Land mis-management and the fisheries crisis: Holding ourselves accountable to our land

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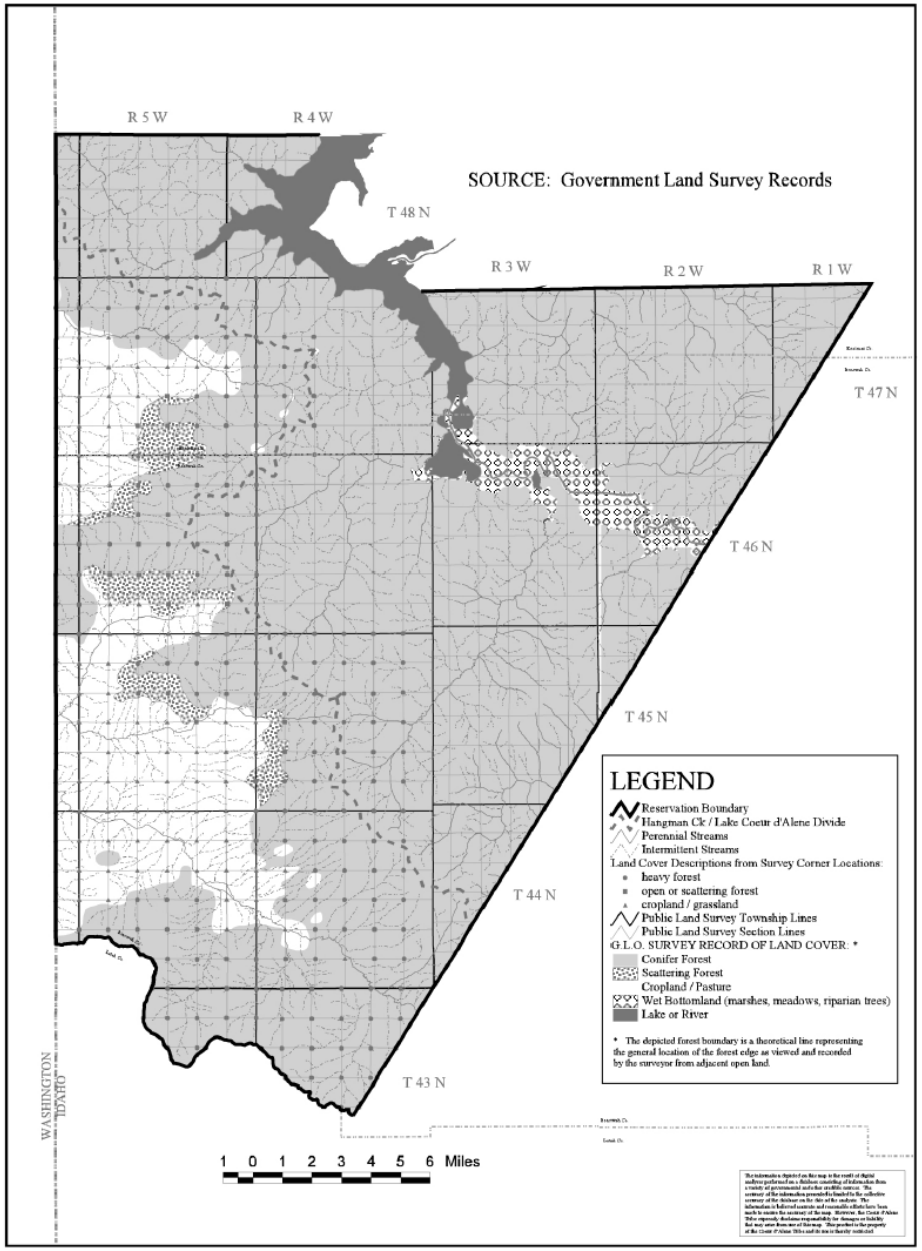
Pre-Contact Forests

- Seasonal calendar
- Fire-dominated
- Ponderosa open stands – fires between 2-25 years
- White pine/cedar/ hemlock were high intensity – 50 to 500 years.
- Mid-19th century, settlers banned tribal fire practices
- Intensive logging and introduction of new diseases changed forest composition

Pre-Contact Palouse Prairie

- Supported multiple Indigenous communities for more than 12,000 years, providing camas, bitterroot, and dozens of culturally significant medicinal and food plants.
- 10% of Palouse has no topsoil; 60% of the area has lost 25-75% of its topsoil (Duffin, 2003)
- A century of conventional tillage has resulted in a loss of 79% of particulate organic carbon and 56% of soil organic carbon (Purkayastha, Huggins, & Smith, 2008)
- Critically endangered ecosystem, with loss of >98% of its biodiversity (Davis, 2019)

Locations of Forest Land and Agricultural/Grasslands in 1906



Coeur d'Alene Tribe Historical Atlas. Environmental Action Plan Project. J. Bottelli, CdA Tribe GIS, 12/4/98 (corners1905.apr)

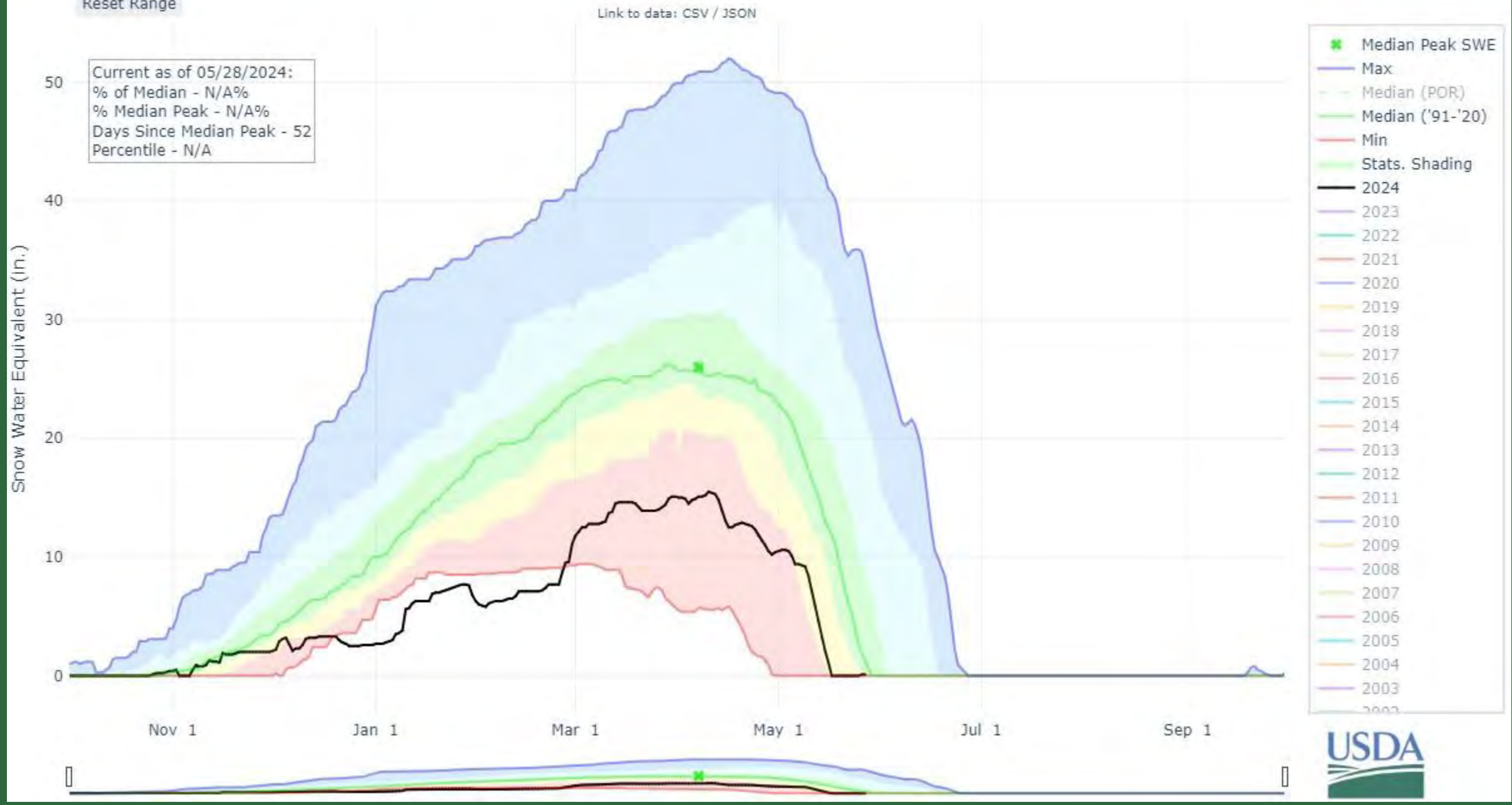
“A history of insults” (Beechie, et al. 2013)

