

# Adaptive Management for Ecosystem Services

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# Self organization in ecosystems

- Humans are reliant on ecosystems
- Humans manipulate ecosystems
- Ecosystems are complex adaptive systems
- This manipulation can lead to catastrophic ecosystem collapse



# Self organization in ecosystems

## soil as an example

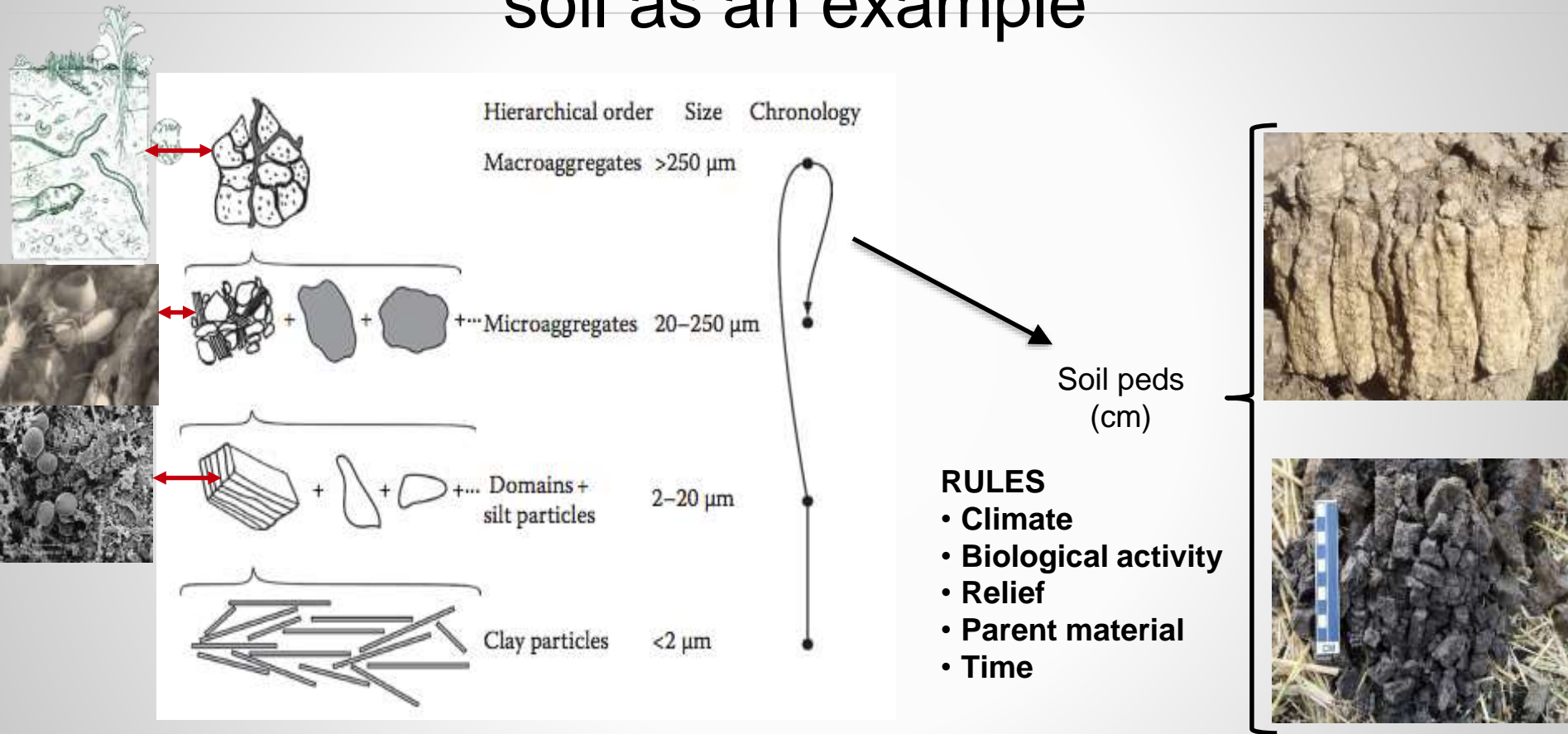


