DESIRED CONDITIONS DIALOGUE WORKSHOP

May 9-10, 2012

OBJECTIVES

- Begin a dialogue on desired forest conditions to develop a common understanding and a framework for shared learning

- Describe desired conditions for ponderosa pine and dry mixed conifer forests

- Describe links between desired conditions and ecological restoration

- Discuss use of desired conditions as a target and measure of success

Development of R3 Desired Conditions

- DC team commissioned in 2008
- History of development
  - DC developed for Forest Plan Revision
  - Iterative and adaptive process
- DCs used in project level development
- Based on best available science for forest ecology, wildlife ecology, natural range of variability, etc.

Desired Condition Team

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Bruce Higgins	Richard Reynolds
Emily Irwin	Joe Stringer
Pat Jackson	Linda Wadleigh
Ronnie Maes	Jim Youtz

Desired Conditions: key elements

- Tree species and age composition
  - Sustaining a balance of tree ages
- Spatial characteristics of forests
  - Tree groups: size, density, arrangement
  - Openings: composition, size, arrangement
- Processes and Functions
  - Biological diversity, foodwebs, hydrologic processes, nutrient recycling, etc.
  - Disturbances (fire, insects, disease, windthrow) at natural frequencies and levels

P Pine vs Dry Mixed conifer

Similar structure and function

P pine	Dry MC
- Ponderosa pine dominated	- Mix of conifers w/ ponderosa pine
- Dryer and warmer	- Cooler and wetter
- Less productive	- More productive
	- larger, denser groups
	- smaller openings

Desired Forest Conditions
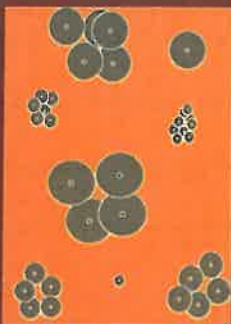

Spatial and Age Characteristics

- Trees grouped with interlocking crowns
- Openings between tree groups
- All age classes and as much old forest as is ecologically sustainable
- High interspersion of age classes

Tree group size and variability

Group size ranges from a few trees to as many as 70 trees up to ¾ acre in size

Openness Variability

72% of area is open grass/forb/shrub

28% is under mid-old tree cover

Area under tree cover

Open area, grass/forb/shrub

Conceptualized forest reference condition at three spatial scales
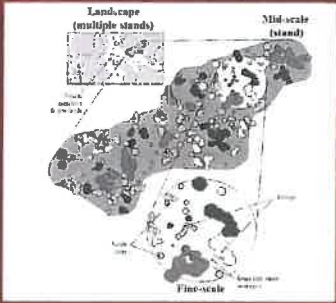
Spatial and Age Characteristics

"Historical" Condition
Fort Valley Experimental
Forest (1940)

Grass/seedlings

Blackjack

Poles

Yellow pine

Spatial Characteristics

Trees grouped with interlocking crowns

Spatial Characteristics
Openings between tree groups
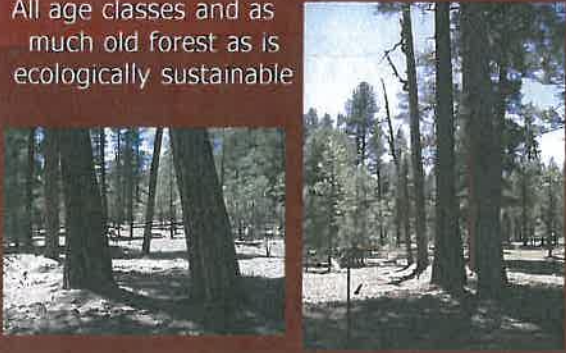
Tree Age

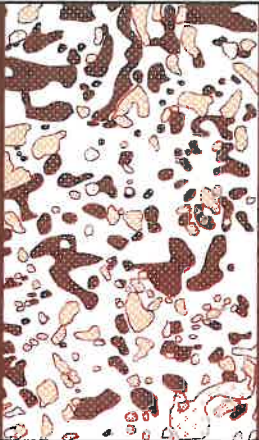All age classes and as much old forest as is ecologically sustainable

