# Session A01

# Conservation Planning for Biodiversity: Landscape Context and Site Design

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# Biodiversity and Site Management

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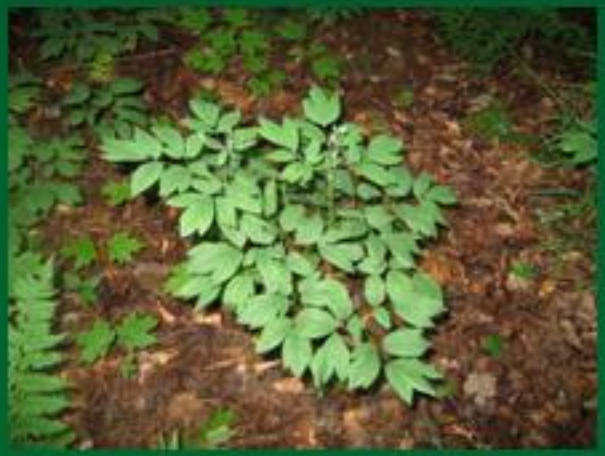
# Overview

- Introduction
- Threats to biodiversity
- Tools for planning
- Management planning
- Partners and resources
- Case studies

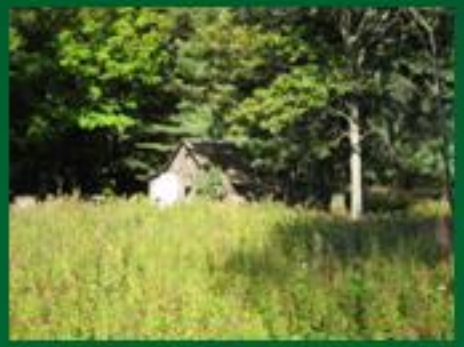
# LTA Standards and Practices

- Standard 8 Evaluating and Selecting Conservation Projects
- Standard 11 Conservation Easement Stewardship
- Standard 12  Fee Land Management



# Importance of Management

- Fee land management is essential to protecting conservation values.
- Failure to protect conservation values may result in the land trust being barred from functioning as a 501(c) (3) organization.



- Conservation values are defined in IRC Section 170(h) to include:
  - Land areas for outdoor recreation by or for the education of the general public,
  - Protection of a relatively natural habitat of fish, wildlife, or plants, or similar ecosystem,
  - Farmland and forest land for scenic enjoyment of the general public, or pursuant to a clearly delineated Federal, State, or local governmental conservation policy
  - Historically important land area or a certified historic structure.

# Goals of Land Management

- In addition to legally defined requirements, the goals of land management might include:
- Maintaining or improving biodiversity
- Providing ecosystem services (water purification, C sequestration, etc.)
- Sense of place and community
- Aesthetics and beauty

# Relationship to Project Selection and Project Planning

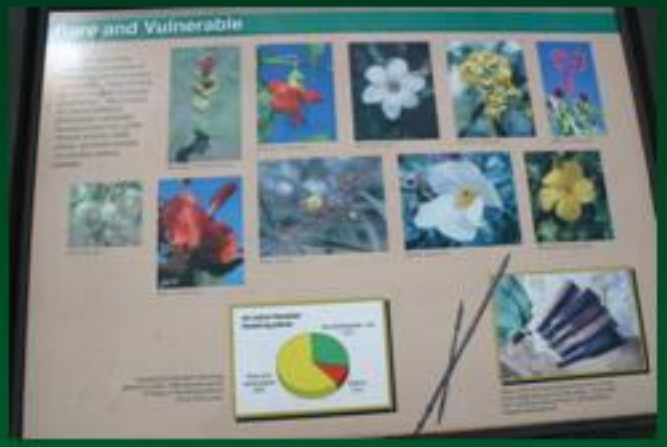
- Selection includes evaluating site in the context of the land trust's mission statement and policy for land acquisition
- Project planning determines whether property acquisition is feasible and appropriate
- Land management planning is the stewardship applied after gaining control

# Fee Land Management Compared to CE

- Land trusts with fee lands are responsible parties
- Land owner of CE is responsible for maintenance of conservation value
- Land trusts can assist landowners with management
- Separate CE agreement and land management plan

