Forest Plan Monitoring

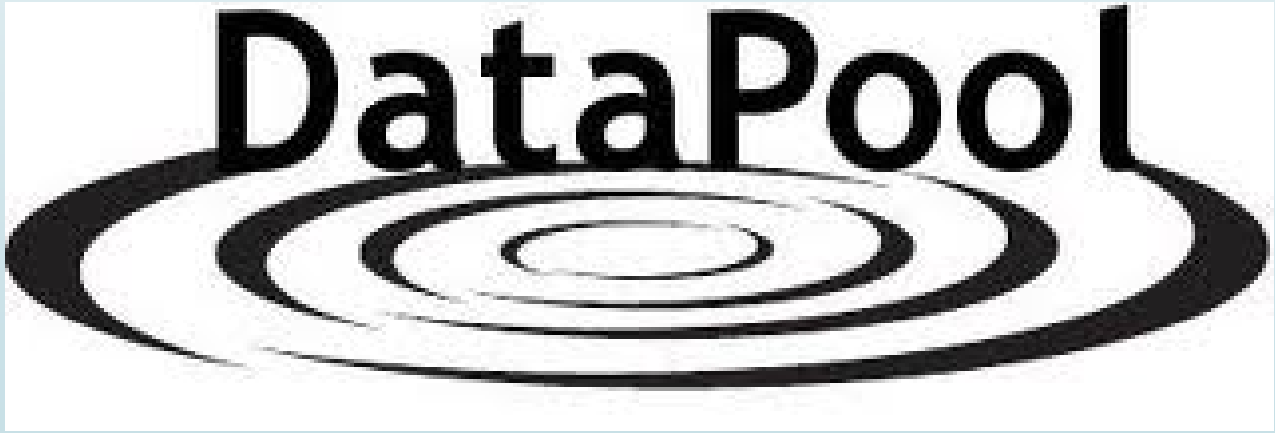
The Broader Scale Monitoring Strategy

Genesis of the BSMS R3/R2 Pilot

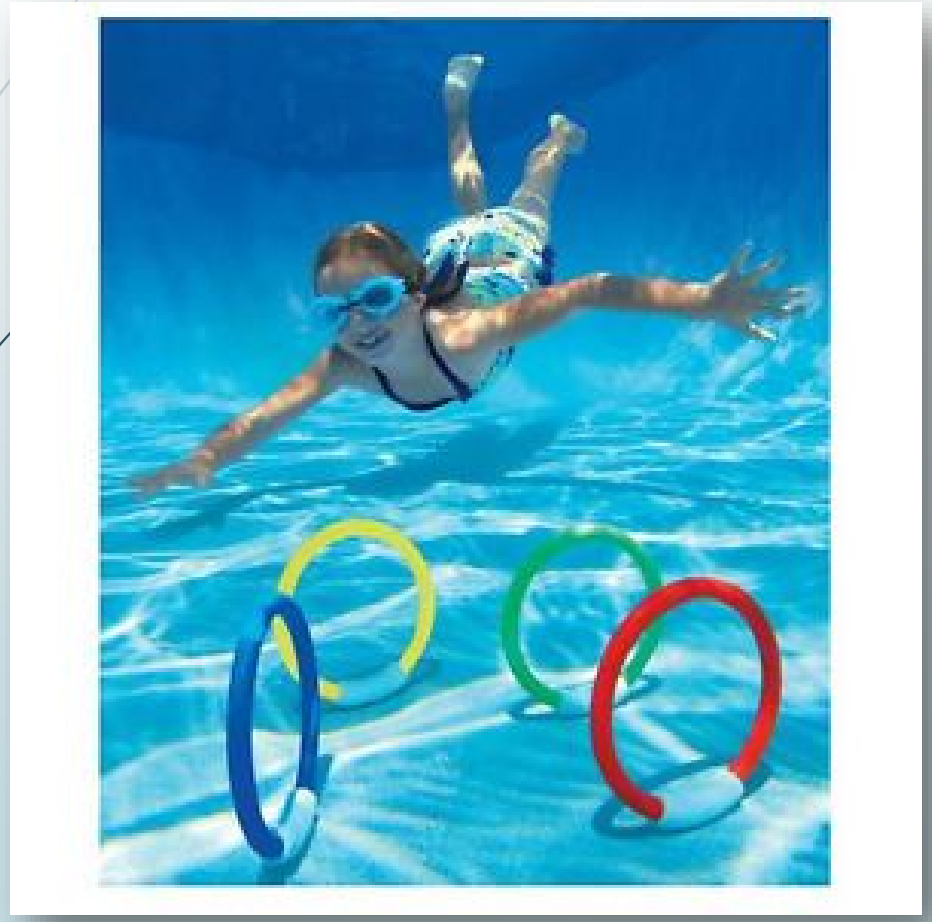
IMA Strategy

Measure Once Use Many Times

Create a pool of nationally consistent, scientifically sound, statistically robust, data that can be used to answer many questions.

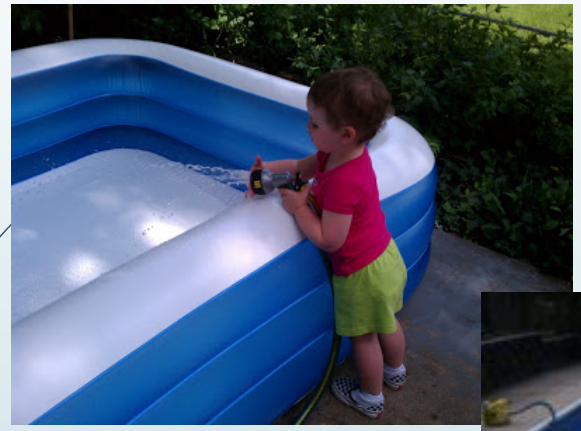


IMA Vision



Land managers can dive into the IMA data pool to find the natural resource
information they need
to collaboratively manage forests and rangelands.

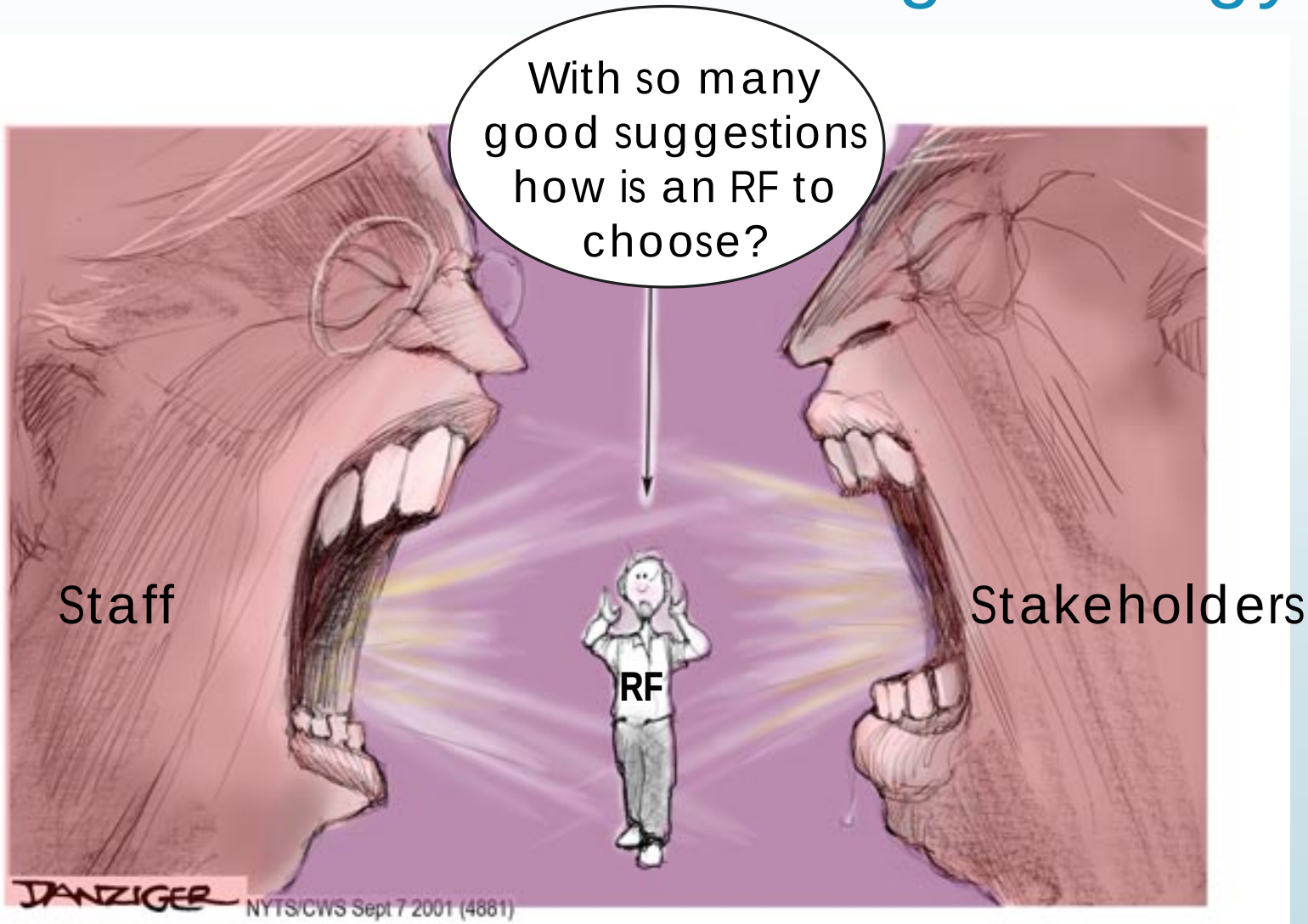
What kind of data pool and how do we fill it?



Broader-Scale Monitoring Strategy
Why a Pilot?

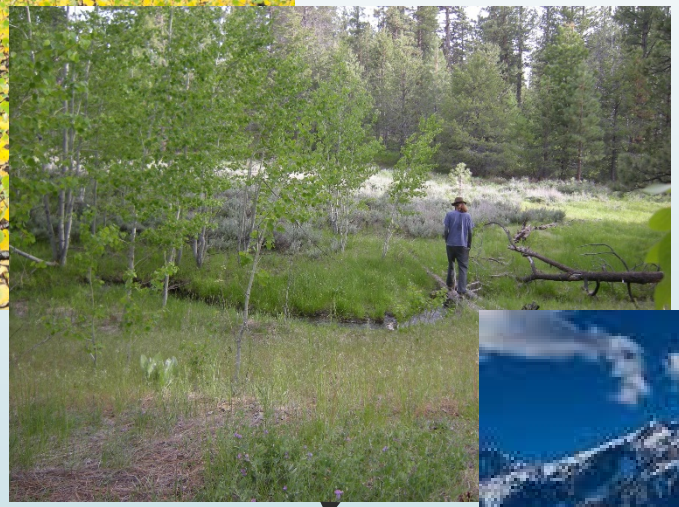
What do we get from a Broader-Scale Monitoring Strategy?

The Challenge of Establishing a Broader-Scale Monitoring Strategy?



Three Steps for Monitoring Aspen Restoration

After conifer removal does aspen sprout?



Does aspen survive?

How well is aspen distributed across the landscape?

Questions ???

Broad Scale Monitoring Workshop Activities on National Forest Systems Lands: *New Mexico*

April 20, 2016

Broad scale Monitoring

- Assessments where key elements have been re-evaluated to determine a change or demonstrate a trend.
- Inventory where repeat measurements yield changed conditions and trends.
- Datasets that are designed and tooled for the broad scale (not fine or mid-scale data).

National Hierarchical Framework of Ecological Units

Subregional Scale:

Subregions are characterized by combinations of climate, geomorphic process, topography, and stratigraphy that influence moisture availability and exposure to radiant solar energy, which in turn directly control hydrologic function, soil-forming processes, and potential natural community distributions. Sections and Subsections are the two ecological units mapped at this scale.

Table 1. National hierarchy of ecological units

Planning and analysis scale	*Ecological Units*	*Purpose, objectives, and general use*
Ecoregion Global Continental Regional	Domain Division Province	Broad applicability for modeling and sampling. Strategic planning and assessment. International planning.
Subregion	Section Subsection	Strategic, multiforest, statewide, and multiagency analysis and assessment.
Landscape	Landtype association	Forest or areawide planning, and watershed analysis.
Land unit	Landtype Landtype phase	Project and management area planning and analysis.
Hierarchy can be expanded by user to smaller geographical areas and more detailed ecological units if needed.		Very detailed project planning.

Forest Inventory and Analysis (FIA)

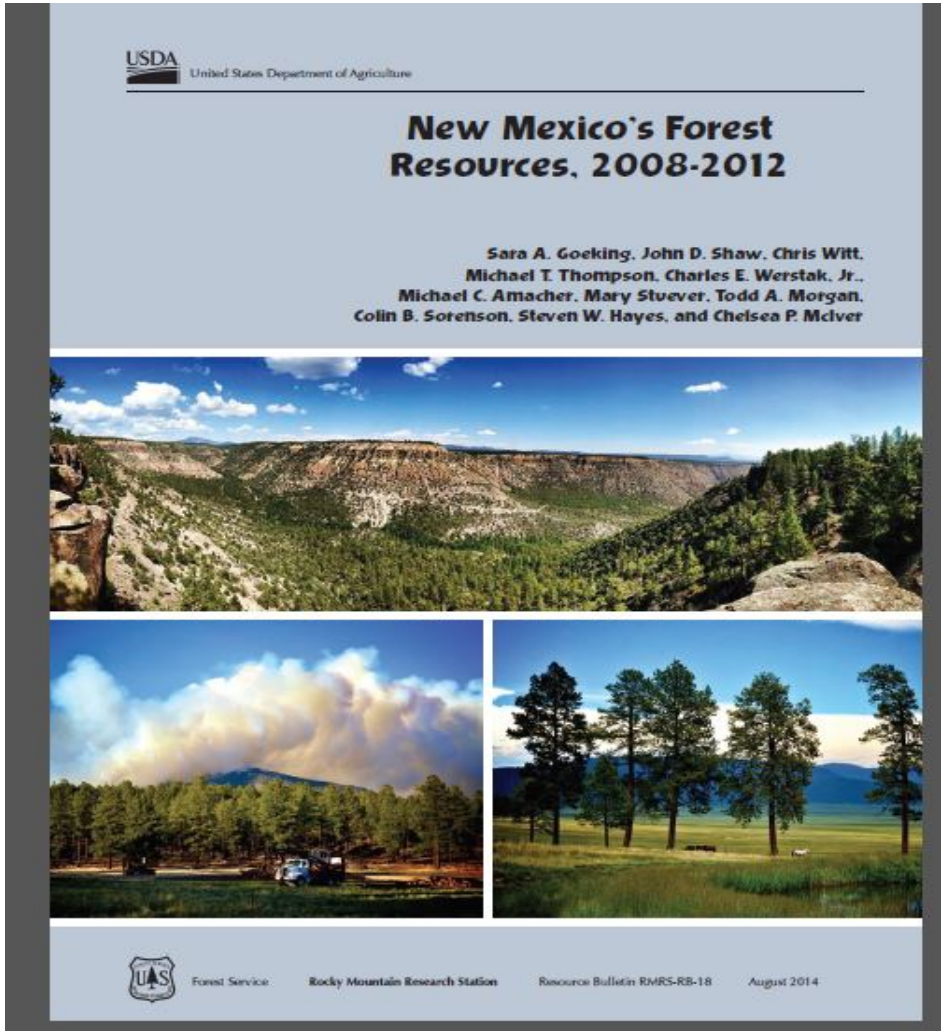
Forest Inventory and Analysis: FIA reports on status and trends in forest area and location; in the species, size, and health of trees; in total tree growth, mortality, and removals by harvest; in wood production and utilization rates by various products; and in forest land ownership.

New Mexico: 1987-1999 periodic sampling

2010-2014+ annualized sampling

http://www.fs.fed.us/rm/ogden/

Partnership with New Mexico State Forestry: AARA funds 2010-2013

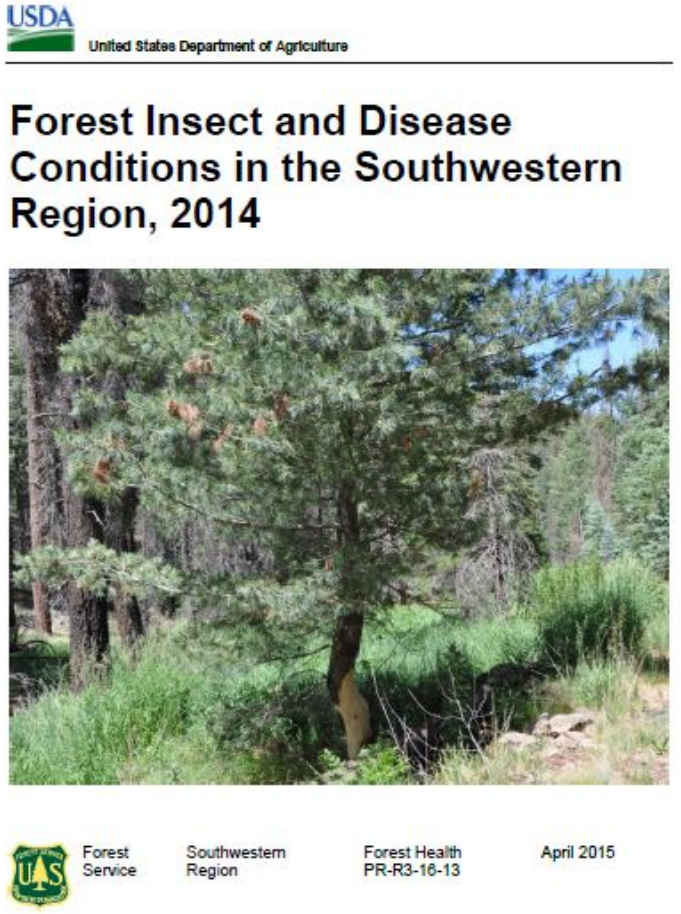


Forest Insects and Disease Surveys

Aerial detections surveys: Aerial surveying monitors forest health conditions more efficiently and economically than other methods. During the surveys, forestry staff look for areas with dying trees (from bark beetles, drought, other factors), various types of defoliation, and abiotic impacts such as from storms and weather patterns.

http://www.fs.usda.gov/detail/r3/forest-grasslandhealth/insects-diseases/?cid=STELPRDB5228474

Partnership with NM State Forestry


USDA
United States Department of Agriculture

Forest Insect and Disease Conditions in the Southwestern Region, 2014

Forest Service | Southwestern Region | Forest Health PR-R3-16-13 | April 2015

Wildlife

Monitoring of Mexican Spotted Owl:

Listed as threatened under ESA 1993. Revised MSO recovery plan 2012. Contracted with Bird Conservancy of the Rockies 2013. Two hundred and one sites surveyed at least twice in 2015. The sites were a random subset of 2014 survey.

kdmalcolm@fs.fed.us

Partnership Agreement: Bird Conservancy of the Rockies

Site Occupancy by Mexican Spotted Owls (*Strix occidentalis lucida*) in the US Forest Service Southwestern Region, 2015

16 November 2015

National Visitor use Monitoring

The National Visitor Use Monitoring program surveys over 100,000 visitors to National Forest System lands every five years, with 20% of the national forests conducting surveys each year.

This nationwide visitor use survey provides statistically sound estimates of visitation to each national forest and to each site type.

The surveys also provide information about who these visitors are demographically, why they come to the national forests, how satisfied they are with the facilities and services provided, and how much money they spend on their visit.

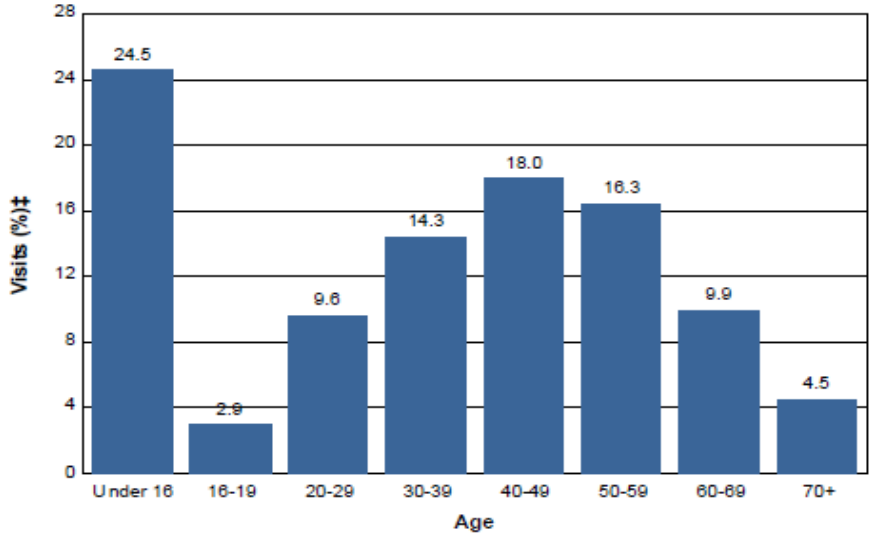
http://www.fs.fed.us/recreation/programs/nvum/

Cibola NF Visitors By Age

Age

Percent of National Forest Visits* by Age

Age Class	National Forest Visits (%)‡
Under 16	24.5
16-19	2.9
20-29	9.6
30-39	14.3
40-49	18.0
50-59	16.3
60-69	9.9
70+	4.5
Total	**100.0**



Watershed

Watershed Condition Classification: Initial classification completed in 2010. Reassessment completed in 2015.

Cibola NF: 0 (2017)

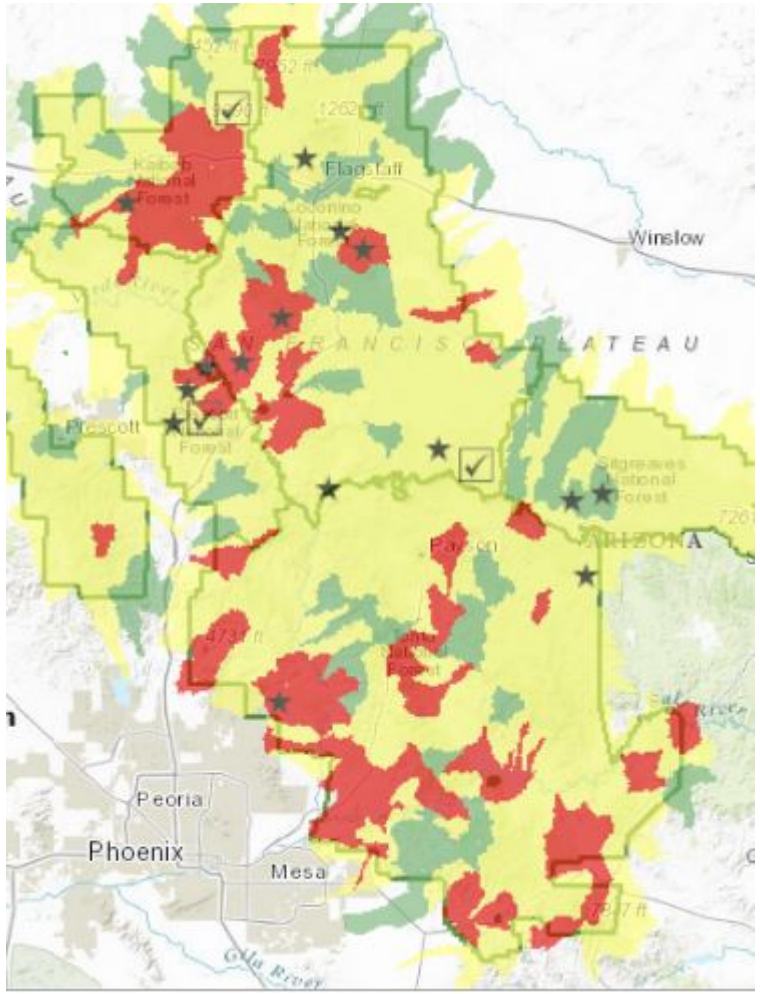
Carson NF: 0 (2017)

Gila NF: 181

Lincoln NF: 8

Santa Fe NF: 25

http://www.fs.fed.us/biology/watershed/condition_framework.html

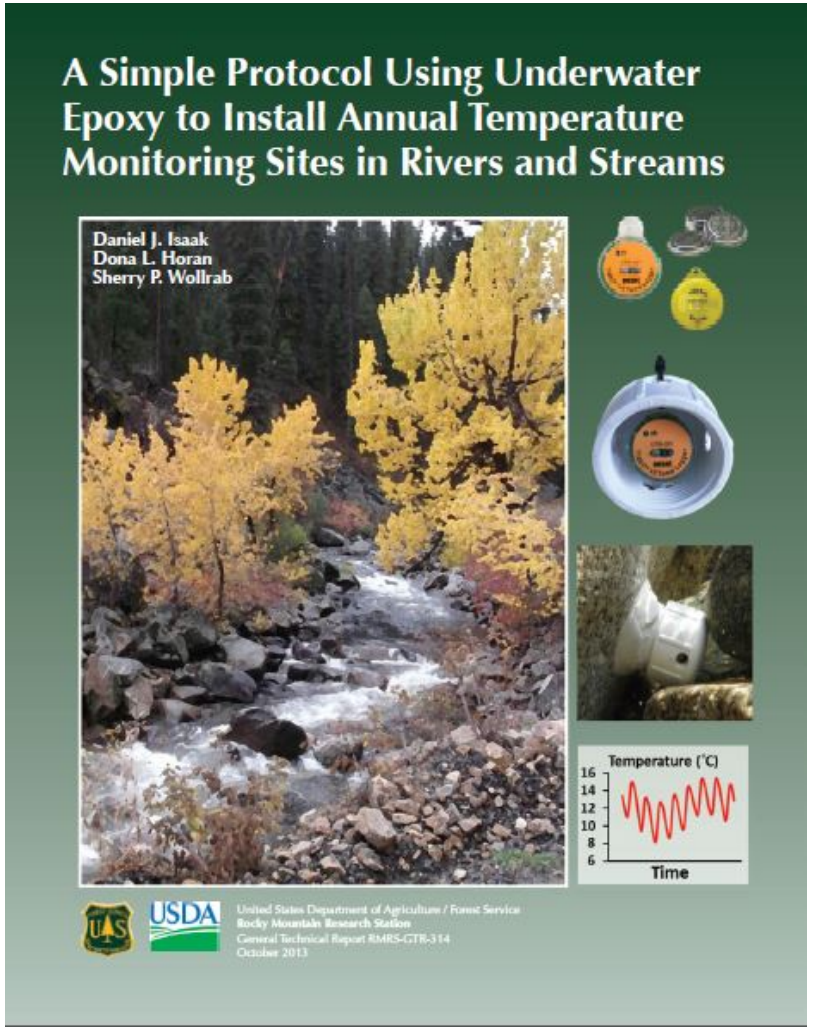


Stream Temperature

Multi-Forest Stream Temperature Monitoring:

