

Eastside Modeling Effectiveness Project (EMEP)

CMER Science Conference
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Background

- Reprise of the presentation from 2018 CMER Science Conference
- Work was performed while Kevin & Mark were at Cramer Fish Sciences
- Mark & Kevin have moved on from Cramer Fish Sciences
- Presenter may be fuzzy on some details...

EMEP Purpose

To model how current riparian stands in eastern Washington respond to the eastside riparian prescriptions over time and to evaluate what riparian stands conditions are necessary to maintain forest health using modeling programs such as the Forest Vegetation Simulator.

Today's Objectives


Discuss three main topics:

1. Current stand conditions
2. Eligibility for harvest
3. Response to management

METHODS

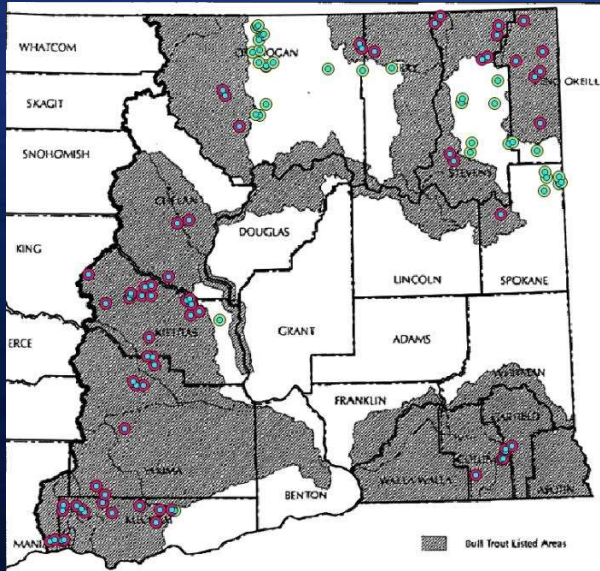
Riparian Stand Data

- EWRAP data from Bonoff *et al.* (2008)
 - Variable-width line sampling
 - Tree species, size, distance from stream
- Compiled data into “stands” by regulatory zone (WAC 222-30-022)
- Insufficient data to classify by ecological zone

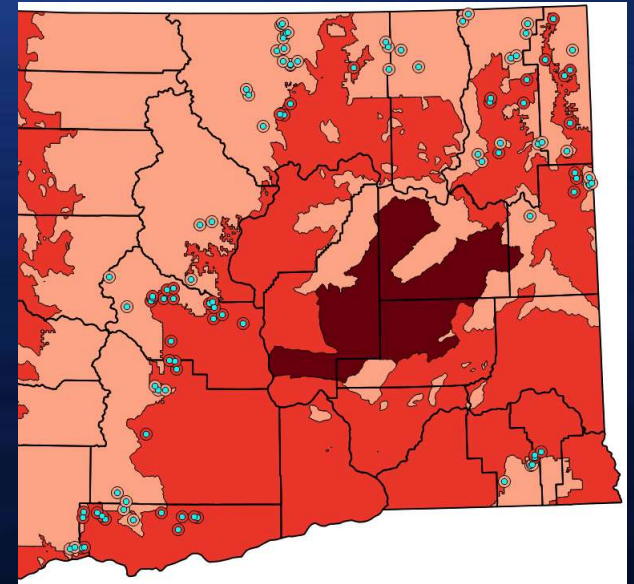
S F		TYPE 'S' OR 'F'		EASTERN WASHINGTON		RMZ REQUIREMENTS		Bankfull width less than or equal to 15 feet	
				Core Zone Width	Inner Zone Width	Outer Zone Width			
SITE CLASS I	130' WIDE RMZ	River/Stream	Migration Zone	30'	45'	55'			
SITE CLASS II	110' WIDE RMZ	Bankfull Width/Channel Migration Zone		30'	45'	35'			
SITE CLASS III	90' WIDE RMZ			30'	45'	15'		Not all streams in Eastern Washington will have an outer zone.	
SITE CLASS IV	75' WIDE RMZ			30'	45'				
SITE CLASS V	75' WIDE RMZ			30'	45'			The width of the inner zone depends on the width of your river/stream(s).	
				No Harvest					
		TYPES 'S' AND 'F' ARE FISH HABITAT STREAMS		 The only timber allowed to be cut in the core zone is what is approved for yarding corridors and/or road construction for a stream crossing. Timber cut for yarding corridors must be left on site.					

