Annual Summary:

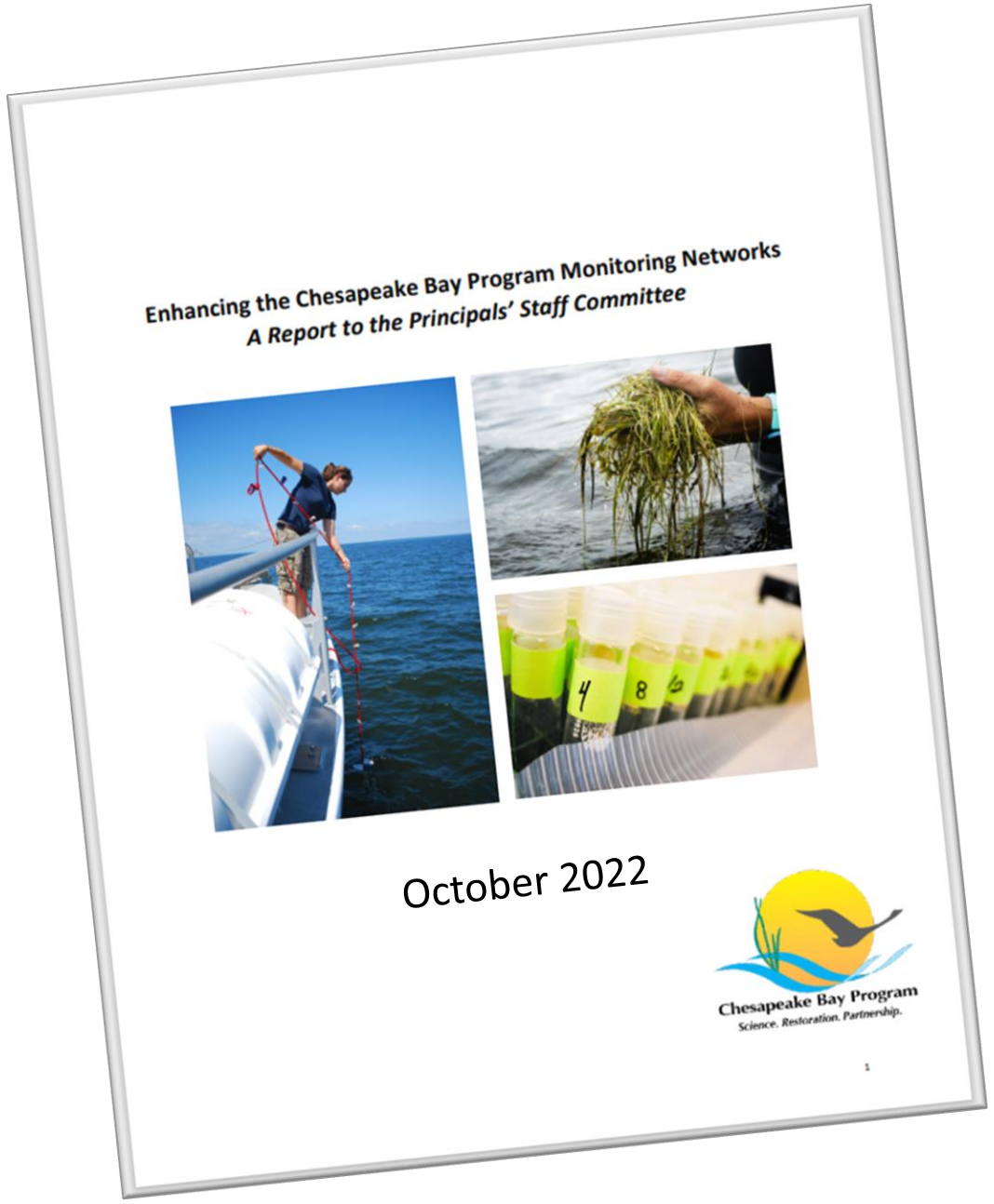
Progress towards addressing CBP monitoring needs identified in the 2022 report to the PSC

Breck Sullivan (USGS),

Peter Tango (USGS)

