



University of Idaho

College of Natural Resources

IS IDAHO'S FOREST STORING CARBON?

Greg Latta

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875 Perimeter Drive MS 1134, Moscow, ID 83844-1134

*Presented to: Idaho Committee on Federalism
September 25, 2024*

3 THINGS I WANT TO ADDRESS



I Forests of Idaho

I How those forests are changing

I Policy context

But first, one quick thing on the title.

- Storing can be **PASSIVE** (*there is carbon in a tree*)
- or **ACTIVE** (*when a tree grows it adds carbon into the tree*)

I will focus on the **ACTIVE** context (*which is the only one that matters*)

IS IDAHO'S FOREST STORING CARBON?

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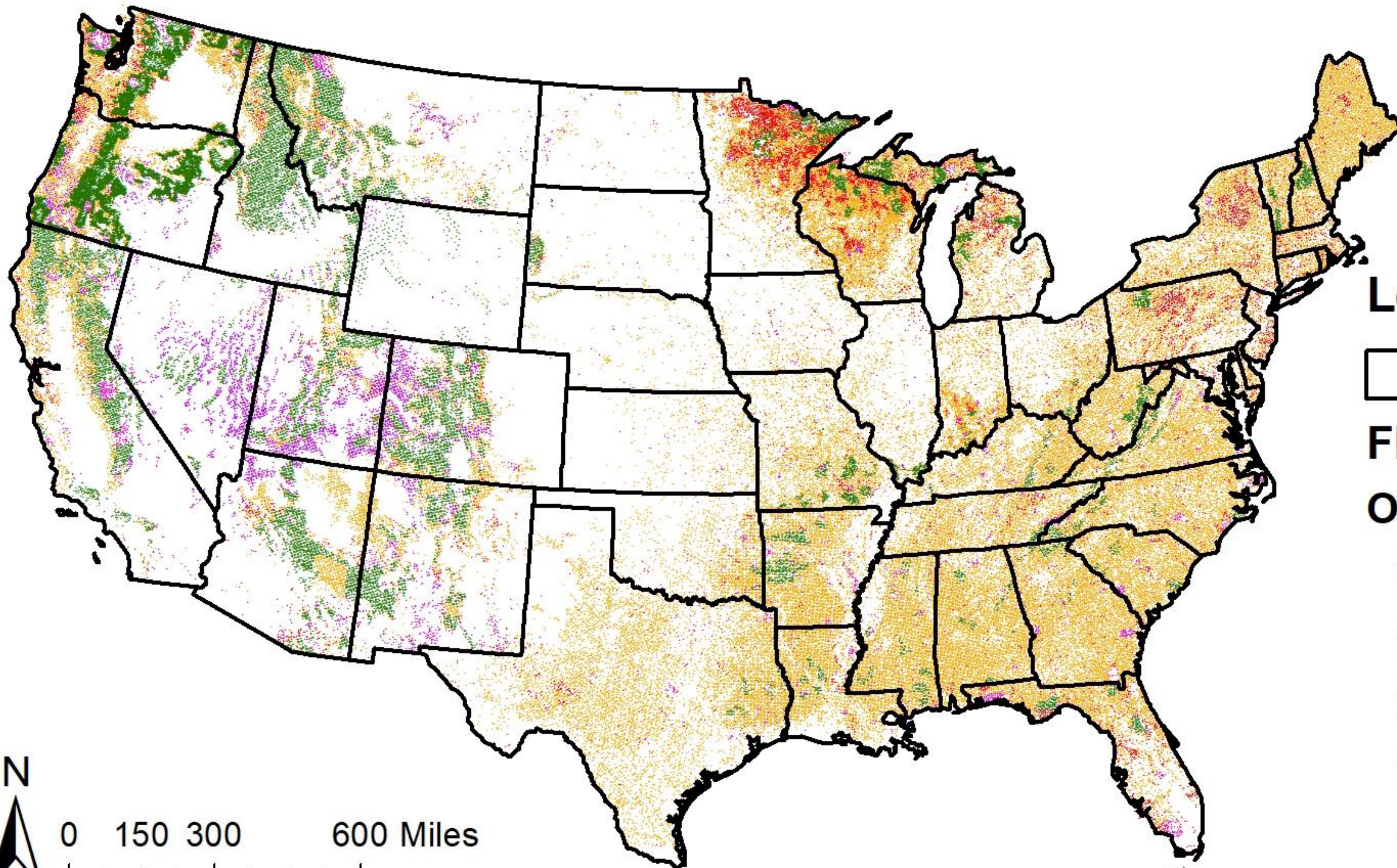
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FORESTS OF THE UNITED STATES



Forest Land Extent and Ownership



Owner	Million Acres	Percentage
BLM	31	5%
Ofederal	19	3%
Private	427	64%
State	57	8%
USFS	135	20%
Total	670	