S F		TYPE 'S' OR 'F'		EASTERN WASHINGTON		RMZ REQUIREMENTS		Bankfull width greater than 15 feet	
				Core Zone Width	Inner Zone Width	Outer Zone Width			
SITE CLASS I	130' WIDE RMZ	River/Stream	Migration Zone	30'	70'	30'			
SITE CLASS II	110' WIDE RMZ	Bankfull Width/Channel Migration Zone		30'	70'	10'			
SITE CLASS III	100' WIDE RMZ			30'	70'			Not all streams in Eastern Washington will have an outer zone.	
SITE CLASS IV	100' WIDE RMZ			30'	70'				
SITE CLASS V	100' WIDE RMZ			30'	70'				
				No Harvest					

Ancillary Data



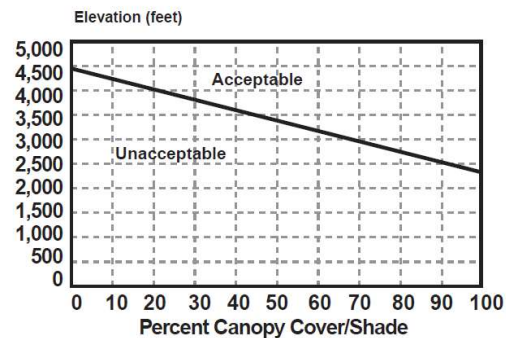
**Bull Trout Overlay
WAC 222-16-010**



**DNR Stream
Temperature Layer**

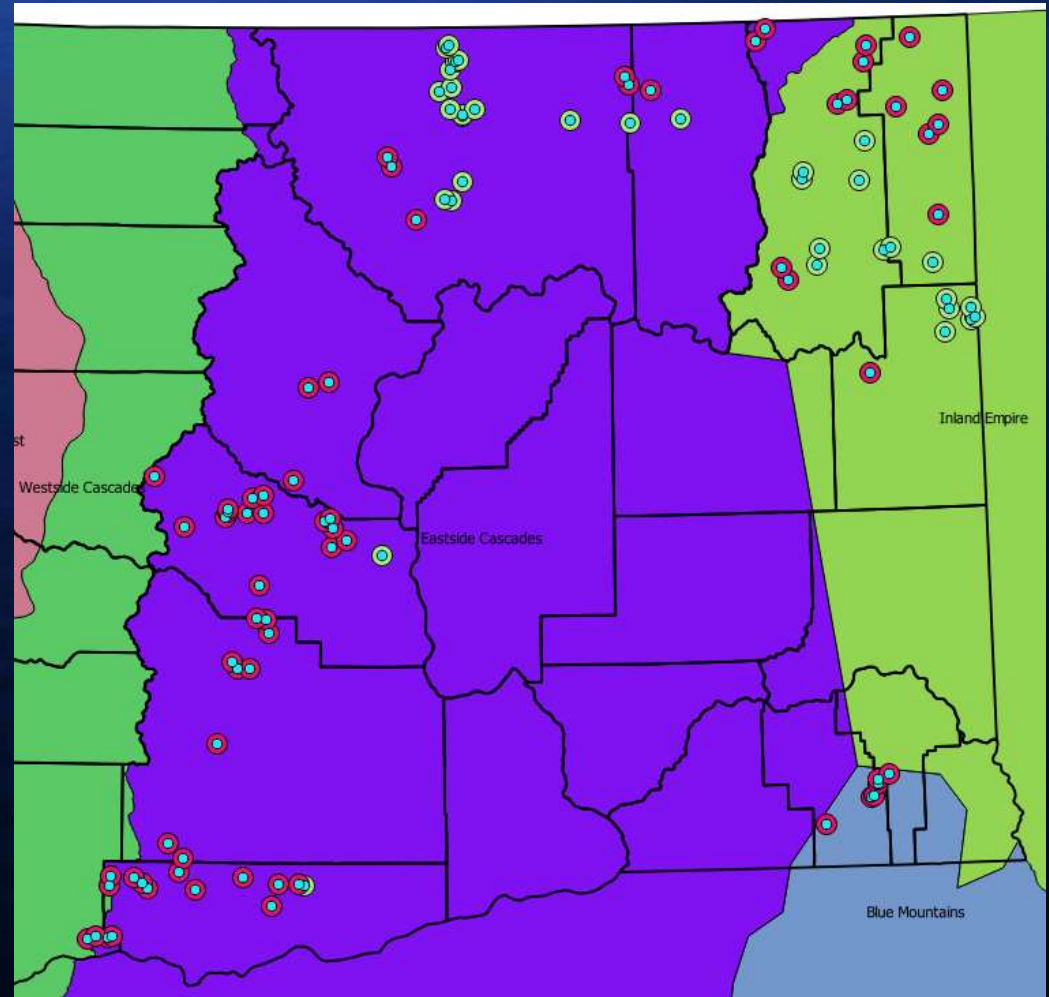
Canopy Cover Nomograph

Eastern Washington Canopy Cover Required
16 degrees C



