A new approach to assessing coarse filter forest vegetation restoration needs: DRAFT METHODS

US Forest Service Region 6 and The Nature Conservancy

11/05/2013

Support by and THANK YOU to:

- Tom DeMeo, USFS
- Mike Simpson, USFS
- Shonene Scott, TNC
- Chris Ringo, USFS/OSU
- Kim Mellen-McLean, USFS
- Ayn Shlisky, USFS
- Jane Kertis, USFS
- Kori Blankenship, TNC/LANDFIRE
- Liane Davis, TNC
- Rick Brown

Uncharacteristic Events

TNC Easement, eastern WA Cascades
2012 Taylor Bridge Fire

Forest Values

Restoration as management paradigm

Photos: John Marshall

Conservation through restoration

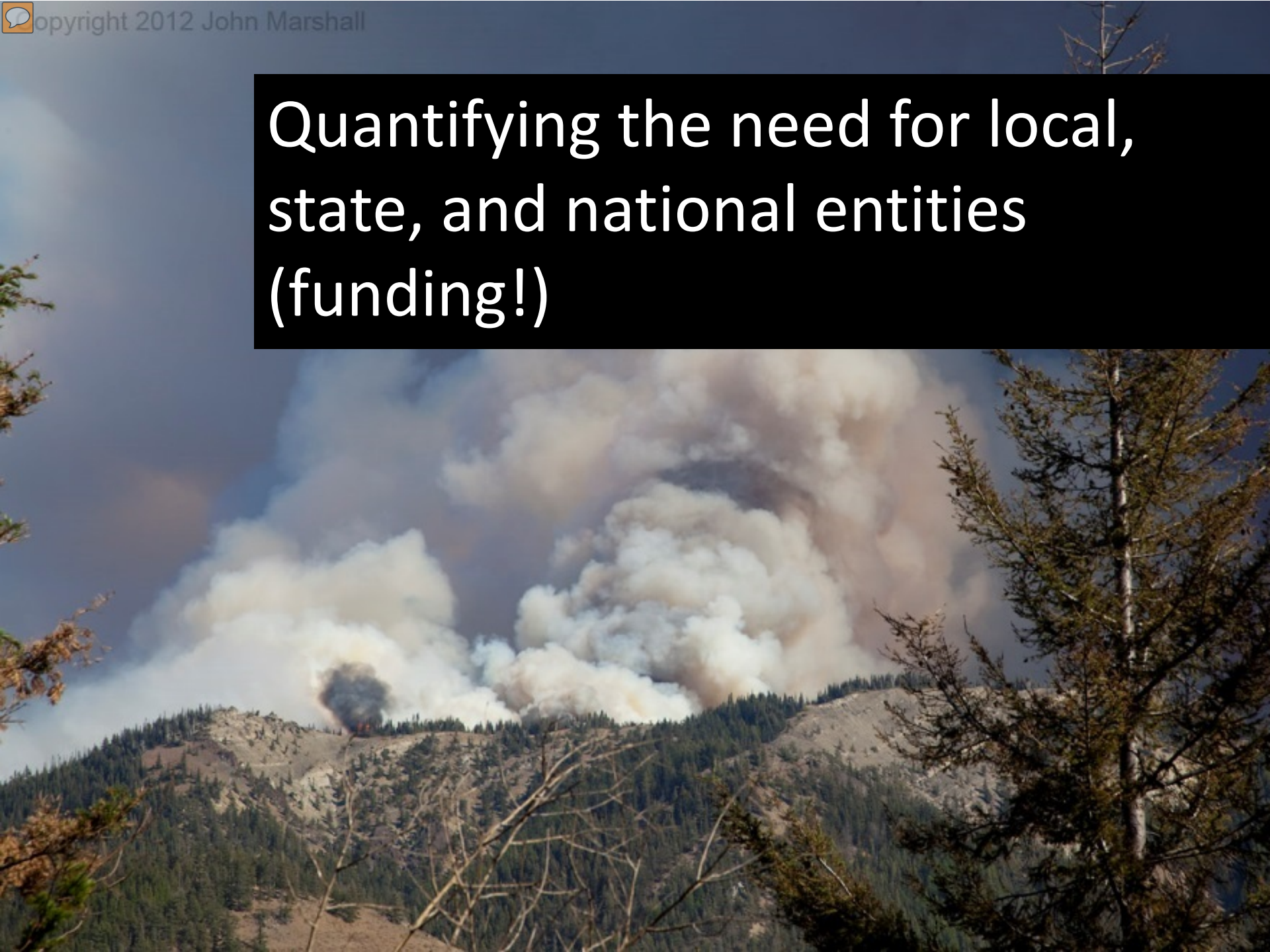
Photos: John Marshall

Where, how much, what kinds of vegetation management for restoration?

opyright 2012 John Marshall
Why is this important?

opyright 2012 John Marshall

Quantifying the need for local, state, and national entities (funding!)



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Telling the story: collaboratives, community groups, and popular media

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Setting the context: appropriate treatments and use of limited resources

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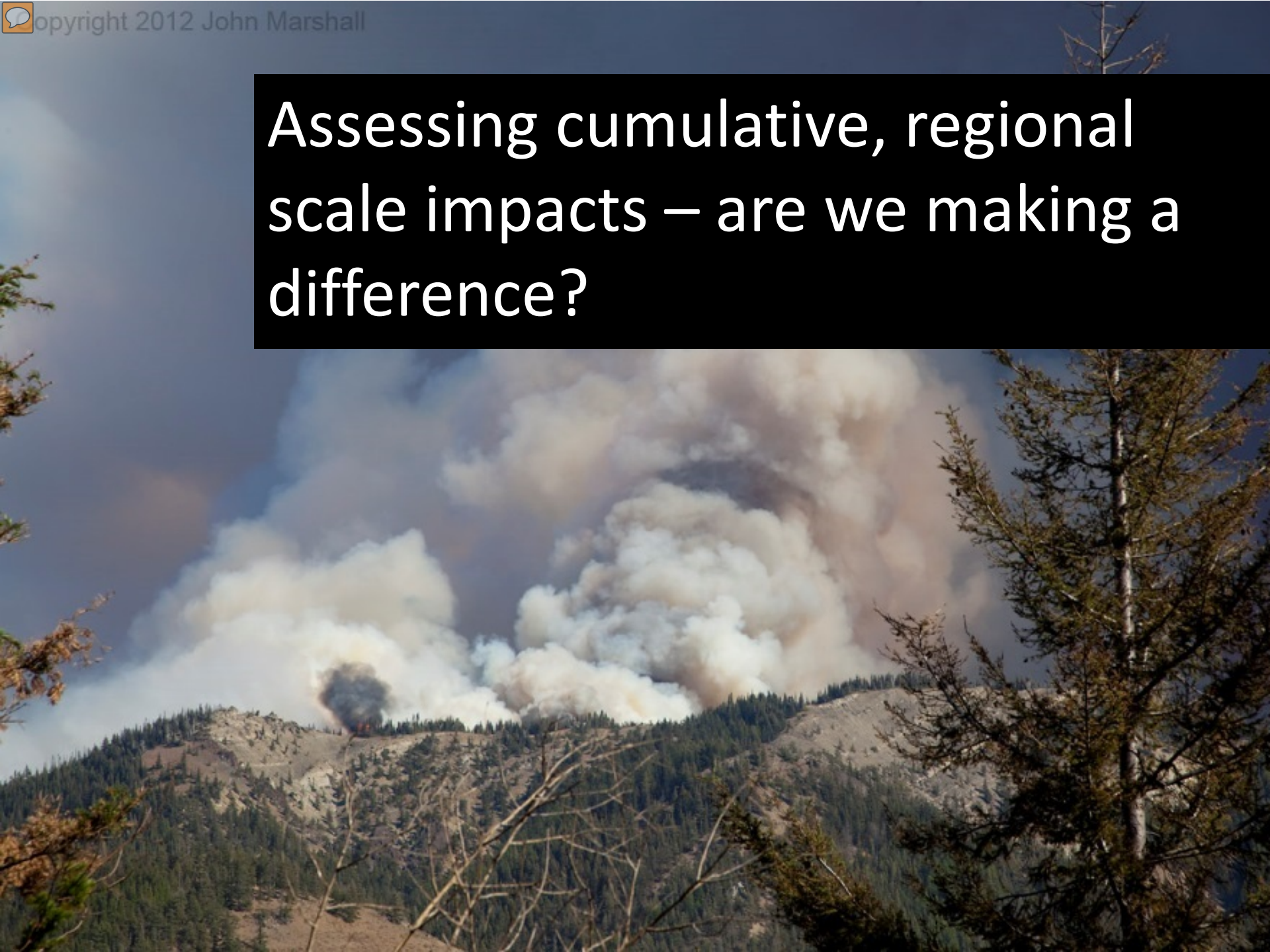
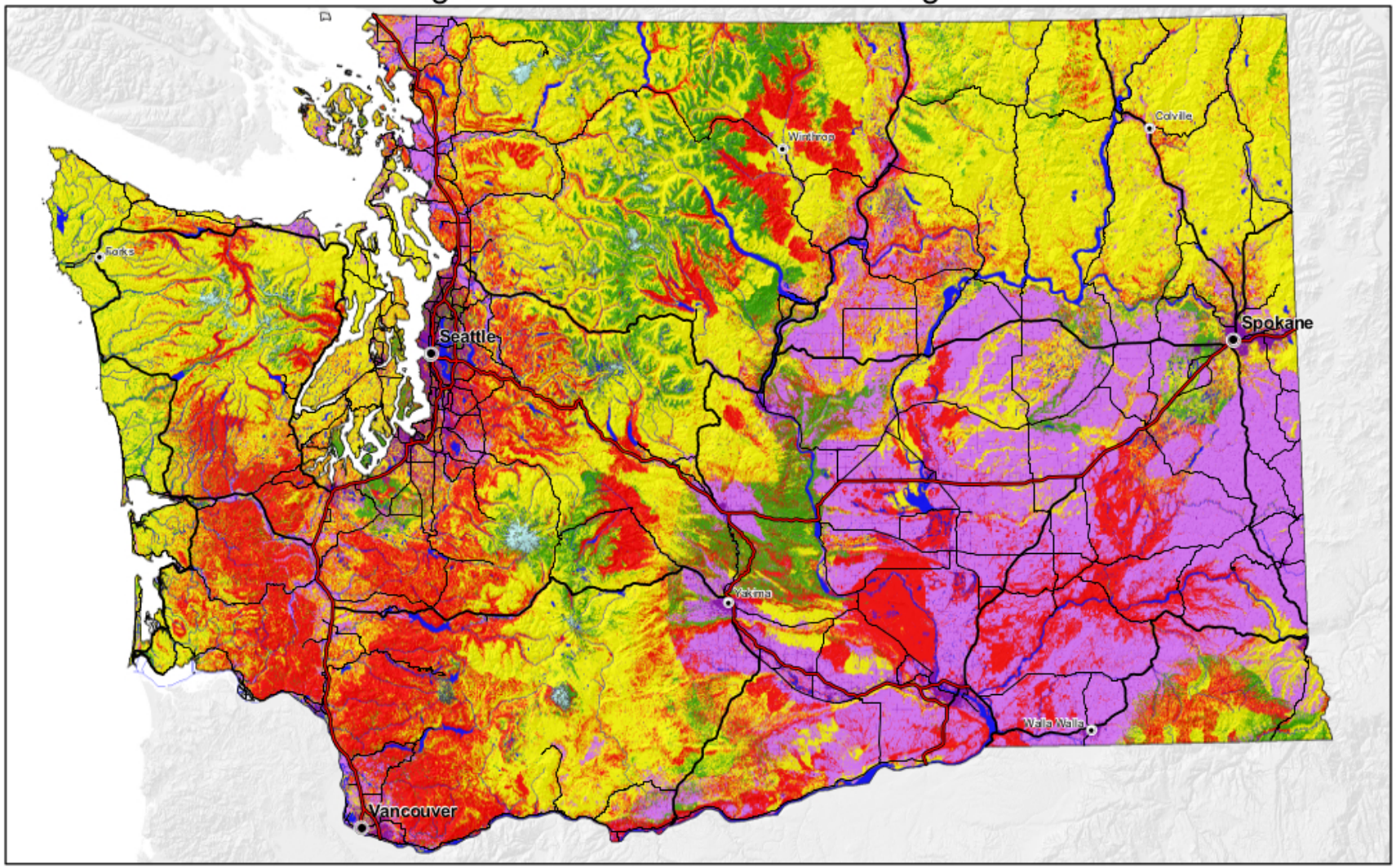
Assessing cumulative, regional scale impacts – are we making a difference?



