

A scenic landscape featuring a river in the foreground with a person fishing. The background consists of rolling mountains under a clear sky. The text is overlaid on a semi-transparent grey band across the middle of the image.

Using the Recovery Potential Screening Tool to Support Planning and Prioritization

Cybertown 2022

Presenters



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Watershed Branch



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The Cadmus Group



RPS Tool Intro

What is Recovery Potential Screening (RPS)?

- Framework for comparing a group of watersheds based on environmental, stressor, and social factors relevant for priority-setting
- Developed by EPA in 2006 to provide a systematic method, data, and tool for comparing watersheds to inform management decisions and priorities
- Variety of applications, for example:
 - TMDL development
 - State nonpoint source program five-year plans & 319 grants
 - Healthy watersheds protection
 - Wetland and riparian buffer mitigation grants
 - Water quality monitoring strategies
 - Deepwater Horizon restoration funding

What is the RPS Tool?

- Excel file with custom macros and menus for running a screening
- Pre-loaded watershed data, HUC12 indicators calculated from national datasets
- Produced for all US states and territories
- Updates released every 1-2 years with new indicator data and tool functions
- Projects in 40+ states and territories

RUN SCREENING		RESET SCREENING																																																																																		
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<https://www.epa.gov/rps/downloadable-rps-tools-comparing-watersheds#Statewide>

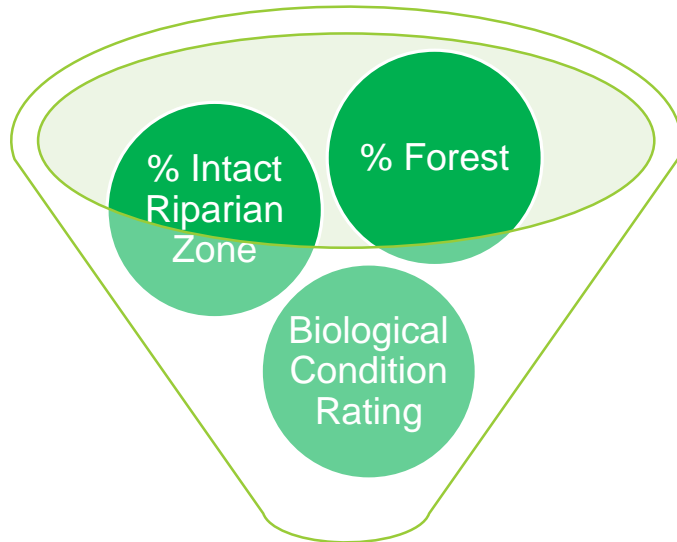


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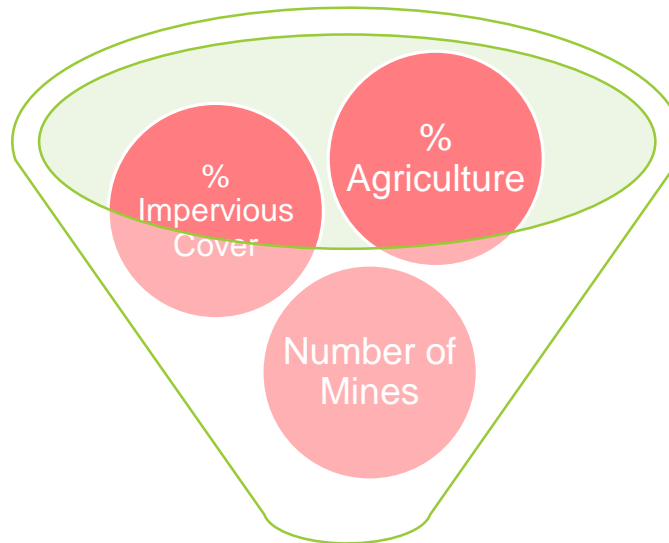
Watershed Indicators

- Indicator-based method for watershed comparison and priority-setting
- Indicators are measures of watershed attributes that are relevant to water quality restoration and protection

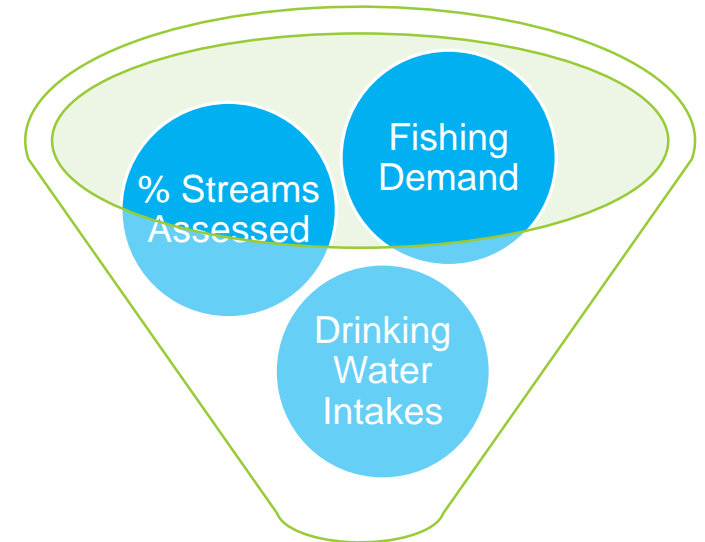
Ecological Indicators



Stressor Indicators



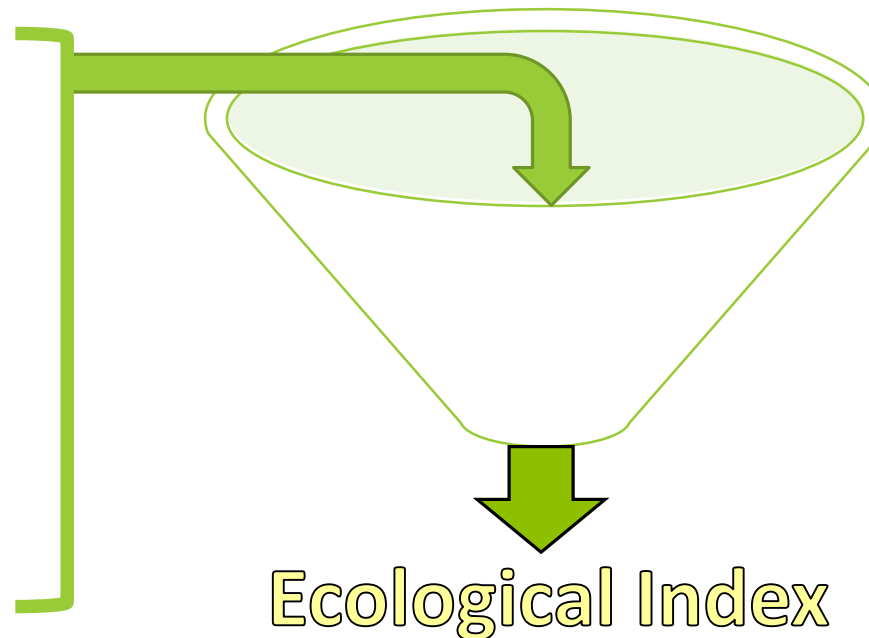
Social Indicators



Ecological Indicators

- Describe the condition of aquatic ecosystems and related watershed characteristics
- Offer insight into the capacity to maintain or regain ecological functions

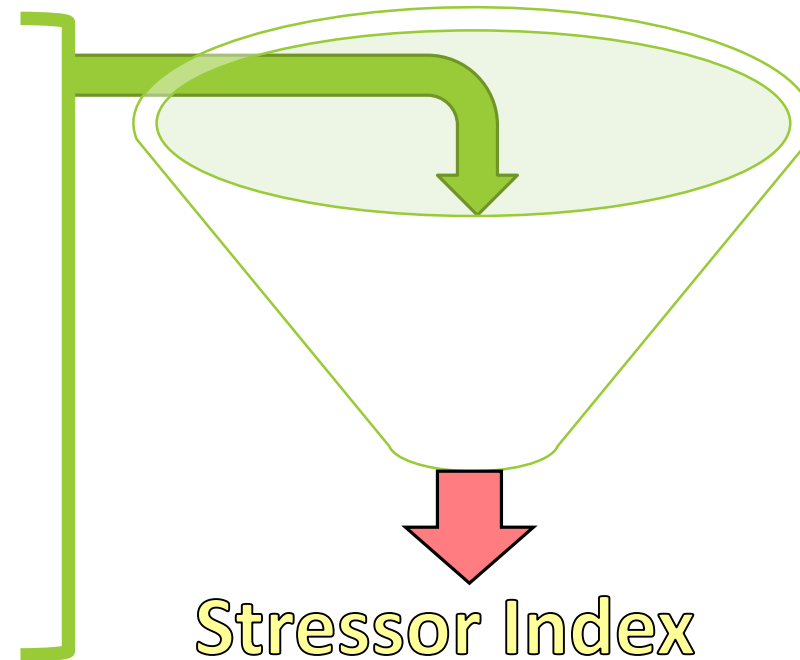
- Natural Land Cover
- Aquatic Life and Habitat
- Soil Attributes
- Stream Order
- Watershed Health Index



