Recovery Potential Screening:

Comparing Restorability in New England Waters

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What is Recovery Potential Screening?

A method to help states and watershed restoration planners compare restorability

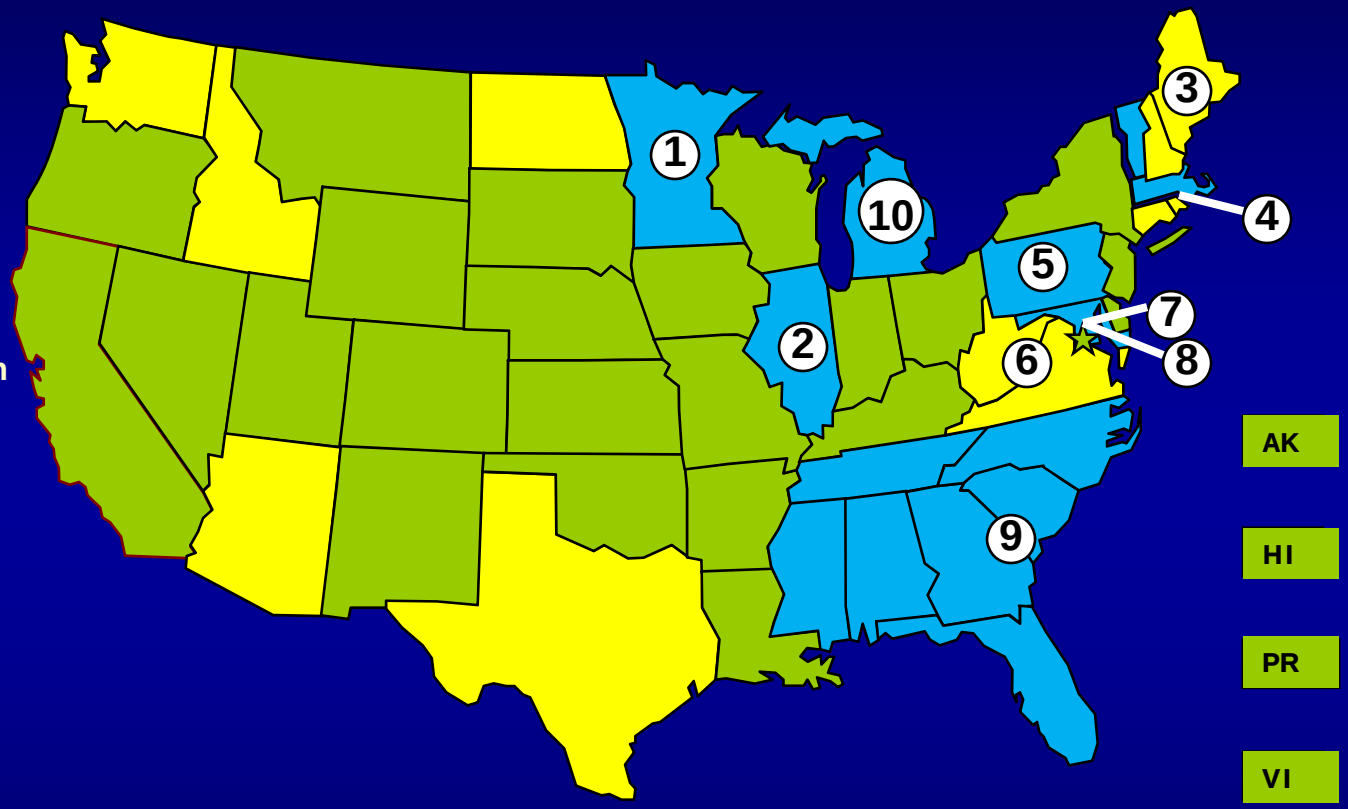
Recovery potential *is the likelihood of an impaired water to reattain WQS or other desired condition, given its*

- ***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)

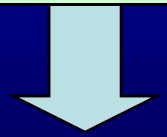


Recovery potential screening assessments (completed, active or scheduled)

Considering recovery potential screening (technical design, assessment, or training)

Recovery Potential Screening - Basic Concept

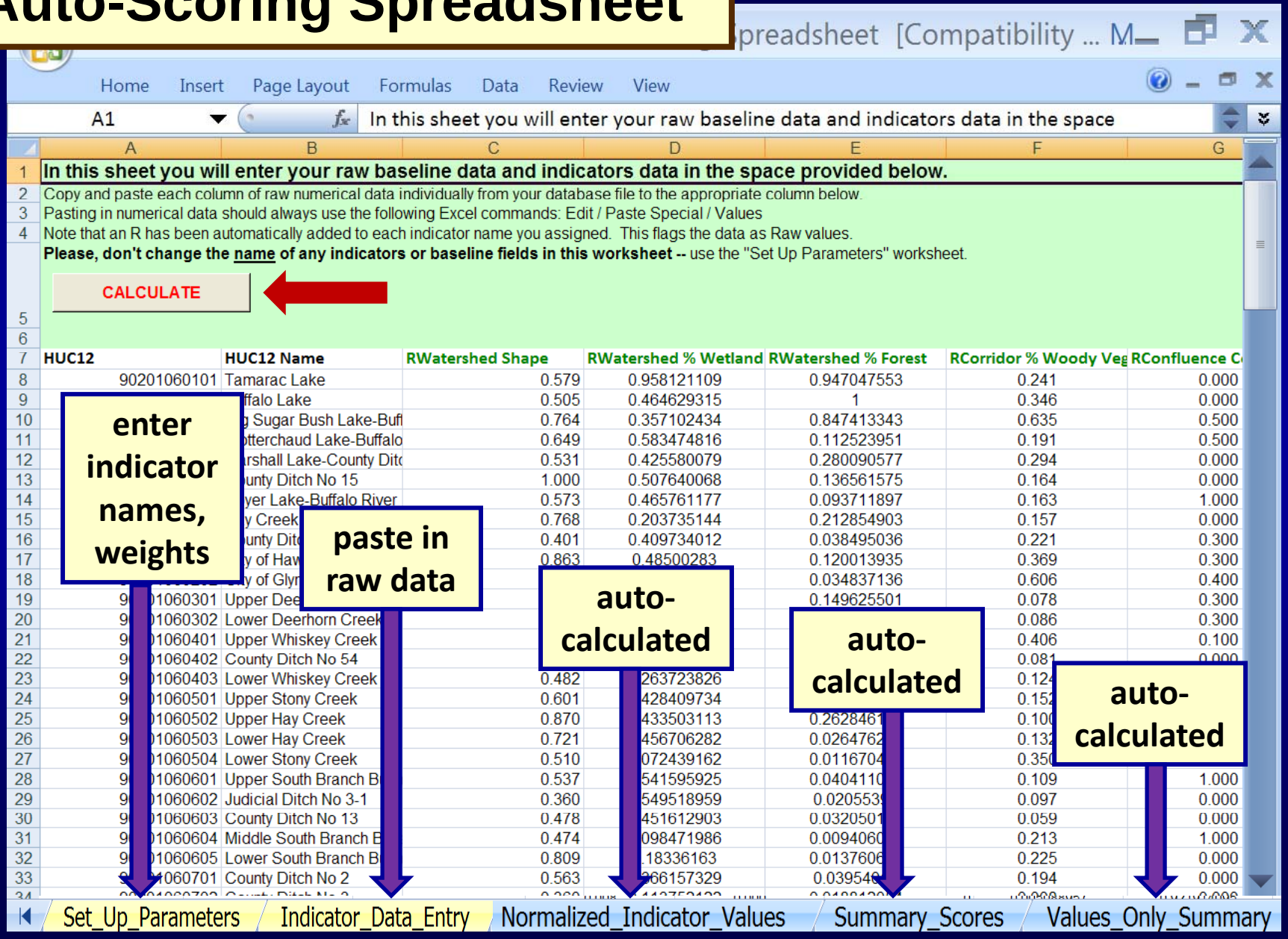
Ecological metrics	Stressor metrics	Social context metrics
Indicator 1	Indicator 1	Indicator 1
Indicator 2	Indicator 2	Indicator 2
Indicator 3	Indicator 3	Indicator 3
Indicator 4	Indicator 4	Indicator 4
Indicator 5….	Indicator 5….	Indicator 5….



