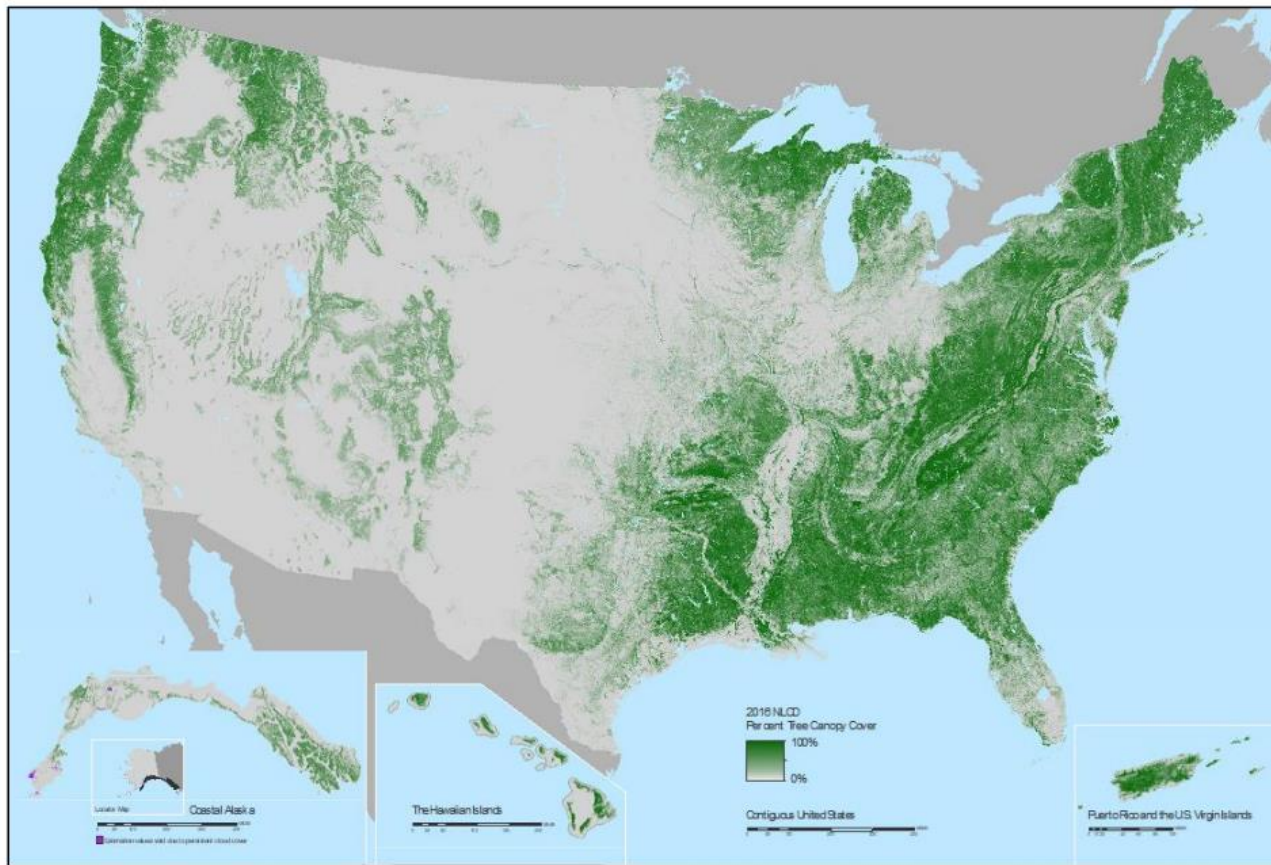




# Earth Observation & Forestry in the United States

**Carl A. Norlen, Ph.D.**  
**[cnorlen@usgs.gov](mailto:cnorlen@usgs.gov)**

# Forest cover varies across the U.S. landscape



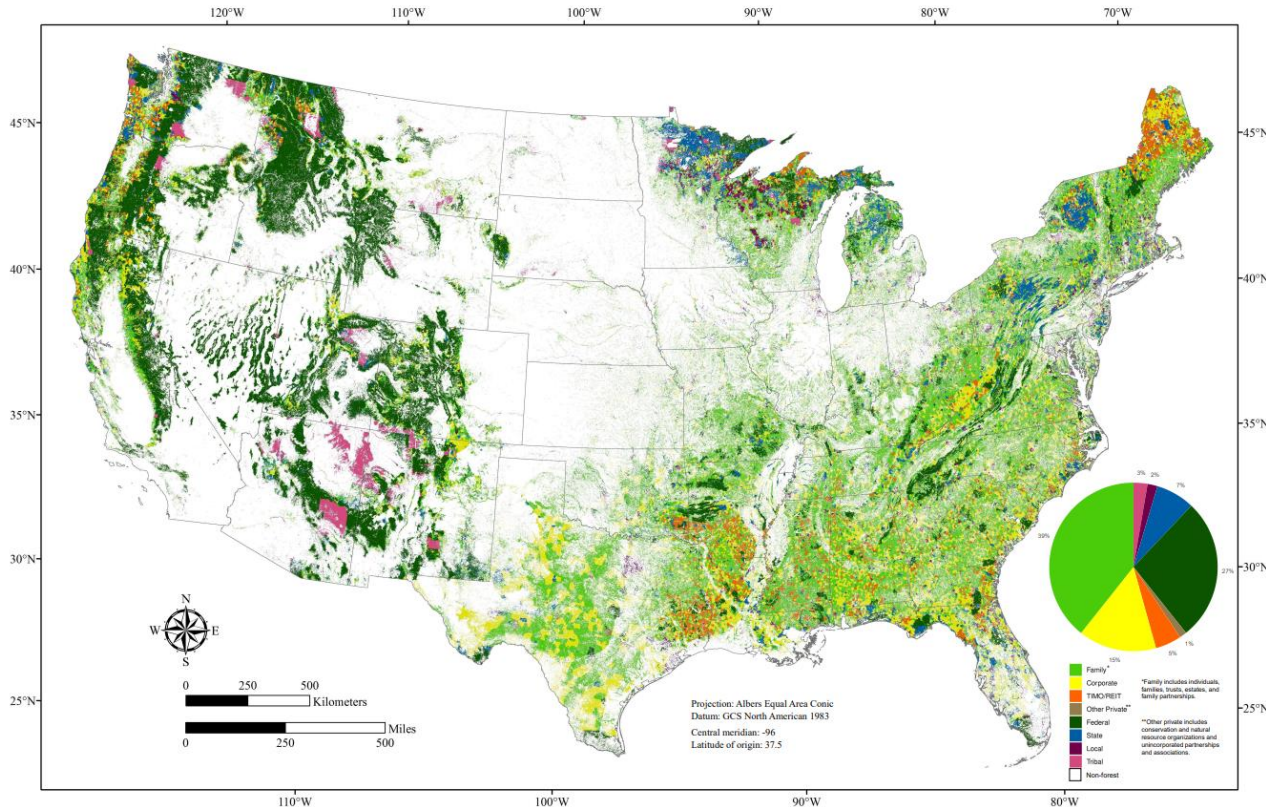
Map of the United States showing the proportion of land that is forested created using Landsat. Credit: [USDA](#)

- **Forest cover varies widely across the U.S.**
- **The eastern and western portions of the U.S. are highly forested**
- **How forests are managed varies widely across the country**

