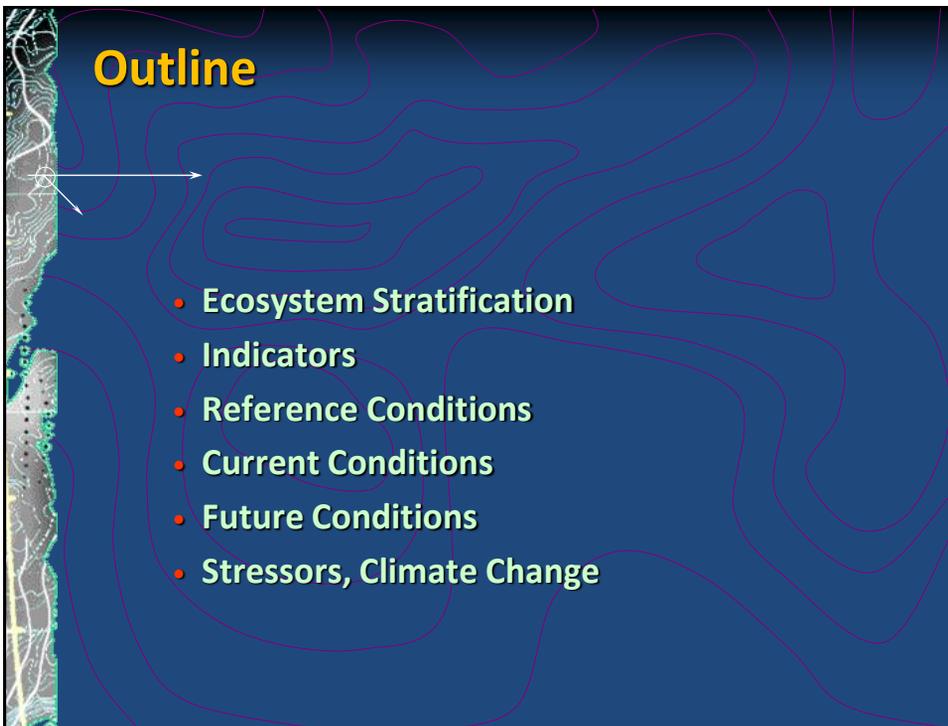


A Framework for the Analysis, Planning, and Management of Ecosystems in the Southwest

Jack Triepke
Wayne Robbie
Ernie Taylor
Max Wahlberg



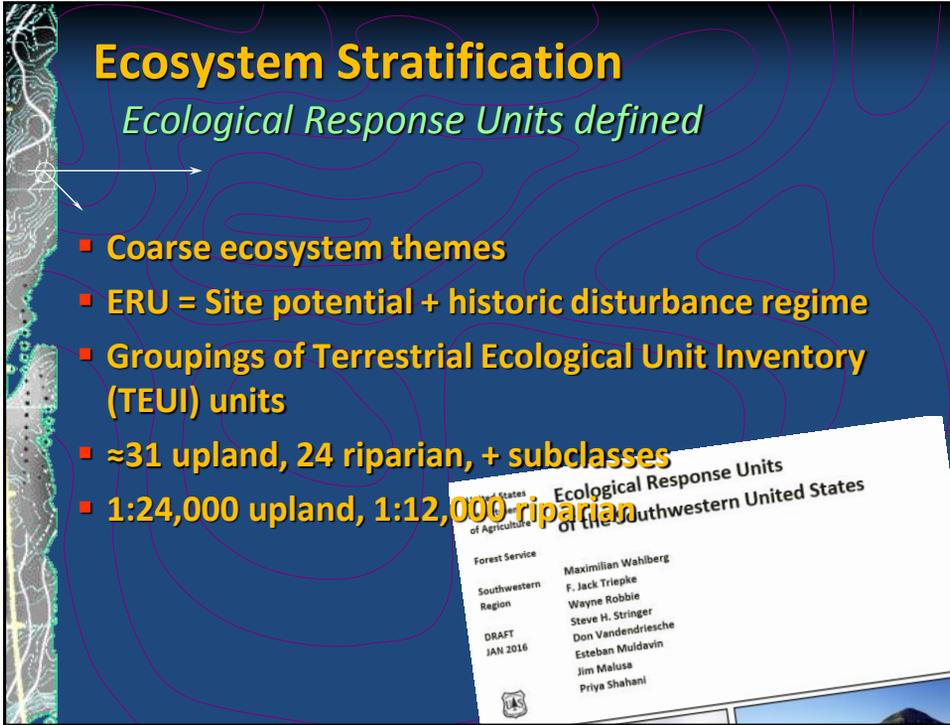
Outline

- Ecosystem Stratification
- Indicators
- Reference Conditions
- Current Conditions
- Future Conditions
- Stressors, Climate Change

