



Minnesota residential wood combustion burning survey

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August 2019

Agenda

Background

2017 Survey

Result

Emissions

Key findings and limitations

Background

- Survey done since the 1960s
- Informs policy
- Manage forests
- Emission inventory
- Wood-burning trends

2017 Survey

Start Here ▶ In the last year, have you burned any wood?

- NO. Please return the survey with this box checked.
You do not need to answer any other questions.
- YES. Please continue.



Residential Wood Fuel Survey
Minnesota, May 2017-April 2018



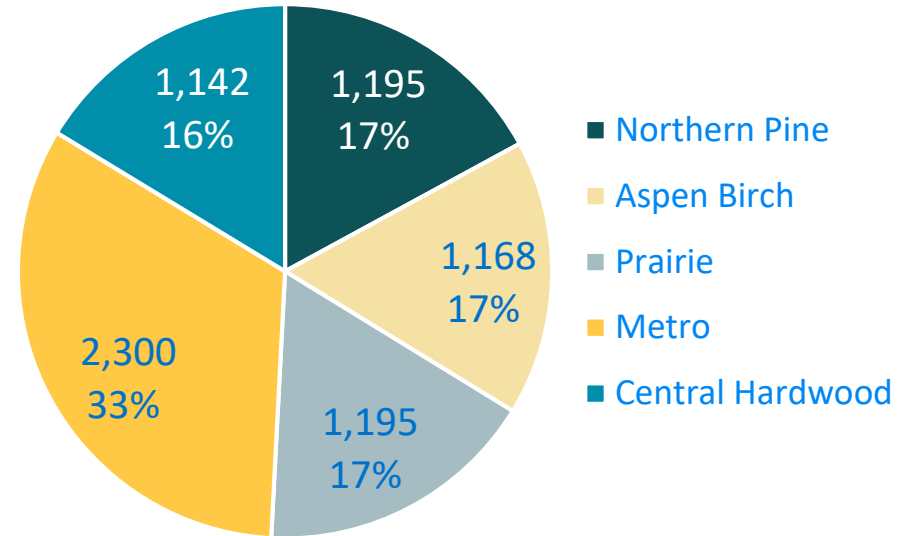
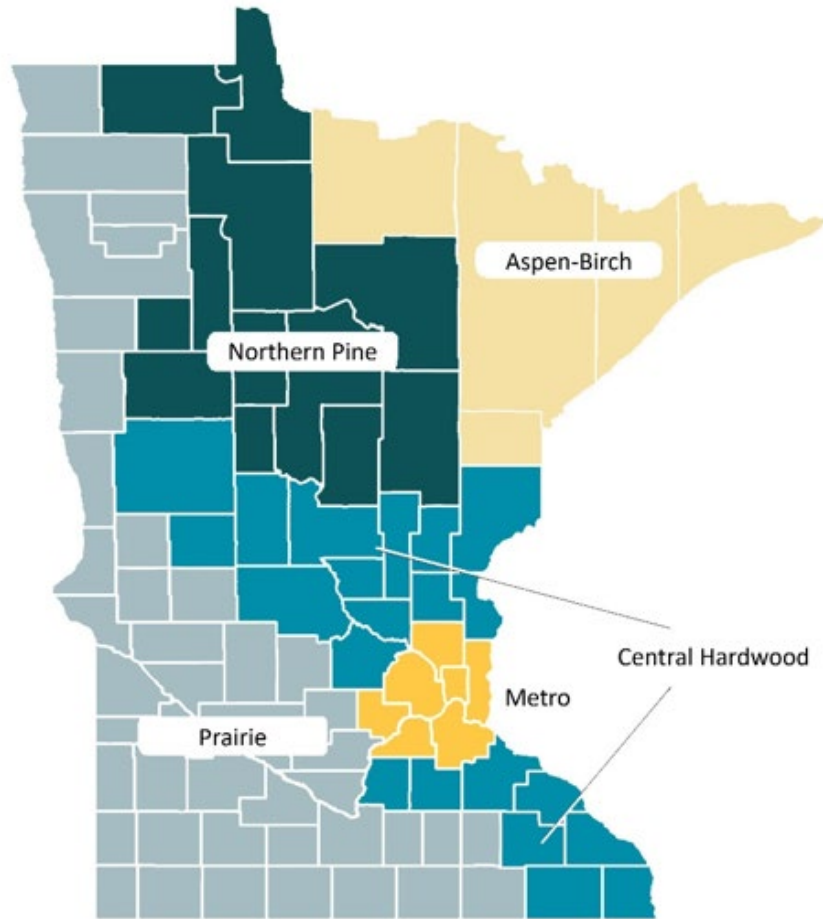
Conducted by the Minnesota Pollution Control Agency in partnership
with the Department of Natural Resources and the US Forest Service

- Design
- Sample selection
- Changes from previous surveys
- Survey administration
- Mailings and response rates

2017 Survey Cont.

- 7000 random addresses
- Only paper surveys
 - Invitation letter and a survey
 - Reminder postcard
 - Final survey packet
- Moved “In the last year, have you burned any wood?” to the front of the survey
- Simplified questions about wood burning equipment
- Wood storage