Stressor Indicators

- Describe anthropogenic attributes of the watershed
- Characterize risks to aquatic ecosystem health and effort required to address those risks

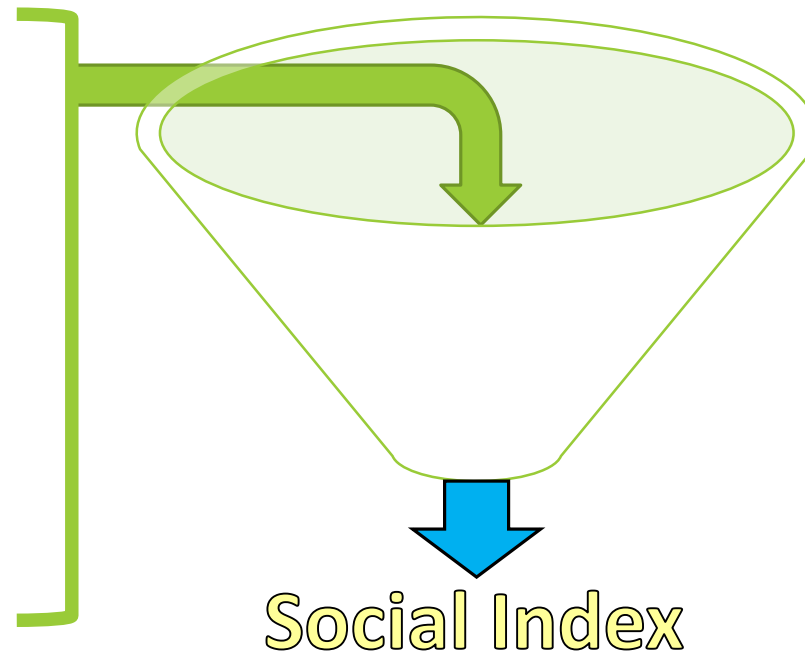
- Human Population
- Human Use Land Cover
- Hydrologic Alteration
- Projected Climate and Hydrologic Change
- Impaired Waters



Social Indicators

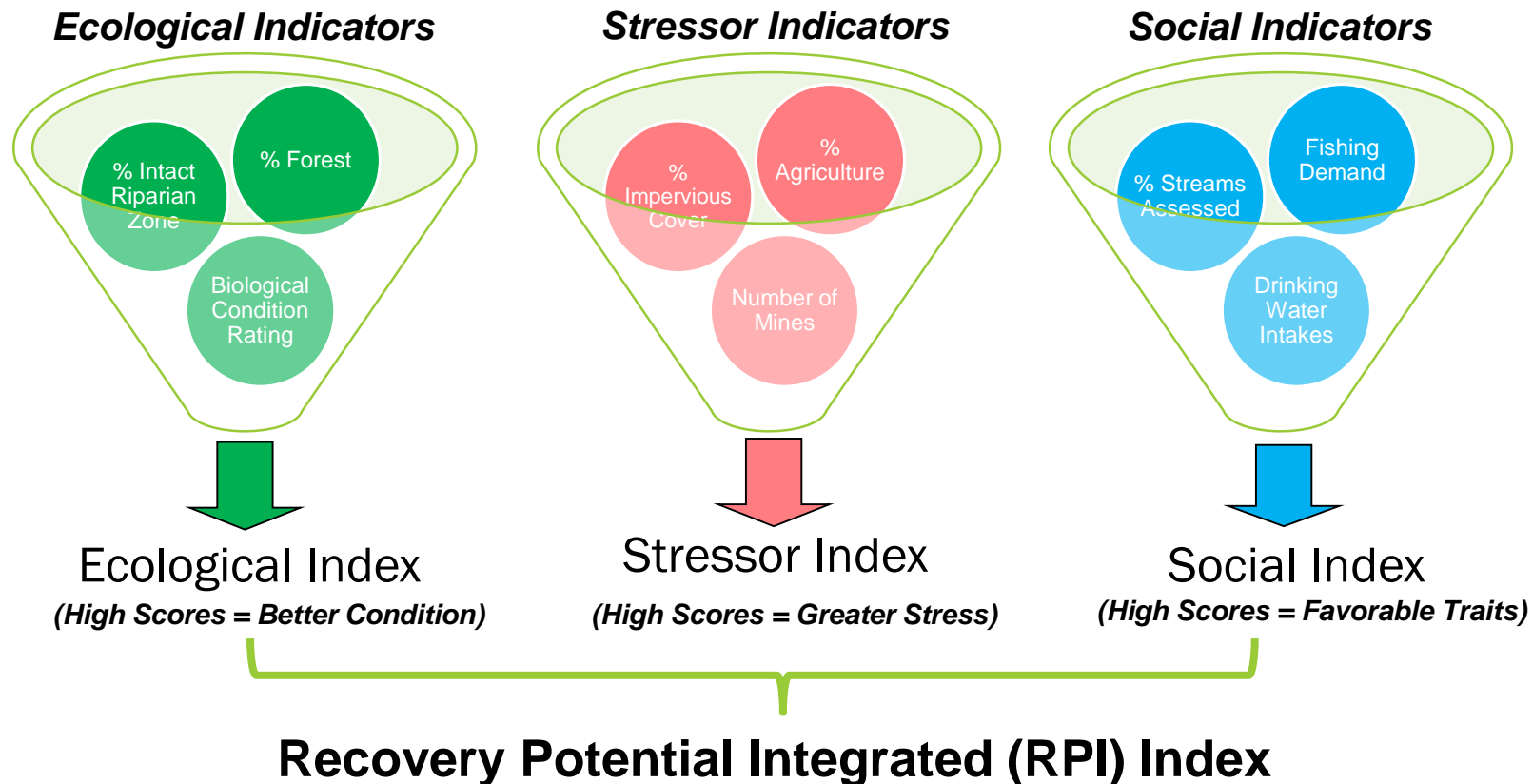
- Societal or programmatic factors that support successful water quality restoration and protection
or
- Are otherwise important for priority-setting

- Community Context
- Drinking Water Protection
- Protected Lands & Waters
- Participation in Conservation Programs
- Water Quality Assessments and TMDLs



RPS Index Scores

- Indicators are combined into **Index Scores** – offer overall picture of ecological, stressor, and social characteristics



