



WESTERN PILOT



Purpose of the Western Pilot

- Advance the science of ecosystem monitoring for western ecological systems
 - indicators
 - reference conditions
 - designs
 - assessment methods
- Build State capacity for long-term monitoring
 - monitoring tools
 - analytical capability
 - partnerships

Objectives of the Western Pilot

- Demonstrate indicators and designs for measuring environmental progress
 - unbiased estimates of condition of ecological resources
 - comparative ranking of stressors
 - tools for biocriteria
- Demonstrate the value of survey based monitoring developed by EMAP
 - apply to real problems of Regional/State interest

Geographic Scope of the Western Pilot

- EPA Regions 8
 - States of North Dakota, South Dakota, Montana, Wyoming, Colorado, Utah
- EPA Region 9
 - States of Arizona, Nevada, California
- EPA Region 10
 - States of Oregon, Idaho and Washington

Ecological Resources of the Western Pilot

- Coastal systems (estuaries and coastal waters)
- Surface water systems (rivers and streams)
- Landscapes

Components of the Western Pilot

- Coastal
 - conditions of estuaries by state
 - focus areas chosen by EPA regional offices
- Surface waters
 - conditions of rivers and streams by State
 - focus areas chosen by EPA regional offices
- Landscapes
 - land cover atlas for the West
 - quantification of relationship between landscape indicators and aquatic condition
 - focus areas chosen by EPA regional offices

Region 8 Focus Areas

- TBD

Region 9 Focus Areas

- TBD

Region 10 Focus Areas

- Coastal
 - Tillamook Bay and north coast of Oregon
- Surface Waters
 - Deschutes and John Day basins
 - Tillamook Bay watersheds (STAR grant)
- Landscapes
 - upper Deschutes basin
 - north coast of Oregon (Newport to Seaside)

Example Coastal Indicators

- Fish community
- Fish pathology
- Fish tissue contamination
- Benthic community
- Sediment contamination (e.g. metals, organics)
- Water physio-chemical (nutrients, temperature, alkalinity dissolved oxygen, heavy metals, depth)

Example Surface Water Indicators

- Fish assemblage
- Fish tissue contamination
- Macroinvertebrate assemblage
- Periphyton
- Physical habitat (e.g. riparian characteristics, woody debris, canopy cover, gradient)
- Water physio-chemical (e.g. nutrients, temperature, alkalinity dissolved oxygen, heavy metals)

