Order out of Chaos: A Dashboard for Forest Accounts

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Forests are valuable –

and so is data about their condition and benefits

Organizing ecosystem data with natural capital accounting

Ecosystem extent

Urban forest

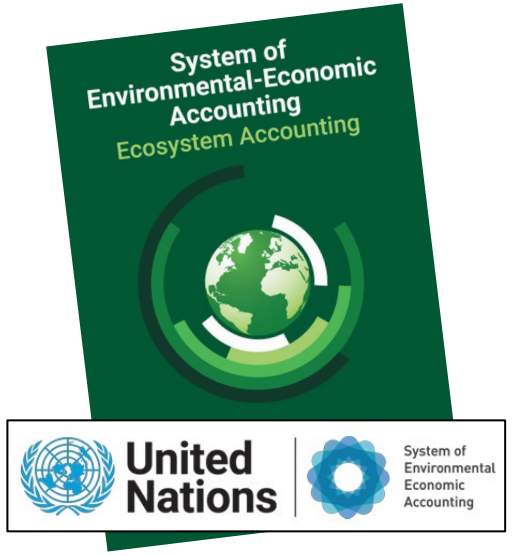
Leaf area in urban tree canopy

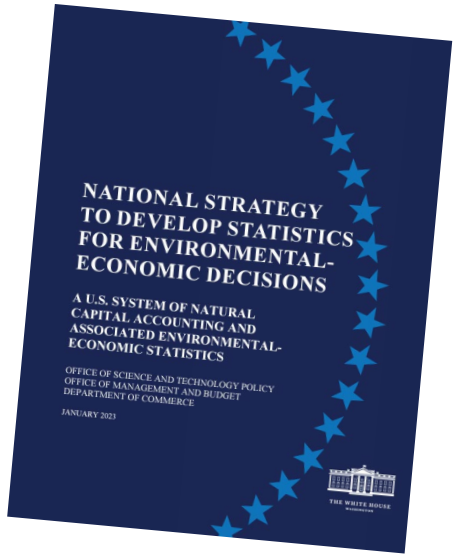
Ecosystem condition

Removal of air pollutants

- Reduced air pollutant concentrations
- Avoided health impacts due to reduced air pollution
- Avoided health spending due to reduced air pollution

Ecosystem services supply & use





Our work: Pilot experimental forest accounts and dashboard

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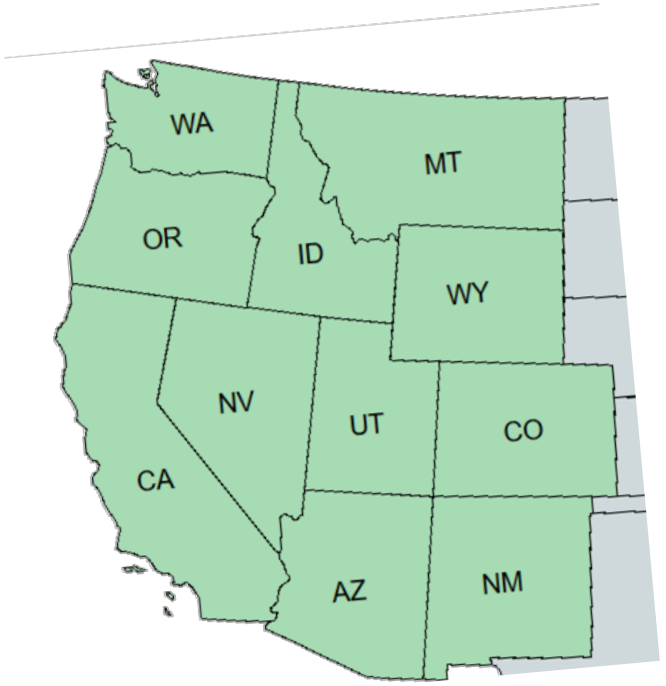


Objectives:

- Explore how the NCA approach can bring together data from multiple sources to answer questions about forests
- Make forest accounts accessible to users who want to explore the data in different ways
- Identify challenges in this process to inform future work on forest accounts

Metrics used in the forest accounts

Extent: Forest area (NLCD)

