

Providing critical geospatial information through enterprise systems – a US Forest Service experience

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Forest Service Enterprise Raster Data Management

General Business Requirements

1. Visualize large volumes of imagery data from centralized location
 - Internal only (Forest Service and BLM)
2. Need to serve authoritative data to public
 - Standardized data
 - Non-standard data
3. Need centralized access capabilities for large volumes of raster data (and Lidar data)
 - Need access for basic analysis
 - Ideally would allow for data mining and modeling of data

Forest Service Enterprise Raster Data Management

General Business Requirements

1. Visualize large volumes of imagery data from centralized location
 - Image Services ArcServer 10.2
2. Need to serve authoritative data to public
 - Standardized data Raster Data Warehouse
 - Non-standard data ArcGIS Online
3. Need centralized access capabilities for large volumes of raster data (and Lidar data)
 - Charter to determine best solution starting this summer

Image Services ArcServer 10.2

Statistics (last 30 days) – 9.x services

- Average daily connections: 10416
- Number of active services: 438
- Average daily users: 695
- Number of unique users: 4111 (8319 in last year)
- Percentage use – based on connection to services
 - NAIP 46%
 - Maps (softcopy, FVM, etc) 38%
 - Resource photography/other imagery 11%
 - Terrain 5%

Image Services ArcServer 10.2

NAIP Image Services

CONUS for each year of NAIP 2007- 2013



2007



2008



2009



2010



2011



2012



2013

FS Image Server ArcServer 10.2

NAIP Image Services

Resource photography – individual services by project



2009-2102

FS Image Server ArcServer 10.2

Other Raster Services



eTOPO Viewing scale dependent
USGS topo maps at 1:24000,
1:100,000 and 1:250,000 scales



