STAC monitoring concerns

- 'Monitoring for attainment' focus needs to shift to 'monitoring for adaptive management' (What is working?)
- Integration of citizen science and modern technologies needs to occur
- Major monitoring overall likely necessary, not just minor tweaks
- New Bay Agreement should clearly articulate goals, outcomes, strategies to identify monitoring needs

Do we need an overhaul?

- Current monitoring is too WQ-weighted
- New agreement, system thaw
- Opportunity to further integrate
- Consideration of new technologies, citizen science
- Level of system understanding is explicit
- Feedback loops for management strategies
- Process needs committed synthesis team and leadership
- Requires expertise and intellectual resources
- Requires a whole system perspective

If you compared:

Chesapeake Bay Program
A Watershed Partnership

CHESAPEAKE 2000

PREAMBLE

The Chesapeake Bay is North America's largest and most biologically diverse estuary, home to more than 3,600 species of plants, fish and animals. For more than 300 years, the Bay and its tributaries have sustained the region's economy and defined its traditions and culture. It is a resource of extraordinary productivity, worthy of the highest levels of protection and restoration.

Accordingly, in 1983 and 1987, the states of Virginia, Maryland, Pennsylvania, the District of Columbia, the Chesapeake Bay Commission and the U.S. Environmental Protection Agency, representing the federal government, signed historic agreements that established the Chesapeake Bay Program partnership to protect and restore the Chesapeake Bay's ecosystem.

For almost two decades, we, the signatories to these agreements, have worked together as stewards to ensure the public's right to clean water and a healthy and productive resource. We have sought to protect the health of the public that uses the Bay and consumes its bounty. The initiatives we have pursued have been deliberate and have produced significant results in the health and productivity of the Bay's main stem, the tributaries, and the natural land and water ecosystems that compose the Chesapeake Bay watershed.

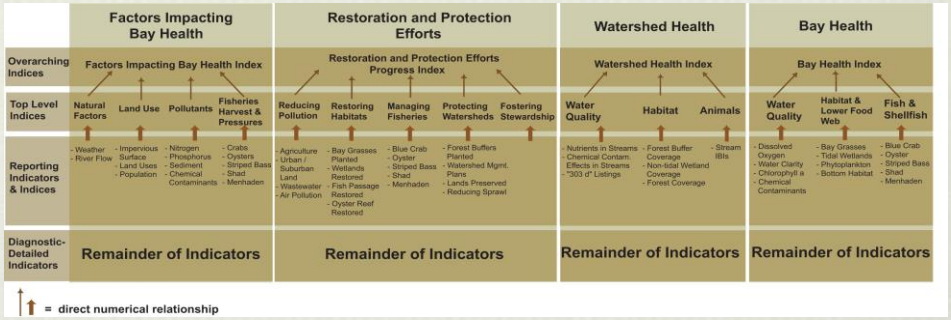
While the individual and collective accomplishments of our efforts have been significant, even greater effort will be required to address the enormous challenges that lie ahead. Increased population and development within the watershed have created ever-greater challenges for us in the Bay's restoration. These challenges are further complicated by the dynamic nature of the Bay and the ever-changing global ecosystem with which it interacts.

In order to achieve our existing goals and meet the challenges that lie ahead, we must reaffirm our partnership and recommit to fulfilling the public responsibility we undertook almost two decades ago. We must manage for the future. We must have a vision for our desired destiny and put programs into place that will secure it.

To do this, there can be no greater goal in this recommitment than to engage everyone — individuals, businesses, schools and universities, communities and governments — in our effort. We must encourage all citizens of the Chesapeake Bay watershed to work toward a shared vision — a system with abundant, diverse populations of living resources, fed by healthy streams and rivers, sustaining strong local and regional economies, and our unique quality of life.

In affirming our recommitment through this new *Chesapeake 2000*, we recognize the importance of viewing this document in its entirety with no single part taken in isolation of the others. This Agreement reflects the Bay's complexity in that each action we take, like the elements of the Bay itself, is connected to all the others. This Agreement responds to the problems facing this magnificent ecosystem in a comprehensive, multifaceted way.

