



Chesapeake Bay Program
Science, Restoration, Policy, and Education

PSC Monitoring Review update, SAV program note, Grant insights

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Chesapeake Bay Program

DIWG Meeting

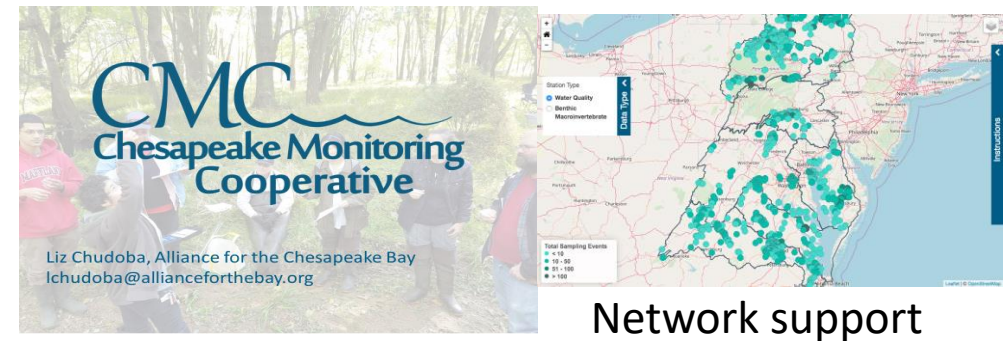
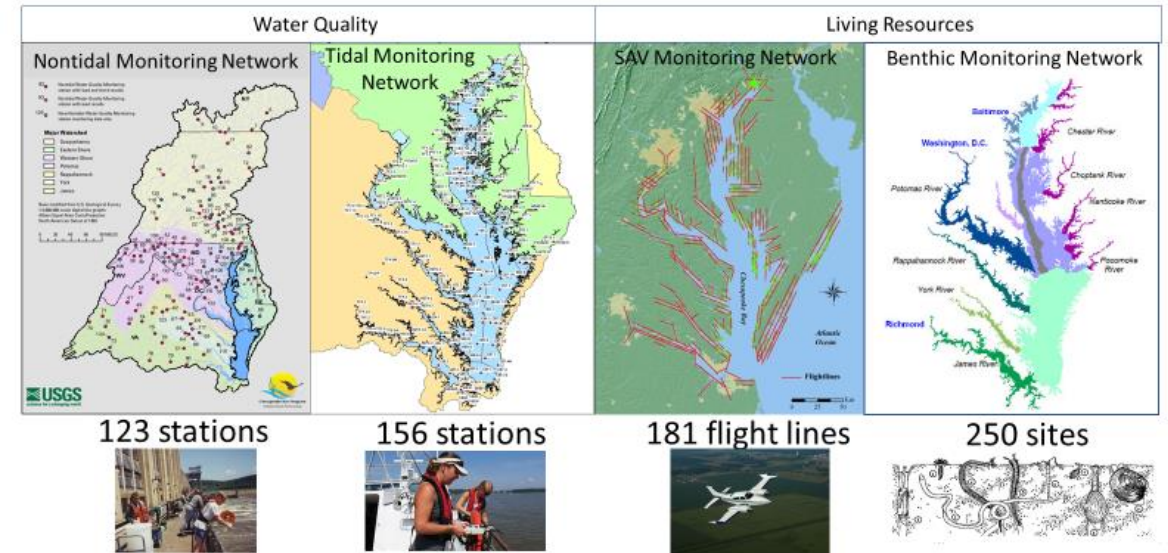
September 30, 2021

Monitoring Presentation to the Principal Staff Committee



- Lee McDonnell provided monitoring presentation on March 2
- Help them better understand CBP budget and funding for monitoring
- CBP networks:
 - Tidal water quality
 - Nontidal nutrients and sediment
 - SAV
 - Tidal Benthic organisms
 - Citizen Monitoring
- Current Funding:
 - CBP \$5M and partners >\$7M

CBP Partnership Monitoring Networks: Annual Monitoring

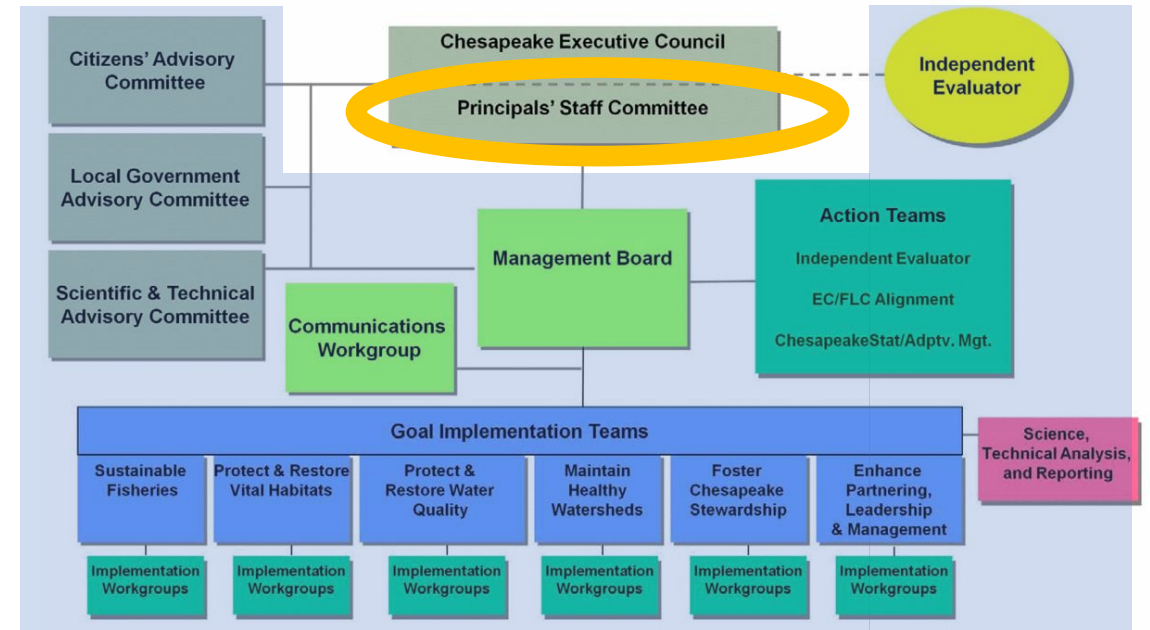


Principal Staff Committee Request



- Provide information needed to improve CBP monitoring networks, including:
 - (1) Current status and threats to the networks,
 - (2) what is needed to improve the monitoring sustainability, and
 - (3) what is already available to address monitoring and assessment capacity shortfalls.
- STAR will Coordinate Response
 - Deliver network assessment and recommendations by January 2022