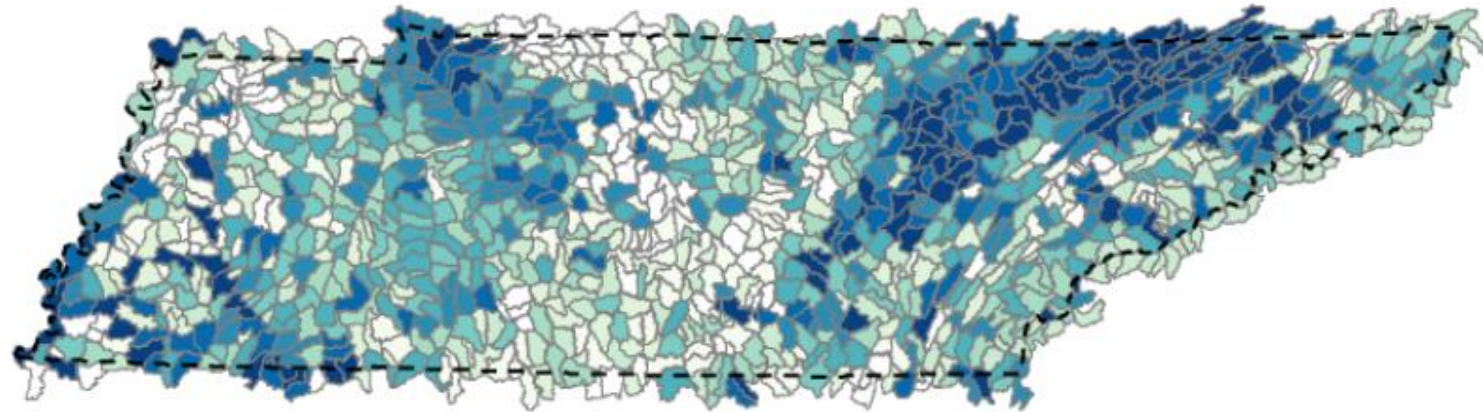
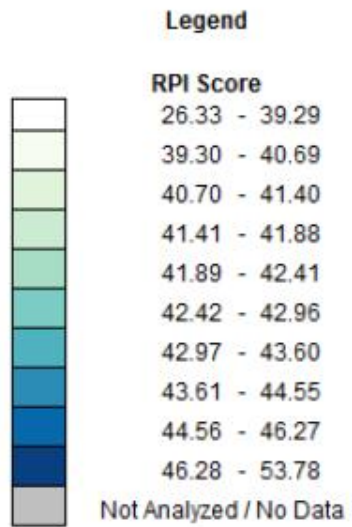
RPS Results

Watershed ID	Watershed Name	Ecological Index	Ecological Rank	Stressor Index	Stressor Rank	Social Index	Social Rank	RPI Score	RPI Rank
0315010101	Headwaters Conasuaga River	53.98	78	2.10	93	19.38	743	57.09	177
0315010102	Jacks River	53.17	84	0.01	7	43.97	58	65.71	7
0315010103	Ball Play Creek-Conasauga River	50.06	160	3.13	156	39.44	125	62.13	42
0315010104	Old Fort Creek-Mill Creek	41.22	582	21.81	917	38.87	131	52.76	451
0315010105	Perry Creek-Conasuaga River	43.14	481	11.60	599	31.48	287	54.34	333
0315010106	Sugar Creek	45.38	362	13.53	671	21.59	652	51.15	598
031501010301	Coahulla Creek Headwaters	42.16	537	14.59	717	26.53	471	51.37	573
031501010302	Mills Creek	37.20	812	13.53	671	21.37	662	48.35	809
031501010303	Coahulla Creek	44.65	408	9.14	475	15.52	897	50.34	672
050500010102	Big Laurel Creek	51.47	118	4.44	235	7.50	1103	51.51	560
050500010103	Headwaters North Fork New River	46.73	292	4.08	212	14.83	928	52.49	471
050500010105	Big Horse Creek	49.44	173	6.26	311	7.73	1099	50.30	675
051100020101	Little Trace Creek-Line Creek	35.39	910	14.89	730	22.32	629	47.61	842
051100020102	Trace Creek-Line Creek	35.82	885	14.94	732	22.94	602	47.94	826
051100020105	Long Fork	39.16	705	25.14	979	15.63	891	43.22	1005
051100020106	Salt Lick Creek	40.38	631	15.10	737	19.82	729	48.37	806
051100020108	Puncheon Creek	36.82	833	15.30	747	18.29	789	46.60	901
051100020109	Sugar Creek-Barren River	41.01	597	15.37	750	2.98	1139	42.87	1020
051100020201	Upper Long Creek	36.27	863	16.23	787	16.23	875	45.42	942
051100020203	Pinchgut Creek-Barren River	40.81	606	13.25	656	22.58	620	50.05	699
051100020501	Headwaters Transumal Creek	37.29	804	19.23	863	28.57	394	48.88	767

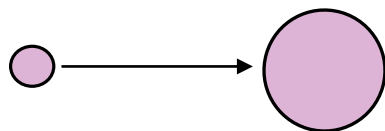
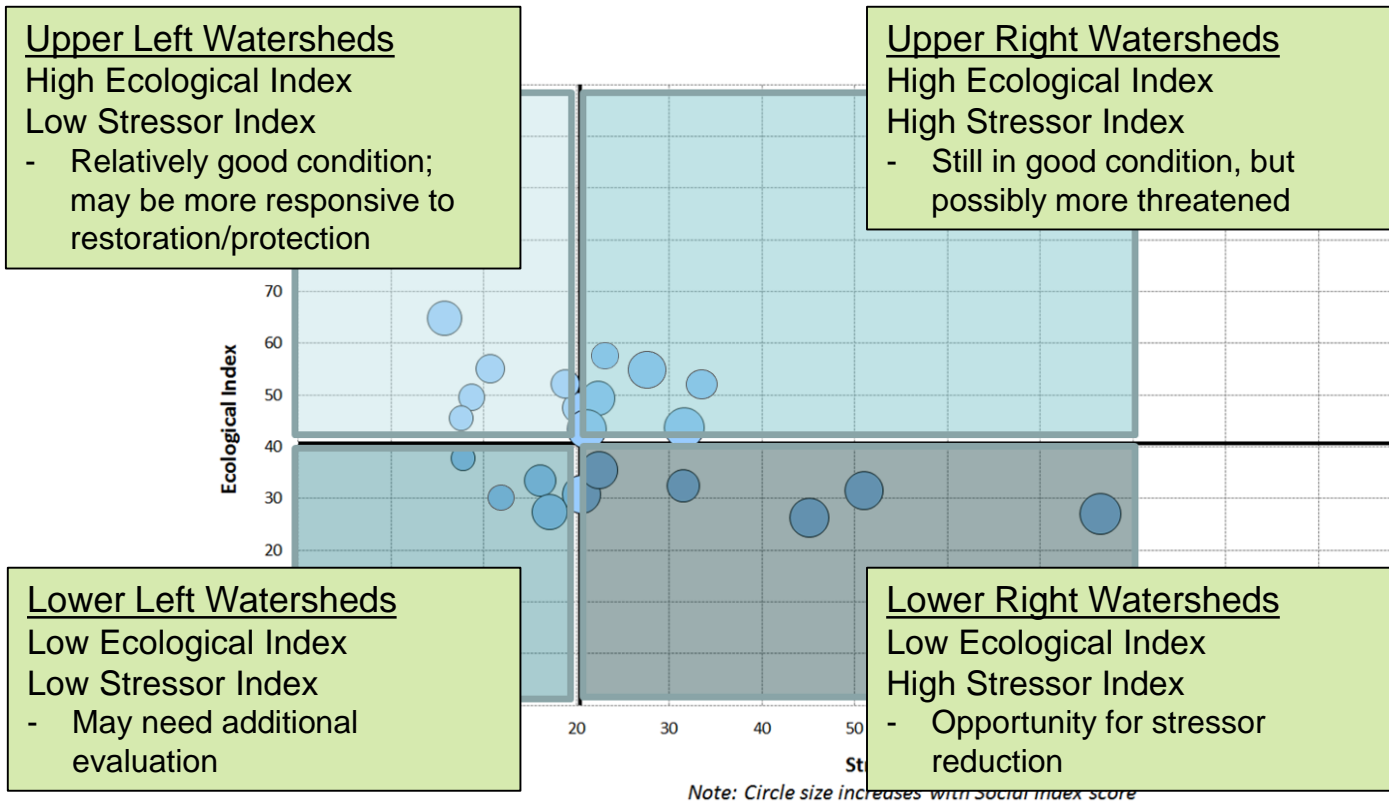
←
→
...
Results
Bubble_Plot
Bubble_Plot_Options
HUC12_Map
HUC8_Data
HUC12_Data

