

Vegetation Inventory and Mapping Lessons Learned



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DOI-RSWG-Data Access NPS Overview – 13 March 2012

NPS I&M Program

- Base Cartographic
- Soils
- Geology
- *Vegetation*
- Bibliographies
- NPS Species - Species lists
- Air quality
- Water quality



Standards

- NPS management policies, standards & guidelines
- Federal Geographic Data Committee standards
 - metadata, transfer, classification etc.
- Nationally consistent, hierarchical, classification scheme
- National Map Accuracy Standards
- Thematic accuracy >80% per class
- Scale of 1:24,000
- Minimum mapping unit of 0.5 hectare



Products from the Program

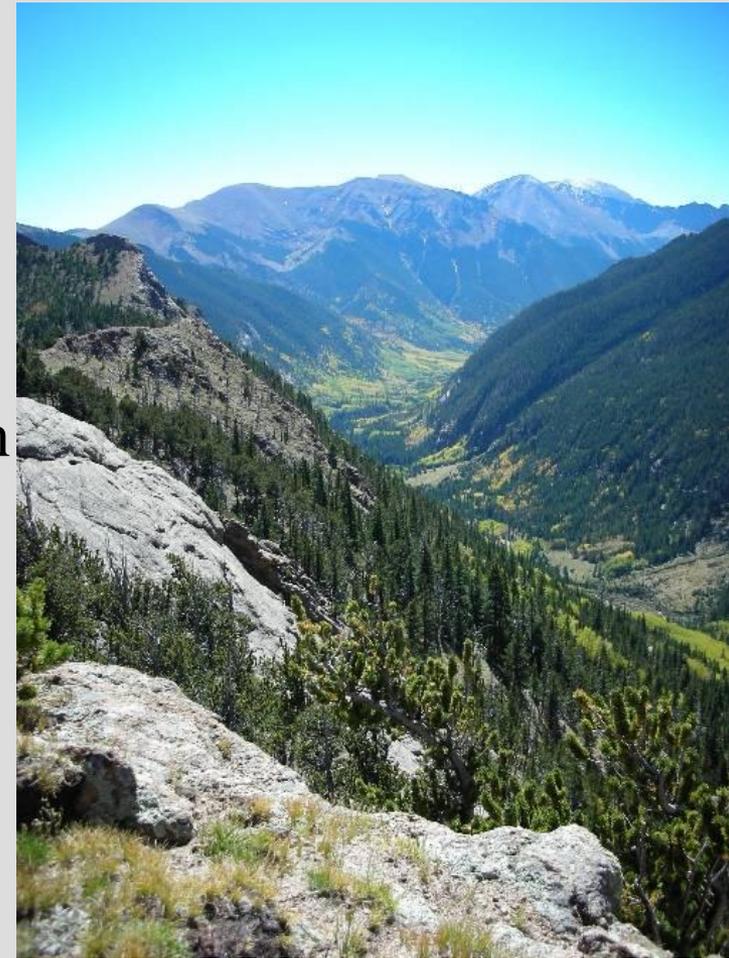
- Aerial photography/ imagery (hardcopy / digital, some new DOQQs)
- Field data (hardcopy and database)
- Classification report (Description and Key)
- Photo interp report (Description and Key)
- Accuracy report
- Vegetation map data (digital coverage)
- All appropriate metadata
- All the guidance can be viewed online at:

<http://science.nature.nps.gov/im/inventory/veg/Guidance.cfm>



Major 12-Steps for the Park

- Data review, study plan
- Scoping / kick off meeting
- Data acquisition
- Field sampling
- Classification characterization
- Photo/ image interpretation, mapping and automation
- Accuracy assessment
- Final product review
- Final product delivery, incl. website posting



FGDC National Vegetation Classification System (2008)

UPPER LEVELS (physiognomy plays a dominant role)

- **L1. Formation Class** Forest and Woodland
- **L2. Formation SubClass** Temperate Forest
- **L3. Formation –** Cool Temperate Forest

MIDDLE LEVELS (physiognomy and floristics play a significant role)