Survey regions

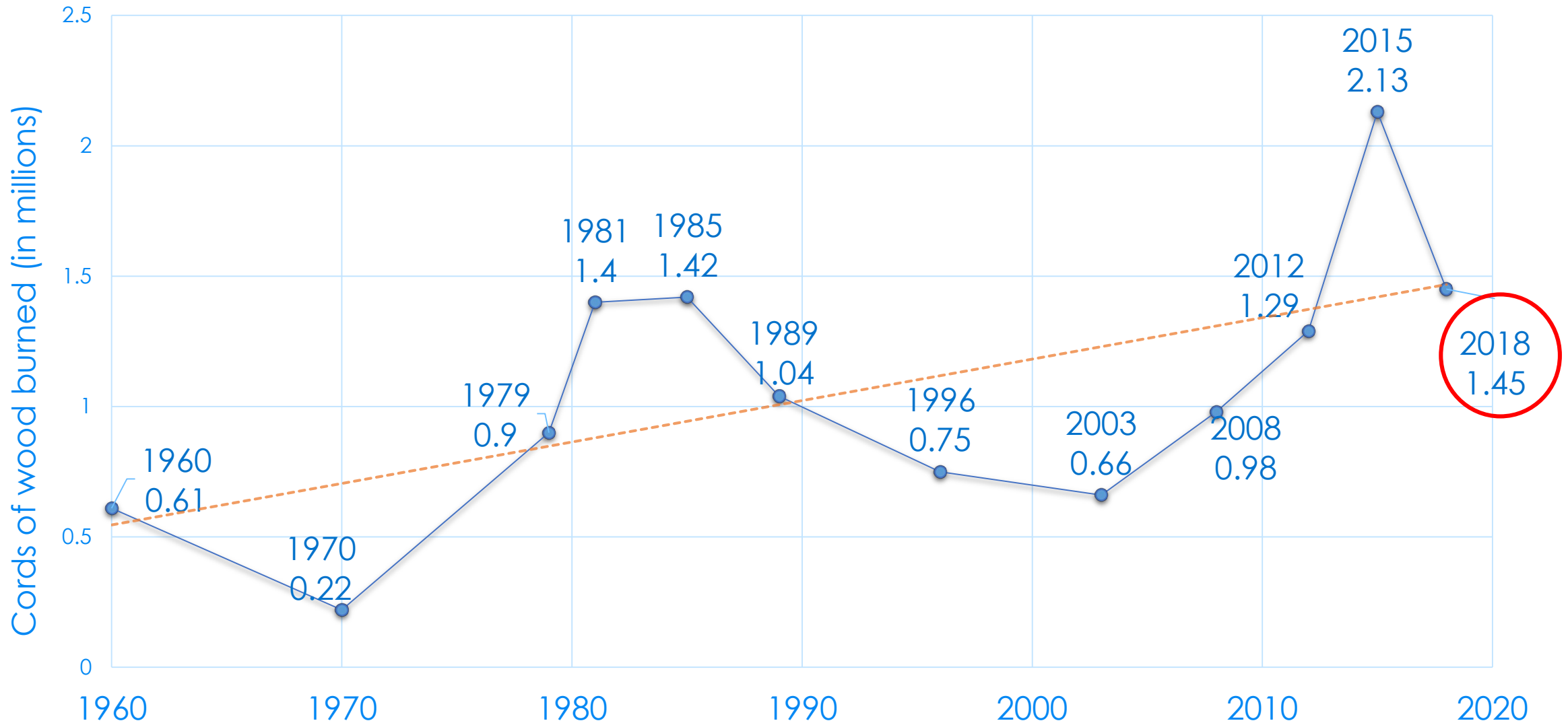


Response rate per region

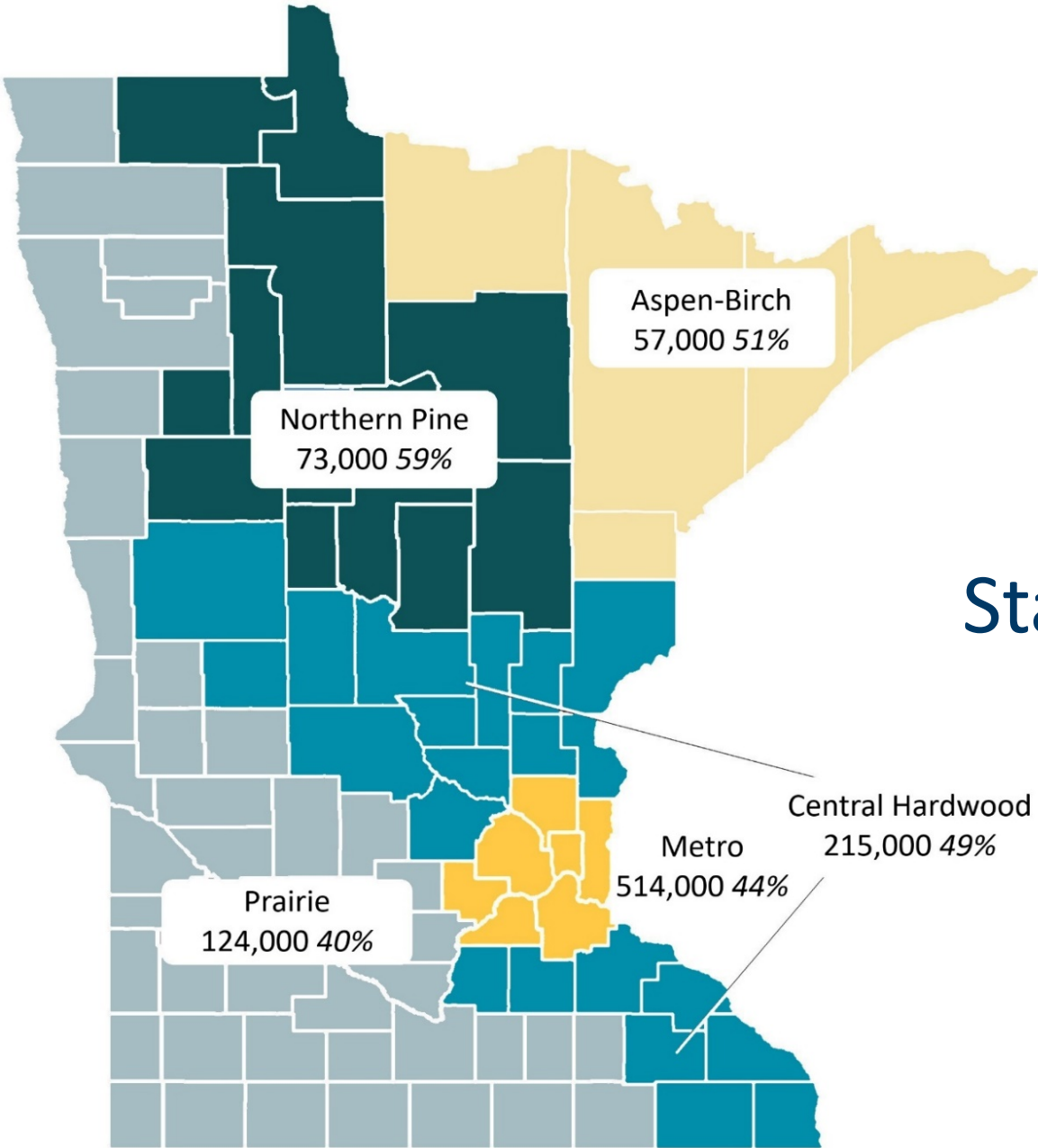
	Northern Pine	Aspen-Birch	Prairie	Metro Area	Central Hardwood	Statewide
Number of occupied housing units*	124,402	112,486	313,278	1,167,668	435,368	2,153,202
Number of addresses in sample	1,195	1,168	1,195	2,300	1,142	7,000
Number of addresses returned as undeliverable	59	52	49	54	32	246
Number of refusals	1	1	1	-	-	3
Total surveys returned	283	278	262	457	278	1,558
Response rate	24.9%	24.9%	22.9%	20.3%	25.0%	22.3%
Survey respondents, by location of primary residence	275	278	262	468	275	1,558
Regionally-adjusted scaling weight**	452	405	1,196	2,495	1,583	N/A

**Number of households represented by one survey respondent from the region (total occupied households divided by survey respondents, by location of primary residence)