RPS Results

RPI Score For HUC12 Watersheds



RPS Results



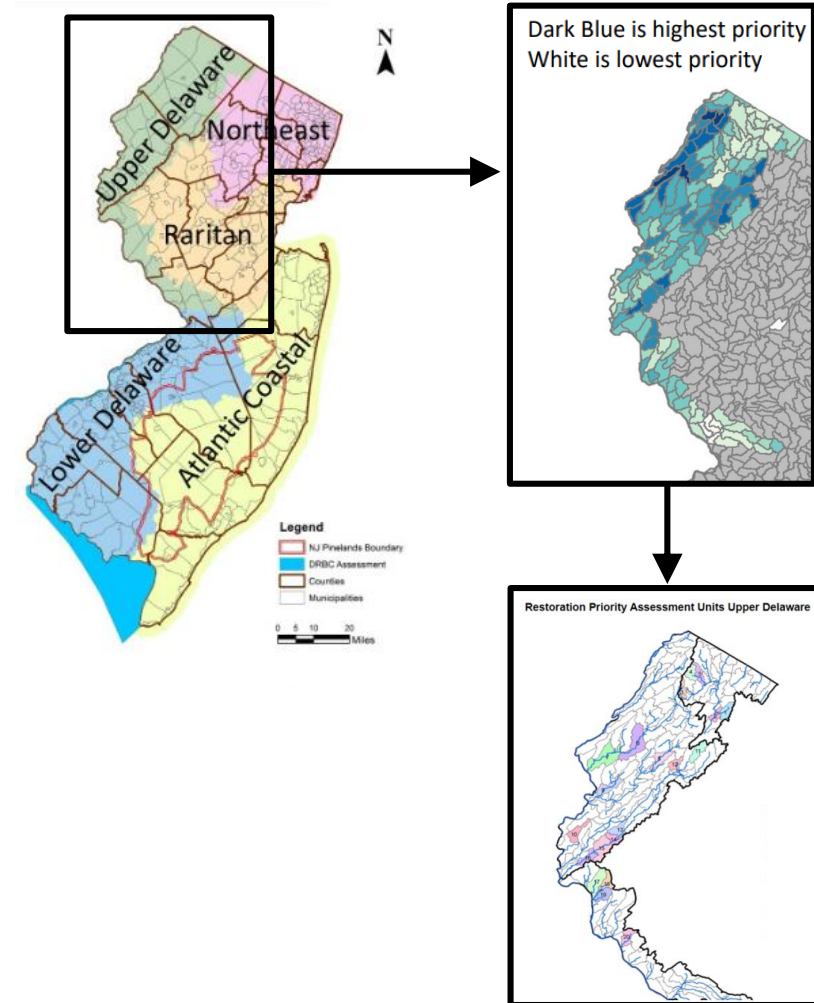
Bubble size

Larger bubbles = more favorable social traits based on screening objective

Example: New Jersey Department of Environmental Protection (NJDEP)

NJDEP used RPS to determine restoration priorities as part of their 2018-2020 Integrated Report

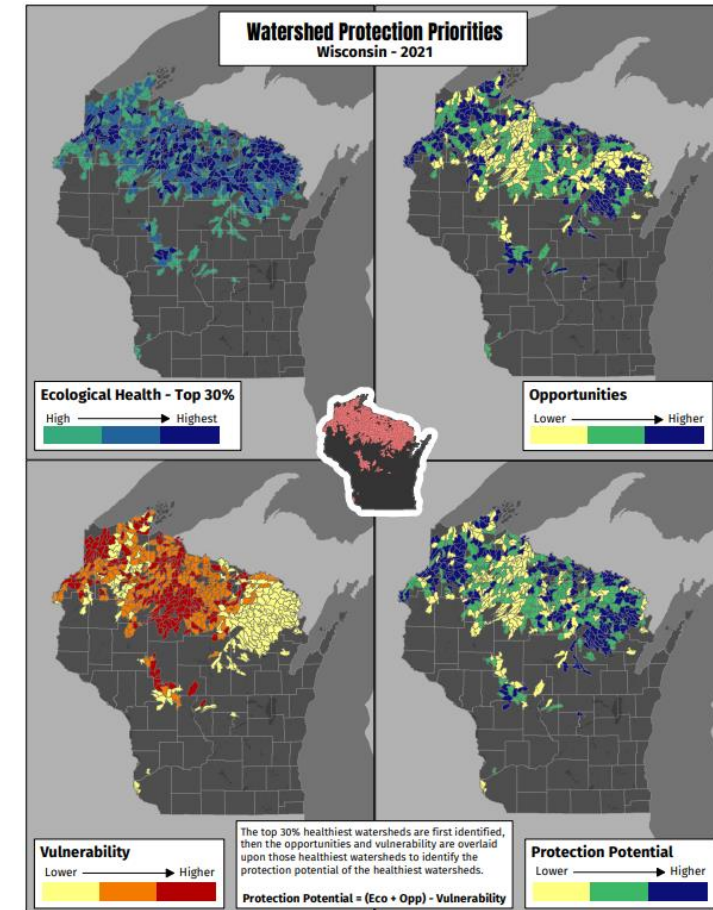
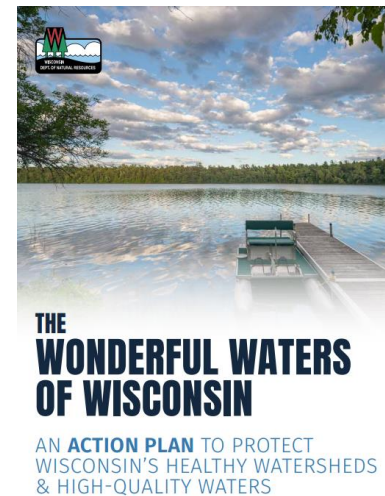
- NJ RPS Tool
 - HUC14 scale – scale used in the Integrated Report
 - Additional custom indicators, including data from NJDEP (e.g., average Index of Biotic Integrity ratings)
- How the NJ RPS Tool is used
 - part of a 2-step process (RPS + comprehensive assessment)
 - Identify Assessment Units that show the best potential in achieving water quality improvements to restore designated uses
- Future of RPS Tool - Inclusion of environmental justice considerations in water quality planning
 - Additional indicator in custom NJ RPS Tool: Area of HUC14 designated as an Overburdened Community under the NJ Environmental Justice Law



Example: Wisconsin Department of Natural Resources (WDNR)

WDNR's Healthy Watersheds, High-Quality Waters (HWHQW) initiative used RPS to model and identify the current healthiest watersheds in the state to enable protection prioritization.

- HWHQW Action Plan
 - Roadmap describing the steps needed to keep 100% of WI's healthy watersheds and high-quality waters protected through 2030
- WDNR adaptation of RPS Tool
 - RPS Tool → Protection Potential Screening Tool
 - Ecological Index – customized PHWA WHI, used to identify healthiest watersheds in the state
 - Stressor Index → Vulnerability (trend-based stressors/vulnerabilities)
 - Social Index → Opportunities (protection opportunities)
 - Recovery Potential Integrated Index → Protection Potential



Related Tool and Resources - WSIO

Watershed Index Online (WSIO): Free, publicly available data library of watershed indicators and a decision-support tool

<https://www.epa.gov/wsio>

- WSIO data library: over 400 indicators, measuring a wide variety of ecological, stressor, and social characteristics of watersheds across the contiguous US
- WSIO tool: adapted from RPS Tool code; user-defined area and indicators

Watershed Index Online (WSIO)



CONTACT US

About Watershed Index Online

- [Introduction to WSIO](#)
- [WSIO Benefits](#)
- [Watershed Indicator Data Library](#)

Watershed Comparison Tools

- [Download and Use the WSIO Tool](#)
- [State-Specific Recovery Potential Screening \(RPS\) Tools](#)
- Training Support: [New Indicator Reference Sheets](#)

Related EPA Topics

- [Healthy Watersheds](#)
- [Recovery Potential Screening](#)
- [Healthy Watersheds Protection](#)
- [How's My Waterway](#)
- [Water Quality Assessment \(ATTAINS\) Information System](#)

Recent updates to WSIO Data Library and RPS Tools

- New HUC12 indicators added in August 2021 relevant to:
 - Environmental justice
 - Watershed vulnerability to future climate change

New Social Indicators	New Stressor Indicators
<ul style="list-style-type: none">• Low-Income Population• Minority Population• Linguistically Isolated Population• Vulnerable Age in Watershed (under Age 5 or over 64)• Less than High School Educated Population• Mobile Home Parks Count	<ul style="list-style-type: none">• Projected Change in Annual and Spring Runoff• Projected Change in Mean Annual and Summer Temperature• Projected Change in Annual and Summer Precipitation• Sea Level Rise Inundation• Nitrogen, Phosphorus, and Sediment Yield• Impaired Waters• 100-Year Flood Zone• Hurricane Storm Surge Zone• NPDES Effluent Violations• Toxic Release and Exposure Potential• Hazardous/Toxic Site Counts