Spatial and Age Characteristics

"Historical" Condition Fort Valley Experimental Forest (1940)
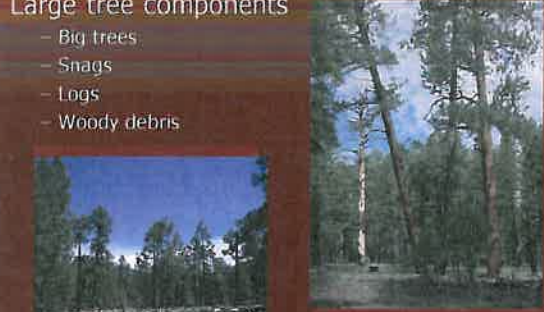
Grass/ seedlings   Blackjack

Poles   Yellow pine

Age and Function

Large tree components
– Big trees
– Snags
– Logs
– Woody debris

Composition and Function

Grass/forb/shrub openings

Processes

- Frequent surface fire
  - 5 to 10 yrs ponderosa pine
  - 7 to 20 dry MC

Sustainability: Growth of Tree Groups (Aging Process)

Young forest 3
Mid-aged forest 4
Seedling sapling 2
Mature forest 5
Grass/forb/shrub 1
Old forest 6

Concepts

- Desired Conditions are a work in progress
  - Will be adapted to new science/information
- Desired Condition characteristics are presented in ranges, not single targets, to account for variability across most of a landscape. For p pine:
  - Percent of area in openings, 30-60%
  - Typically 20 to 90 sq ft/BA per acre
  - Generally 3 to 7 tons woody debris per acre
- Desired Condition at three scales
  - Landscape
  - Mid scale
  - Fine scale

Links between desired conditions and ecological restoration

- The Desired Conditions fall within natural historic conditions

- Natural conditions are a good example of functioning, sustainable, and resilient ecosystems

- Attaining the Desired Conditions will achieve restoration objectives

Application of Desired Conditions

Characteristic	Current Condition	Desired Condition
Forest Openings	Few openings	Openings generally are 30% to 60% of area, 10% and 70% are extremes of range
Spatial distribution of trees	Even to random spacing, minimal to no tree groups	Groups of trees separated by openings
Tree ages	Primarily single- or two-aged forest	Balance of ages, young, mid, old

Challenges

- Desired Conditions may not be attainable in a single treatment

- Operational feasibility (funding, workforce, industry capacity, etc.) may constrain our ability to achieve desired conditions everywhere

- Necessitates prioritizing landscapes and strategies for achieving desired conditions

- Maintenance of desired conditions

Outcomes of Desired Conditions

- Reduced severity of fire effects
- Reduced fire hazards and increased flexibility for managing fires
- Increased resilience to climate variability and change, insects, disease

Outcomes (cont)

- Sustainable old growth condition
- Restored hydrologic function
- Sustainable wood supply
- Improved forage production
- Enhanced visual quality
- Improved plant and animal habitat, biodiversity, foodwebs

Desired conditions and resiliency

Pre-fire treatment (Fort Apache I.R.)
(one week after Rodeo-Chediski Wildfire)

Desired Conditions: Habitat, Biodiversity, and Foodwebs

The northern goshawk as an example

Morphological and Behavioral Characteristics

- Adapted to forest environments
- Long tail, short wings
- Sub-canopy forager
- Primarily perch hunter
- Short-sit, short-flight hunting behavior
- Searches for prey in low vegetation column
- Broad diet

Foraging Habitat

- Occupies many forest types
- Forest structure
  - Lifted crowns (mature forests)
  - Open understory (flight space)
  - Hunting perches
- Strong evidence of food limitation

Prey

Mammals
- Chipmunks
- Cottontail
- Jackrabbit
- Mantled ground squirrel
- Red squirrel
- Abert's squirrel

Birds
- American robin
- Band-tailed pigeon
- Blue grouse
- Mourning dove
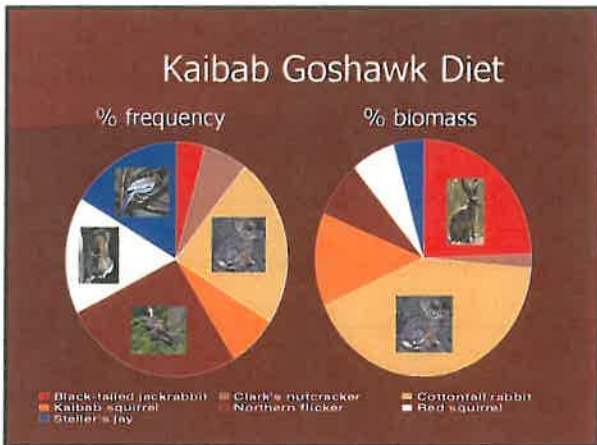- Steller's jay
- Northern flicker
- Hairy woodpecker

