Chesapeake Bay Program
Science. Restoration. Partnership.

ROUGH DRAFT V1.0 TANGO

Water Quality Standards Attainment and Monitoring Outcome

Presenter's Name TBD,
Organization and
Role in Relation to the Outcome

Through the Chesapeake Bay Watershed Agreement*, the Chesapeake Bay Program has committed to…*

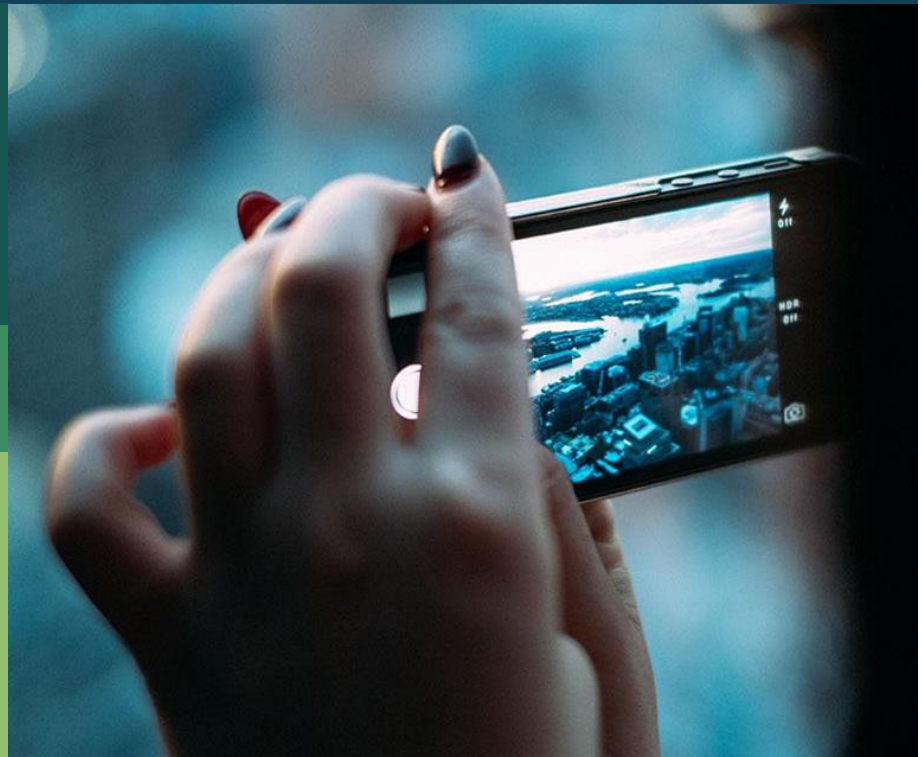
Relevant Photo

Goal: *Reduce pollutants to achieve the water quality necessary to support the aquatic living resources of the Bay and its tributaries and protect human health.*

Outcome:

Continually improve the capacity to monitoring and assess the effects of management actions being understand to implement the TMDL and improve water quality. Use the monitoring results to report annually to the public on progress made in attaining established water quality standards and trends in reducing nutrients and sediment in the watershed.

What We Want



1. Monitoring Capacity building with your support.

A vision for next steps in a successful path forward:

- **Summer 2018**. Management Board accepts Citizen Science and Nontraditional Partner MOU.
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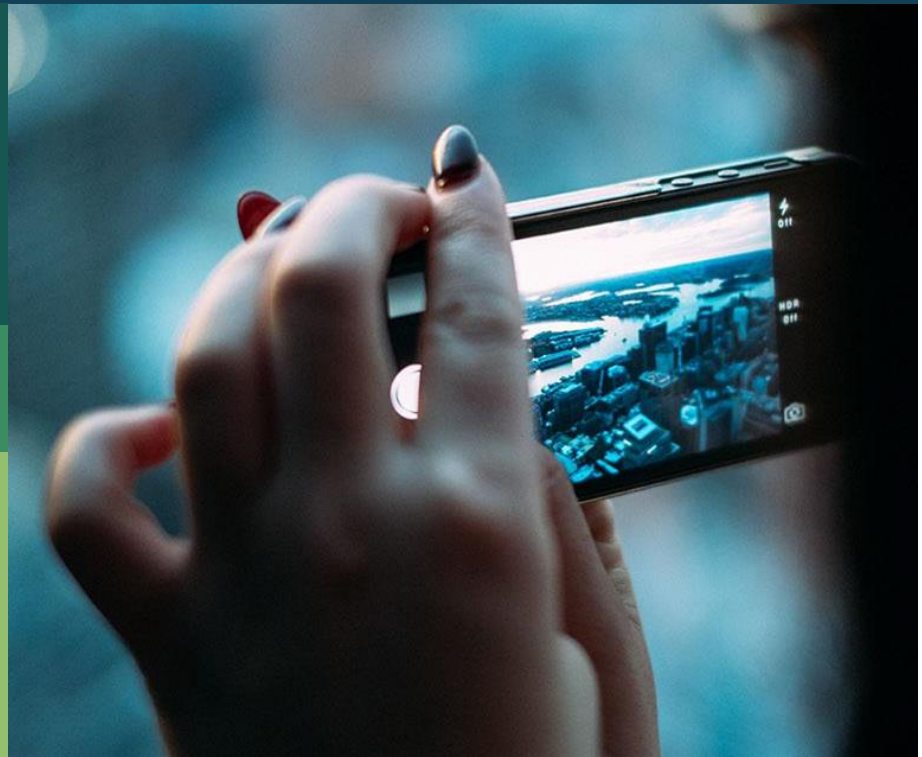
Why We Need This

