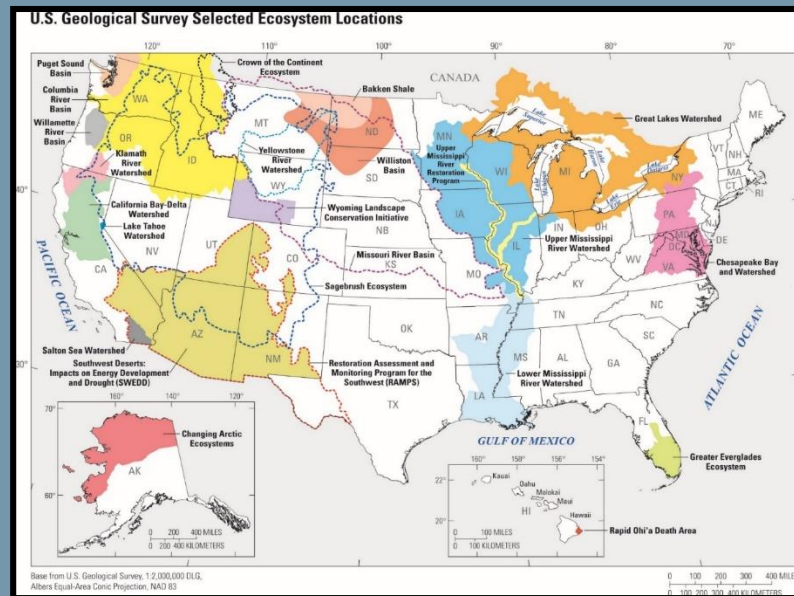# Evolving USGS Chesapeake Studies
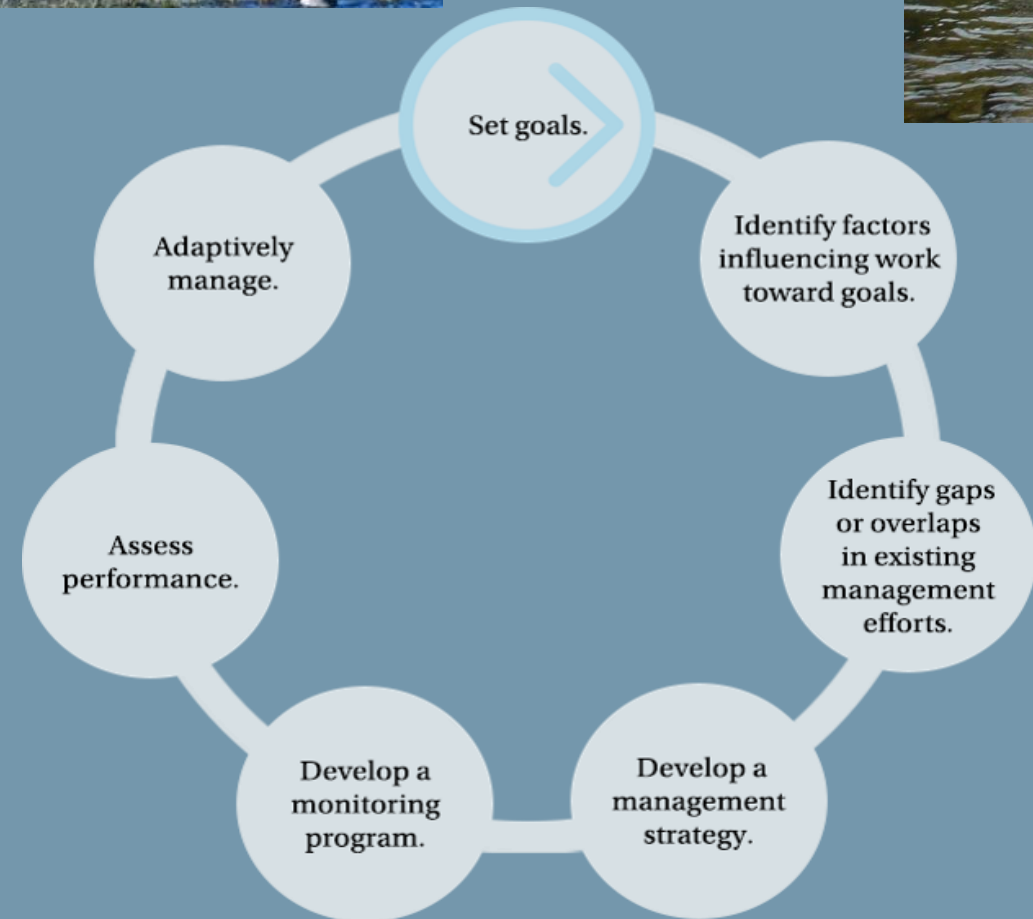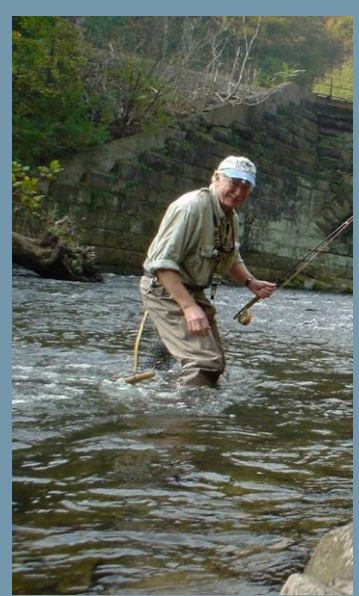