- **L4. Division** Eastern North America Cool Temperate Forest
- **L5. MacroGroup** Central Oak, Hardwood, and Pine MacroGroup
- **L6. Group** Chinquapin Oak – Ash – Red Cedar Alkaline Forest Group

LOWER LEVELS (floristics plays a dominant role)

- **L7. Alliance -** Chinquapin Oak - (Sugar Maple) Forest Alliance
- **L8. Association -** Chinquapin Oak - (White Oak, Northern Red Oak) - Bitternut Hickory / Smooth Blackhaw Forest





Sources: All with acceptable results; no required imagery (Typical 1:10-12K; NAIP-CIR)

Lessons Learned:

- Deciduous forest vegetation types need CIR and max fall color (APPA) ; 1ft resolution (BUFF)
- Aerial collects OR tasking are used to obtain needed resolution; open to requirements management tools like USGS.



Taxonomy: Scaling of Fine Level Units

(Alliances, Associations)

Lessons Learned:

- Consistency in scaling of vegetation classification models needs more attention.
- Within NPS VI, diversity metrics are being used to guide scaling appropriate to management needs.



Collections, and Upcoming Imagery Needs: e.g. BICY

Lesson Learned:

8.3 m acres underway with existing datasets, with useful detail. (NAIP, etc.) 12 m acres to complete in 19 remaining parks ~2018

New Collects:

BICY mission requested to support South Florida / Carib Network ¼ ha MMU efforts with South Florida Water District / COE mapping; Appalachian Trail maximum color collect fall 2-week window 2011



Climate Support, LIDAR support: e.g. Crater Lake

Climate Support:

Ecologically important variables supported by Alliance level detail for downscaling carbon

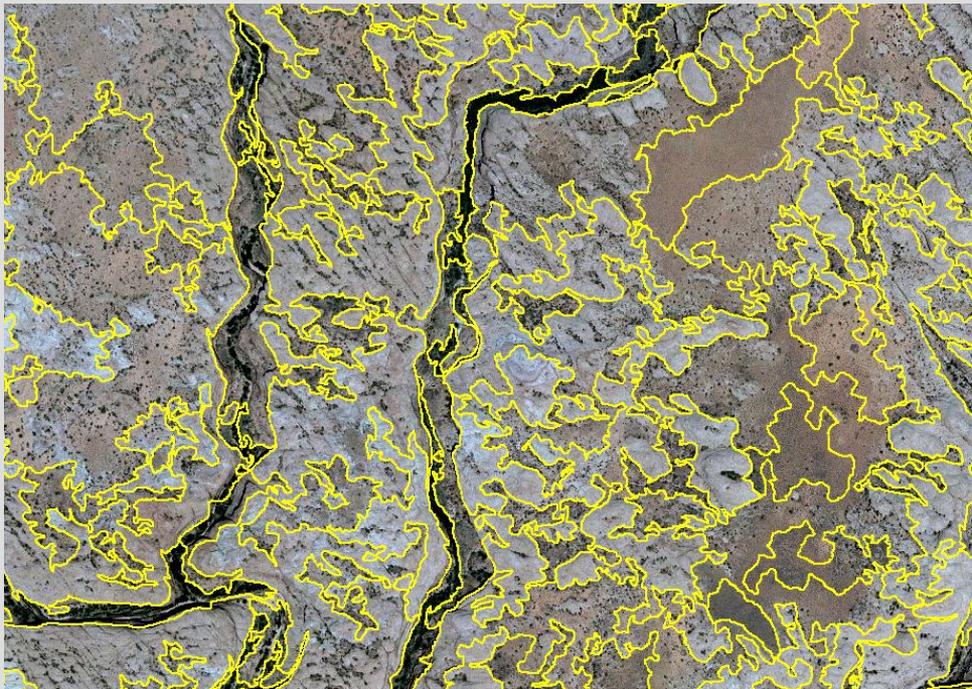
Lidar Collect:

Crater Lake NE corner to support park use and DEM improvement along with Cascade Volcano Observatory datasets for volcano monitoring