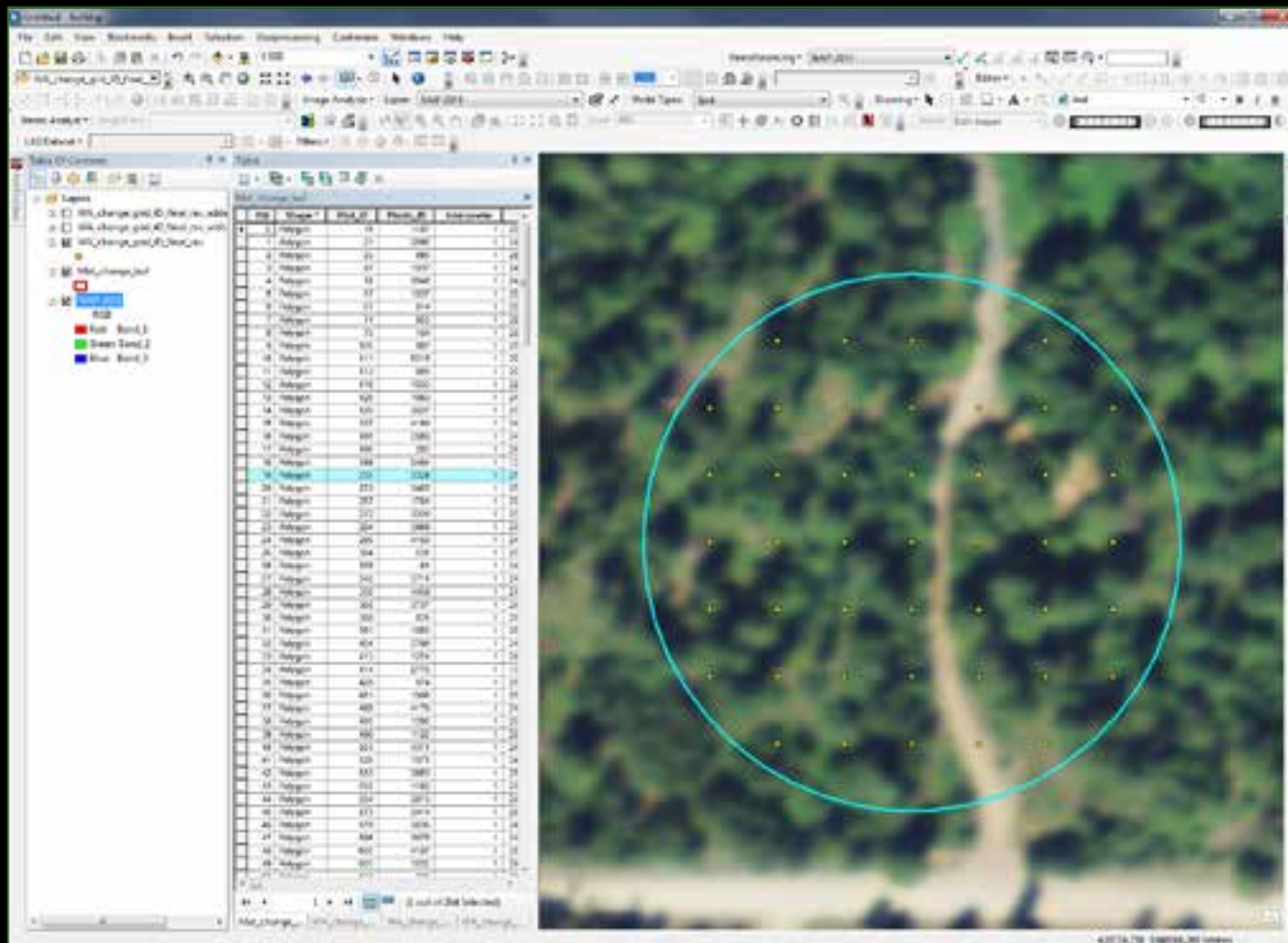
Forest Visitor Maps



Primary Base Series - up-to-date
1:24000 topo maps administered by USFS

FS Image Services ArcServer 10.2

Uses of NAIP and Resource Imagery