Fire Regime Condition Class of Washington State



Fire Regime Condition Class (Strata FRCC)

- Low Vegetation Departure (FRCC 1)
- Moderate Vegetation Departure (FRCC 2)
- High Vegetation Departure (FRCC 3)
- Water
- Snow / Ice
- Urban
- Barren
- Sparsely Vegetated
- Agriculture

Why Departed?

Photos: John Marshall

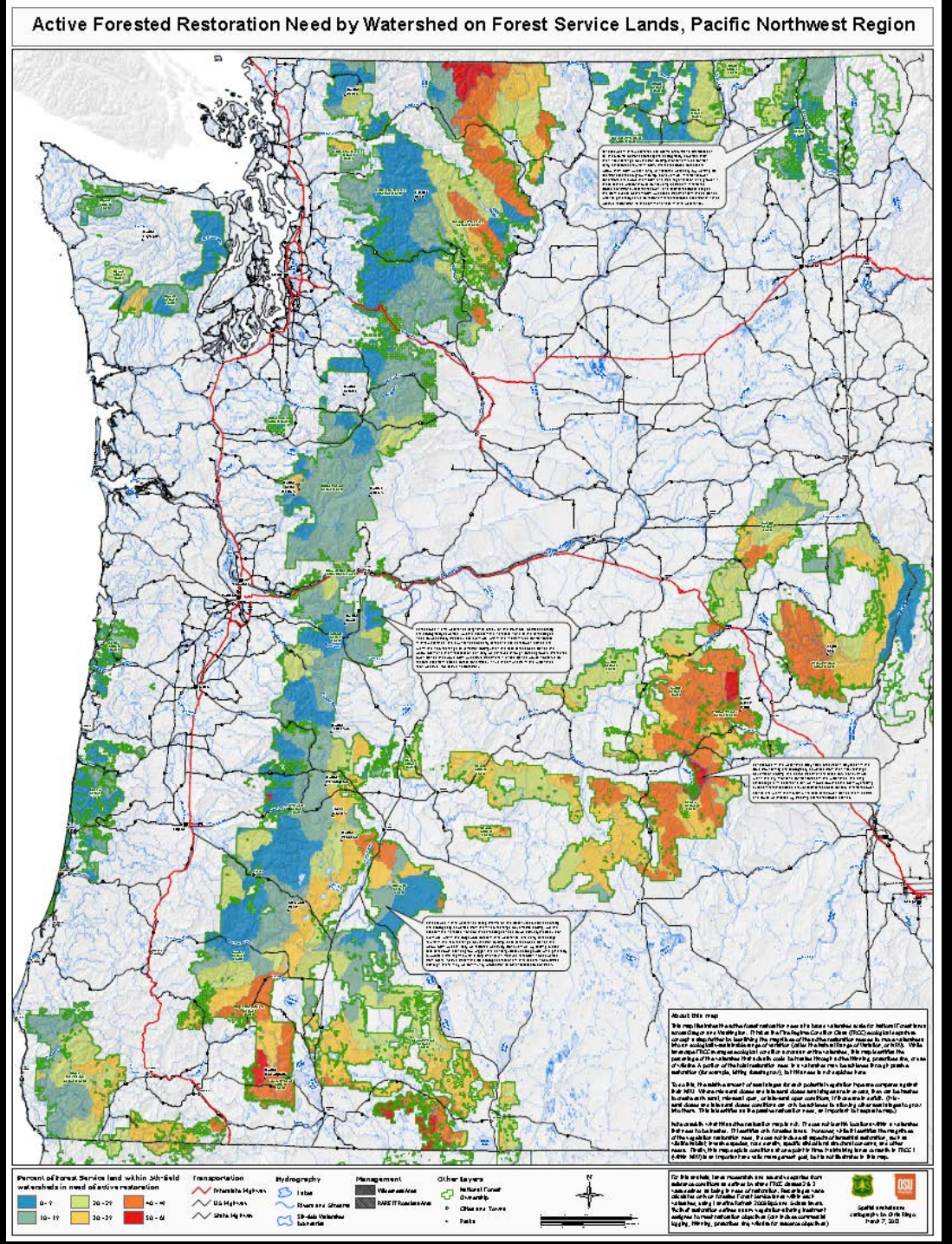
What needs to be done?

Photos: John Marshall

Other Assessments:

LANDFIRE Based Analysis

- 2006 TNC Oregon
- 2009 TNC Oregon
- 2012 TNC Oregon
- 2012 TNC Washington
- 2013 USFS R6
- 2013 TNC Oregon



2013 R6 Analysis –

A more robust product

- Explicit number of Acres needing **Restoration,** not just the amount of **departure**.
- **Active** and **Growth** Restoration Need
- R6-wide, all forested lands, all ownerships
- Based on best available data
- Various scales depending on scale of disturbance

Mission Statement:

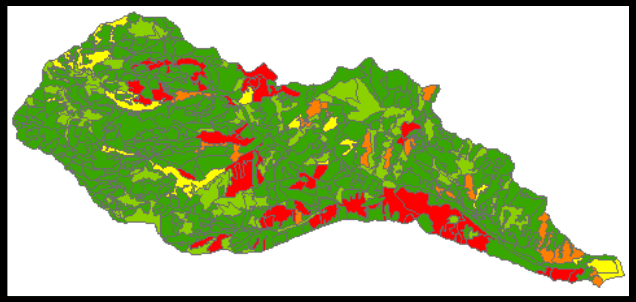
The Nature Conservancy and Region 6 of the US Forest Service are conducting a joint analysis of the number of acres in need of treatment to restore historic/sustainable forest vegetation structure and composition across Oregon and Washington.

This work is intended to quantify the need for vegetation restoration and to set the context for appropriate vegetation restoration treatments at the scale of 5th field watersheds and larger geographic extents.

Methods and results will be communicated through traditional and innovative outlets including: open source peer-reviewed papers, general technical reports, briefing papers, infographics, postings on websites, and partner outreach

Regional Restoration Needs

30,000+ ft. level



Watershed /
Project Planning

Silvicultural prescriptions

“Active Restoration”

- Reduction in canopy cover and/or tree density.

- May be accomplished through fire or mechanical treatment.

Active Restoration Pathways

Treatment

Mid-Seral Closed Canopy → Mid-Seral Open Canopy

Treatment

Late-Seral Closed Canopy → Late-Seral Open Canopy

forest diagrams based on illustrations by R. Van Pelt

“Growth Restoration”

- Successional processes, allowing a forest stand to grow into a later development successional class.

Growth Restoration Pathways

Early Seral

Time to grow

Mid-Seral Closed Canopy

Mid-Seral Closed Canopy

Late-Seral Closed

Mid-Seral Open Canopy

Late-Seral Open Canopy

forest diagrams based on illustrations by R. Van Pelt

1. Mapping & classification of “forest systems”
2. Modeled NRV reference conditions
3. Landscape unit delineation
4. Current conditions