Ecosystem Stratification

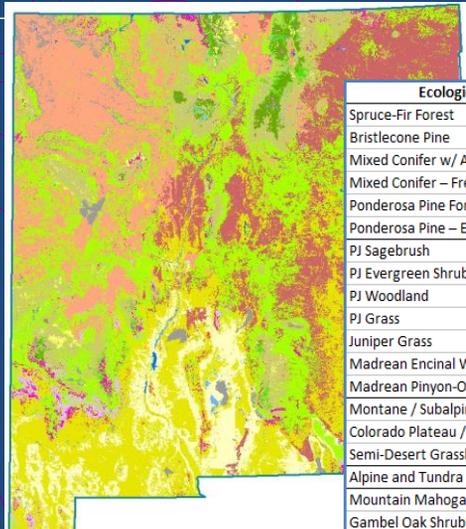
Ecological Response Units defined

- Coarse ecosystem themes
- ERU = Site potential + historic disturbance regime
- Groupings of Terrestrial Ecological Unit Inventory (TEUI) units
- ≈31 upland, 24 riparian, + subclasses
- 1:24,000 upland, 1:12,000 riparian




Ecosystem Stratification

Ecological Response Units defined

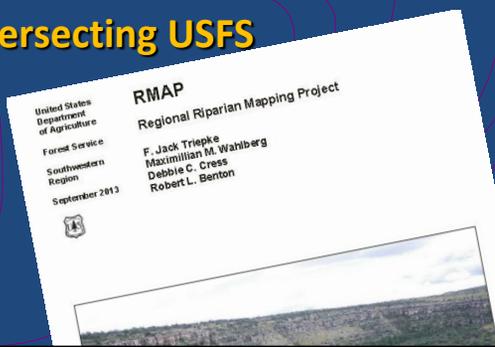
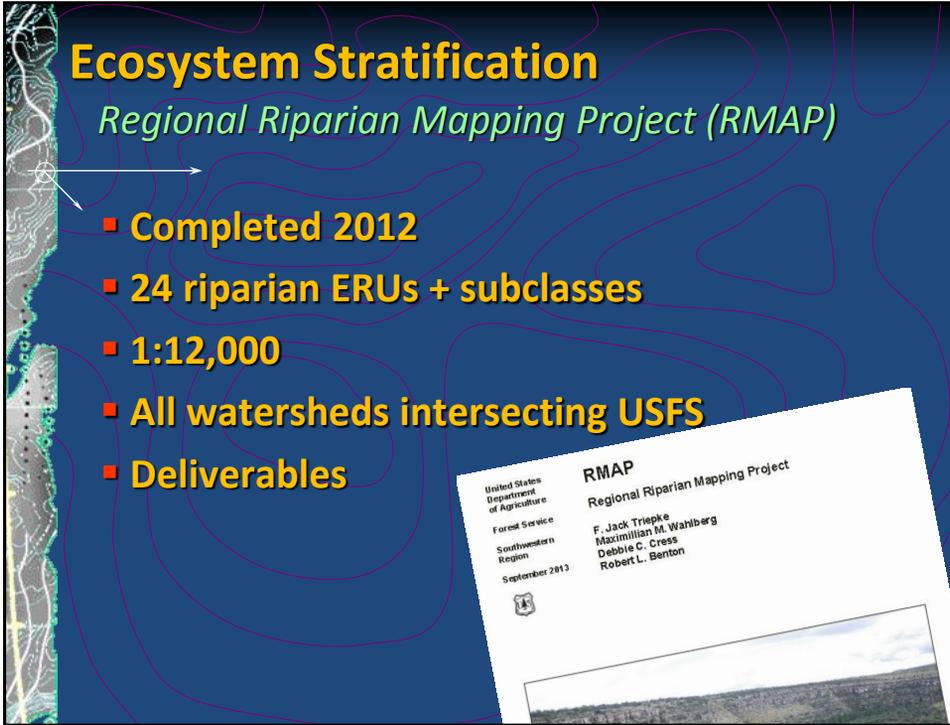


Ecological Response Unit	ERU Code	Ecosystem Type
Spruce-Fir Forest	SFF	forest
Bristlecone Pine	BP	forest
Mixed Conifer w/ Aspen	MCW	forest
Mixed Conifer – Frequent Fire	MCD	forest
Ponderosa Pine Forest	PPF	forest
Ponderosa Pine – Evergreen Oak	PPE	forest
PJ Sagebrush	PJS	woodland
PJ Evergreen Shrub	PJC	woodland
PJ Woodland	PJO	woodland
PJ Grass	PJG	woodland
Juniper Grass	JUG	woodland
Madrean Encinal Woodland	MEW	woodland
Madrean Pinyon-Oak Woodland	MPO	woodland
Montane / Subalpine Grassland	MSG	grassland
Colorado Plateau / Great Basin Grassland	CPGB	grassland
Semi-Desert Grassland	SDG	grassland
Alpine and Tundra	ALP	shrubland / mixed
Mountain Mahogany Mixed Shrubland	MMS	shrubland
Gambel Oak Shrubland	GAMB	shrubland
Sagebrush Shrubland	SAGE	shrubland