Mapping: Tests of Detail

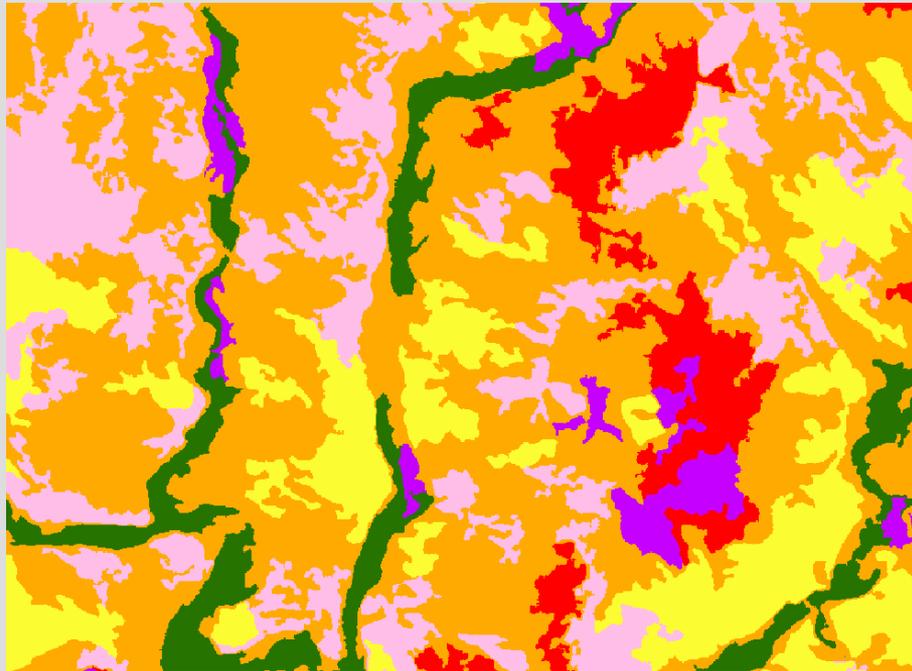
- “Alliance / Association” linework
 - “Rock Park” Arches NP Segmentation Level 5



- Import into Erdas Imagine to reduce polygons to minimum mapping units (0.5 hectares) and smooth “rasterized” edges in ArcGIS. Level 5 less detailed than 1.

Mapping: Tests of Detail

- “Alliance / Association” linework
 - “Rock Park” Arches NP Segmentation

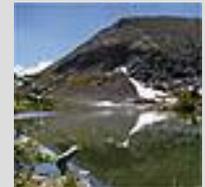


“Vegamatic” (veg formations)