Ecological Sub-score **Stressor Sub-score** **Social Sub-score**

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

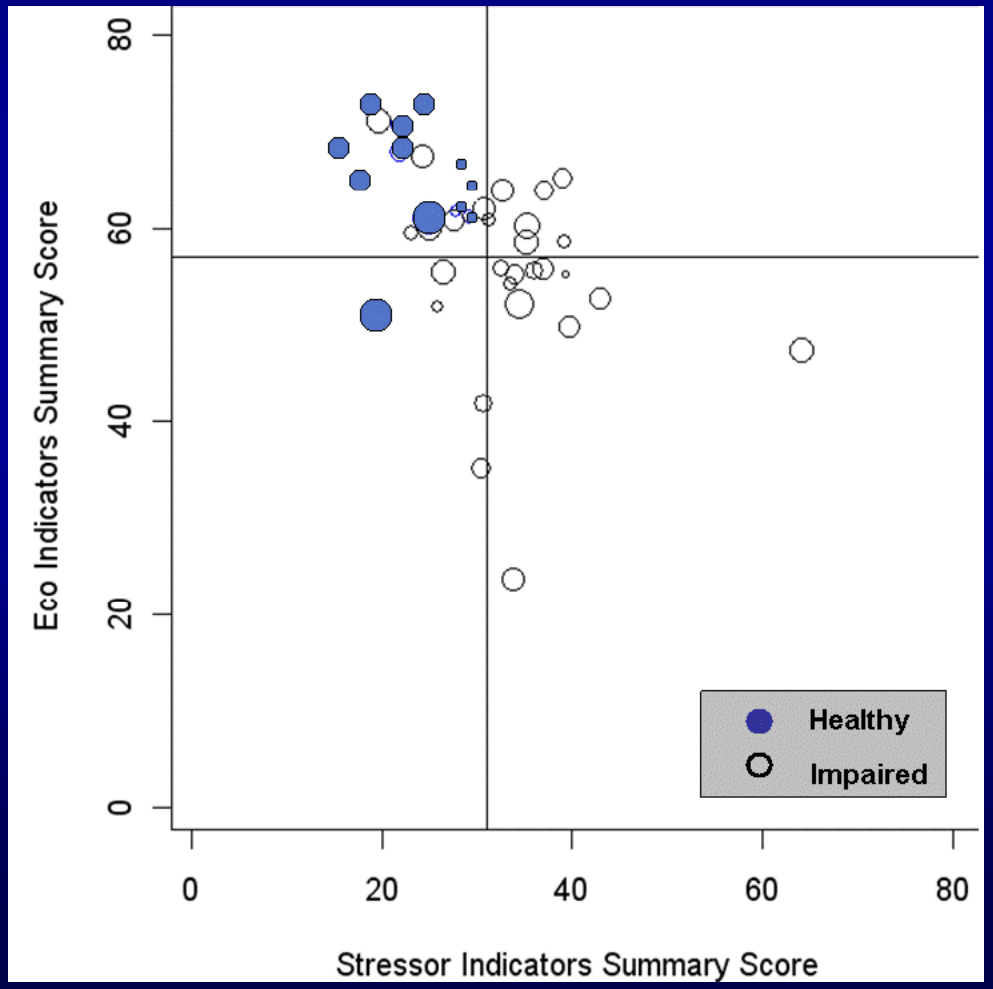
Recovery Potential Screening Tools:
Auto-Scoring Spreadsheet



Functions of a Recovery Potential Screening Method:

Informing plans and decisions

Bubble-Plotting



Rank-Ordering

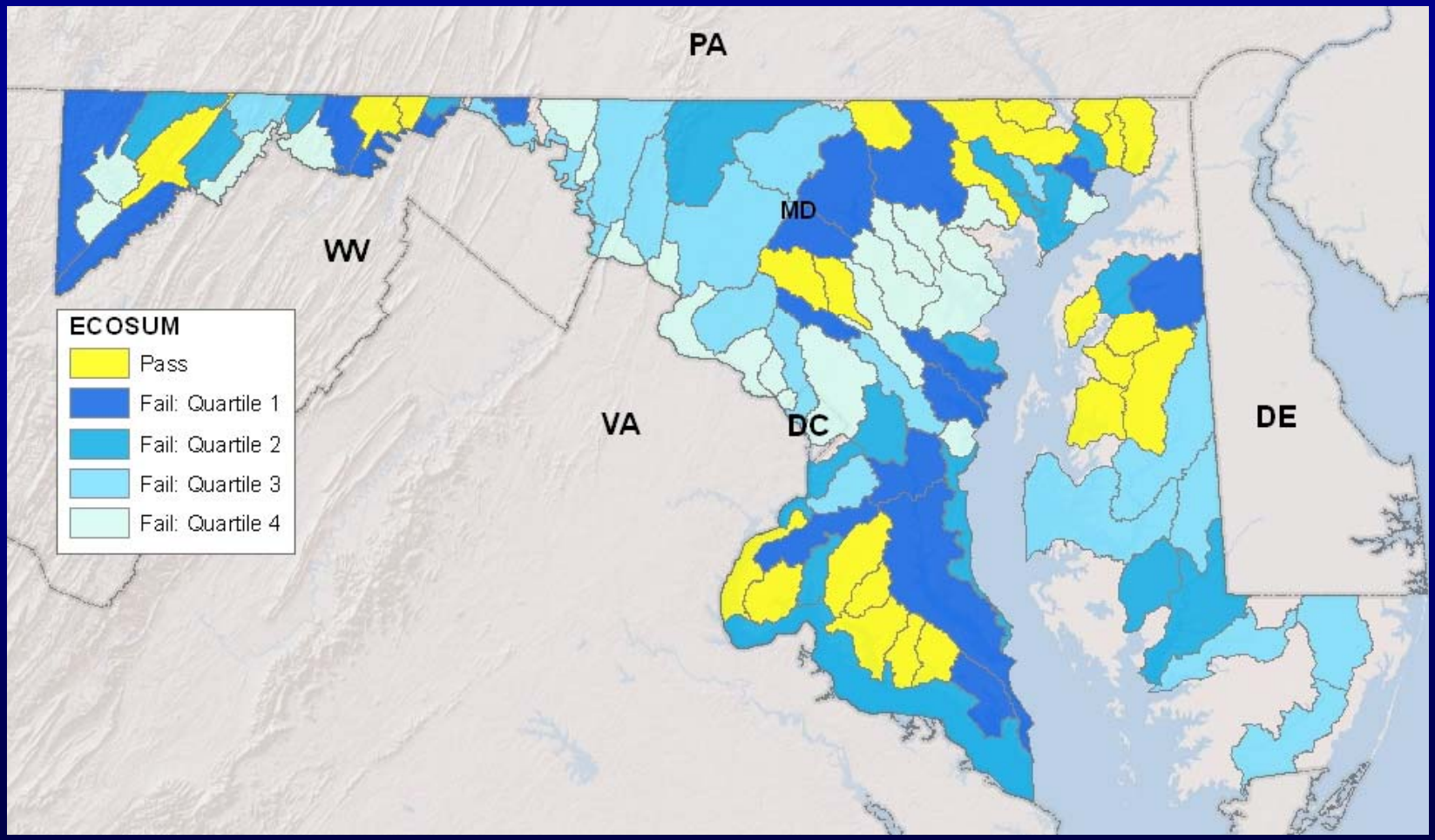
A	B	C	D	E	F
NAME	SUMFORMULA	RANK	ECOSUM	RANK	STRES
Broad Creek	7.28	1	61.45	11	19.
Deer Creek	5.86	2	67.09	2	20.
Furnace Bay	5.67	3	67.87	1	20.
Octoraro Creek	5.31	4	63.50	8	20.
Bush River	5.24	5	57.94	17	18.
Little Gunpowde	4.50	6	65.33	4	23.
Rocky Gorge Da	4.38	7	63.48	9	24.
Prettyboy Reser	4.02	8	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 Reserv	2.93	17	60.48	14	34.
Liberty Reservoi	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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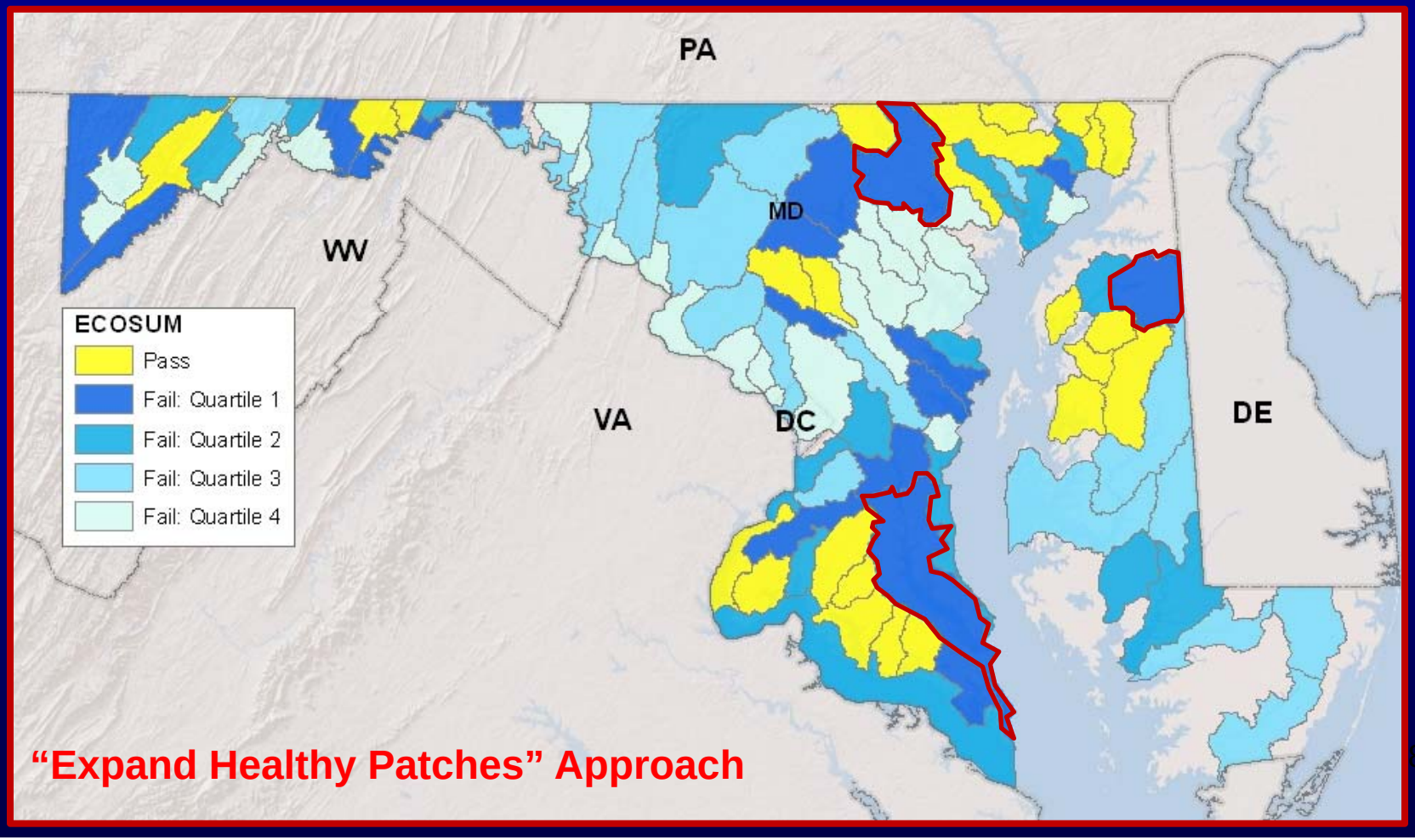

