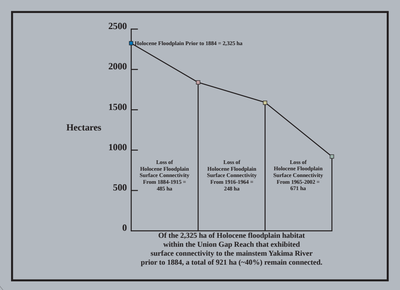
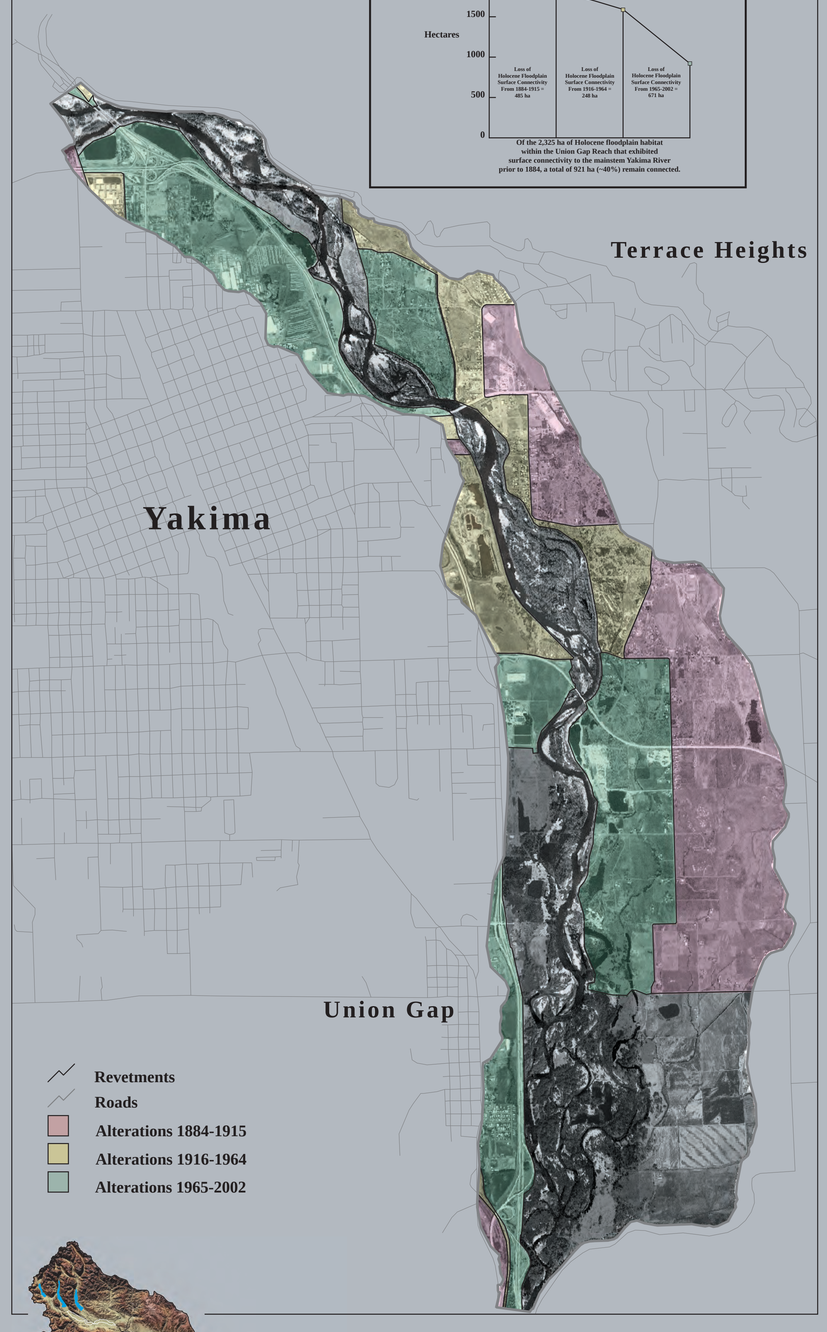
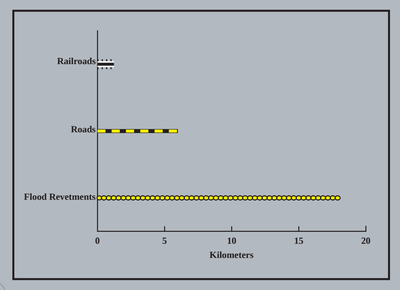
