

BIOGRAPHICAL INFORMATION

H. L. Case, III
Physical Scientist
U.S. Geological Survey

Specific Responsibilities

H. L. (Lee) Case, III joined the U.S. Geological Survey (USGS) in 1973. He currently is a member of the USGS Northwest Geographic Science Office and is responsible for assisting with the implementation of The National Map in the State of Washington. He also assists in the development of partnerships and the identification and implementation of scientific applications of the National Map the Pacific Northwest area.

Past Experience

H.L. (Lee) Case, III began his career with the U. S. Geological Survey in 1973 as a hydrologist in WRD's Louisiana District office. In 1978 he became chief of the Rapid City, SD, Subdistrict office and was project chief of the South Dakota parts of both the Northern Great Plains and the High Plains Regional Aquifer System Analysis projects. He transferred to Albuquerque, NM, in 1981 as chief of the Hydrologic Investigations Section. From 1987 through 1995, Lee served as District Chief for USGS Water Resources Division activities in Utah. From 1995 through 1999, Lee was assigned to the Director's Office at USGS Headquarters in Reston, Virginia as the Theme Coordinator (later as Science Advisor to the Director) for Natural Resources for the USGS. Lee returned to Salt Lake City, Utah in 1999 as the Intermountain West Liaison for the National Mapping Discipline. In late 2001, Lee transferred to Seattle, Washington, where he assumed his current duties as a physical scientist with the Northwest Geographic Science Office.

Educational Information

B.S. – Geological Sciences, University of Texas at Austin
M.S. Geology, Oklahoma State University

Professional Memberships

Professional Hydrogeologist, American Institute of Hydrology
Northwest Regional Floodplain Managers Association

DEVELOPMENT OF AND APPLICATIONS FOR *THE NATIONAL MAP*—THE
NEXT-GENERATION DIGITAL TOPOGRAPHIC MAP—IN THE SEATTLE-
TACOMA, WASHINGTON, URBAN AREA

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ABSTRACT

The U.S. Geological Survey (USGS) is supporting the homeland-security community by producing high-resolution imagery and by assigning a high priority to developing *The National Map* for the Nation's major urban areas. Working with local, State, and Federal partners, the USGS is implementing *The National Map* as a seamless, integrated online mapping service. By accelerating the implementation of *The National Map* in the Seattle-Tacoma, Wash., urban area, the USGS and its partners provided valuable support to the recent TOPOFF2 weapons-of-mass-destruction drill in Seattle.

INTRODUCTION

The Seattle-Tacoma, Wash., urban area is one of the fastest growing and largest metropolitan areas on the west coast with more than 4 million people (more than 60 percent of the State's population) living in the corridor around Puget Sound from Everett to Olympia, Wash. In addition to the urban corridor along Interstate Highway 5, the six-county area (King, Pierce, Snohomish, Thurston, Mason, and Kitsap) includes agricultural lands, Fort Lewis and McChord Air Force Base, Muckleshoot Indian Reservation, Mount Rainier National Park, and much of the Mount Baker-Snoqualmie National Forest. Within this six-county area, the Seattle-Tacoma urban area is in the top 10 on the 120-cities list for the Department of Homeland Security.

The purpose of this paper is to review the development, status, and potential applications of *The National Map* in the Seattle-Tacoma, Wash., urban area (figure 1). The specific objectives

Figure 1 near here

are to (1) provide a brief overview of *The National Map*, (2) summarize the status of *The National Map* implementation in the Seattle-Tacoma urban area, and (3) discuss a potential application of *The National Map's* eight basic data themes in support of top officials and emergency-response personnel during the May 2003 TOPOFF2 weapons-of-mass-destruction drill in Seattle.

A detailed discussion of the principles and concepts of *The National Map* is beyond the scope of this report; additional information can be found at *The National Map* Web site (URL <http://nationalmap.usgs.gov/>). The availability, accuracy, resolution, extent, and currentness of the geospatial data presented in this report are specific to the Seattle-Tacoma area and vary at other locations throughout the Nation.

THE NATIONAL MAP

To fulfill the need of government agencies, private industry, and the public for seamless, up-to-date, easily accessible maps, the U.S. Geological Survey (USGS) is working with local, State, and Federal partners in Washington, Oregon, and Idaho to integrate the best available geographic information from disparate sources in the form of interactive maps publicly available online. The resulting *National Map* is a consistent framework for the geographic knowledge needed by the Nation. It will provide public access to high-quality geospatial data from multiple partners to help inform decisionmaking by resource managers and the public.

Data Characteristics

The National Map is designed to be a seamless, continually maintained, nationally consistent geospatial dataset that will be publicly available on the Internet 24 hours a day, 7 days a week. *The National Map* will support integrating, sharing, and using spatial data easily and consistently. It will allow for datasets of variable resolution and will completely cover the Nation at potentially multiple scales. The data will have variable positional accuracy without cartographic offsets.