Level 1 segmentation shown here was input to Erdas for ecological model building

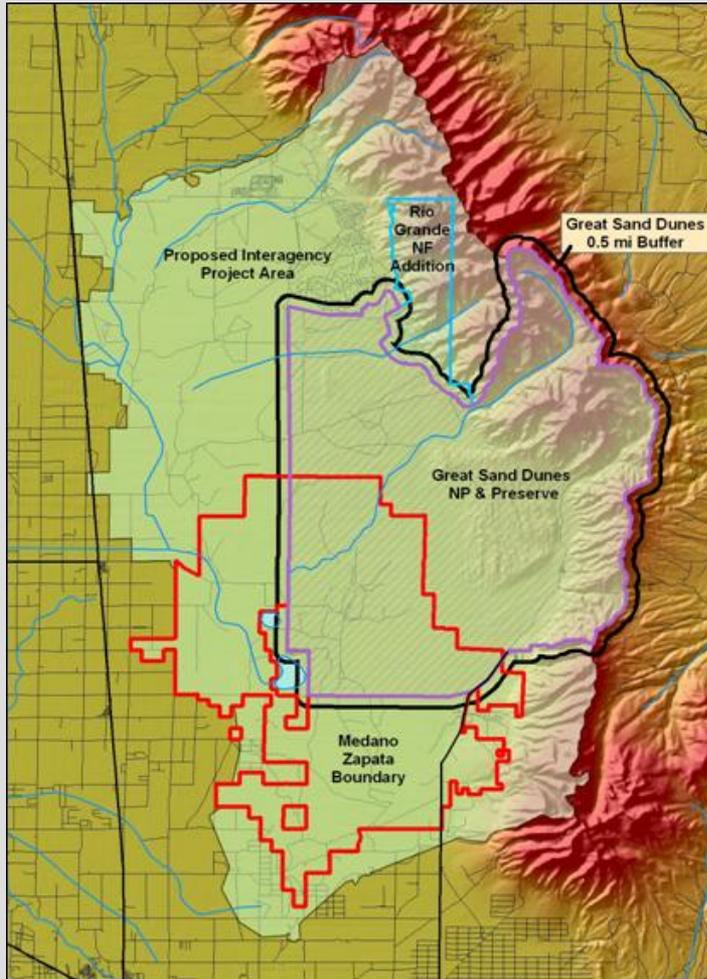
Mapping Case Study Great Sand Dunes

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Mike Britten, Billy Schweiger / ROMN / NatureServe /
TNC, US Fish and Wildlife Service, USGS, GRSA Staff,
Colo Natural Heritage Program & Bureau of Reclamation



Map Dataset Roll-out Meeting with Partners