Active / Growth Restoration Needs

1) Forest Systems

- Mapping
  - ILAP PVT

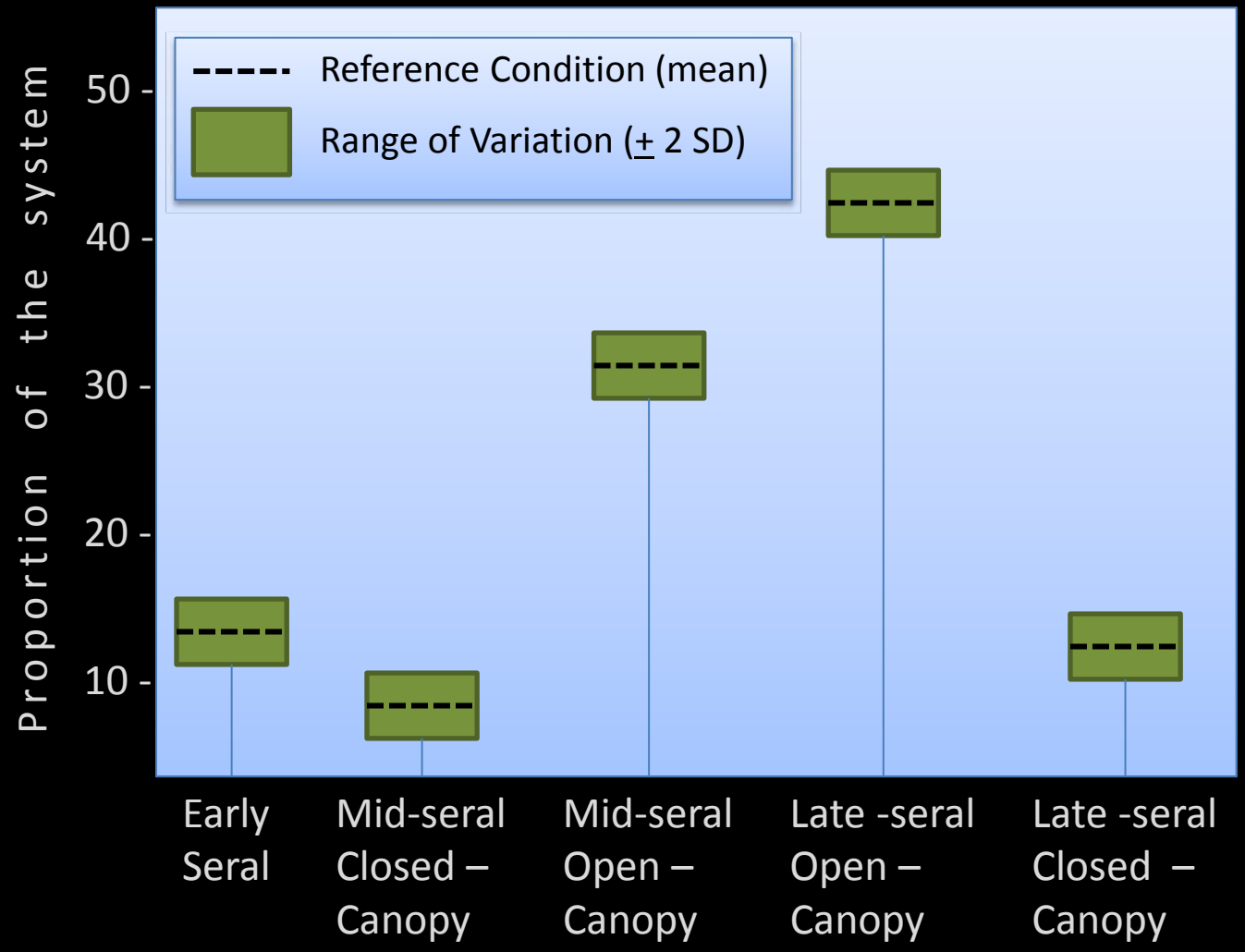
- Each PVT -> Landfire BpS model

ILAP Forested PVT's

2) NRV Reference Conditions

- NRV = ± 2 SD of stochastic range

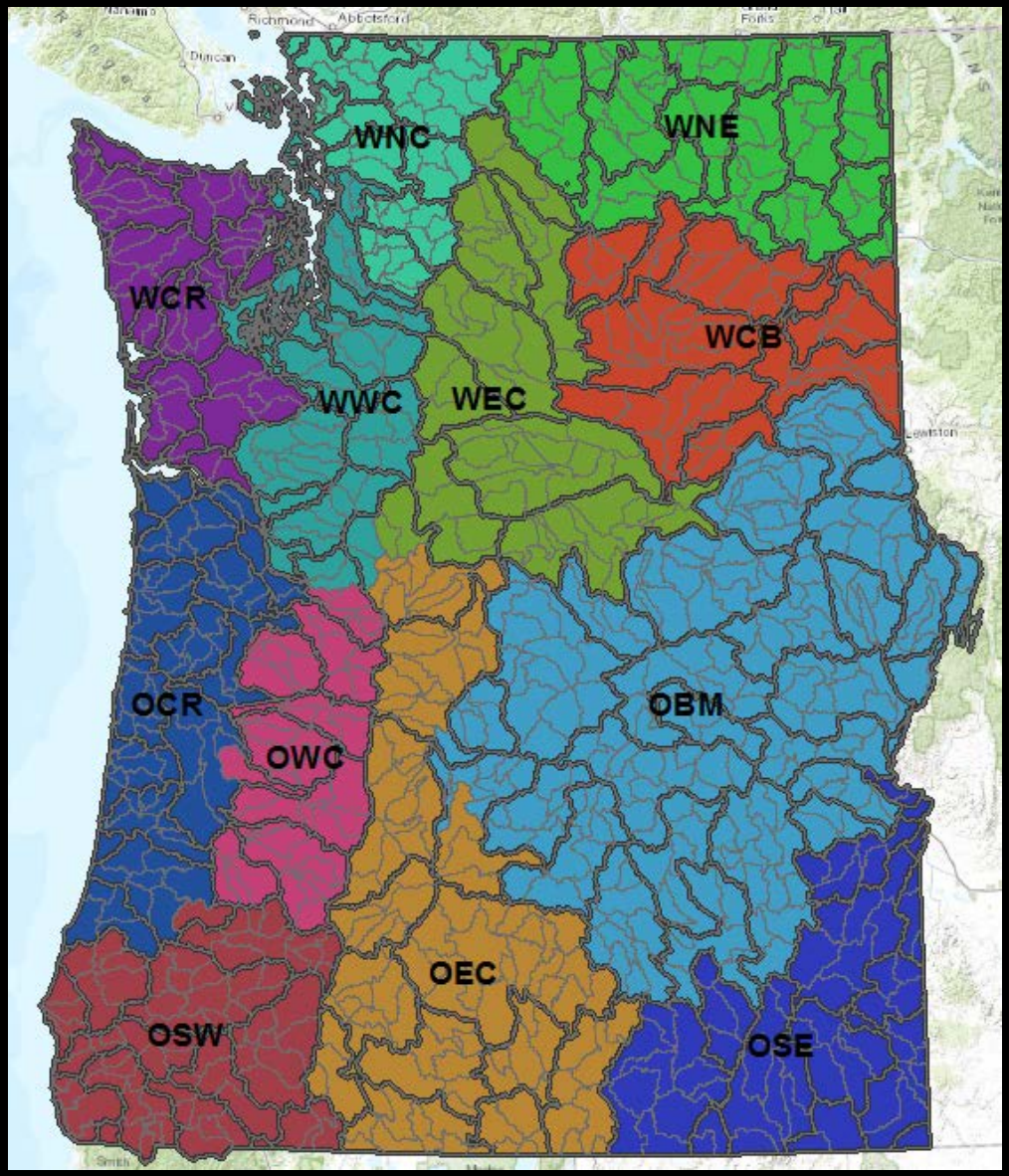
Caution: Generalized Dry Forest System



3) Landscape Delineation

- Base analysis unit = Landscape Unit + Forest System = "Strata"

- Different sized landscapes based on system and scale of historical disturbance



4) Current Conditions

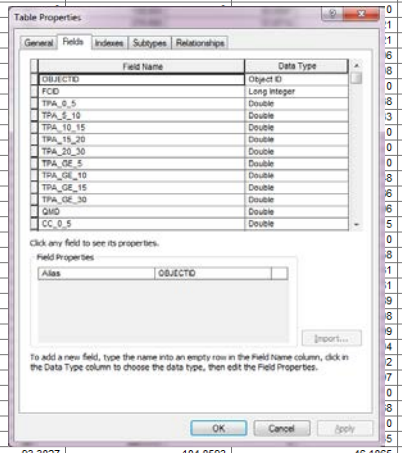
GNN -> S-Classes

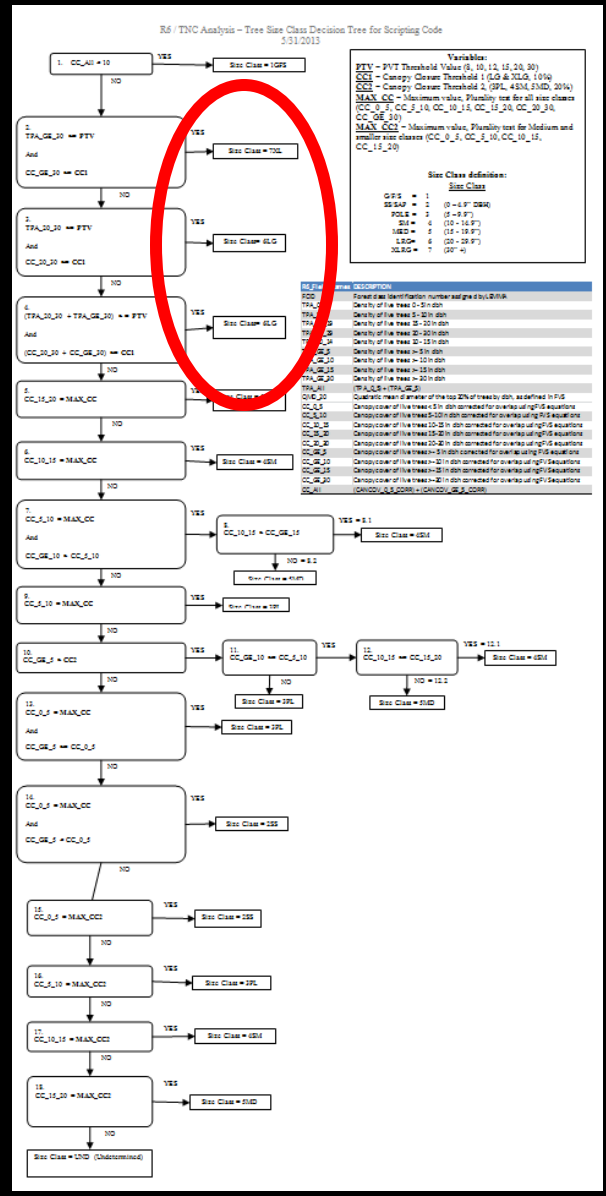
- BpS size and canopy cover thresholds per S-Class
- Map GNN size classes (7) and canopy cover (10)
- Map S-Classes

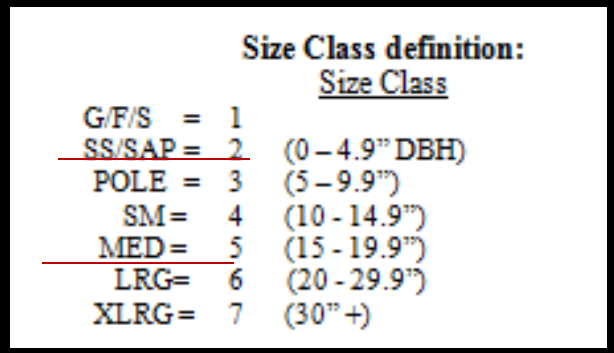
GNN to Size Class

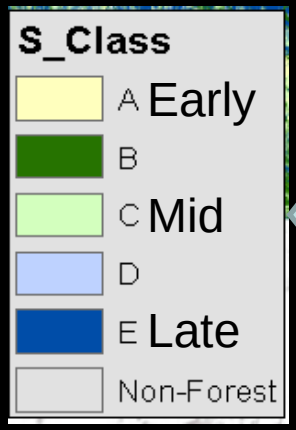
OBJECTID *	FCID	TPA_0_5	TPA_5_10	TPA_10_15	TPA_15_20	TPA_20_30	TPA_(
1	3	55.6698	43.2987	0	0	0	
2	5	0	213.2558	38.0454	0	0	
3	7	0	0	71.3878	33.4238	15.0847	
4	8	93.3027	0	19.0315	3.8475	0	
5	9	0	41.4047	60.05	11.5129	6.324	
6	10	232.773	279.3164	21.8493	11.8976	5.5685	
7	11	139.954	83.0097	96.711	26.9838	11.458	
8	12	279.908	51.6714	6.2037	18.5055	1.3954	
9	13				0	0	
10	15				12.2575	8.5051	
11	17				0	0	
12	22				28.1381	30.6653	
13	23				21.9897	1.3209	
14	24				0	0	
15	26				3.3169	12.5469	
16	28				0	4.0132	
17	30				4.8921	14.2102	
18	31				0	1.5074	
19	33				4.1286	0	
20	34				13.5313	8.2002	
21	38				10.8783	23.4445	
22	41				4.6001	0	
23	42				27.4976	9.2906	
24	43				5.6444	3.3197	
25	49				16.7647	7.1274	
26	50				6.5779	5.2027	
27	51				32.0257	0	
28	53				3.3666	2.0575	
29	55				23.4998	34.6961	
30	61				8.263	13.2803	
31	62				6.5155	5.9969	
32	65				26.7092	20.8121	
33	67				28.6898	15.562	
34	70				7.0603	6.6774	
35	74				3.8576	14.9812	
36	76				30.432	14.4292	
37	78				10.5222	16.0393	
38	79	93.3027	104.0593	46.1065	3.8122	21.5005	
39	80	47.9952	0	0	0	1.9622	
40	82	187.3547	85.0171	37.4784	0	2.8167	
41	84	1400.5049	45.5785	0	0	0	
42	86	0	0	27.5041	3.5766	4.3194	
43	88	466.5131	0	0	29.0295	2.4799	
44	90	0	18.783	76.3304	20.8292	2.8899	
45	93	0	0	40.1743	0	0	
46	95	279.3491	20.957	96.6715	24.156	9.6135	

1 (of 50909)



