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THE STRESSOR IDENTIFICATION GUIDANCE DOCUMENT

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LTG 2 Poster 01

Science Question

How can causes of biological impairments be inferred, so that the right pollutant is remediated?

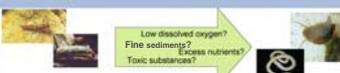
- For temperature?
- For flow alteration?
- For nutrients?
- For suspended and bedded sediments?
- For toxic chemicals?

Research Development

Develop a logical, scientific process to evaluate available information to identify the stressors that are most likely causing biological impairments.

How Research Addresses the Water Quality MYP Goals

Why did this aquatic community change...?



From mayflies and caddisflies that indicate high environmental quality... to snails and worms that indicate poor environmental quality?

The Problem: When using biological surveys and biocriteria to assess water body conditions, the EPA and others were unable to determine the causes of water body impairments.

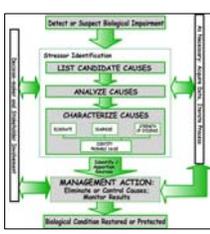
- Over a thousand US waters are listed by states as biologically impaired. For many of these, the cause of the impairment is also reported as "unknown".
- Before an appropriate management action can be designed, the cause of the biological impairment, for example, excess fine sediments, nutrients, or toxic substances, must be determined.
- Defensible causal analyses require knowledge of the mechanisms, symptoms, and stressor-response relationships for various specific stressors as well as the ability to use that knowledge to draw appropriate conclusions.

The Solution: synthesize approaches from different intellectual fields into a novel, defensible and useful methodology that identifies the probable cause or causes of undesirable biological conditions.

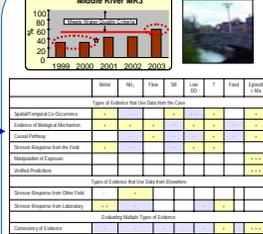
Guidance Development Process



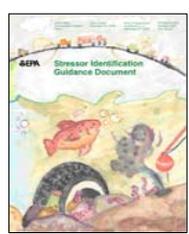
Learned from the deep thinkers on causality.



Organized and customized process for ecological situations.



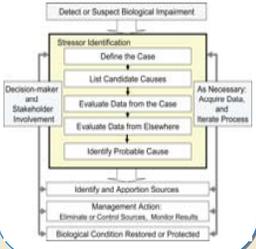
With state partners, applied to real places with real problems.



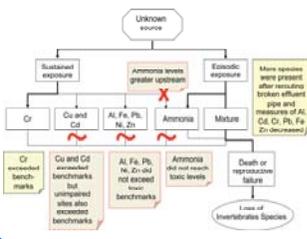
Published process and case studies.

Research Results

Continuing to refine the method.



Discovered challenges in implementation and learned ways to communicate scientific evidence.



Identified resources to make stressor identification easier.



Research Conclusions and Future Directions

See Accompanying LTG2- Poster 02

Enabling scientists to infer causes of biological impairment

Touchet River, WA



Long Creek, ME



Interactions with Customers



Floyd River, IA



Clear Fork, WV



Bogue Homas, MS



How Research Contributes to Outcomes

Environmental Management

Organization

West Virginia Department of Environmental Protection
 Department of Fish and Game

Ohio Environmental Protection Agency
 Mississippi Department of Environmental Quality
 Iowa Department of Natural Resources

Education

University of Bologna, Italy

California Department of Fish and Game

Business

Neptune, Inc. Decision Analysis Modeling Group

Tetra Tech, Inc

Output

Armstrong Creek, Morris Creek, and Loop Creek Watersheds: TMDL Public Meetings
 California Developing a biological and physical habitat assessment program for the Department of Pesticide Regulation

Lower Cuyahoga River Watershed TMDLs
 Red Creek, Short Fork Creek, TMDL and other rivers
 Little Floyd River, Camp Creek, Stressor Identification and Recommended TMDL action

Ecotoxicology Course: contents Environmental fate of pollutants... USEPA Stressor Identification procedure. Toxicity prediction. Ecological risk assessment

Interpreting Biological Metrics and Current Topics on the Use of Freshwater Ecological Assessments in Water Quality Regulation

Webpage: Developing an interactive web-based decision support tool for watershed management using surface water stressor identification

Provides contractual support to states by performing causal assessment and TMDL. Provides courses that include instruction on SI process and its usefulness in the TMDL process.

Outcome

Uses SI to engage stakeholders, and to determine probable causes for TMDL
 Recommends use of SI in their assessment program

Uses SI process to develop TMDL in multiple tributaries
 Uses SI process to identify probable causes including nutrient enrichment
 Uses SI process to identify probable causes including nutrient enrichment, sediment, temperature and habitat modification

Uses SI to teach how to assess and predict the effects of pollutants on organisms, populations, communities and ecosystems

Presentation: "Using Stressor Identification Guidance and Presentation on Scientifically Sound Environmental Activism Discussion on How to use Stakeholders in Ecological Assessment Programs

Business providing support for environmental clients.

Expanding State capacity to perform TMDLs