

# Ecosystem Management & Conservation of Biological Diversity



# Goals for this evening:

1. Provide information on ecosystem management and biodiversity on the FLNF
2. Gather public comments on these topics for the revised Forest Plan

# Agenda

- Announcements
- Overview of Plan Revision
- Ecosystem Management and Conservation of Biological Diversity
- Clarifying Questions
- Small Group Work

# Announcements

- Missed previous meetings?
- Public input meetings – No Decisions
- Website:  
[www.fs.fed.us/r9/gmfl/nepa\\_planning/  
plan\\_revision.htm](http://www.fs.fed.us/r9/gmfl/nepa_planning/plan_revision.htm)

# Forest Plan Revision

- Why are we revising the plan?
- How can you get involved?
- Where are we in the process?

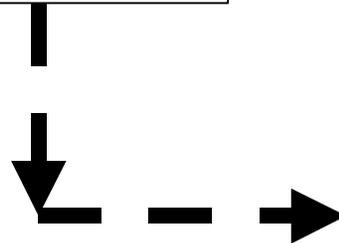
# **FLNF Forest Plan Revision Timeline**

## **Where we have been...**

**Formal and informal  
comments  
(1996-2001)**



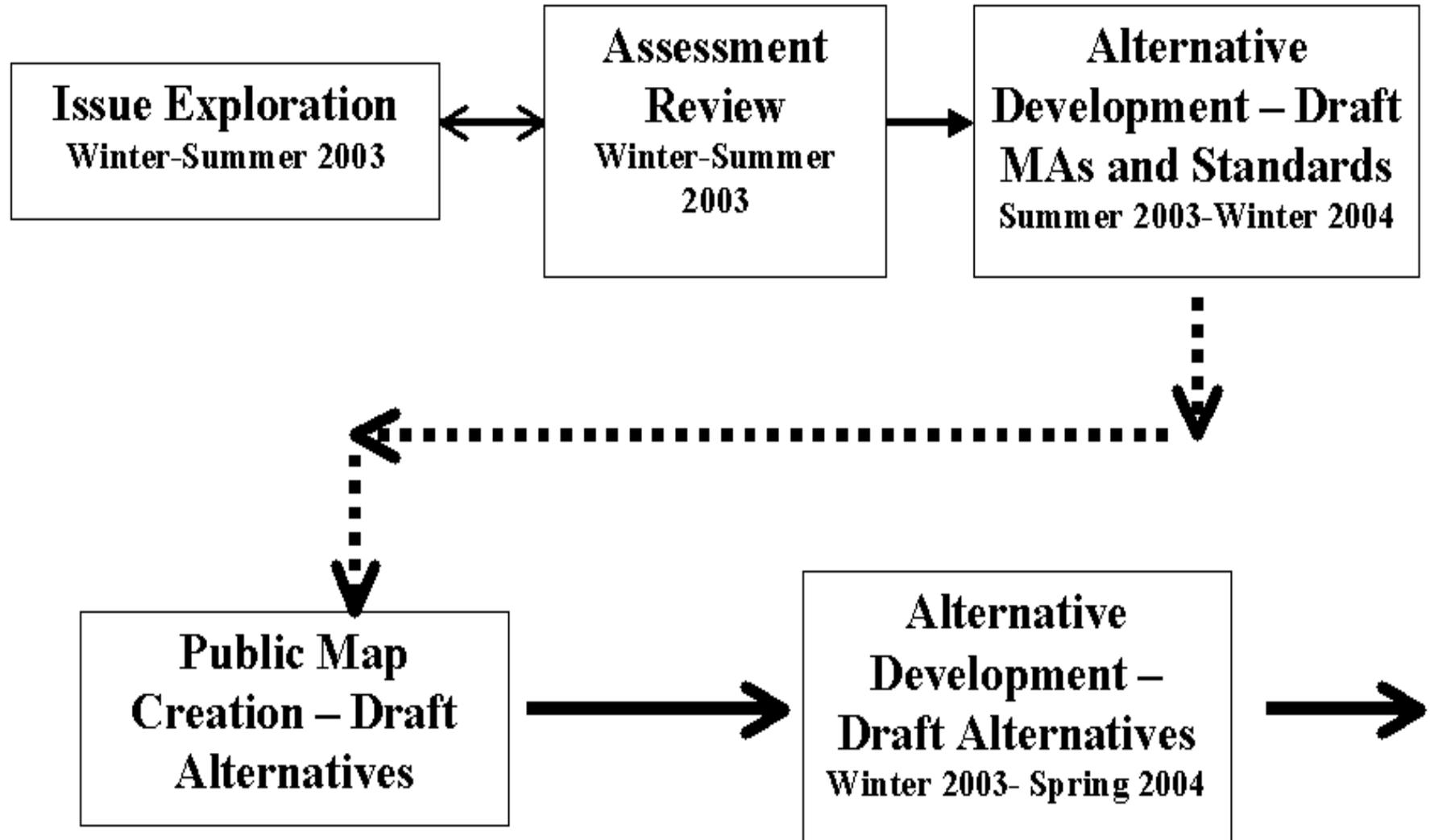
**Notice of  
Intent  
(May 2002)**



**90 Day Formal  
Written Comment  
Period  
(August 2002)**

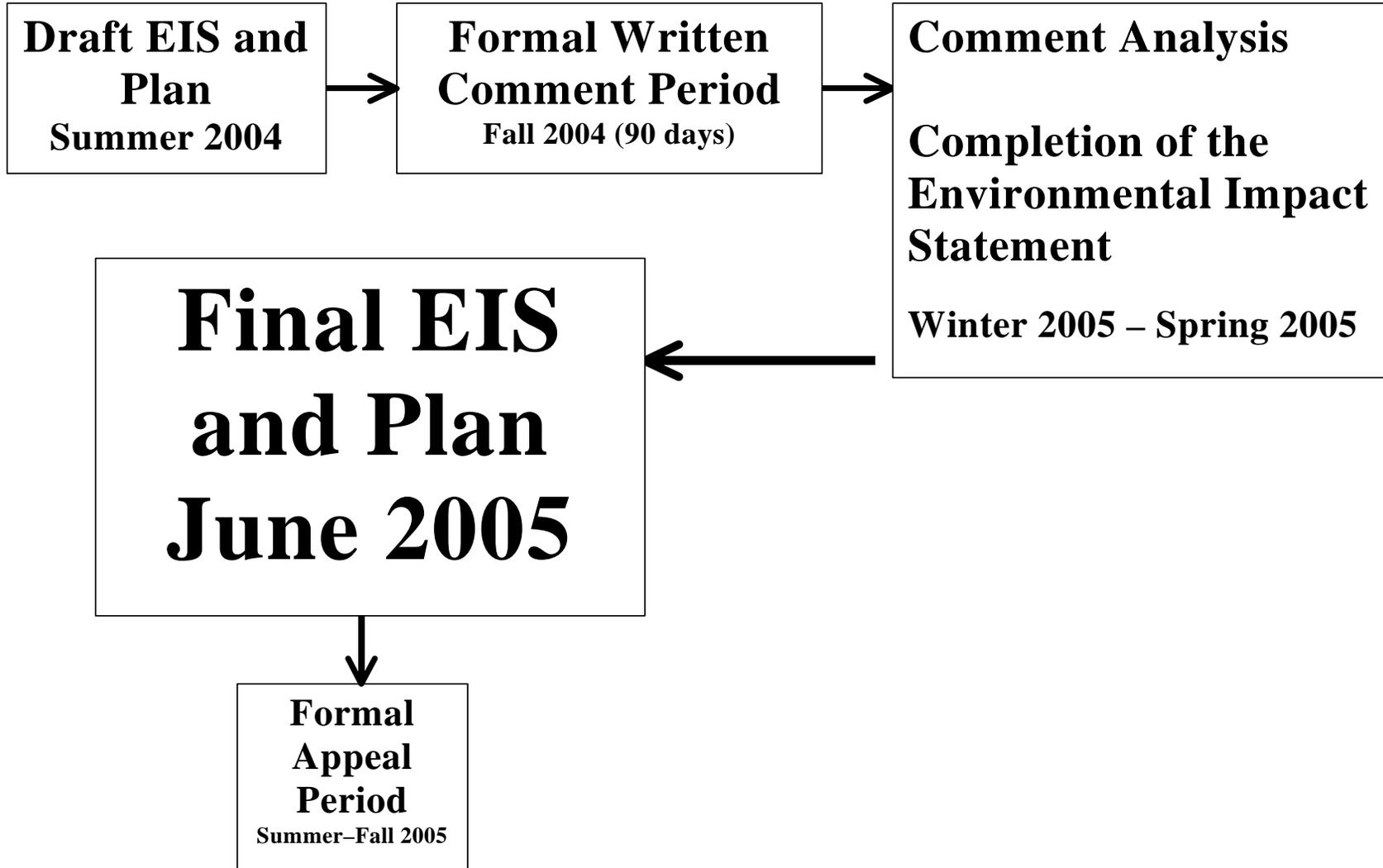


# Public Involvement Timeline Winter 2003 - Spring 2004



# **Formal Public Involvement Timeline**

## **Summer 2004 - June 2005**



# Ecosystem Management and Conservation of Biological Diversity

Finger Lakes National Forest

# Outline

- Ecosystems
- Ecosystem Management
- Conservation Biology
- Biodiversity
  - ✦ Species
  - ✦ Communities
  - ✦ Landscapes

# What is an Ecosystem?

- An ecosystem is a community of living organisms (e.g. plants, animals, humans), their physical environment, and the processes, functions, and interactions that combined lead to their recognition as an interdependent unit

# Ecosystems are...



## SPATIAL

Ecosystems range in  
size

Ecosystems are  
hierarchical

Ecosystems are  
interdependent



# Ecosystems are...

- INFLUENCED BY FORCES
- Disturbances
- Competition & predation
- Changes in forces



# Ecosystems are...

## ● TEMPORAL

● Ecosystems are dynamic

● Ecosystems are influenced by their history

● Over hundreds of years, ecosystems can grow larger, shrink, or disappear – through natural or human causes

“Ecosystems are not only more complex than we think, they are more complex than we can think. This should lead us to be cautious, and a little bit humble.”  
– Jack Ward Thomas

# What is Ecosystem Management?

“An approach to the management of natural resources that strives to maintain or restore the sustainability of ecosystems and to provide present and future generations a continuous flow of multiple benefits in a manner that is harmonious with ecosystem sustainability.” - David Unger, Ass. Deputy Chief of the US Forest Service, 1996

# What is Ecosystem Management?

- Ecosystem management represents a shift in focus from “outputs” to “process, pattern, and function”
- Ecosystem management makes use of tools developed over decades of management and applies them to this new focus.

