EVALUATING RIPARIAN MANAGEMENT AT THE REACH AND WATERSHED SCALES

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NetMap

Community Digital Watersheds & Shared Analysis Tools (www.netmaptools.org)

RIPARIAN MANAGEMENT TOOLS

NetMap can help resource managers estimate changes to channel habitats due to forest management or forest restoration. Relevant tools address: 1) wood recruitment, 2) thermal loading, 3) habitat types, 4) floodplain mapping, and 5) landslide and debris flow susceptibility (and related wood recruitment).

Example application: The Siuslaw National Forest (R6) is engaged in an ESA Section 7 Consultation with National Marine Fisheries Service regarding the potential impacts of thinning dense second growth forests (35 yrs old) in the Oregon Coast Range. The Siuslaw National Forest has applied forest growth models (FVS) to forecast the growth and death of trees over one to two centuries. Model output in terms of annual number of living and dead trees is imported into NetMap's reach scale and watershed scale wood recruitment tools to evaluate the changing size and abundance of wood in streams. The analysis has implications across the wider Northwest Forest Plan area.

Two management scenarios are evaluated. Scenario 1 evaluates a thinning treatment (70 TPA) within a 10 m no thin buffer outside of a 10m riparian deciduous stand. In Scenario 2 the buffer is included in the thinning treatment. Output from the Forest Vegetation Simulator (FVS) was used.

REACH SCALE WOOD SUPPLY

At the reach scale, analysts can assess the effects of different treatments along one or both stream banks. Evaluations can be made for a single year or for multiple years (often a century) if forest growth models (FVS, Oreganon, Zelig) have been applied (Fig.1). Other important components include bank erosion, valley slope, and log taper. User selects outputs in pieces or volume per channel length.

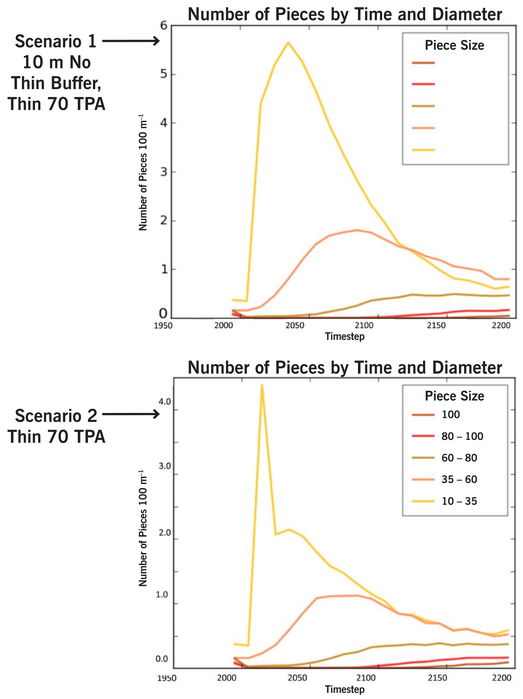

Fig. 1. More pieces of wood enter the stream from the unthinned forests initially than the thinned forest, but after 2130 these values start to converge.

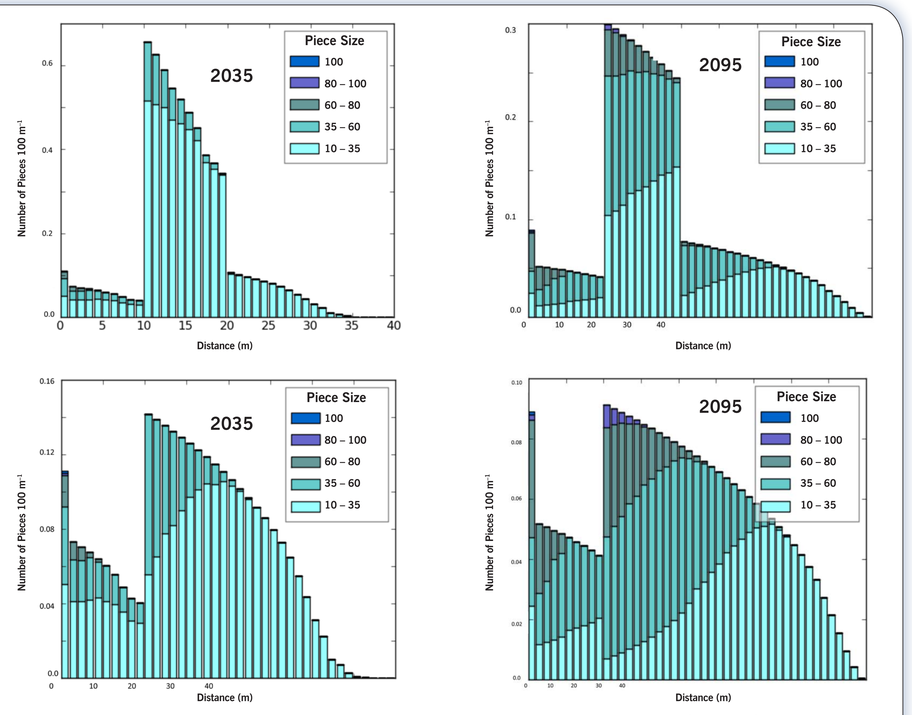

Fig. 2. Annual number of pieces by distance to stream and piece size for two time periods post-treatment (2035, 2095) for scenarios 1 (no thin buffer) and 2 (thinned buffer), (y-axes differ).