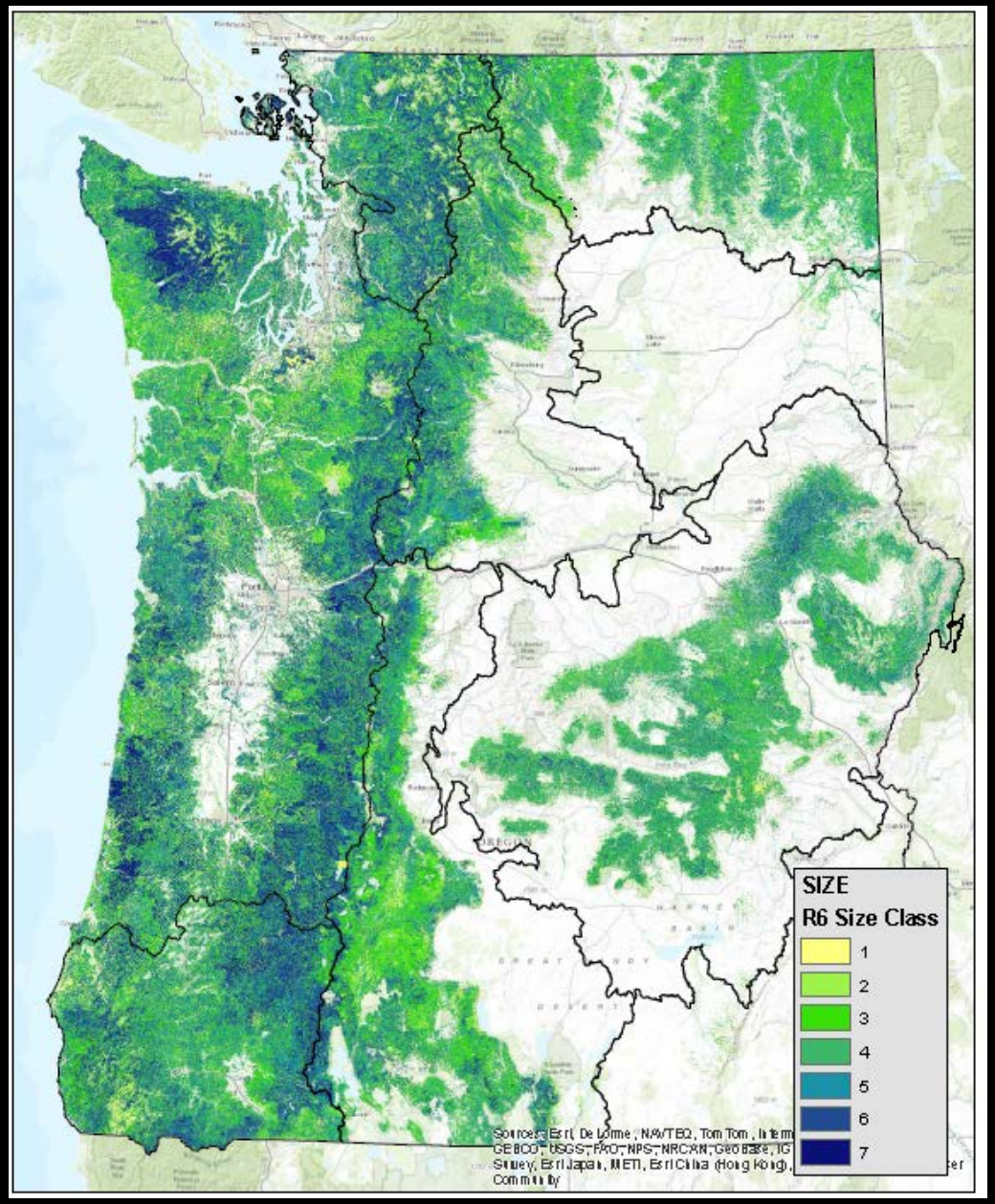






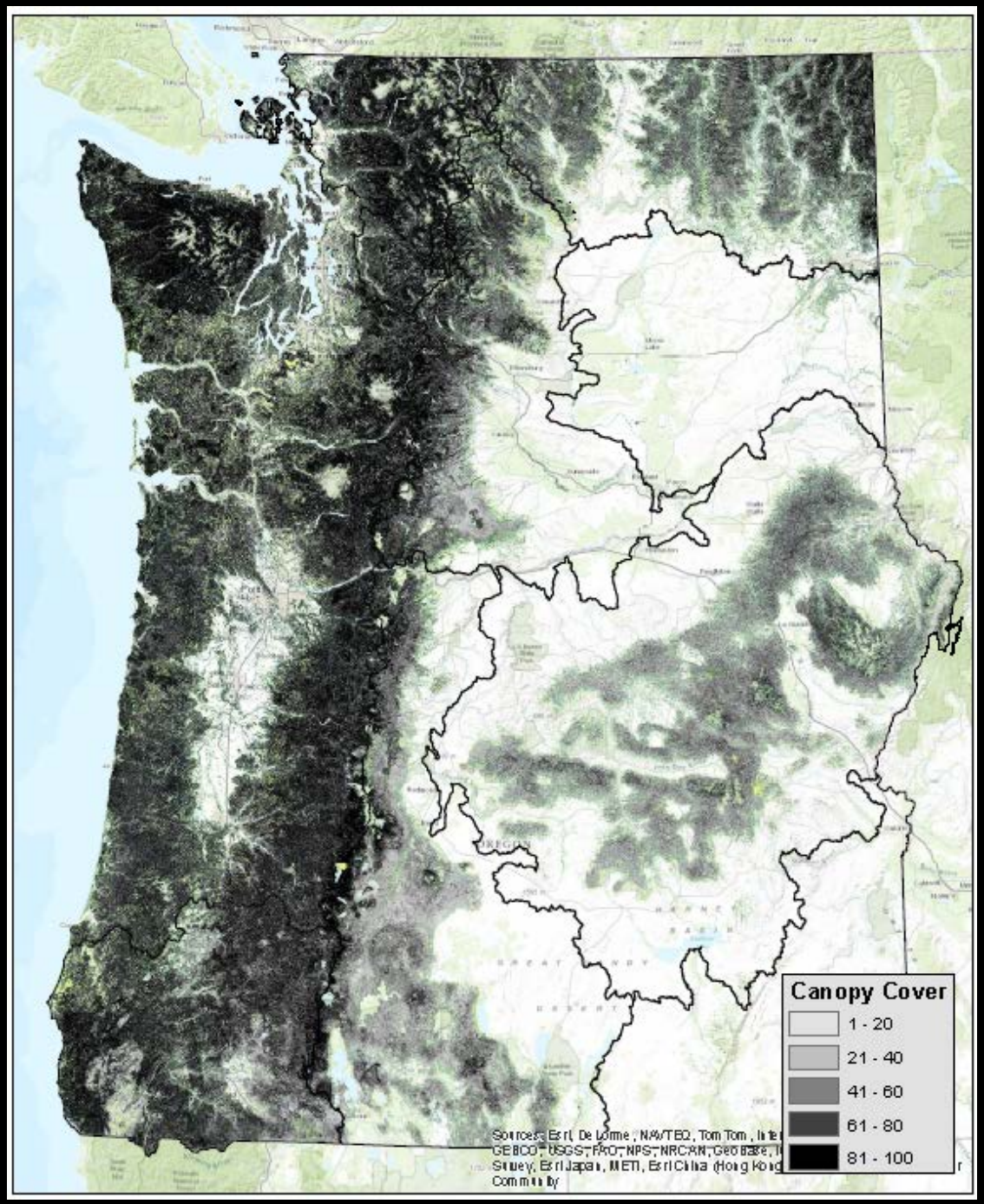
4) Current Conditions

- Size Class



4) Current Conditions

- Canopy Cover



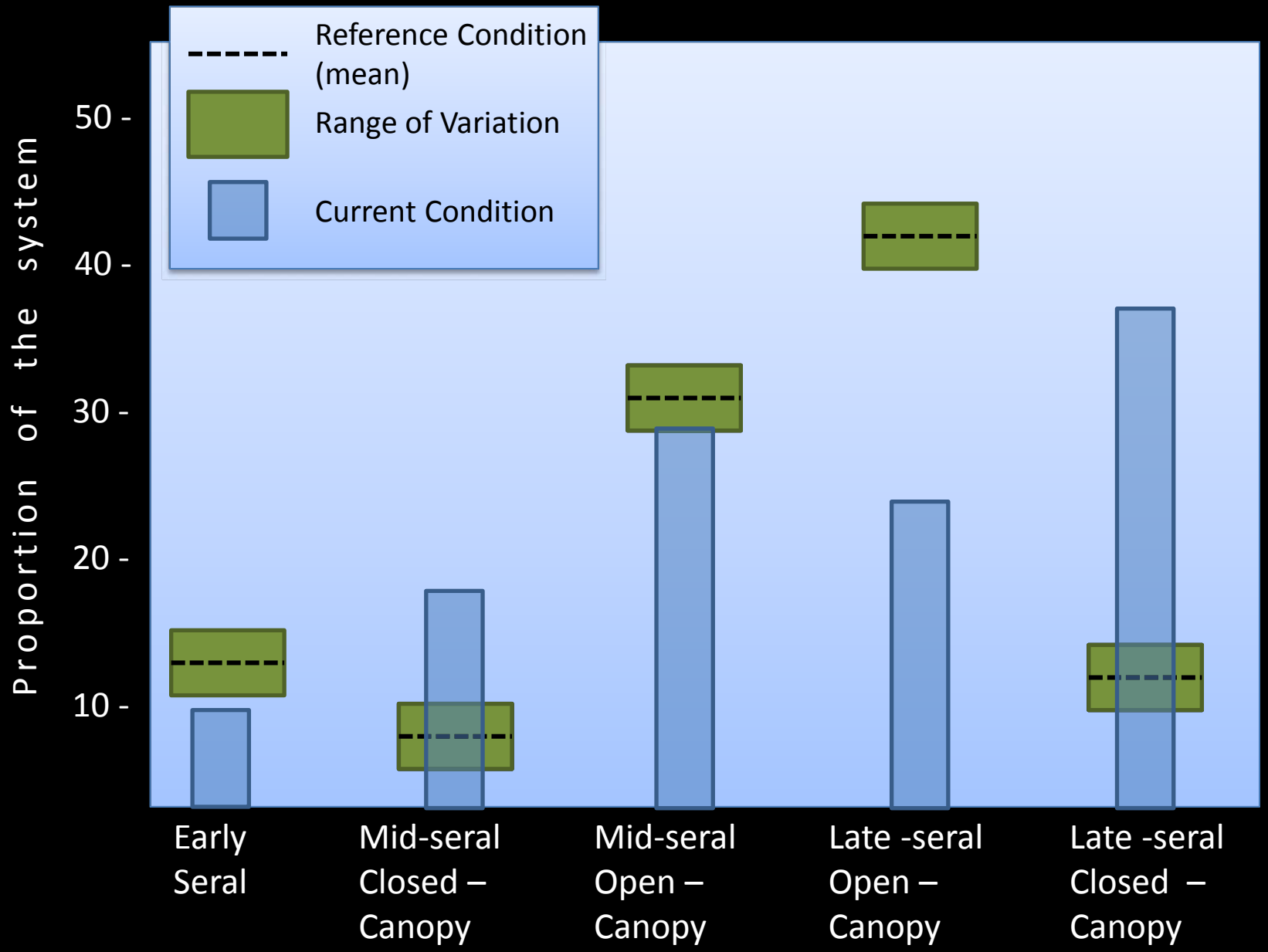
4) Current Conditions

- S-Class

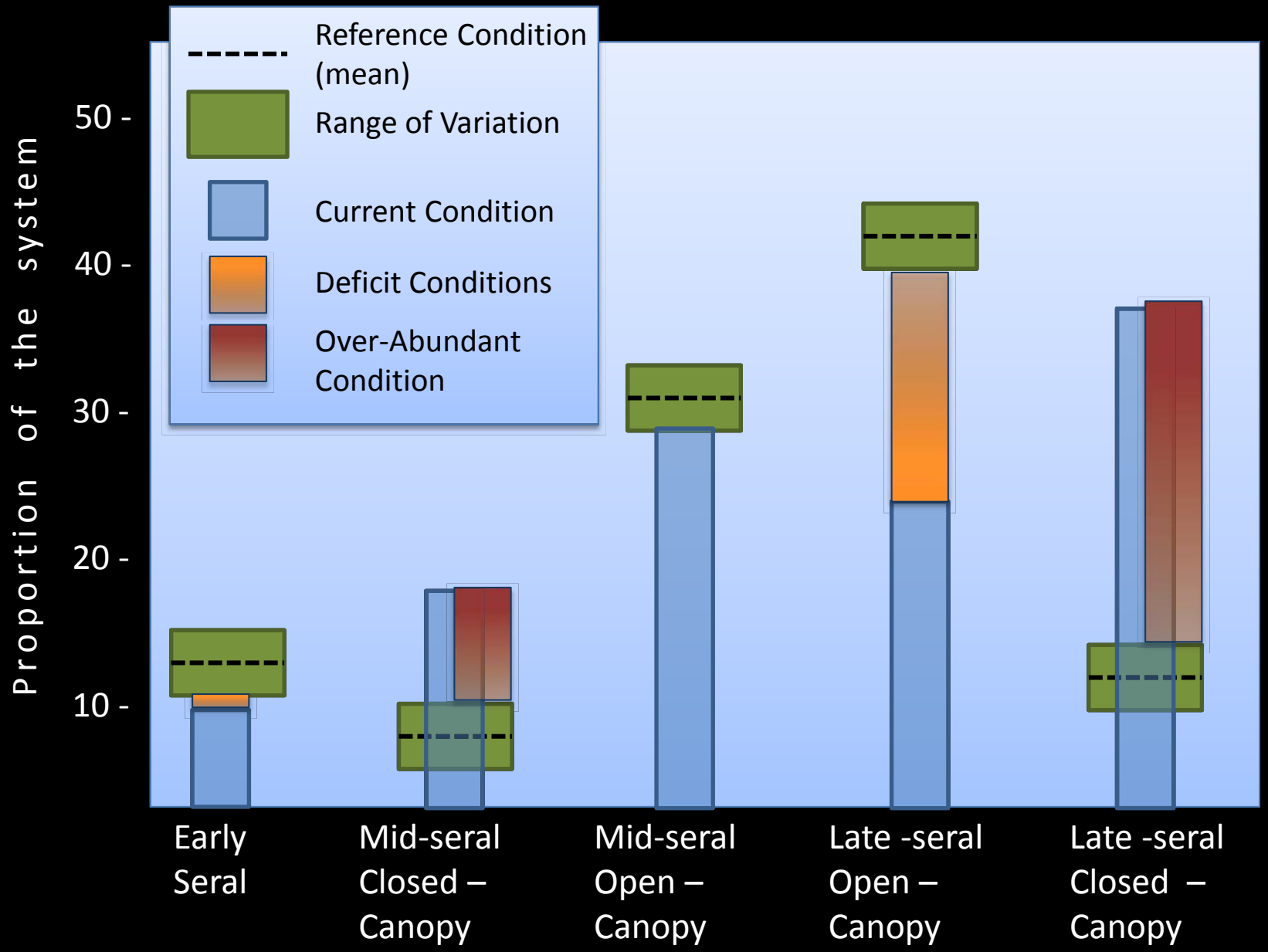
1. Mapping & classification of “forest systems”
2. Modeled NRV reference conditions
3. Landscape unit delineation
4. Current conditions