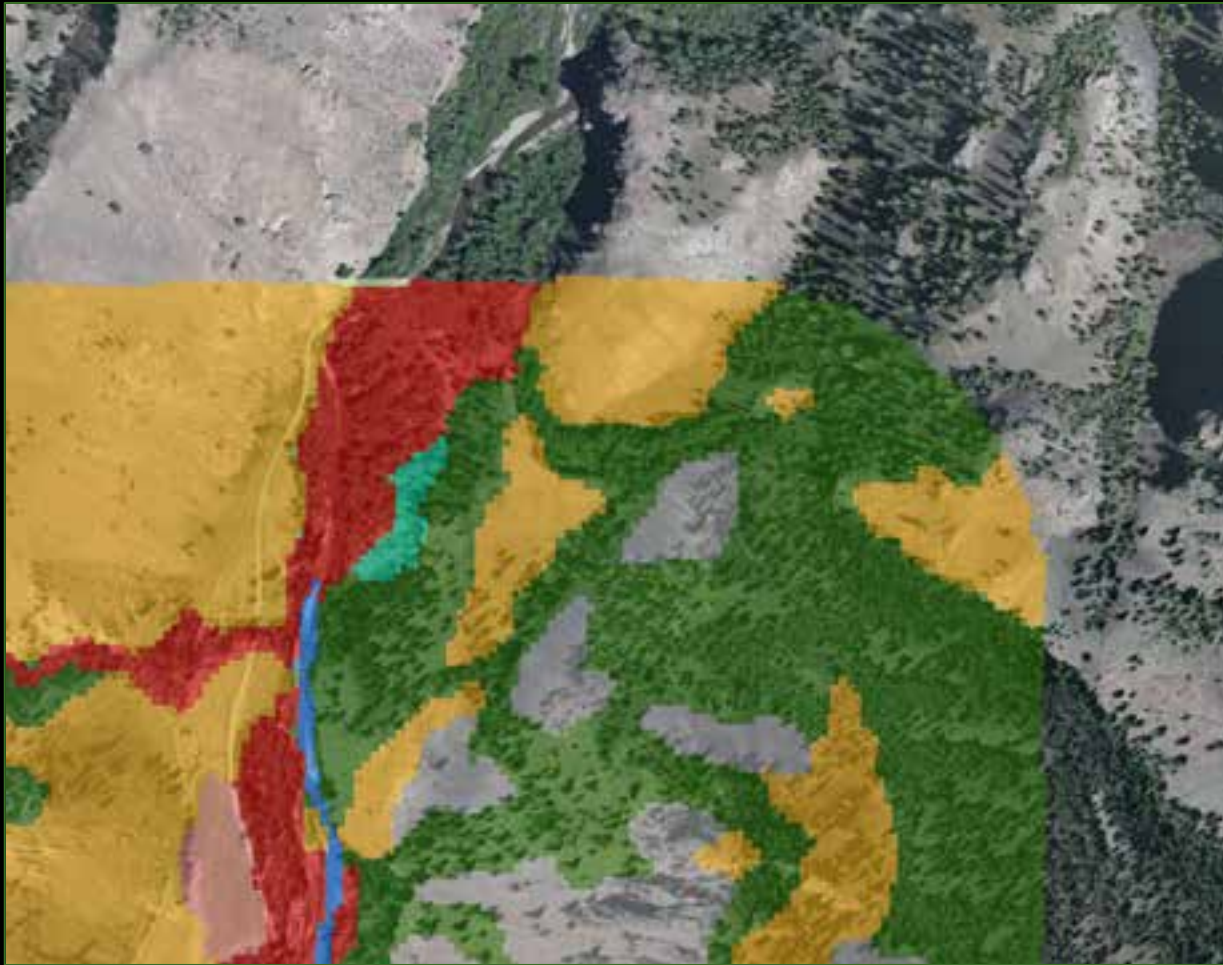


Inventory sampling assessment



FS Image Services ArcServer 10.2

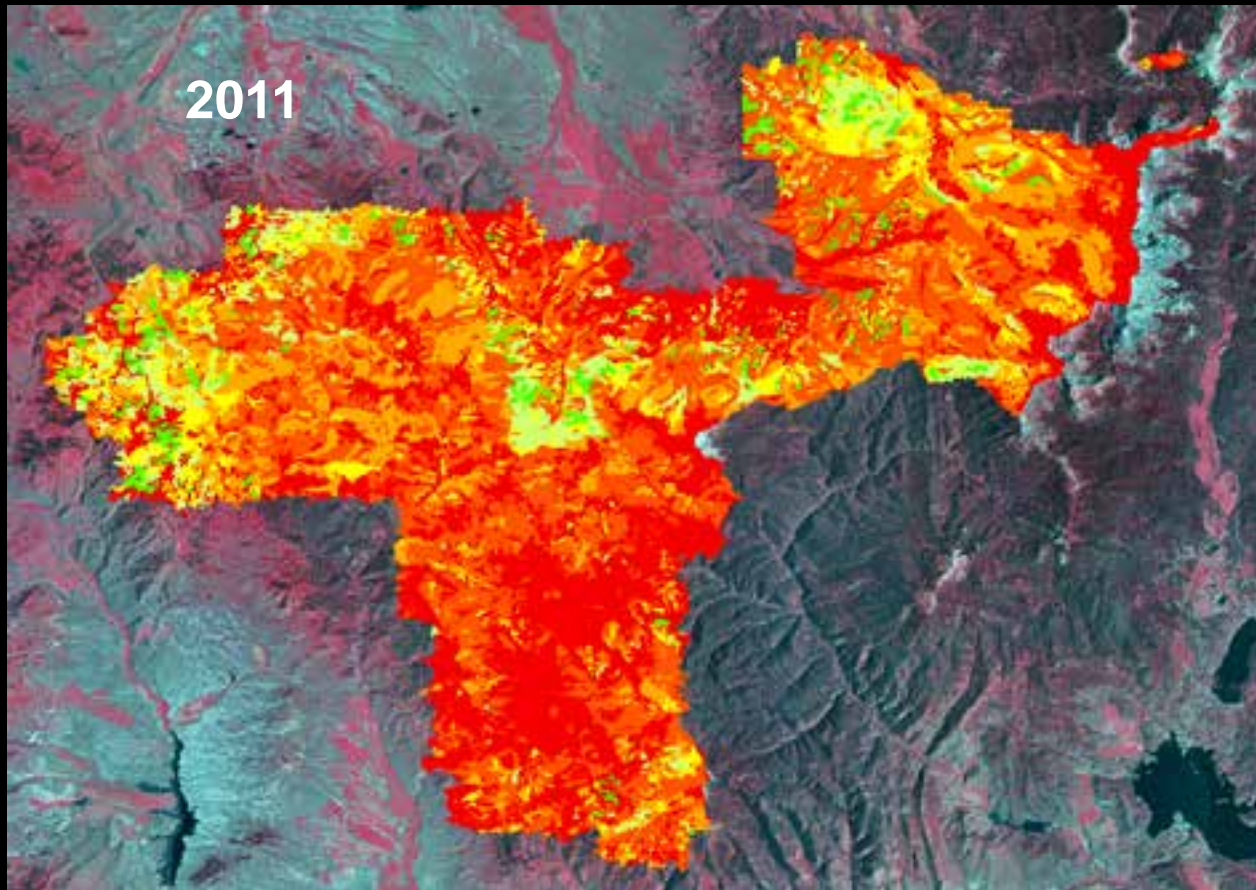
Uses of NAIP and Resource Imagery



Verification of data produced from mapping projects