Example Landscape Indicators

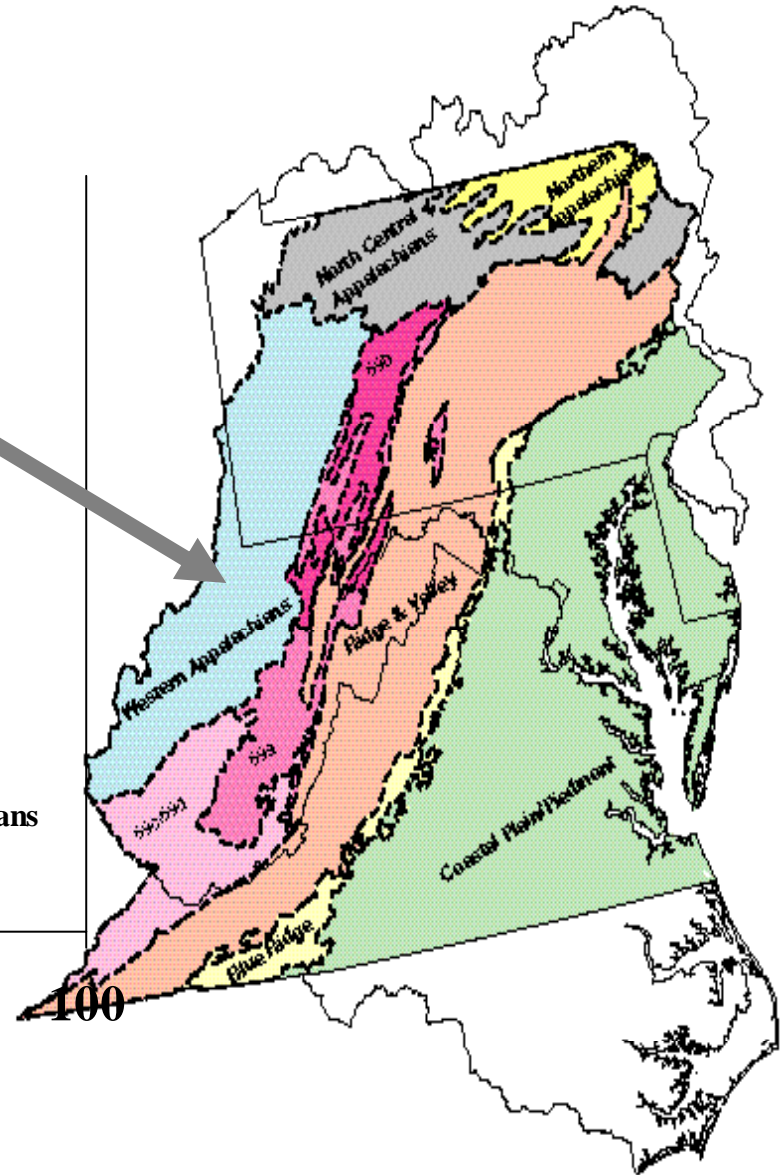
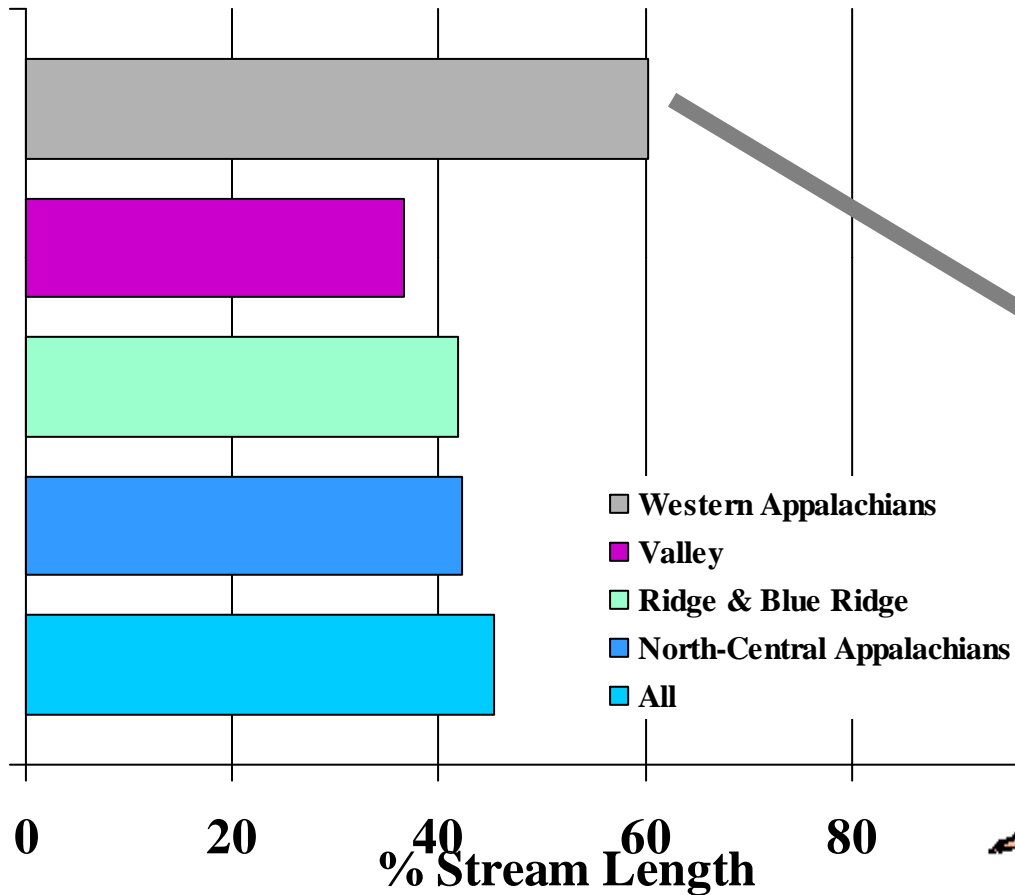
- Riparian indicators
 - land cover along streams
 - disturbance (e.g. grazing)
- Watershed indicators
 - land use and cover
 - upland erosion
 - natural cover diversity
 - impervious surfaces
 - population density

Value of Improved Approaches to Monitoring

- Monitoring for results
 - GPRA objectives
- Targeting
 - most important areas
 - most important stressors
- Support development of biocriteria
- Support for specific assessments
 - 305 (b) reporting

Example Geographic Targeting

Poor Fish Integrity



Key Elements of the EMAP Approach

- Ecological (i.e., biological) resources
- Direct measures of condition
- “Integrated” condition
- Reference conditions
- Surveys for unbiased results
- Ranking of stressors
- Spatial comparisons

Survey Design Advantages

- Guarantees representation and inference to systems of interest
- Adapted to resource characteristics
- Adjusts sample sizes to meet precision requirements
- Adaptable to temporal and spatial scales of resolution

Lessons from Mid Atlantic Pilot

- True ORD/Regional partnerships necessary
 - Internal Regional and ORD commitment top to bottom (long-term)
- Biological and habitat indicators compliment current chemical monitoring, can be used now and are economical
- Sound environmental characterization can drive management decisions and influence public perceptions

Lessons from Mid Atlantic Pilot (cont.)

