

GeoMAC

Wildfire Locations and Interactive Internet Mapping

Location: National

Project Summary: GeoMAC provides the public and wildland fire managers Internet access to interactive maps with current wildland fire locations and perimeters.



Close-up view showing the perimeter of the Cave Creek Complex fire for July 5, 2005.

Resource Challenge

The 2000 wildfire season was one of the worst on record: by mid-August, 64,000 fires had burned an estimated 4.5 million acres and hundreds of structures. More than 25,000 firefighters, 900 fire engines, 200 helicopters, and all available air tankers were deployed.

Interagency Fire Coordination Centers set priorities for deploying fire-fighting resources based on human safety, protecting property, and natural resource values. Using printed maps and situation reports limited the information available to make these decisions. As the 2000 fire season wore on, fire managers asked for real-time geographic information on wildfire status, location, and proximity to life, property, and infrastructure to help them send resources where they were needed most.

Examples of Key Partners

National Interagency Fire Center, USDI Bureau of Land Management (BLM), USDA Forest Service (USFS), USDI Bureau of Indian Affairs, USDI Fish and Wildlife Service, USDI National Park Service, U.S. Geological Survey (USGS).

Results and Accomplishments

The Geospatial Multi-Agency Coordination (GeoMAC) Group developed an Internet based mapping tool which allows online access to maps of wildfire locations and perimeters. Using a standard web browser, fire personnel and the public can view information to pinpoint fire areas. Users can manipulate maps, zoom in and out, and print copies for dispatch offices, coordination centers, and briefings. Users can also display information on individual fires such as the name and current acreage.

Innovation/Highlight

GeoMAC improves the distribution of wildland fire information by providing on-line interactive maps, displaying detailed information about where wildland fires are burning, and sharing the latest wildland fire information.

Sponsored by the National Interagency Fire Center, the USGS Rocky Mountain Geographic Science Center developed and maintains the application. The fire perimeter data is provided by on-site wildfire personnel and is updated daily. The USFS Remote Sensing and Applications Center provides thermal satellite data. Situation report data comes from the USFS server in Kansas City. Weather data comes from several agencies including the National Weather Service.

In addition to providing on-line data, GeoMAC has a data repository of the perimeter and point fire locations that is available to resource managers, burned area rehabilitation teams, researchers, scientists, and academia. Overall use of GeoMAC has risen sharply: in 2001, the first year GeoMAC collected user statistics, there were 1.8 million requests; as of July 2005, there have been 7.4 million requests.

Following on GeoMAC's success, the California Department of Forestry and Fire Protection has partnered with the BLM and the USDA Forest Service to develop a similar site for California fire planning.

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LANDFIRE

Mapping Tool Targets Areas for Hazardous Fuels Reduction

Location: Nationwide

Project Summary: LANDFIRE is a multi-organization partnership to identify and prioritize areas for, and improve coordination on, hazardous fuel reduction.



Discussing mapping techniques during the Rapid Assessment Modeling workshop in Little Rock, Arkansas.

Resource Challenge

The Landscape Fire and Resource Management Planning Tools Project (LANDFIRE), is a 5-year, multi-partner project to map ecosystems and wildland fire fuels. It is an outgrowth of the National Fire Plan, which moves the Nation toward reducing the number of wildland fires by controlling excessive vegetation and fuels that feed destructive fires.

LANDFIRE began after federal land agencies asked for maps to identify and prioritize areas for hazardous fuel reduction. LANDFIRE will provide consistent, nationwide fuel and vegetation data to help:

- Identify areas at risk from excessive fuels and vegetation.
- Prioritize hazardous fuel reduction projects.
- Improve fuels treatment coordination between agencies.
- Monitor completed projects.

LANDFIRE data and models can be used at the national, regional, and local levels. Principle investigators are located at the USDA Forest Service Rocky Mountain Research Station Fire Sciences Laboratory in Missoula, Montana and at the U.S. Geological Survey (USGS) National Center for Earth Resources Observation and Science in Sioux Falls, South Dakota. The Nature Conservancy and other organizations are providing field data and valuable scientific expertise and technology transfer skills. Sponsored by the Wildland Fire Leadership Council, LANDFIRE operates primarily from USDA Forest Service and USGS funding.

