

# STAC Fish Habitat Workshop

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

**April 25-26, 2018**

**Maymont Estate Richmond, Virginia.**

# Outline



## National Fish Habitat Assessment

- What can you do with an assessment?



## Workshop Process and Framework



## Utility of a Chesapeake Bay Watershed Regional Fish Habitat Assessment



## Draft Results



## Recommendations

# 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.
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- Recommendations



# National Fish Habitat Partnership



Produce “*Status of Fish Habitats in the United States*” report every 5 years

<http://assessment.fishhabitat.org/>

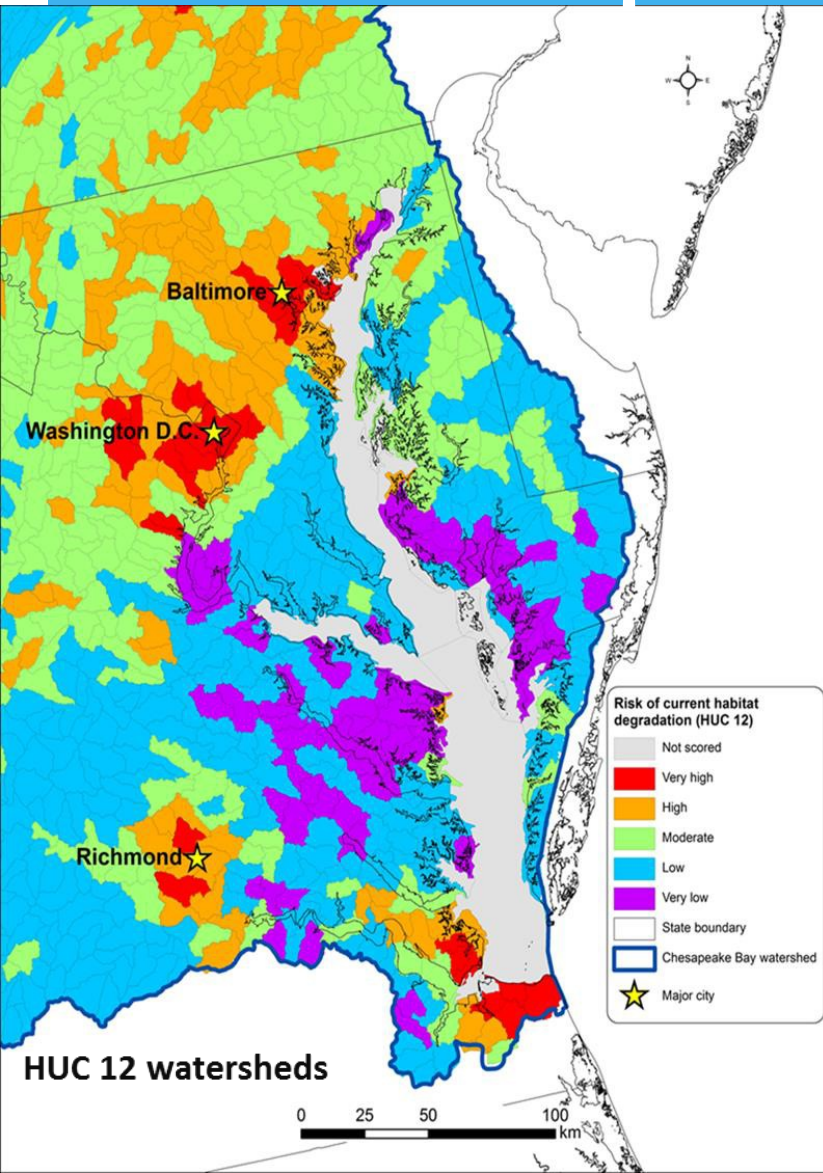


Three Products for 2015

1. Inland Stream Assessment
2. National Estuary Assessment
3. Regional Estuary Assessment-Gulf of Mexico

# What Do the Assessments Tell Us in the Chesapeake Bay Watershed?

What are limiting disturbances to fish habitat in the Chesapeake Bay basin?



- Agriculture (pasture/hay)
- Urbanization
- Mining (coal and mineral)
- Nutrients (N and P)
  
- Results vary regionally, by spatial extent

# Data Not in the Assessment

## INLAND

- Intensive logging
- Locations experiencing grazing
- High density animal farming
- Regional habitat stresses (e.g., oil drilling)
- Water diversions from streams
- Culverts
- Small dams
- Legacy land uses, ie. historic mining operations

## ESTUARY

- Benthic habitat loss
- Shoreline armoring
- Status of living (biogenic) habitats (e.g. shellfish beds)





# 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.*



*More detailed, finer-scale assessments will help provide additional information to guide management actions*

# What Do the Assessments Tell Us?



Assessment results indicate which habitats may be vulnerable as well as factors that may be responsible



Assessments can help develop specific habitat management objectives aimed at protecting and/or restoring habitat to help recover fish populations or improve productivity of stocks.