Scott Phillips

USGS Chesapeake Bay Coordinator

Habitat Goal Team Meeting

May, 2019

Outline

- Evolving Science Directions

- USGS Chesapeake Science Themes

- Next Steps

- Habitat Goal Team and WGs

Role of USGS Chesapeake Studies:
Providing Science and Evolving for the Future

Chesapeake
- $100B value
- CBP: 10 goals for restoration and conservation

USGS:
Primary federal science agency
- Completing activities to support TMDL Mid-Point Assessment and states preparing plans
- Reducing nutrient activities

Evolving efforts and new directions
- Increased focus on habitats for fisheries &waterfowl, and lands for people
- CBP Goals and Outcomes, DOI & USGS Priorities

Integrated science to inform stakeholders on restoration and conservation activities

(Modified from Phillips, 2006)

Present   **Future**
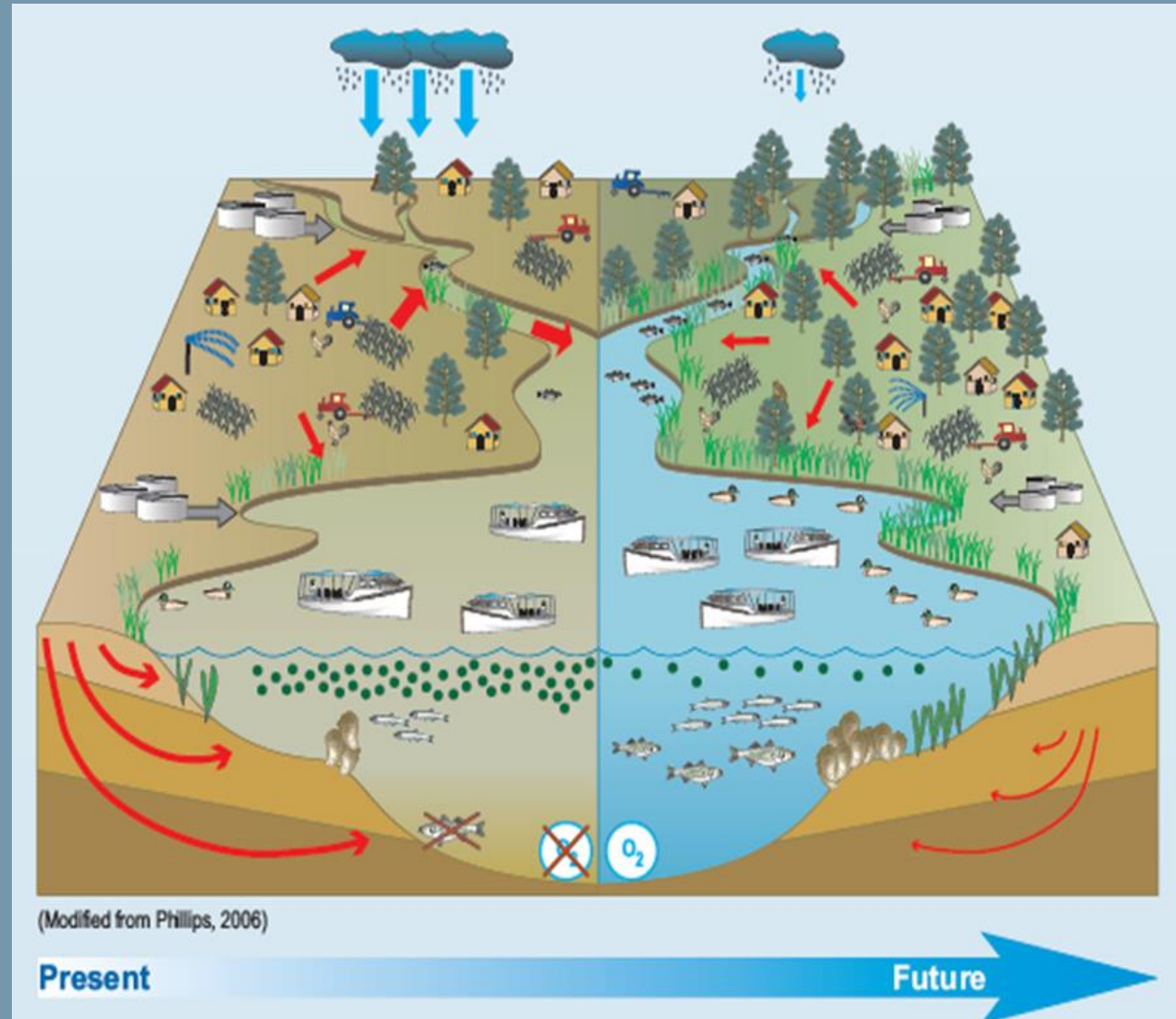
Align with Stakeholder Priorities
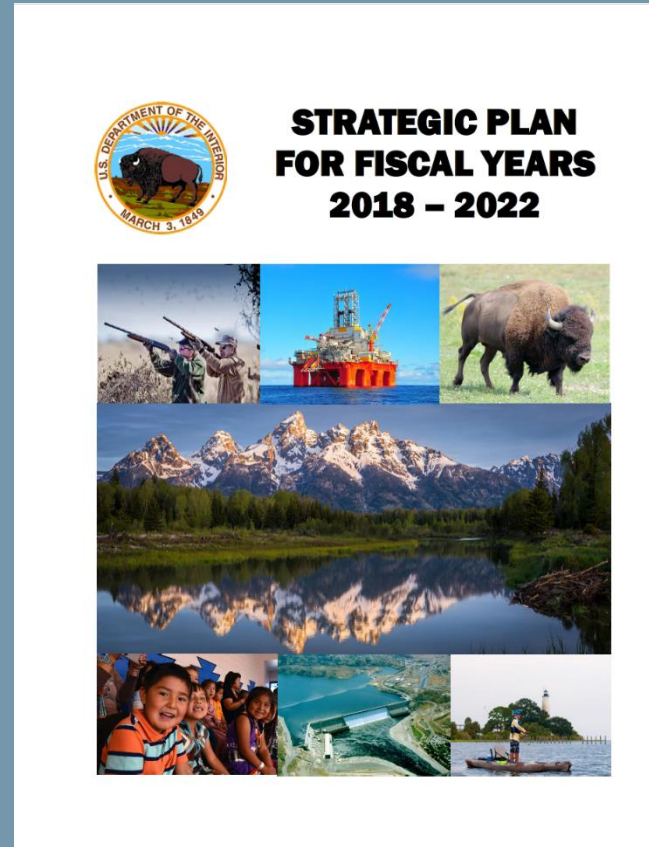
- **DOI priorities**
  - Federal responsibilities
  - Conservation stewardship
  - Protecting people
  - Modernizing infrastructure