Legend

State

FIA Plots

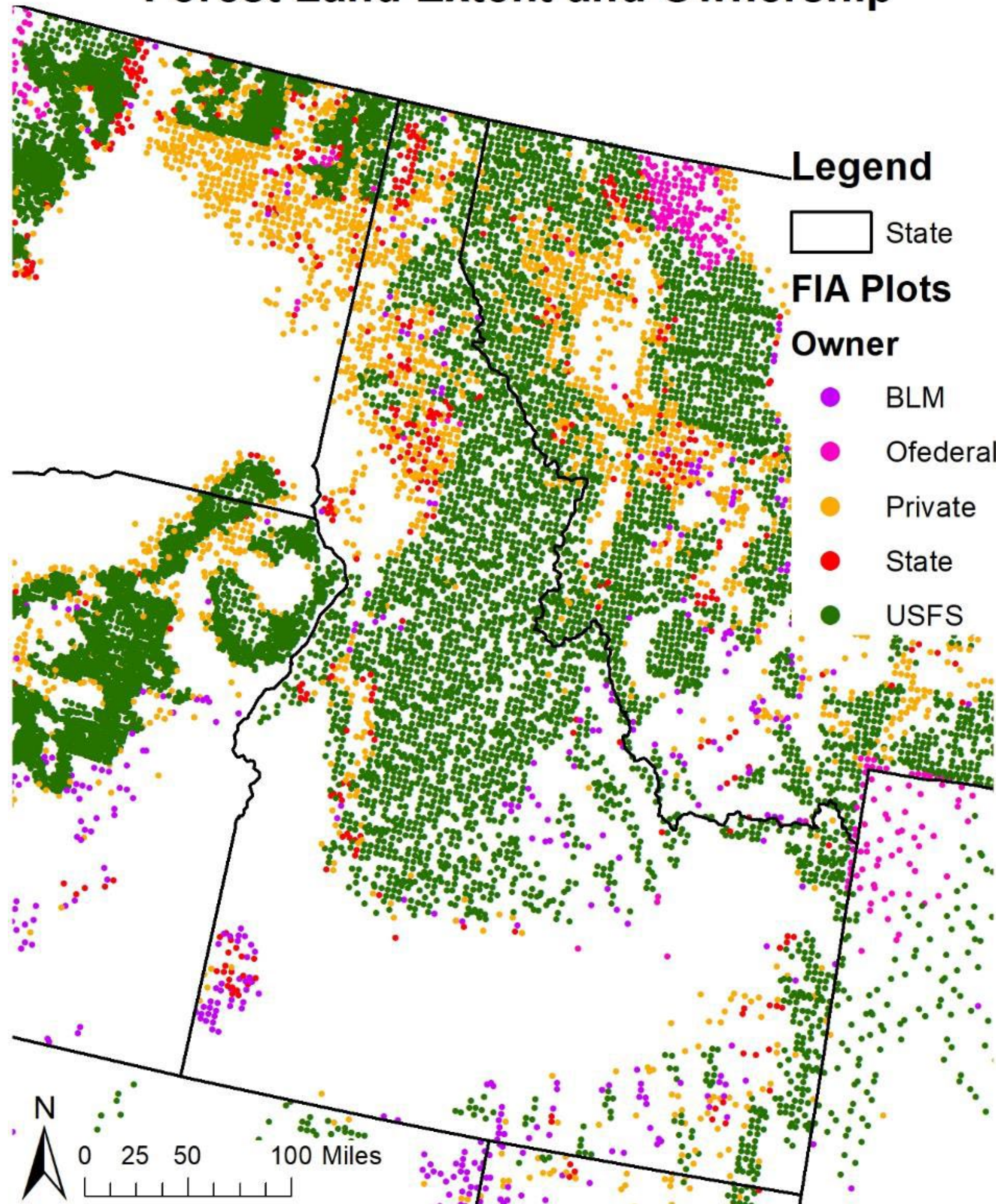
Owner

- BLM
- Ofederal
- Private
- State
- USFS

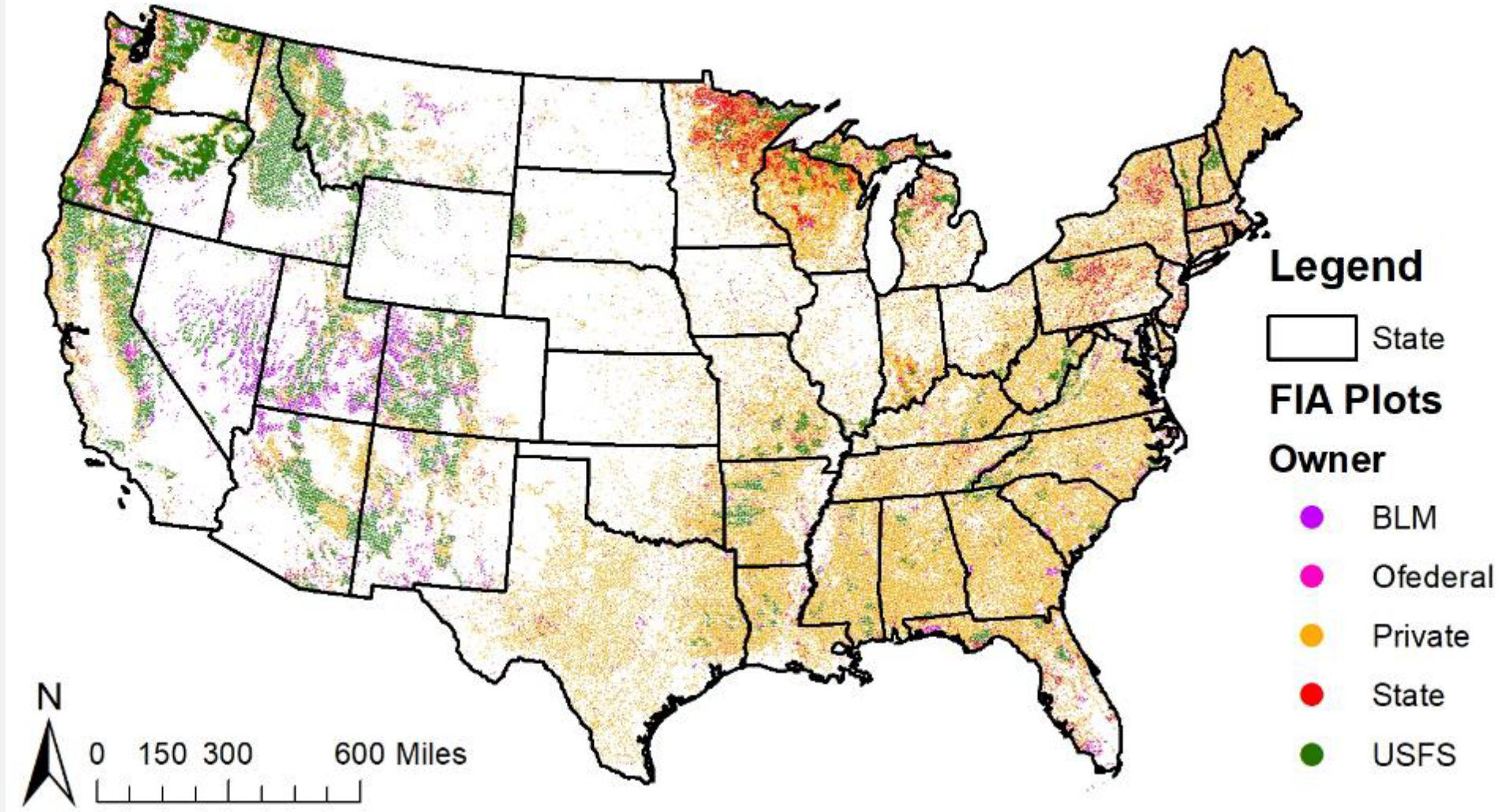
FORESTS OF IDAHO



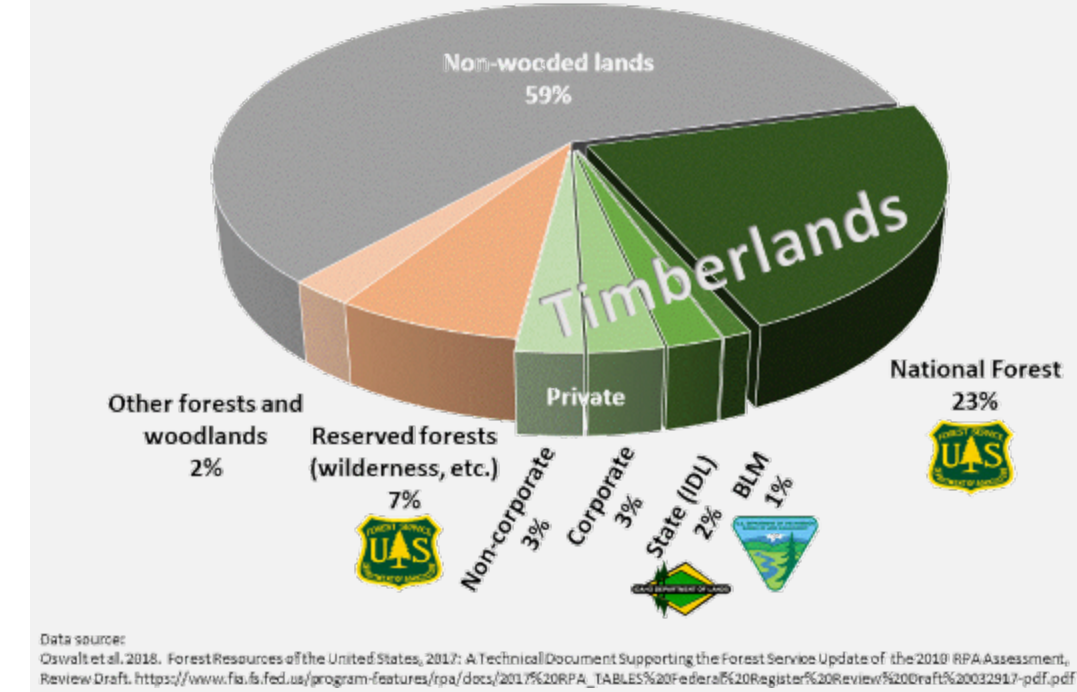
Forest Land Extent and Ownership



Forest Land Extent and Ownership



Idaho's 53 Million Acres



Idaho

Owner	Million Acres	Percentage
BLM	0.9	4%
Ofederal	0.1	0%
Private	2.9	14%
State	1.2	6%
USFS	15.9	76%
Total	21	

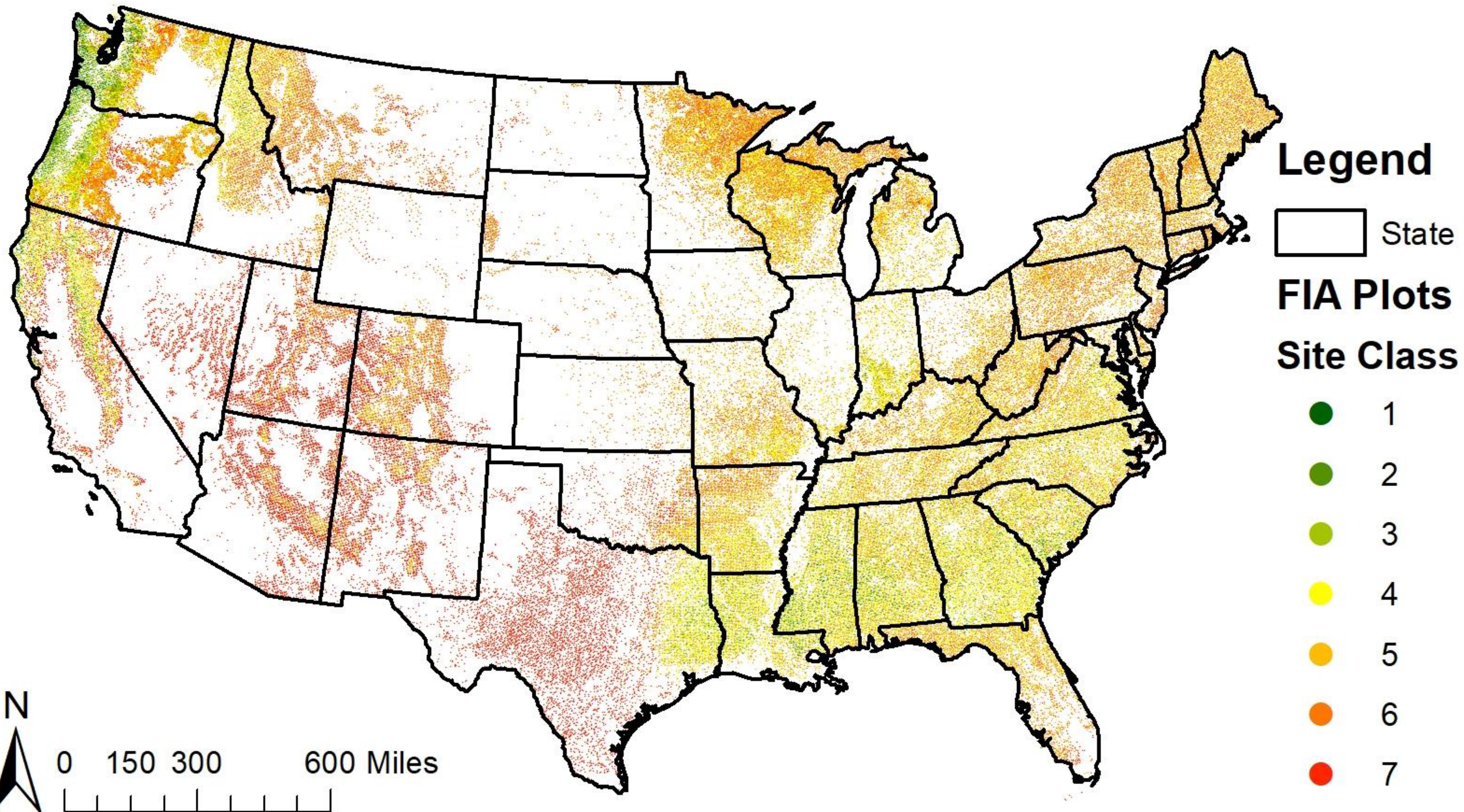
United States

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FORESTS OF THE UNITED STATES