Volume of wood consumed over survey years

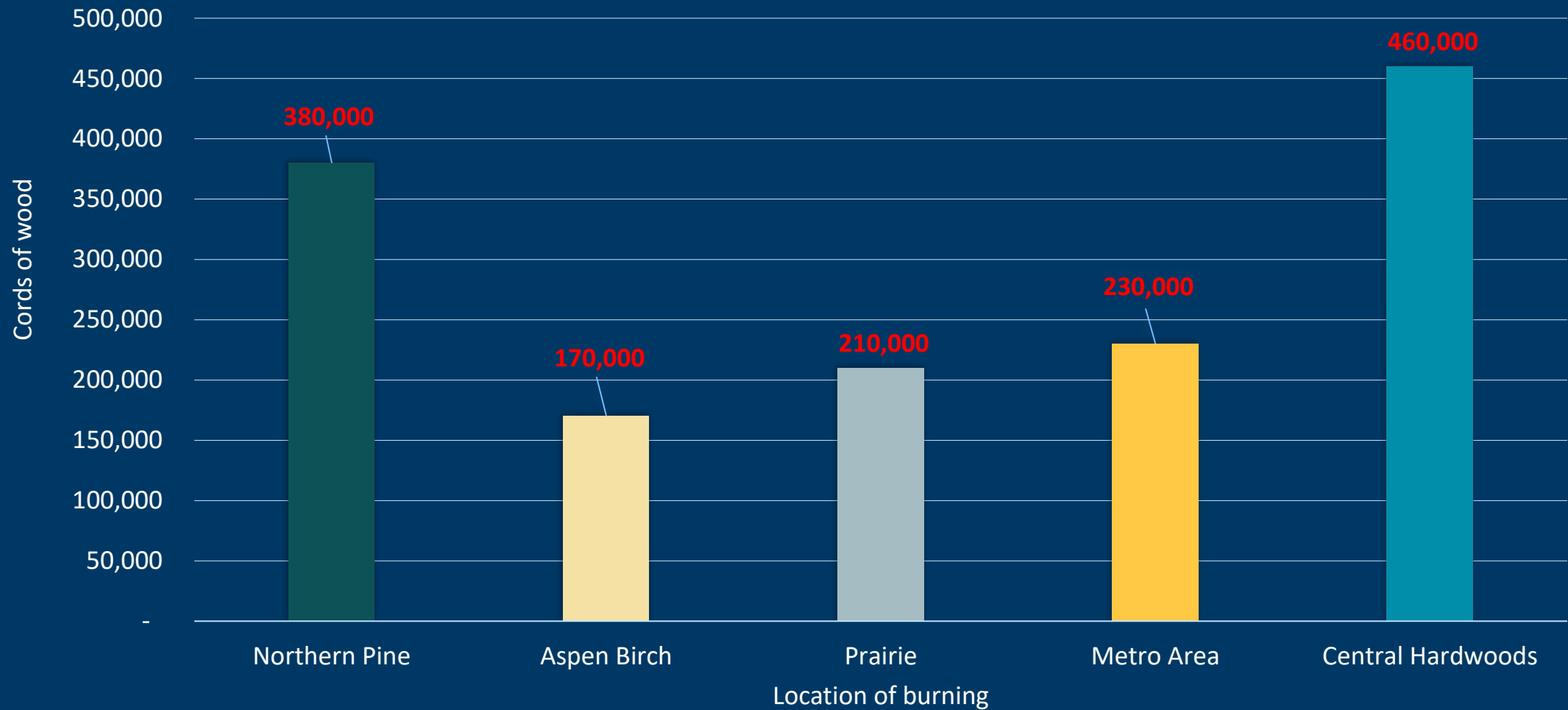


Percentage of households burning by region

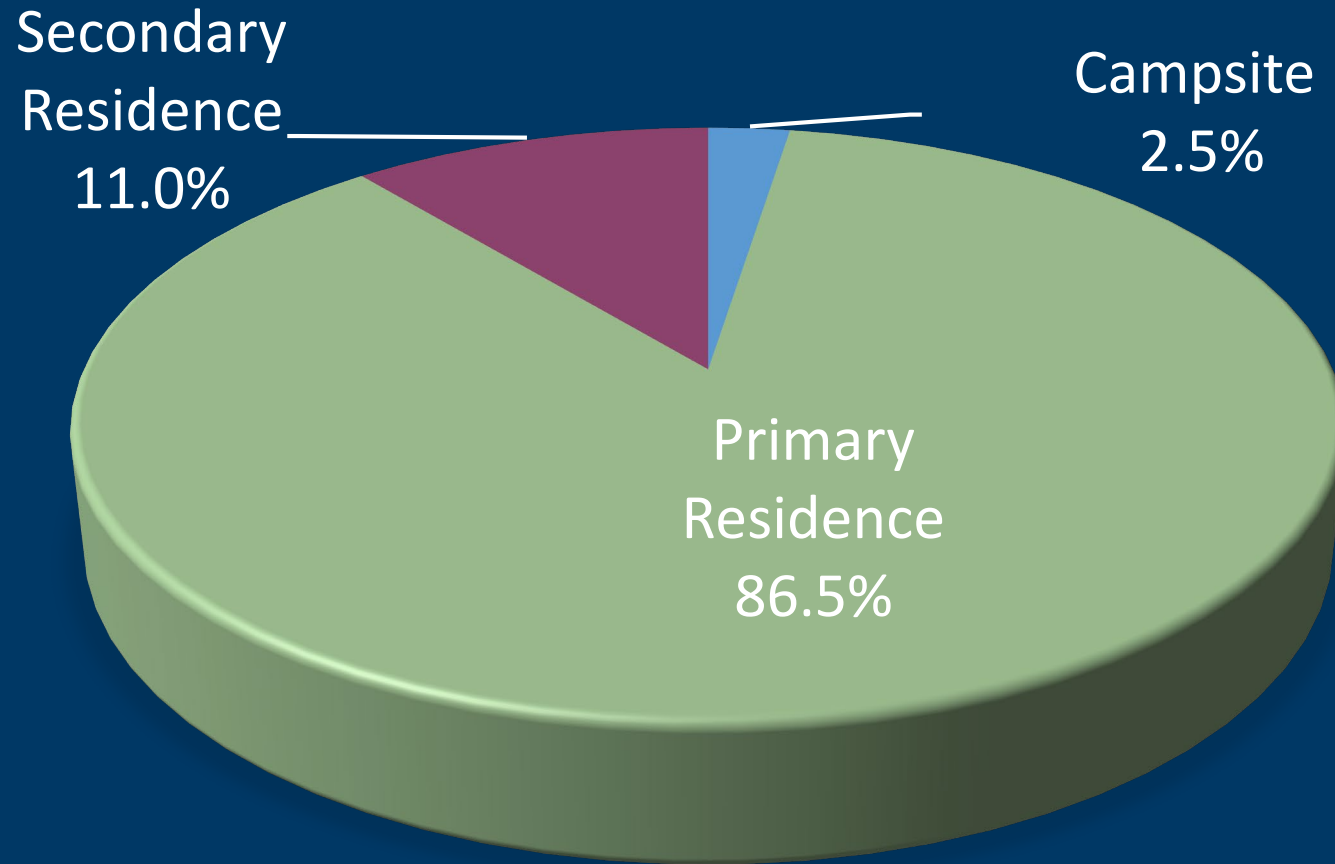


Statewide burning rate **46%**

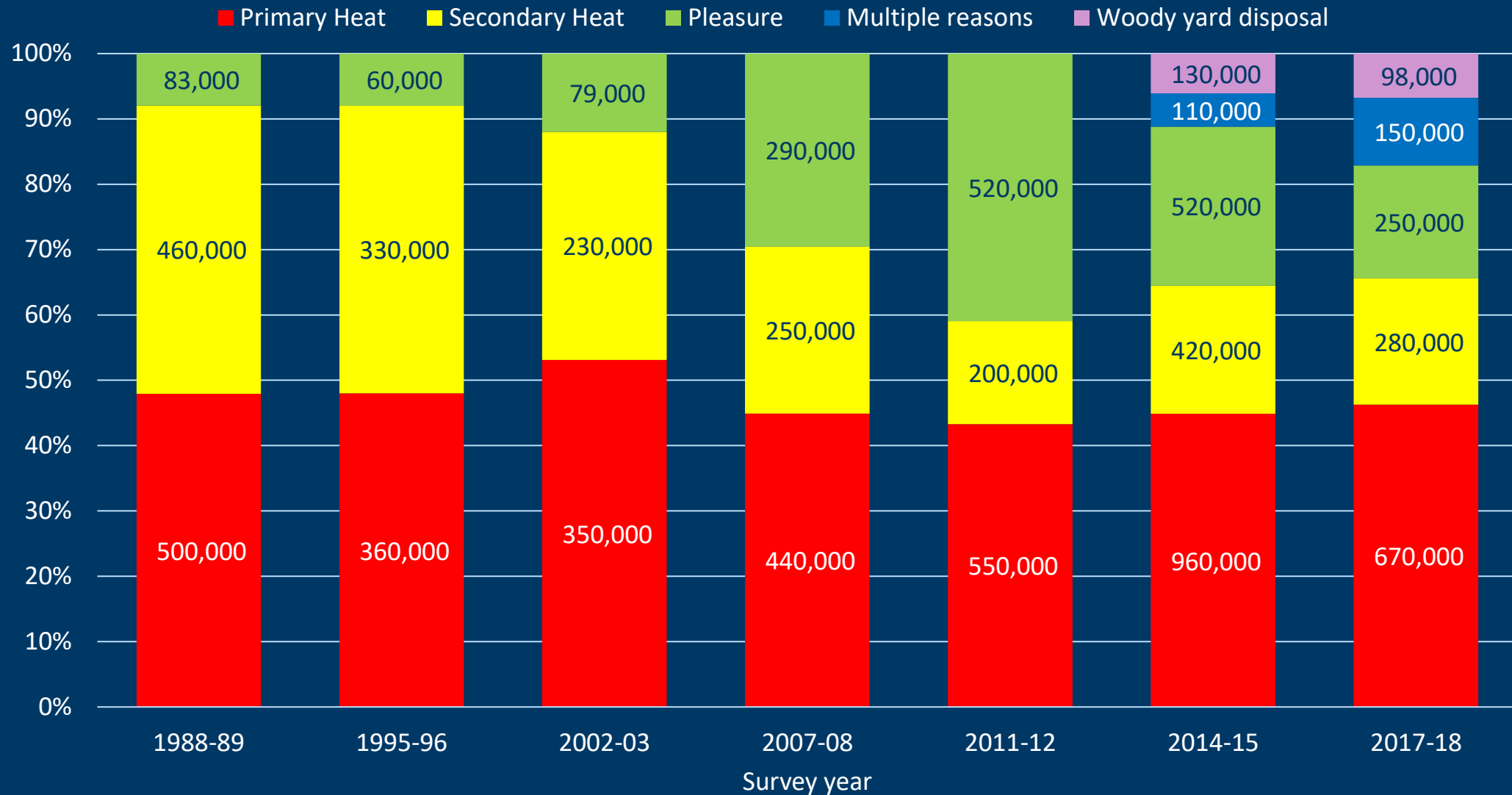