Ecosystem Stratification

Regional Riparian Mapping Project (RMAP)

- Completed 2012
- 24 riparian ERUs + subclasses
- 1:12,000
- All watersheds intersecting USFS
- Deliverables



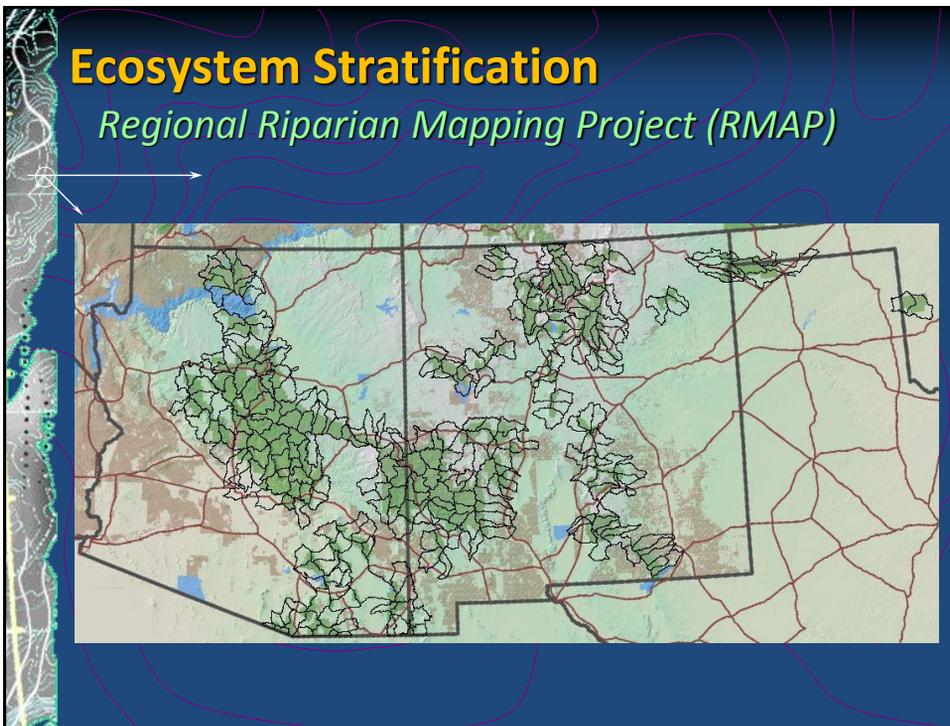
United States
Department
of Agriculture
Forest Service
Southwestern
Region
September 2013

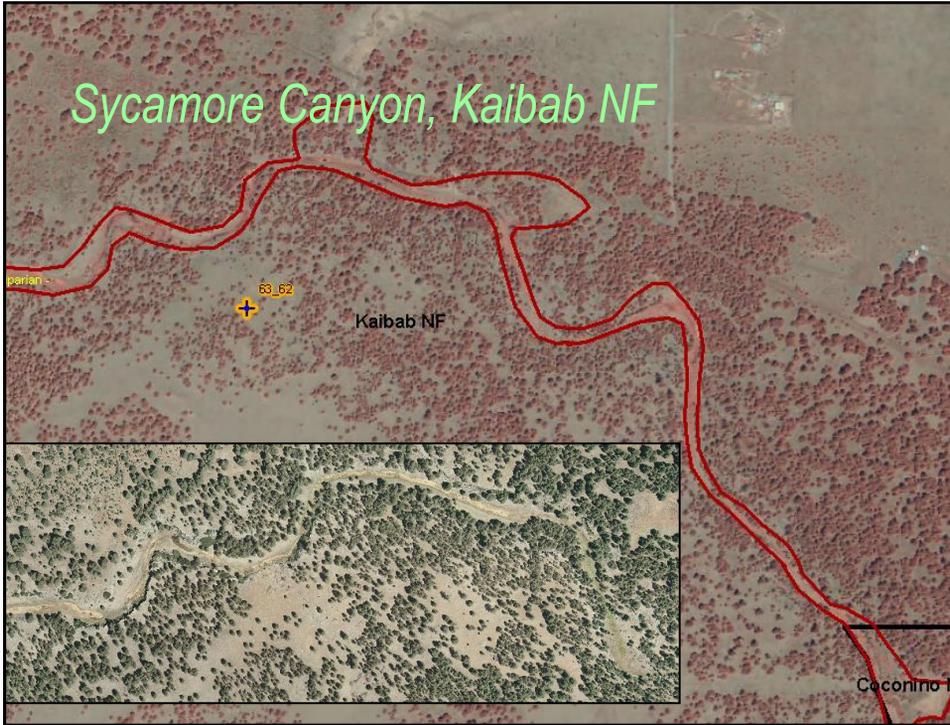
RMAP
Regional Riparian Mapping Project

F. Jack Triepke
Maximilian M. Wahlberg
Debbie C. Cress
Robert L. Benton

Ecosystem Stratification

Regional Riparian Mapping Project (RMAP)