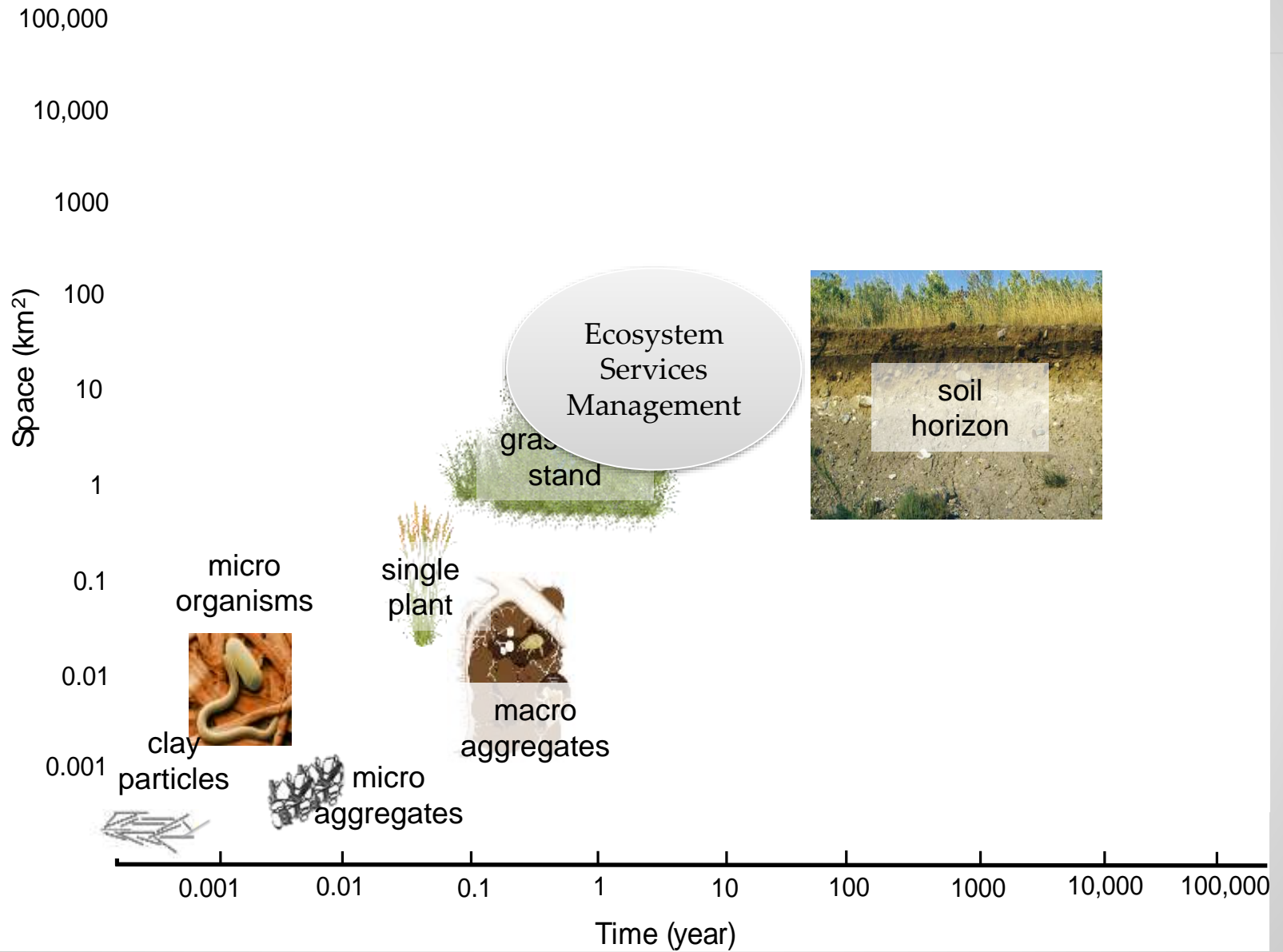
FIGURE 2.1 Hierarchical conceptual model of soil aggregation. (Modified from Dexter, A.R. 1988. Advances in characterization of soil structure. *Soil Till. Res.* 11:199–238; Six, J. 2004. A history of research on the link between (micro)aggregates, soil biota, and soil organic matter dynamics. *Soil Till. Res.* 79:7–31.)