Great Sand Dunes HQ Mosca, CO
March 1-3, 2010

Great Sand Dunes National Park



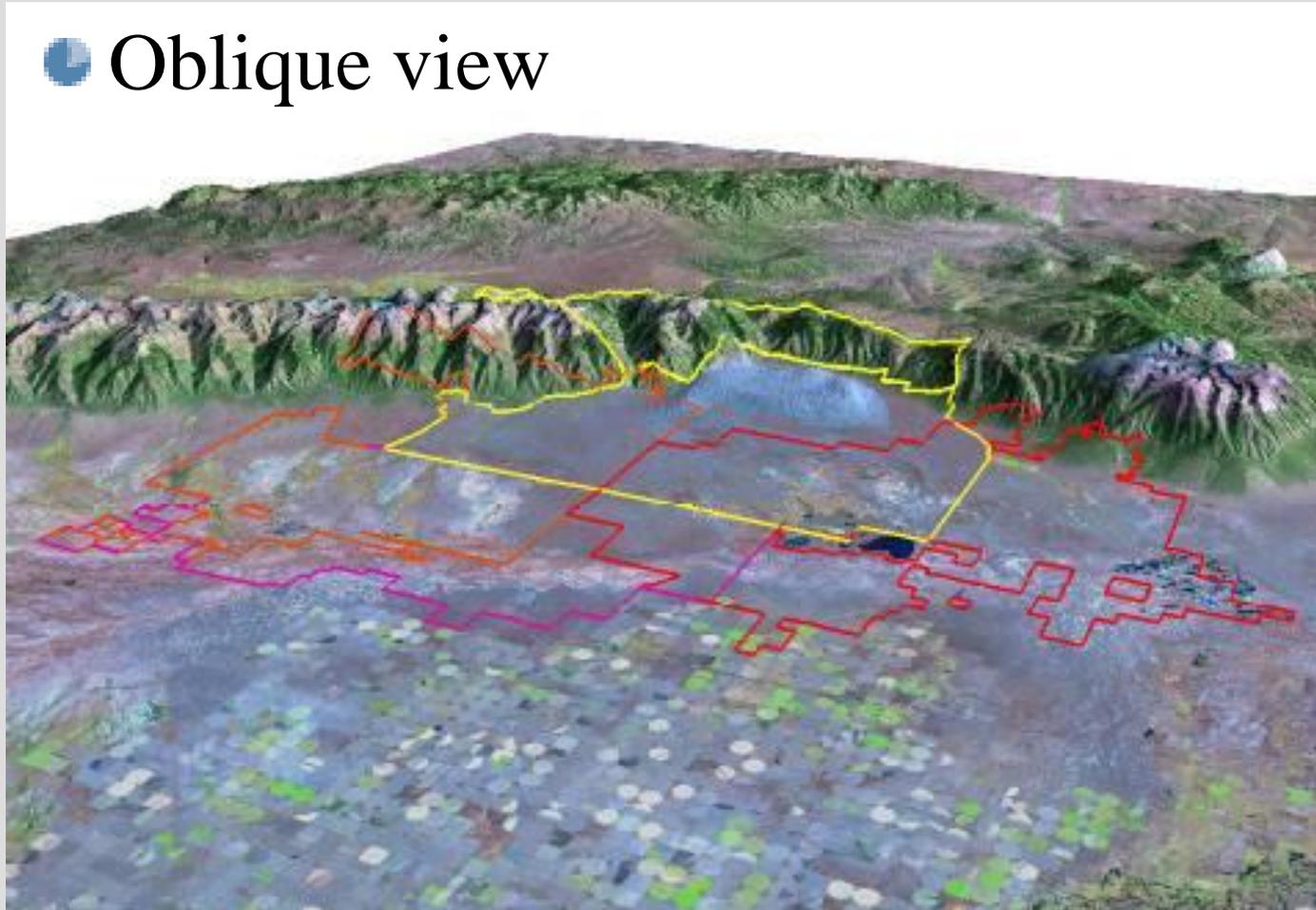
- The Great Sand Dunes National Park sits in a mixed ownership matrix of Federal State and private land in Southwest Colorado.
- US Forest Service and Bureau of Land Management Lands, a US Fish and Wildlife Refuge, and the National Park share a common fire planning unit.



