

*highlights from the*  
**S<sub>3</sub> RCN CAPSTONE MEETING**

November 14 and 15, 2018

DAY 1: ECOSYSTEM SERVICES RESEARCH

**Summary**

Eight scientists shared their work creating the scenarios or using the scenarios datasets to answer research questions related to ecosystem services. Approximately 40 people attended the workshop and participated in a discussion moderated by **Lucy Lee** which reflected on the New England Landscape Futures project and considered next steps in continuing scenario-based ecosystem services research.

**Presentations**

**Jonathan Thompson** and **Joshua Plisinski**, both from Harvard Forest, on the stakeholder engagement process that created the scenario narratives and simulating the narratives to produce spatial datasets:

- Generating the datasets was an iterative process between scientists and stakeholders to ensure fidelity to the original scenario narratives
- Each scenario contains unique rates and spatial allocation of landcover change based on the stakeholder narratives
- Modeling with core-based statistical areas ensured local land-use patterns were retained throughout the region, given 13 land-use transitions and 7 driver variables

**Matthew Duveneck**, from the New England Conservatory and Harvard Forest, on the impacts of the scenarios for forest composition and carbon by 2060:

- Yankee Cosmopolitan and Connected Communities remove less aboveground carbon than Recent Trends due to decreases in harvest and development, respectively, while Go It Alone and Growing Global remove more aboveground carbon as a result of more intense harvests
- High-intensity harvest scenarios like Growing Global and Go It Alone may shift species composition on disturbed (harvested) sites from spruce-fir to northern hardwood in northern New England
- Separate biomass maps for 32 different tree species exist for each scenario and timestep and can be used to evaluate additional ecosystem services such as maple syrup or wildlife habitat

**Joshua Rapp** and **Meghan Graham MacLean**, both from Harvard Forest, on the impacts of the scenarios for maple syrup by the year 2060:

- Yankee Cosmopolitan leads to a 50% increase in potential sugar maple taps, while Go It Alone reduces potential taps by 50% (Recent Trends leads to ~10% increase in potential taps)
- Lower intensity harvest prescriptions such as sugarbush, leave tree, thinning, and firewood cutting yield more potential sugar maple taps compared to higher intensity prescriptions in all scenarios
- Due to the large increase in potential taps, Yankee Cosmopolitan is the only scenario in which New England has the potential to overtake Canada as the world's leading maple syrup producer

**Schuyler Pearman-Gillman**, from University of Vermont, on the scenario impacts for wildlife by 2060 using American black bear as an example:

- Predictive models and regional distribution maps, in development for 10 commonly managed New England wildlife species, can be used to identify regions of increasing, decreasing, or stable habitat suitability under current or future (e.g., scenario) conditions
- Across all scenarios, parts of southern and eastern New England (from Fairfield County, CT to Kennebec County, ME) become less suitable for black bears, while much of interior New England

and northern Maine remains stable ( $\pm 10\%$ ) in probability of black bear occurrence

- Black bear results can be assessed along with analyses of the other 9 species to gain a more holistic understanding of the impact of future changes on New England's wildlife

**Robert Griffin**, from the Natural Capital Project and Stanford University, on the scenario impacts for water quality in the Narragansett Bay in the year 2060:

- Most variables determining water quality vary little across scenarios except for bacterial contamination, which skyrockets under Growing Global and Yankee Cosmopolitan due to the increases in developed land without additional water infrastructure
- People living in the upper Narragansett Bay are willing to pay \$80 and \$100 dollars per household per year to avoid water quality changes that would occur in the upper bay under Yankee Cosmopolitan and Growing Global, respectively, totaling \$67 and \$84 million dollars annually

**Andrew Guswa**, from Smith College, on the impacts of the scenarios for water partitioning and high flows in the Charles River and Cocheco River watersheds by 2060:

- Overall water balance is unaffected by land-use differences across the scenarios, but land use does affect the relative contribution of baseflow and storm surface runoff, with more runoff in Yankee Cosmopolitan and Growing Global compared to the other scenarios
- Annual maximum daily flow increases with increasing urbanization, and the increase due to land-use differences across the scenarios is stronger than the effect due to climate change

## Key Takeaways

- Download data for free and connect with a community of scenario data users by **joining** the New England Landscape Futures group on DataBasin.org
- Based on the land-use datasets, we have created biomass data for 32 individual tree species, and we can derive other datasets of forest characteristics, impervious cover, etc.
- The land-use datasets have been shown to be suitable for use with hydrologic models, species distribution models, and forest landscape models at multiple scales
- Interpretation of results involving water, especially in urban areas, must be nuanced due to lack of information on future green and grey infrastructure
- Research to date lays the foundation for synthetic work, and there are many more possible applications of the scenarios and simulations

## DAY 2: PRACTICAL APPLICATIONS

### Summary

The S3 RCN organized the sessions for the Future Scenarios track at the 2018 **Regional Conservation Partnership Network Gathering**. Our sessions were well attended at one of the largest and most dynamic RCP Network conferences ever. In addition to our sessions dedicated to the scenarios work, we ran a beta-testing kiosk that exposed hundreds of passers-by to our new tool and engaged quite a few in targeted tasks to help improve usability.

