STAC Fish Habitat Workshop

Factors Influencing the Headwaters, Nontidal, Tidal, and Mainstem Fish Habitat Function in the Chesapeake Bay Watershed: Application to Restoration and Management Decisions

April 25-26, 2018
Maymont Estate Richmond, Virginia.

Outline

- Workshop Process and Framework
- Utility of a Chesapeake Bay Watershed Regional Fish Habitat Assessment
- National Fish Habitat Assessment
  - What can you do with an assessment?
- Results
- Recommendations
- Next Steps

Fish Habitat Workshop Assessment Framework

Objective: To identify the necessary information and analytical approaches to assess the **condition** and **vulnerability** of fish habitat in the Chesapeake Bay Watershed.

Guiding Principles:

- Scale must support planning and management decisions
- Based on best available science, data, and analytical approaches.
- Designed to integrate or compliment with other tools

Regional Fish Habitat Assessment User Needs

A guiding principal for the assessment framework is that it should **support planning and management decisions.**

Therefore, a user-needs questionnaire was developed to determine what land use and restoration planners, and habitat and fish managers need in a fish habitat assessment.

Questionnaire Methods

What do you need to improve the watershed?

Habitat scientists from around the Chesapeake Bay watershed are looking to **better understand your information needs** for project and land-use planning. The goal of this effort is to compile data and resources that habitat and land-use project designers, planners, and implementers can easily access and utilize to improve and increase the effectiveness of their work.

How can we help you?

With your input, compiled resources and data would be made available in a regional habitat assessment that would include the Chesapeake Bay Watershed (District of Columbia, Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia). The habitat assessment would focus on factors that impact the quality and quantity of fish habitat in your specified region, the species that utilize that habitat, and identify the factors/stressors influencing fish habitat.

How can you share your needs?

To help ensure this assessment is relevant and beneficial to you, please complete this online survey by March 16, 2018. In **less than 10 minutes** you can answer 20 questions related to your experience and project or planning needs. Keep in mind that many land-use plans and habitat projects that you may work on have an impact on fish habitat even if that is not the primary focus. We request that you please participate even if fish habitat is not a primary project goal of your work.

Where will your response go?

A summary of the responses will be provided at a workshop on fish habitat stressors and assessment needs in April 2018. Your collective responses will be used to guide decisions and discussions for a future regional habitat assessment and the potential development of other resources.

Thank you for your valuable input!

If you have any concerns or questions about this survey, please contact Gina Hunt at (410) 948-9836.

Survey Monkey – all online.

