

Aquatic Ecosystem Protection and Fisheries Management in the Mid-Atlantic Highlands (USA) Using WHAT IF:

A Collaboration of the Canaan Valley Institute, the Office of Research and Development, and Region III

ABSTRACT

In the Highlands of the Mid-Atlantic, riparian zone restoration is a critical watershed management practice not only for the ecosystem services provided, but also for the potential socioeconomic growth from environmental investment and job creation. As described in its Highlands Action Program, the Canaan Valley Institute (CVI) partnered with the U.S. EPA to develop a watershed assessment and management tool that allows managers to evaluate riparian restoration actions to improve in-stream habitat quality and aquatic community sustainability. Continuing the successes of the ORD's MAIA, Environmental Monitoring and Assessment Program (EMAP), and the Regional Vulnerability Assessment (REVA) programs, Watershed Health Assessment Tool Investigating Fisheries (WHAT IF) integrates data and methods for achieving desired environmental outcomes in the Highlands. In collaboration with Region 3 and the Highlands states, the tool has been expanded to include stream insect (macrobenthic) Indices of Biotic Integrity (IBI), the common regulatory endpoint in Maryland, Pennsylvania, Virginia, and West Virginia. Stream insect IBIs can thus be evaluated side by side with fish health measures such as community biomass, abundance, and diversity. West Virginia provided REMAP (Regional-EMAP) data for validating WHAT IF, and Maryland, Pennsylvania, and Virginia are collaborating on further refinement of the tool for use in their states.

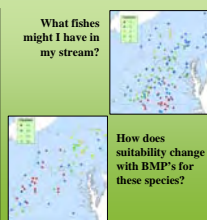
This tool can be used for:

- Evaluation of sites for restoration
- Species conservation (e.g., management for brook trout would include maintaining lower temperature and cover of large woody debris/boulders)
- Prioritization of management activities within a region

FISH ASSEMBLAGE CALCULATOR

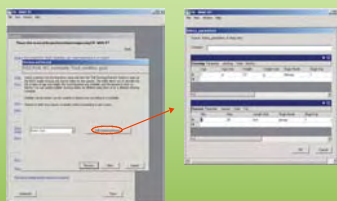


SPATIAL DISTRIBUTIONS OF IDENTIFIED ASSEMBLAGES



BASS FISHERIES MANAGEMENT TOOL

How does the proportion of trophy-size trout change the various stocking programs?



HYDROLOGICAL TOOL

What is the average flow depth, streamflow, and water temperature in my stream?



MID-ATLANTIC HIGHLANDS STREAMS OUTCOMES

Accomplishments

- ORD has developed fish habitat suitability calculators, a statistical model for fish community assignment and screening BMP analysis, a fish community dynamics simulation model (BASS), and both web-based and desktop-based tools to apply the models - called WHAT IF (Watershed Health Assessment Tool Investigating Fisheries)
- ORD has produced a suite of peer-reviewed articles and technical reports
- ORD has designed a color brochure for stakeholders explaining the suitability index approach: "Habitat Suitability Analysis for Indicator Fish Species in the Mid-Atlantic Highlands"
- ORD has redesigned the BASS model for trout management, including fisheries stocking and harvest functions, and to respond to habitat changes related to BMPs and restoration
- CVI adopts WHAT IF as part of their prioritization "toolbox" for the Highlands Action Program

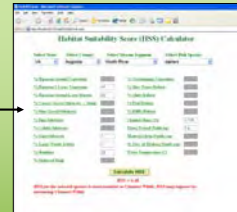
Future Outcomes

- MAIA and CVI work with West Virginia to create state programs - WV Trout
- WV uses WHAT IF to identify and rank/prioritize watersheds for BMPs, restoration & fisheries management
- WV makes funding decisions through WV Trout, establishing Watershed Strategies for each watershed and allocated funds from various sources for watershed restoration (EPA 119 funds, NOAA Coastal Zone Management, EPA Watershed grant initiatives, and other smaller funding sources)
- WV implements BMPs, restoration and fisheries management according to the Watershed Strategies
- WV has more miles of streams which support productive fish communities
- WV derives increased economic benefits from improved streams - more fishing licenses, recreational jobs, ecotourism, etc.
- WV derives improved human health and other socio-economic benefits

- How do trout respond to riparian zone alteration?
- How do trout respond to stocking?
- How do non-game species respond to stocking?



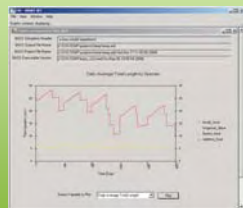
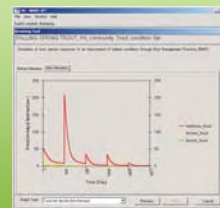
Habitat characteristics are input by the user



Habitat suitability scores (range 0-1) for fish species are given as output

FISHERIES AND RESTORATION SCENARIOS

How does average length and weight of fish change through time when BMP's are applied?



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