FS Image Services ArcServer 10.2

Uses of NAIP and Resource Imagery



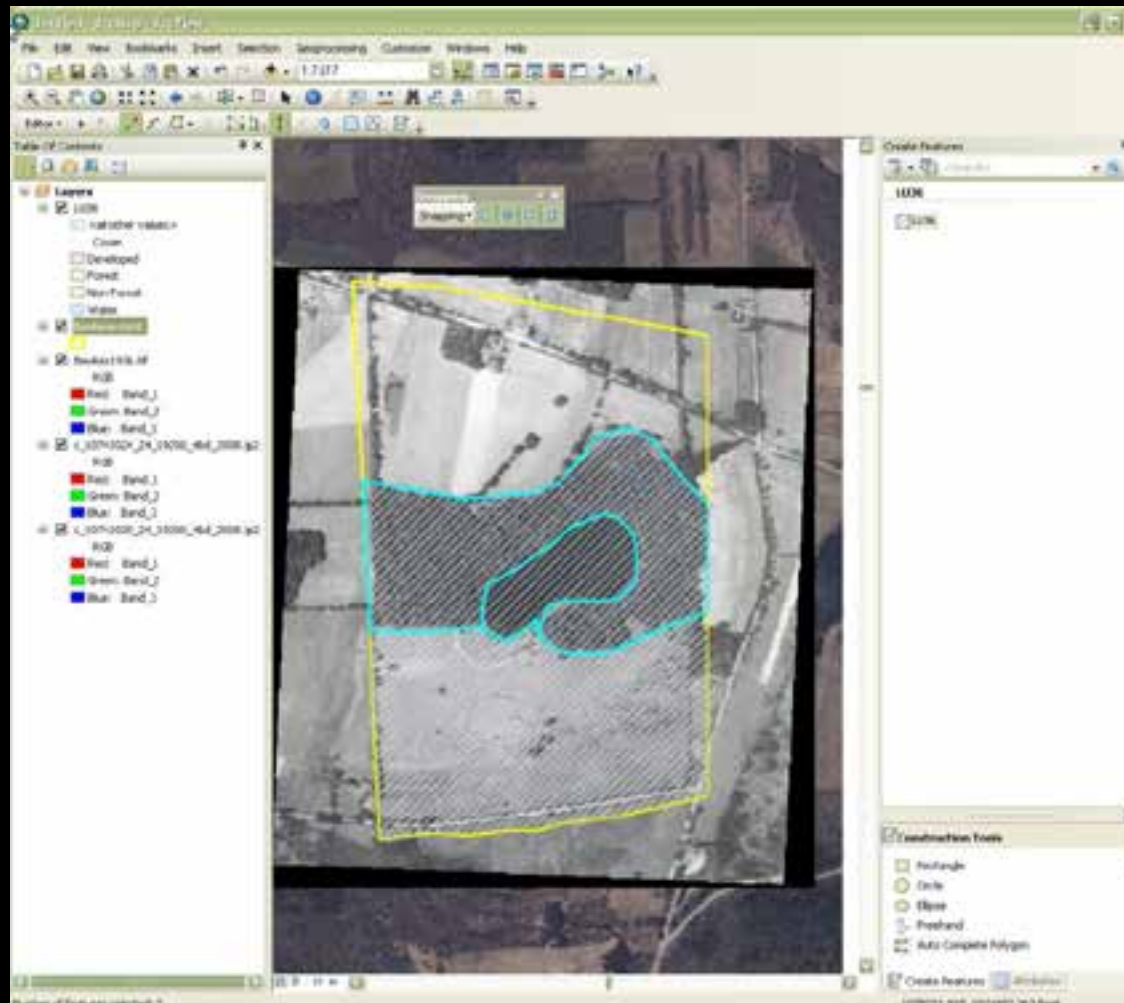
Canopy cover class



Reference Data canopy cover maps (example: Medicine Bow Route NF)