# Forest ownership varies widely across the U.S.

Public Ownership

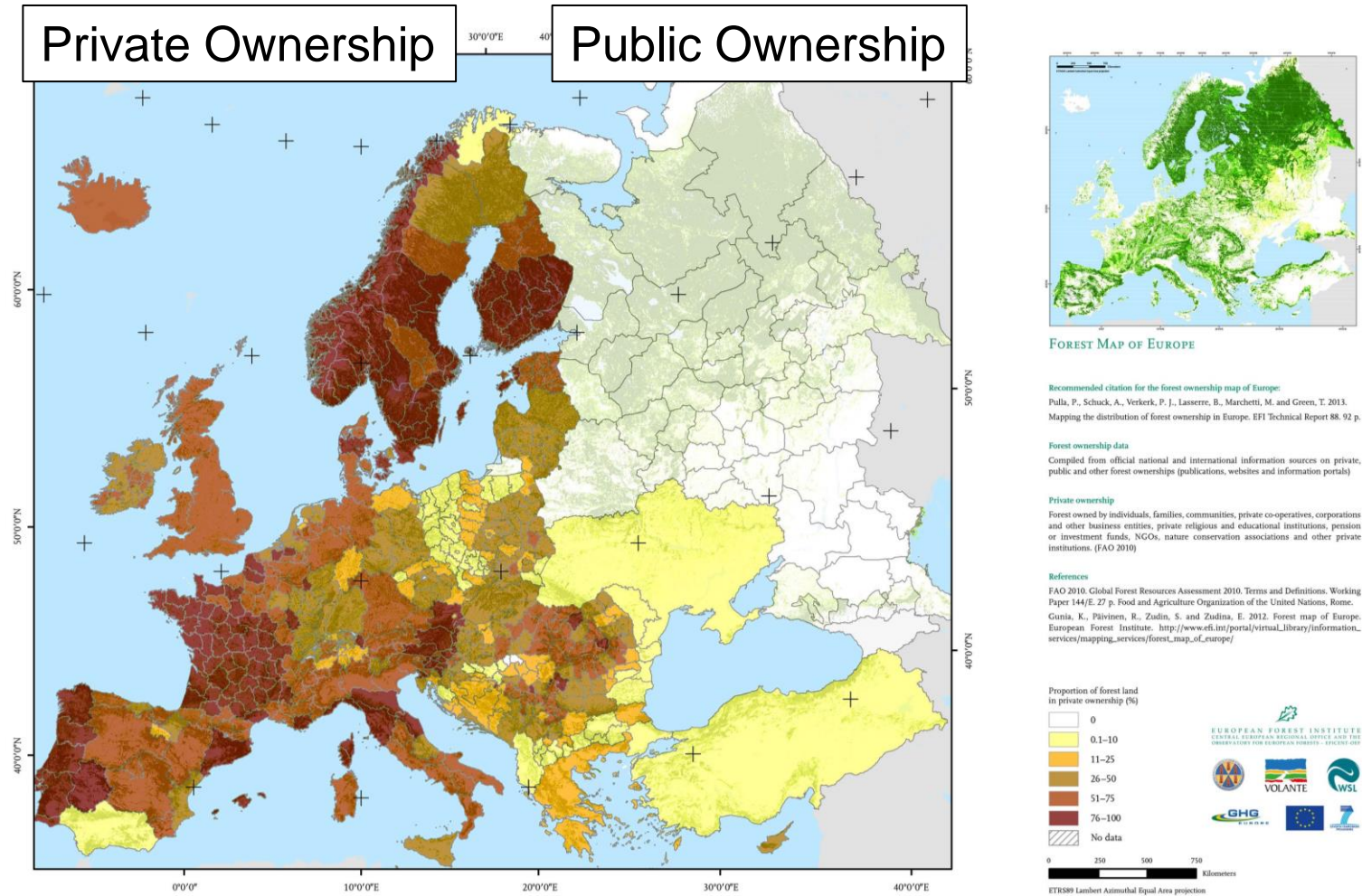
Private Ownership



Forest ownership across the conterminous U.S. Image Source: [USFS](#).