BY THIS AGREEMENT, we commit ourselves to nurture and sustain a Chesapeake Bay Watershed Partnership and to achieve the goals set forth in the subsequent sections. Without such a partnership, future challenges will not be met. With it, the restoration and protection of the Chesapeake Bay will be ensured for generations to come.



Would you get the same picture?

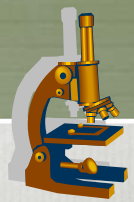
STAC Ancient History

- STAC review of CBP monitoring (2008) asked senior managers what are key information needs and are they getting what they need
  - Delisting the tidal segments of the Bay and determining the effectiveness of management actions in the watershed should be the priorities of the CBP funded monitoring programs; and
  - The current allocation of monitoring resources does not reflect these priorities and there should be some rebalancing.
- CBP monitoring team developed options for "rebalancing". (March 2009)
- Management Board accepted STAC findings but wanted more information about options.

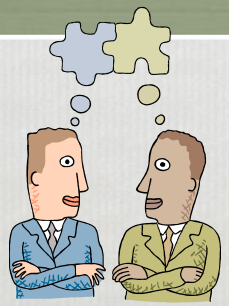
Proposal requests:

1. Provide an assessment of how well the current package of Bay Program funded monitoring programs support Bay Program objectives. And decision-making in the Bay watershed
2. Provide recommendations that will enable more efficient use of scarce resources and improved ecological assessments in support of Bay Program objectives. These recommendations should address
    1. opportunities to better coordinate Bay Program and non Bay Program funded monitoring programs,
    2. potential applications of specific new technologies and techniques, and
    3. possible reallocations of resources among the current monitoring programs.
3. Explain implications, pro and con, of recommended changes.
4. Prioritize recommended changes.

Identify existing goals



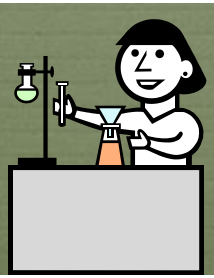
Identify existing monitoring programs



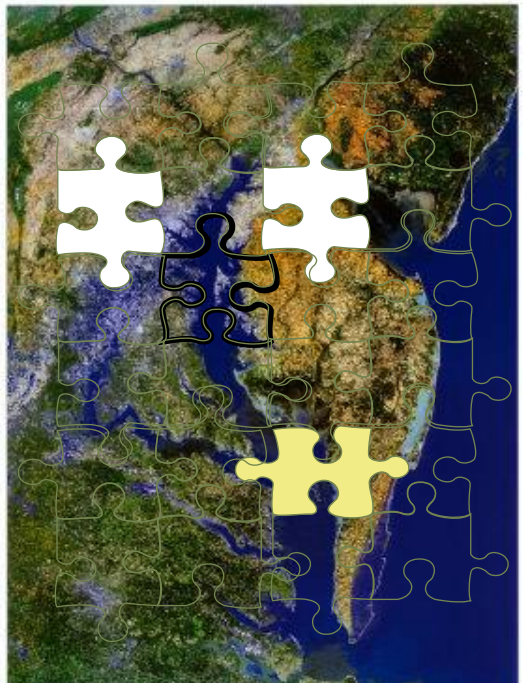
Compare goals and monitoring programs to identify gaps.

Recruit a professional facilitator

Identify & convene senior level management personnel to prioritize goals.

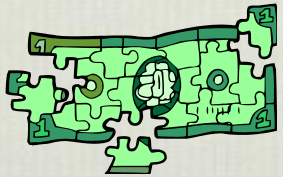


Identify & convene monitoring program representatives and identify attributes of existing programs.



Compare senior management priorities with existing monitoring programs to identify gaps, overlaps, and efficiencies.

A Satellite View



Reconvene senior level managers to reaffirm priorities and realign monitoring programs to match priorities.

Implement program changes. Assess the ability of changes to address priorities. Report results.