# 5 Principles of Ecosystem Management

1. Socially defined goals and management objectives
2. Integrated, holistic science
3. Broad scales – time and space
4. Collaborative decision building
5. Adaptable institutions

- *from Moote et al 1994; Iverson 1993.*

# Relationship with National Forest Management Act (NFMA)

- National Forests are ecosystems
- Important aspects of national heritage preserved
- Coordinated planning with other land management agencies
- Integration of planning activities
- Public involvement
- Responsiveness to changing conditions

# Ecosystem Management on the FLNF

- Ecological land classification
- Spatial analysis
- Public involvement and use of science  
in plan revision
- Monitoring program
- Scales of biological diversity

# Ecosystem Management, NFMA, and Biological Diversity

- NFMA and associated regulations within the agency also require management to:
  - ✱ "...maintain at least viable populations of [existing native and desired non-native plants, fish, and wildlife] species."
  - ✱ "...provide for diversity of plant and animal communities based on the suitability and capability of the specific land area..."

# What is Conservation Biology?

- First formulated in the late 1960's to 1980's as the application of science to conservation problems
- Addresses the dynamics and problems of species, communities, and ecosystems that are disturbed
- Publication of "Conservation Biology" by Michael Soulé in 1980
- Formation of professional organization "Society for Conservation Biology", and peer-reviewed journal "Conservation Biology" in 1987

# What is Conservation Biology?

- Crisis or mission-oriented science
- Combination of pure and applied science
- Focuses on how to maintain, protect, and restore the diversity of life on Earth, or biodiversity.

# What is Biodiversity?

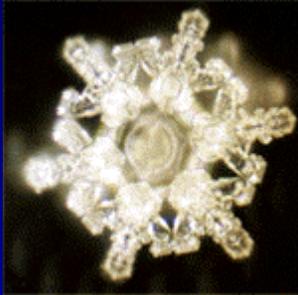
## *The Variety of Life and its Processes*

The variety of living organisms & their genetic differences;

The communities and ecosystems in which they occur;

The ecological and evolutionary processes that keep them functioning, yet ever changing and adapting.

# What is Biodiversity?



**Genes**  
**Species**



**Populations**  
**Communities**



**Ecosystems**  
**Landscapes**



# What is Biodiversity?

**Species**



**Communities**



**Landscapes**



The Most Useful and Relevant Levels

# Is There a Biodiversity Crisis?

- In the U.S. there are 1,262 plants and animals federally listed as T or E
- Scientists indicate current rate of extinction is 100-1,000 times faster than natural rate
- Acceleration throughout human history
- This loss will affect people – food, medicine, industrial products, eco-services

# Why is Biodiversity Important?

- Utilitarian value – benefits to people
  - ✱ Food crops
  - ✱ Building materials
  - ✱ Decomposing organisms
- Inherent value – value due to existence

# What are the Main Threats to Biodiversity?

- Habitat loss and fragmentation
- Habitat degradation
- Introduced species
- Overharvesting of species



# Key Elements of Biodiversity Conservation

- Viable populations
- Representation in conservation design
  - ✦ Species
  - ✦ Natural communities
  - ✦ Landscapes

# How the FLNF is Examining Biodiversity

Species



# How the FLNF is Examining Biodiversity

- Focus is on conservation of rare species that are at risk of being lost from the Forest
- Process called Species Viability Evaluation
- Identify at species-at-risk
- Evaluate effects of alternative management plans on them
- Once an management plan is selected, species that continue to be at risk are protected

# What is a Species Viability Evaluation (SVE)?

- A qualitative process
- Assembles existing information
- Uses expert judgments
  - ✦ likely future status of species populations
  - ✦ ecological conditions that support them.

# Why are we doing a Species Viability Evaluation?

- National Forest Management Act viability requirements
- Legal decisions - identify ecological conditions needed to maintain species viability over time

# What is "Viability"?

A viable population is "one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area."

"...habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area."

-NFMA 1982 regulations

# What is Viability?

Size: Populations large and healthy enough to endure long-term

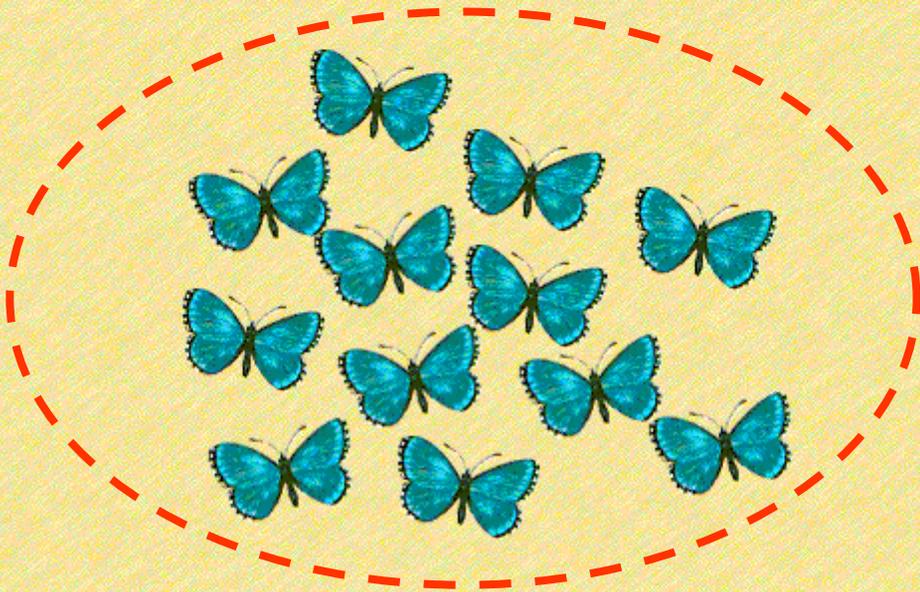
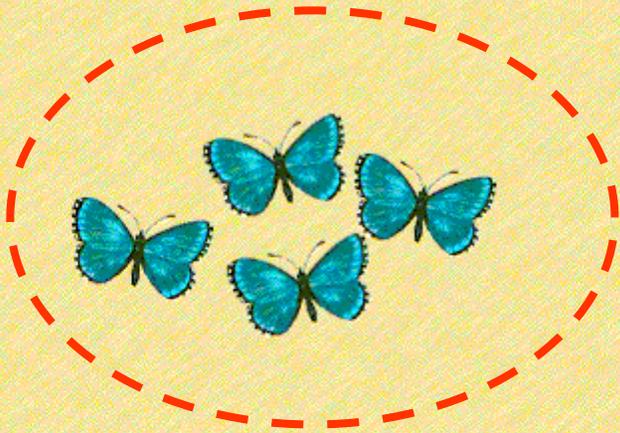
Condition: With most components intact, not significantly degraded

