

# Ecosystem Protection and Management

# Preview

1. Regarding Reserves
  - A. Selection
  - B. Design
  - C. Management

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# Regarding Reserves

- Conservationists attempt to preserve examples of:
  - Ecosystems
  - Species groups
- How do we preserve more than just examples?

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# Regarding Reserves

- Types of stakeholders (and uses) in land use
  - Individual homeowners (housing)
  - Cities (industry, commercial, administration)
  - Producers (farming, ranching)
  - Special interests (hunting, fishing, boating, basketweaving)
  - Federal government (administration, research, services)

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# Regarding Reserves

- Stakeholders cont'd
  - E.g., US Forest Service
  - Motto: Caring for the land and serving people



Forests and Community

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# Regarding Reserves

- Three aspects of ecosystem protection
  - Selection
  - Design
  - Management

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# Regarding Reserves

- Selection
  - Criteria for selection
    - Beauty/aesthetics
    - Recreation
    - Significant species (cultural, economic)
  - Two extremes of selection
    - Where are the important species?
    - Where are the region's ecosystems?



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# Regarding Reserves

- Species-based selection
  - Centers of species diversity
  - Biodiversity “hotspots”
    - >1500 endemic plant species
    - >70% habitat loss
    - Global hotspots contain
      - ~50% of all plant species
      - 42% of vertebrate species

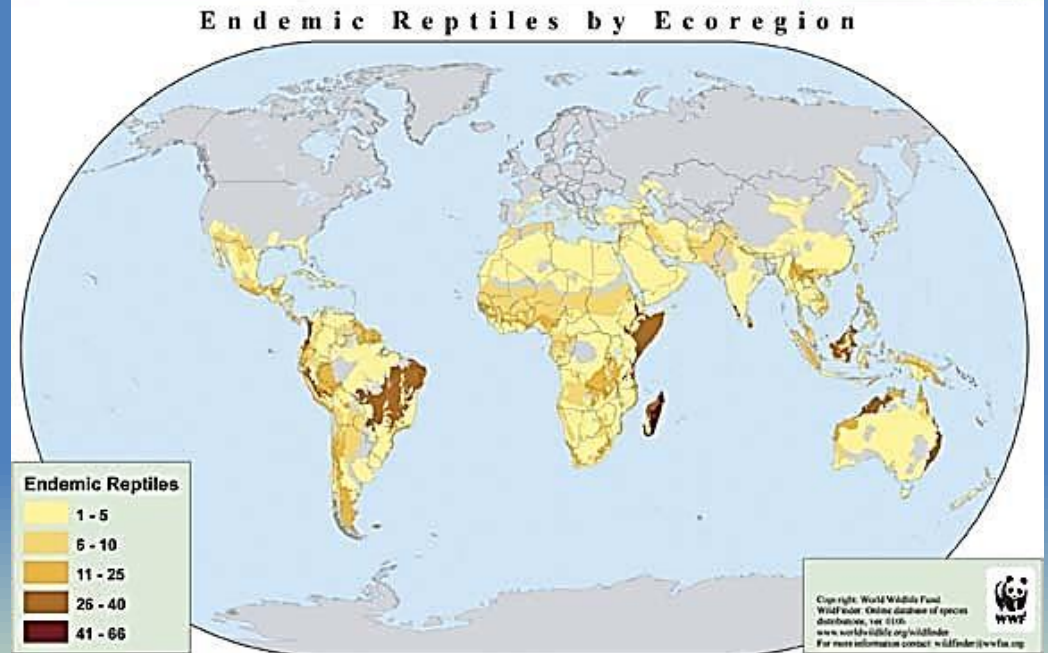
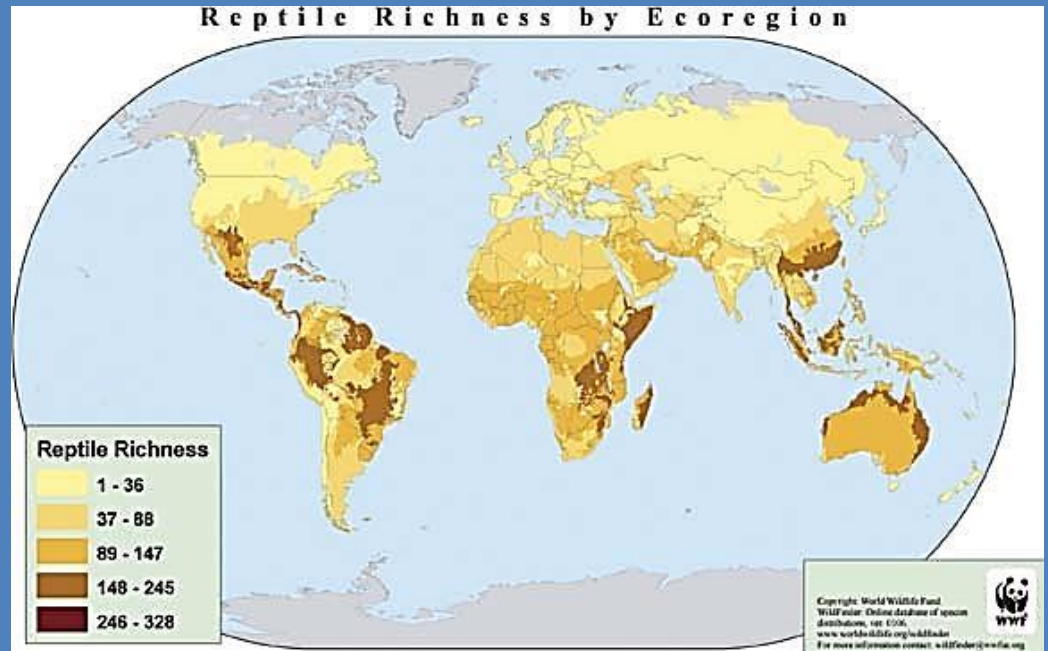
CA Floristic Province