"Expand Healthy Patches" Approach

Functions of a Recovery Potential Screening Method:

Communicating findings

Mapping

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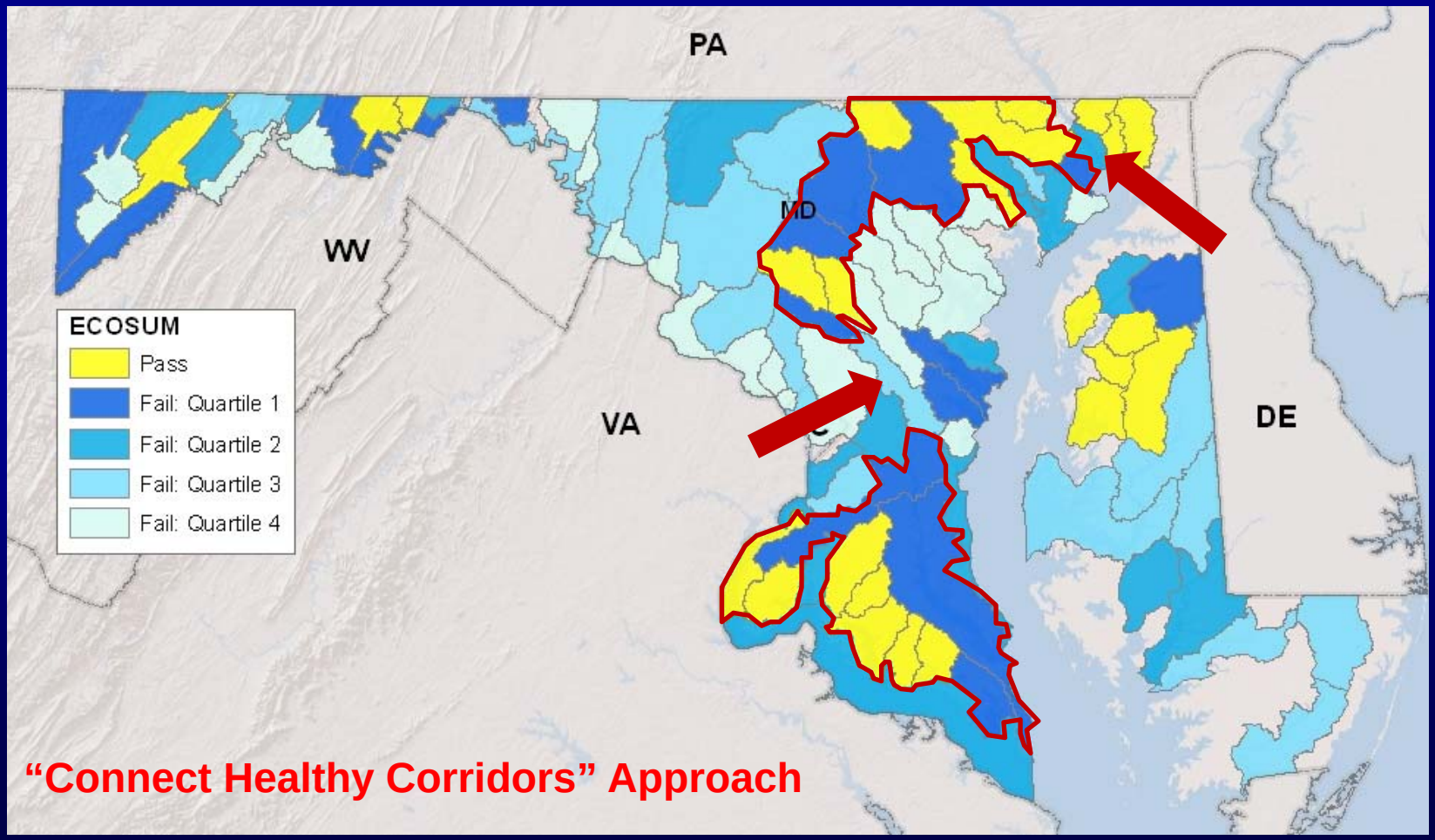
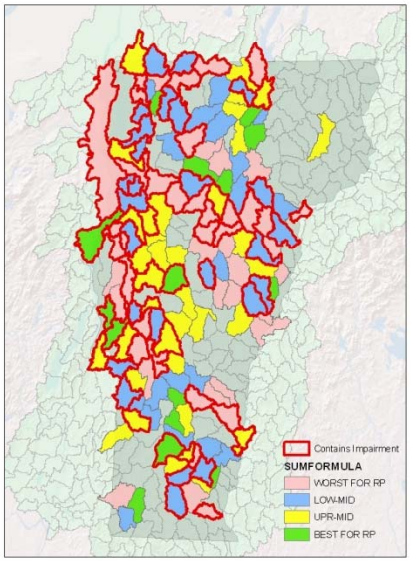


Applications of Recovery Potential Screening

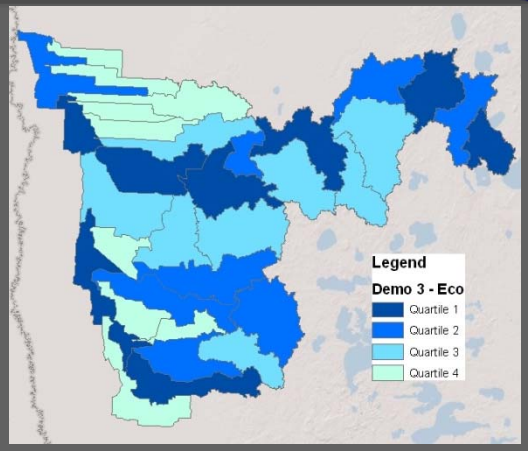
Highlights from current projects

Vermont



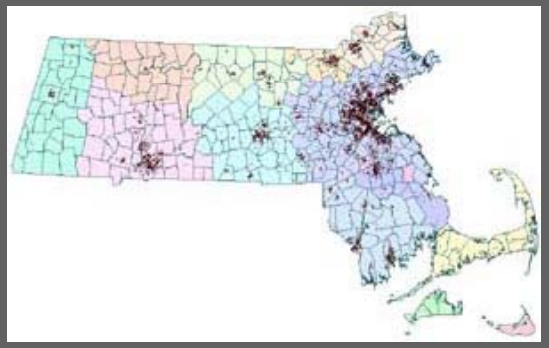
- *Unit: HUC12s and their subwatersheds*
- *Involvement: State TMDL/303(d) and River Management programs*
- *Purpose: evaluate restorability to inform priority setting*
- *Indicators: 36 candidates (15 eco, 11 stressor, 10 social)*
- *Unique features: applying river morphology and condition concepts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