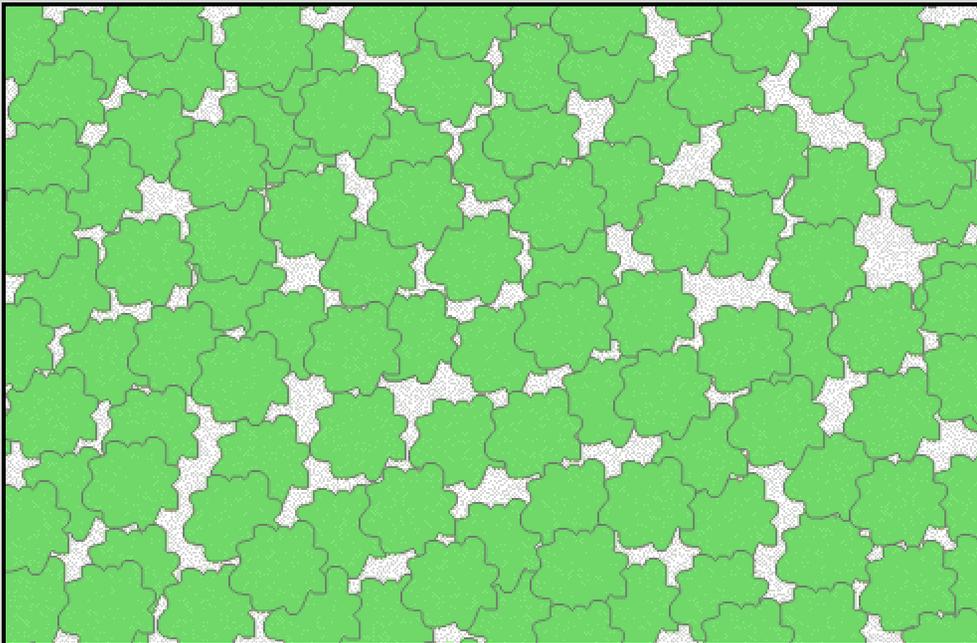
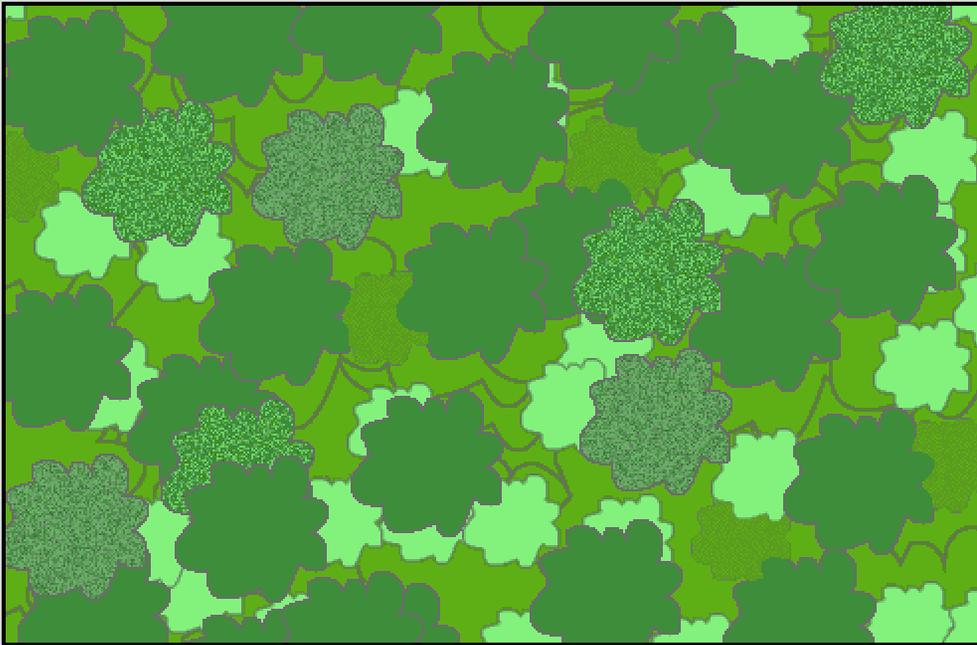
Landscape Context: In a setting which supports an organism's life history and ecosystem functions

For example...

# Viability:

Size





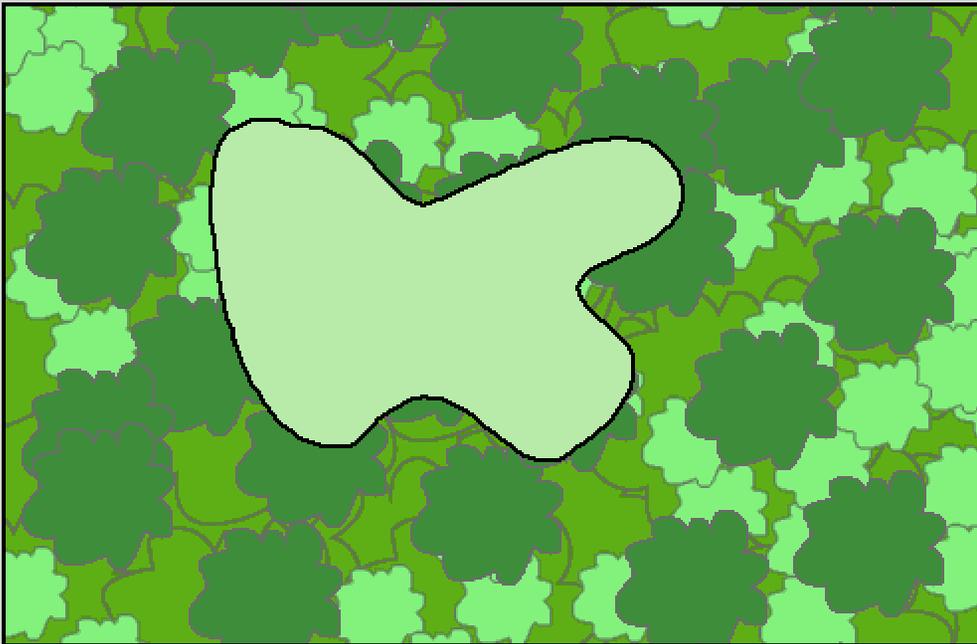
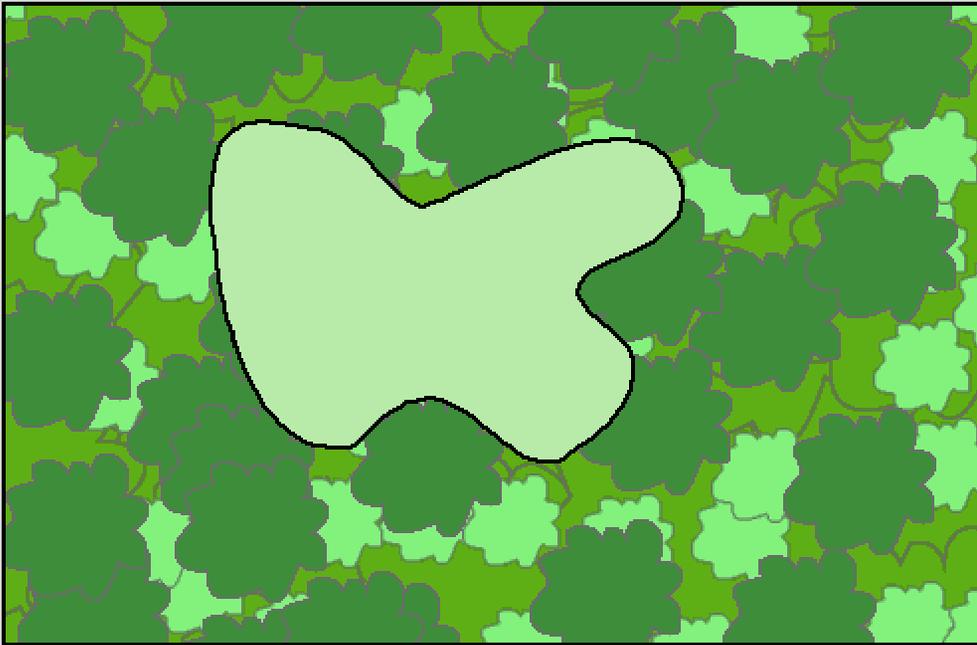
# Viability:

## Condition

- Age Structure
- Habitat Structure
- No Exotics
- “Good” Habitat

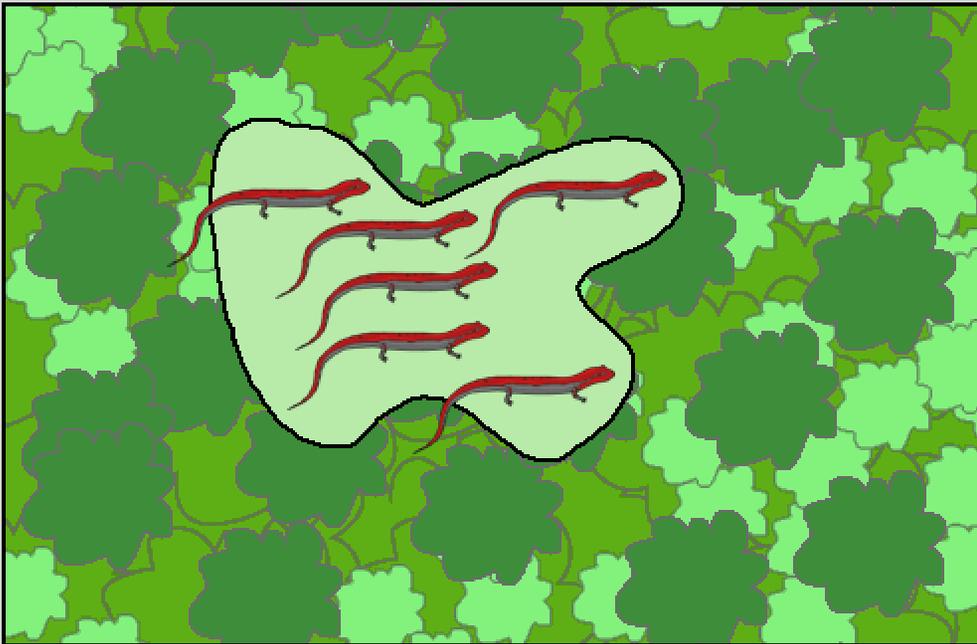
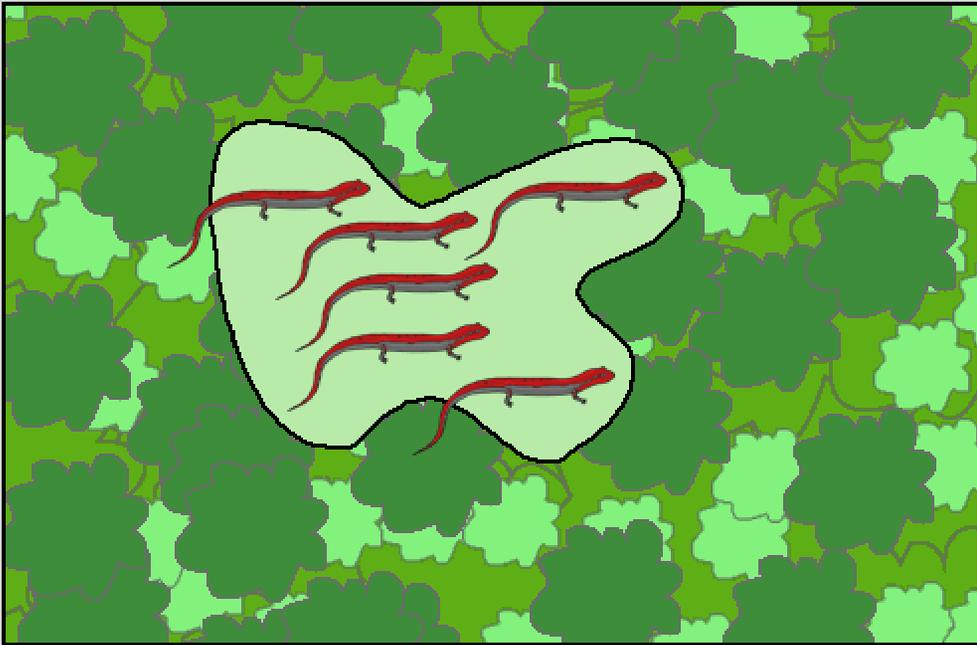
# Viability:

Landscape  
Context



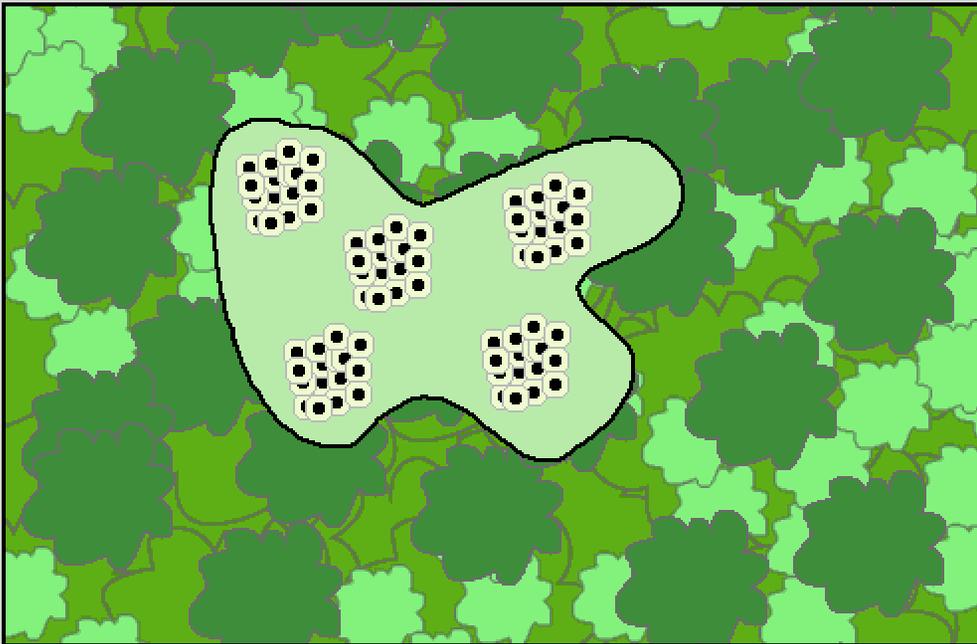
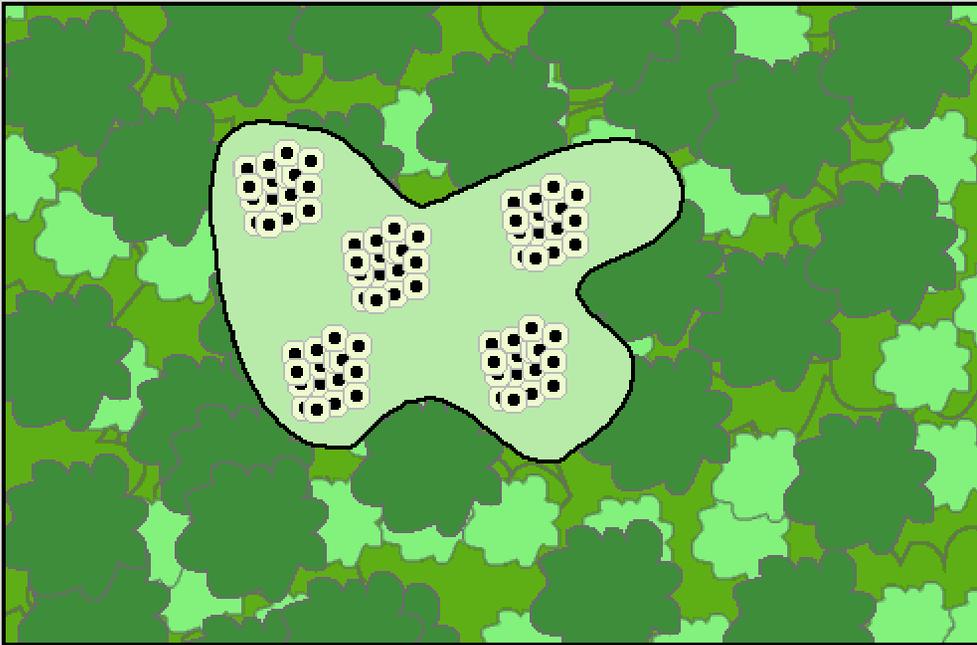
# Viability:

## Landscape Context



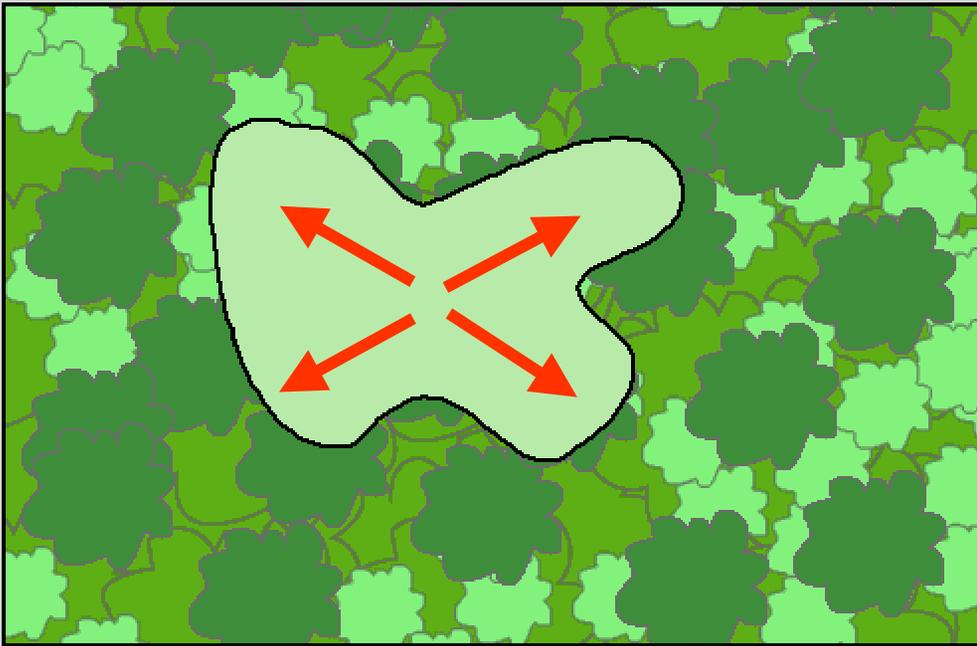
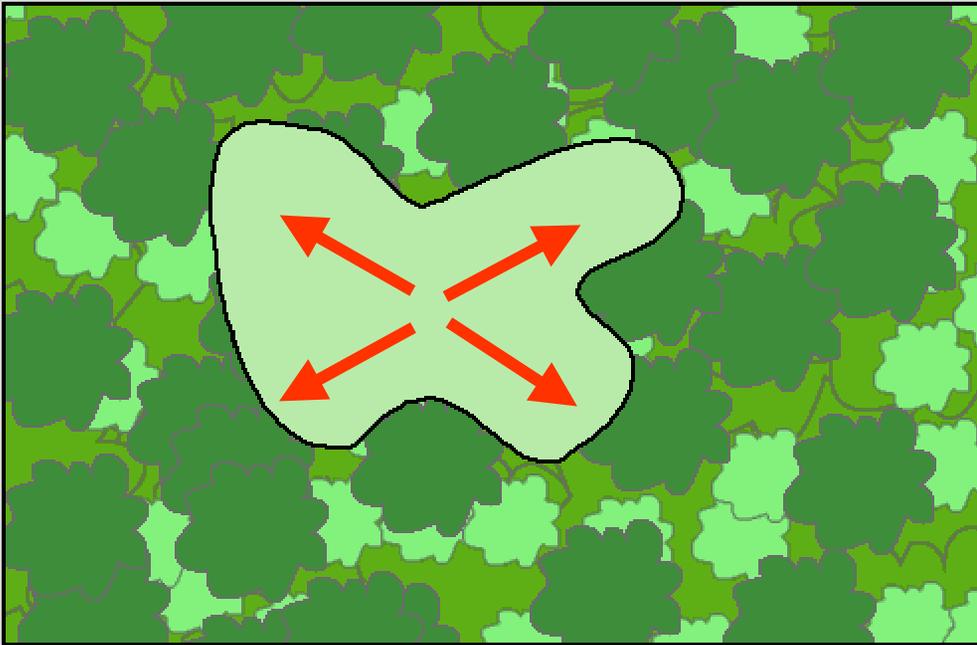
# Viability:

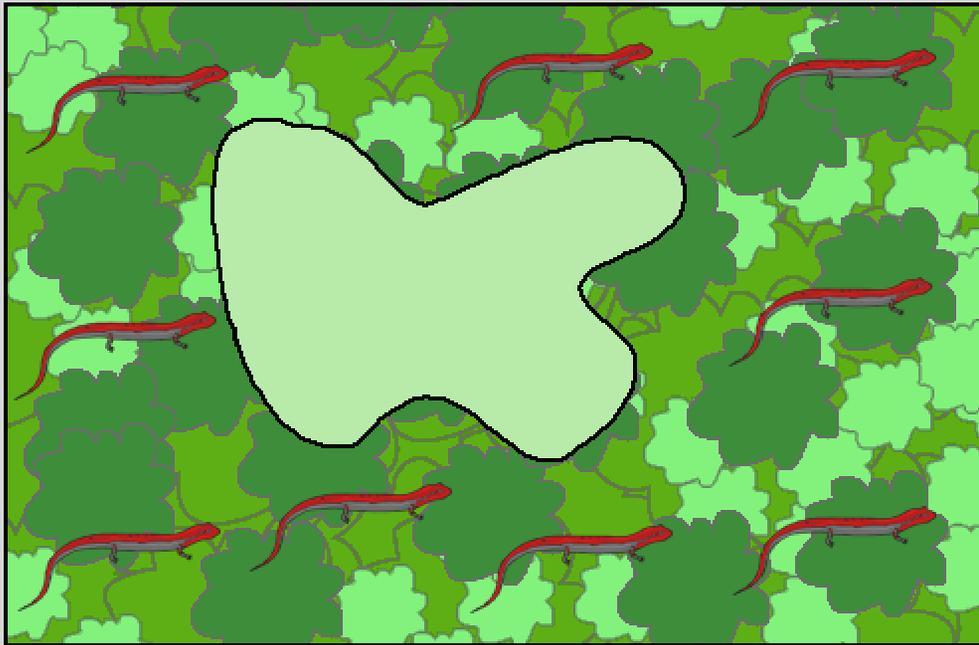
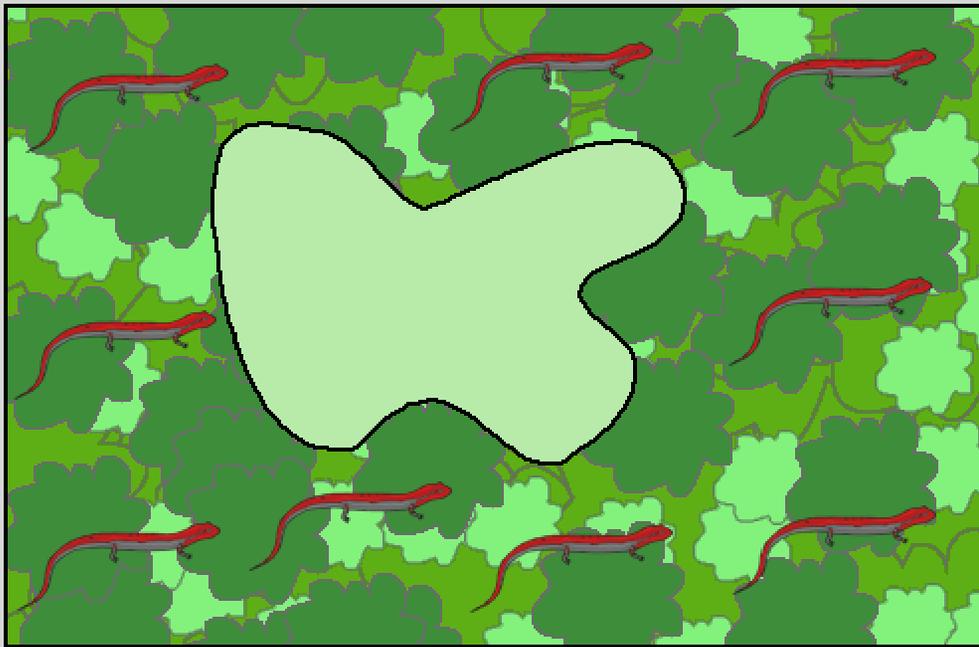
## Landscape Context



# Viability:

Landscape  
Context



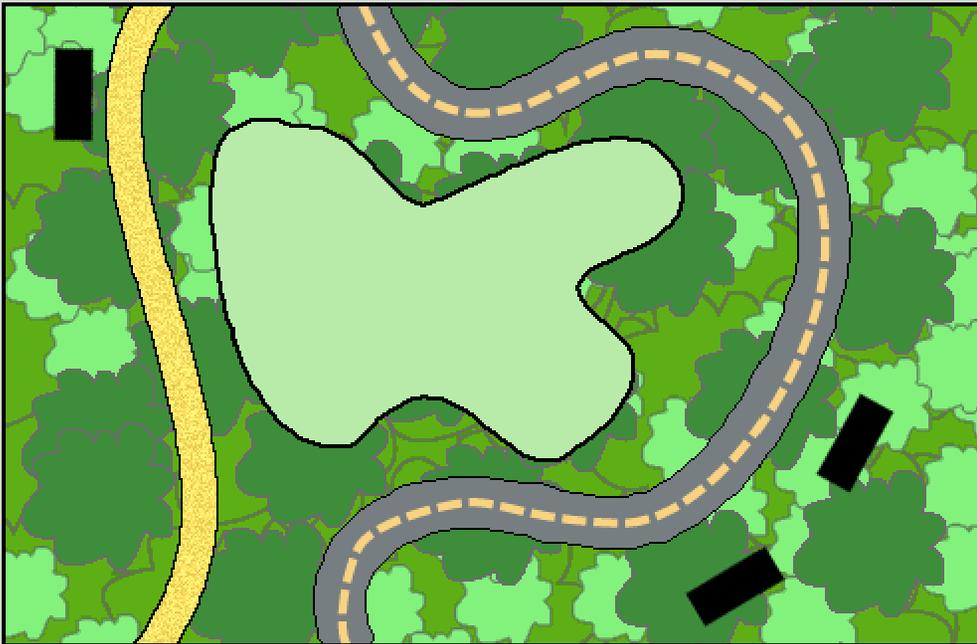
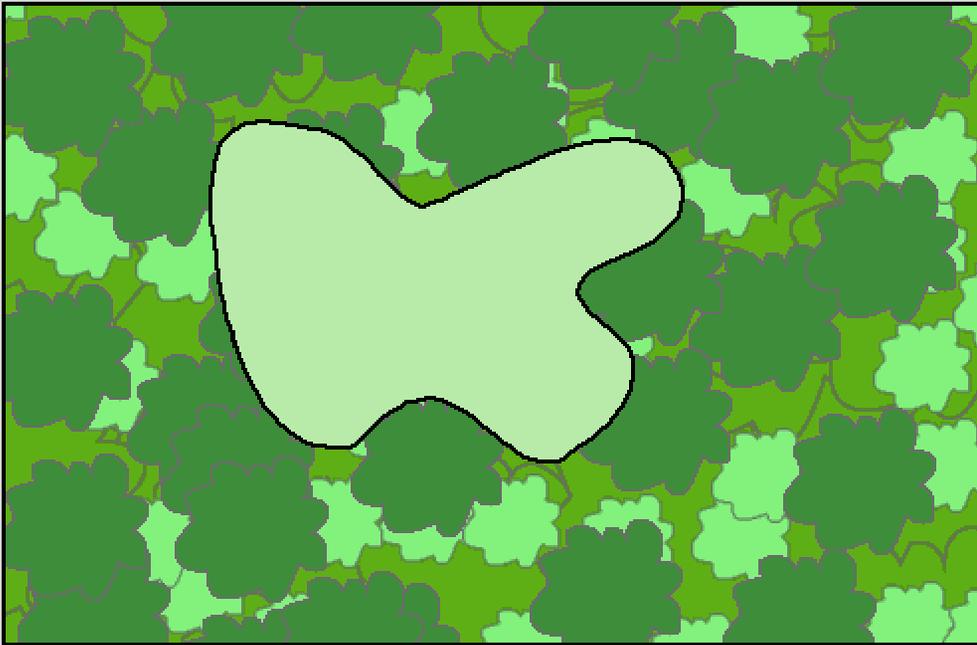