RPS Resources and Support

- User Guide with step-by-step instructions
- Video Training Series - short instructional videos that each focus on critical elements of the RPS Tool
- Reports from past projects
- Indicator Reference Sheets
- Technical support
- Coming soon
 - RPS Scenario factsheets
 - WSIO Web Service Guide
 - Updated RPS Tools in June

**Please reach out to be added to distribution list:
HWP_Team@epa.gov**

The image shows a YouTube video player on the left with the title "Using the Recovery Potential Screening Tool" and "Video Training Series". The video content includes a title slide with the EPA logo and the text "The Screening Process". To the right is a document titled "USER GUIDE FOR THE RECOVERY POTENTIAL SCREENING (RPS)". The document features a bubble chart with a legend and a map of the United States. Below the video and guide is a "Indicator Reference Sheet - DRAFT December 9, 2021" for "Population Demographics". The sheet lists five indicator names: % Low-Income Population in Watershed (WS), % Minority Population in Watershed (WS), % < High School Educated Population in Watershed (WS), % Linguistically Isolated Population in Watershed (WS), and % Vulnerable Age Group Population in Watershed (WS). It also includes an "Indicator Description" section with background and measurement information, and a color-coded map of the United States showing low-income population percentages by watershed.

Indicator Description

Background

Demographics describe the socioeconomic characteristics of a group of people. Demographics are used by researchers and practitioners to help understand the vulnerability of a population to pollution and environmental degradation.¹

What the Indicators Measure

These indicators describe five demographic characteristics of the population that resides in a HUC12 subwatershed:²

- **% Low-Income Population in Watershed (WS)** – population living in a household with low-income. Low-income is defined as a household income that is less than or equal to twice the federal poverty level.⁴ Reported as a percentage of the total population in the HUC12 with known household income (Figure 1).

- **% Minority Population in WS** – population in a minority group. Minority groups include individuals

Low Income Population Percent in Watershed
0% < 90%

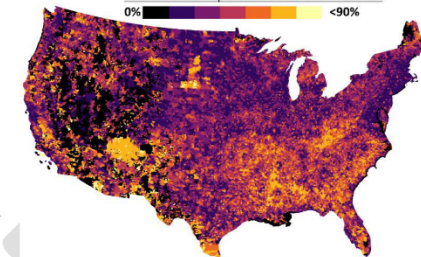


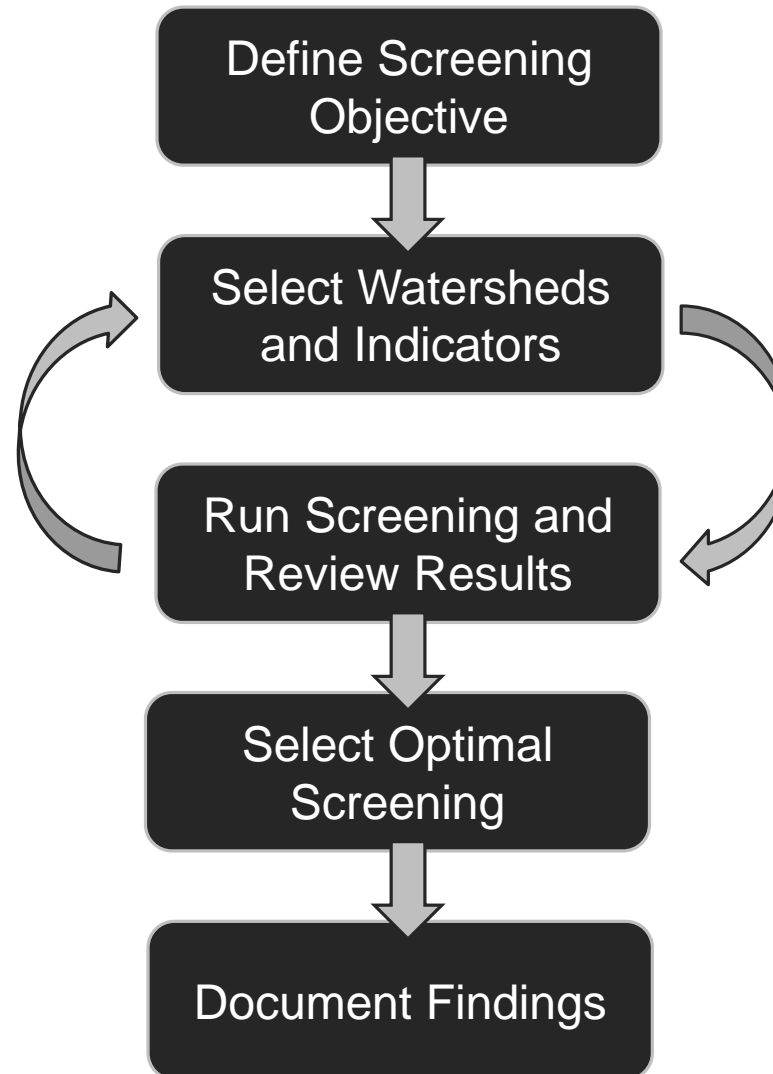
Figure 1. Map of % Low-Income Population in Watershed for HUC12s in the contiguous US.

indicators of a community's potential vulnerability to be impacted by pollution and environmental degradation.¹

A scenic view of a rocky stream flowing through a lush forest. The water is clear and flows over large, smooth rocks. Sunlight filters through the dense green foliage, creating a bright and peaceful atmosphere. The overall scene is a natural, outdoor setting.

RPS Tool Demo

RPS Screening Process



RPS Tool Demo

- The *State of Paradise* is conducting long-term planning to identify subwatersheds that will be priorities for TMDL development and implementation over the next decade



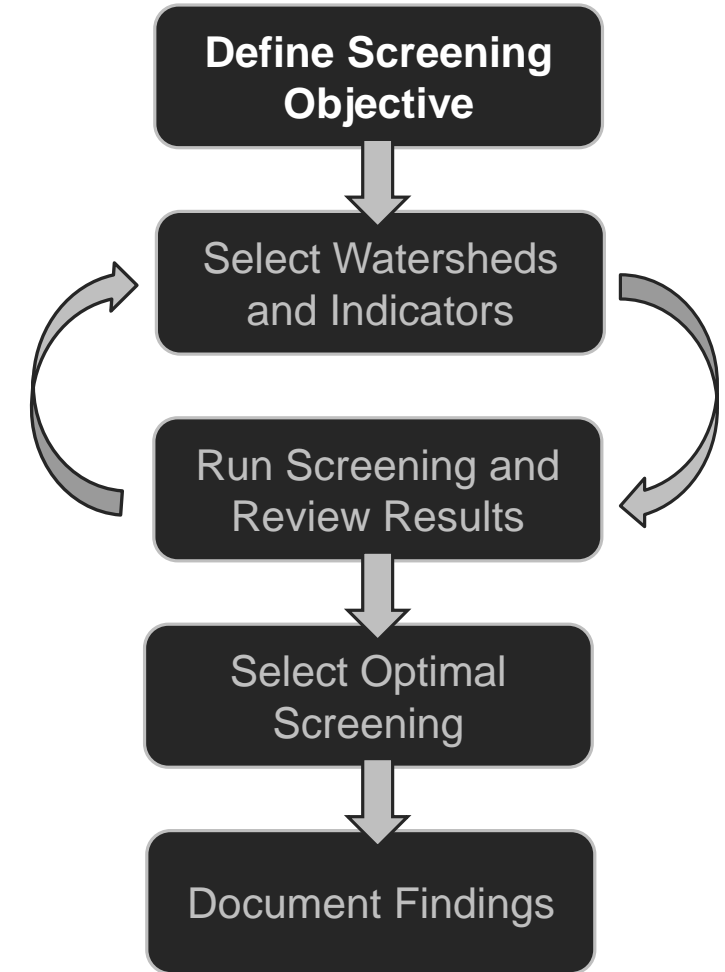
RPS Tool Demo

- DEP will focus on TMDLs for nutrient impairments and will consider environmental justice factors for planning
- The RPS Tool will be used to identify an initial group of priority HUC12s for further evaluation