# Biodiversity Status

- Endangered species
  - 398 animals
  - 599 plants
- Threatened species
  - 129 animals
  - 146 plants




Source: US Fish and Wildlife Service Endangered Species Bulletin March 2006

# Biodiversity Status 2

- Over a thousand species have plans
- About 350 species have been stabilized
- 16 species moved from endangered (to less threatened)
- 10 species have been delisted

Source: US Fish and Wildlife Service Endangered Species Bulletin March 2006

# Biodiversity Status 3

- Terrestrial Vegetation of the U.S.
  - Cooperative project between the Nature Conservancy and the Natural Heritage Network
  - Based on a combination of physiognomic and floristic characteristics
  - Identified seven classes and 4,149 associations

Source:Grossman et al. 1998.
http://www.natureserve.org/publications/library.jsp

# Biodiversity Status 4

State of the Union: Ranking America's Biodiversity

- Scientists have documented more than 200,000 species in the US (10% of global)
- We are a center of diversity for salamanders, mussels, and turtles
- About 1/3 of well known species are at risk
- Habitat destruction and degradation; and alien species are major threats

Source: Stein, B.A. 2002. NatureServe http://www.natureserve.org/Reports/stateofunions.pdf

# Protection of Biodiversity

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# Role of Disturbance

- Natural
  - Tree fall
  - Change in hydrology (e.g. beaver pond)
  - Grazing
- Human induced
  - Vegetation removal
  - Ditching or dredging
  - Road or trail construction
- Scale of disturbance
- Frequency

# Threats

- Identify threats or stresses to the health of the ecosystem
- Threats include
  - Changes in hydrology
  - Fire and fire suppression
  - Plant diseases and insect infestations
  - Invasion of exotic species, etc.
  - Overgrazing by deer or other herbivores

# Invasive Species

- Often out compete native species (esp. in stressed systems)
- Includes both plants and animals (list is extensive)
- Controls are expensive and time consuming

Living Lands Project

# Excessive Herbivory

- White tail deer and other species may degrade plants at low heights
- Deer damage can occur at 10 animals per square mile (or less)

# Hydrologic Alteration

- Most agricultural lands have been drained by tiles and ditches
- Urban areas often have more runoff and flooding because of impervious surfaces
- Wetlands may suffer from less (or more) water and degraded water quality

# Fire Regime

- Fire was a natural disturbance in many ecosystems
- Fire suppression has resulted in greater fuel loads which can lead to more intense burns
- Interval and intensity of fire help determine communities and structure
- Example: Lack of fire causes canopy closure and increase in shade tolerant species

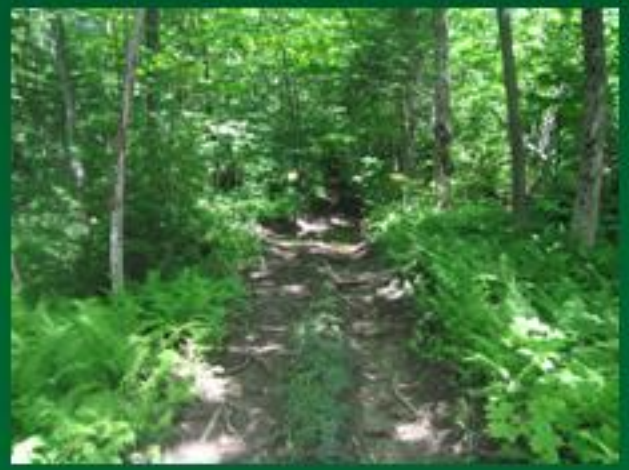
# Erosion and Sedimentation

- Soil loss decreases productivity and removes seed bank
- Sediment in water bodies decreases photosynthesis, covers non-mobile organisms

# Other Human Activity

In addition to “natural” threats, human misuse of a site is also a threat in many locations.

- Trails (foot, bike, vehicle, horse, etc.)
- Dumping, littering, etc.
- Hazardous waste disposal
- Hunting/harvesting
- of game or plants



# Tools for Planning

# Conservation Design

- Core area or buffer?
- Size of parcel: Will it support diverse communities?
  - Varying species have widely different area requirements
- Shape: How much edge effect?