- **Public, private, and tribal (Indigenous)**
- **Public: federal executive (e.g., US Forest Service), state, and local agencies (e.g., cities)**
- **Private: family, corporate, and non-profits (e.g., The Nature Conservancy)**

# Parallels between U.S. and E.U. forest ownership



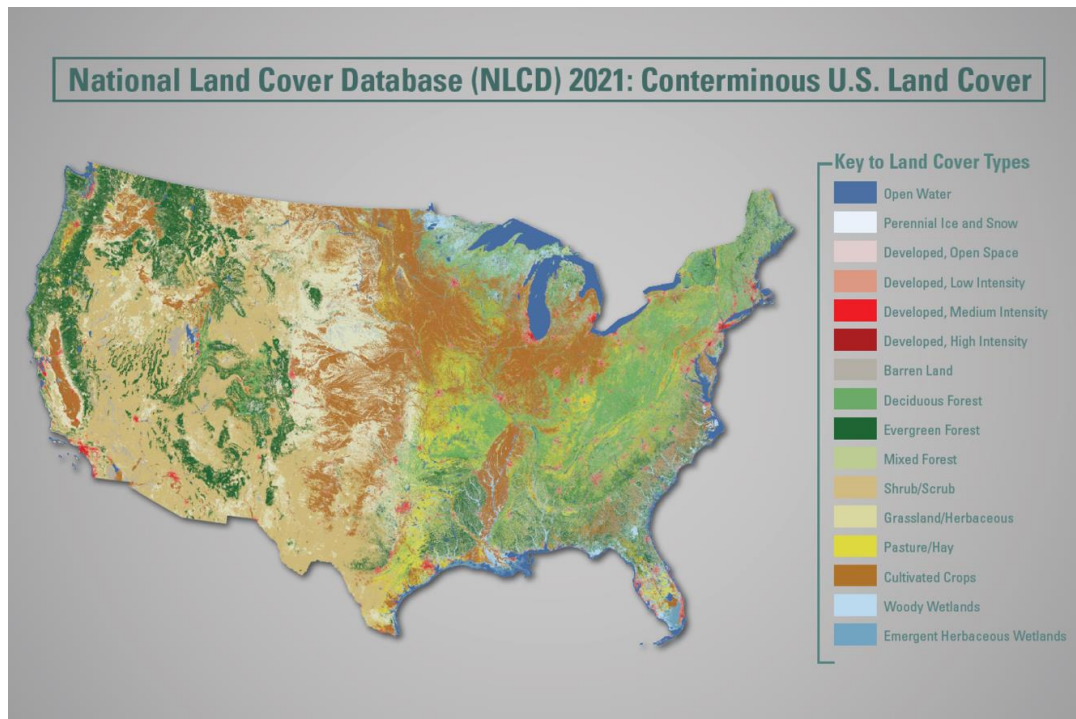
Private forest ownership across the EU. Image Credit: [European Forest Institute](http://www.efi.int/)

- **Implementing the U.S. National Forest Inventory (Landsat)**
- **Wildfire hazard prediction (Landsat) and active wildfire monitoring (Harmonized Landsat Sentinel (HLS), VIIRS)**
- **Prioritizing land management (Landsat, Sentinel-1,2 & Planet)**

# Land Cover for planning national forest inventories (FIA)

The Landsat based National Land Cover Database (NLCD) is widely used in U.S. Forestry