- **USGS Priorities**
  - Land, water, and species management
  - Safeguard communities
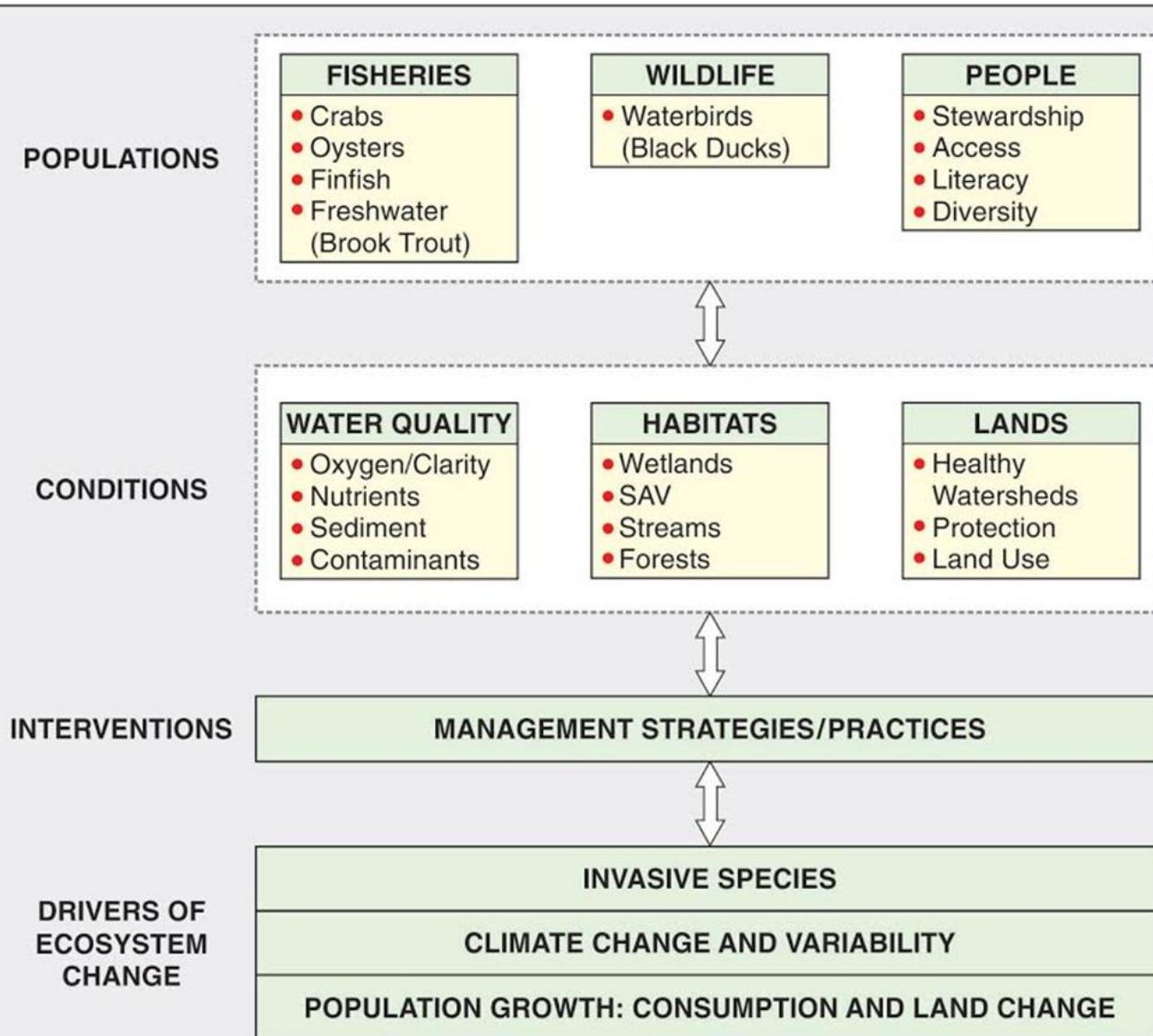 - Deliver mapping and land imaging
  - Landscape strategy