Thermal regimes are important to aquatic ecosystems because they strongly dictate species distributions, productivity, and abundance. Inexpensive digital temperature loggers, geographic information systems (GIS), remote sensing technologies, and new spatial analyses are facilitating the development of temperature models and monitoring networks applicable at broad spatial scales.

http://www.fs.fed.us/rm/boise/AWAE/projects/stream_temperature.shtml



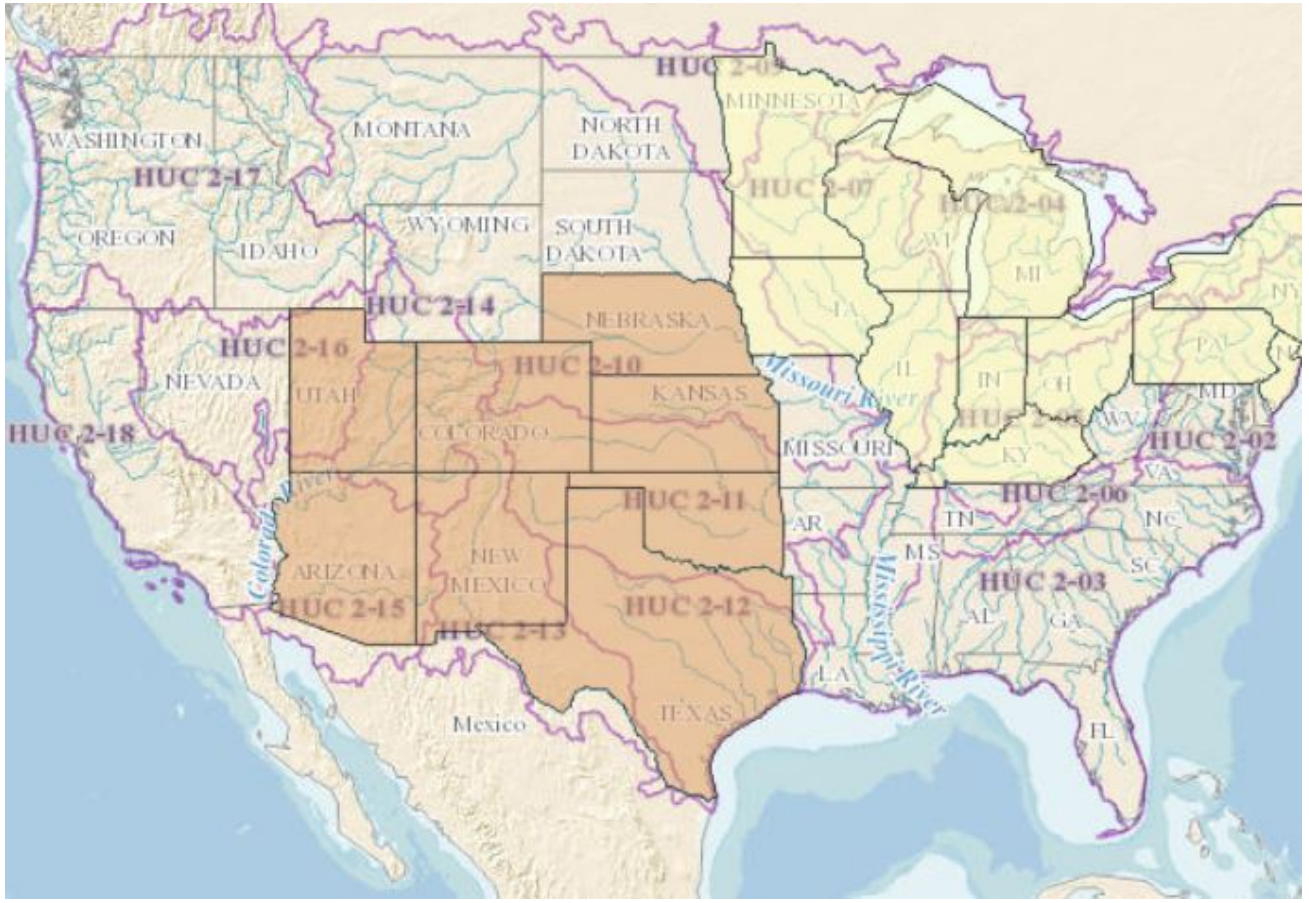
National Hydrography Data Set

The NHD represents the drainage network with features such as rivers, streams, canals, lakes, ponds, coastline, dams, and stream gages.

These data are designed to be used in general mapping and in the analysis of surface water systems.

http://nhd.usgs.gov/

Partnership with Desert LCC and University of Arizona on NHD updates.



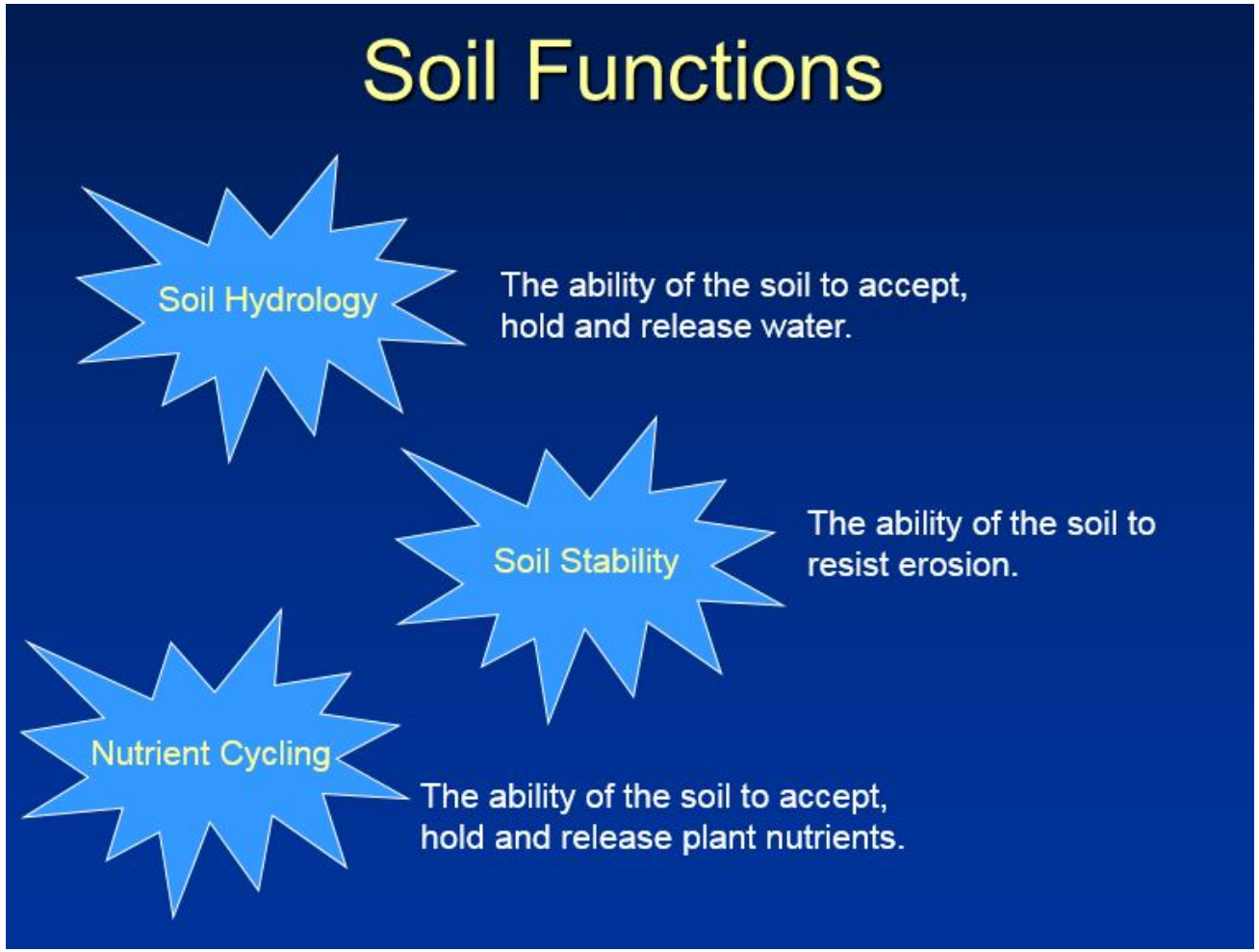
Soil Quality

Soil Quality/Soil Condition: An evaluation of soil quality based on an interpretation of factors which affect vital soil functions.

1991 GTES; Carleton, Owen et., al.

2010 Watershed Condition Classification;

20008-2016; Forest plan revision



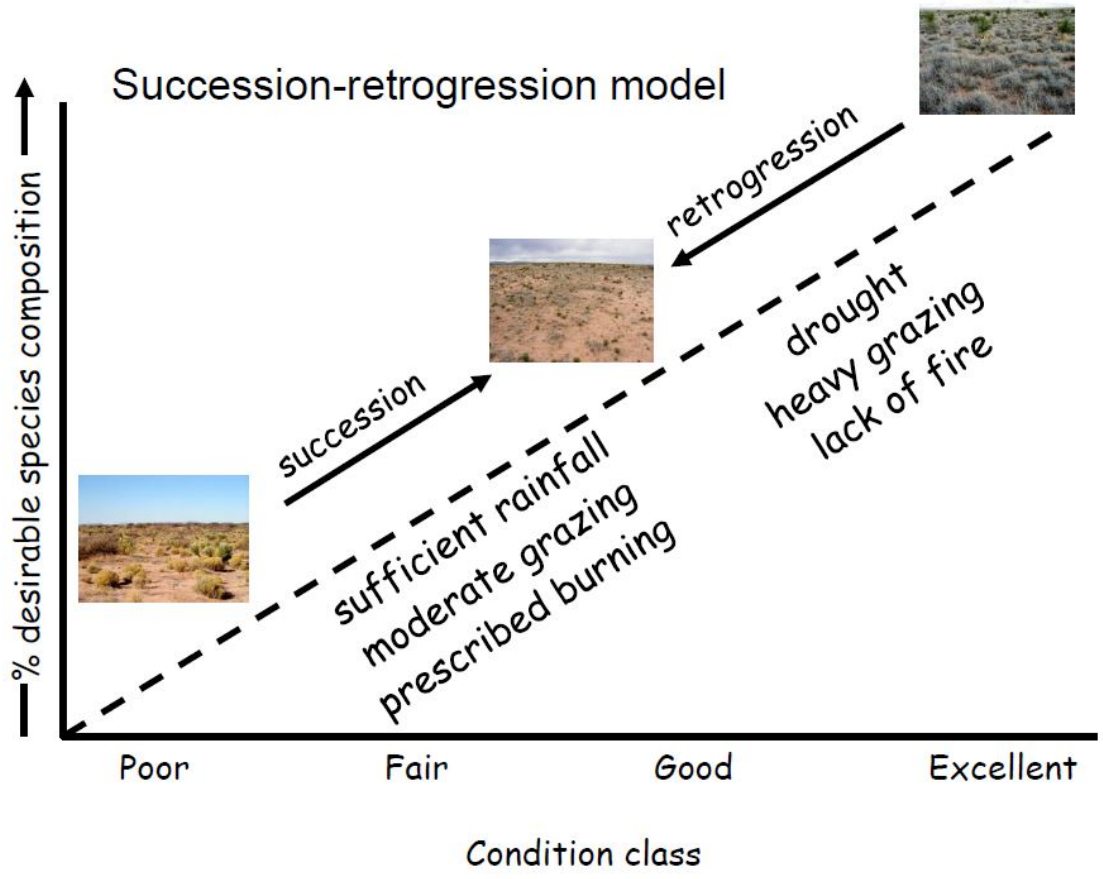
Ecological Site Description Core Group

Ecological sites comprise a land classification system that describes the ecological potential and ecosystem dynamics of land areas. When linked to mapping, these sites stratify the landscape and organize ecological information to allow monitoring and assessment; interpretation of resource hazards and opportunities; and prioritizing and selecting of land management actions to promote the sustainable use of ecological resources.

http://jornada.nmsu.edu/esd

Partnerships with ARS, BLM, NMSU, BIA, USFS, NRCS

History of ecological sites



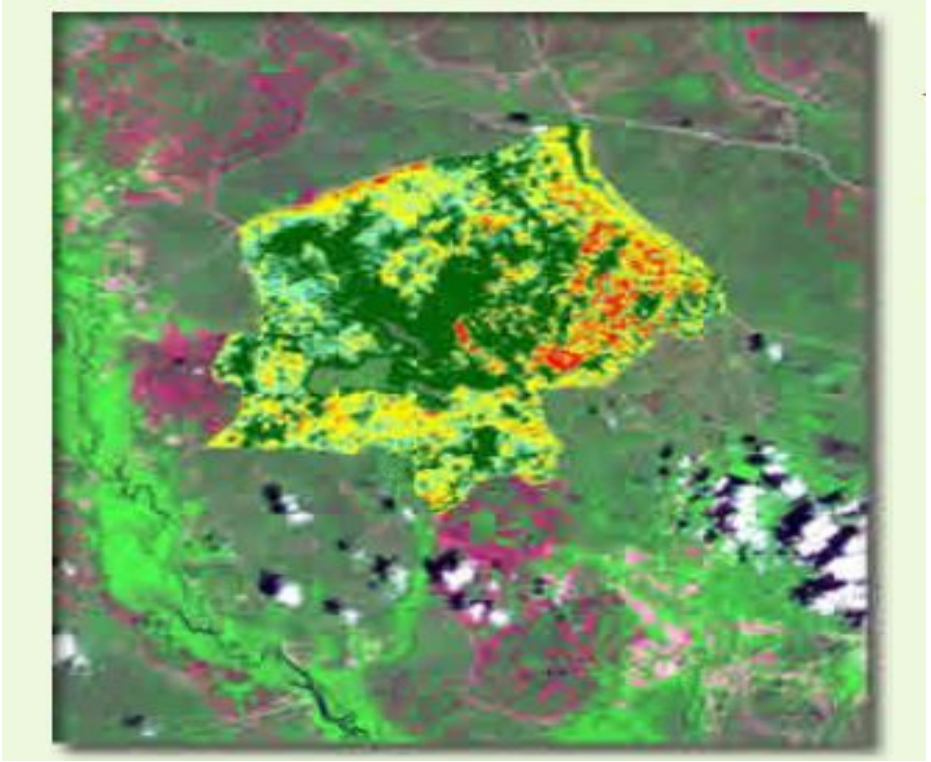
Fire Management & Science

MTBS-Monitoring Trends in burn severity:

The primary objective of MTBS is to provide consistent summary information to WFLC on the location, extent and magnitude of burn severity on all lands in the US, including Alaska and Hawaii for the period of 1984 and beyond.

In general, more acres are being burned in the West and the proportion of high burn severity has increased.

http://mtbs.gov/



Climate and Climate Change

Monitoring trends in climate change: Four strategic areas;

1. Detection and Evaluation – A unified monitoring system would provide a mechanism to detect and evaluate national and regional trends in climate change impacts on forest and grassland health and productivity.

2. Information Delivery – A unified monitoring system would provide reliable, timely, and transparent information to inform planning, decision making and implementation at all levels by Forest Service line officers, our partners, and communities.

3. *Partnerships* – Partnerships must be a priority in addressing climate change and conservation across areas that are shared among public, private and community interests.

4. *Science Integration* - A unified monitoring system supports adaptive management by facilitating the integration of science and management. Coordinated and enhanced monitoring systems provide a mechanism for translating relevant science into land management applications, using predictive models and decision support tools.

Remember Earth Day: 22 April

How might broader-scale monitoring fit with forest plans?

A hypothetical example

Forest Plan Monitoring
Monitoring Aspects: 2012 Planning Rule

- Under the 2012 Planning Rule, monitoring is composed of the following two aspects:
  1. The Plan Monitoring Program: the monitoring developed **specific to each Forest's Plan** and is designed to inform the management of resources on the plan area, including testing relevant assumptions, tracking relevant changes, and measuring management effectiveness and progress toward achieving or maintaining the plan's desired conditions or objectives.
  2. The broader scale monitoring strategies: strategies developed under the responsibility of the Regional Forester for plan monitoring questions that can best be answered at a **geographic scale broader than one plan area**.

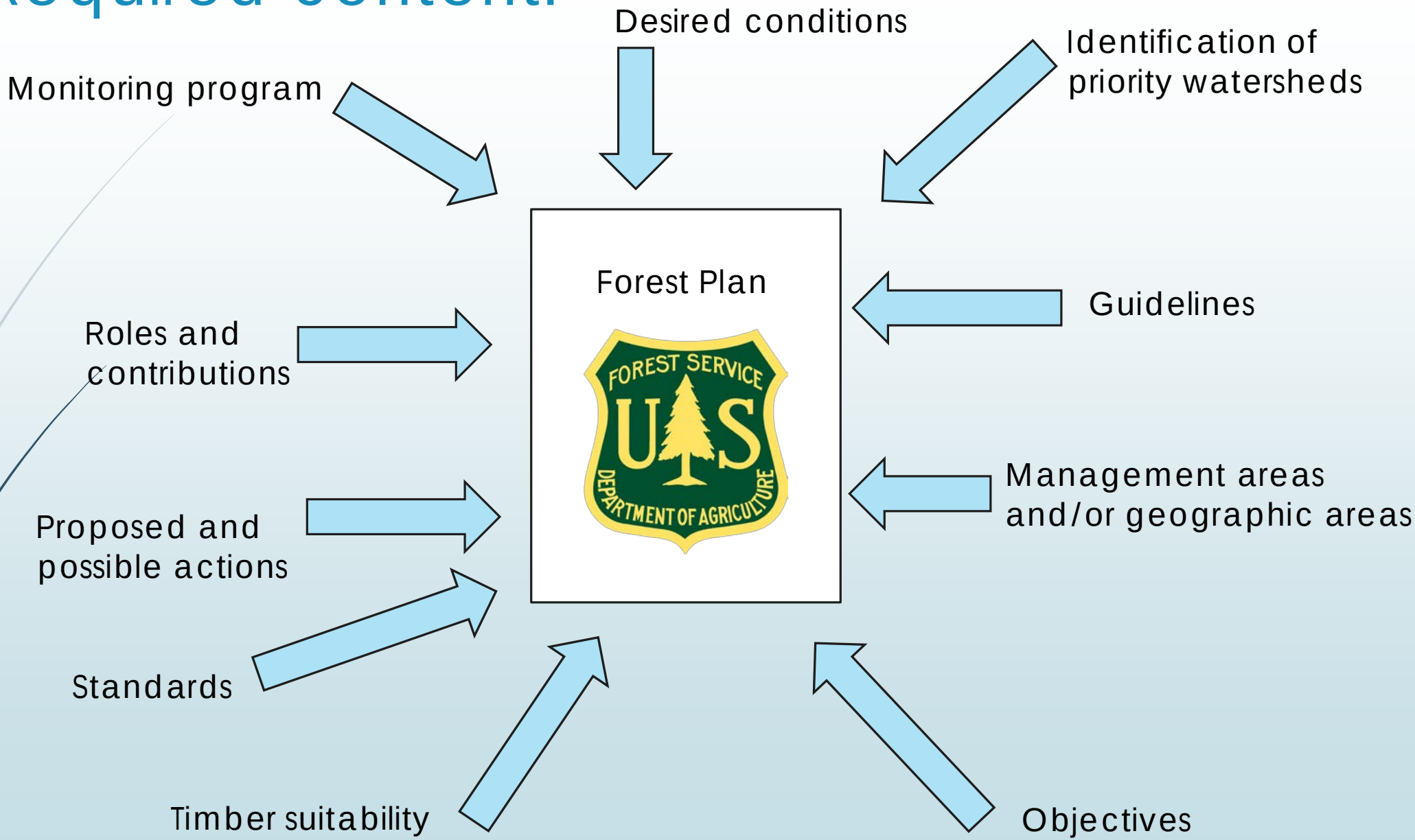
Each monitoring plan must include 1 or more questions/indicators that address:

- (i) The status of select watershed conditions.
- (ii) The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.
- (iii) The status of focal species to assess the ecological conditions required under § 219.9.
- (iv) The status of a select set of the ecological conditions required under § 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.
- (v) The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.
- (vi) Measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area.
- (vii) Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.
- (viii) The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C))

Under the 2012 Planning Rule, the broader scale monitoring strategies:

- Are the responsibility of the Regional Forester
- Should be **coordinated and integrated with each plan's Plan Monitoring Program** (which is the responsibility of each Forest Supervisor), in order "…to ensure that monitoring is complementary and efficient, and that information is gathered at scales appropriate to the monitoring questions."
- Should be undertaken "… to **answer plan monitoring questions common to two or more administrative units** that can best be answered at a geographic scale larger than one plan area."
- Should be developed "…where it would be **more efficient than monitoring limited to an individual plan area** to inform the management of resources…"

Required content:



DESIRED CONDITIONS FOR USE IN
FOREST PLAN REVISION IN THE SOUTHWESTERN REGION
Development and Science Basis
Final: 10/15/2014

PURPOSE

This document provides background, context, and linkages among forest plans, desired ecosystem conditions (i.e., desired conditions), and restoration objectives. It describes concepts upon which desired conditions are based, summarizes the history and process that prompted the development of desired conditions to guide forest plan revisions, and supplies language specific to Southwestern forest types that is suitable for describing desired conditions during subsequent forest plan revisions.

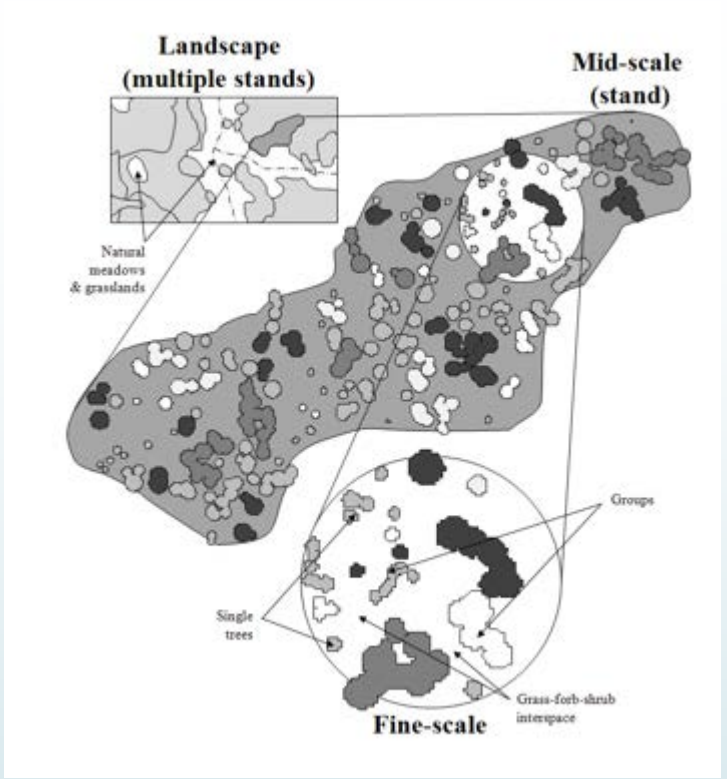
INTRODUCTION

In an age of accelerating threats to the health and productivity of ecosystems, restoration and maintenance of ecosystem function and resilience should be an integral part of forest management plans. Desired conditions describe attributes and characteristics that comprise structure, function, and composition of resilient systems while providing services that benefit both man and nature. Desired conditions must be developed based on a synthesis of scientific knowledge of the ecology and habitats of component species to an ecosystem: dominant and co-dominant over- and understory plants as well as native and desired non-native wildlife and plant species in a forest type.

Forest Service policy directs that resource management programs address ecological restoration and that restoration be integrated into forest plans. Ecological restoration is a process that assists recovery of resilience and adaptive capacity of ecosystems that have been degraded, damaged, or destroyed.[1] The objective of ecological restoration is to reestablish and retain biodiversity, health and productivity, ecological function, and resilience of National Forest System lands.

Given the importance of restoration in Forest Service policy and that declines in biodiversity resulted largely from human-induced changes to ecosystems during the past century, defining desired conditions that include historical plant and animal habitats arrayed into dynamic landscapes is an ecologically sound approach. Desired conditions should be based on an ecosystem's historical ecology, composition, structure, and landscape pattern, which can be inferred based on historic ranges of variability. It is also necessary to reflect social and economic desires in terms of the services humans expect from ecosystems (Choi et al. 2008). Achieving desired conditions that emphasize ecosystem composition, productivity, structure and function, as well as desired services, will: a) add value to plant and wildlife habitats b) improve hydrologic function and visual quality c) increase availability of wood products and forage d) reduce fire hazards (Fulé et al. 2001), and e) increase resilience to insects, disease, and other stressors such as climate change.

[1] Forest Service Manual 2000 –National Forest Management, Chapter 2020 – Ecological Restoration and Resilience.