Great Sand Dunes National Park



● Oblique view

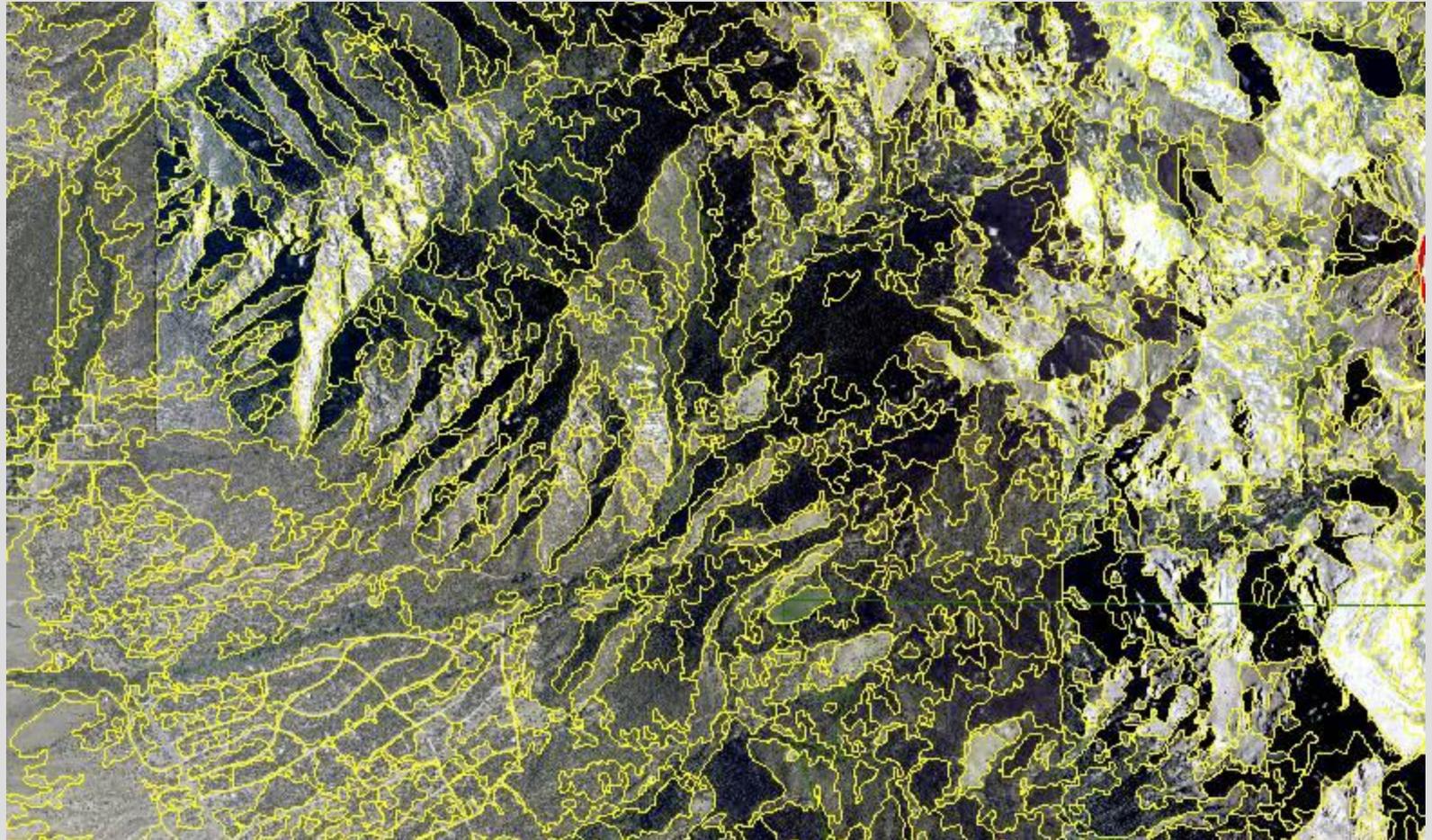


Great Sand Dunes National Park

- The US Fish and Wildlife Service collected CIR with their FWS developed 4-band sensor over the lower elevation areas. They did not image the entire project area due to the ceiling limit of 10K for the aircraft.
- Orthorectification was accomplished using ERDAS Imagine. Although initially promising, the color banding was a challenge.
- Segmentation outputs include the dunefield, wash, and woodland transition zone



Willow Creek – too detailed



Great Sand Dunes



National Park Service
U.S. Department of the Interior

NPS Vegetation Inventory Program



Tool Evaluation Conclusions

- “Object Oriented” technologies
- No specific object oriented software or technique is superior
- Use of the tools and how they can contribute shows limited promise as an alternate to the photo-interpretation method.
- When to use Object-oriented, when to go back to GIS, and when to use photo-interpretation depends on project complexity and size
- A combination of ERDAS ecological or CART modeling, object oriented segmentation and classic aerial photo interpretation can be used to characterize the landscape.