- Statistical surveys are very important to setting goals and measuring progress
- Expanding use of environmental indicators and statistical surveys changed the view of relative risk
- Long-term outlook essential
- Partnership/stakeholders involvement is critical

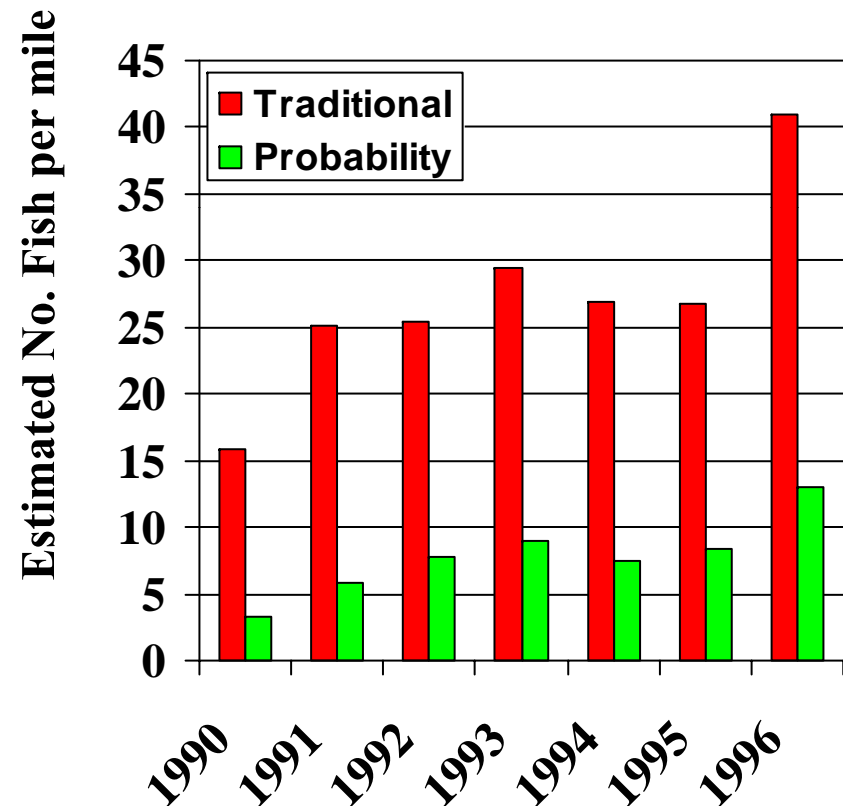
Benefits of EMAP Approach

- Improved estimates of population size
- Expectations differ from reality
- Scientifically sound reference conditions
- Scientifically sound regional assessments
- Scientifically sound cross regional assessments
- Improved 305 (b) reporting
- Tools for landscape characterization and assessments