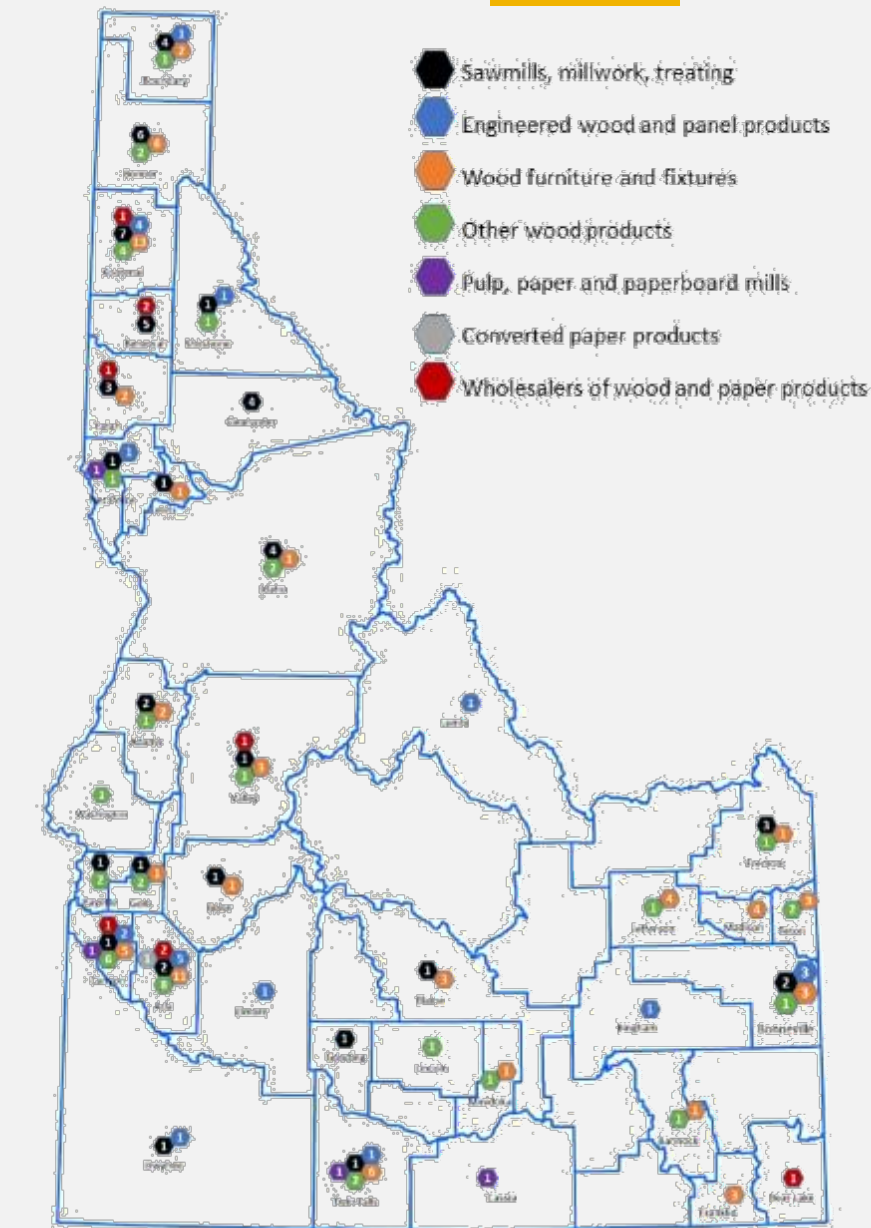
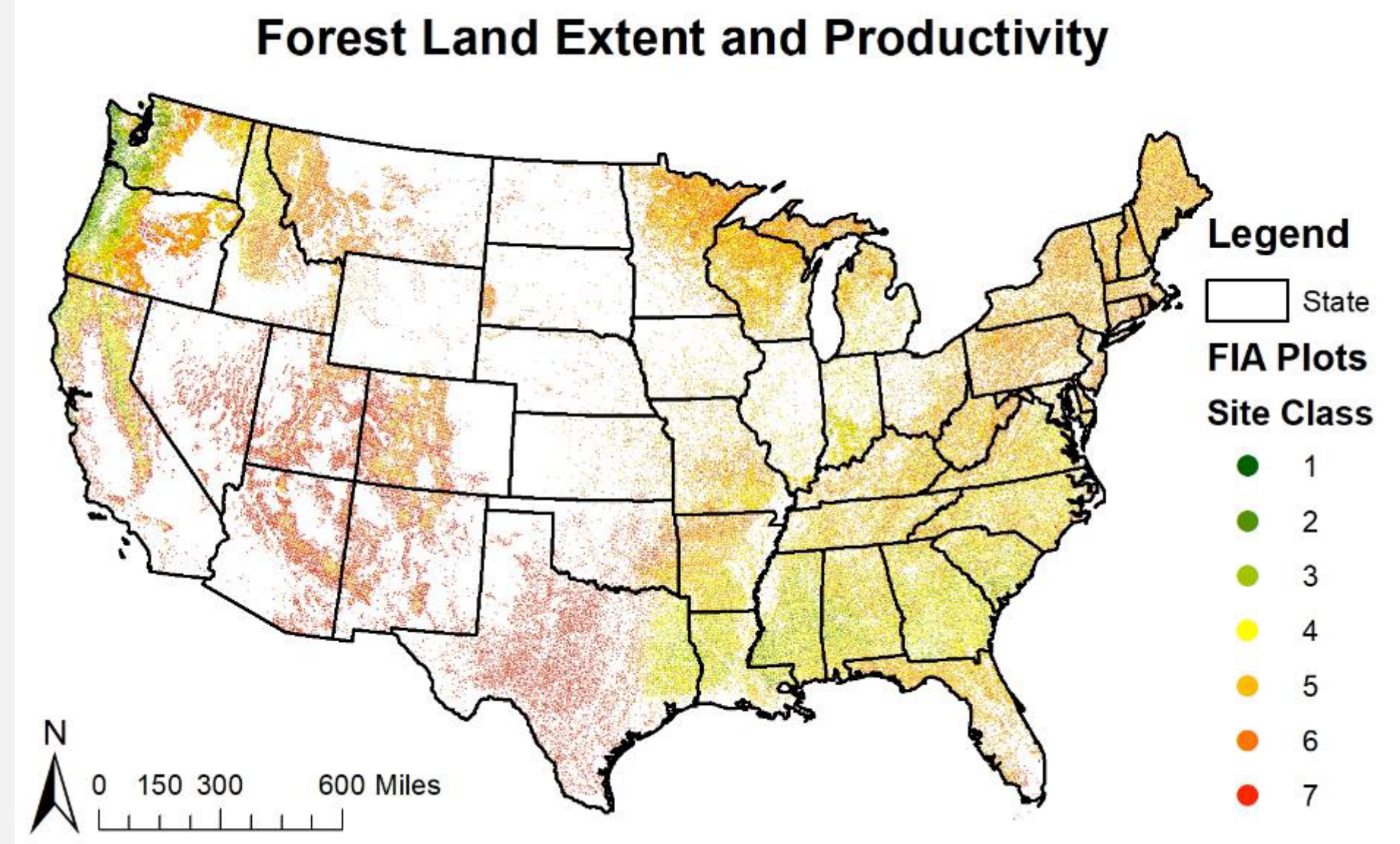
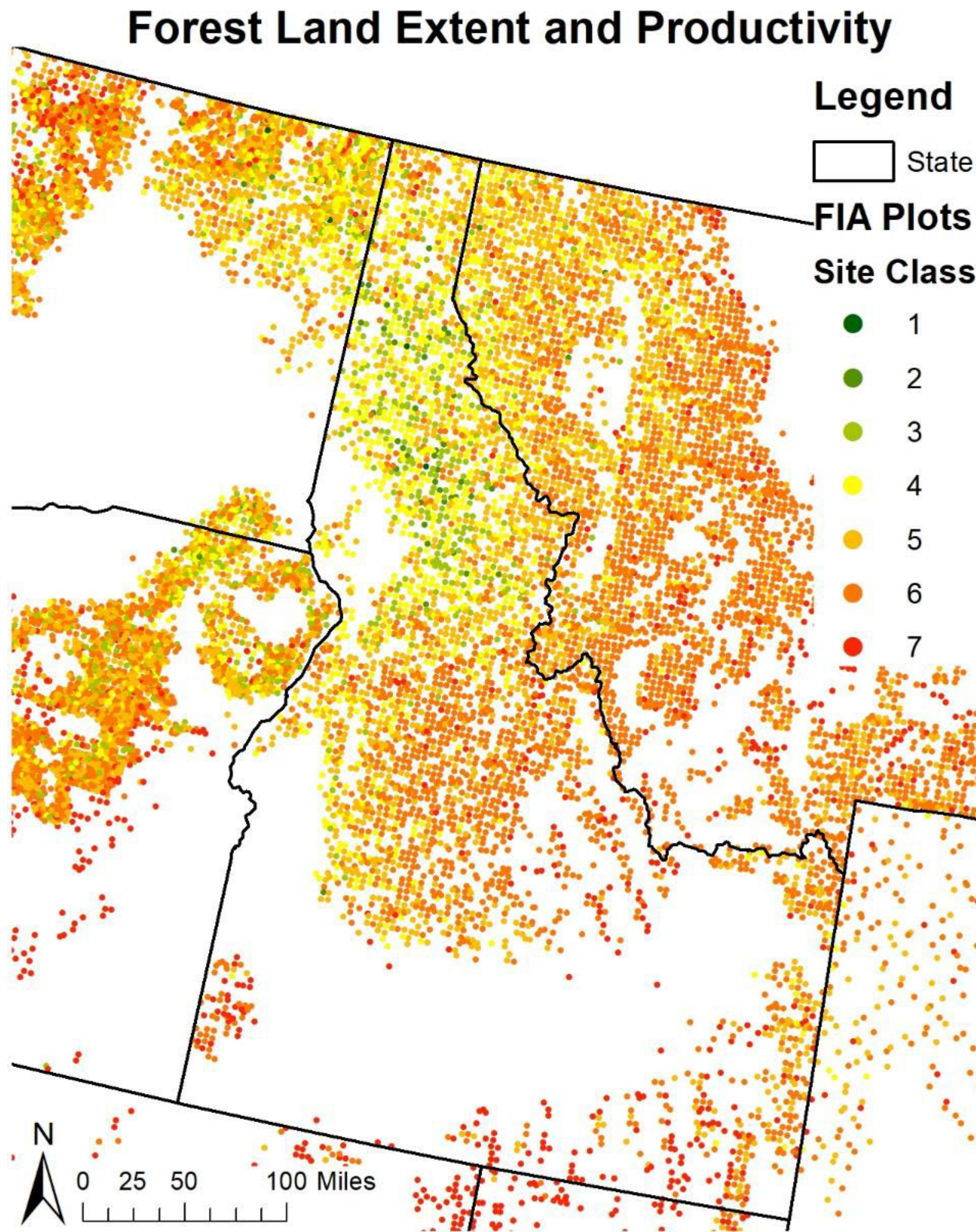
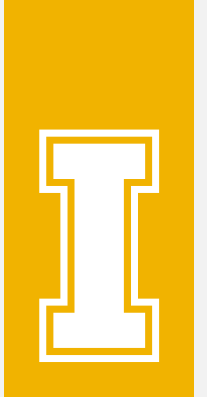


Forest Land Extent and Productivity



Site Class	Million Acres	Percentage
1	2	0%
2	17	3%
3	50	7%
4	109	16%
5	190	28%
6	160	24%
7	140	21%
Total	670	

FORESTS OF IDAHO



Idaho

Site Class	Million Acres	Percentage
1	0.01	0%
2	0.26	1%
3	1.64	8%
4	3.99	19%
5	6.50	31%
6	7.29	35%
7	1.31	6%
Total	21.01	

United States

Site Class	Million Acres	Percentage
1	2	0%
2	17	3%
3	50	7%
4	109	16%
5	190	28%
6	160	24%
7	140	21%
Total	670	