Volume of wood burned by region



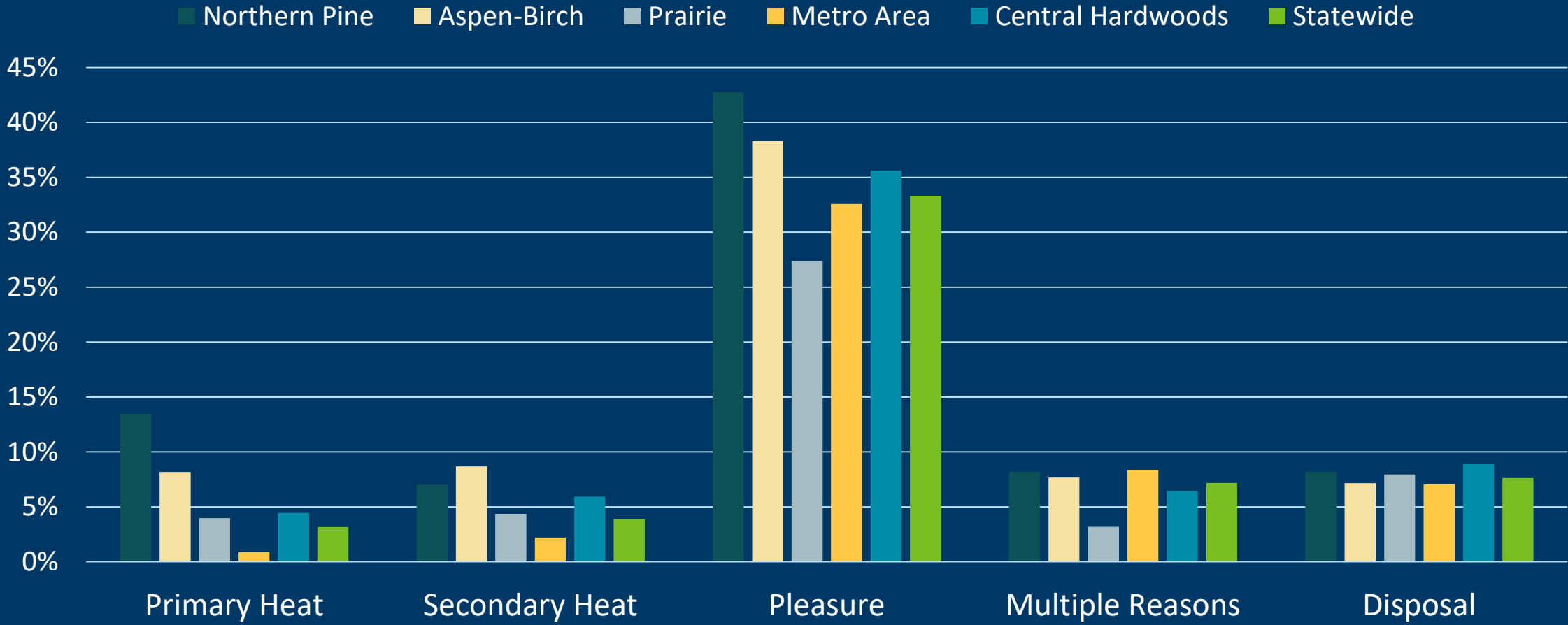
Wood burned by property type



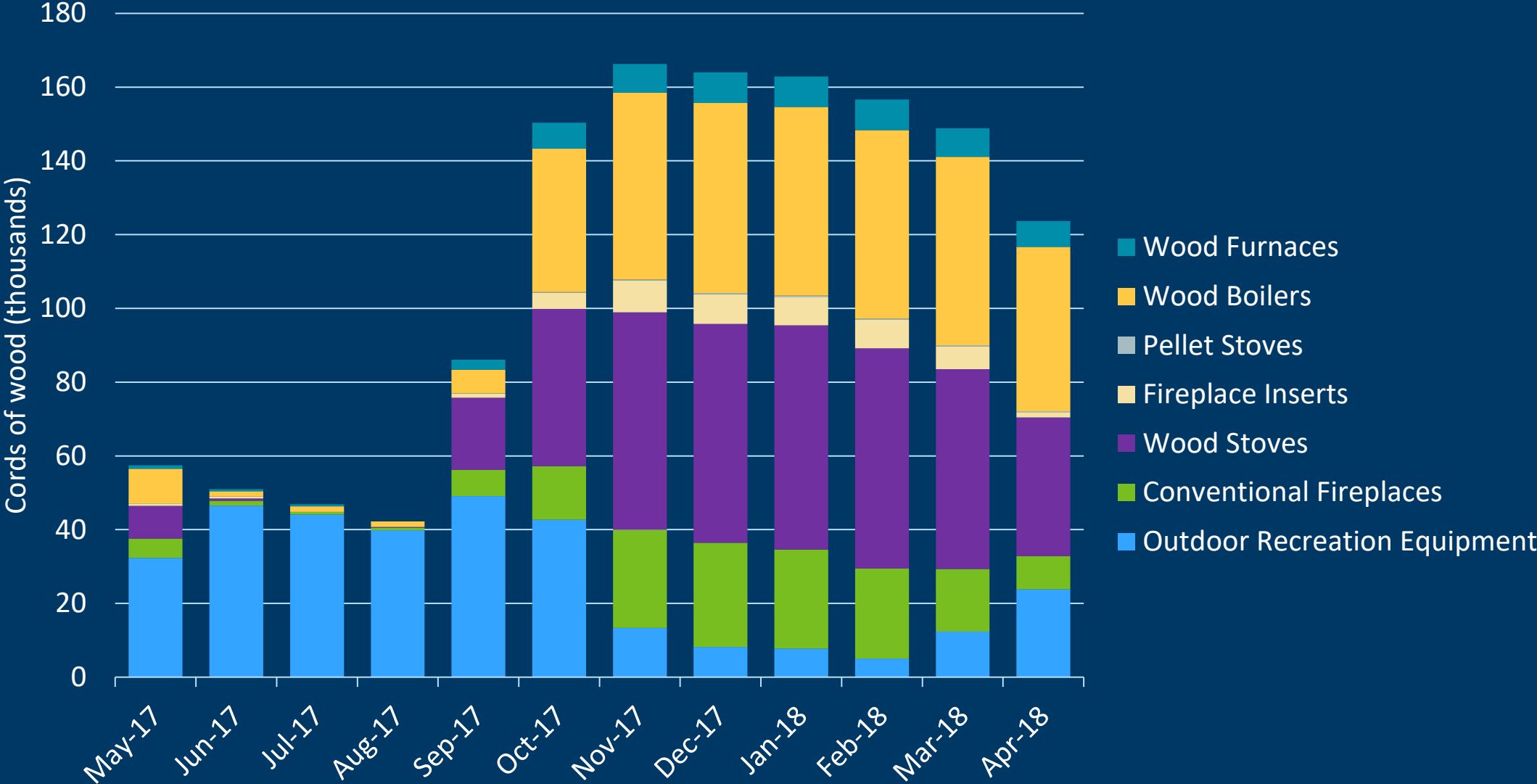
Wood burned by reason for burning over time, as percent of total wood burned