### Presentations

**Jonathan Thompson**, from Harvard Forest, on past, present, and future land use in New England:

- Forest expansion has peaked but species distributions are different now due to legacies of land-use
- Land use continues to be the biggest driver of change in New England forests, and land use is difficult to predict due to the independent decisions of hundreds of thousands of private landowners
- Harvesting is the most important ecological disturbance in New England forests, and frequency and intensity of harvests vary by owner; corporate harvests in northern New England are unsustainable
- 24% of New England is protected, ranging from 20% in CT and ME to 32% in NH
- 50% of New England's protected land is publicly owned and 50% is privately owned, with publicly

- owned lands ranging from 32% in Maine to 71% in Massachusetts and Rhode Island
- 51% of our region's protected areas have been protected since 1990, ranging from 29% in Massachusetts to 71% in Maine
- Of the half of conserved areas protected 1990 or later, more than half were protected as large protected timberlands (LPTs); in terms of area 27% of protected lands in New England are LPTs
- 24,000 acres of forest are lost each year to development (mostly low-density development)
- If trends in harvesting, land protection, and development continued into 2060, development would increase from 8% to 12% and reduce forest cover to 76%; 54% of our land would be protected
- **Scenarios** that contrast with recent trends were developed with stakeholders and simulated to produce research quality datasets and online decision support tools

**Jim Fox** and **Karin Rogers**, from UNC Asheville's National Environmental Modeling and Analysis Center, on the newest version of the web-based decision support tools:

- Scenarios are a planning tool that can help with decision making amid uncertainty, in realms such as land-use planning, conservation priority-setting, and other decision spaces identified by workshop attendees such as water resource management
- A **web tool** is in development that allows the user to explore the scenario data and the impacts of the land use on areas of conservation relevance such as wetlands and core forests
- The web tool exists inside a **story map** wrapper so that users are empowered with background knowledge of the project and instructions for use, enabling them to use the tool in their work and share it with others
- Case studies in the story map provide an opportunity to examine different scenario outcomes for specific places, reflect on the diverse ways different places can be impacted by the same scenarios, and compare other parts of New England to the user's area of interest
- By walking users through the story map, attendees learned the major features of the web tool and were able to provide feedback directly to the tool developers

**Heidi Ricci**, from Mass Audubon, on the ways her organization is using scenarios to achieve its goals in Massachusetts and Rhode Island with the Resilient Taunton Watershed Network and other partners:

- Demonstrate the progression of sprawl and urbanization across the region by town
- Show the increase in each town's impervious cover using policy-relevant thresholds to illustrate the opportunity and need for smart planning to avoid water-induced problems (e.g. flooding, water contamination) and reduce infrastructure maintenance costs
- Investigate effects of land use on water quality in the Narragansett Bay and show that people are willing to pay \$90 million for the water quality that forests and smart land use help provide
- Demonstrate that in a Growing Global scenario we develop more resilient lands compared to Connected Communities or even Recent Trends
- Examine what happens to green infrastructure under each scenario in the Taunton watershed
- Use the scenarios as thought-provoking exercises in conversations with municipal decision-makers about land-use choices and options

**Lisa Vernegaard**, from Sudbury Valley Trustees, on her experiences using the scenarios to aid in her fundraising efforts:

- After asking donors to imagine their favorite place, she shows them the map of Recent Trends in 2060; in 30-50% of cases the person's favorite place is developed
- Illustrating that the current pace of protection may not be enough to save their favorite place has increased donations with a 100% success rate so far

## **Key Takeaways**

- The legacy of past land use is still seen in today's forests, and land use continues to be the biggest driver of forest change in New England
- States vary widely in terms of their conserved lands: who owns them (public/private), when they

- were protected (before/after 1990), and why they were protected (e.g., timberland management)
- If recent trends continue we will lose 4% of our forest cover by 2060, reducing forest cover to 76%
  - Scenarios present a way of exploring alternative futures, and a web tool is in development that will help users incorporate scenario planning into their work using the scenarios created by stakeholders of the New England Landscape Futures project
  - Scenario land-use maps provide a starting point for thought-provoking conversations with municipal decision-makers about future land-use choices
  - Organizations can analyze and use the scenario data at the scale most relevant for them (e.g., state, watershed, town) to most effectively engage with stakeholders and decision-makers
  - The Recent Trends scenario has been effective in convincing donors of the need to give more by illustrating what the landscape, including their favorite place, would look like with business as usual