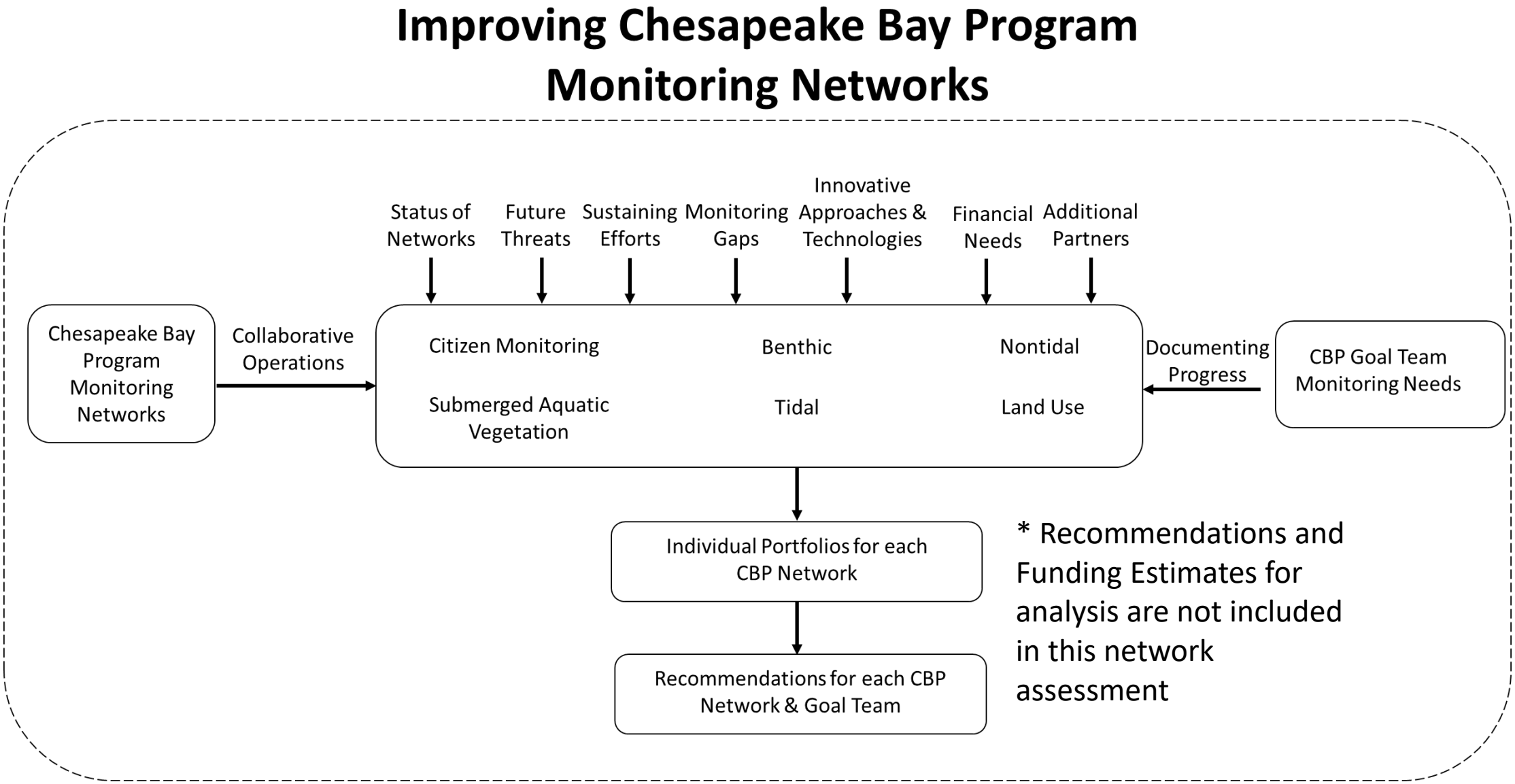
STAR Meeting

September 28, 2023



2021-22 Review: Assessing monitoring needs of CBP networks

STAR-STAC team engaged multiple CBP partners and GITs to refine monitoring needs and develop recommendations