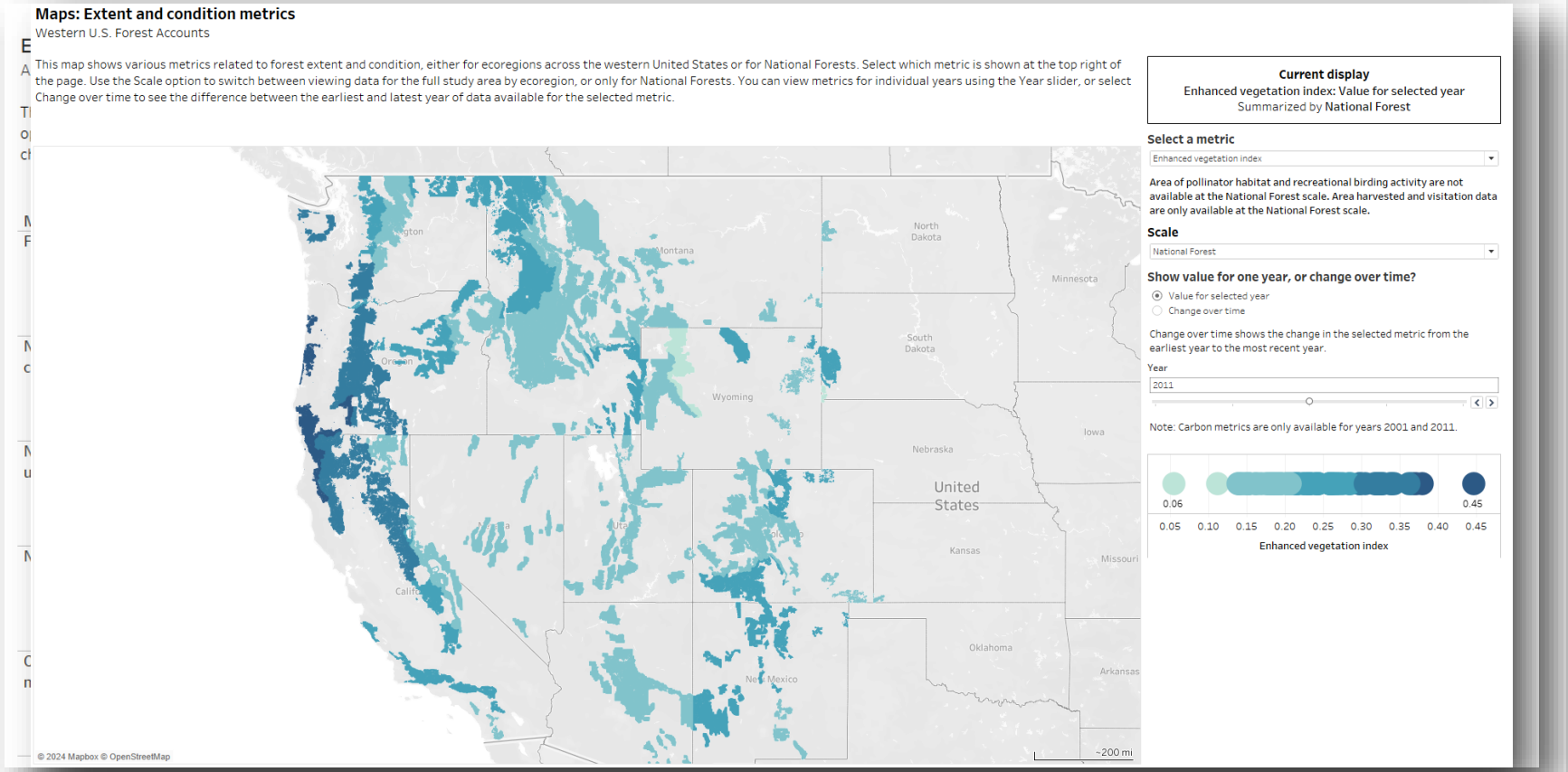
Condition:

- Enhanced vegetation index (LANDSAT annual)
- Interior forest area and proportion of total forest (NLCD)
- Burned area and proportion burned since 1984 (USGS)
- Pollinator habitat area near dependent crops (Warnell – NLCD and CDL)
- Total ecosystem carbon (NFCMS)
- Ecosystem carbon density (NFCMS)

Use by people:

- Recreational birding activity (Warnell – eBird & NSFHWAR)
- Timber harvest area (USFS, National Forest scale only)
- Visitation – total, day use developed, overnight use developed, undeveloped, and wilderness (USFS, National Forest scale only)

Interactive Tableau dashboard



Interactivity:

- Scale: full study area / ecoregion / National Forest
- View certain years or manager types
- Maps: select year or see change over time

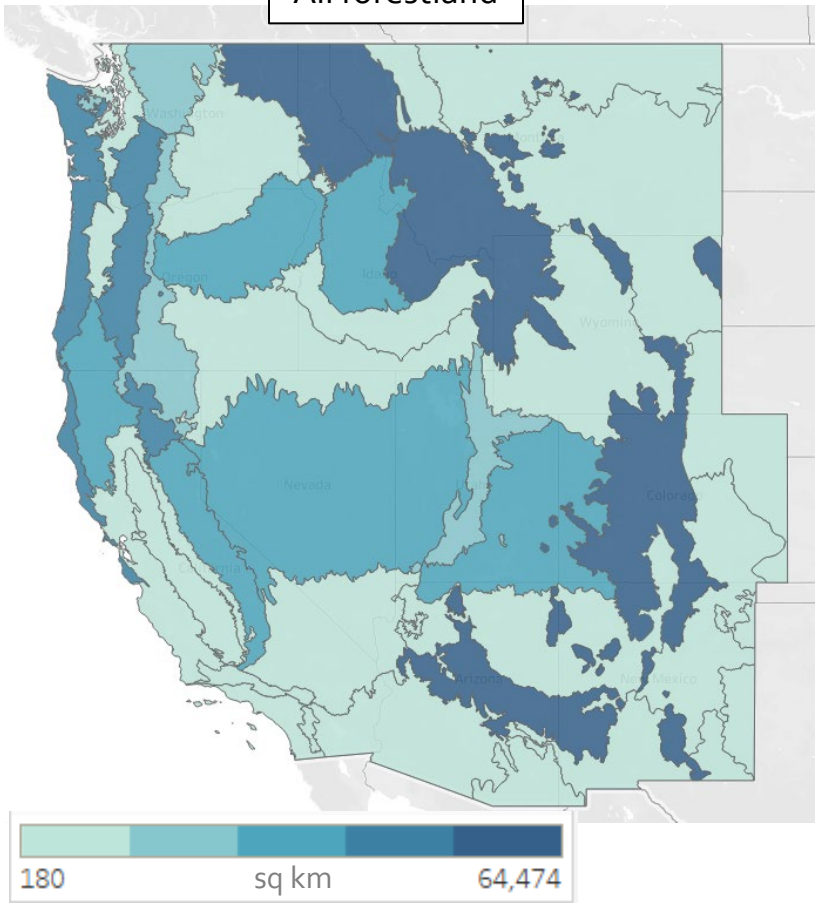
What the pilot accounts can tell us about forest extent, condition, and use

(& what they can't tell us)