- Extirpation of salmon from Spokane River system; near extirpation of cutthroat and bull trout
- Ongoing damages from water impoundment, legacy mining and nutrient loading into Coeur d’Alene Lake
- Intensive logging and land use conversion
- Palouse topsoil loss

Current state of climate and forest practices

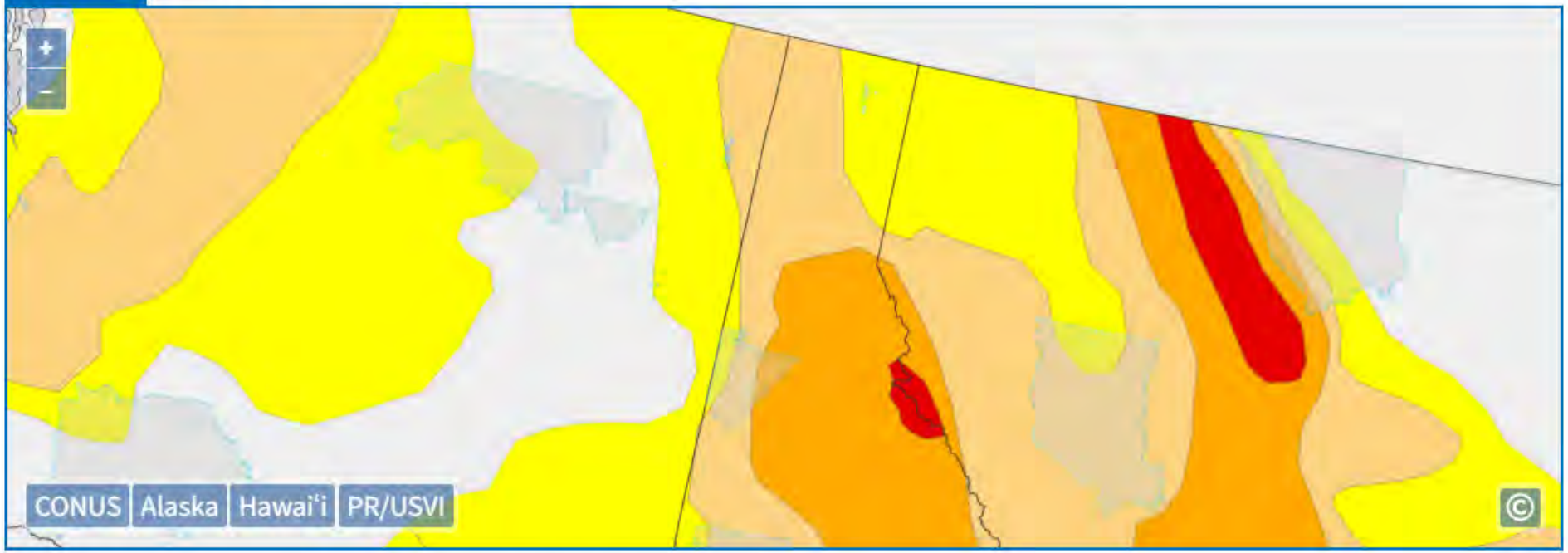
- US net GHG emissions would have to decline by more than 6% per year, reaching net-zero emissions around midcentury, to meet current mitigation targets & temperature goals; US GHG emissions decreased by less than 1% per year between 2005 and 2019. (5th National Climate Assessment, 2023)
- Deforestation and forest degradation = 26% of anthropogenic contribution to atmospheric CO_2 since 1870. (Watson et al., 2018)
- PNW: temps have increased 0.86°C since first half of 1900s; expected to rise between 2.0 and 2.6°C by 2050s.
- Projected forest Impacts include:
  - Ecosystem productivity
  - Carbon storage
  - Soil moisture
  - Wildfire frequency and size
  - Susceptibility of forests to insect and diseases (Case, Johnson, Bartowitz, & Hudiburg, 2021).
- Concern of "landscape trap" – a cascade of damage where repeated injuries (logging, fire risk, invasive impacts) lead to perpetual early successional states. (Watson et al, 2018)

LOOKOUT, ID (594) SNOW WATER EQUIVALENT



Drought Conditions for Tribal Nations

Current | Last Week | Last Month



The U.S. Drought Monitor depicts the location and intensity of drought across the country. The map uses 5 classifications: Abnormally Dry (D0), showing areas that may be going into or are coming out of drought, and four levels of drought (D1–D4).

This map shows U.S. Drought Monitor drought designations alongside tribal nation boundaries, according to U.S. Census Bureau legal boundary data.

