# Visualization Tool for Preserving Forests Under Climate Change

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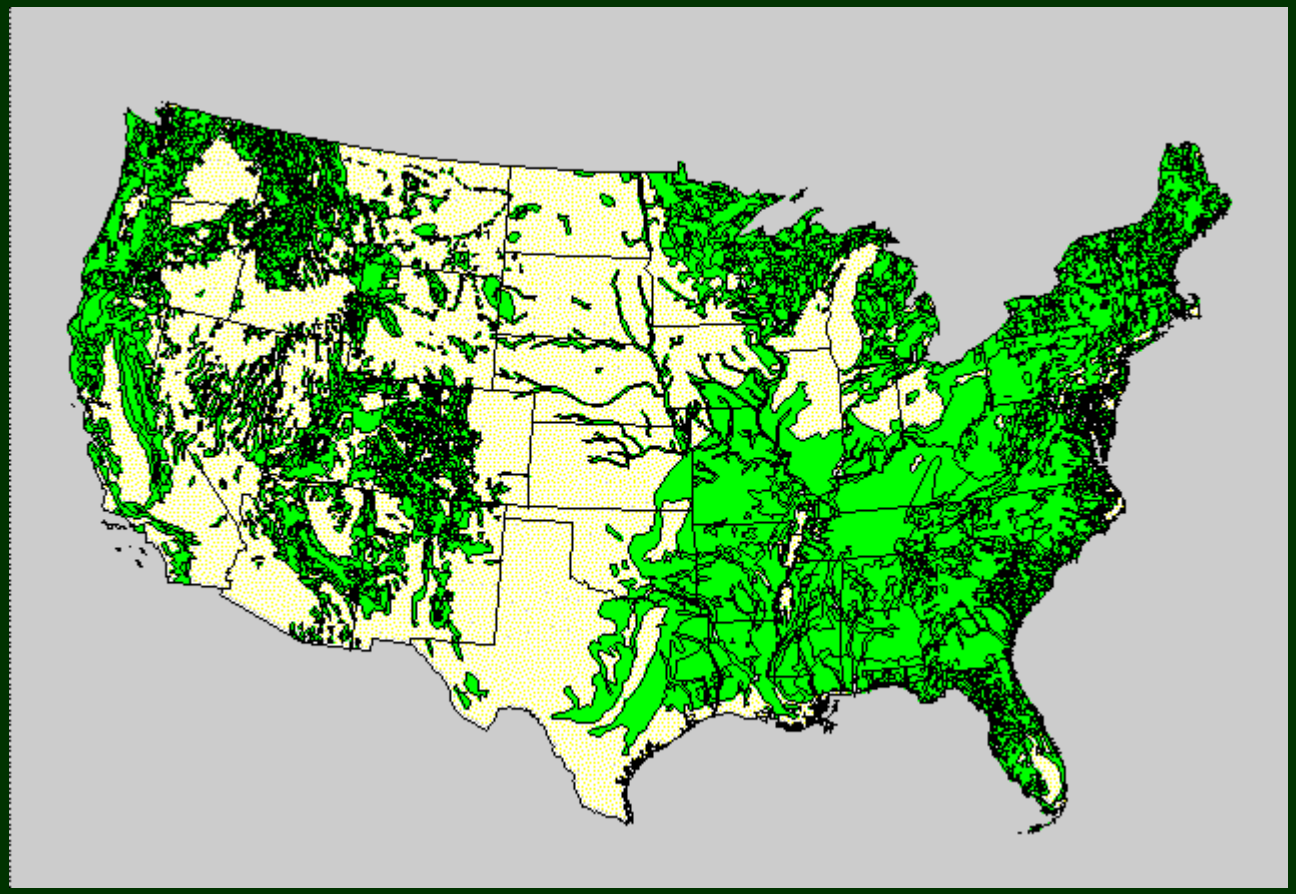
# Forest land in U.S.



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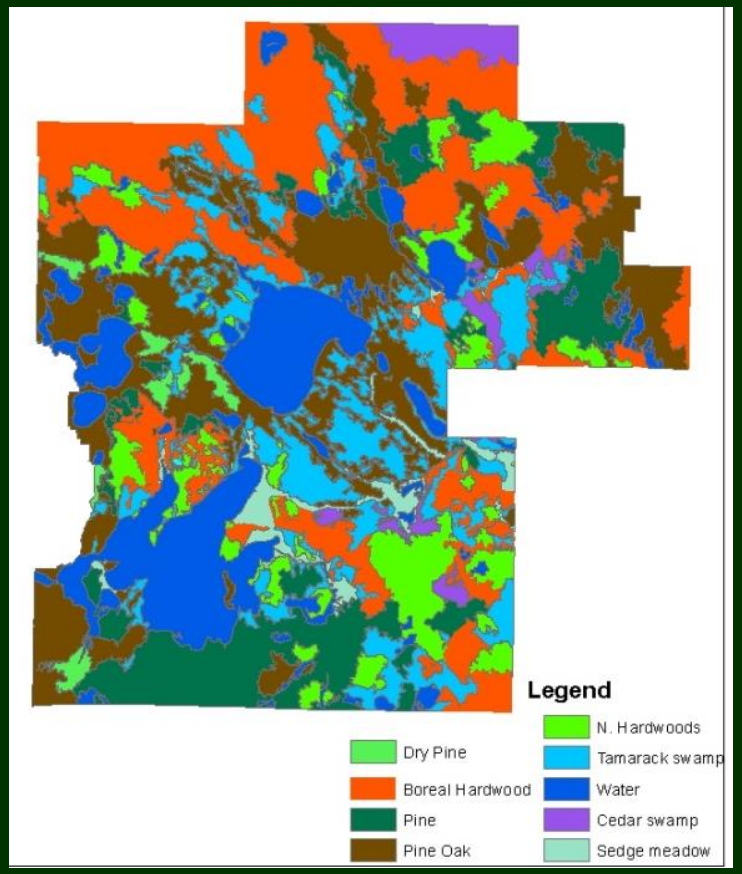
# Forests provide many important services to humans

# Forest Managers




What services do they want their forest to provide?

What are the tree species they want to maintain?

What management tool(s) is best?