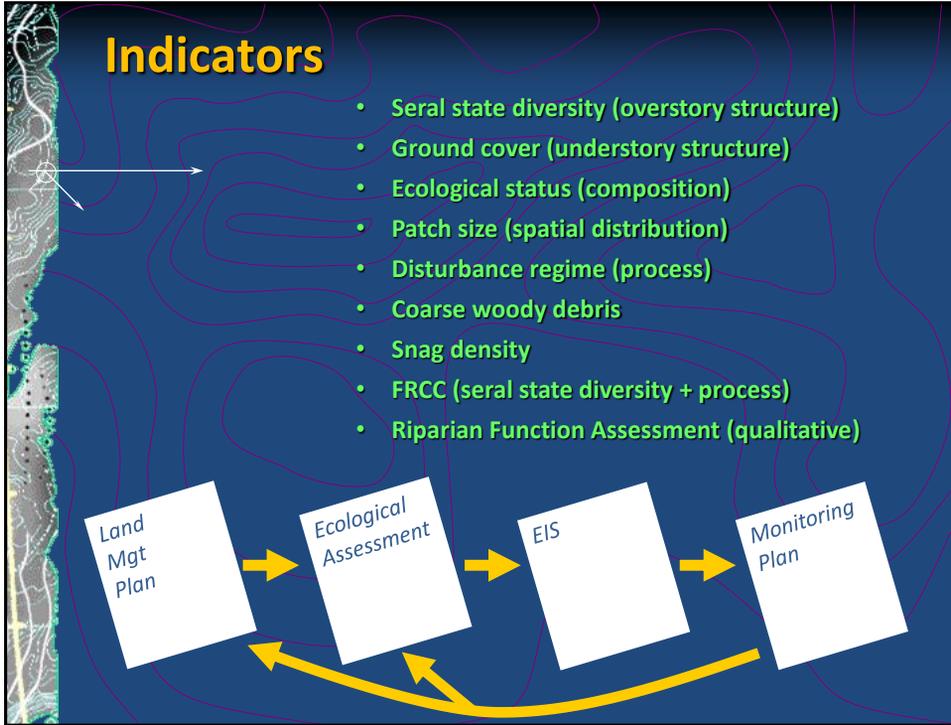




Indicators

- Seral state diversity (overstory structure)
- Ground cover (understory structure)
- Ecological status (composition)
- Patch size (spatial distribution)
- Disturbance regime (process)
- Coarse woody debris
- Snag density
- FRCC
- Riparian Function Assessment (qualitative)

The slide features a dark blue background with a list of indicators in green text. On the left side, there is a vertical strip showing a topographic map with contour lines and a river. A white arrow points from this strip towards the list. The word 'Indicators' is written in large, bold, orange letters at the top left of the slide.



Reference Conditions

Sources

- TNC SW Forest Assessment
- TEUI
- LANDFIRE
- ERI white papers
- Regional studies
- Ecosystem modeling

USDA
United States Department of Agriculture
Forest Service
Wildland Health
September 2015