Key findings

- Monitoring is critical
  - Monitoring shows CBP partners progress from water-quality and restoration efforts
  - Need to maintain and enhance core CBP monitoring networks AND partner monitoring programs

- Monitoring for many CBP outcome assessments is insufficient
  - No segment of the bay has assessed for all water-quality criteria, and therefore can't be delisted!
  - Some Outcomes need a more coordinated effort to track progress
  - Some Outcomes lack information to assess progress

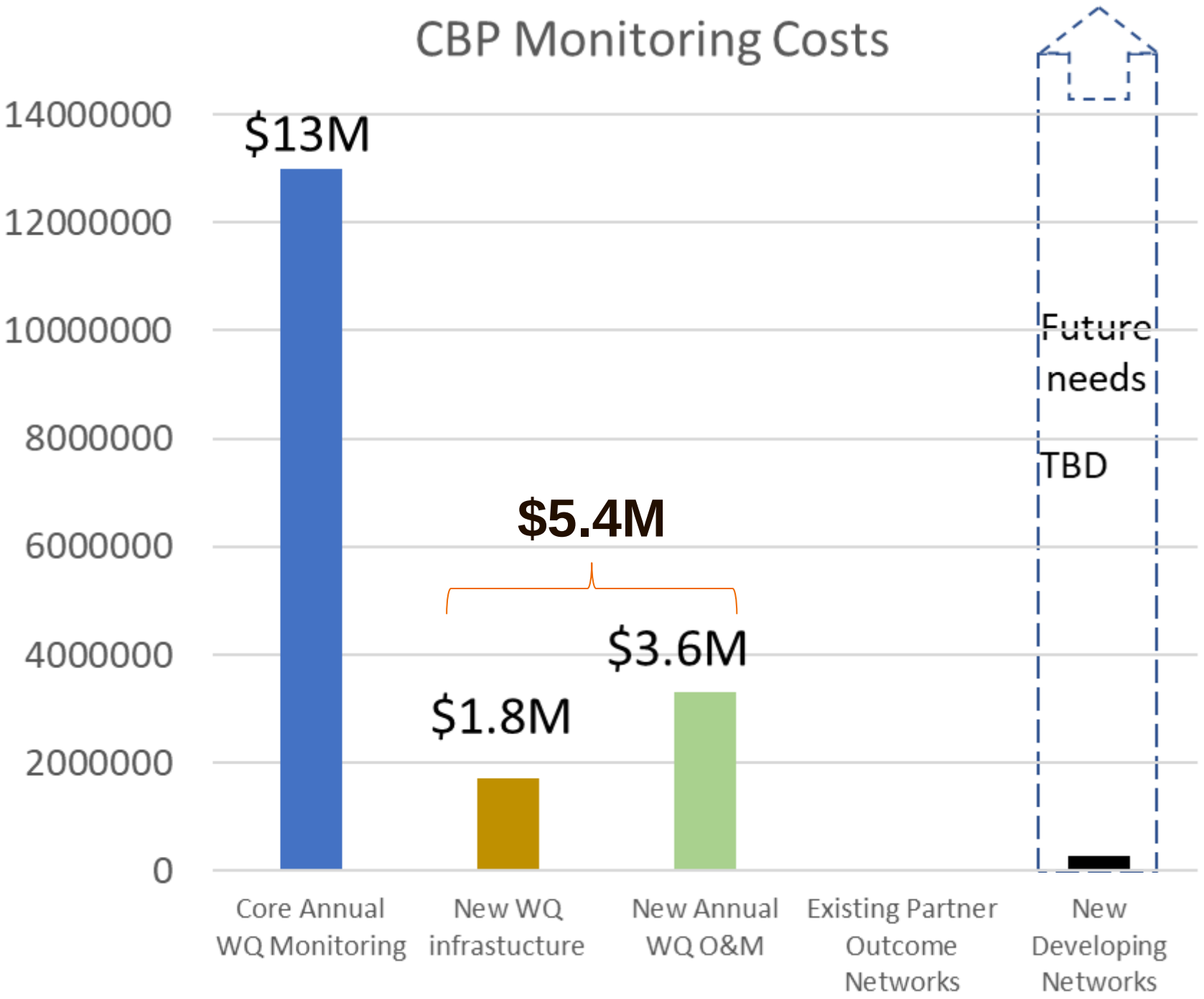
- Opportunities for fundings exist
  - The CBP partners committed to achieving these outcomes have a unique opportunity to build monitoring capacity.

