I&M Inventory and Monitoring Fact Sheet

U.S. Department of the Interior
National Park Service
Natural Resource Information Division

Vegetation Mapping (updated)

June 1997 **97-23**

The Natural Resource Inventory and Monitoring (I&M) Program was established to gather information and develop techniques for maintaining the integrity of the ecological communities in the approximately 250 National Park System units with significant natural resources. The details of the program are outlined in *Natural Resource Inventory and Monitoring in National Parks*, available from the address listed below.

Since its inception in 1992, the I&M Program has funded mapping of vegetation, soils, and geologic features; collection of base cartographic data; compilation of automated park-based bibliographic databases; initiation of several prototype monitoring programs; and development of data management standards and protocols. The series of fact sheets of the Natural Resource Information Division provides updated information on the progress in each of these areas.

Vegetation Mapping

Every National Park System unit[1] with significant natural resources will be provided with information on the composition and distribution of its vegetation. This information is based on descriptions from data collected by field sampling and interpretation of aerial photography. Aerial photography and remotely sensed imagery acquired for vegetation mapping will also be used to support geologic mapping, soil surveys, and species inventories.

To maintain consistency in detail and accuracy, standards and protocols were developed for the vegetation classification system, sampling methodologies, and accuracy assessments of final products. As a result, the National Park Service in cooperation with the vegetation subcommittee of the Federal Geographic Data Committee and other agencies is developing a standard hierarchical vegetation classification. The standard is based on a system originally developed by UNESCO and further refined by The Nature Conservancy through its network of natural heritage programs. For consistency in detail and accuracy, the classification system, sampling methodologies, and procedures for the assessment of map accuracy are being tested in representative National Park System units.

The primary product of the vegetation mapping is a digital map of the vegetation in a park that is compatible with the GIS (Geographic Information System) of that park. Digitizing the vegetation data provides flexibility in map design and production and facilitates data integration and analysis. Other products include vegetation class descriptions, field keys, hard copy maps, detailed field data, analysis of data, and aerial photography. Field data will be maintained in the park in which they were collected to ensure their availability to managers.

Program Status

In 1994, standards and protocols for the classification system were developed under the contracted direction of the Biological Resources Division of the U. S. Geological Survey. Refinement of the field sampling methods and procedures for assessment of map accuracy has progressed. A completed inventory of existing data in 101 parks is providing the basis for identifying the need for aerial photographs and other base data. The I&M Program is locating and acquiring from other agencies aerial photographs that meet the requirements and standards of its vegetation mapping. When necessary, new imagery is obtained. The park units will be mapped in order of priority of need for vegetation information and the availability of Digital Orthophoto Quarter Quads, which serve as the cartographic base for the mapping.

Interagency agreements with the U. S. Bureau of Land Management and the U. S. Forest Service have been used to acquire photographs for the following park units: Bent's Old Fort National Historic Site; Colorado, Devils Tower, Florissant Fossil Beds, Great Sand Dunes, Natural Bridges, Rainbow Bridge national monuments; Arches, Bryce Canyon, Canyonlands, Capitol Reef, Rocky Mountain, and Zion national parks; and Glen Canyon National Recreation Area. Reprints of existing photographs were obtained for the Mount Rushmore National Memorial; Devils Tower and Jewel Cave national monuments; and for Isle

[1]National parks and other entities of the National Park Service such as national monuments, national rivers, wild and scenic riverways, national scenic trails, and others are called *units* and collectively constitute the *National Park System*.

Royale, Great Smoky Mountains, and Theodore Roosevelt national parks. In 1995, photos were acquired under contract for Fort Laramie National Historic Site (specific areas of interest to the park) and for Agate Fossil Beds, Scotts Bluff, and Tuzigoot national monuments. The acquisition of photographs for the Congaree Swamp, Sunset Crater Volcano, Walnut Canyon, and Wupatki national monuments and for the Glacier and Voyagers national parks were contracted in 1996. New photography for Acadia, Badlands, Great Smoky Mountains, and Wind Cave national parks was contracted in 1997. The acquisition of photographs for Glacier Bay National Park and Preserve and Klondike Gold Rush National Historical Park through partnerships with the U. S. Forest Service, U. S. Geological Survey, and National Aeronautic and Space Agency in Alaska is also planned. Additional imagery and maps will be acquired under contract.

Pilot Projects

To test the new classification system, field methodologies, and procedures for assessing map accuracy, pilot projects are being conducted in several parks. A summary of the accomplishments in each pilot project is as follows.

