USGS Science for the Chesapeake Bay Restoration

The President's Executive Order

In May 2009, the President issued Executive Order (EO) 13508 for Chesapeake Bay Protection and Restoration. For the first time since the creation of the Chesapeake Bay Program (CBP) in 1983, the full weight of the Federal Government will be used to address the challenges facing the Chesapeake Bay. The EO directs the U.S. Department of the Interior (DOI), represented by the National Park Service (NPS), the U.S. Fish and Wildlife Service (USFWS), and the U.S. Geological Survey (USGS), to increase its efforts and leadership to restore the Bay and its watershed. A Federal Leadership Committee (FLC) was established to ensure coordination of Federal activities and consult with States and stakeholders to align restoration efforts.

The New Federal Strategy

In May 2010, the FLC released the new *Strategy for Chesapeake Bay Watershed Restoration and Protection*. The strategy has four essential goals and associated outcomes:

- restore clean water
- recover habitat
- sustain fish and wildlife
- conserve land and increase public access

Four supporting strategies will help achieve the goals:

- expand citizen stewardship
- develop environmental markets
- respond to climate change
- strengthen science

USGS Role

The **USGS has been given the lead responsibility**, in collaboration with the National Oceanographic and Atmospheric Administration (NOAA), for two critical supporting strategies: **to strengthen science** and **respond to climate change**. The USGS and its partners will use ecosystem-based adaptive management, which will **provide science to improve the efficiency and accountability of CBP activities**. The three main elements are to: (1) improve models to help partners target restoration and protection activities, (2) enhance monitoring to assess progress toward environmental outcomes, and (3) evaluate the effectiveness of restoration and protection actions and policies. The findings will be used by NPS, USFWS, and other CBP partners to improve water quality, habitat, fish and wildlife, and to conserve lands.

The USGS Chesapeake activities to address the EO can be grouped into four major themes:

- **Promote adaptive management and decision support to enhance ecosystem management.**

- **Assess and explain water-quality conditions and change.**

- **Document the status and change of the health of fish, wildlife, and critical habitats.**

- **Forecast and assess impacts of climate and land-use change.**

USGS Chesapeake Activities: Addressing USGS and DOI National Priorities

The USGS Chesapeake activities, working with USFWS and NPS, provide a place for USGS and DOI to carry out their national priorities. The Chesapeake activities address several **DOI priorities:**

America's Great Outdoors—the Chesapeake activities will develop an approach to land conservation that will be a model for national DOI efforts.

Climate Change—the Chesapeake activities will help achieve the DOI goal to address the impacts of climate change on America's land, water, wildlife, cultural-heritage, and tribal resources.

Water Challenges—the Chesapeake activities will address the DOI goal to help communities improve conservation and increase water availability, restore watersheds, and resolve longstanding water conflicts.

The Chesapeake activities will **address USGS science directions** including ecosystems, climate variability and land-use change, water resources; energy, minerals, and environmental health; hazards, and core science systems.
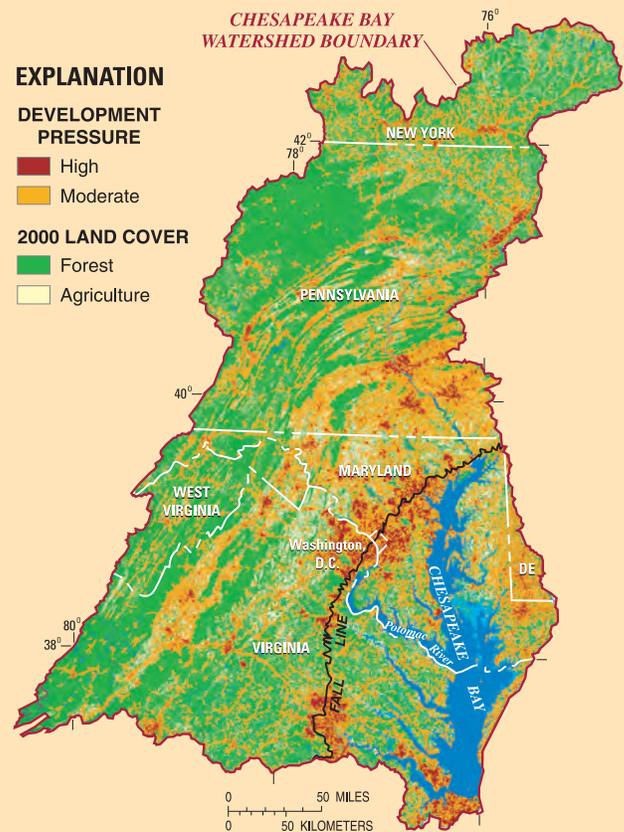
Potential future development pressure in the Chesapeake Bay watershed. [The USGS will focus its efforts to strengthen science in the Bay watershed to address the goals of the President's Chesapeake Bay EO and the national priorities of the DOI and USGS. One of the USGS activities is to improve its Chesapeake Land Change model to help identify areas for conservation and forecast the combined impacts of climate and land-use change on streams, water quality, and critical habitats for fish and wildlife.]