Where are we now?

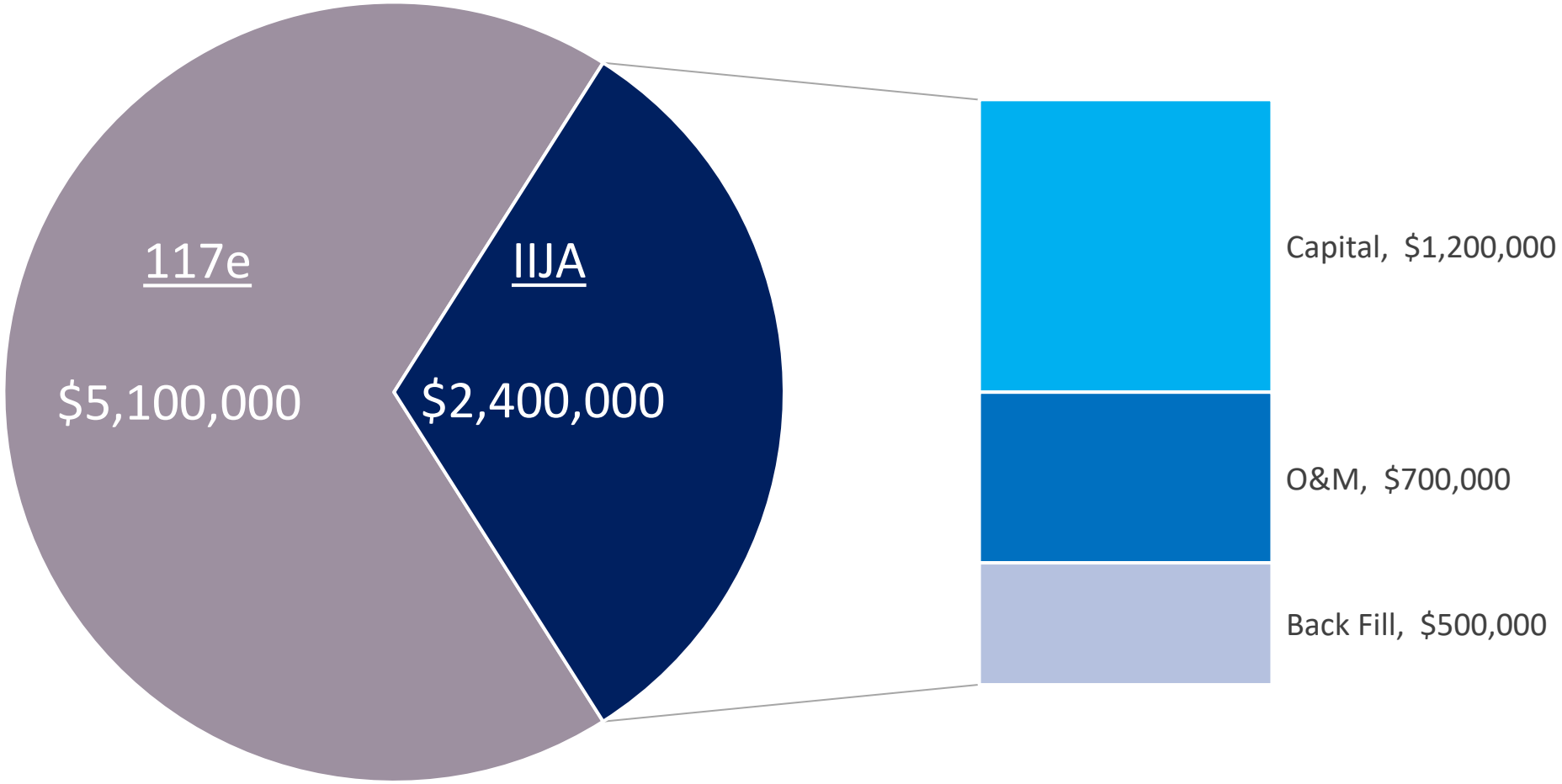
Success Story

October 2022-September 2023:

Within ONE YEAR, $4.9M of the $5.4M (>90%) of the recommended support has been committed for core programs.