Assateague Island National Seashore

Existing aerial photographs (1:12,000) were used on Assateague Island. Field sampling in 114 plots in summer 1995 indicated 25 vegetation types. Photo interpretation was also completed and provided more detail than the cover classes. The classification, vegetation type descriptions, and field key for the Assateague Island National Seashore were delivered to the National Park Service by the contractor. The final accuracy assessment is planned by fall 1997.

Tuzigoot National Monument

New aerial photography (1:6,000) was completed in fall 1995. Analysis of field sampling in 35 plots indicated 19 vegetation types. Photo interpretation and automation were completed. The classification, vegetation type descriptions, and field key were delivered. In spring 1997, each polygon of the final map was visited to assess the accuracy of the final product. Final results of the assessment are forthcoming.

Scotts Bluff National Monument

New aerial photography (1:12,000) and field sampling were completed in the monument in 1995. Analysis of the vegetation in 100 plots indicated 18 vegetation types. Sampling accuracy was assessed in 150 sites. The classification, vegetation type descriptions, and field key were delivered. The park also was mapped by additional personnel a second time to obtain a benchmark for the mapping procedures.

Great Smoky Mountains National Park

Existing aerial photography was used for the initial sampling in the park. Existing aerial photography and related data to conduct the pilot in the park were reviewed in 1995 and will be the foundation of planning the field sampling. The taking of new photographs is underway as of spring 1997.

Vegetation mapping is underway also in Fort Laramie National Historic Site; Mount Rushmore National Memorial; Agate Fossil Beds, Congaree Swamp, Devils Tower, and Jewel Cave national monuments; Acadia,Isle Royal. Joshua Tree, Voyagers, Wind Cave, and Yosemite national parks; and Rock Creek Park. The standards and protocols developed for this program are also used for mapping vegetation on Point Reyes National Seashore and in Hawaii Volcanoes National Park.

Vegetation Mapping In Alaska

Mapping of 22 million hectares (54 million acres) of vegetation in the 15 national parks in Alaska is coordinated by the Alaska Regional Office. It is conducted independent of vegetation mapping in parks elsewhere in the United States, primarily because of the large spatial scale. In national parks in Alaska, vegetation is mapped from satellite imagery, not from aerial photographs. Initially, FirePro field data collected during vegetation mapping over the years in Denali, in Gates of the Arctic, Katmai, Lake Clark, and Wrangell-St. Elias national parks were automated. In Fiscal Year 1996, imagery for vegetation in Denali and Lake Clark national parks and preserves was acquired. Now, vegetation mapping is conducted in Lake Clark, Noatak, and Wrangell-St. Elias national parks and preserves and in Cape Krusenstern National Monument. A major focus is on acquisition of new imagery for

vegetation mapping in other parks in Alaska.

The National Vegetation Classification System by The Nature Conservancy and the Biological Resources Division of the U. S. Geological Survey is being adapted for Alaska and field tested in one or more of the national parks in Alaska.

Activities in 1997

Priorities for the upcoming field season include:

- continued acquisition of aerial photos for priority parks
- continued field testing of procedures and methods
- review of products from pilot projects.

Field sampling, photo interpretation, vegetation description, and data automation are planned for additional pilot projects in Acadia, Joshua Tree, Voyageurs, and Yosemite national parks and in Congaree Swamp National Monument. Others will be initiated when funding is available.

Training Opportunity

The U. S. Geological Survey contracted The Nature Conservancy to conduct a workshop on the standardized national vegetation classification system. The initial class will be held for National Park Service personnel but will include representatives from the U. S. Bureau of Land Management, Bureau of Reclamation, Department of Defense, Environmental Protection Agency, U. S. Fish and Wildlife Service, and the U. S. Geological Survey. The purpose of the workshop is to explain the classification system; discuss the data that are necessary to use the system; describe methods for sampling and analysis of data; and conduct field exercises in gathering data, analyzing results, and producing keys and other products.

For further information, contact:

Dr. Gary Williams
Inventory and Monitoring Program CoordinatorNational Park Service
1201 Oak Ridge Drive, Suite 350
Ft. Collins, CO 80525
Telephone (970) 225-3539
E-mail: gary_williams@nps.gov
cc: Mail Williams, Gary

Mike Story
National Resources Information Division
National Park Service
PO Box 25046
Room 8000
Denver, CO 80225-0046
Telephone (303)202-4236
E-mail: mike_story@nps.gov