

# Fish, Forests, and Fire

## Alternative riparian management to protect forest and fish

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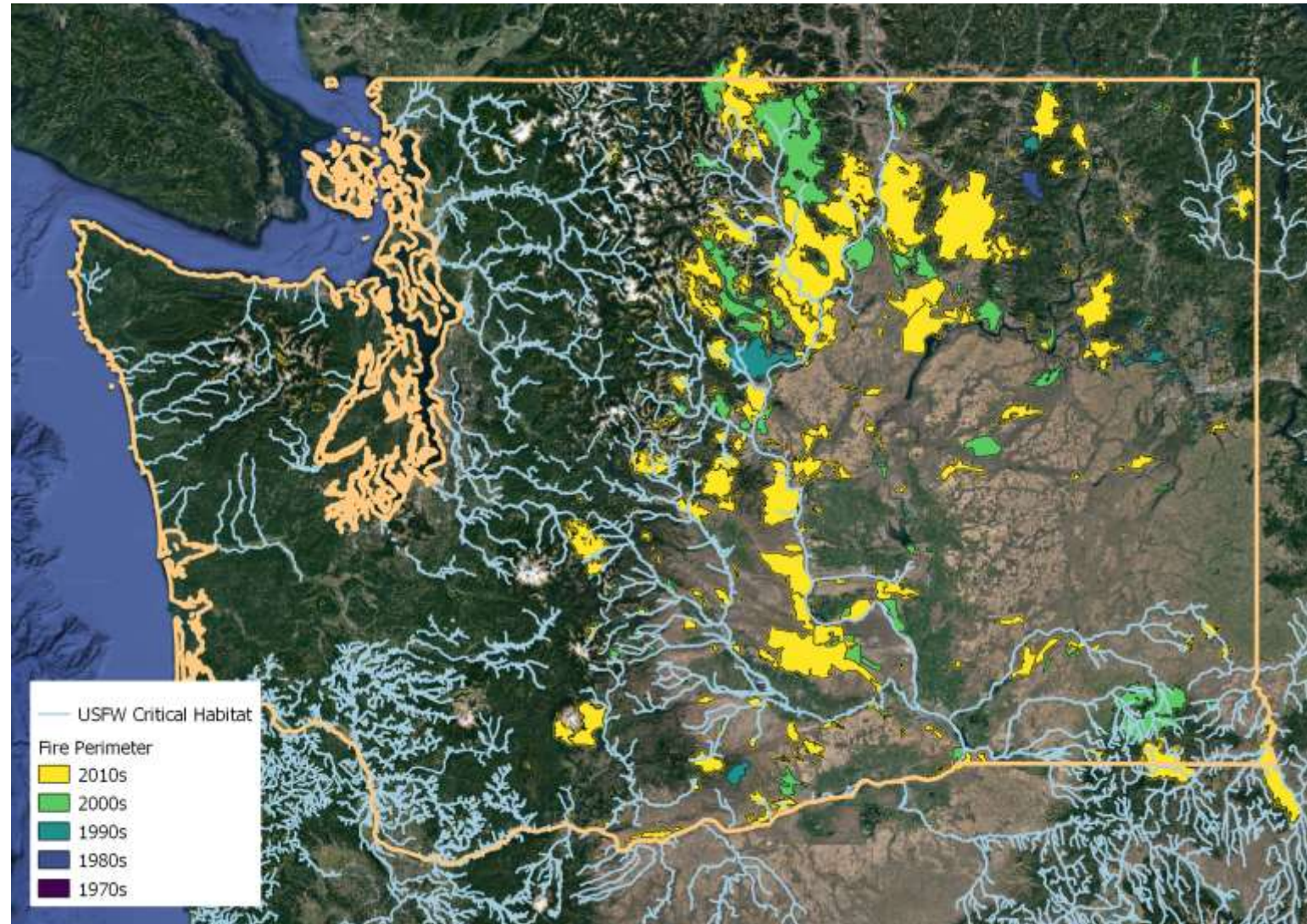
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# Eastern Washington forests are burning

- Acreage burned been increasing.
- Fires are uncharacteristically large and intense
- Forest management has reduced fire-resiliency
  - High fuel loads
  - Fuel connectivity
  - Fire-intolerant species