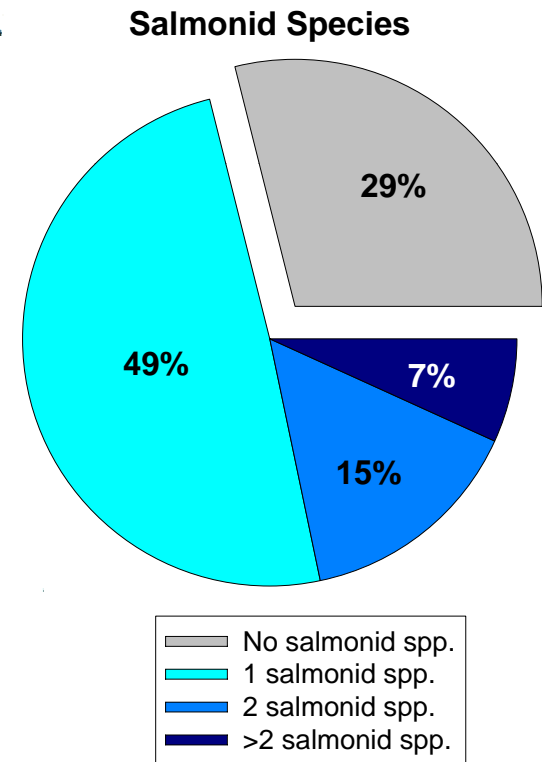
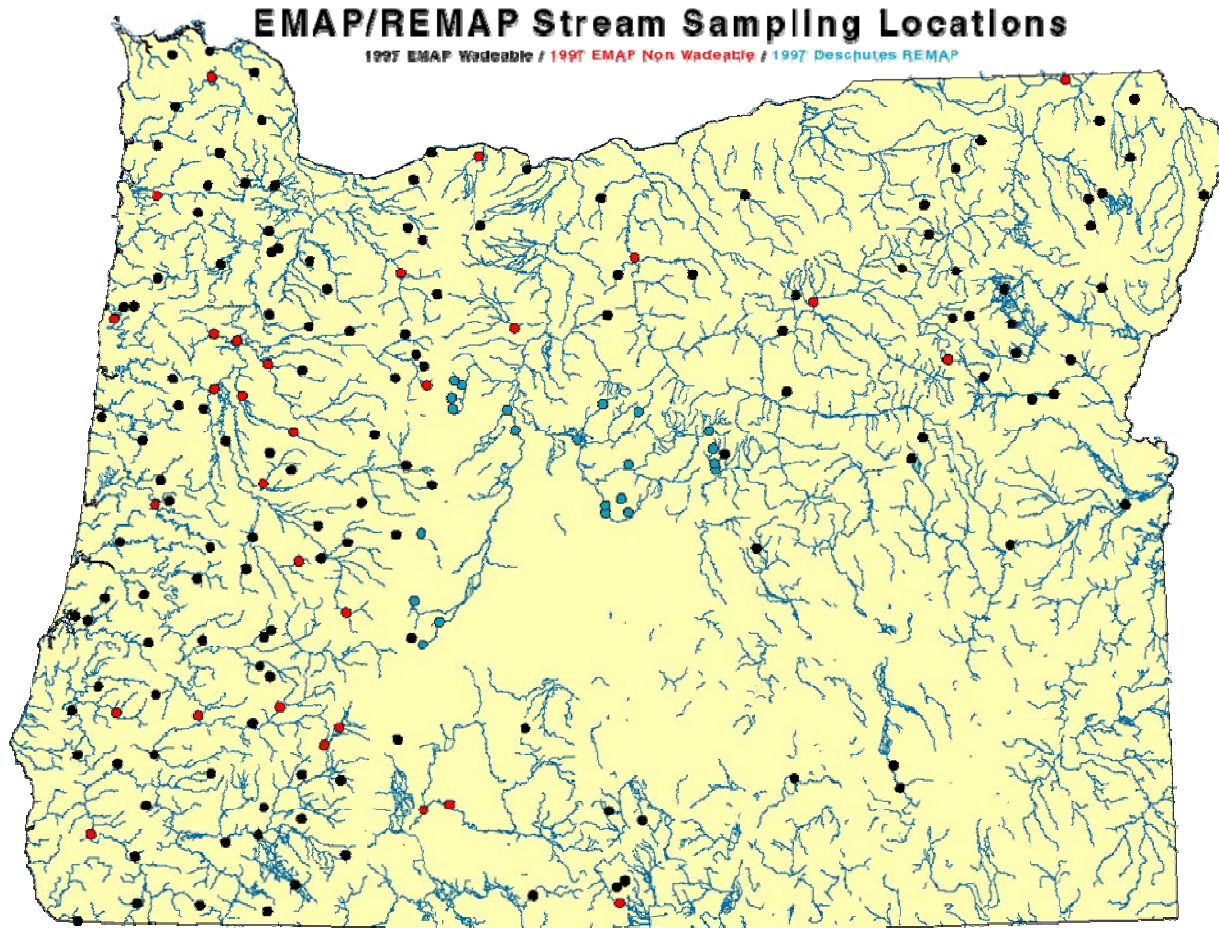
Improved Estimates of Population Size

Oregon Coho Salmon

- **Historic long term monitoring of spawning suggests minimal problem**
- **Historic survey biased**
- **Salmon populations continue to decline**
- **Survey results more accurately reflect populations**
- **State program modified based on probability design**