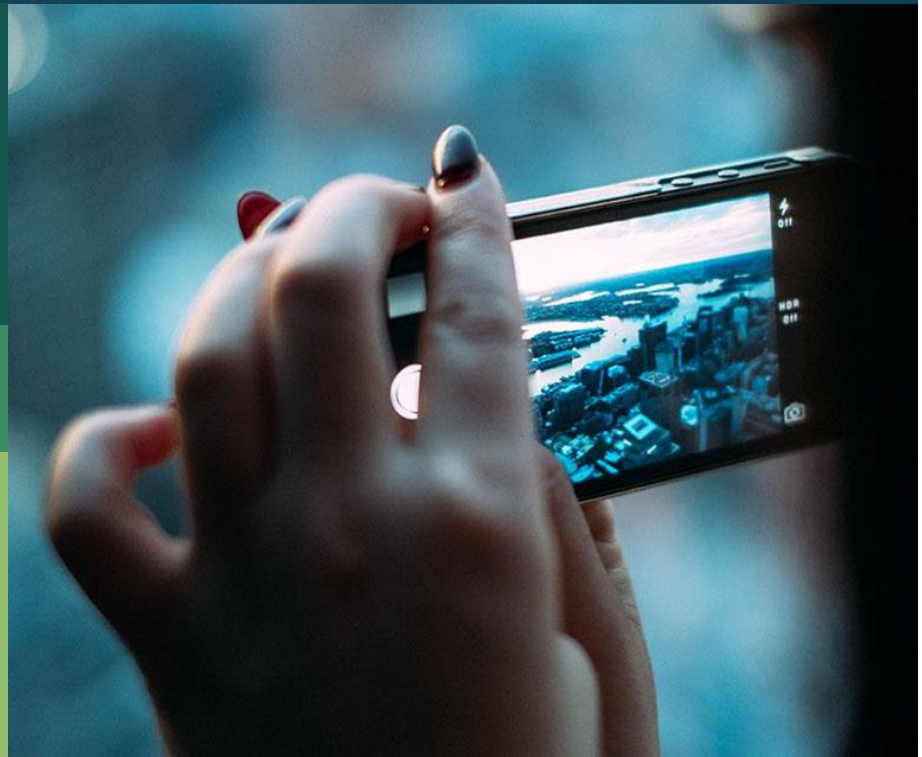


1. Monitoring Capacity building with your support.

Improved capacity leads to:

- **improved accuracy** of WQS attainment assessments,
- **reduced uncertainty** about progress
- **earlier detection of change** in response to management actions
- **better management targeting** of limited resources.

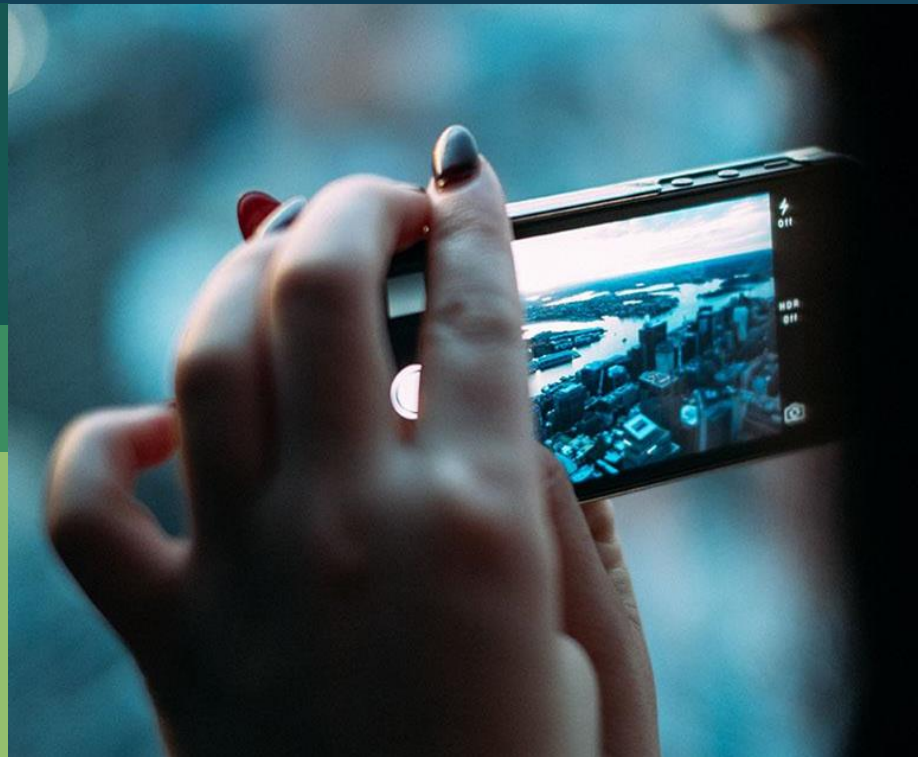
What We Want



2. Use the monitoring results to report annually to the public on progress made in attaining established Bay water quality standards and trends in reducing nutrients and sediment in the watershed.

An accounting of use of new data streams to fill gaps in partnership data needs.

Why We Need This



2. Use the monitoring results to report annually to the public on progress.

Enhanced data use leads to:

- **improved accuracy** of WQS attainment assessments
- **reduced uncertainty** about progress
- **earlier detection of change** in response to management actions
- **better management targeting** of limited resources
- **combat inflation** with cross GIT utcome support

1

Setting the Stage:

What are our assumptions?

