Recovery Potential Screening Tool in North Dakota

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A History

What is the Recovery Potential Screening Tool?

- A tool that can compare and prioritize watersheds based on user defined indicators

- Helps to determine likelihood of impaired water to reach desired condition given its capacity to regain function, its exposure to stressor, and the social context affecting efforts to improve its condition

Recovery Potential Screening Tool

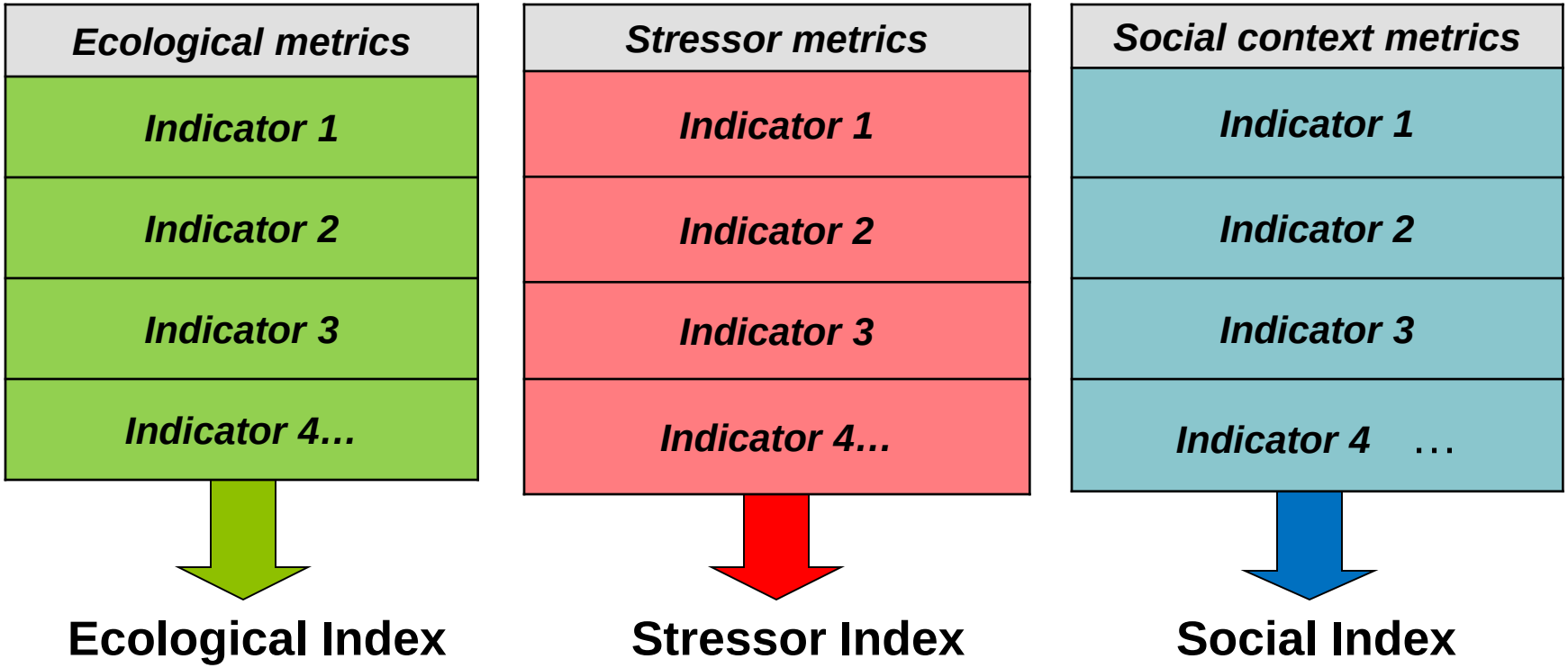
- User–driven, specially coded Excel file with embedded watershed data (GIS)
- HUC8 and HUC12 scale analyses
- Backbone is a suite of indicators based on spatial datasets and analyses – divided into 3 categories

RPST - Indicators

- Over 200 indicators are provided by US EPA, developed from national datasets (land use, soils)
- States provide information for their own indicators (monitoring data, livestock)

Ecological	Stressor	Social
Biotic Community Integrity	Invasive Species	% Protected Land
% Natural Cover	Phosphorus Load	Jurisdictional Complexity
Watershed % Wetlands	Watershed % Agriculture	Recreational Resource
Natural Channel Form	Land Use Change: CRP to Row Crops	# of Conservation Projects in Watershed
	Hydrologic Alteration	Community Education Level*
	Watershed Road Density	Sonoran Index of Economic Stress*

Conceptual Approach



$$\frac{\text{Ecological} + (100 - \text{Stressor}) + \text{Social}}{3} = \text{Recovery Potential Index}$$

Other Features of RPST

- The programmed data spreadsheet weighs and normalizes indicators and auto calculates summary scores. EPA has over 200 indicators for 48 states, and a Lit. database of 1600+ articles

- Multiple outputs : maps, tables, and bubble plots

- Can be modified to individual basins, projects, or used as statewide tool

- Will be updated and maintained by EPA (except state data)

- EPA will provide user support

RPST PROJECT-NORTH DAKOTA

(DETAILS OF HOW THE RPST WORKS)

Watershed Focused Analysis

- 2 scale analysis
  - Larger - HUC8 Sub Basin
  - Smaller - HUC12 Sub Watershed
- ND state-specific indicators developed
  - HUC8 : 61 total
  - HUC12 : 248 total