Repeat as necessary (every 2 to 3 years)

Watershed Managers say:

- **Continuing operation of the monitoring effort in a status quo condition is unacceptable**

Papering the wall

- Goal 1: Protect and Restore Fisheries
- Goal 2: Protect and Restore Vital Aquatic Habitats
- Goal 3: Protect and Restore Water Quality
- Goal 4: Maintain Healthy Watersheds
- Goal 5: Foster Chesapeake Stewardship
- Goal 6: Enhance Partnering, Leadership and Management

Watershed Managers say:

- **Continuing operation of the monitoring effort in a status quo condition is unacceptable**
- **The delisting of the tidal segments of the Bay and determining the effectiveness of our management actions are the responsibilities of the partnership, and should be the priorities of the monitoring program**

What does the Emerald City of monitoring look like?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Watershed Partners Senior Managers Decision Rules

- Identify portions of the monitoring picture that are "sacred" (base commitment),
- Identify which portions are flexible (potential dis-investing),
- Identify priorities for addition (re-investing).

Watershed Managers Decision Rules:

- Identify portions of the monitoring picture that are "sacred" (base commitment),
- Identify which portions are flexible (potential dis-investing),
- Identify priorities for addition (re-investing).

Management Board Information Requests 13 March 2009

- The ability of partners to backfill portions of the monitoring program that were designated as "flexible"
- Impacts on linkages between the core monitoring program being considered and other monitoring/investigative efforts
- Impacts of the options on the ability to make management decisions
- The available flexibility in the EPA Grant Programs
- The ability of individual states to meet the match requirements implied in the various options
- Implications of the options on long term and/or critical scientific understanding of the Bay ecosystem (the remaining portions of 'what is sacred")

Proposal requests:

1. Provide an assessment of how well the current package of Bay Program funded monitoring programs support Bay Program objectives.
2. Provide recommendations that will enable more efficient use of scarce resources and improved ecological assessments in support of Bay Program objectives. These recommendations should address
    1. opportunities to better coordinate Bay Program and non Bay Program funded monitoring programs,
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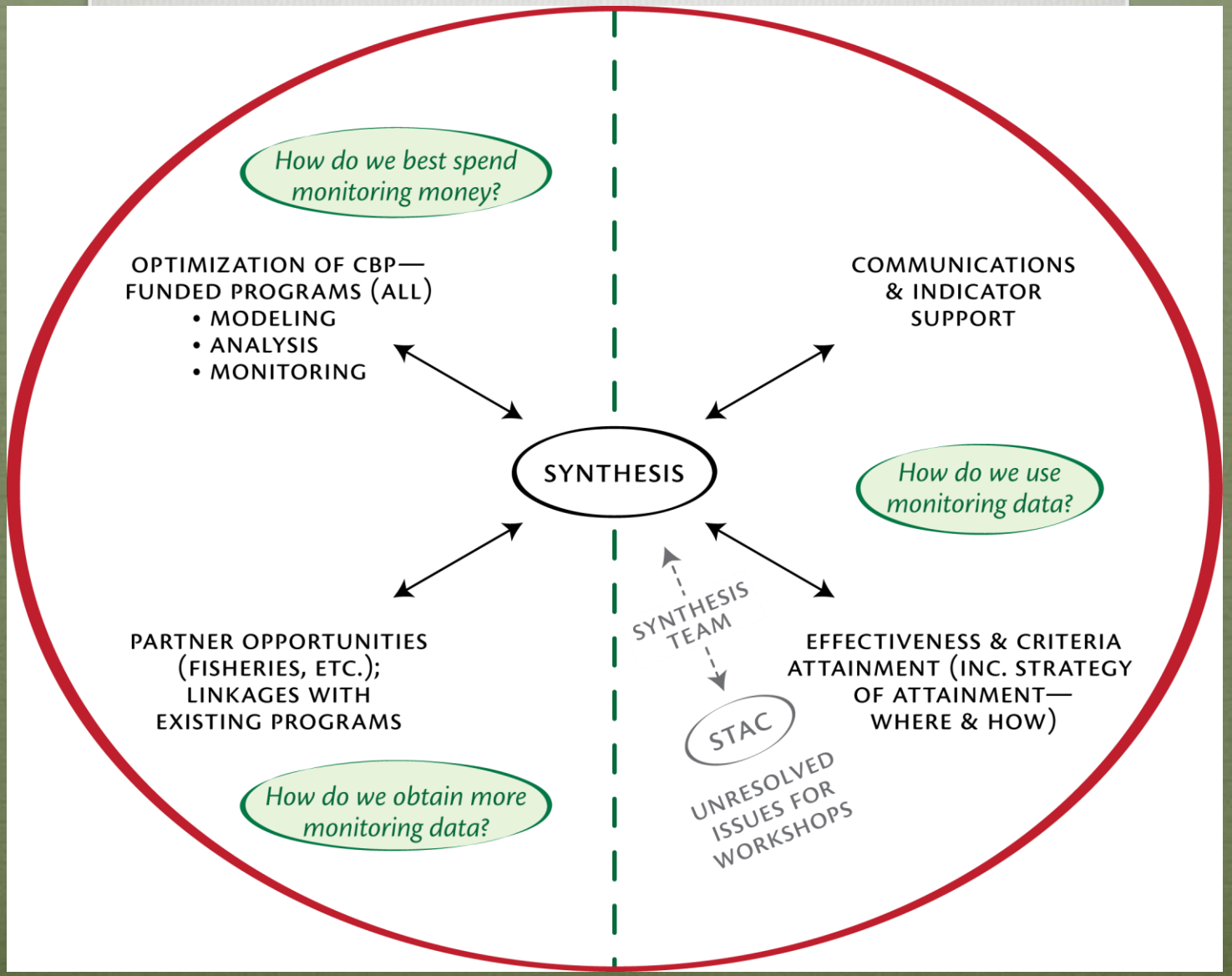
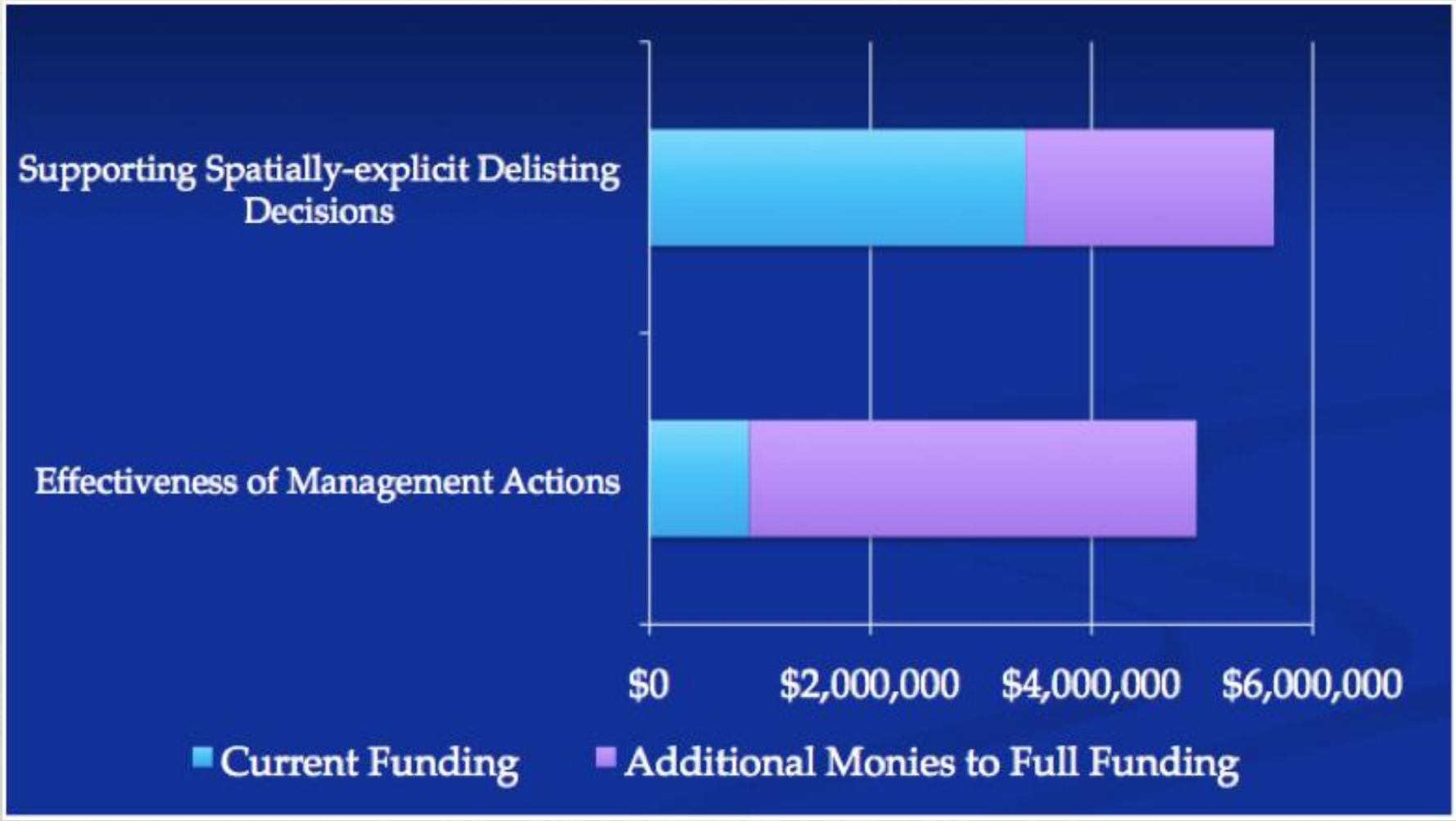
Monitoring Realignment Action Team