WATERSHED SCALE WOOD SUPPLY

Evaluating wood recruitment at the watershed scale (hundreds to thousands of individual channels and forest stands) may be the best way to plan and evaluate forest mgmt or restoration.

FVS was used to develop stand growth forecasts in Lake Creek (Oregon Coast Range). The simulation started in 2005 with zero wood and thinning to 70 trees per acre occurred in 2015 and 2025 (Fig. 3).

We ran 2 scenarios that thinned the buffer (**pink**) to 70 trees per acre or left the buffer uncut. The buffer contains 7% of the watershed area.

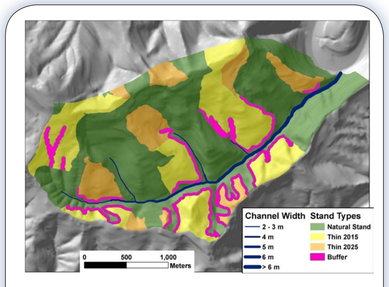

Fig. 3. Stand types in Lake Creek watershed with channels > 2 m wide.

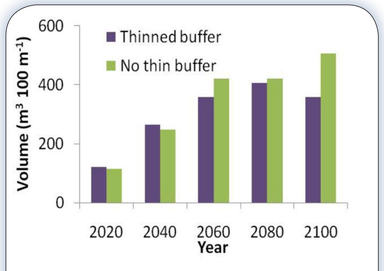

Fig. 4. During the earlier years, higher wood volumes result from the thinned buffer, but after 2060, more wood comes from the unthinned buffer.

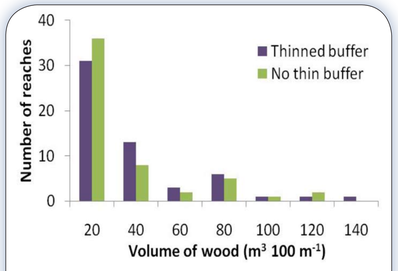

Fig. 5. Mid to high-range volumes of wood are more common in reaches with thinned buffers.

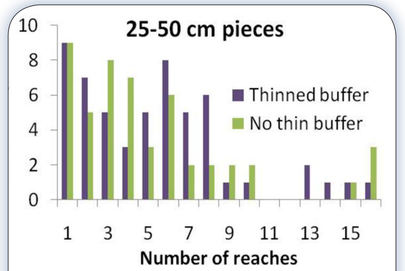

Fig. 6. No consistent trend exists for the number of pieces for thinned and no thin buffers: 25-50cm . Other piece sizes are available.

WOOD RECRUITMENT BROWSER

NetMap's online scenario browser allows users to explore how different forest mgmt scenarios can affect wood recruitment. http://mazamascience.com/ESI/ScenarioBrowser

Users can select plots to show time series of annual in-stream wood or accumulated wood (Figs. 7 and 8), source distance from reach (Fig. 9), or difference plots (Fig. 10). Difference plots are useful to calculate the effects of mitigation strategies.

Refer to NetMap Technical Help for relevant citations.

Contact Earth Systems Institute at:
www.earthsystems.net or www.netmaptools.org

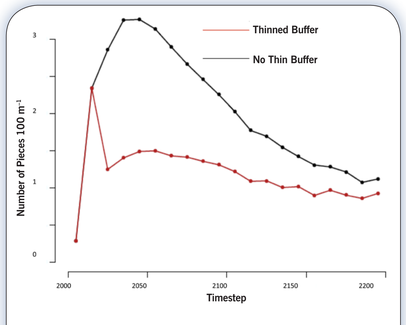

Fig. 7. Annual wood recruitment.

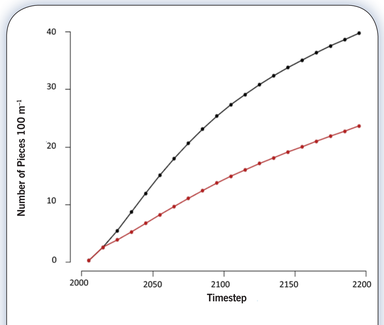

Fig. 8. Accumulated wood.

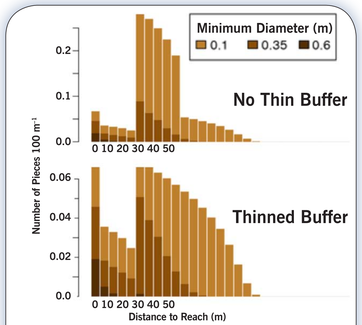

Fig. 9. Wood recruitment: 2045 (y-axes differ).

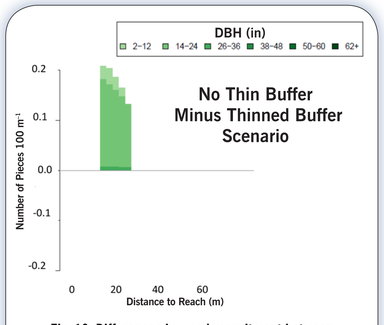

Fig. 10. Differences in wood recruitment between scenarios by DBH and distance to stream for 2045.