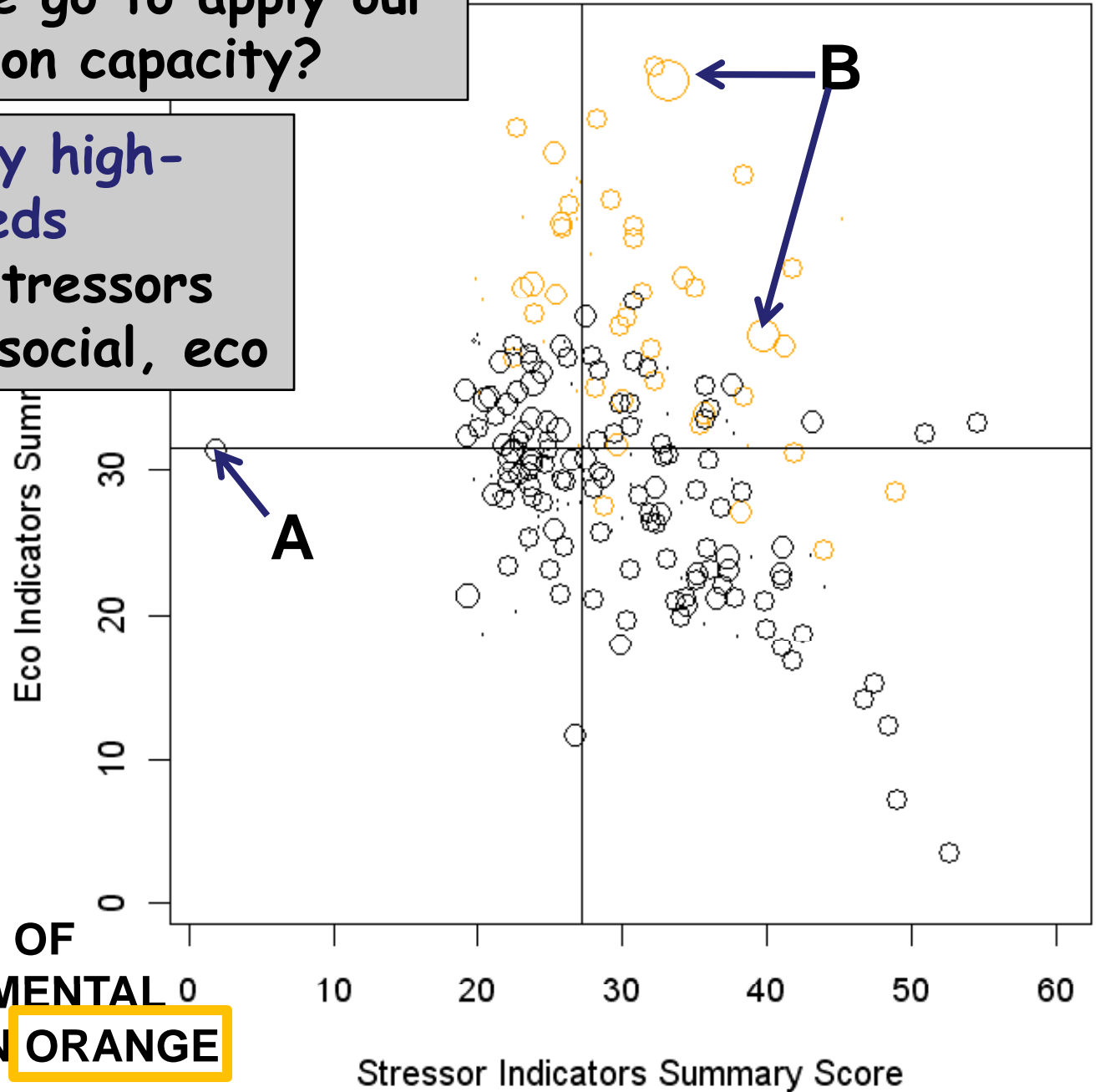
- Upper left quadrant
- Low stressor and high eco scores
- Good place to start if optimizing for recovery

Stressor Indicators Summary Score
Circle size increases with Social Context summary score value

Where should we go to apply our limited restoration capacity?