- **Chesapeake Bay Watershed Agreement**
  - Goals and Outcomes
  - Goal Teams

USGS Chesapeake Needs and Science Themes

CONCEPTUAL DIAGRAM OF CHESAPEAKE BAY ECOSYSTEM

POPULATIONS

FISHERIES
- Crabs
- Oysters
- Finfish
- Freshwater (Brook Trout)

WILDLIFE
- Waterbirds (Black Ducks)

PEOPLE
- Stewardship
- Access
- Literacy
- Diversity

CONDITIONS

WATER QUALITY
- Oxygen/Clarity
- Nutrients
- Sediment
- Contaminants

HABITATS
- Wetlands
- SAV
- Streams
- Forests

LANDS
- Healthy Watersheds
- Protection
- Land Use

INTERVENTIONS

MANAGEMENT STRATEGIES/PRACTICES

DRIVERS OF ECOSYSTEM CHANGE

INVASIVE SPECIES

CLIMATE CHANGE AND VARIABILITY

POPULATION GROWTH: CONSUMPTION AND LAND CHANGE

USGS Themes:
1. Fish habitat, health, and aquatic conditions
2. Coastal habitats and waterbirds
3. Land change and forecasting
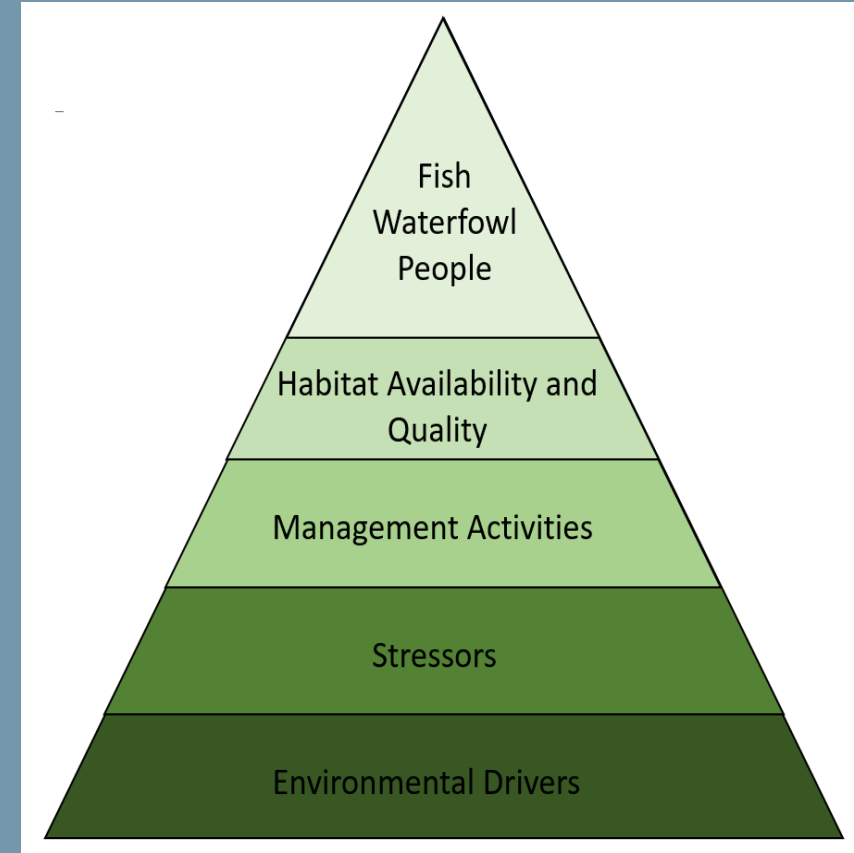4. Integrate and engage stakeholders

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Theme 1: Fish Habitat, Health, and Aquatic Conditions

CBP:

- Fish habitat

- Stream health

- Brook trout

- Fish passage

- Toxic contaminants

- Water quality

DOI/USGS:

- Biological threats (invasives, disease)

- Fish health

- Aquatic conditions

Fish
Waterfowl
People

Habitat Availability and Quality

Management Activities

Stressors

Environmental Drivers

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Theme 1: Fish Habitat, Health, and Aquatic Conditions

