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# **Civil Applications Committee**

## **2006**


### **Activity Report**

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## Civil Applications Committee Background

### Overview

The Civil Applications Committee (CAC) is an interagency committee that coordinates and oversees the Federal civil use of classified collections. The CAC was officially chartered in 1975 by the Office of the President to provide Federal civil agencies access to National Systems data in support of mission responsibilities. In recent years, CAC activities have expanded beyond traditional mapping applications to a broad range of environmental and remote sensing applications central to Federal agency missions. Examples include monitoring volcanoes; [REDACTED]; coordinating emergency response to natural disasters, such as hurricanes, earthquakes, and floods; monitoring ecosystems; and mapping wetlands.

### Membership

The CAC is made up of voting representatives from the Department of Commerce (DOC), Department of the Interior (DOI), Department of Transportation (DOT), Environmental Protection Agency (EPA), Federal Emergency Management Agency (FEMA), Department of Health and Human Services (HHS), National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), U.S. Coast Guard (USCG), U.S. Army Corps of Engineers (USACE), and the U.S. Department of Agriculture (USDA). Additional non-voting associate members of the CAC include representatives of the Office of the Director of National Intelligence (DNI), Defense Intelligence Agency (DIA), Department of Energy (DOE), Department of State (DOS), National Geospatial-Intelligence Agency (NGA), and National Reconnaissance Office (NRO).

### Functions and Responsibilities

Functionally the CAC is composed of a technical and coordinating committee – chaired by the Director of the USGS – that meets monthly; an Executive Steering Group – chaired by the Deputy Secretary of the Interior – that meets as necessary, and the CAC Secretariat, which provides operational support to the CAC and is hosted by the USGS. The CAC sponsors the Global Fiducials Working Group (GFWG) as a standing interagency working group. In addition, the CAC sponsors the Emergency Response Working Group (ERWG), Imagery Derived Products Working Group (IDPWG), Requirements Working Group (RWG), Security Working Group (SWG), and Thermal Event Sensing Working Group (TESWG) on an ad-hoc basis.

Primary CAC responsibilities are: facilitating the relationship between the Civil Community, the Department of Defense (DOD), and the Intelligence Community (IC); providing oversight of all Civil Community source collection and management; supporting National disaster response; representing and advocating civil requirements and interests in various DOD and IC forums; providing an inter-community forum for technology and information exchange; coordinating training for CAC member agency personnel; providing oversight for the Global Fiducials Program; promoting civil use of Imagery Derived Products (IDPs); and ensuring Civil Community needs are considered and addressed in the design of future space architectures.

The CAC provides a forum through which Federal civil agencies coordinate data requirements, develop tasking strategies, certify proper use of data, and track and plan for the progress and evolution of National Systems. The CAC coordinates the use of imagery exploitation and



application resources and supports remote sensing research and development activities at special facilities, such as the USGS Advanced Systems Center (ASC). At these facilities, appropriate capabilities and exploitation tools are available for CAC members to use for end-to-end data processing and developing custom products. Through the CAC, arrangements can also be made for technical support from military and IC agencies.

#### **Data Acquisition and Management**

Through the National Civil Applications Program (NCAP), the USGS Eastern Geographic Science Center staff at the ASC assists CAC member agencies by processing requests for the acquisition of National Systems data. The team provides expertise for acquiring, receiving, archiving, and disseminating data in support of a wide variety of scientific investigations and mapping projects with unique requirements. Government and contractor personnel work together with customers to analyze these requirements, plan, and coordinate support for submitting data requests, and acquire approval from appropriate authorities. Archive searches are also performed to locate existing data sources to meet project needs in addition to initiating new data collections. Upon receipt of data, USGS specialists perform a quality assessment to ensure that requirements are met, archive the data, and deliver a copy to the requestor.

The presence of USGS staff representing the CAC community at meetings in which imagery acquisitions are adjudicated provides opportunities to further explain and defend CAC agency collection needs. Regular participation in the Domestic Requirements Working Group is particularly important because most CAC requirements fall within the U.S. and its territories. Coordination with other members of the imagery community results in higher success rates for competing and obtaining source on a non-interference basis with other agency requirements.

