



Base Cartography Inventory

Background

Twelve baseline inventories have been identified by the Inventory and Monitoring Program of the National Park Service. These inventories are considered the minimum information needed to effectively manage and protect natural resources within parks. The Base Cartography Inventory serves as the basis and background that other inventories build upon. Spatial displays and analyses provide an efficient and cost-effective way for park managers and planners to utilize complex natural resource information. For example, by incorporating relatively basic information about topography and vegetation communities into a spatial analysis, managers can locate potential habitats for endangered species or predict the likely course of a wildfire (National Park Service, 2009).

In Alaska, a regional approach to conducting and managing the base cartography inventory is most effective because of the large area coverage and remote nature of many of the national parks within Alaska. The regional approach focuses on integrating the management of the base cartography inventory.

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Mapping Alaska's Parks

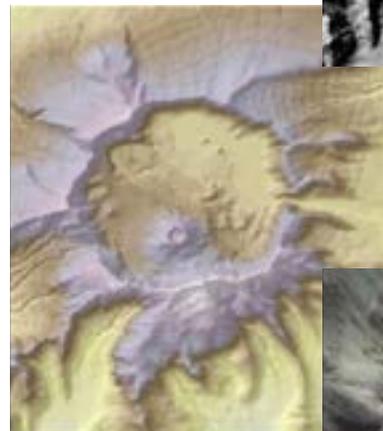
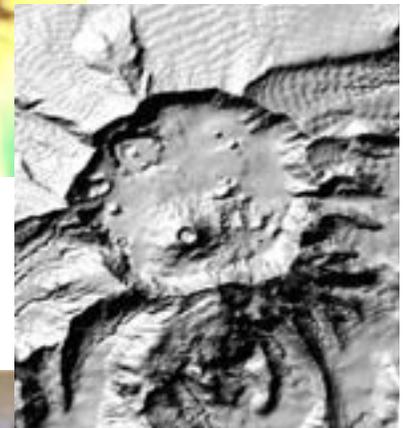
Currently in Alaska, USGS 1:63,360 topographic maps are the standard mapping base available across the region. Most of these topo maps are over 50 years old, do not meet National Map Accuracy Standards (NMAS), and are widely regarded as grossly inaccurate and unsuitable to support modern information management practices. For instance, recent changes in water bodies, shorelines, glaciers, rivers, and human development often are not reflected on these maps.

To provide current mapping quality data, the Base Cartography Inventory acquires high quality digital elevation models (DEMs) and current high-resolution imagery. Together, these two sets of data are used to produce ortho-rectified "image map" products that meet 1:24,000 scale ($\pm 12m$ horizontal accuracy) National Map Accuracy Standards. We accomplish this by using DEM and image data from commercial satellite, airphoto, and mapping vendors procured through contracts and/or interagency agreements.



Digital Elevation Data

Hillshade Derived from Digital Elevation Data



Hillshade and Digital Elevation Data

True-Color Ortho-rectified Image



The images above show the Aniakchak National Monument and Preserve caldera represented in the four products of the Base Cartography Inventory. The inventory acquires high quality digital elevation data and imagery for all national parks in Alaska. Digital Elevation Models (DEM) are combined with high resolution imagery to produce true-color and near infrared ortho-rectified imagery.



The Base Cartography Inventory has many applications. The image above shows a 3D model of the White Pass area of Klondike Gold Rush National Historical Park (park boundary noted in yellow). The model was developed by combining a digital elevation model with high-resolution aerial photography. It is being used to plan vegetation field inventory work, including transect site selection and travel routes to be taken by researchers.

Status

Starting in FY2010, the Inventory Program established the first of several interagency agreements (IA) with the USGS to utilize their Geospatial Product and Service Contracts (GPSC) program in an effort to update regional park DEM data with Interferometric Synthetic Aperture Radar (IFSAR) derived DEMs. These agreements also facilitated NPS' participation in a multi-agency partnership to update the State of Alaska National Elevation Dataset (NED), which includes all NPS park lands in the state. Several data deliveries from these agreements have already been made for Wrangell-St. Elias and Denali National Park and Preserves. Deliveries are scheduled for Bering Land Bridge and Noatak National Preserves, Cape Krusenstern National Monument, and Glacier Bay National Park and Preserve in 2013.

The Inventory program also plans to continue "cloud clean-up" activities for the Region's imagery base layers by placing acquisition and archive requests through the President's U.S. Commercial Remote Sensing Space Policy (CRSSP) and the National Geospatial-Intelligence Agency Web-Based Access and Retrieval Portal (WARP).

To date, approximately 18 million acres (33%) of Alaska parklands have ortho-rectified high resolution imagery. The remaining 37 million acres (67%) have high resolution base imagery acquired and are awaiting improved DEMs for the ortho-rectification process to occur. It is anticipated that the processing of this imagery will continue opportunistically as current and more accurate IFSAR DEMs become available to produce 1:24,000 scale ortho-rectified products, which will be compliant with the National Mapping Accuracy Standards.

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Applications of Base Cartography

Ortho-rectified imagery provides a foundation for project planning and mapping. DEMs and ortho-rectified imagery serve as foundations for other inventories, including the vegetation and soil inventories. They are used in developing models of habitats and ecosystems. They facilitate project planning, data analysis, and verification of geographic information systems (GIS) data layers. They are also often required prior to initiating other inventories. For example, pre-fieldwork activities often utilize ortho-rectified imagery to identify sample locations. These sample locations are then evaluated for slope, aspect, and elevation using DEMs.

The ortho-rectified imagery developed in this inventory also has applications beyond scientific studies and field work. Planning for emergency response, trail development or maintenance, and back country travel are all activities to which ortho-imagery can be applied. Information can also be used to develop interpretive and educational materials to connect the public to park resources.

For more information on natural resource inventories:

National website: <http://science.nature.nps.gov/im/>

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