# Connectivity

- Consider adjacent properties
  - High quality sites can disperse natives
  - Poor quality sites can increase invasive species
- Corridors for wildlife
- Fragmentation/isolation

# Site Context

- Surrounding land uses
- Local development trends
- Demographics of local community
- Anticipated public use needs that this property may be expected to fulfill

## Assess Current Communities:

- Size (acres) and % of original
- Number of occurrences and
  - sufficiency of occurrences to support community
- Quality of communities and % under protection
- Degree of fragmentation and isolation

Source: Chicago Wilderness

# Assessment (cont.)

- Extent and effectiveness of current management
- Status of community (imperiled or secure)
- Can develop rating system to target which communities need highest level of protection and/or management

Source: Chicago Wilderness

# Active or Passive?

- Letting nature take its course may not work
- Landscape is so human altered that natural processes are limited
- Most systems require intentional management

# Site Activities

- Preservation (protection of existing communities)
- Restoration (establishment of a community similar to a reference one)
- Reconstruction or rehabilitation (establishment of a functional community unlike the reference)
- Succession and passive management (letting nature take its course)

# Preservation

- Appropriate for sites with relatively intact, functional ecosystems
- Key is to minimize human-induced disturbance
- Manage to continue historical conditions

# Restoration

- Determine historical communities
  - Public land survey records
  - Soil characteristics (esp. drainage)
  - Neighboring communities in similar landscape positions
- Plant/introduce appropriate species
- Manage site to support communities

# Restoration

- An excellent description of the range of restoration practices is available on the Society for Ecological Restoration's website (see http://www.ser.org/content/ecological_restoration_primer.asp)

# Rehabilitation/Reconstruction

- Determine community based on site characteristics and property goals
- Develop species list
- Modify site to support introductions
- Use native species and appropriate landscape design

# Land Management Planning

- Steps in site planning:
  - Collect information
  - Determine conservation priorities
  - Set goals and objectives
  - Develop work plan
  - Implement plan
  - Monitor and assess
  - Review and revise

# Collect Site Information

- Property name and location with directions
- Contact information for responsible person(s) e.g. stewardship coordinator
- Legal documents including deed or title insurance documents
- Zoning and other land use restrictions
- Intentions of donors, funders, etc.

# Resource Layers

- Geology
- Soils
- Hydrology
- Existing infrastructure (buildings, roads, etc.)
- Other (maps and narrative)
- Geographical Information Systems (GIS)

# Natural Resource Inventory

- Plant community description and health (maps and narrative)
- Plant and animal species list, inclusive of locations of rare/declining species habitat
- Presence/absence of resource problems/issues (deer overabundance, invasive plants, hazards, trash etc.)

# Conservation Priorities

- Determine plant communities and other land cover (e.g. cliff face)
  - Compare to list of rare or unique habitats
- Assess likelihood of presence of rare, threatened and endangered species
  - Consult state Natural Heritage, Nature Serve or State Wildlife Action Plan databases
- Identification and protection of most critical resources
  - (i.e., conservation priorities)

Project

# Plan Considerations

- Protection of critical natural resources
- Permitted uses (e.g. hiking, bird watching, etc.)
- Non-permitted uses (e.g. logging, mining, development, etc.)
- Productive uses (e.g. farming, timber harvest, grazing, etc.)

# Plan Development

- Who is responsible for writing?
- What resources are required
- Time frame for implementation
- Potential partnerships

# Invasive Species

- Monitor for early detection
- Identify pest and understand life cycle
- Develop a control strategy
- Control practices
  - Herbicides
  - Burning
  - Biological control (e.g., musk thistle weevil)
  - Grazing

# Fire Management

- Is system fire dependent?
- Develop prescribed burn plan
- Obtain required permits
- Consider safety issues
- Check on insurance coverage
- Time burn according to conservation targets
- Leave refuges (don't burn all habitat at once)

# Hydrologic Considerations

- Effectiveness of surface drainage
- Presence and effect of tile drains
- Construction of water control devices (e.g., levees, dams, gates, etc.)
- Watershed scale planning

# Human Management

- Visitation Policy
  - Prohibited without permission
  - Allowed
  - Encouraged
- Trails
- Signage
- Fencing
- Patrol/enforcement

# Implementation of Plan

- Establish strategies for each stewardship unit to meet goals
- List of activities to be performed in each stewardship unit
- Time frame for completion of activities
  - Short term (0 to 2 years)
  - Long term (more than 2 years)

# Monitoring and Assessment

- Biological survey
  - Routine
  - Scientific
- Are objectives and goals being attained?
- Has work plan been successfully implemented?