Increased Monitoring Funding of Core CBP Monitoring Networks with Infrastructure Investment and Jobs Act dollars: FY22



Supported investments for 27 out of 30 Recommendations with CBP Monitoring Networks

Tidal WQ

- 8 new sites for vertical sensor arrays packages; Operation & Maintenance (O&M)
- 4D water quality interpolator development support
- Nutrient Limitation RFA competed and awarded
- Sustain existing programming
- VADEQ COLA

Nontidal WQ

- 7 River Input Monitoring (RIM) continuous monitoring (Con-Mon) sensor packages completes RIM; O&M
- 5 new small watershed Con-Mon locations; 6 sensor instruments; O&M
- 3 lower Susquehanna Reservoir input Con-Mons (PA USGS cost basis)
- Station loss backfill annual risks coverage
- PADEP funded through EPA

Supported investments for 27 out of 30 Recommendations with CBP Monitoring Networks

SAV

- Satellite-based, AI/ML supported SAV assessment RFA competition (in progress)
- COLA

Benthic

- COLA

Citizen Monitoring

- Community Science Monitoring Support RFA – under development with:
  - Under-represented community monitoring equipment (5 sets)
  - SAV database application programming interface (API) improving
  - SAV Watchers database development
  - Volunteer/Community Science SAV Watchers + Nitrate Monitoring program
  - SAV Watchers Database management

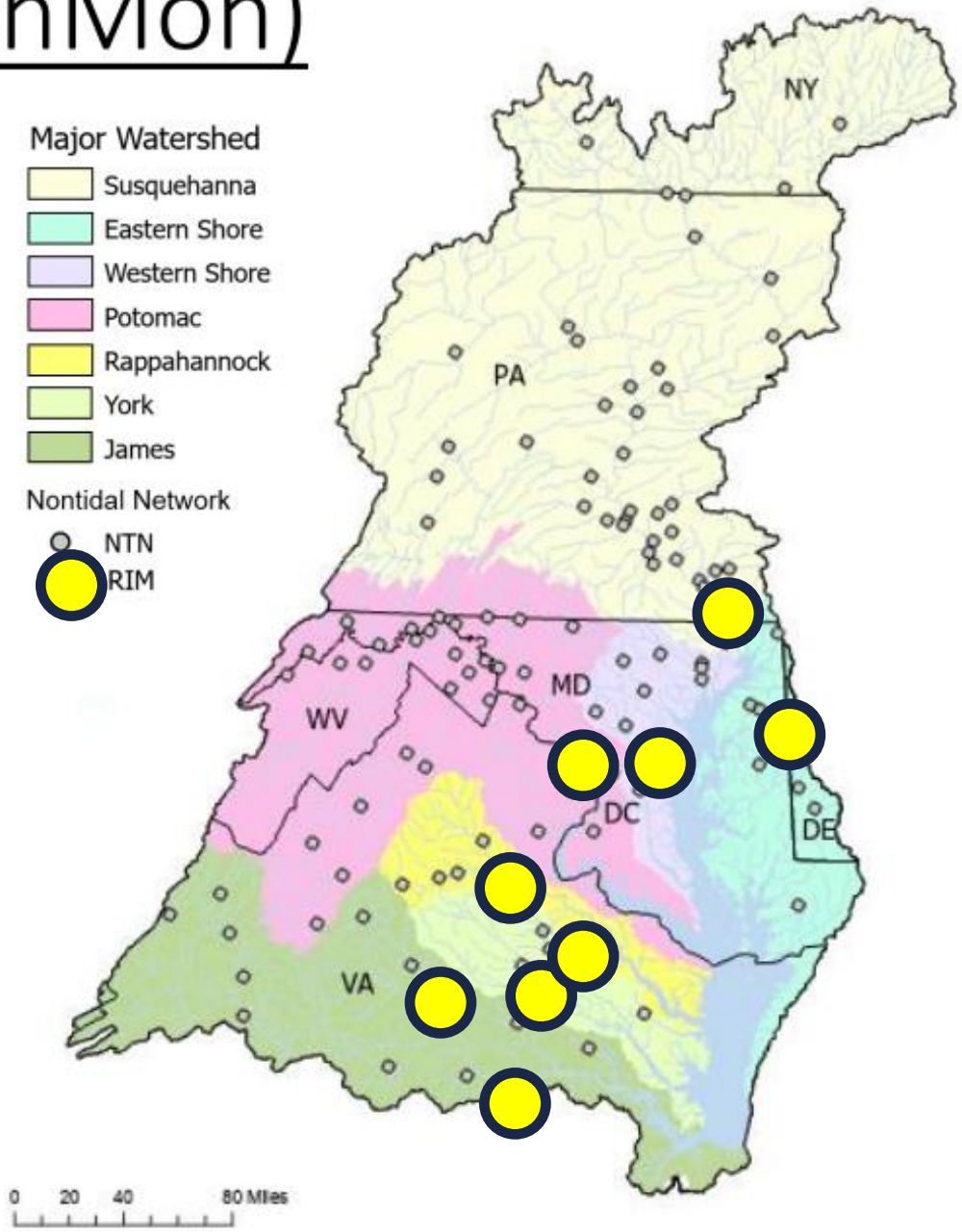
Pending Recommendations for CBP Monitoring Networks (3 out of 30)

