

Harvested Wood Product (HWP) Carbon Storage from Oregon Forests

**Todd A. Morgan, CF
&
Dan Loeffler**

October 18, 2018

**Forest Carbon Accounting Stakeholder Meeting
Salem, OR**

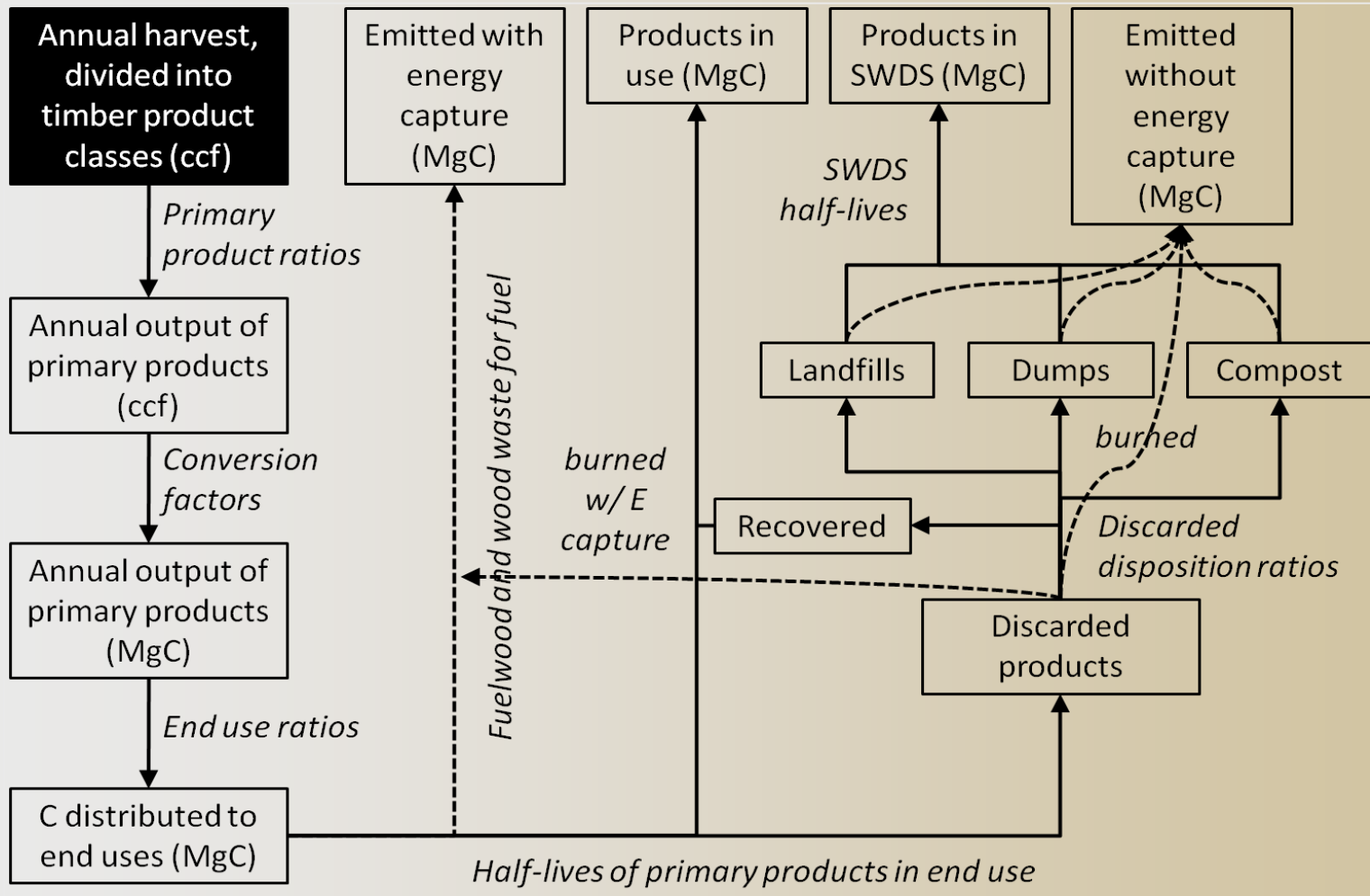
HWP C in the context of forest carbon

IPCC Approaches

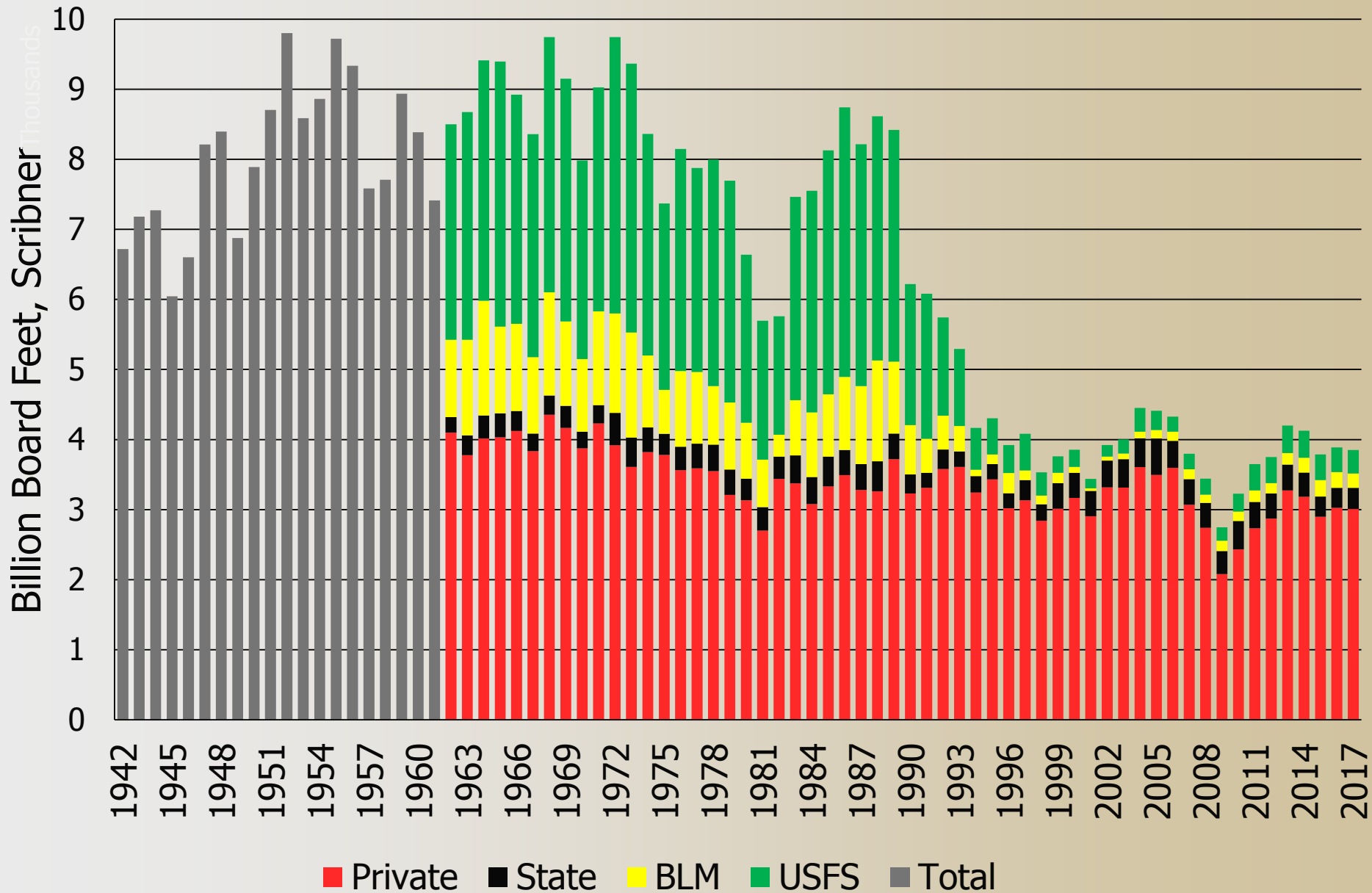
1. Stock Change Approach
2. Production Approach
3. Atmospheric Flow Approach



HWP Modeling Framework



Oregon Timber Harvest



Production, Prices, Employment, and Trade in Northwest Forest Industries, All Quarters 1998

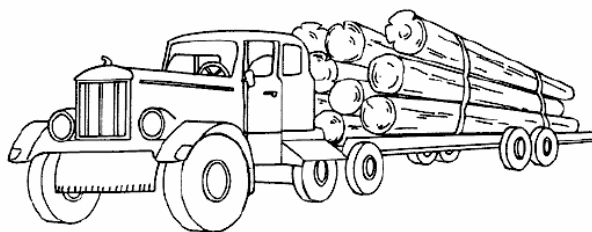
Debra D. Warren



Estimates of carbon stored in harvested wood products from United States Forest Service Pacific Northwest Region, 1909-2012



Oregon's Timber Harvests: 1849-2004



State Data – 1849 to 2004
 County Data – 1925 to 2004

Compiled by Alicia Andrews and Kristin Kutara
 Oregon Department of Forestry



2005

Edward Butler
 Keith Stockman
 Nathaniel Anders
 Ken Skog
 Sean Healey
 Dan Loeffler
 J. Greg Jones
 James Morrison
 Jesse Young