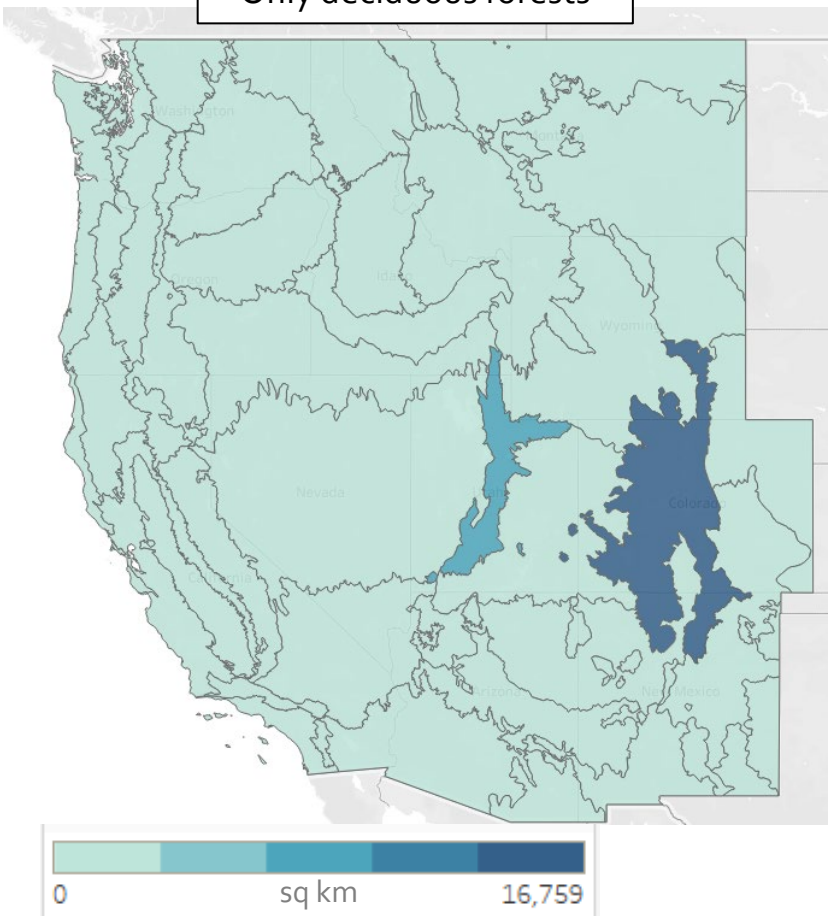
How much forest land is there, and where is it?