Source(s): U.S. Census Bureau, U.S. Drought Monitor

Legend —

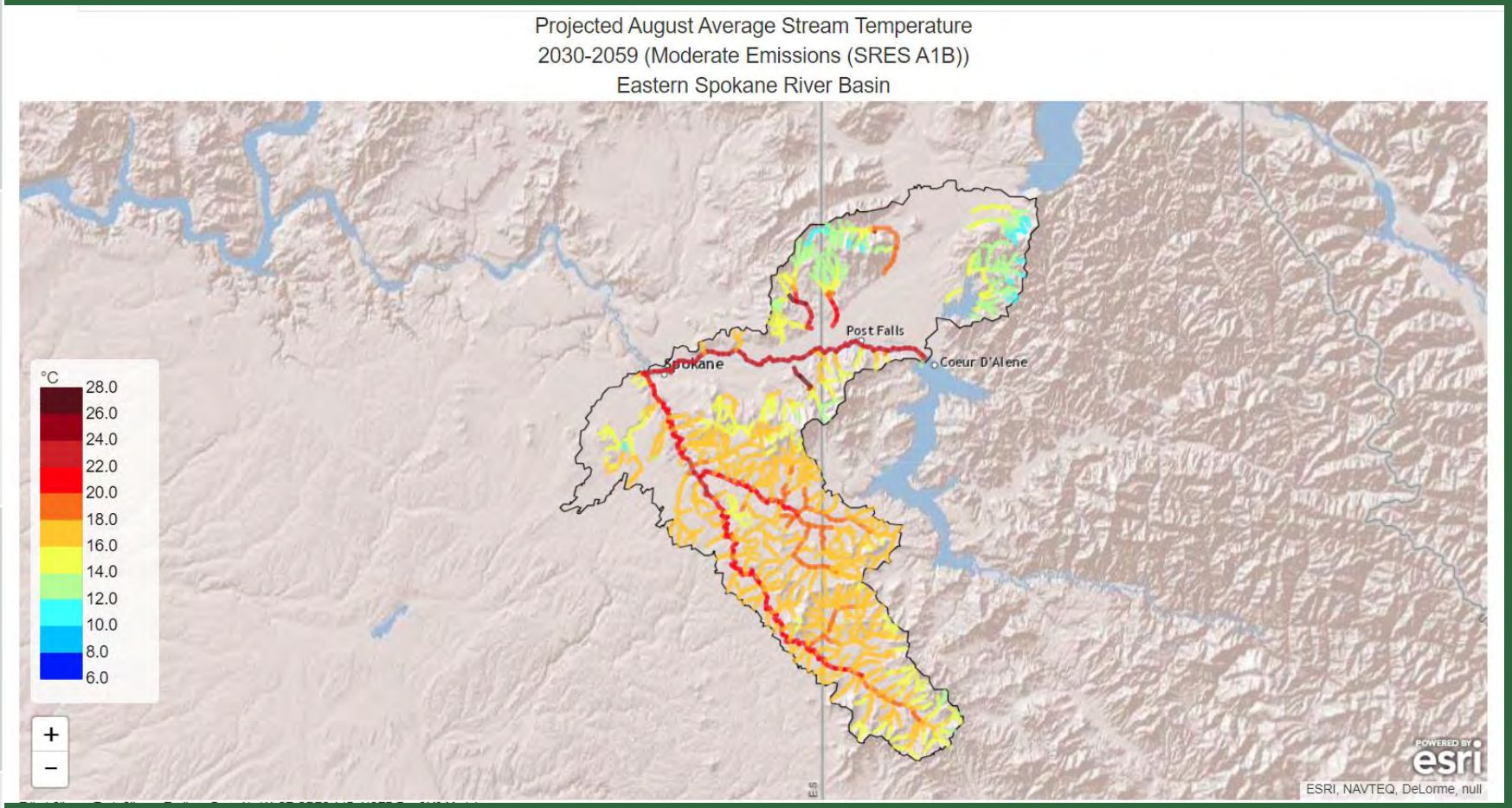
U.S. Drought Monitor

D0 D1 D2 D3 D4

Tribal Nations

Tribal Nation Boundaries

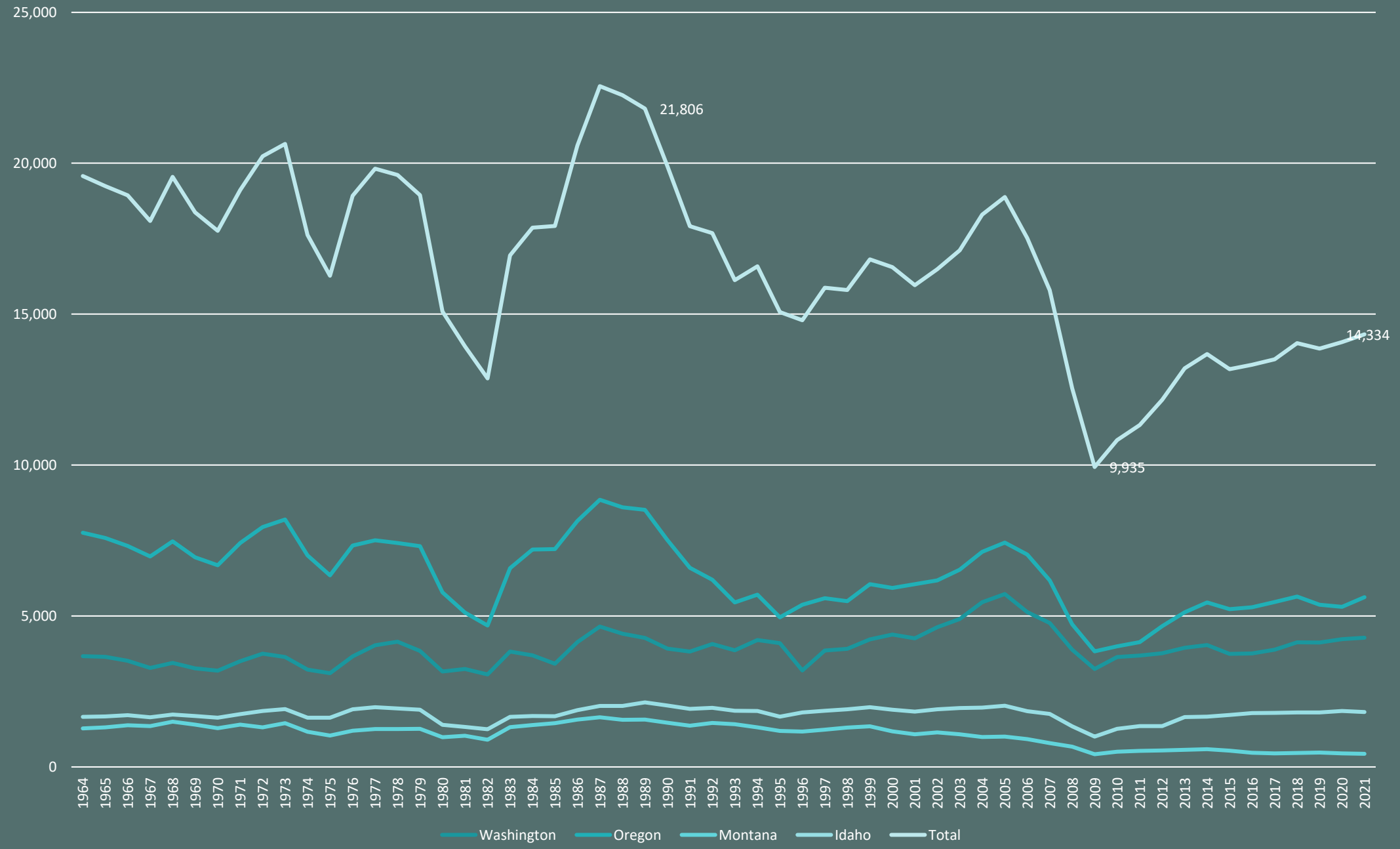
Life stage	Chinook	Steelhead
Adult migration – Lethal threshold	22°C	22 °C (thermal blockage)
Adult holding and spawning – optimal threshold	14.5°C	12.8°C
Incubation and early fry developme nt	14.5°C	19°C
Juvenile rearing – optimal threshold	14.8°C	19°C