Watershed Team

- Detailed recommendations on monitoring & data analysis to address management questions
  - Maintain existing network – improve data mgmt
  - Enhanced analysis of CBP and partner data to document, explain, and communicate changes in water quality
  - Enhanced data collection on watershed landscape characteristics
  - New monitoring stations targeting small basins: agric. and urban
- Prioritized recommendations Appendix D, pp 30-35. Highest priority $1.059 million listed in Synthesis Report, Table 1.
- Current funding, $0.9 million, is only 20% of full funding needs, ~$4.6 million.


Supporting Spatially-explicit Delisting Decisions
Effectiveness of Management Actions
$0
$2,000,000
$4,000,000
$6,000,000
Current Funding
Additional Monies to Full Funding

What are those watershed priorities?

- Table 1 (highest priority for funding)
  - Data mgmt and analysis of existing long term monitoring network. **$300k**
  - Three new small watershed monitoring stations **$435k**
  - Analysis / synthesis of existing small watershed studies **$535k**
  - Initial investment to document and assemble historical info for complete description of watershed **$606k**
  - Larger investment to document and assemble historical info for complete description of watershed **$807k**
  - Add five more small watershed monitoring stations **$1,032k**
  - Provide support to partner monitoring **$1,057k**

Watershed Team

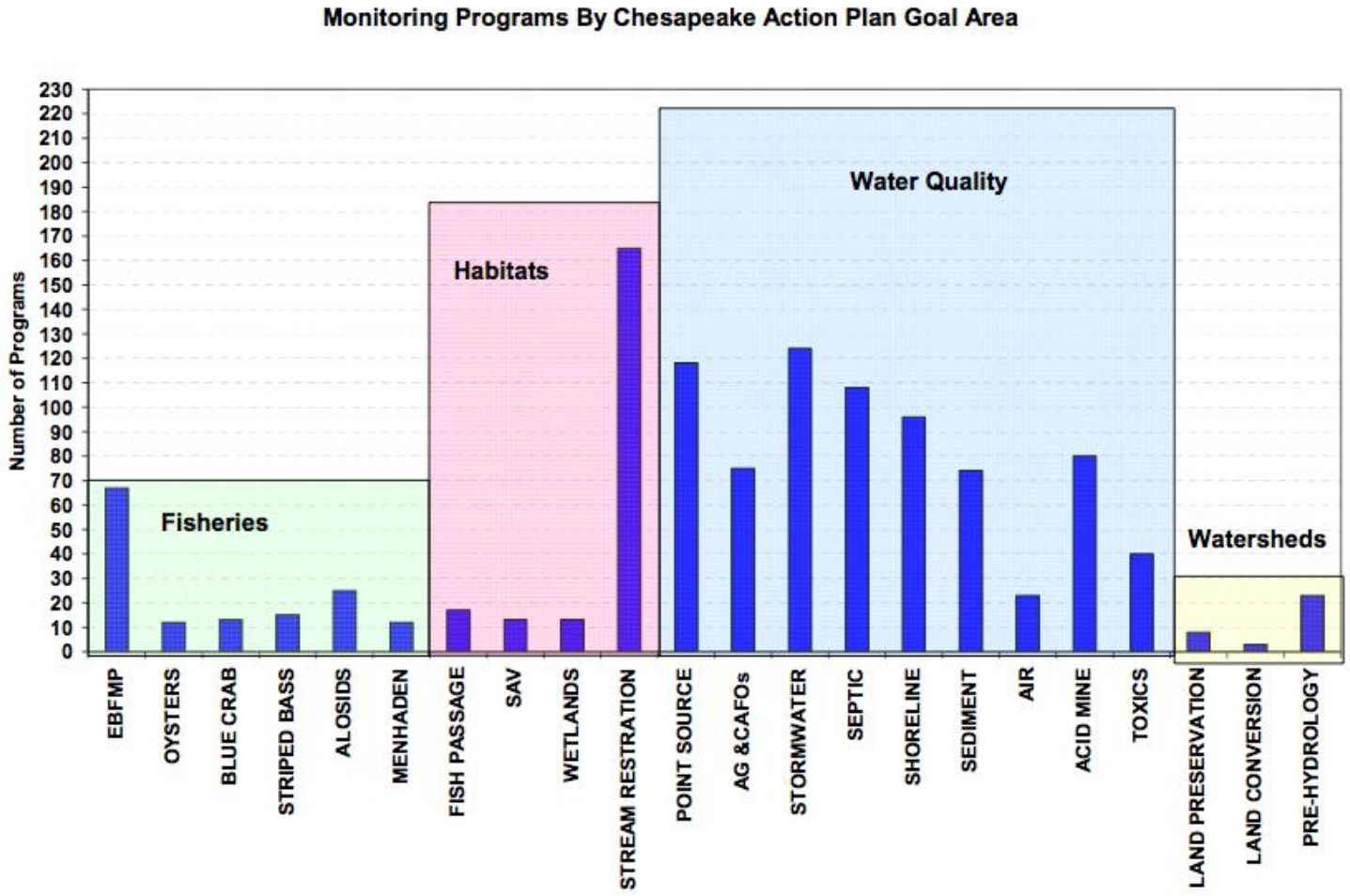


Figure 2. Break Down of Programs Meeting Chesapeake Action Plan Goal Area Monitoring Needs. The shaded areas denote Chesapeake Action Plan Goal Areas. Of the total of 295 reported monitoring programs: 71 met Fisheries needs,185 met habitat need, 223 met water quality need and 31 healthy water shed need.

Communications Team

- Documented multiple uses of monitoring data for communication
- Communication priorities
  - Linking restoration activities to pollution reduction
  - Identify success stories
  - Identify struggling situations
  - Look at smaller scale systems, i.e. “my” watershed
  - Highlight long term trends

Optimization Team

- CBP funded tidal monitoring has enabled huge advances in understanding of Bay ecosystem.
- All elements of current tidal monitoring have value, but some elements may be more critical to CBP management moving forward.
- Identified potential (and actual) dis-investment opportunities and identifies consequences of cuts
- Proposes creation of a Data Synthesis Center to facilitate periodic intensive analysis to answer specific questions.