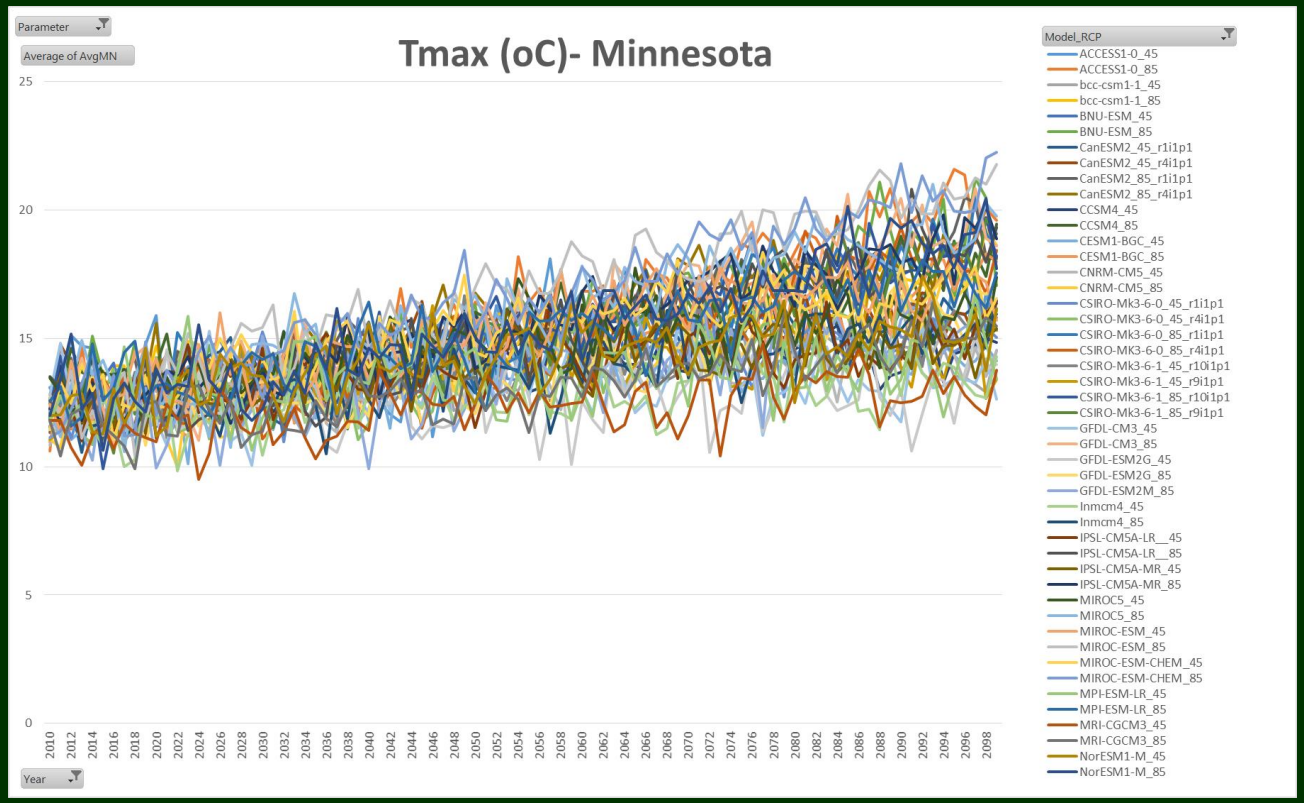
**Land and Resource Management Plan**

**Chippewa National Forest**

| Species | Existing (2003) | 100 year goal |
|---|---|---|
| Jack pine | 6% | 12% |
| Red pine | 30% | 37% |
| White pine | 2% | 5% |
| Spruce-fir | 4% | 4% |
| Oak | 2% | 2% |
| Northern hardwoods | 8% | 8% |


# Climate Change

Project a ~8.5 °F increase in max temps over the next 100 years

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**Land and Resource Management Plan**

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**Ecosystem Vulnerability Assessment and Synthesis: A Report from the Climate Change Response Framework Project in Northern Wisconsin**

General Technical Report NRS-82
2011

**Table 6.—Modeling results for LANDIS-II for northern Wisconsin tree species based upon effects of climate change, disturbance (management and wind), and fragmentation-constrained seed dispersal.**

| Severe decline or loss | Likely decline |
|---|---|
| White spruce | Northern white-cedar |
| Balsam fir | Quaking aspen |
| Red pine | Yellow birch |
| Jack pine | Red maple |
| Paper birch | Red oak |

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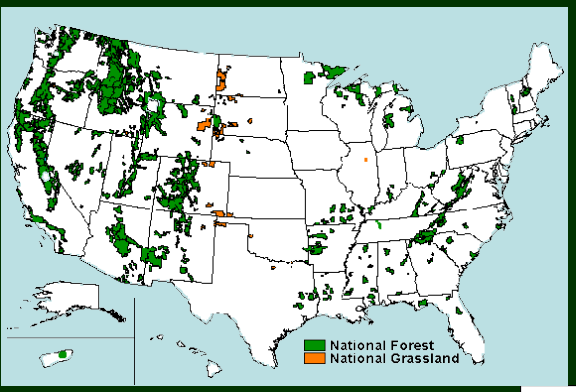
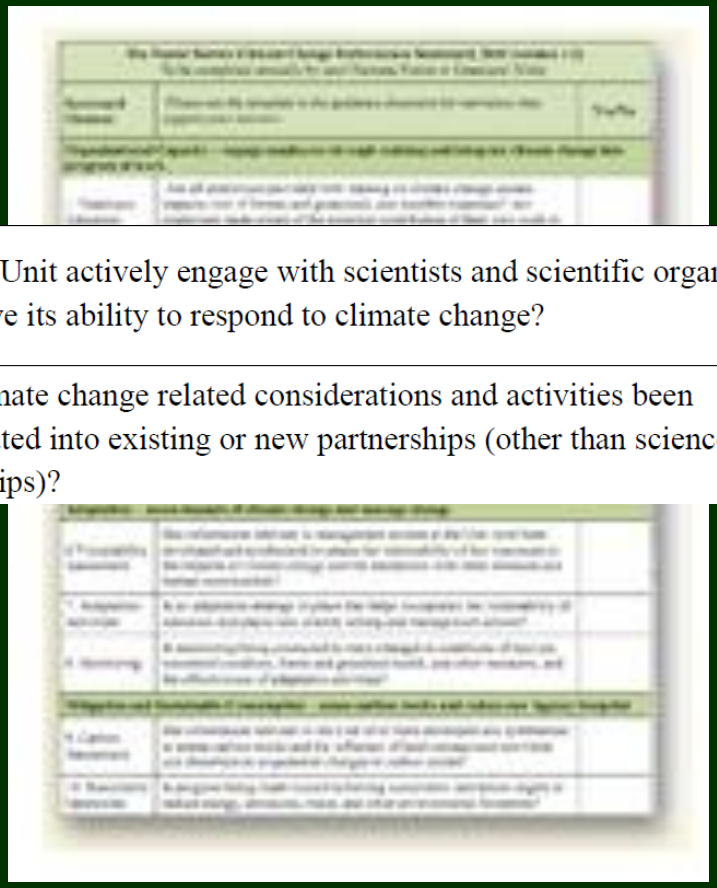
# USFS National Forests Climate Change Scorecard