Madagascar

Mesoamerica

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Some overlap  
between  
richness and  
endemism



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# Regarding Reserves

- Ecosystem-based selection
  - Coarse filter approach
    - Focus on abiotic factors
    - Acquire ecosystems → protect species

[Nature Conservancy](#)



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# Regarding Reserves

- Selection
  - how much are should be protected?
  - WCU: 10-15%
  - CBD: 10%
  - Currently 12% worldwide, but representation varies

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# Regarding Reserves

- Design
  - Single large or several small (SLOSS; Diamond 1975)
  - Size/shape of reserve should be proportional landscape context

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large > small

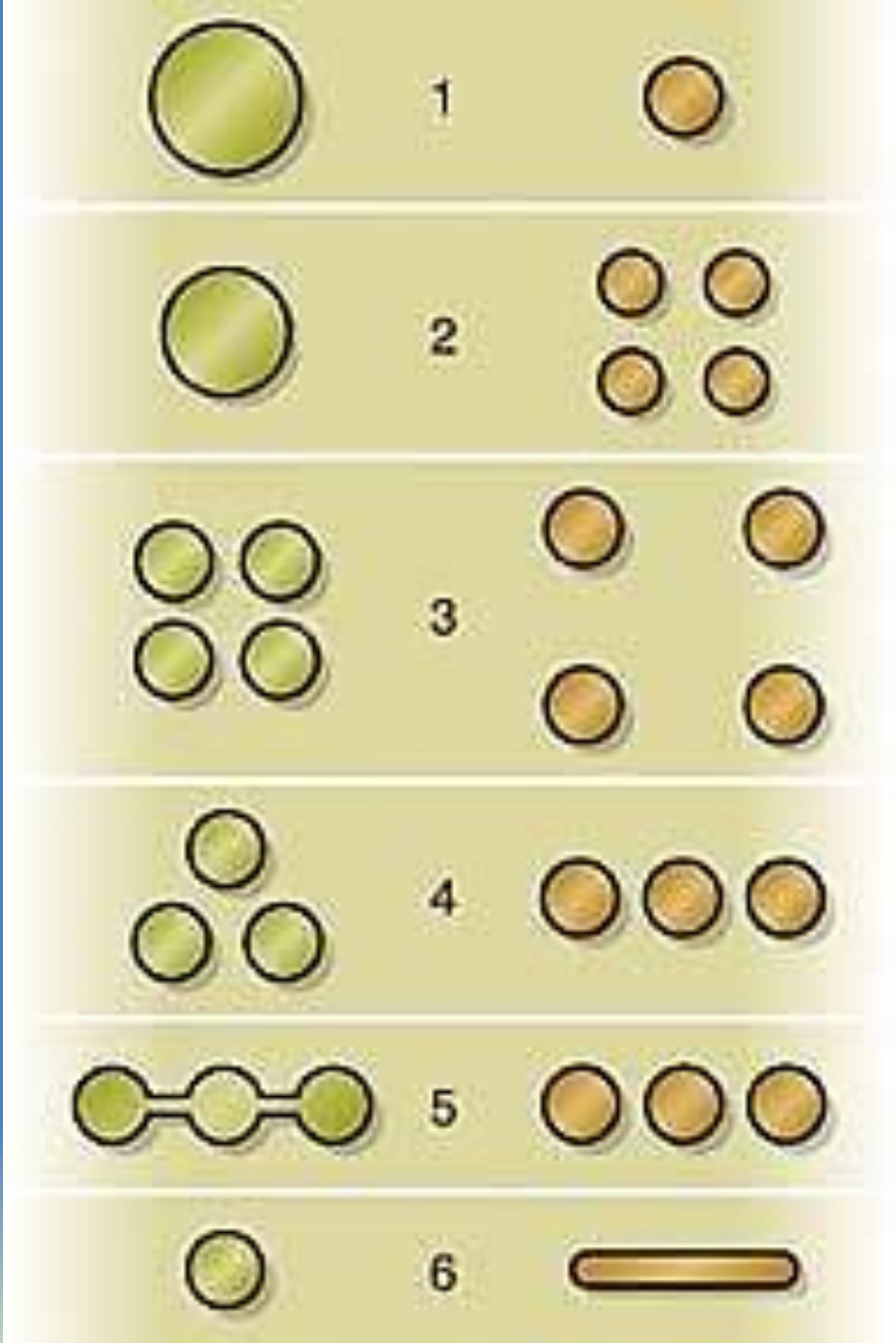
single large > several small

close together > far apart

clustered > linear

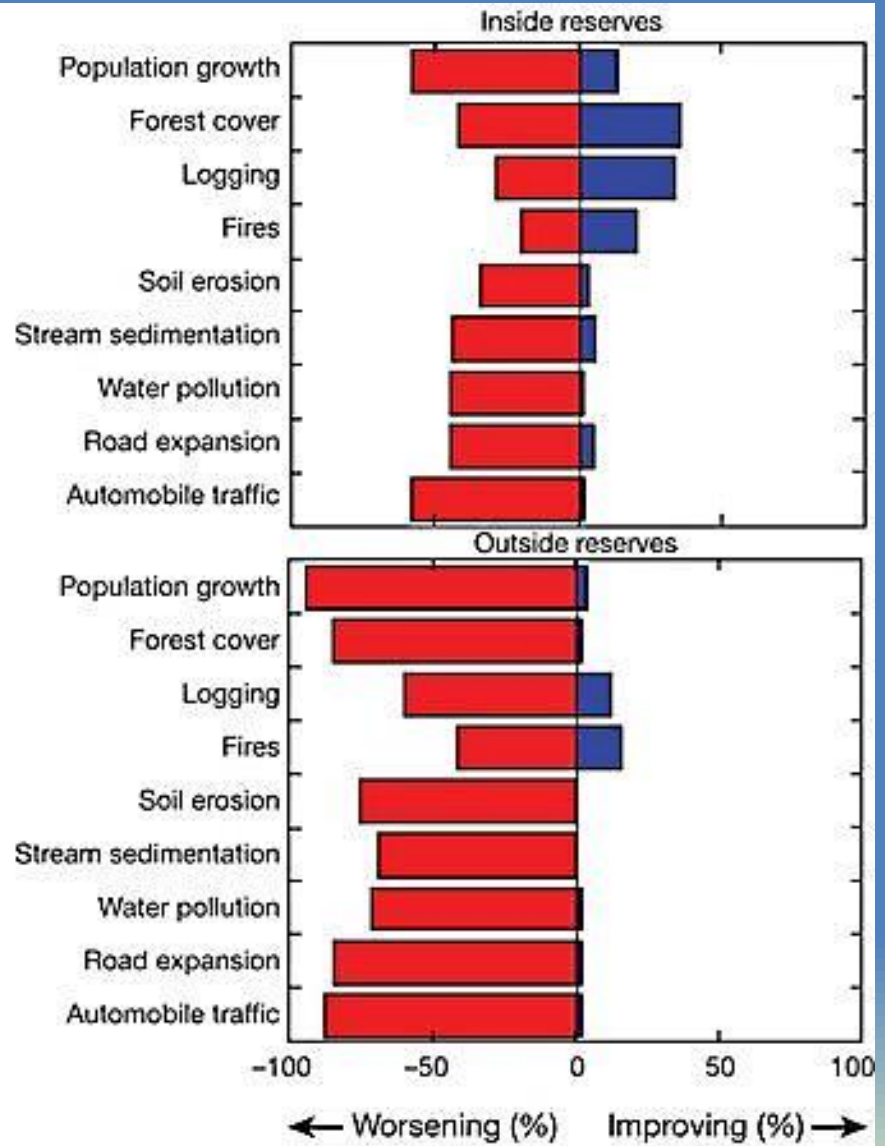
corridors > no corridors

circular > non-circular



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# What surrounds a reserve matters!



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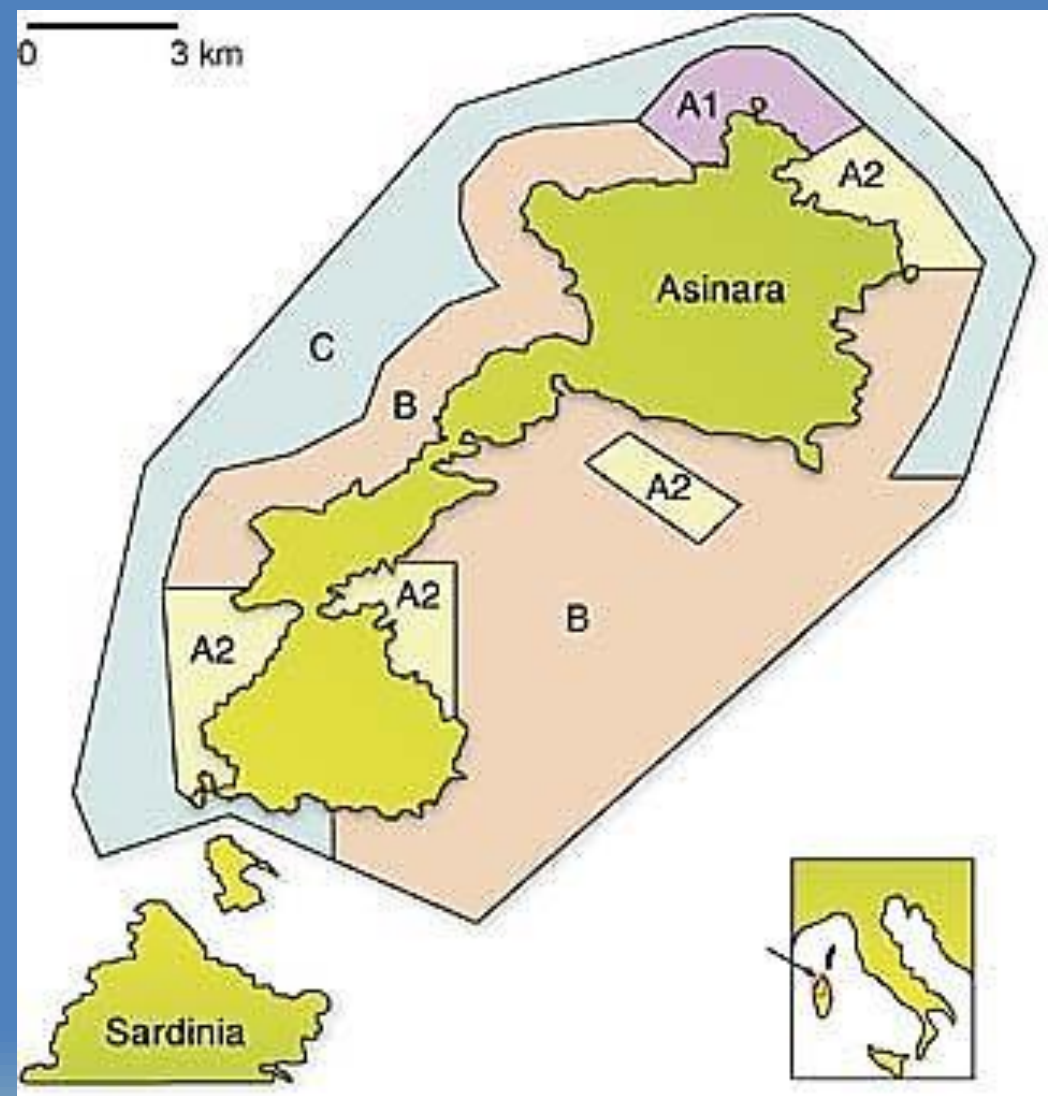
# Regarding Reserves