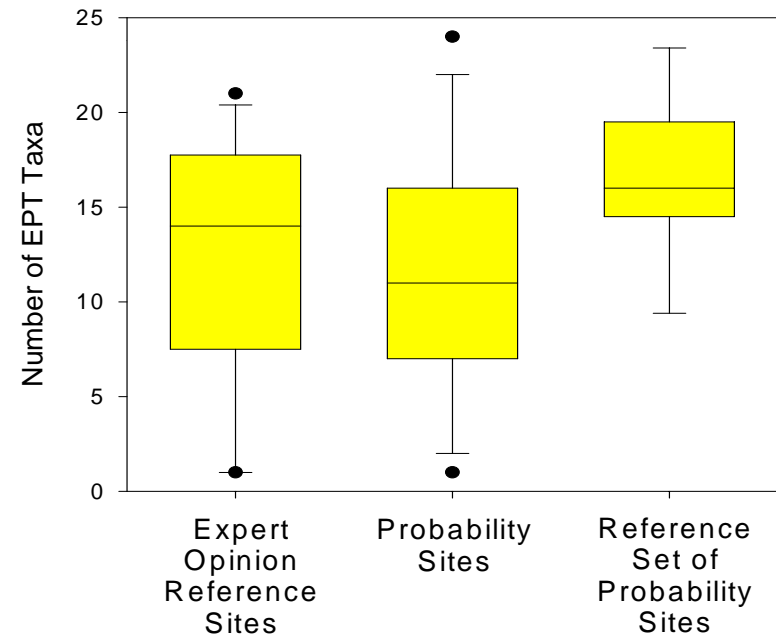
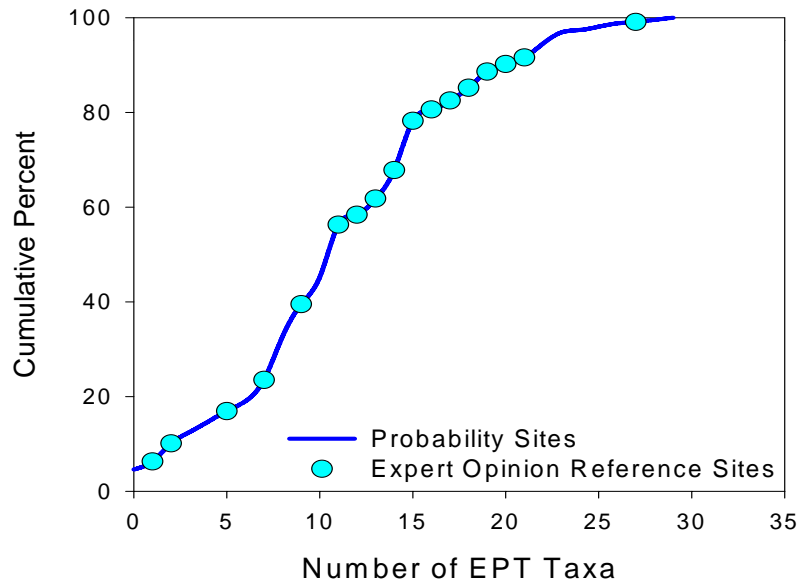