CBP Organizational Structure and Leadership 09-20-10



Process

9 months start to
finish

8 questions to
answer

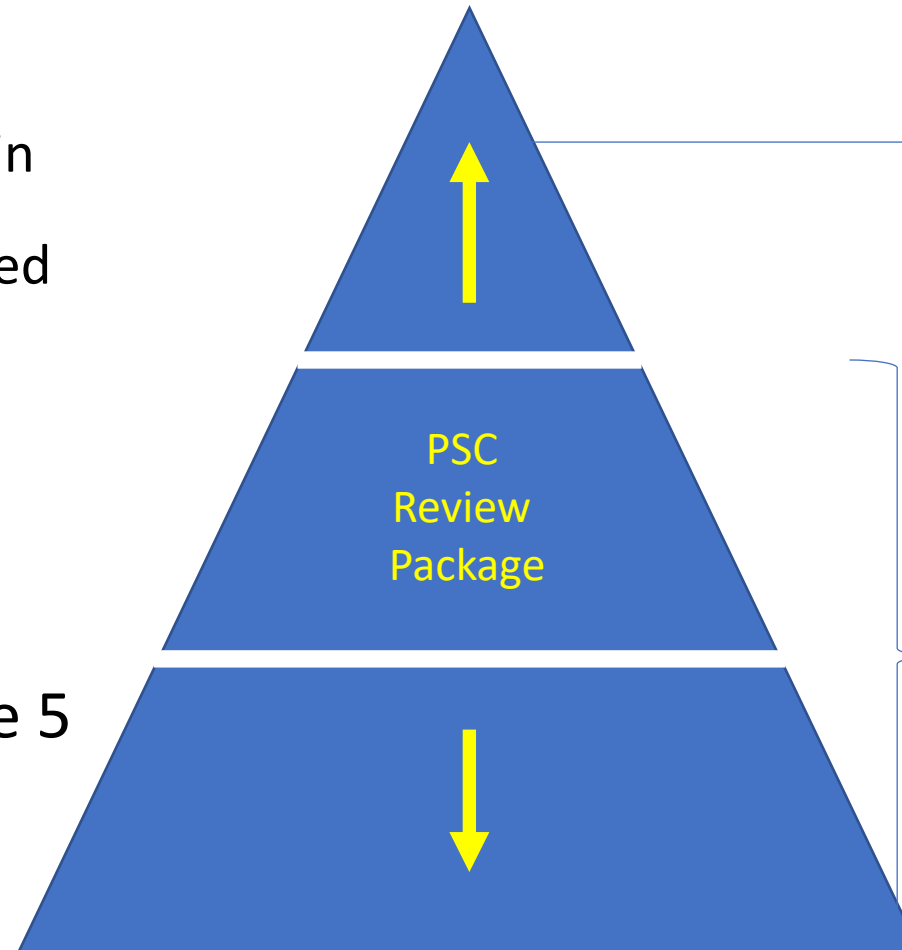
Provide a short
synthesis to address
the questions, vision
going forward.

Process timeline and themes to answer questions

[illegible]

Delivering a final product: Tiered communication

- Section 1: Executive summary
 - recommendations to sustain and grow networks:
 - strategies, resources needed
- Section 2: 5 network portfolio summaries
- Section 3: Network and program needs beyond the 5 networks



Section 1 Exec Summary

Example Product Target:
Network portfolios with recommendations

• Recommendations

- Partner with ABCD organizations to finalize protocols on satellite-based monitoring
- Adopt satellite-based monitoring for SAV, light, chl-a
- Adopt AI algorithm interpretation for satellite-derived data for cost effective assessments
- Increase 11% budget to augment losses on core monitoring SA

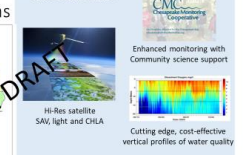
• Vulnerabilities

Category	Issue	Explained
Inflation	Rising power	Cost impact
Level funding	COLA impact	Cost impact
Aging infrastructure	Replacement cost	Resource distribution
Contractor viability	Discontinuity of service	Mixed sampling
Pandemic	Safety	Mixed sampling
Staffing	Capacity	Missing capacity

• Status

The current tidal monitoring network was established in 1984, its first full year was 1985. There are 154 active stations sampled for physical, chemical, and biological measures throughout the water column with a consistent set of collection and analysis protocols.