The Global Fiducials Library (GFL) is managed at the ASC. Classified remotely sensed data is collected on a regular basis for sites selected for their significance in long-term studies on environmental processes and change. The ASC staff works with the CAC sponsoring agencies to define new site information and determine collection requirements. Tasking and acquisition of data, archiving, and dissemination services are provided for library users. The imagery and associated imagery derived products are used to support current agency programs while also being stored for future use by the scientific community. Program issues are worked in coordination with the GFWG as a means for communicating with the GFL user community.

### **CAC Highlights**

#### **CAC Membership**

In September 2004, the CAC Chairman sent a letter to Secretary Ridge formally inviting the Department of Homeland Security (DHS) to become a member of the CAC and CAC Executive Steering Group (ESG). This action was a follow-up to prior discussions with the office of the DHS Geospatial Information Officer regarding the possibility of DHS petitioning the CAC for membership. Though DHS was established in 2002, the U.S. Coast Guard and the Federal Emergency Management Agency have continued to maintain membership in the CAC as individual agencies pending a decision at the departmental level regarding broader DHS



membership. As of December 31, 2006, a DHS response was still pending.

In 2002, the CAC representative assigned from the DOT was absorbed into the new Department of Homeland Security. In October of 2004, the CAC Chairman sent a letter to the Secretary of Transportation requesting identification of a new primary and alternate representative to the CAC and ESG. As of December 31, 2006, a response from the DOT was still pending.

#### **CAC 30<sup>th</sup> Anniversary**

In May 2006, the CAC assembled in the Great Hall of the National Academy of Sciences building in Washington, DC, to celebrate the 30<sup>th</sup> anniversary of its inception in October of 1975. The event was well attended by both current and former CAC Members. Mr. Tom Weimer, Assistant Secretary of the Department of the Interior for Policy, Management and Budget, was the keynote speaker.

#### **CAC Executive Steering Group**

A CAC Executive Steering Group (ESG) meeting was held on January 26, 2006, to brief ESG members on the results of the Blue Ribbon Study (BRS). Mr. Keith Hall, who chaired the Independent Study Group that produced the BRS, presented highlights from the study. Dr. Pat Leahy, Acting Director, U.S. Geological Survey, and Ms. Mary Margaret Graham, Deputy Director of National Intelligence for Collection, who co-chaired the BRS Senior Steering Group, initiated a discussion of the BRS findings.

#### **Domestic Applications Office**

In May 2006, Charlie Allen, the DHS Assistant Secretary for Intelligence and Analysis, chaired a meeting to discuss the implementation of the BRS recommendations which included the establishment of a Domestic Applications Office (DAO). Participants at the meeting included Dr. Pat Leahy, Dr. Bruce Molnia, Acting Executive Director, Civil Applications Committee (CAC) and Mary Margaret Graham. They agreed to establish a DAO Implementation Planning Team (IPT) to be led by the DHS.

On August 15, 2006, a memorandum from Ms. Mary Margaret Graham was released. The memorandum served as formal notification of the establishment of the DAO IPT and requested that the organizations to which the memorandum was distributed be prepared to support the effort. Organizations on the distribution list included: the Department of State, Department of Homeland Security, Department of Treasury, Department of Energy, Federal Bureau of Investigation, National Reconnaissance Office, National Geospatial-Intelligence Agency, United States Geological Survey, and Civil Applications Committee.

During 2006, the DHS entered into an agreement with the USGS to establish the DAO IPT Office at the USGS ASC. The DHS hired personnel to staff the Office, and began the development of both a DAO Concept of Operations and a Charter.

#### **Disaster / Hazard Response**

During 2006, CAC members requested imagery to support the following events or concerns:

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**Landslides, Wildfires, Floods, and Other Non-Volcanic Hazards**

| <b>Date</b>              | <b>Name / Location</b>  | <b>Event / Concern</b>   |
|--------------------------|---|--|
| Feb                      | McMurdo Sound Ice Dam, Antarctica                               | Ice Blockage of Primary NSF Shipping Channel                   |
| Feb                      | National Petroleum Reserve Area (NPRA) Dalton Test Well, Alaska | Continued Shoreline Erosion in Vicinity of NPRA Test Wells     |
| Jun                      | Wildfire, Sedona, Arizona                                       | Potential Damage and Loss of Life                              |
| Mar<br>May<br>Aug<br>Sep | [REDACTED]  | Potential Catastrophic Flooding from Lakes Formed by Landslide |