Logic Behind Our Outcome

Following the Decision Framework:

Factors

- Delivering necessary financial capacity to implement practices and programs
- Improving the identification of sources and their contributions to N, P, Sed, pollutant loads

Current Efforts and Gaps

- Continue/expand monitoring and analysis efforts to coincide outputs with two-year milestones and annual progress runs needs.

Management Approaches

- Adapt the existing monitoring program
- Cit Sci/new partner support in assessments
- Continue to incorporate new land use data.
- Refine factors affecting source and loads changes.
- Better predict future pop growth and climate change impacts

2

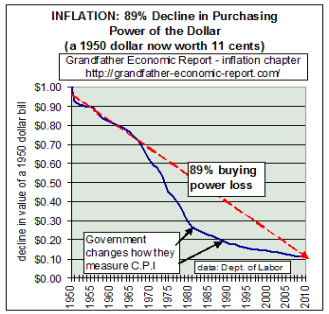
Progress:

Are we doing what we said we would do?

What is our progress?

Capacity to Monitor:
Watershed: Adequate
Bay: Marginal
Both: thresholds of decline.

(-) Inflation impacts are occurring with level funding.

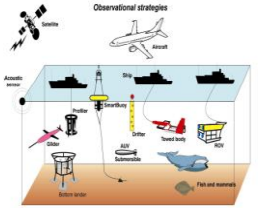


(-) Aging out of the infrastructure (e.g., boats, sensors)

(-) Lost partnerships at gage stations

(+) Use of Citizen based and nontraditional partner data.

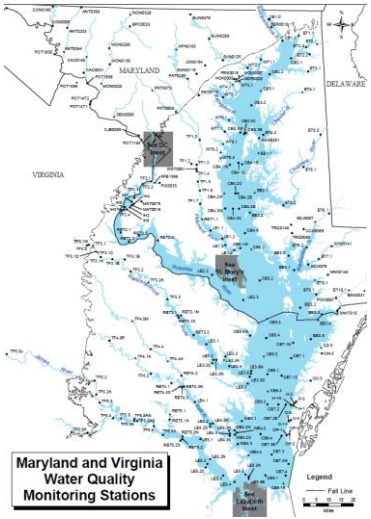
(+) Updated assessment protocols (USEPA 2017)

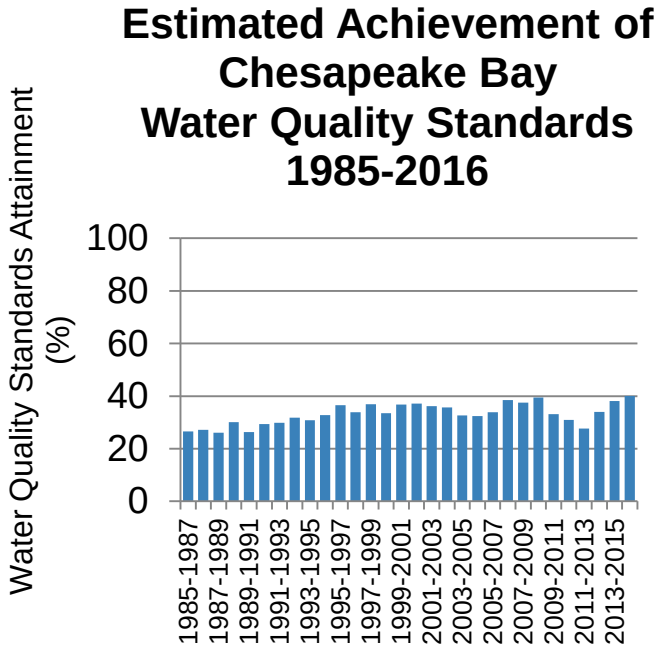


(+) Adapting existing resources and work associated with the shallow water monitoring programming

Are we on track? The Bay

- 2014-16 assessment was **the best index score on record**.
- Long-term and short-term trends are improving.





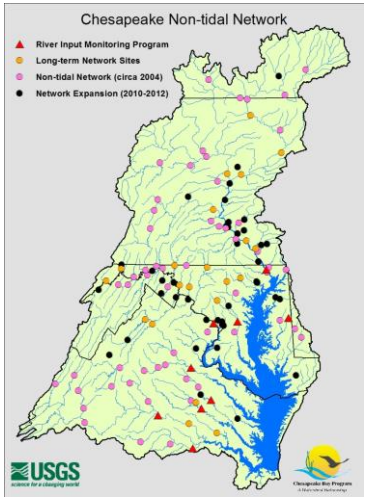
GAMS plots of station trend here

Monitoring

Assessing progress

Are we on track? The Watershed RIM

- N mostly improving. P and S more degrading.