Ecological metrics	*Stressor metrics*	*Social context metrics*
% 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)

ut Formulas Data Review View

fx HUC12ID

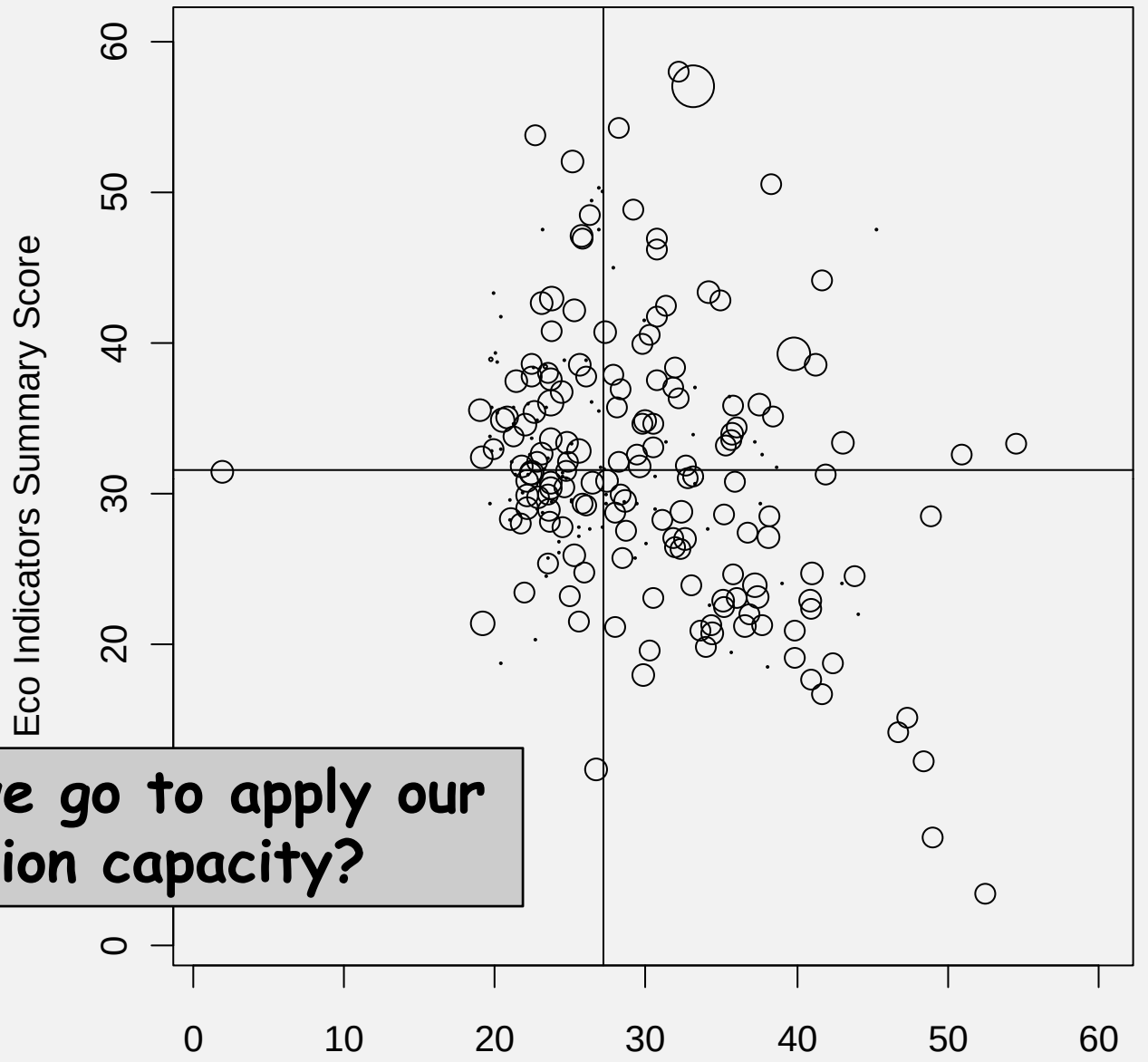
	A	B	C	D	E	F	G	H	I	J
1	HUC12ID	NAME	SUMFORMULA	SUMRANK	ECOSUMSCORE	ECORANK	STRESSUMSCORE	STRESSORRANK	SOCIOSUMSCORE	SOCIORANK
2	010802040205	Ware River-Barre F	35.31	1	31.52	125	1.89	1	35.11	43
3	011000050203	Hubbard Brook	3.84	2	53.72	4	22.77	53	33.74	119
4	010900020206	Sagamore groundw	3.74	3	57.00	2	33.20	180	67.22	1
5	010802040102	East Branch Swift R	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-Catac	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 Westf	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 Westf	3.37	11	32.93	104	20.01	14	34.56	67
13	010802060201	West Branch Westf	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-W	3.23	14	47.17	15	25.76	106	36.05	25
16	010802020206	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