# Viability:

Landscape  
Context

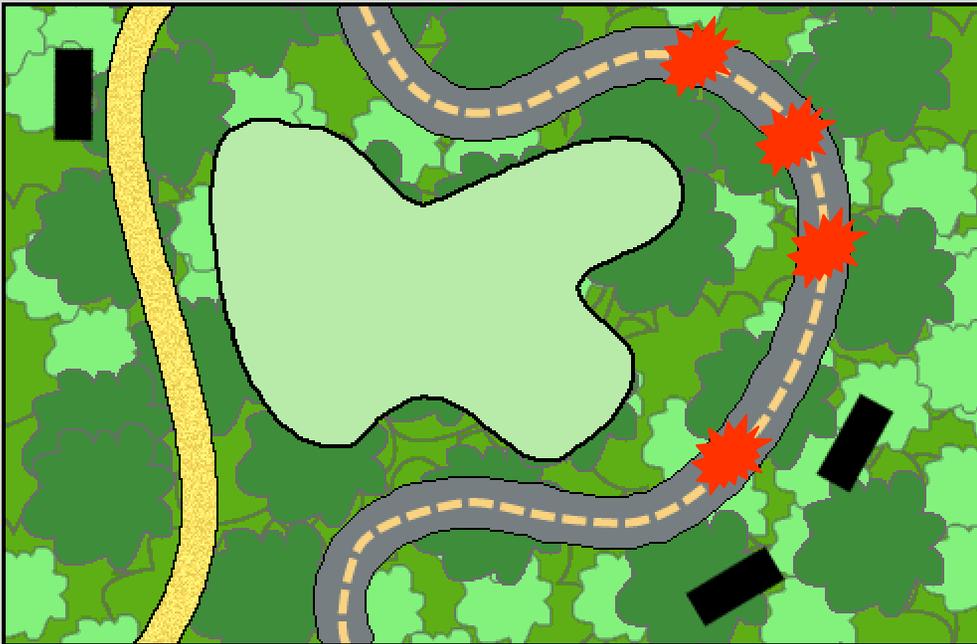
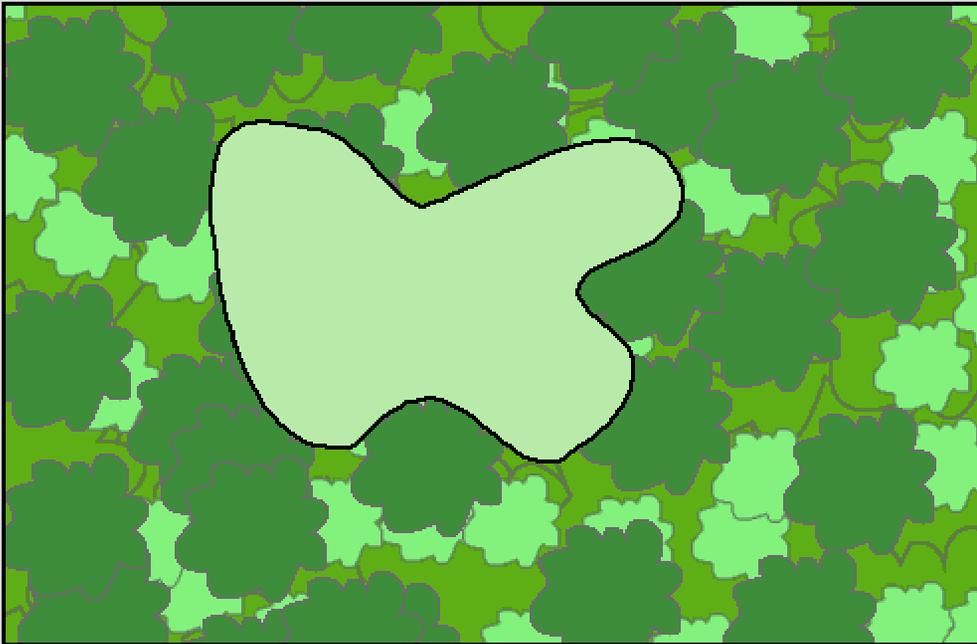
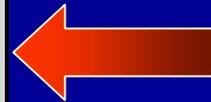
# Viability:

## Landscape Context



# Viability:

Landscape  
Context



# What species do we need to evaluate throughout Revision?

- Federally Endangered, Threatened and Proposed species
- Regional Forester's Sensitive Species (RFSS)
- Species likely to occur on the FLNF for which viability in the next 10-20 years is a concern

# Species with a viability concern

- State endangered, threatened, and special concern species
- Species that are State ranked as rare
- Those at risk of being extirpated from the Finger Lakes National Forest
- Only those known or likely to occur on the Forest

# SVE Process

- Literature reviews
  - ✱ 83 plants, 49 animals
- Expert panels
  - ✱ Significance of FLNF
  - ✱ Current and future outcomes
- Working SVE list

# How will this information be used?

## ● Forest Plan Revision:

- ✱ Management direction
- ✱ Standards and guidelines for species enhancement and protection
- ✱ Landscape-level habitat objectives
- ✱ Evaluation of management alternatives

## ● In project work

- ✱ Protection & enhancement needs



# How the FLNF is Examining Biodiversity –

## Management Indicator Species



# Management Indicator Species

- Based on the premise that certain species can represent other species in terms of:
  - ✦ Response to management
  - ✦ Population trends

# Management Indicator Species

## ● Summary Requirements – NFMA 1982

- ✱ MIS indicate effects of management through changes in species populations
- ✱ Can include virtually any vertebrate, invertebrate, plant
- ✱ Must be used to analyze effects of alternatives
- ✱ Must be monitored and related to habitat

# MIS on the FLNF

- Selection based on major vegetative community types and special habitat features/conditions
- The FLNF selected 9 MIS species, including 7 birds and 2 mammals
- Habitats represented by these species include:
  - ✱ Young and mature hardwoods
  - ✱ Mature softwoods
  - ✱ Young and mature aspen/birch
  - ✱ Mature oak
  - ✱ Open areas (incl. permanent openings, orchards)
  - ✱ Unique habitats – beaver flowage, cavities/snags

# MIS Trends on the FLNF

- Increasing trends for species representing:
  - ✱ Young Hardwoods/shrublands (chestnut-sided warbler)
  - ✱ Low elevation mature softwood (white-tailed deer)
- Possible stable trend for species representing:
  - ✱ Mature oak (gray squirrel)
- Uncertain trends for species representing:
  - ✱ Mature aspen/birch (yellow-bellied sapsucker)
  - ✱ Young aspen/birch (ruffed grouse)
  - ✱ Beaver flowage (tree swallow)
  - ✱ Openings, cavities/snags (woodcock, bluebird)
  - ✱ Mature hardwoods (goshawk)

# MIS Issues

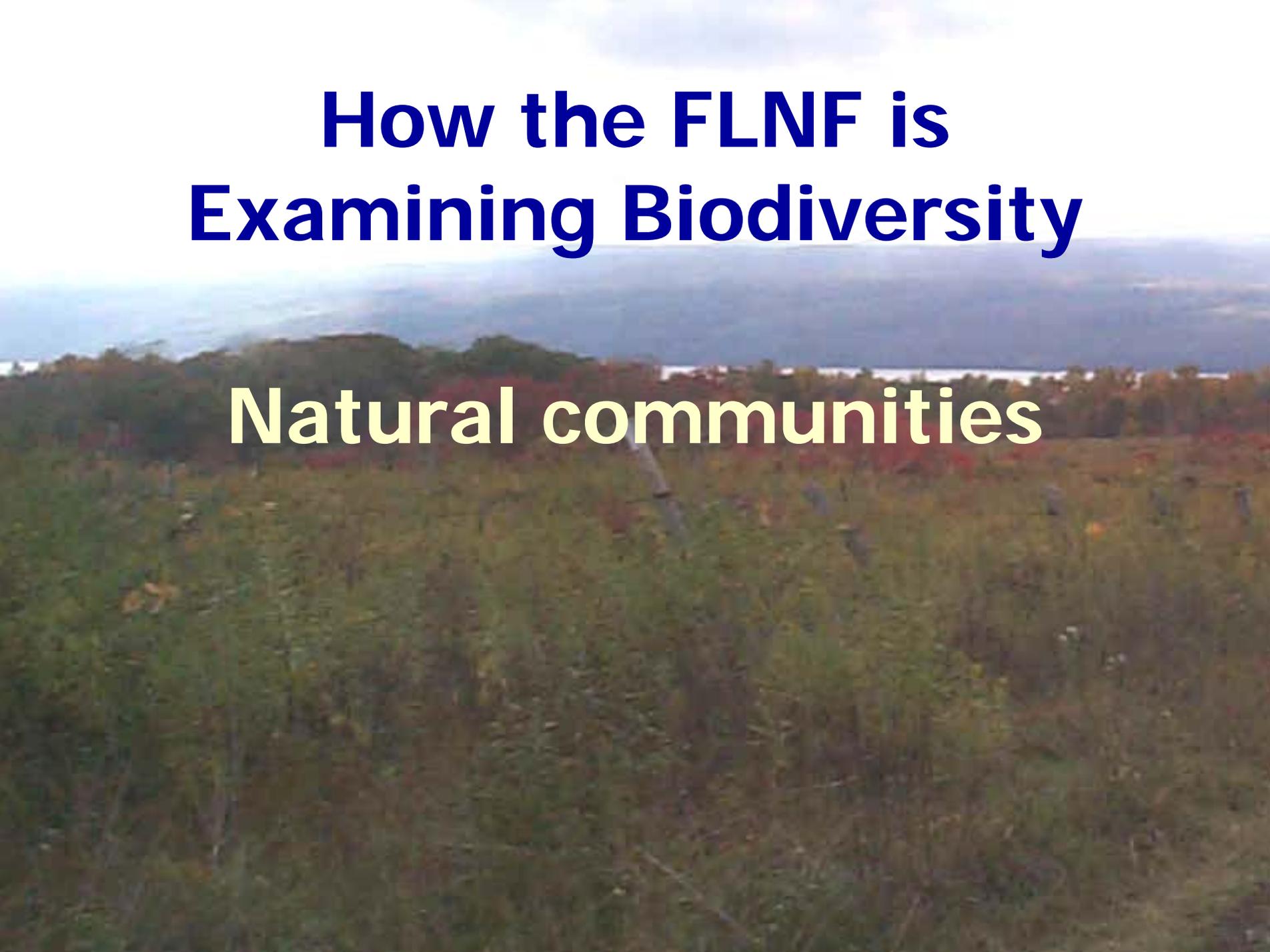
- Poor funding of monitoring program
- Monitoring methods need improvement
- Some MIS were ineffective indicators (swallow, sapsucker)
- Trends can sometimes take decades to detect
- Success of vertebrates  $\neq$  success of other elements of biodiversity

# MIS – Next Steps

- Determine what adjustments in MIS program would better satisfy NFMA
- Work with research on improvements to monitoring mechanics
- Integrate use of other ecological indicators – e.g. # cavity trees, vernal pools - to get at health of habitats and natural communities

# **How the FLNF is Examining Biodiversity**

**Natural communities**

A landscape photograph showing a grassy field in the foreground, a line of trees in the middle ground, and a body of water in the distance under a cloudy sky.