# Self organization in ecosystems

## Feedbacks matter, and yield ES

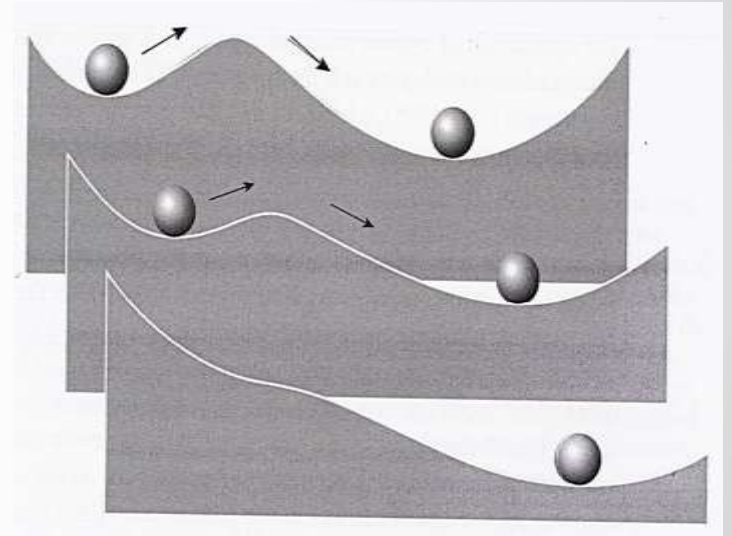
- Primary production
- Atmosphere and climate regulation
- Waste processing
- Erosion control
- Medicinal resources
- Pest control
- Disease mitigation





