USGS Chesapeake Themes and Multi-year Work Plan

Fish
Waterfowl
People

Habitat Availability and Quality

Management Activities

Stressors

Environmental Drivers
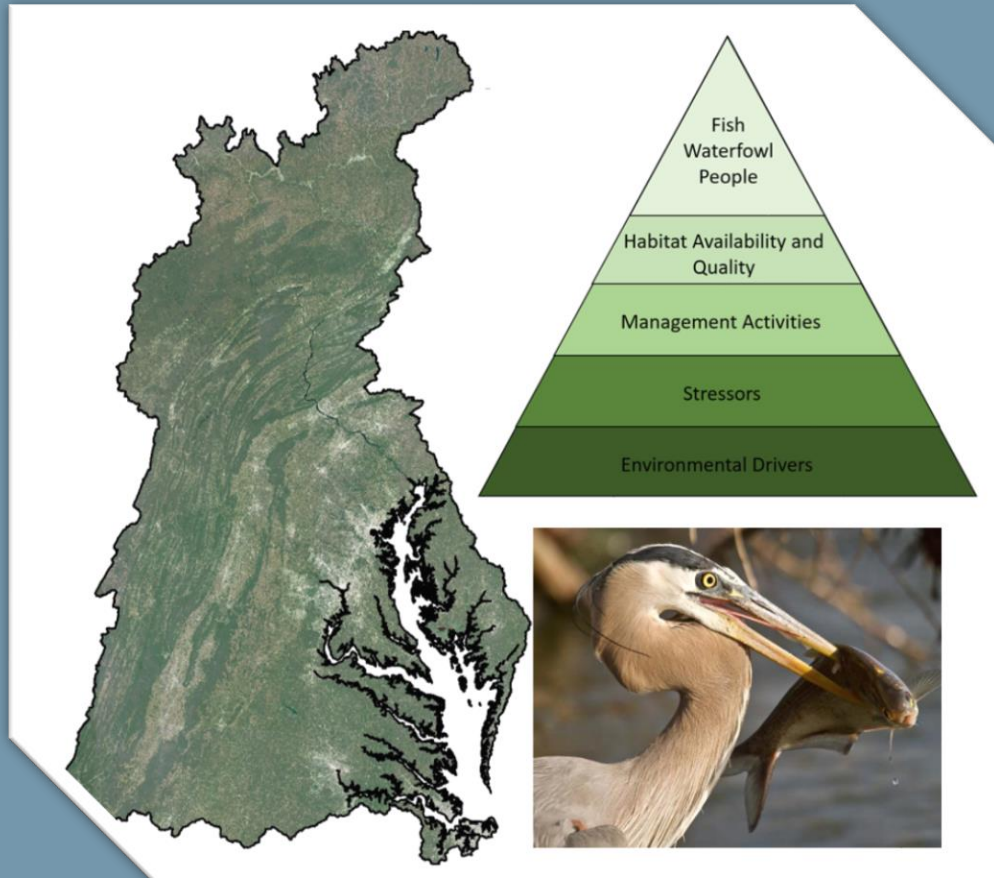
Scott Phillips