RPS Tool Demo – Screening Objective

Hypothetical example:

“Identify target HUC12s for nutrient TMDL development and implementation to support ecosystem and community resilience”



RPS Tool Demo – Select Watersheds & Indicators

- ❑ HUC12 selection: only screen HUC12s with nutrient impairments
- ❑ Indicator selection: characteristics of “target” HUC12s for TMDL development and implementation
 - 1) Indicators of a potential underserved community
 - 2) Elevated nutrient sources and loading
 - 3) Relatively high watershed health compared to other candidate HUC12s

RPS Tool Demo – Select Watersheds & Indicators

➤ Potential underserved communities



Social Indicators
% Low Income Population
% Minority Population
% < High School Educated Population
% Linguistically Isolated Population
% Vulnerable Age Groups

➤ Elevated nutrient sources and loading



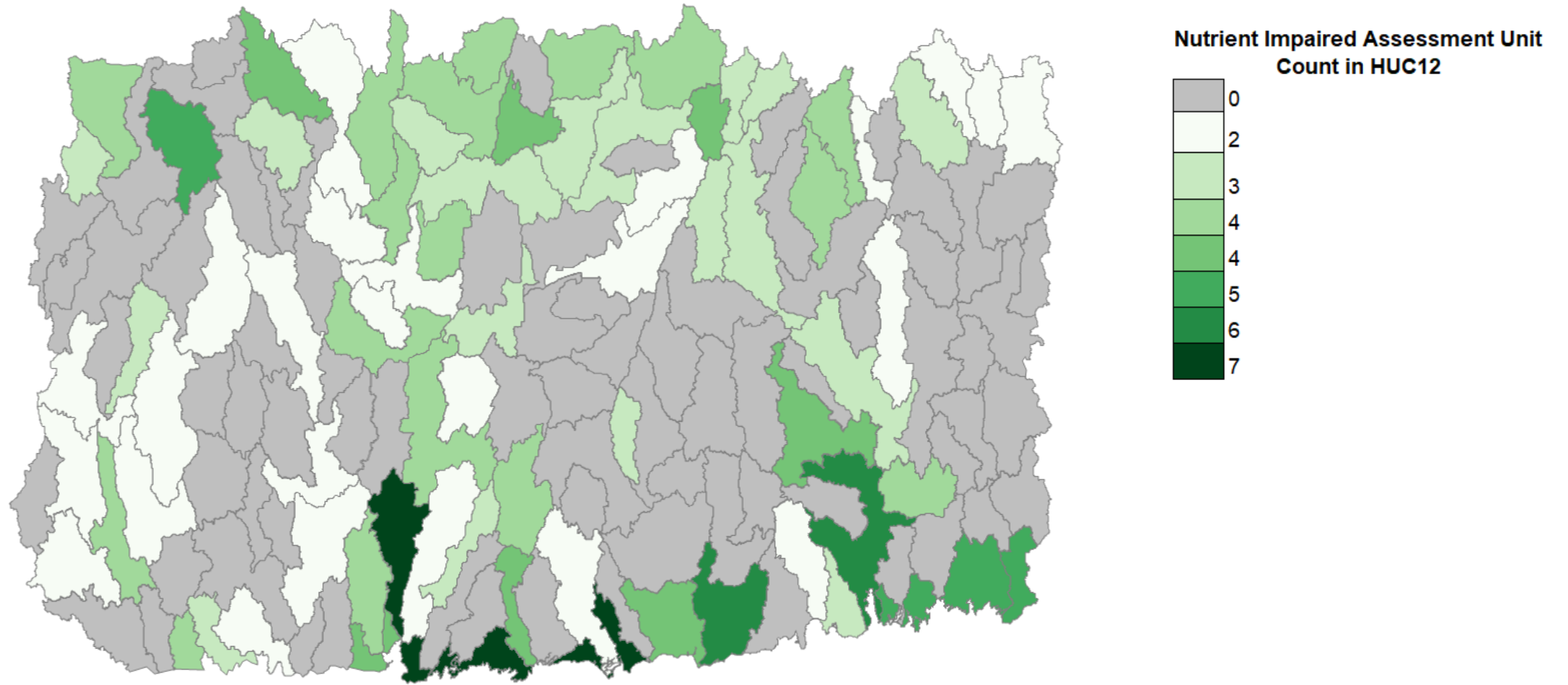
Stressor Indicators
Nitrogen Yield
Phosphorus Yield

➤ Watershed health



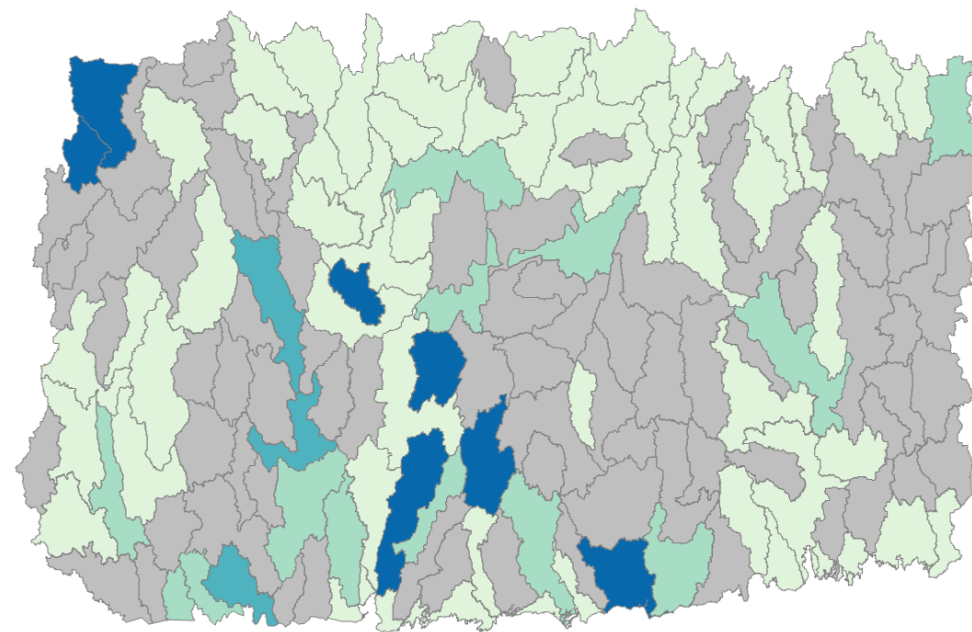
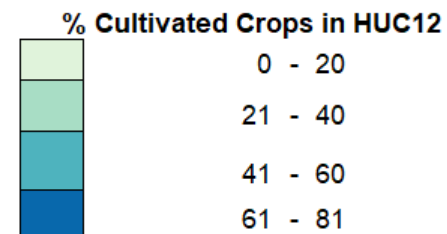
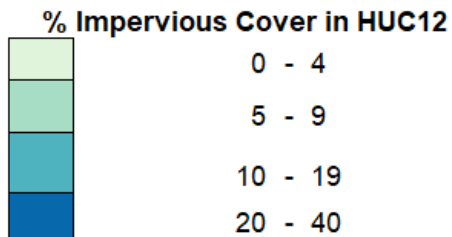
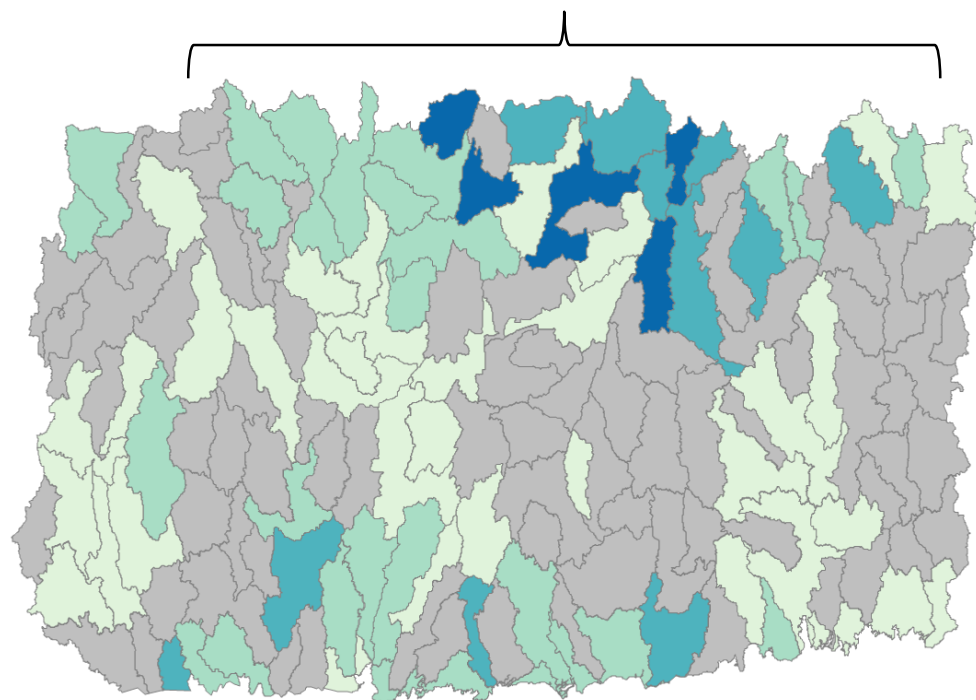
Ecological Indicators
PHWA Watershed Health Index

