



Inventory and Comparison of Floodplain Embankment along Large Rivers

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Flood control is a fundamental human response to flood risk, and floodplain embankment by dike (levee) construction is among the oldest forms of societal impacts to natural systems. Large lowland alluvial valleys are some of Earth's most distinctive environments and represent high levels of geodiversity and biodiversity. Embankment of large lowland alluvial river valleys alters fundamental processes related to floodplain hydrology, sedimentation, and ecology and eventually results in a transformation of the embanked floodplain environment. Since embankment, many large lowland floodplains have been heavily modified for floodplain agriculture and include high population densities, increasing flood risk. While there is much discussion about the pros and cons of dike construction and the impact to floodplain environments there is no systematic inventory which documents the magnitude and intensity of floodplain embankment to lowland rivers.

In this study we characterize and inventory floodplain embankment along large lowland alluvial valleys. The review includes some of Earth's largest embanked fluvial systems, and primarily focuses on northern hemisphere rivers in the United States, Europe and Asia. Data sources includes the U.S. National Levee Database, SRTM DEM, recently obtained high resolution satellite imagery, various national topographic map series, and hydrologic data from the published literature. These data are integrated into a GIS framework to facilitate the measurement and characterisation of floodplain embankment. Spatial indices of floodplain embankment are constructed, including the intensity of embankment and how it relates to the natural floodplain and constriction of flooding.