USGS Chesapeake Bay Coordinator

Water-Quality Goal Team

Sept, 2019

USGS Chesapeake Studies: Providing Science and Evolving for the Future
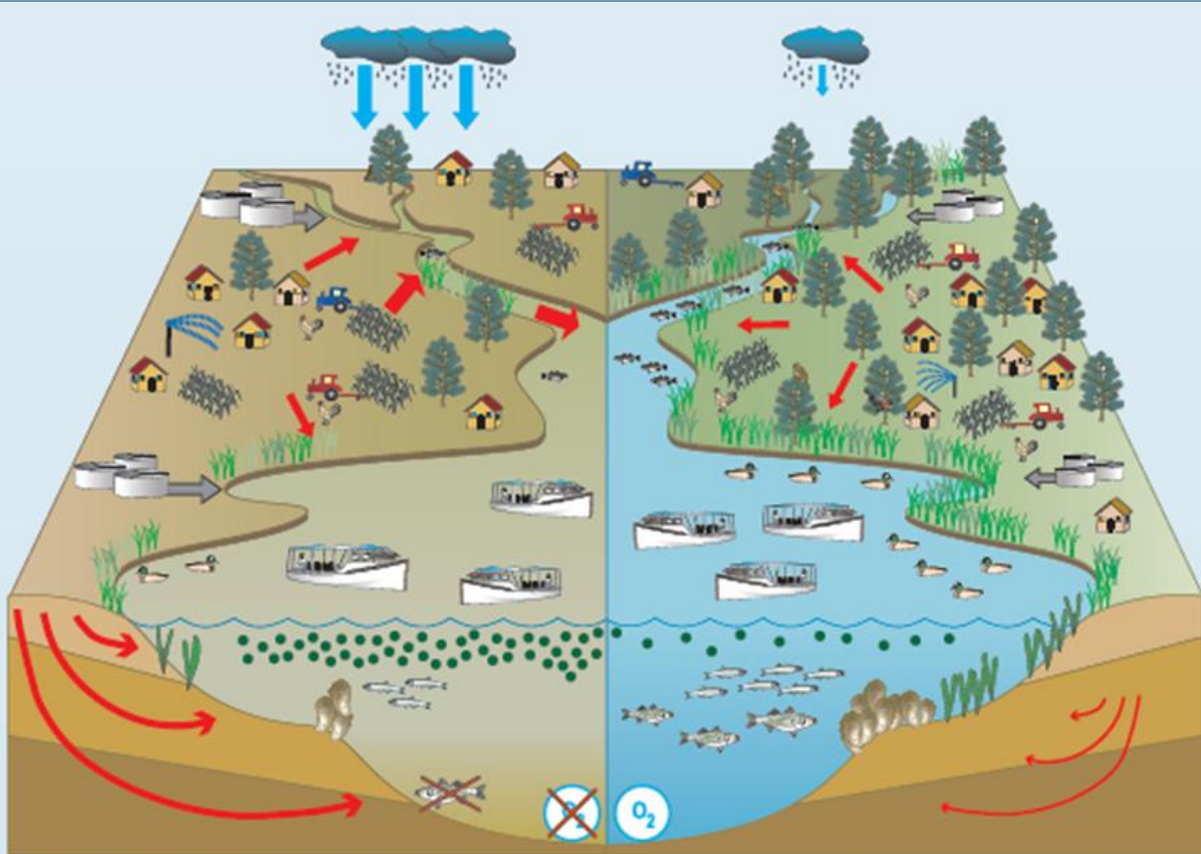
(Modified from Phillips, 2006)