FS Image Services ArcServer 10.2

Uses of NAIP and Resource Imagery



Heads up digitizing to update or delineate historical features

FS Image Services ArcServer 10.2

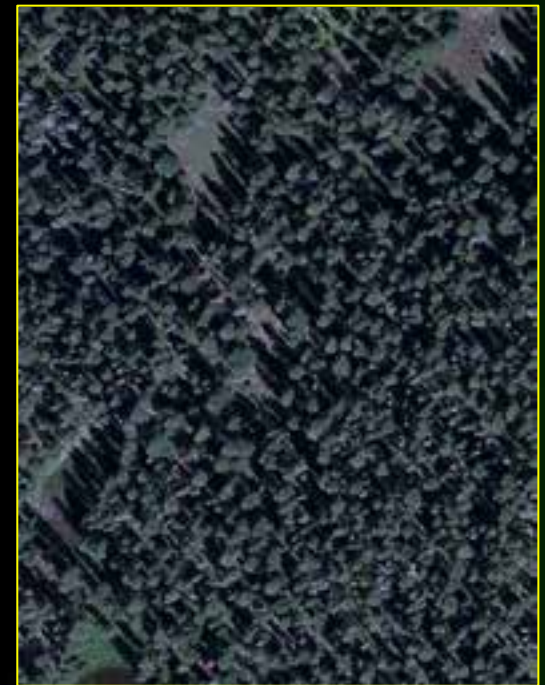
Esri Base Maps - FS image services



NAIP 2013 CIR



NAIP 2013
Natural Color



Esri Base Imagery

Raster Data Warehouse

... As part of the Enterprise Data Warehouse (EDW) to serve this need:

1. To provide public access to authoritative Forest Service produced raster datasets

- § Governance process in place from EDW


- § CONUS level datasets were to be served first


- § Raster Data Warehouse is still not ready to go ...

Some more immediate needs will be met this year

Forest Inventory and Analysis Atlas project

Working with Esri to create web-based story maps





ALASKA
4 major regional fire regimes

THE 2000 NATIONAL FIRE REGIME DATA

■ Class 1
■ Class 2
■ Class 3
■ Class 4
■ No Data

Wildland Fire Management

Over the past century, understanding how fire shaped forests of the United States and how it plays a role in ecosystem and evolution are more deliberate environmental efforts but resulted in a more complex approach to fire management. Today's fire management strategy includes suppression of some fires, use of carefully controlled fires where beneficial, and introduction of fire to achieve local management objectives based on the type and condition of the ecosystem.

Early in the 20th century, fire suppression became the management focus regarding wildland fire in the United States. In 1935, the Chief of the Forest Service established the goal of suppressing each fire by 10 a.m. the day after detection. For the many decades that policy was in effect and fully implemented in the forest. Consequently, there has been an increase in fire size and severity and a decline in ecosystem health, particularly in fire-dependent ecosystems.

Today, fire management has even complex goals that range from suppressing fires. Fire managers they choose to suppress fires that threaten the safety of people or structures, or potentially harm the ecosystem. Other

actively occurring fires are allowed to burn because they are in a natural and ecological setting that will benefit from a fire. Managers may also start fires designed to achieve objectives to manage ecosystems and to help restore fires to a more natural fire regime.

Fire regime is an ecosystem characteristic defined by the combination of fire frequency, predictability, intensity, seasonality, and extent that are characteristic of fire in an ecosystem. For example, in some areas,

Recent surface fires that occur every 5 to 20 years remove small trees and wood from the forest floor, preventing the buildup of fuels that could feed a more intense wildfire. In other places, large forest areas are lost naturally to intense crown fires every 100 to 100 years. Fuel loads combined with drought, has changed the fire regime and increased the intensity and severity of wildland fires.

There are many ecosystems and fire regimes associated with grassland fires, surface fires, and crown fires in the United States. Much of the time, the effects of wildland fires are beneficial to an ecosystem and are part of the natural cycle of forest regeneration. Following wildfire in these ecosystems, wildlife enjoy the fresh biomass as plants and shrubs regrow from the forest floor, seedbank plants flourish, nutrients are released into soils, and a new generation of trees begin to grow.



UNITED STATES
4 major regional fire regimes

THE 2000 NATIONAL FIRE REGIME DATA

■ Class 1
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WILDFIRE AND ECOSYSTEM A growing body of research shows that a variety of roles of fire suppression and control that regularly impacted many ecosystems. These patterns indicate the need for ecosystem fire to help fire managers interpret landscape condition and determine how to manage the regime. The map shows fire regime groups, which were developed by the LANDFIRE project (www.landfire.gov) and characterize natural fire regimes after landscape based on interactions between vegetation dynamics, the extent, the effects, and spatial pattern.