Conceptual model for explaining change of fish habitat, fish health, and aquatic conditions in relation to stressors and management activities
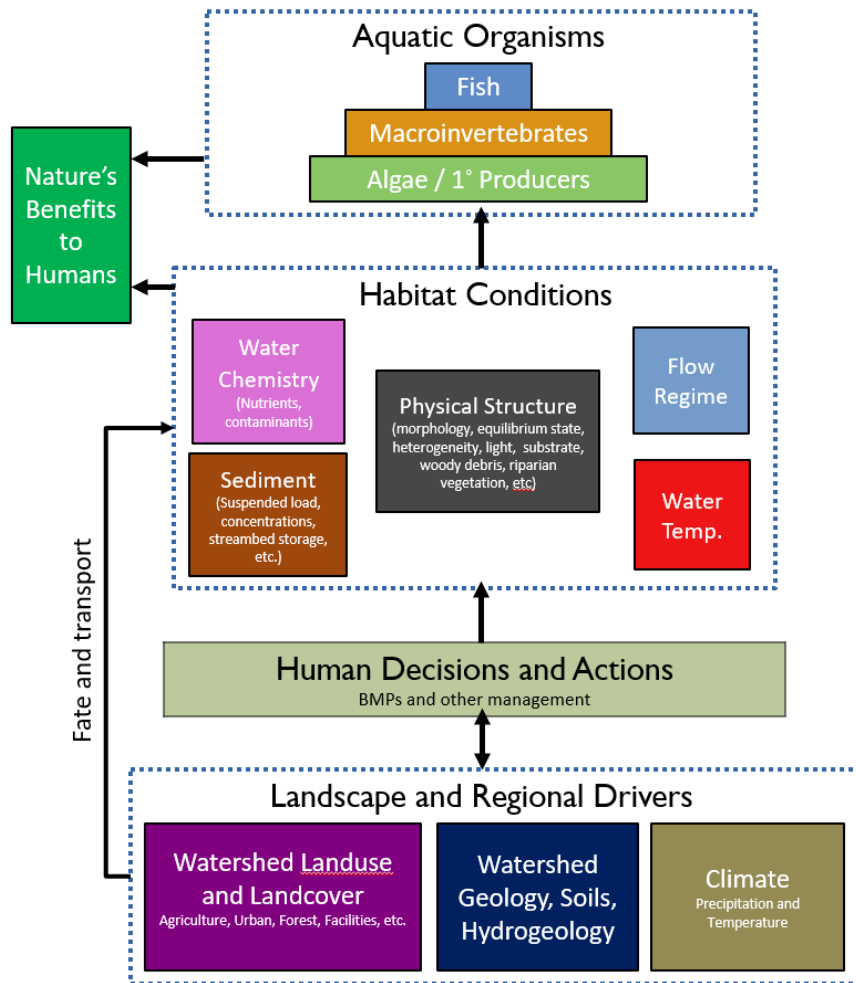
Status and Trends

- Fish populations

- Stream biology

- Habitat and aquatic conditions

Characterize and explain factors

Regional fish-habitat assessments

- Fish and macroinvertebrates

- Habitat conditions: spatial patterns and factors

- Biological threats

Explain changes and response to management

- Streams and aquatic conditions

- Brook trout and invasive species

- Fish health, disease, and water quality

- Relation to management practices

Theme 2: Risks to Coastal Habitats and Migratory Waterbirds

Coastal habitats and DOI lands

CBP:

• Wetlands, SAV

• Climate resiliency

DOI/USGS:

• Assess risks to coastal habitats

• FWS Refuges, NPS lands

Migratory Waterbirds

CBP: Black Duck

DOI/USGS:

• Atlantic flyway & 1M wintering waterbirds

• Multiple migratory species

• Factors affecting habitat & food sources

• Biological threats

Matt Rath, CBP

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Theme 2: Risks to Coastal Habitats and Migratory Waterbirds

Risks to Coastal Habitats & DOI Lands

- Factors and risks affecting habitats

- Forecast marsh migration, coastal vulnerability & response

- Relation to waterbird habitats

Migratory Waterbirds and Habitats

- Waterfowl distribution
  - Multiple species and black ducks
  - Benthic and SAV abundance
  - Tidal water quality

- Biological threats: avian influenza

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Theme 3: Land Characterization and Change to Assess Vulnerability

- **Inform conservation to benefit people, fish, and wildlife**

CBP:

- Healthy watersheds and streams
- Land protection
- Public access
- Land use

DOI/USGS:

- Forecasting land change
- Landscape characteristics
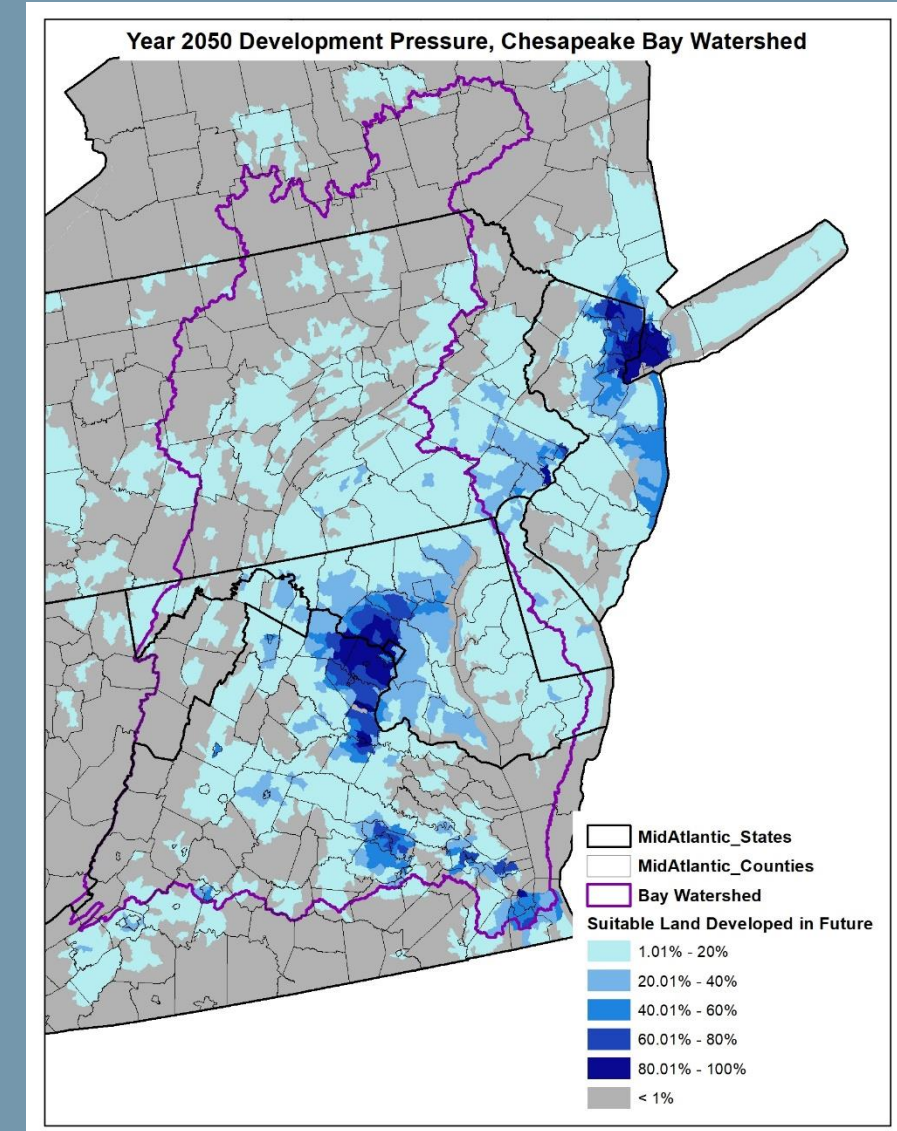- Protection/drinking water