Beechie et al., 2013

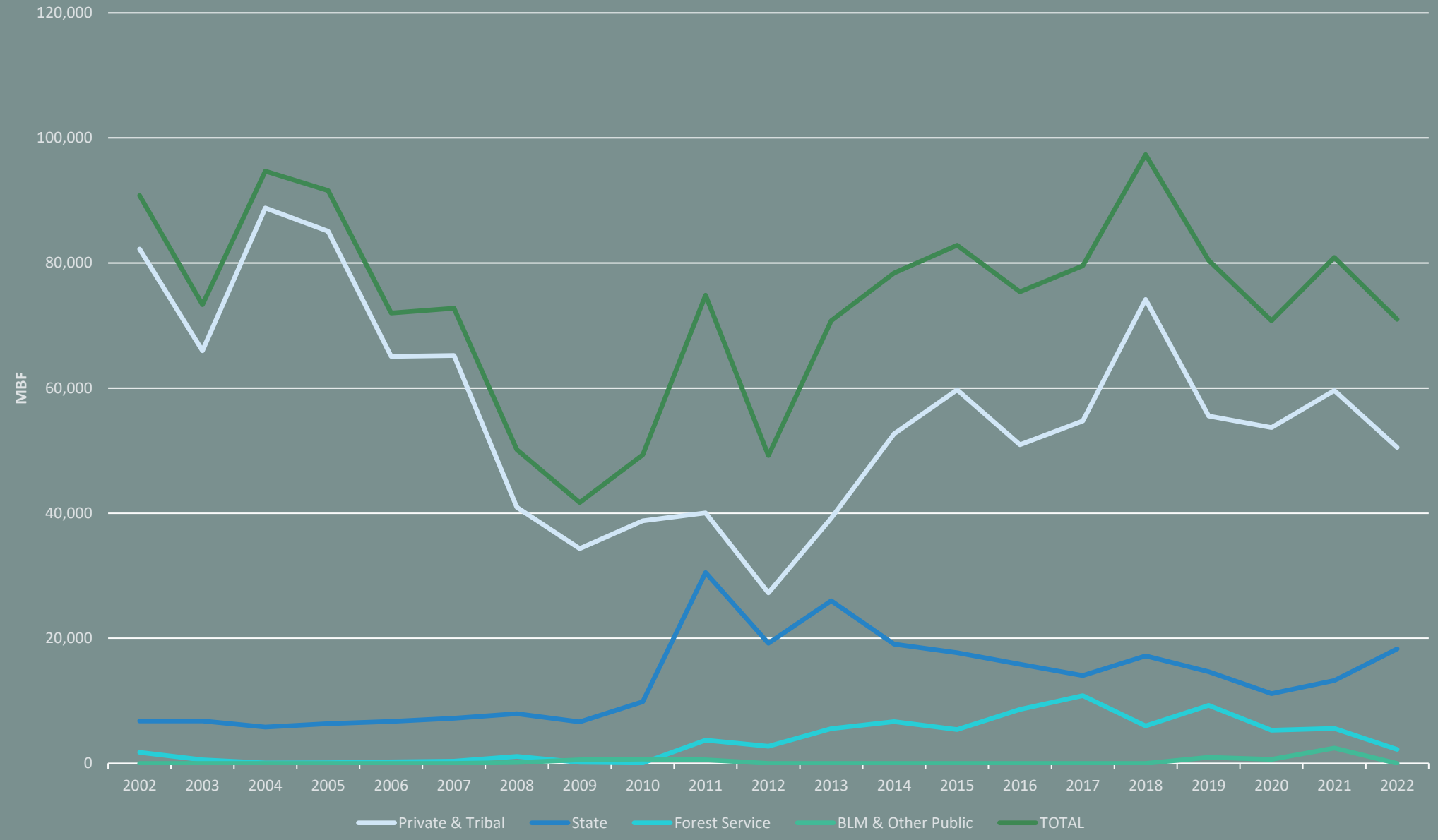
Lumber Production in NW States, 1964-2021 (million board feet)

(source: USFS PNW Research Station)