Results are spatial and can be mapped



# 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
<b>Total = 15</b>	<b>441</b>	<b>31</b>	<b>28</b>

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# 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.

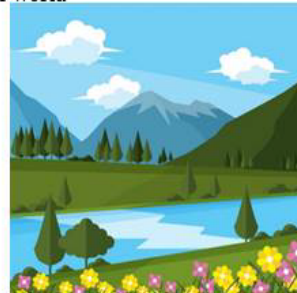


## Where will your response go?

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

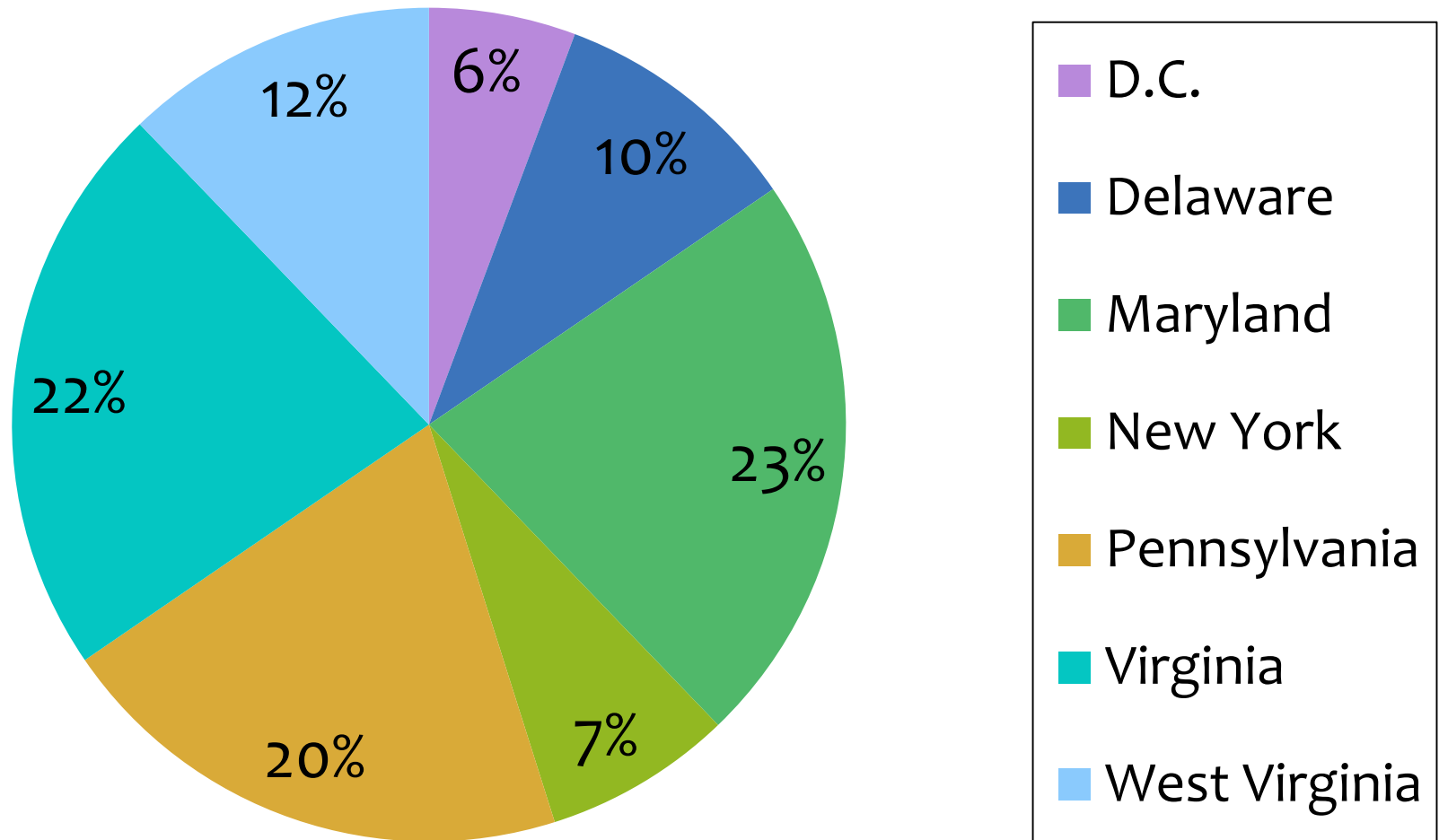
148 individuals  
responded to the  
questionnaire.