Present

Future

USGS Role and Contributions:
- Monitor conditions....assess progress
- Explain ecosystem change...focus and evaluate management approaches
- Forecast.....emerging issues
- Translate science...inform difficult decisions
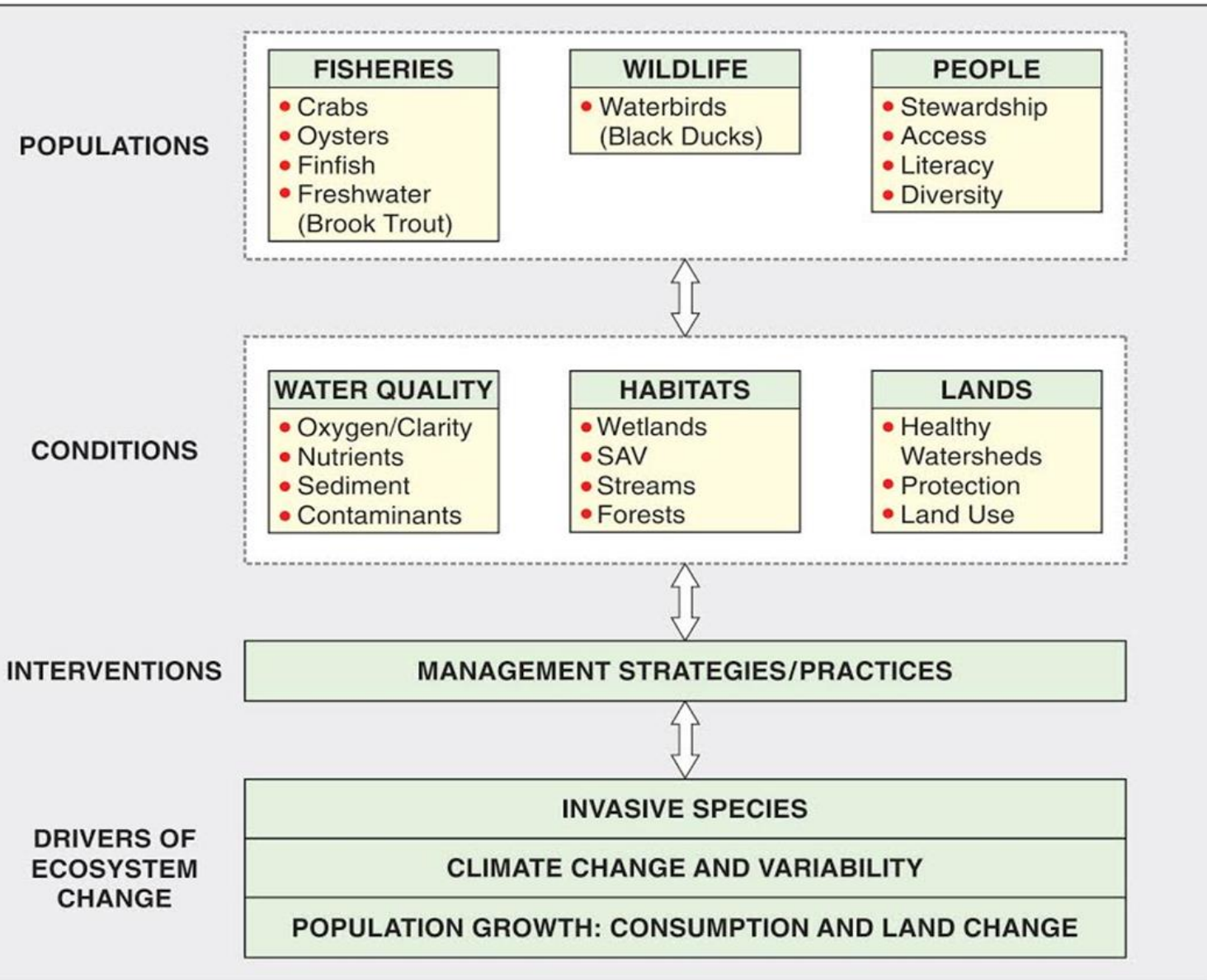
TMDL Midpoint assessment:
- 2010-2025
- New water-quality insights
- Informing state implementation plans

Evolving USGS Science:
- Fish, waterfowl, and people
- Integrated science to address complex issues
- 2020-2025

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 watersheds
4. Integrate and engage stakeholders

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 (invasive species, disease)
- Fish health
- Aquatic conditions

Landscape Settings

- Based on fish habitat types
- STAC workshop

Settings:

- Cold headwaters
- Streams and Rivers
- Tidal Fresh
- Estuary

- All depend on aquatic conditions & water quality

Aquatic Conditions

- Flow, temperature, and water quality

Status and Trends

- Nutrient and sediment monitoring and trends
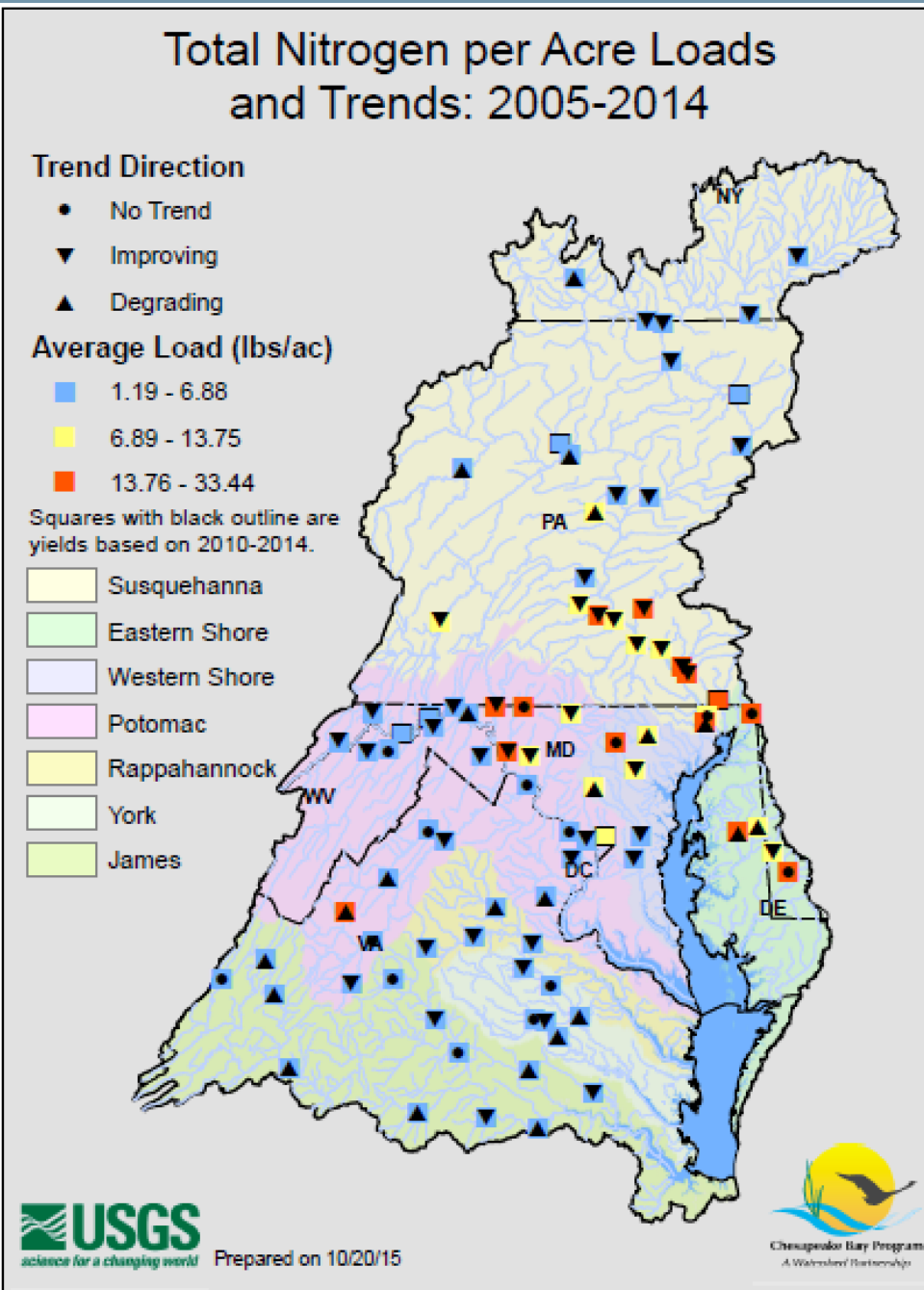- Estuary trends and standards

Explaining Trends

Streams and Rivers:

- Water-quality response to BMPs
- Relation to stream conditions & fish habitat
- Water quality, disease, fish health