Kaibab Goshawk Diet

% frequency

% biomass

- Black-tailed jackrabbit
- Clark's nutcracker
- Cottontail rabbit
- Kaibab squirrel
- Northern flicker
- Red squirrel
- Steller's jay

Proportion of Pairs Breeding

Prey Density and Goshawk Productivity

Annual precipitation and goshawk breeding — Kaibab Plateau

Habitat Synthesis: The Goshawk Food Web
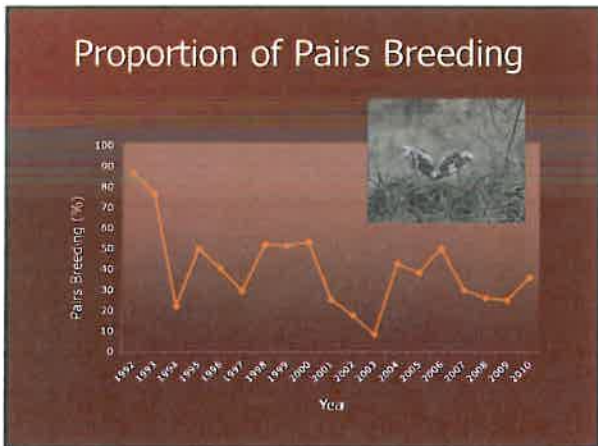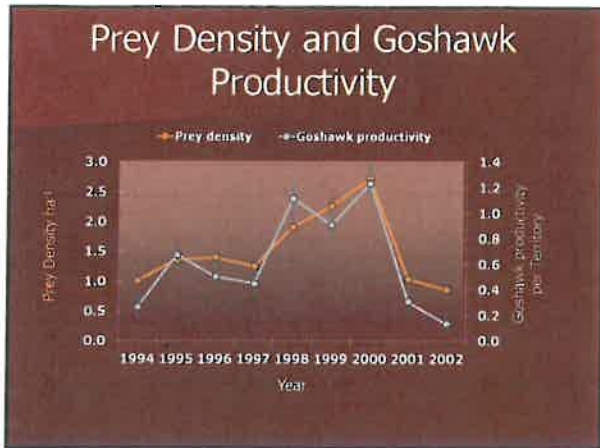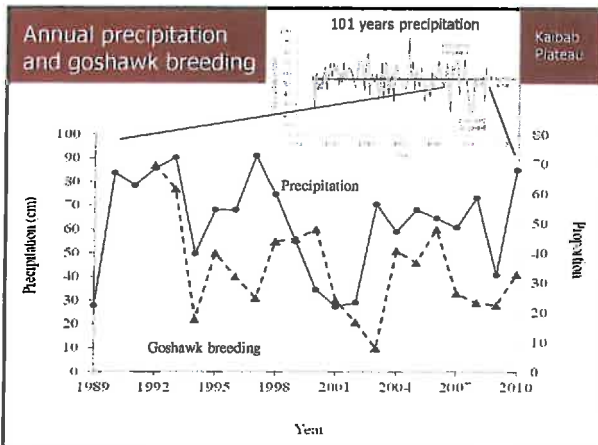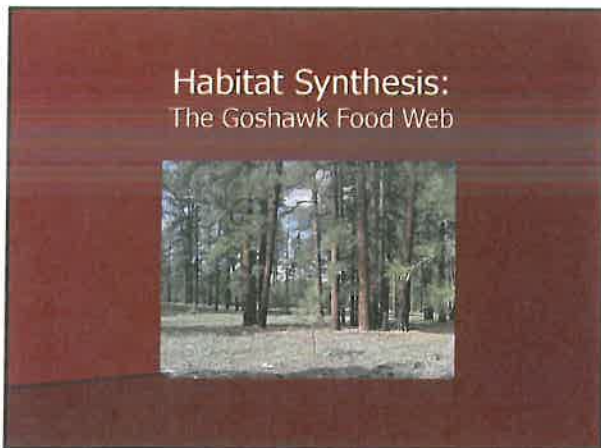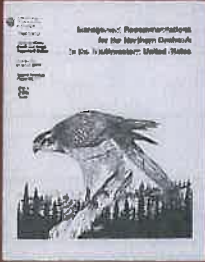
Management Recommendations for the Northern Goshawk in the Southwestern United States

