

Riparian Ecology, Climate Change, and Management on the Tongass Forest

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Abstract

Riparian zones within the Coastal Temperate Rainforest (CTR) watersheds of the Tongass National Forest are unique in the extent of their interaction with stream and estuarine ecosystems. Although riparian zones are often defined by their proximity to surface water, the unique characteristics of the CTR suggest that the reciprocal interactions between terrestrial and marine ecosystems should be more explicitly recognized in definitions of riparian zones. The transfer of nutrients from spawning anadromous salmon can be an important ecological phenomenon in some riparian zones. However, the ubiquitous wetlands of the CTR dominate stream biogeochemistry through subsurface and intermittent surface hydrologic connections to streams. These saturated soils create large zones of riparian influence far removed from the nearest water body. Tongass streams are generally short and steep, with rapid transfer of water and entrained materials to adjacent estuaries where organic matter and inorganic nutrients are rapidly taken up by marine organisms. Thus from a functional point of view, Tongass NF riparian areas influence the coastal ocean as well as freshwaters and include a larger proportion of land than only the stream margins. The extensive riparian zones associated with the thousands of streams on the Tongass are largely unmanaged, therefore future impacts will be driven by direct and indirect effects of climate change more than direct management actions. Understanding how unmanaged riparian zones will change in form and function will require new models and cooperation among disciplines. Although the proportion of riparian zone impacted by harvest is small, the highest value floodplain riparian zones were among the first harvested, when riparian protections were non-existent. Restoration of degraded riparian habitat in these areas is progressing with increasing coordination among user groups, but is still largely oriented around structural enhancements. Functional metrics that explicitly recognize the importance of riparian process in addition to habitat structure are needed to guide riparian restoration efforts from an ecosystem perspective. Restoration goals based on a desired future condition represented by currently "pristine" habitat will need to be modified to reflect the widespread changes to unmanaged riparian areas that will be caused by climate change.