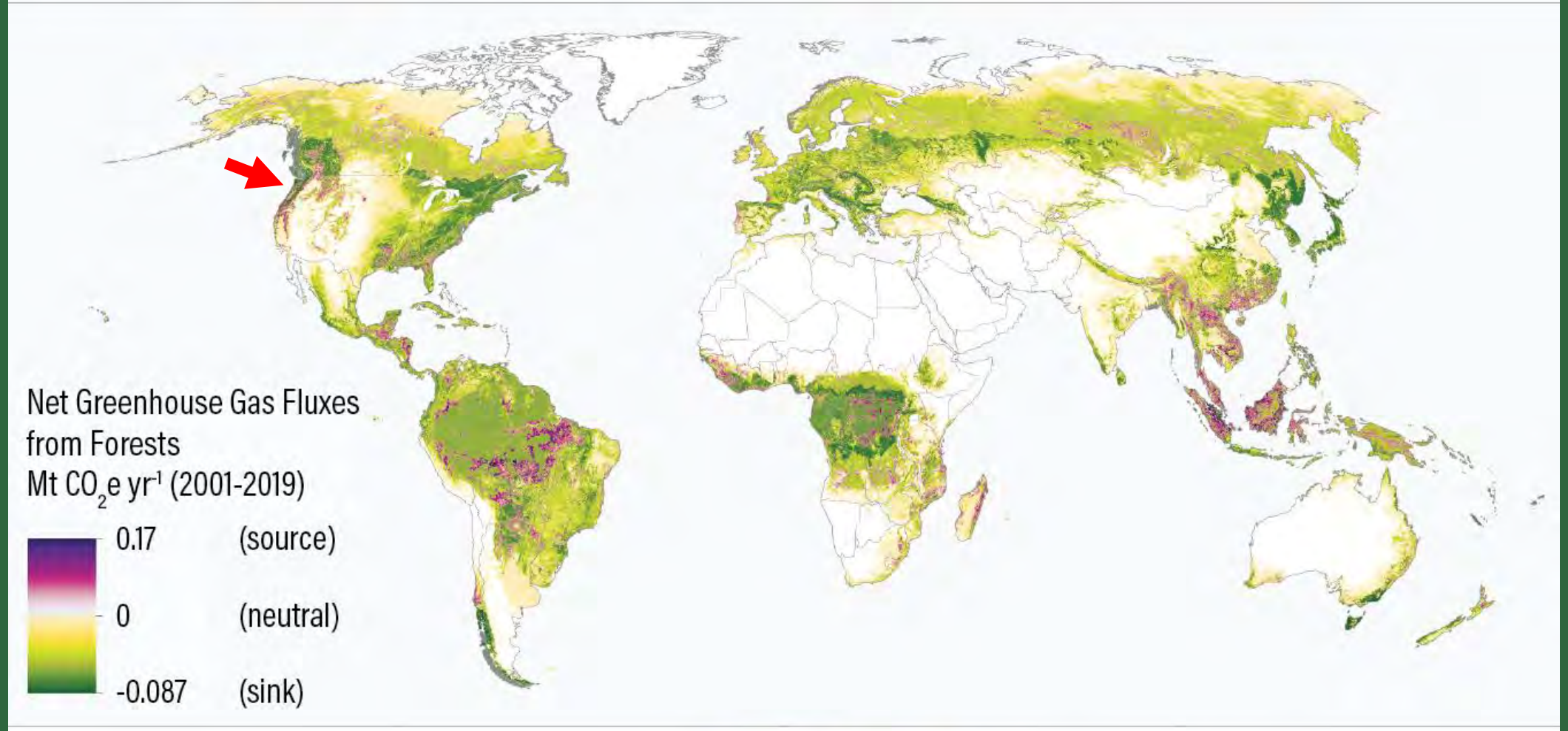


Timber Harvest for Kootenai County, 2002 -2022

(University of Montana, Bureau of Business and Economic Research)



Forests: Carbon Sinks or Carbon Sources?