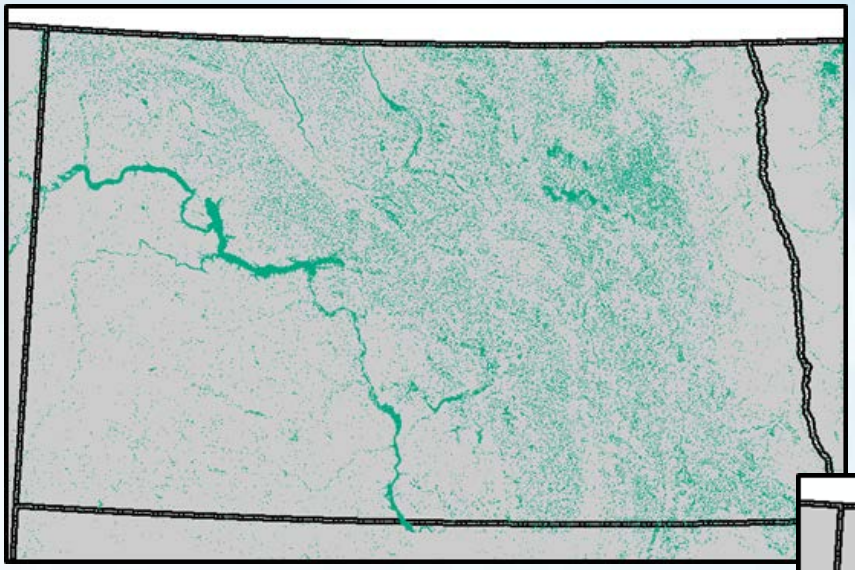
Scenario A – Eastern Watersheds

- Where should nutrient management and restoration efforts be focused?

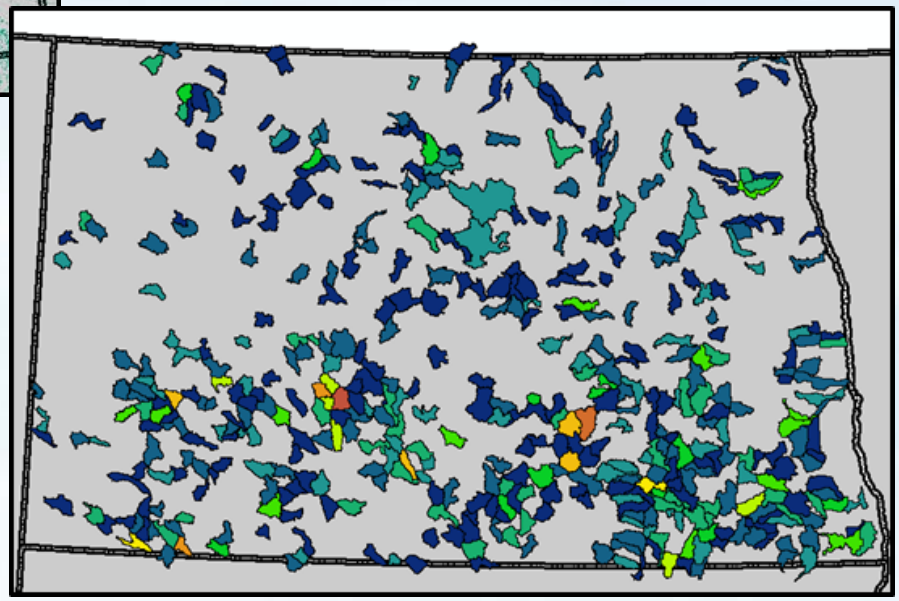
Ecological Indicators	Stressor Indicators	Social Indicators
% natural cover in watershed*	% Corn, soybeans or sugar beet in watershed*	Nutrient TMDL count
% natural cover in riparian zone*	% of watershed transition from grassland to row crop*	% GAP status 1, 2, and 3 in watershed (protected lands)
National Fish Habitat Partnership Habitat Condition Index	Nitrogen yield (SPARROW incremental)	Percent drinking water source protection area in watershed
% wetlands in riparian zone*	Phosphorus yield (SPARROW incremental)	% of watershed with conservation activities (20 yrs)*
	% population increase (2009-2013)*	% of watershed with CRP activities (2007)*
	AFO/CAFO Operations	
	Nutrient impaired segment count	

Outputs : Maps

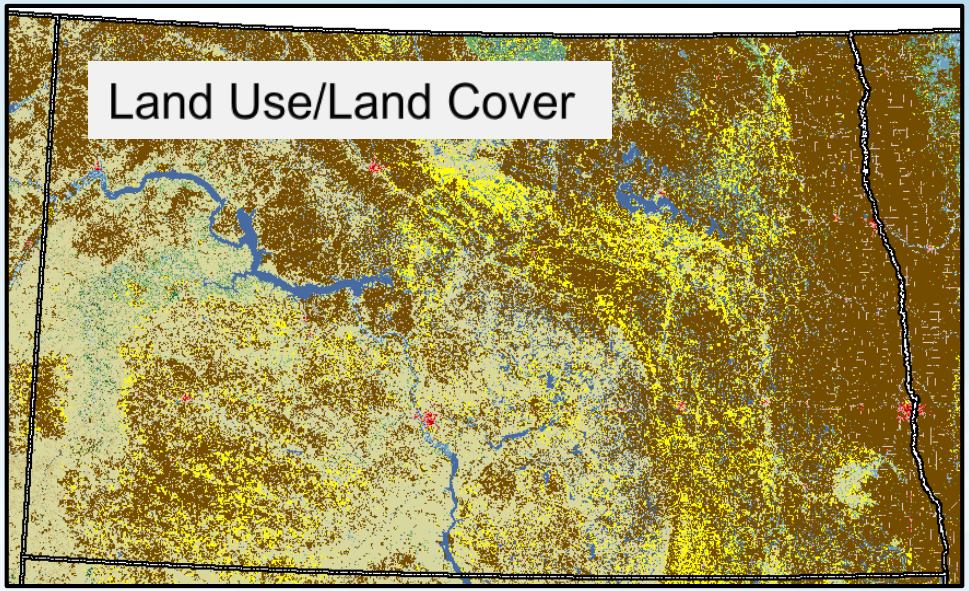
Wetlands (NLCD 2011 and NWI)