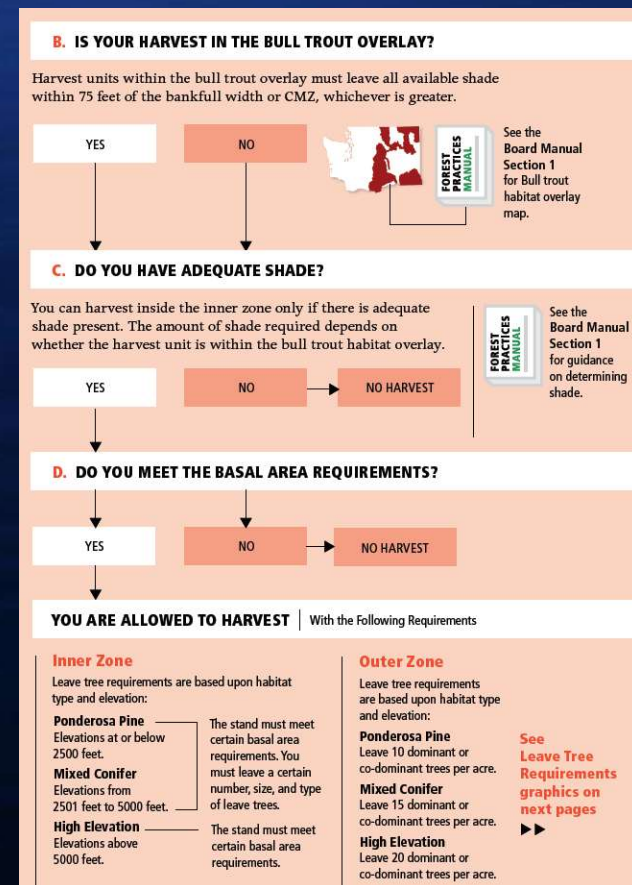
FVS Simulations

- Three regional variants
 - East Cascades
 - Inland Empire
 - Blue Mountains
- 50-year simulations
- No Action plus all possible harvests under the Forest Practices Rules



Harvest Simulations

- Followed the complex Forest Practices Rules to determine prescriptions
- Inner zones harvest eligible only if they met shade and basal area requirements
- Outer zone harvest eligible if TPA limits met
- Zone and forest type leave targets applied



Data Summary

Standing, Mortality and Harvested Trees

- Quadratic mean diameter (QMD)
- Basal are per acre (BA)
- Trees per acre (TPA)
- Stand Density Index (SDI)
- Curtis' Relative Density (RD)
- Board-foot volume per acre
- Cubic-foot volume per acre