Total forestland in the western US (2019): 676,000 sq km

All forestland

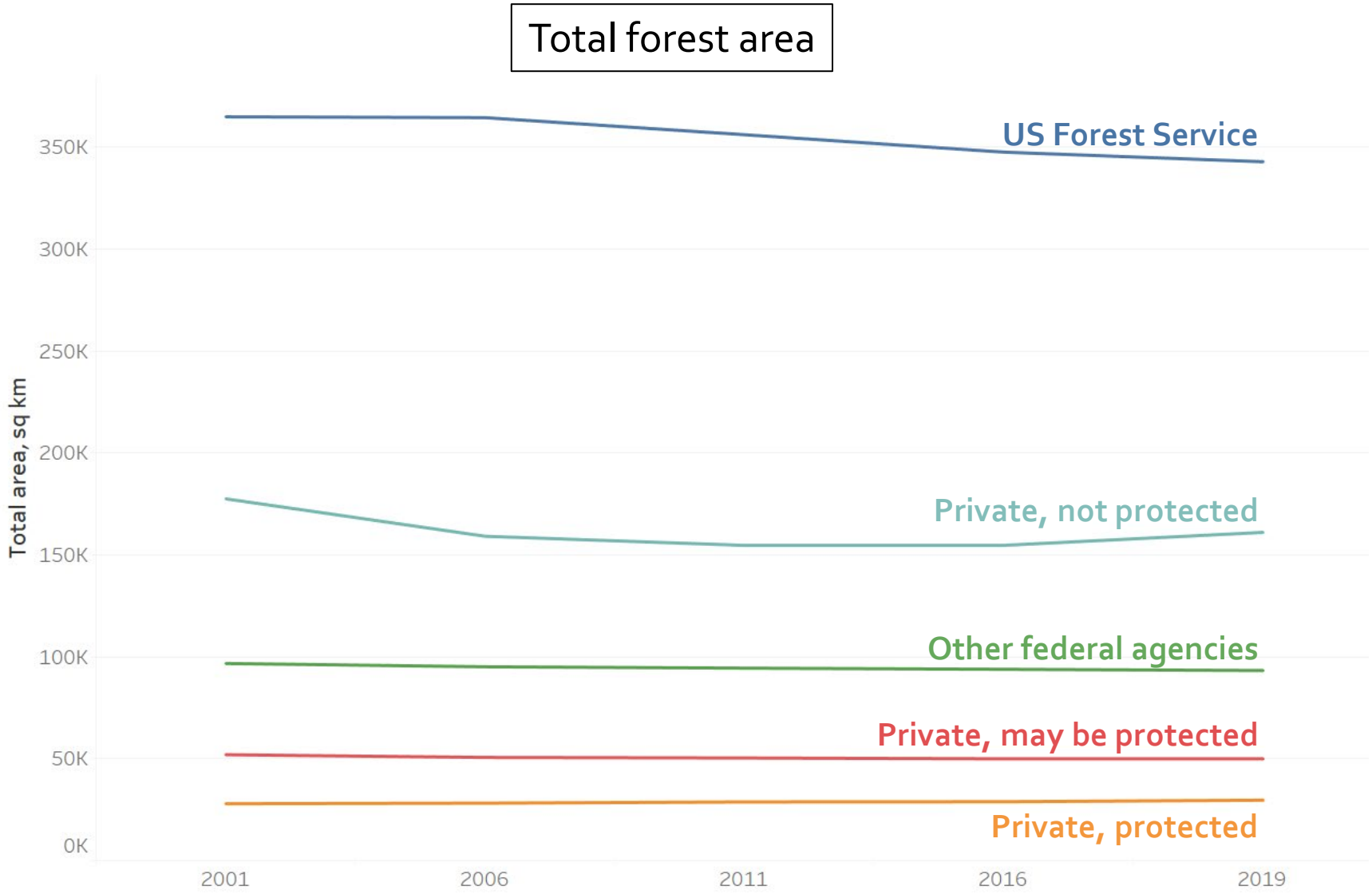


Only deciduous forests



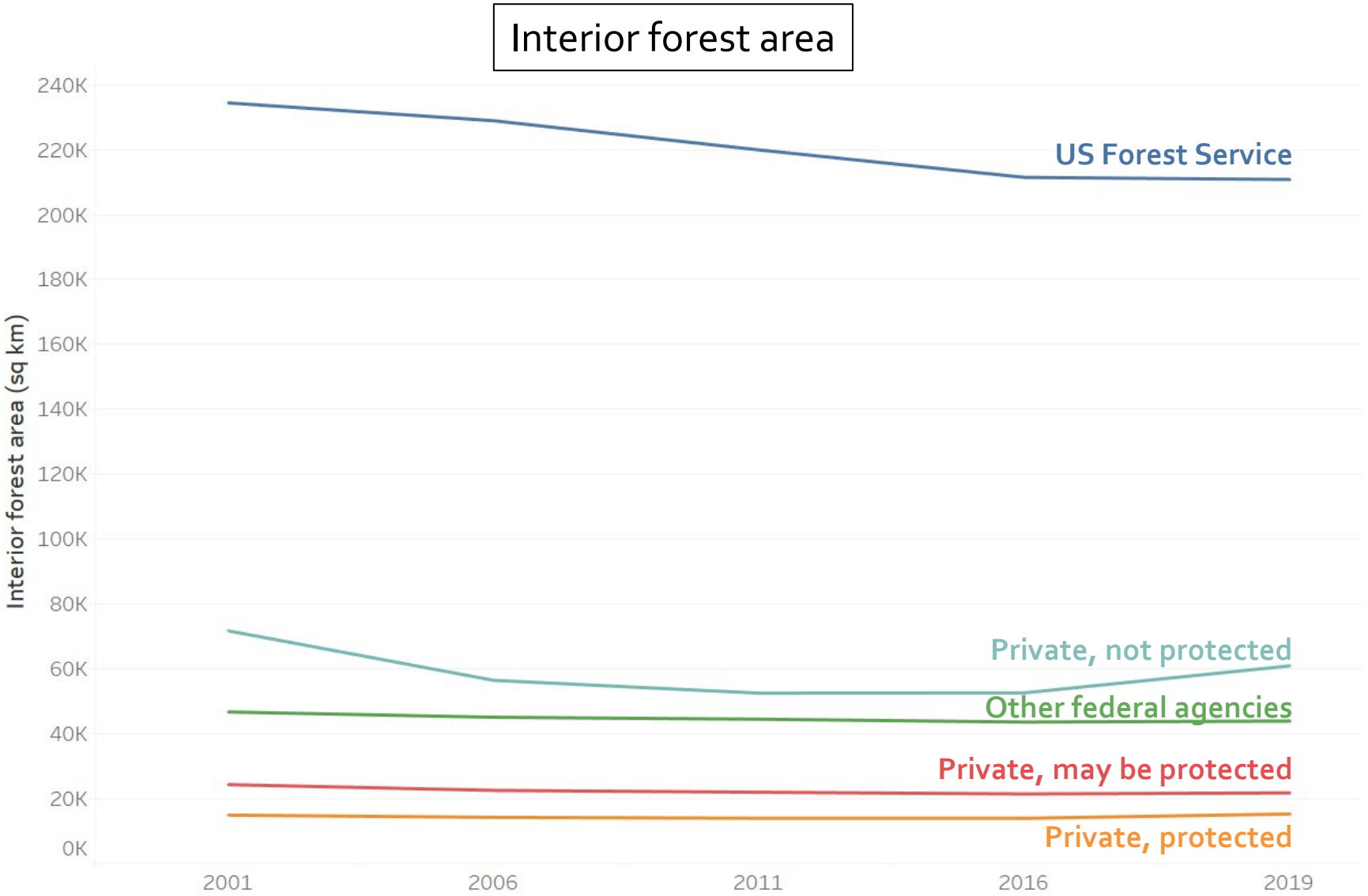
What they can't tell us: How the geographic distribution of forests reflects different tree species within forests. Future forest accounts may add more detail.

Who manages western forests?



What they can't tell us: How the history of land ownership influences who manages forests in the western US.

How is forest condition changing…



What they can't tell us: Why forest condition is changing – many factors including geography, climate, management decisions, and stressors like invasive species.