Monitoring

Table 1. Summary of long-term (1985-2016) and short-term (2007-2016) trends in nitrogen, phosphorus, and suspended-sediment loads for the River Input Monitoring stations.
[Improving or degrading trends classified as likelihood estimates greater than or equal to 67 percent]

Monitoring station	Total nitrogen load		Total phosphorus load		Suspended-sediment load	
	Long term	Short term	Long term	Short term	Long term	Short term
SUSQUEHANNA RIVER AT CONOWINGO, MD	Improving	Degrading	Degrading	Degrading	Degrading	No trend
POTOMAC RIVER AT WASHINGTON, DC	Improving	Improving	Improving	Degrading	Improving	No Trend
JAMES RIVER AT CARTERSVILLE, VA	Improving	Improving	Improving	No Trend	Degrading	Improving
RAPPAHANNOCK RIVER NR FREDERICKSBURG, VA	Improving	Improving	Degrading	No Trend	Degrading	No Trend
APPOMATTOX RIVER AT MATOACA, VA	No Trend	Degrading	Degrading	Degrading	No Trend	Degrading
PAMUNKEY RIVER NEAR HANOVER, VA	No trend	Degrading	Degrading	No trend	Degrading	Degrading
MATTAPONI RIVER NEAR BEULAHVILLE, VA	Improving	Degrading	No Trend	Degrading	No Trend	No Trend
PATUXENT RIVER NEAR BOWIE, MD	Improving	Improving	Improving	Improving	Improving	Degrading
CHOPTANK RIVER NEAR GREENSBORO, MD	Degrading	Degrading	Degrading	Degrading	Improving	Degrading

Assessing progress in changing loads

3

Challenges:

Are our actions having the expected effect?

Challenges

Maintain Monitoring Capacity

- In spite of our biggest investments in monitoring in the history of the CBP, inflation, retiring aging infrastructure and lack of monitoring-specific State match availability are eroding our program to the threshold of limiting monitoring program maintenance under a level funding status in the next 3 years.

Water Quality Standards Attainment

- Low spatial density of stations and low temporal resolution often require big ecosystem changes in order to detect changes in status.

Challenges: Trends and Synthesis

- (+) There are significant analysis developments extensive new syntheses and a roll out of publications in progress on trends and linkages.
- (+) Support for analysis in our teams (Emily, Qian)
- (-) There have been some reductions in statistical support due to inflationary pressures
- (+/-) Diverse synthesis support funding

4

Adaptations:

How should we adapt?

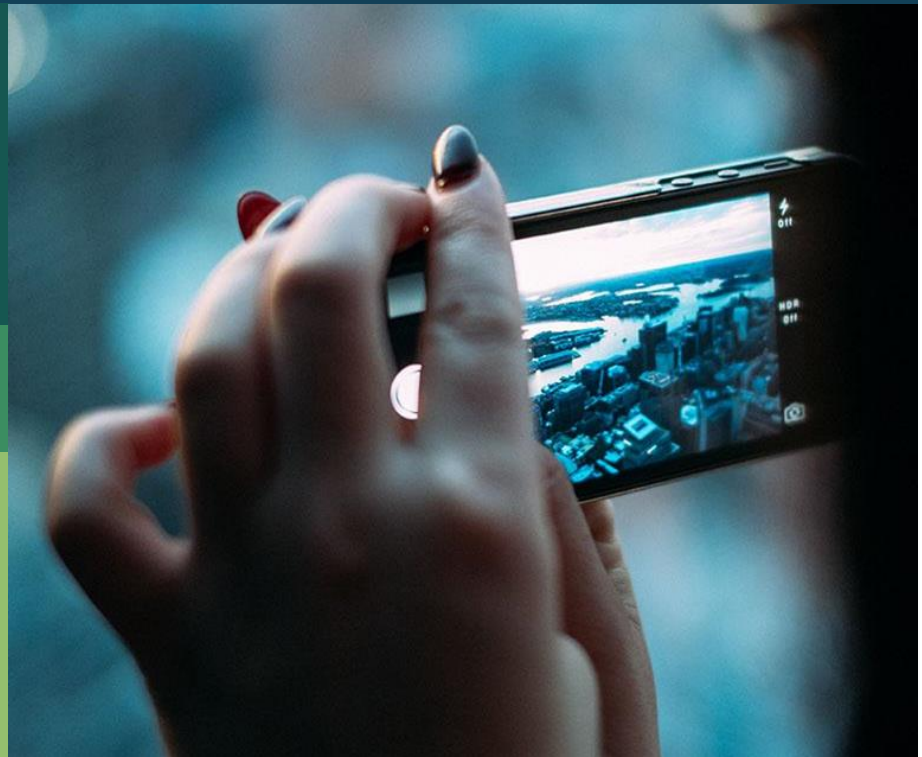
Based on what we've learned, we plan to…

- Improve capacity with your help by accepting and promoting the Citizen science and nontraditional partner MOU through PSC signing and data use by all partners.

Cross-Outcome Considerations

- Integration of Citizen Science complements work of the Stewardship GIT and Diversity Outcome by engaging groups and creating new leadership across the watershed plus the Habitat GIT and Stream Health Outcome assessment.
- Maintaining the networks supports 'factors' data supporting proposed priority climate impacts and resilience indicators.
- Improved accuracy and reduced uncertainty in water quality standards attainment assessments directly relate to Fish Habitat Outcome information needs.
- Trends in the watershed water quality support the Healthy Watersheds Outcome information needs.