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



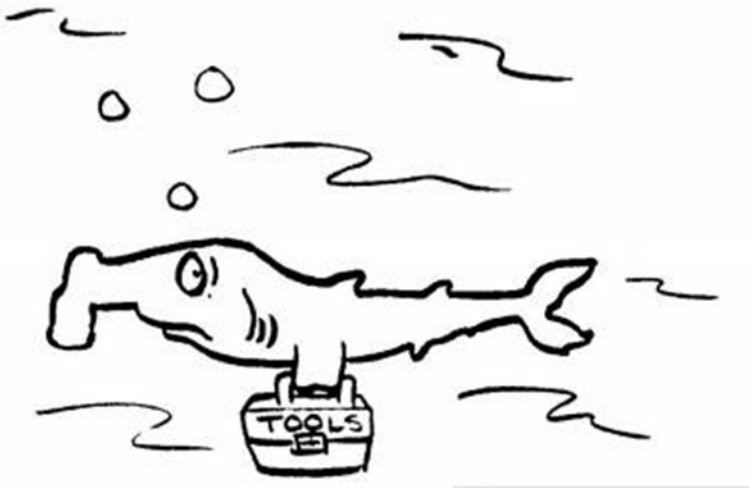
# Questionnaire Results

*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 Results

*What data should be included for the assessment to be useful?*

Water quality degradation – nutrient, sediment, and emerging contaminants	77
Development/urban land use	66
Impervious surface – patterns of growth and impervious surface percentage	65
Wetland distribution and type	60
Agricultural land use	59
Invasive species distribution and abundance (e.g., zebra mussels, rock snot, hydrilla)	58
Fish species distributions and abundance	57
Fragmentation by dams and culverts/barriers to fish migration	55
Shoreline armoring/hardened shoreline	43

# 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.

## **Guiding Principles:**

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# What about You?



Could you use a Regional  
Fish Habitat Assessment?



How?



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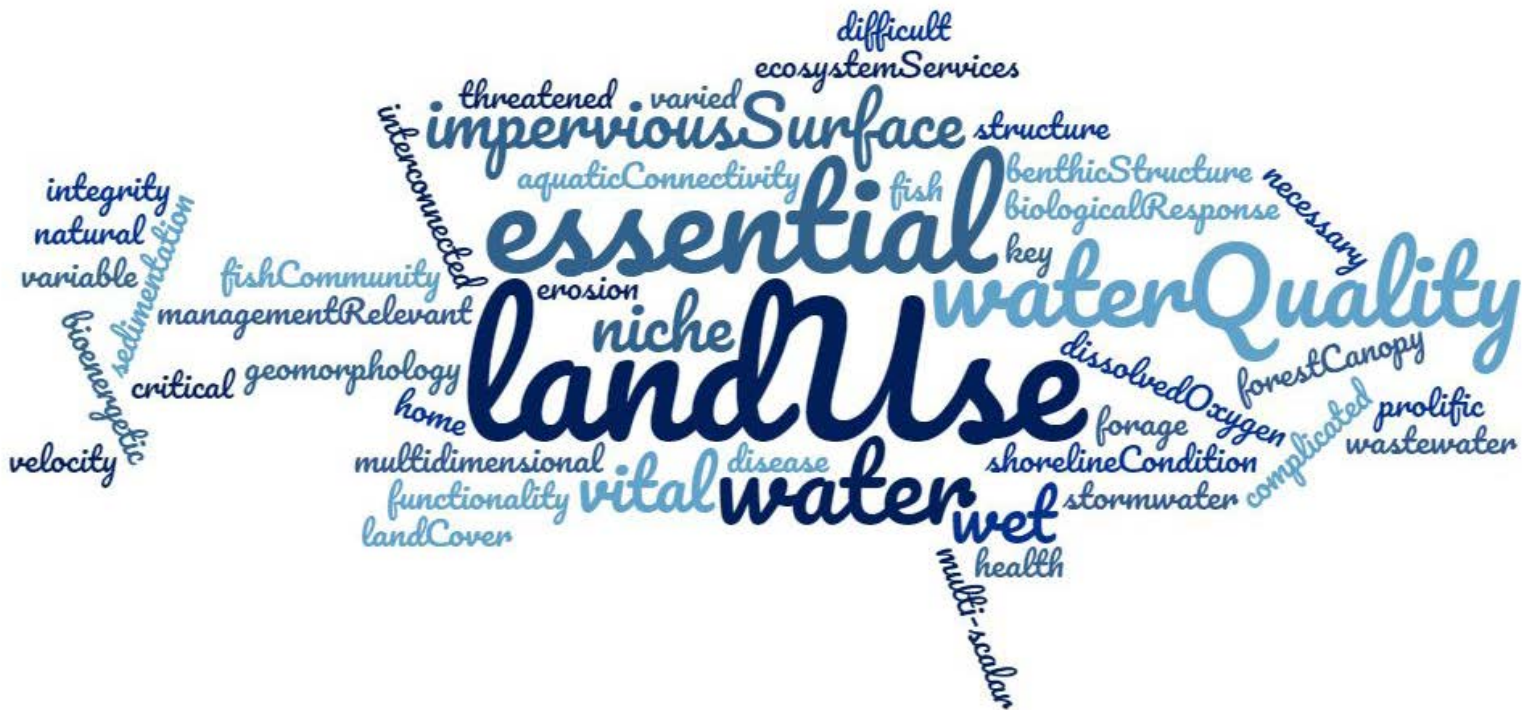
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# Results