Theme 3: Land Characterization and Change to Assess Vulnerability

Assess and forecast land change

- Vulnerability of healthy watersheds, habitats, vital lands

- Monitor land cover/use change

- Forecast land use change

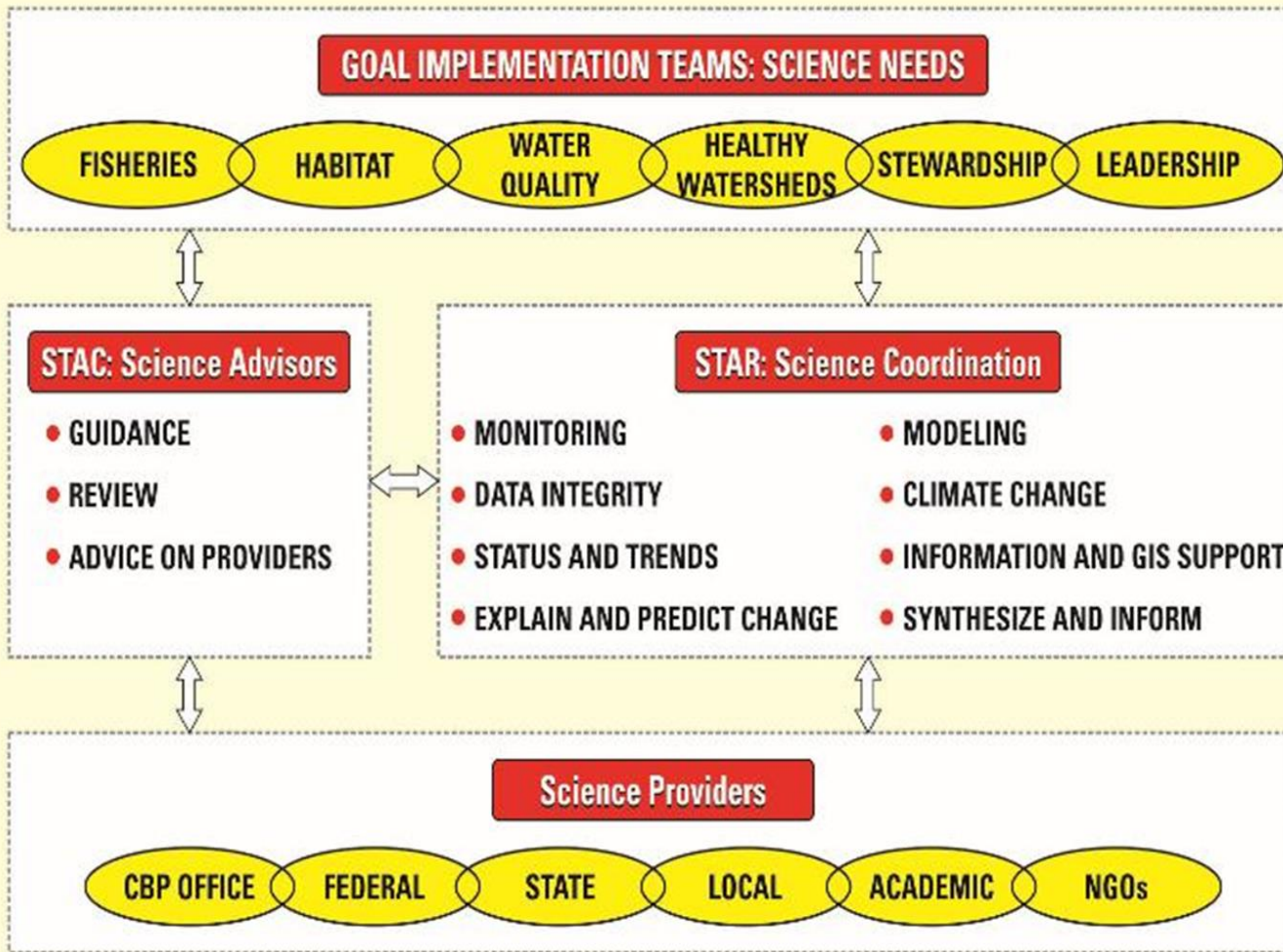- Inform land use planning and land protection