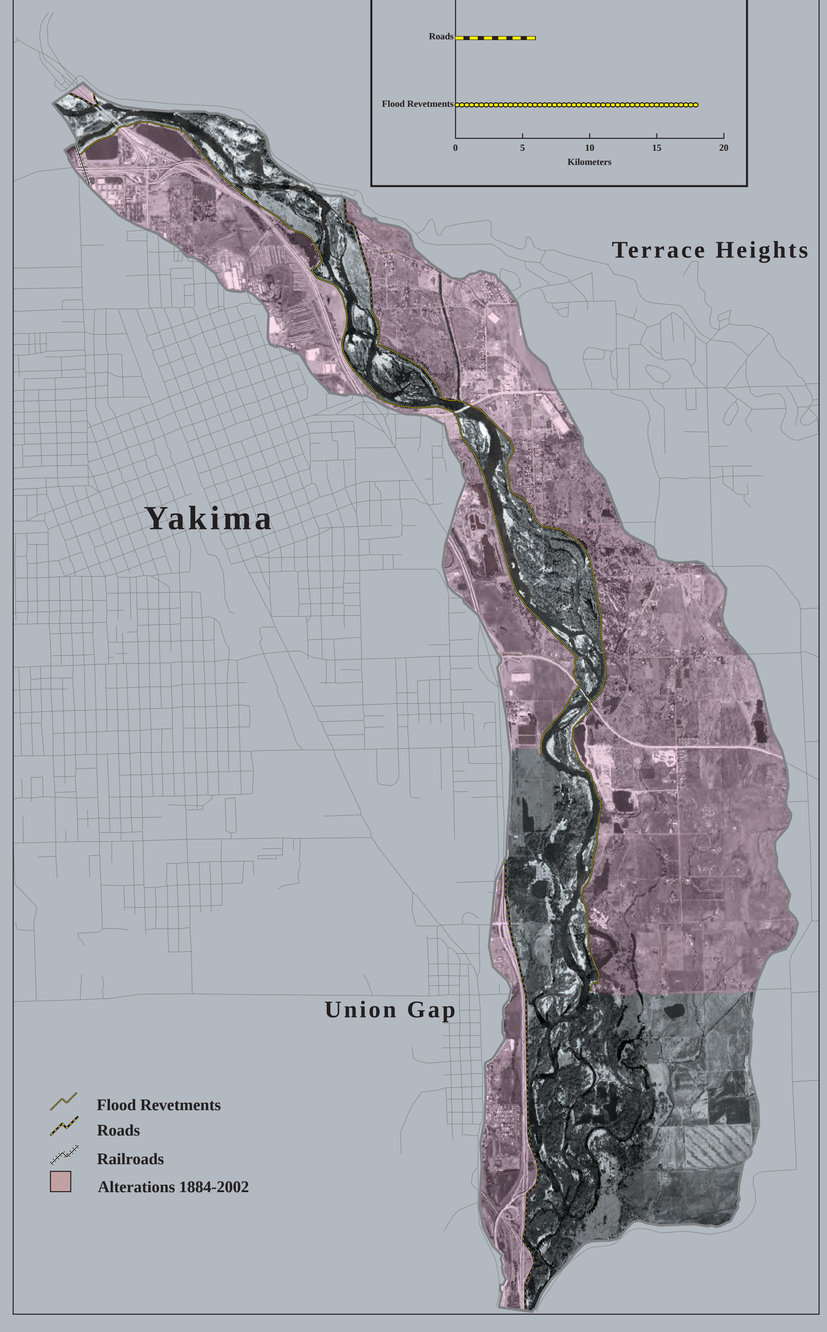
Loss Of Lateral Connectivity
To The Union Gap Holocene Floodplain From 1884 To 2002





