STS Biodiversity Highlights

A Sampler

Global Stats - IPCC

CC causing:

- Local species loss, increased disease, mass mortality
- Widespread local species extinctions – in 47% of 976 spp examined
- First climate driven extinctions
- Ecosystem restructuring
- Drop in ecosystem services

Future threats:

- Will increase with every 1/10th degree warming
- Species facing temps beyond historical experience

North America Impacts

- Changes in Ecosystem Structure
  - Maine ex: loss of eelgrass and kelp beds
  - Maine ex: loss of forest understory due to invasives
- Range Shifts
  - Maine ex: Boreal chickadee no longer found Downeast
  - Maine ex: Swainson's thrush moving into Bicknell's thrush montane habitat
  - Maine ex: Range contraction of two boreal butterflies – Hoary Comma and Arctic Fritillary
- Phenology
  - Mismatch between plants and animals
  - Maine ex: caterpillars out earlier in spring (driven mostly by degree days) than migratory birds arrivals (warblers, vireos; driven mostly by day length)

Global Stats – IPBES, CBD & WWF

- Change in natural systems over past 50 years unprecedented in human history (due to land use change, overexploitation)
- Globally 268 species declined around 53% between 1970-2014
- 25% of species at risk of extinction = 1 Million Species
  - Invasives contributed to 60% of global extinctions, primary driver in 16%
  - Neonics threaten >200 TE species
    - Maine ex: Rusty-patched Bumblebee, Karner Blue Butterfly
- Economic incentives favor increased economic activity over environmental harm, conservation or restoration
- Indigenous knowledge important to listen to, learn from

High Diversity Areas

- Wilderness Areas with half risk of extinction for terrestrial diversity as non-wilderness areas
- Biologically mature forests (>200 yrs) harbor more biodiversity than “financially mature” forests (50-75 yrs) – especially for mosses, lichens, fungi, vernal plants, and insects
- Many species more abundant in older NE forests, especially native woodpeckers, warblers, thrushes, fisher, marten

Conservation Targets - CBD

- Restore 30% degraded areas by 2030
- Conserve and effectively manage 30% of lands and waters by 2030
- Halt human induced extinctions
- Eliminate, minimize, reduce, mitigate invasives
- Ensure ag, aquaculture, fisheries, and forestry are managed sustainably
- Increase area, quality, connectivity, access, and benefits of green and blue spaces in urban and densely populated areas.

High Value Habitats

- Maine wetlands better quality and quantity than other New England states; can play critical role in protecting wetlands x the region
- Peatlands cover 500-750,000 acres; store most C of all wetland types. But risk of switching from C sink to C source with warming
- Salt Marshes threatened by SLR; currently store more C than all other states except MA
- Tundra, boreal and montane forests, peatlands, coastal marshes all vulnerable to CC, but also with many specialized species, including several at-risk plants, butterflies, and birds.
- Habitats with lots of specialists (wetlands, mountains) stand to lose the most # species

Species Highlights

- 8 new species added to ET list this year:
  - 4 threatened by CC: Saltmarsh Sparrow, Bicknell's thrush, Blackpoll Warbler, Marginal Tiger Beetle
  - Cliff and Bank Swallows – suffering from loss of habitat and declining insects
- Little Brown Bat vulnerable to declining flying insects, warming caves
- Amphibians vulnerable to changing hydroperiods and flow in marshes, vernal pools, and streams
- Moose susceptible to heat stress, changing vegetation, increased parasites

Results from Breeding Bird Survey

Examples of new birds moving into Maine since 1983:

- Red-bellied woodpecker, Carolina Wren, Merlin, Sandhill Crane, American Oystercather

Examples of birds with range loss:

- Cape May, Bay-breasted, and Tennessee Warblers
- Bobolink, Eastern Meadowlark

Examples of birds shifting range:

- Expanding – Indigo Bunting, Eastern Bluebird, Prairie Warbler, Tufted Titmouse
- Moving South – Merlin, Fox Sparrow
- Moving North – Boreal Chickadee, Olive-sided Flycatcher

Conservation Strategies - Maine

- Create and connect a strategic network of protected areas
- Add about 200,000 ac conserve land/year to reach 30x30 goal
  - especially older forests
  - both tidal and freshwater wetlands
  - climate resilient areas
  - climate refuges, including cool microclimates
    - These may help not just cold-adapted taxa but warm-adapted taxa as well, increasing overall biodiversity
  - Focus Areas of Statewide Ecological Significance
- Change forest & ag practices to increase both biodiversity & carbon
- Reduce other threats/stressors such as land use change
- Include backyard and municipal management improvements as well