A key to successful implementation of *The National Map* is the establishment of long-term partnerships with local, State, and other Federal agencies that allow for cataloging and serving of their data through *The National Map*. By facilitating the connection between users and our partners' datasets, the potential for providing the highest resolution and most current geographic information is significantly enhanced. Users can specify the combinations of data and their geographic area of interest.

Data Themes

The National Map focuses on the following eight basic data themes designed to meet broad user needs for fundamental geographic information:

1. Orthorectified (scale corrected) imagery-- a key source of interpreted feature information. In many high-priority urban areas, imagery at 1/3-meter resolution has been collected (figure 2);

Figure 2 near here

2. Land characterization--the surface-cover classification by seasonal land-cover types;
3. Elevation--including Lidar data where available and in sufficient detail to yield contours for primary topographic-map series;

4. Hydrography--streams, rivers, ponds, lakes, and so on;
5. Transportation--roads, highways, railroads, streets, waterways, and so on;
6. Structures--houses, buildings, some pipelines, and so on;
7. Boundaries--of governmental units, such as publicly owned lands or reservation boundaries; and
8. Geographic names—of physical and cultural features.

IMPLEMENTATION OF *THE NATIONAL MAP* IN THE SEATTLE-TACOMA, WASH., URBAN AREA

Implementation of *The National Map* in the Seattle-Tacoma, Wash., urban area was formally initiated in October 2002 and continues as part of the USGS' ongoing efforts to implement *The National Map* throughout the State of Washington.

Inventory

An inventory of existing geospatial data in the Seattle-Tacoma area was completed in early January 2003. The inventory was conducted by reviewing State, county, and city Web sites and by personal contacts with partner Geographic Information System (GIS) specialists. The inventory included information about data types, scales, datums, extent, and personal contacts. Results of the inventory were inputted to a Microsoft Access data base that was made available internally and to selected partners.

Coordination

A "kickoff" meeting was held in March 2003 with city, county, State, and other Federal agencies. The purpose of the meeting was to introduce the rationale for implementing *The National Map* in the Seattle-Tacoma area, to identify issues and questions, to discuss communication mechanisms, and to seek input for formulating a detailed study plan. This meeting was an essential component of the overall strategy that recognizes the importance of developing strong partnerships for successful implementation of *The National Map*. After the meeting, personal visits with individual partners were conducted to better understand the issues associated with developing long-term partnerships with agencies actively working in the area. Coordination at the State level has focused on participation in the Washington State Geographic Information Council (WAGIC), Washington Transportation Framework Partners meetings, and the Washington Framework Management Group. Coordination at the Federal level has primarily been through individual meetings and through the Interorganizational Resource Information Coordinating Council.

Data Themes

Geospatial data are being added to and made available through *The National Map* on the basis of the guiding principle of inputting existing publicly available data at the best resolution. Higher-resolution data currently in local, State, and other Federal agency files will be inputted as partnerships are formally developed and agreements are signed. Activities in Federal Fiscal Year 2003 focused on the following data themes:

Orthoimagery: A contract for the acquisition of aerial photography and orthophotographic production over the study area (figure 1) was let in Fall 2002. The natural-color, 1/3-meter ground-pixel resolution orthoimages were delivered in April 2003. Figure 3 illustrates the resolution and quality of images, using the Seattle Space Needle (a well-known landmark).

Figure 3 near here

These data (approximately 200 GB) have been shared with local partners by downloading data from 37 DVDs to portable storage devices. We are actively pursuing funding and partnerships to obtain high-resolution imagery over additional parts of the Puget Sound area.

Elevation: Metadata are being added to Lidar data collected by the Puget Sound Lidar Consortium. Lidar data and their metadata are being inputted to the National Elevation Dataset (NED). These data are available through the Seamless Data Distribution System Viewer (URL <http://seamless.usgs.gov/viewer.htm>) by checking the 1/9" NED layer for raster data.

Transportation: Roads derived from USGS Digital Land Graphs (DLGs) and from the U.S. Forest Service and the U.S. Bureau of Land Management are available through the viewer.

Hydrography: Data derived from USGS DLGs are available and served through the viewer. Higher-resolution data from State and local agencies are becoming available, and negotiations to make these data available through *The National Map* are ongoing.

Land Characterization: Land-use data from Thurston County and from the National Land Characterization Dataset are available through the viewer. Higher-resolution data from State and local agencies are available, and negotiations to make these data available through *The National Map* are ongoing.

Boundaries: Data derived from USGS DLGs are available and served through the viewer. Available Higher-resolution data from local, State, and other Federal agencies have been integrated into boundary data displayed on *The National Map*. Negotiations to make additional high-resolution boundary data available through *The National Map* are ongoing.

APPLICATIONS

Top officials and emergency-response personnel need immediate access to specific types of accurate, up-to-date, geospatial data when responding to human-caused and (or) natural disasters. In May 2003, the Department of Homeland Security sponsored a drill to test the response of local, State, and Federal officials to a simulated disaster---a potential terrorist attack involving a weapon of mass destruction (a "dirty bomb")---in

Seattle. The ultimate objective of the drill was to help improve how officials and emergency-response personnel share information, make decisions, and work together in the event of a real disaster.