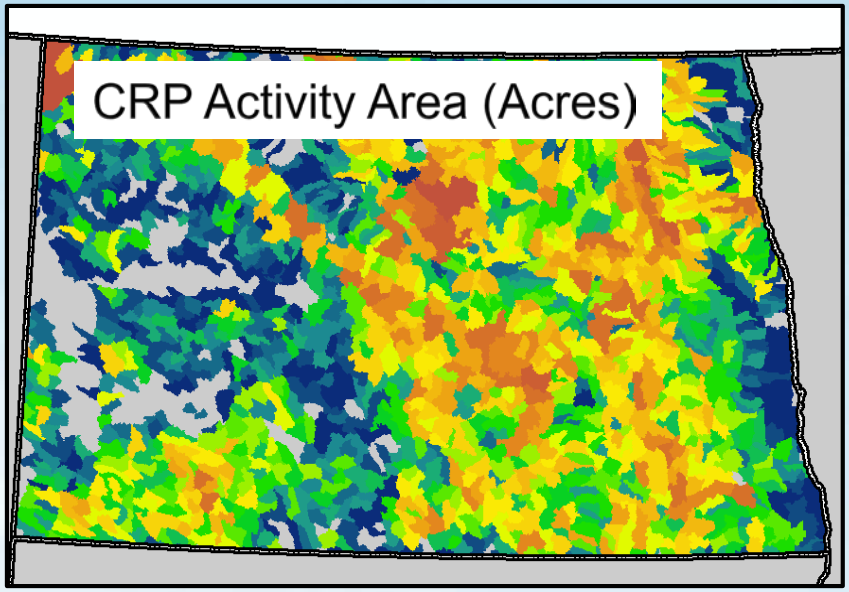


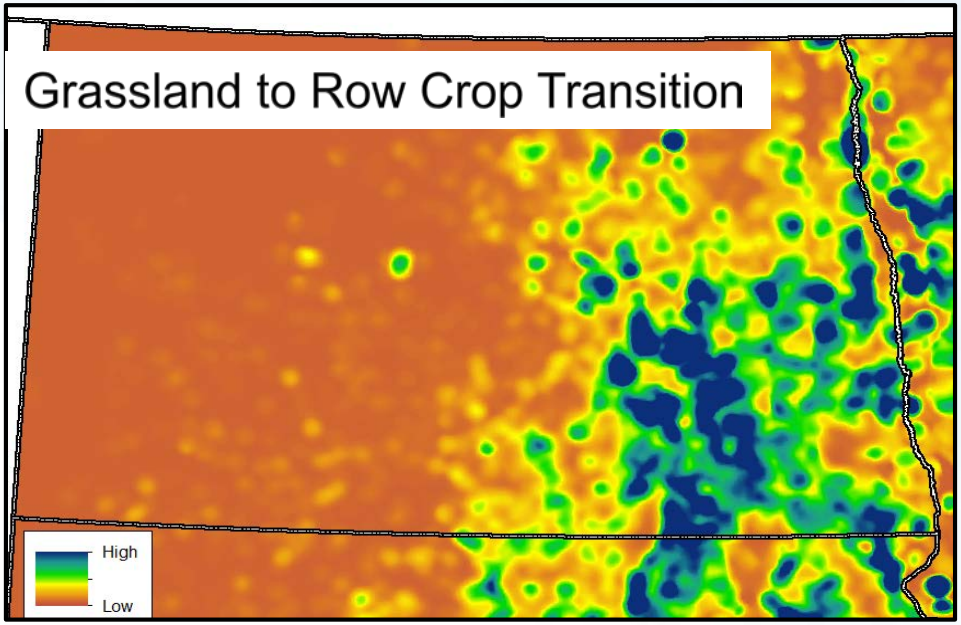
Active AFO/CAFO Permit Count

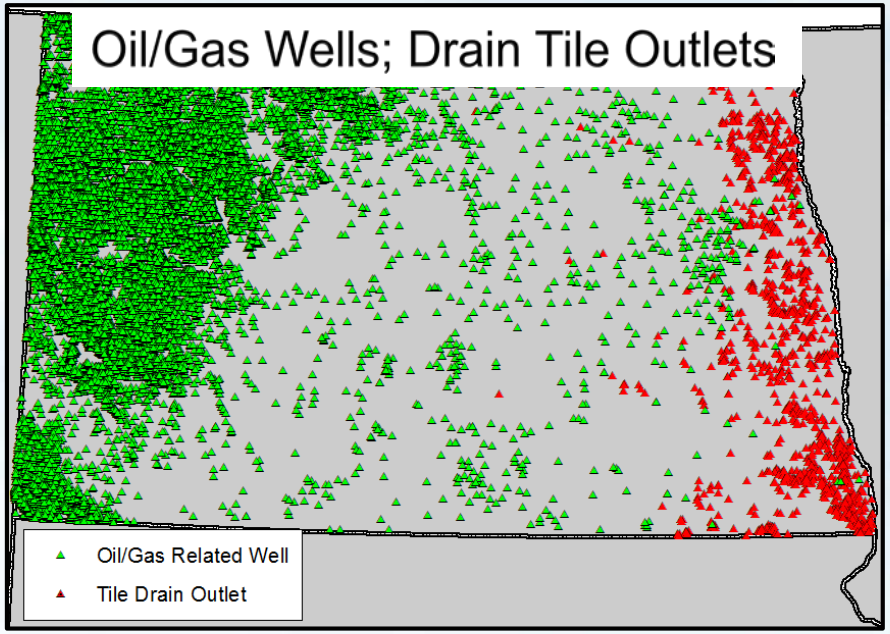


Output : Maps


Land Use/Land Cover


CRP Activity Area (Acres)