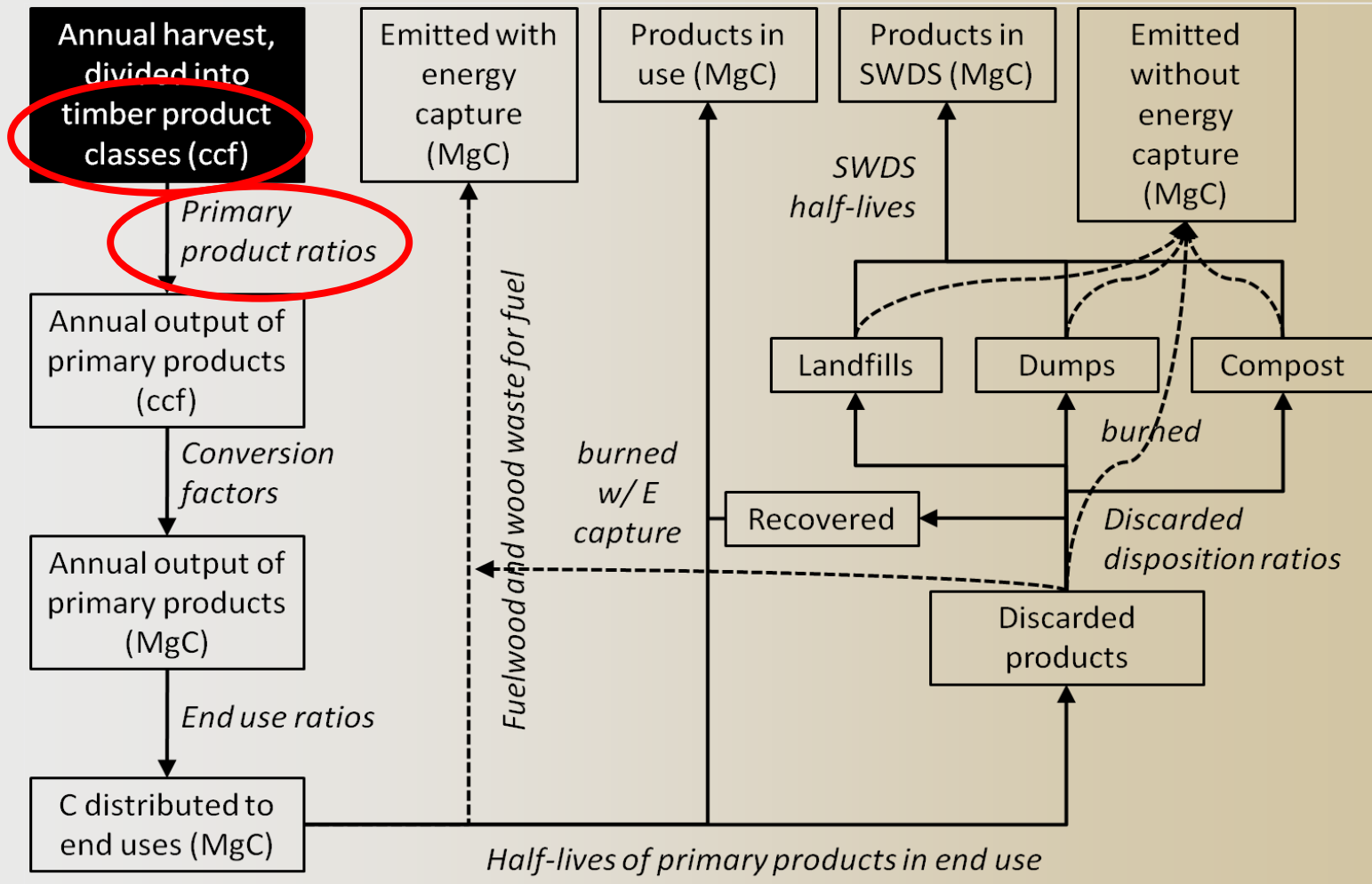
April, 2014

Oregon's Forest Products Industry and Timber Harvest 2013 With Trends Through 2014

Eric A. Simmons, Micah G. Scudder, Todd A. Morgan, Erik C. Berg,
 and Glenn A. Christensen



The HWP framework



Timber Products vs. Primary Products

Timber Products:

Categories recorded at time of timber sale or harvest, may not closely correspond to primary products manufactured.

Examples: sawtimber, pulpwood, fuelwood, non-saw, misc-convertible products.

Primary Products:

Categories of 1st products manufactured from the timber, includes mill residue uses.

Examples: lumber, plywood, woodpulp, non-structural panels.