40% open rate

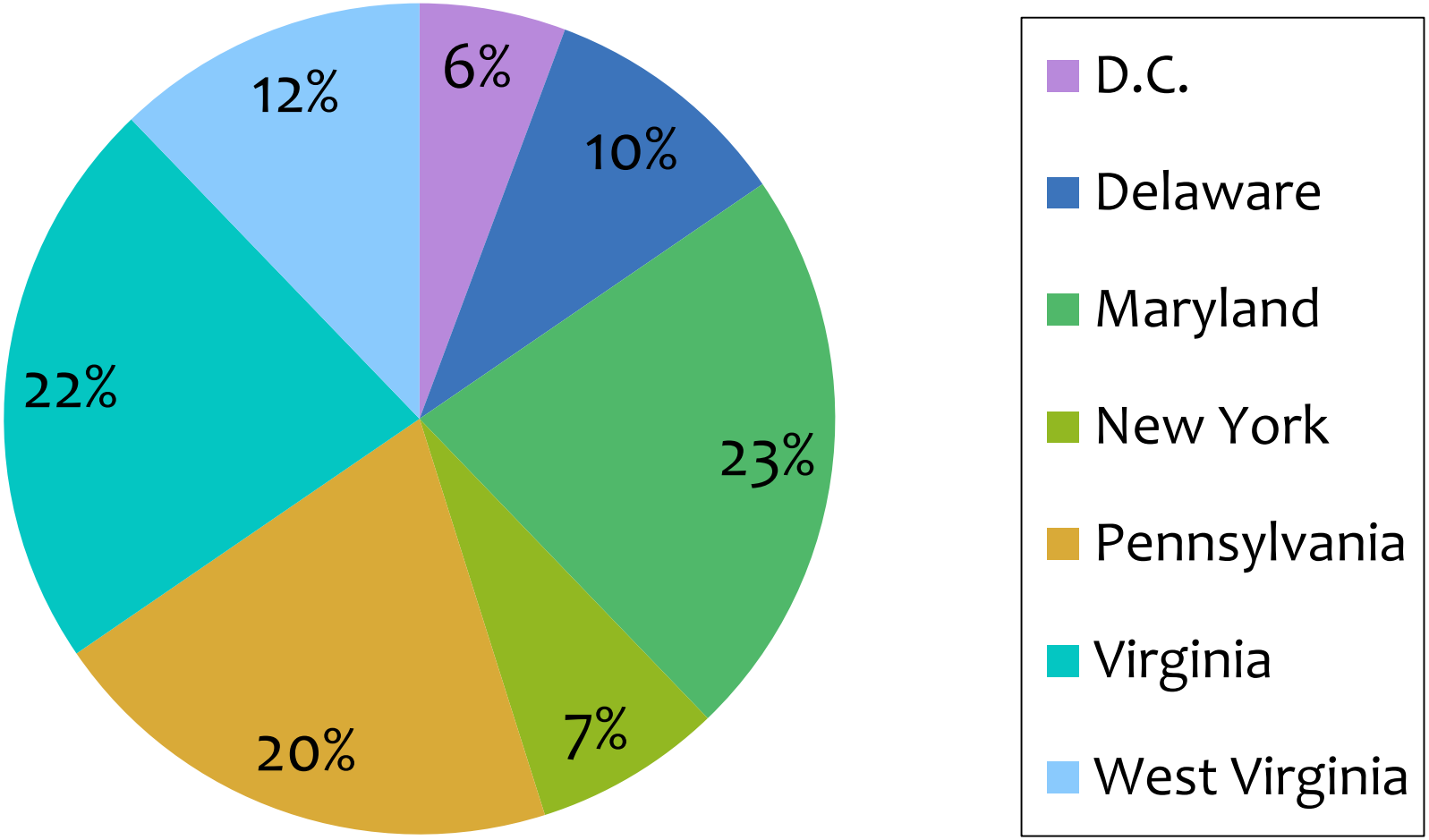
Nineteen Questions

148 individuals responded to the questionnaire.

41% work in local government. More than any other sector.

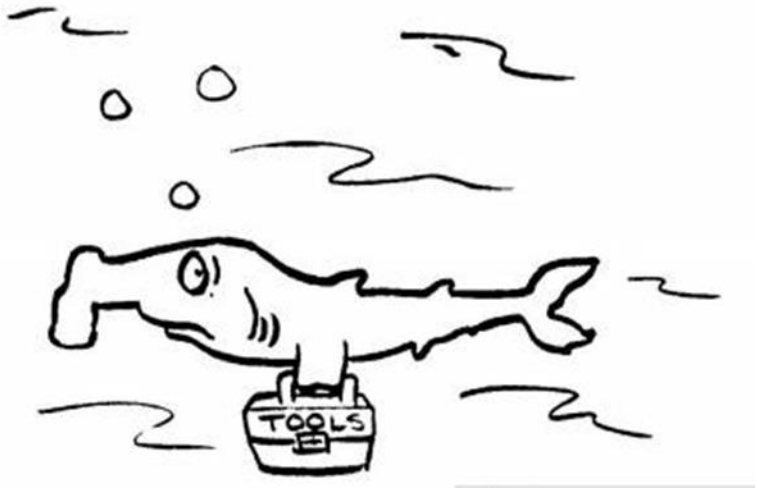
Questionnaire Results

Responses from all jurisdictions in the watershed



Questionnaire Results

Good News! 70% indicated that they would use a regional habitat assessment to prioritize potential sites for restoration/conservation.