Expectations Differ from Reality



Scientifically Sound Reference Conditions

Expert opinion compared to probability

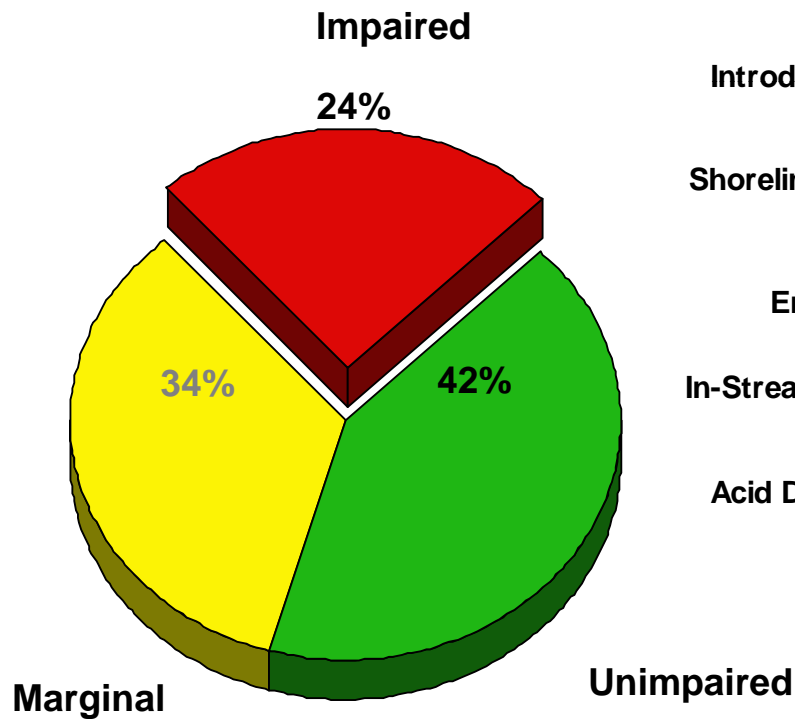


Mid Atlantic streams

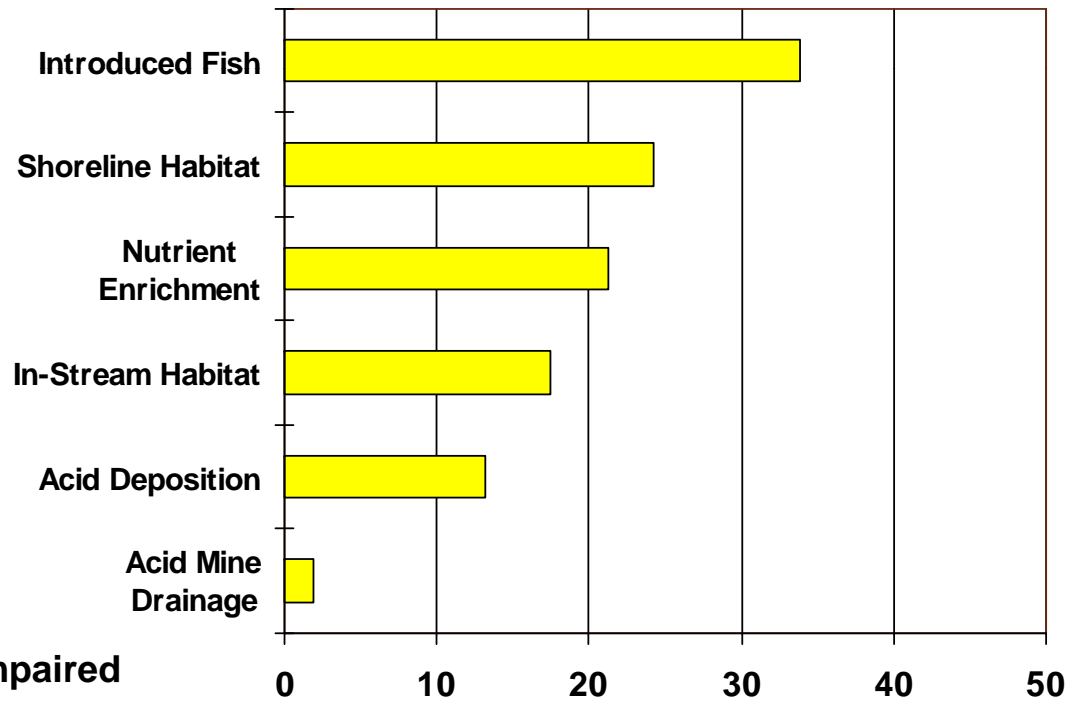
Scientifically Sound Regional Assessments