**Terrestrial Ecological Unit Inventory
Technical Guide:
Landscape and Land Unit Scales**

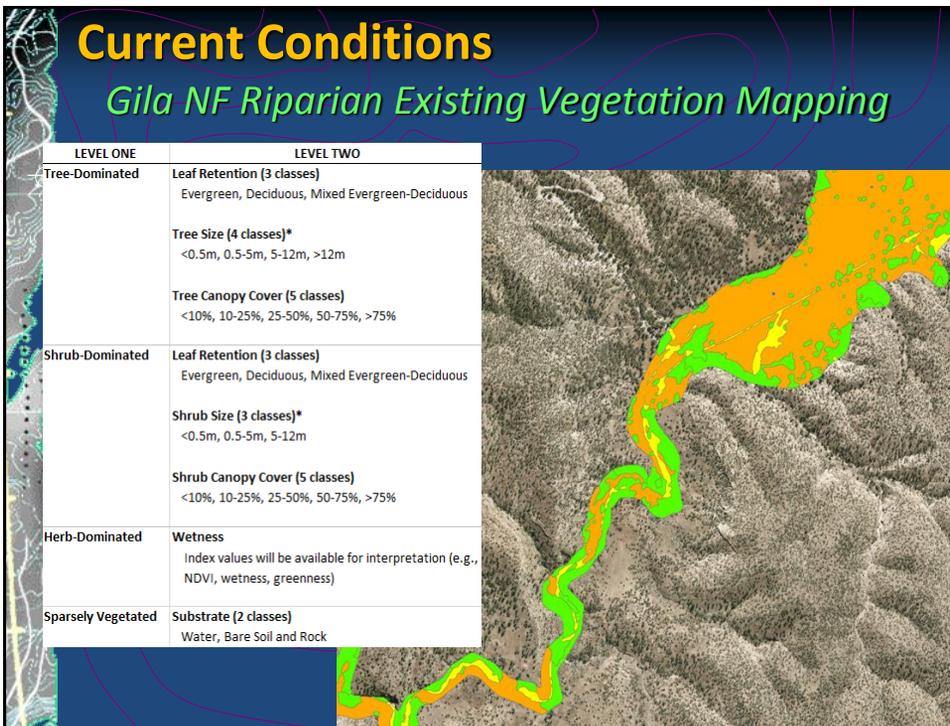
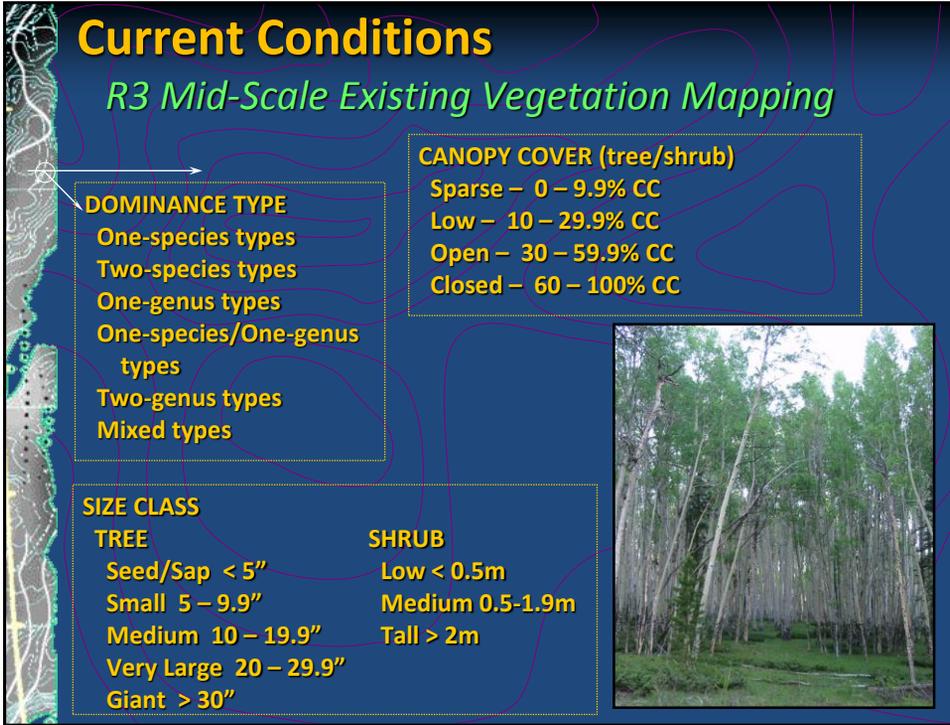
LANDFIRE