Grassland to Row Crop Transition
High
Low


Oil/Gas Wells; Drain Tile Outlets
Oil/Gas Related Well
Tile Drain Outlet

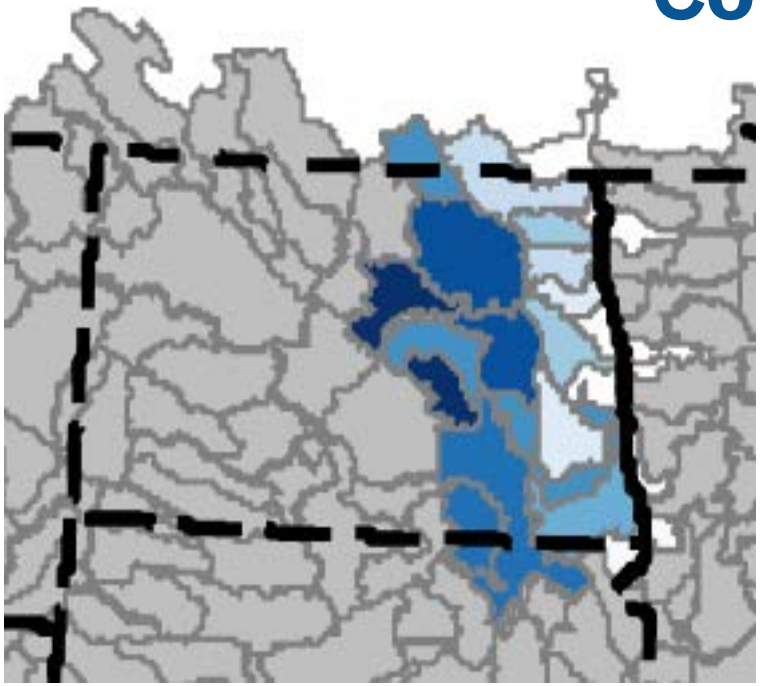
Output : Tables

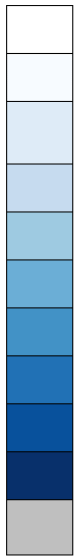
Watershed ID	Watershed Name	Eco Index	Stressor Index	Social Index	RPI Score	RPI Rank
09020202	Upper Sheyenne	75.28	18.05	41.88	66.37	1
10160002	Pipestem	82.28	26.52	36.81	64.19	2
09020203	Middle Sheyenne	73.60	32.82	51.19	63.99	3
10160004	Elm	58.78	22.53	49.66	61.97	4
10160003	Upper James	62.45	23.11	40.35	59.90	5
09020315	Upper Pembina River	51.83	8.76	30.58	57.88	6
09020204	Lower Sheyenne	55.30	49.90	63.04	56.15	7
09020201	Devils Lake	70.70	38.60	33.44	55.18	8
09020105	Western Wild Rice	48.83	37.46	50.06	53.81	9
09020310	Park	36.95	26.95	50.64	53.55	10
10160001	James Headwaters	53.30	25.83	32.70	53.39	11
09020308	Forest	36.45	29.65	51.74	52.85	12
09020307	Turtle	32.10	30.43	52.96	51.54	13
09020316	Lower Pembina River	33.28	11.03	24.05	48.77	14
09020311	Middle Red	12.38	17.97	20.41	38.27	15
09020205	Maple	21.38	40.48	26.58	35.82	16
09020109	Goose	39.48	65.78	28.39	34.03	17
09020101	Bois De Sioux	19.70	31.52	11.36	33.18	18
09020301	Sandhill-Wilson	1.85	32.41	26.85	32.10	19
09020104	Upper Red	16.23	54.44	1.09	20.96	20
09020107	Elm-Marsh	0.00	53.54	7.91	18.13	21

Highest recovery potential index scores

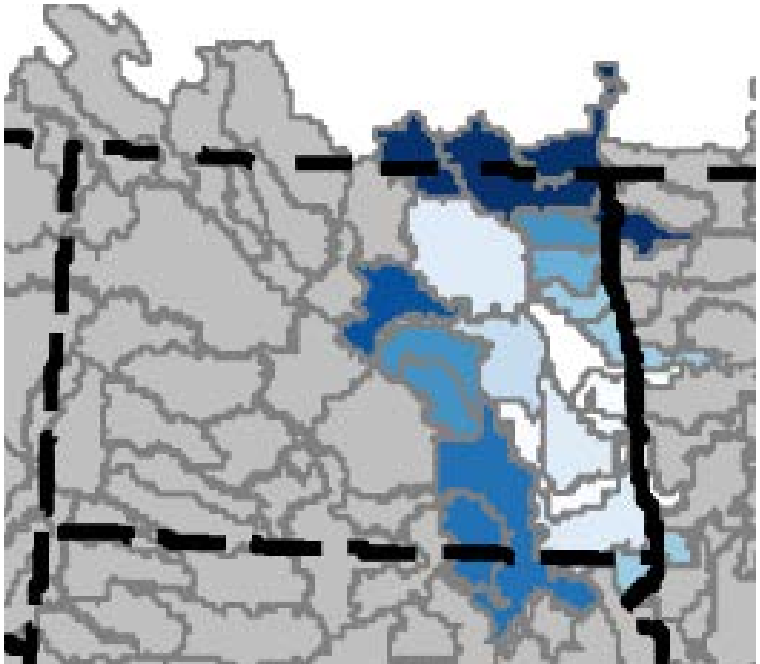
Cells are shaded according to rank (black = 76 -100th percentile; dark gray = 51-75th percentile; light gray = 26-50th percentile; white = 0-25th percentile).