Active / Growth Restoration Needs

Quantifying Restoration Need



Quantifying Restoration Need



			Receiving Development Class				
			Currently underrepresented compared to reference condition				
Donating Development Class	*Currently overrepresented compared to reference condition*		**Early Devl.**	**Mid Closed**	**Mid Open**	**Late Open**	**Late Closed**
		Early Devl.		Grow w/o fire	Grow w/ fire	Grow w/ fire + Grow w/ fire	Grow w/o fire + Grow w/o fire
		Mid Closed	Regen / high fire		Thin / low fire	Thin / low fire + grow w/ fire	Grow w/o fire
		Mid Open	Regen / high fire	Regen / high fire + grow w/o fire		Grow w/ fire	Grow w/o fire
		Late Open	Regen / high fire	Regen / high fire + grow w/o fire	Overstory Removal		Grow w/o fire
		Late Closed	Regen / high fire	Regen / high fire + grow w/o fire	Overstory Removal	Thin / low fire	

= Active Restoration

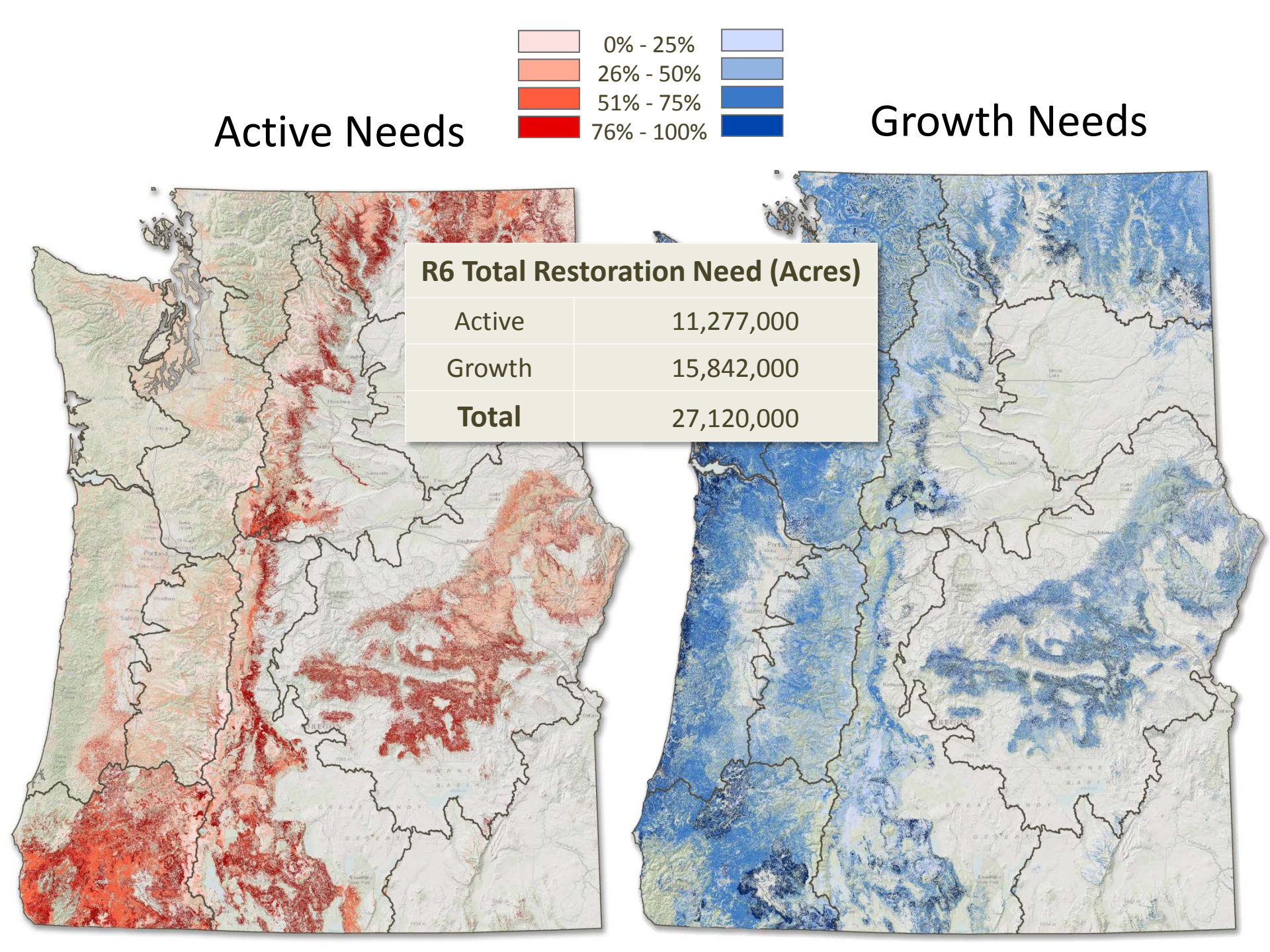
= Growth Restoration

= Active AND Growth Restoration

Results!

We actually finished something! However, they may change.

Photo: John Marshall



R6 Total Restoration Need (Acres)	
Active	11,277,000
Growth	15,842,000
Total	27,120,000

Forest Restoration Need

DRAFT RESULTS

How much, where, and what kind of forest restoration is needed in the Pacific Northwest:

In partnership, The Nature Conservancy and the US Forest Pacific Northwest Region are assessing forest vegetation restoration needs across Washington and Oregon. While the need for ecological restoration is widely acknowledged, we currently lack a comprehensive understanding of where, how much, and what kinds of treatments are needed to restore historic / resilient forest vegetation. This analysis will assist TNC and USFS in "telling the story" of forest restoration needs and in setting the context for appropriate vegetation restoration treatments and use of limited resources.

Active Forest Restoration

Restoration through a reduction in canopy cover and/or tree density. By emulating natural disturbance processes, active restoration results in a transition to an earlier development successional class and/or to an open canopy successional class. Active restoration may be accomplished through fire, mechanical treatment, or other active means.

Understanding the Graphs

Restricted Management: *Forests in which mechanical treatments are typically not allowed. Examples include Wilderness Areas, National Parks, Inventory Roadless Areas, and Research Natural Areas.*

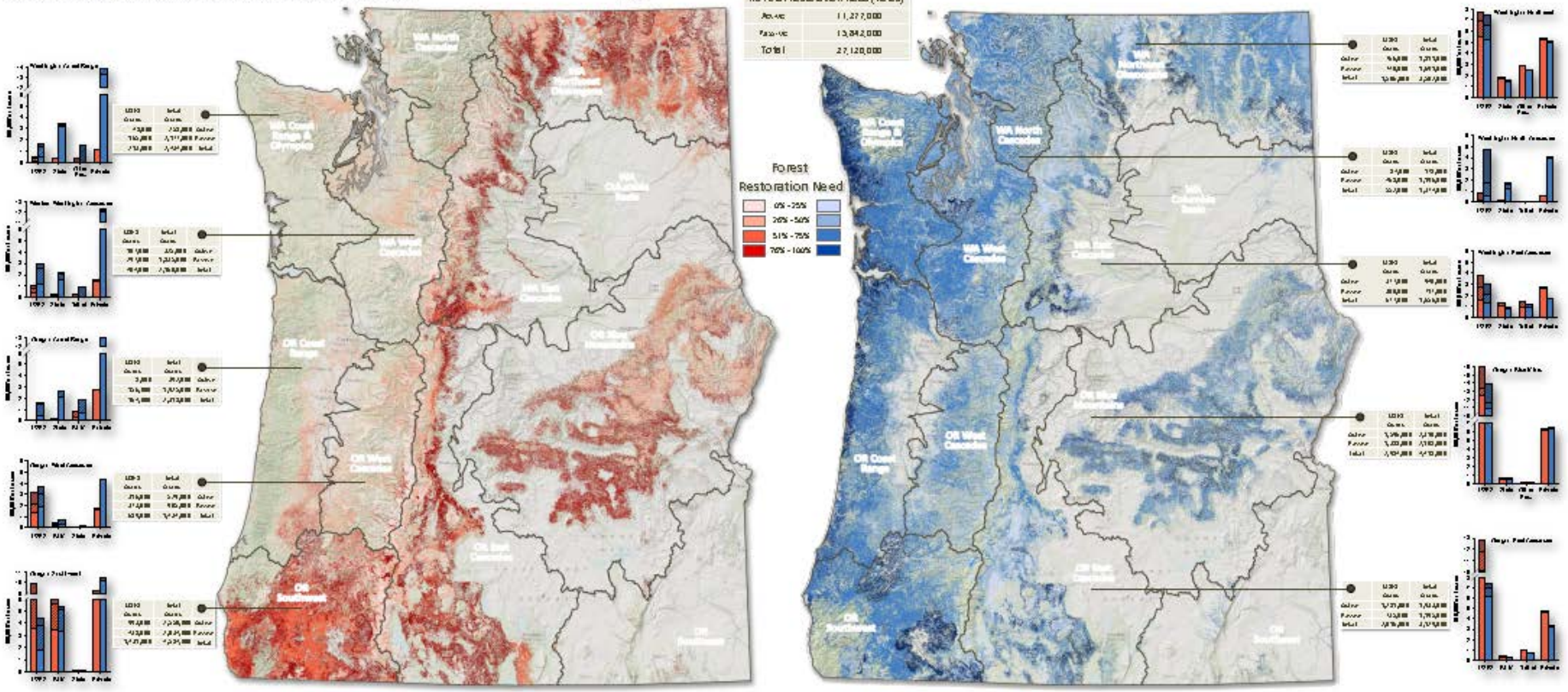
Limited Management: *Forests in which mechanical treatments may be allowed, but with certain limitations. Examples include open areas, habitats for threatened / endangered species, and/or successional reserves.*

General Management: *Forests in which mechanical treatments are typically allowed. Examples include USFS mainstream and industrial private forestlands.*

R6 Total Restoration Need (Acres)	
Active	11,277,000
Passive	15,842,000
Total	27,120,000

Passive Forest Restoration

Restoration through natural succession (including natural disturbance), which helps facilitate a forest stand to grow into a later development successional class.