FIRST9 | rankorder110512 | Sheet5

MASSACHUSETTS RECOVERY POTENTIAL SCREENING

FIRST DEMO PLOT

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

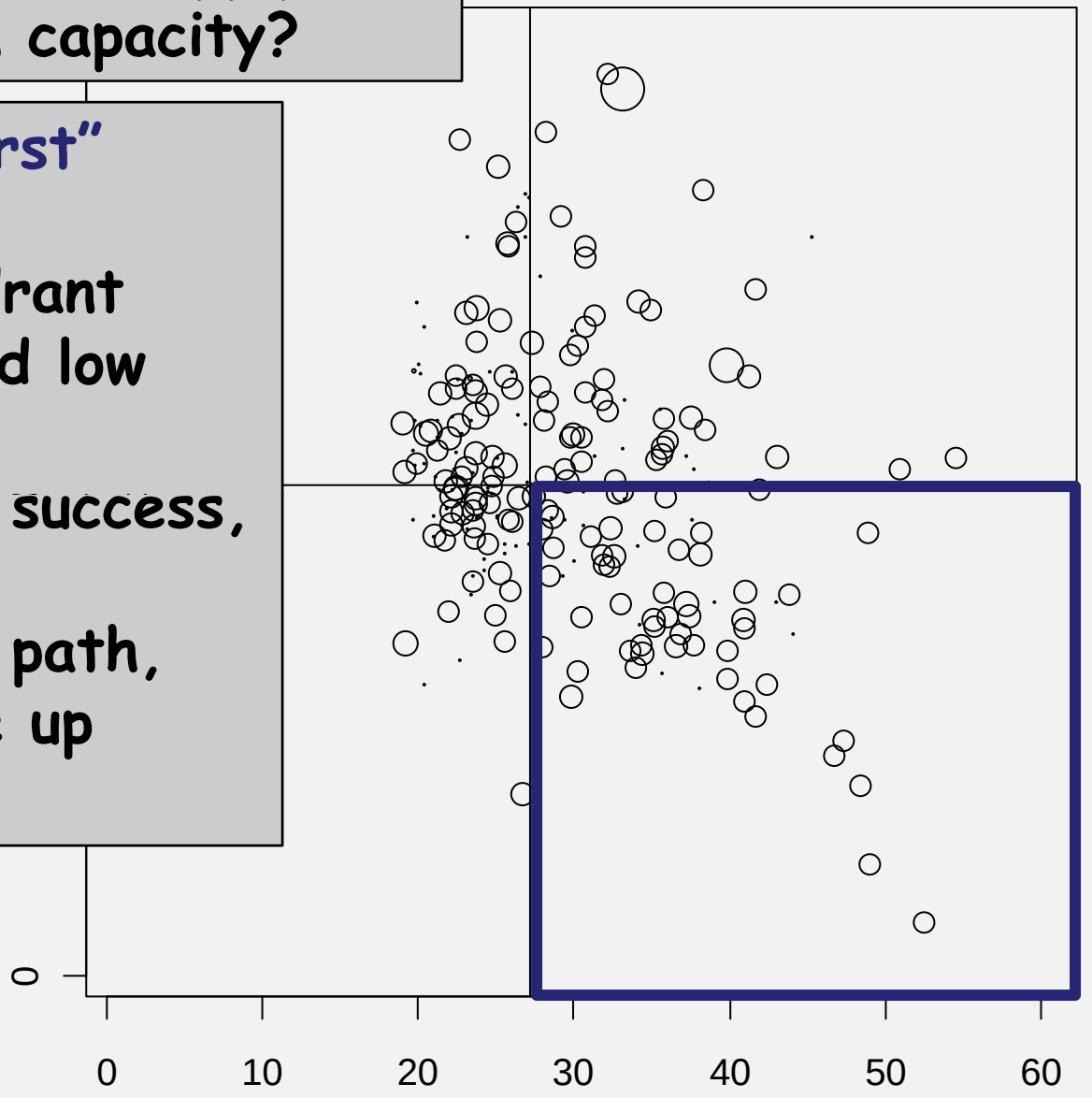


Where should we go to apply our limited restoration capacity?

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



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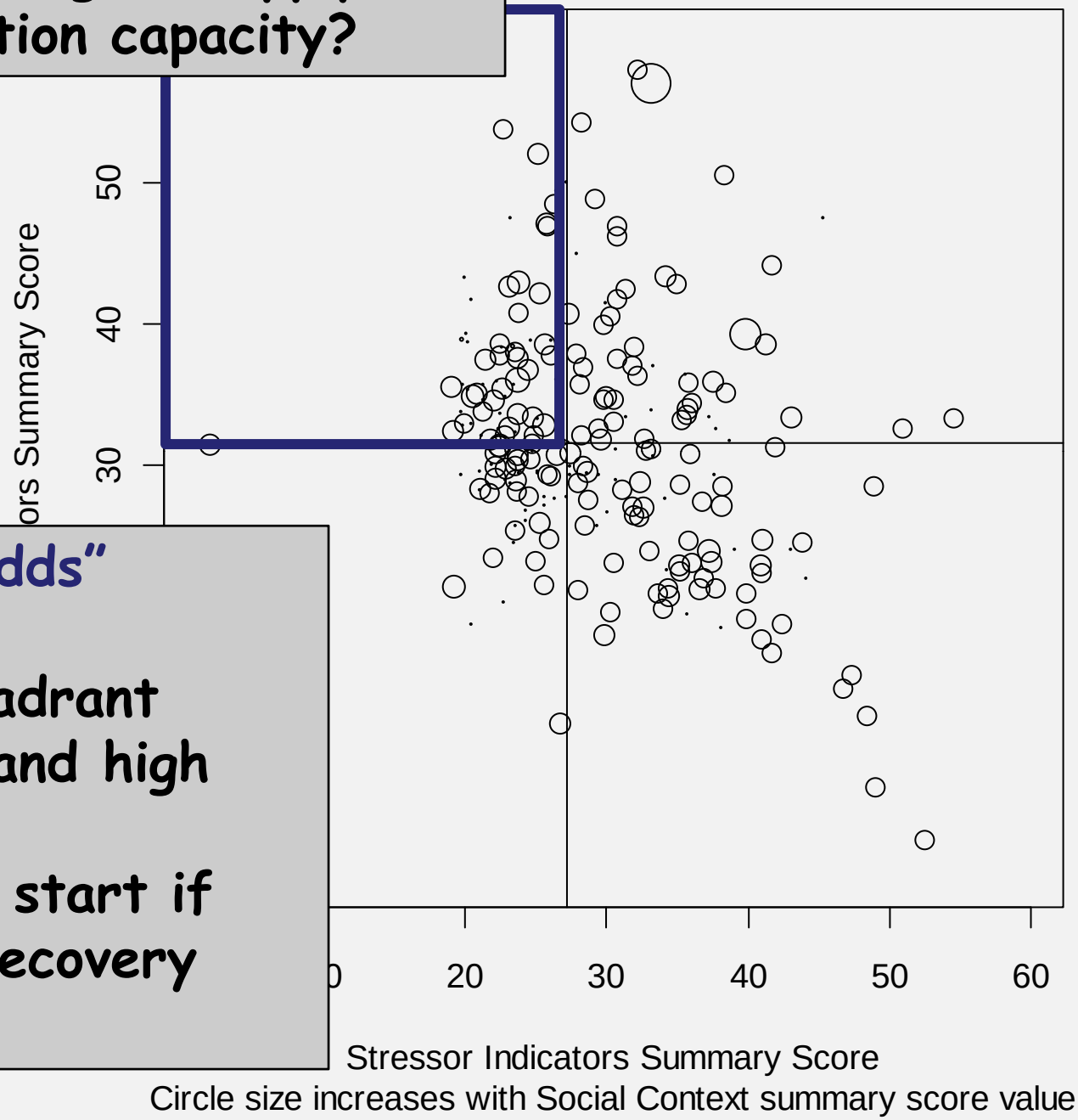