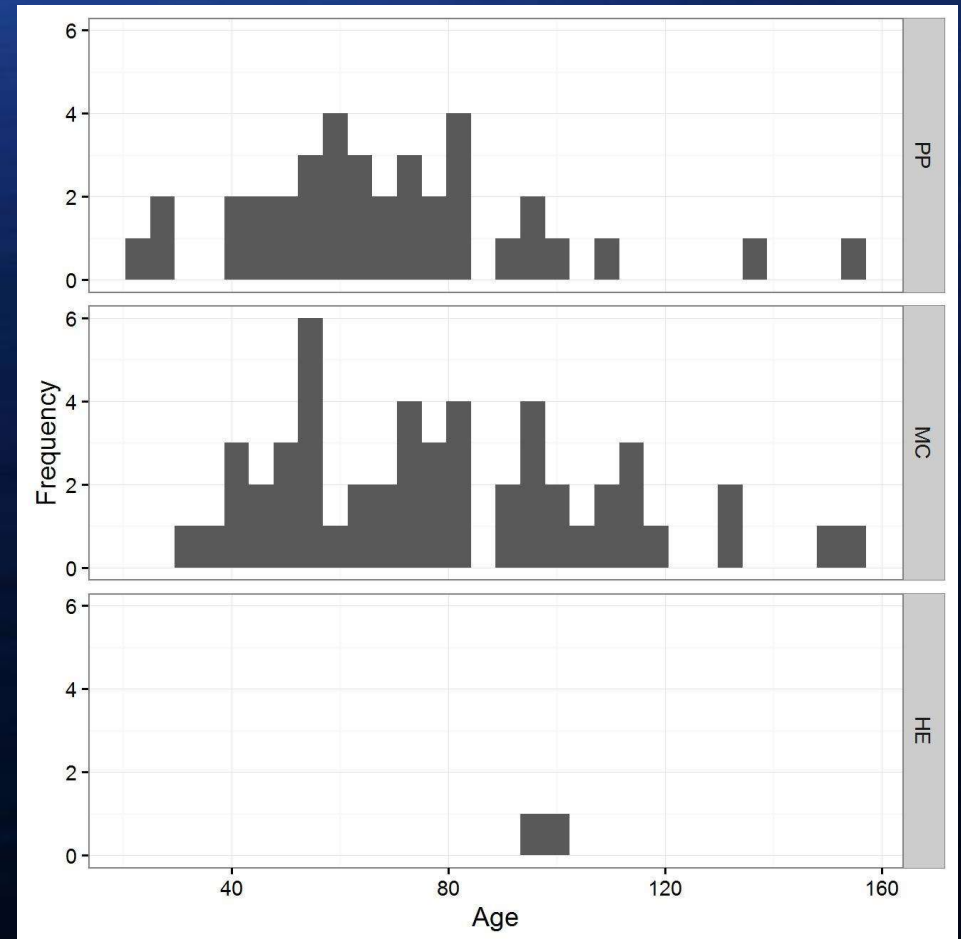
Forest Health and Risk

- Surface flame length
- Total flame length
- Hessburg *et al.* (1999) insect and disease ratings

RESULTS – CURRENT CONDITIONS

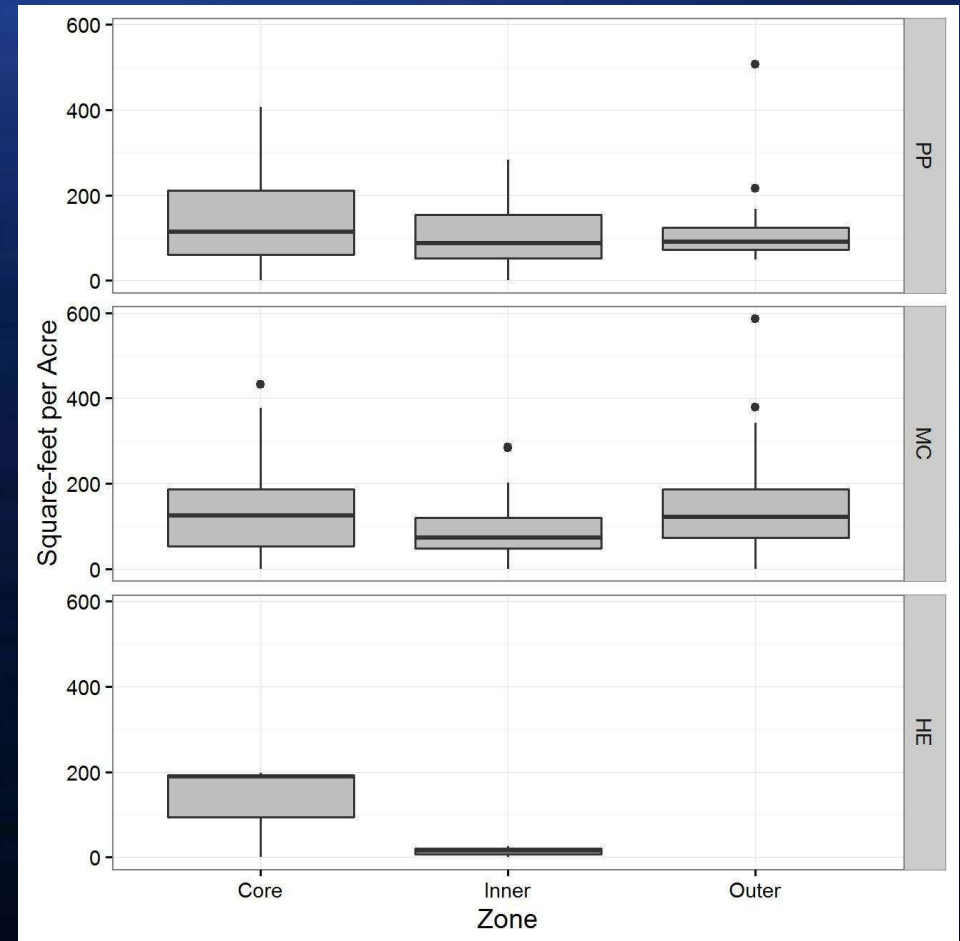
Current Conditions: Timber Habitat Type & Age

- 42 Ponderosa Pine sites
- 58 Mixed Conifer sites
- 2 High Elevation sites
- Generally 40 – 120 years old
- Higher proportion of young stands in Ponderosa Pine