SAV	• Infrastructure agreement for satellite imagery
Land Use Land Change	• Annual high resolution image acquisition and processing
Toxics	• Adding 3 sites in 1 geographic-focus area to monitor PCB response to management efforts

Continuous Monitoring (ConMon) Sensor Packages

River Input Monitoring Stations:

- **Virginia**: Appomattox & Mattaponi
  - SUNA (Nitrate)
  - 5 Parameter sondes deployed (pH, SC, Turbidity, DO, Temperature)
- **Maryland**: Choptank River
  - 5 Parameter sonde deployed
  - SUNA
- **Maryland**: Patuxent River
  - Siting permissions ongoing
  - Collecting data at Gwynns Falls



Small Agricultural Watershed Monitoring Updates

2023 – Presently pursuing 4-5 locations in DE, PA, VA and MD

- **Objectives:** (1) To evaluate the effects of agricultural management practices on monitored nutrient and sediment loads and (2) to generate monitoring-based insights that inform the management of agricultural Chesapeake Bay watersheds.

- **Approach:** Streamflow and water-quality monitoring data will be collected from 5 small (~5-10 mi2) agricultural Chesapeake Bay watersheds. Monitoring data will consist of (1) a stream gage, (2) continuous water-quality, and (3) discrete water-quality samples.

Key to success with applying investments –

Well-defined approach to addressing decision support gap with explicit program cost estimates.

- **What is the indicator** for assessing status, tracking progress?

- IF not using an existing indicator, THEN, with costs defined:
  - **What data are needed** to compute the indicator?
  - **Explicit sampling designs**
    - Where, when, how many measures are needed?
  - **Data management plan**
  - **Partner commitment to monitoring program activity**
    - infrastructure, operations and maintenance commitments

Figure 1. Envisioning an expanded set of investments across the CBP partnership to address critical monitoring needs identified during the review.

