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
Assumptions for Developing an Approach

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

Data are available for measuring many factors (monitoring, GIS data)

Analyzing multiple lines of evidence from these metrics reveals differences in restorability

A systematic, repeatable comparison process is feasible

Rapid, flexible methods for screening scenarios are needed (vs. a single output that rigidly assigns priority)

Systematic comparisons can be merged with expert judgment in informing restoration planning

Recovery Literature Review

• Over 1700 published papers

• Identification of factors influencing or associated with impaired waters recovery

In literature

In practice

Where it started (2004)…
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...
How does it work?
Recovery Potential Screening - Basic Concept

Ecological metrics
- Indicator 1
- Indicator 2
- Indicator 3
- Indicator 4
- Indicator 5...

Stressor metrics
- Indicator 1
- Indicator 2
- Indicator 3
- Indicator 4
- Indicator 5...

Social context metrics
- Indicator 1
- Indicator 2
- Indicator 3
- Indicator 4
- Indicator 5...

Ecological Index
Stressor Index
Social Index

Ecological + Social + (100 – Stressor)

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### RPS Indicator selection for screening based on prioritizing pathogen TMDLs

<table>
<thead>
<tr>
<th>ECO</th>
<th>STRESSOR</th>
<th>SOCIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent natural cover</td>
<td>Percent pasture in watershed</td>
<td>Jurisdictional complexity</td>
</tr>
<tr>
<td>Percent forest in corridor</td>
<td>Percent impervious in watershed</td>
<td>TMDL count</td>
</tr>
<tr>
<td>Stream density</td>
<td>Percent septic in stream corridor</td>
<td>Percent protected lands</td>
</tr>
<tr>
<td>Stream order</td>
<td>Percent sewered</td>
<td>Active volunteers</td>
</tr>
<tr>
<td>Change in natural cover</td>
<td>Impairments count</td>
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</table>

### RPS Indicator selection for screening based on development risks to watersheds

<table>
<thead>
<tr>
<th>ECO</th>
<th>STRESSOR</th>
<th>SOCIAL</th>
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<tr>
<td>Percent NaturalCover</td>
<td>Percent Sewered</td>
<td>Percent Stressors_Known</td>
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<tr>
<td>Percent_Forest_In_Corridor</td>
<td>Percent Impervious</td>
<td>Percent Length_Assessed</td>
</tr>
<tr>
<td>Percent_Wetlands</td>
<td>Percent Impervious _&gt;5_In Corridor</td>
<td>Percent Watershed.Protected.Lands</td>
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<tr>
<td>Topo_Complexity</td>
<td>Percent Length_Impaired</td>
<td>Low_Jurisdictional_Complexity</td>
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<tr>
<td>NFHAP_HCI_Condition</td>
<td>Road_Density</td>
<td>Low_Landuse_Complexity</td>
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<td>Combined_Natural_Habitat_Index</td>
<td>Percent_Septic_In_Corridor</td>
<td>Active_Volunteers_Count</td>
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<td>Percent Change_Natural_Cover</td>
<td>Population_In_Corridor_With_Septic</td>
<td>Percent_Source_Water_Protection_Area</td>
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<tr>
<td>Percent_Natl_Eco_Framework</td>
<td>Population</td>
<td>Other_Priority_Recognition</td>
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<tr>
<td>Stressor_Count</td>
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</table>
Recovery Potential Screening and the Watershed Index: Teaming 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
RPS Scoring Tool

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

Requires only spreadsheet skills to run screenings, create RPS products
Three Types of Recovery Potential Screening Products
(from the indicator scoring)

Rank Ordering

Bubble Plotting

Mapping
Applying RPS in State Programs
• SP12 screening results of Eco, Stressor, and Social Indices relative to “improving watersheds” possible priority
- RPS at catchment scale for restoration priority setting
- RPS at HUC12 scale for healthy watersheds protection
• Evaluate restorability to inform dialogue on priority setting

• **USDA, EPA, MPCA, MDNR** involvement
Nutrients RPS Two-Stage Approach

• Statewide ‘coarse sort’ of all HUC8s (Loading, sources, ecological condition, readiness)

  (RPS targeting metrics)

• RPS Targeting stage: identify priority HUC8s (optimize for load reduction, good RP prospects)

  (RPS implementing metrics)

• RPS Implementing stage: HUC12s in HUC8 (where to take action within priority 8’s)
## Maryland RPS Nutrients-Based Watershed Screening Results

<table>
<thead>
<tr>
<th>MDE8DIGT</th>
<th>MDE8NAME</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>S6 TOTAL SCORE FROM SYNTHs</th>
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</table>
UT: a N-based scenario selection identifies 23 possible target HUC8s

- 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
Compare HUC12s to each other for specific N&P management actions (e.g., importance of social metrics and community support)
Suggestions for all Recovery Potential Projects

*you DO have the goals, the data, the tools, and the help....just do it.*

- **embrace the flexibility of RPS** – don’t expect one rigid set of results; run multiple screenings with different indicators, then select or combine results.
- **screen all your subwatersheds** – at least at a basic level of common indicators; it’s little difference in work to measure the indicators on all vs some of them.
- **use reference watersheds** – screen these along with your other subwatersheds so you have context with which to compare your results.
- **limit your indicators in screening, but not in compilation** – measure as many things as you can afford to – because they provide options for further screenings; but, select fewer/more important indicators for each screening run.
- **narrow down your screening purposes** – more focused screenings allow more specific indicator selection, receive clearer signals vs noise -- e.g., screen rural/ag vs urban vs mixed pathogen impairments separately instead of all at once.
- **use the RPS results display options** – the different techniques reveal different things and stimulate “discussion support.”
A Method for Comparative Analysis of Recovery Potential in Impaired Waters Restoration Planning

Douglas J. Norton · James D. Wickham · Timothy G. Wade · Kelly Kunert · John V. Thomas · Paul Zeph

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Abstract Common decision support tools are needed to make use of the growing body of knowledge about ecological response to restoration efforts to inform and guide large state and federal restoration programs affecting thousands of impaired waters. Under the federal Clean Water Act (CWA), waters meeting Water Quality Standards are placed on the CWA Section 303(d) list for impairment and restoration efforts are required. There is a need for tools that can compare the recovery potential of impaired waters and that can assist with selecting priority restoration efforts. This paper describes a method for such comparisons that uses data from an existing national database of ecological response to restoration and processes that can be used to select priorities for restoration efforts. The method could be used to compare recovery potential of unimpacted waters as well as that of impaired waters.

Thank you for your time!

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