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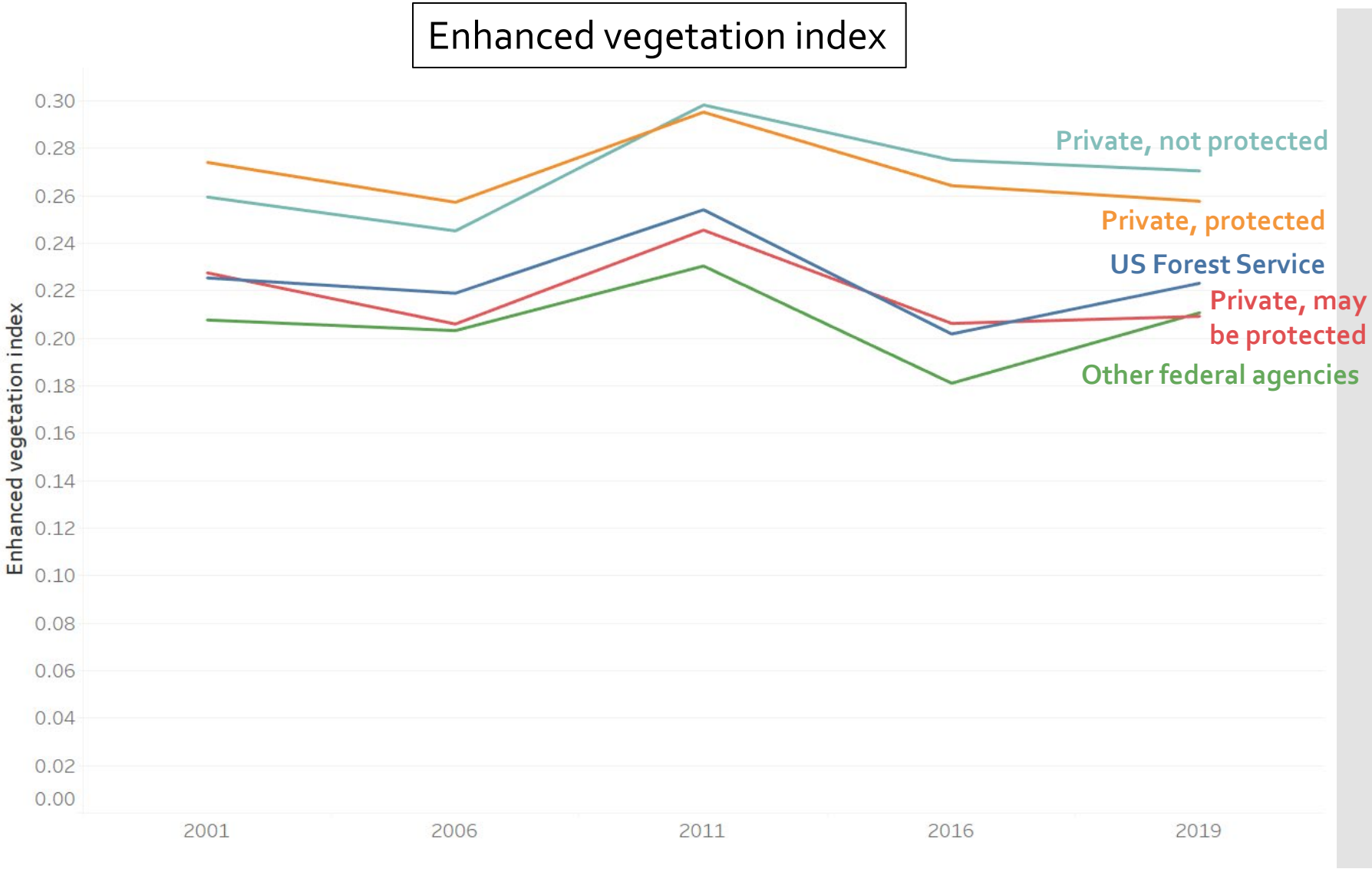
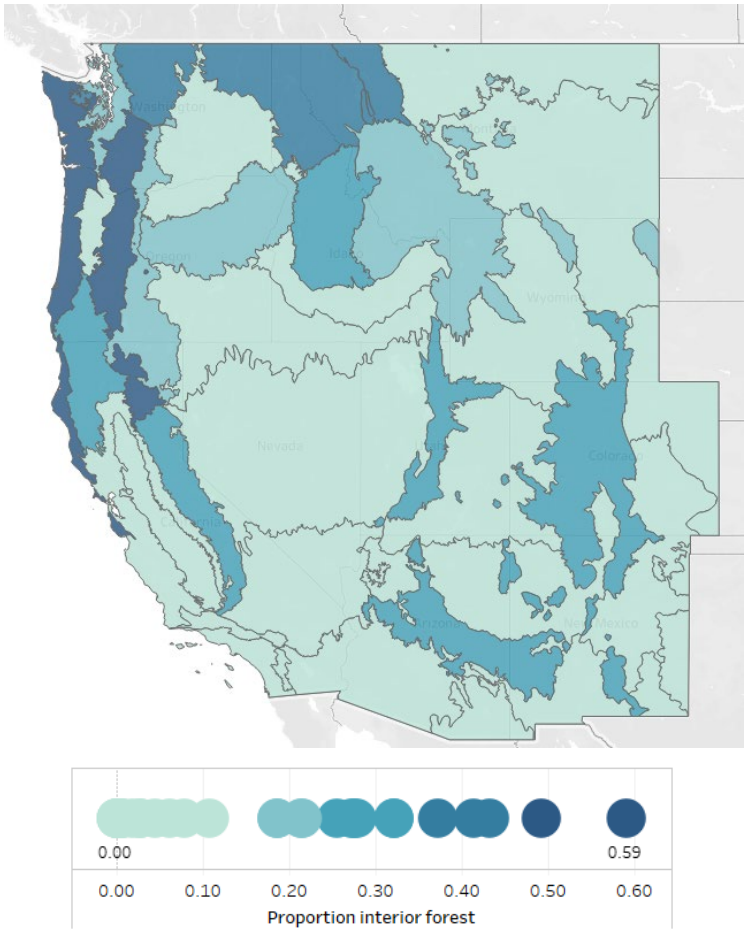