• Innovations



• Financials

- 2021 – level funding at \$X.a M
- Projected program changes include X.Y Z

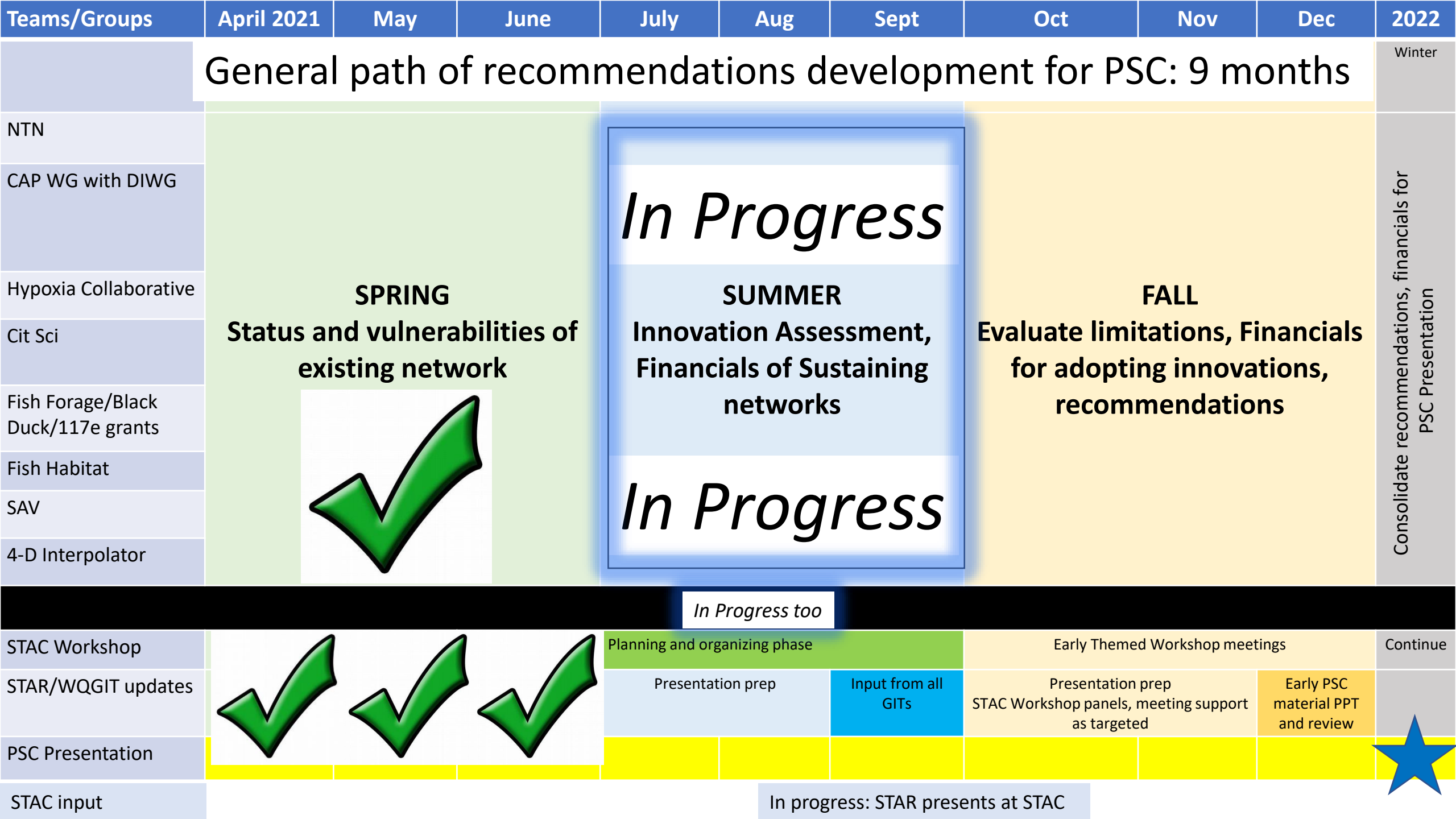
• Gaps

- Short duration D.O. criteria
- Efficient CHLA coverage
- Efficient light limitation coverage

Section 2 and Section 3



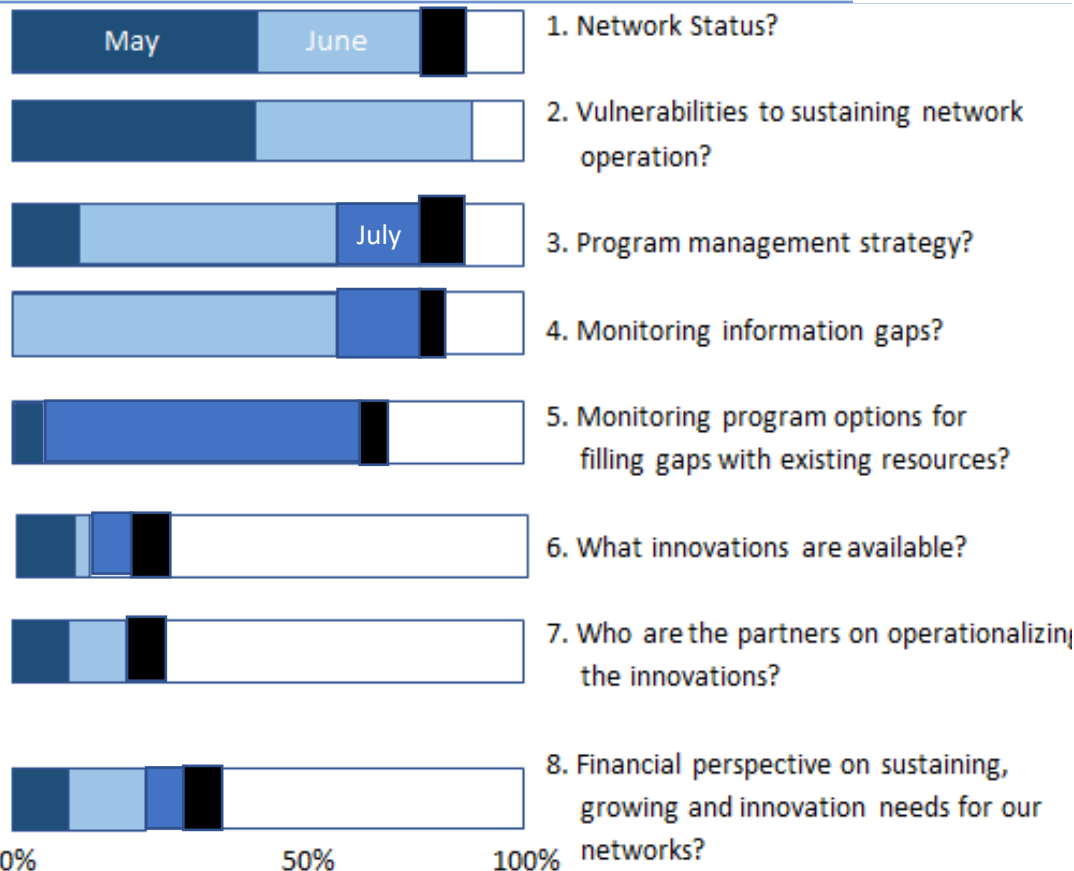
**How Are We
Doing?**



Report Progress:

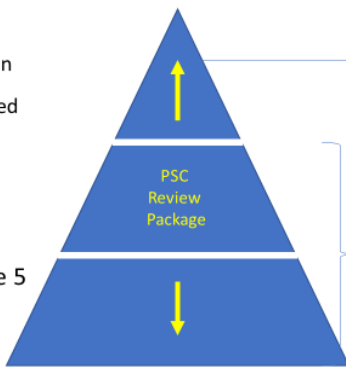
Section 2

Tracking our progress on the short report: August 2020



Delivering a final product: Tiered communication

- Section 1: Executive summary
 - recommendations to sustain and grow networks:
 - strategies, resources needed
- Section 2: 5 network portfolio summaries
- Section 3: Network and program needs beyond the 5 networks

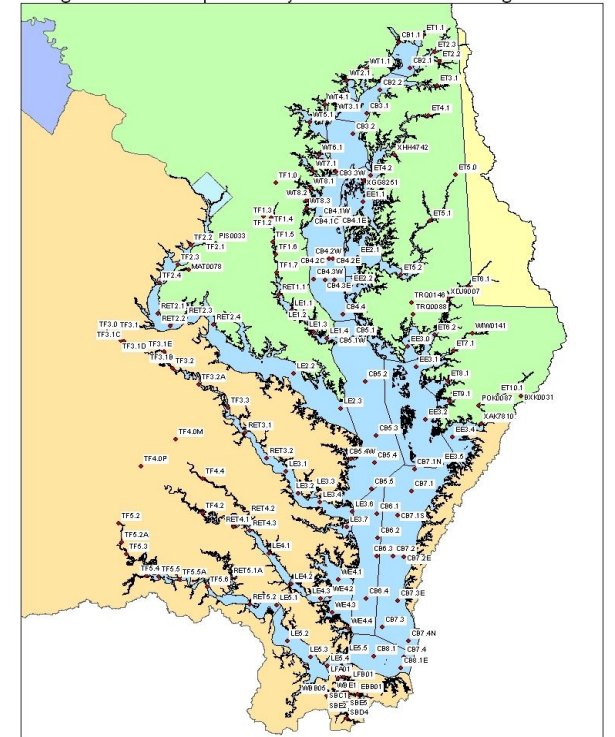


Section 3 (Q9). Addressing needs beyond the 5 networks

Key findings to date



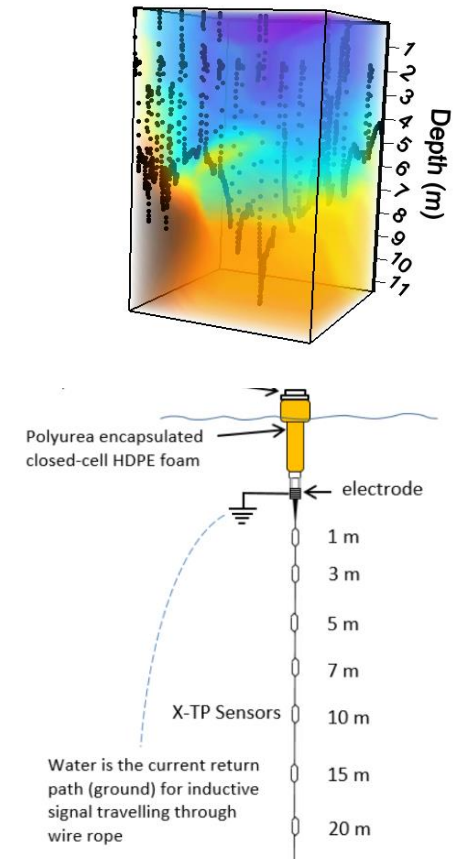
Status: Tidal Water Quality Monitoring Network



Tidal Water Quality Monitoring (1)

Time needed (i.e., about a year) before additional investment in high frequency monitoring sampling design for the bay

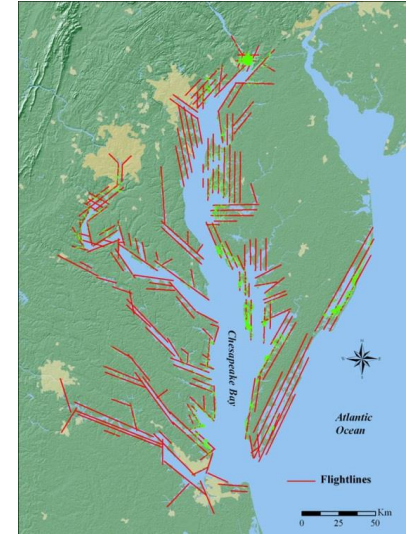
- **Documentation development** was started for the new 4D interpolator (4D Team)
 - **Initiated development on a case study** with new methods for interpolation (4D Team). Presentation in the next meeting being planned.
- **2 new mainstem bay deployments of vertical monitoring arrays** located on eastern and western sides of the deep channel (Hypoxia Collaborative)
 - Lower Potomac and Lower Rappahannock are interests for additional vertical arrays. (Sept. Hypoxia Collaborative and 4D Team suggestions)
- **High frequency DO monitoring design issue for the bay needs more work** before forming a project/workshop (Multiple teams)
 - General feedback from multiple groups – we need a bit more time before delving into a sampling design plan to account for detailed boundary estimation.