Does the Unit actively engage with scientists and scientific organizations to improve its ability to respond to climate change?

Have climate change related considerations and activities been incorporated into existing or new partnerships (other than science partnerships)?

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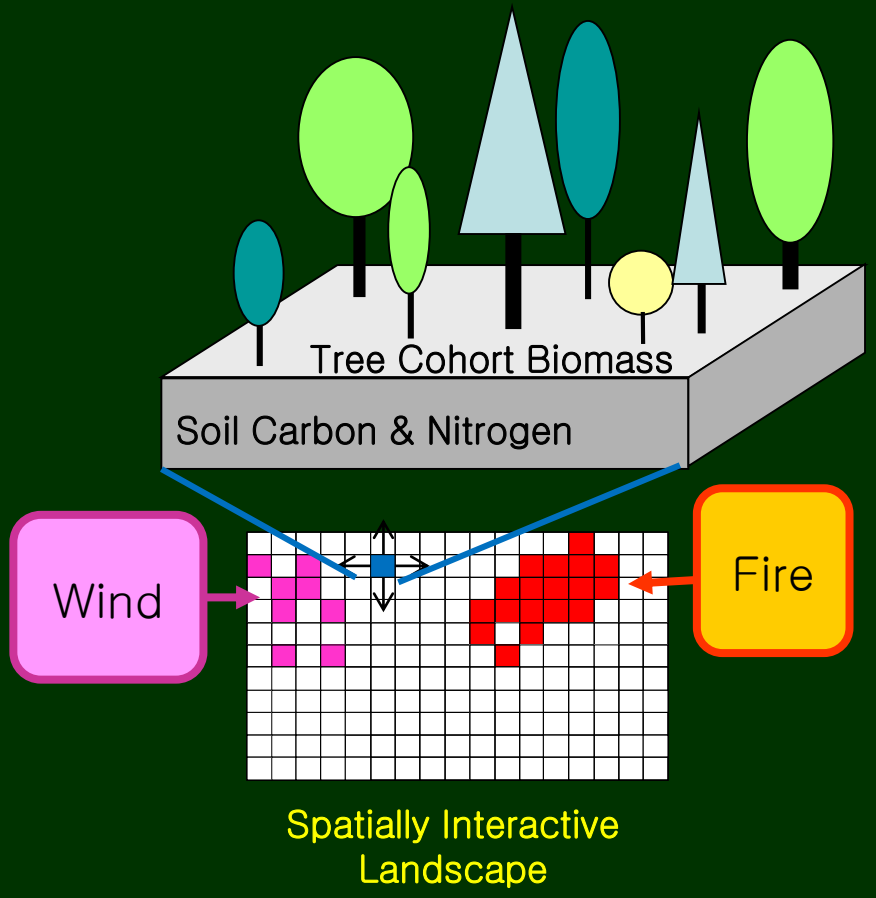
# Forecasting Tool: LANDIS-II




Dynamic species

C & N Accounting

Disturbances and Climate Change

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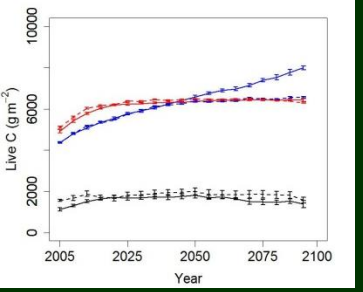
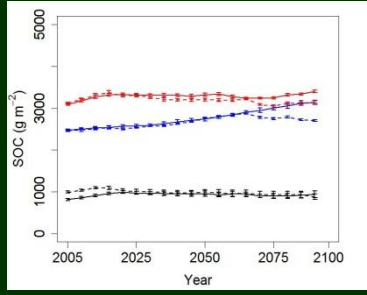
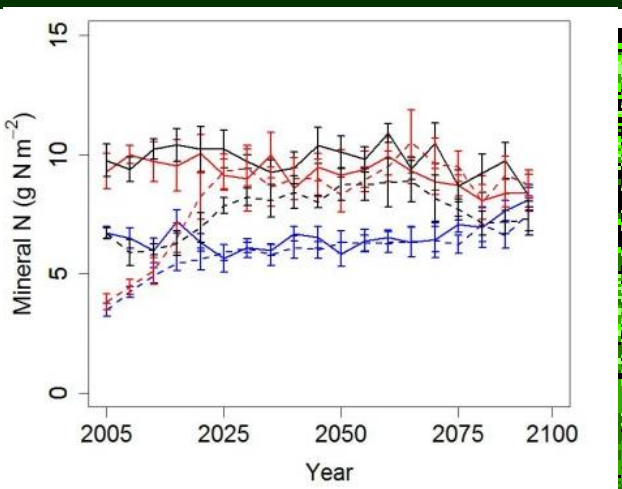
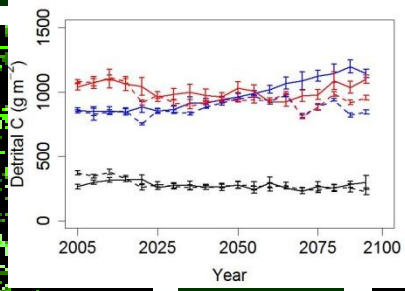
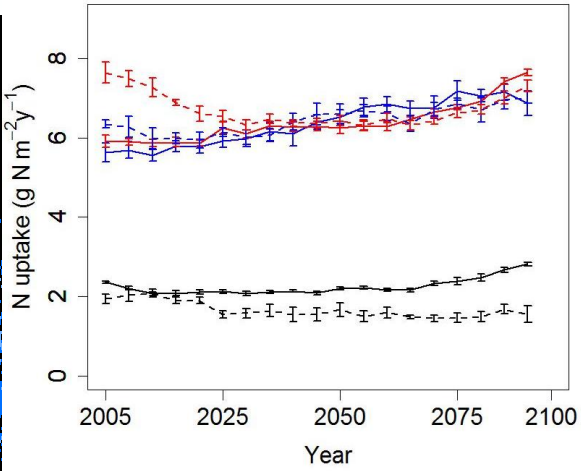
# Model Outputs