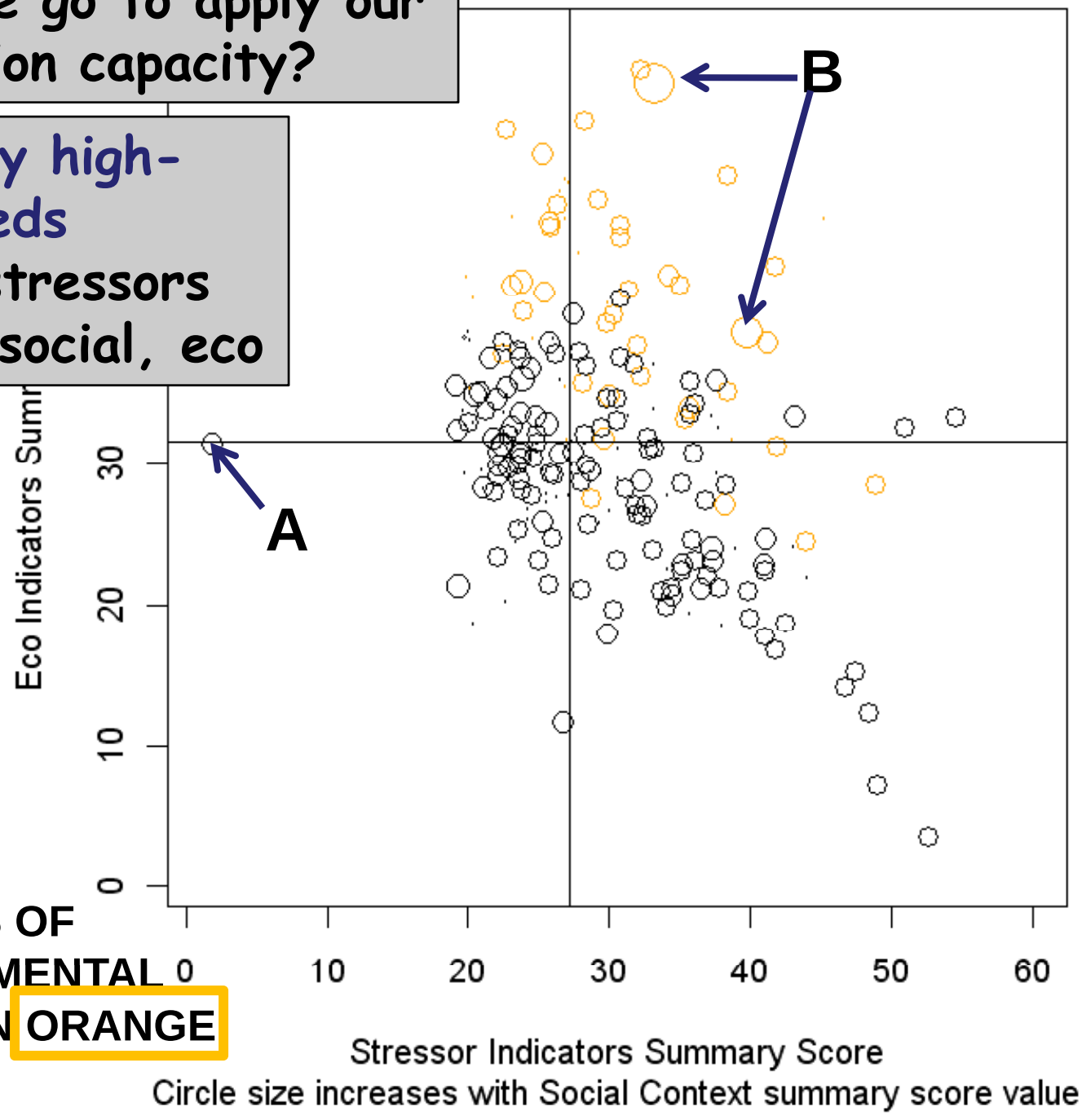
Option: "Best odds" perspective

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

Where should we go to apply our limited restoration capacity?