**Volcanoes Observed During 2006**

| <b>Name / Location</b> | <b>Event / Concern</b> |
|------------------------|------------------------|
| [REDACTED]             | Erupted                |
| [REDACTED]             | Erupted                |
| [REDACTED]             | Monitored Activity     |
| [REDACTED]             | Monitored Activity     |
| [REDACTED]             | Erupted                |
| [REDACTED]             | Monitored Activity     |
| [REDACTED]             | Monitored Activity     |
| [REDACTED]             | Erupted                |
| [REDACTED]             | Erupted                |
| [REDACTED]             | Erupted                |
| [REDACTED]             | Erupted                |
| [REDACTED]             | Erupted                |
| [REDACTED]             | Erupted                |
| [REDACTED]             | Erupted                |
| [REDACTED]             | Erupted                |
| [REDACTED]             | Monitored Activity     |
| [REDACTED]             | Monitored Activity     |
| [REDACTED]             | Monitored Activity     |
| [REDACTED]             | Monitored Activity     |
| [REDACTED]             | Monitored Activity     |
| [REDACTED]             | Erupted                |
| [REDACTED]             | Monitored Activity     |



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|                          |                    |
|--------------------------|--------------------|
| Augustine, Alaska        | Erupted            |
| Chiginagak, Alaska       | Monitored Activity |
| Cleveland, Alaska        | Erupted            |
| Fourpeaked Mt, Alaska    | Erupted            |
| Kliuchef, Alaska         | Monitored Activity |
| Korovin, Alaska          | Monitored Activity |
| Mt Spurr, Alaska         | Monitored Activity |
| Mt St Helens, Washington | Erupted            |
| Redoubt, Alaska          | Monitored Activity |
| Shishaldin, Alaska       | Monitored Activity |
| Veniaminof, Alaska       | Erupted            |

**Participation in External Forums**

During 2006, the CAC participated in the following external forums to represent civil interests and advocate for civil requirements:

- Domestic Requirements Working Group (DRWG)
- Future Needs Working Group (FNWG)
- Geospatial Intelligence Board (GIB)
- Imagery Policy and Security Committee (IPSCOM)
- Mission Requirements Board (MRB)
- Operations Committee (OPSCOM)

[REDACTED]:

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

**CAC 2006 Monthly Meetings and Briefing Topics**

|            |            |
|------------|------------|
| <b>Jan</b> | No Meeting |
|------------|------------|

|            |   |                           |
|------------|---|---------------------------|
| <b>Feb</b> | Mt. Steller Landslide (Alaska)                      | Bruce Molnia              |
|            | ██████ Landslide and Augustine Volcano Status       | Ron Keeler                |
|            | BuckEye: An Airborne High Resolution Imaging System | Jed Richards, Joe Pimenta |

|            |   |                            |
|------------|---|----------------------------|
| <b>Mar</b> | Topical Session: Hurricane Katrina / Rita Response  |                            |
|            | US EPA Airborne Spectral Photometric Environmental Collection Technology (ASPECT) Emergency Response and Rapid Needs Assessment | Paul Lewis                 |
|            | Methods for Detection of Oil Slicks Using ██████ Data   | Gerald Arp                 |
|            | NGA / PGA Support to Katrina Relief Efforts   | Barbara Eckstein           |
|            | Impact of Hurricane Katrina on Louisiana Wetlands Restoration Sites   | Jim Thomas, Kurt Roettiger |
|            | ICC GEOINT Hurricane Response   | Jason Tucker               |
|            | Harvest Hand Hurricane Relief: Challenges, Issues, and Capabilities   | David Johnston             |
|            | Support to Homeland Defense: Aftermath of Hurricane Katrina   | Mike Zimmer                |
|            | NRO Support to NGA During Hurricane Katrina   | Matthew Mandina            |
|            | Impacts of Hurricanes Katrina and Rita on the Gulf Coast  | Max Ethridge               |
|            | Utility Assessment of Residential Building Damage During Natural Disaster Events: Hurricane Katrina                             | David Brierly              |
|            | 2006 Hurricane Season Preparedness Discussion   | Pat Leahy                  |

