

EUS Survey Program Manager Survey Design Exercise


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10/02/2025





Objectives

1. Assessment approach, logic, and assumptions
2. **Answer Key Questions:**
 - I. Using the data provided in the Mechanical_One_Line tab, the data dictionary, and the accompanying RBSA user guide, *please assess how well or poorly conclusions about HVAC equipment in manufactured homes can be made.*
 - II. Based on your assessment, what improvements could be made to the upcoming RBSA?
3. Key considerations around design, scope, and budget for leadership to consider
4. Gap analysis. What other data and information would you recommend seeking out to inform your assessment?
5. What questions came up as you developed your business case?



Assessment Approach, Logic, & Assumptions



Assessment: An epidemiologic approach



Methodology



Survey Design



Research Questions / Hypotheses



Data Quality



Analysis



Limitations



Conclusions



2022 Residential Building Stock Assessment (RBSA) Methodology

- The 2022 RBSA database is to provide a current, robust, and representative characterization of the existing residential single-family and multi-family building stock in the Northwest.
 - Data is collected from single & multi-family residences in urban/rural regions of Idaho, Montana, Oregon, & Washington
 - Data can be further divided by building type, including:
 - Single family home
 - Apartment
 - Duplex/Triplex/Fourplex
 - Townhome
 - Manufactured home
-

2022 RBSA Limitations

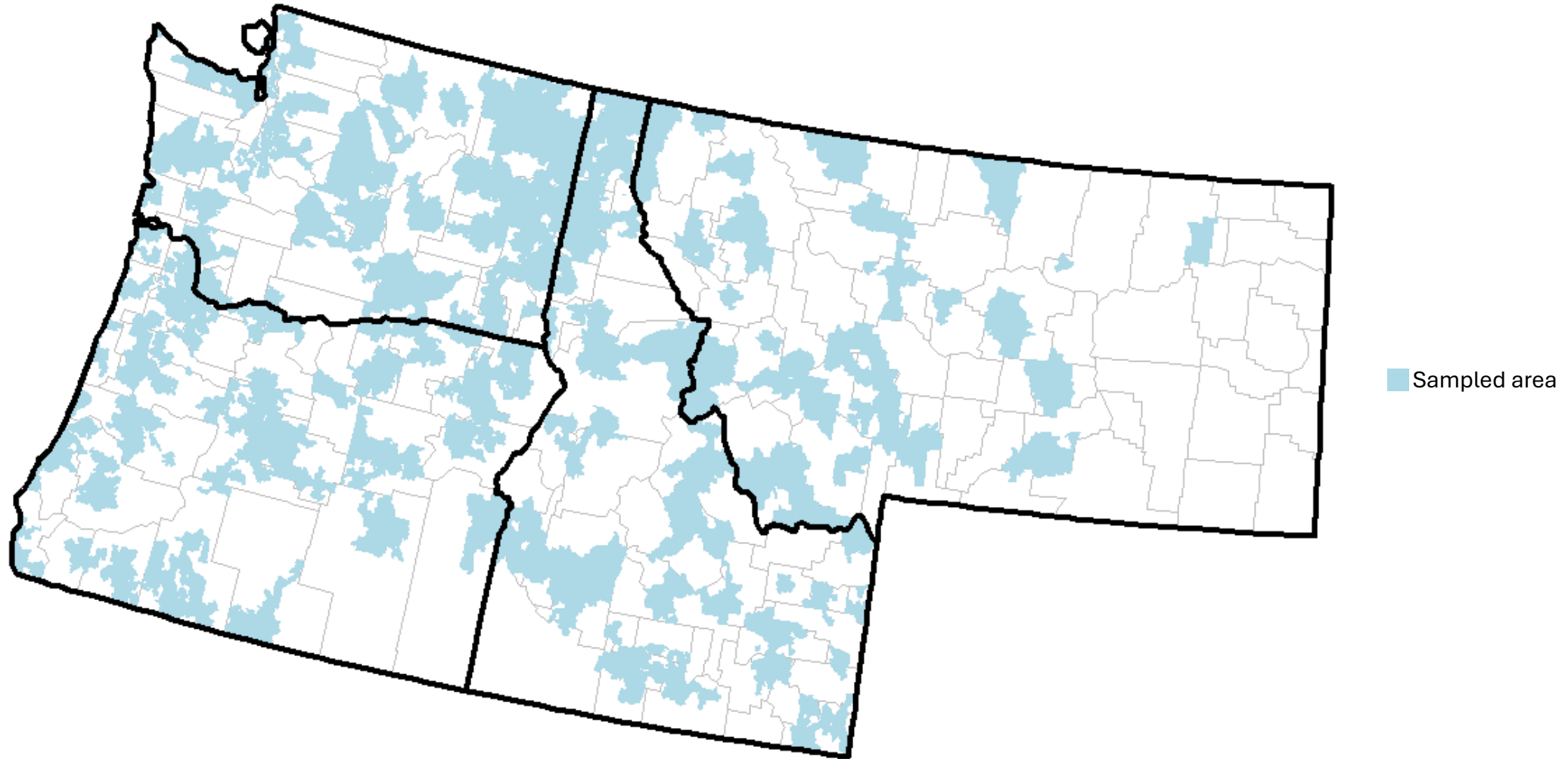
- Demographic data is **not** supported
- Multi-family buildings in Idaho and Montana is small
- Analysis of $n < 10$ are **not** recommended
 - Usually a consequence of overly specific analyses
- Manufactured homes analyses **cannot** be compared to previous RBSA studies
- Does **not** support analysis by manufacturer or regional availability of equipment