PONDEROSA PINE FOREST DESIRED CONDITIONS

General Description

The ponderosa pine forest vegetation community includes two sub-types: Ponderosa pine bunchgrass and ponderosa pine Gambel oak. The ponderosa pine forest vegetation community generally occurs at elevations ranging from approximately 5,000 to 9,000 feet. It is dominated by ponderosa pine and commonly includes other species such as oak, juniper, and pinyon. More infrequently species such as aspen, Douglas-fir, white fir, and blue spruce may also be present, and may occur as individual trees. This forest vegetation community typically occurs with an understory of grasses and forbs although it sometimes includes shrubs.

Landscape Scale Desired Conditions (1,000-10,000 + acres)

The ponderosa pine forest vegetation community is composed of trees from structural stages ranging from young to old. Forest appearance is variable but generally uneven-aged and open; occasional areas of even-aged structure are present. The forest arrangement is in individual trees, small clumps, and groups of trees interspersed within variably-sized openings of grass/forbs/shrubs vegetation associations similar to historic patterns. Openness typically ranges from 10 percent in more productive sites to 70 percent in the less productive sites. Size, shape, number of trees per group, and number of groups per area are variable across the landscape. Seral state proportions, per the R3 Seral State Proportions Supplement, are applied at the landscape scale, where low overall departure from reference proportions is a positive indicator of ecosystem condition. In the Gambel oak sub-type, all sizes and ages of oak trees are present. Denser tree conditions exist in some locations such as north facing slopes and canyon bottoms.

Old growth occurs throughout the landscape, generally in small areas as individual old growth components, or as clumps of old growth. Old growth components include old trees, dead trees (snags), downed wood (coarse woody debris) and structural diversity. The location of old growth shifts on the landscape over time as a result

Region 3 Desired Conditions

Desired Condition	Relevance to Owl
Strive for a diversity of patch sizes with minimum contiguous patch size of 1 ha (2.5 ac) with larger patches near activity center; mix of sizes towards periphery (Peery et al 1999; Grubb et al 1997; May and Gutiérrez 2002). Forest type may dictate patch size (i.e., mixed conifer forests have larger and fewer patches than pine-oak forest). Strive for between patch heterogeneity.	Nest/roost habitat patches are the most limiting habitat for the owl. Patches should enhance spatial heterogeneity, provide nest/roost options, provide varied microclimates (thermoregulation) options, and create edges for prey species (e.g., *Neotoma*).
Horizontal and vertical habitat heterogeneity within patches, including tree species composition.* Patches are contiguous and consist of trees of all sizes, unevenly spaced, with interlocking crowns and high canopy cover (Ganey et al. 2003).*	Provides roosting options, thermal and hiding cover for the owl, and habitat for a variety of prey species.
Tree species diversity, especially with a mixture of hardwoods and shade-tolerant species (Willey 1998).* For example, Gambel oak provides important habitat for woodrats and brush mice (Block et al. 2005, Ward 2001)	Provides habitat and food sources for a diversity of prey, roosting options, and perches and hiding cover for young owls during early flight development. Large tree-form Gambel oaks are an important nesting substrate for owls (Ganey et al 1992; SWCA 1992; May and

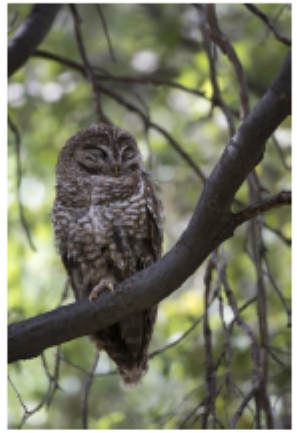
MSO Recovery Plan

Site Occupancy by Mexican Spotted Owls (*Strix occidentalis lucida*) in the US Forest Service Southwestern Region, 2014

30 March 2015

Rocky Mountain Bird Observa
14500 Lark Bunting
Brighton, CO 8
303.659.
www.rmb
Technical Report #SC-MSO-USF

Site Occupancy by Mexican Spotted Owls (*Strix occidentalis lucida*) in the US Forest Service Southwestern Region, 2015



16 November 2015

Bird Conservancy of the Rockies
Connecting People, Birds and Land

Bird Conservancy of the Rockies
14500 Lark Bunting Lane
Brighton, CO 80603
303.659.4348
www.birdconservancy.org
Technical Report SC-MSO-USFS-02

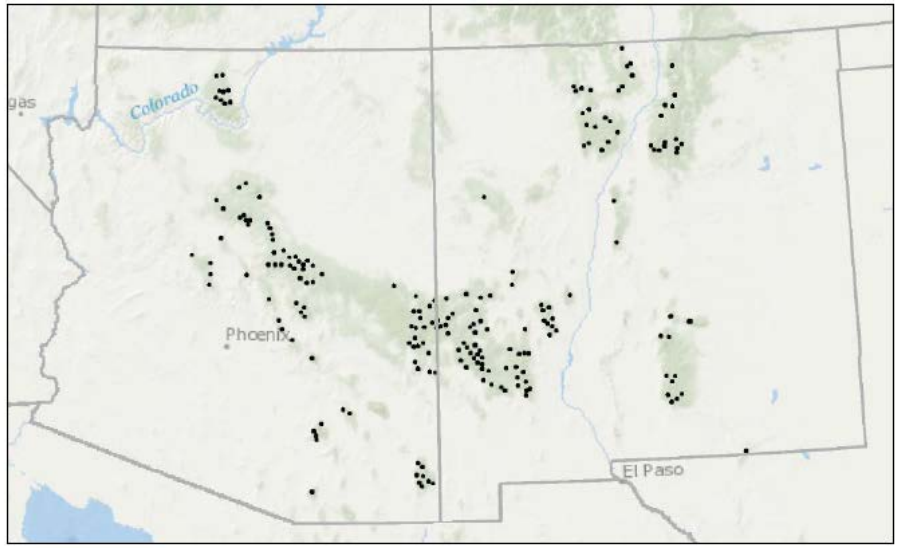
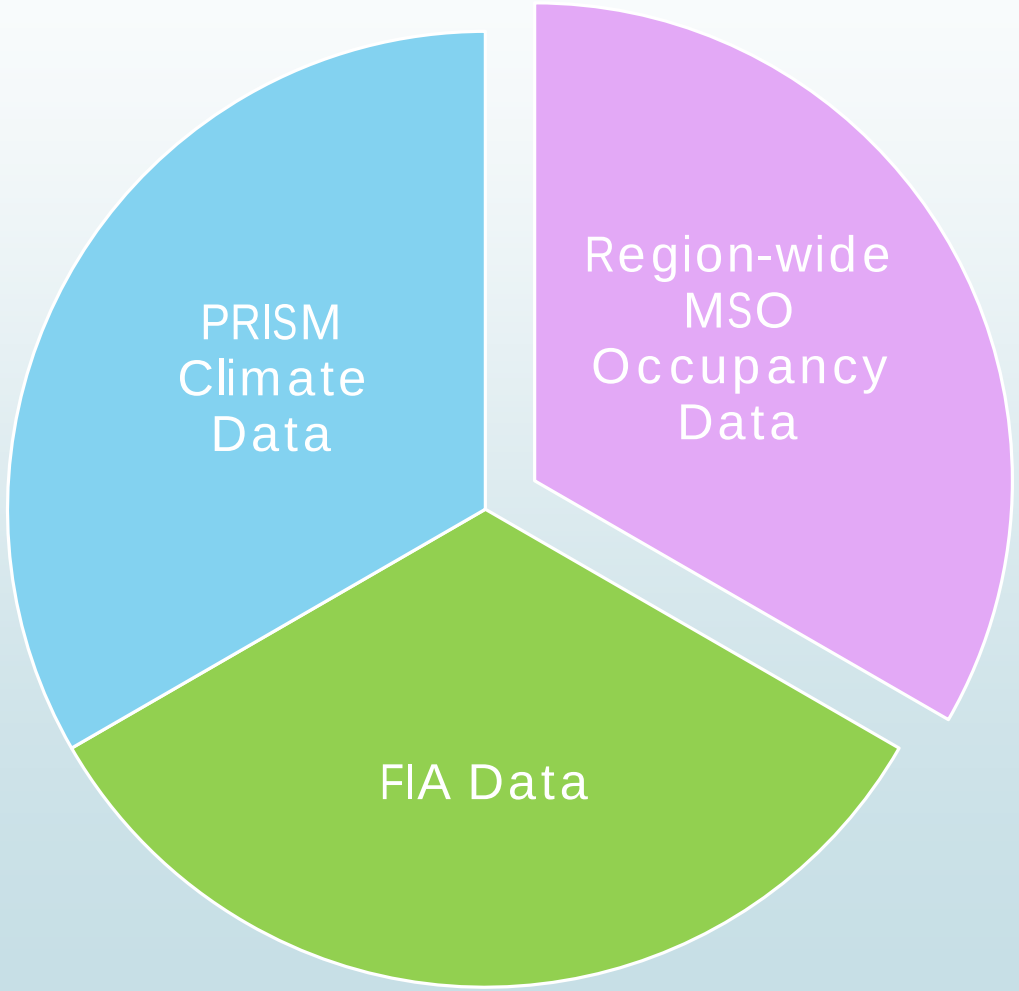


Figure 1. The distribution of sampling units ($n = 201$) surveyed for Mexican Spotted Owl occupancy in 2015 in the US Forest Southwestern Region.

Broader-Scale Monitoring Strategy



What can this BSMS tell us?

- Are we achieving desired conditions for ponderosa pine at the landscape level or broader scale?
- Are our assumptions about suitable MSO habitat holding at the landscape level or broader scale?
- Are MSO occupying the available suitable habitat at the landscape level or broader scale?
- How are ponderosa pine forests that have met desired conditions faring in the face of climate change or other stressors? How does that vary at the landscape level or broader scale?
- Is MSO occupancy responding to climate change and other stressors at the landscape level or broader scale?

USFWS – Southwest Region Inventory and Monitoring

Mission: *The U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continued benefit of the American people.*

Steven E. Sesnie, US Fish and Wildlife Service, Southwest Region, Department of Biological Sciences, Albuquerque, NM 87102
Steven_Sesnie@fws.gov

April 20, 2016

Inventory & Monitoring "Initiative" 2010

"La piedra en el zapato para los manejadores"

USFWS – Southwest Region

FWS Region 2

States: Arizona, New Mexico, Oklahoma, and Texas

- Four states
- 47 refuges
- 8 fish hatcheries
- 84 Native American tribes
- 19 Law enforcement offices

FWS LCC

http://www.fws.gov/southwest/

USFWS – Southwest Region

Bottomland hardwood - OK

Semidesert grassland - AZ

Marsh/wetlands - NM

Coast wetlands/Tamaulipan shrub - TX

Why monitoring? Why here? Why now?

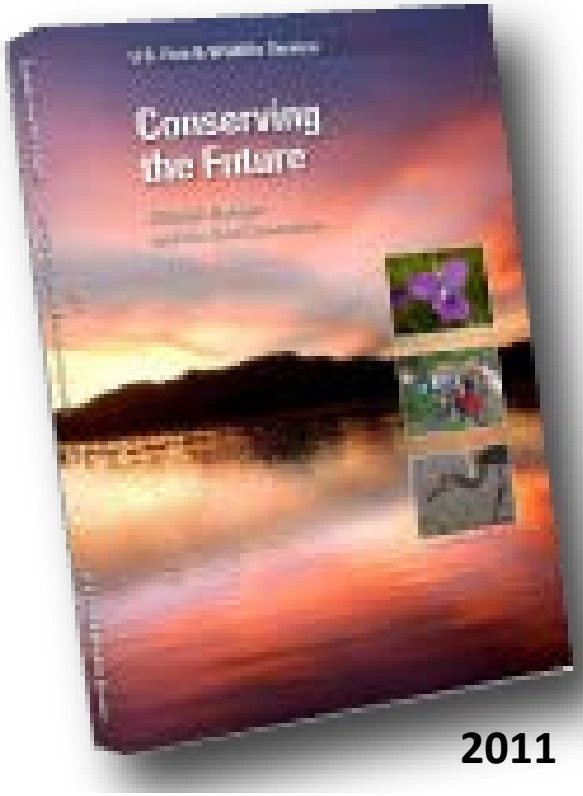


1) <u>Active management</u>: The Refuge System uses inventory and monitoring surveys to assess the status and trends of refuge lands, waters, plants and wildlife, a well as their responses to management actions.

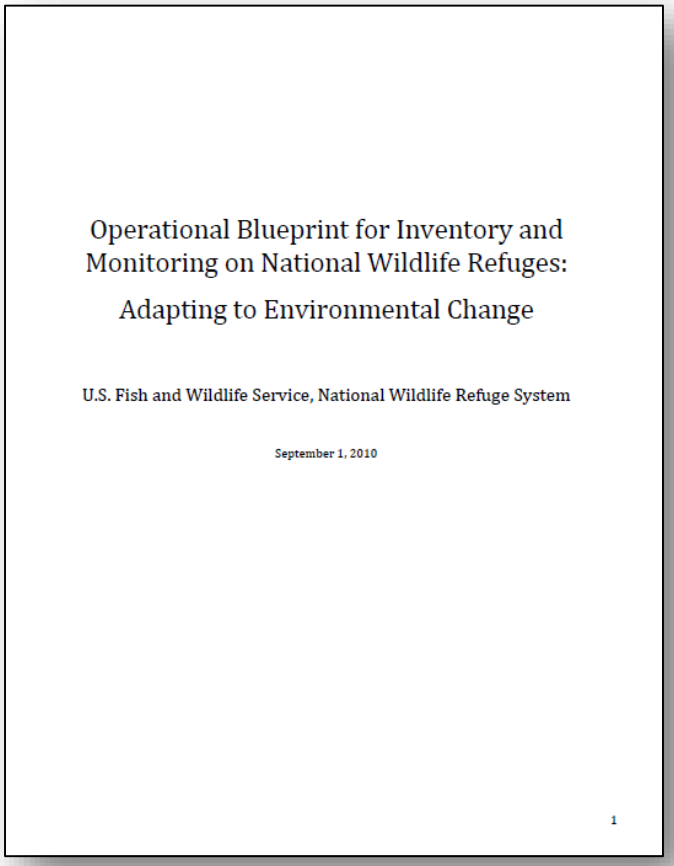
2) <u>Meet scientific standards</u>: The national Inventory and Monitoring program (I&M) coordinates the design, collection, retention and analysis of critical scientific information across the Refuge System. Rigorous scientific standards ensure that the Refuge System is a key contributor to the larger scientific body of knowledge.

Why monitoring? Why here? Why now?

Conservation planning for the next century:



2011


Operational Blueprint for Inventory and Monitoring on National Wildlife Refuges:

Adapting to Environmental Change

U.S. Fish and Wildlife Service, National Wildlife Refuge System

September 1, 2010

1

http://www.fws.gov/Refuges/vision/index.htm

I&M Planning and Priorities

Policy - 701FW2 Inventory and Monitoring

A. **Inform planning** and resource management at **multiple scales**

B. **Promote consistency** in natural resource surveys throughout the refuge system

C. Implement **scientifically rigorous** surveys

D. Meet Service and Refuge System **legal mandates**…**support landscape conservation** approach

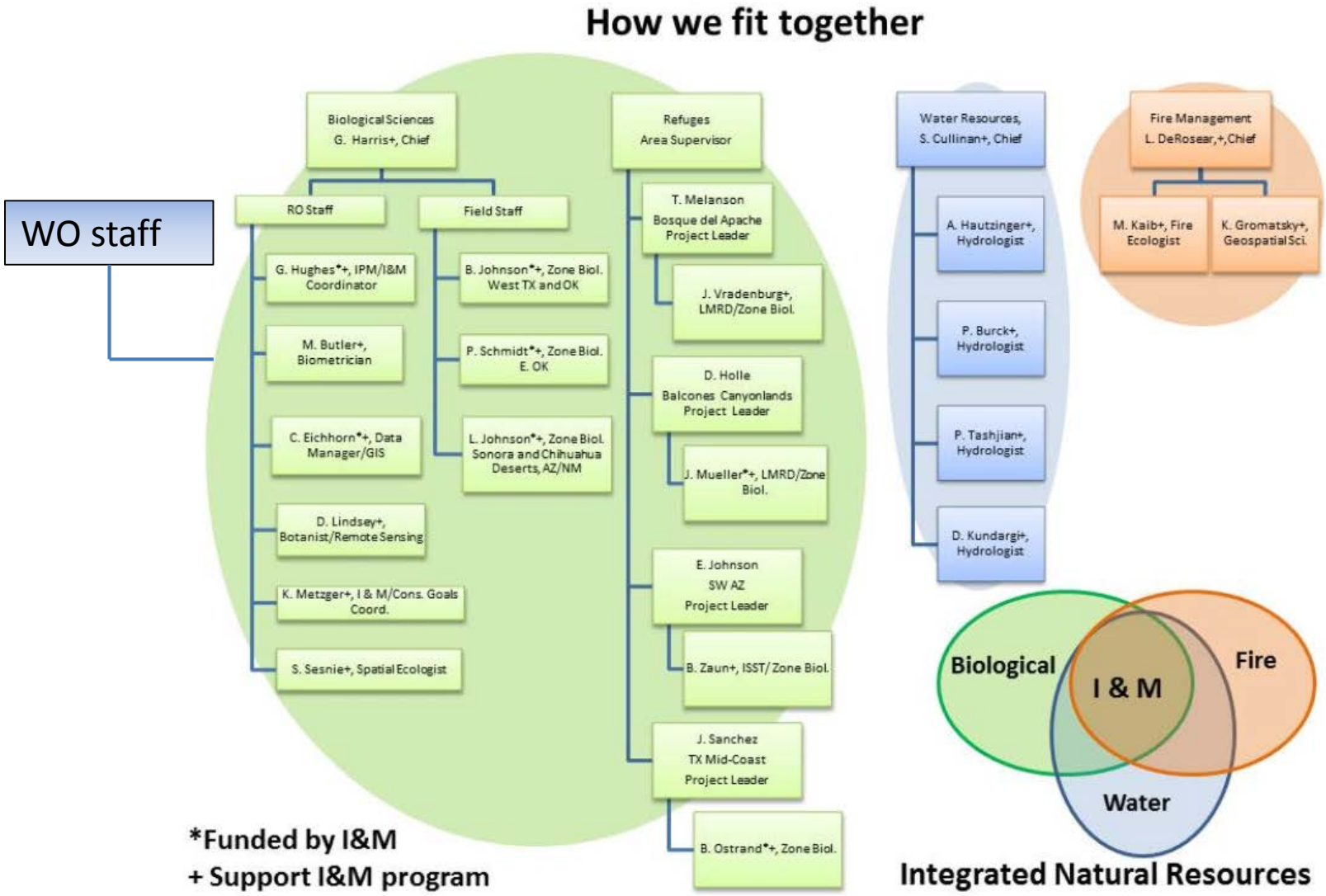
1. Gather **baseline data** and record benchmark conditions
2. Estimate **status and trends** in fish, wildlife, plant populations and their habitats
3. Assess trends in biological integrity, diversity, and environmental health
4. **Evaluate the effectiveness of management** actions contributing to established goals….

Implementation – Inventory and Monitoring Plan (IMP)

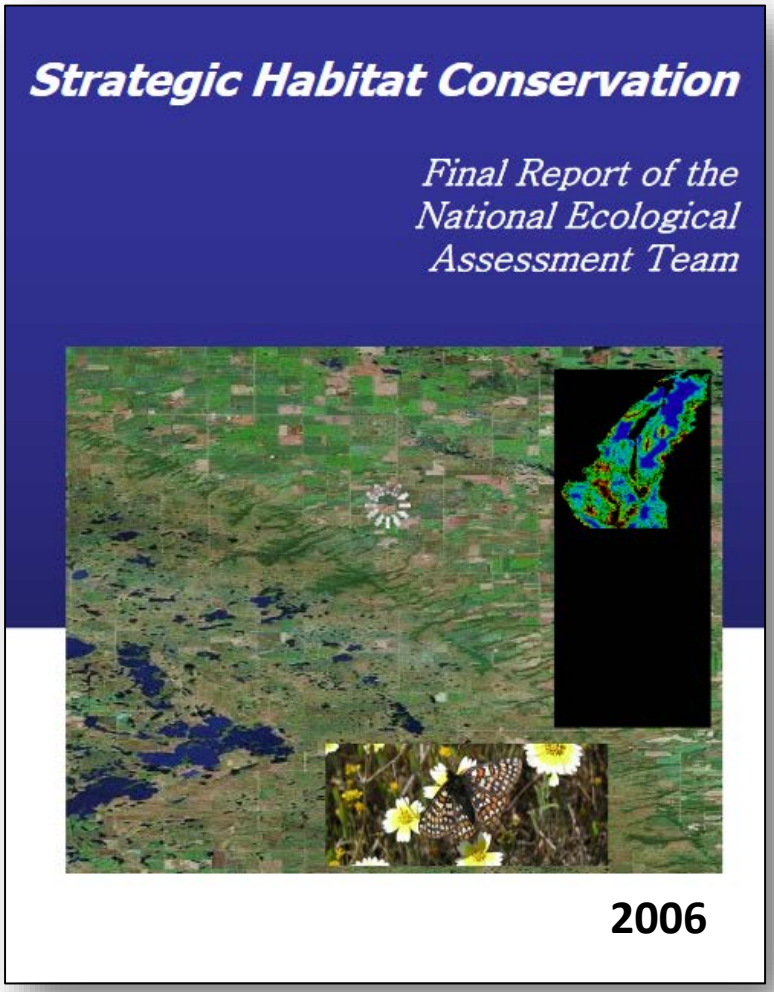
A. The policy requires that refuges develop and follow an Inventory and Monitoring Plan (IMP). An IMP:

1. Is an **operational plan** for one or more refuges that clearly **states I&M priorities** and clarifies operational commitments, depending on available capacity;

I&M Personnel Structure - 2010



Adaptive management



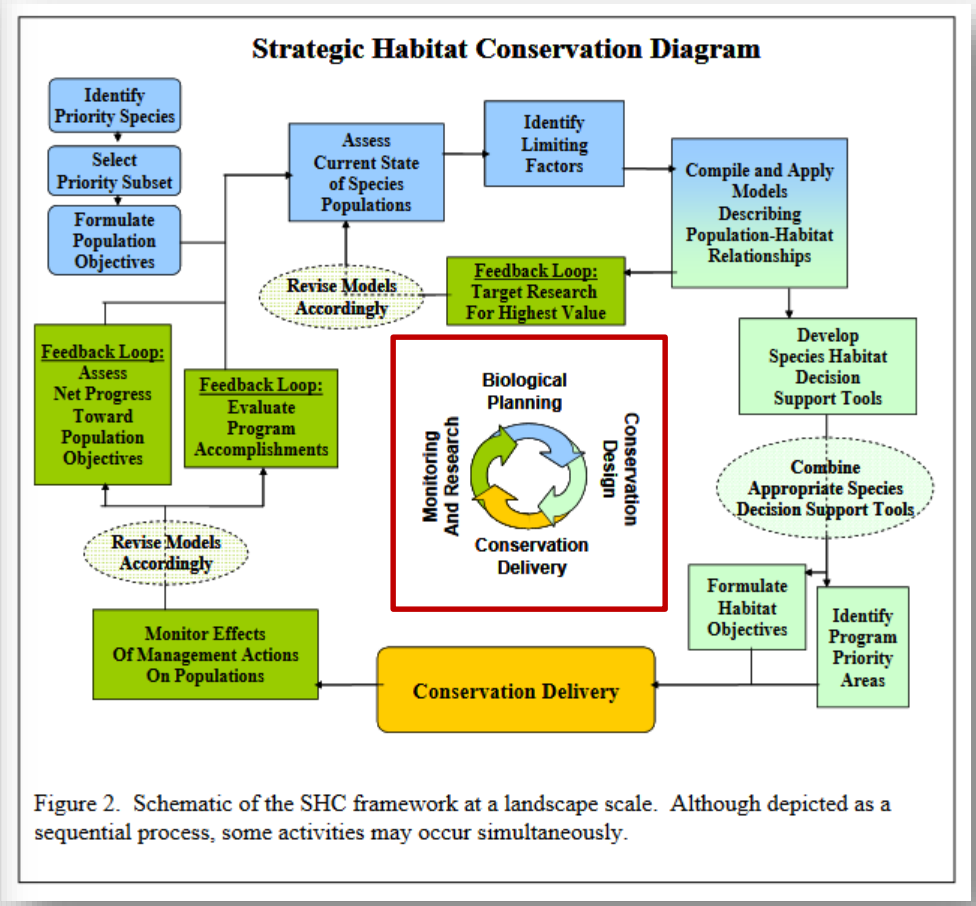
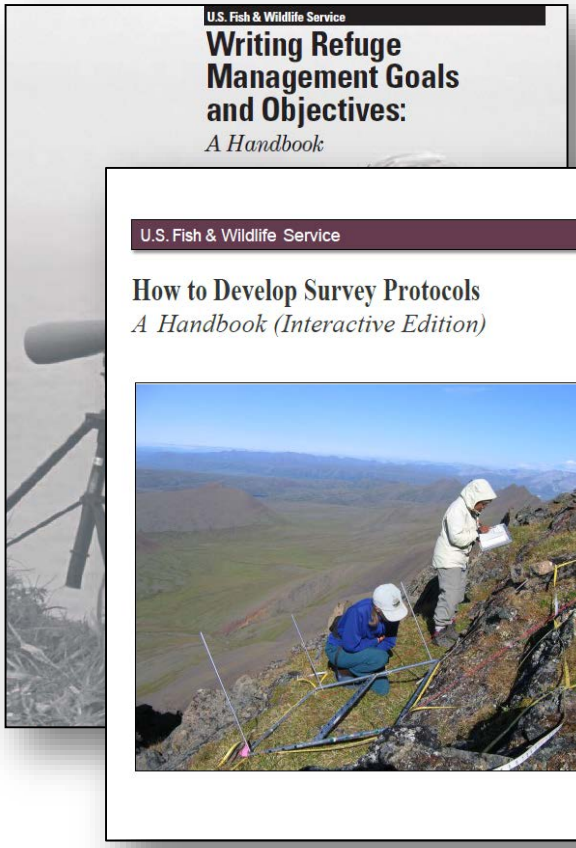
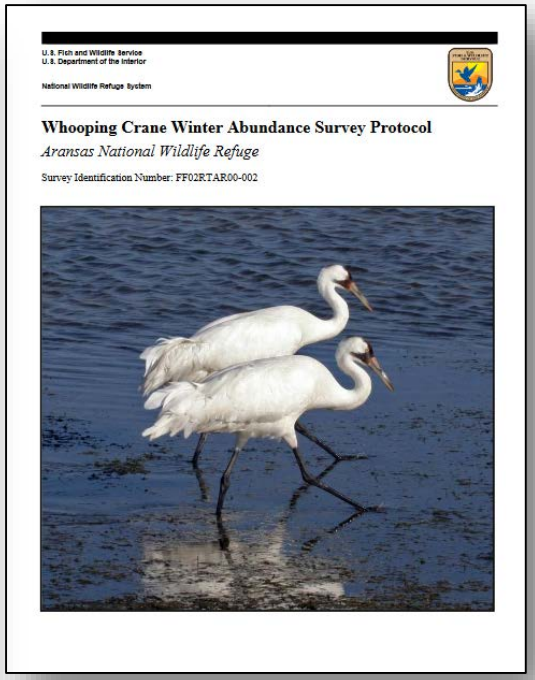
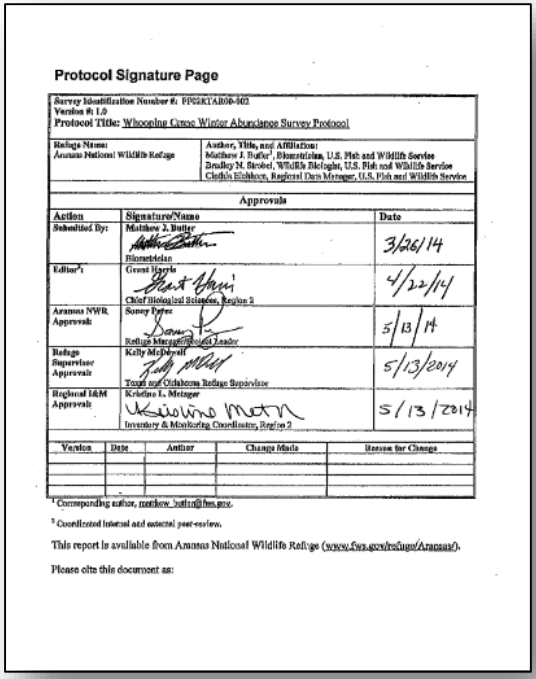


Figure 2. Schematic of the SHC framework at a landscape scale. Although depicted as a sequential process, some activities may occur simultaneously.