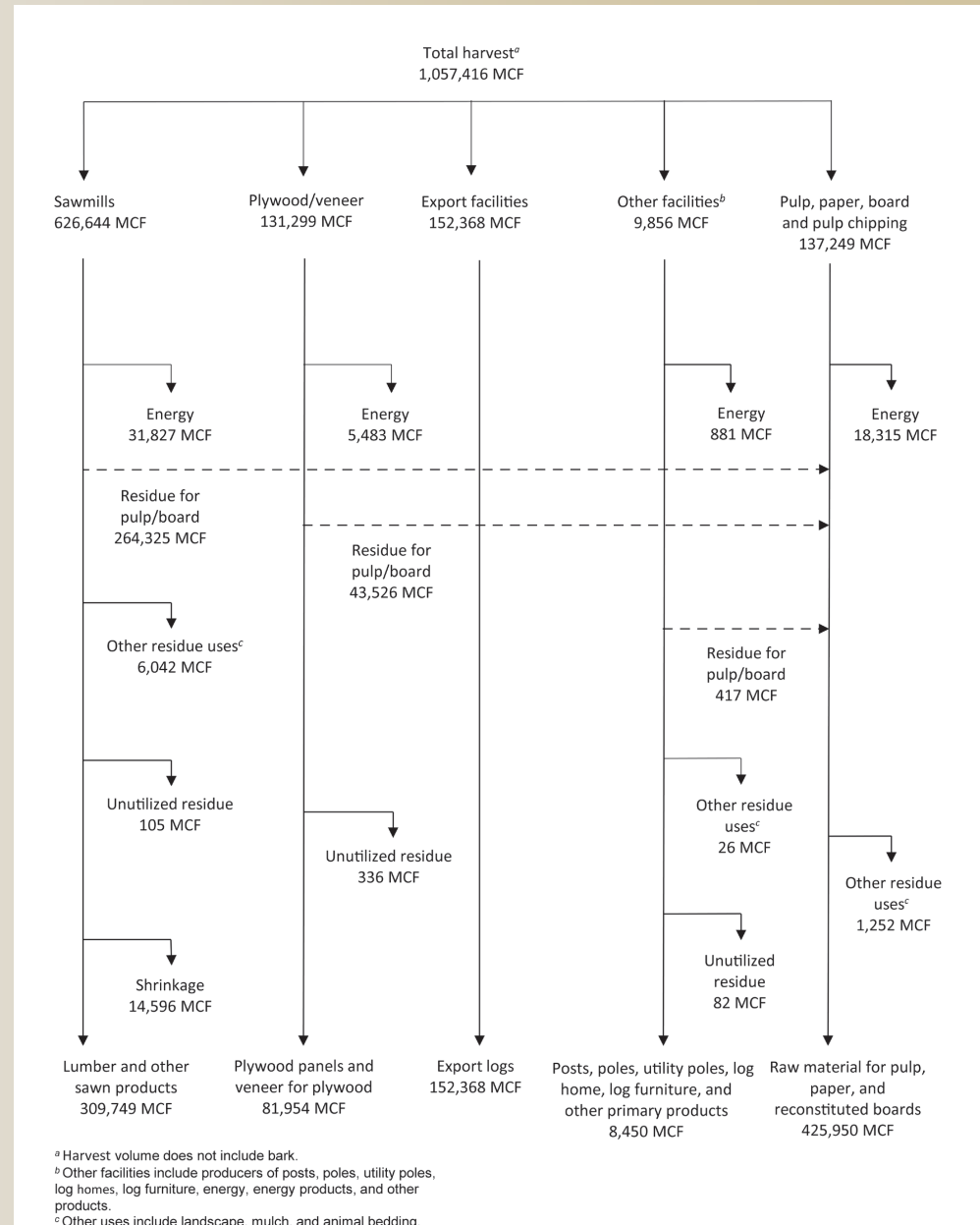
Timber Product Ratios

- The model has 40 timber product classes, 20 classes each for softwood and hardwood
- Annual time series; ratios sum to 1.00
- Examples of timber product classes include:
 - Hardwood sawtimber, softwood sawtimber, softwood poles, hardwood poles, hardwood pulpwood, softwood pulpwood, mine props, ties, float logs, miscellaneous convertible