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Survey Summary

Survey Sample Collection Area



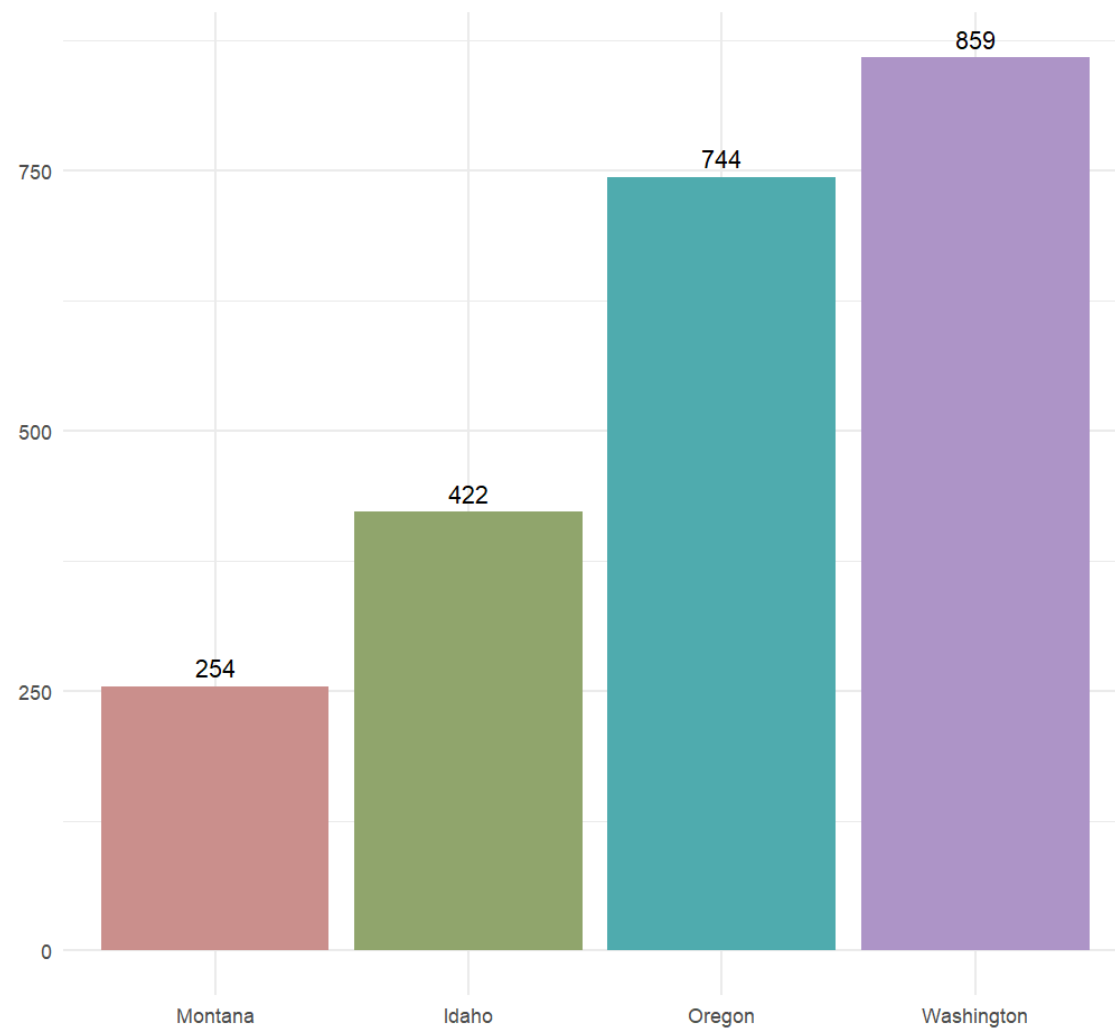
Source: 2020 US Census & 2022 RBSA survey

