Dendrochronological techniques to extend discharge records and explore rates of floodplain turnover, Yellowstone River, Montana

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Abstract. Shifts in river flows threaten both water supplies and riverine ecosystems, but identifying the causes instigating river change is difficult because of concurrent land use, water management, and climate change. Predicting flow changes and their effects on floodplain ecosystems is essential to effective river management, however. Nearly all large Western rivers have undergone damming or substantial flow manipulation, but dendrochronological flow reconstruction on the free-flowing Yellowstone River provides a unique opportunity to isolate the effects of climate change on flow and forest regeneration. In 2013, cores were collected from 200 plains cottonwoods (*Populus deltoides*) on the lower Yellowstone River near Sidney, MT. These cores are being cross-dated, measured, and quantitatively analyzed. We plan to use the program seascorr to relate annual growth to monthly precipitation, temperature and flow to extend the discharge record at USGS stream gauge #06329500. Additionally, plains cottonwood is a pioneer species that establishes soon after land is created, so tree age is a proxy for the substrate on which it grows. Our random sample will be used to estimate the age-area distribution of land within the floodplain. The floodplain age-area distribution will reveal whether river migration rates have varied throughout the past three centuries, and we will explore climatic explanations for any changes documented. Goals of this research are to inform management of water supplies and floodplain forests in an era of climate change, knowledge translatable to other large Western rivers.