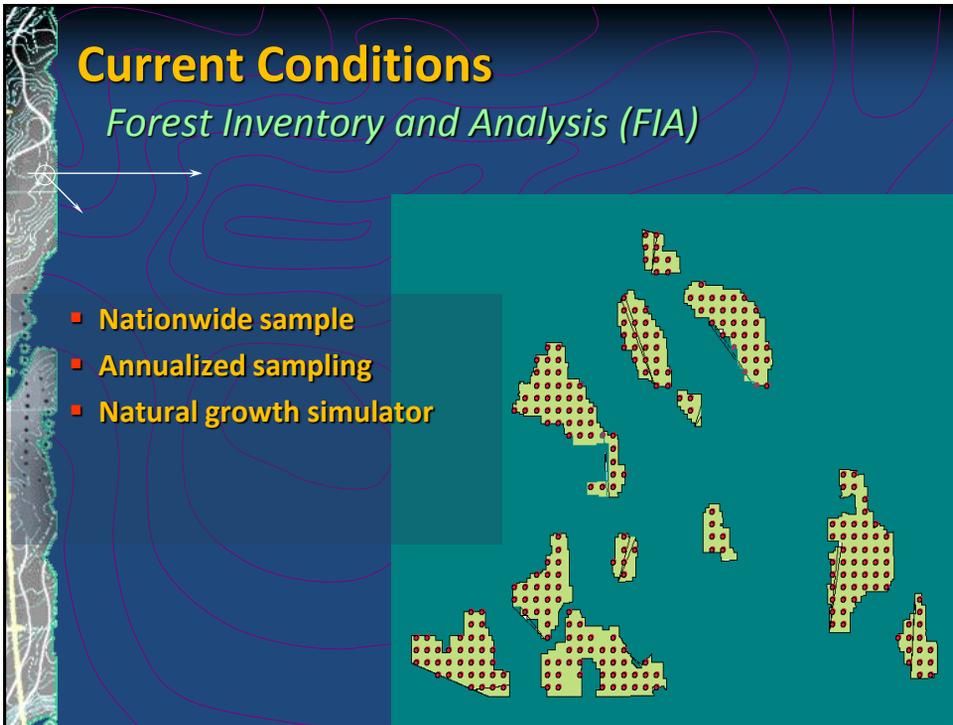
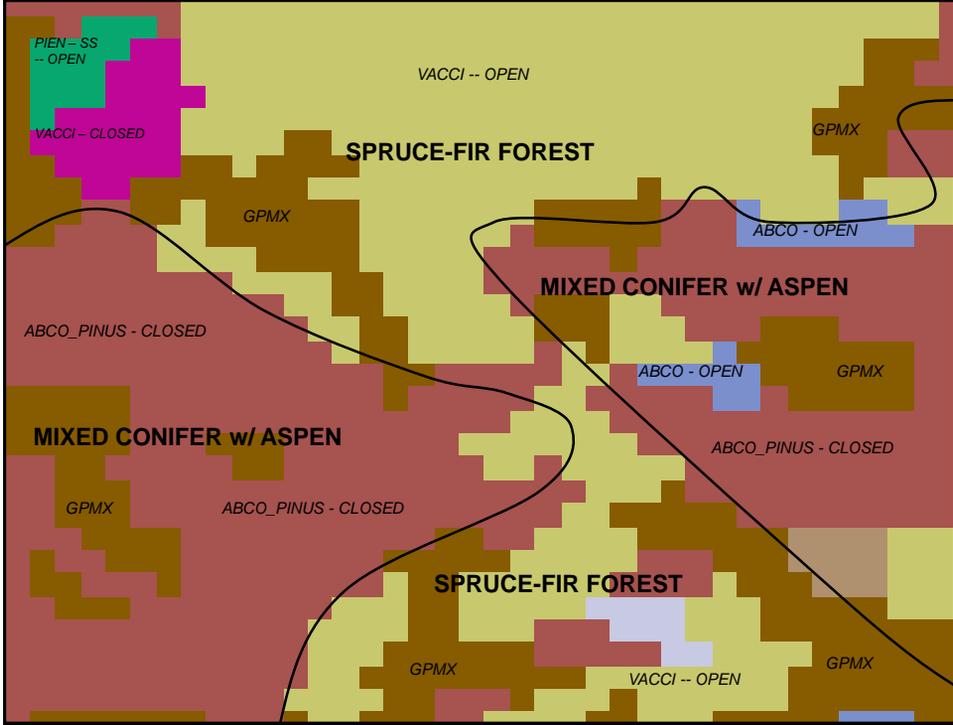
Biophysical Settings Description and Quantification Models