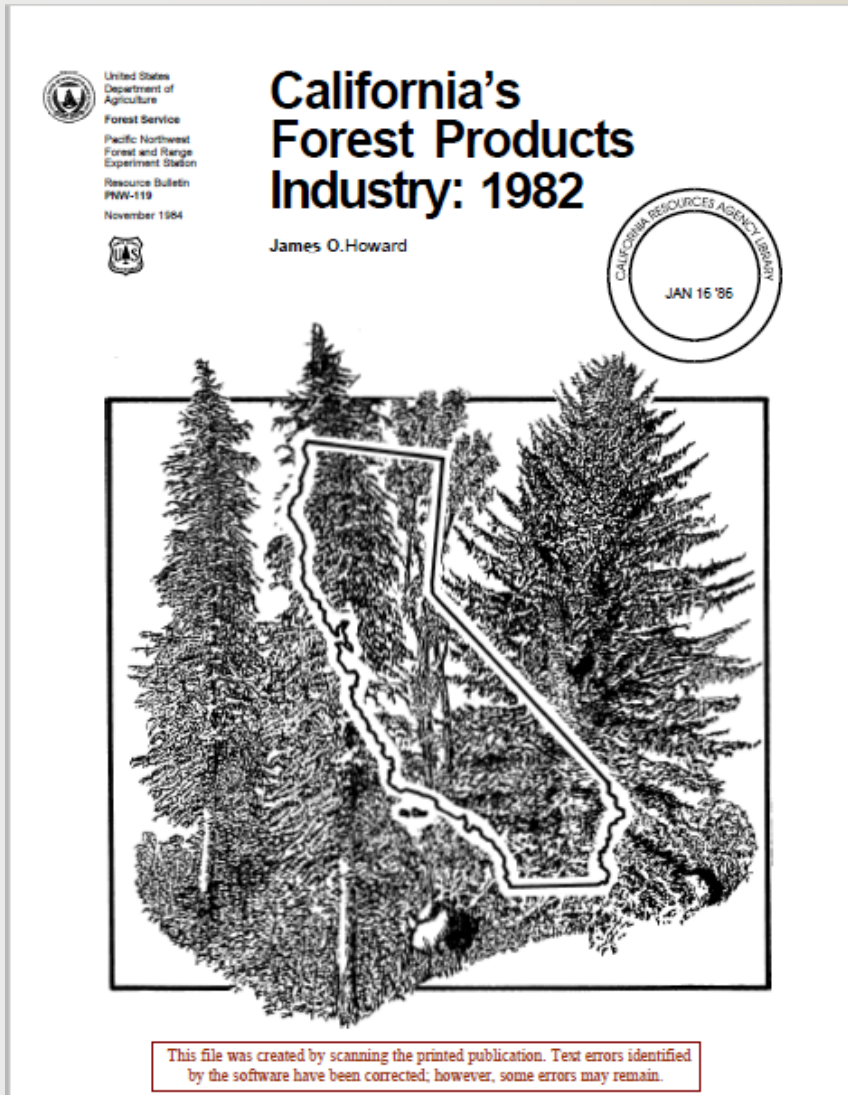
Oregon Timber Harvest and Use

1,057 MMCF of wood fiber

- **60% to sawmills**
- **14% to log exports**
- **13% to pulp mills**
- **12% to veneer mills**
- **82% of mill residue used for pulp & particleboard**
- **15% of mill residue used for energy**
- **0.5 MMCF (0.1%) not used**



Timber Product Ratios



This file was created by scanning the printed publication. Text errors identified by the software have been corrected; however, some errors may remain.

All Industries, California

Table 8—Log consumption by mills, by species, resource area, and industry, California, 1982
(THOUSAND BOARD FEET, SCRIBNER LOG RULE)

RESOURCE AREA AND LOGS/TYPE ¹	ALL SPECIES	DOUGLAS-FIR	REDWOOD	TRIE FIRS	SUGAR PINE	POINTEIRA PINE	LOCKEPOLE PINE	INCENSE-CEDAR	OTHER SOFTWOODS	WEEVILS
NORTH COAST:										
LUMBER	891,263	336,281	611,871	24,041	4,200	11,000	..	971	1,538	1,252
VENEER AND PLYWOOD	41,520	30,359	5,596	2,740	..	..	..	..	2,590	..
PULP AND BOARD	27,696	..	..	25,841	..	..	..	..	..	4,154
SHAKE AND SHINGLE	538	..	..	..	..	..	..	..	..	..
TOTAL	1,061,028	366,670	617,467	30,322	4,200	11,000	..	1,331	4,629	5,406
CENTRAL COAST:										
LUMBER	14,210	1,770	12,383	..	..	..	..	2,000	7	..
TOTAL	16,210	1,770	12,383	..	..	..	..	2,000	7	..
NORTHERN INTERIOR:										
LUMBER	512,915	95,201	..	85,356	95,918	237,675	2,562	33,294	490	200
VENEER AND PLYWOOD	92,837	13,784	..	78,244	482	2,038	..	..	..	..
TOTAL	605,752	109,985	..	163,600	97,378	240,980	3,055	33,294	490	200
SACRAMENTO:										
LUMBER	531,836	66,800	..	173,745	65,575	161,417	..	30,247	60	4,000
VENEER AND PLYWOOD 1/	23,223	3,910	..	18,662	13	500	..	..	..	..
TOTAL	555,059	70,710	..	192,407	65,588	161,916	30	30,247	60	4,000
SAN JOAQUIN:										
LUMBER	318,528	10,763	..	117,029	48,815	106,040	2,521	33,330	37	..
VENEER AND PLYWOOD 1/	..	..	..	..	..	..	..	..	..	..
TOTAL	318,528	10,763	..	117,029	48,815	106,040	2,521	33,330	37	..
EXPORT:										
LUMBER	..	..	..	..	..	..	..	..	..	..
VENEER AND PLYWOOD	2,370,777	533,000	524,324	405,171	178,504	616,385	5,114	66,912	2,130	5,452
PULP AND BOARD	158,390	47,360	5,596	81,575	475	3,271	494	..	2,685	..
SHAKE AND SHINGLE	27,695	..	..	..	..	..	..	..	..	4,154
EXPORT 2/	538	..	..	..	..	..	..	..	..	..
POST, POLE, AND PILING 2/	29,874	3,071	2,508	21,013	71	1,027	..	71	3,041	..
TOTAL	2,598,812	694,462	632,430	547,401	179,080	621,443	5,693	103,243	5,244	6,456

1/ Sacramentos and San Joaquin combined to avoid disclosure.
2/ All resource areas combined to avoid disclosure.

ALL AREAS:

LUMBER 2,370,777

VENEER AND PLYWOOD 158,390

PULP AND BOARD 27,695

SHAKE AND SHINGLE 538

EXPORT 2/ 29,874

POST, POLE, AND PILING 2/ 11,538

TOTAL 2,598,812

Primary Product Ratios

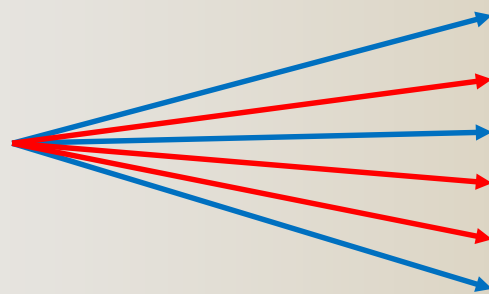
- Annual volumes of harvested timber products (e.g. softwood sawtimber) distributed to primary products
- The model has 64 primary product classes
- Examples of primary product classes include:
 - Softwood lumber, softwood poles, hardwood wood pulp, softwood wood pulp
- Example of a timber product distributed to primary products:

Timber product

Primary products

Sawmill products

Softwood sawtimber



Sawmill residue

Fuelwood and other

Lumber

Non-structural panels

Plywood

Other industrial products

Wood pulp

Oregon Mill Residue

About 4.8 million BDT of woody mill residue (excluding bark) generated annually. About 0.1% not used.