Combining Index and Maps





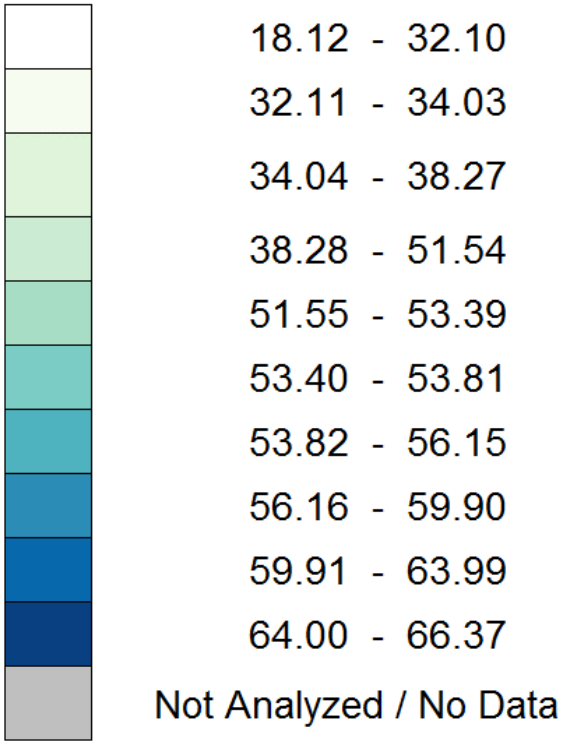
Ecological Ranking

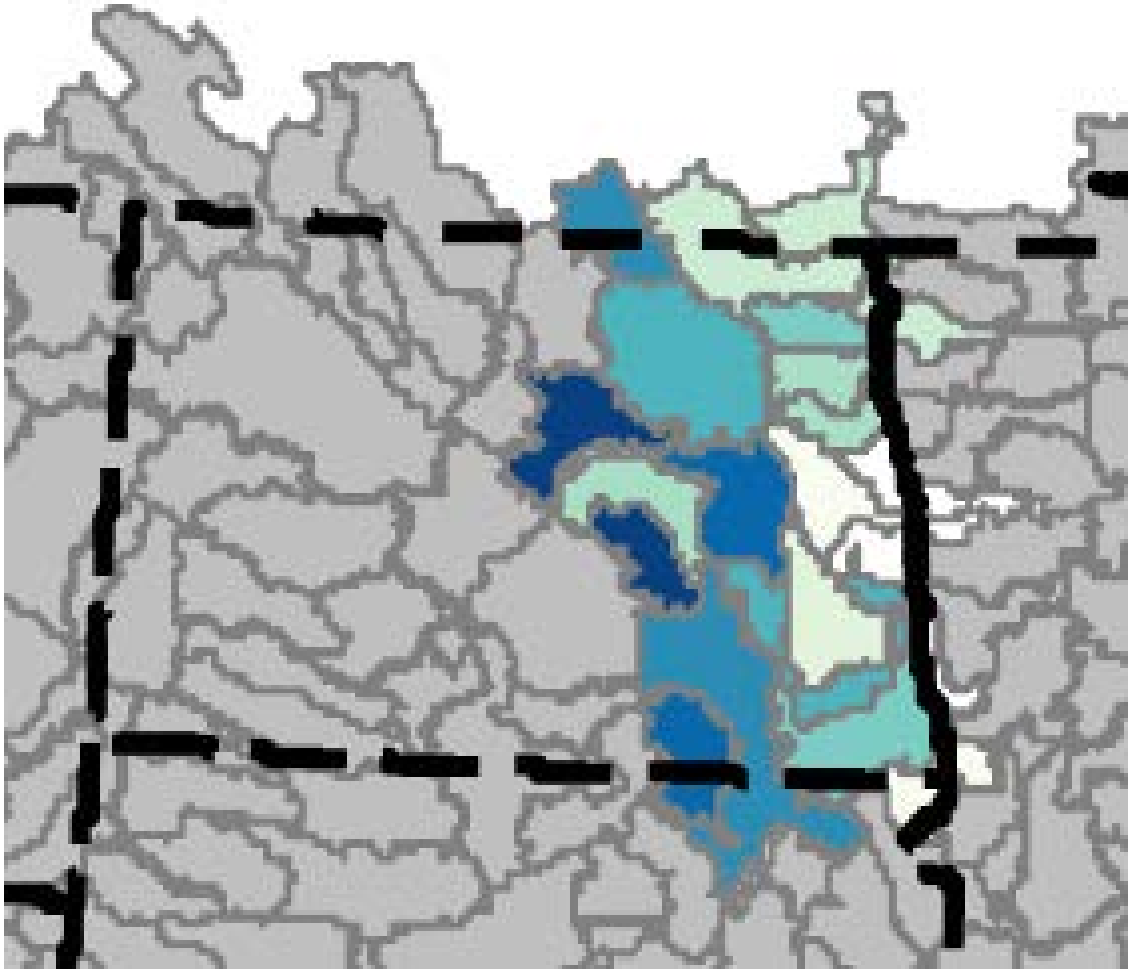


Stressor Ranking