|            |   |                 |
|------------|---|-----------------|
| <b>Apr</b> | Topical Session: Avian Influenza Threat               |                 |
|            | Threat Overview                                       | Sue Haseltine   |
|            | Human Health Component (HHS/CDC)                      | Bruce Gellin    |
|            | Agricultural Component (USDA/APHIS)                   | Randall Levings |
|            | Wildlife Component (DOI/USGS)                         | Sue Haseltine   |
|            | Government Activity / Response (NGA)                  | Beth Starr      |
|            | Government Activity / Response (DHS)                  | Jim Wilson      |
|            | Potential Applications of NTM (Classified Discussion) |                 |

|            |   |                              |
|------------|---|------------------------------|
| <b>May</b> | Army GEOPDF Project                         | Ray Caputo                   |
|            | Joint Processing Center Capabilities        | Rusty Russell                |
|            | Greenland Ice Study                         | Ron Birk                     |
|            | Climate Change                              | Michael Prather, Phil DeCola |
|            | Long-Term solution for Landsat-Type Imaging | John Cullen                  |



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| <b>Jun</b> | ONIR Requirements Management / Tasking Integration: CONOPS and Implementation | Joshua Stahl |
|            | Update on [REDACTED]  | Ron Keeler   |
|            | Status of Commercial Remote Sensing Infrastructure                            | Andy Smoak   |
|            | Avian Influenza Update: Response to April Meeting Actions                     | Dave Greene  |

|            |  |                  |
|------------|--|------------------|
| <b>Jul</b> | Intelligence, Surveillance, and Reconnaissance (ISR) Support for the 2006 Hurricane Season | Michael Clements |
|            | NGA Commercial Imagery Policy  | Danny Henderson  |

|            |            |  |
|------------|------------|--|
| <b>Aug</b> | No Meeting |  |
|------------|------------|--|

|            |                                   |  |
|------------|-----------------------------------|--|
| <b>Sep</b> | Special Offsite Session in Alaska |  |
|------------|-----------------------------------|--|

|            |            |  |
|------------|------------|--|
| <b>Oct</b> | No Meeting |  |
|------------|------------|--|

|            |                                   |                      |
|------------|-----------------------------------|----------------------|
| <b>Nov</b> | Lake Havasu, Arizona, Boat Census | Bob Bewley, Ed Harne |
|            | 2006 Lower 48 [REDACTED] Response | Paul Greenfield      |

|            |  |             |
|------------|--|-------------|
| <b>Dec</b> | Special Offsite Session at NRO J D Hill Auditorium |             |
|            | Future Brief                                       | R. Blystone |
|            | Advanced Topic "A"                                 | R. Stocks   |
|            | Current Status                                     | N. Miller   |
|            | Advanced Topic "B"                                 | J. Jansen   |

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## **Working Group Activities**

### **Global Fiducials Working Group**

The Global Fiducials Working Group, which met several times in 2006, is in the process of updating the Global Fiducials Program factsheet.

### **Emergency Response Working Group**

No activity was reported.

### **Imagery Derived Products Working Group**

No activity was reported.

### **Requirements Working Group**

No activity was reported.

### **Security Working Group**

No activity was reported.

### **Thermal Event Sensing Working Group**

No activity was reported.

## **Member Agency Activities**

### **U.S. Department of Agriculture**

USDA agency missions continue to benefit from the use of National Systems data for emergency response, natural resource inventory and monitoring, mapping, development of conservation measures, and land management support. Applications during 2006 include:

#### **Forest Service**

##### **Ground Control and Ground Control Extension**

The Forest Service is responsible for mapping all National Forest lands. One of the critical steps in the mapping process is to obtain ground control point coordinates in order to accurately reference the map to a world coordinate system. The Forest Service typically uses Global Positioning System (GPS) technology to collect control by physically visiting field sites. In remote locations, such as wilderness areas, GPS field crews are prohibited from using motorized vehicles and can spend weeks hiking to the required locations to take the needed measurements. The Forest Service has tested and obtained approval for a technique to collect control that eliminates the need to visit these remote field sites. In 2006, this technique was used to advantage where control was needed in remote wilderness areas and in glacier-covered mountains of Alaska, while surveyors obtained control for the accessible portions of the project by traditional methods.