Most used for pulp/paper or particleboard (>82%)

Less used for bioenergy and landscaping/mulch

Result of wood products industry operating in OR

Table 27—Production and disposition of wood residue by sawmills, by type of residue, use, resource area, and mill-size class, California, 1982

(TONS, DRY WEIGHT)

ALL TYPES OF RESIDUE

RESOURCE AREA AND
MILL-SIZE CLASS 1/

USED 2/

TOTAL

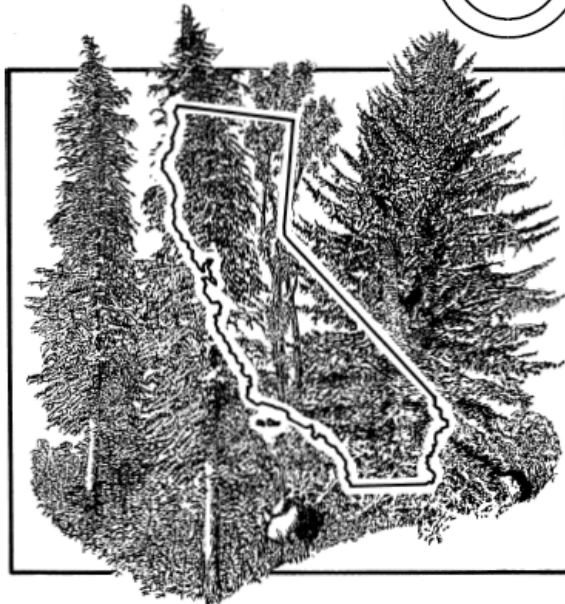
PULP BOARD FUEL MISCELLANEOUS UNUSED



United States
Department of
Agriculture
Forest Service
Pacific Northwest
Forest and Range
Experiment Station
Resource Bulletin
RMW-119
November 1984

California's Forest Products Industry: 1982

James O. Howard



This file was created by scanning the printed publication. Text errors identified by the software have been corrected, however, some errors may remain.

C	35,931	30,981	583	--	3,045	818	259
B	555,340	549,484	5,831	1,788	15,710	7,674	4,950
A	2,384,407	2,350,754	177,648	47,517	258,106	68,213	5,856
			876,007	248,884	1,017,881	107,982	33,653
TOTAL	2,980,361	2,935,643	1,060,049	398,167	1,292,742	184,685	44,718

See footnotes at the end of table.

HWP distribution examples

Timber product:

Softwood sawtimber

Primary products:

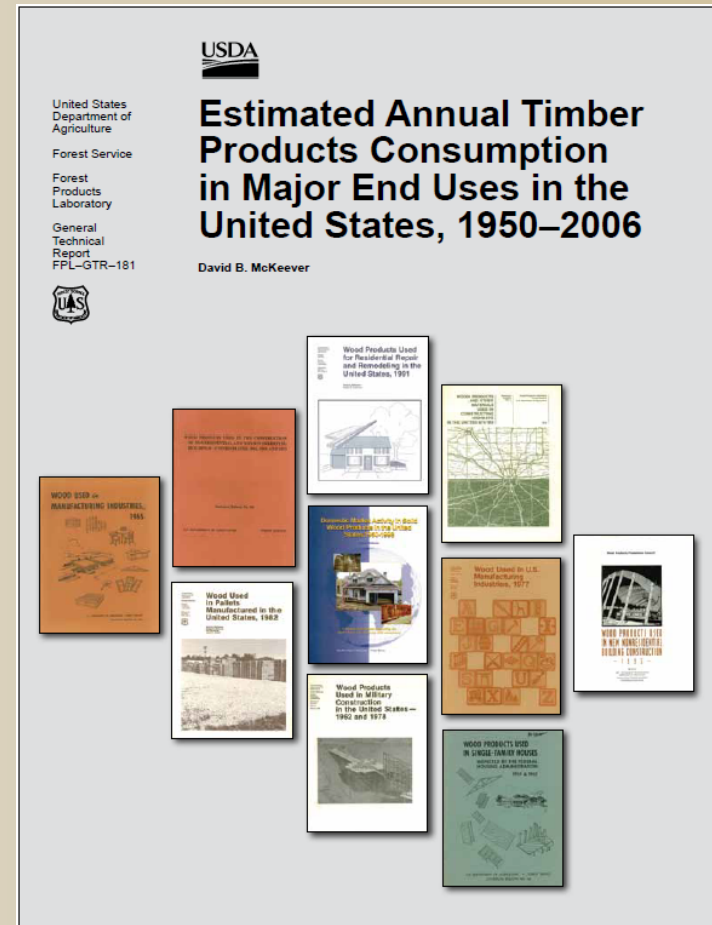
Softwood lumber, softwood plywood, mill residue pulp, mill residue fuel, mill residue non-structural panel, etc.