Tidal Water Quality Monitoring (2)

Monitoring workshop planning progresses

- STAC Workshop on Advanced Monitoring
 - **Subcommittee held meetings** in August and September
 - Meg Cole helping us plan next subcommittee meeting
 - **The SAV-focused workshop element is taking shape** for early December
 - Review the report findings from the 2019-2020 pilot study on
 - Presentations on advances in SAV assessment with other satellite resources, image filter improvements, AI algorithms for interpreting imagery
 - Program recommendations on next steps



Tidal Water Quality Monitoring (3)

Fill in details on financial assessments now

- Financials
 - Peter is having some one-on-one time with the agencies now.
 - We have had various conversations during grant progress reviews as well as in various meetings. Ready to tighten up status and outlook details now.

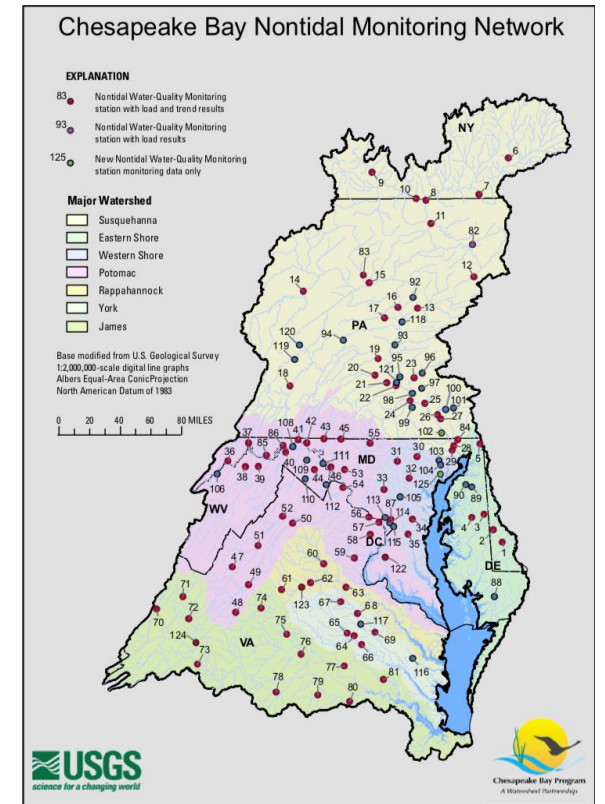
Table 4. Fundamental investment targets needed to maintain existing operations and address required growth to meet gaps in the existing monitoring programs to address essential remaining management decision support.

Network	Sustain existing network capacity	Grow existing network operations	Adopt new approach to fill assessment gap
Tidal	Annual COLA	Revised shallow water monitoring strategy	Hypoxia network investment
	Field and Lab audits		Satellite assessment - Chlorophyll
	Infrastructure (MD)?		
Nontidal	Annual COLA	Storm flow at 2ndary stations in Virginia	Not applicable
	Lost station funding (Deer Creek, MD)		
SAV	Supported	None	Satellite assessment – SAV & light limitation Algorithm application
Benthic Invertebrates	Supported	None	Not applicable
Citizen Science	Supported	Supported	Not applicable

Blue identified from the CBP Science Needs Database, Green identified from STAC Workshop activities, Yellow have been discussed in workgroup meetings.

Evolving report table and info

Status: NonTidal Monitoring Network



Nontidal Water Quality Monitoring

Immediate need for backfill on lost partner support at 1 station, optimization work getting established.

- **Nearterm:**

- **Unplanned losses** on a near annual frequency remain a key vulnerability challenging the good plans and support to date maintaining the network.

- 2021: Deer Creek monitoring station is losing support.

Good News! Deer Creek funded for another year!

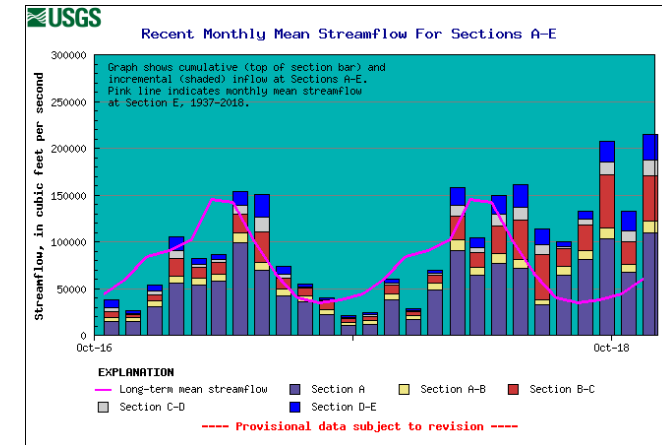
- **One partner is operating with a bootstrapped budget structure** – we need to visit this with EPA leadership.

- **Network optimization tools** were updated and recently reviewed by Matt Cashman (USGS).

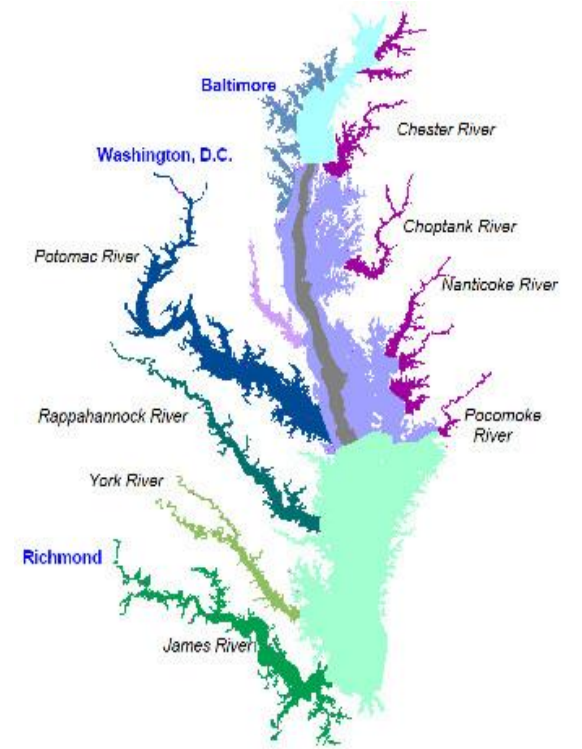
- Qian Zhang (STAR Team, UMCES) is learning the tools to assist with network optimization work.
 - This work will feed into Financial need assessment for maintaining the network.