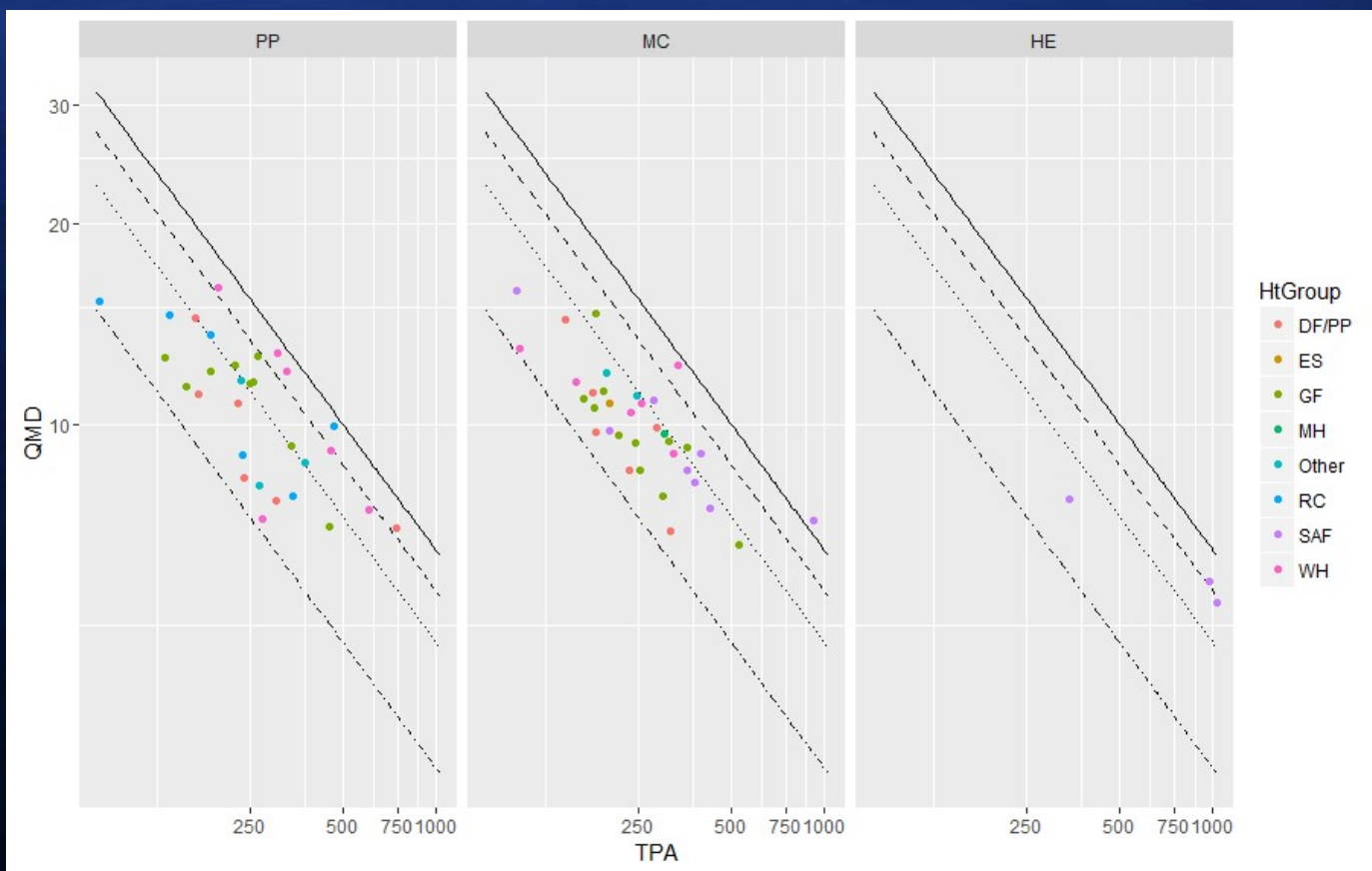


Current Conditions: Density (BA)

- Density generally decreases with distance from stream
- QMD comparable between inner and outer zones
- Increases in basal area per acre in outer zones where they occur