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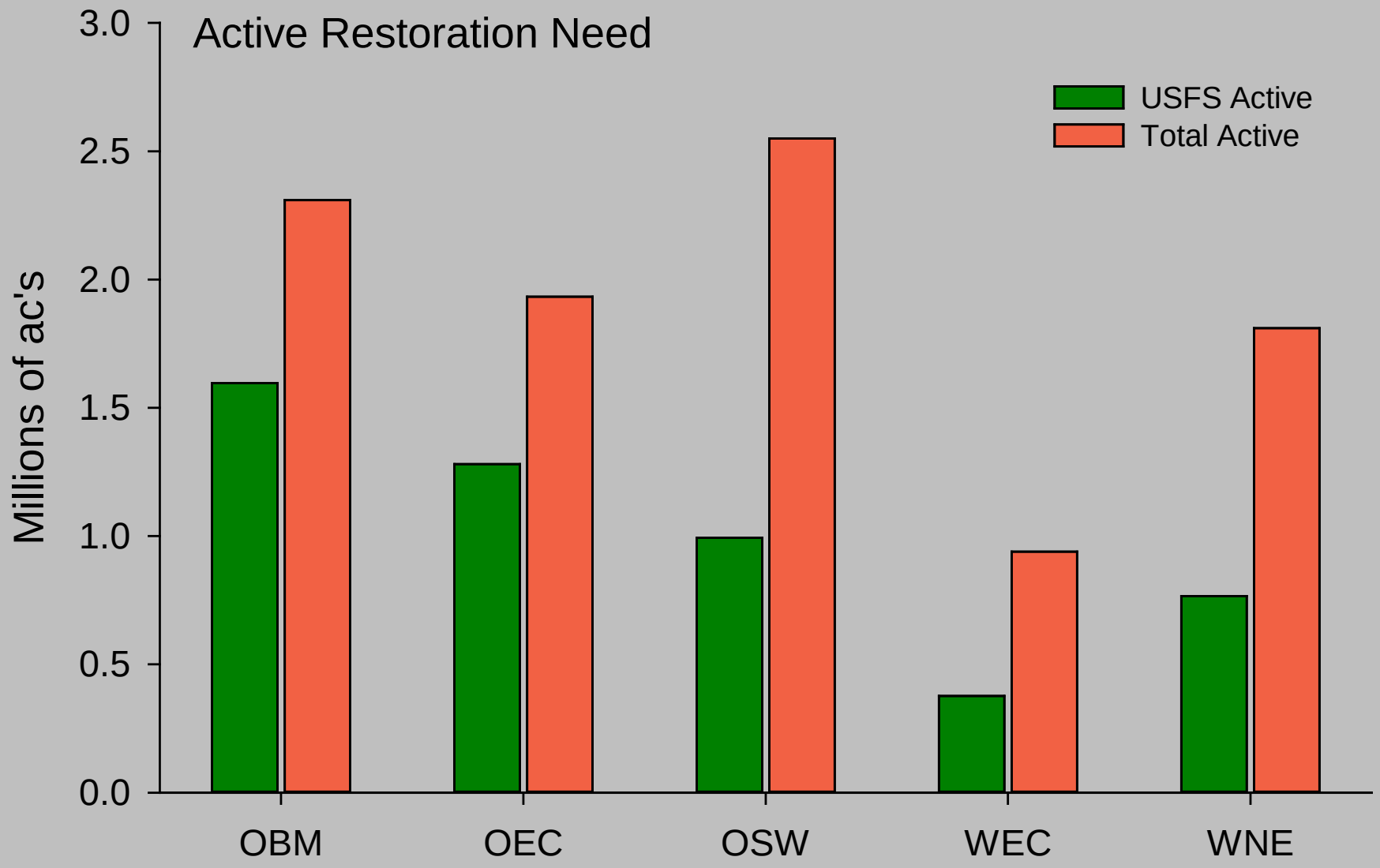
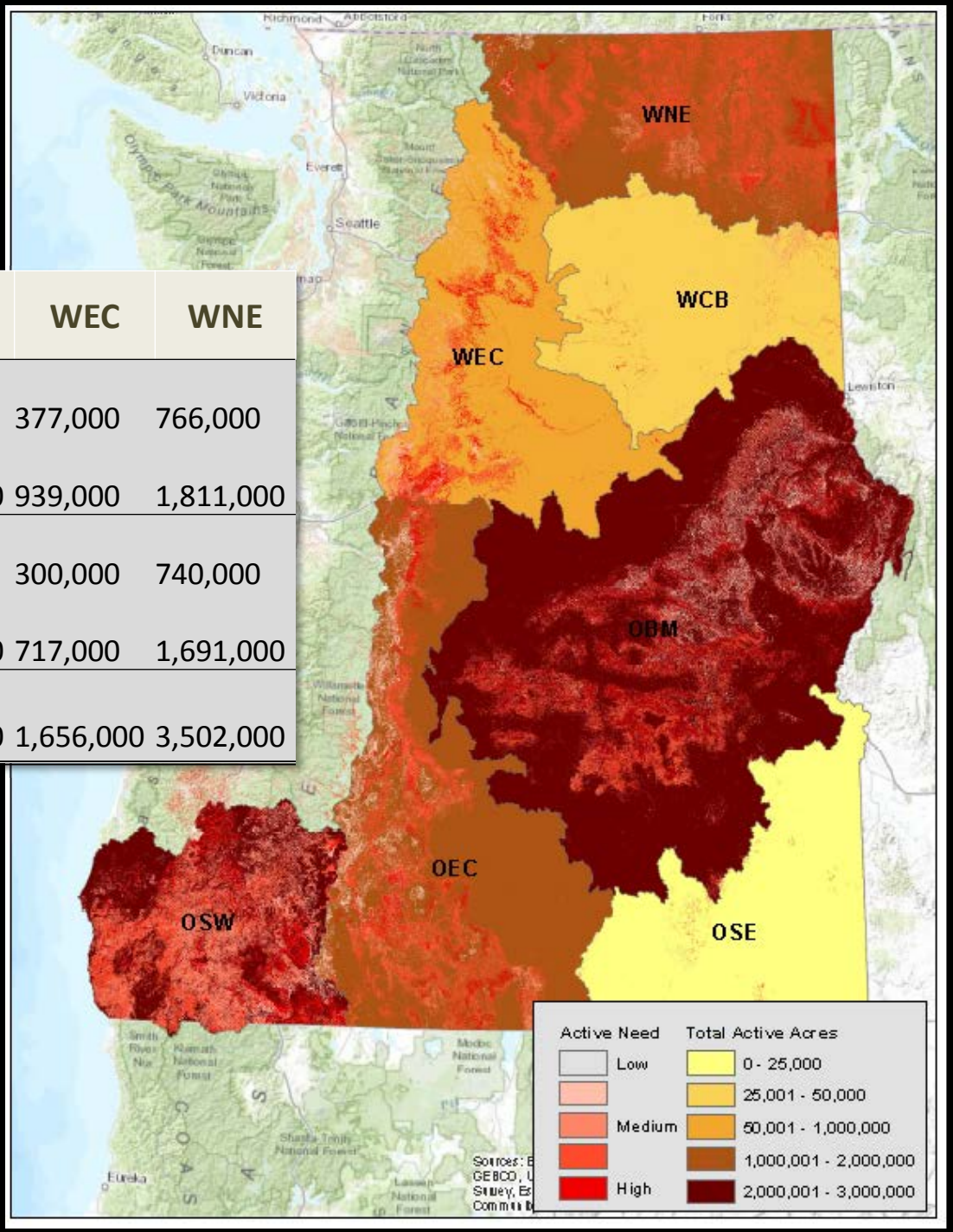
Additional Team Members: Ann Shibble USFS, Damon Bangbo TNC, Jane Kerrb USFS, Mark Stern TNC, Kim Mellen-McLean USFS, Milad Hanamaw OSU, Mike Simpson USFS, Rick Brown, Chris Ringo USFS, Steve Burnick TNC

The Nature Conservancy


Active Restoration Need
USFS Active
Total Active
Millions of ac's
3.0
2.5
2.0
1.5
1.0
0.5
0.0
OBM
OEC
OSW
WEC
WNE

Restoration Needs in Eastern R6

Restoration Need in Acres	OBM	OEC	OSW	WEC	WNE
USFS Active	1,596,000	1,281,000	993,000	377,000	766,000
Total Active	2,310,000	1,933,000	2,550,000	939,000	1,811,000
USFS Growth	1,388,000	735,000	438,000	300,000	740,000
Total Growth	2,108,000	1,195,000	2,034,000	717,000	1,691,000
Total Restoraton Acres	4,418,000	3,129,000	4,584,000	1,656,000	3,502,000