N = 2,279



Responses by State

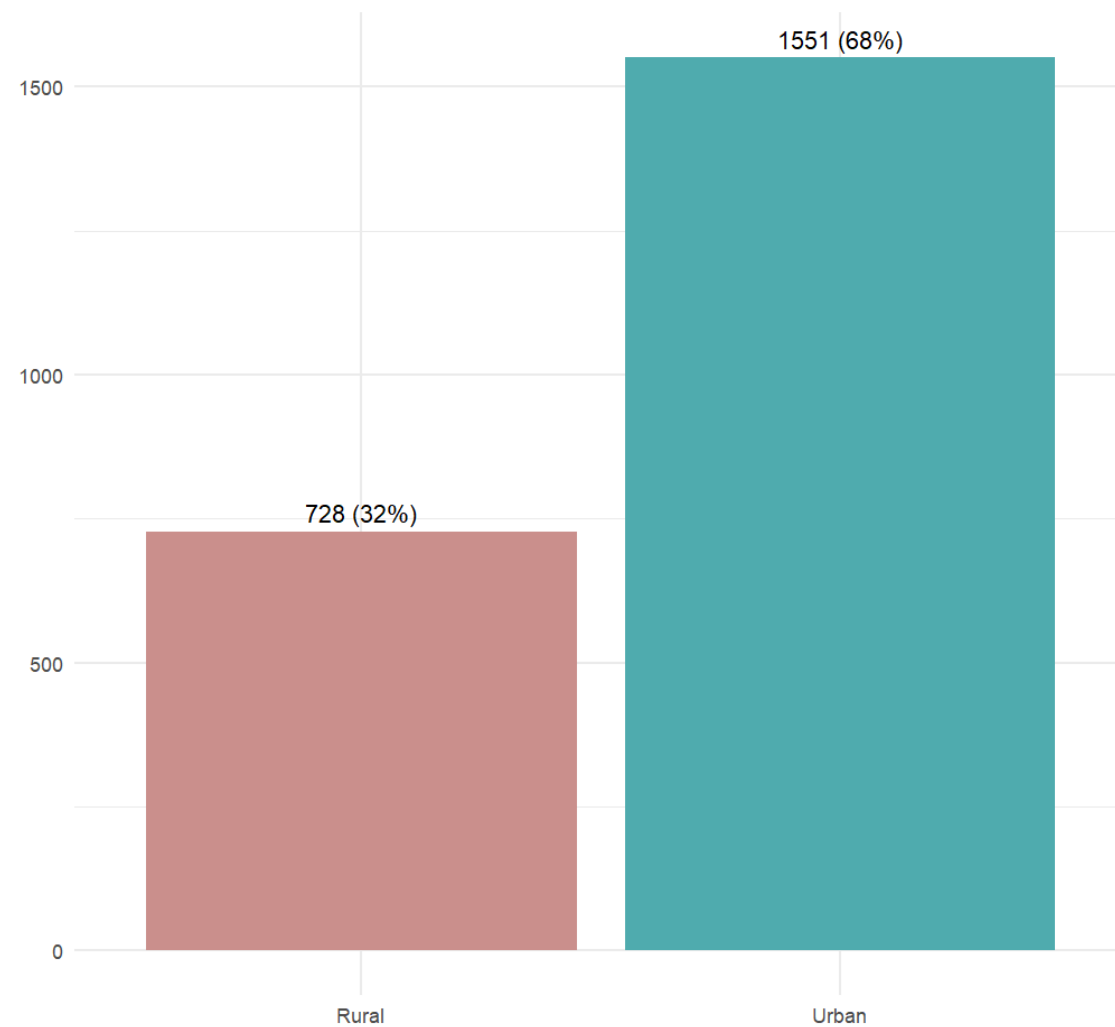
N = 2,279





Rural vs Urban

N = 2,279




Responses by Residence Type

N = 2,279	Multi-Family Residence (N = 369)	Apartment Building (3 or fewer floors)	155
		Apartment Building (4 to 6 floors)	141