- Design cont'd
  - Corridors for movement
    - Daily
    - Annual
    - Dispersal
    - Range shifts
  - Need buffers against less preferred ecosystems/intensive uses



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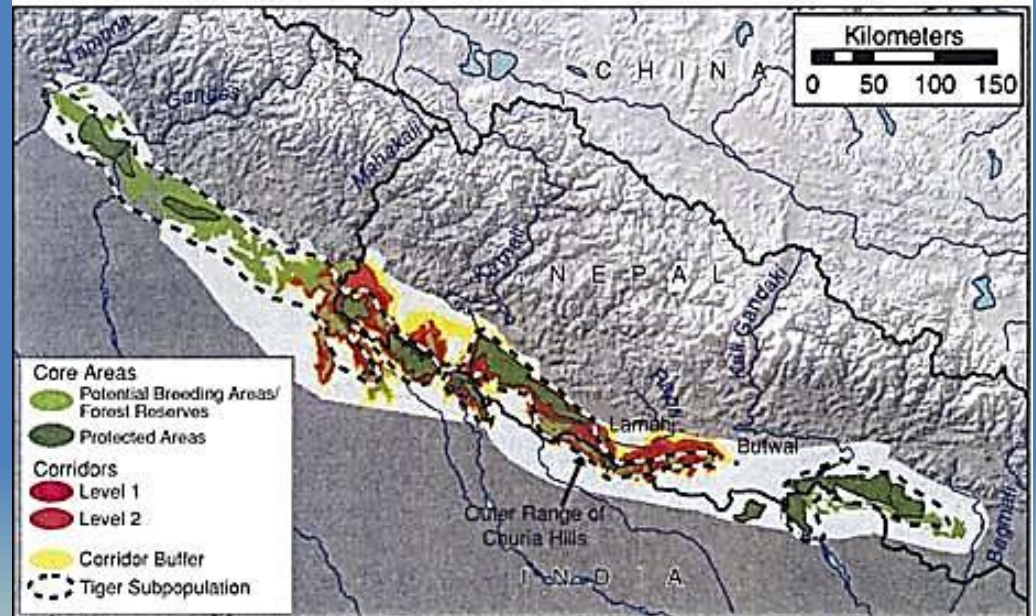
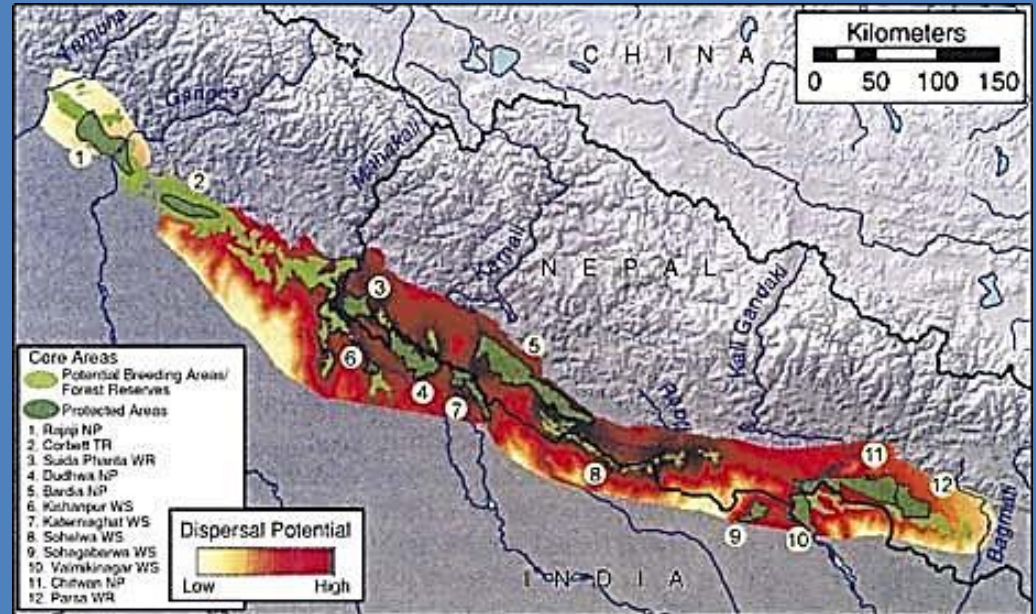
A1, A2: no take  
B: take with low limits  
C: take with higher limits