# Ignoring Cross Scale Dynamics

## Lessons from History



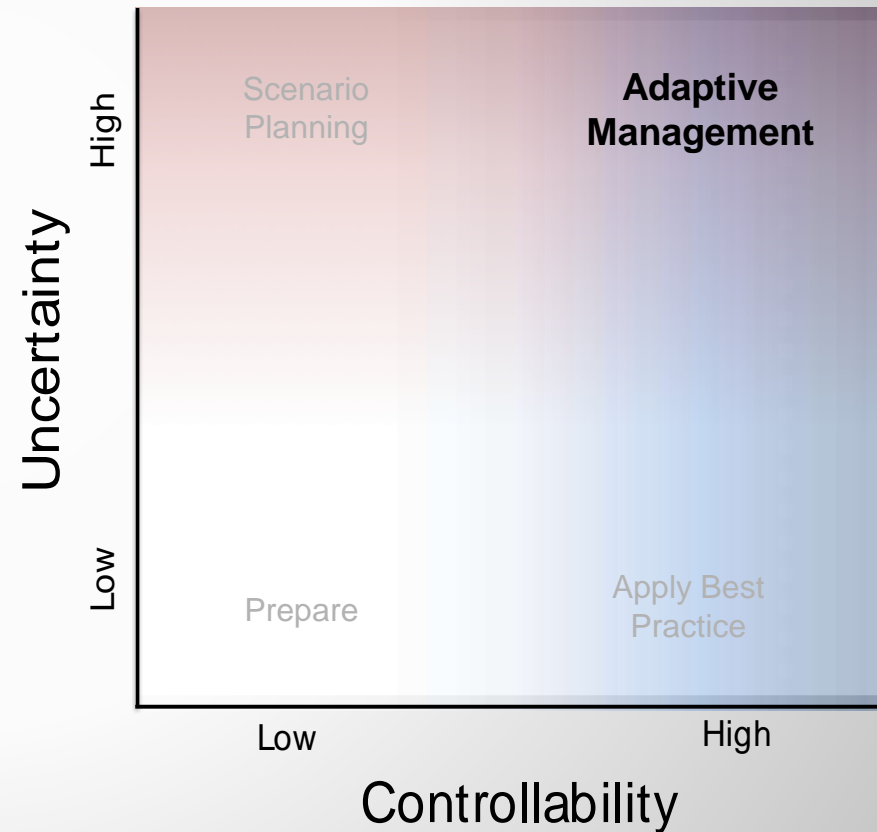
# *Now what?*

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