Source: Harris et al. 2021

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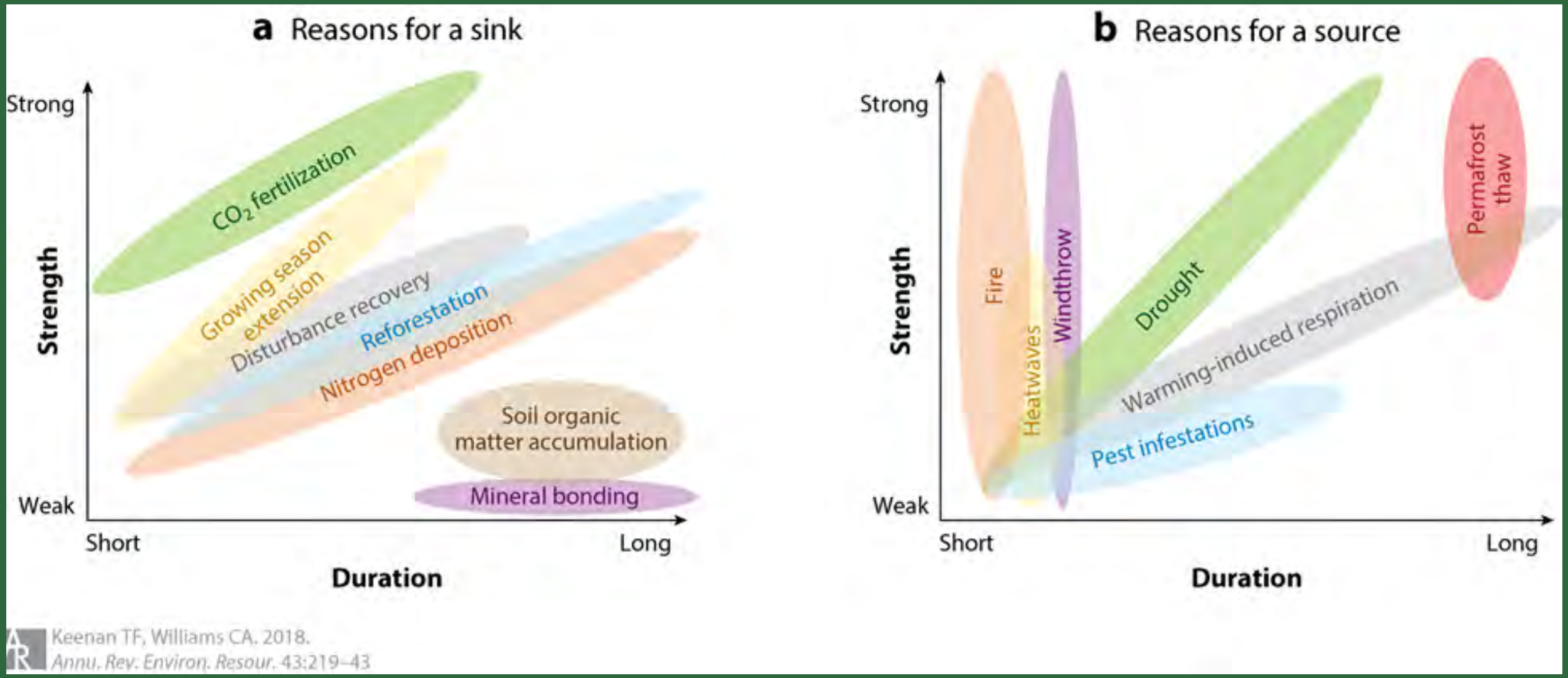
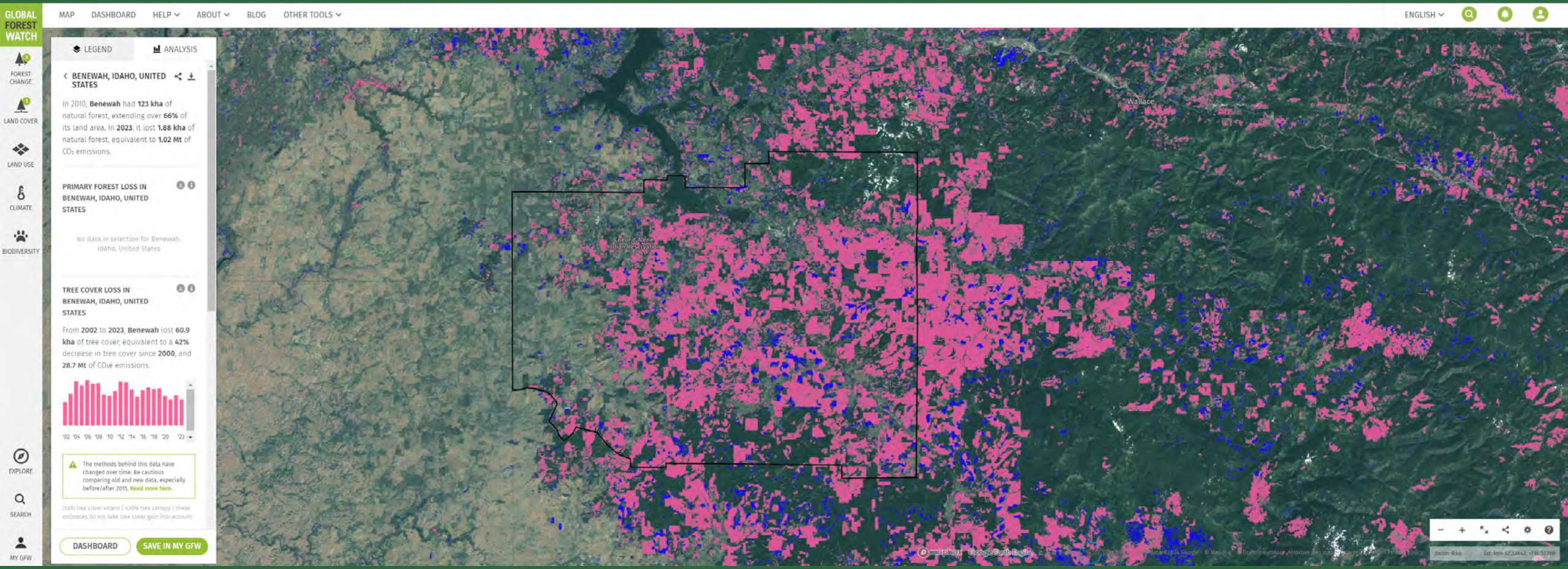
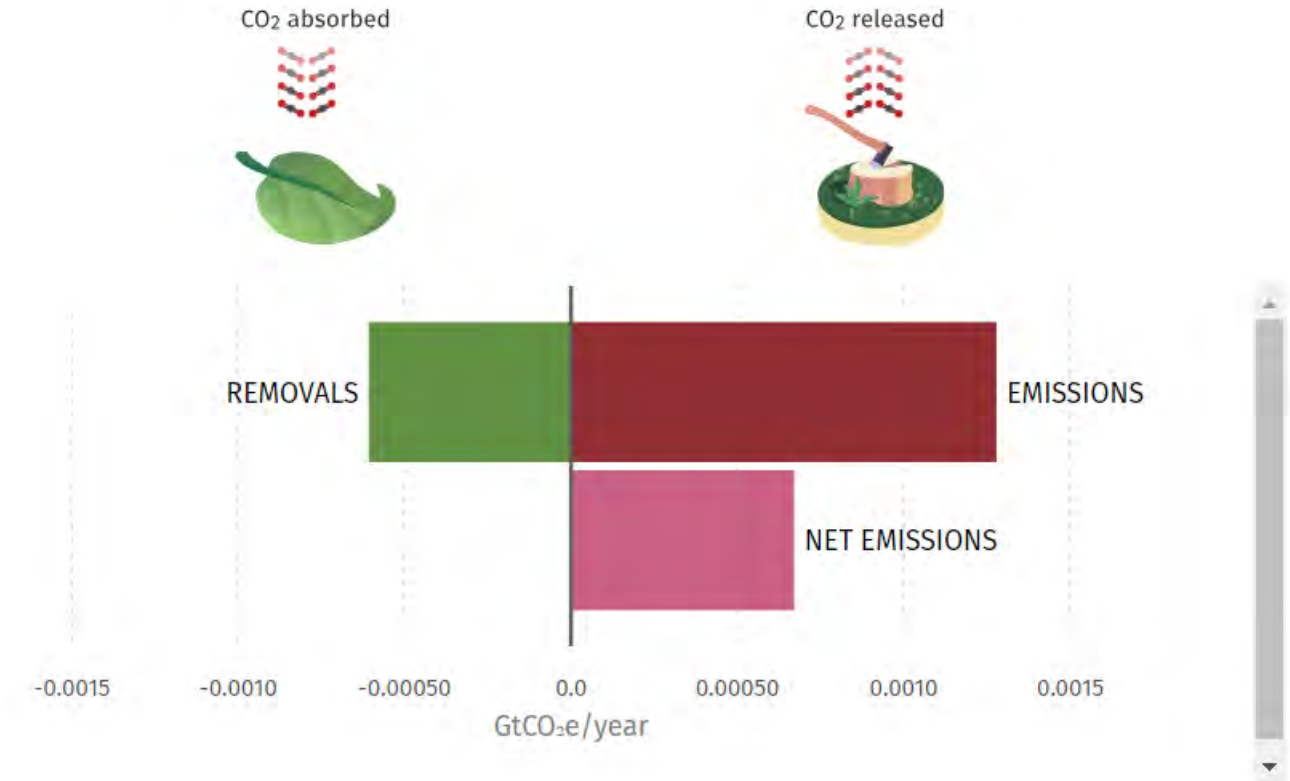