In addition to collecting control as described above, the process of control extension can be used to generate control locations based on a minimal number of field-surveyed control points. As



part of the National Digital Orthophoto Program, the Forest Service is responsible for creating and maintaining digital orthophoto quadrangles over National Forest lands. In support of this activity, control extension work covering almost 12,000 square miles was completed in 2006, saving field personnel approximately \$220,000 in surveying costs.



In the 2006 wildland fire season, there were 96,385 large fires, with 9,873,429 acres burned.

#### **Forest Inventory and Analysis**

The Forest Service is directed by Congress to perform a National Forest Inventory and Analysis (FIA) for all lands within U. S. borders, and to develop a strategy to incorporate remote sensing and other advanced technologies into this analysis. The benefits of National Systems data to support inventory and monitoring applications have been studied by the agency in previous years, with satisfactory results. In 2006, statistical information such as forest/non-forest, tree type, health, etc. was derived for 140 new permanent measure plots which had been previously imaged in Interior Alaska, and non-literal IDPs were produced. The products will be used to supplement other plot data collected by field personnel in more accessible locations. With an average cost of \$4,000 per plot in Alaska, this activity saved field personnel over \$600,000 in data collection costs. In addition, all of these plots were in areas that were difficult and/or dangerous to access.

#### **Forest Pest and Disease Mapping**

There is interest in testing National Systems data to aid in pest and disease mapping in Michigan where the Emerald Ash Borer is having serious economic impacts. Data was successfully acquired in 2006 of known Emerald Ash Borer sites in Michigan and is being evaluated.

### **Department of Commerce**

#### **Offices within the National Ocean Service (NOS)**

The NOAA Coastal Services Center (CSC) used National Systems data in 2006 to support National Marine Sanctuary (NMS) visitor use. Data were acquired for the Gray's Reef NMS, located 20 miles east of the Georgia coast, and the Flower Garden Banks NMS, located off the coasts of Texas and Louisiana. Seventy Imagery Derived Products (IDPs) were produced from the imagery. The sanctuaries management and research studies plans focus on the long-term status of fish populations, benthic invertebrates, oceanographic conditions, sediment transport, benthic habitat, and visitor use. A boat census was performed for each sanctuary using National Systems data and Coast Guard Auxiliary flight observations to detect seasonal variations in visitor use.



## **National Marine Fisheries Service (NMFS)**

Based on imagery exploited by the USGS Advanced Systems Center, Dr. James Thomas of the NOAA Fisheries Office of Habitat Conservation presented a series of briefings on the effects of hurricanes Katrina (August 29, 2005) and Rita (September 24, 2005) on NOAA-sponsored restoration projects undertaken in southern Louisiana under the auspices of the Coastal Wetlands Planning, Protection and Restoration Act. The separate briefings were to: NOAA Homeland Security senior management, the Civil Applications Committee, and the NOAA Ocean Council. Nine projects (i.e., delta-wide crevasse, East Timbalier Island, Pt Au Fer and Lake Chapeau, Sediment Delivery Area and Big Island Mining in the Atchafalaya Delta, Four Mile Canal, Little Vermilion Bay, and Pecan Island) between the Mississippi River Delta and the Texas-Louisiana border were examined using imagery derived products from before and after the hurricanes. These projects have been monitored with imagery since their construction which, for the oldest (i.e., the Atchafalaya Delta projects) was 1998. Monitoring with imagery is continuing and will be long-term under the Global Fiducial Program.

## **Department of the Interior**

### **Bureau of Land Management**

BLM is responsible for managing 164 million acres of public land, primarily in the West and Alaska. BLM has used National Systems data as one of its natural resource mapping and assessment tools since 1994. Starting with mapping wetlands, BLM use of National Systems data expanded to support other activities. However, in recent years some traditional uses of this data, such as hydrographic meander line mapping, has diminished as commercial high-resolution satellite imagery has become available. Unfortunately, commercial high-resolution satellites cannot fully match all the capabilities of National Systems data, and the Bureau continues to exploit the unique capabilities provided by these high tech tools.