# We are seeing the effects of forest fires



Space Needle Live Camera, August 20, 2019





# Fires burn riparian zones

- Uncharacteristically intense fires can kill or consume all riparian vegetation.
- Aquatic resource protection greatly reduced
  - Little, if any, shade
  - Increased sediment delivery potential
  - Loss of future LWD inputs



# Forested stream protection is important

## Federal Lands - Northwest Forest Plan Standards and Guidelines (1994)

### Description - Riparian Reserve Widths

Riparian Reserves, as described in detail in the Aquatic Conservation Strategy starting on page B-9 of these standards and guidelines, are specified for five categories of streams or waterbodies as follows:

- *Fish-bearing streams* - Riparian Reserves consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet total, including both sides of the stream channel), whichever is greatest.
- *Permanently flowing nonfish-bearing streams* - Riparian Reserves consist of the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet total, including both sides of the stream channel), whichever is greatest.
- *Constructed ponds and reservoirs, and wetlands greater than 1 acre* - Riparian Reserves consist of the body of water or wetland and: the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or the extent of unstable and potentially unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the wetland greater than

## Private Lands - Washington Forest Practices Rules (2001)

### Chapter 222-30 WAC

### TIMBER HARVESTING

WACs in this chapter were in effect 7/2001 except some have been amended since 7/2001. The effective dates of the amended WACs are shown after the WAC headings.

#### WAC

WAC 222-30-010	Policy--Timber harvesting .....	1
WAC 222-30-020	*Harvest unit planning and design .....	2
WAC 222-30-021	*Western Washington riparian management zones .....	7
WAC 222-30-022	*Eastern Washington riparian management zones.....	17
WAC 222-30-023	Riparian management zones for exempt 20-acre parcels.....	24
WAC 222-30-025	Even-aged harvest--Size and timing.....	28
WAC 222-30-030	*Stream bank integrity.....	29
WAC 222-30-040	Shade requirements to maintain water temperature.....	29
WAC 222-30-045	Salvage logging within riparian management zones.....	30
WAC 222-30-050	Felling and bucking.....	30
WAC 222-30-060	Cable yarding.....	31
WAC 222-30-062	*Large woody removal or repositioning.....	33
WAC 222-30-065	Helicopter yarding.....	33
WAC 222-30-070	Ground-based logging systems.....	34
WAC 222-30-080	Landing cleanup.....	36
WAC 222-30-090	Postharvest site preparation.....	36



# But regulatory programs have not kept pace

- Federal, state, and private riparian zone regulations based on old science
  - Forest Ecosystem Management Team report – 1993
  - Forest and Fish Report – 1999
- Key goals include:
  - Support harvestable levels of salmon
  - Support long-term viability of other species
  - Meet or exceed water quality standards
  - Support an economically viable timber industry





# Eastern Washington riparian management zones

- Intent was to recognize disturbance
- Maintain adequate shade
- Are very complex
- Often lead to no management



76 Timber Harvesting | Riparian Management Zones

1 DETERMINE THE TYPE OF STREAM

2 DETERMINE THE WIDTH OF STREAM

3 DETERMINE THE SITE CLASS

4 DETERMINE THE HARVEST OPTION

5 MARK YOUR RMZ

4b DETERMINE THE HARVEST OPTION | EASTERN WASHINGTON

How you harvest adjacent to a Type S, F or Np stream (see page 60) in Eastern Washington is based upon the site class, timber habitat type, and shade requirements needed to protect your stream(s).

A. HOW WIDE IS YOUR RIPARIAN MANAGEMENT ZONE (RMZ)?

Once you have determined the site class and know the width of your stream, using the charts below, add the core, inner, and outer zone widths to determine the maximum width of your RMZ.

SF

TYPE 'S' OR 'F' EASTERN WASHINGTON RMZ REQUIREMENTS

Bankfull width less than or equal to 15 feet

	River/Stream	Core Zone Width	Inner Zone Width	Outer Zone Width
SITE CLASS I	130' WIDE RMZ	30'	45'	55'
SITE CLASS II	110' WIDE RMZ	30'	45'	35'
SITE CLASS III	90' WIDE RMZ	30'	45'	15'
SITE CLASS IV	75' WIDE RMZ	30'	45'	
SITE CLASS V	75' WIDE RMZ	30'	45'	

Not all streams in Eastern Washington will have an outer zone.