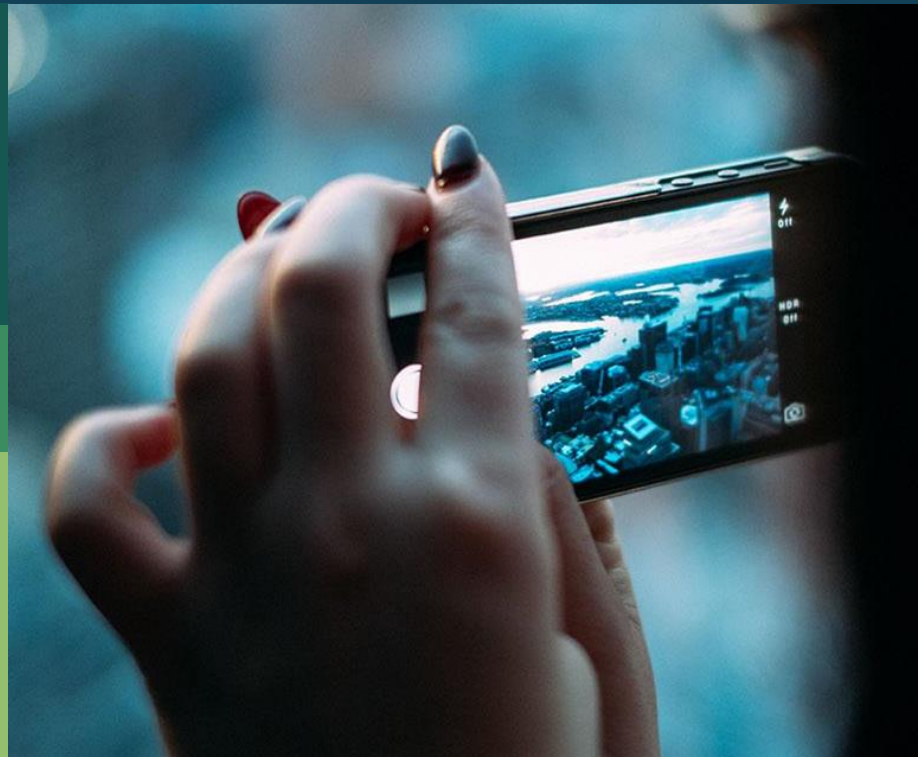
What We Want



1. Accept and promote the Citizen science and nontraditional partner MOU.

2. Account for new data streams being used across the partnership

What We Want



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Discussion

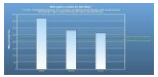
Agreement Goals and Outcomes

Sustainable Fisheries

- Blue Crab Abundance
- Blue Crab Management
- Oyster
- Forage Fish
- Fish Habitat

Vital Habitats Goal

- Wetlands
- Black Duck
- Stream Health
- Brook Trout
- Fish Passage
- Submerged Aquatic Vegetation (SAV)
- Forest Buffer
- Tree Canopy



Water Quality Goal

- 2017 Watershed Implementation Plans (WIP)
- 2025 WIP
- Water Quality Standards Attainment and Monitoring

Toxic Contaminants Goal

- Toxic Contaminants Research
  Toxic Contaminants Policy and Prevention

Healthy Watersheds Goal

- Healthy Waters

Stewardship Goal

- Citizen Stewardship
- Local Leadership
- Diversity

Land Conservation Goal

- Protected Lands
- Land Use Methods and Metrics Development
  Land Use Options Evaluation

Public Access Goal

- Public Access Site Development

Environmental Literacy Goal

- Student
- Sustainable Schools
- Environmental Literacy Planning

Climate Resiliency Goal

- Monitoring and Assessment
- Adaptation Outcome

Our Water Quality Monitoring Funding Support has grown and is the greatest it has ever been in the history of the program.

- 2008: ~3.08M EPA funding the monitoring programs.

- 2010: ~$4.3 Million EPA funds. Not including state match, partner funds.

- 2018:~$5.0M + SAV + State match efforts (not all monitoring match) + Citizen Science.

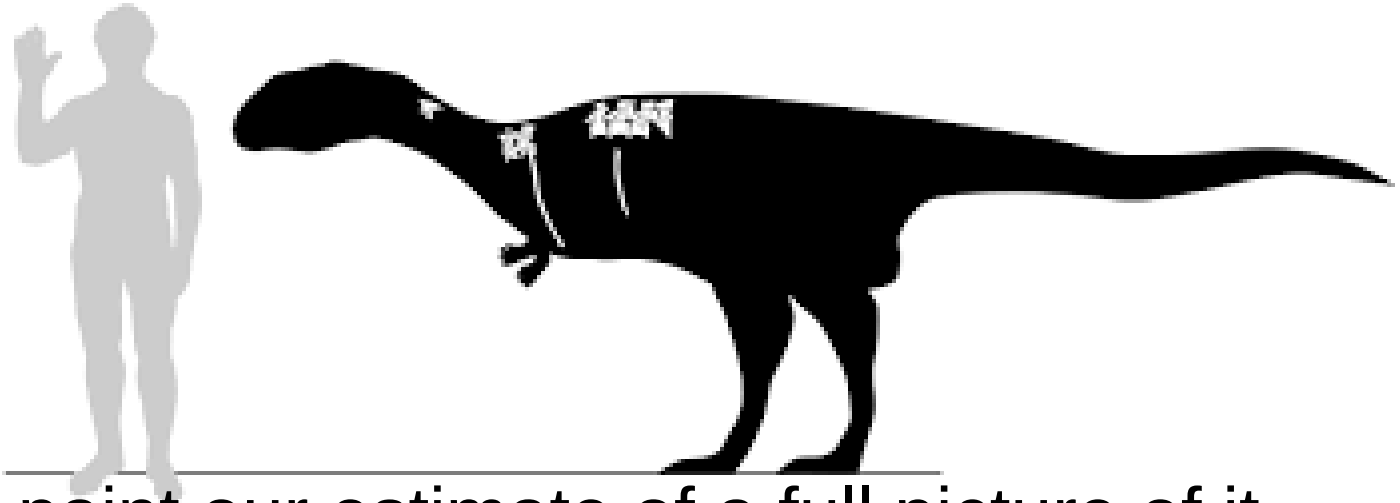
Activity: Dinosaur fossil hunting…what did we find?