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Priority:

1. Core Areas
2. Corridors
3. Buffers



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# Regarding Reserves

- Management
  - Visitors (2014)
    - Yosemite: 1.7 million
    - Yellowstone: 1.3 million

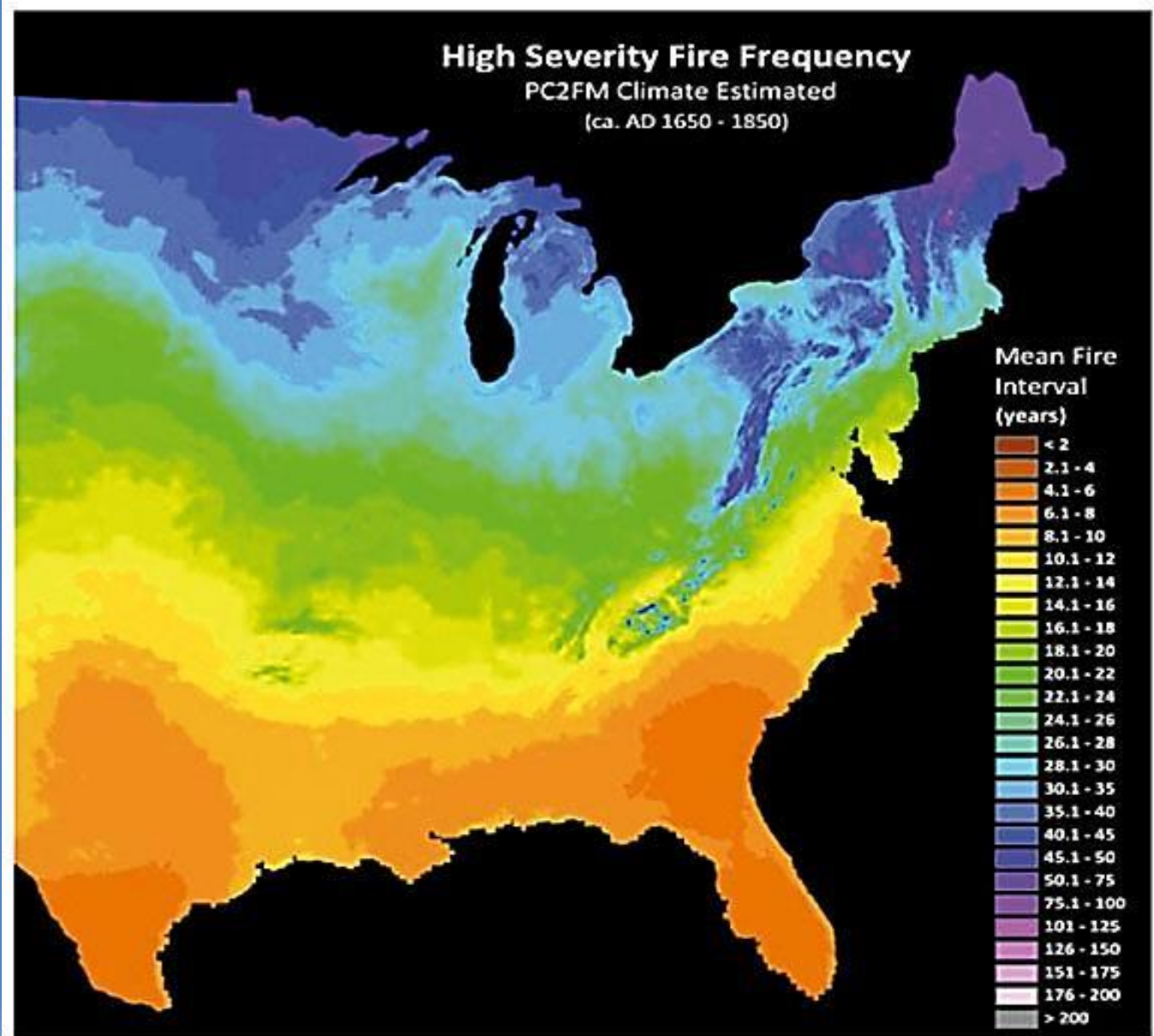
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# Regarding Reserves