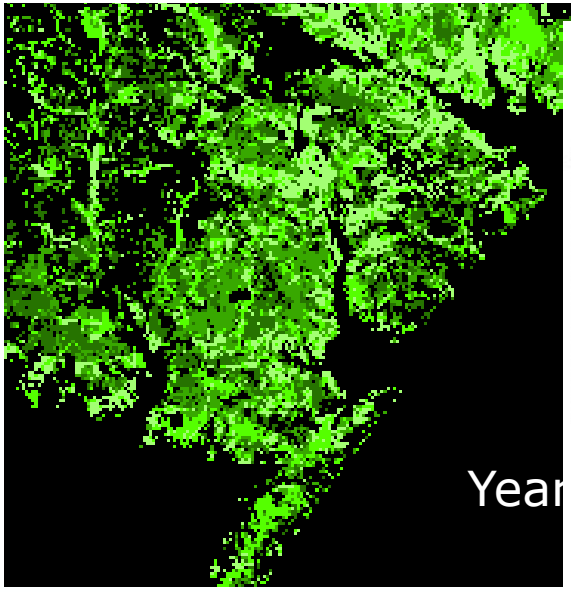


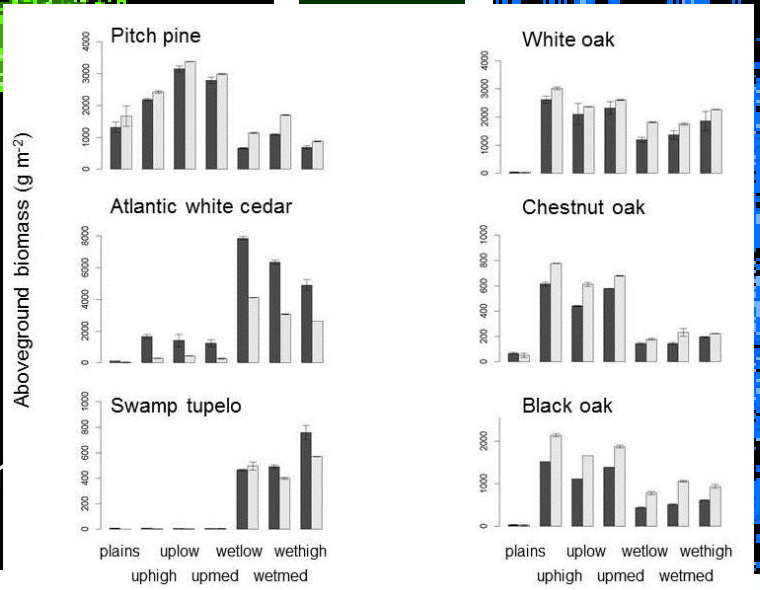



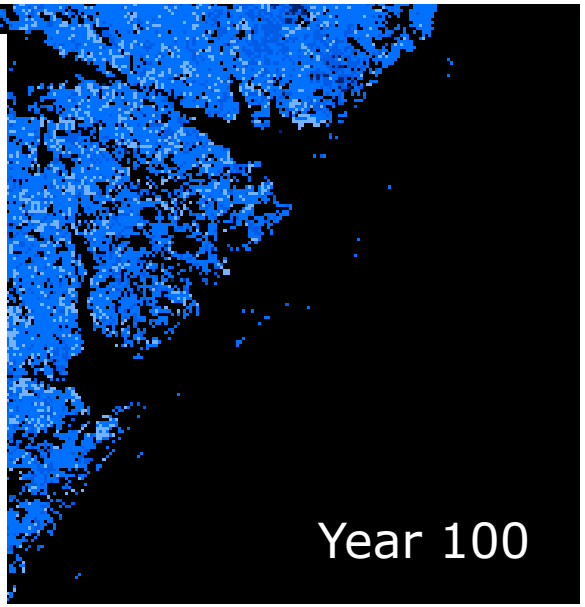



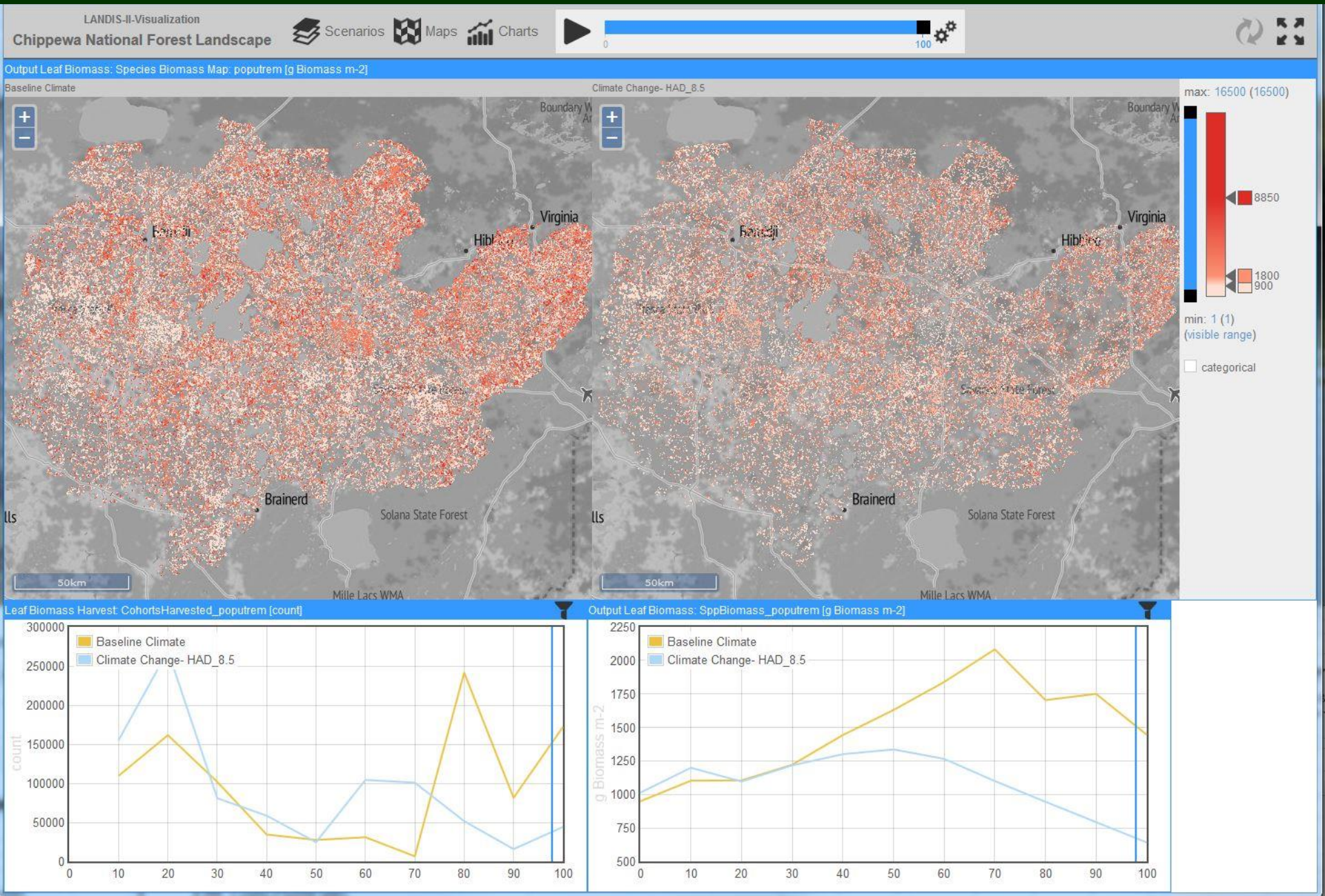



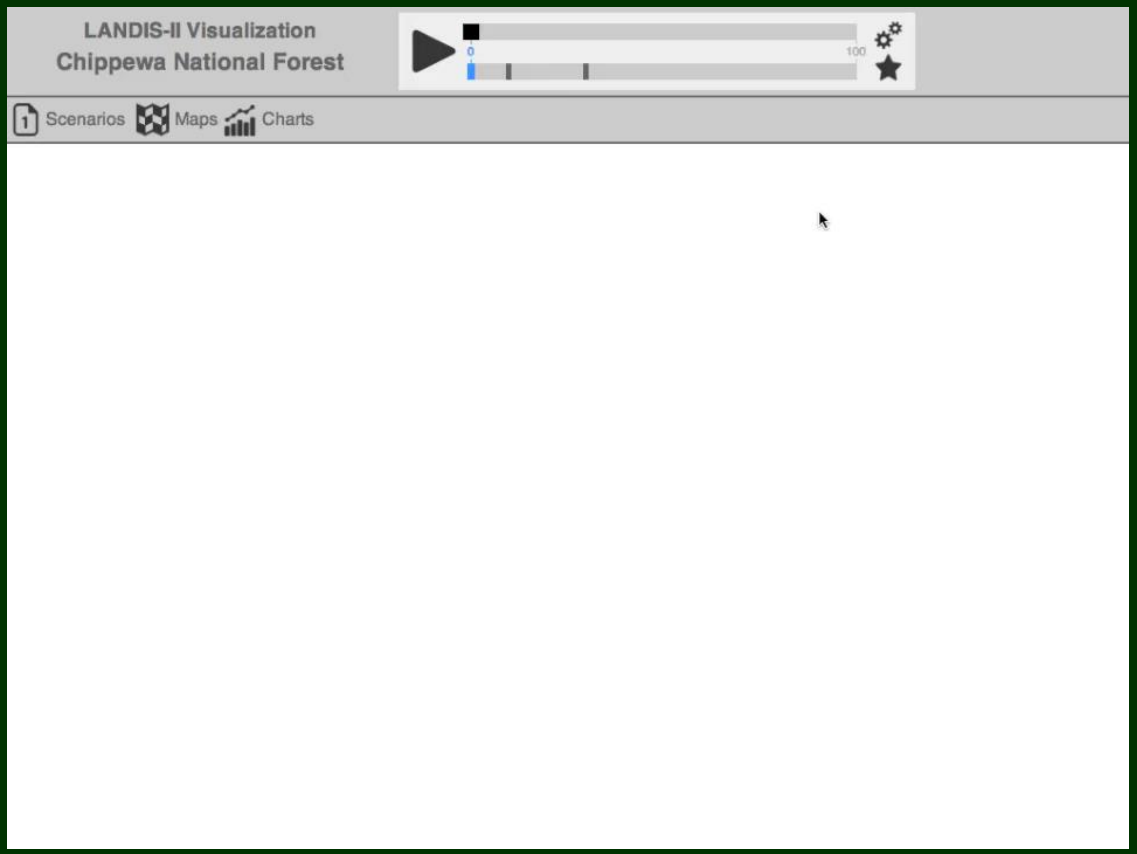



