Chesapeake Bay Land Surface Change Studies

Principle Investigator(s):

Robert G. Clark   bclark@usgs.gov
USGS National Center
12201 Sunrise Valley Drive
Reston, Virginia 20192

Peter R. Claggett   pclaggett@usgs.gov
410 Severn Avenue Suite 109
Annapolis, Maryland 21403

David A. Kirtland   dakirtland@usgs.gov
USGS National Center
12201 Sunrise Valley Drive
Reston, Virginia 20192

Thomas R. Moreland tmorelan@usgs.gov
USGS National Center
12201 Sunrise Valley Drive
Reston, Virginia 20192

Statement of Problem: This project investigates the causes and consequences of human-environment interactions with respect to the land surface in the Chesapeake Bay Watershed. Key areas of study include land use and cover change in coastal regions (especially those with significant metropolitan areas), trends in land use/cover change, natural and human-induced processes contributing to change (such as natural hazards and road construction), and impacts of land use/cover change. New and innovative approaches to monitoring the landscape, understanding the driving forces that shape the landscape, and identifying the consequences of land use/cover change on ecosystem health and services, water quality and quantity, materials flow, natural resource utilization, air quality, contaminant transport, and natural hazard risk potential will be developed. Modeling approaches to land use/cover change are investigated so that alternative future landscapes can be created in response to a variety of possible scenarios

of that speculate on the future state of human-environment systems. Partnerships are pursued with other disciplines, regions, bureaus, agencies, states, cities, universities, other interested organizations.

Objectives: This research also supports the USGS Chesapeake Bay Science Program goal to "improve watershed and land-use data to understand changes in water quality and living resources". This research also supports the following GAM goals: 1) Conduct long-term monitoring of the state and trends of the Nation's land surface as critical input for regional and national policy decision-making, and 2) Analyze and interpret the record of land use dynamics that includes land use and land cover change to enhance understanding of the physical and social drivers of land surface change.

Approach: Through these long-term studies, Eastern Region Geography will develop an understanding of the land's surface at various spatial and temporal scales, and will also develop an understanding of the rates, causes, and consequences of natural and human-induced processes and their interactions that affect the landscape over time. Eastern Region Geography will use this project as a foundation to build relationships with various Eastern Region discipline and external collaborators.

Selected Reports and Other Products:

Claggett, P.R., Jantz, C.A., Goetz, S.J., and Bisland, Carin, 2004, Assessing development pressure in the Chesapeake Bay Watershed: An evaluation of two land-use change models: Environmental Monitoring and Assessment, v. 94, p. 129-146. The journal article is located at http://journals.kluweronline.com/article.asp?PIPS=5268731.

Claggett, P.R., Hopkins, K., and Brandt, S., 2004, Assessing urban land cover change in the Chesapeake Bay Watershed (1990 – 2000): National Ecosystem Restoration Conference, December 2004, poster submission.

Bisland, C., and Claggett, P.R., Forecasting Development and Related Water Quality Impacts in the Chesapeake Bay Watershed. USEPA RARE grant proposal. Funded in March 2004.

Database, Delivered: 2000 Land Cover data derived from Landsat 7-ETM imagery for the CB watershed by the University of Maryland's Regional Earth Science Applications Center

Database, Delivered: 2000 Impervious Cover data derived from Landsat 7-ETM imagery for the CB watershed by the University of Maryland's Regional Earth Science Applications Center

Database, Delivered: 1990 Impervious Cover data derived from Landsat 5 TM imagery for the CB watershed by the University of Maryland's Regional Earth Science Applications Center

Relevance and Benefits: This project contributes to an understanding of the landscape change, key driving forces, and forecasts of future trends for Chesapeake Bay Watershed. Understanding land use dynamics is the regional science priority addressed. This research will also provide information to support four of the ten Chesapeake Bay Program keystone commitments. These commitments involve reducing the rate of forest and

farmland conversion due to sprawl development, targeting valuable and vulnerable lands for protection, developing watershed management plans in two-thirds of the Bay watershed, and correcting nutrient- and sediment-related problems in the Bay and its tidal tributaries.

For further information, see the following web pages:

Geographic Analysis and Monitoring Program: http://gam.usgs.gov/

ERG Regional Investigation Team: http://erg.usgs.gov/regionalinvestigations/index.html

The National Map: http://nationalmap.usgs.gov/