US POLICY CONTEXT

- WHAT WE SUBMIT TO THE UNFCCC AS REQUIRED UNDER THE PARIS AGREEMENT

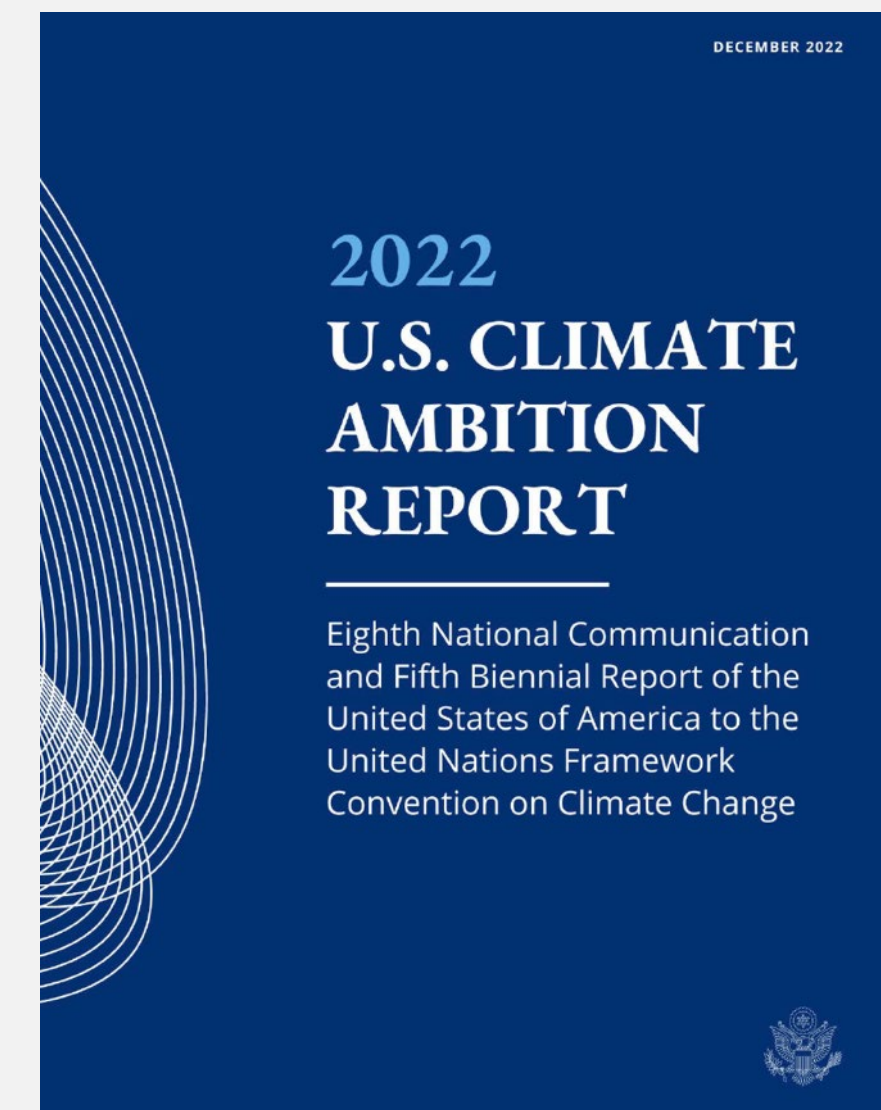


EMISSIONS PROJECTIONS AND TRENDS BY SECTOR

Table 5-2: Historical and Projected U.S. GHG Emissions Baseline (2021 Policy Baseline), by Sector: 2005-2035 (MMT CO₂e)

Sector	Historical				Projected		
	2005	2010	2015	2020	2025	2030	2035
Energy	4,416	4,153	3,800	3,263	3,297	3,241	3,181
Transportation	1,904	1,731	1,743	1,592	1,704	1,668	1,643
Industrial Processes	366	363	376	376	367	376	349
Agriculture	574	593	614	595	596	599	600
Waste	176	168	156	156	162	165	169
Total Gross Emissions	7,435	7,008	6,689	5,981	6,127	6,049	5,941
LULUCF (historical / low-sequestration)	-790	-761	-700	-759	-672	-604	-602
LULUCF (high-sequestration)	-	-	-	-	-778	-813	-846
Total Net Emissions (historical / low-sequestration)	6,645	6,246	5,989	5,222	5,455	5,445	5,339
Total Net Emissions (high-sequestration)	-	-	-	-	5,349	5,236	5,095

Forests reduced gross US emissions 12.6% in 2020



IDAHO CONTEXT

- WHAT WE CONTRIBUTE FROM OUR FORESTS TO THAT EFFORT



State	Carbon Pools	1990	1995	2000	2005	2010	2015	2020	2021
-----MMTCO2 Eq.-----									
US	Total Forest Ecosystem	-698.4	-691.1	-665.6	-608.9	-629.0	-547.9	-611.6	-593.3
US	Aboveground Biomass	-499.1	-485.0	-468.7	-443.8	-440.8	-425.8	-419.0	-409.0
US	Belowground Biomass	-101.8	-98.6	-95.1	-89.7	-88.6	-85.2	-83.2	-81.1
US	Dead Wood	-100.8	-101.8	-101.1	-97.9	-101.2	-97.2	-102.3	-101.1
US	Litter	0.8	-7.8	-1.9	22.4	2.6	58.0	-1.8	1.9
US	Soil (Mineral)	3.2	2.7	1.8	0.4	-0.9	0.9	-5.5	-4.0
US	Soil (Organic)	-0.8	-0.7	-0.6	-0.4	-0.2	1.5	0.1	0.1
US	Drained Organic Soil	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
-----MMTCO2 Eq.-----									
Idaho	Total Forest Ecosystem	3.2	3.3	3.3	3.3	3.3	3.3	3.9	4.0
Idaho	Aboveground Biomass	7.3	7.3	7.2	7.1	6.8	6.5	6.2	6.2
Idaho	Belowground Biomass	1.7	1.7	1.6	1.6	1.5	1.5	1.4	1.4
Idaho	Dead Wood	-6.5	-6.4	-6.2	-6.0	-5.7	-5.3	-4.3	-4.1
Idaho	Litter	1.1	1.1	1.1	1.0	1.0	0.9	0.9	0.8
Idaho	Soil (Mineral)	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3
Idaho	Soil (Organic)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

1. This is a flux (so it is a change in carbon stocks)
2. It is CO₂ so a negative means CO₂ coming out of the atmosphere into terrestrial accounts (like trees)
3. Idaho's forests are a positive meaning a net emitted into the atmosphere
4. The negative in dead wood indicates a build-up of fuel



BEYOND FEDERAL POLICY – HOW MIGHT THIS AFFECT SPECIFIC IDAHO INDUSTRIES

Journal of Forestry, 2023, XX, 1–12
https://doi.org/10.1093/jofore/fvad037
Advance access publication 14 August 2023
Research Article - biomass, carbon & bioenergy



If you use Idaho lumber in your building you must include a negative (bad) carbon balance

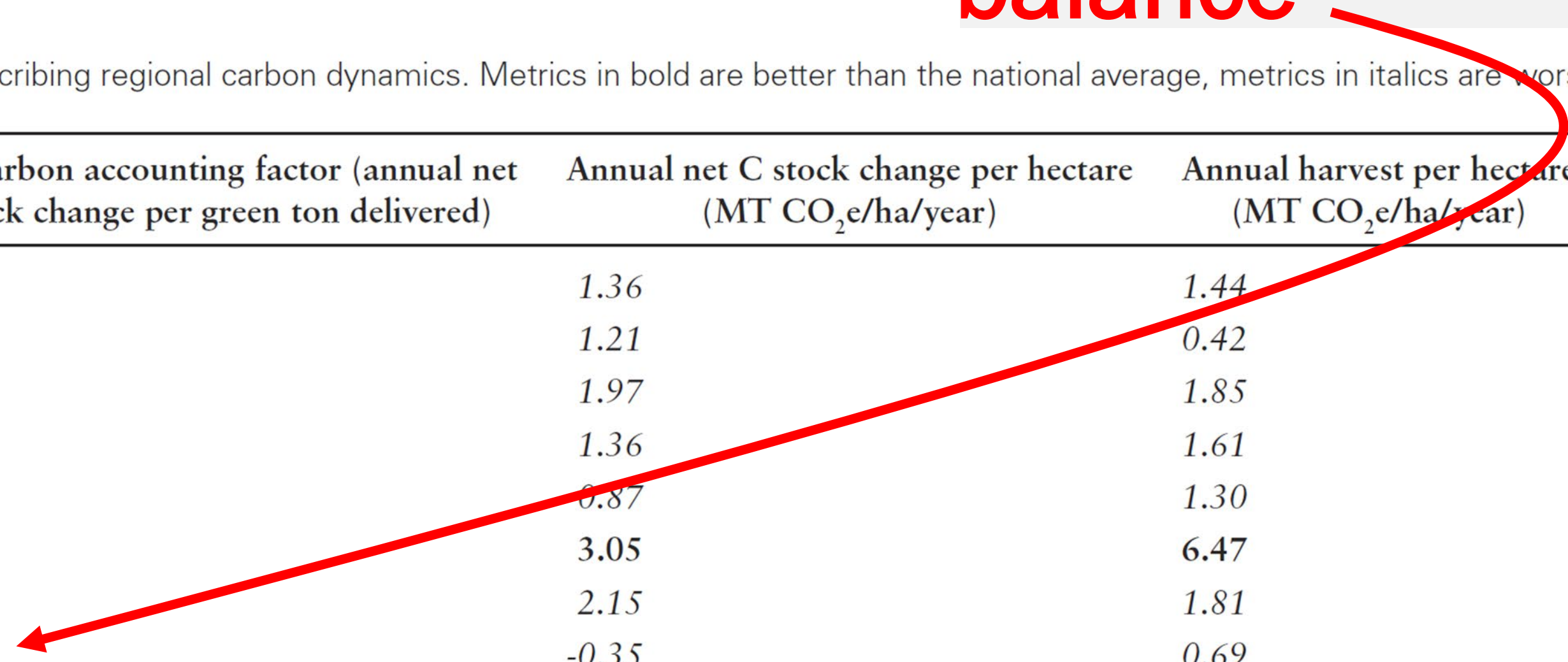
Calculating a Land Carbon Accounting Factor in the United States: an Example and Implications

Stephen P. Prisley^{1,*} and Edie Sonne Ha

¹National Council for Air and Stream Improvement, Inc., 850
²Three Trees Consulting, 140 Lakeside Ave, Ste. A-146, Seat
*Corresponding author email: sprisley@ncasi.org