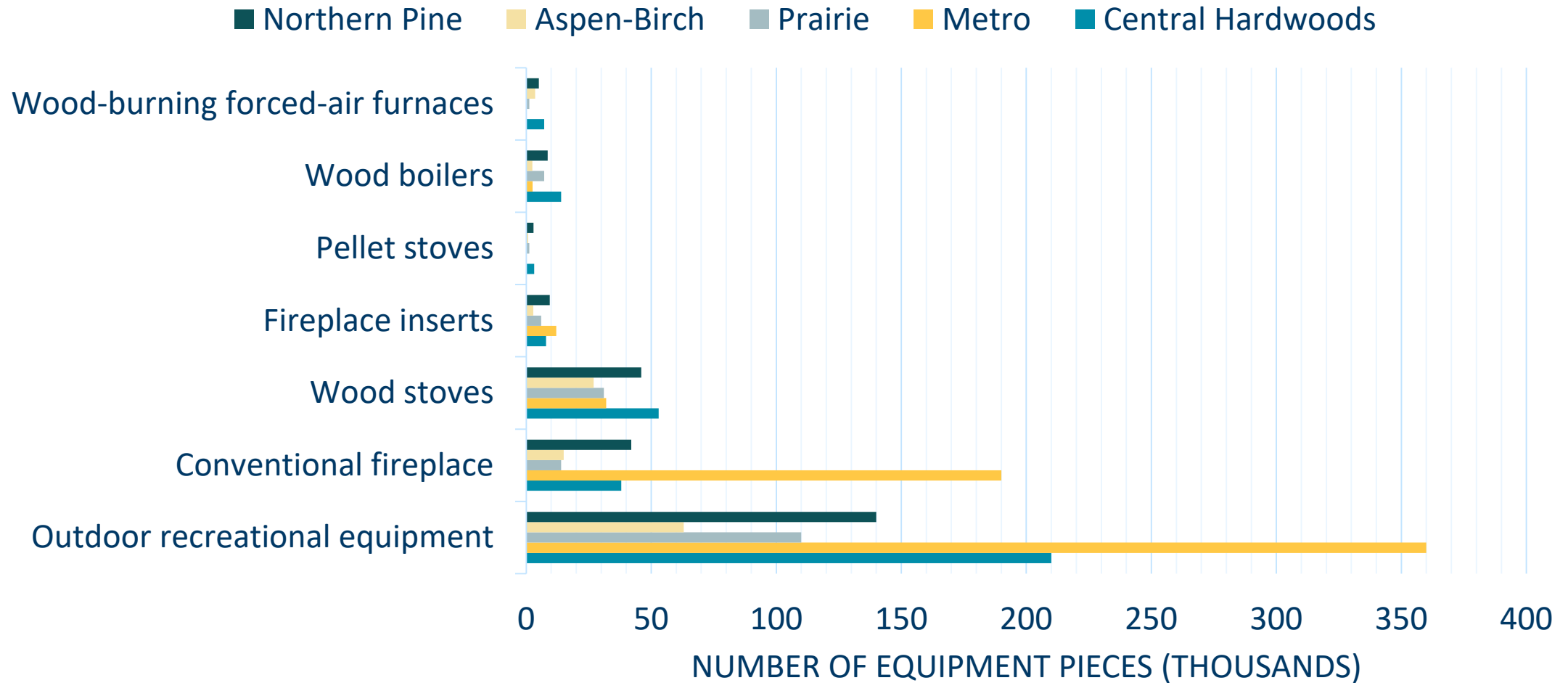
Percent of household population per region that burn by reason



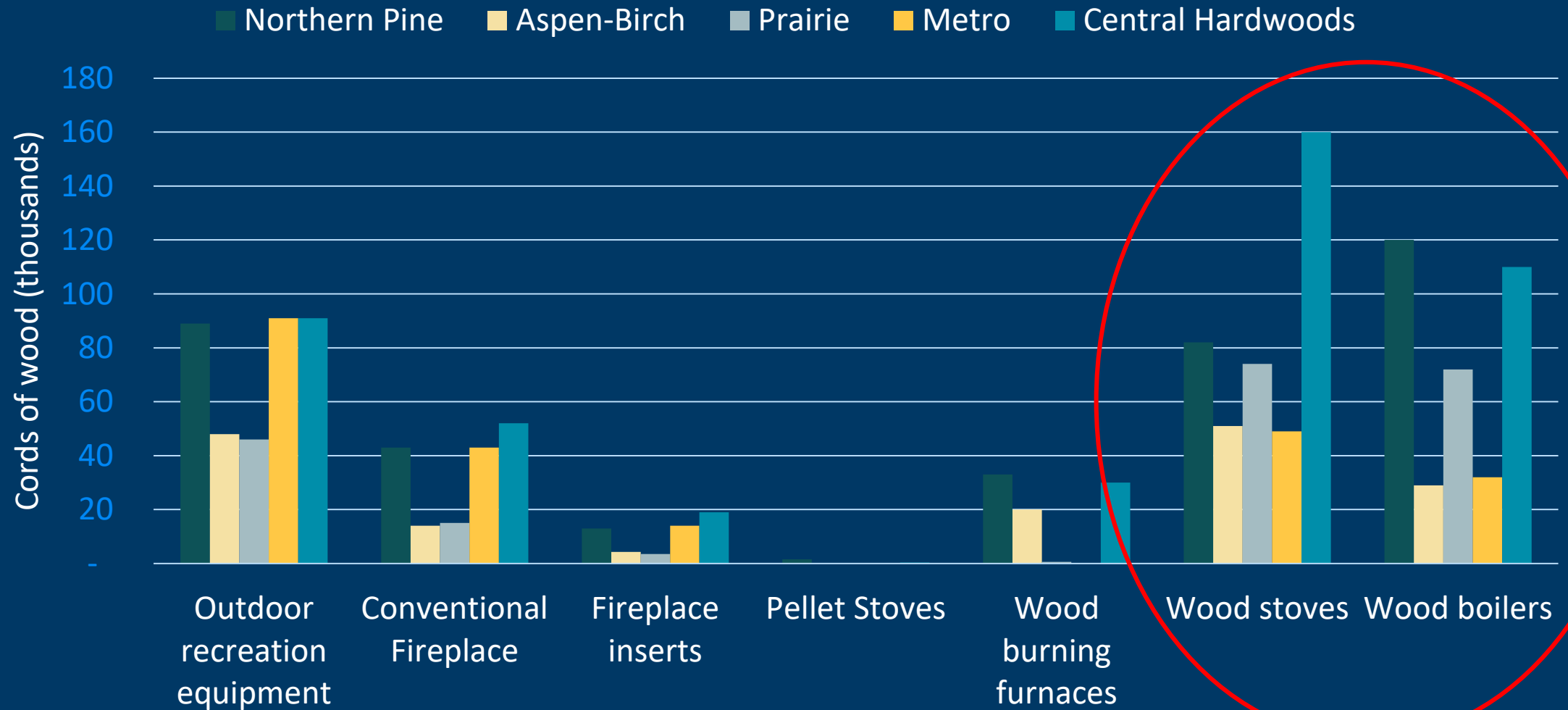
Volume of wood consumed each month by equipment type