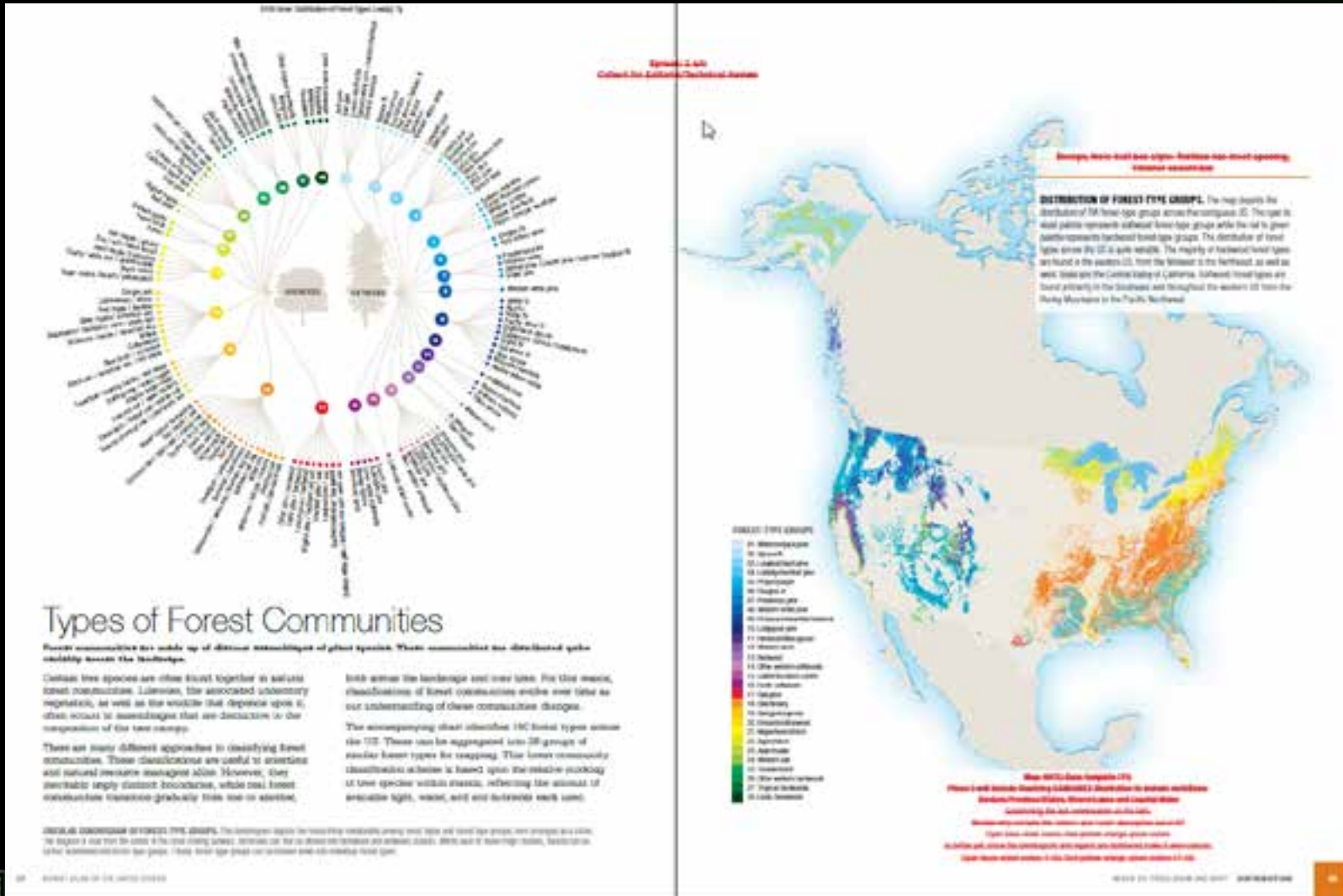
THE 2000 NATIONAL FIRE REGIME DATA - The 2000 National Fire Regime Data is a map of the United States and its territories. The map shows the fire regime for the United States. The map is based on the LANDFIRE project (www.landfire.gov) and characterizes natural fire regimes after landscape based on interactions between vegetation dynamics, the extent, the effects, and spatial pattern.

LANDFIRE PROJECT - The LANDFIRE project is a multi-agency effort to improve fire management and planning. The project is a partnership between the U.S. Department of the Interior, U.S. Department of Agriculture, and U.S. Environmental Protection Agency. The project is a multi-agency effort to improve fire management and planning.