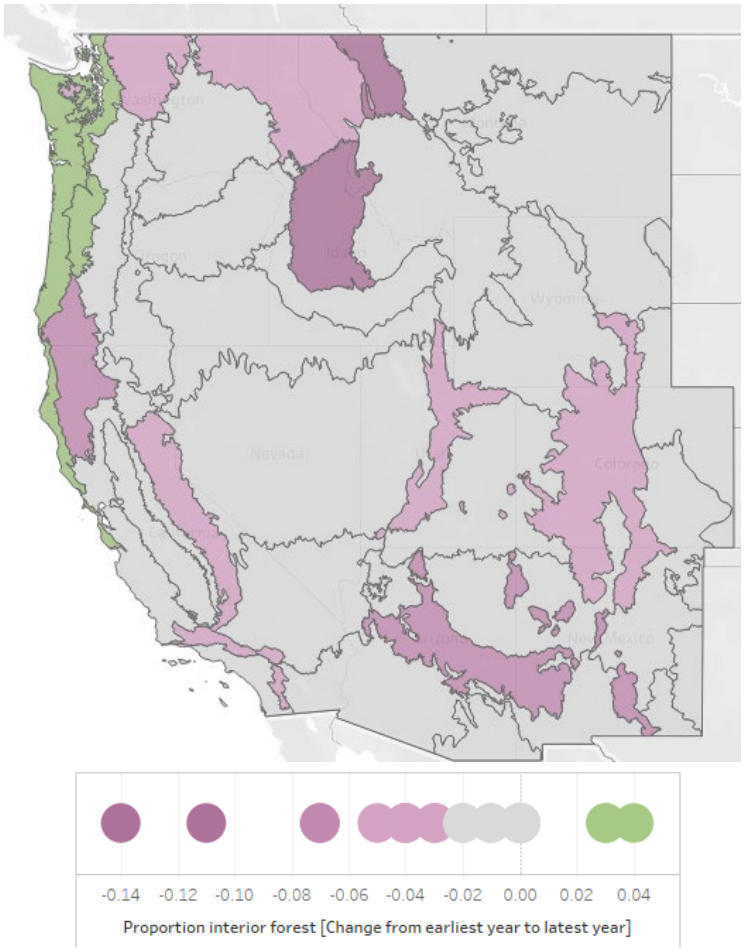
What they can't tell us: Why forest condition is changing – many factors including geography, climate, management decisions, and stressors like invasive species.

…and how does condition vary geographically?

Proportion interior forest, 2019



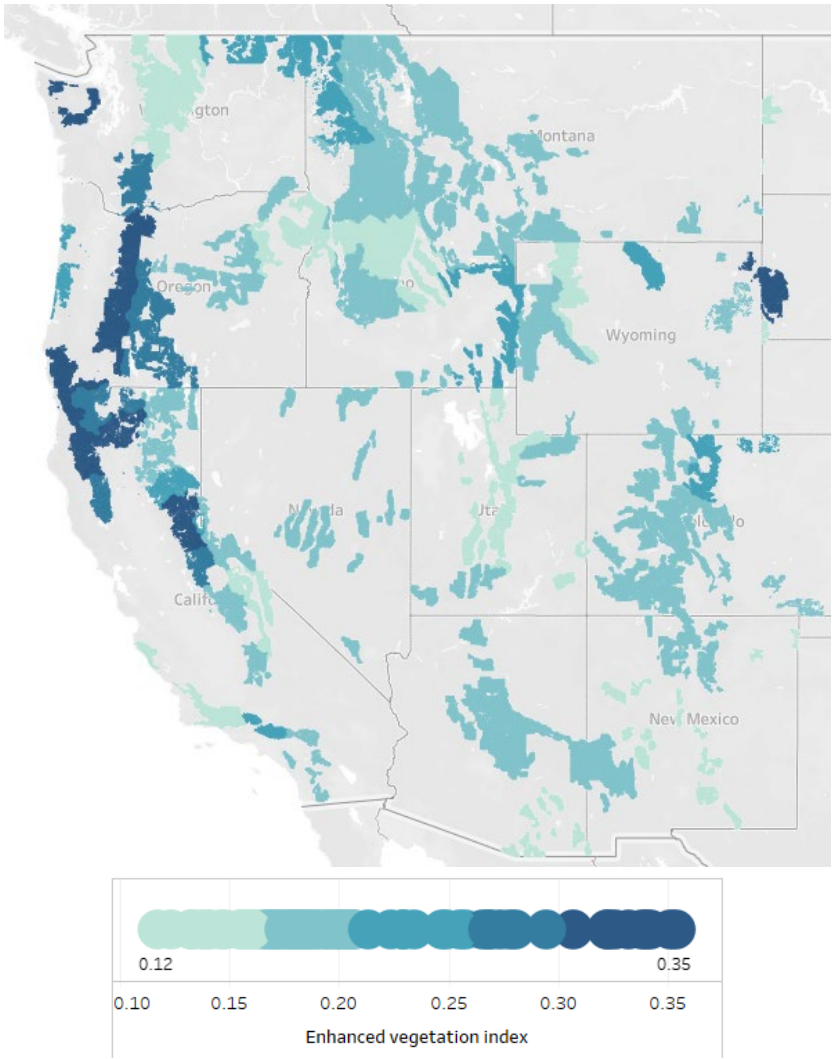
Change in proportion interior forest, 2001-2019