Number of pieces of equipment

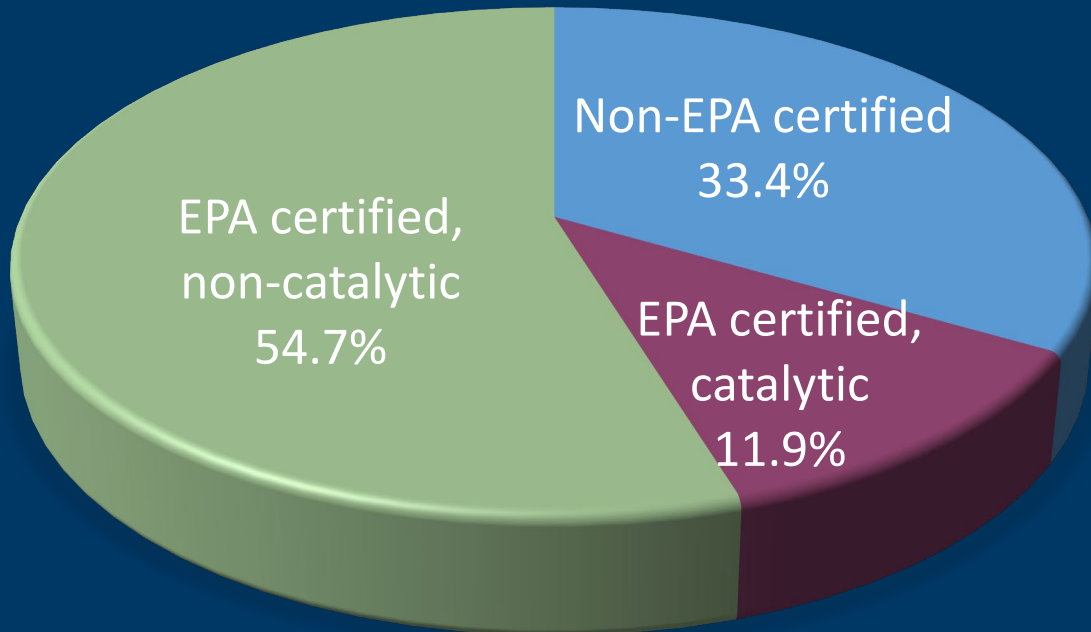


Estimated volume of wood by equipment type by location

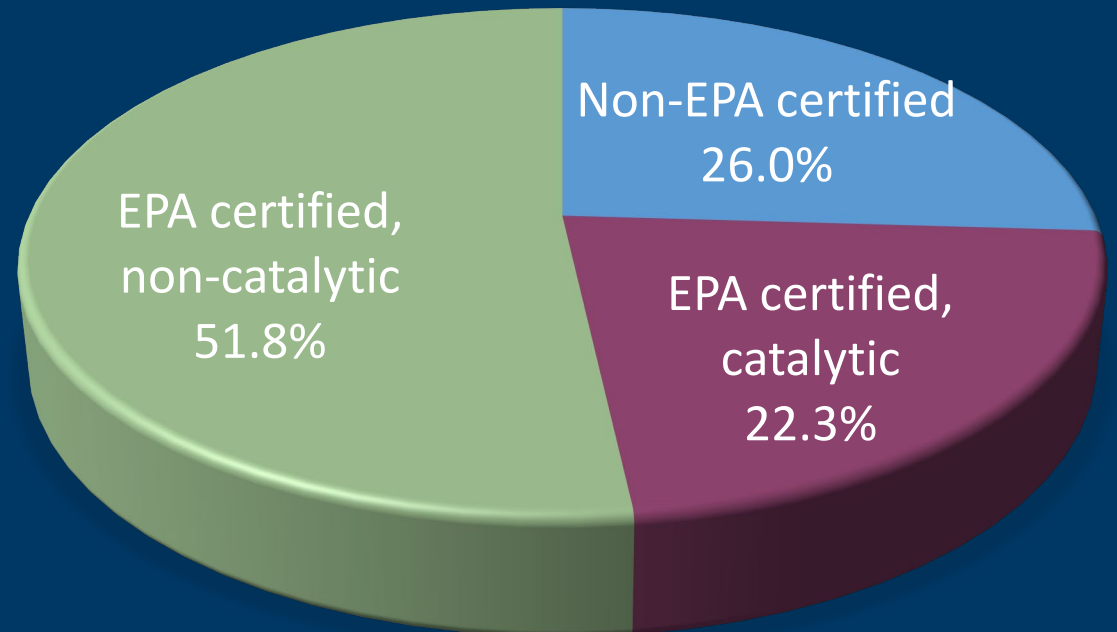


Woodstoves and fire place interests

Wood Stoves

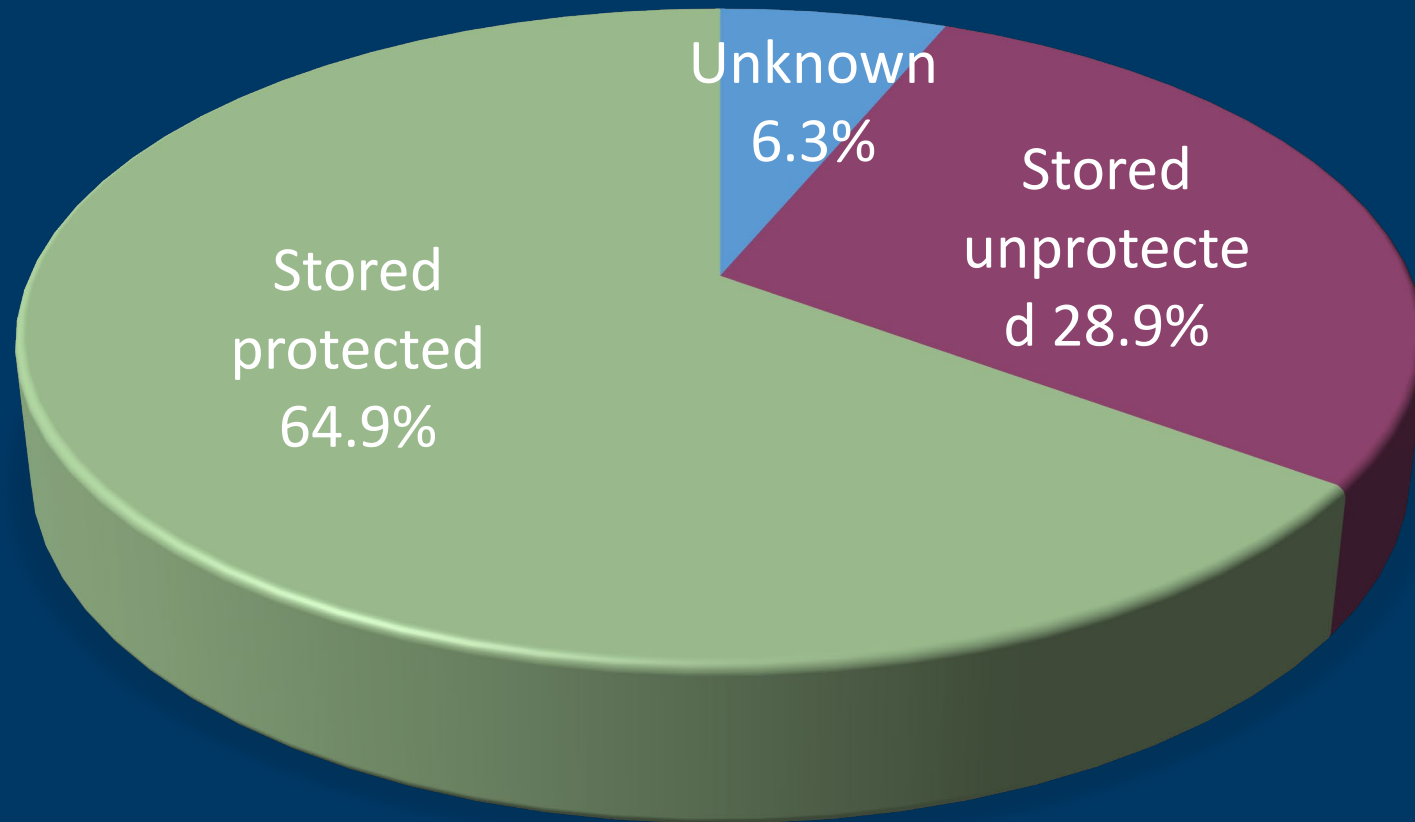


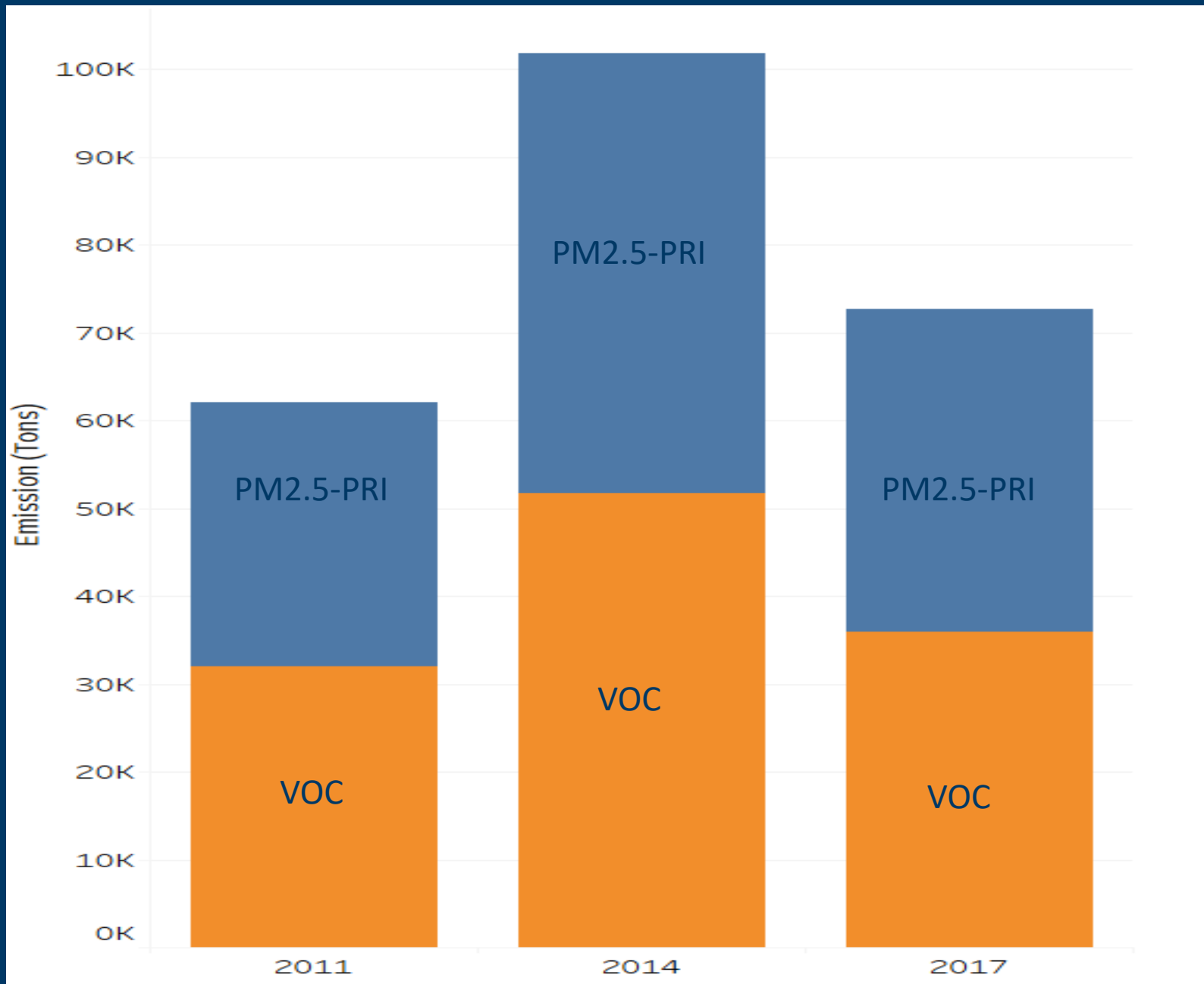
Fireplace Inserts



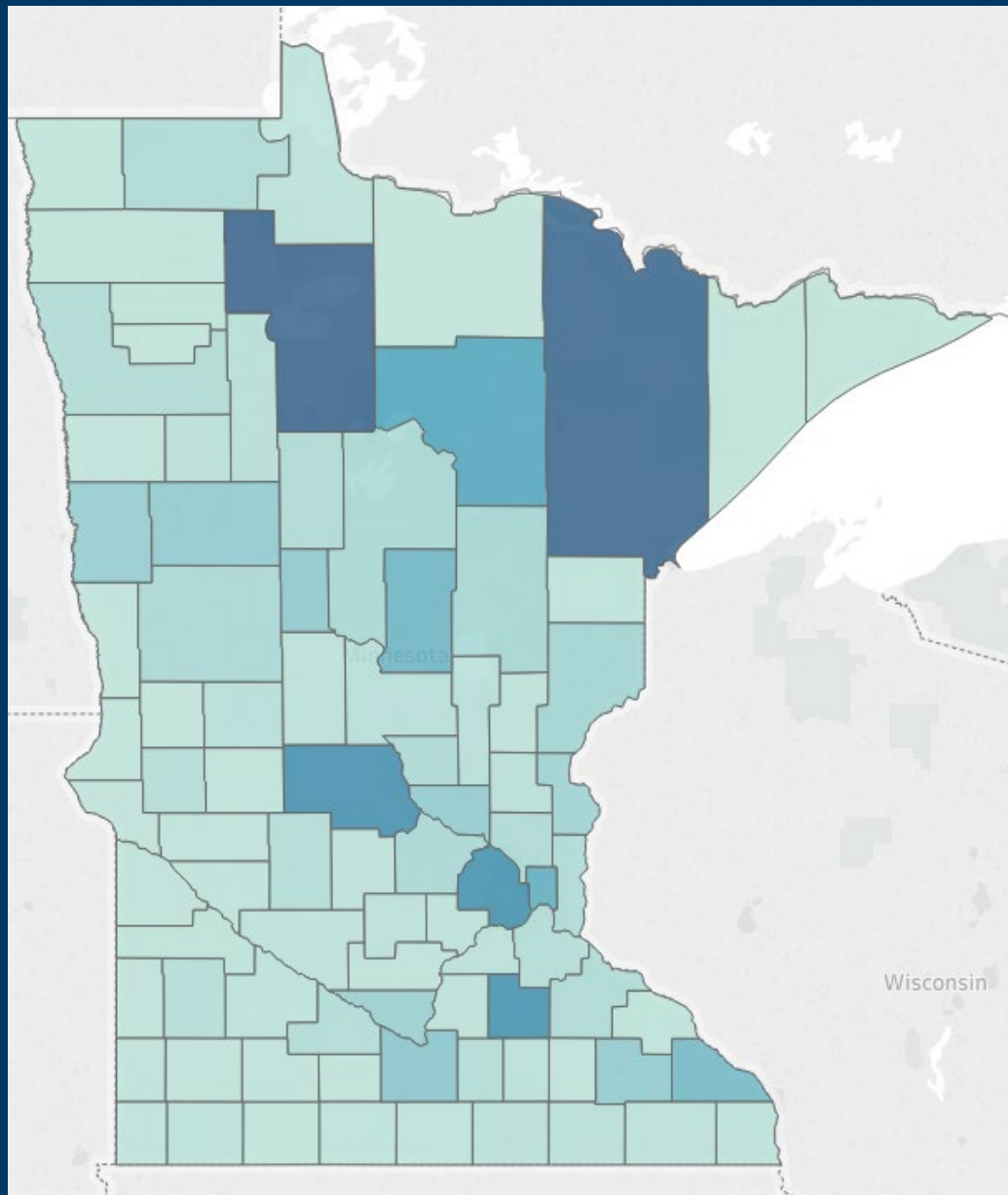
88.7% of Fireplaces: general (not inserts)