Activity: Dinosaur fossil hunting…what did we find?

A few bones of some dinosaur. What does it look like?

What does it look like?

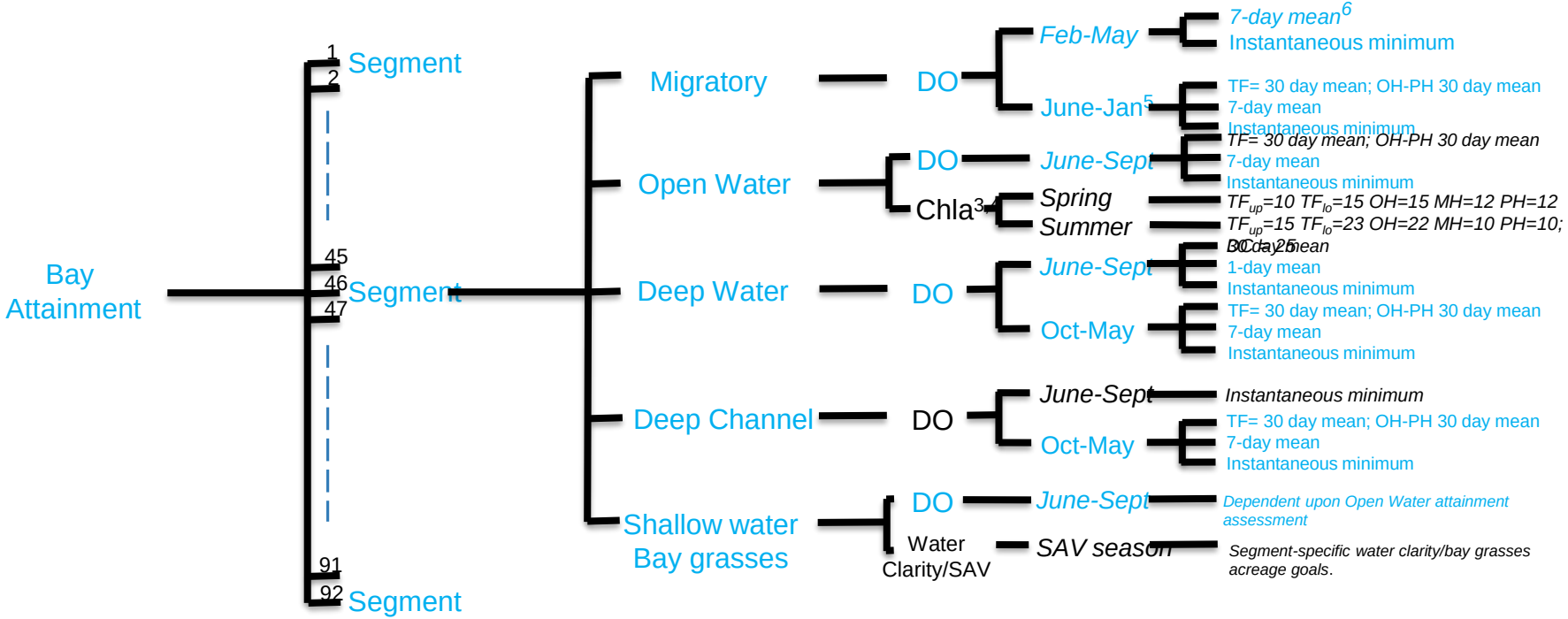
It’s about a 10 ft dinosaur, standing about 6 feet tall, small front limbs, strong hind limbs, it has about a 4 foot tail and a head as large as my chest is across.



We can paint our estimate of a full picture of it from just a few bones

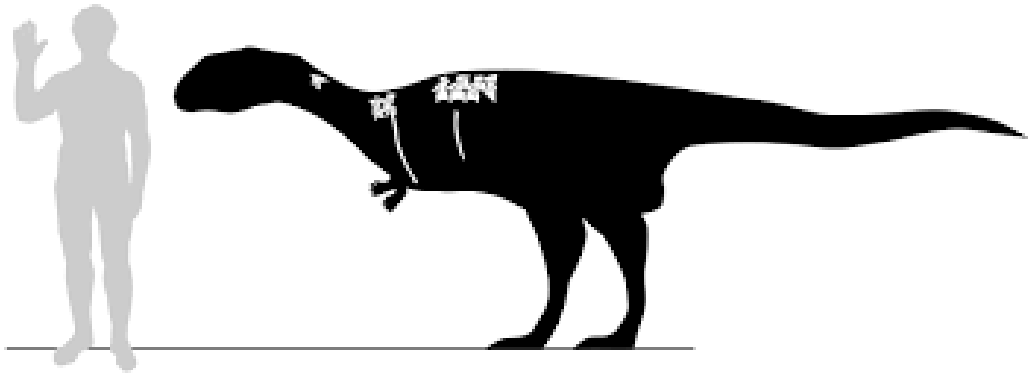
INDICATOR of Water Quality Standards Attainment Assessment