# Adaptive Management

- Adaptive management uses research strategies to evaluate success of alternative practices
- Design experiment to test:
  - Date of herbicide application
  - Timing of fire
  - Use of grazing animals
  - Et cetera

# Summary

- Planning requires effort and resources
- Alternatives are
  - Inefficient use of time and money
  - Failure to achieve goals and objectives
  - Loss of biodiversity
  - Diminished public support

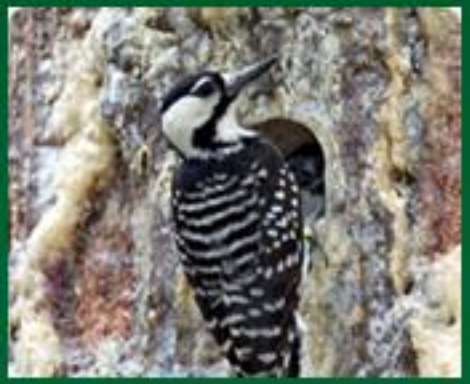
# Assistance Available for Plan Development

- Land Trust Alliance (including LTANET)
- State land trust service centers
- The Nature Conservancy
- Other land trusts in your area
- Federal agencies (US Fish and Wildlife, US Geological Services (Biological Resources), USDA Natural Resources Conservation Service, etc.

- State agencies: Departments of Natural Resources, Environment, etc.
- Local government: Planning agencies, parks, etc.
- Not for profits: Defenders of Wildlife, Audubon Society, Sierra Club, Wilderness Society, etc.
- Colleges and universities (landscape architecture, natural resource depts. etc)
- Consulting companies

# Red Hills: Case Study

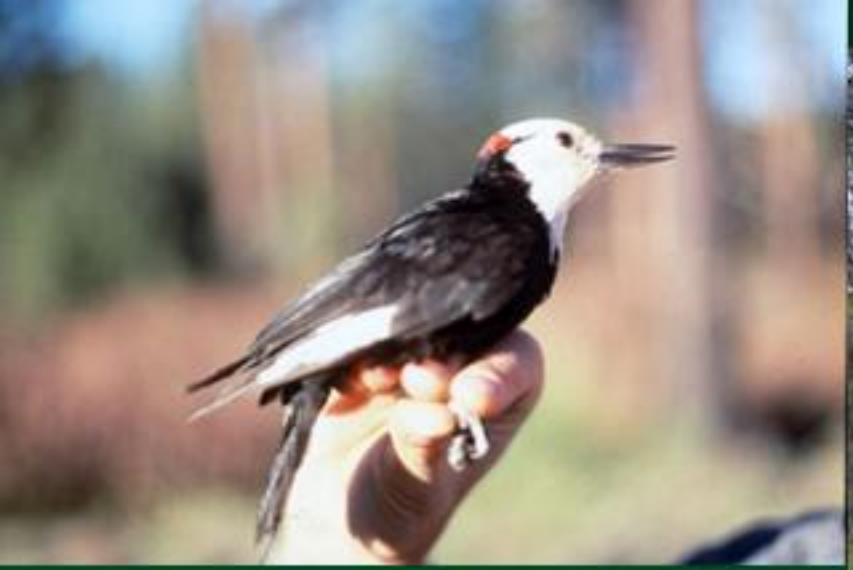
- Wade Tract managed by Tall Timbers Research Station and Land Conservancy
- Old growth of long-leaf pine with wiregrass understory
- Managed for support of Red-cockaded woodpecker