Freshwater/tidal interface

- Tidal water-quality response to
flow and nutrient/sediment reductions

Total Nitrogen per Acre Loads and Trends: 2005-2014

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
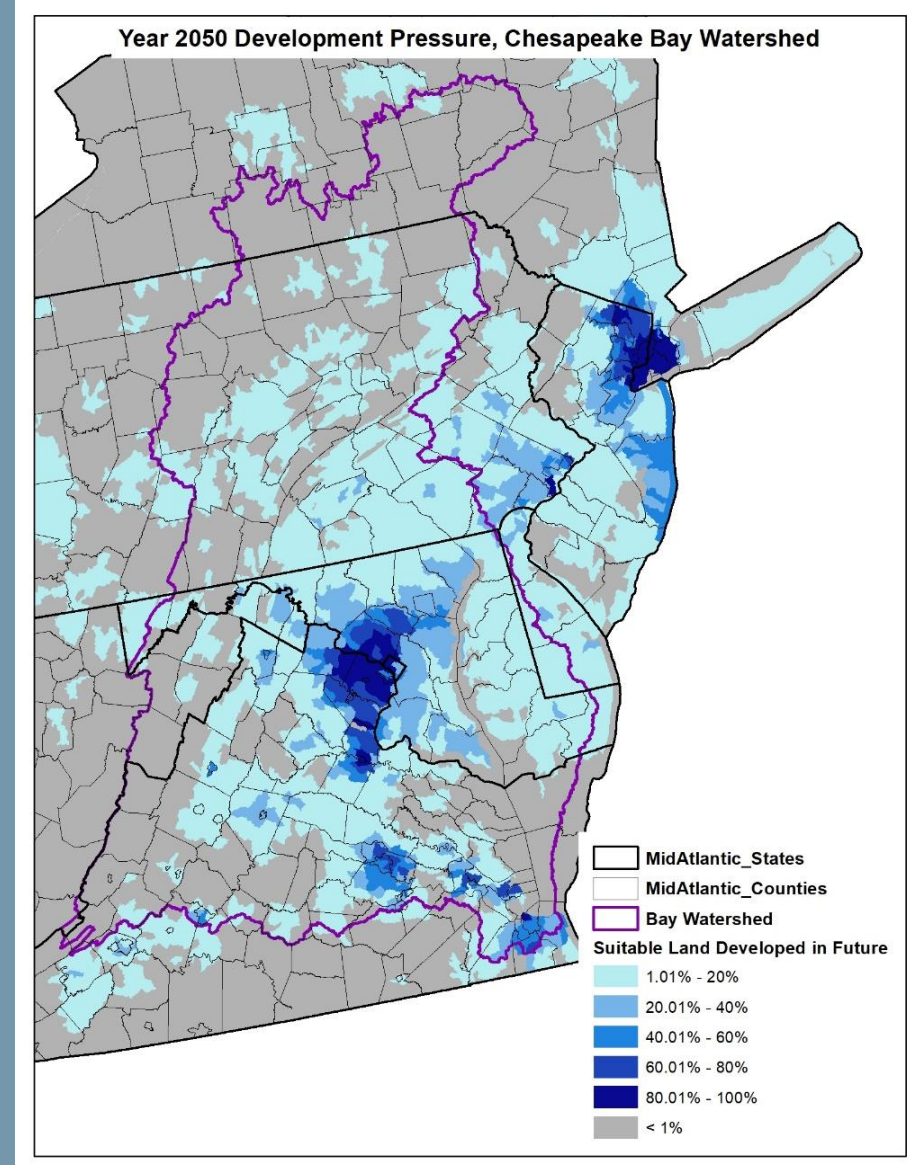 - Benthic and SAV abundance
  - Tidal water quality
- Avian influenza

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USGS
science for a changing world