End uses:

New residential construction (single, multi family, mobile homes) residential upkeep and improvement, new non-residential construction, manufacturing (household furniture, other furniture, other products), shipping, other uses

End Use Ratios

- McKeever, David B. 2009. FPL-GTR-181
- 224 primary product end uses:
 - 47 each for HW and SW sawtimber
 - 47 each for HW and SW pulpwood
 - 36 for all other primary products



HWP Data Sources

- Annual Harvest data (several sources)
- Timber & Primary product ratios (from OR mill studies):
 - 2017, 2013, 2008, 2003, 1998, 1994, 1992, 1988, 1985, 1982, 1976, 1972, 1968**
- Wood to carbon estimates (Smith et al. GTR-343)
- Half-life data (Skog 2008)
- End use ratios (McKeever 2009)
- Fuelwood and wood waste emitted with energy capture, discarded products to landfills, dumps, compost (Skog 2008)

* **Bold font = user created data**; plain font = examples of data and parameters hard wired in the current HWP model

Run the model

Harvested Wood Products

Configure a simulation.

Download an Excel macro-enabled workbook that will help create the input data files [here](#). Use the HWP Ribbon to export data in the correct format for this tool or to add a new year. Do NOT change the basic format of any of the worksheets.

Steps:

1 Upload yearly harvest data

No file chosen

2 Upload yearly timber product ratios

No file chosen

3 Upload yearly primary product ratios or choose region for default ratios

See a map of the regions [here](#).

or No file chosen

4 Upload distribution parameters (optional and rarely used)

No file chosen

5 Upload ratios for burned with energy capture (optional and rarely used)

No file chosen

6 Enter number of iterations

Any number larger than 1 will result in Monte Carlo simulation and the only output will be a table of confidence intervals around carbon storage for each year.

Address to send email when done with Monte Carlo:

7 Run the model

<http://maps.gis.usu.edu/HWP/>

Annual Timber Product Output

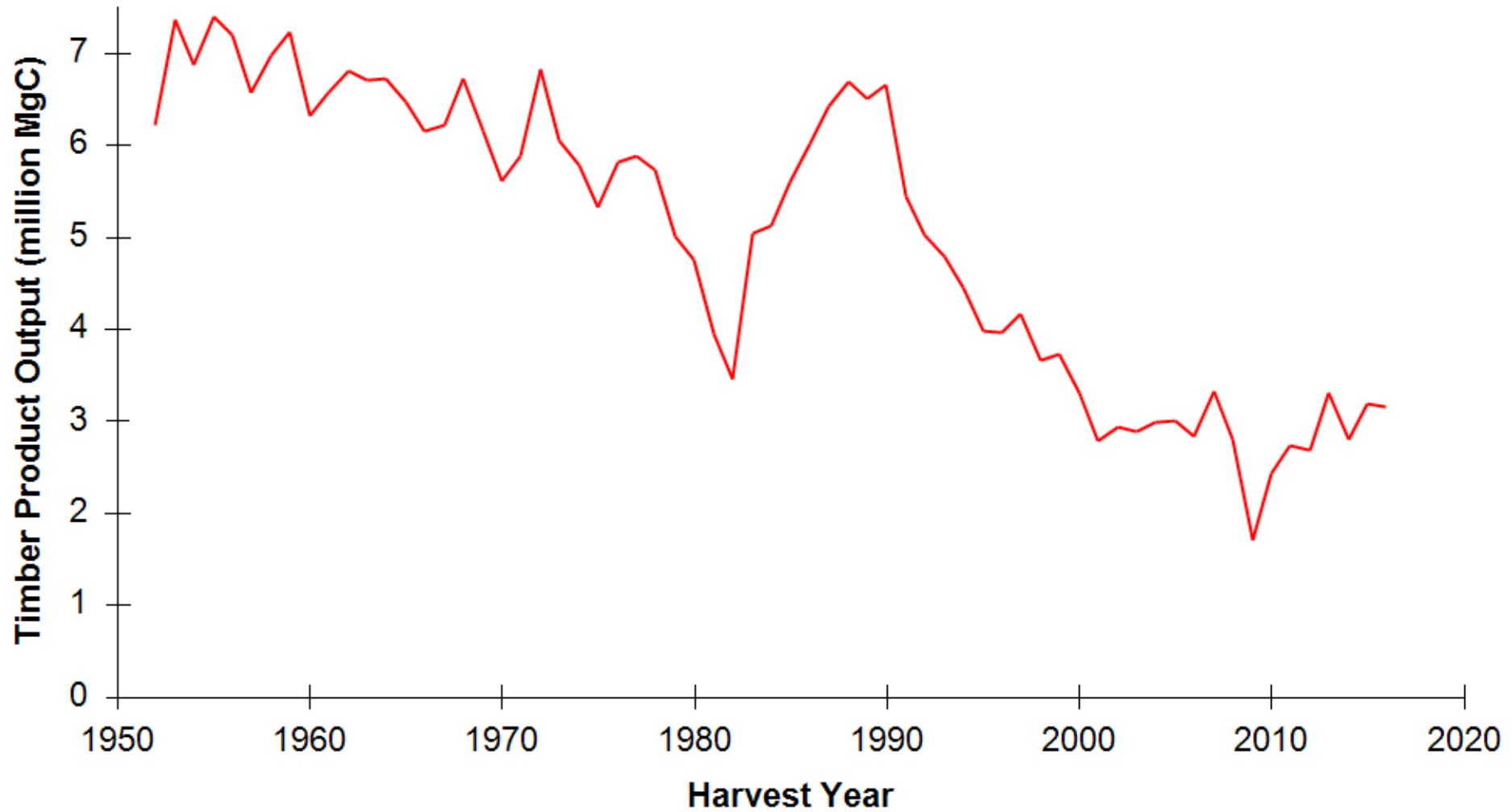


Figure 1. Annual timber harvest in California, converted to MgC, 1952 to 2016.