Current Conditions: Stocking



RESULTS – HARVEST ELIGIBILITY

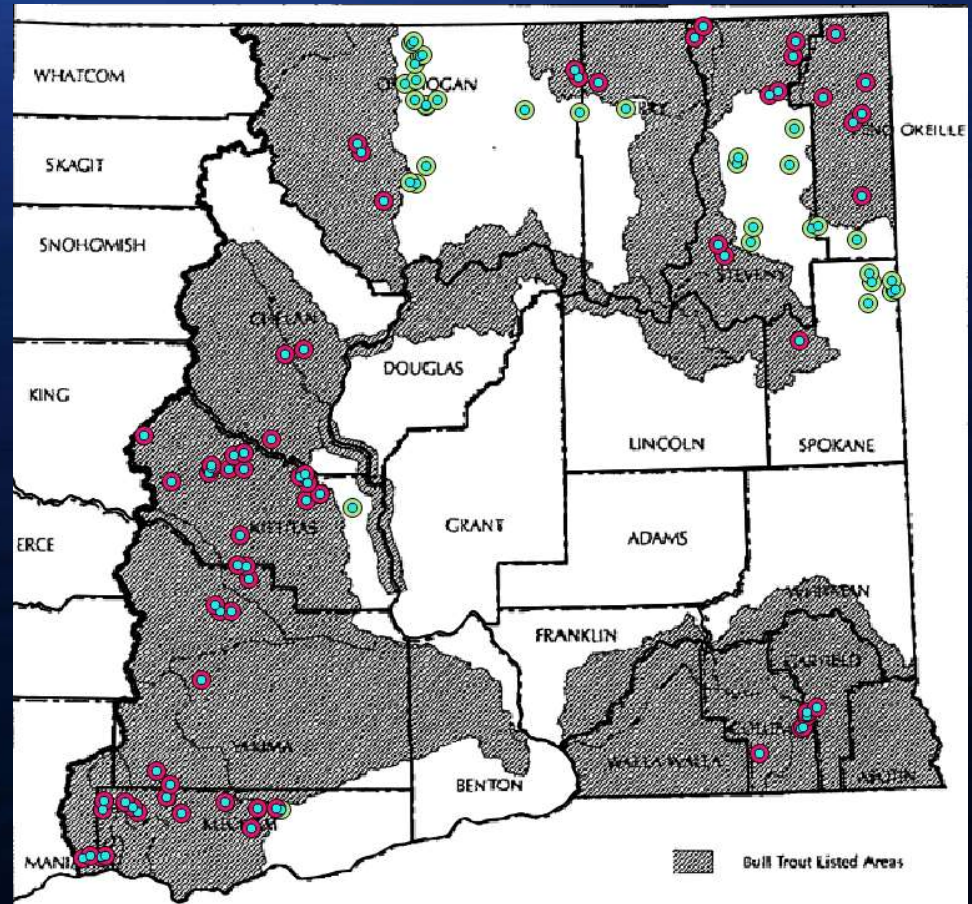
Inner Zone Harvest Eligibility

		Year 0		Year 10		Year 20		Year 30		Year 40		Year 50	
Meets Shade Requirements		N	Y	N	Y	N	Y	N	Y	Y	N	N	Y
		83	20	84	19	83	20	83	20	83	20	82	21
Meets Stocking Requirements	N	59	7	61	7	58	6	56	2	55	3	54	3
	Y	24	13	23	12	25	14	27	18	28	16	28	18

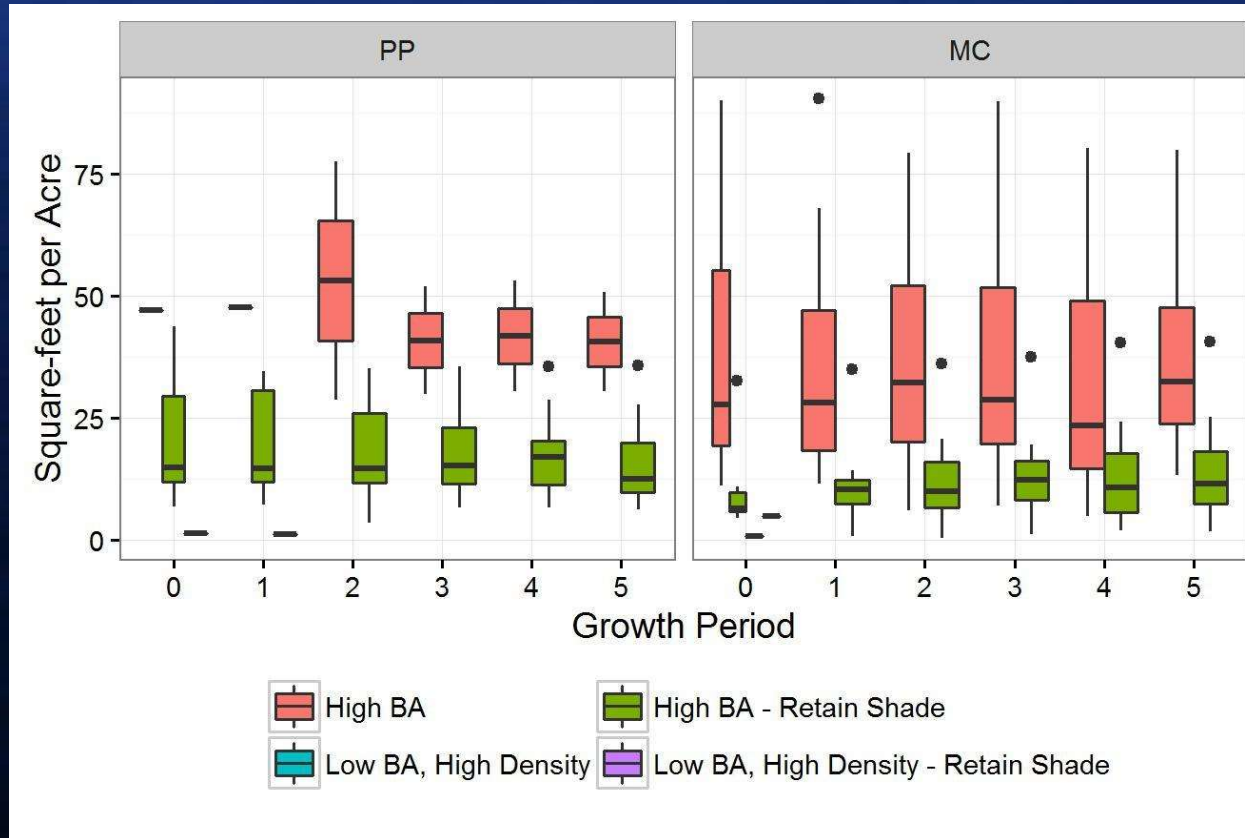
- Shade and basal area criteria not met are not harvested (red)
- Shade not met but basal area is met can have harvest beyond 75' (yellow)
- Shade and basal area criteria both met harvested throughout (green)