Bay Attainment	Segments[1]	Designated Uses[2]	Criteria	Season	Thresholds

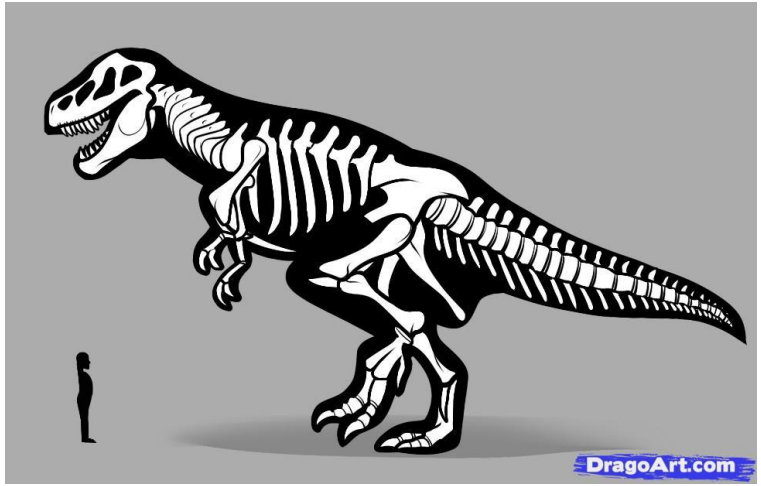


BLACK is measured, known. BLUE is NOT MEASURED BY THE MONITORING PROGRAM. The Indicator ***Estimates Attainment*** *at this time.*

Which dinosaur picture is has less uncertainty and more accuracy?



Marginal information



Adequate to full information

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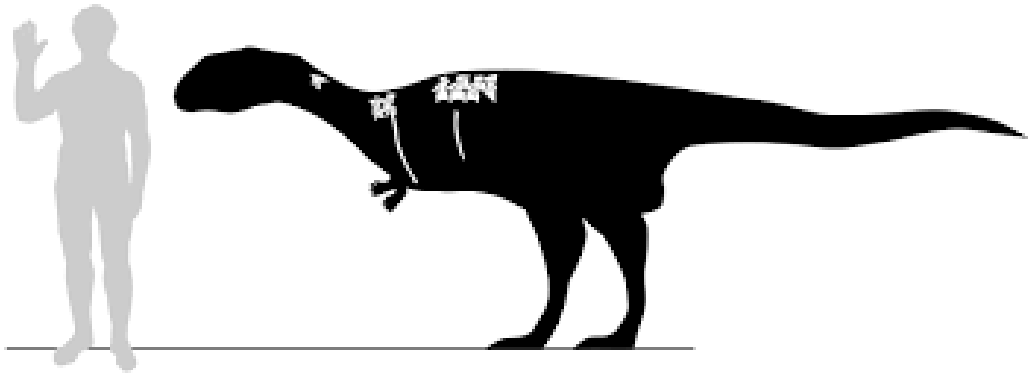

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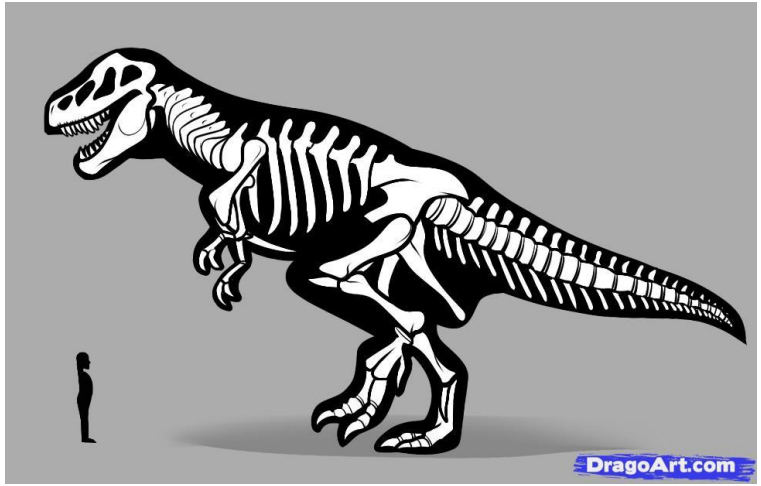

Adequate to full information

This is our Water Quality Standards Attainment Assessment right now

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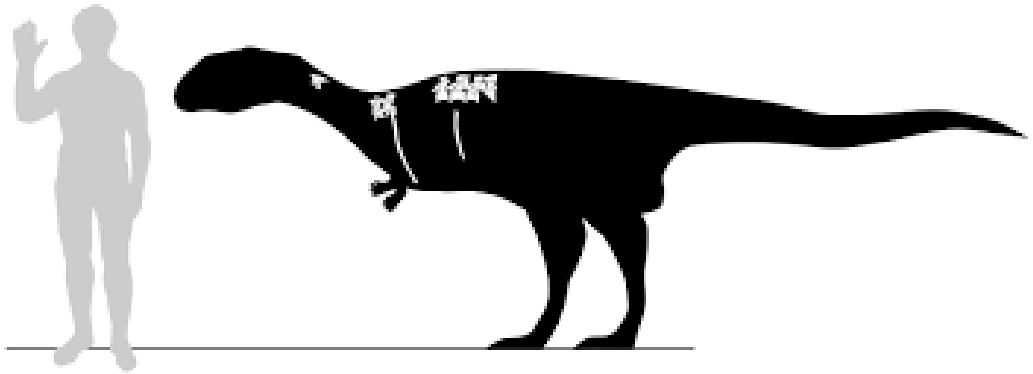