- **Long term:**

- Considerations are being evaluated on where and when continuous monitoring stations may be added into the network.



Status: Tidal Benthic Monitoring Network

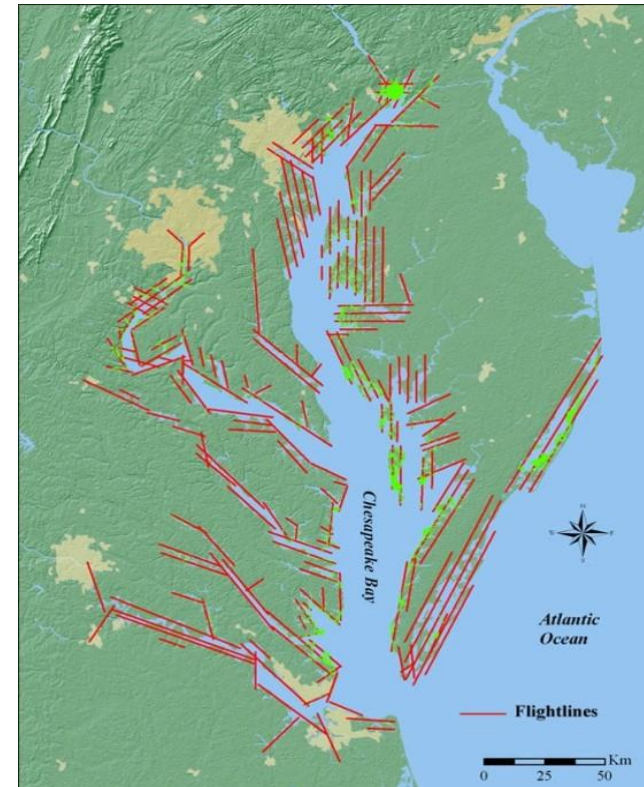


Tidal benthic invertebrate community monitoring
Summer season monitoring focus continues.
No additional support requested at this time.

- **Summer meetings and communications review (CAP WG, Fish Habitat, Fish Forage, Black Duck)**

- Historically we had spring and summer assessments in the Bay
- Spring sampling was defunded 2009/2010 (MRAT outcome)
- States are well positioned in grants for continuing nearterm (i.e., 5-year) summer IBI sampling and reporting support
- No support was expressed for the return of spring benthic monitoring program in the Bay at this time.

Status: SAV Monitoring



SAV Annual Survey

Stable. Support needs will be evaluated to match any new recommendations from the upcoming workshop

- **SAV Annual Survey**

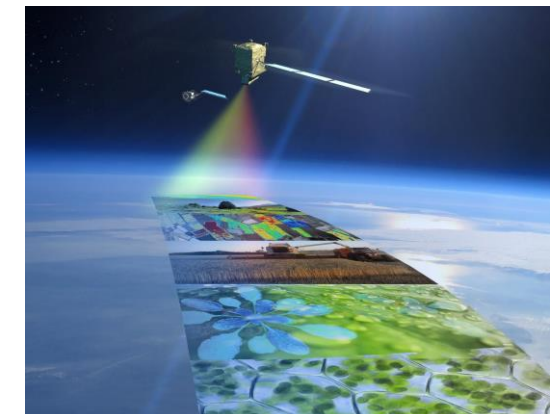
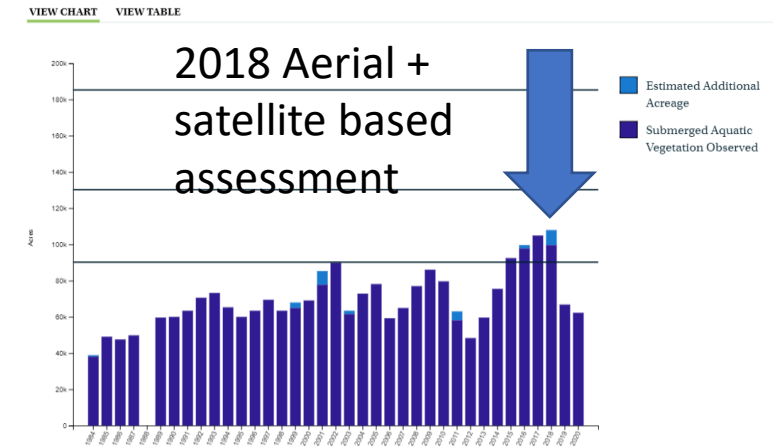
- Exploring Satellite-based Assessment STAC Workshop report released in 2021
- EPA-supported pilot work on satellite-based SAV assessment following up on recommendations from the workshop using commercial satellite imagery from one satellite.
 - Pilot work report is in review.
- Researchers continued working on additional recommendations for
 - Use of other satellite resources to assess SAV
 - AI algorithm development for image interpretation across diverse habitat conditions

- **STAC Advanced Monitoring Workshop 2021-22 (early December 2021 target)**

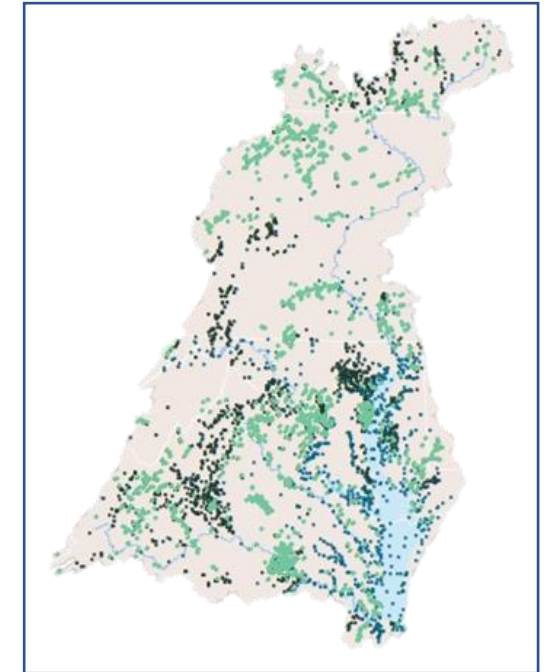
- Full report out on findings of the 2020 pilot study
- Progress in satellite-based SAV assessment beyond the funded study
- Provide recommendations on program adaptation and finances as a function of workshop findings

Submerged Aquatic Vegetation (SAV) Abundance (1984-2020) –

*Estimated Additional Acreage: Factors such as adverse weather conditions, water clarity, or security restrictions over military air space prevented researchers from collecting aerial imagery. For these unmapped areas, estimates of SAV acreage are based on the prior year's survey.