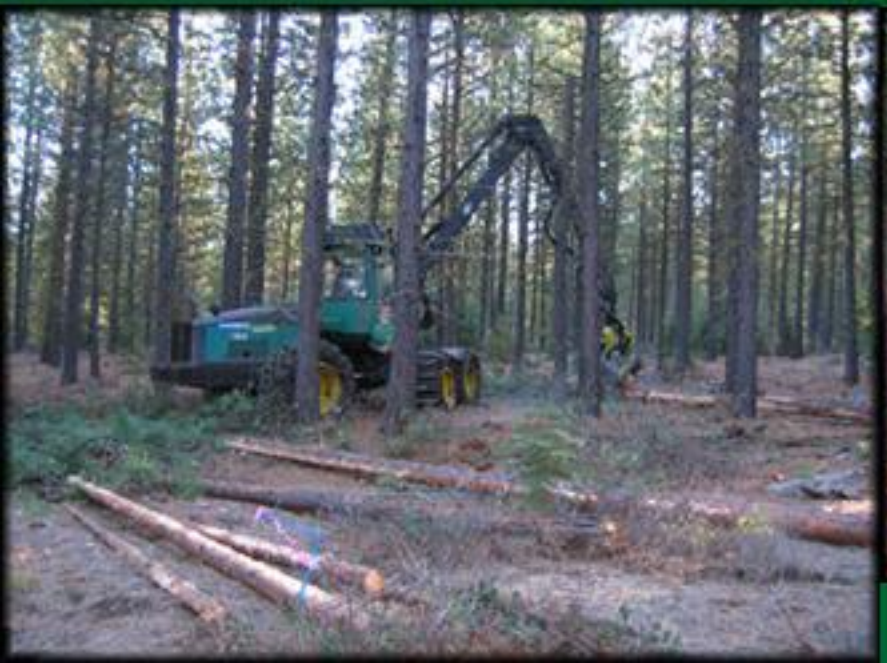


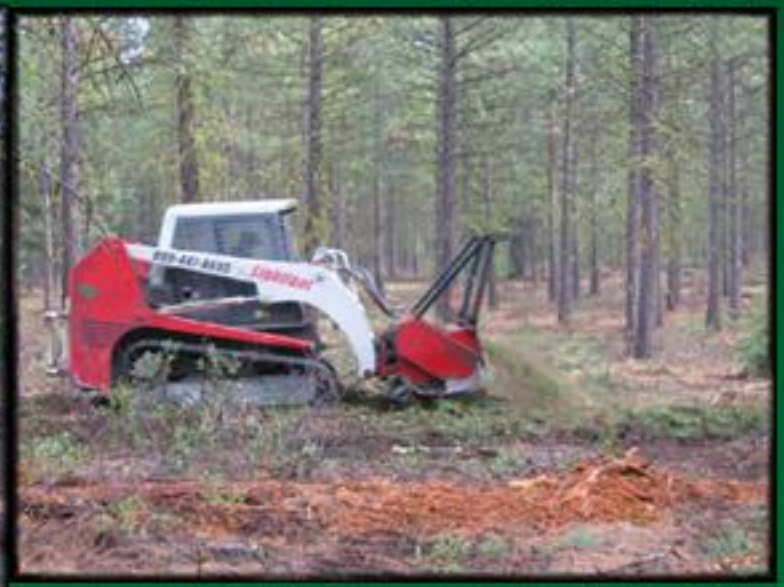
Source: Environmental Defense

# Metolius Preserve: Case Study II

- Preserve is managed by Deschutes Basin Land Trust
- Predominantly Ponderosa Pine forest with White-headed Woodpecker
- Deschutes worked with Integrated Resource Management to develop a forest thinning strategy to produce more natural structure (clumpy and patchy)