I&M Protocols



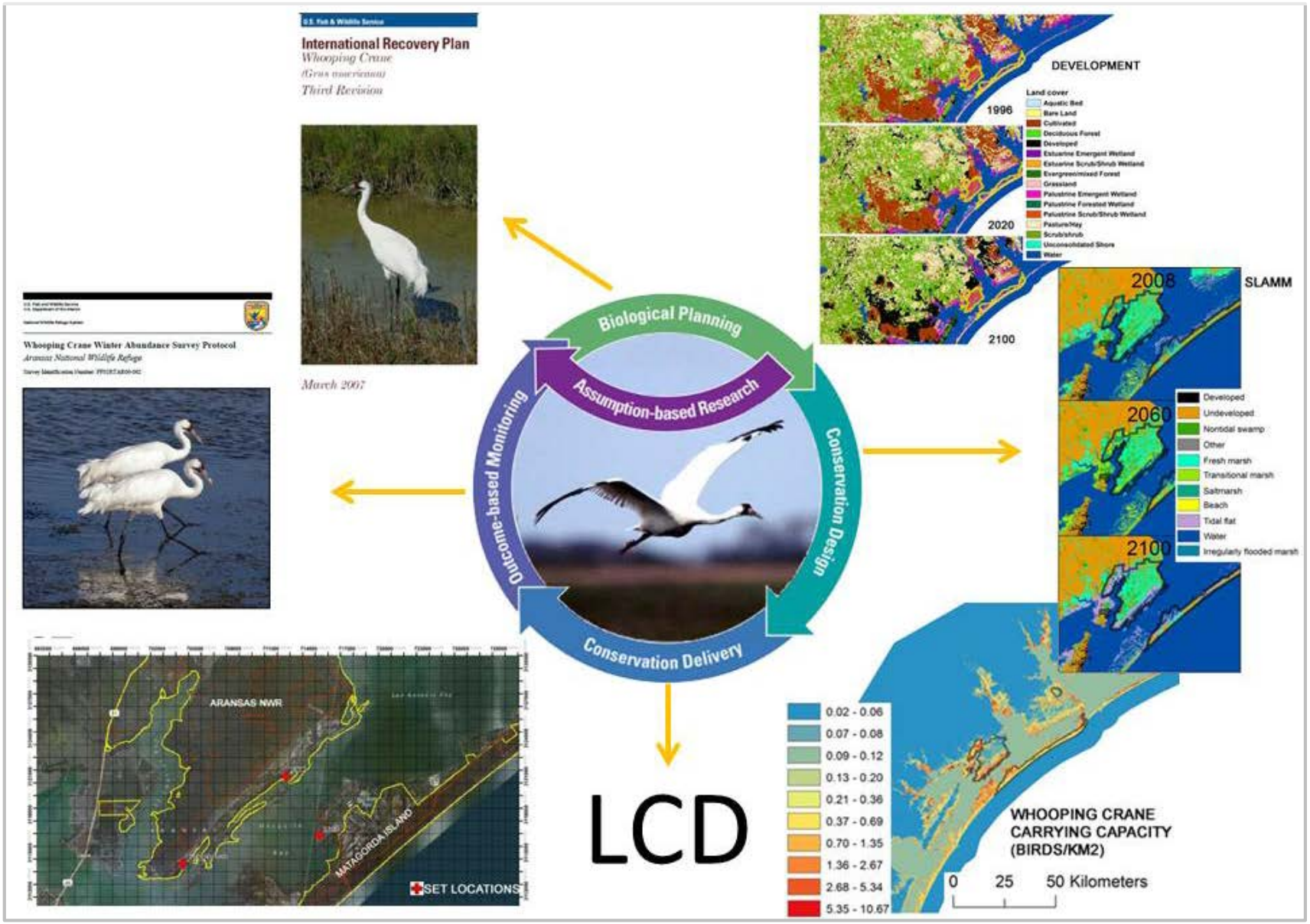




Guidance ⟷ **Development** ⟷ **Review**

Implementation

Science Support for Landscape Conservation Design - SHC

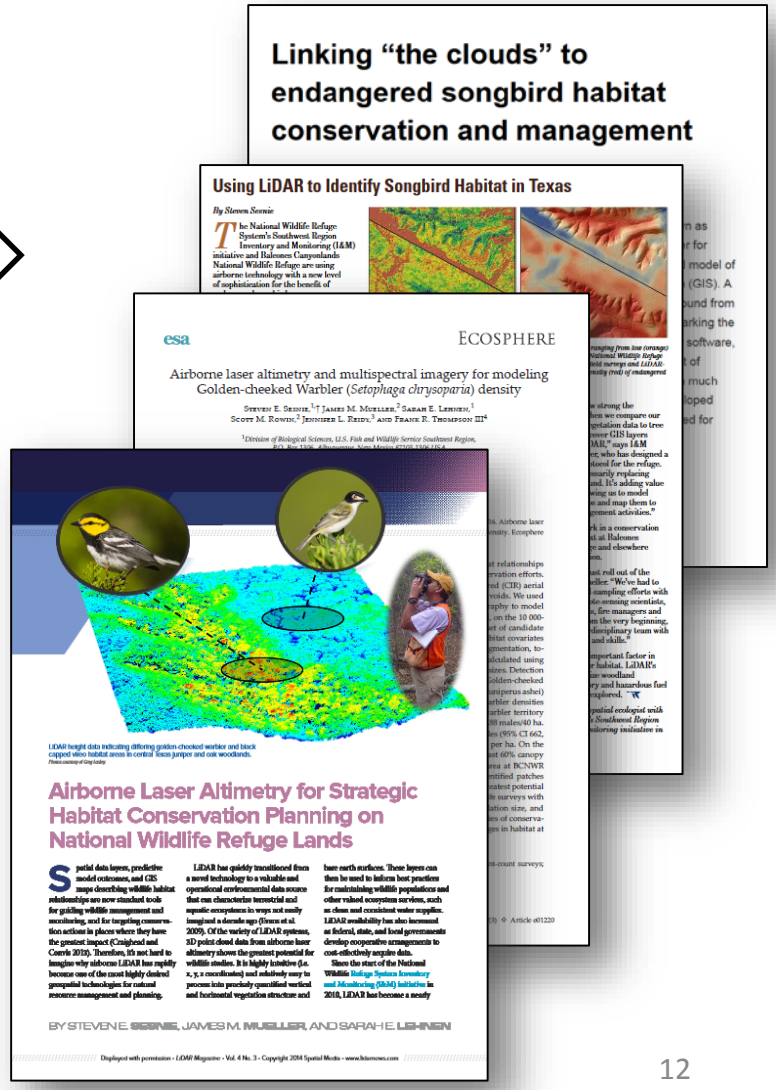


Science Implementation & Delivery

Monitoring design

$

Publication



Planning and implementation

Thank you – Questions?

RIO GRANDE WATER FUND
Monitoring Program

Broader-Scale Monitoring Strategy Workshop

April 20-21, 2016; Albuquerque, NM

The Nature Conservancy
Protecting nature. Preserving life.™


06/26/2011 19:40
Las Conchas Fire, Day 1


CONCERN #1
Increasing areas of high-severity burn

Severe Fires Threaten Water Security

CONCERN #2
Post-fire flooding & Sedimentation

Severe Fires Threaten Water Security

CONCERN #3: Water Quality

In 2011, ABCWUA stopped using San Juan-Chama water for 40 days; BDD stopped diversions for over 20 days.

--

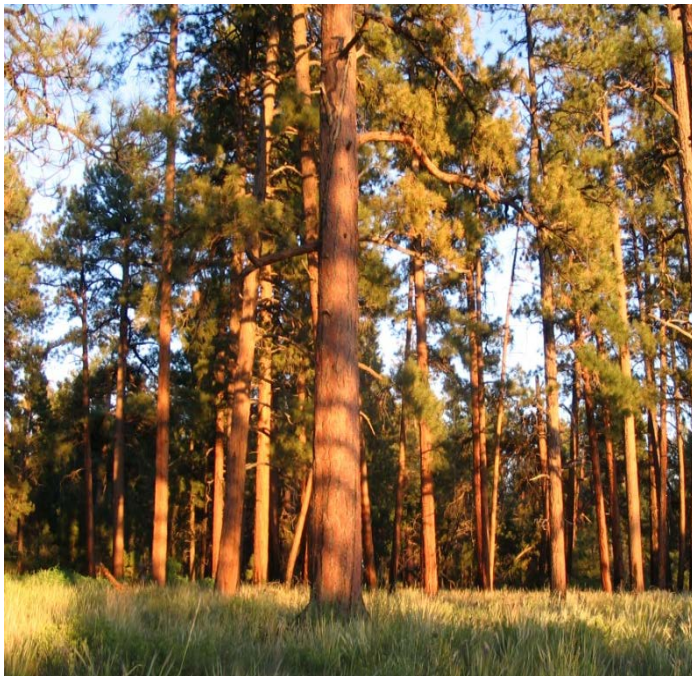
In 2013, BDD stopped diversion for over 30 days.

RIO GRANDE
WATER FUND
A Wildfire and Water Source Protection Project

Water Fund Goal

Protect storage, delivery & water quality of Rio Grande water

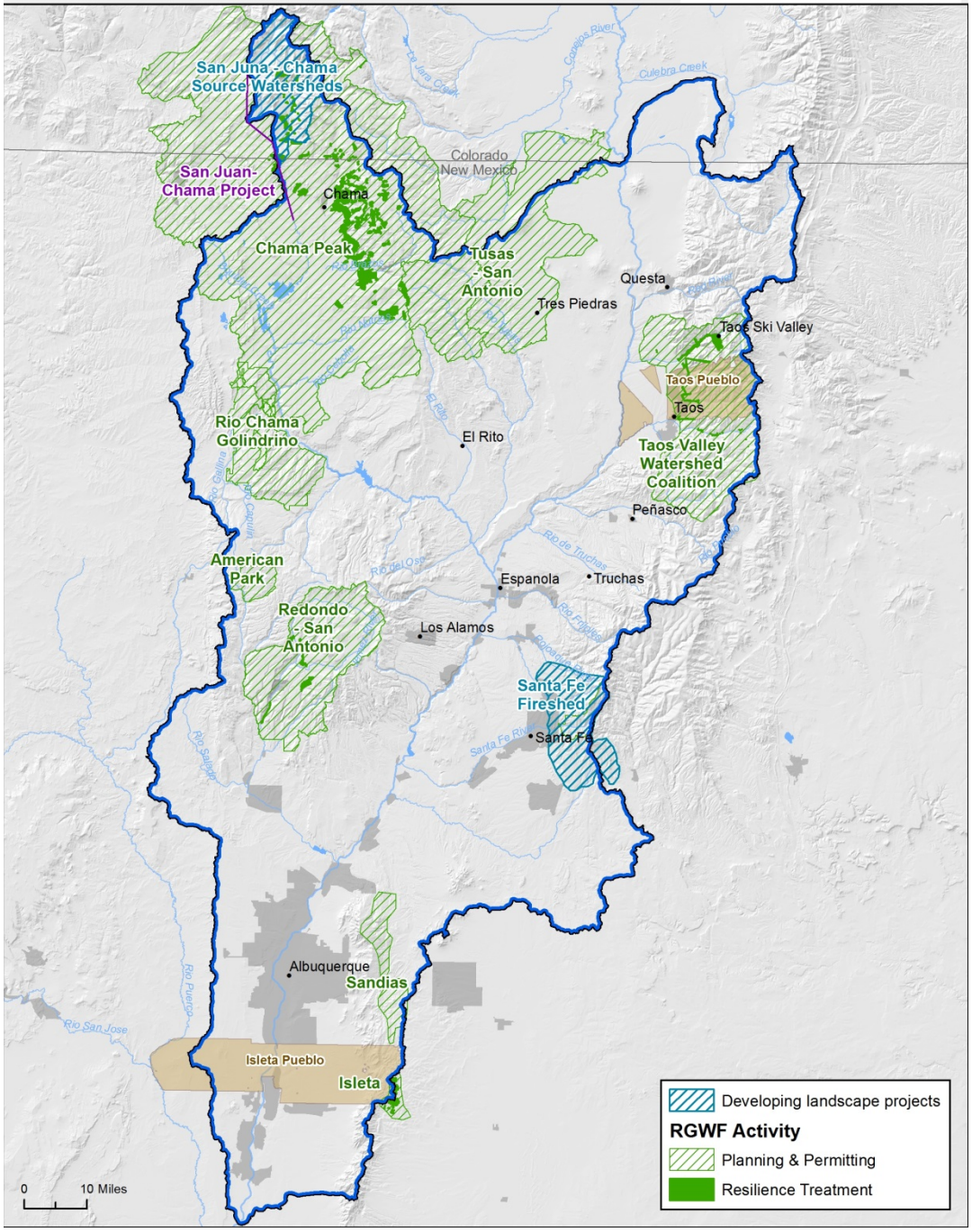
* Reduce forest fuels
* Mitigate flooding & debris flows
* Improve health of streams
* Support forest product industry
* Secure sustainable funding



RGWF Activities

The Nature Conservancy
Protecting nature. Preserving life.

RIO GRANDE WATER FUND
A Wildfire and Water Source Protection Project



Water Fund Milestones

- Watershed studies initiated *Feb. 2013*
- Advisory Board & Working Groups *Aug. 2013*
- Comprehensive Plan completed *July 2014*
- Water Fund launched - $1 million *July 2014*
- RGWF Charter completed & signatories *Nov. 2014*
- Executive Committee formed *April 2015*
- Forest restoration proposals solicited (RSI) *Feb. 2015*
- 4 projects funded & Candidate List created *Sept. 2015*
- Taos Valley Landscape Restoration Strategy *July 2015*
- Monitoring plan finalized *Oct. 2015*
- S Juan-Chama & SF Fireshed planning begins *Nov. 2015*

Monitoring & Adaptive Management Framework

Monitoring Plan Objectives

- Track environmental & economic effects
- Ensure investments achieve expected outcomes
- Corrections to restoration (adaptive management)

Monitoring & Adaptive Management Framework

15 Components - ecological, economic & social outcomes of RGWF investments & activities

- **Monitoring Question**
- **Management Objective/Desired Condition**
- **Indicator(s)**
- **Frequency of Measurement & Reporting**
- **Data Source & Cost**

RIO GRANDE
WATER FUND
A Wildfire and Water Source Protection Project

Monitoring Metrics

Treatments implemented: fuel reduction (ac)-30,000 ac./yr (2018)
stream restoration (miles)

Fire behavior & post-wildfire effects in treated & untreated areas

- **↓ Ignition probability, crownfire potential & flame length (modeled)**
- **↓ % high severity (HS) burn, HS patch size (observed)**
- **↓ Debris flow risk & volume (modeled)**

Water quantity & quality

- **↑ Soil moisture, soil erosion & runoff (paired basin)**
- **↑ Herbaceous understory cover, ↓ Bare ground cover**

Mechanical treatments (ac.) – design features, BMPs & mitigation

Roads decommissioned (miles) – design features, BMPs & mitigation measures

Economic & Social Monitoring Metrics

Economic/Financial

Investment: # and type of donors, amount invested

Number & types of jobs generated from forest treatment projects

Percent of jobs held by NM residents

Tons of woody biomass sold & utilized

Types of wood products generated

Health of RGWF as a Collaborative (Annual Survey)

Number & diversity of Charter signatories & Advisory Board members

No. of signatories & members serving on Working Groups & in leadership positions

Type and status of restoration & fundraising activities that signatories undertake together

2016 Monitoring Initiatives

Roving Monitoring Team (Rob Strahan, NMFWRI)

- Assist private and agency land managers with pre- and post-treatment monitoring
- Chama Peak & Taos Valley landscapes & Isleta Project (USFS)

Citizen Science Monitoring Events (Krista Bonfantine, ALI)

Adaptive Management Process (Dec. 2016)

- Monitoring data will be analyzed/summarized (NMFWRI, TNC)
- Monitoring Technical Team meets to review data & recommend course corrections, as needed
- Charter Signatories for input → Executive Committee for review
- Monitoring data & results posted on RGWF Website

RIO GRANDE
WATER FUND
A Wildfire and Water Source Protection Project

Monitoring Working Group

Page Pegram (NMISC)

Bob Parmenter (VCNP)

Dan Shaw (BEMP)

Kim Eichhorst (BEMP)

Kim Fike (BEMP)

Katherine Yuhas (ABCWUA)

Rick Billings (ABCWUA)

Barbara Gastain (ABCWUA)

Sharon Sivinski (ABCWUA)

Steve Glass (Ciudad SWCD)

Abe Franklin (NMED)

Danny Katzman (LANL)

Jack Triepke (USFS)

Roy Jemison (USFS)

Shawn Martin (USFS)

Sue Harrelson (USFS)

Cliff Dahm (UNM)

Carrie Weitz (Intel)

RIO GRANDE
WATER FUND
A Wildfire and Water Source Protection Project

Signatories

1. NM Land Grant Council
2. NM Land Grant Consejo
3. Chama Peak Land Alliance
4. Forest Guild
5. NM Environment Dept.
6. Ciudad SWCD
7. Business Water Task Force
8. AMAFCA
9. Bernalillo County
10. NM Acequia Association
11. Trout Unlimited
12. USFWS
13. Valles Caldera NP
14. NM Forest Industry Assoc.
15. BLM
16. Sierra Club
17. BEMP
18. Nature Conservancy
19. NRCS
20. Rocky Mtn. Youth Corps
21. ABQ-BC Water Authority
22. Coronado SWCD
23. NM Museum Science
24. Edgewood SWCD
25. Claunch-Pinto SWCD
26. NM FWRI
27. Dekker/Perich/Sabatini
28. LOR Foundation
29. Taos County
30. US Army Corps of Engineers

RIO GRANDE
WATER FUND
A Wildfire and Water Source Protection Project

Signatories

31. Bohannan Huston
32. City of Santa Fe
33. Los Alamos County
34. MRGCD
35. NMA Conservation Districts
36. NMC Conservation Districts
37. NM Dept. Game & Fish
38. NM Interstate Stream Comm.
39. NM State Land Office
40. NM WDOC
41. Presbyterian Healthcare Serv.
42. Sandoval County
43. Souder Miller & Associates
44. Taos CEDC
45. Taos Land Trust
46. Town of Taos
47. University of New Mexico
48. USDA Forest Service
49. Village of Taos Ski Valley

RIO GRANDE
WATER FUND
A Wildfire and Water Source Protection Project

Adaptive Management Process

Identify Objectives

- Quantitative desired conditions

Plan & Implement Actions

Monitor Outcomes

- Indicators/metrics
- Data source, spatial scale
- Measurement & reporting frequency

Assess Results

Review & Revise Actions

Monitoring & Adaptive Management Framework

How effective are treatments in ↓ burn severity?

Objective: < 5% treated areas burn at HS; HS patches < 20 ac.

Metric: % treated areas at HS, size of high severity patches

Data source: MTBS, LANDSAT

Frequency: 2 yr. post-wildfire

Integrated Monitoring in Bird Conservation Regions (IMBCR)

Bird Conservancy of the Rockies

Chris White
Director of Science Operations

New Name!

- Formerly Rocky Mountain Bird Observatory
- Now **Bird Conservancy of the Rockies**

Bird Conservancy of the Rockies

IMBCR Partnership Objectives

1. Density estimates, population size, and occupancy estimates;
2. Long-term status and trend data;
3. Design framework to integrate bird monitoring efforts in the region;
4. Habitat association data to address habitat management issues;
5. Maintain a high-quality database;
6. Generate decision support tools

Bird Conservancy of the Rockies

Integrated Monitoring in Bird Conservation Regions (IMBCR)

- One of the largest breeding bird monitoring programs in the nation
- Statistically rigorous design with a clearly defined sampling frame
- Coordination among partners can reduce the costs and increase efficiencies
  - Joint analysis by species
  - more detections
  - higher precision of estimates
- Nested design
- Can be used for other taxa

Bird Conservancy of the Rockies

IMBCR Partners

IMBCR Anticipated Growth

2015 Effort
1.2 million km²

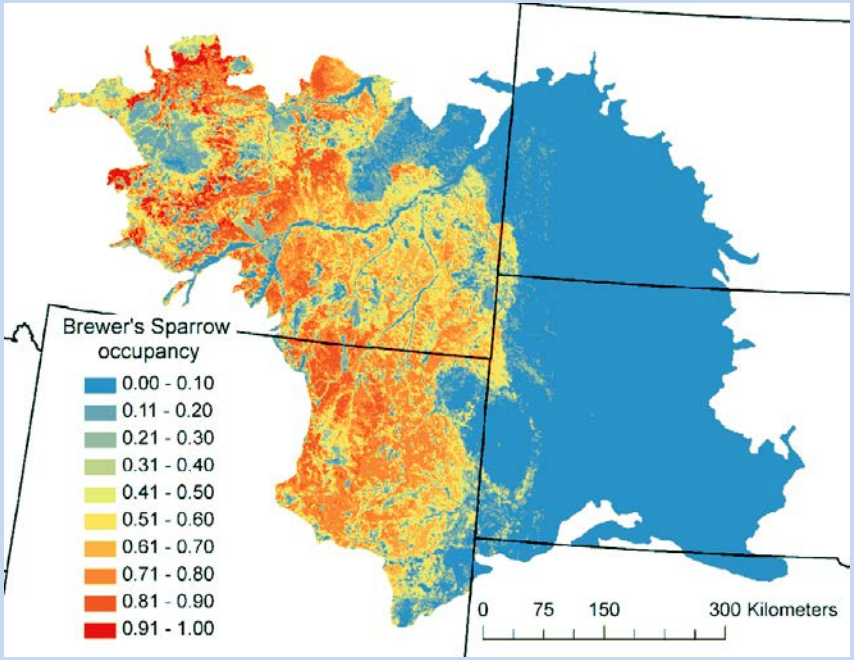
2016 Effort
↑ 785,000 km²

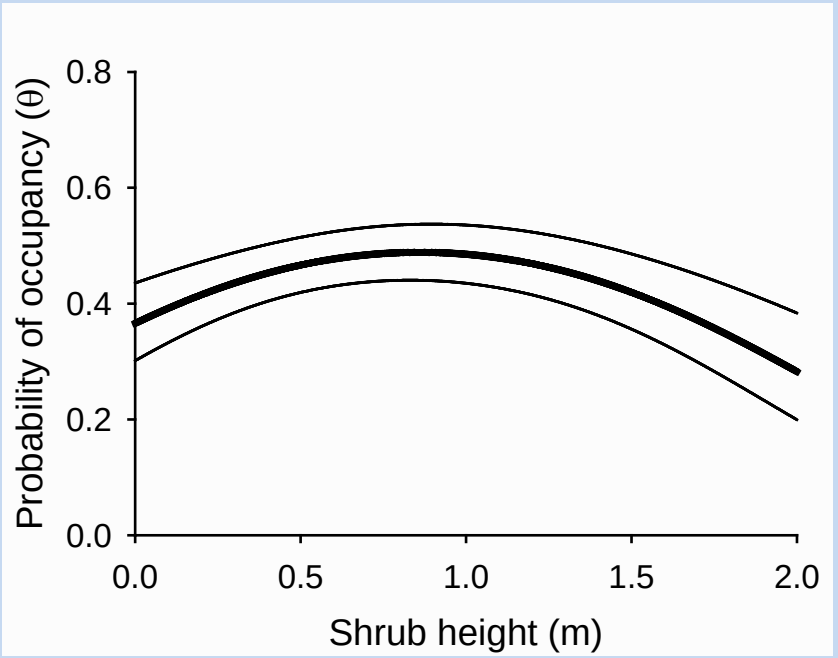
2017 Projection
↑ 497,000 km²

2017 Effort
2.5 million km²

IMBCR Conservation Applications

- Density, population and occupancy estimates at stratum and regional levels
- Habitat modeling
  - Ex: Spruce Beetle Project in CO
- Predictive Occupancy and Density Mapping