# What is a Community?

A Natural Community is an interacting assemblage of organisms, their physical environment, and the natural processes that affect them.

They occur repeatedly across the landscape.

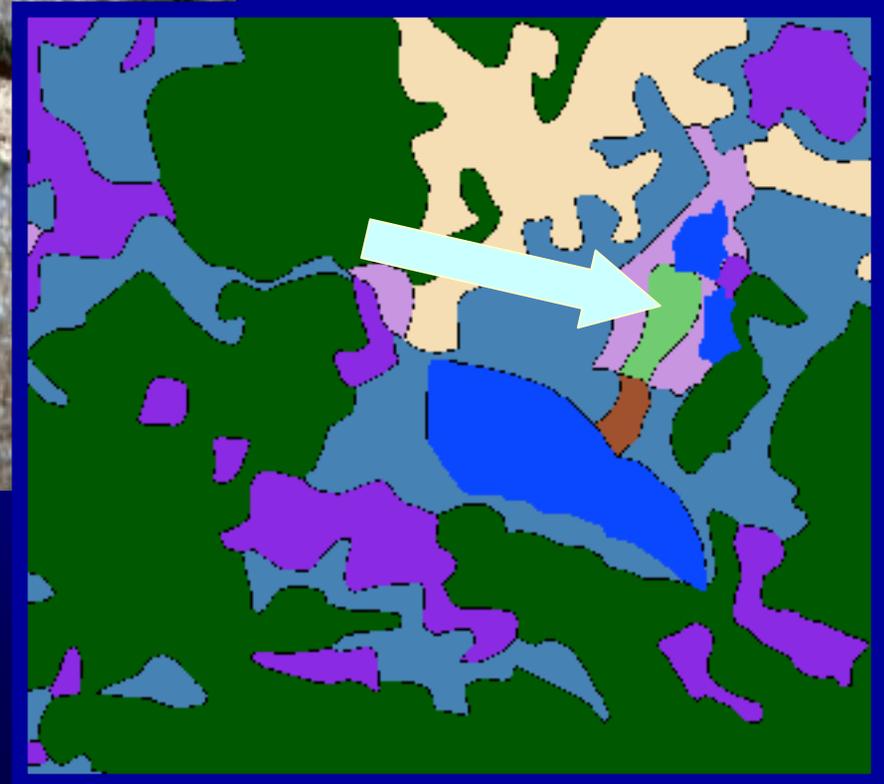
They may be named by plant community

There are 243 ecological communities in New York, ~60 of these occur on the FLNF.

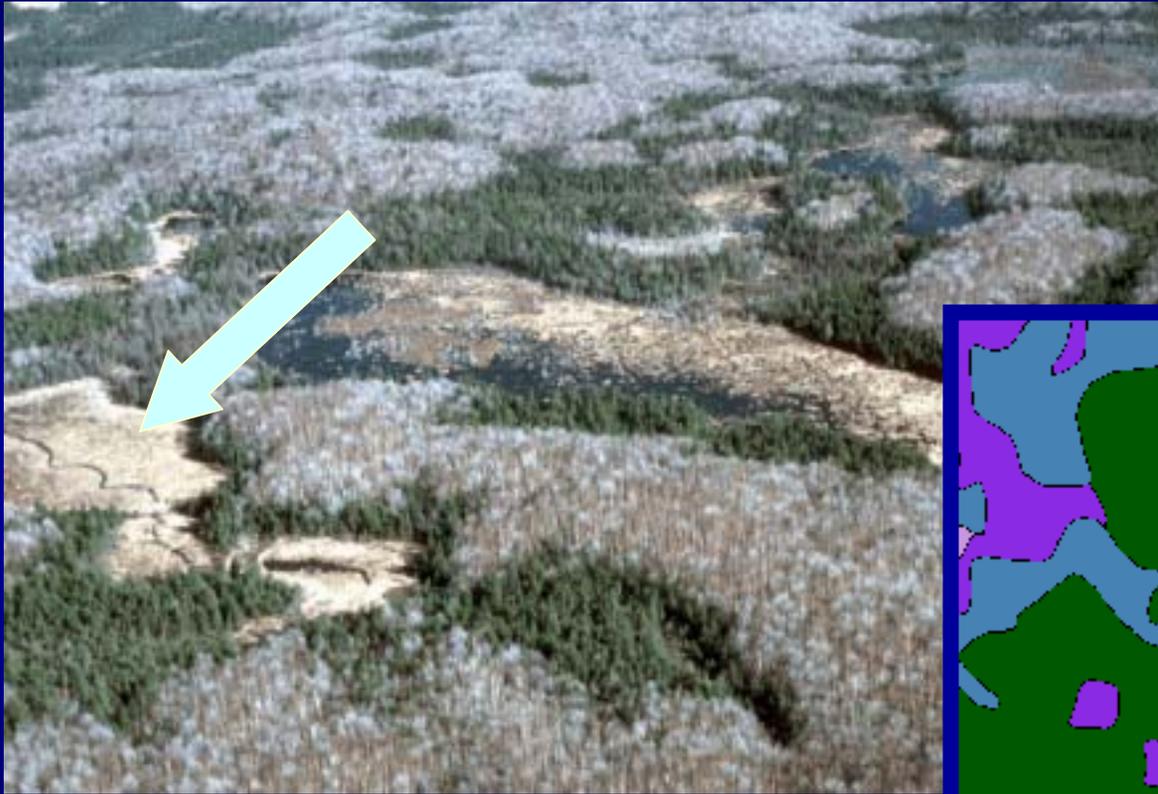
# What is a Community?