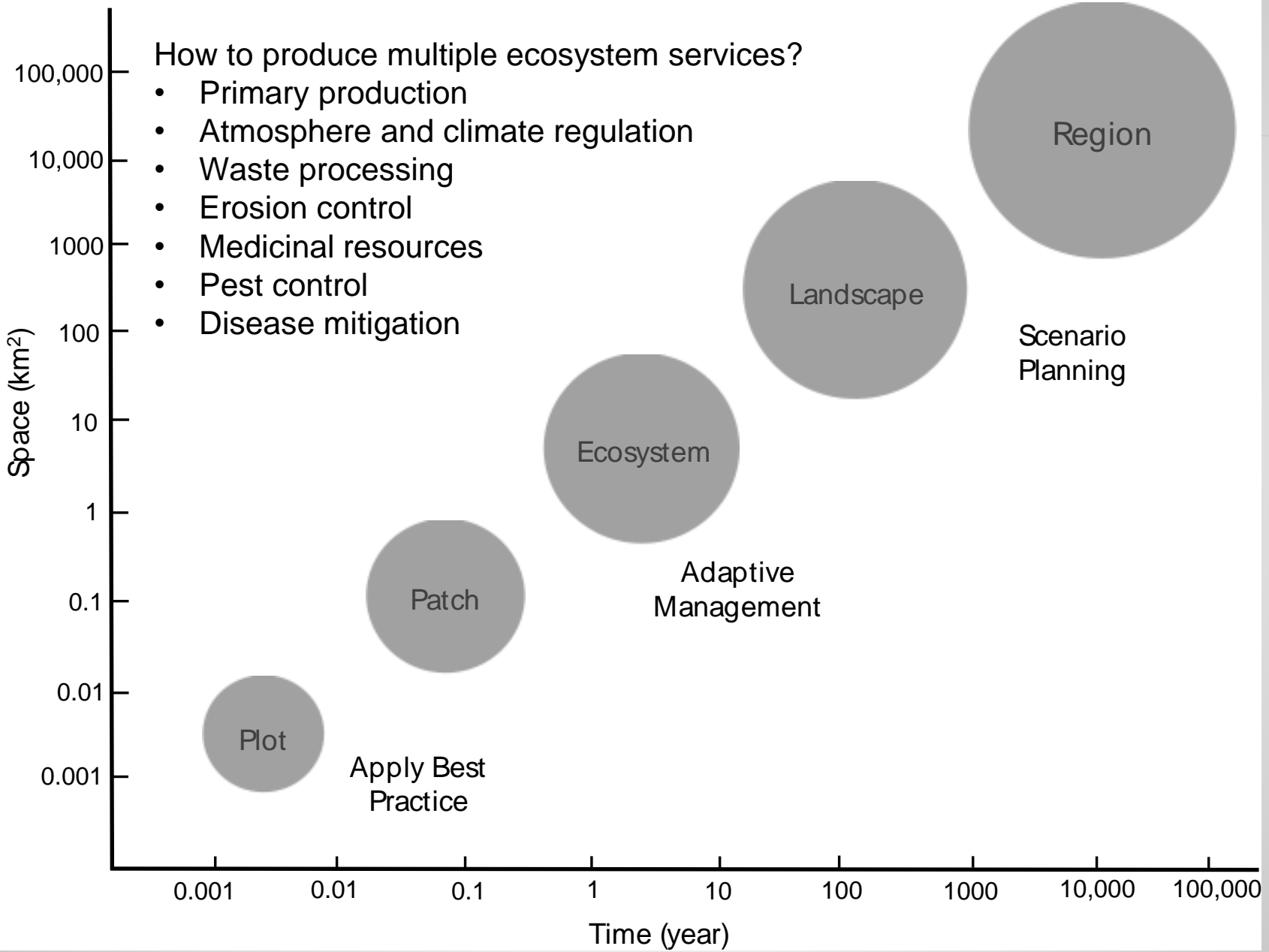
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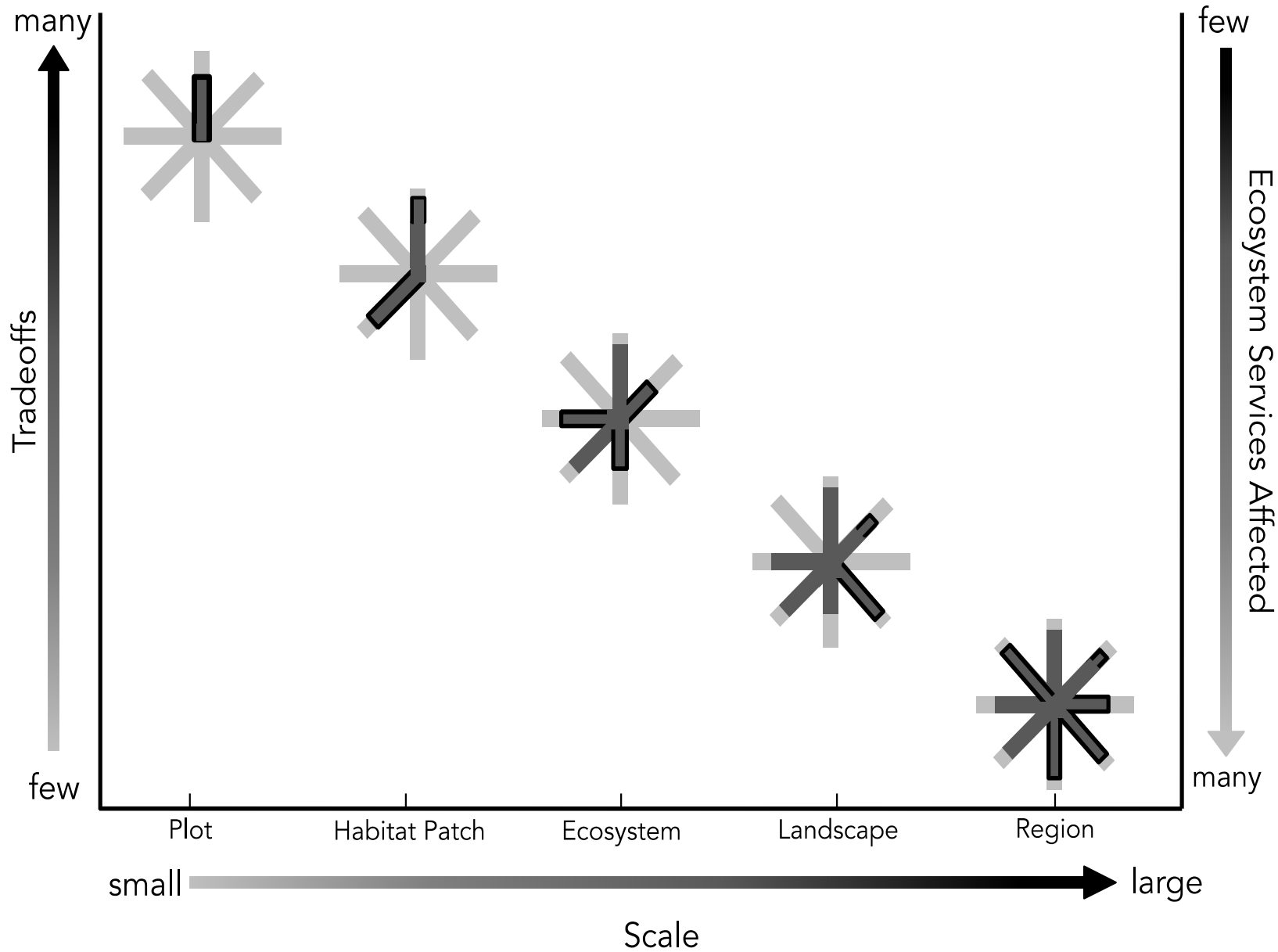
# Adaptive Management