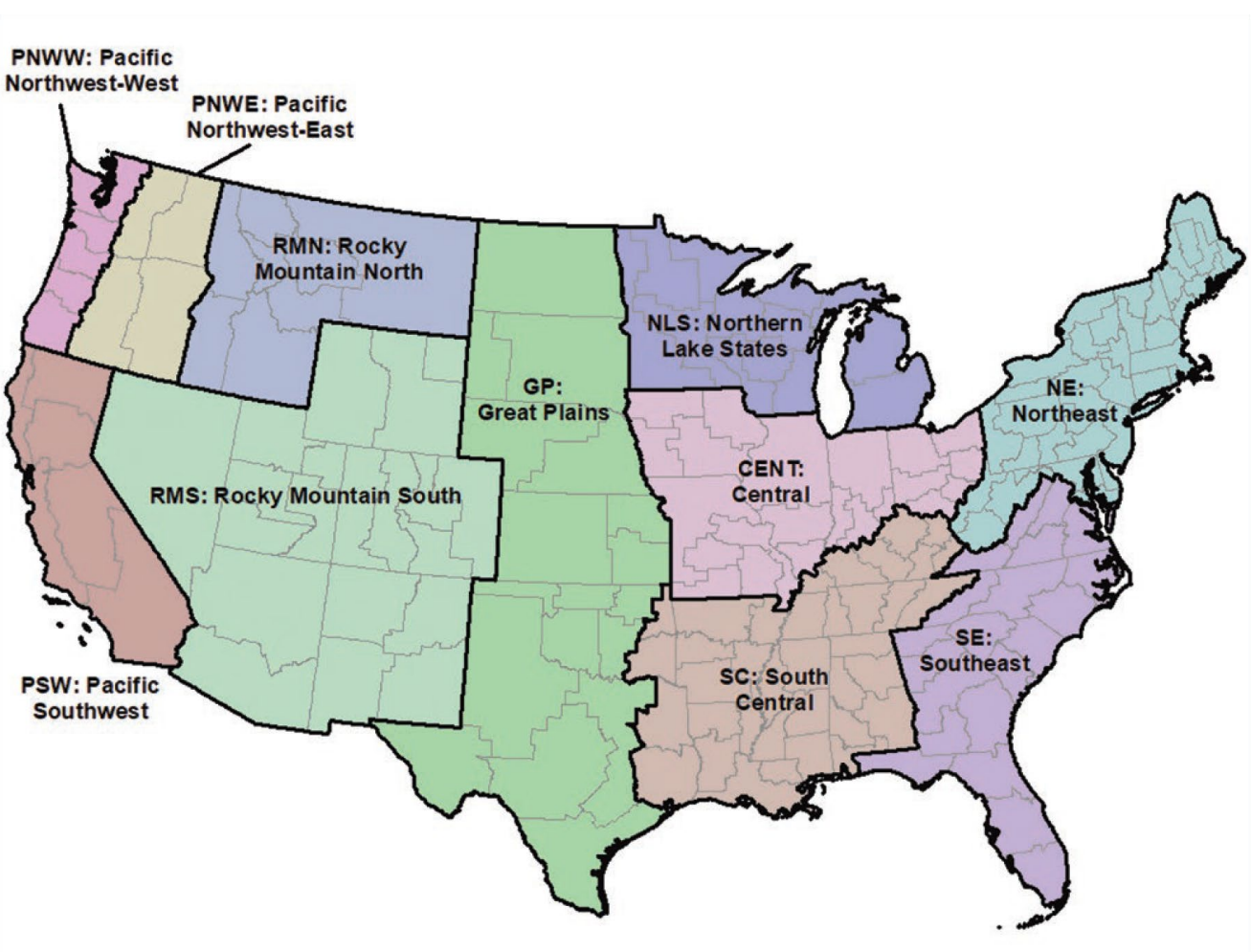
Table 5. Metrics describing regional carbon dynamics. Metrics in bold are better than the national average, metrics in italics are worse.

Region	Land carbon accounting factor (annual net C stock change per green ton delivered)	Annual net C stock change per hectare (MT CO ₂ e/ha/year)	Annual harvest per hectare (MT CO ₂ e/ha/year)	Mortality as percent of stock
CENT	1.174	1.36	1.44	1.53
GP	3.648	1.21	0.42	1.73
NE	1.313	1.97	1.85	1.02
NLS	1.002	1.36	1.61	1.38
PNWE	0.832	0.87	1.30	1.20
PNWW	0.637	3.05	6.47	0.63
PSW	1.354	2.15	1.81	0.97
RMN	-0.509	-0.35	0.69	1.74
RMS	-6.171	-1.39	0.13	2.38
SC	1.309	4.18	3.87	1.04
SE	0.757	3.07	4.67	1.13
National average	0.979	2.26	2.79	1.16



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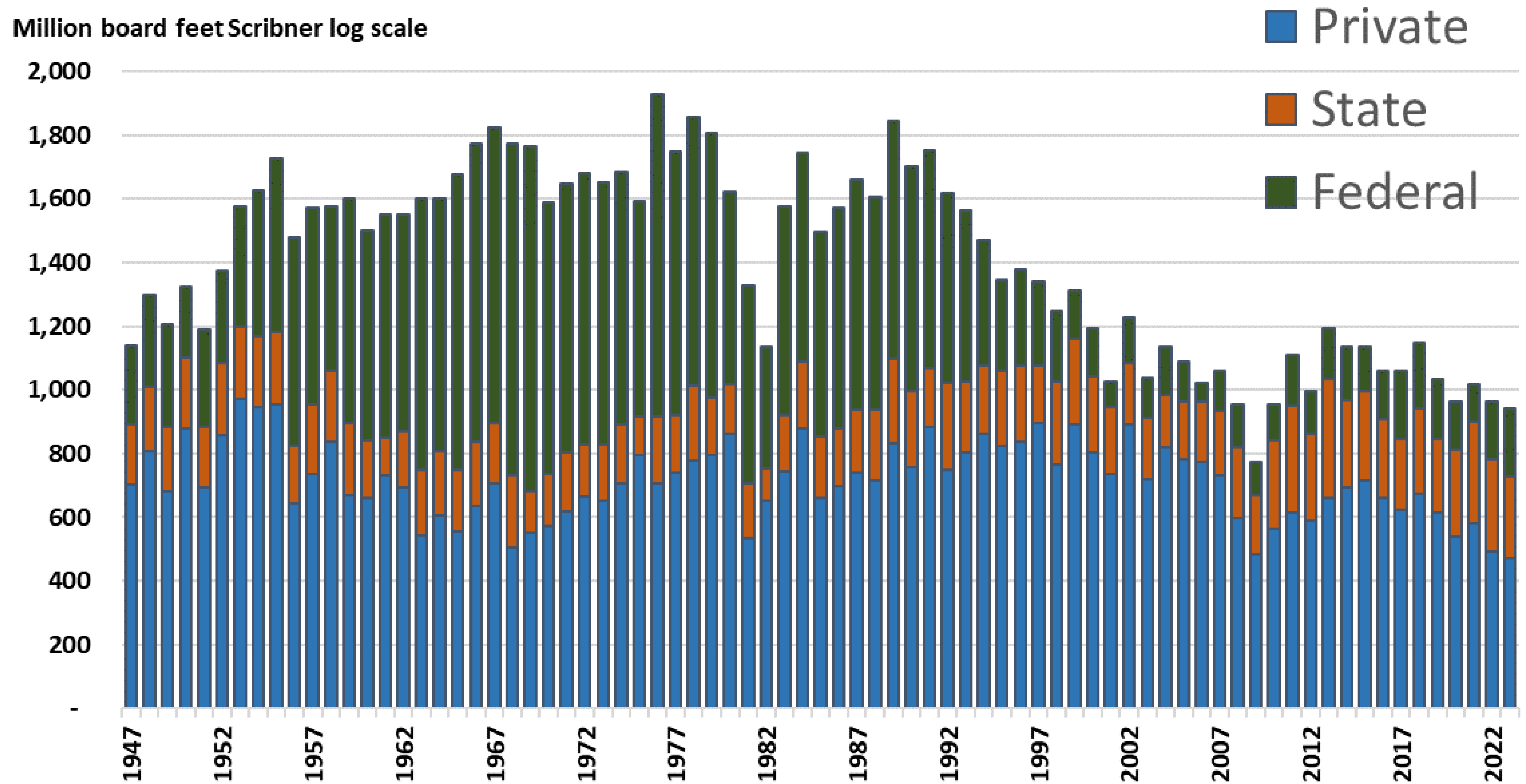
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IDAHO'S TIMBER HARVEST



Idaho Timber Harvest by Ownership

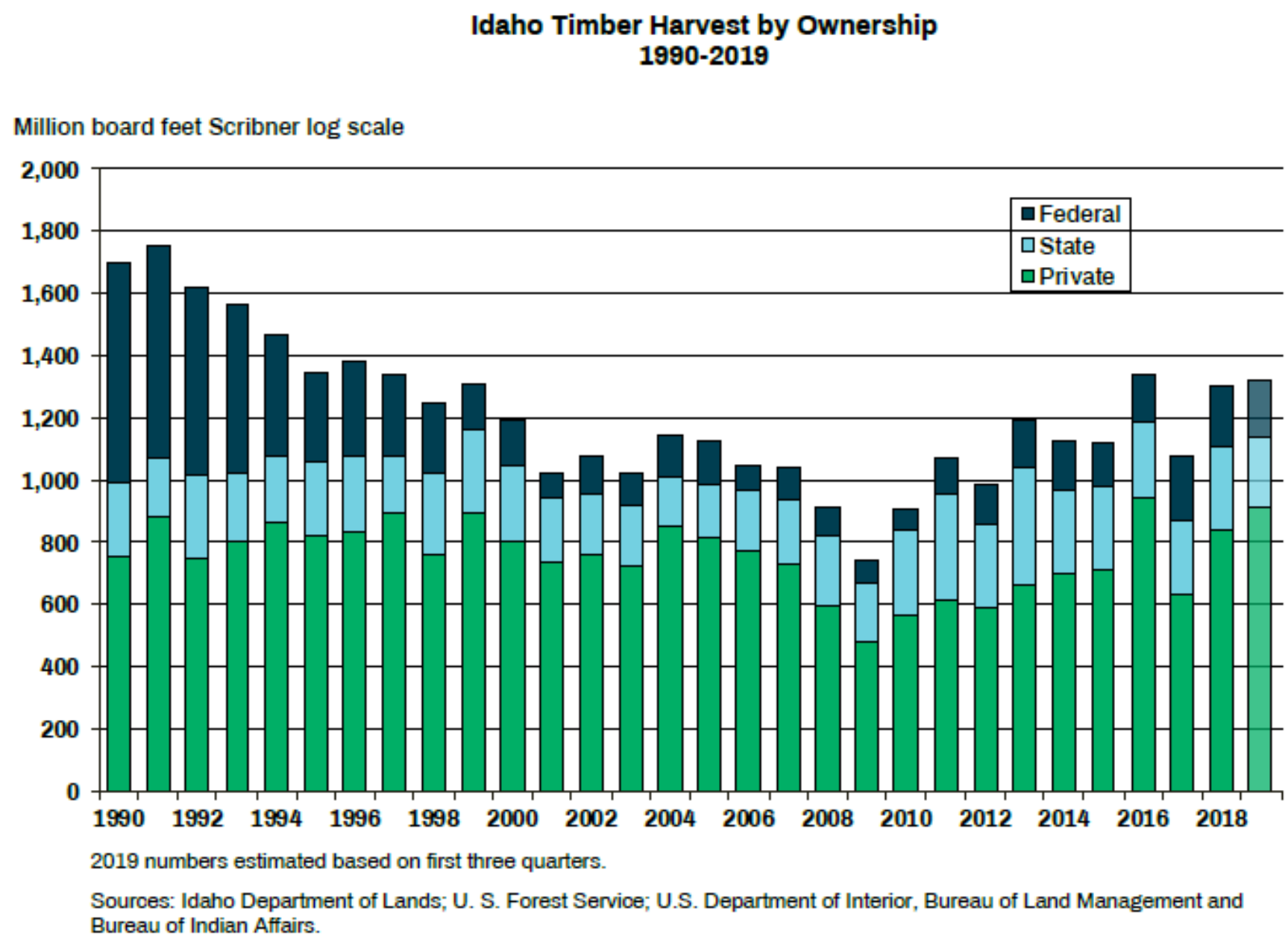


Sources: Bureau of Business and Economic Research, University of Montana, Idaho Department of Lands; U. S. Forest Service; U.S. Department of Interior, Bureau of Land Management and Bureau of Indian Affairs