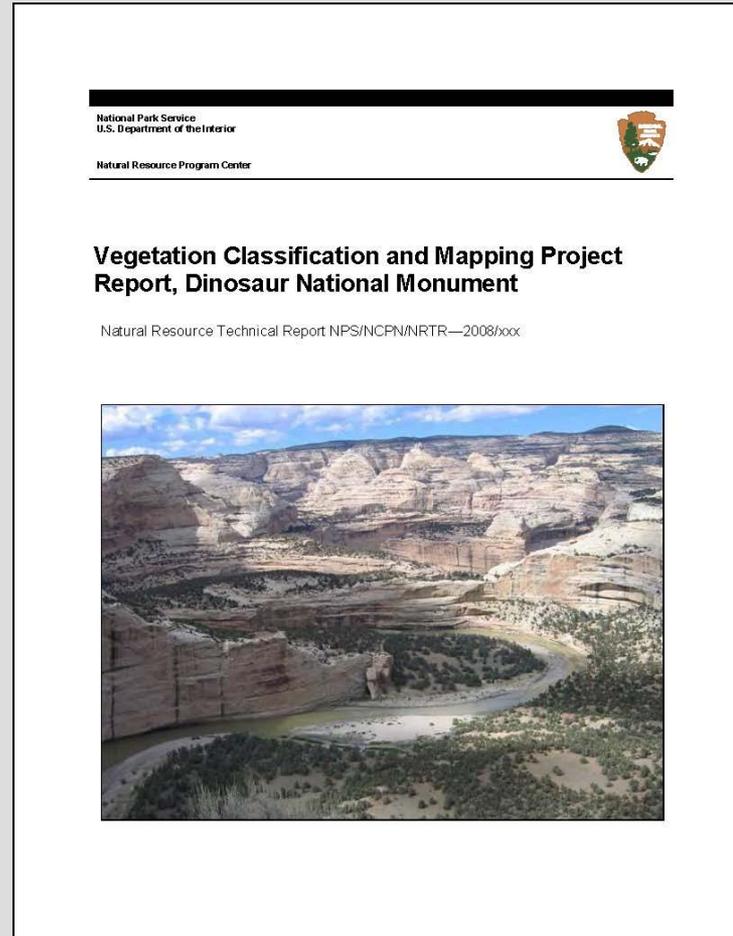


Accuracy Assessments

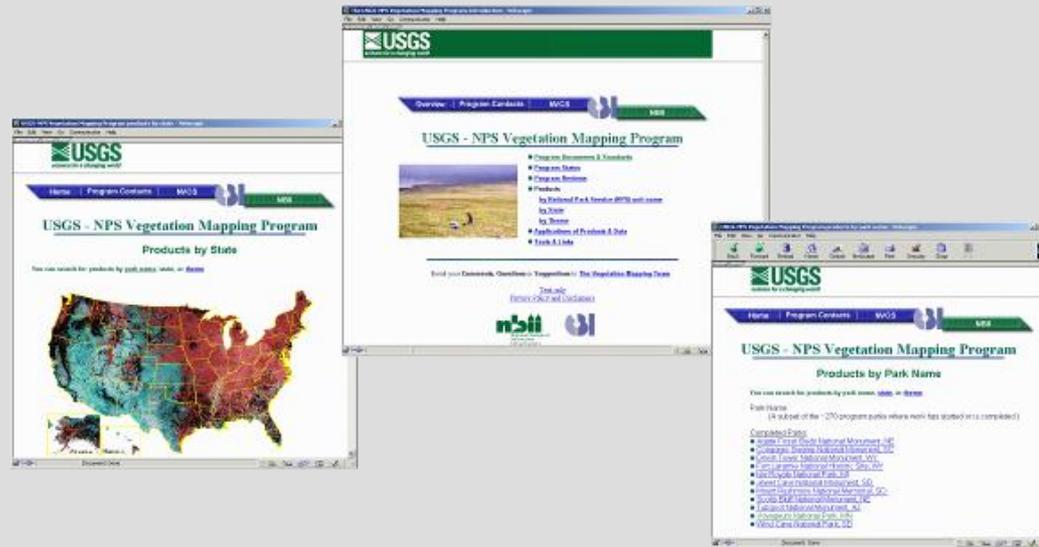
New Approaches:

- Set realistic accuracy targets for each level.**
- Report accuracy for various hierarchy levels, rather than “fuzzy”**
- Use verification to correct most errors**
- Collect basic data only (~ 10 minutes at a site)**
- Use but reduce “corrections” and analysis after the fact.**

Reports – NPS-NRR Series



Data Availability

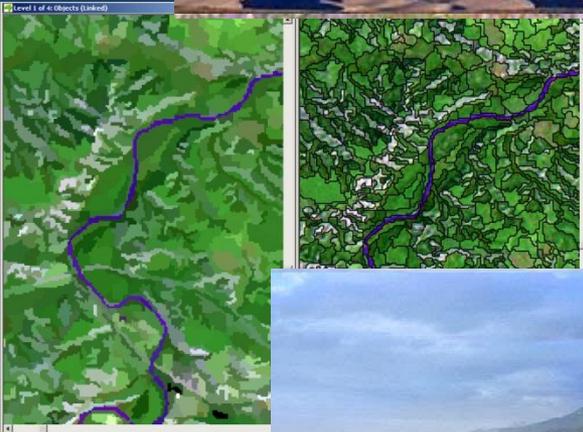


- All products are made available via a public internet website:
<http://biology.usgs.gov/npsveg/>
- Final Product Instructions:
http://science.nature.nps.gov/im/inventory/veg/docs/Product_Specifications.pdf
- USGS and NPS Data Store serving of datasets
- Archiving of datasets; Data Store & EROS Data Center

National Park / Environs Collaboration



- Consider areas of interest for neighboring public lands
- Project management and multi-park / agency efficiencies
- Develop fuel model polygons from NVCS vegetation polygons / photos / attributes
- AK different scale, based on satellite data
- Gulf Coast – 9 park effort



More Information

- NPS I&M Website: <http://science.nature.nps.gov/im/inventory/veg/index.cfm>
- USGS-NPS Website: <http://biology.usgs.gov/npsveg>

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Great Sand Dunes

Thanks!



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Thanks

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