Stream Conditions in Mid-Atlantic Highlands

Biological Quality



Ranking of Stressors



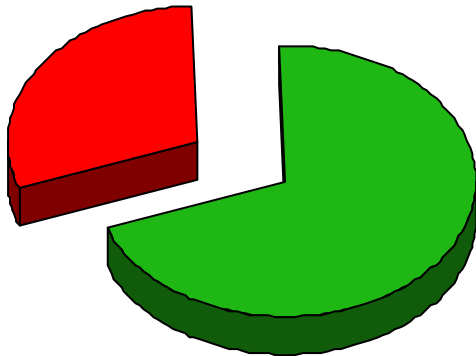
Percent of Stream Miles

Scientifically Sound Cross Regional Assessments

Benthic conditions in Estuaries

Louisianian Province

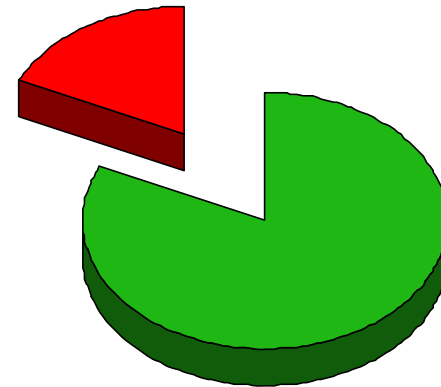
Degraded
 $30 \pm 6\%$



Undegraded
 $70 \pm 6\%$

Virginian Province

Degraded
 $18 \pm 8\%$

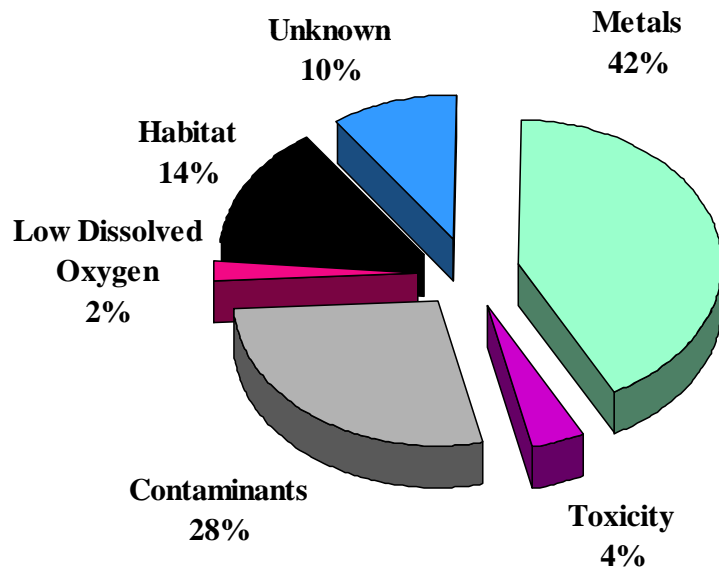


Undegraded
 $82 \pm 8\%$

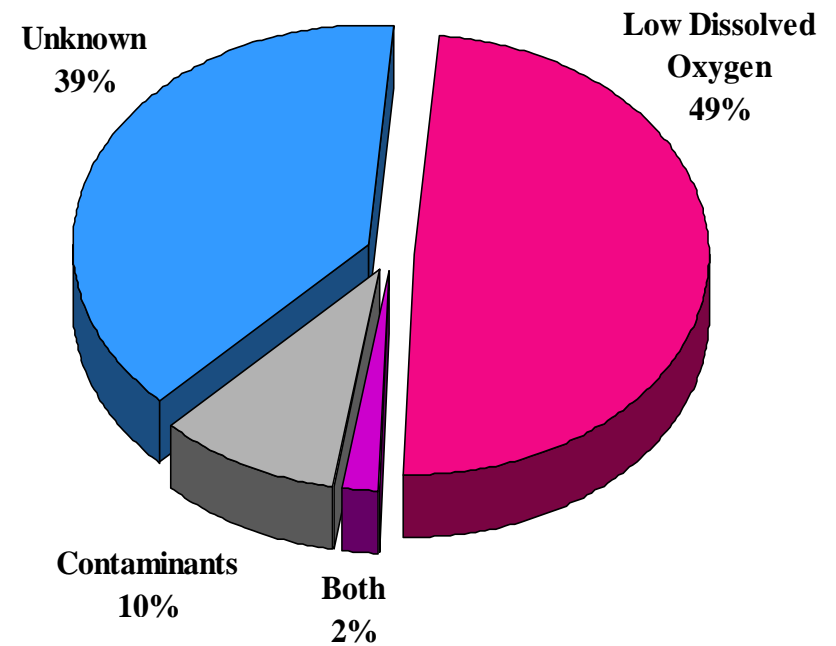
Scientifically Sound Cross Regional Assessments

Ranking of stressors

Louisianian Province

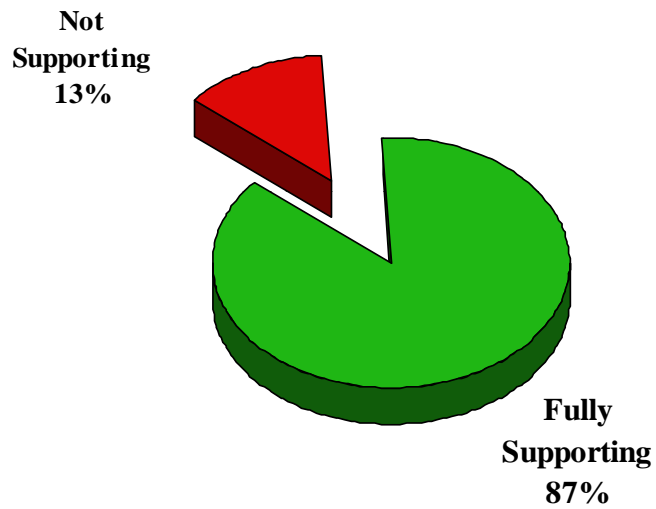


Virginian Province

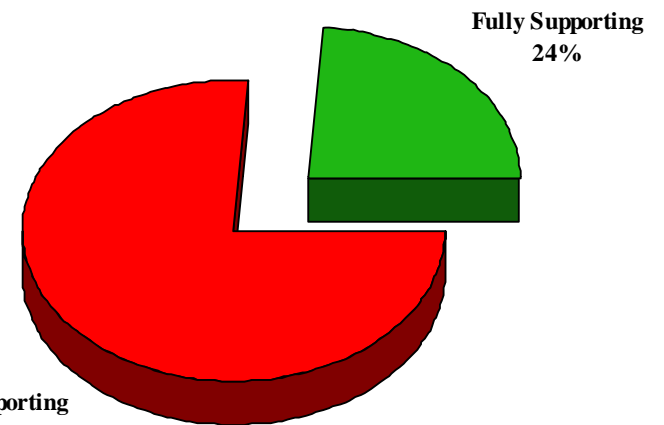


Improved 305 (b) Reporting Delaware

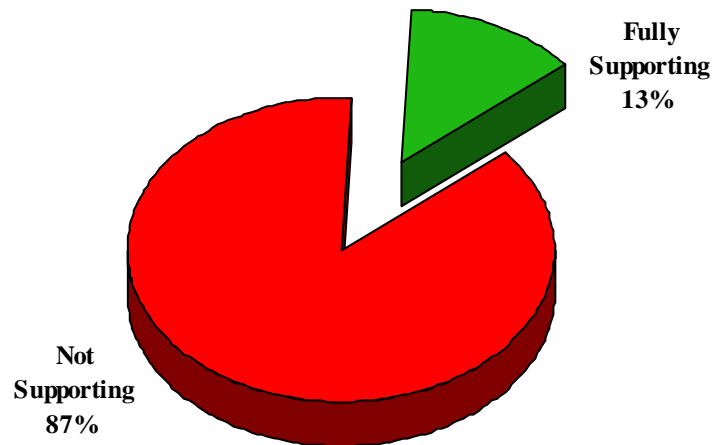
Traditional 305(b) Report -
Chemical Evidence, Aggregation of Existing Data