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Forest Inventory and Analysis Atlas project

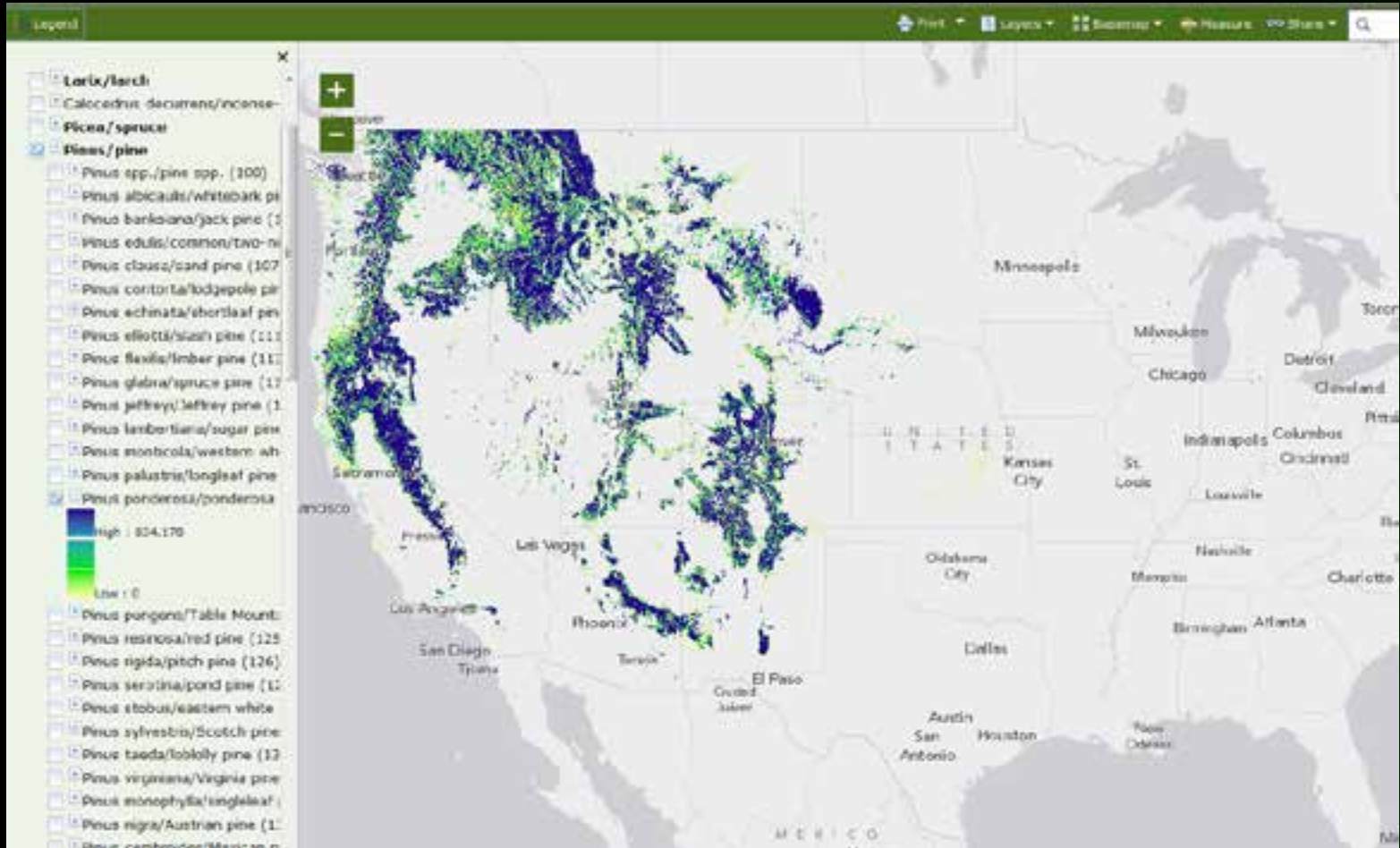
Working with Esri to create web-based story maps



Forest Inventory and Analysis Atlas project

Working with Esri to create web-based story maps

Feature a wide variety of assemblages in the United States



Forest Inventory and Analysis Atlas project

Other services to be produced by Esri for Atlas Project

1. Web based stories for:

- § Types of Forest Communities
- § Wildland Fire Management
- § **America's Private Forest Owners**