**Bering Glacier** – BLM has used National Systems data to monitor the environment around the Bering Glacier for over eight years. The objectives of these activities include; a) delineate and monitor glacier forelands and ice margins, b) monitor beach side and ice erosion, c) identify and assess existing and potential anadromous fish habitat, d) identify Dusky Canada Geese habitat, e) monitor and assess seal populations, and f) assess hazards for recreation and transportation. As a result of these activities, BLM, along with the USGS, and with input from the Intelligence Community, has developed procedures and techniques to accurately map and measure subtle changes and movement of earth and ice masses. National Systems data have played an important role in enabling BLM to understand and



monitor this unique environment. Ablation measurements using NTM are currently being validated with on-the-ground measurements. National Systems continue to be an important source of information for the Bering Glacier monitoring program since weather poses significant obstacles to commercial platforms and/or human validation. Currently this is the only valid source of acquiring clear definition of ice margins. In addition, the Global Fiducials Program continues to archive seasonal information on the Bering Glacier.

**National Petroleum Reserve-Alaska** – The National Petroleum Reserve-Alaska (NPR-A) is an Indiana-sized area on the North Slope of Alaska that is the center of increasing interest for the production of oil and natural gas. Numerous leases have been issued for exploratory drilling and more are slated for sale. Although new drilling technology minimizes the impact on the environment, this delicate ecosystem requires continued monitoring to evaluate the effectiveness of our environmental policies. National Systems data provide unique capabilities for year-round environmental monitoring and are important tools that allow BLM to validate the guidance it provides to oil and gas companies. North Slope: Prior to development within the National Petroleum Reserve-Alaska (NPRA), BLM Alaska has been collecting baseline information on several sites using the only reliable source: NTM. BLM is also investigating the use of NTM for hydrology research within the NPRA. The Global Fiducials Program currently has the largest designated search area for seasonal monitoring of the area northeast of Teshukpuk Lake in the NPRA.

**Lake Havasu Boat Census** – National Resources were utilized during the 2005 summer vacation season to obtain information regarding the number of boats on Lake Havasu, Arizona. Extensive visitor use information is available for the 105 shoreline camps along the Arizona side of Lake Havasu, from Lake Havasu City south to the Parker Dam. However, there was no quantifiable information available for the number of boats on the 19,100 acre lake at peak use periods during the intense use days of the summer Holidays. Information was obtained for July 4<sup>th</sup> and Labor Day as well as a non-holiday period. Boat census statistics and GIS point files will be utilized by BLM recreation, fisheries and natural resource managers in the area.

### **U.S. Geological Survey**

Activities are ongoing to enhance and replace key infrastructure components at the ASC. Legacy systems have been operational for 6-8 years and must be updated to remain compatible with changing community architectures and to ensure continued operation. The major secure communications components were upgraded in November 2005. The data receipt and archive systems (Dissemination Element and Primary Product Server) were replaced with an Image Product Library (IPL) in 2006.

### **U.S. Army Corps of Engineers**

The Topographic Engineering Center, representing the US Army Corps of Engineers, maintained participation in the Global Fiducials Library Program during 2006. A request was submitted by the USACE GFL representative for an updated USACE GFL site list and collection status. TEC produced 57 (Urban Terrain) Imagery Derived Products (IDPs) in CY2006, using Technique 97-

16, UR 2202-03. The Army G2 approved a new broad coverage non-literal IDP in support of all TEC missions in 2006 as well.

**U.S. Environmental Protection Agency**

Terry Slonecker and Taylor Jarnagin have been working with Robert Clark of USGS, and the ASC staff to develop a temporal database of geo-spatial materials for the Chesapeake Bay watershed. Several investigative projects are planned in support of the research needs of the joint USEPA/USGS Chesapeake Bay Program Office (CBPO). Forested riparian buffers will be mapped in selected watersheds in order to model their effectiveness at reduction of nitrogen and sediment loads.

Land Use and Land Cover change will be verified for selected areas of the Mid Atlantic in support of *Consequences* research and to support the 2007 Center of Excellence for Geospatial Information Science Research Proposals Funding Award; "A Landscape Indicator Approach to the Identification and Articulation of the Ecological Consequences of Land Cover Change in the Chesapeake Bay Watershed, 1970 – 2000" submitted by Terry Slonecker and Peter Claggett of the CBPO.

During the past year, Terry Slonecker and Taylor Jarnagin both successfully completed CAC-sponsored training from NGA on the [REDACTED] Technology Course." Approximately ten people from EPA attended the "NTM for Civil Applications" training March 1 2007.



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