

**GEOMORPHIC COMPARISON OF HOLOCENE TERRACES BETWEEN THE
SUN RIVER, MONTANA AND THE SOPACHNAYA RIVER, KAMCHATKA:
IMPLICATIONS TO THE FISHERIES RESOURCE RESULTING FROM
FLOODPLAIN FUNCTION AND LAND USE^{AFS}**

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Impacts of land-use activities on a salmonid fishery are well documented. However, geomorphic evaluation of floodplain function and departure is often overlooked. Throughout many of the rivers in the northern Rocky Mountains, three major Holocene fluvial terraces have formed as rivers abandoned their floodplain in response to global climate change after the end of the Pleistocene. On the Sun River, the highest Holocene terrace stands 15 ft above bankfull, and is rarely preserved and never inundated. The middle terrace is found 6-8 ft above bankfull and is rarely inundated (>100-yr flood). This feature has well-developed loamy soil and has been deforested and farmed. The lowest terrace is 3 ft above bankfull and is inundated frequently (10-yr flood). The Sopachnaya River in Kamchatka, Russia has a similar geomorphic setting to the Sun River but flows through a pristine wilderness. There

are also two well-developed Holocene terraces, one at 15' and the other at 8' above bankfull stage. In marked contrast to the Sun River, there is no lower Holocene terrace. Instead, the low landforms associated with the Sopachnaya are active floodplains with organically rich deposition and young vegetation (< 20 yrs old). Although similar in many respects, the contrast in land-use and flow regulation between the two rivers points to the impacts of floodplain function. The Sun River has lost access to a wide floodplain, the floodplain vegetation has become decadent and the floodplain soils have desiccated. In contrast, the Sopachnaya displays frequent inundation, greater stability, and increased fish habitat diversity.