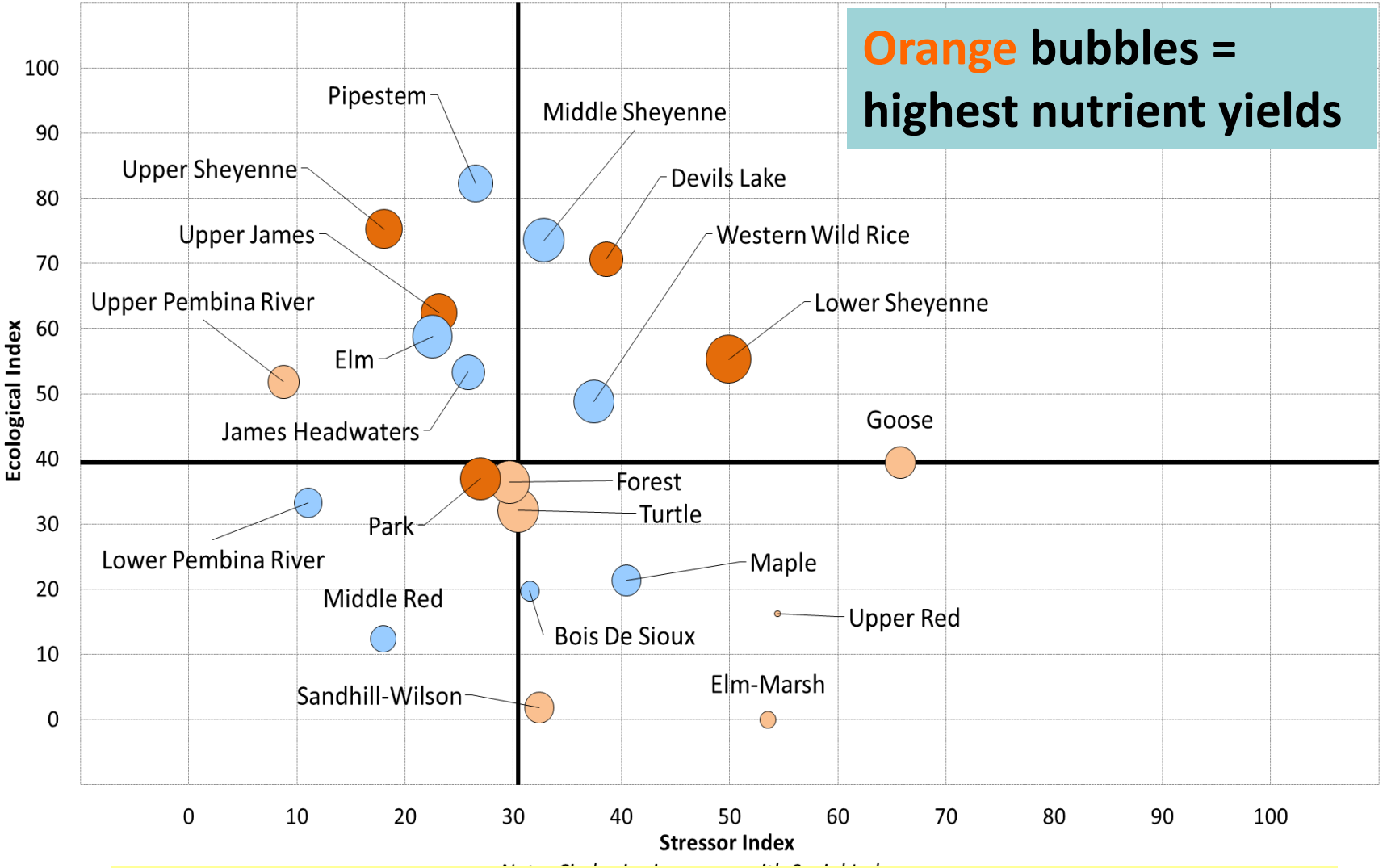
Overall RPI Score

Higher/Darker = better recovery potential



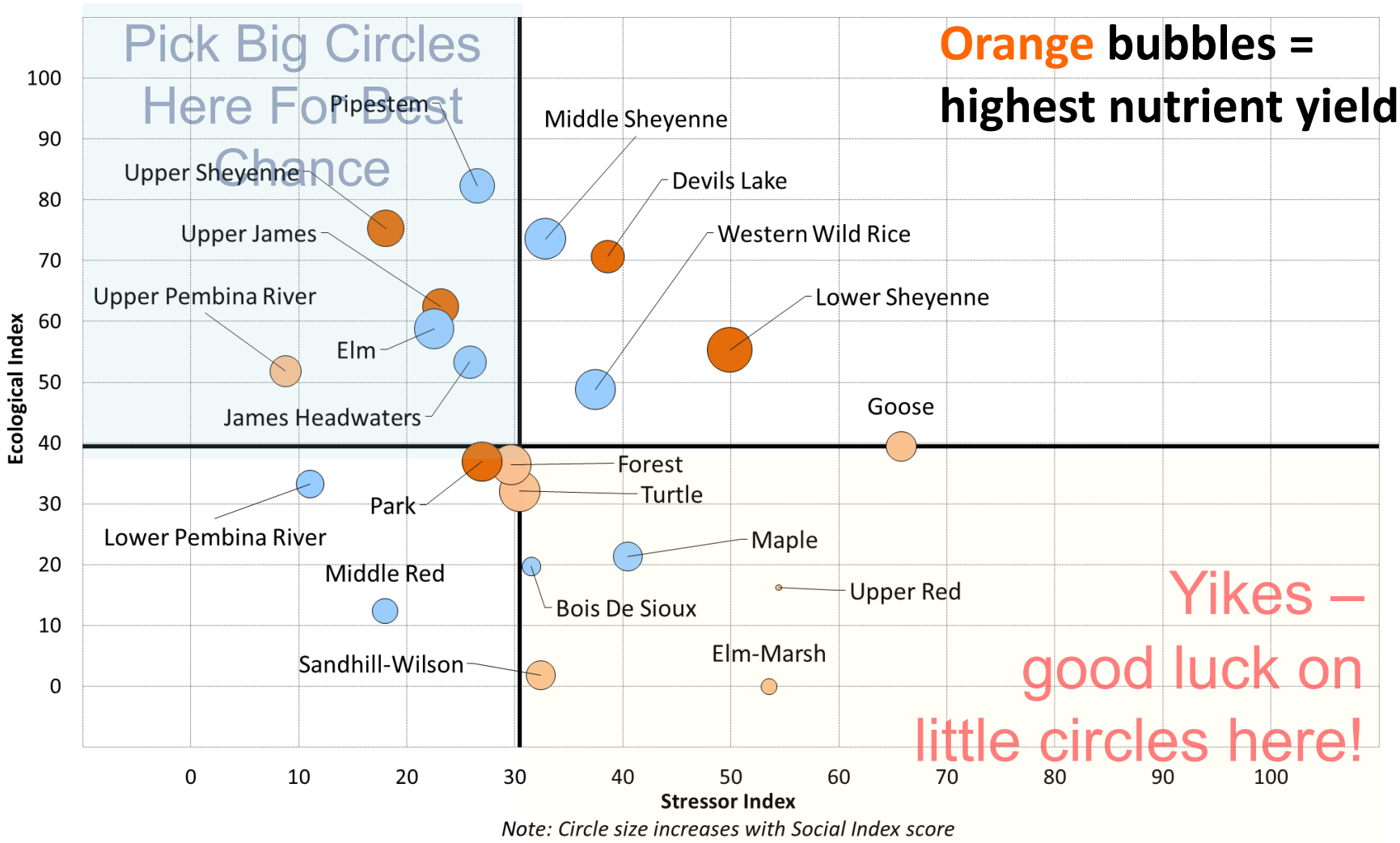