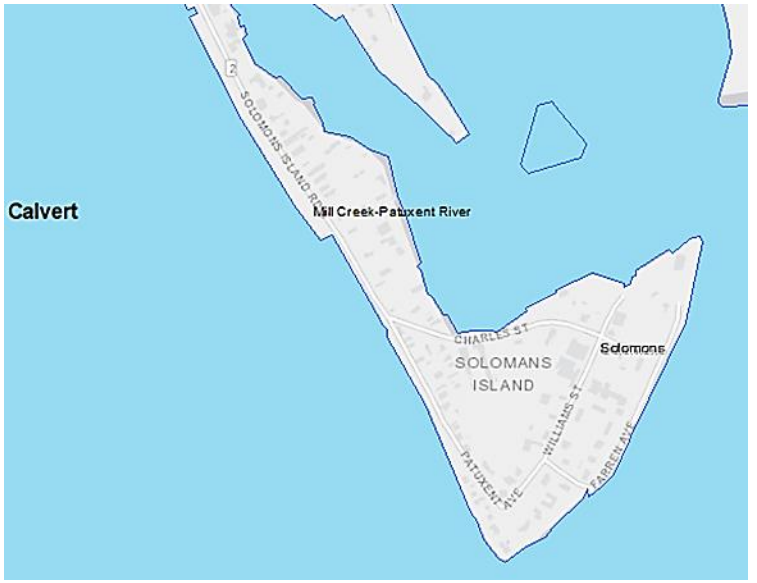
But there are many existing spatial tools! Additional responses indicated it would need to complement their current process or tools.

Questionnaire Results

What map scale is most appropriate so you could use a regional Habitat Assessment to improve your work?

Majority requested the smallest scale offered:
less than 1:24,000.

Others suggested the HUC 12 scale or smaller and the ability to switch from a Google Earth to Topo map scale.

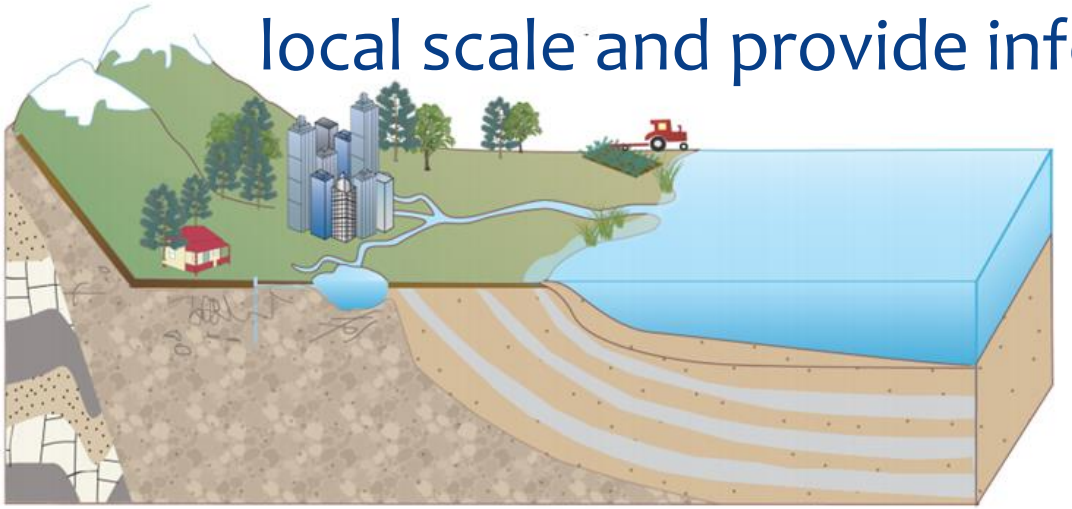


Ability to move back and forth based on resolution of available data- Hierarchical assessment

Questionnaire Conclusions

The assessment will not be the primary process for choosing a restoration or conservation area; but they will use it.