# Visualization Tool






http://landis-visualization.research.pdx.edu/Results_Erics_paper_v5/

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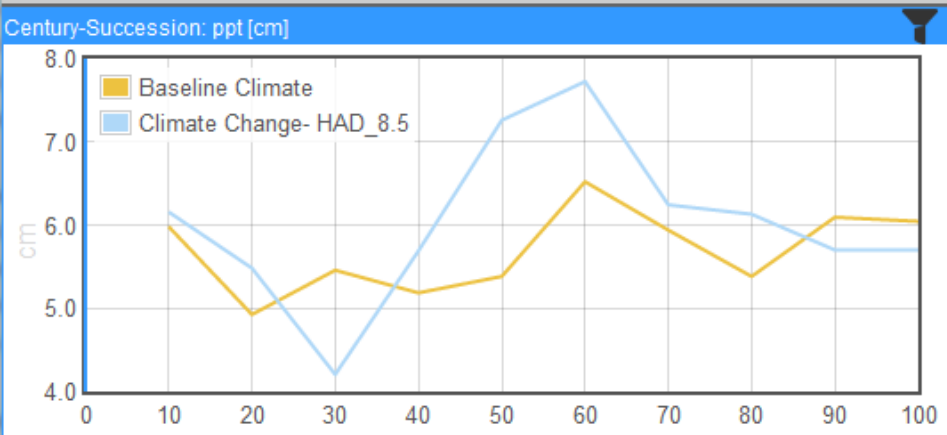
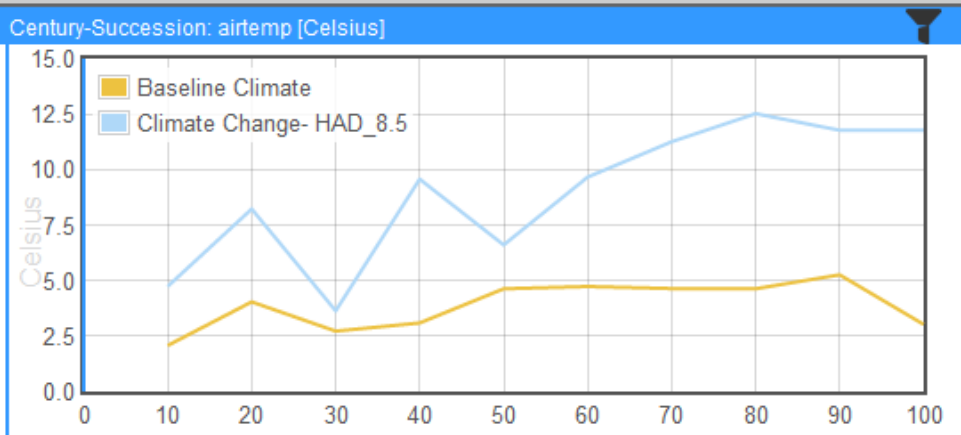
LANDIS-II-Visualization