- Management cont'd
  - In some cases, we need to protect parks against a LACK of disturbance

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# Historic vs. current disturbance



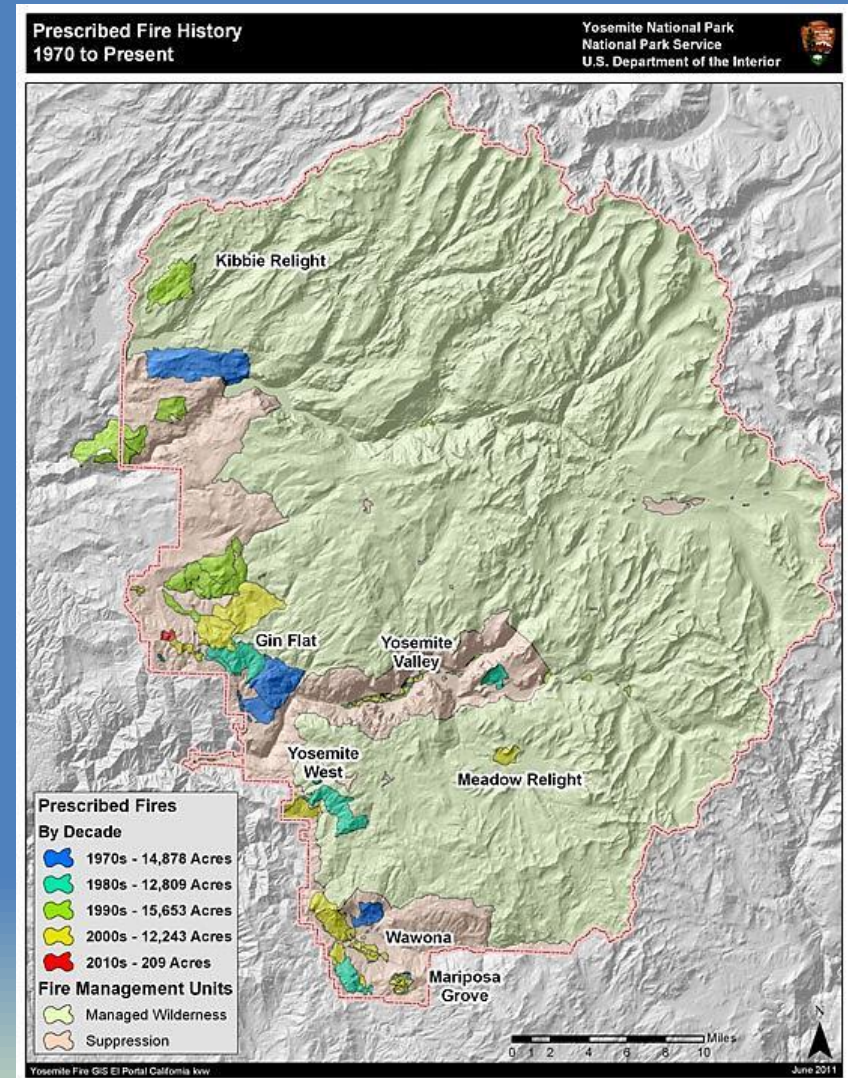
**Figure 1.** Estimated mean fire intervals in the eastern United States as predicted by Guyette *et al.* (2005). The mapped mean fire intervals are modeled based on fire scar tree-ring histories from forested landscapes throughout the eastern United States, and represent estimates of fire frequency for the historic period 1650 to 1850, which is the end of the Native American occupation in this area. The map illustrated here is a revision of that originally published in Guyette *et al.* (2005), and is presented here with permission of Dr. Guyette .