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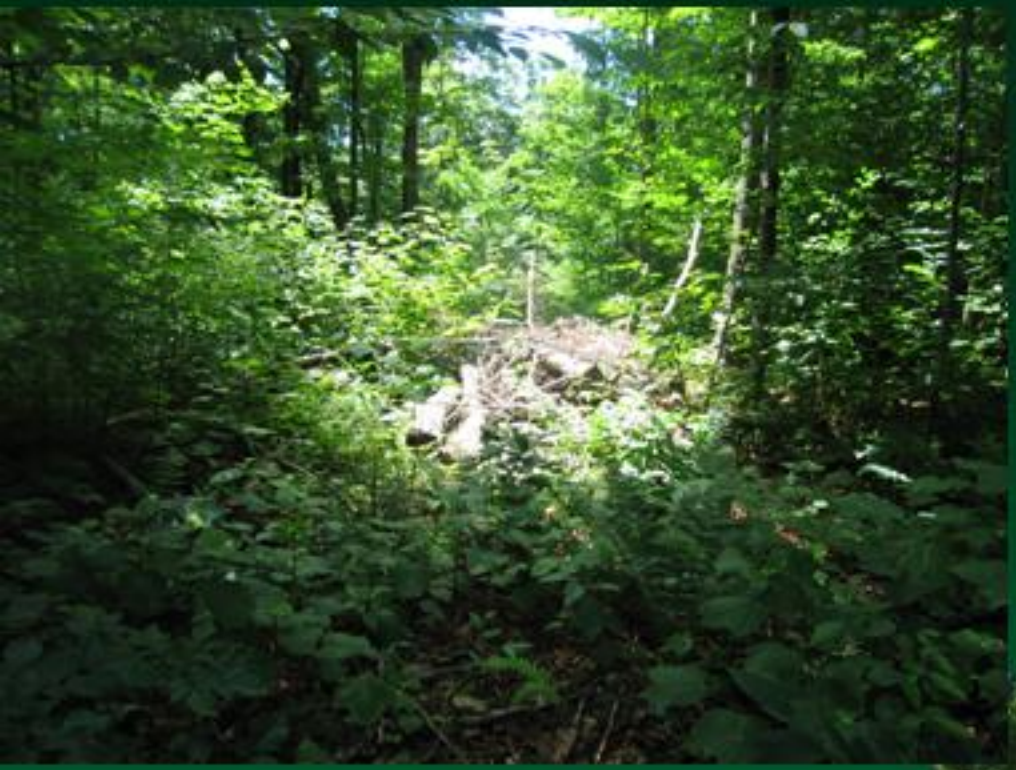
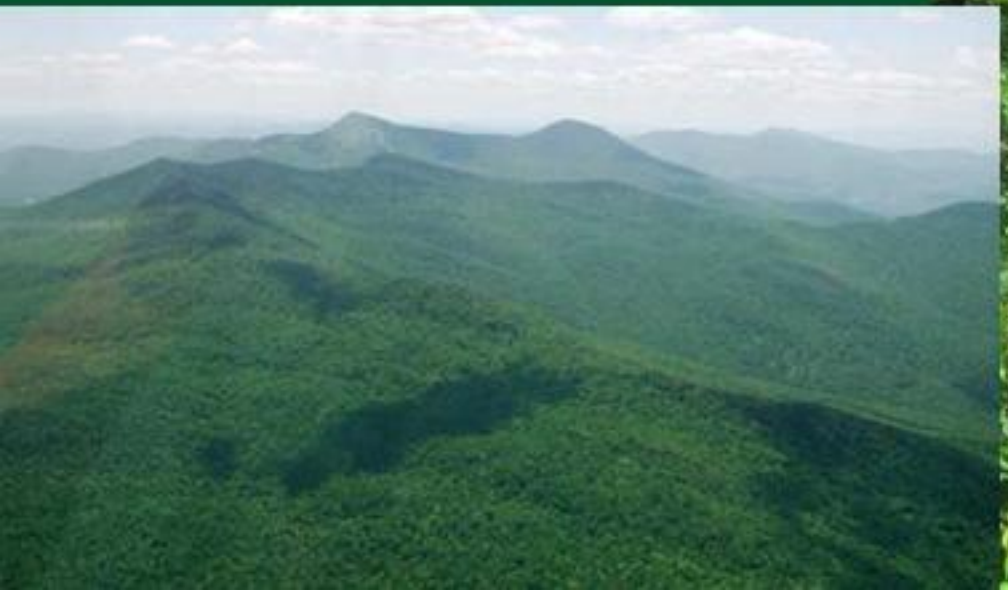
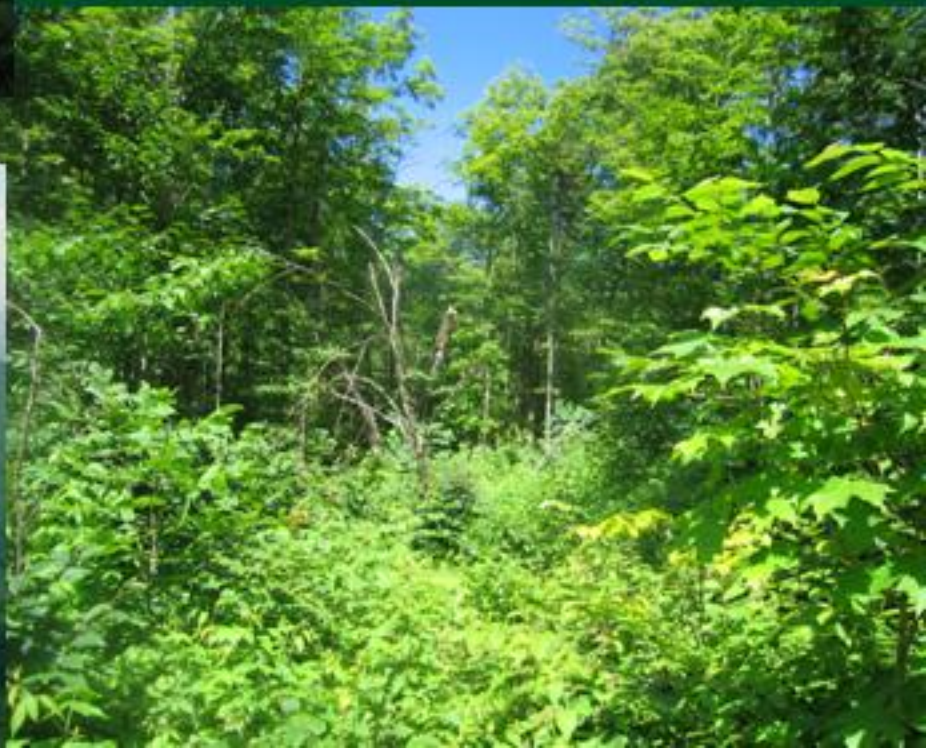
# Atlas Forest: Case Study III