Examples of Key Partners

U.S. Geological Survey, USDA Forest Service, USDI Bureau of Indian Affairs, USDI Bureau of Land Management, USDI Fish and

Wildlife Service, USDI National Park Service, Federal Emergency Management Agency, The Nature Conservancy, Student Conservation Association, NatureServe, Systems for Environmental Management., SANBORN, EarthSat, Science Application International Corp., National Association of State Foresters, National Association of County Officials.

Results and Accomplishments

The LANDFIRE team is currently developing geographic data on vegetation cover types and structure characteristics, biophysical settings such as elevation and slope, wildland fuel models, fire history, and fire regime condition classes. As of March 2005, the project team had compiled data contributed by various agency and non-governmental cooperators from more than 230,000 field plots.

Ultimately, LANDFIRE will deliver more than twenty geospatial layers for the entire United States, which will be readily available over the Internet. LANDFIRE maps will be available for the entire U.S., showing:

- Wildland fuel.
- Fire regime condition classes.
- Existing vegetation.
- Biophysical settings.

The Southern Utah Color Country Fuels Assessment is currently working with the first data to be included as a part of the national implementation of LANDFIRE. Vegetation modeling and technology transfer workshops for field personnel will begin this year.

Innovation/Highlight

LANDFIRE integrates remote sensing, geographic information systems, databases, and applied science to help land managers assess and prioritize fuel treatments to help prevent wildfires.

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Multi-Resolution Land Characteristics Consortium

High-Tech Maps Cover the Entire US

Location: National

Project Summary: A consortium of federal agencies produced a comprehensive spatial database for user-specified mapping of 21 types of land cover anywhere in the U.S.



Multi Resolution Land Characteristics (MRLC) Consortium Partners meeting in Denver, Colorado in February 2005.

Resource Challenge

Until recently, the Nation lacked a detailed, nationally consistent land-cover map and database. Land-cover maps show the physical nature of the land, including vegetation, soil, rock, and manmade structures. Data can come from either aerial photography or satellite images. These maps are used for hundreds of purposes, including assessing ecosystem status and health, modeling nutrient and pesticide runoff, seeing spatial patterns of biodiversity, land use planning, developing land management strategies, and more.

The Multi-Resolution Land Characteristics Consortium (MRLC) is a group of federal agencies who began collaborating in 1993, pooling resources to assemble satellite imagery for the lower 48 United States. They developed a comprehensive database called the National Land Cover Datasets (NLCD), mapping 21 types of land cover that seamlessly covers the U.S. Each of the 66 mapping zones can also be looked at independently using common tools and techniques.

Examples of Key Partners

U.S. Geological Survey (USGS), U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration, NASA, USDA Forest Service, USDA Natural Resources Conservation Service, National Agricultural Statistical Service, USDI Bureau of Land Management, USDI National Park Service, USDI Fish and Wildlife Service, LANDFIRE, State of Illinois, State of Kentucky, State of Maine.

Results and Accomplishments

The NLCD system uses the "Database" approach to land-cover mapping. Instead of mapping specific land-cover types such as

natural vegetation, agriculture, and developed areas, USGS scientists developed a procedure that identifies all of the physical characteristics of each satellite pixel, which are tiny squares of the land surface that, when put together, make up the image. The characteristics include visible and near-infrared reflected light, land elevation, slope, aspect, soil moisture, percent canopy density, percent impervious surface, and others. With these characteristics stored in a spatial database, users can specify the particular map they need.

The NLCD data are used by Consortium partners for many environmental, land management, and modeling applications, such as evaluating patterns of landscape change and mitigation of future impacts to ecosystems. In addition, NLCD data are an invaluable national resource used in a large number of applications ranging from commercial sector (locating cell-phone towers), scientific activities (quantifying potential pollution removal), education (landscape visualization), and government organizations (emergency response).

The NLCD website delivers a standard map showing all 21 datasets. Alternatively, users can specify which data sets and data set parameters they want. The LANDFIRE Program uses this feature to add tree species and canopy structure information to produce fire fuel maps.

Innovation/Highlight

"Database" land use maps allow users to specify which combination of 21 land characteristics they want to identify and acquire.

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