Keenan TF, Williams CA. 2018.
Annu. Rev. Environ. Resour. 43:219–43

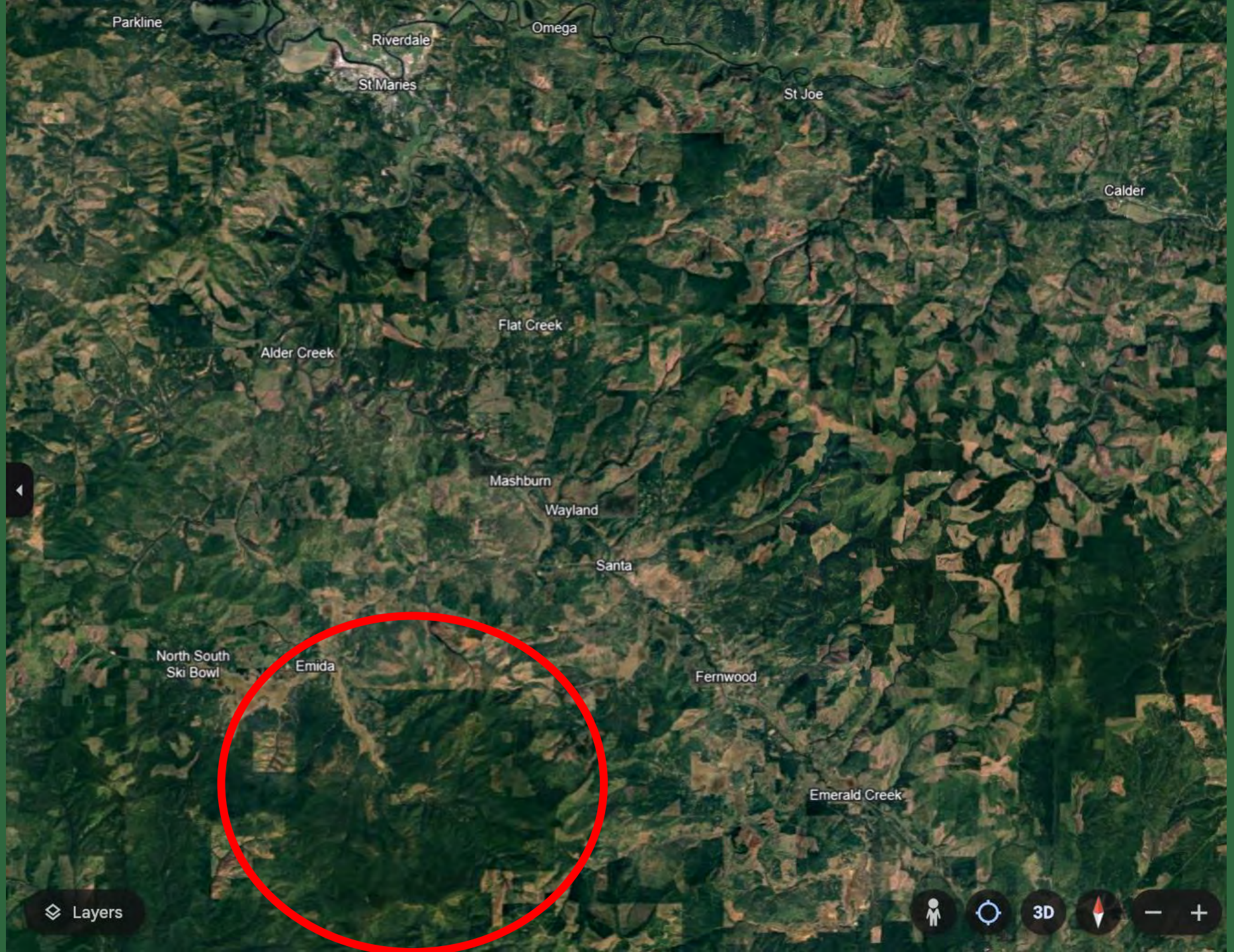

GLOBAL FOREST WATCH
MAP
DASHBOARD
HELP
ABOUT
BLOG
OTHER TOOLS
ENGLISH
FOREST CHANGE
LAND COVER
LAND USE
CLIMATE
BIODIVERSITY
EXPLORE
SEARCH
MY GFW
LEGEND
ANALYSIS
BENEWAH, IDAHO, UNITED STATES
In 2010, Benewah had 123 kha of natural forest, extending over 66% of its land area. In 2023, it lost 1.88 kha of natural forest, equivalent to 1.02 Mt of CO₂ emissions.
PRIMARY FOREST LOSS IN BENEWAH, IDAHO, UNITED STATES
No data in selection for Benewah, Idaho, United States
TREE COVER LOSS IN BENEWAH, IDAHO, UNITED STATES
From 2002 to 2023, Benewah lost 60.9 kha of tree cover, equivalent to a 42% decrease in tree cover since 2000, and 28.7 Mt of CO₂e emissions.
'02 '04 '06 '08 '10 '12 '14 '16 '18 '20 '23
The methods behind this data have changed over time. Be cautious comparing old and new data, especially before/after 2015. Read more here.
2000 tree cover extent | >30% tree canopy | these estimates do not take tree cover gain into account.
DASHBOARD
SAVE IN MY GFW
Wallace
Coeur d'Alene Indian Reservation

FOREST-RELATED GREENHOUSE GAS FLUXES IN BENEWAH, IDAHO, UNITED STATES

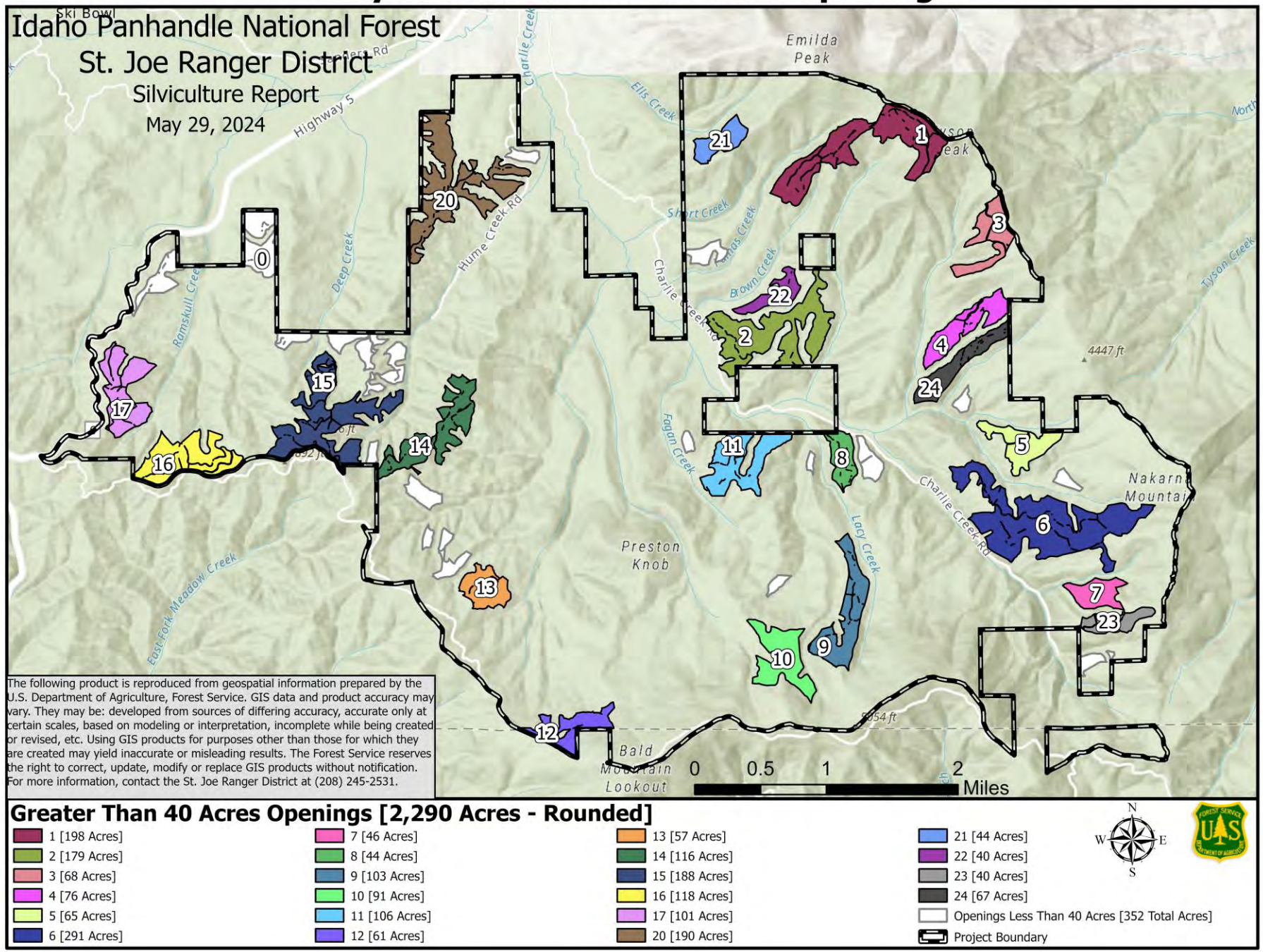
Between **2001** and **2023**, forests in **Benewah** emitted **1.28 $MtCO_2e$/year**, and removed **-608 $ktCO_2e$/year**. This represents a **net carbon source** of **671 $ktCO_2e$/year**.