Theme 3: Land Characterization and Change to Assess Vulnerability

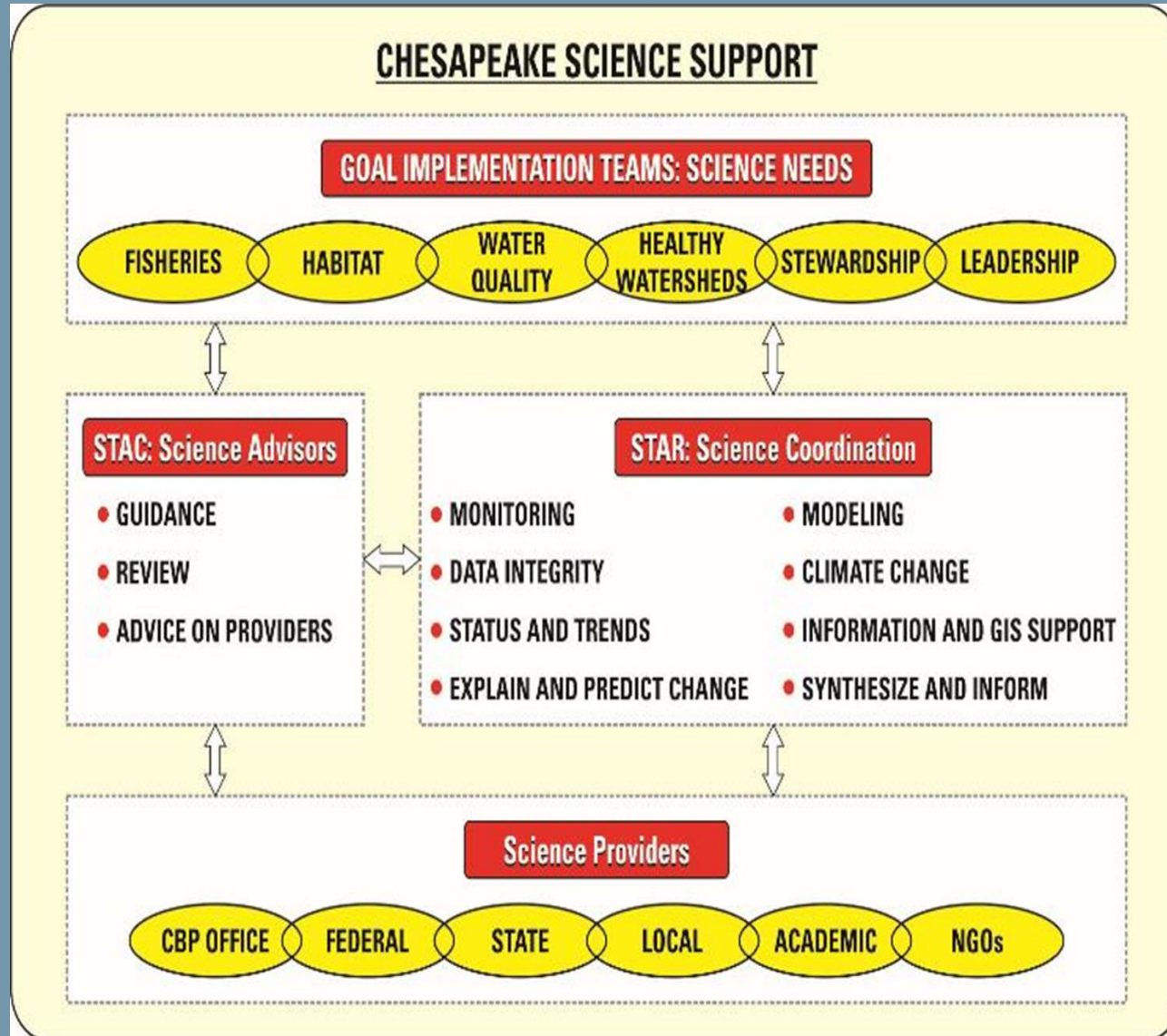**Improve land characteristics information**

- Monitor land cover/use change

- Streams

- Land management and BMPs

- Forecast changes

Explain characteristics affecting vulnerability and resilience

- Assess risk factors

- Changing watershed characteristics and stream health

- Inform planning and land protection actions

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

Theme 4: Integrate Science and Engage Stakeholders

Importance & Issues

- Inform decisions for goals
- Meet deadlines
- Effective use of resources

Science Integration

- Collaboration
- Data sharing

Translate science and engage stakeholders

- CBP Goal Teams
- Co-produce materials
- Tools and multiple benefits

Next Steps and Contacts

- USGS finalize science directions for 2020-2025
- Tasks updated annually

- Contacts:
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- Ken Hyer (Kenhyer @usgs.gov

- More information: https://www.usgs.gov/centers/cba