Option: Unusually high-scoring watersheds

- A: really low stressors
- B: really high social, eco



HUC12 WITH AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACEC) IN **ORANGE**

Circle size increases with Social Context summary score value

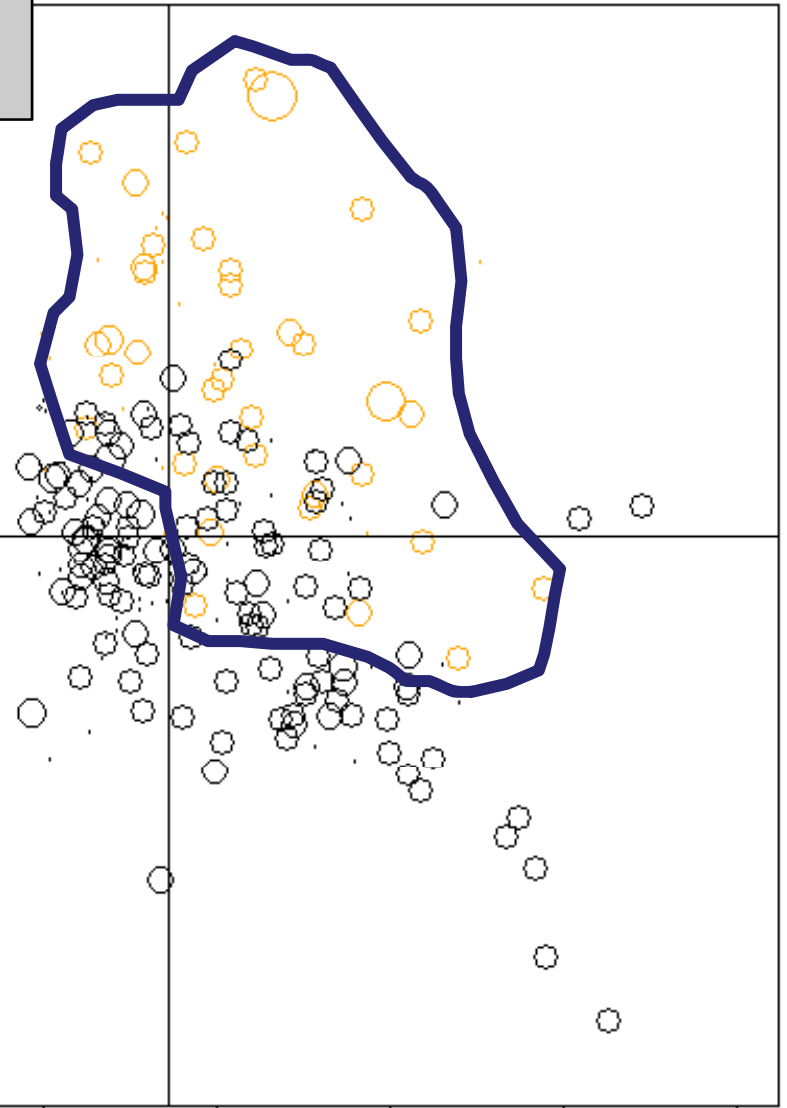
Where should we go to apply our limited restoration capacity?

Option: 54 watersheds with ACECs

- Good eco scores
- mostly good social context
- about 20% of HUC12s

Eco Indicators

20
10
0



HUC12 WITH AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACEC) IN **ORANGE**