Rocky Mountain Avian Data Center

- Node of the Avian Knowledge Network
- Data Collection – protocols and data sheets
- Explore and Download Summarized Data:
  - Maps
  - Estimates of density and occupancy
  - Species Lists
- Raw data download for Partners (password protected)


Questions?
Bird
Conservancy
of the Rockies

Broader-scale Monitoring

GOALS AND SCALES

Forest Plan Monitoring Aspects

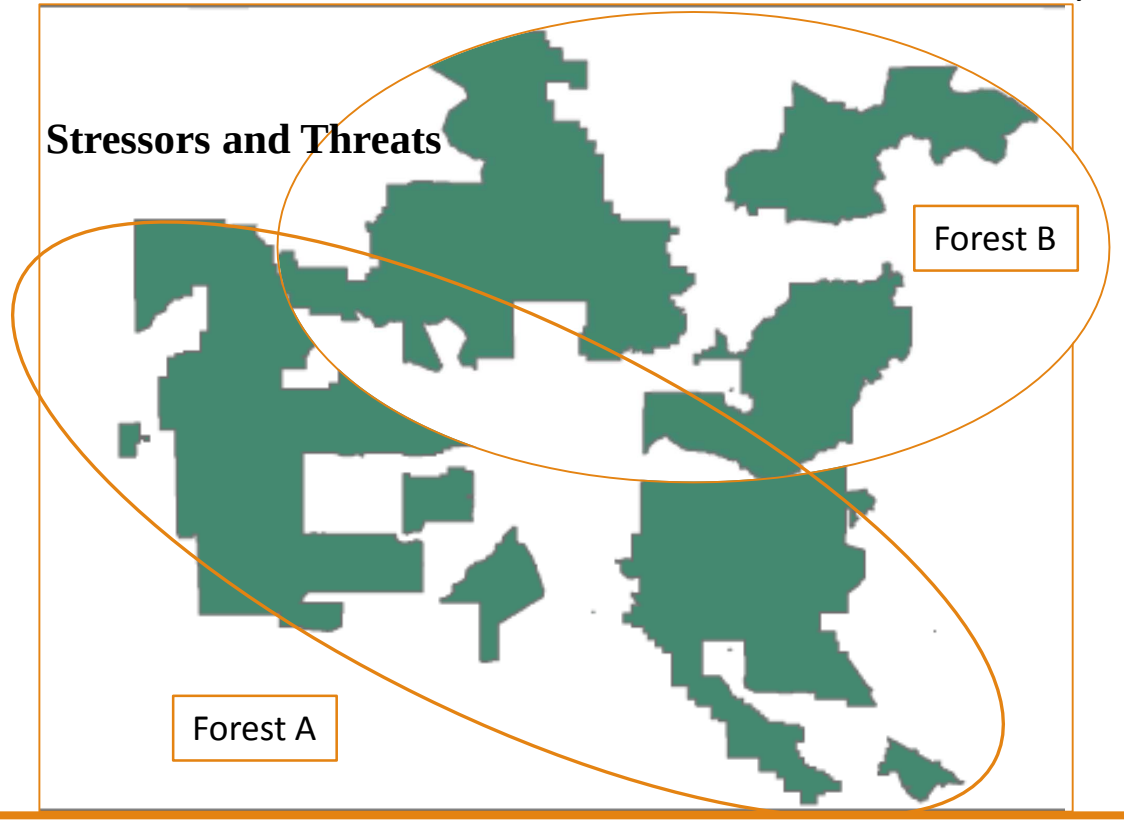
Better inform forest-level decisions

- Test relevant assumptions
- Measure management effectiveness in order to assess progress toward achieving or maintaining desired conditions
- Track relevant changes, including, but not limited to:
  - Risks, stressors and conditions beyond unit boundaries

Forest Plan Monitoring Aspects

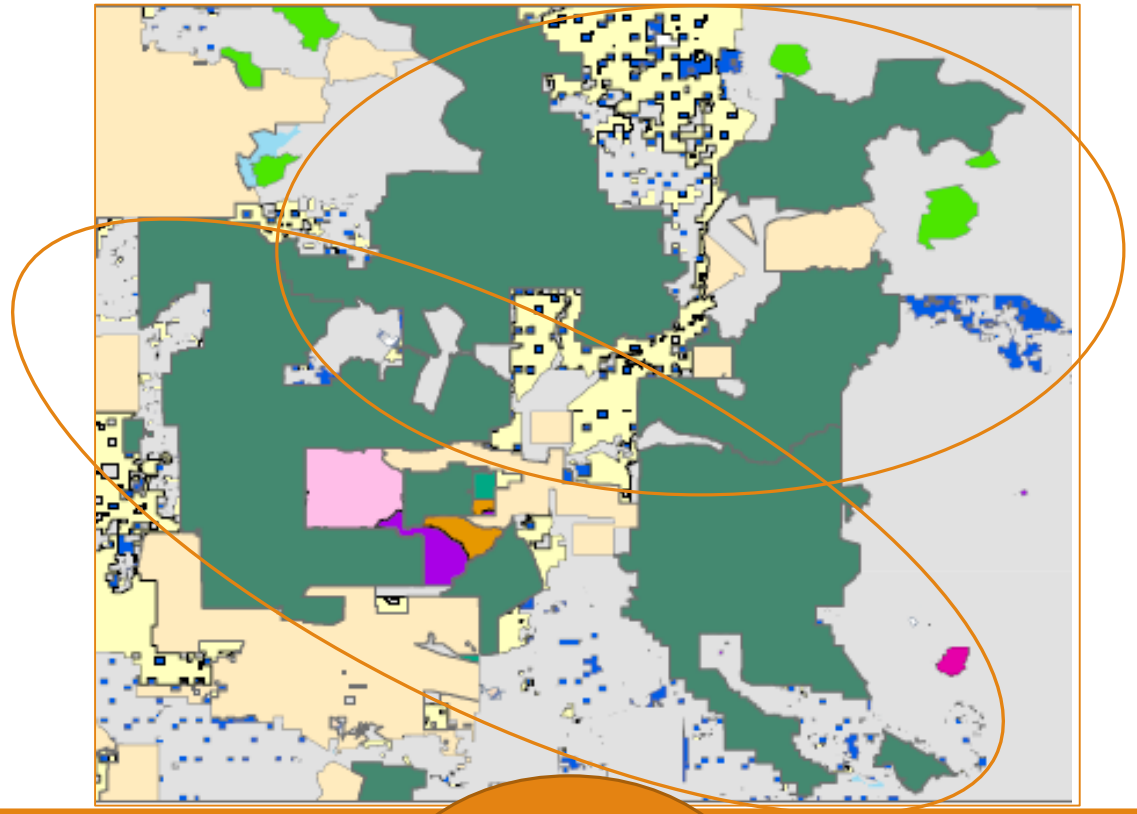
Forest Plan Monitoring

Responsibility of Forest Supervisor
Forest Unit lands, with assessment of stressors and threats beyond



Broader-scale Monitoring (BSM)

BSM provides consistent and complementary data for questions common to two or more plan areas



Forest Plan Monitor

National & Regional Capacity

BSM substrategies may be developed by the Region, in conjunction with the Forests.

BSM substrategies may be developed from existing National and Regional monitoring.

Existing Research Programs

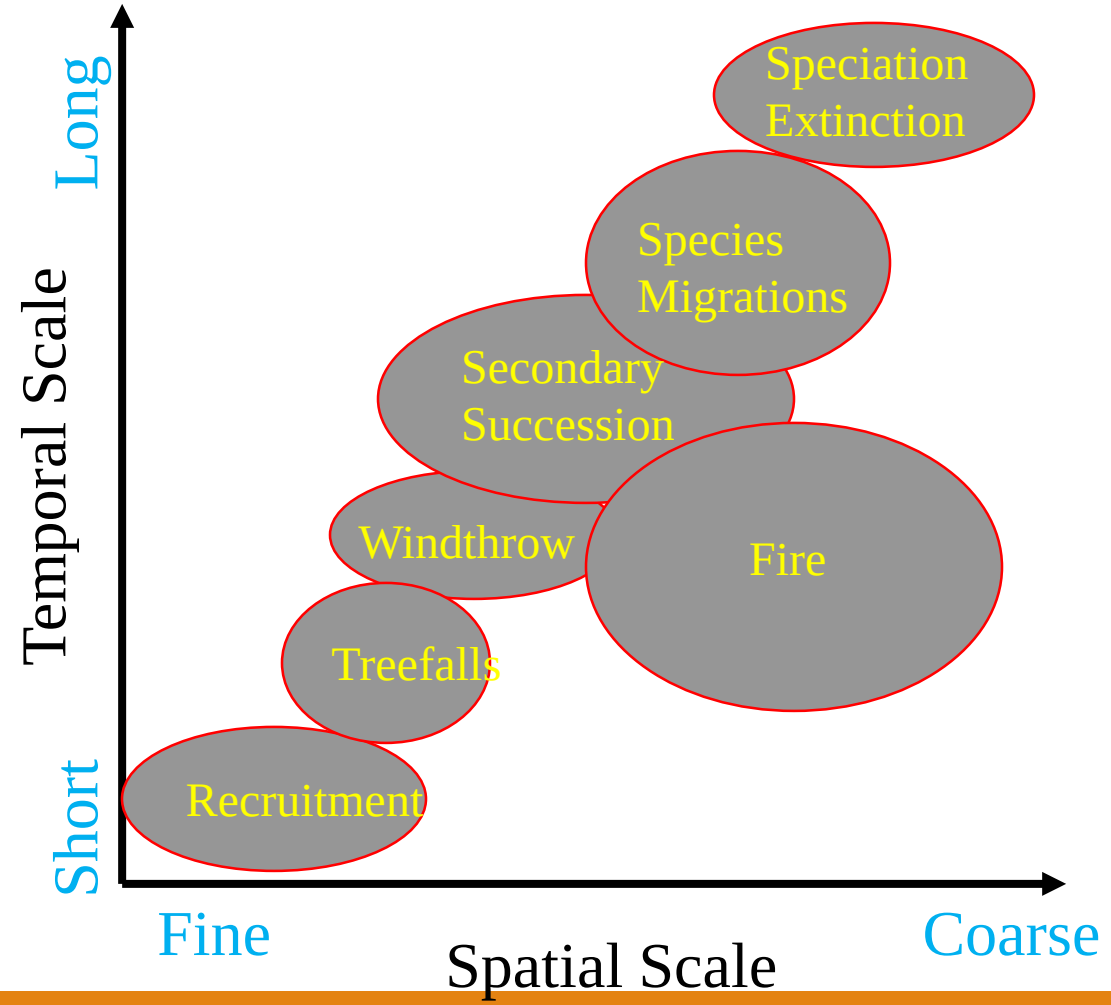
External Partner Programs

National & Regional Monitoring

BSM substrategies may be developed with partners and the public.

BSM substrategies may be adopted from external partners.

Ecological Scaling



- Ecological phenomena occur at various scales of space & time
- To understand these, we must select the appropriate scale

Ecological Scale

- Ecological phenomena have spatial & temporal variability
  - Vegetation patterns
  - Biotic responses
  - Disturbance regimes
  - Etc.

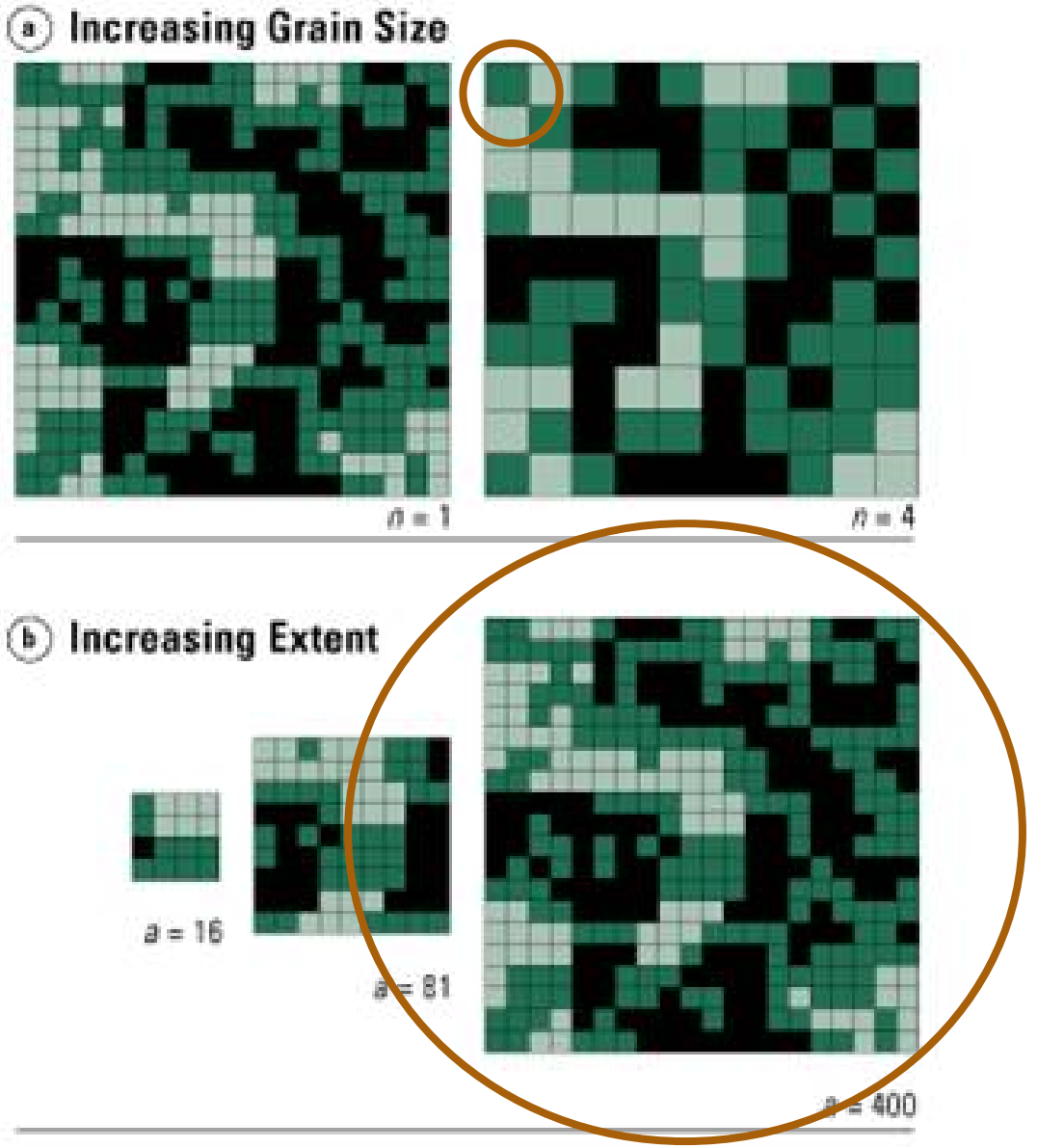
Scale : the spatial or temporal dimension of an object or process, characterized by both ***grain*** and ***extent*** **(**Turner et al. 1989)

Components of Scale

- Characterized by:
  - Grain
  - Extent

- ***Grain*** – finest ***spatial resolution*** (cell size or pixel size)

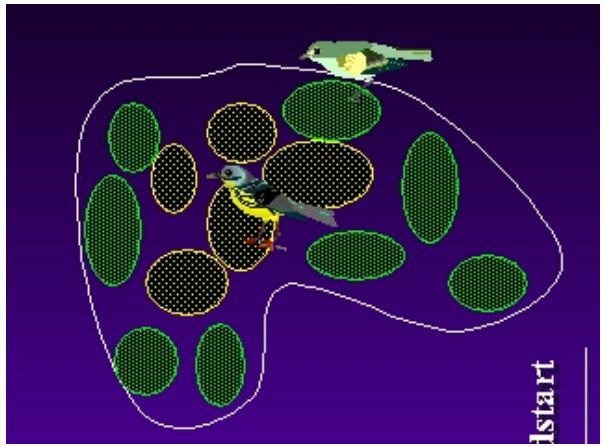
- ***Extent*** – the ***size*** of the overall study landscape (multi-forest, watershed, HUC, ecoregion)



Ecological Scaling: Components of Scale

- Grain and extent often dictated by scale of available spatial data (e.g. spatial layers & imagery), logistics, or technical capabilities

Ecological Scaling: Scale & Pattern

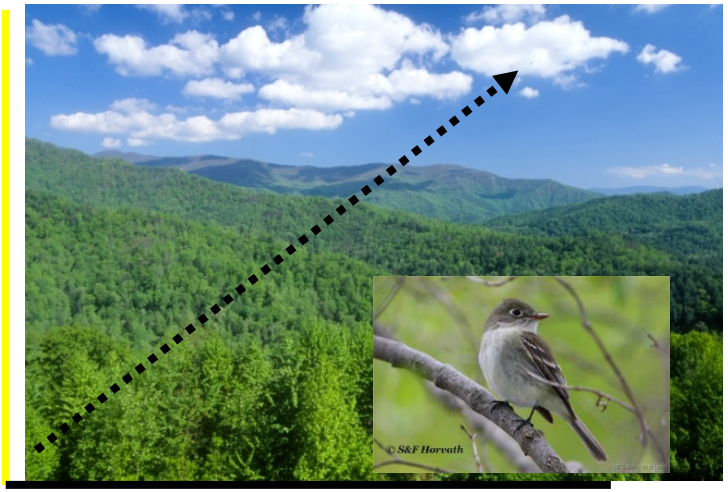


- Different patterns emerge, depending on the scale of investigation

Local Scale
(4 ha plots)

Western Bluebird

Regional Scale
(thousands of ha)



Least Flycatcher

Ecological Inference:
Patterns and Scale Matter

How Do:

Habitat types

Patch sizes

Patch Arrangement

Connectivity

Affect:

Species Distributions

Community Parameters

Ecosystem Processes

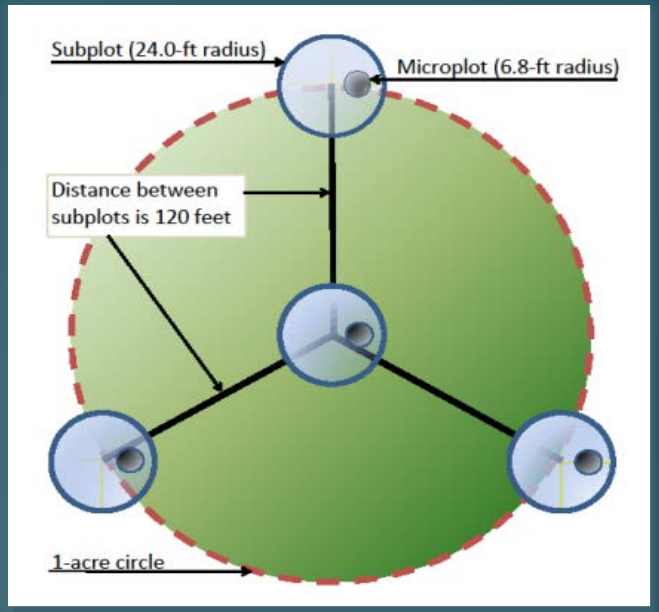
Wildlife Applications for the Forest Inventory and Analysis program

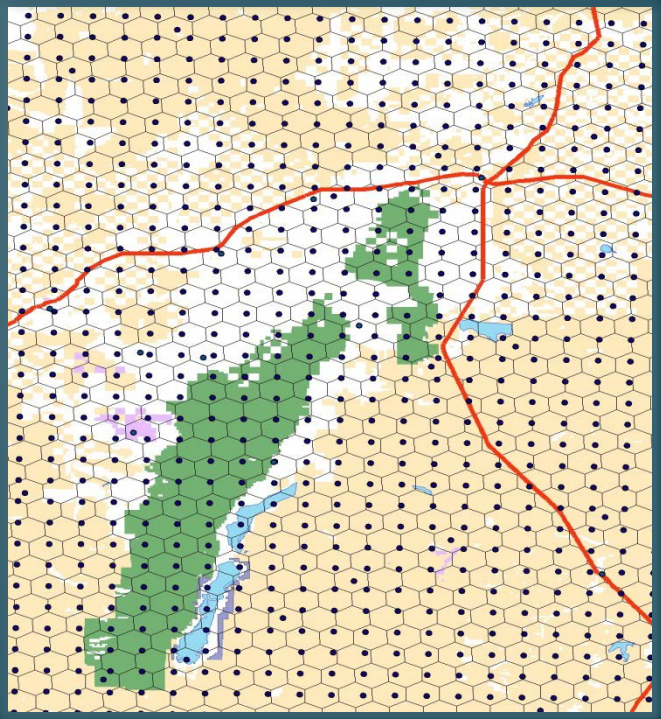
Chris Witt, Ecologist, USFS Rocky Mountain Research Station, Forest Inventory and Analysis program

What we do…

Nation's Forest Census

- Across all ownerships
- Plots located on grid ≈ 1 plot per 6000 acres
- 10 percent of a state's plots are visited (revisited) each year
- > 120 forest/tree attributes measured
- Provide area estimates and trends at landscape scales

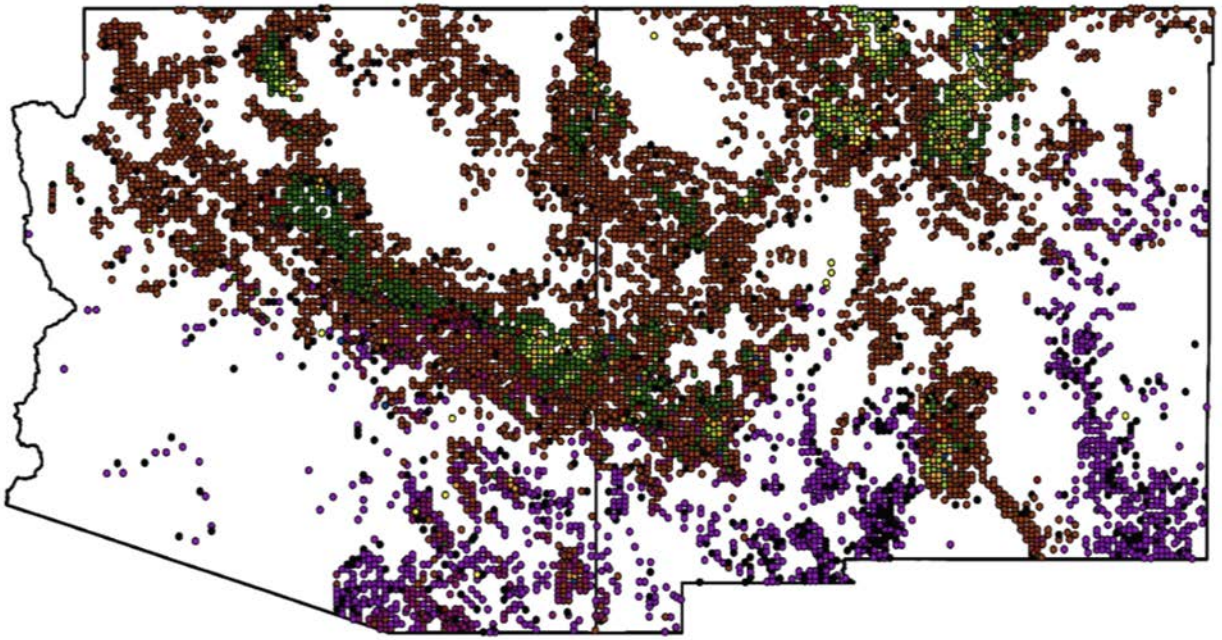




Where we go…

- All forest lands in U.S.
- 8,099 forested plots in Region 3

3,619 (1,476 NFS) forested plots in Arizona



4,480 (1,562 NFS) forested plots in New Mexico

What we measure…

Plot-level attributes

- forest type
- stand-age
- ownership
- tree cover by layer
- canopy cover
- basal area
- elevation
- Aspect

Examples – mule deer winter range, lynx dens, pinyon jay habitat

Tree-level attributes

- diameter
- height
- status
- decay class
- species
- disease
- annual growth

Examples- fisher dens, bat roosts, cavity-nesting birds

What we measure…

Understory vegetation

- Cover of most common (up to four) species of:
  - Trees
  - Shrubs
  - Graminiod
  - forbs
- Cover of each of the growth habits by layer
- Aerial cover of each growth habit