The width of the inner zone depends on the width of your river/stream(s).

No Harvest

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.

TYPES 'S' AND 'F' ARE FISH HABITAT STREAMS

SF

TYPE 'S' OR 'F' EASTERN WASHINGTON RMZ REQUIREMENTS

Bankfull width greater than 15 feet

	River/Stream	Core Zone Width	Inner Zone Width	Outer Zone Width
SITE CLASS I	130' WIDE RMZ	30'	70'	30'
SITE CLASS II	110' WIDE RMZ	30'	70'	10'
SITE CLASS III	100' WIDE RMZ	30'	70'	
SITE CLASS IV	100' WIDE RMZ	30'	70'	
SITE CLASS V	100' WIDE RMZ	30'	70'	

Not all streams in Eastern Washington will have an outer zone.

No Harvest

Timber Harvesting | Riparian Management Zones

www.dnr.wa.gov

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1 DETERMINE THE TYPE OF STREAM

2 DETERMINE THE WIDTH OF STREAM

3 DETERMINE THE SITE CLASS

4 DETERMINE THE HARVEST OPTION

5 MARK YOUR RMZ

B. IS YOUR HARVEST IN THE BULL TROUT OVERLAY?

Harvest units within the bull trout overlay must leave all available shade within 75 feet of the bankfull width or CMZ, whichever is greater.

YES

NO

See the Board Manual Section 1 for Bull trout habitat overlay map.

C. DO YOU HAVE ADEQUATE SHADE?

You can harvest inside the inner zone only if there is adequate shade present. The amount of shade required depends on whether the harvest unit is within the bull trout habitat overlay.

YES

NO

NO HARVEST

D. DO YOU MEET THE BASAL AREA REQUIREMENTS?

YES

NO

NO HARVEST

YOU ARE ALLOWED TO HARVEST | With the Following Requirements

Inner Zone

Leave tree requirements are based upon habitat type and elevation:

Ponderosa Pine

Elevations at or below 2500 feet.

Mixed Conifer

Elevations from 2501 feet to 5000 feet.

High Elevation

Elevations above 5000 feet.

The stand must meet certain basal area requirements. You must leave a certain number, size, and type of leave trees.

The stand must meet certain basal area requirements.

Outer Zone

Leave tree requirements are based upon habitat type and elevation:

Ponderosa Pine

Leave 10 dominant or co-dominant trees per acre.

Mixed Conifer

Leave 15 dominant or co-dominant trees per acre.

High Elevation

Leave 20 dominant or co-dominant trees per acre.

See Leave Tree Requirements graphics on next pages

# Can active management build resilience?



- Strategies effective on upland sites
  - Change species composition
  - Change fuel connectivity
- What level of treatment can meet forest resilience and aquatic protection goals ?





# Current eastern Washington riparian conditions

Washington DNR Adaptive Management Program commissioned two studies:

- Eastern Washington Type F Riparian Assessment Project (EWRAP) (Bonoff et al. 2008)
- Bull Trout Overlay (BTO) monitoring (Cupp & Lofgren 2014)
- Both collected spatial forest inventory data in riparian areas to assess forest conditions along fish-bearing streams



# Active management alternatives

## Assessed the ability of riparian zone alternative plans to meet both fire-resilience and aquatic protection goals

- Spatial forest inventory created using EWRAP and BTO data for 90 riparian stands.
- Simulated current riparian treatments and 15 alternative treatments
- USFS Forest Vegetation Simulator (FVS) modeled growth, yield, treatment, and fire impacts regulatory zones.
- Modeled shade (Teply and McGeer 2014) and instream LWD (Teply et al 2007).
- Fire and Fuel Effects model for FVS characterizes fire impacts on regulatory zones assuming historical wildfire conditions (70F, 20 mph winds, low fuel moisture).



