

# Mosaic Landscapes

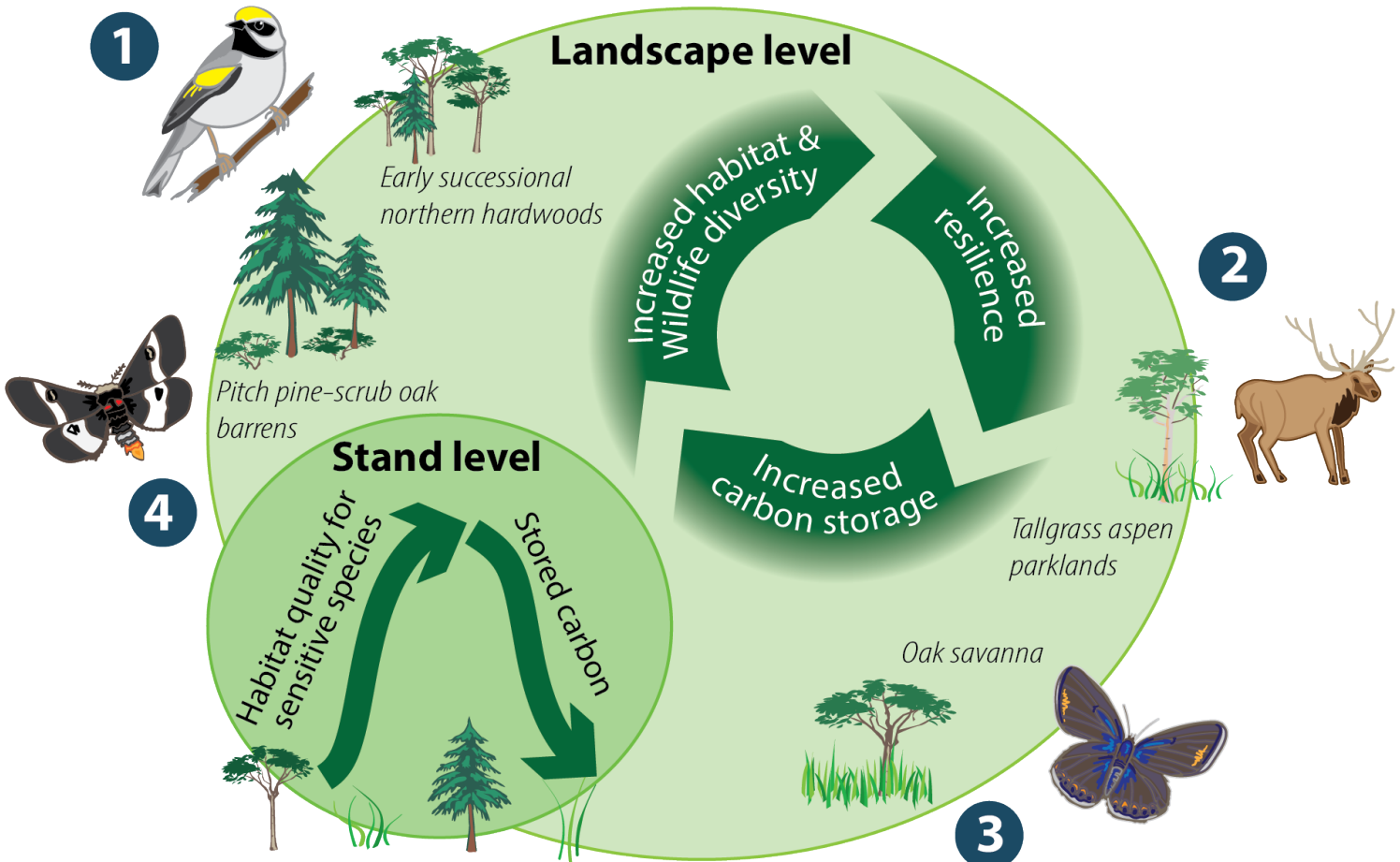
For wildlife habitat, carbon storage, and climate adaptation in the Northeast and Upper Midwest



**NECASC**

Northeast Climate Adaptation Science Center

Management concern: Balancing carbon storage and habitat quality



In each of the four habitats illustrated here, managing for a sensitive species causes carbon loss at the stand level but increases resilience at the landscape level.

## Takeaways:

- Forests are a critical natural climate solution because they store carbon.
- Management strategies prioritizing carbon storage are not always beneficial to the wildlife species most vulnerable to climate change.
- Improving habitat for sensitive wildlife species can mean decreasing carbon storage in trees within a single stand or small group of trees.
- At the landscape scale, managing for a diversity of forest and woodland habitats for imperiled species creates a **mosaic landscape**. This heterogeneity supports biodiversity, increases resilience, and may ultimately store more carbon over time by resisting carbon loss from disturbances like fires and floods.

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In each of these ecosystems, focusing on managing for mature stands of trees fails to provide critical habitat, but managing a landscape to include each of these habitats increases resilience and carbon storage.

1. **Early successional conditions in northern hardwood stands** provide breeding habitat for the Golden-winged Warbler, which has experienced one of the steepest declines of any North American songbird.
2. Maintaining Minnesota's **tallgrass aspen parklands via mowing, harvest openings, and prescribed burns** have supported the return of elk populations after extirpation in the early 20th century.
3. **Midwestern oak savanna** with wild blue lupine is key habitat for the federally-endangered Karner blue butterfly, which lays eggs almost exclusively on lupine.
4. Restoration of **low severity fire in pitch pine-scrub oak barrens** provides habitat for many invertebrates including the barrens buckmoth, which has been in decline.

*Restoring these habitats often involves reintroducing disturbances that were historically present – naturally and through Indigenous practices such as controlled burning.*

Some strategies may have unintended harmful consequences for climate change adaptation, wildlife protection, or carbon storage:

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- If forest carbon markets incentivize maximizing carbon storage in every forest stand, pursuing the maximum carbon storage may **inadvertently sacrifice biodiversity by decreasing the diversity of habitats**.
- If management strategies aim to increase carbon storage by limiting timber harvests on public lands, they may **inadvertently stall habitat restoration for at-risk wildlife**.
- When developers target forestland for green energy construction, **habitat for wildlife, carbon storage in trees, and resilience in the face of uncertainty are sacrificed**. By one estimate, one quarter of natural land conversion in Massachusetts over five years was due to solar development.

*White Paper: Trade-offs and Opportunities for Forest Carbon and Wildlife Using a Climate Adaptation Lens*



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