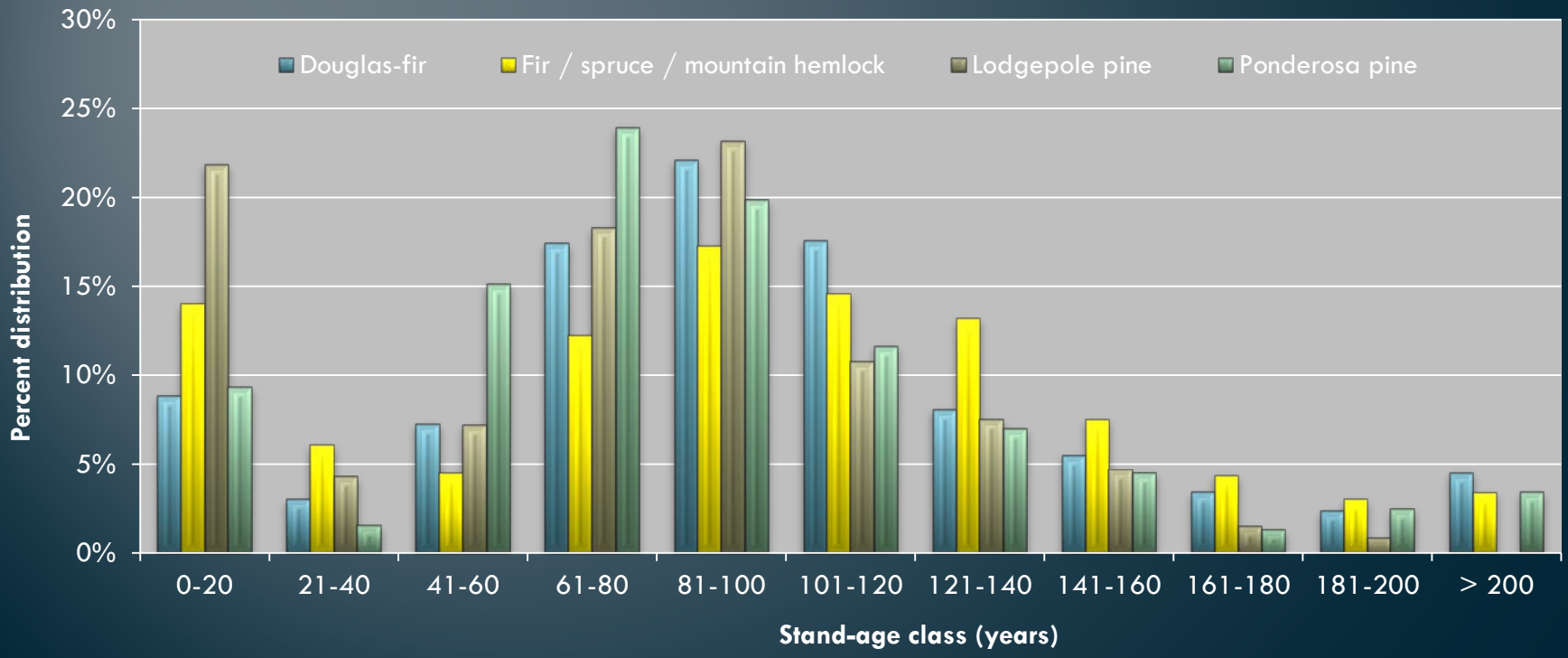
Down woody material

- Mean number of logs > 3” d.b.h.
- Mean cover of fine woody material (3 size classes< 3’ d.b.h.)
- Mean depth of litter and duff

How we use it…

Population-level estimates:

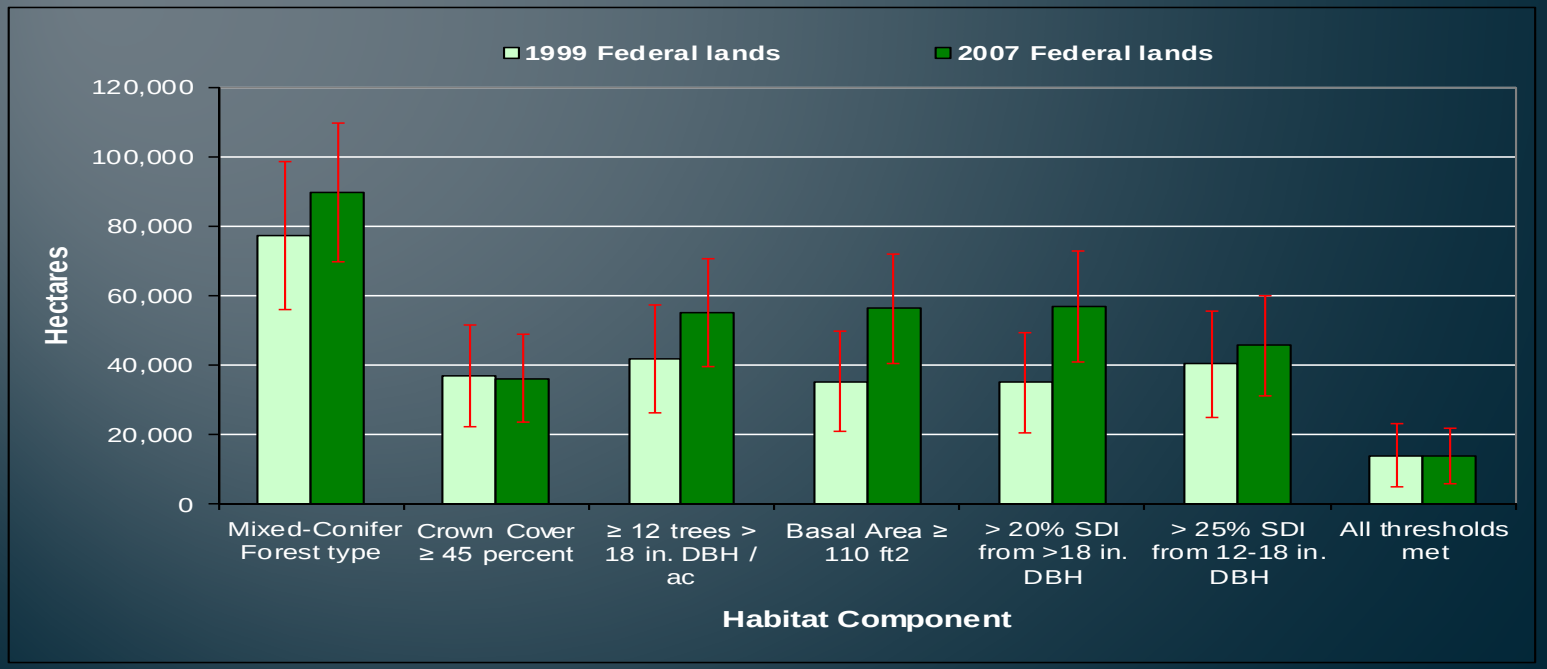
- Quantifying resources at the level of a Forest District, County, or State.
- Tracking forest health, disturbance, growth and removals



How we use it...

Monitoring:

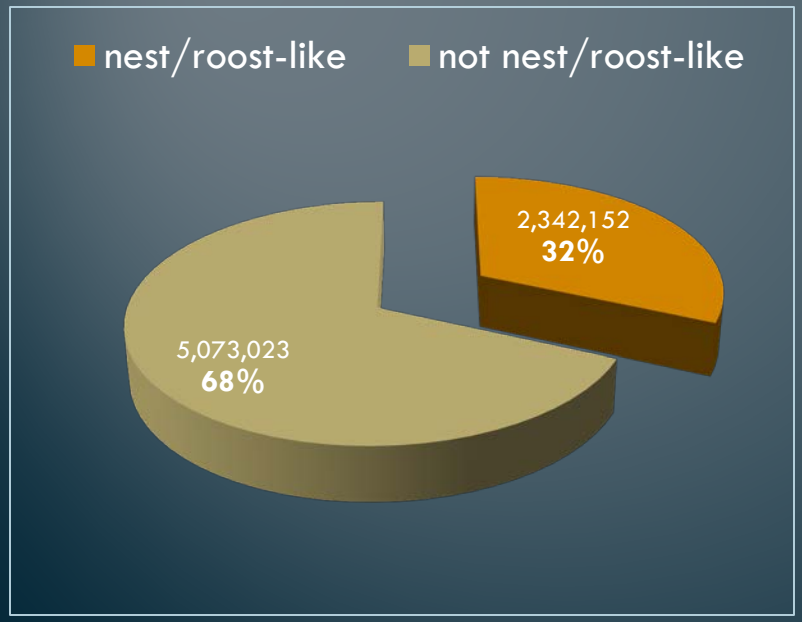
- Tracking changes in resources over time
- Assessing effectiveness of management plans

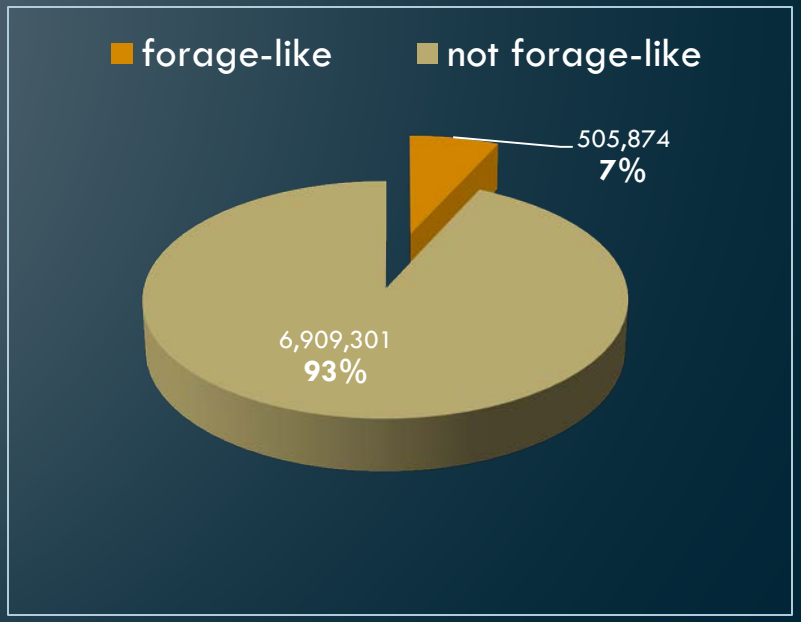


How we use it…

Habitat assessment:

- Quantifying habitat at landscape scales
- Identifying limiting resources

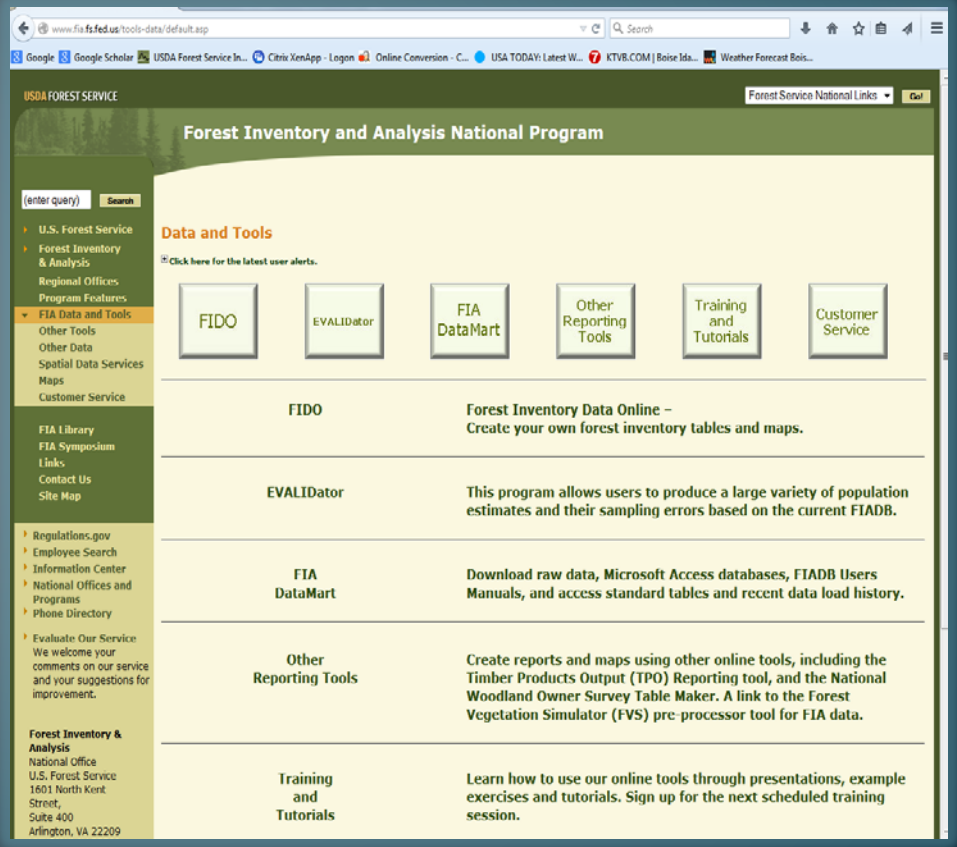




Where is the data?

- Data portals are at:

  http://www.fia.fs.fed.us/tools-data/default.asp



- Assistance with data access and analysis:

  chriswitt@fs.fed.us (208) 373-4370

New Mexico RNA Climate Change Network Project

Using Research Natural Areas (RNAs)

and

Areas of Critical Environmental Concern (ACECs)

to

Track Plant and Animal Responses to Climate Change

Across the Southwest

Esteban Muldavin and Natalia Moore
Natural Heritage New Mexico
University of New Mexico
muldavin@unm.edu

Jack Triepke, Regional Ecologist
Region 3, USFS

NATURAL HERITAGE NEW MEXICO
Museum of Southwestern Biology
THE UNIVERSITY of NEW MEXICO

Rocky Mountain Research Station
Grassland, Shrubland and Desert Ecosystems Science Program

FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE

*RNAs and ACECs

* Designated federal lands established to protect biological and/or cultural values and conduct research

* Few roads—no grazing, wood harvest, mining, buildings, and other human impacts

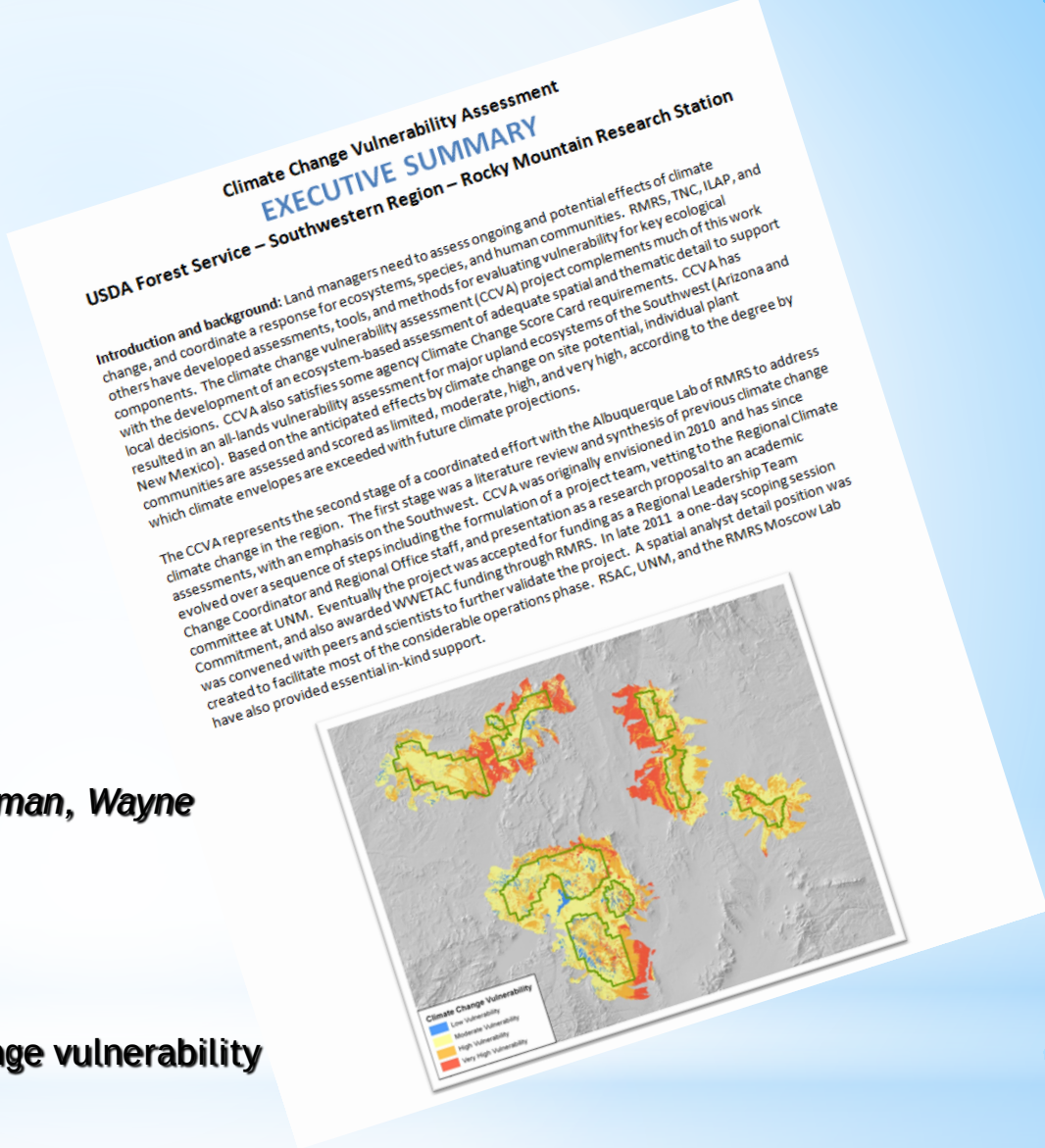
* Ideal for tracking climate-driven ecological change

* 56 RNAs (18 established, 38 proposed) and 175 ACECs being databased: establishment records, maps, data and publications

Turkey Creek
Gila

*Climate Change Monitoring Network

- **Development of a network of sites based on climate change models that will be particularly sensitive to ecological change.**


Climate Change Vulnerability Assessment

EXECUTIVE SUMMARY

USDA Forest Service – Southwestern Region – Rocky Mountain Research Station

Introduction and background: Land managers need to assess ongoing and potential effects of climate change, and coordinate a response for ecosystems, species, and human communities. RMRS, TNC, ILAP, and others have developed assessments, tools, and methods for evaluating vulnerability for key ecological components. The climate change vulnerability assessment (CCVA) project complements much of this work with the development of an ecosystem-based assessment of adequate spatial and thematic detail to support local decisions. CCVA also satisfies some agency Climate Change Score Card requirements. CCVA has resulted in an all-lands vulnerability assessment for major upland ecosystems of the Southwest (Arizona and New Mexico). Based on the anticipated effects by climate change on site potential, individual plant communities are assessed and scored as limited, moderate, high, and very high, according to the degree by which climate envelopes are exceeded with future climate projections.

The CCVA represents the second stage of a coordinated effort with the Albuquerque Lab of RMRS to address climate change in the region. The first stage was a literature review and synthesis of previous climate change assessments, with an emphasis on the Southwest. CCVA was originally envisioned in 2010 and has since evolved over a sequence of steps including the formulation of a project team, vetting to the Regional Climate Change Coordinator and Regional Office staff, and presentation as a research proposal to an academic Committee at UNM. Eventually the project was accepted for funding as a Regional Leadership Team Commitment, and also awarded WWETAC funding through RMRS. In late 2011 a one-day scoping session was convened with peers and scientists to further validate the project. A spatial analyst detail position was created to facilitate most of the considerable operations phase. RSAC, UNM, and the RMRS Moscow Lab have also provided essential in-kind support.

Jack Triepke, Max Wahlberg, Richard Periman, Wayne Robbie, Esteban Muldavin

- Spatial probability analysis of climate change vulnerability
- All lands, all ecosystems
- Builds on existing information (e.g., TEUI)
- Consistent with R3 Ecosystem Response Unit (ERU) framework

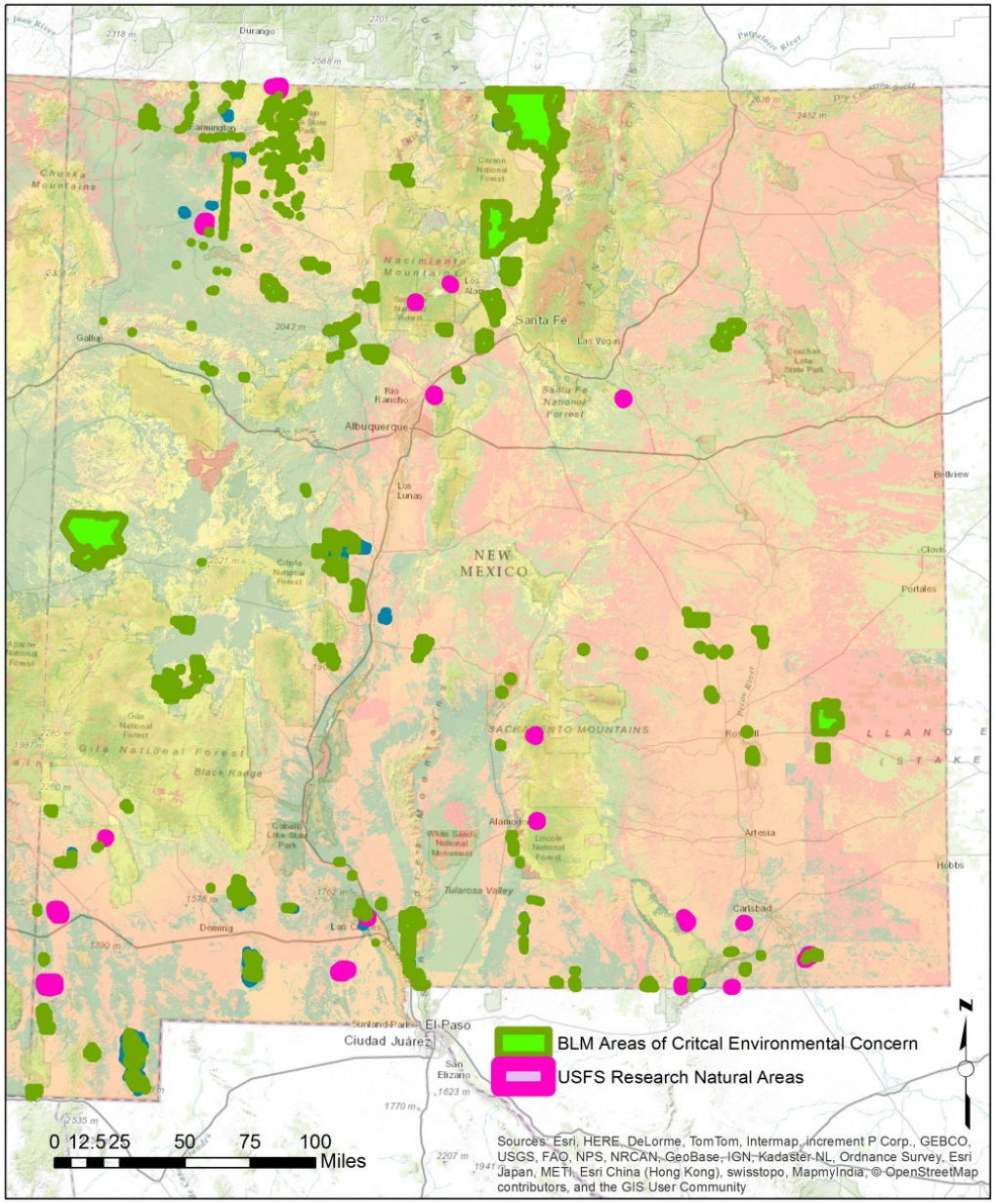
* New Mexico Project

Which sites are projected to be the most sensitive?

Logistically useful?

Eventually add other areas (refuges, parks, etc.)

Reasonable targets for researchers, students and the public



*CITIZEN SCIENCE OPPORTUNITIES

Valle Vidal

- ***Document landscape-scale changes through repeat photography based on historical photos***
- ***Track forest health by monitoring tree mortality and seedling establishment***
- ***Participation in guided ecological data collection***
- ***BioBlitz inventories of plant and animal species***
- ***Collaborating with New Mexico Natural History Museum for first events in spring of 2017***

*Data Stewardship

- **The data repository will be the on-line**

New Mexico Conservation Information System (NM-CIS)

- **Provide portals for entering and retrieving data by scientists, students, and the public**

- **Keeping it meaningful: good questions, curation, and QC**


NatureServe
A Network Connecting Science With Conservation

CITIZEN SCIENCE STRATEGY

WORK TOGETHER: CITIZEN SCIENTISTS AND THE NATURESERVE NETWORK

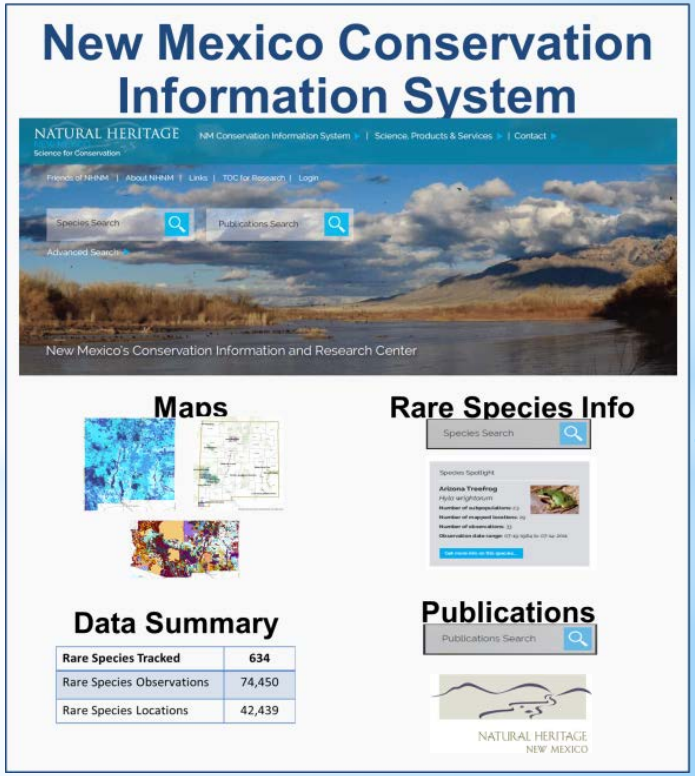
Citizen science taps the human passion for exploration and discovery to illuminate our understanding of the natural world. Functioning as both a scientific methodology and an organizing principle, citizen science encourages amateur participants (who, in the word's original sense, do the work for love, not money) to take an active part in creating knowledge by aligning their interests and labor with those of professional scientists.