- Richard T. Reynolds
- Russel T. Graham
- M. Hildegard Reiser
- Richard L. Bassett
- Patricia L. Kennedy
- Douglas A. Boyce, Jr.
- Greg Goodwin
- Randall Smith and
- E. Leon Fisher

Flow chart:
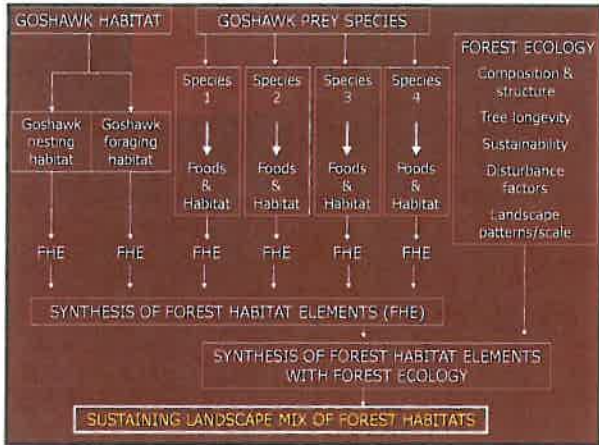
GOSHAWK HABITAT | GOSHAWK PREY SPECIES | FOREST ECOLOGY

Goshawk nesting habitat — Goshawk foraging habitat

Species 1, Species 2, Species 3, Species 4

Foods & Habitat (×4)

FOREST ECOLOGY: Composition & structure; Tree longevity; Sustainability; Disturbance factors; Landscape patterns/scale

FHE (×6)

SYNTHESIS OF FOREST HABITAT ELEMENTS (FHE)

SYNTHESIS OF FOREST HABITAT ELEMENTS WITH FOREST ECOLOGY
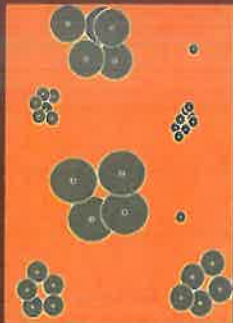
SUSTAINING LANDSCAPE MIX OF FOREST HABITATS

Habitat, biodiversity, foodwebs

- Trees grouped with interlocking crowns
- Grass-forb-shrub openings between tree groups
- All age classes and as much old forest as is ecologically sustainable
- High interspersion of age classes

Habitat, biodiversity, foodwebs
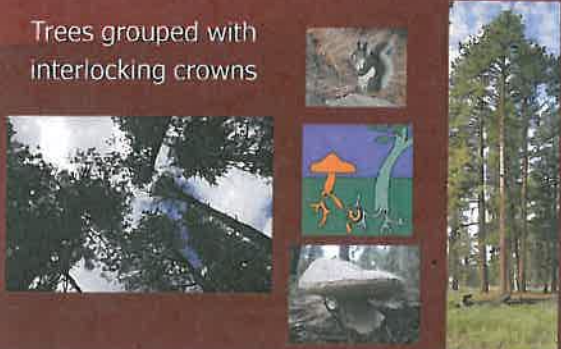
Trees grouped with interlocking crowns

Habitat, biodiversity, foodwebs

As much old forest in groups as is ecologically sustainable

Habitat, biodiversity, foodwebs

High age-class interspersion

Habitat, biodiversity, foodwebs

Large tree component provides:
- Snags
- Logs
- Woody debris

Habitat, biodiversity, foodwebs

grass/forb/shrub

Desired conditions provide habitats for goshawk food web

Grass/seedlings
Poles
Blackjack
Yellow pine

"Historical" conditions
Fort Valley Experimental Forest

Unique elements

- Multi-species focus, not single species!!

- Food web approach
  - Information across trophic levels

- Desired conditions are:
  - Ecosystem specific, different DCs for different forest types

Unique Elements

- Landscape ecology
  - Multiple goshawk home ranges = landscape scale
  - 1,000-year planning horizon incorporates forest growth and succession
  - Spatial & temporal shifting mosaic of habitats

- Forest Restoration
  - Natural composition, structure, and pattern of forest use as guides for assembling habitats
  - Restores natural disturbances, processes, and forest health (productivity)

Summation

- Small groups of trees with interlocking crowns

- Scattered single trees

- Grass-forb-shrub open interspaces between groups

- Snags, logs, woody debris

- Spatial and temporal distribution of the above

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