NORTHERN ARIZONA UNIVERSITY

ECOLOGICAL RESTORATION INSTITUTE

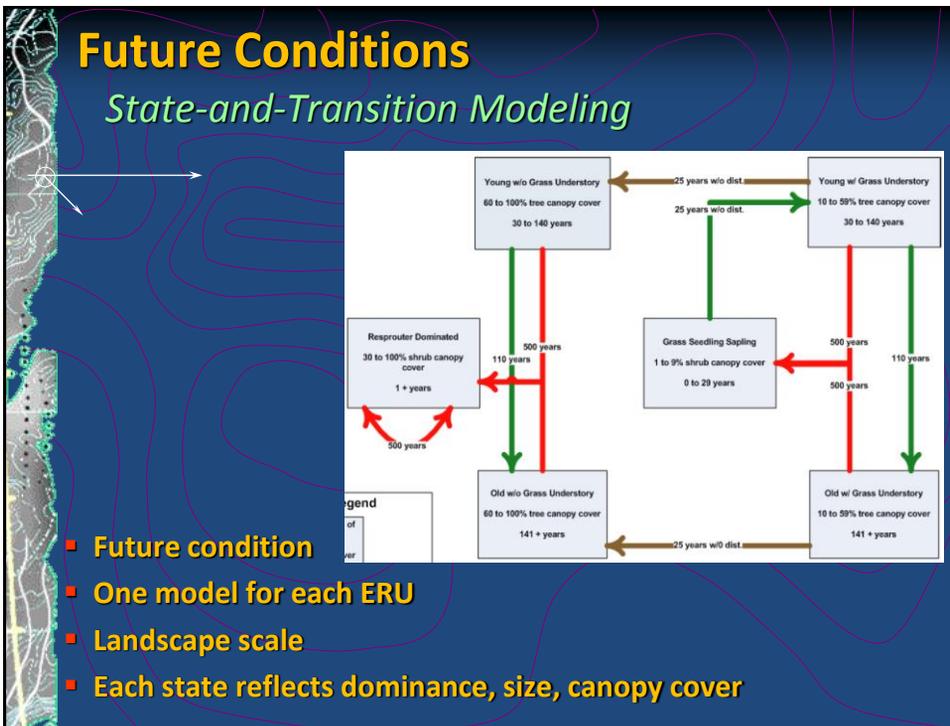
PUBLICATIONS

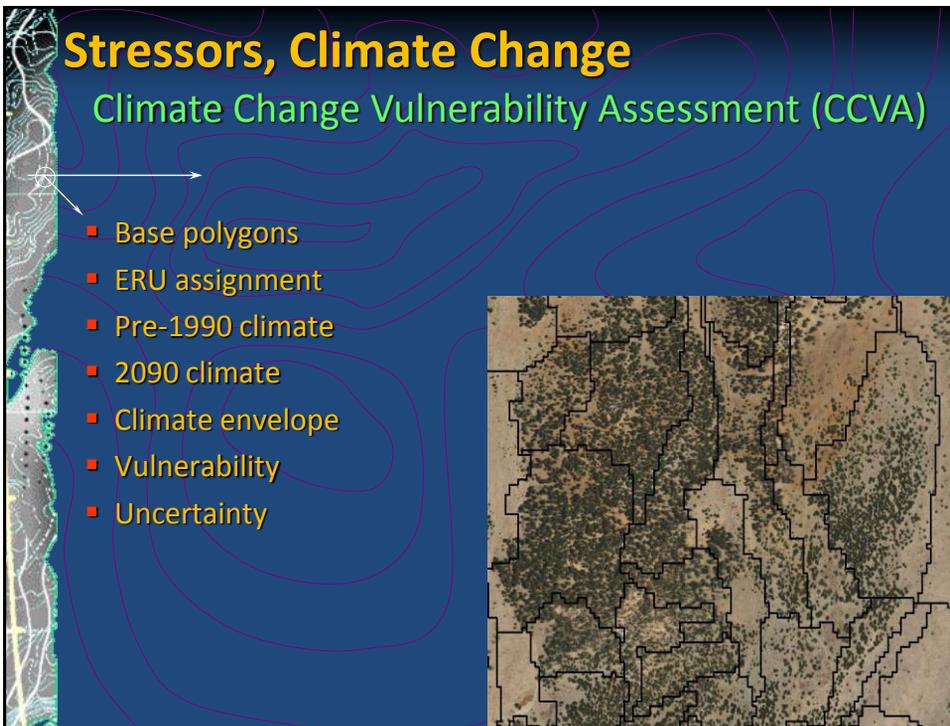
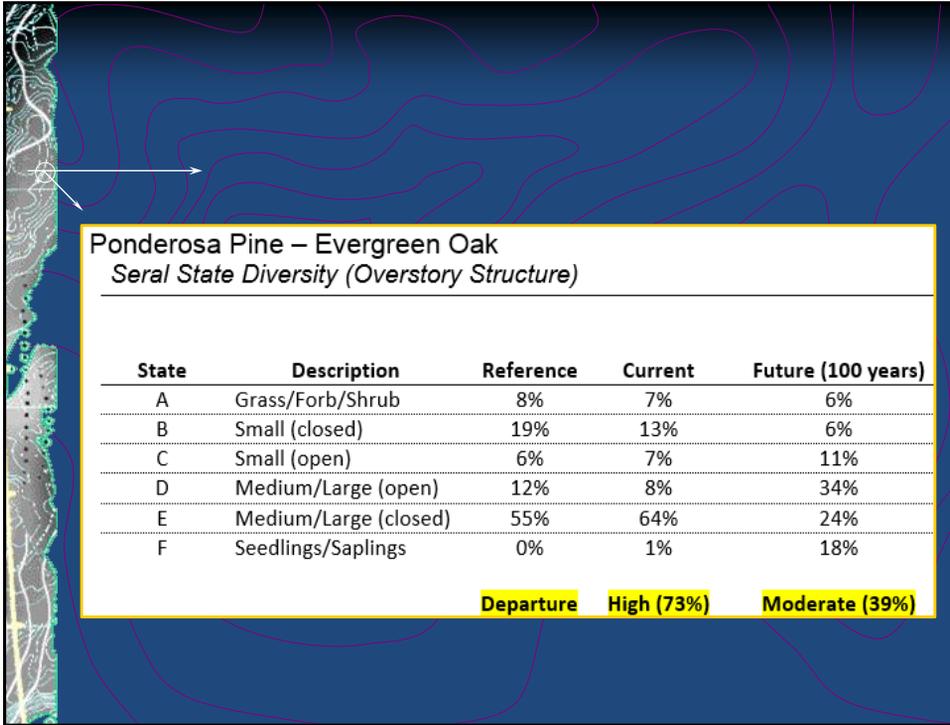




Current Conditions Forest Inventory and Analysis (FIA)