In order to be meaningful, it will need to work well with their existing tools and processes, provide resolution at a local scale and provide information that has been otherwise unavailable or scattered in its availability.



Fish Habitat Workshop Assessment Framework

Objective: To identify the necessary information and analytical approaches to assess the **condition** and **vulnerability** of fish habitat in the Chesapeake Bay Watershed.

Guiding Principles:

- Scale must support planning and management decisions
- Based on best available science, data, and analytical approaches.
- Designed to integrate or compliment with other tools

National Fish Habitat Partnership

- Produce "*Status of Fish Habitats in the United States*" report every 5 years
  http://assessment.fishhabitat.org/
- Three Products for 2015
  1. Inland Stream Assessment
  2. National Estuary Assessment
  3. Regional Estuary Assessment-Gulf of Mexico

NATIONAL FISH HABITAT PARTNERSHIP

What Do the Assessments Tell Us?

Status – Which areas are most affected by anthropogenic stress?

- *Areas with the worst relative condition could be considered high priority for restoration*
- *Can identify where high quality areas are that may be targets for conservation.*
- *Finer-scale assessments could help guide management actions, and specific habitat management objectives to help recover or improve productivity of fish populations.*

What Do the Assessments Tell Us?

- Gives a national picture of fish habitat condition; landscape-scale results are seamless across the US. But won't be very good at local scale using 1:100K data.
- And missing some significant regional data because it is not nationally available.
- What do we have that it is missing???

Thank Goodness for USGS and NOAA Partners!!!

A team of USGS and NOAA scientists determined the availability of these data for the Chesapeake Bay watershed and compiled the relevant metadata.

Objective- Identify data specific to the Chesapeake Bay watershed that were either not used in the 2015 National Fish Habitat Partnership (NFHP) Assessment or that were newly available at a finer spatial scale.

A summary of variables identified from the compilation effort compared to the National Fish Habitat Partnership Assessments separated by Factor Grouping

Factors	# Variables	# Variables NFHP Inland	# Variables NFHP Estuary
Watershed	18	0	0
Pollution	38	3	1
Dams	12	2	1
Mines	53	4	1
Water Use	7	5	1
Human	5	1	1
Urban	34	6	7
Ag	26	2	2
Natural	86	3	13
Nutrient	29	3	0
Water Quality	19	0	1
Climate	20	2	0
Habitat	38	0	0
Biological (Response and Predictor)	46	11	0
Miscellaneous	10	0	0
Total = 15	**441**	**31**	**28**

Fish Habitat Workshop Assessment Framework

Objective: To identify the necessary information and analytical approaches to assess the **condition** and **vulnerability** of fish habitat in the Chesapeake Bay Watershed.

Guiding Principles:

Scale must support planning and management decisions
Based on best available science, data, and analytical approaches.
Designed to integrate or compliment with other tools

DAY 1

- Identify scale needed to drive action at relevant management levels
- Determine criteria for selection and ranking of variables
- Identify the variables (stressors and conditions) most influencing habitat condition and vulnerability.