Inventory

In preparation for the drill, the Department of Homeland Security reviewed the inventory of geospatial datasets (developed as part of *The National Map* implementation), and identified 36 data themes residing in four different agency databases. Having an inventory of existing datasets, knowing where the datasets resided, having information about licensing and (or) proprietary requirements, and having a local USGS presence capable of meeting with and obtaining the datasets helped to expedite the process of assurance that the datasets were available when needed.

Coordination

The USGS helped to link and integrate local geospatial data with Federal and other emergency-response needs. Meetings with local agencies to develop long-term partnerships in support of *The National Map* facilitated the process of identifying available data and obtaining them expeditiously. USGS personnel were “on standby” throughout the drill to provide additional geographic information as needed without adding to potential confusion in the drill command center. In this capacity, requests for cost and time estimates for additional high-resolution imagery and elevation data were received and met.

Data Themes

Top officials and emergency-response personnel identified the need for a wide variety of geospatial datasets during the TOPOFF2 drill. High-resolution imagery was especially popular, and the need for additional aerial and thermal imagery after the simulated detonation of the device was recognized. The large file size of the high-resolution orthophotographs prompted some users to indicate a willingness to accept a lower-resolution but smaller-file-size image (Ron Langhelm, oral commun., 2003). Lidar data were also used, and a need for additional Lidar data after the simulated detonation was identified. Other requested data themes include transportation (roads, railroads), land cover, structures, and hydrography. The interest in being able to know the exact location of water-supply wells, water-treatment plants, wetlands, streams, and other features is associated with the need to assess short- and long-term impacts of the simulated detonation on essential services and the environment.

SUMMARY

The National Map is a consistent framework for geographic knowledge needed by the Nation. It provides public access to high-quality geospatial data from multiple partners to help inform decisionmaking by resource managers and the public. It is designed to be a seamless, continually maintained, nationally consistent geospatial dataset that will be publicly available on the Internet 24 hours a day, 7 days a week.

Implementation of *The National Map* in the Seattle-Tacoma, Wash., urban area was initiated in October 2002. An inventory of existing geospatial databases in the area was

completed in early January 2003. Coordination with local, State, and Federal partners has been emphasized from the beginning. New high-resolution imagery was collected, and metadata were added to existing Lidar data collected by the Puget Sound Lidar Consortium. Data for the eight basic data themes of *The National Map* are available (although some may currently be at a coarse resolution) through *The National Map* viewers. Higher-resolution data are available from State and local agencies, and negotiations to make these data publicly available through *The National Map* are ongoing.

The concept and need for geospatial data were tested in the TOPOFF2 weapons-of-mass-destruction drill held in May 2003 in Seattle. The USGS contributed by conducting and providing the results of an inventory of geospatial data, assisting in coordination efforts and providing additional geographic information on a “standby” basis, and providing access to high-resolution imagery, elevations, and other priority datasets.

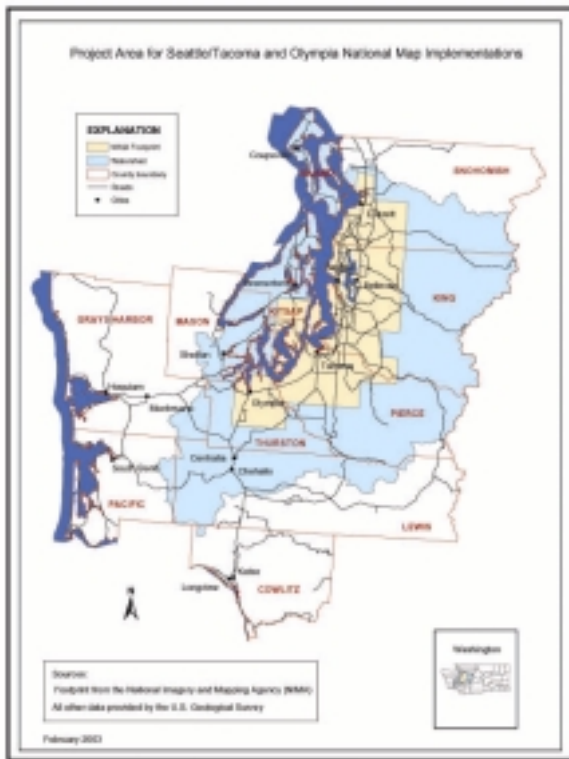


Figure 1. Seattle-Tacoma, Wash., urban area, showing locations of pilot-project areas for *The National Map* implementation. Base from the National Imagery and Mapping Agency; all other data provided by the U.S. Geological Survey.



Figure 2. High-resolution orthoimage of Safeco Field, Seattle, home of the Seattle Mariners.



Figure 3. High-resolution orthoimage of the Seattle Space Needle.