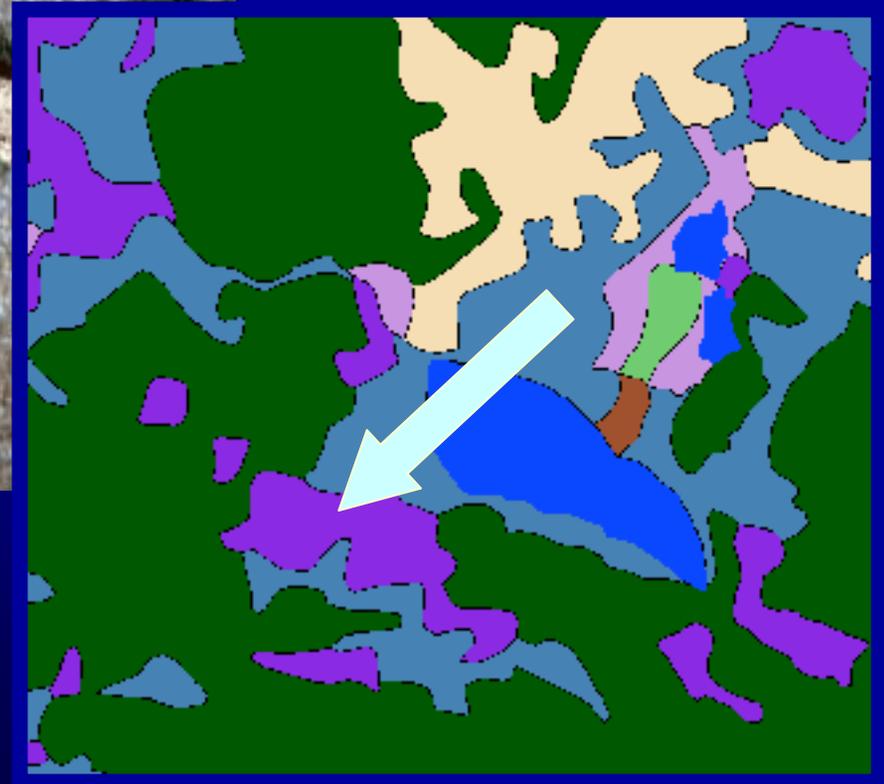
Sedge Meadow: Small Patch <20 Acres



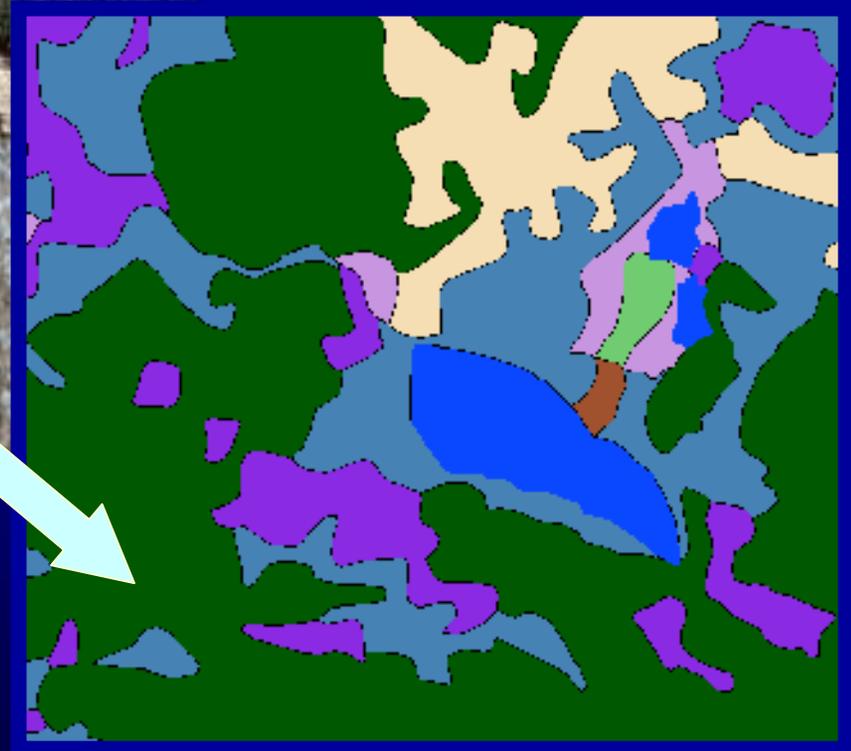
# What is a Community?



Emergent Wetland:  
Large Patch <100 Acres



# What is a Community?



Northern Hardwood Forest:  
Matrix 25,000+ Acres

# Natural Communities

Surrogates for species



# Why is Protecting Natural Communities Important?

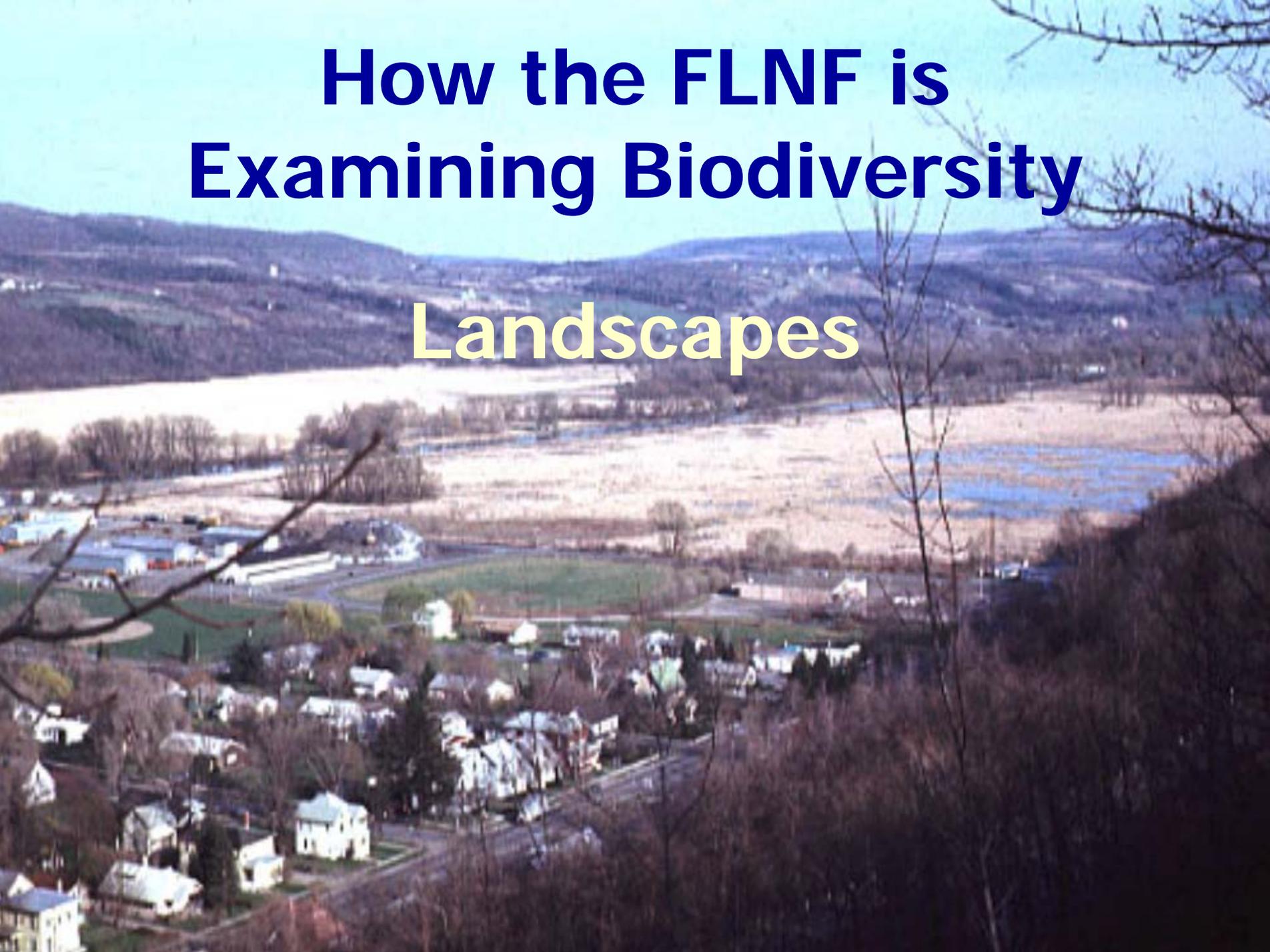
- Traditional conservation focused on protection of single species and small patch communities (fine filter)
- Current practices focus on protection of larger communities or groups of communities (coarse filter)
- This increases the chance that ecosystem processes and uninventoried species are protected

# How the FLNF is Examining Biodiversity

- The FLNF has so far identified:
  - ✱ 8 significant natural communities (1 rare)
  - ✱ 87 rare plant communities (72 butternut sites)
- NFMA does not specify conservation goals for natural communities or ecosystems
- Preliminary goal is to at least conserve all rare natural communities and the best examples of the more common ones

# How the FLNF is Examining Biodiversity

## Landscapes



# What is a Landscape?

“...a heterogeneous land area composed of a cluster of interacting ecosystems that is repeated in similar form throughout.” – Forman & Godron 1986

# What is a Landscape?

- Landscapes are ecosystems that occur at a scale of 1000's of acres
- Includes smaller ecosystems that interact
- The interacting ecosystems exhibit a pattern
- The pattern of small, large, and matrix ecosystems repeats
- Corridors connect similar patches through a dissimilar matrix or patch group

# Why is Protecting Landscapes Important?

- Increases the chance that large ecosystem processes are protected
- Coarse filter – catches organisms that range widely and depend on a heterogeneous landscape for life history
- A diverse representation of physical environments will likely maintain a majority of species diversity

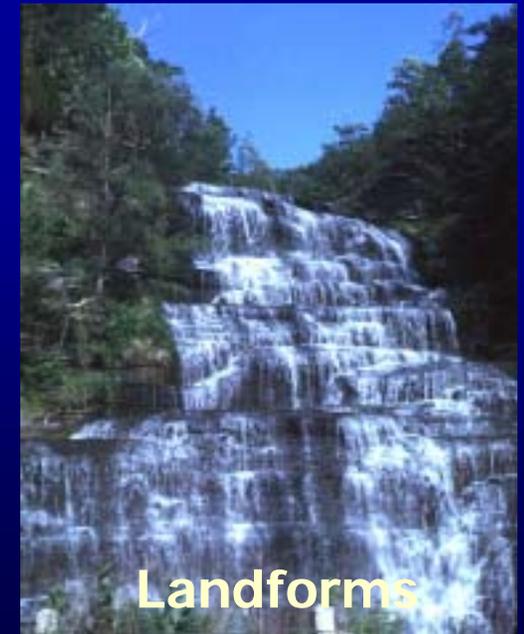
# How the FLNF is Examining Biodiversity

- Mapping landscapes and landscape components
  - ✱ Biophysical regions, subsections
  - ✱ Land Type Associations (LTAs)
  - ✱ Ecological Land Types (ELTs)
- Approaches to conserving landscapes

# Enduring Features



Physical  
diversity as a  
surrogate for  
community  
diversity



# Approaches to Conserving Landscapes

- Zoning Approach (reserves, buffers, matrix)
  - ✱ Reserves – conserve natural processes
  - ✱ Buffers – manage resources sustainably
  - ✱ Matrix – intensive management
- Alternative Forest Management
  - ✱ Management in the buffers
  - ✱ Conserves biodiversity
  - ✱ Reserves limited and targeted

# How the FLNF is Examining Biodiversity - summary

- Review all of the available approaches to conservation of biodiversity
- Rely on available scientific data
- Rely on expert knowledge
- Use GIS tools for analysis
- Clearly document methods
- Make planning tools available

# Questions

1. What does conservation or protection mean to you? What sorts of management activities or uses are consistent or inconsistent with these terms?
2. What plant or animal species, or groups of species, would you like to see protected or enhanced?
3. What natural communities, ecological conditions, or landscape features would you like to see conserved, maintained or enhanced?