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# Regarding Reserves

- Management cont'd
  - Scale of disturbance vs. scale of protected area

## Yosemite Fire



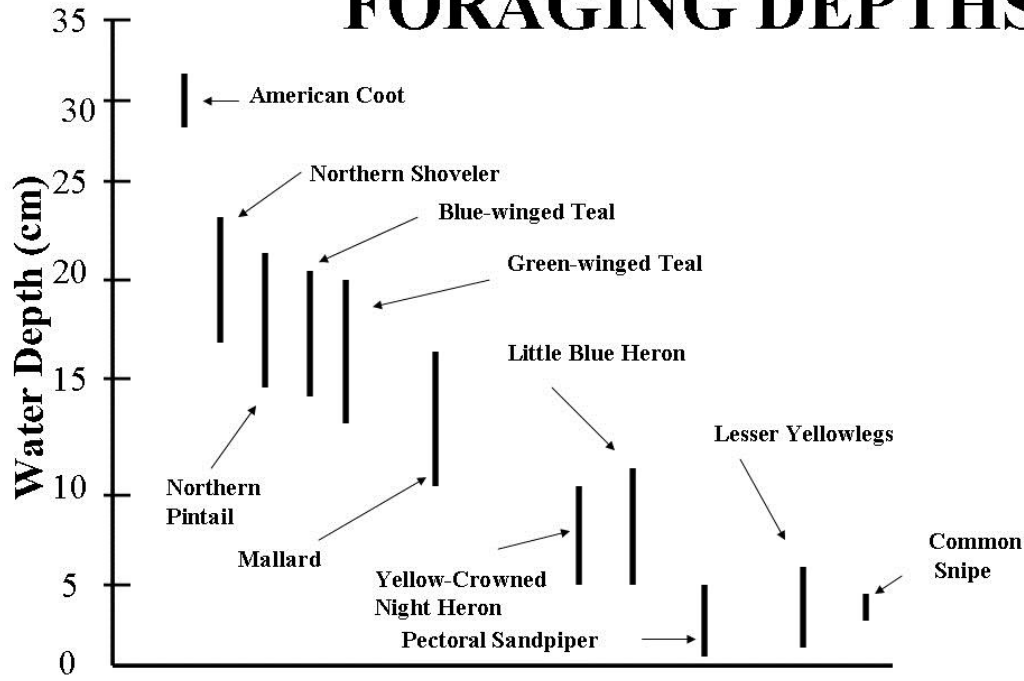
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# Regarding Reserves

- Management cont'd
  - Water regimes
    - What should water be used to do?
      - Stand in wetlands
      - Provide drinking water
      - Crop irrigation
      - Power generation

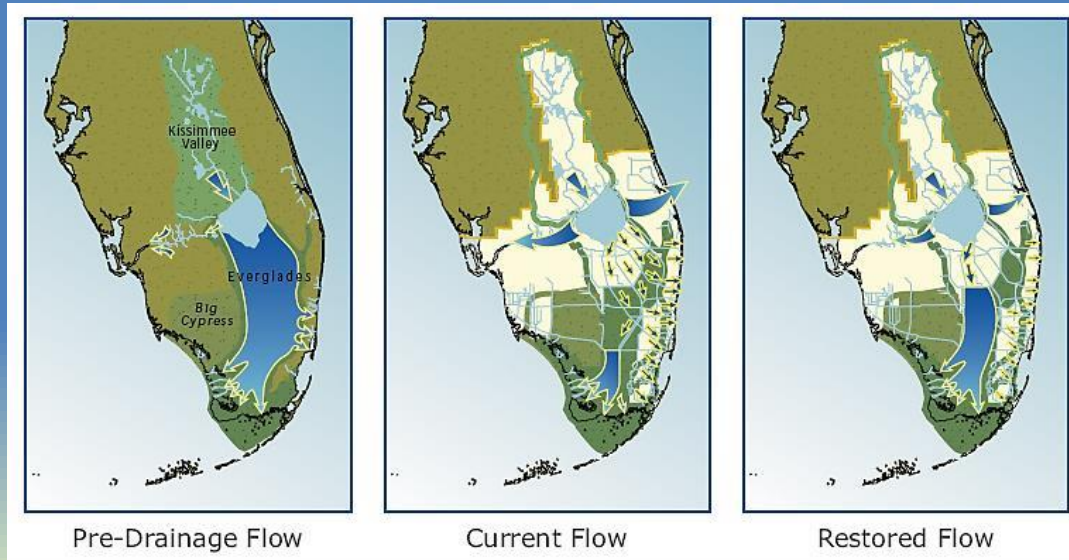
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# FORAGING DEPTHS



Adapted from Fredrickson and Taylor (1982)

## Everglades Restoration





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# Regarding Reserves

- Important guiding questions
  - What is our baseline?
  - What do we consider “natural” (esp. human activities)?
  - What are we managing toward?

# Resources

## Publications

Hunter Jr., M. L., and J. Gibbs. 2007. Fundamentals of Conservation Biology, 3rd Edition. Blackwell, Malden.