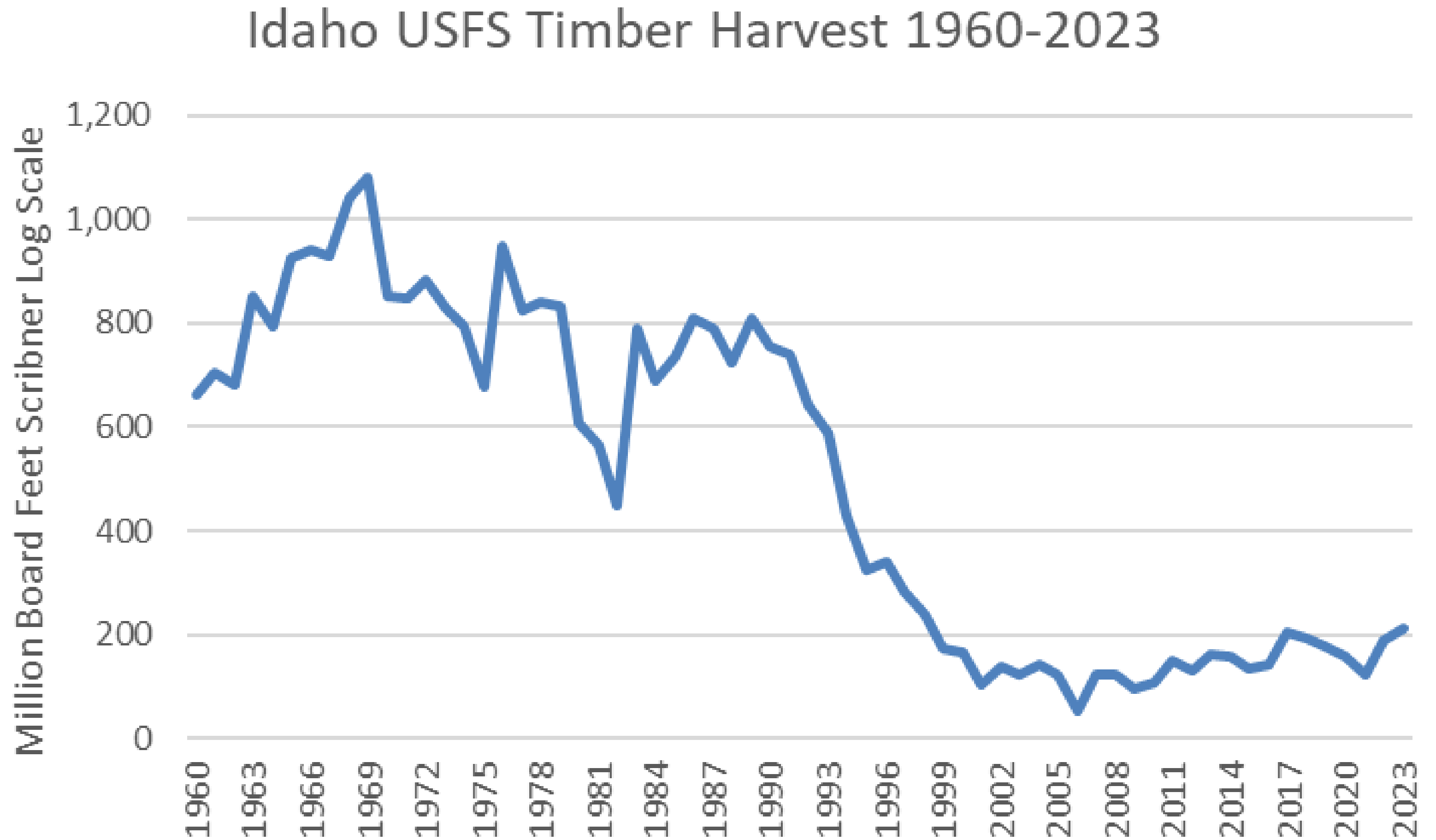
IDAHO'S TIMBER HARVEST



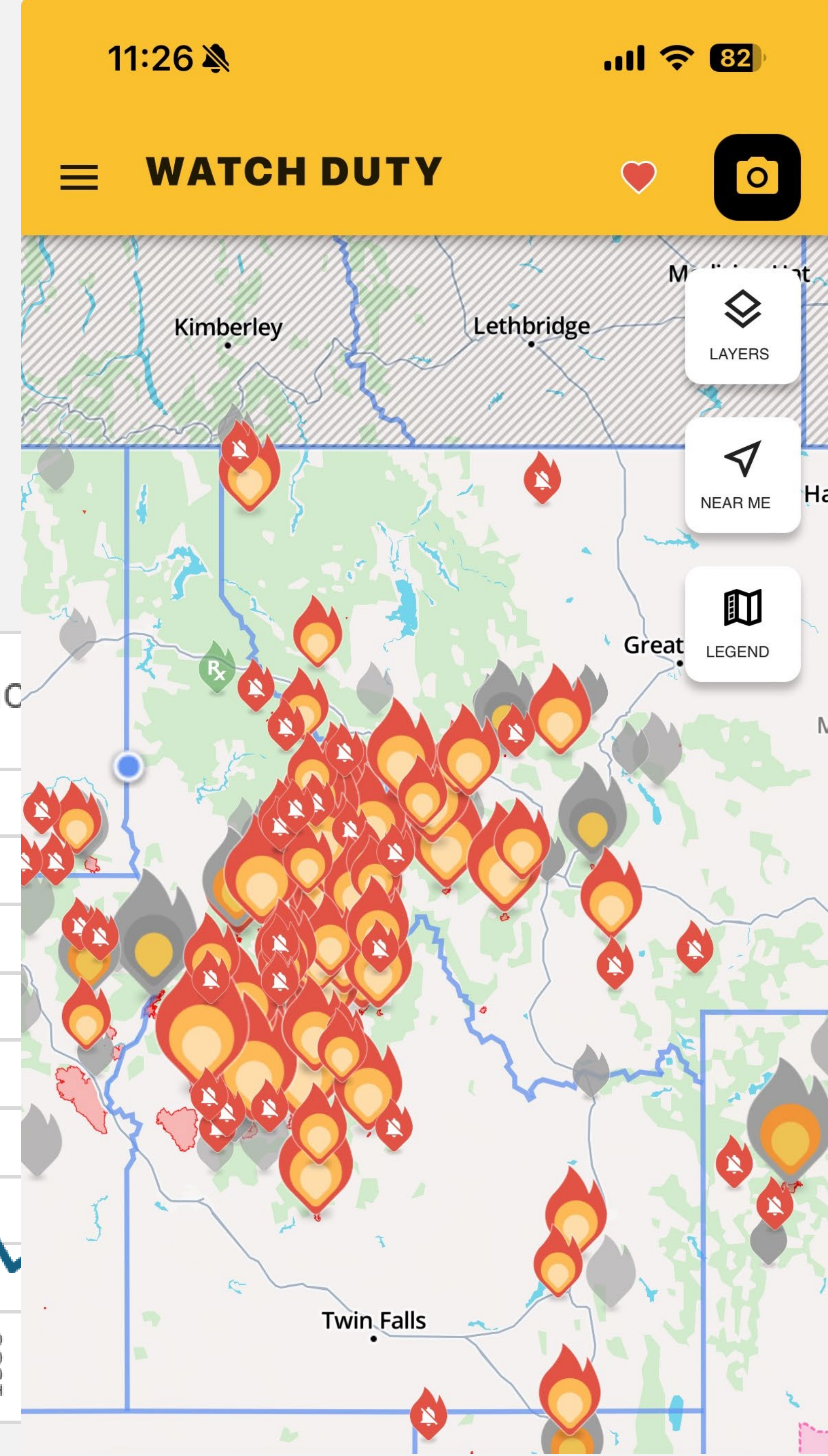
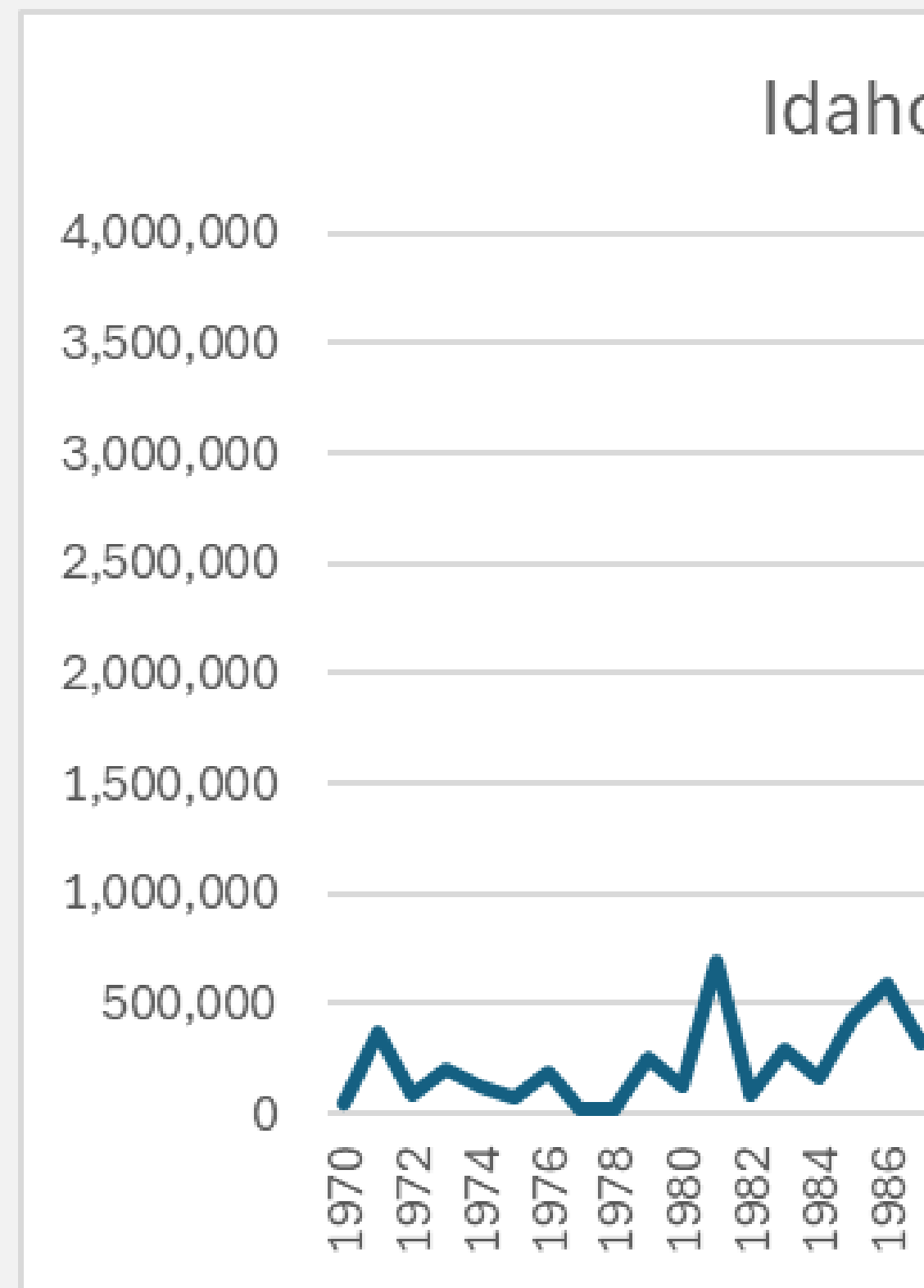
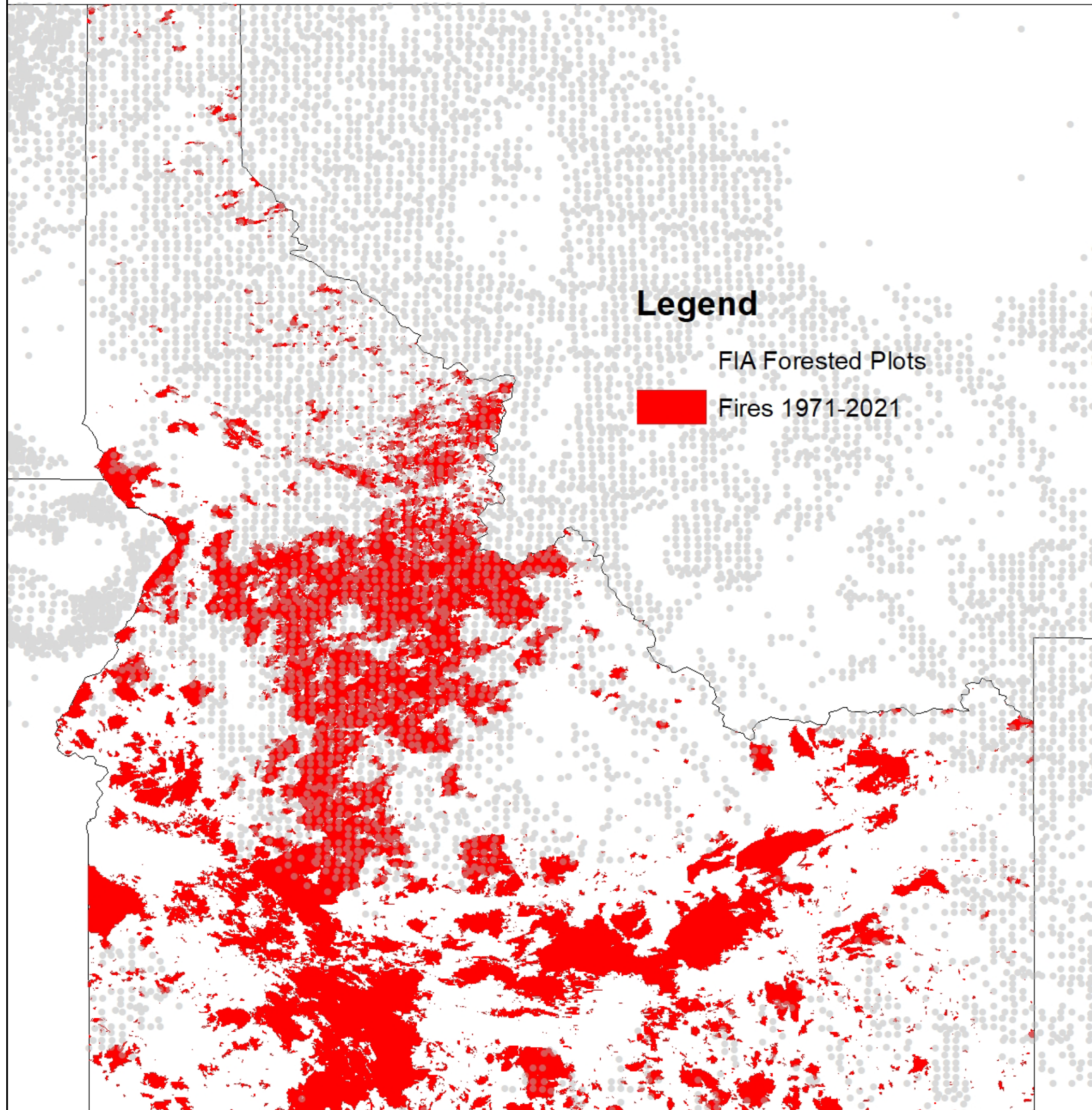
Idaho Timber Harvest by Ownership, 1990-2019



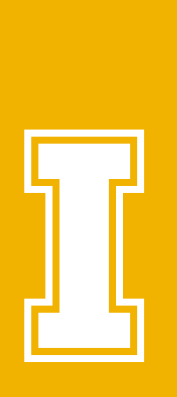
- Isolating the USFS component of total Idaho harvest
- >85% drop in harvest in the 1990's



IDAHO WILDFIRE



IDAHO CONTEXT AND FIRE – FIRE WITHIN THOSE VALUES

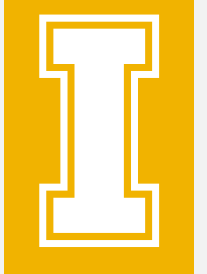


Region	Metric	1990	1995	2000	2005	2010	2015	2020	2021
		-----MMTCO2 Eq.-----							
Idaho	Area burned	3.0	0.3	265.5	57.6	4.5	123.5	45.0	86.3
US	Area burned	131.1	107.0	793.2	375.1	333.3	884.7	1,471.7	1,646.4
	ID% of Continental US	2%	0%	33%	15%	1%	14%	3%	5%
		-----MMTCO2 Eq.-----							
Not Just a CO2 issue									
Idaho	CH ₄ - Methane	0.03	0	2.51	0.58	0.04	1.29	0.44	0.84
Idaho	CO ₂ - Carbon Dioxide	0.32	0.03	29.94	6.79	0.47	15.03	5.3	9.95
Idaho	N ₂ O - Nitrous oxide	0.01	0	1.32	0.3	0.02	0.66	0.23	0.44
US	CH ₄ - Methane	3.24	0.54	7.71	10.91	1.97	16.62	14.96	15.5
US	CO ₂ - Carbon Dioxide	52.18	9.75	104.74	168.38	33.12	239.86	182.8	202.57
US	N ₂ O - Nitrous oxide	2.29	0.42	4.6	7.42	1.44	10.55	8.04	8.89

1. We have contributed up to 1/3rd of the forest fire emission in the continental US
2. It is not just CO₂ that matters. There are also methane and nitrous oxide emissions.