Option: Unusually high-scoring watersheds

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

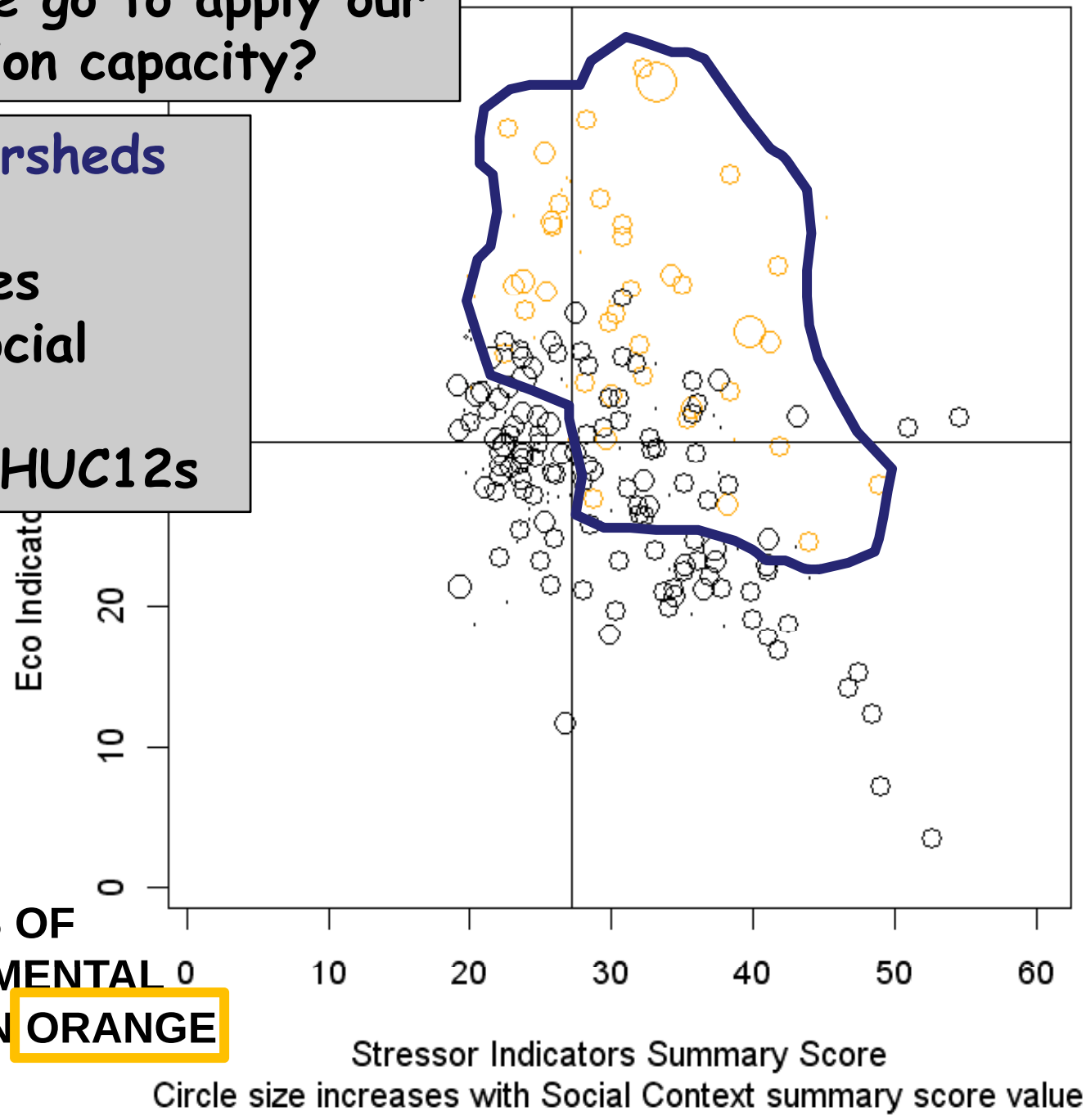


HUC12 WITH AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACEC) IN ORANGE

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

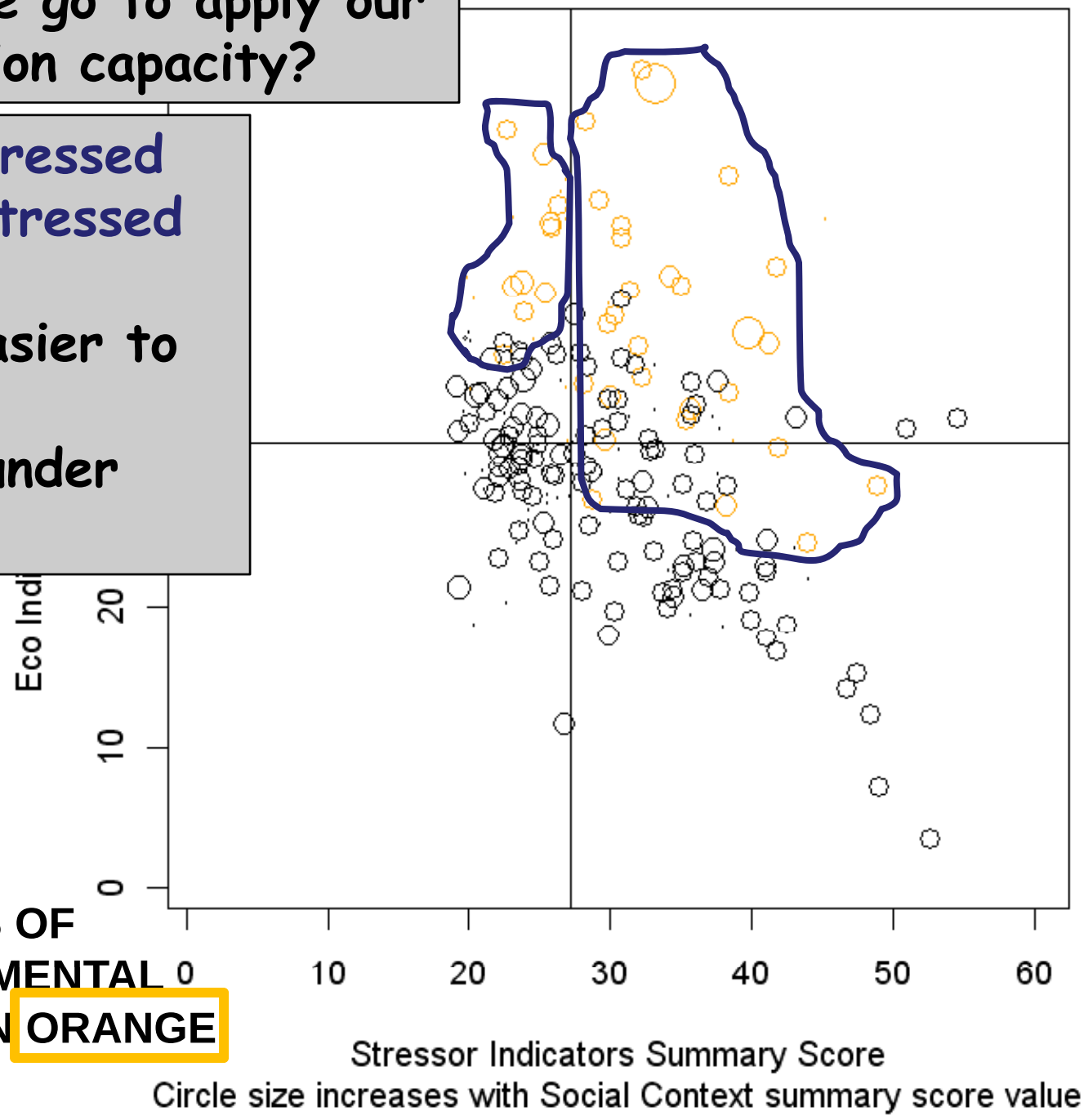


HUC12 WITH AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACEC) IN ORANGE

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



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

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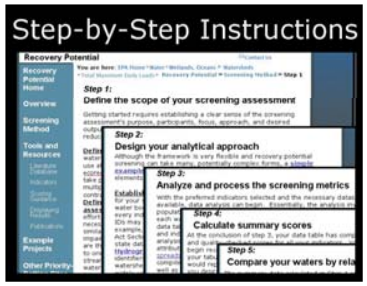

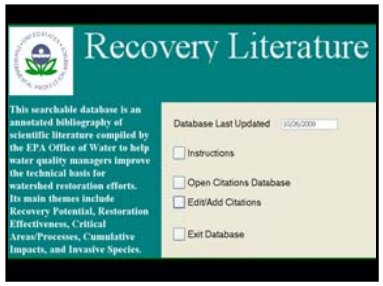

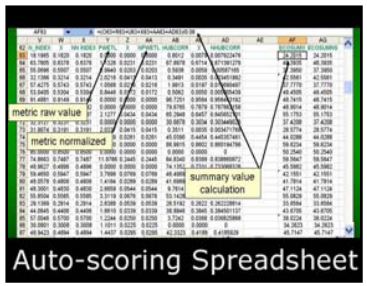

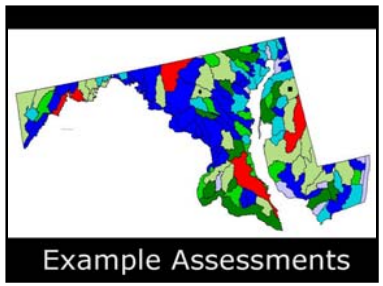

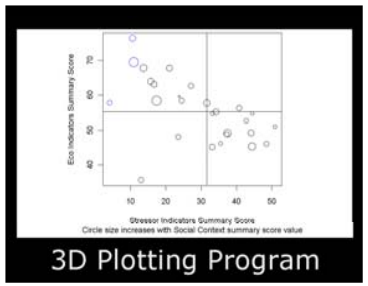

Recovery Potential Screening

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.tetratech-ffx.com/RECOVERY_POTENTIAL/home.html