A structured approach to managing natural resources while avoiding critical thresholds









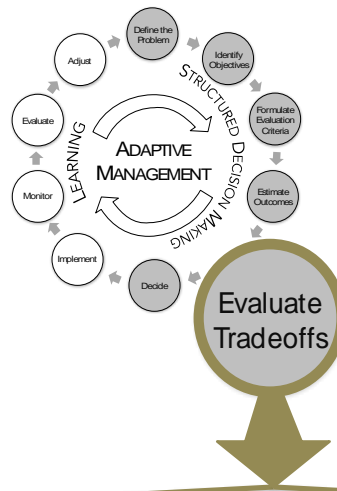
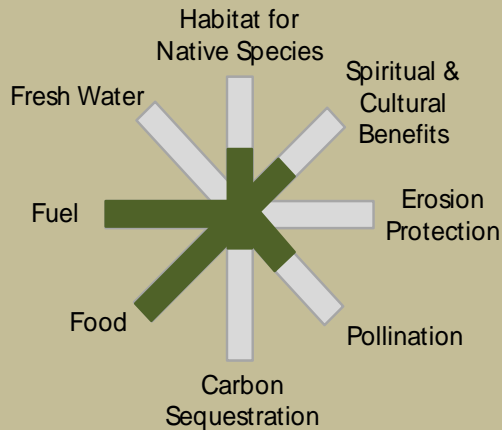


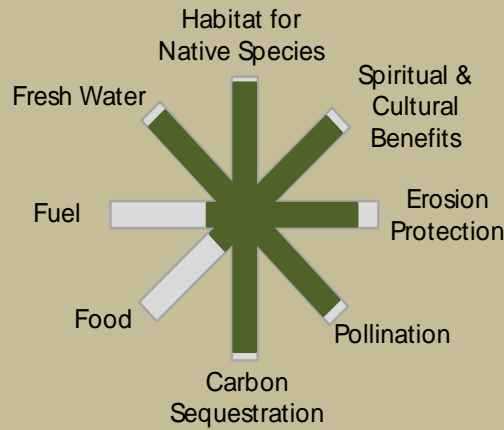
Photo credit: Hannah Birge



Corn Soybean Rotation



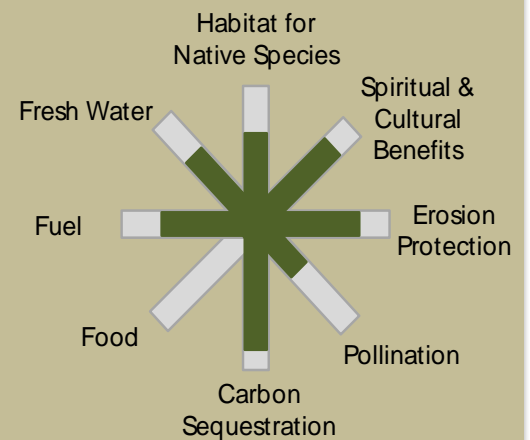
Photo credit: Hannah Birge



Tallgrass Prairie



Photo credit: Christine Bielski



Cedar Woodland



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Research article

### Adaptive management for ecosystem services

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#### ABSTRACT

Management of natural resources for the production of ecosystem services, which are vital for human well-being, is necessary even when there is uncertainty regarding system response to management action. This uncertainty is the result of incomplete controllability, complex internal feedbacks, and non-linearity that often interferes with desired management outcomes, and insufficient understanding of

Thank you