3. And – health, quality-of-life, ecological, and economic issues that shouldn't be overlooked

PAG UPDATE

COUNTY-LEVEL REPORTING



- About
- Research
 - Publications
 - Academic Journal Articles
 - State-Level Forest Reports
 - County-Level Forest Reports**
 - Presentations
 - In Progress
- Newsletters

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 Directions

County-Level Forest Reports

The Policy Analysis Group periodically publishes basic resource reports based on larger state reports to provide additional insight into sub-regional differences. Reports include information on the state of the National Forest Inventory in each of Idaho's counties and the economic contributions of the forest products industry to Idaho for each county.

To access the reports available for each county, please click on the appropriate county in the map or use the links below.

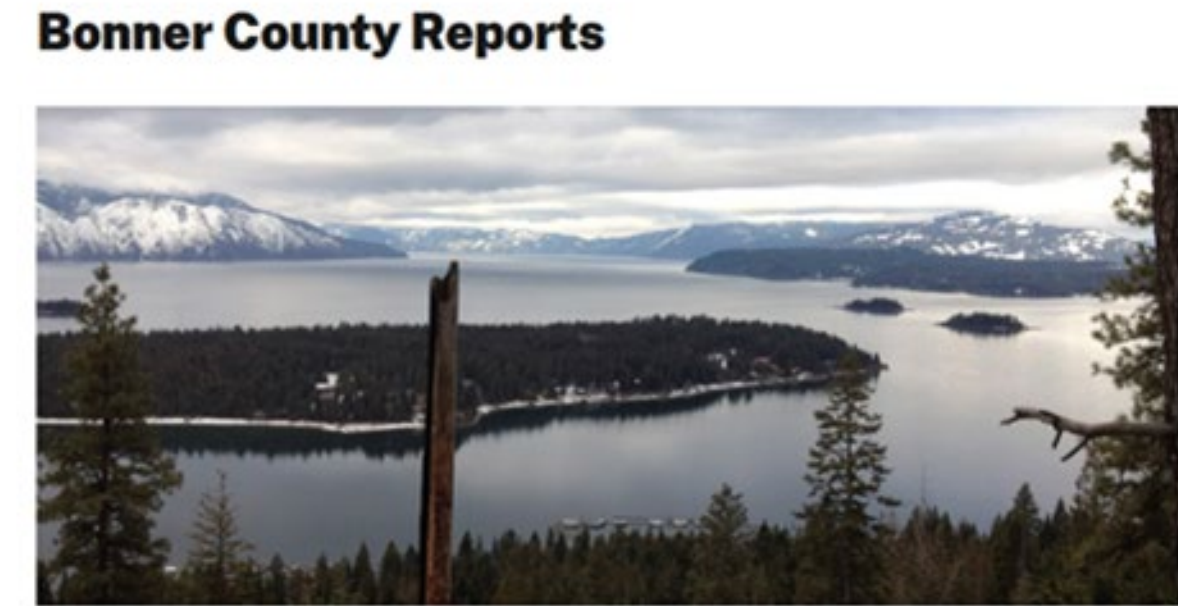
County Map



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- County List**
- A B C E F G I

Bonner County Reports



The Policy Analysis Group periodically publishes reports on the state of the National Forest Inventory in Bonner county. The Policy Analysis Group looks at the state of the forest products industry, forest inventory stocks and how they have changed over time.