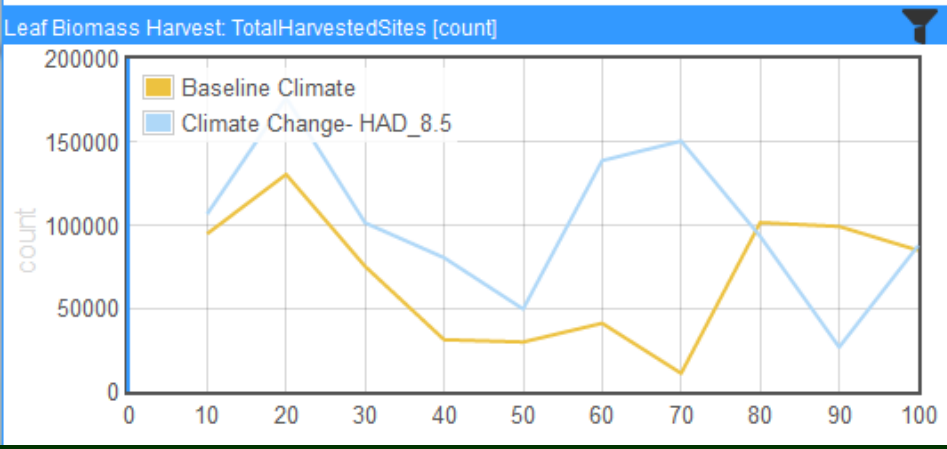
Chippewa National Forest Landscape

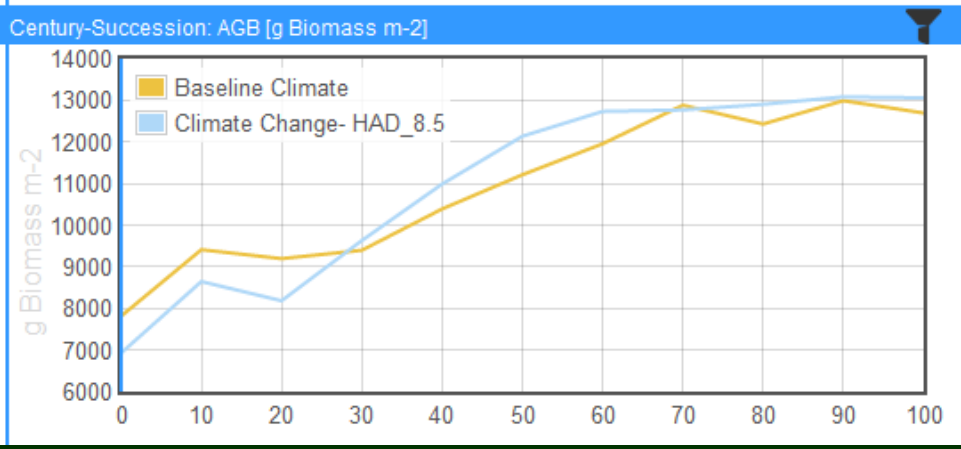
Scenarios Maps Charts

0 100

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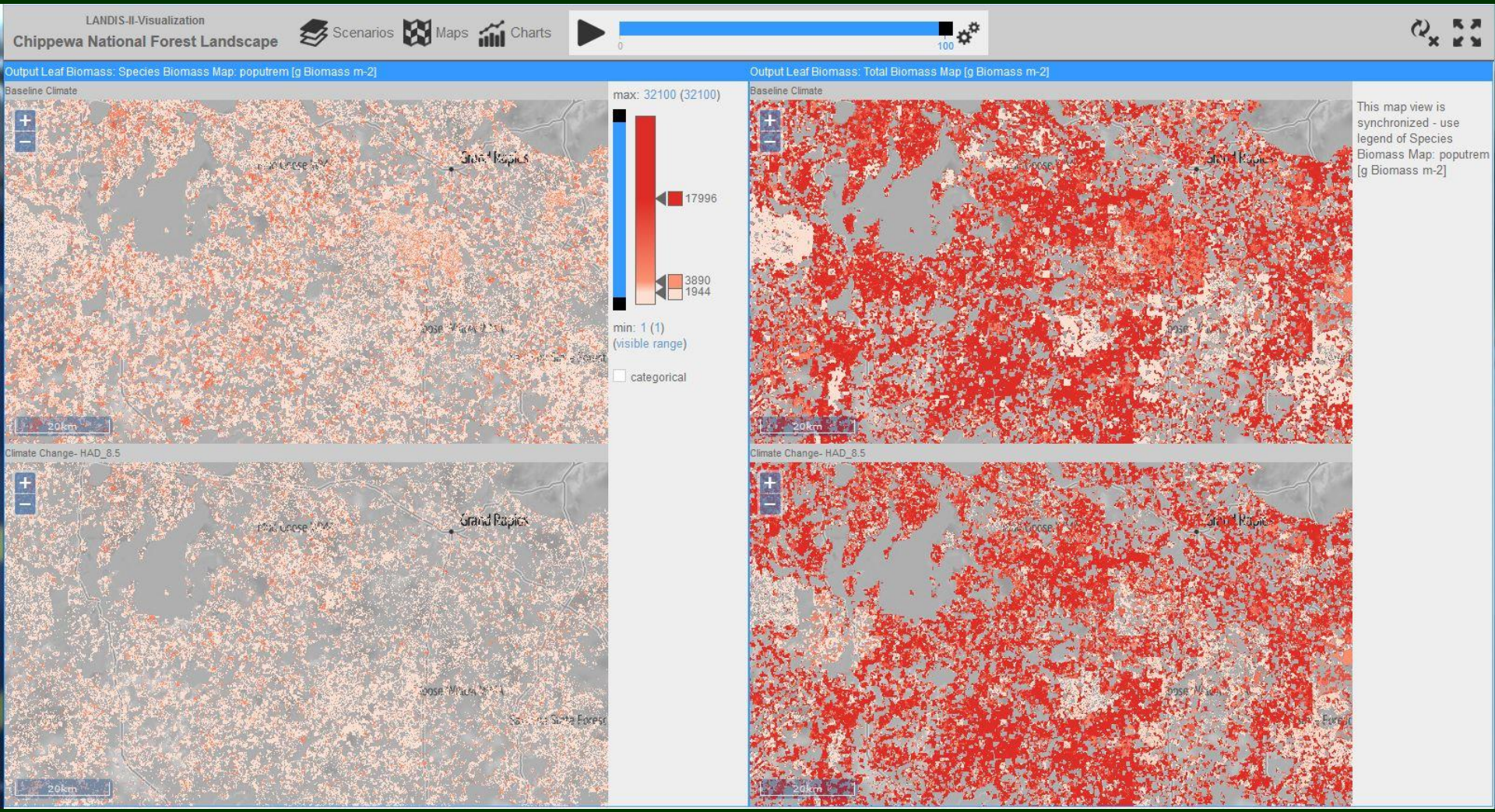