What are those tidal dis-investments (2)?

- Potential additional
  - (MD) Reduce # of shallow water monitoring stations to 15 **$606k**
  - (MD) Reduce # of mainstem cruises from 16 to 14 **$796k**
  - (MD & VA) Further reduce shallow water monitoring effort so total program cost is $115k each state. **$896k**
  - (MD) Eliminate funding for MD Ecosystem Processes Analysis Program **$1,008k**
  - (MD & VA) Eliminate funding for status and trends **$1,059k**
  - (MD & VA) Reduce mainstem nutrient sampling by 50%

Synthesis

- Given the CBP monitoring objectives defined by Senior Managers, MRAT has provided the Management Board with
  - Prioritized list of watershed monitoring investments required to assess effectiveness of management actions in the watershed up to a "full funding" level of ~$4.6-4.9 million
  - List of potential (actual) tidal dis-investments to reallocate funds to watershed monitoring
  - List of tidal investments should new funds become available up to a "full funding" level of ~$5.3-5.65 million.
  - List of communications priorities
  - Extensive documentation of other monitoring programs which may be used when looking for data & partnership opportunities

Lessons Learned

- Identifying priority important management endpoints and decisions was critical for the technical review process.
- Ongoing communication between scientists and managers is essential in this process.
- Two-year assessments of progress are going to become the norm.
- Synthesis is critical.
- A balance needs to be reached in the effort allocated to near term, high priority or crisis issues that can change every few years and the effort allocated to long term and emerging issues.

Moral of the story is:

- There is no replacement for monitoring in measuring attainment of outcomes, system understanding, or effectiveness of actions
- If left unattended, monitoring drifts from objectives; the longer you wait, the harder it gets
- The scale of resources to answer all of the monitoring needs is beyond the current program funding; efficiencies are necessary
- Process is needed for adaptive management, not solution
- Process is critical for defensibility; principles provide design criteria

Do we need an overhaul?

- Current monitoring is too WQ-weighted
- New agreement, system thaw
- Opportunity to further integrate
- Consideration of new technologies, citizen science
- Level of system understanding is explicit
- Feedback loops for management strategies
- Builds on existing expertise
- Process needs committed synthesis team and leadership
- Requires expertise and resources
- Requires a whole system perspective

System Components

- What are the objectives of the agreement?
  - Monitor ecosystem state
  - Monitor implementation
  - What is alternative view of system
- What are the sacred, long-term monitoring needs?
- What is necessary to maintain trusted communication with the public?
- How do we implement new technology, citizen science?
- Integrate and obtain efficiencies (e.g., tidal and non-tidal, scientists and managers)
- Prioritization and roadmap

STAR CBP Monitoring Shortfall Options Paper (Nov 2013)

- Phase I: Short term program adjustment completion in August 2013 is focused on meeting the Federal FY13 funding gap across the partnership.

- Phase II: A 6 month mid-term monitoring program review with CBP-STAC evaluating the program, its business and operations model, with consideration for sustaining the water quality monitoring program meeting CBP priorities through 2025. This will include the additional shortfall of $163K for SAV monitoring that also is being addressed.

- Phase III. CBP further works with STAC in the long term considering the broader context of monitoring needed to support the new Chesapeake Bay Agreement.

Proposed Process

- Short term collective needs from new agreement
- Long-term view of resourcing monitoring
- Reconvene holistic review
  - Gather “stakeholders” (agreement partners, ecosystem science leaders, GIT chairs, CBP communication strategists, citizen science, monitoring technology experts, BASIN)
  - Identify synthesis team
  - Draft monitoring program purpose statement
  - Define design period
  - Define process

Integrative Design Process

- A decision making process that seeks to marry optimum strategies together in a synergistic, holistic and integrated way for excellence in outcome

- 6 Cs:
  - Collaborative, Diverse Team
  - Clarity of Vision, Clarity of Goals, Clarity of Objectives
  - Communication: Open and Candid
  - Creative, Innovative Thinking
  - Continuous Feedback Loops
  - Collective Decision-Making