Stressor Indicators Summary Score

Circle size increases with Social Context summary score value

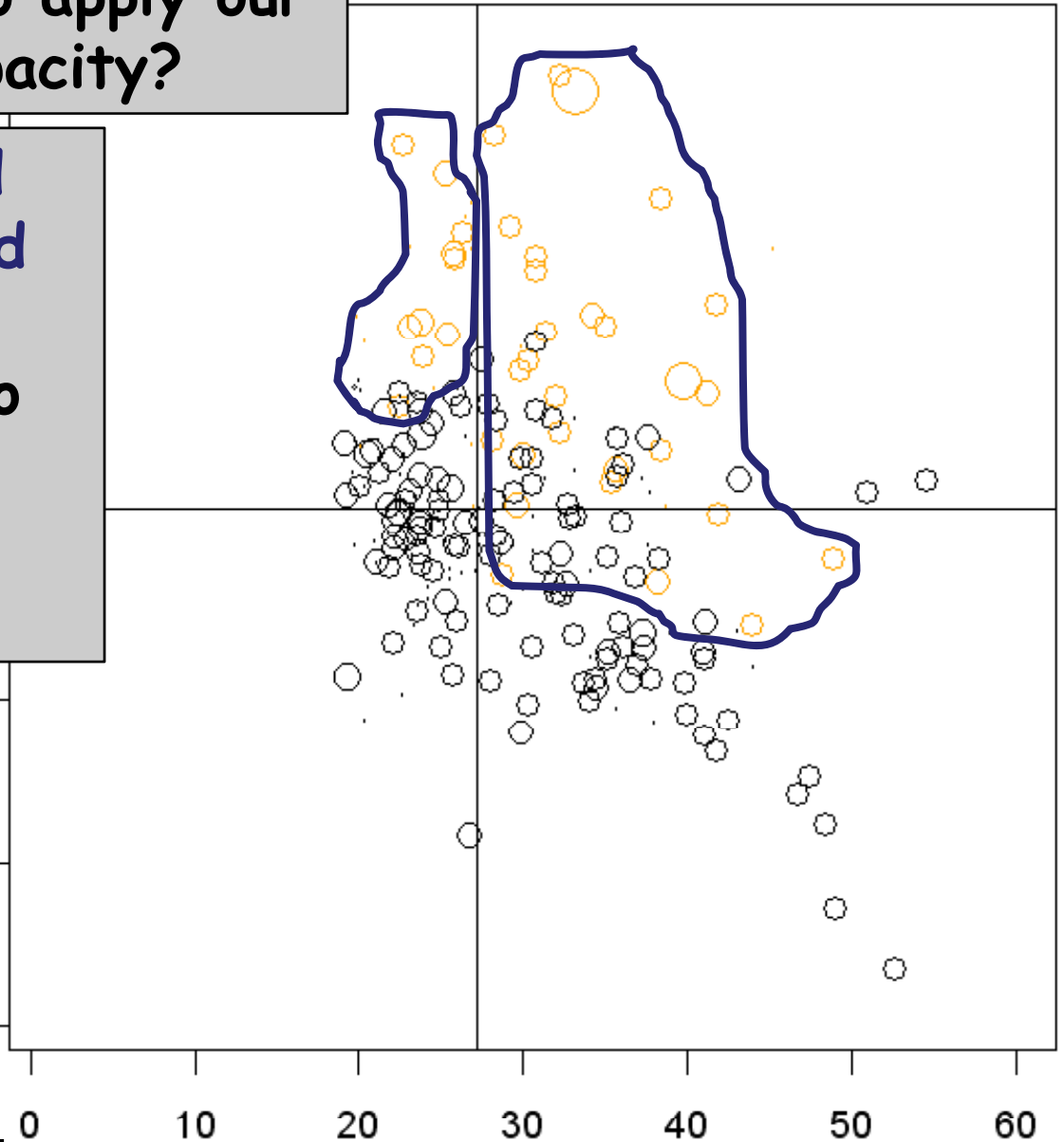
Where should we go to apply our limited restoration capacity?

Option: more-stressed (right) vs less-stressed (left) ACECs

- less may be easier to fix
- more may be under greater threat

Eco Indi

20
10
0



HUC12 WITH AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACEC) IN **ORANGE**

Stressor Indicators Summary Score

Circle size increases with Social Context summary score value

Recovery Potential

Contact Us

Recovery Potential Home

Overview

Screening Method

Tools and Resources

Literature Database

Indicators

Scoring Guidance

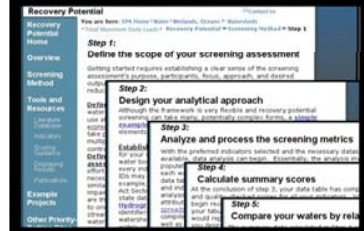
Displaying Results

Publications

Example Projects

You are here: [EPA Home](#) » [Water](#) » [Wetlands, Oceans & Watersheds](#) » [Total Maximum Daily Loads](#) » [Recovery Potential](#)

Step-by-Step Instructions



Recovery Potential
You are here: EPA Home » Water » Wetlands, Oceans & Watersheds » Total Maximum Daily Loads » Recovery Potential » Screening Method » Step 1

Step 1: Define the scope of your screening assessment
Getting started requires establishing a clear sense of the screening assessment's purpose, participants, tools, approach, and desired results.