DAY 2

- Prioritize the variables (stressors and conditions) most influencing habitat condition and vulnerability.
- Identify information gaps
- Recommendations

Workshop Results
Determine Scale and Criteria to Rank Variables

Scale: 1:24,000

Three Criteria selected:

- Severity
- Mitigation Potential
- Certainty

Ranked- assigned a numerical score (2, 4, or 6) to each criteria

Habitat	*List aggregate variable/stressors for each factor*	*Criteria 1: Severity*	*Criteria 2: Mitigation Potential*	*Criteria 3: Certainty*	Factor
TidalFresh	Nutrients	6	4	6	Agriculture
TidalFresh	Toxins	6	4	6	Agriculture
TidalSalt	nutrients	6	4	6	Agriculture
TidalSalt	runoff	6	4	6	Agriculture
TidalSalt	sedimentation	6	4	6	Agriculture
TidalSalt	Land use	6	4	6	Agriculture
TidalFresh	Fishing activities	6	6	6	Biological
TidalFresh	Invasive species	6	2	6	Biological
TidalSalt	loss of feeding habit	6	4	6	Biological
TidalSalt	loss of forage	6	4	6	Biological
TidalSalt	HABs	6	4	6	Biological
TidalSalt	trophic effects	6	2	6	Biological
TidalSalt	invasive species	6	2	6	Biological
TidalFresh	Temperature	6	2	6	Climate
TidalSalt	Water temp	6	2	6	Climate
TidalSalt	SLR	6	2	6	Climate
WarmNonti	stormwater runoff	6	4	6	Human
WarmNonti	fragmentation / def	6	2	6	Human
WarmNonti	impervious surface	6	2	6	Human
WarmNonti	population density	6	0	6	Human
WarmNonti	housing density	6	0	6	Human
TidalFresh	Fishing / boating activities	6	6	6	Human
TidalFresh	Land use change (shoreline, etc.)	6	4	6	Human

Workshop Results
Identify the Variables Most Influencing Habitat

From the list of 441 variables:

- **87** variables were identified from the combined habitat groups as likely to have a significant impact on fish habitat in the Chesapeake Bay watershed (determined as a severity and certainty score of 6).
- **54** unique variables identified as having a significant impact on fish habitat.

Habitat Type	Total Number of Selected Variables	Number of Unique Variables Identified with High Severity and Certainty
Headwaters	23*	7*
Large Nontidal Rivers	108	15
Tidal Freshwater	83	31
Tidal Saltwater	66	34

Workshop Results
Variables that were Identified as Significant by Multiple Habitat Types

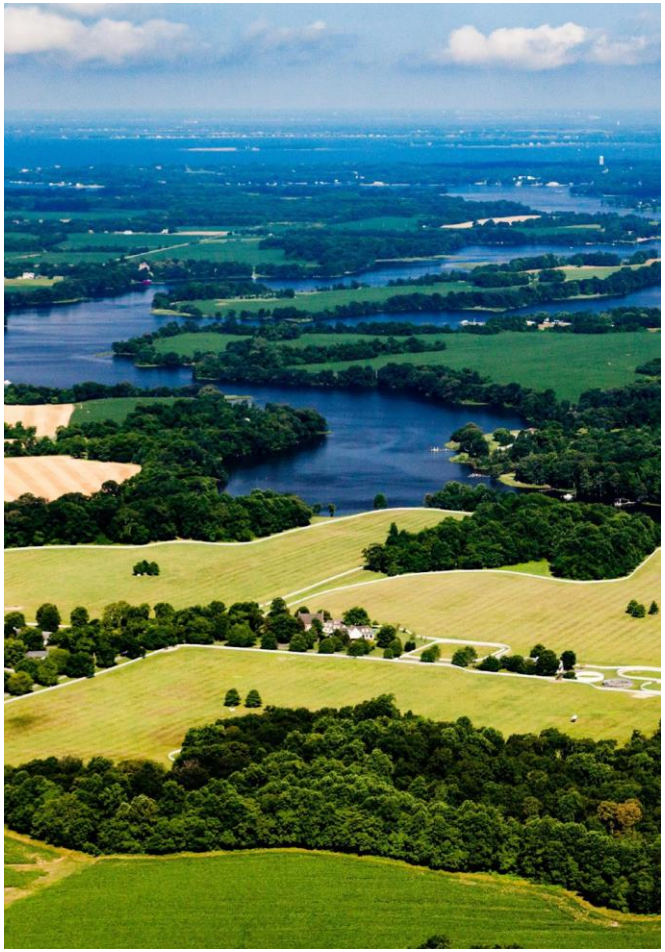
Factor	*Stressor/Variable*	*Habitat*
4 Habitats		
Agriculture, Nutrients	Nutrients	Large Nontidal Rivers , Tidal Salt, Headwaters, Tidal Fresh
Urban, Human	Impervious Surface	Large Nontidal Rivers, Tidal Salt, Tidal Fresh, Headwaters
3 Habitats		
Climate, Habitat, Pollution, Water Quality	Water Temperature	Tidal Salt, Tidal Fresh, Headwaters
Agriculture, Urban, Pollution	Sedimentation	Large Nontidal Rivers , Tidal Salt, Headwaters
Urban, Human	Stormwater discharge/runoff	Large Nontidal Rivers , Tidal Salt, Headwaters
Agriculture, Human	Land use	Tidal Salt, Tidal Fresh, Headwaters
Agriculture, Habitat	Erosion	Large Nontidal Rivers , Tidal Fresh, Headwaters
Human	population density/change	Large Nontidal Rivers , Tidal Fresh, Headwaters
2 Habitats		
Habitat	SAV Loss	Tidal Salt, Tidal Fresh
Biological	Invasive species	Tidal Salt, Tidal Fresh,
Urban, Human	Habitat loss	Tidal Salt, Tidal Fresh,
Urban, Natural	Wetlands loss	Tidal Salt, Tidal Fresh,