2. User data ingest for value adding

- Ability to do analysis and create new content

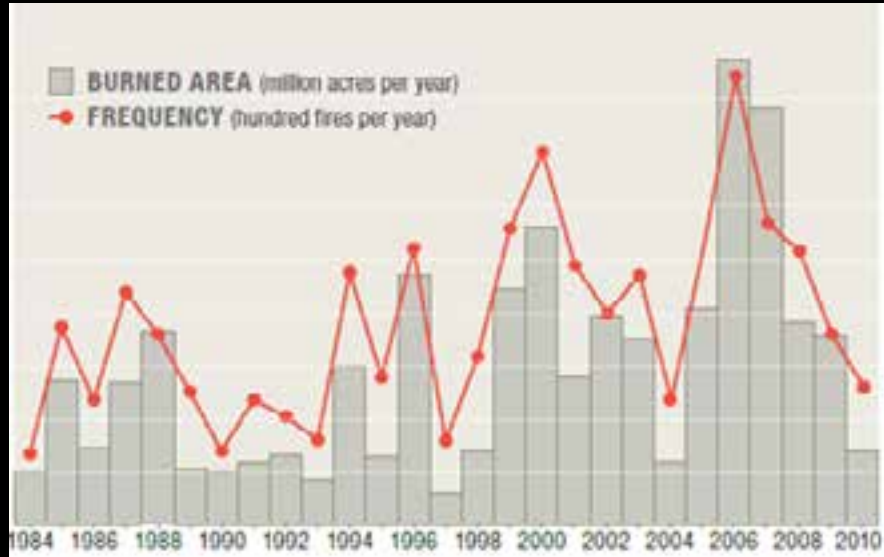
3. User result posting and source linkages

- Ability to publish 'value added' products to portal

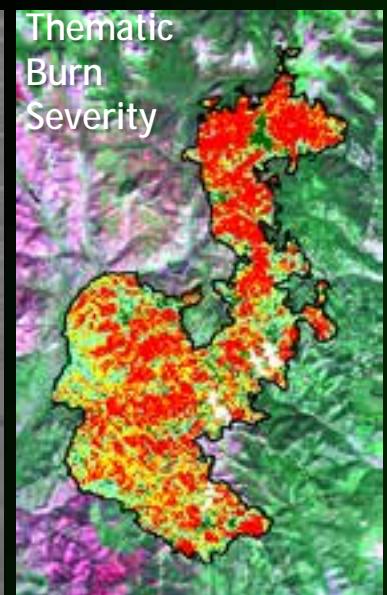
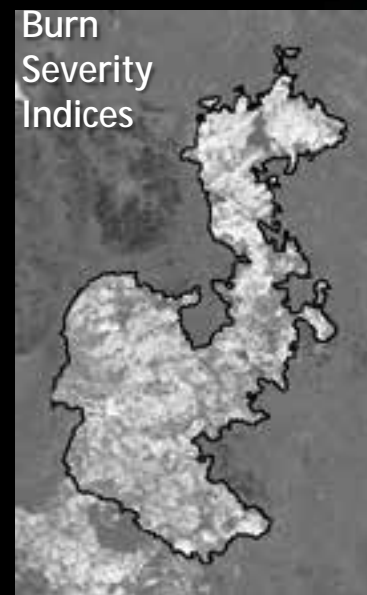
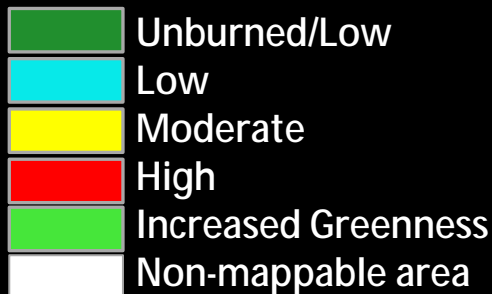
Other CONUS raster data for public Access

Monitoring Trends in Burn Severity

<http://www.forestrygis.com/BurnSeverity/>



class thematic burn severity data



ArcGIS Online Implementation for FS Non-standard data

HOME GALLERY MAP GROUPS Sign In

US FOREST SERVICE

100 Years of Caring for the *land* and serving *people*

U.S. Forest Service

- Administrative Boundaries Map
- Administrative Forest Boundaries
- Administrative Ranger Districts
- Administrative Region Boundaries

Welcome to the U.S. Forest Service on ArcGIS Online

The U.S. Forest Service is using ArcGIS Online to share maps, data, and applications for use by other federal agencies as well as the public. Users can find and use map services published by the Agency, together with their own data, to create web maps and mashups.

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QUESTIONS?