Implement recommendations and pay for monitoring

- Need a *multi-partner approach* to invest in gaps.
- Partners can identify which monitoring items they want to support
- Example: Hypoxia collaborative

Growing investments are occurring via partnering

Ongoing work to maintain investments and address needs of more outcomes

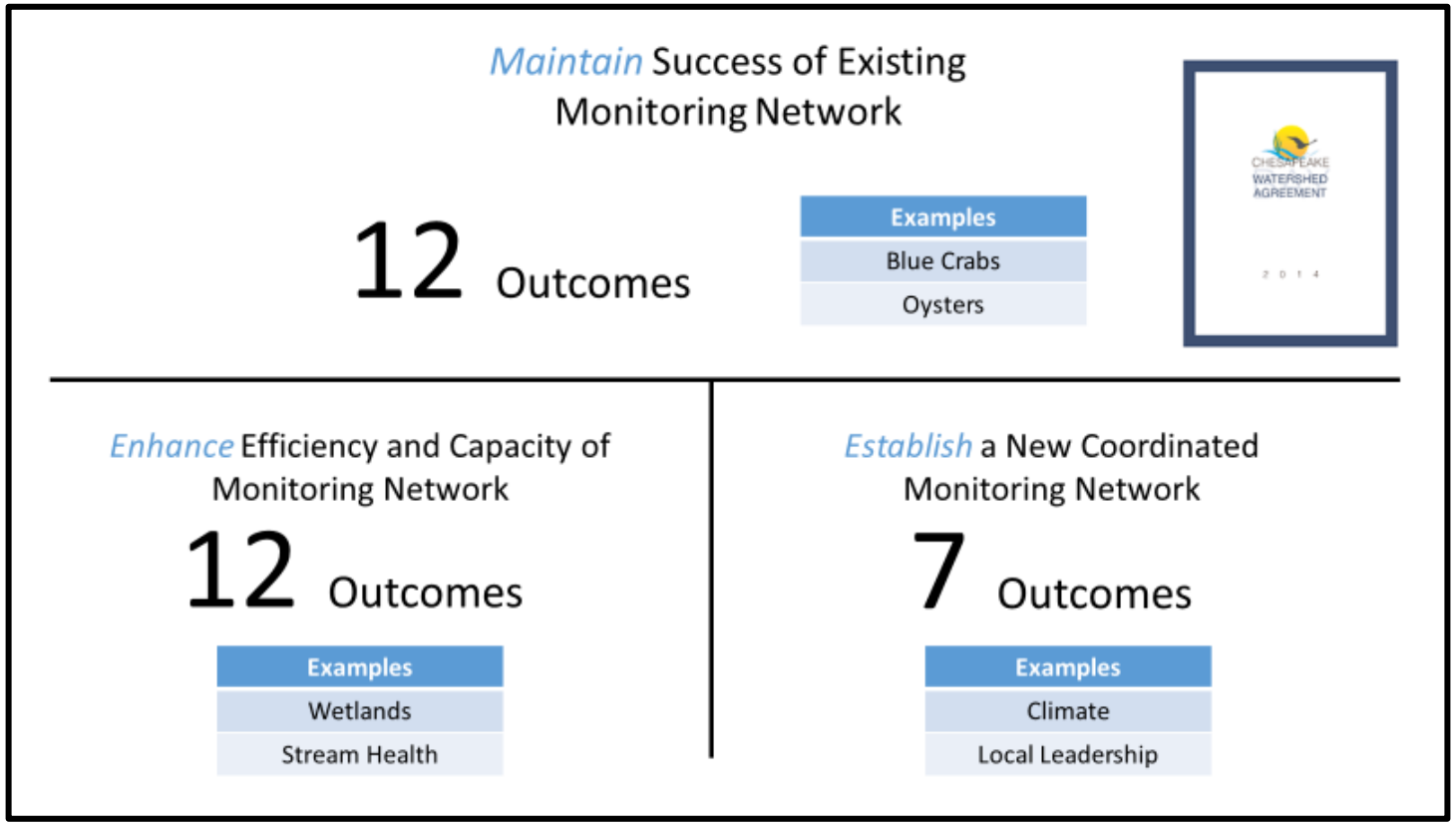
Several partnerships are already developing for identified priority investments!