Harvest Eligibility: Bull Trout Overlay

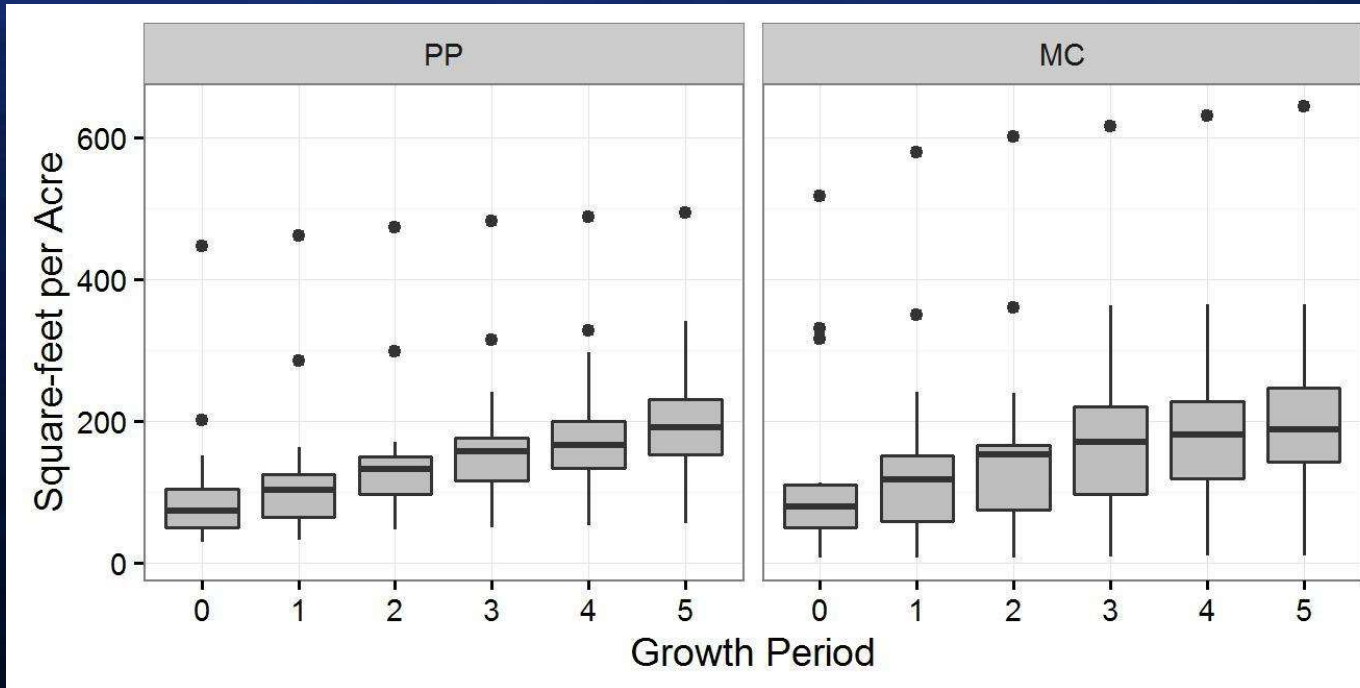
- 69 sites in BTO
- 31 Ponderosa Pine:
 - 14 Small Stream
 - 17 Large Stream
- 38 Mixed Conifer:
 - 21 Small Stream
 - 17 Large Stream



Inner Zone Basal Area Removal



Outer Zone Removals



RESULTS – RESPONSE TO MANAGEMENT

Growth Response – Inner Zone

- Slight increases in growth occur on managed sites.
- No changes statistically significant

Metric	PP		MC	
	Not Managed	Managed	Not Managed	Managed
Basal Area	1.4%	2.6%	1.5%	2.8%
Trees per Acre	0.1%	22.8%	0.7%	2.8%
Stand Density Index	1.1%	3.6%	1.3%	3.0%
Relative Density	1.1%	4.0%	1.2%	3.1%
Quadratic Mean Diameter	0.7%	-0.2%	0.5%	0.3%
Cubic Foot Volume	1.7%	2.4%	2.0%	3.3%
Board Foot Volume	2.0%	2.3%	2.1%	3.1%