>30% tree canopy and tree cover gain


Parkline
Riverdale
Omega
St Maries
St Joe
Calder
Flat Creek
Alder Creek
Mashburn
Wayland
Santa
North South
Ski Bowl
Emida
Fernwood
Emerald Creek
Layers
3D

Lacy Lemoosh Over 40 Acre Openings



Top 10 countries for global tree cover loss, 2001-2023[1]

Country	Tree cover loss, 2001-23 (million hectares)	Tree cover extent, 2000 (million hectares)	Percentage of loss likely to be permanent, 2001-23
Russia	83.7	761.2	0
Brazil	68.9	519.2	71
Canada	57.5	418.1	0
United States	47.9	279.4	5
Indonesia	30.8	160.6	86
Democratic Republic of the Congo	19.7	199.3	35
China	12.1	162.7	1
Malaysia	9.2	29.4	80
Australia	9	42.3	3
Bolivia	8	64.5	86

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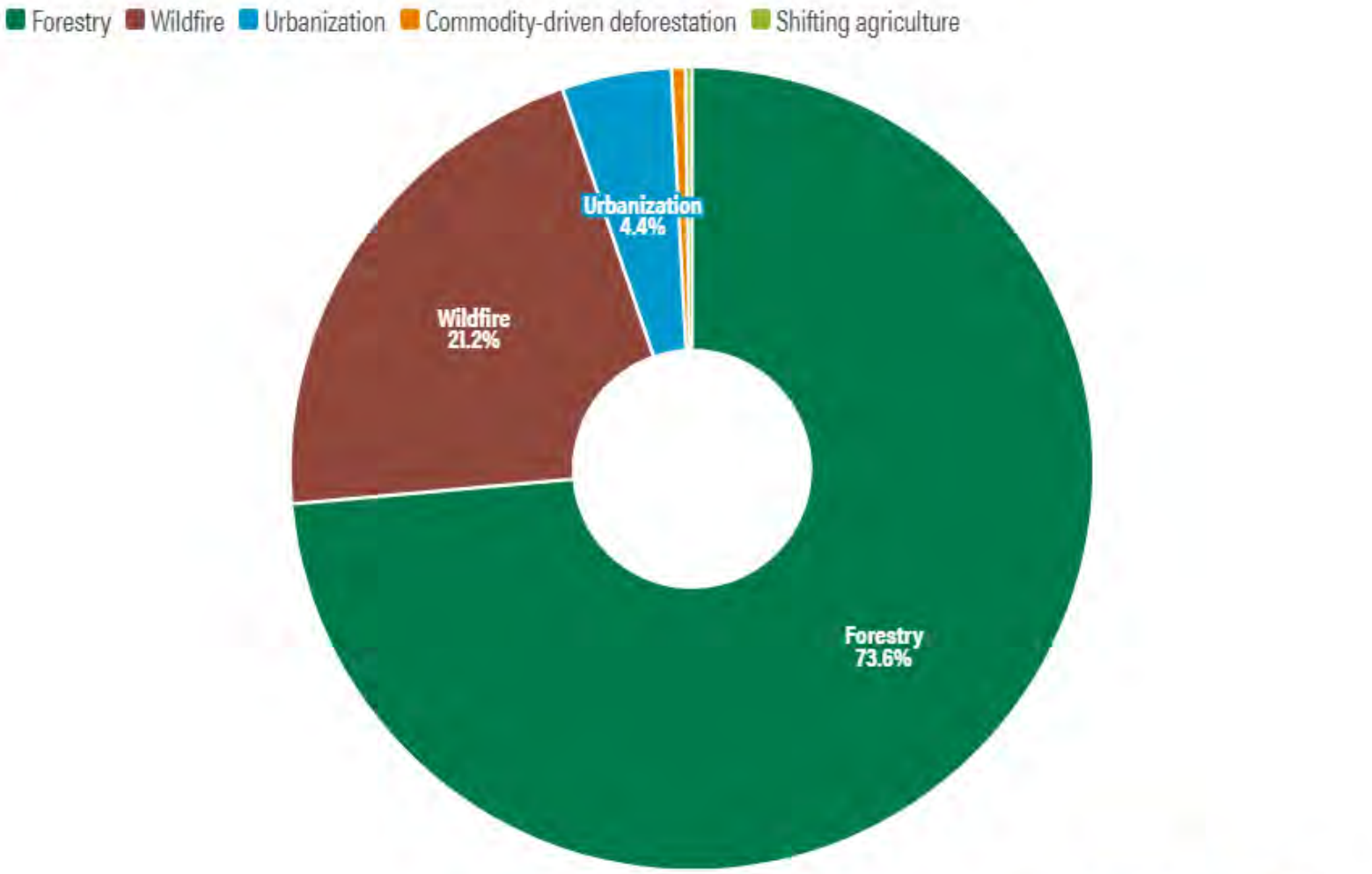
Dominant drivers of tree cover loss in the United States, 2001-2023



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What are our assumptions about what makes climate resilient landscapes?

- IRA Sec 23003 – $700 million for the Forest Legacy Program for the acquisition of land and interest in lands
- USDA: “In FY23, over $188 million in funding awarded to 35 projects to conserve more than 245,000 acres of environmentally and economically important private forestlands… [ensuring] that working forests that are vital to the fabric of local economies remain working forests, and adavance the most critical conservation issues facing our nation’s forests, including protecting watersheds, mitigating wildfire risk, conserving habitat for at-risk species, and mitigating climate change.”

How do we define the health of our landscape?

- Idaho Department of Lands: – “A measure of the robustness of forest ecosystems. Aspects of forest health include biological diversity; soil, air, and water productivity; natural disturbances; and **the capacity of the forest to provide a sustained flow of goods and services for people.”**
- Washington Forest health is defined in state statute as “the condition of a forest being sound in ecological function, sustainable, resilient, and resistant to insects, diseases, fire and other disturbance, and **having the capacity to meet landowner objectives”** (RCW 76.06)
- What do our current regulatory frameworks protect?

Questions we need to ask

- Where do we have intact ecosystems that should be protected?
- What don’t we know that we need to better understand?
  - Changes in carbon with changes in species composition
  - Above-ground v. below ground carbon
  - Seedling recovery
  - Soil moisture projections
  - Changes in hydrology
- How do we assess economic benefits?
- Whose values are being represented?

Resilience is “the ability of a system to absorb change and still maintain its basic ecosystem functions and relationships, even though the balance of habitat types or species may shift slowly through time.” (Beechie, et al. 2013)

Two questions for any ecosystem adaptation strategy:

1) Does climate change alter restoration needs in the future?

2) Can restoration actions increase ecosystem resilience by reducing climate change effects or increasing habitat diversity?

- Requires data on environmental effects of climate change, and need to evaluate potential actions impacts under future climate scenarios.

Are we planning for resilience?

- Carbon storage
- Water
- Fire
- Biodiversity - Above and below-ground

What's the Coeur d'Alene Tribe doing?

- Moratorium on timber sales on Tribal lands
- Biochar production: UI Climate Smart Ag
- Water Resources conducting a nutrient source tracking study in the St. Joe River watershed and southern CDA Lake tributaries to begin to assess where nutrients are originating.
- Partnerships with University of Idaho, UBC faculty to assess carbon fluxes, nutrient status, and climate impacts on Tribal forest soils and in Hangman drainage

Business as usual?

Or a restorative future?

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