- The Vermont Land Trust partnered with the Nature Conservancy to manage a large tract of hardwoods
- Two goals:
  - Maintain or improve biodiversity
  - Produce sustainable revenue from timber sales

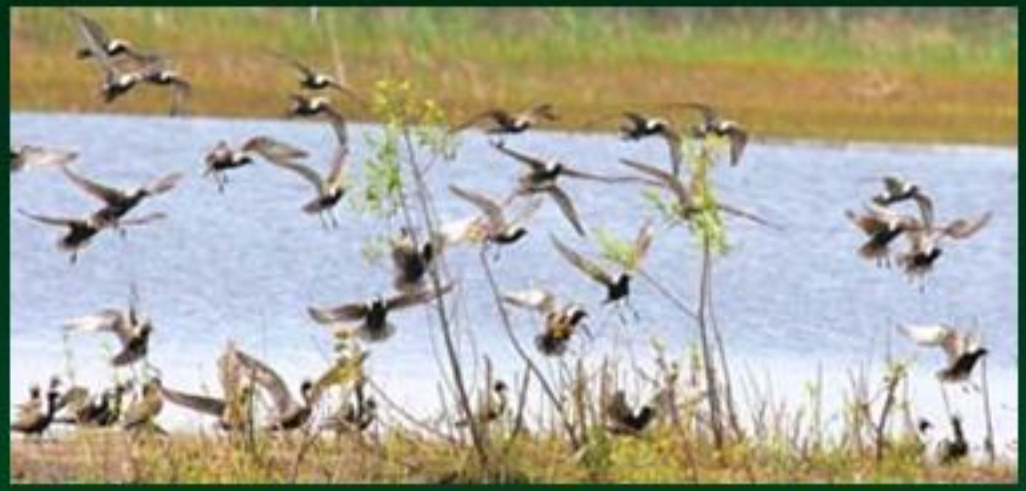






# Case Study IV
# Kankakee Sands Restoration

- TNC project on over 7,000 acres in NW Indiana
- Removed drainage ditches to create wetlands and wet prairie
- Developed own seed nursery with 390 species
- Habitat for Henslow's sparrow, grasshopper sparrow, lesser yellowlegs, etc.



American Plover (l) and Lesser Yellowlegs (R) courtesy of TNC website

Marsh Milkweed

Source: Wisconsin Stewardship Network