Land characteristics which influence vulnerability and resilience

- Hydrographic datasets

- Stream flow, watershed characteristics & land use change

Year 2050 Development Pressure, Chesapeake Bay Watershed

MidAtlantic_States
MidAtlantic_Counties
Bay Watershed
Suitable Land Developed in Future
1.01% - 20%
20.01% - 40%
40.01% - 60%
60.01% - 80%
80.01% - 100%
< 1%

Chesapeake Bay Land Change Model v3a

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Theme 4: Integrate Science and Engage Stakeholders

CHESAPEAKE SCIENCE SUPPORT

GOAL IMPLEMENTATION TEAMS: SCIENCE NEEDS

FISHERIES — HABITAT — WATER QUALITY — HEALTHY WATERSHEDS — STEWARDSHIP — LEADERSHIP

STAC: Science Advisors
- GUIDANCE
- REVIEW
- ADVICE ON PROVIDERS

STAR: Science Coordination
- MONITORING
- DATA INTEGRITY
- STATUS AND TRENDS
- EXPLAIN AND PREDICT CHANGE
- MODELING
- CLIMATE CHANGE
- INFORMATION AND GIS SUPPORT
- SYNTHESIZE AND INFORM

Science Providers

CBP OFFICE — FEDERAL — STATE — LOCAL — ACADEMIC — NGOs

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Science Integration:
- Internal planning & coordination
- Align resources
- Collaboration with external partners
- Data sharing

Science synthesis and engage stakeholders:

Interact and co-produce:
- Engage CBP teams
- Synthesize and translate
- Address multiple outcomes
- Awareness to broader audiences

Leveraging USGS Resources for Chesapeake Efforts

- Multiple sources of funds: $23M

- USGS:
  - Mission Areas and programs: $13M
  - Most are obligated to specific projects or monitoring
  - PES: More flexible for stakeholder needs and integrated science

- Reimbursable
  - $10M
  - Mostly for water monitoring
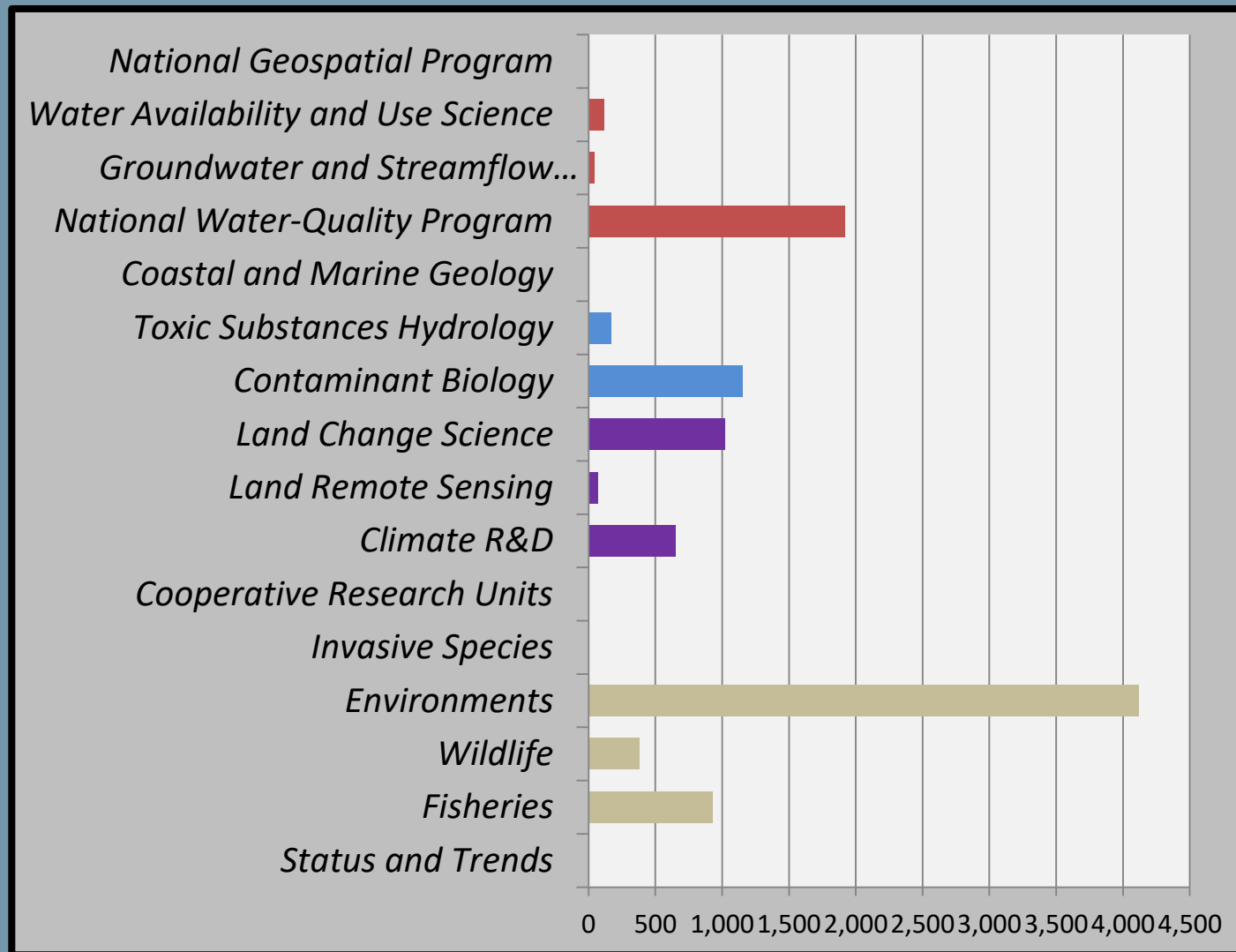
Process and Next Steps