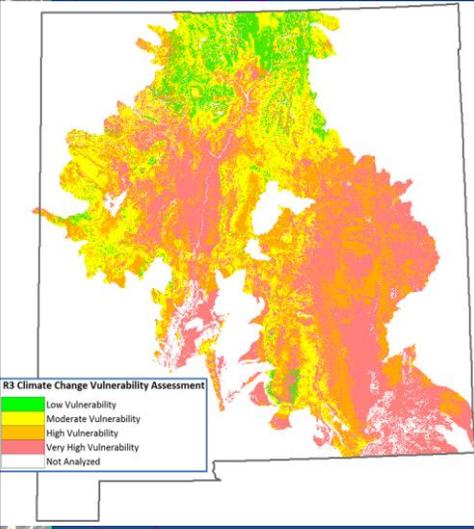
		SPRUCE-FIR FOREST ERU							
		VDDT STATE							
Computed Variables	Vegetation Structure Variables:	A_GFB	B_SSA	C_SMA	D_MAS	E_VAS	F_MAM	G_VAM	H_SMA
Stand-Stock Variables:									
LCA.ALLSX	Live – Cubic Feet/Acre = 5.0"+ diameter	29	2,400	3,153	3,859	4,631	3,984	4,359	2,356
LBD.ALLSX	Live – Board Feet/Acre = 9.0"+ diameter	46	10,921	11,508	16,937	22,698	17,980	20,737	8,649
Wildlife Habitat Variables:									
<i>Standing Snags</i>									
SNGOBT12	Small = 8-12" diameter	14.4	4.4	12.5	24.3	4.9	14.2	6.2	6.0
SNG12T18	Medium = 12-18"+ diameter	4.8	4.1	4.5	14.0	9.6	10.2	5.8	4.2
SNG18P	Large = 18"+ diameter	0.0	8.8	6.2	3.1	23.4	7.8	16.2	3.2
		19.1	17.4	23.3	41.3	37.9	32.2	28.1	13.3
Wildfire Risk Variables:									
CRWNBLKD	Crown Bulk Density	0.0	0.2	0.2	0.2	0.1	0.2	0.1	0.1
CRWNBSHG	Crown Base Height	7.0	2.5	3.9	4.8	5.5	3.3	2.9	5.8
CRWNIIDX	Crowning Index	144.2	12.1	10.6	14.7	22.8	16.4	18.7	23.2
TRCHIDX	Torching Index	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CWDDUFF	Fuel Load - Duff Layer	10.2	18.2	20.5	21.6	26.1	22.2	24.0	17.3
CWDLTR	Fuel Load - Litter Layer	0.2	5.7	7.0	7.3	5.3	6.2	5.6	6.0
CWDD00T3	Fuel Load – Coarse Woody Debris = 0-3" diameter	2.4	10.8	12.0	12.7	16.6	12.2	14.1	11.3
CWDD03T12	Fuel Load – Coarse Woody Debris = 3-12" diameter	7.1	19.2	22.4	29.9	38.4	27.2	31.1	17.8
CWDD12P	Fuel Load – Coarse Woody Debris = 12"+ diameter	0.1	12.6	12.8	7.5	19.8	11.3	18.9	5.6
		7.2	31.8	35.1	37.3	58.2	38.5	50.0	23.4
Biomass-Carbon Variables:									
TRBIOMSS	Tree Biomass – Dry weight live & dead/boles & crown	5	80	89	94	123	99	112	72
STDCARBN	Stand Carbon – Total carbon above & below ground	13	82	93	99	130	102	117	75





Stressors, Climate Change

Climate Change Vulnerability Assessment (CCVA)

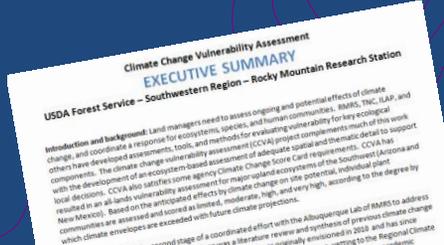


R3 Climate Change Vulnerability Assessment

- Low Vulnerability
- Moderate Vulnerability
- High Vulnerability
- Very High Vulnerability
- Not Analyzed

Deliverables

- Graphics
- Tabular summaries - vulnerability
- Tabular summaries – uncertainty
- Executive summary



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. BLM, USFS, IAP, 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 the 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.

Thank you!

In no particular order...

- Bob Davis – USFS Director EAP-WSA
- Ernie Taylor – USFS Analysis Team Leader
- Natural History of the Gila Symposium, Bill Norris, Art Telles, Matt Schultz
- Gila NF staff
- TEUI teams, AZ and NM
- USFS GIS Team – Candace Bogart, Rick Crawford, Jarl Moreland, Bart Matthews
- The Nature Conservancy – NM and AZ chapters
- Rocky Mtn Research Station, Albuquerque, Deb Finch
- NAU Ecological Restoration Institute
- Natural Heritage NM
- U of A, School of Natural Resources and the Environment, Jim Malusa
- Too many to mention!