		Apartment Building (More than 6 floors)	73
	Single Family Residence (N = 1,902)	Duplex, Triplex, or Fourplex	122
		Manufactured - Double Wide	26
		Manufactured - Single Wide	8
		Single Family Detached	1703
		Townhome or Rowhome	51

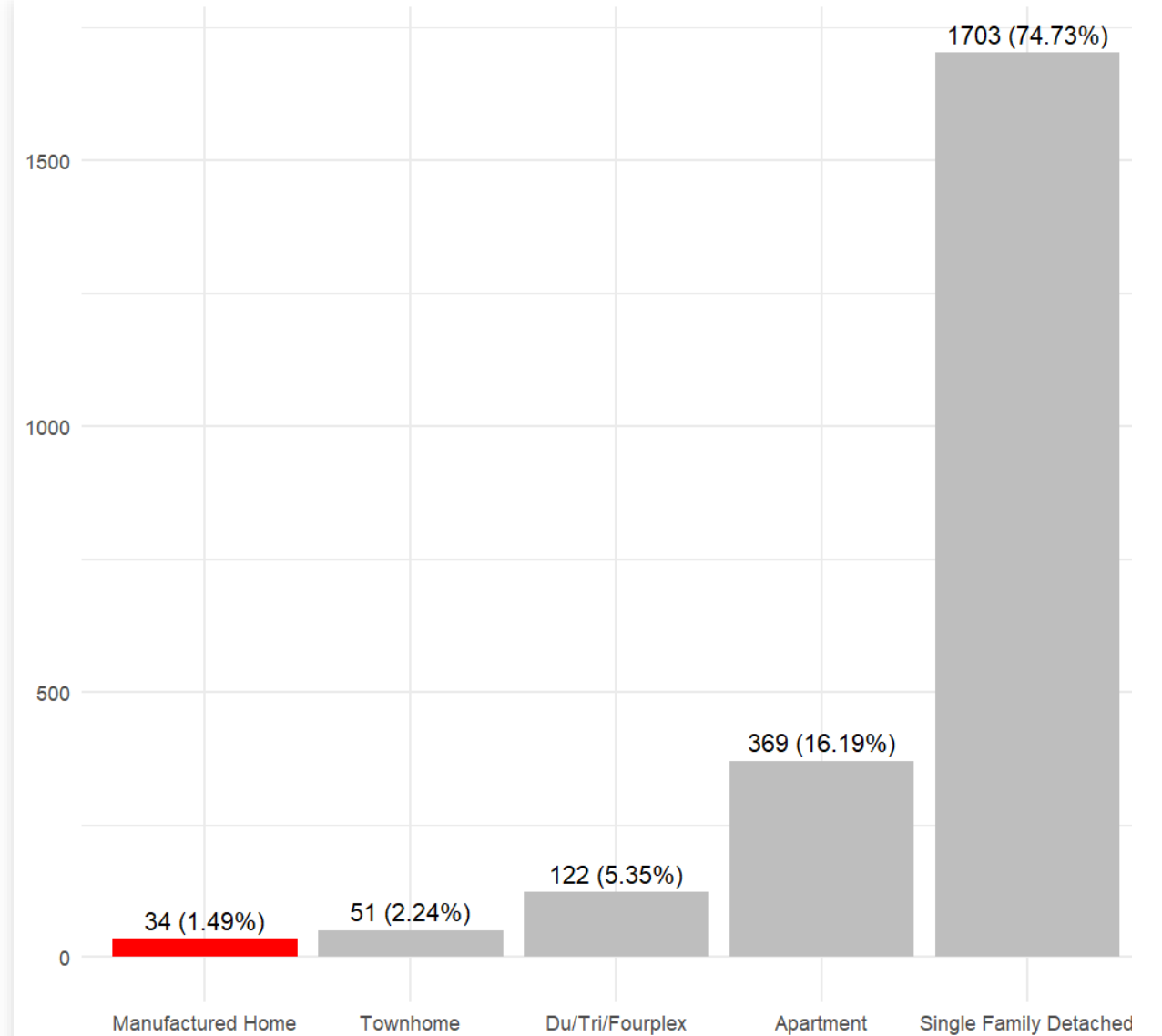


Key Question 1:

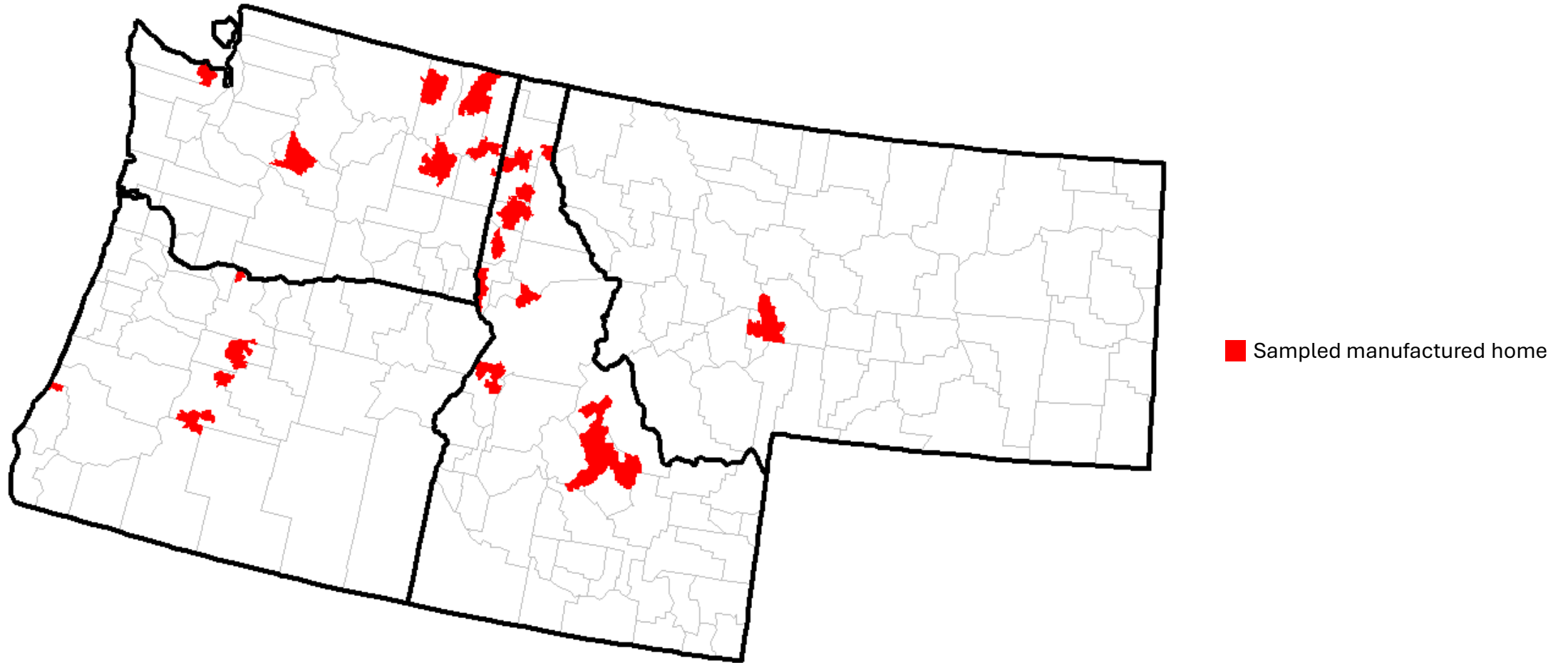
Using the data provided in the Mechanical_One_Line tab, the data dictionary, and the accompanying RBSA user guide, **please assess how well or poorly conclusions about HVAC equipment in manufactured homes can be made.**



Manufactured homes are the **least sampled** building type



Manufactured Home Collection Area



Source: 2020 US Census & 2022 RBSA survey

Manufactured Homes by State

Total	State	Manufacture Home Type	n
N = 34	Idaho (N = 18)	Single Wide	14
		Double Wide	4
	Montana (N =2)	Single Wide	2
		Double Wide	0
	Oregon (N = 5)	Single Wide	4
		Double Wide	1
	Washington (N = 9)	Single Wide	6
		Double Wide	3