Satellite-based SAV assessment

Hypoxia network

Continuous water quality monitoring at Conowingo Pool (Marietta)

There remains a broad set of monitoring needs across 31 outcomes captured in the report. Maturity of need definitions are evolving:

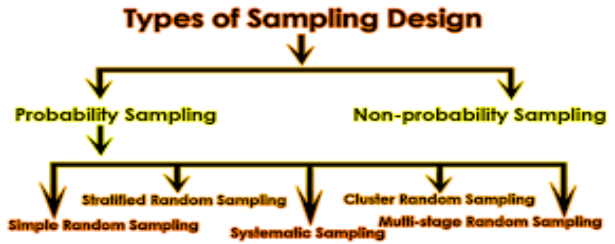


See report for details: [Enhancing_the_Chesapeake_Bay_Program_Monitoring_Networks_A-Report_to_the_Principals_Staff_Committee.pdf (d18lev1ok5leia.cloudfront.net)]

Process of developing recommendations supporting outcome monitoring needs

Needs assessments from CBP **Science Needs Database** and meetings with Goal Implementation Teams

Structure of need by group varies from topic of interest to monitoring design considerations



Develop costs for need based on proposed designs

COST MANAGEMENT CATEGORY	Year 1
Salaries and Wages (Data management, regression development)	$21,520
Salaries and Wages (Installation of QW sondes)	$ 21,300
Equipment and Installation Supplies	$105,000

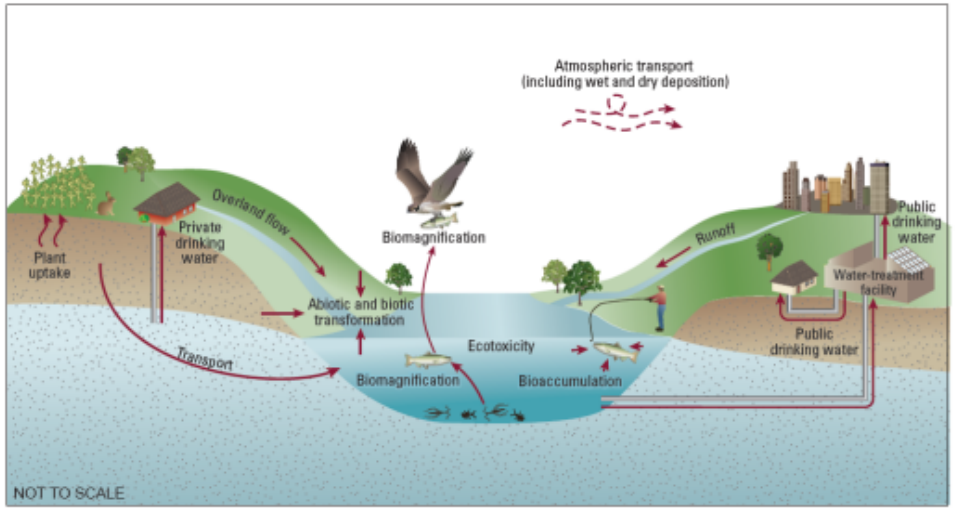
Collate cost estimates

Total cost

Toxic Contaminant Outcome

- **Need:** A STAC Workshop gathered speakers to better understand the state of the science and purpose approaches to improve knowledge of PFAS including considering study designs and comparable sampling and analysis methods for a more coordinated PFAS science effort.
- **Approach:** New USGS Hire, Funding for FY23 and FY24

Improving Understanding and Coordination of Science Activities for Per- and Polyfluoroalkyl Substances (PFAS) in the Chesapeake Bay Watershed



STAC Workshop Report
May 17-18, 2022
Annapolis, MD and virtual

STAC Publication 2023

Stream Health Outcome

CHESAPEAKE WATERSHED
COOPERATIVE ECOSYSTEM STUDIES UNIT

- **Need:** Prioritize and enhance monitoring
  - Fill gaps to enhance watershed representation and expand Chessi BIBI (spatial monitoring)
  - Design long-term monitoring network (temporal monitoring)
  - Site selection for restoration (restoration monitoring)

- **Approach:** CESU with UMBC to conduct multi-day workshop and report out recommendations

Future need

Analysis and reporting needs were not included in the monitoring review

Have your monitoring needs changed?

How can STAR help you structure your monitoring need?

Breck Sullivan (USGS), Peter Tango (USGS)

September 28, 2023