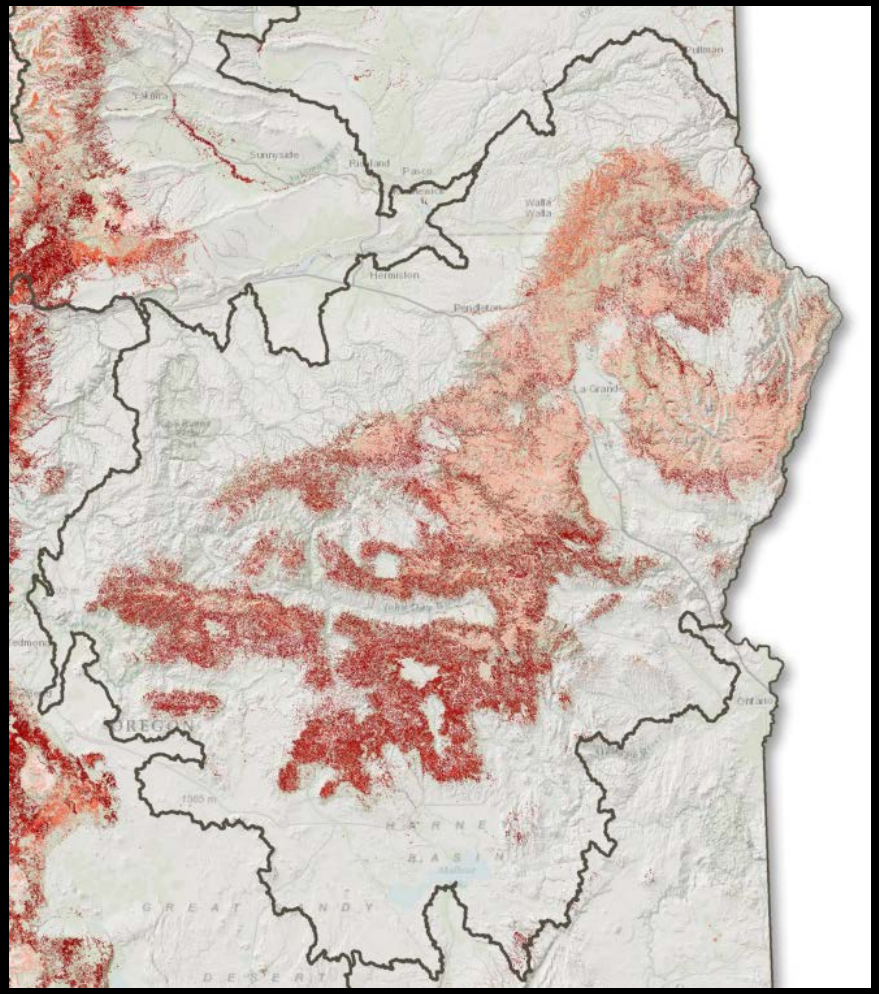


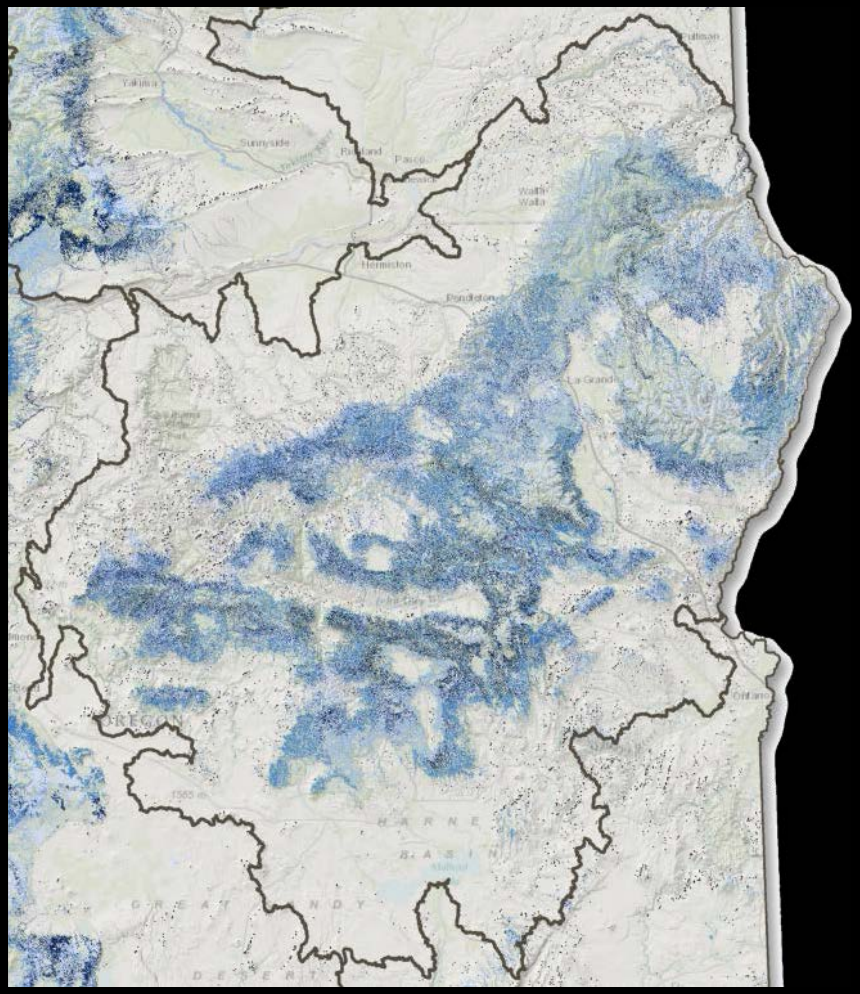
Oregon Blue Mtns.

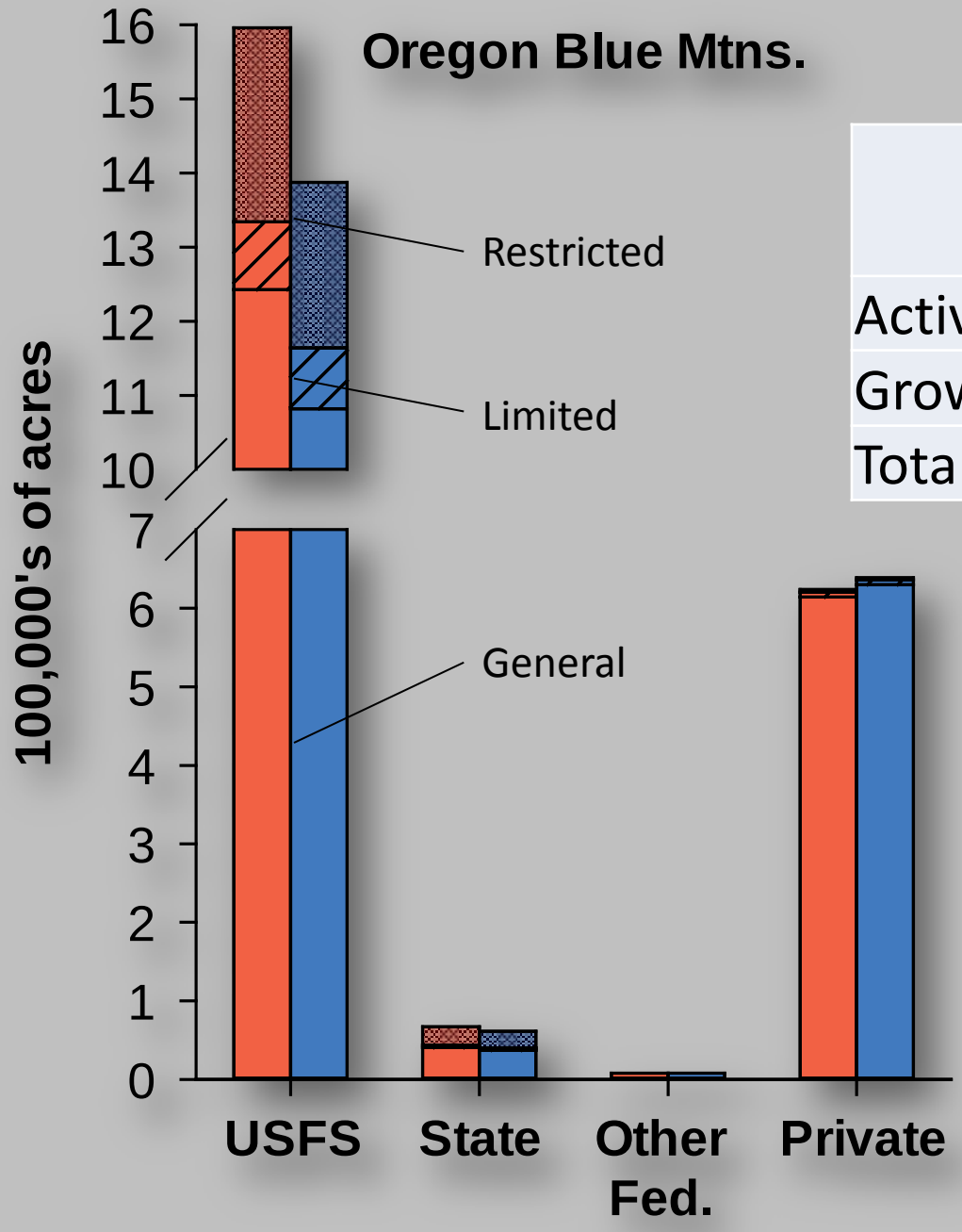
Active Needs

0% - 25%
26% - 50%
51% - 75%
76% - 100%

Growth Needs







	USFS	Total
	Acres	Acres
Active	1,596,000	2,310,000
Growth	1,388,000	2,108,000
Total	2,984,000	4,418,000

Wet-side problems?!?

- Succession may not happen with growth alone
- Does not capture silvicultural treatment to promote OG development.

R

Next Steps

- New run of analysis to fix few bugs
- Manuscript for peer review
- Follow-up work for west side
- Internal TNC roll-out - January
- Public roll-out

Communication products

- Manuscript for F.E.M.
- Infographic & poster
- Short results white paper
- “Official” powerpoint slides

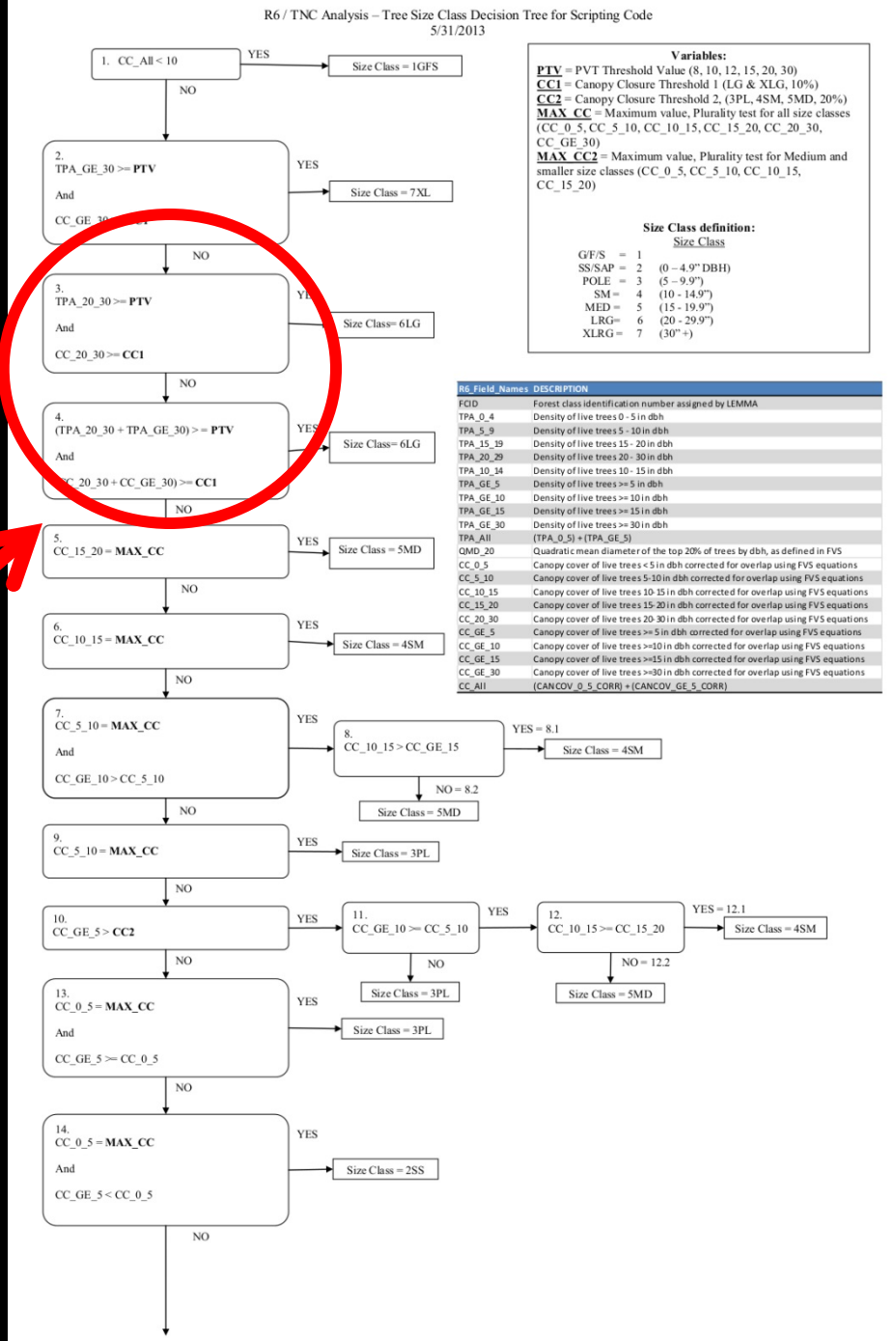
Thanks – Questions/Comments….

Completed Components

- Landscape units by FRG
- Forest type layer (ILAP PVT)
- PVT to BpS Crosswalk
- Stochastic ranges for BpS Reference models
- Region 6 size class decision tree
- “Size classing” script and size class layer
- S-Class rules look-up table
- “S-Classing” Script and draft S-Class layer
- Active / Passive restoration calculation logic and rules tables
- Active / Passive restoration calculations script and draft active / passive calculations

GNN -> Size Class

- Solution: Decision Tree process - “Modified Simpson-Shlisky ”
- CC and DBH are the input data from GNN. Thresholds for each of the variables sets the size class.
  - Set by Forest System



Mid Dev.
Closed Can.

Late Dev.
Closed Can.