Output : Bubble Plots

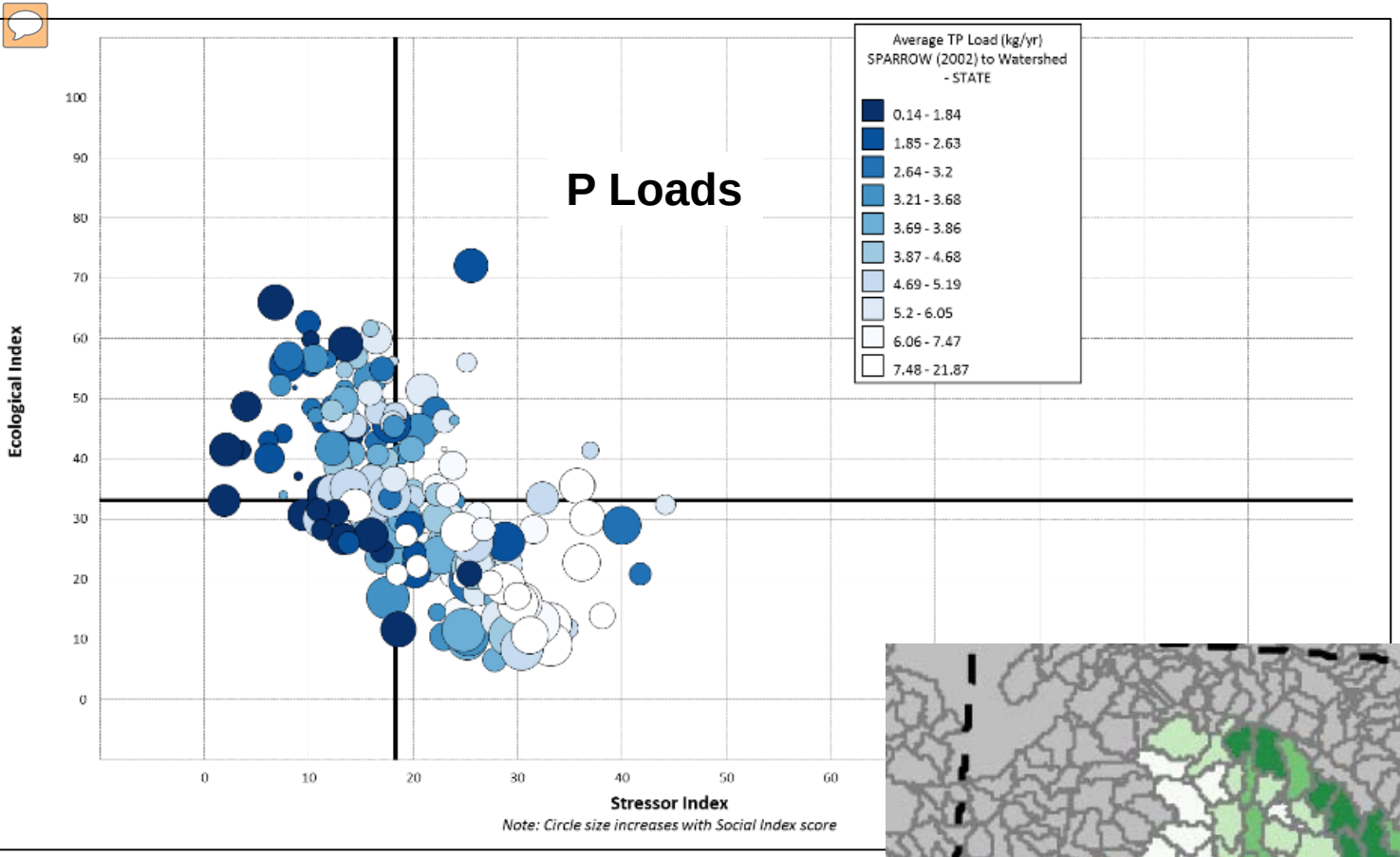


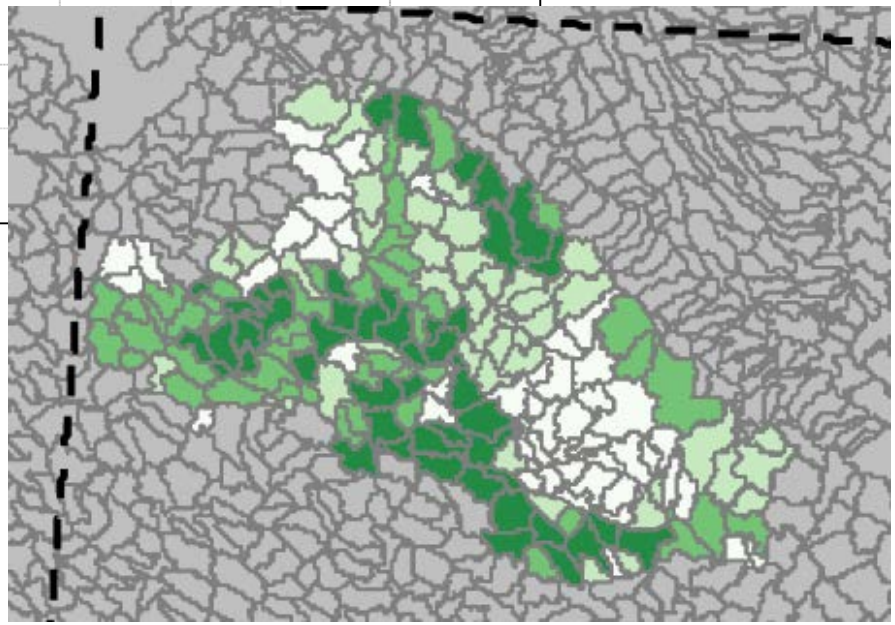
Circle Size Increases with Social Index Score