NLCD helps select FIA plot locations



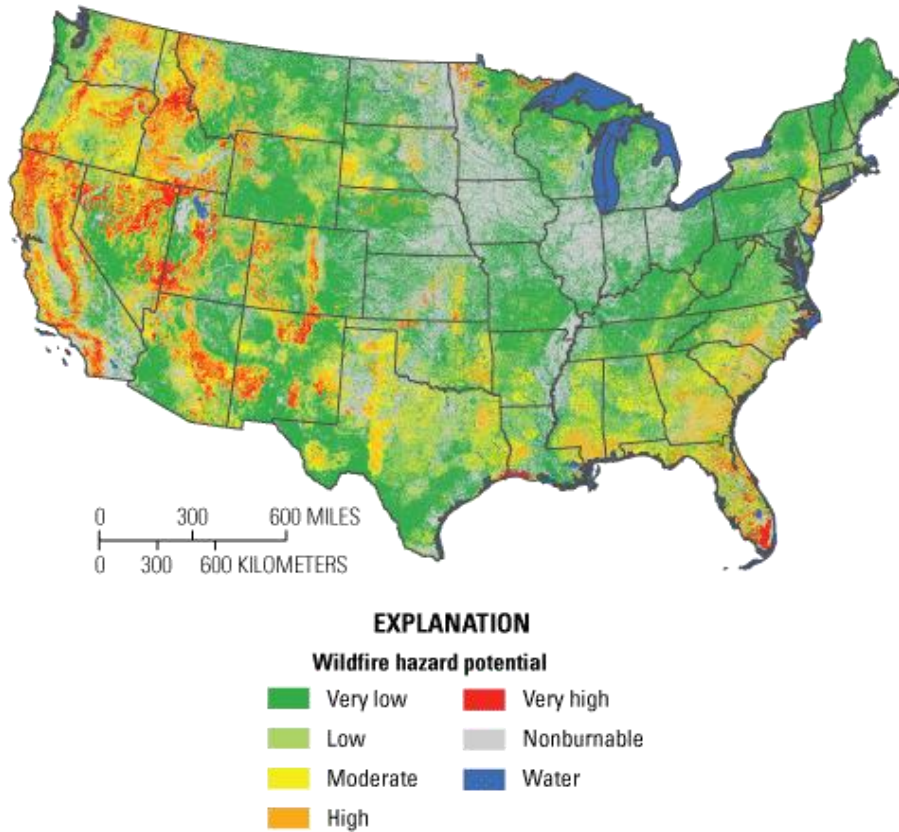
Map of the National Land Cover Database for 2021. Source: [USGS](https://www.usgs.gov/).



A field crew member measures a tree on a Forest Inventory and Analysis plot in Oregon. Source: [USFS](https://www.usfs.gov/).

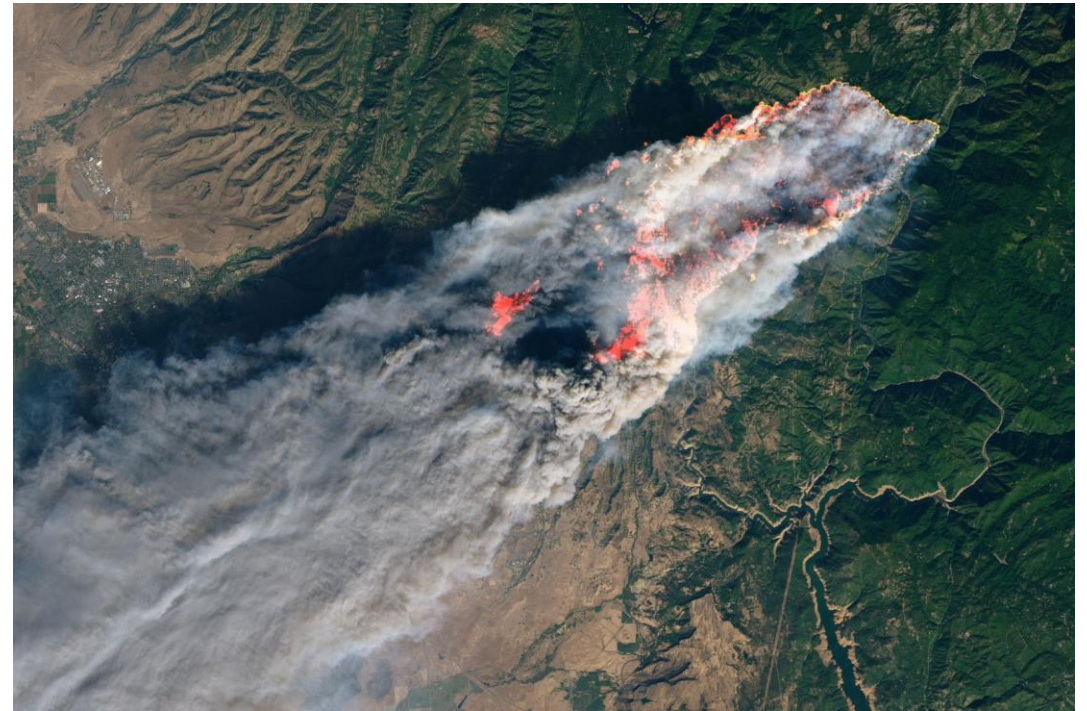
# Wildfire hazard prediction and active fire monitoring