Identify the variables most influencing habitat

Some overlap across habitat types, but there were 88 variables identified.

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# Variables that were Identified by Multiple Habitat Types

<b>Factor</b>	<b>Stressor</b>	<b>Habitat</b>
<i>4 Habitats</i>		
Agriculture, Nutrients	Nutrients	WarmNontidal, Tidal Salt, ColdNontidal, Tidal Fresh
Urban, Human	Impervious Surface	WarmNontidal, Tidal Salt, Tidal Fresh, ColdNontidal

<i>3 Habitats</i>		
Climate, Habitat, Pollution, Water Quality	Water Temperature	Tidal Salt, Tidal Fresh, Cold Nontidal
Agriculture, Urban, Pollution	Sedimentation	WarmNontidal, Tidal Salt, Cold Nontidal
Urban, Human	Stormwater discharge/runoff	WarmNontidal, Tidal Salt, ColdNontidal
Agriculture, Human	Land use	Tidal Salt, Tidal Fresh, ColdNontidal
Agriculture, Habitat	Erosion	WarmNontidal, Tidal Fresh, Cold Nontidal
Human	population density/change	WarmNontidal, Tidal Fresh, Cold Nontidal

<i>2 Habitats</i>		
Habitat	Submerged Aquatic Vegetation 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,

# 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

<i>Habitat</i>	<i>List aggregate variable/stressors for each factor</i>	<i>Criteria 1: Severity</i>	<i>Criteria 2: Mitigation Potential</i>	<i>Criteria 3: Certainty</i>	<i>Factor</i>
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 habi	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

# Use of Ranking Variables for today

Ideally we would already have an assessment to help in your decision making!!

But you will have a list of variables with a high level of severity in your break out group region.

Lower Susquehanna Region – Workshop stressors with high level of severity.

Habitat Type: Nontidal 4th order plus (Warm Non-tidal)

Habitat Function: Spawning, Recruitment, Survival, Growth, Shelter

<i>List aggregate variable/stressors for each factor</i>	<i>Criteria 1: Severity</i>	<i>Criteria 2: Mitigation Potential</i>	<i>Criteria 3: Certainty</i>	<i>Factor</i>
pesticides	6	2	4	Agriculture
Sediments	6	4	6	Agriculture
Nutrients	6	4	6	Agriculture
species shifts	6	2	2	Biological
drought	6	2	4	Climate
flow alteration	6	2	6	Dams
bank erosion	6	4	6	Habitat
<u>stormwater runoff</u>	6	4	6	Human
fragmentation / deforestation	6	2	6	Human
impervious surface	6	2	6	Human
population density	6	0	6	Human
housing density	6	0	6	Human
river flow variability	6	2	4	Natural
forest loss	6	4	6	Natural
eutrophication	6	4	6	Nutrient
toxics (ag)	6	4	2	Pollution
toxics (urban)	6	4	4	Pollution
heavy metals	6	4	4	Pollution
sediment/siltation	6	4	6	Pollution
toxics	6	4	4	Urban
flow alteration	6	2	4	Urban
loss of riparian vegetation	6	2	4	Urban
<u>stormwater runoff</u>	6	4	6	Urban

# 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?

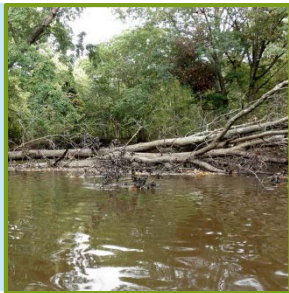


# Draft Recommendations

- 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.
- Variables with high to moderate severity and low to moderate certainty should be a focus of future research.

# Draft Recommendations

- Pursue opportunities to fill data gaps with volunteer monitoring
- Consider species assemblages as opposed to being species-specific to facilitate management decisions
- Conduct pilot level assessments in representative waterways in MD, VA, PA to validate approach and utility, then construct a regional assessment.



# Next Steps

Looking for feedback on recommendations-

Do you support pursuing pilot level assessments in representative waterways in MD, VA, PA to validate approach and utility?

Final Report should be available this fall.