Manufactured Homes by State: **N < 10**

Total	State	Manufacture Home Type	n
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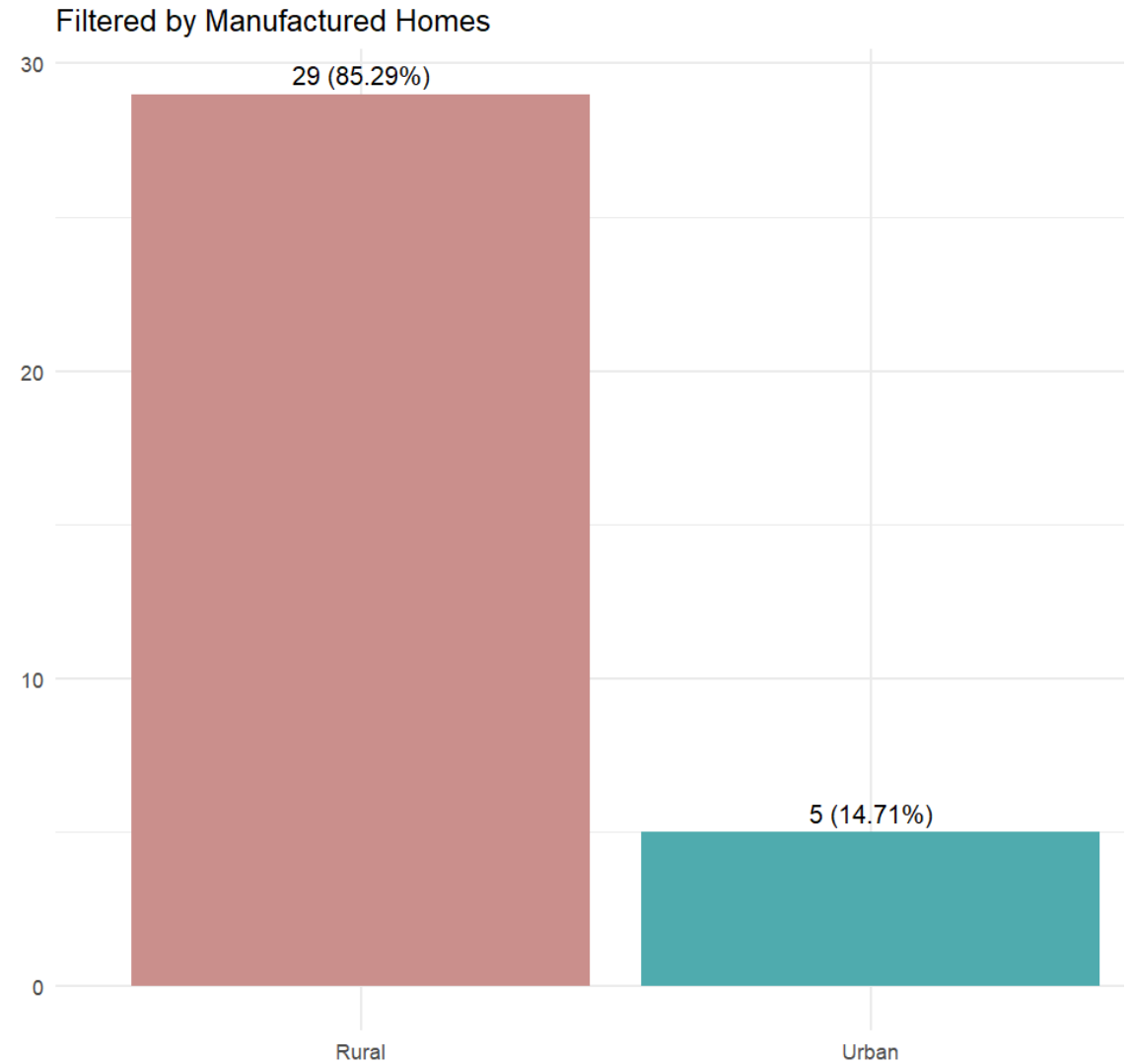


Key Question 2:

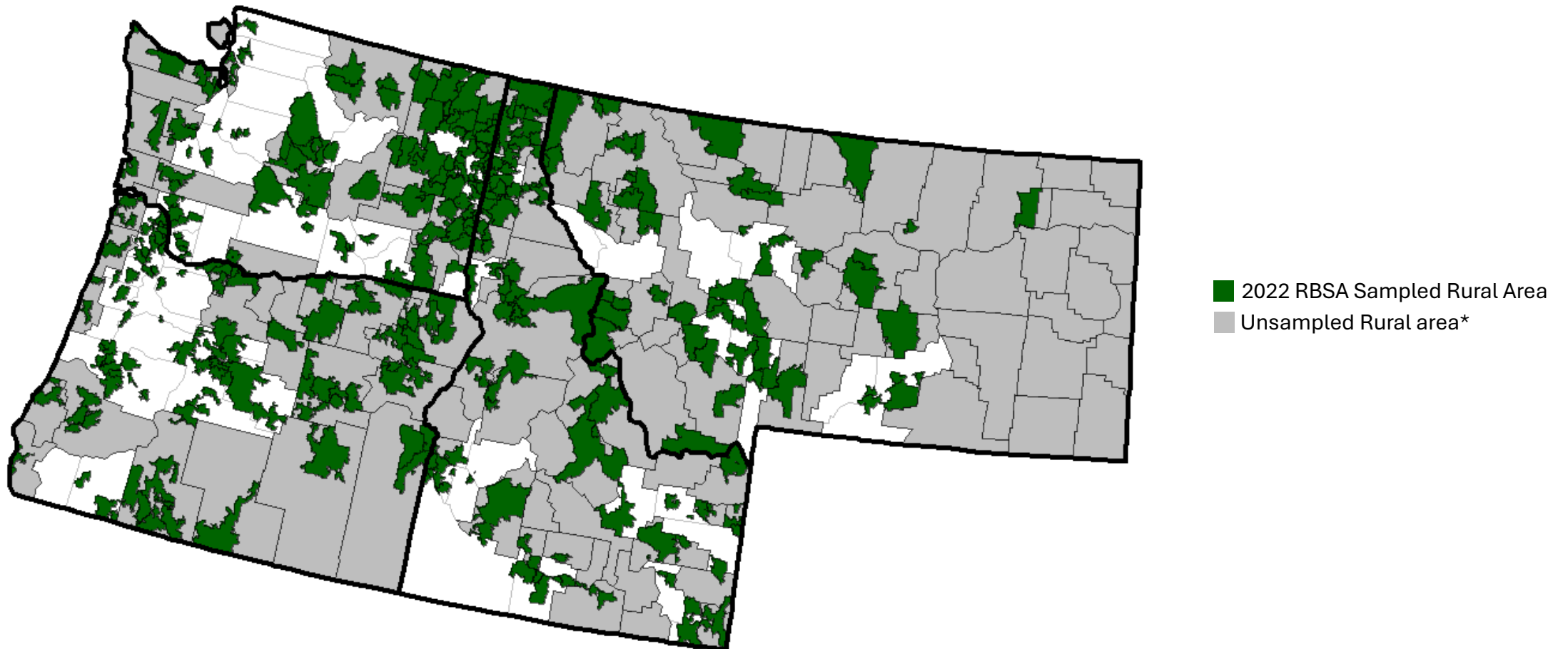
Based on your assessment, what improvements could be made to the upcoming RBSA?



Manufactured homes are more present in rural areas



Rural Areas for Oversampling





Key considerations around design, scope, and budget for leadership to consider

- **Budget Consideration for next survey:**
 - Identify and Oversample Manufactured homes
 - **Strategy:**
 - Oversample already surveyed areas
 - Identify and recruit from more rural areas
 - **Utilize more modes of survey distribution:**
 - Online surveys
 - Telephone calls
 - Identify survey distributors that specialize in rural areas
 - **Weighting manufactured home data is also an option**
 - However, a larger n is still necessary ($n > 10$)
-

Gap analysis. What other data and information would you recommend seeking out to inform your assessment?

- Require up to 5x more manufactured home survey responses for future analyses
- More information of manufacture home building distribution required
- Demographic variables may help to identify manufactured home trends



What questions came up as you developed your business case?

- What methods and modes of survey distribution were used for data collection?
- What other limitations and challenges are often faced by the RBSA survey distribution?
- Should I be aware of potential biases in data?
i.e. Are certain resident types more likely to respond to the RBSA surveys?

Questions?

 Thank You!