Predicted wildfire hazard with LANDFIRE fuels based on Landsat



Fire hazard based on LANDFIRE fuels mapping with Landsat. Image Credit: [USGS](#)

Actively fire monitoring with Harmonized Landsat Sentinel (HLS) and VIIRS



Active fire monitoring of Camp Fire in California. Image Credit: [NASA](#)

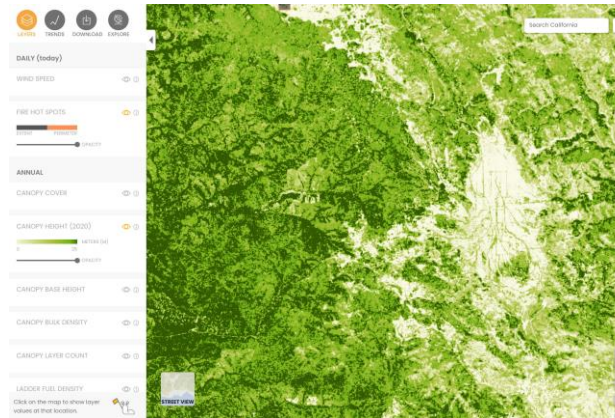
# Quantifying societal benefits to prioritize land management

## Regional Resource Kits for the State of California



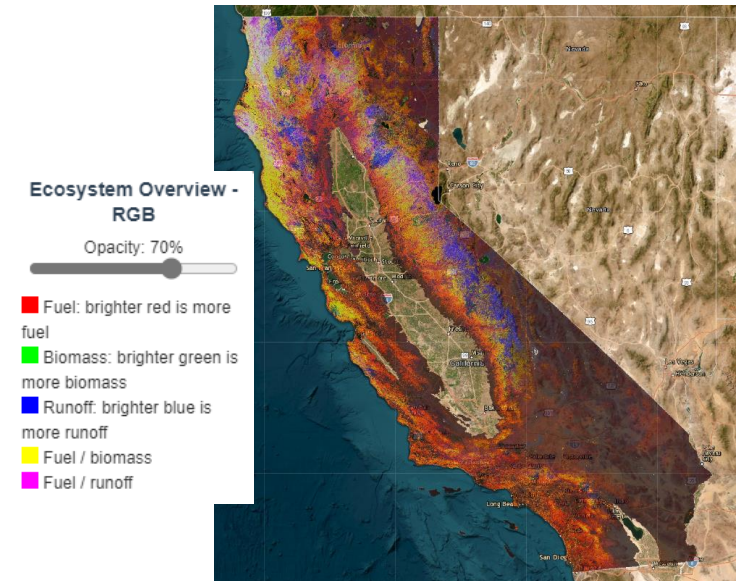
Pillars of resilience for the Sierra Nevada region.  
Image Credit: [Sierra Nevada Conservancy](#)

## Forest Fuels: Sentinel-1,2 & Planet



Forest fuels based on Landsat and Sentinel data.  
Image Credit: [Salo Sciences](#)

## Forest Fuels, Water, Carbon: Landsat & Eddy Covariance



Atlas of landscape properties for California based on Landsat. Image Credit: [CECS](#).

## ➤ **Implementing the U.S. National Forest Inventory (Landsat)**

- ❑ The USFS uses the Landsat based NLCD dataset to implement the U.S. national forest inventory

## ➤ **Wildfire hazard prediction (Landsat) and Active wildfire monitoring (HLS, VIIRS)**

- ❑ LANDFIRE maps of fuels based on Landsat allow prediction of wildfire hazard
- ❑ NASA and USFS track active fires at fine scales (30-meters) with HLS every 2-3 days

## ➤ **Prioritizing land management (Landsat, Sentinel-1,2 & Planet)**

- ❑ Maps of forest properties are used to prioritize forest management to promote societal benefits