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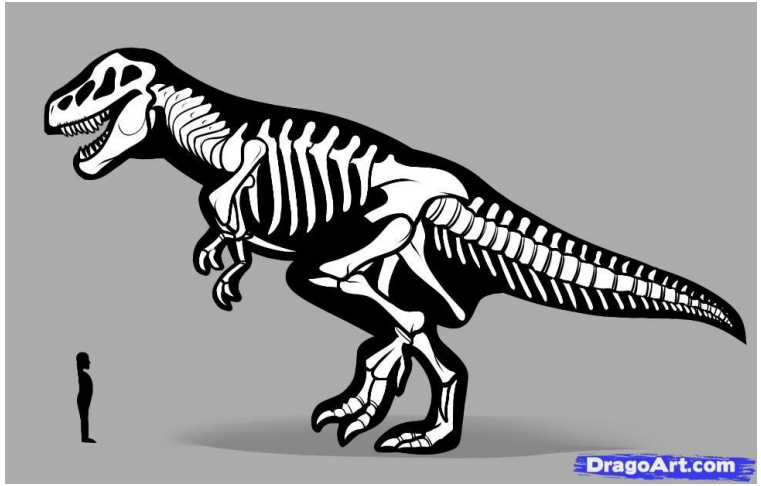
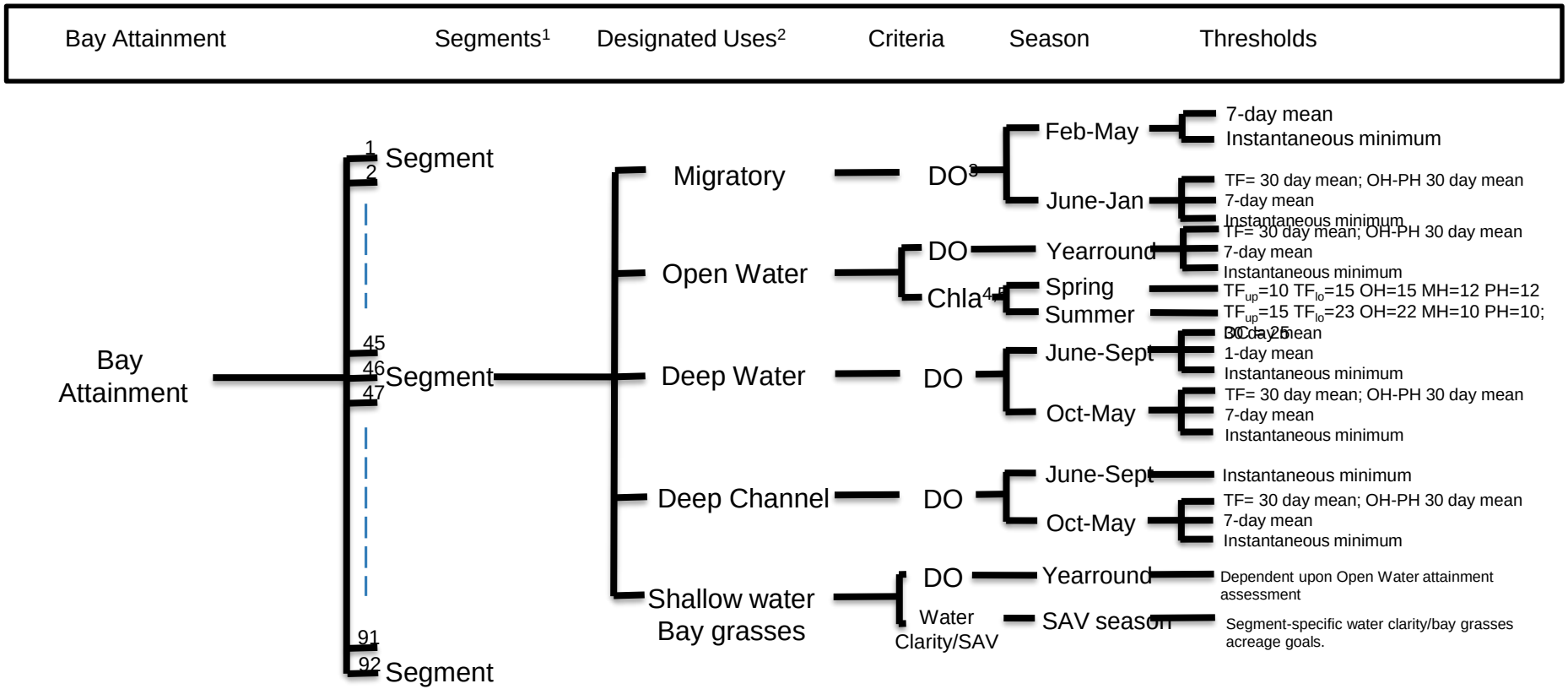


Adequate to full information

With new data plus USEPA 2017 we are getting closer to this.

FULL Water Quality Standards Attainment Assessment for Chesapeake Bay Dissolved Oxygen, Water Clarity and Chlorophyll a



Capactity - Analysis

- EPA funding and partnerships have grown the monitoring program throughout its history to its greatest level of support ever.
- Managing budgets to address annual inflation are critical to sustaining the existing core monitoring for water quality standards.
- Incorporating newly published protocols will improve the accuracy of our index.
- Adding Citizen Science support to the monitoring program portfolio will expand our monitoring resolution in the bay.
- Adjusting the priorities of shallow water monitoring funding to targeted monitoring will improve segment assessments
- CAP WG opportunity to introduce satellite image assessment of baywide water clarity could further improve attainment assessments
- SAV monitoring program funding is being shored up.
- There are opportunities for State match/additional partners to fill gaps.