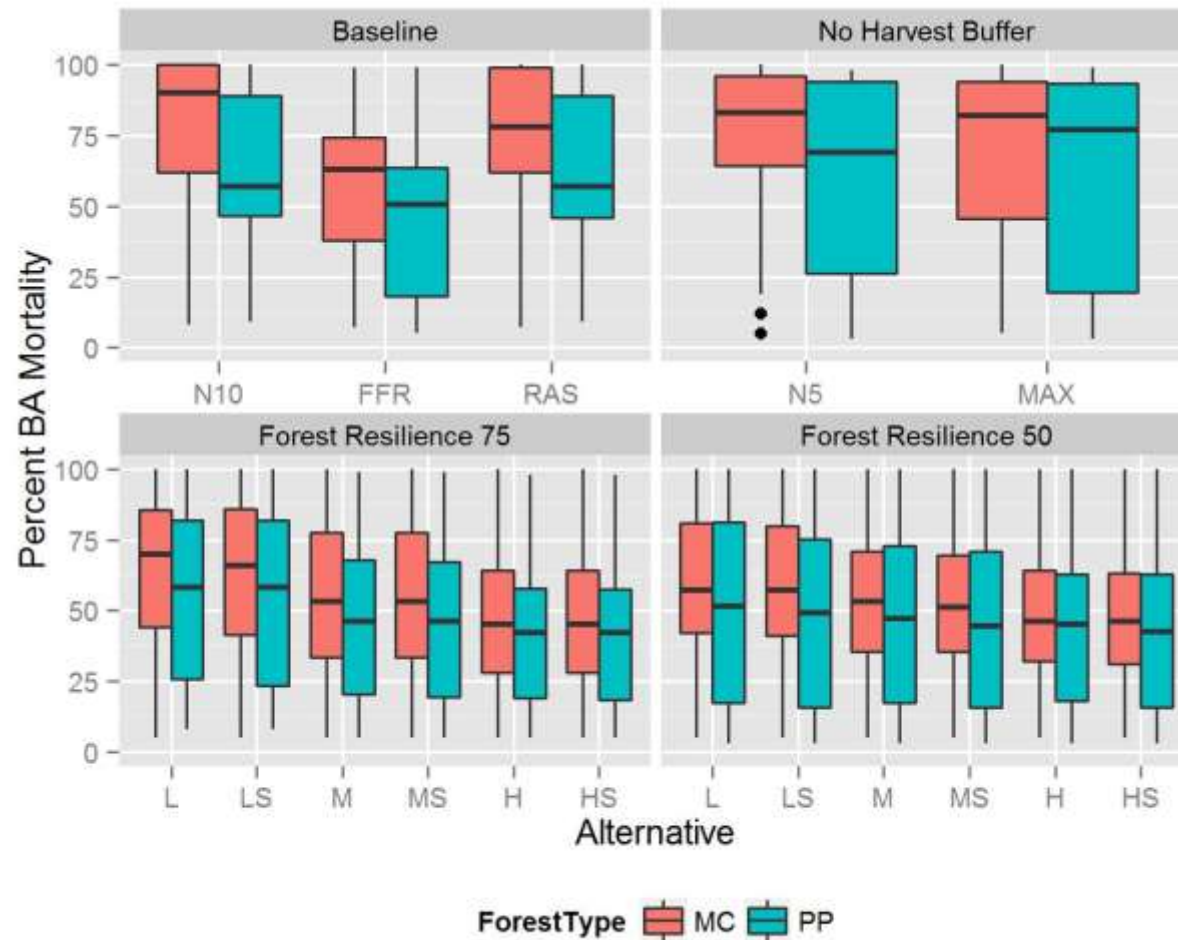


# Simulated Treatments

- Baseline
  - 100-foot no-cut (N10)
  - Current regulations (FFR)
    - 30-foot no-cut
    - 45- or 70-foot basal area limit thin
    - 0 – 55-foot heavy thin
  - Retain all shade (RAS)
- No Harvest Buffer
  - 50-foot no-cut (N5)
  - 30-foot no-cut (MAX)
- Forest Resilience
  - 50- and 75-foot buffers
  - Thin from below
  - Thin throughout the buffer
  - 10% basal area removal (L)
  - 20% basal area removal (M)
  - 30% basal area removal (H)
  - Early-seral, fire-tolerant species preference (S) options for all