RPS Tool Demo – Subsetting HUC12s



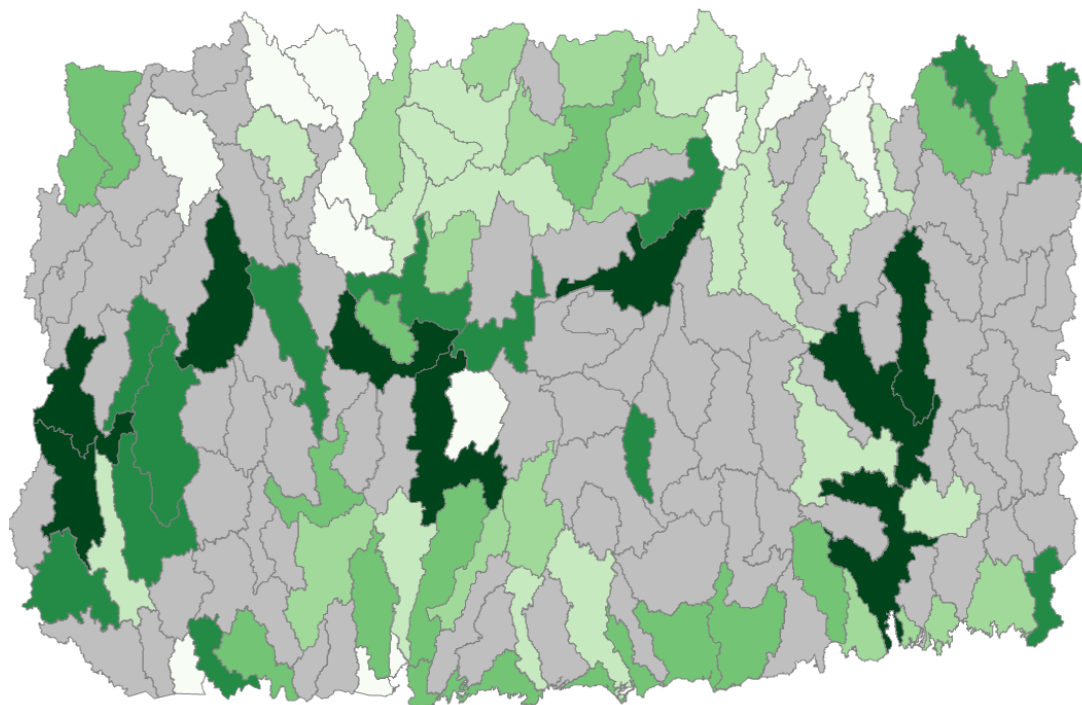
RPS Tool Demo – Run Screening and Review Results

High density development concentrated in north coast HUC12s

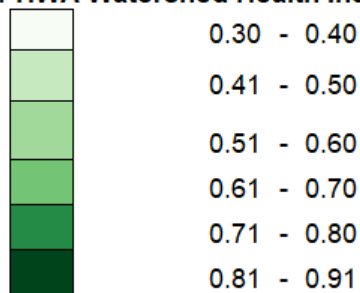


Extensive cropland and agriculture in south and west coast HUC12s

RPS Tool Demo – Run Screening and Review Results



PHWA Watershed Health Index, State



Healthy Watersheds Protection www.epa.gov/hwp



Learn about Watersheds

- [Basic Information and Answers to Frequent Questions](#)

Assessing Watersheds

- [Healthy Watersheds Data](#)
- [Integrated Assessment](#)

Protecting Watersheds

- [Initiatives to Protect Healthy Watersheds](#)

Related EPA Topics

- [Watershed Index](#)



Landscape Condition
Patterns of natural land cover, natural disturbance regimes, lateral and longitudinal connectivity of the aquatic environment, and continuity of landscape processes.



Habitat
Aquatic, wetland, riparian, floodplain, lake, and shoreline habitat. Hydrologic connectivity.



Hydrology
Hydrologic regime: Quantity and timing of flow or water level fluctuation. Highly dependent on the natural flow (disturbance) regime and hydrologic connectivity, including surface-ground water interactions.



Geomorphology
Stream channels with natural geomorphic dynamics.



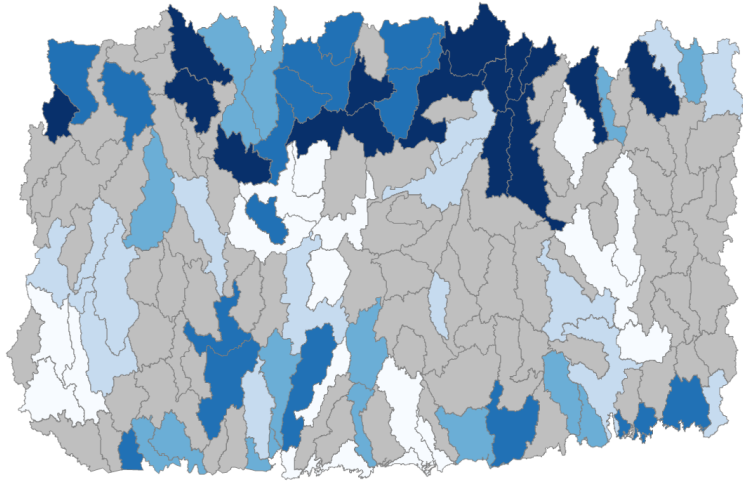
Water Quality
Chemical and physical characteristics of water.



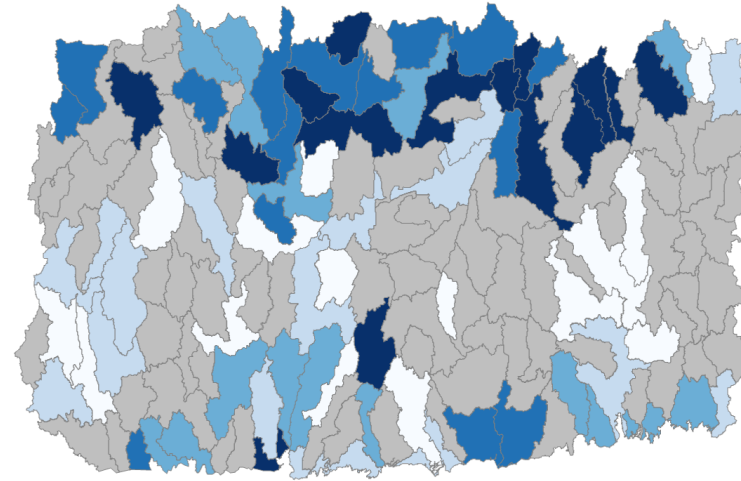
Biological Condition
Biological community diversity, composition, relative abundance, trophic structure, condition, and sensitive species.