Status: Community Science



Blue: Chesapeake Bay Program

Black: Volunteer monitors

Green: CMC integrated volunteer
monitoring data locations

Community Science – new award in 2021.

No new resources requested at this time.

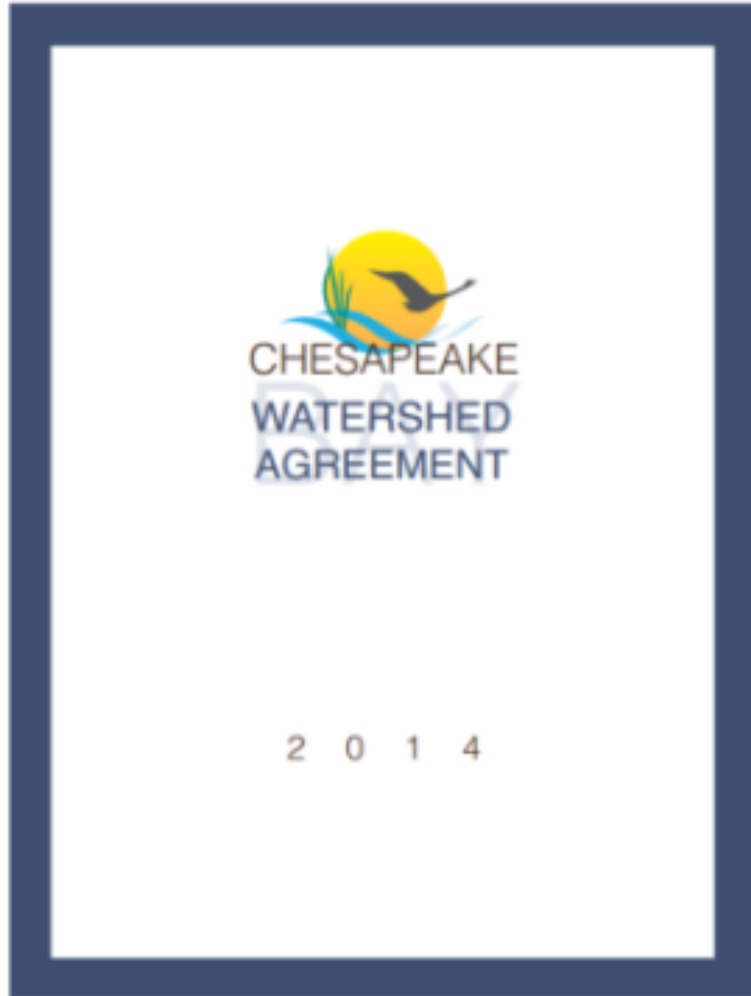
- Chesapeake Monitoring Cooperative is focusing on filling gaps in
 - **Tidal water quality monitoring** supporting water quality standards attainment assessments, and
 - **Nontidal benthic macroinvertebrate sampling** supporting Stream Health Outcome
 - **Other monitoring support needs will be evaluated** during the award period
- CMC is already capturing additional data that may serve other workgroup needs, e.g.,
 - Salt Watch
 - Bacteria
 - And more...

Community Science – new award in 2021.

Award is helpful in leveraging other resources.

- **CMC is coordinating with EPA Wheeling Laboratory** on Chesapeake Bay Trust-sponsored work aligned with Stream Health monitoring needs through community science support. Deliverables include:
 - Sample identification for CBT sponsored sampling the next 6 years (approximately 100 samples)
 - Documenting a protocol for volunteer-based sample collection
 - Documenting a protocol for volunteer-based picking of samples for identification purposes in the lab
- **CMC is coordinating with NFWF** on a habitat assessment protocol for stream health monitoring sites.

