

# Pinelands Science Forum

## Pinelands Communities and Habitats: the Landscape Perspective

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# Pinelands CMP

- “Preserve the essential character of the existing pinelands environment, including the plant and animal species indigenous thereto and the habitat therefor”;
- Within the preservation area – “Preserve an **extensive and contiguous area of land** in its natural state, thereby insuring the continuation of a **pinelands environment** which contains the **unique and significant ecological and other resources** representative of the pinelands area”

# Pinelands communities and habitats

- No detailed wall-to-wall mapping of vegetation communities or habitats Pinelands-wide
- Breden et al's *Classification of Vegetation Communities of New Jersey: Second Iteration* (2001) represents a starting point for a vegetation classification, the rub is the mapping
- Not an easy proposition, especially due to the patchy landscape pattern, in both space and time - the result of wildfire, past human disturbance and natural succession dynamics

# Landscape Mapping

- Using land use/land cover as a surrogate for mapping habitat and characterizing landscape pattern and monitoring landscape change, recent work has documented the loss and fragmentation of pinelands characteristic habitats.
- Major questions remain:
  - What components of landscape pattern are ecologically relevant manner?
  - What constitutes important fragmenting influences and barriers and/or corridors for plant/animal movement and dispersal?



# PC Ecological Integrity Index

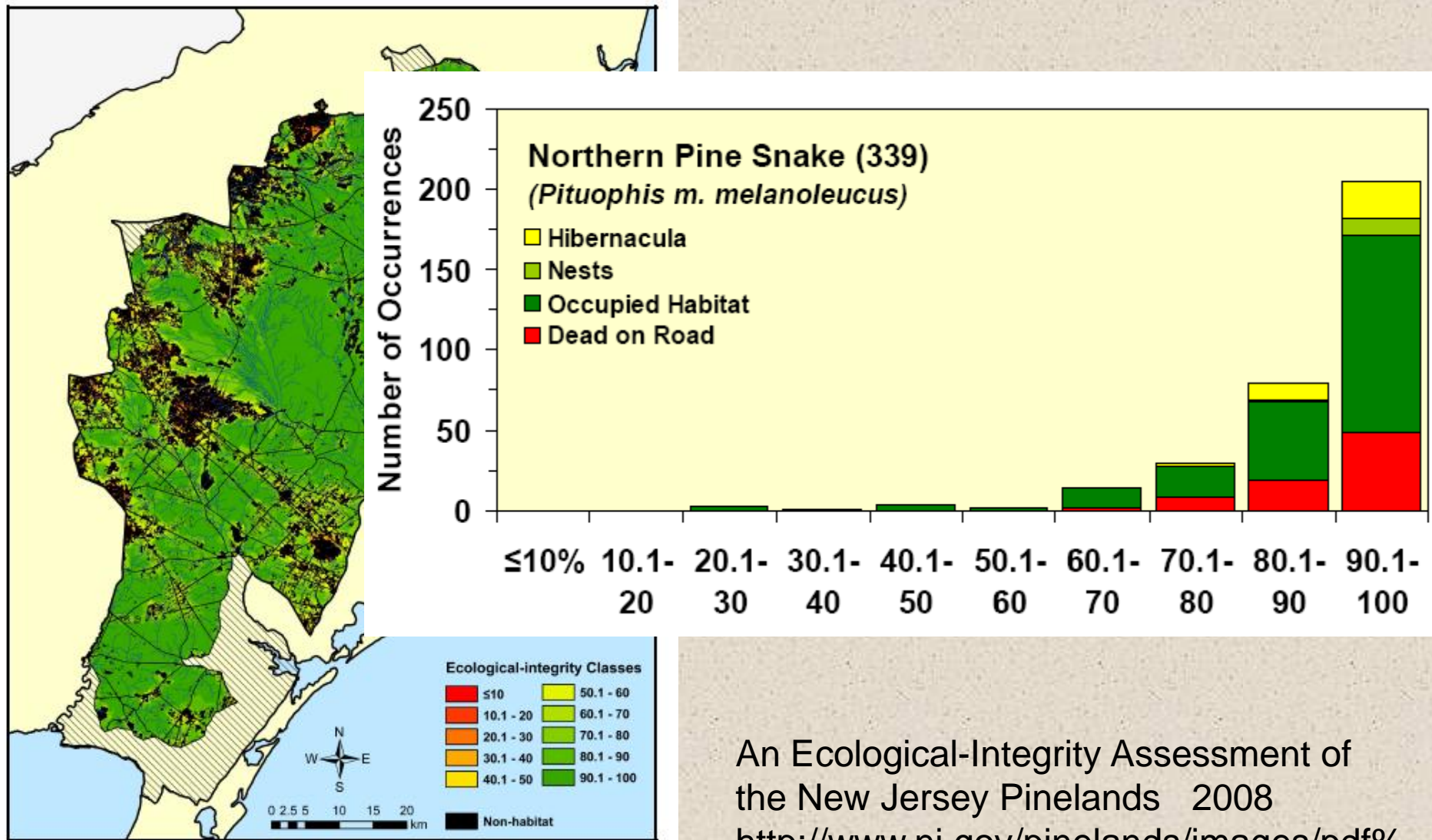


Figure 8. Ecological integrity of Pinelands habitat. Ecological-integrity for each habitat cell is an average of the landscape-, aquatic-, and wetland-drainage-integrity scores based on 2002 land-use/land-cover data. The 90.1-100% class represents the highest level of ecological integrity. The hatched area represents the portion of the Pinelands National Reserve outside the Pinelands Area.

An Ecological-Integrity Assessment of  
the New Jersey Pinelands 2008  
[http://www.nj.gov/pinelands/images/pdf%20files/EIA\\_Final\\_Report.pdf](http://www.nj.gov/pinelands/images/pdf%20files/EIA_Final_Report.pdf)

# What are the thresholds of cumulative impact?

- The habitat area needed to support a minimum viable population/metapopulation of indigenous Pinelands species is an open question.
- The needed research and modeling is highly species-specific, data intensive and yet to be undertaken.