Identify Information Gaps

Each Habitat type answered the following questions:

- What variables are we missing or underrepresented with data per habitat type (gaps)?
- What additional stressors should we recommend need study/monitoring?
- What are the implications on the assessment tool of not having without having the information
- Research recommendations?

Recommendations



Develop Pilot Assessment- Continue gathering data sets on key stressors along with biological data and evaluating the scale of applicability.
Select pilot areas and test various biological response metrics to determine which measures are most sensitive to stressors and to validate approach and utility.

Incorporate Adaptability- an assessment should be built in a way that can incorporate additional stressors as science evolves.

Recommendations

Develop the Assessment at the finest scale possible- A fine spatial scale (1:24,000 or finer) is recommended for planning, management, restoration, or mitigation of fish habitats.

Participants recognized a hierarchical approach may be necessary because not all data are available Bay-wide at this resolution.

Recommendations

Prioritize Research Needs- Identified numerous research needs. All groups suggested researching stressors that were ranked as low certainty and expected high severity.

Conduct data mining exercise to fill data gaps- Datasets were identified, but data were lacking for some habitat types. Additional data needs are listed under each habitat type. Where data gaps persist, research should be prioritized.

Recommendations

Establish a Community of Practice- a group of people among those utilizing and developing fish habitat assessment tools to facilitate the transfer of knowledge on lessons learned.

Identify a person as an Assessment Coordinator- Identify a person to lead the workshop recommendations and build upon the enhanced collaborations from this workshop.

A coordinator would be instrumental in making the connections with this Chesapeake Bay habitat assessment effort and the larger Northeast habitat assessment.