RPS Tool Demo – Run Screening and Review Results

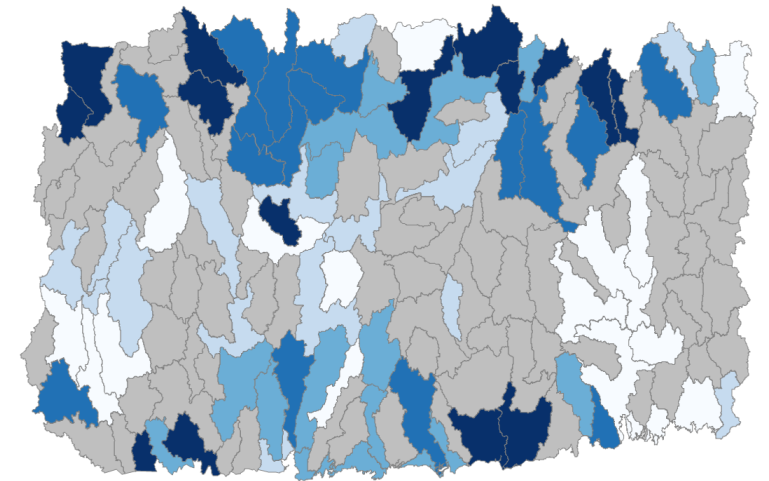
% Low-Income Population



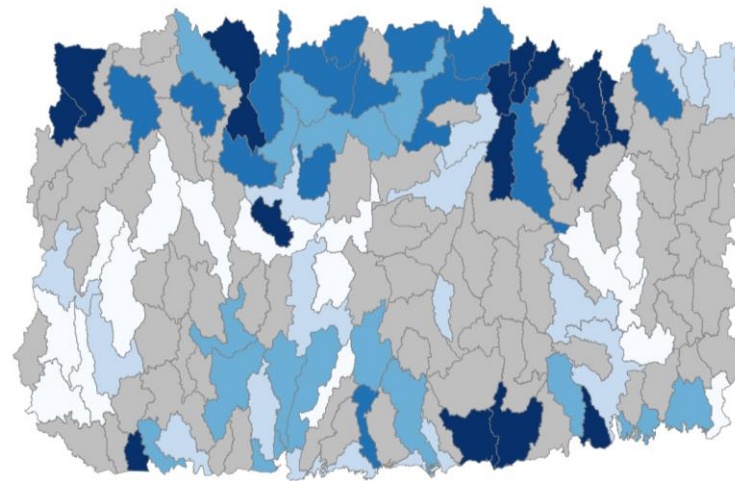
% Minority Population



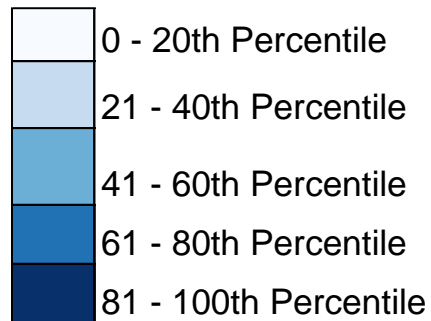
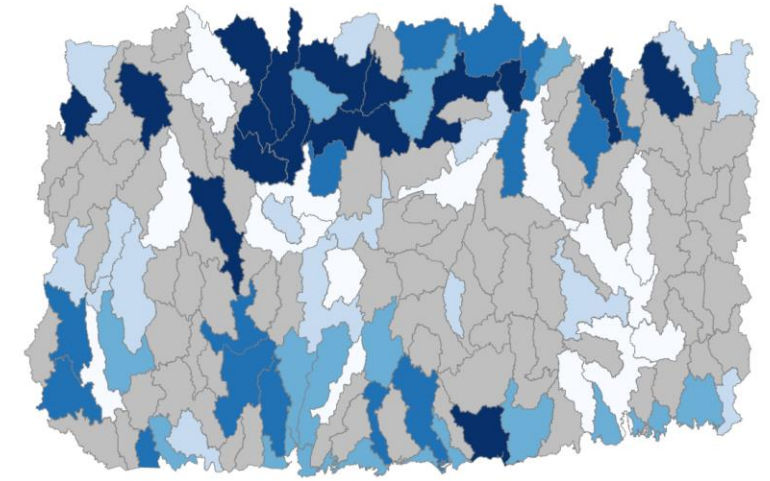
% < High School Educated



% Linguistically Isolated Population

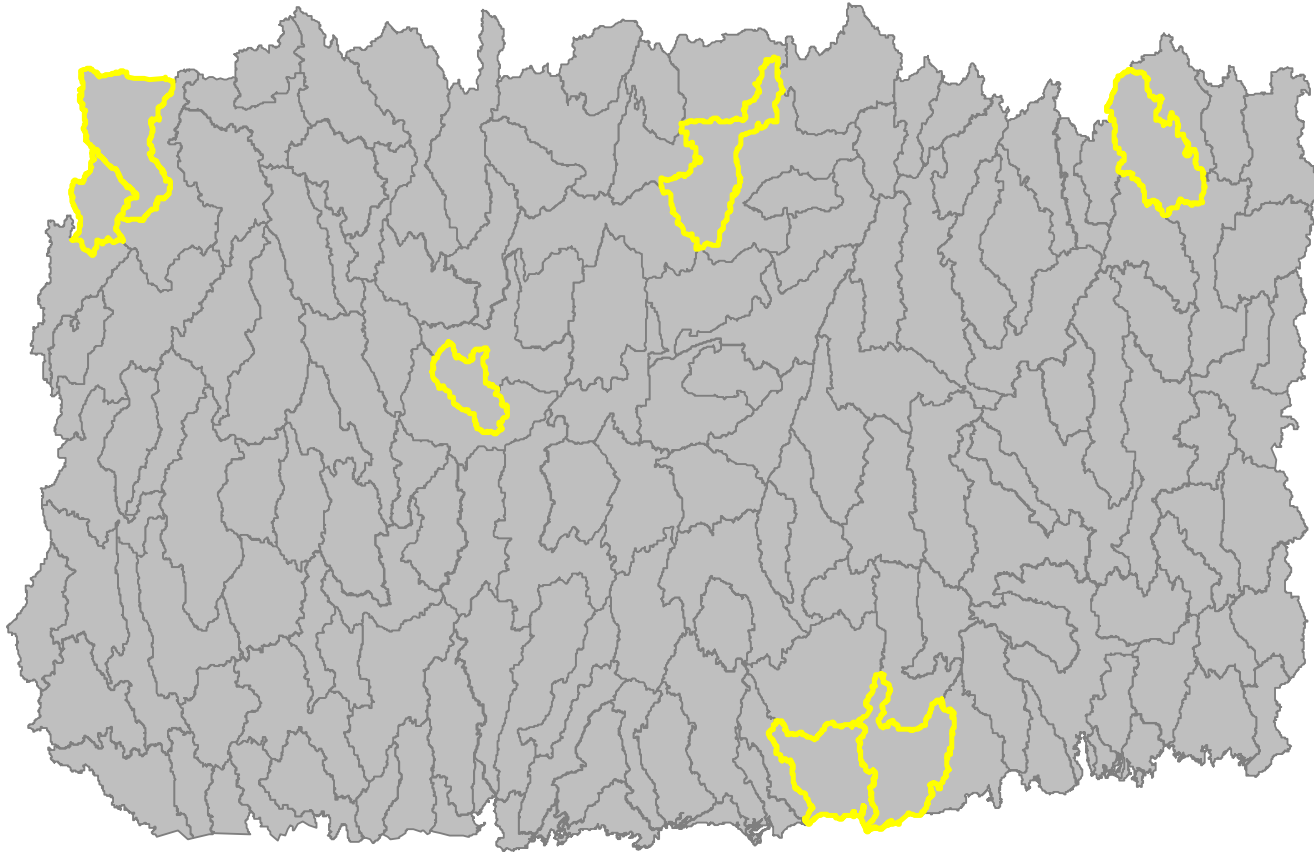


% Vulnerable Age Groups



RPS Tool Demo – Run Screening and Review Results

Potential Priority HUC12s



Above average Ecological, Stressor, and Social Index scores:

1. Freshwater Brook-Paradise River
2. Little River
3. Cedar River
4. Pine River
5. Mine Brook
6. Salmon Creek
7. Mudge Pond Brook