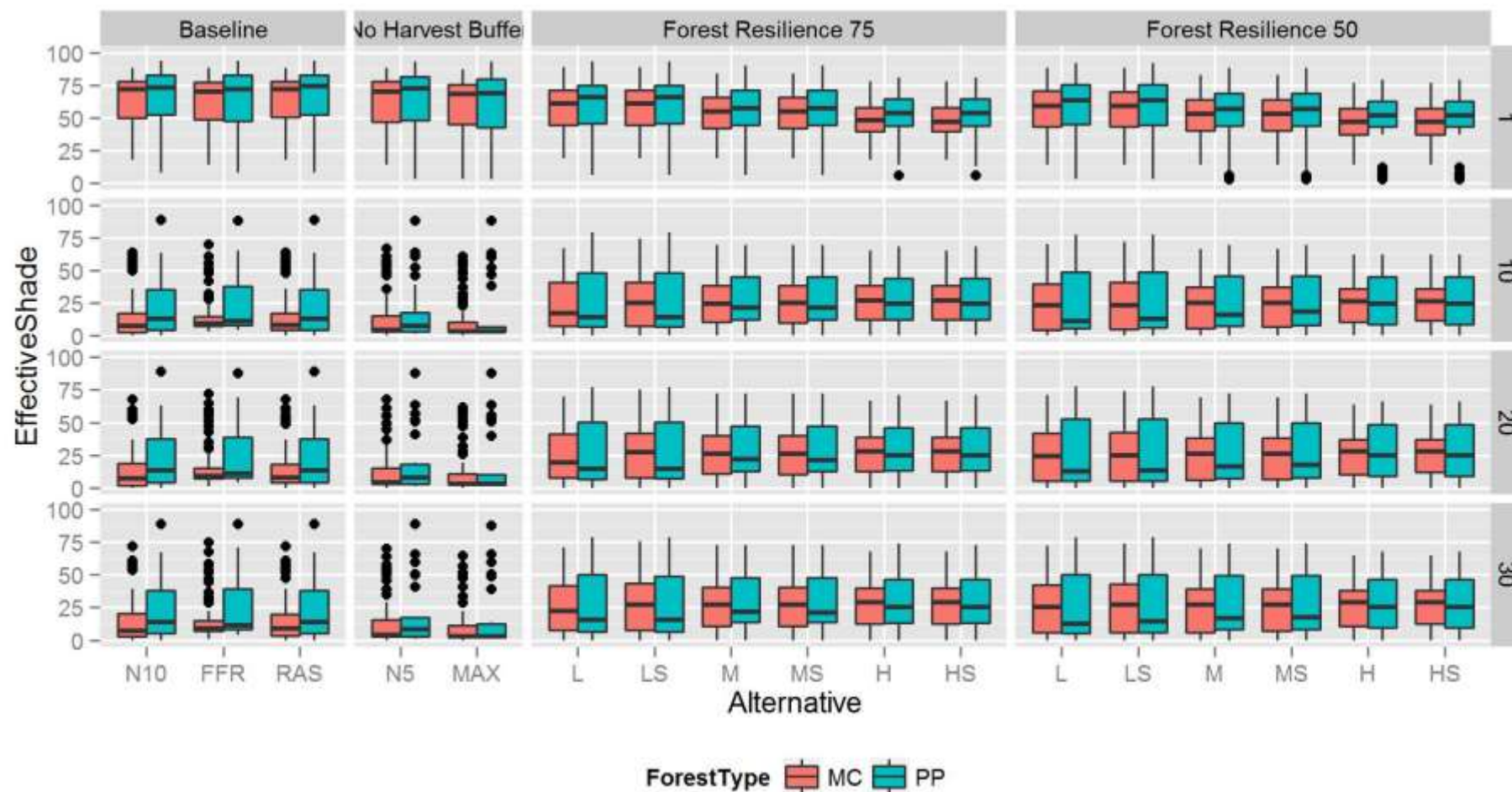


# Potential wildfire basal area mortality

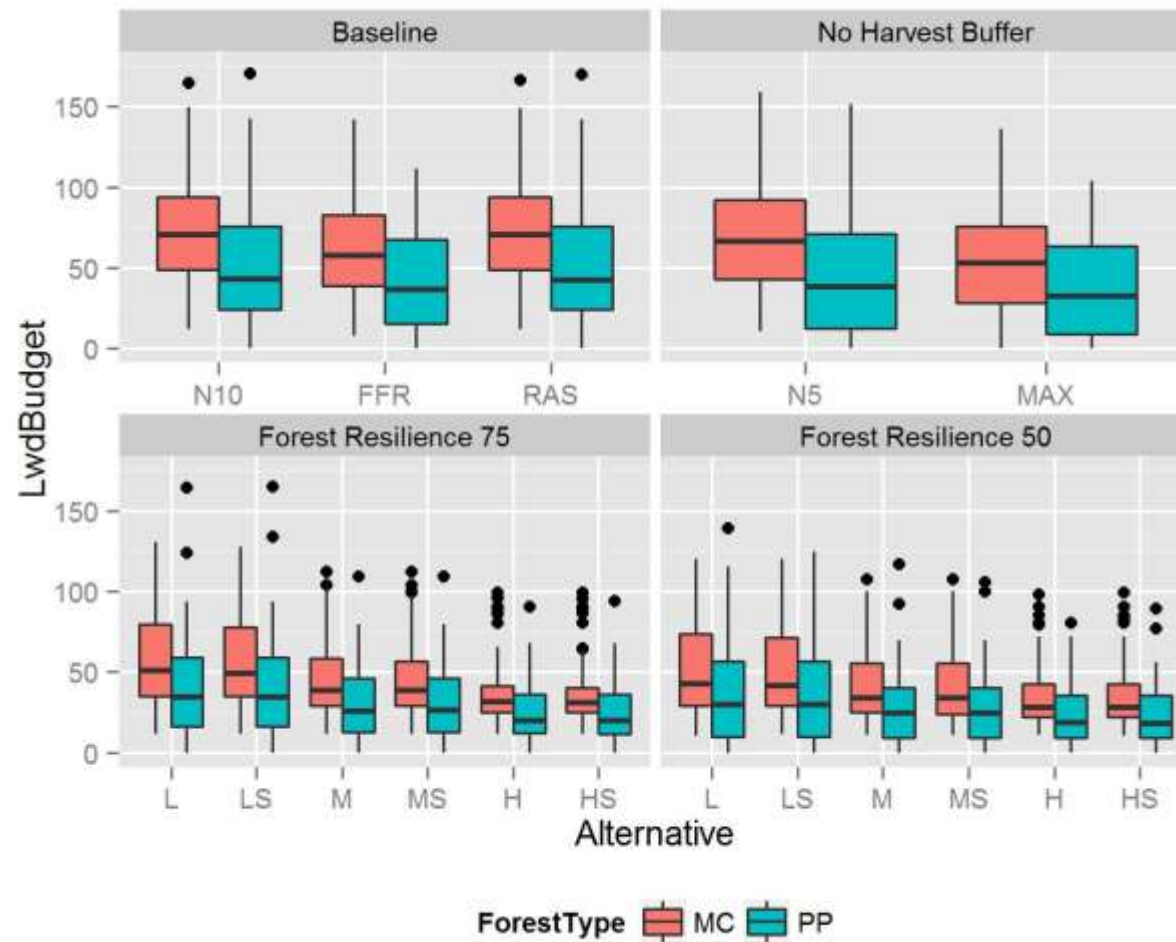




# Effective shade



# Large woody debris budget





# We can make fire-resilient riparian zones

With treatment:

- Fire-related mortality is reduced
- Post-fire shade is greater

However:

- Effective shade is reduced after treatment, which is persistent without fire.
- Large woody debris inputs are reduced
- Responses depend on forest type



# Why do some prescriptions work?

- Thinning from below removes ladder fuels
- Thinning reduces competition
- Select for fire-tolerant species
- Heavier thinning can be better
  - Disconnect canopy fuels
  - Increase tree growth



# Fire is inevitable, but impacts are not





# Thank You!

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