Next Steps

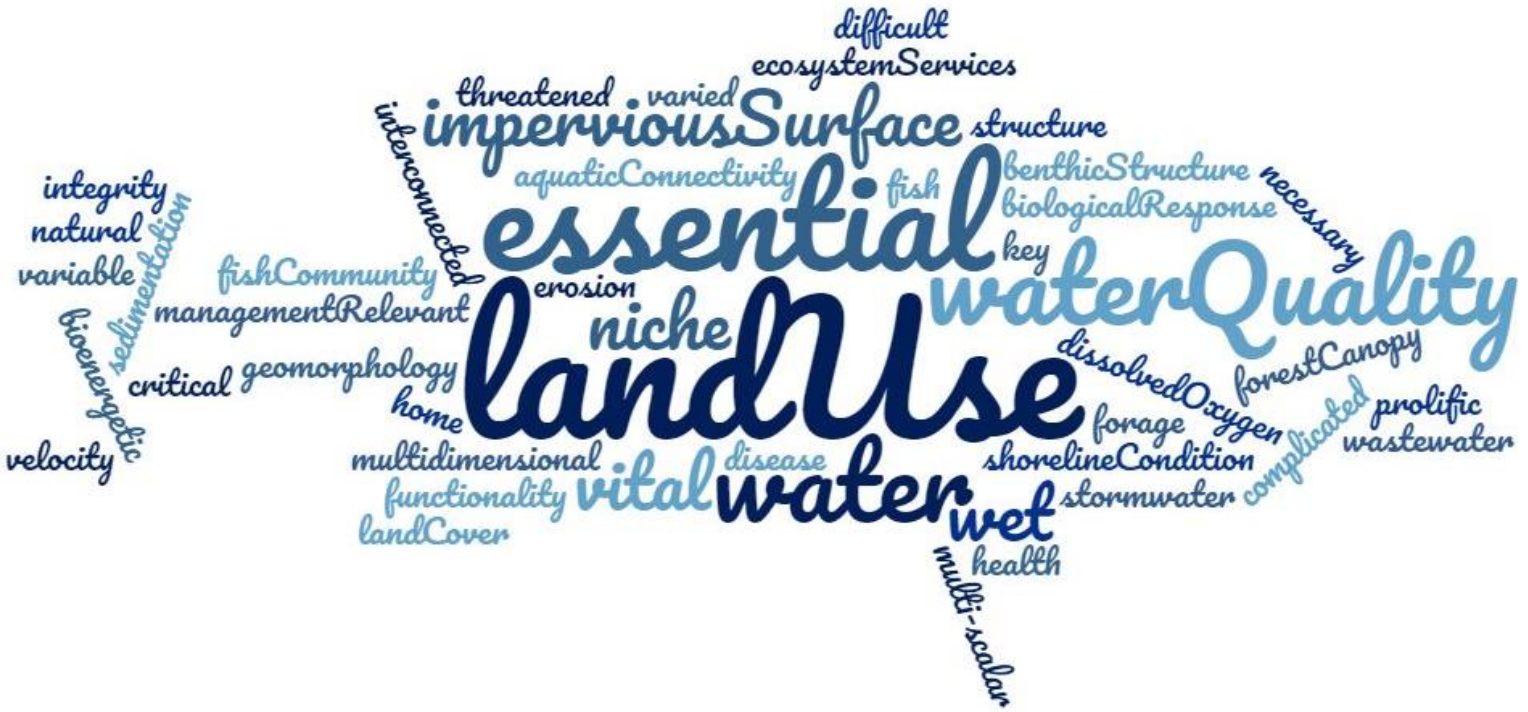
- Management Board approval of the report
- Incorporate recommendations and the new stressor information into Version 2 of the Fish Habitat Management Strategy

Next Steps

- A post-workshop project proposal was selected for Chesapeake Bay Program GIT funding. Funds will be used to secure a contractor for one year to continue building on the STAC workshop data inventory with biological data and analysis of the data for use in the pilot assessments, and potential regional assessment.

- Collaboration with NOAA and USGS partners will continue with this project.

Questions


difficult
ecosystemServices
threatened
varied
imperviousSurface
structure
interconnected
aquaticConnectivity
fish
benthicStructure
necessary
biologicalResponse
integrity
natural
variable
sedimentation
essential
key
waterQuality
fishCommunity
erosion
managementRelevant
niche
landUse
dissolvedOxygen
forestCanopy
bioenergetic
critical
geomorphology
home
forage
prolific
complicated
wastewater
velocity
multidimensional
disease
shorelineCondition
functionality
vital
water
wet
stormwater
landCover
health
multi-scalar