Section 3: Addressing needs beyond the WQ Networks

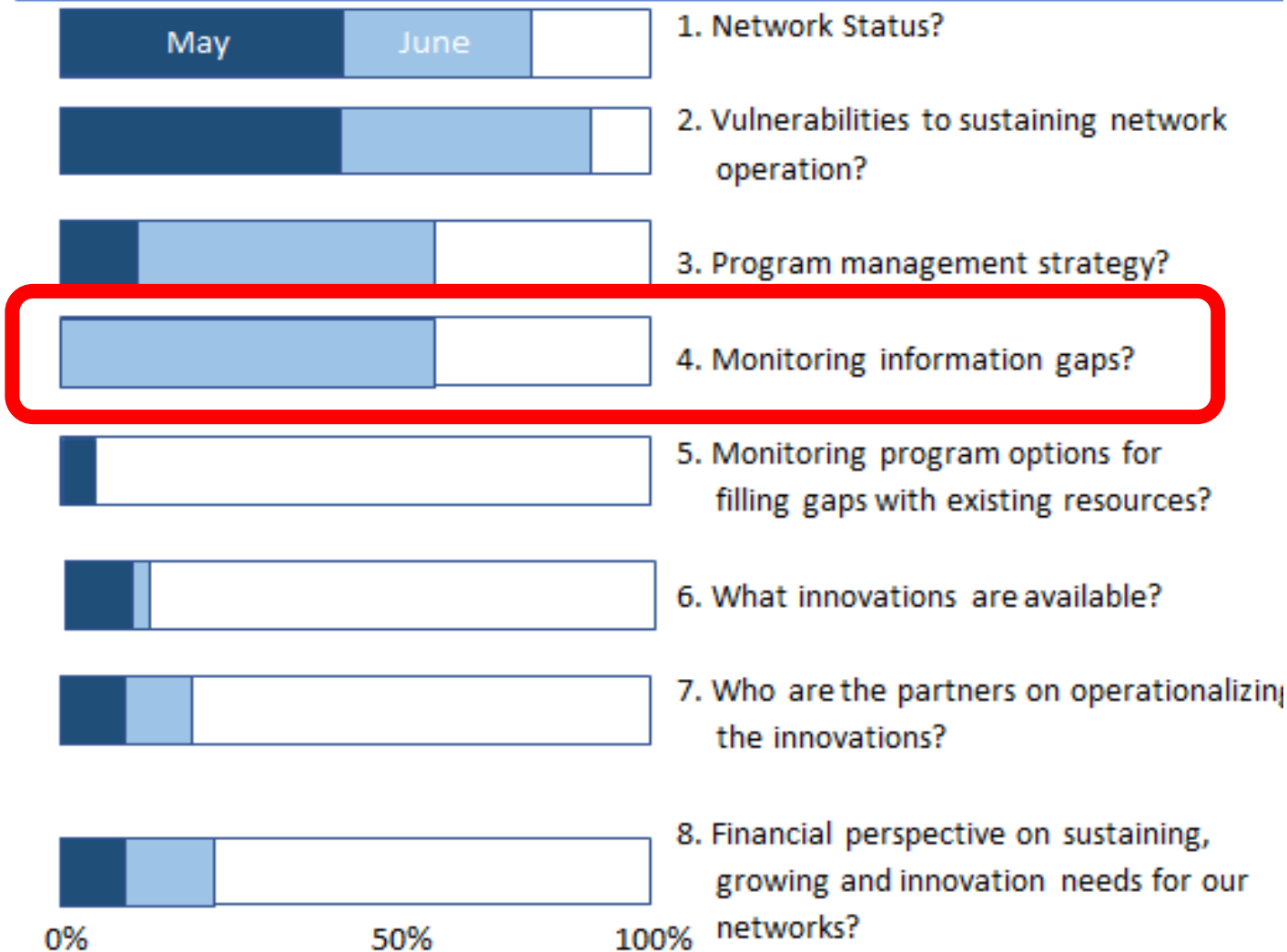


- Watershed Agreement
 - Fisheries
 - Habitats and waterfowl
 - Water quality
 - Toxic contaminants
 - Healthy watersheds
 - Land conservation
 - Stewardship
 - Access
 - Env. literacy
 - Climate resilience
- Monitoring needs (SRS)
- CESR

Q9. What are the monitoring needs beyond the Water Quality Network?

Network Information

Tracking our progress on the short report: June 2020



Monitoring
Gaps captured
in CBP Science
Needs
Database.

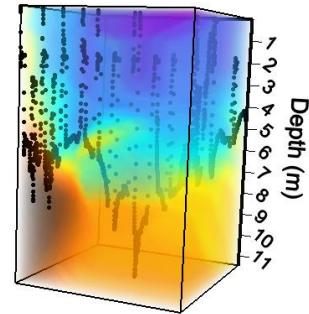
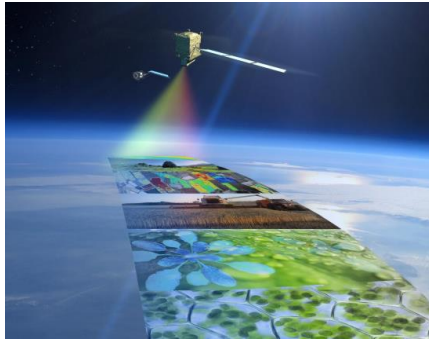
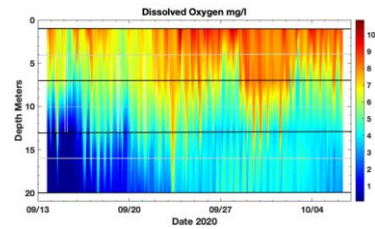
Outcome Monitoring Opportunities

CBP Outcome	Need	Status of Need
Healthy Watersheds	Increased capacity for individual jurisdictional efforts to monitor, assess, and determine watershed health	In Progress
Climate Resiliency Monitoring and Assessment	Better understanding of sea level rise and subsidence impacts related to wetland loss, marsh migration, and adjacent land use considerations	In Progress
Environmental Literacy	Quantify and support BMP installation and restoration at schools to contribute directly to Bay restoration goals.	In Progress
Public Access Site Development	Identify public access sites and potential effects from climate change (sea-level rise and flooding)	In Progress
Brook Trout	Track restoration efforts/monitoring across partners including states and non-profits like Trout Unlimited; Need framework for collecting data across partners and reporting back to CBP	In Progress

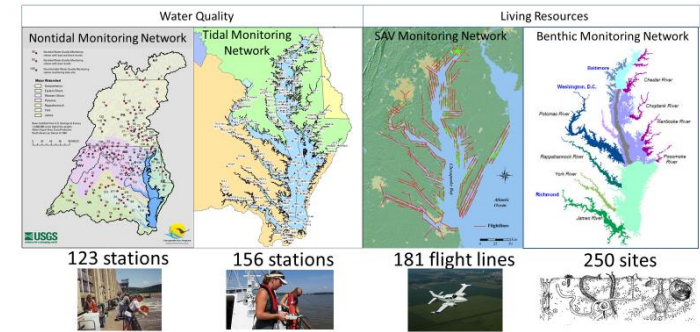
Grant outlook

Grant outlook

- Near daily interactions with CBP leadership on funding for sustaining existing programming and growing monitoring programming to fill data gaps.
- No immediate changes to level funding outlook to report, however,...
- Depending on the bills that do or don't pass in congress these days, there is consideration in proposed EPA-CBPO funding for additional monitoring and analysis support with tidal and nontidal network efforts, and,
- The PSC review was driven in part by an interest with funding for the program to fill data gaps, so we have that additional eye on support from the partnership.



CBP Partnership Monitoring Networks: Annual Monitoring



Thank you and
Discussion