- Available Reports**
- Forest Resource Condition (2022)**
This report explores our national forest inventory plots in the county. It first breaks down the current conditions by ownership, forest type and overall land use. It then explores how those conditions have been changing over time, highlighting carbon disturbance and management.
 - Economic Contribution (2021)**
This report explores how the forest sector affects the local economy. It focuses on the last two decades of timber harvest, jobs and gross domestic product. It also breaks down this year's numbers by subsectors for both direct and indirect effects.

Statewide Forest Inventory Report
 See how Forest Inventory stocks have changed over time in the state of Idaho.
[VIEW THE REPORT](#)

Statewide Economic Contribution Report
 Learn more about the economic contributions of the forest products industry to the state of Idaho.
[VIEW REPORT](#)

Upcoming Reports

Wildfire
 Our Wildfire Report will take a long-term look at the acreage within the county subject to wildfire, breaking it down across current land use and ownership. It will then break that data down further for the last decade, bringing in burn intensity categories.

Forest Density
 Our Forest Density Report will combine cutting edge U of I research on the maximum density across the landscape with satellite data imputed tree cover across the county. It will detail forest density metrics, acreage by ownership, land use and relative density classes.

Bonner County Forest Inventory Stocks

Land Base Overview

The Forest Inventory and Analysis (FIA) program administered by the USDA Forest Service serves as our national forest inventory. In Idaho, each plot represents roughly 6,000 acres and is revisited on a 10-year cycle beginning in 2004. The data collected provides valuable information on forest extent and stocks as well as how those stocks change over time. This fact sheet details the FIA data for Bonner County, Idaho.

Area Sq Miles	Forested Acres	% Forested	Total Acres
1,200	1,083,460	90.3%	1,200,000

Bonner County is highly forested with just over 1 million acres (88%) of its land base classified as forested. Forest Service forests dominate the northwestern and southwestern parts of the county while the private and state owned forest land is concentrated mostly in the center.

Area and Volume by Forest Type and Owner

Equally important to the overall extent of the county's forests is its ownership and prevalent forest types. Forest extent by type and the volume on those acres provides insight into the economic and ecological opportunities given each owner's management focus. Bonner County is largely Forest Service land in largely softwood forest types like True Fir, Douglas-fir and other softwoods.

Forest Type	Private/Other				Forest Service			
	Other	State/Local	Native American	Total	Other	State/Local	Native American	Total
Softwood								
Douglas-fir	462	47	56	565	130	15	43	188
Lodgepole Pine	56	0	7	63	20	0	11	31
Other Softwood	309	0	180	489	385	0	43	54
Ponderosa Pine	11	0	8	19	11	0	6	22
True Fir	440	0	129	569	43	0	53	48
Hardwood	0	4	2	6	2	0	2	4
Total	1,878	51	389	2,318	483	20	159	662

Bonner County Forest Inventory Change

Forest Carbon

Forests are a significant part of the global carbon cycle. The productivity class indicates potential annual forest growth. This potential along with current forest size and stocking affect how much carbon a forest can intake, sequestering it from atmospheric accounts into woody biomass. Bonner County's forests have been removing carbon from the atmosphere at a rate of 0.2 MT C per year since 2013. Dead tree carbon pools have been relatively stable over that time period ranging between 2 and 3.5 MT C in stocks.

Forest Productivity Class

Class	Acres
165-224	165-224
120-164	120-164
85-119	85-119
50-84	50-84
20-49	20-49

Each year since 2004, the FIA has measured 1/10th of the plots in Bonner County. This means that a full sample was not collected until 2013. This is indicated by the blue coloring on the graph, which becomes lighter as more plots are measured. The early measurements are less precise than the ones after 2013, when all plots were measured, and the re-measuring process began.

Disturbance

Disturbances, either natural or management-related, are another factor of change affecting Idaho's forests. Disease and other disturbances are the largest factor of disturbance observed in the FIA data for Bonner County, and becoming a bigger problem. Forest management related disturbances are much smaller and largely on private land.

Disturbance Agent	Forest Service	Other Federal	State/Local	Private/ Native American	Total
Disease	88,204	0	3,620	2,098	93,922
Fire	7,239	0	0	0	7,239
Insect	4,346	0	3,201	1,331	8,878
Other Disturbance	8,153	0	8,892	20,105	35,945
Management	42,968	0	12,759	98,188	153,915
Harvesting	0	0	122	0	122
Clearing	789	915	3,420	1,342	6,466
Other Treatment	0	0	0	0	0
Prescription	0	0	0	287	287
Total	152,857	915	21,702	122,763	278,237



Kelsey Vershum
Undergraduate

BONNER COUNTY'S FOREST PRODUCTS INDUSTRY 2021

TIMBER HARVEST

Bonner County Timber Harvest by Ownership 2002-2021

121 million board feet
 ~10% from 2020

58% from Private lands
 35% from State lands
 7% from Federal lands

FOREST SECTOR GDP AND JOBS

Forest Products Industry Economic Contributions
 as a proportion of total county economy

3.8% of total county GDP
 +2% from 2020

4.3% of total county employment
 -2% from 2020

BONNER COUNTY'S FOREST PRODUCTS INDUSTRY 2021

ECONOMIC CONTRIBUTIONS

DIRECT EFFECTS
 initial spending by FPI businesses for:
 • Forest Management (foresters)
 • Harvest Operations (loggers)
 • Wood Products, Paper, and Furniture Manufacturing (mill workers)

SUPPORT EFFECTS
 additional spending by FPI businesses for supplies and by FPI workers, for example:
 • Harvesting equipment
 • Mill equipment
 • Home sales to workers
 • Food for workers' families

\$302 Million to Idaho's Gross State Product
 and more than **3,600 jobs**

Category	Direct	Support	Total
Employment (jobs)	349	227	572
Labor Income (million dollars)	\$18	\$9	\$27
Gross State Product (million dollars)	\$20	\$14	\$34

Each Million Board Feet of Timber Harvested in Idaho Provides **30 Jobs**
 1.4 direct jobs plus 1.6 support jobs

REPORT CONTRIBUTORS:
 Greg Alward, Ph.D., Senior Researcher
 Greg Latta, Ph.D., Director



Greg Alward
Senior Scientist

BONUS SLIDES



- The carbon/climate context for Idaho is very similar to the old growth context
- These last three slides are from another recent presentation on old growth and idaho

THE SAME ISSUES AFFECT OLD GROWTH



FS-1242a | January 2024

Introductory Report

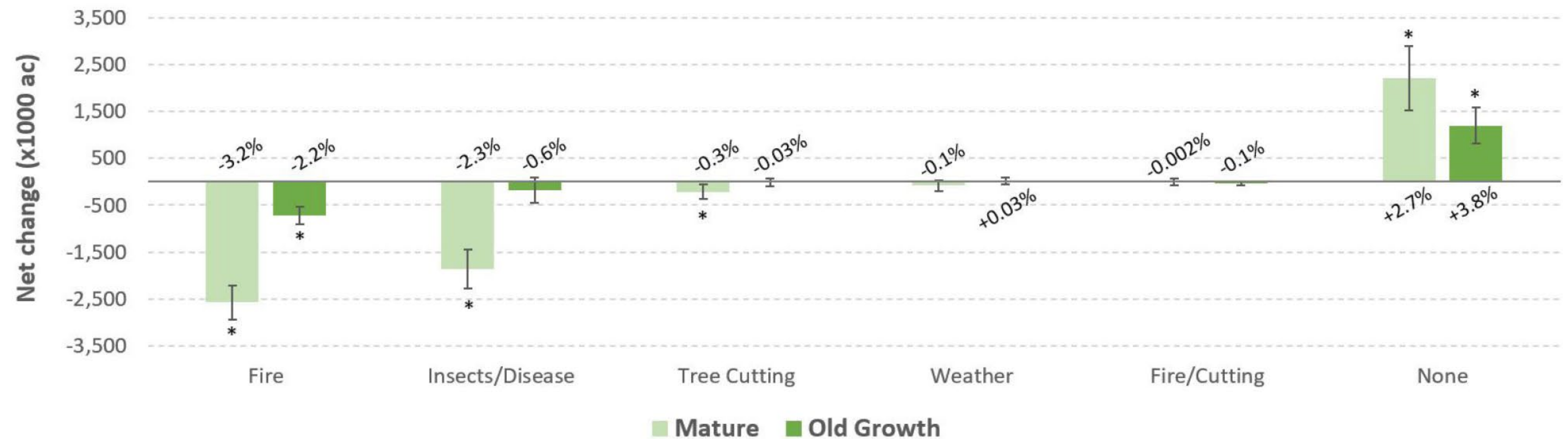
Analysis of Threats to Mature and Old-Growth Forests on Lands Managed by the Forest Service and Bureau of Land Management

Fulfillment of Executive Order 14072, Section 2.c.ii

The one thing that we do know for certain is that there will be change

Overview

Executive Order (EO) 14072—*Strengthening the Nation's Forests, Communities, and Local Economies*—instructs



A total of 30,864 Forest Inventory and Analysis (FIA) plots, representing 81.5 million acres of mature and 31 million acres of old growth, were measured twice between 2000 and 2020. Net changes in mature and old-growth area (based on the definitions used in the mature and old-growth inventory) are shown above. Error bars represent 95 percent confidence intervals and asterisks indicate a statistically significant change.

WHAT'S AT STAKE?

The issue is unfortunately a lot more political than ecological

This is being sold as the “gateway” to either **logging it all** or **locking it all up**.

The reality is that we have altered both the **initial conditions** (e.g. fire suppression) and the **future conditions** (e.g. climate) and the idea that we just sit back and monitor our way out of it doesn't seem like a great option



WHAT'S NEXT?



I think a more localized context is important (hence the focus on Idaho)

- While also looking across all ownerships
1. You gather information
 2. You evaluate how that will change over time
 - And with different interventions
 3. You assess what your desired outcomes are
 - How much and what do we want these forests to look like in the future
 4. You determine silvicultural pathways that can achieve that goal
 5. And then you act



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e-newsletter and reports

<http://www.uidaho.edu/cnr/pag>