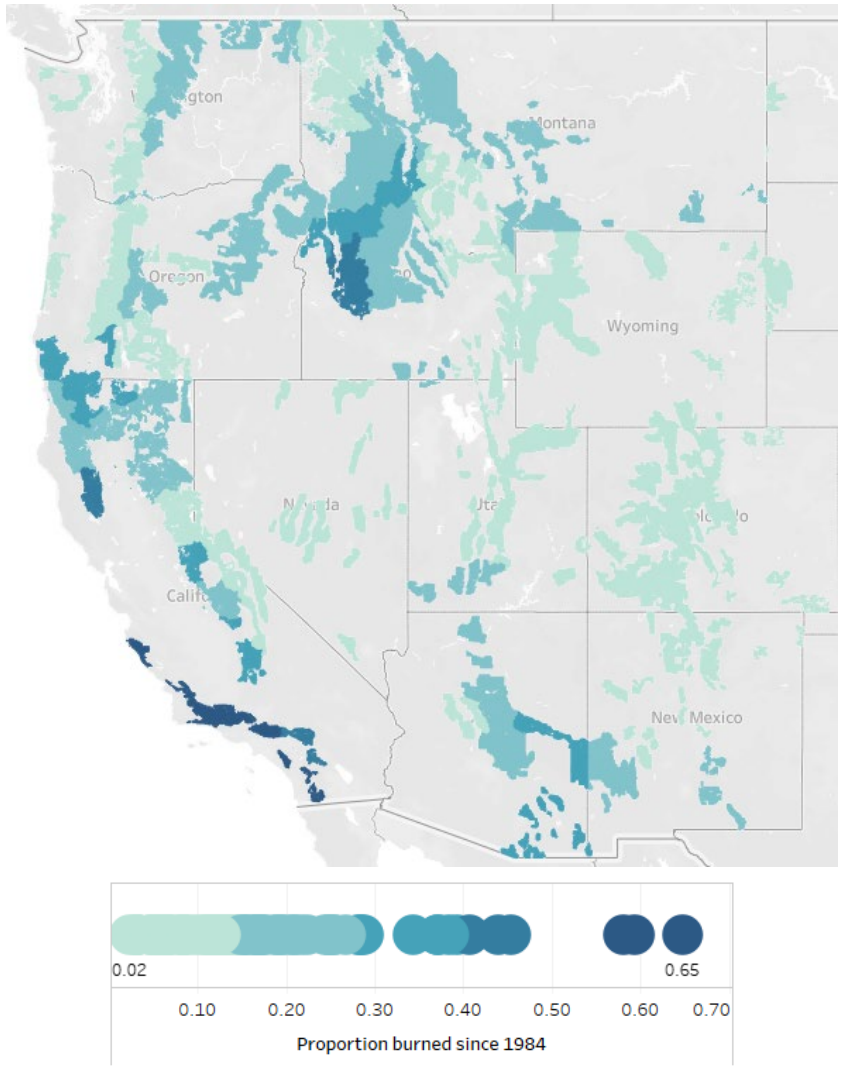
What they can't tell us: Why condition varies geographically, although climate likely plays a big role.

How do National Forests vary in their condition?

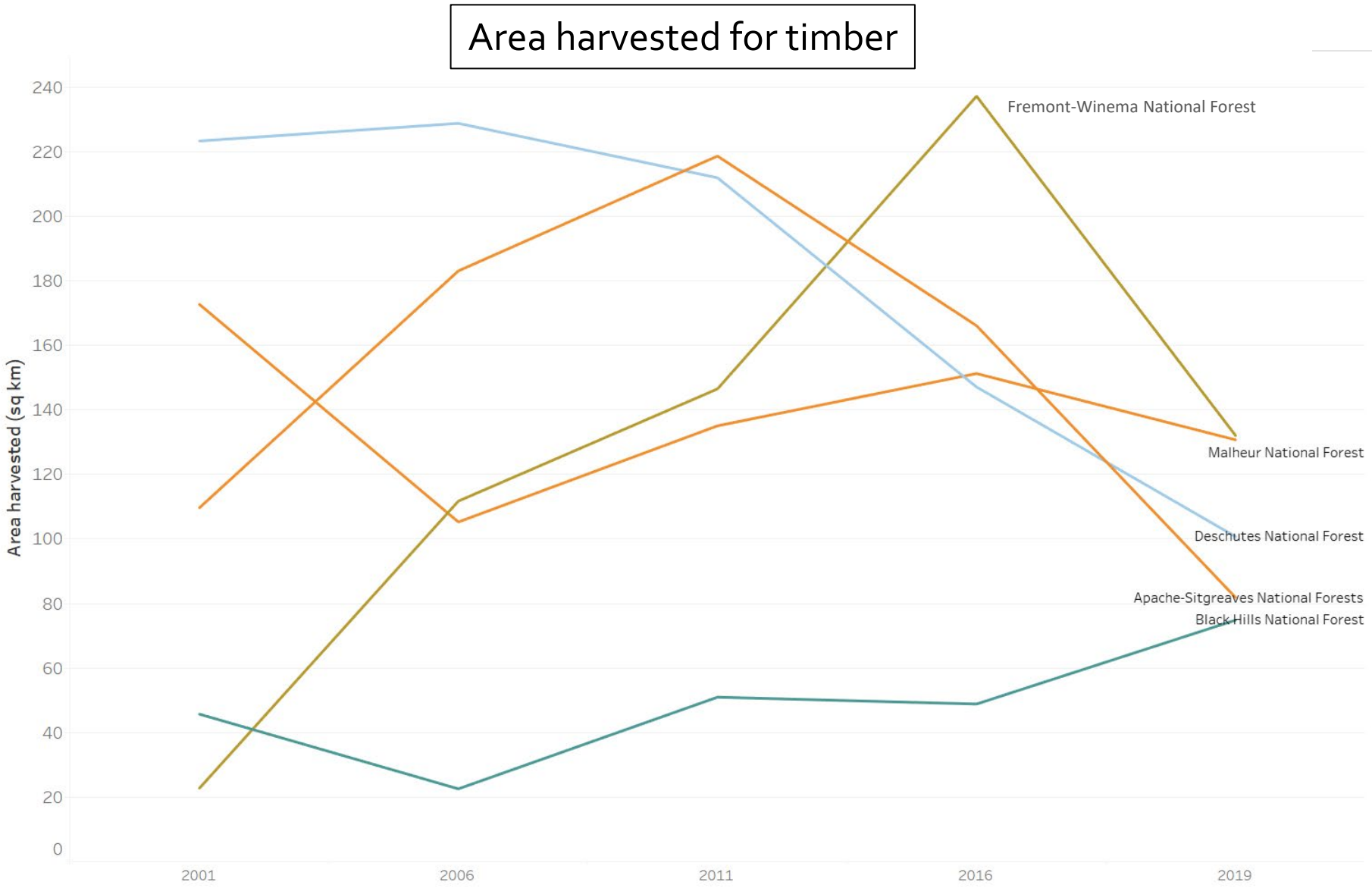
National Forests by EVI (2019)