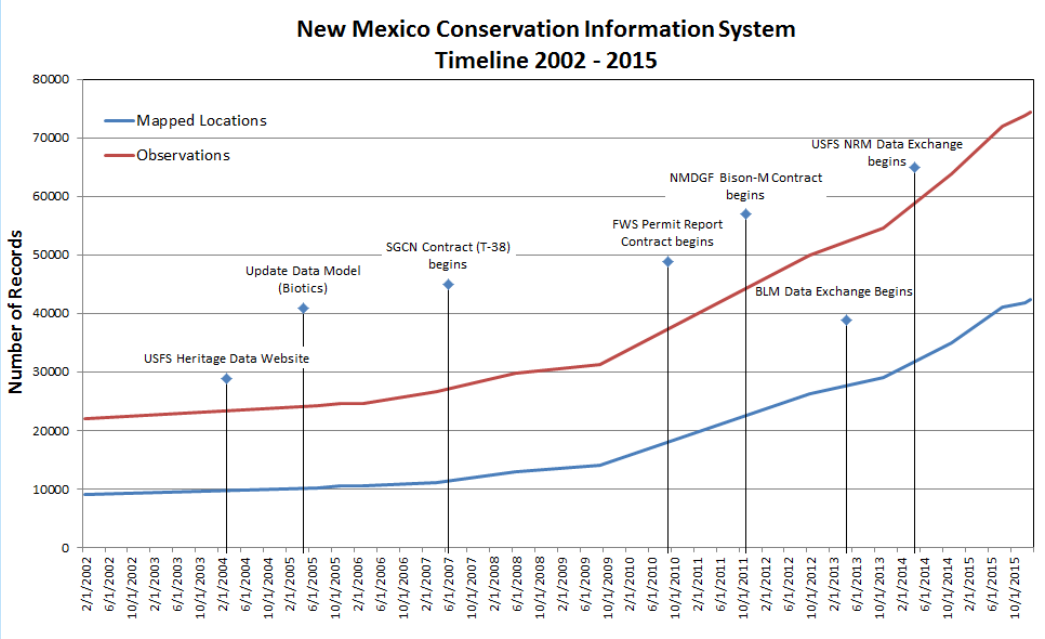
Public participation in scientific research for the common good is not new: its history is deeply rooted in ideals of the Enlightenment and American populism, as natural expressions of intellectual liberty and local, civic identity. Citizen science provides significant societal benefits by increasing scientific knowledge and capacity, promoting scientific literacy, and encouraging broad public engagement in decision-making about natural resource use and management. Thanks to advances in handheld computing, online mapping, and web technologies, nearly anyone on Earth can collect valuable data on species, their habitats, and the rapid changes impacting them both—though, to be sure, birders, naturalists, gardeners, hunters, fishers, trappers, ranchers, students, teachers, and other outdoor enthusiasts are the most likely contributors.

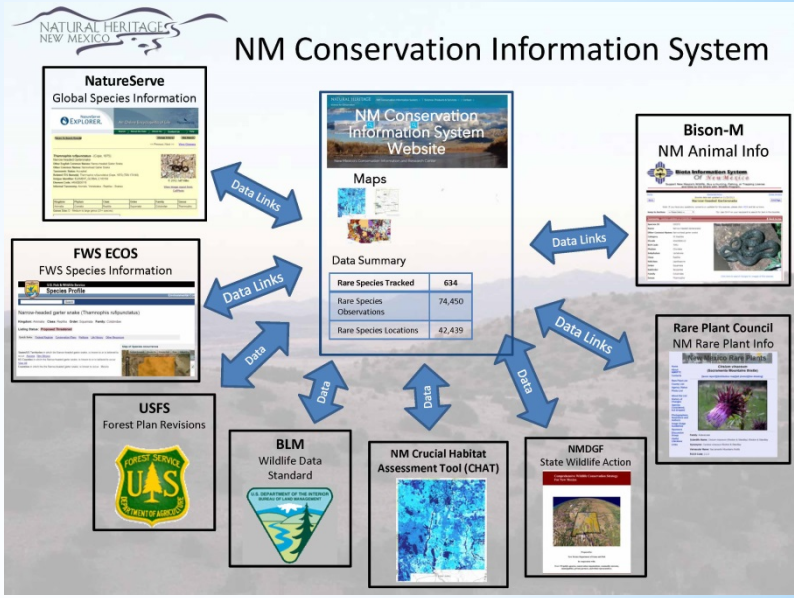
The NatureServe network has four decades of experience developing scientific knowledge to guide conservation of rare and imperiled species and all types of ecosystems worldwide. NatureServe uniquely possesses a combination of existing data, expertise, application tools, and network of partnerships to maximally leverage the opportunity offered by citizen science. Although many network members participate in citizen-science projects (briefly detailed in *Appendix 1*), NatureServe has not had a formal approach for incorporating data from such efforts into our methods. As a result, we have neither developed specific data standards and tools nor implemented the business processes needed to incorporate citizen science data with our international datasets and maps

Photos in this document highlight activities during a Goldman Sachs Community Team Works project co-hosted by the New York Natural Heritage Program (http://www.nynhp.org) and NatureServe at Breezy Point, Long Island, in August 2011.

Suggested Citation
Ormes, Margaret, Mary Klein, Kathy Goodin, Healy Hamilton, and Kyle Copas. 2014. NatureServe Citizen Science Strategy. Arlington, VA: NatureServe.







* **Ecological Monitoring Databases**

Post fire monitoring: Bandelier, Carlsbad Caverns, San Andres NWR, Sevilleta NWR

Vegetation plots: 14,419 plus 1,828 TEUI veg plots (ILAP) from the 80's onward

Riparian: Middle Rio Grande Hink and Ohmart transects from the 80s; Santa Ana Trees (7 yrs)

Albuquerque Overbank Project (15 years)

Ecological Survey of the Big Bend Area – 71 plots (1956)

*RNA Project Impact

* ***Supports research on climate change impacts across a large area (multijurisdictional)***

* ***Provides information to help guide land management***

* ***Contributes to the New Mexico Conservation Survey***

  Do you have data to contribute?

  * muldavin@unm.edu

* ***Public engagement and stewardship support for interesting and scenic places***

William Telfer

NATURAL HERITAGE NEW MEXICO

Museum of Southwestern Biology

THE UNIVERSITY of NEW MEXICO

Rocky Mountain Research Station

Grassland, Shrubland and Desert Ecosystems Science Program

FOREST SERVICE

USDA

DEPARTMENT OF AGRICULTURE

United States Department of Agriculture Forest Service

The Role of Remote Sensing in Broader-scale Environmental Monitoring:

USFS RSAC Overview and Example Applications

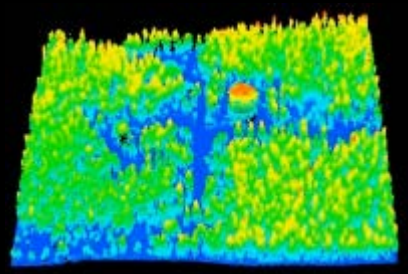
Mark Finco, PhD
Senior Scientist
RedCastle Resources, Inc.

Dave Vanderzanden
Program Leader

USDA Forest Service
Remote Sensing Applications Center (RSAC)
Salt Lake City, Utah

Talk Overview

- USFS Remote Sensing Applications Center
  - Mission, Organization, Capacity, Services
- Example Monitoring Applications
  - Monitoring Trends in Burn Severity (MTBS)
  - FHP Forest Disturbance Monitor (FDM)
  - Image-based Change Estimation (ICE)



USDA

Forest Service Chief

- International Programs

Deputy Chief State & Private

- Fire & Aviation
- Forest Health
- Cooperative Forestry
- Community Ed
- Urban and Community Forestry
- Tribal Relations

Deputy Chief Nat'l Forest System

- Regional Offices & National Forests
- Ecosystem Management Coordination
- Forest Management
- Lands
- Minerals & Geology
- Range Management
- Rec & Heritage
- Watershed, Fish, Wildlife, Air, and Rare Plants
- **Engineering, Technology, and Geospatial Services**

Deputy Chief Research

- Landscape Restoration & Ecosystem Services
- Sustainable Forest Mgmt
- Policy Analysis
- Inventory, Monitoring & Assessment

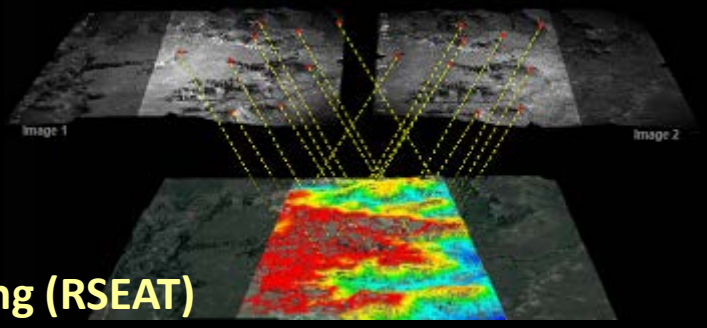
Deputy Chief Business Ops

- Chief Information Office
- Human Relations
- Budgeting and Acquisition

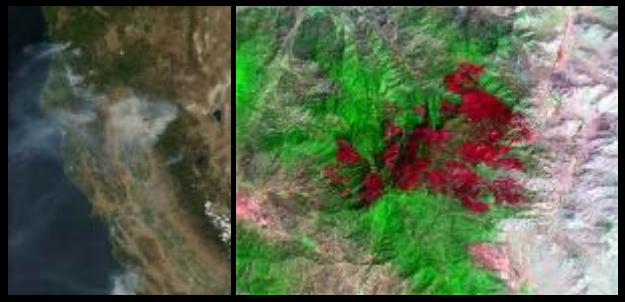
Remote Sensing Applications Center (RSAC)

- Detached WO - National Technical Center
- Located in Salt Lake City, Utah
- *Mission:* Provide assistance to agency units and national programs in applying the advanced remote sensing / geospatial technologies for improved inventory, mapping and monitoring of natural resources.

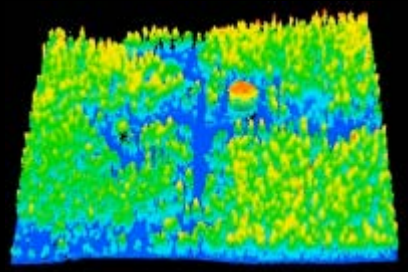
RSAC Organization



- **Center Director (Vacant)**
- **4 Program areas:**
  - **Remote Sensing Evaluation, Application & Training (RSEAT)**
    - Haans Fisk
  - **Resource Mapping, Inventory & Monitoring (RMIM)**
    - Kevin Megown
  - **Rapid Disturbance Assessment & Services (RDAS)**
    - Brad Quayle
  - **Enterprise Data & Services (EDS)**
    - Dave Vanderzanden



- **10 federal FTEs, ~50 contract staff**
  - A blend of highly skilled technical staff - remote sensing, image processing, GIS, IT, and natural resource management



USDA

RSAC Core Competencies

- Satellite data processing and analysis
- Geospatial analysis programming
- Resource applications knowledge
- Inventory / RS integration
- Lidar processing and analysis
- Statistical big data analysis
- Project scoping and management
- Training development and delivery
- Software tools and web development
- Geospatial / science communications and design

USDA

Accessing RSAC Services

National Steering Committees

- Remote Sensing Steering Committee (RSSC)
- Forest Inventory & Analysis Techniques Research Band (TRB)
- Geospatial Management Advisory Group (GMAG)
- Inventory Monitoring Technology Development Steering Committee (IMTDSC)
- Tactical Fire Remote Sensing Advisory Committee (TFRSAC)

Direct Programmatic Support

- Information Resource Decision Board
- Forest Inventory & Analysis (FIA) Program
- FHP Forest Health Technology Enterprise Team
- Fire & Aviation Management – NIFC
- Burn Area Emergency Response (BAER) Coordinators
- WO CIO Image Processing System, Help desk
- WO Ecosystem Management Coordination

Reimbursable Project Support to USFS Units and Stakeholders

- Technical consultation
- Geospatial data development – cooperative projects
- Acquiring, processing and analyzing imagery
- International geospatial and REDD/REDD+ applications support
- Toolkit and applications development
- Data services

USDA

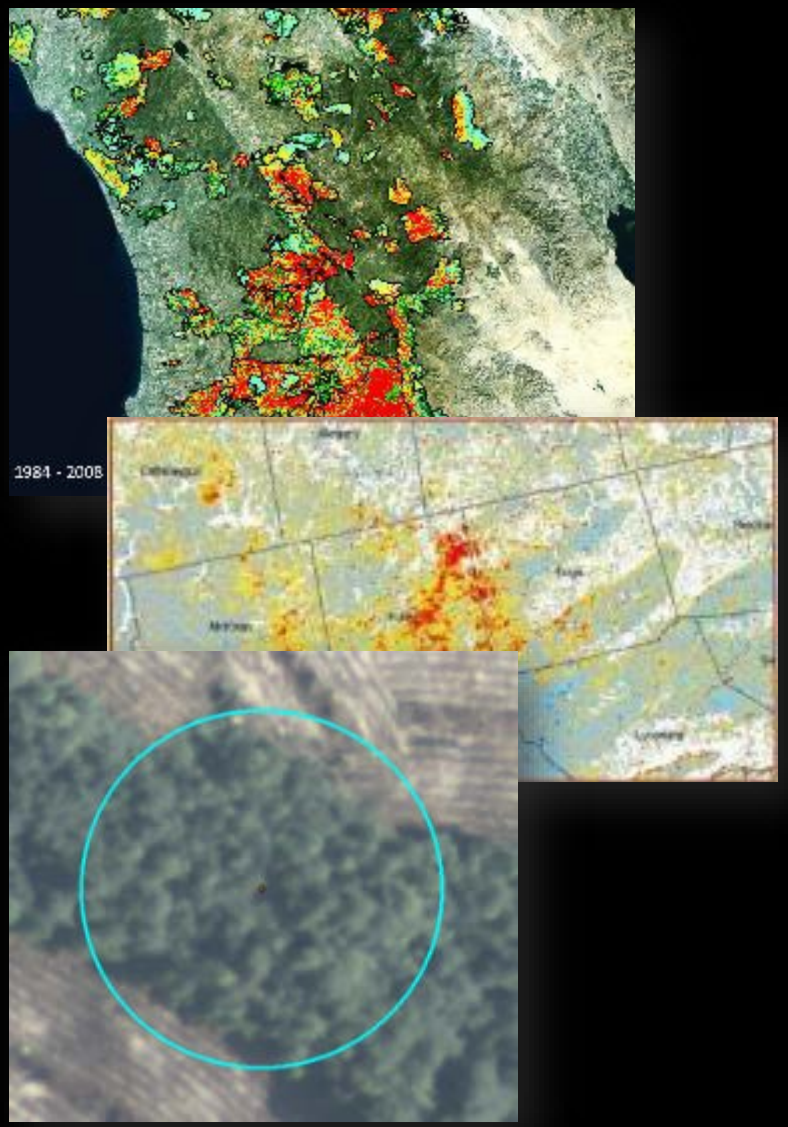
Geospatial Technology & Application Center (GTAC)

- 2 Geospatial Centers in Salt Lake City
  - Remote Sensing Applications Center (RSAC)
  - Geospatial Service and Technology Center (GSTC)
- Center integration underway – Summer 2016
- “What” is unaffected. “Who/How” may be.
- Minimize Stakeholder Impact

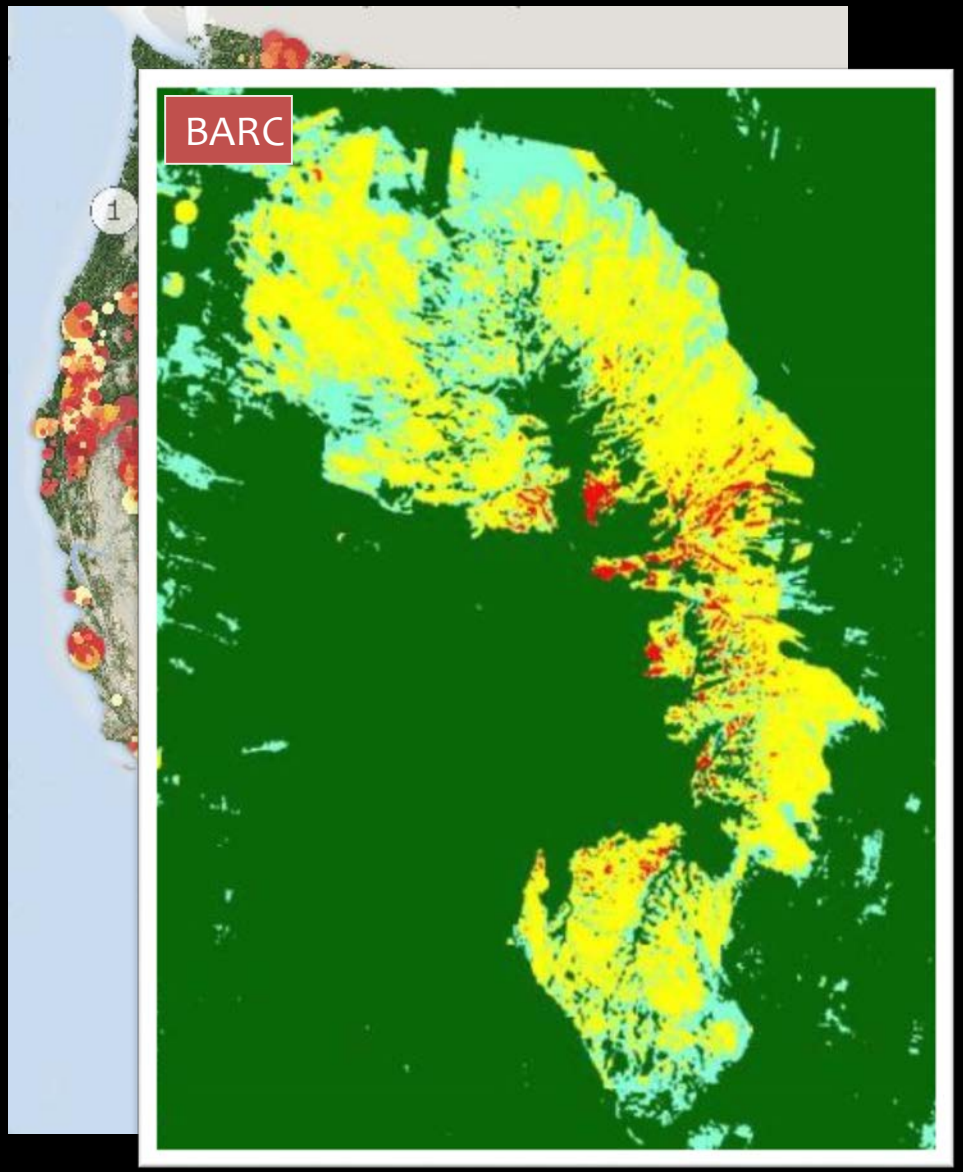
USDA

Example RS Monitoring Applications

- Monitoring Trends in Burn Severity (MTBS)
- FHP Real-Time Forest Disturbance (ICE)
- FIA Image-based Change Estimation (RTFD)



Monitoring Trends in Burn Severity (MTBS)



- Location, Extent, Severity
- 1984-Present
- >1000 acres (W), >500 acres (E)
- 30-m Landsat
- Standardized Methods
- Database input from all states, NASF, and all federal agencies

USDA

MTBS Data Access

Monitoring Trends in Burn Severity (MTBS)

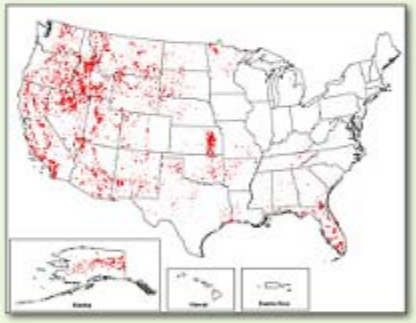
- Home
- What's NEW?
- Background and Partners
- Documents and References
- Methods
- Product Descriptions
- Mapping Status
- Applying MTBS Data
- Project Reports
- Data Access
- Tech Transfer
- Glossary
- Related Websites
- FAQs
- Contact Us

National Geospatial Data

Accessing National MTBS Datasets

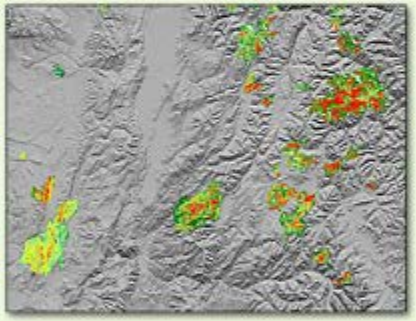
National MTBS datasets are accessible via the links below:

National MTBS Burned Area Boundaries Dataset



National MTBS Fire Occurrence Dataset

National MTBS Burn Severity Mosaics



MTBS Map Services

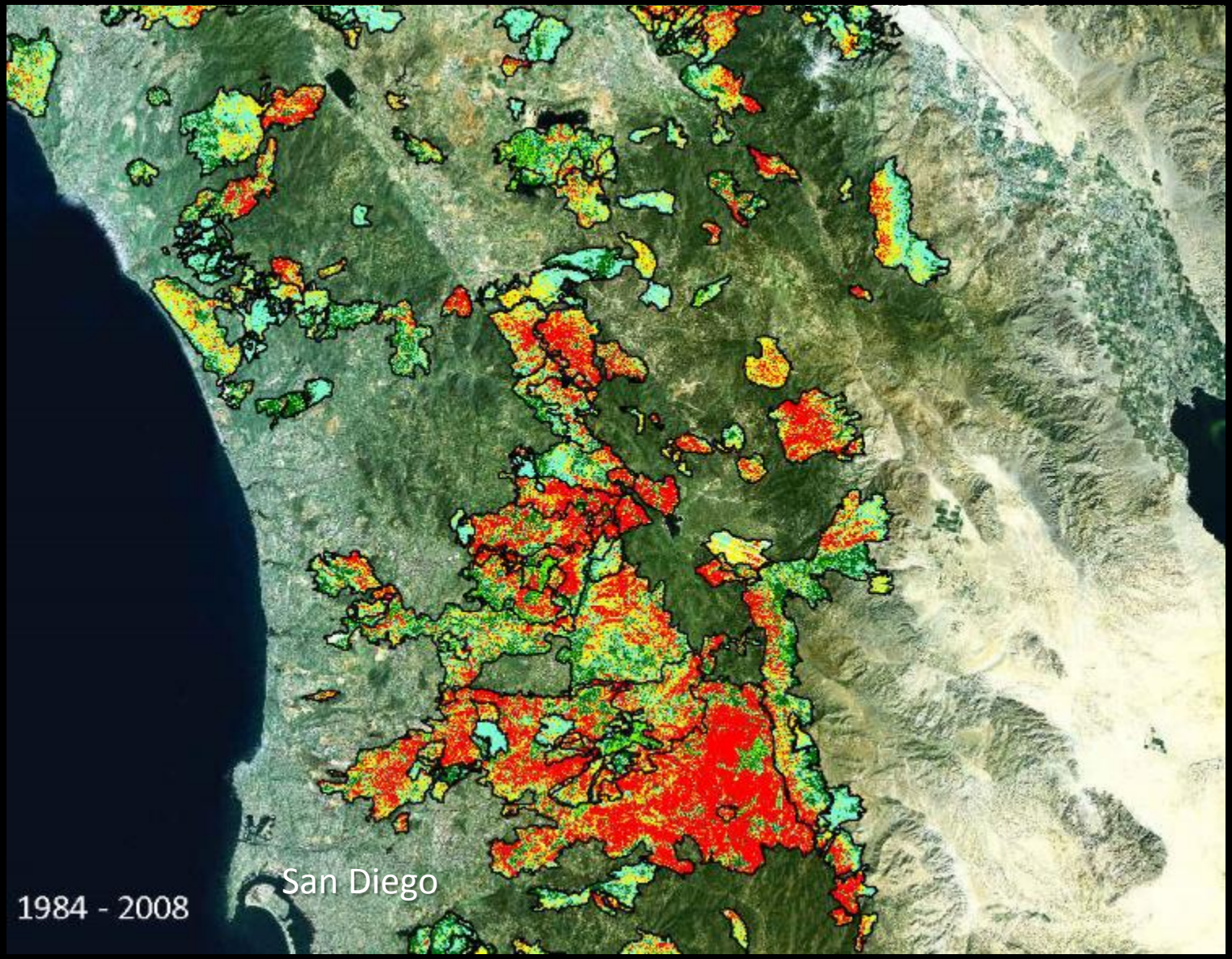
MTBS provides web map services (WMS) as another method to access the national MTBS geospatial datasets. All three types of the seamless national datasets are published as an Open Geospatial Consortium (OGC)-compliant WMS. Please use the WMS Connection URL to access this service within an application. The GetCapabilities URL can also be used to obtain information about the published service.