Storage conditions of burned wood

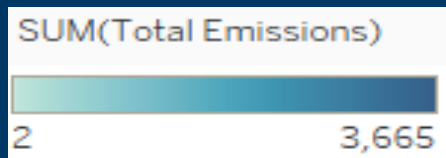




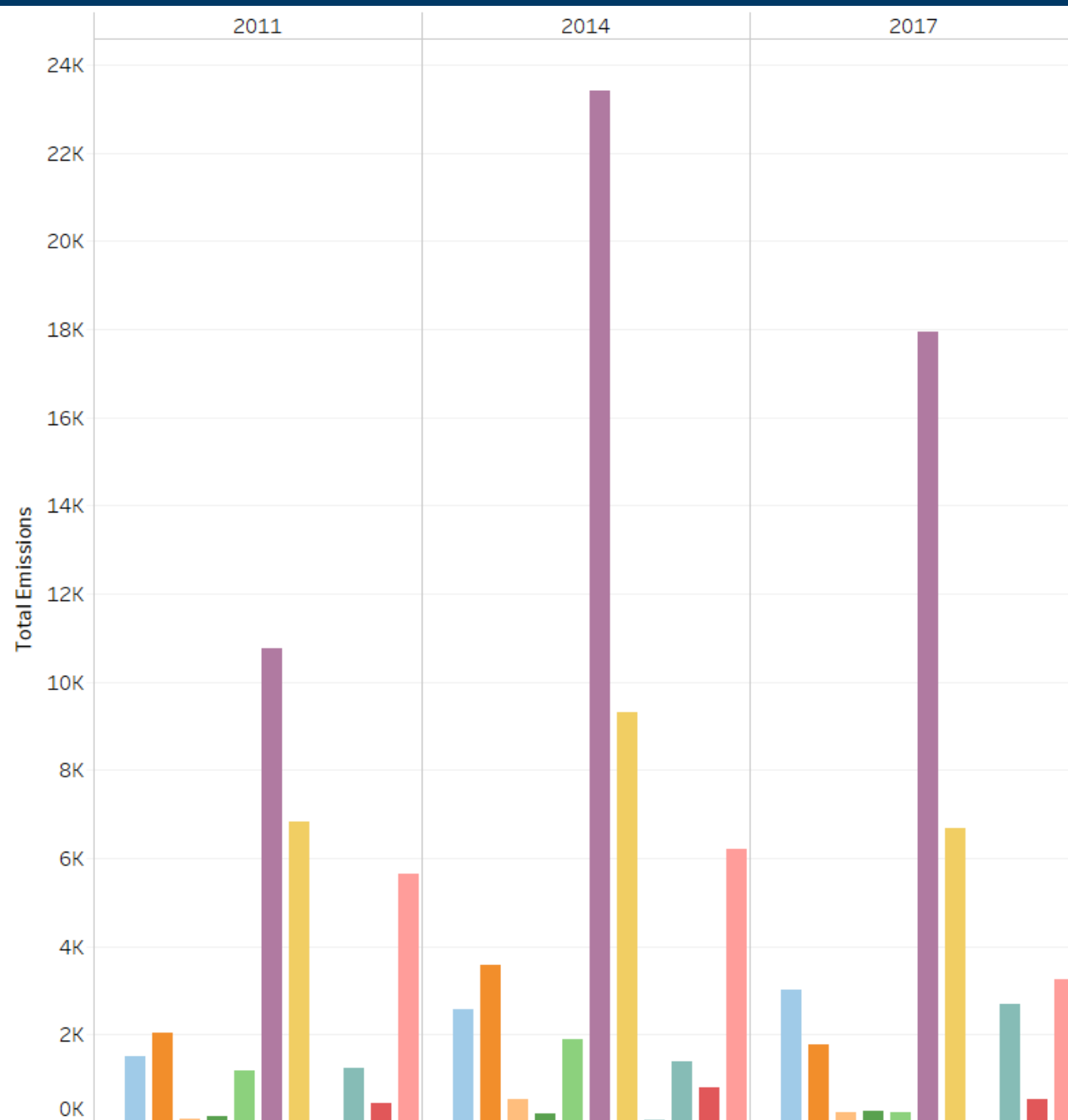
Statewide
emissions by
year



2017 PM2.5 emissions by county



PM2.5 Emissions per Equipment



Key findings and limitations

- Wood burning is increasing over time
- 46% of all MN households burn wood
- Most wood used for primary heat
- Woodstoves and boilers use most wood of all equipment types
- Emissions are down compared to 2014

Key findings and limitations

- Most wood that is burned is protected from the elements
- In the future we may use this data to compile state specific emission factors
- 2020 woodstove emission factors/outdoor recreational equipment factors
- No information about equipment numbers per household

Thank you!

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