National Forests by proportion burned (1984-2019)



How do National Forests vary in their use by people?



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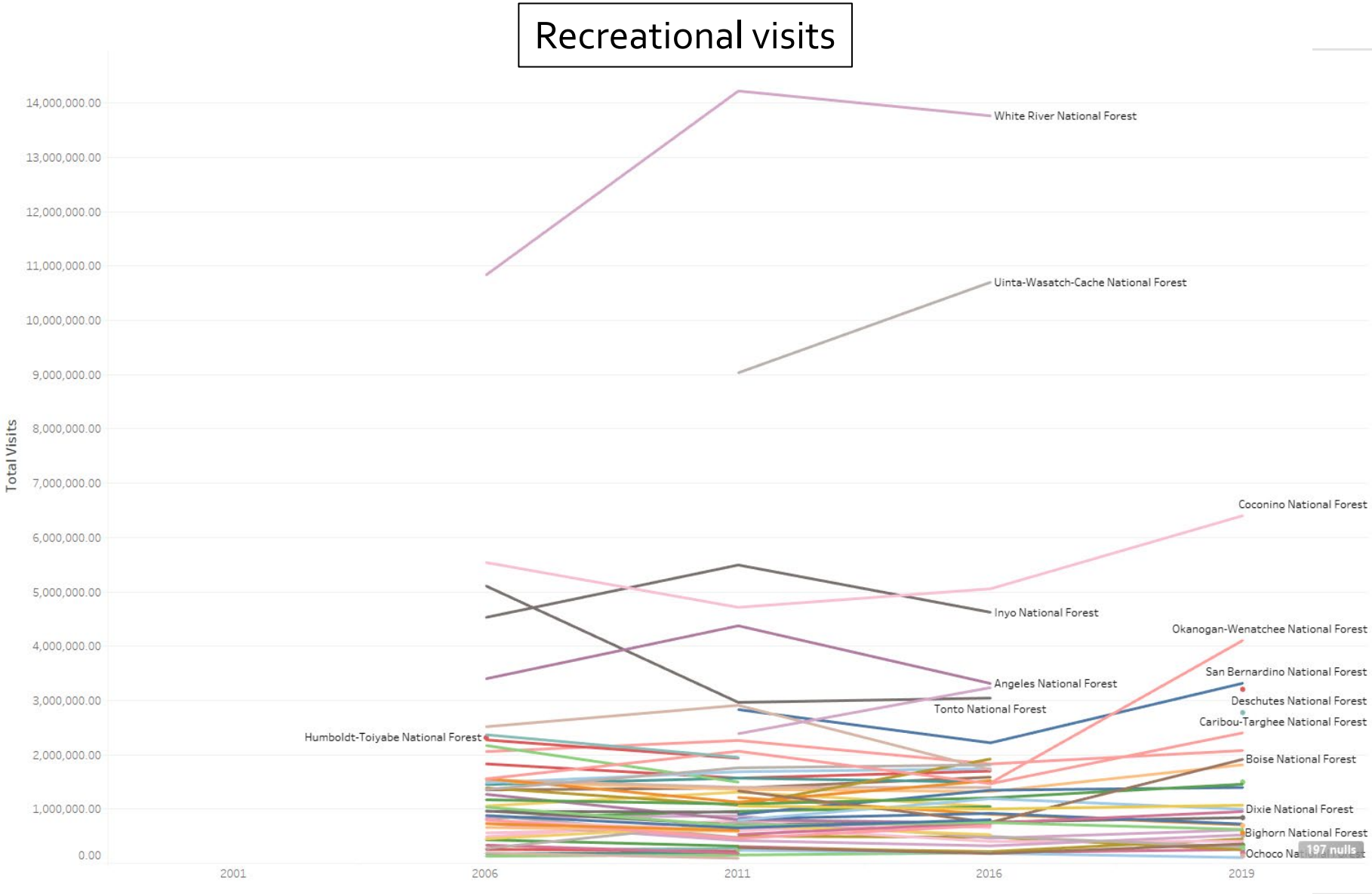

What they can't tell us: How National Forest management decisions influence their condition & use.

Lessons learned

Data challenges:

- Variability in definitions (what is a forest?)
- Aligning data spatially and temporally
- Data gaps

Visualization:

- Important to show data at multiple scales
- Visualization options other than tables are helpful for seeing temporal and spatial trends
- Complexity increases when adding these elements to visualization tools like Tableau

Workflow & reproducibility:

- Data processing and modeling in Python and results table prep in R create inputs to Tableau that can be easily reproduced when datasets are updated or new data are added

Explore the (draft) experimental forest accounts here →

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