Planned USGS Activities

To help fulfill its responsibilities under the EO, the USGS has prepared a Chesapeake Study Plan for 2011–2016 that identifies planned activities and opportunities to work with USGS programs and CBP partners to carry out the actions needed to meet the EO goals.

Promote adaptive management and decision support to enhance ecosystem management.

The USGS will provide leadership to strengthen the use of science and promote adaptive management among Federal, State, regional, and local partners.

Planned USGS activities

- Synthesize science and explain management implications in targeted communication products.

- Establish decision-support specialists.

- Enhance tools to apply science—Chesapeake Online Adaptive Support Toolkit (COAST) and ChesapeakeStat (online decision tools).

- Coordinate Federal activities to increase CBP science efforts for adaptive management through improved models, monitoring, and evaluation of restoration and conservation activities.

EO topic addressed: Strengthen Science

- Key Federal partners: NOAA and USEPA

Assess and explain water-quality conditions and change.

To help restore clean water, the USGS will increase efforts to model, monitor, and explain changes in nutrients and sediment in the watershed so that the U.S. Environmental Protection Agency (USEPA), the U.S. Department of Agriculture (USDA), and the six CBP States can more effectively implement actions, and evaluate progress, toward improving water quality in the Bay and its watershed.

Planned USGS activities

- Enhance models of nutrients, sediment, and groundwater to help target management actions.

- Improve regional water-quality monitoring to assess progress toward water-quality goals.

- Establish monitoring in small urban and agricultural watersheds to assess the effects of restoration activities.

- Explain water-quality changes and the effects of basin-wide Total Maximum Daily Load (TMDL) implementation.

EO topic addressed: Restore Water Quality

- Key Federal partners: USEPA and USDA

Forecast and assess impacts of climate and land-use change.

USGS research will identify vulnerable lands and habitats and assess the risks posed by climate change and population growth.

Planned USGS activities

- Develop tools to prioritize land conservation.

- Assess vulnerability of land through improved land-change model forecasting.

- Forecast impacts of land and climate change on coastal wetlands and water quality and habitat in the watershed.

- Enhance monitoring of climate and land-use change.

- Provide key findings and interact with CBP partners to consider climate adaptation strategies for restoration and protection activities.

- Improve coordination of regional climate activities.

EO topics addressed: Conserve Lands and Address Climate Change

- Key Federal partners: NPS, USFWS, and NOAA

Document the status and change of the health of fish, wildlife, and critical habitats.

To improve conditions for fish and wildlife, the USGS, working with USFWS, will conduct research and monitoring on the multiple factors causing die offs and poor health of fish and wildlife in the watershed and coastal areas.

Planned USGS activities

- Improve scientific information on conditions of, and factors affecting, the health of fish and wildlife in the Bay watershed.

- Determine the extent and sources of endocrine-disrupting chemicals and other toxic contaminants that impact selected fish and wildlife species.

- Develop monitoring to evaluate new strategies to reduce contaminants and improve the health of fish and wildlife.

- Improve information on habitat conditions and food sources for migratory waterfowl.

EO topics addressed: Sustain Fish and Wildlife, Recover Habitats, and Restore Water Quality (Toxic Contaminants)

- Key Federal partners: USFWS and USEPA