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# Tool has three components:

- Model (LANDIS-II)- open source
- Pre-processing tool- interested in marketing
- Visualization Tool- open source


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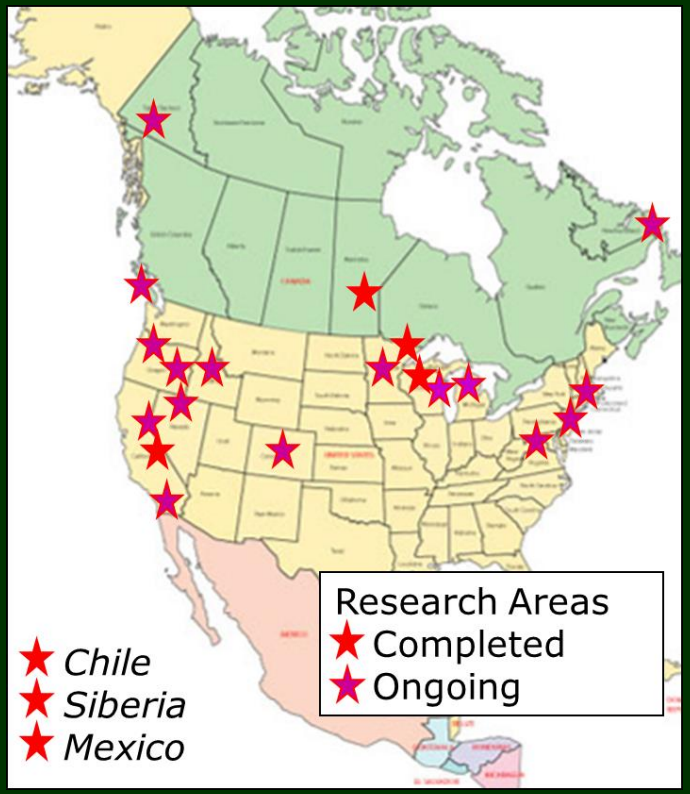
# LANDIS users