- Bottom-line: in the absence of concrete information preserving as much habitat as possible is a prudent conservation approach

# Cumulative Impacts of Human Land Use at watershed scales

- PC research has established that there is good scientific evidence that are thresholds when it comes to aquatic community integrity: > 10% altered land (developed land and upland agriculture) in a watershed resulted in a significant deviation from 'pristine' reference-site water quality
- Major Questions remain as to
  - What is the impact of groundwater withdrawal on freshwater aquatic and wetland communities?
  - What is the role of watershed surface and groundwater nutrient inputs to the eutrophication of neighboring estuarine ecosystems ?



# Fire Regime

- Past few years has seen a surge of research into assessing the impact of Pinelands fire regimes on forest structure and composition.
- Major questions remain:
  - How to define desired endpoints, such as which characteristic Pinelands habitats and communities do we wish to perpetuate?
  - How to establish and maintain fire regimes that sustain ecological goals, while also protecting human infrastructure?



# Ecological restoration in a landscape context

- Increased focus on restoring previously degraded Pinelands habitats.
- Major questions remain:
  - How to define desired endpoints?
  - How to integrate site-scale efforts but also open space preservation into a larger landscape scale context?

# Original 1982 Science Forum

*Ecological Solutions to Environmental Management  
Concerns in the Pinelands National Reserve*

- Among other issues such as nutrient dynamics, hydrology and fire management, **ecosystem fragmentation** was highlighted.
- What were some of the big questions then?

# 1982 Science Forum: Ecosystem Fragmentation

- How are episodic events and their influences incorporated into our understanding and management of fragments?
- How can we assess the relative vulnerability of species to local and patch extinctions?
- Are patches defined by land use/vegetation data synonymous with patches defined by the biology of natural populations?
- What methods are available for measuring important characteristics of landscape elements and describing spheres of influence on regional biota?
- How do rare species relate to management of ecosystem fragments?
- What special issues relate to corridors and ecosystem fragmentation?
- How are ecosystem fragmentation concepts related to the acquisition program?