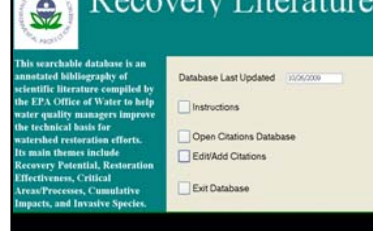
Step 2: Design your analytical approach
Although the framework is very flexible and recovery potential screening can take many different approaches, there are several key elements to consider when designing your approach.

Step 3: Analyze and process the screening metrics
All the information of Step 3, your data table has completed and you are ready to calculate summary scores.

Step 4: Calculate summary scores
All the information of Step 3, your data table has completed and you are ready to calculate summary scores.

Step 5: Compare your waters by results

Recovery Literature



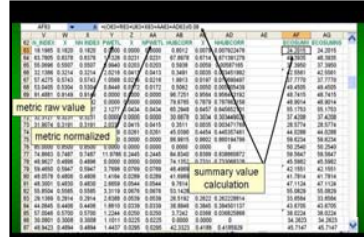
This searchable database is an annotated bibliography of scientific literature compiled by the EPA Office of Water to help water quality managers improve the technical basis for watershed restoration efforts. Its main themes include: Recovery Potential, Restoration Effectiveness, Critical Areas/Processes, Cumulative Impacts, and Invasive Species.

Database Last Updated: 10/26/2009

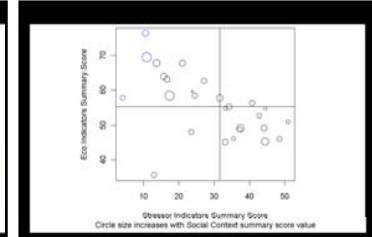
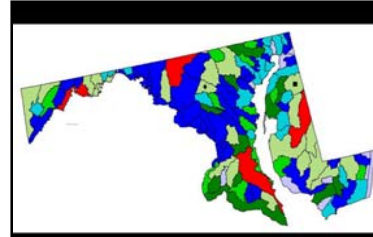
Instructions
 Open Citations Database
 Edit/Add Citations
 Exit Database

Recovery Potential Indicators

Ecological Capacity Metrics	Stressor Exposure Metrics	Social Context Metrics
ecological character	erosion species risk	watershed % protected land
recreation access	channelization	agricultural regulation
streamer stream order	hydrologic alteration	funding eligibility
sea level presence	aquatic barriers	2002 wetlands priority
historical species occurrence	connector road crossings	estimated restoration cost
species range factor	connector road density	severity of coastal threats
erosion	connector % timber	TMDL or other plan existence
connector % forest	connector % agriculture	urbanity proximity
connector % woody vegetation	connector % urban	severity of restoration practice
connector slope	connector % impervious surface	watershed organizational leadership
bank stability/beds	watershed % U index	watershed collaboration
bank stability/woody vegetation	watershed road density	large watershed management potential
watershed stream	watershed % agriculture	government agency involvement
watershed size	watershed % the drained landscape	local socio-economic conditions
watershed % forest	watershed % urban	watershed complexity
proximity to green infrastructure hub	watershed % impervious surface	watershed % forest
continging stream infrastructure	severity of 2002 listed causes	severity of loading
esthetic community integrity	severity of loading	human health and safety
soil resilience properties	coal and use change trajectory	restoration resource



Auto-scoring Spreadsheet



Recovery Potential Screening

Tools for Priority-Setting in Impaired Waters Restoration

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 site 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.

Draft Web Site:

http://hudson.tetrattech-ffx.com/RECOVERY_POTENTIAL/home.html