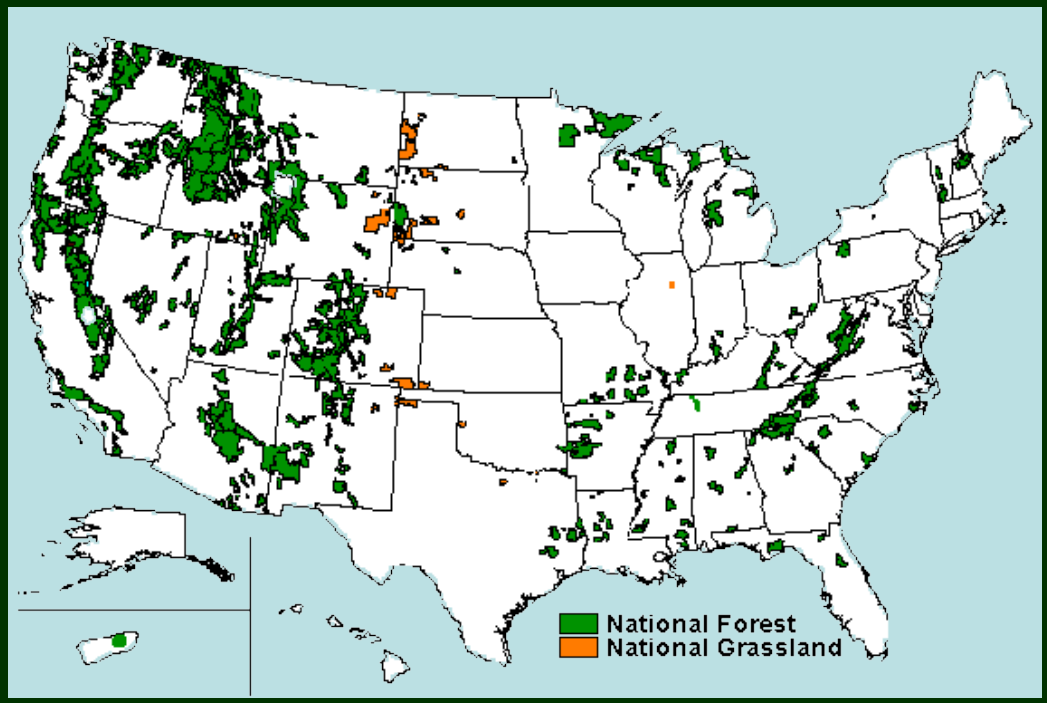
300+




# Forest Managers:

150 on national forest land alone

Another 210 owners with 25K acres or more

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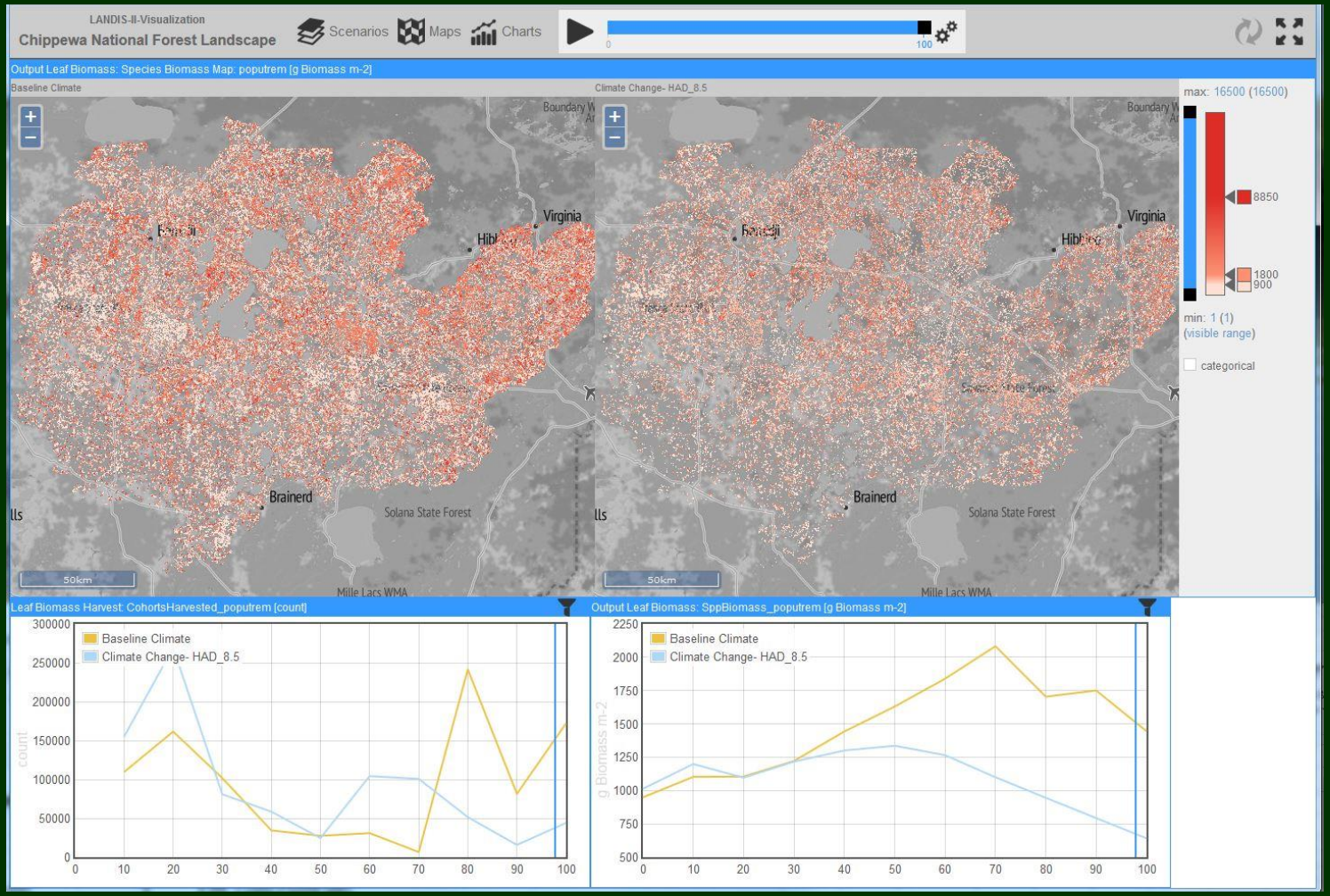
# Thanks!


LANDIS-II-Visualization
Chippewa National Forest Landscape
Scenarios
Maps
Charts
Output Leaf Biomass: Species Biomass Map: poputrem [g Biomass m-2]
Baseline Climate
Climate Change- HAD_8.5
max: 16500 (16500)
8850
1800
900
min: 1 (1)
(visible range)
categorical
Virginia
Brainerd
Solana State Forest
Mille Lacs WMA
50km
Leaf Biomass Harvest: CohortsHarvested_poputrem [count]
count
Output Leaf Biomass: SppBiomass_poputrem [g Biomass m-2]
g Biomass m-2
Baseline Climate
Climate Change- HAD_8.5