But How to Get Stakeholder Understanding



Note: Circle size increases with Social Index score





% Agriculture (2006) in Watershed

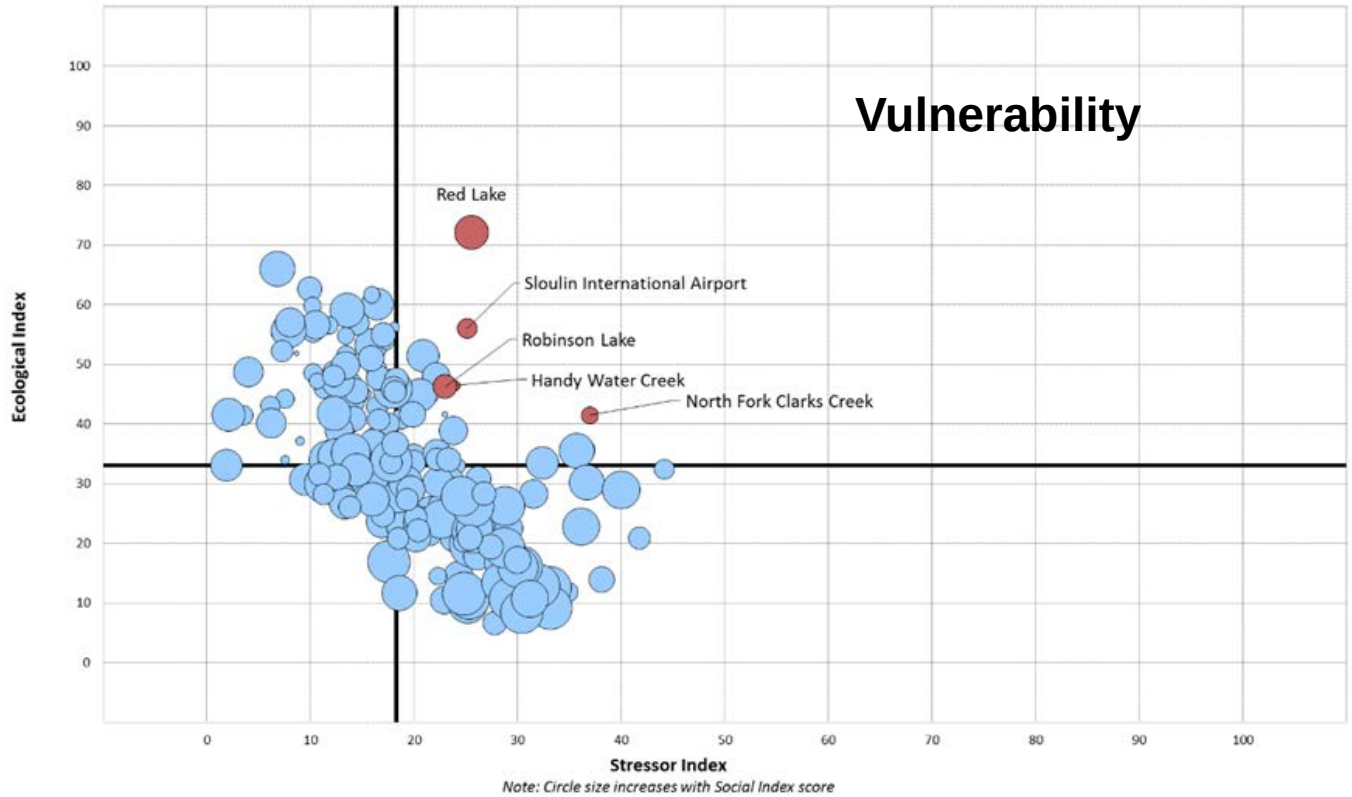
0.00 - 23.79

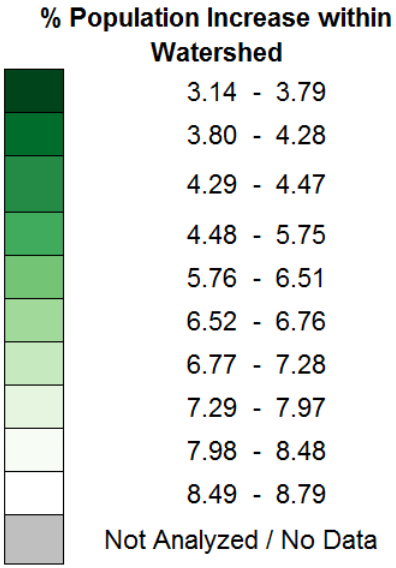
23.80 - 42.88

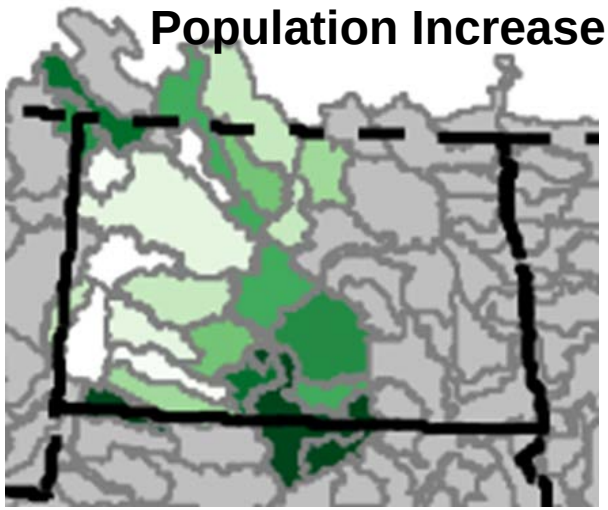
42.89 - 61.27

61.28 - 90.93

Not Analyzed / No Data


Vulnerability
Red Lake
Sloulin International Airport
Robinson Lake
Handy Water Creek
North Fork Clarks Creek
Ecological Index
Stressor Index
Note: Circle size increases with Social Index score


% Population Increase within Watershed
3.14 - 3.79
3.80 - 4.28
4.29 - 4.47
4.48 - 5.75
5.76 - 6.51
6.52 - 6.76
6.77 - 7.28
7.29 - 7.97
7.98 - 8.48
8.49 - 8.79
Not Analyzed / No Data


Population Increase

Summary

- RPST uses commonly available datasets to screen user-selected indicators that influence restorability
- Stakeholders included in prioritization process by helping to choose indicators
- Integrates three indices (ecological, stressor, and social) that relate to three major drivers affecting recovery potential
- Multiple output formats to help in decision making
- New indicators can be added at any time to further expand the Tool capabilities

Challenge is to present data so that Stakeholders who helped build understand the results to help with decision making

Thank you!

US EPA's Tool –
http://www.epa.gov/rps

Fact Sheets on NDDoH Table

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