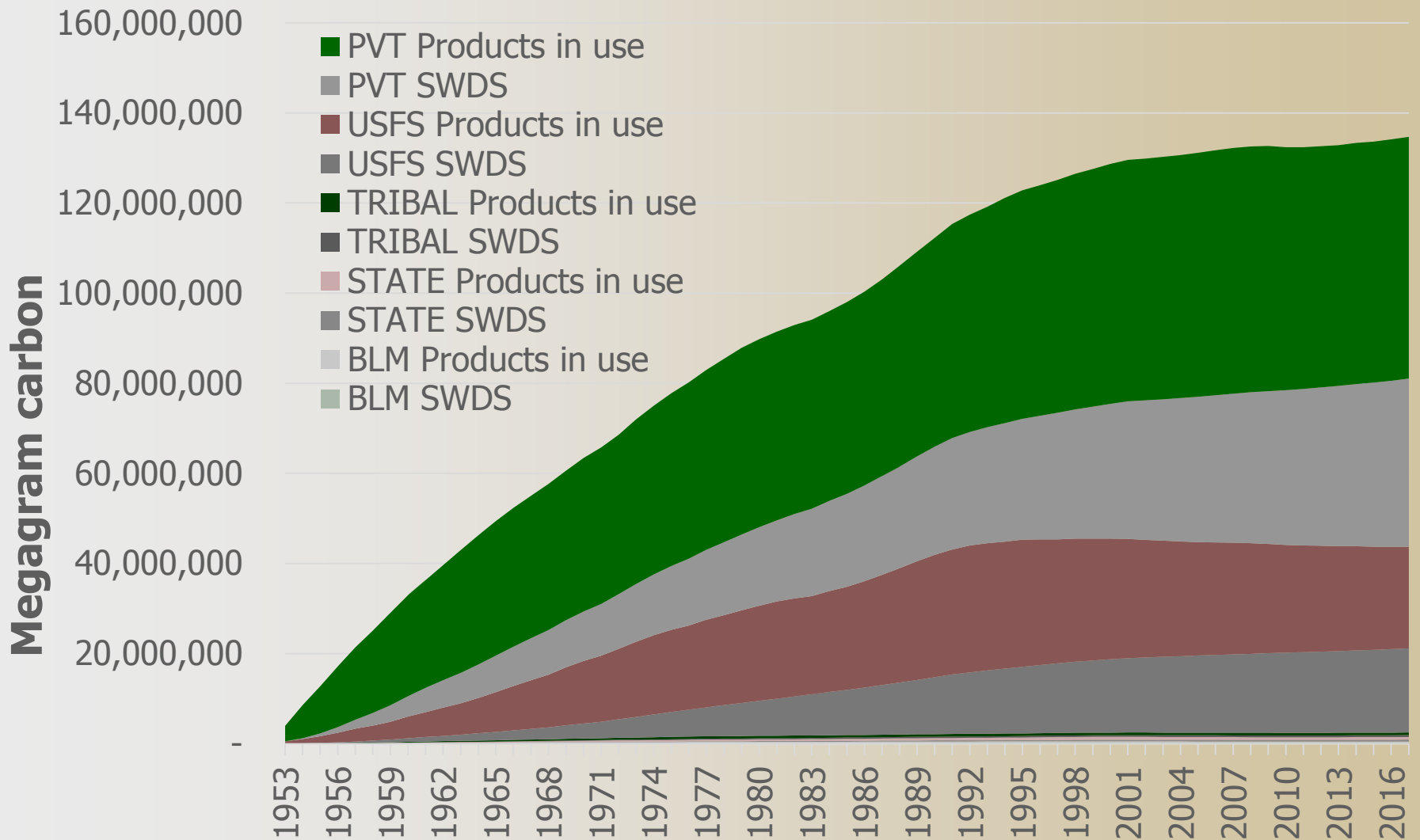


Figure 2. All ownership HWP C disposition of products in use and in SWDS

Oregon HWP C Analysis Schedule

1. Present methods & discuss with stakeholders & ODF (Oct 2018)
2. Gather historic data: harvest volumes, information to develop timber & primary product ratios (Oct 2018 – Jan 2019)
3. Investigate & update (where possible) OR-specific model parameters such as use & disposal rates, decay functions (Jan – May 2019)
4. Preliminary results & workshop with stakeholders (Jun/Jul 2019)
5. Draft final report to ODF (Sep/Oct 2019)

Thank you!



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