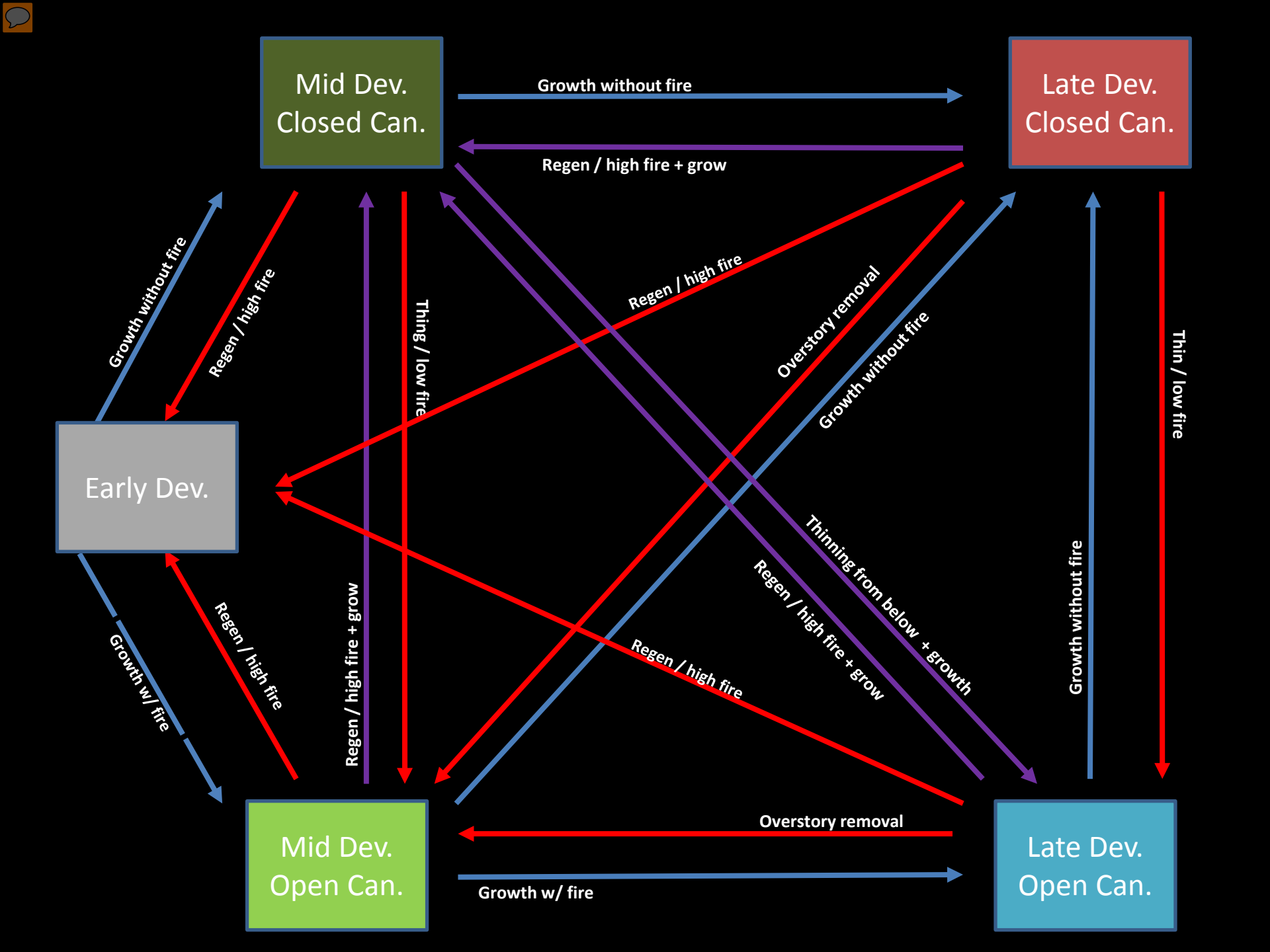
S-Class Balance

NRV vs. current per “strata”

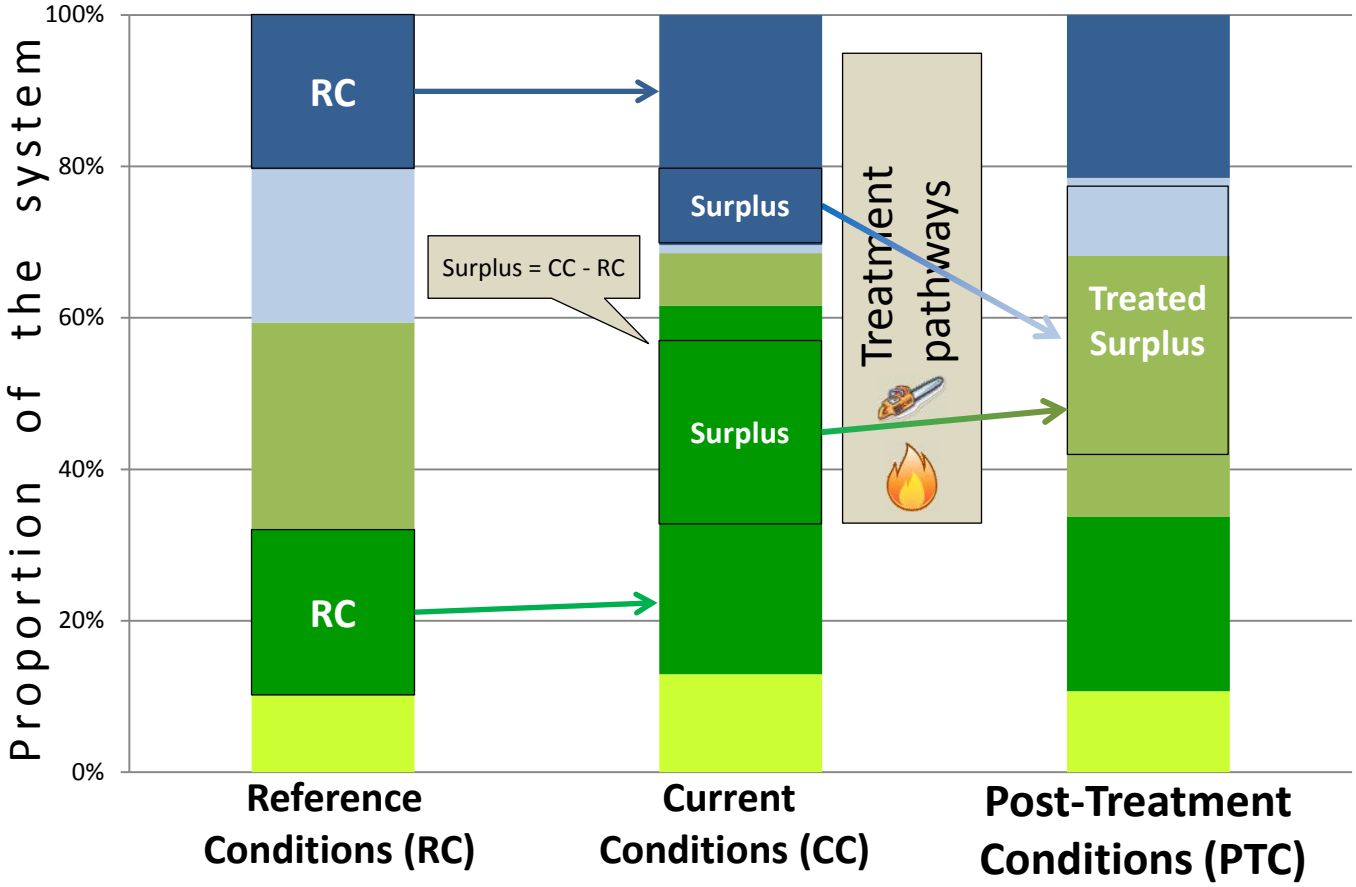
Early Dev.

Mid Dev.
Open Can.

Late Dev.
Open Can.


Mid Dev.
Closed Can.
Growth without fire
Late Dev.
Closed Can.
Regen / high fire + grow
Growth without fire
Regen / high fire
Thing / low fire
Regen / high fire
Overstory removal
Growth without fire
Thin / low fire
Early Dev.
Thinning from below + growth
Regen / high fire + grow
Growth without fire
Regen / high fire + grow
Regen / high fire
Growth w/ fire
Regen / high fire
Overstory removal
Mid Dev.
Open Can.
Late Dev.
Open Can.
Growth w/ fire

Active Restoration Treatment Process

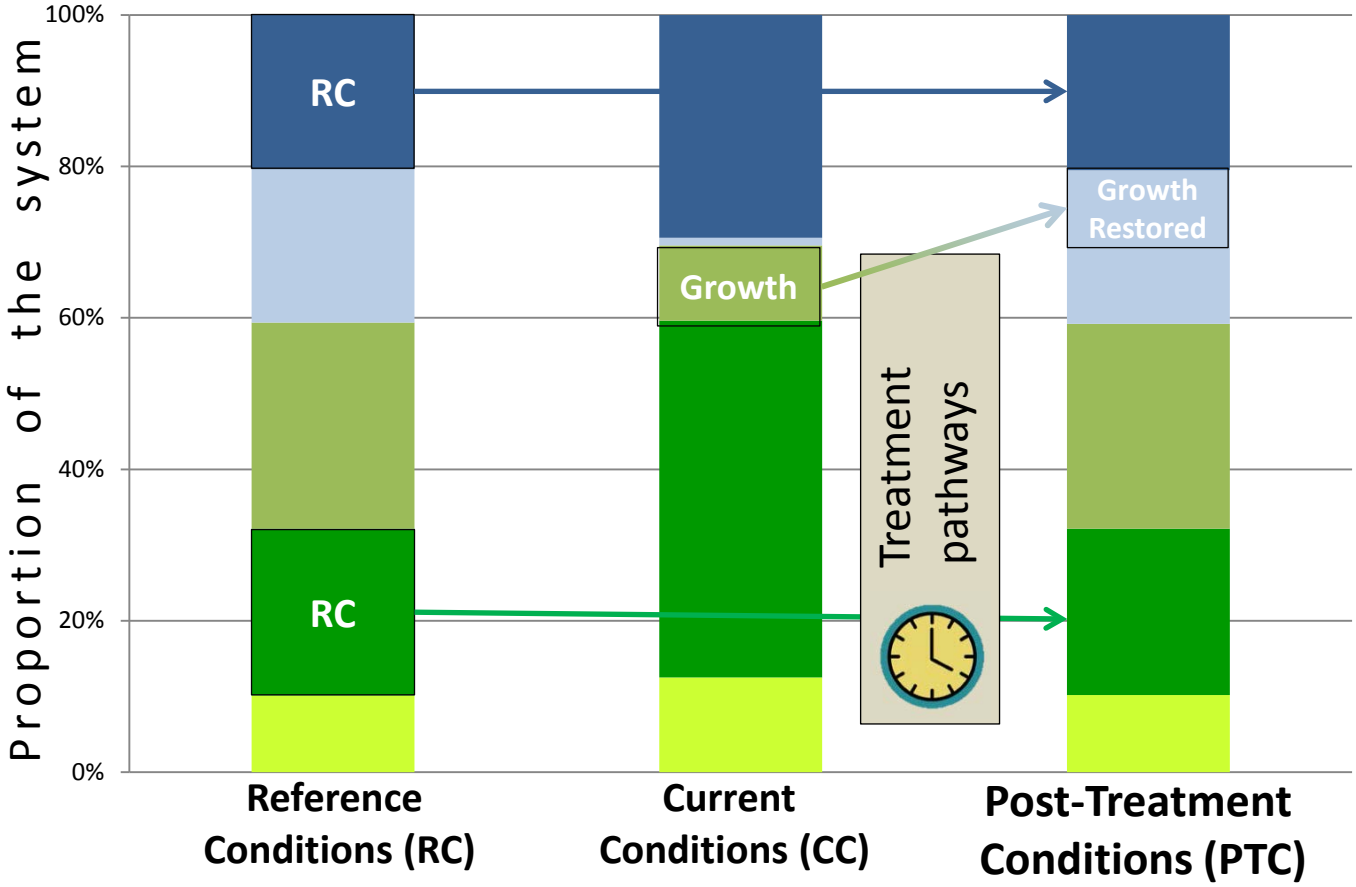


This represents a generalized frequent-fire forest system

Succession Class

- Late - Seral Closed
- Late - Seral Open
- Mid - Seral Open
- Mid - Seral Closed
- Early Seral

Growth Restoration Treatment Process



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