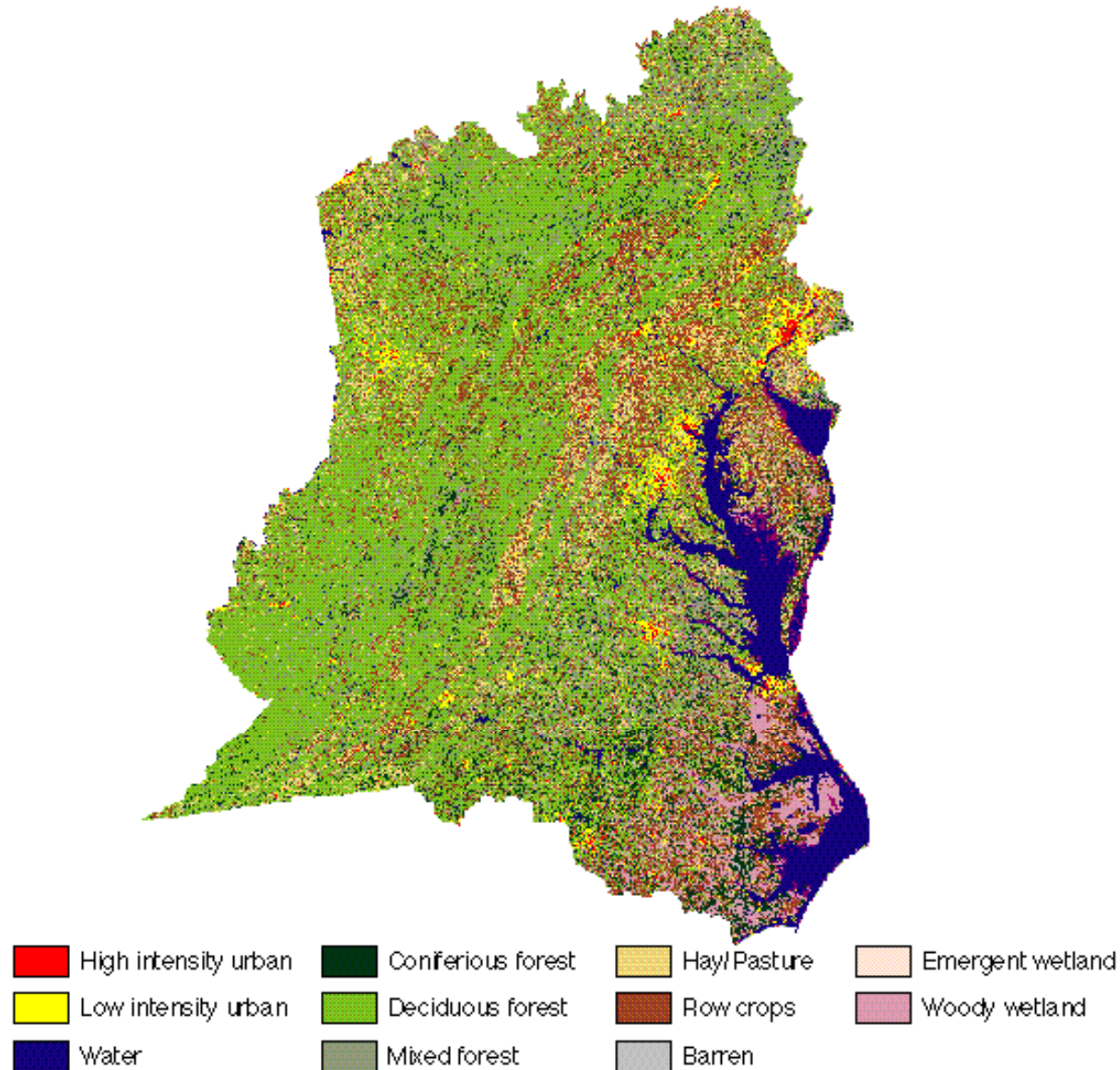
New Report -
Chemical Evidence, Probability Survey



New Report -
Biological Evidence,
Probability Survey



Tools for Landscape Characterization and Assessment





WESTERN PILOT

WESTERN PILOT GIF PAGE

You can use this page to select a number of images to customize your own presentation. Just click on the image you desire and copy it to your overheads. We have left space in the bottom right corner for these images.