Growth Response – Outer Zone

- Significant increases in managed growth rates in both timber habitat types

Metric	PP		MC	
	Not Managed	Managed	Not Managed	Managed
Basal Area	1.4%	2.6%	1.5%	2.8%
Trees per Acre	0.1%	22.8%	0.7%	2.8%
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Insect & Disease Response – Ponderosa Pine

Insect or Pathogen	Treated	Inner			Outer		
		Low	Mod	High	Low	Mod	High
WSB	Not Treated	0.3	-3.0	2.7	-1.0	-4.0	5.0
WSB	Treated	0.3	-1.8	1.5	2.3	-3.0	0.7
T1WPB	Not Treated	-6.3	6.3	0.0	-4.5	2.8	1.7
T1WPB	Treated	-3.5	4.3	-0.8	2.8	-3.3	0.5
T2WMPB	Not Treated	-2.0	1.7	0.3	-0.8	1.0	-0.2
T2WMPB	Treated	0.3	-0.2	-0.2	2.0	-0.8	-1.2
T1MPB	Not Treated	1.5	-1.5	0.0	0.0	0.0	0.0
T1MPB	Treated	1.7	0.2	-1.8	3.0	-2.5	-0.5
AROS	Not Treated	-1.5	-3.5	5.0	-2.7	0.7	2.0
AROS	Treated	-1.5	-3.5	5.0	-0.8	0.0	0.8
PHWE	Not Treated	-0.7	-4.3	5.0	-2.0	0.0	2.0
PHWE	Treated	-0.7	-4.3	5.0	-0.5	-0.3	0.8
HEANS	Not Treated	0.0	-2.0	2.0	-1.0	-2.0	3.0
HEANS	Treated	0.7	-1.8	1.2	0.3	-1.7	1.3
SRBR	Not Treated	0.3	-7.2	6.8	-2.5	1.5	1.0
SRBR	Treated	0.3	-5.3	5.0	0.2	0.7	-0.8

Units are the average change in the number of sites in a category between year 0 and year 50

Insect & Disease Response – Mixed Conifer

Insect or Pathogen	Treated	Inner			Outer		
		Low	Mod	High	Low	Mod	High
WSB	Not Treated	-1.7	-7.8	9.5	-2.3	1.3	1.0
WSB	Treated	-0.7	-5.0	5.7	-1.5	3.3	-1.8
T1WPB	Not Treated	-11.8	11.2	0.7	-4.3	4.3	0.0
T1WPB	Treated	-3.2	2.8	0.3	-1.5	1.5	0.0
T2WMPB	Not Treated	-3.0	4.0	-1.0	-0.3	0.3	0.0
T2WMPB	Treated	-1.3	4.0	-2.7	2.0	-1.2	-0.8
T1MPB	Not Treated	-3.7	1.2	2.5	0.5	-0.5	0.0
T1MPB	Treated	0.7	-1.0	0.3	3.2	-3.0	-0.2
AROS	Not Treated	-1.7	-6.5	8.2	-3.3	1.3	2.0
AROS	Treated	-1.3	-5.2	6.5	-1.5	0.8	0.7
PHWE	Not Treated	-1.0	-5.2	6.2	-2.3	0.3	2.0
PHWE	Treated	-0.7	-4.2	4.8	-2.0	1.3	0.7
HEANS	Not Treated	0.0	-5.5	5.5	-1.3	0.3	1.0
HEANS	Treated	0.0	-4.8	4.8	-0.7	0.2	0.5
SRBR	Not Treated	-2.3	-3.0	5.3	-3.8	1.8	2.0
SRBR	Treated	-2.3	0.2	2.2	-1.8	1.5	0.3

Units are the average change in the number of sites in a category between year 0 and year 50

Response to Management - Fire

- Average total flame length is reduced with management
- Reductions are most pronounced in the outer zones
- Managed site flame lengths are still high.

Zone	PP		MC	
	No Managed	Managed	Not Managed	Managed
Inner	28.2	25.5	40.7	31.2
Outer	47.5	24.6	45.1	19.7

Conclusions

- Stocking and shade requirements limit harvest eligibility in inner zones
- Shade requirements limit inner zone removals
- Growth increases post harvest, primarily in outer zone
- Susceptibility to insects and disease decreases even with low levels of management
- Wildfire flame lengths are reduced but primarily in outer zone

Acknowledgements

- Cooperative Monitoring Evaluation and Research Committee (CMER)
- Scientific Advisory Group for the Eastside (SAGE)
- Howard Haemmerle, DNR Project Manager (retired)

Thank you

Questions?

Comments?

Please insert report link here...

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