- CBP stakeholder interaction
  - SRS
  - Goal Teams and WGs
  - Strategic Science Framework

- Draft USGS science directions and inventories

- USGS Chesapeake multi-year work plan

- Conduct activities and work with stakeholders

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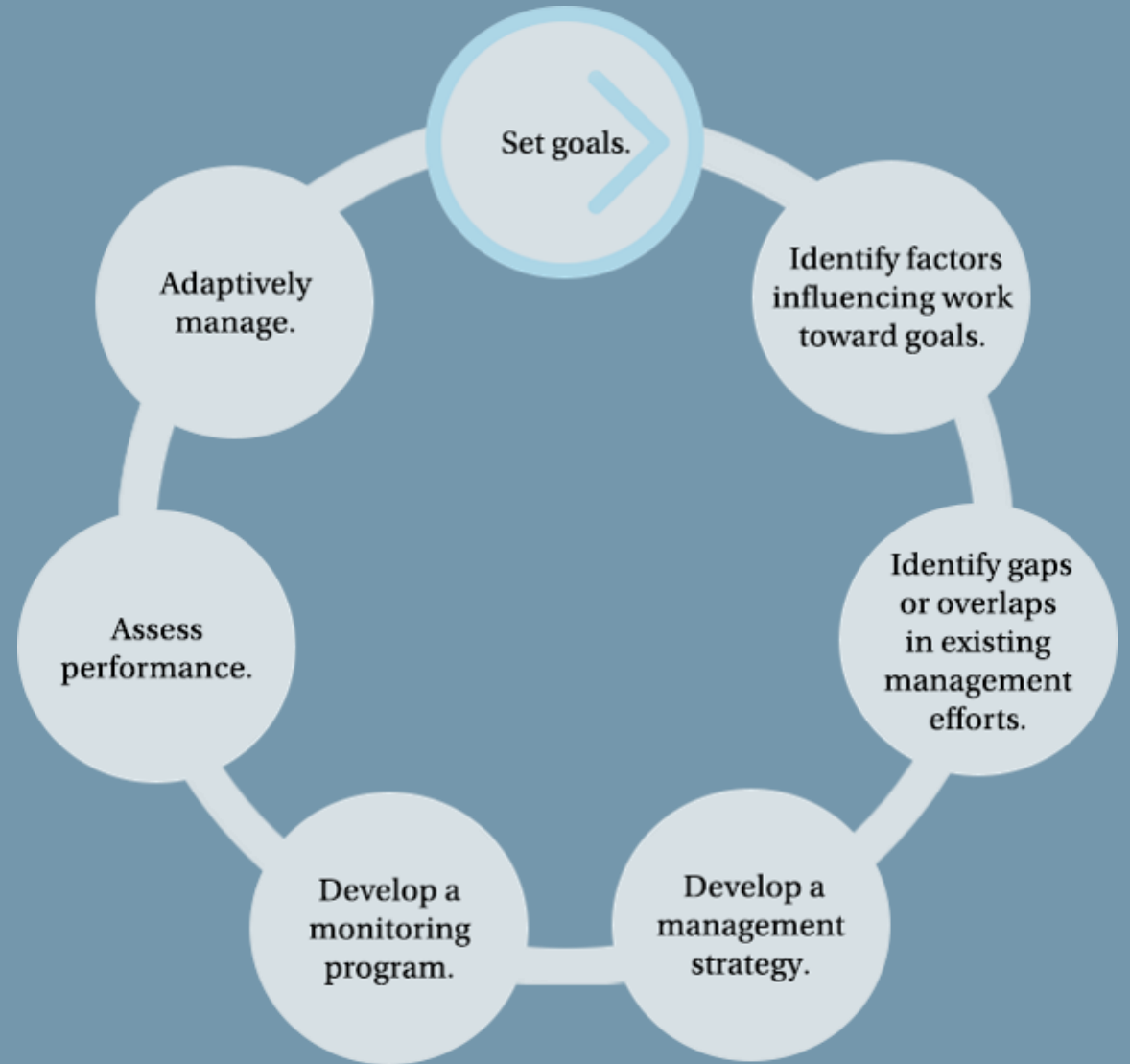
Discussion

- Need a balance of meeting CBP needs and DOI/USGS directions

- Are there CBP outcomes and needs you would like USGS to have a larger (or smaller) role?
  - Fish habitat
  - Stream health
  - Brook trout
  - Fish passage
  - SAV
  - Wetlands

- What other suggestions do you have for USGS?

More information and contacts:

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USGS Chesapeake Bay Studies: https://www.usgs.gov/chesapeake

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