WMS Connection URL:
http://psgeodata.fs.fed.us/arcgis/services/MTBS/MTBS/MapServer/WMSServer

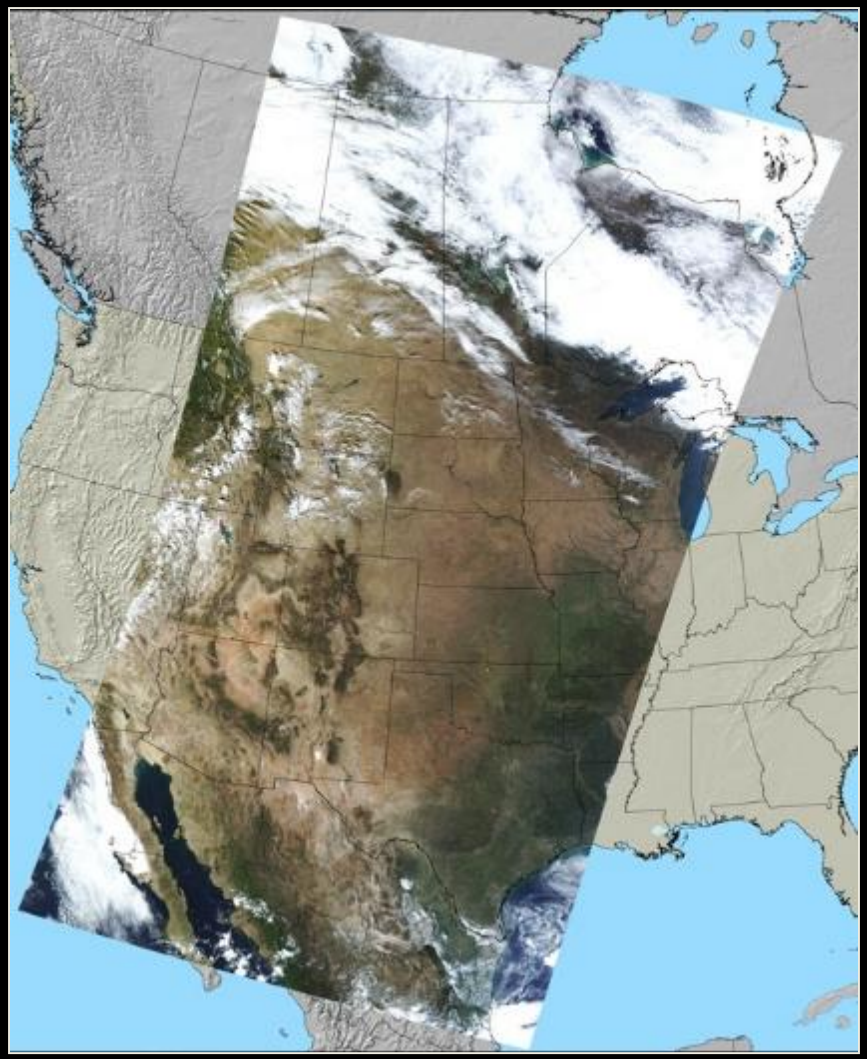
USDA

www.mtbs.gov

Monitoring Trends in Burn Severity



MODIS Real-Time Forest Disturbance (RTFD)

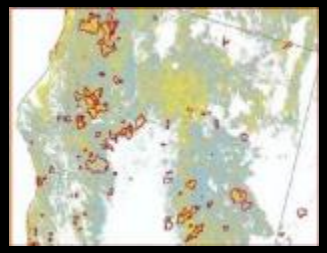


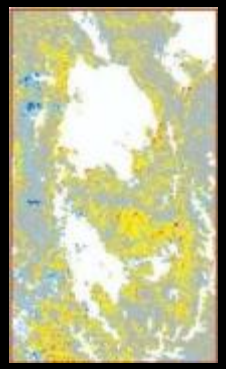
- MODIS Terra and Aqua
- Multispectral (36 bands)
  - 250 meter spatial resolution (red, NIR)
  - 500 meter resolution (blue, green, NIR, SWIR)
- Temporal extent: 2000 - present
- Two daily acquisitions
  - Morning – Terra
  - Afternoon – Aqua
- No cost image data

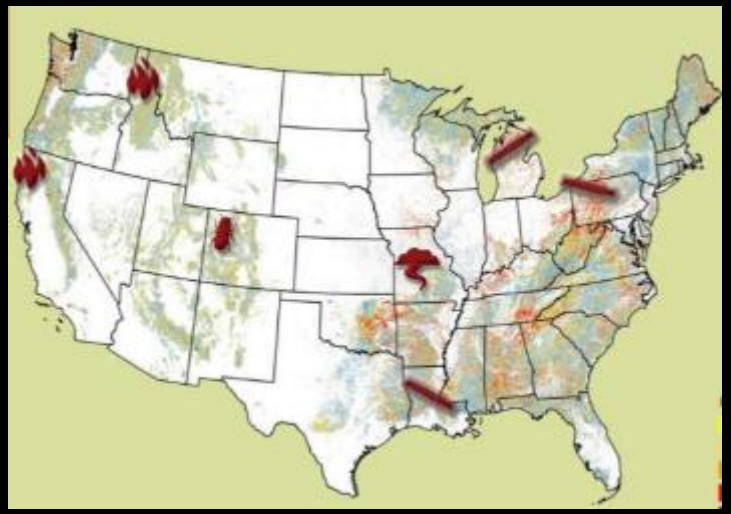
USDA

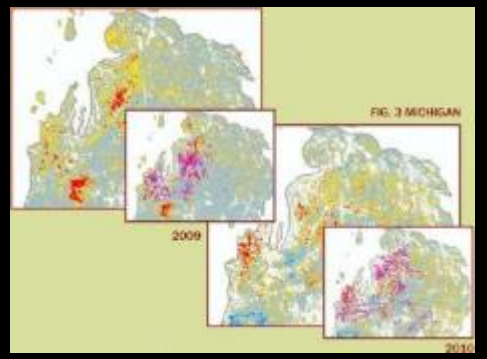
MODIS Real-Time Forest Disturbance (RTFD)

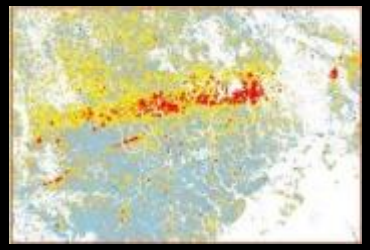
- Both z-Score and Trend methods
- Timely information to forest health community
- New change maps every 8 days (growing season)

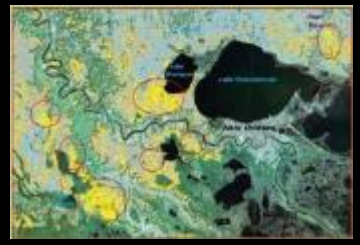






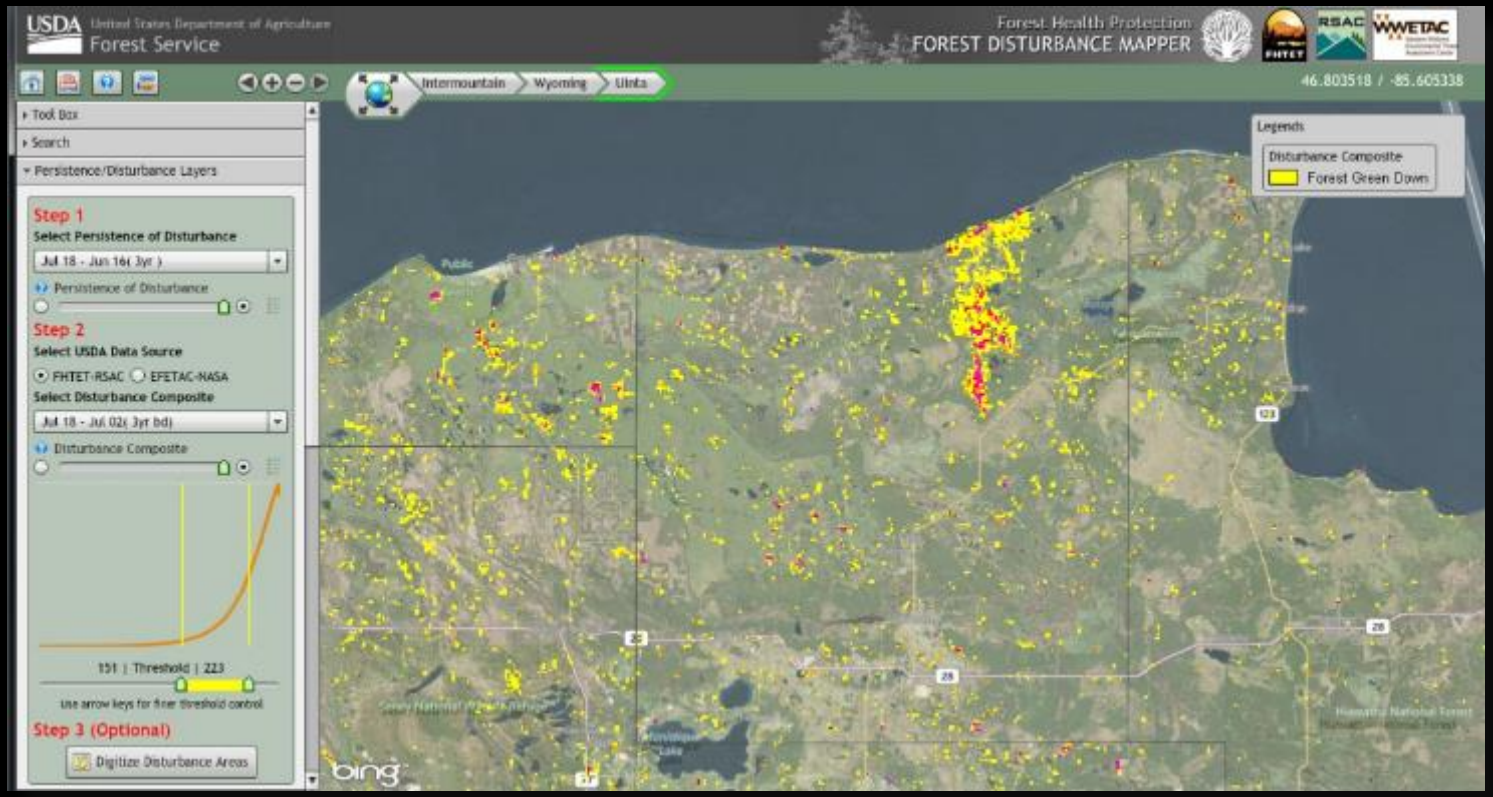






USDA

Forest Disturbance Monitor (FDM)



- Web tools to support forest insect and disease survey
- Broad level early warning system
- Rapid evaluation of large areas for potential forest disturbance activity
- User adjusted disturbance data
- User created shape files for easily download / reporting / field verification
- http://foresthealth.fs.usda.gov

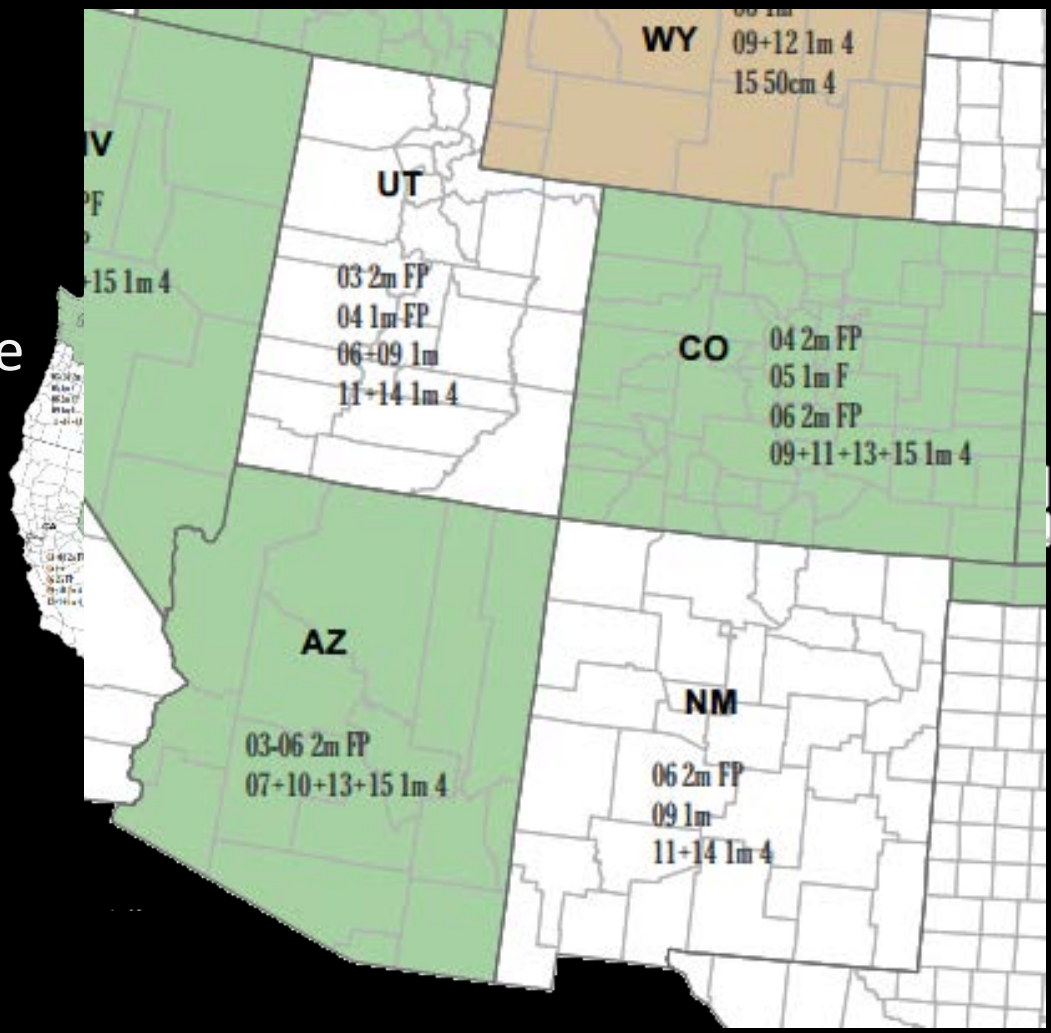
Image-based Change Estimation (ICE)

- FIA / RSAC Collaboration
- Image based estimation of land cover and land use change
- Separate Attribution of
  - Land Use
  - Land Cover
  - Change Agent
- Augments FIA field data
- Process easily adapted

USDA

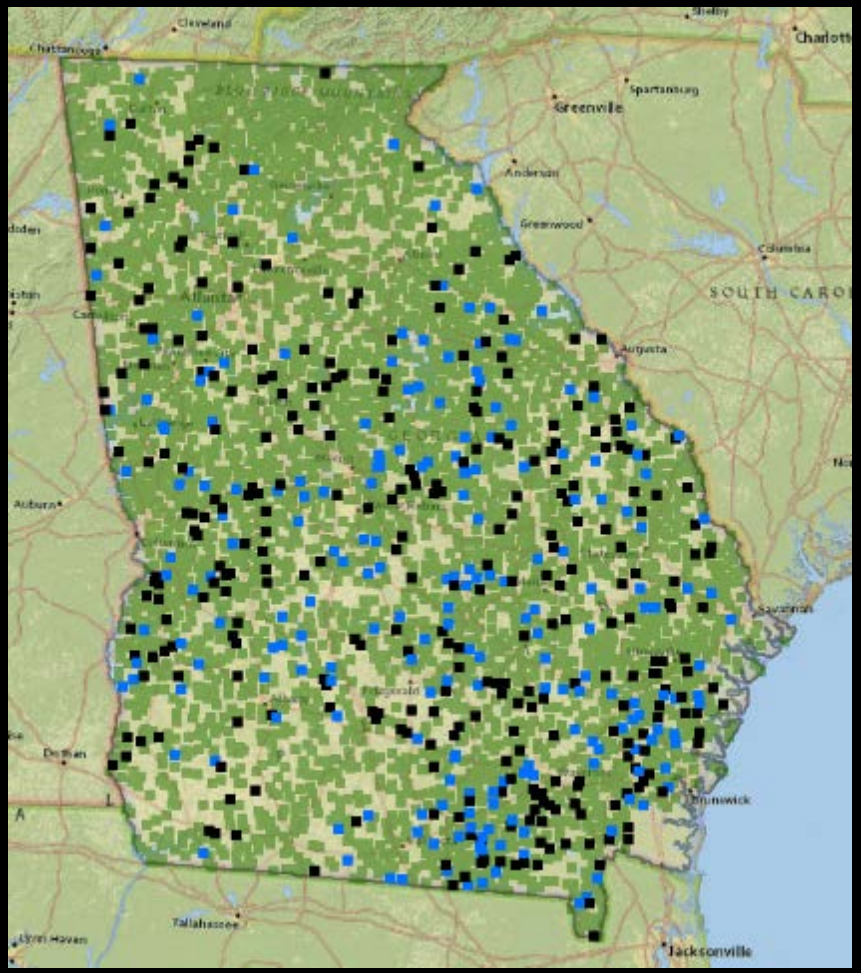
Leverage NAIP Imagery

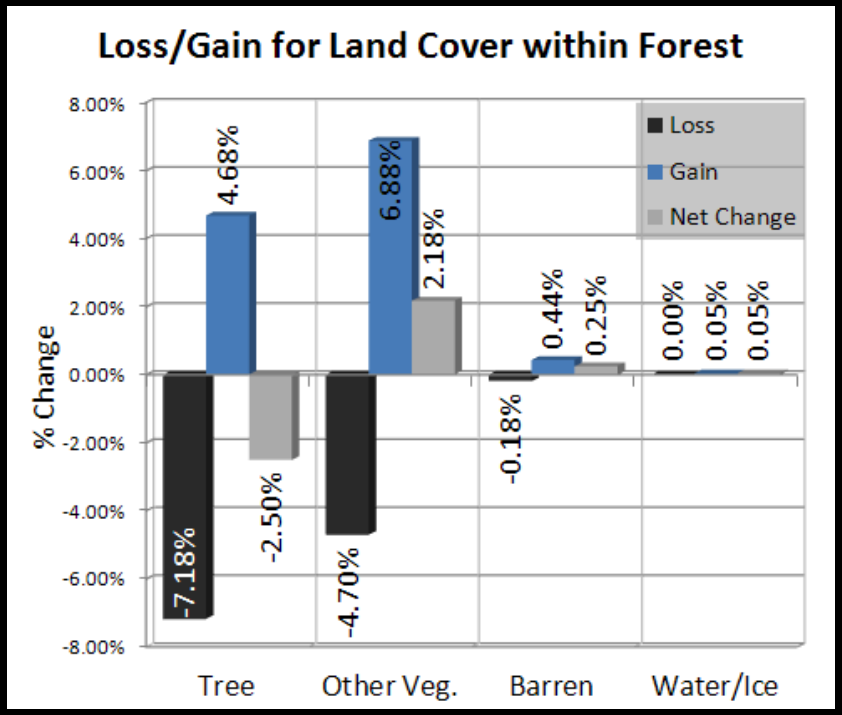
- Annual Federal Investment
- 2-3 year acquisition schedule
- 0.5-1.0 m resolution
- Natural color or 4-Band



Quick Analysis – Broad Area Assessment

Tree Cover Loss/Gain





Thank you!

Remote Sensing Evaluation, Application & Training (RSEAT)

- **Haans Fisk**, hfisk@fs.fed.us, 801-975-3760

Resource Mapping, Inventory & Monitoring (RMIM)

- **Kevin Megown**, kamegown@fs.fed.us, 801-975-3726

Rapid Disturbance Assessment & Services (RDAS)

- **Brad Quayle**, bquayle@fs.fed.us, 801-975-3737

Enterprise Data & Services (EDS)

- **Dave Vanderzanden**, dvanderzanden@fs.fed.us, 801-975-3753

RedCastle Resources

- **Mark Finco**, mfinco@fs.fed.us, 801-975-3767
- **Paul Maus**, pmaus@fs.fed.us, 801-975-3756

USDA

Opportunities in BSMS

Kent Reid

April 2016

Agenda – 7-8 April, 2016

"All-Hands" Meeting, Southwest Jemez Mountains Resilient Landscapes and Collaborative Forest Landscape Restoration Project

Santa Fe Community College, Jemez Rooms

Thursday, April 7:

8:30 Welcome and Introductions: *Erik Taylor (SFNF) and Bob Parmenter (VALL)*

8:45 Goals and Objectives for CFLRP: *Joe Norrell (SFNF), Jorge Silva-Bañuelos (VALL)*

9:00 Implementation Overviews: Completed through 2015.
- Implementation "footprint" summary: *Jeremy Marshall (SFNF)*
- Jemez Pueblo: *John Galvan (Jemez Pueblo Natural Resources Department)*
- Santa Clara Pueblo: *Daniel Denipah (Forestry Division, Santa Clara Pueblo)*
- Forest Industry Group: *Jose Varela López (NM Forest Industry Association)*
- Riparian restoration (cross boundaries): *Jim Matison (WildEarth Guardians)*

9:50 Climate update: Is the drought over? *Bob Parmenter (VALL)*

10:00-10:15 BREAK

Project Activity: Forest Thinning

10:15 Impementation goals/objectives and projects summaries *Scott Compton (VALL)*
10:35 Monitoring results: Vegetation *Martina Suazo (VALL)*
10:55 Monitoring results: Wildlife *Gail Garber (Hawks Aloft), James Cain (USGS/NMSU).*
11:15 Monitoring results: Cultural Resources *Connie Constan (USFS)*
11:30 Monitoring results: Socio-economic Impacts *Eytan Krasilovsky, Matt Piccarello (Forest Stewards Guild)*
11:40 Education program results: *Brittney van der Werff (VALL)*
11:50 Questions and Discussion

12:00 BREAK FOR LUNCH

Who owns?

- Forest Service
- BLM
- NMSLO
- Tribal
- DoD and DoE
- USF&WS
- NPS
- NM State Parks
- Private

Who measures?

- Forest Service
- BLM
- Tribal
- DoD
- NPS
- USDA
- NMFWRI
- USGS
- NMG&F
- NMED
- TNC
- Others *if funded*

Funding

- Monitoring is too important to leave to the academics.

Tension in Objectives

- Ownership
  - Buy-in
- Protocols
  - Compatibility

Coordination

- WHO CG
- Another State Forestry group
- FS Regional Leadership Team, etc
- Watershed groups

But emphasis is on coordination of *treatments*

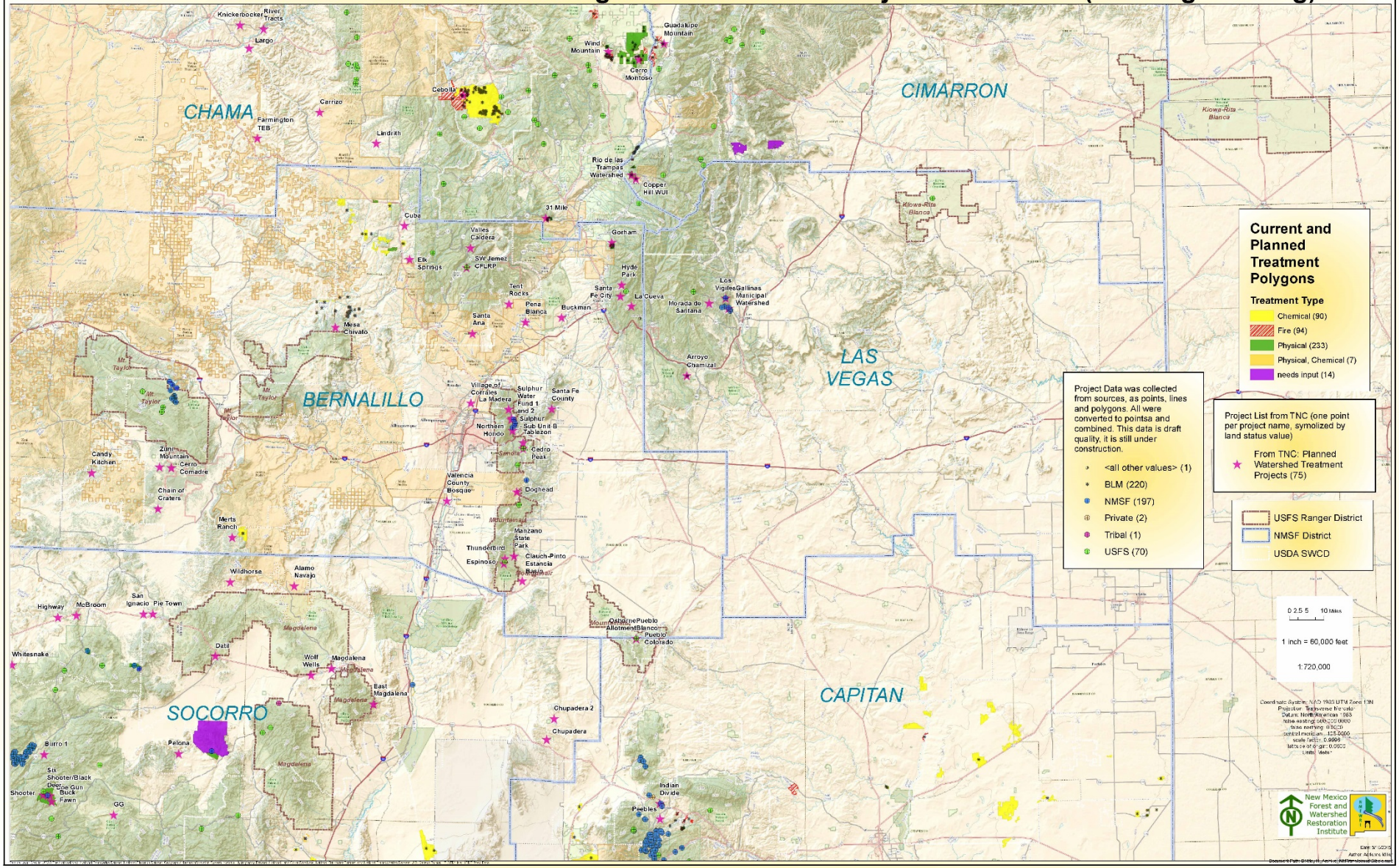
Archiving

- A place to store it
- Maintenance
- Security
- Accessible
  - Usable

Cibola National Forest Area

Draft 2

Current and Planned Forest and Watershed Vegetation Treatment Projects 2014-2016 (Pending Funding)



rkreid@nmhu.edu 505-426-2145

Link to the interactive App

http://arcg.is/1LGHqCD

Access

- On the FWRI ftp site, go to:
- ftp://ftp.nmfwri.org/NM_Vegetation_Treatment/
- ftp://ftp.nmfwri.org/Watershed_Treatment_Maps/
  - User Name: guest2
  - Password: watershed

- On the All About Watersheds site, go to :
- http://allaboutwatersheds.org/
  - (Register and) Log in
  - Search “amiller”

- PDFs of maps that must be downloaded to view

Take-Home Message

Groups

and

Openings

Usefulness - minimum

- Access
- Completeness
- Updated and updating

rkreid@nmhu.edu

505-426-2145