Anthropogenic Features
Responsible For The Loss Of Lateral Connectivity To The Union Gap Holocene Floodplain





Position of the Union Gap Reach within the Yakima Basin.

Conversion Constants

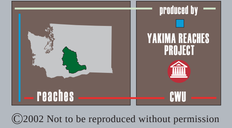
Multiply Hectares by 2.47 to obtain Acres

Multiply Kilometers by 0.621 to obtain Miles

0 .4 .8 1.2 1.6 km

0 1 mi

Cartography By
Douglas J. Eitemiller



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The Union Gap Reach

By

Morris L. Uebelacker, Clay P. Arango, and Douglas J. Eitemiller

Located on the mainstem Yakima River within the Ridge and Canyon Landscape (plate II) the Union Gap Holocene floodplain encompasses 2,325 hectares. The Union Gap floodplain is situated in a deep structural synclinal valley between the Yakima Ridge anticline on the north and Ahtanum Ridge-Rattlesnake Hills anticline on the south. The Yakima River's largest tributary, the Naches River, enters this floodplain at its northern end just south of Yakima Ridge. The Naches River, together with Ahtanum and Wide Hollow creeks, plays an important role in determining the overall fluvial geomorphic character of the Union Gap Holocene floodplain.

Settlers were quick to exploit the rich, fine textured, alluvial soils located on the floodplain's eastern margins. These soils and an abundant source of water flowing through the multiple side channels of an extensive riparian gallery had attracted the interests of ranchers and farmers by 1860. For example, one of the first white settlers to this vicinity, Leonard Thorp, homesteaded on a springbrook near the eastern margins of the floodplain (Lyman 1919). An increasing demand for water prompted the construction of irrigation ditches that supplied the region's growing population. The Union Ditch, built in 1868, delivered water from the Naches River to areas outside of the floodplain and spurred the expansion of settlement. Constructed in late 1884, the route of the NPRR was for the most part situated on a terrace just west of the Yakima River and therefore had little impact on the surficial connectivity of the Union Gap Holocene floodplain. More importantly, the railroad intensified settlement and land use across the basin by linking it to the Pacific Northwest's expanding economy.

By 1901, the diversions of irrigation companies had become a familiar feature on the riverine landscape, and water was becoming scarce (Tuck 1995). Diversions originating from both the Yakima and Naches rivers, and from Ahtanum and Wide Hollow creeks, carried water to irrigated lands on the Union Gap floodplain and the surrounding terraces. From the upper middle to the bottom end of the floodplain, side channel systems and tributary streams became conduits for irrigation return flows, waste discharge systems, and millstreams.
The federal government's involvement in developing and expanding the irrigated landscape during the early part of the twentieth century was critical to the continued growth of the region's economy (Bureau of Reclamation 1993). By 1933, large storage reservoirs, mainstem river diversions, and water delivery systems had altered the flood pulse of the Naches and Yakima rivers. Ranching, farming, land clearing, woodcutting, and transportation corridors continued to impinge on floodplain processes (Tuck 1995). By 1915, the surficially connected area of the Union Gap Holocene floodplain was reduced to 1,840 hectares.

The city of Yakima emerged as the primary agricultural-industrial center in the Yakima Basin during the second period of analysis, and early maps illustrate its growth along the western edge of Holocene floodplain. The growth of Yakima was dependent upon an expanding infrastructure that required a source of gravel for construction projects. Consequently, parts of the Selah, Union Gap, and Wapato floodplains were mined. The city of Yakima and its attendant industry delivered waste to the Yakima River. Irrigated agriculture continued to spread across large parts of the floodplain and onto the surrounding terraces, while residential development initiated on its eastern margins. From 1916 through 1964, the construction of rudimentary flood revetments, state and county road systems, and irrigation infrastructure decreased the area of the Union Gap Holocene floodplain subject to surficial process to 1,592 hectares.

From 1965 to the present, land use intensified on disconnected areas of the floodplain as urban, suburban, and industrial uses subverted agricultural use. Transportation infrastructure became firmly connected across the Holocene floodplain, particularly through bridge and revetment construction in the Terrace Heights and Moxee City areas. Construction of I-82 and its incorporation into the urban fabric of the greater Yakima area increased the diversity of land use on the floodplain and encouraged the building of additional flood revetments. Gravel pit mines associated with the developing transportation infrastructure and growth of Yakima expanded, and in some places, dominated land use on the Holocene floodplain. Ironically, the margins of the diminished floodplain emerged as a core recreation zone for the greater Yakima area; recreational pathways established on flood revetments and gravel ponds have been integrated into the Yakima Greenway. Currently, just 40% (921 hectares) of the Union Gap Holocene floodplain remains surficially connected to the Yakima River.

Results from the GIS analysis of the hydrologically active portion of the Union Gap Holocene floodplain show a reduction from 808 hectares in 1927 to 584 hectares today. Currently, 28% of the active floodplain habitat present in 1927 has been lost (plate XXII).

Given the disparity in discharge of the mainstem Yakima River at the Umtanum (UMTW) and Naches River (NRYW) gauging stations in 1927 and the mainstem Yakima River at Roza Dam (RBDW) and Naches River (NRYW) gauging stations in 1992 aerial photography, a comparison of changes that have occurred to all channel types and lengths across the Holocene floodplain cannot be made (appendix I). Nevertheless, the length of the mainstem Yakima River has decreased by 43% between the second and last periods of analysis. This difference is the result of an extensive system of levees built by the Army Corps of Engineers that protects the various infrastructures sitting behind these flood revetments. If comparisons of all channels were possible, we should expect a concomitant decrease in their overall length and complexity.

References

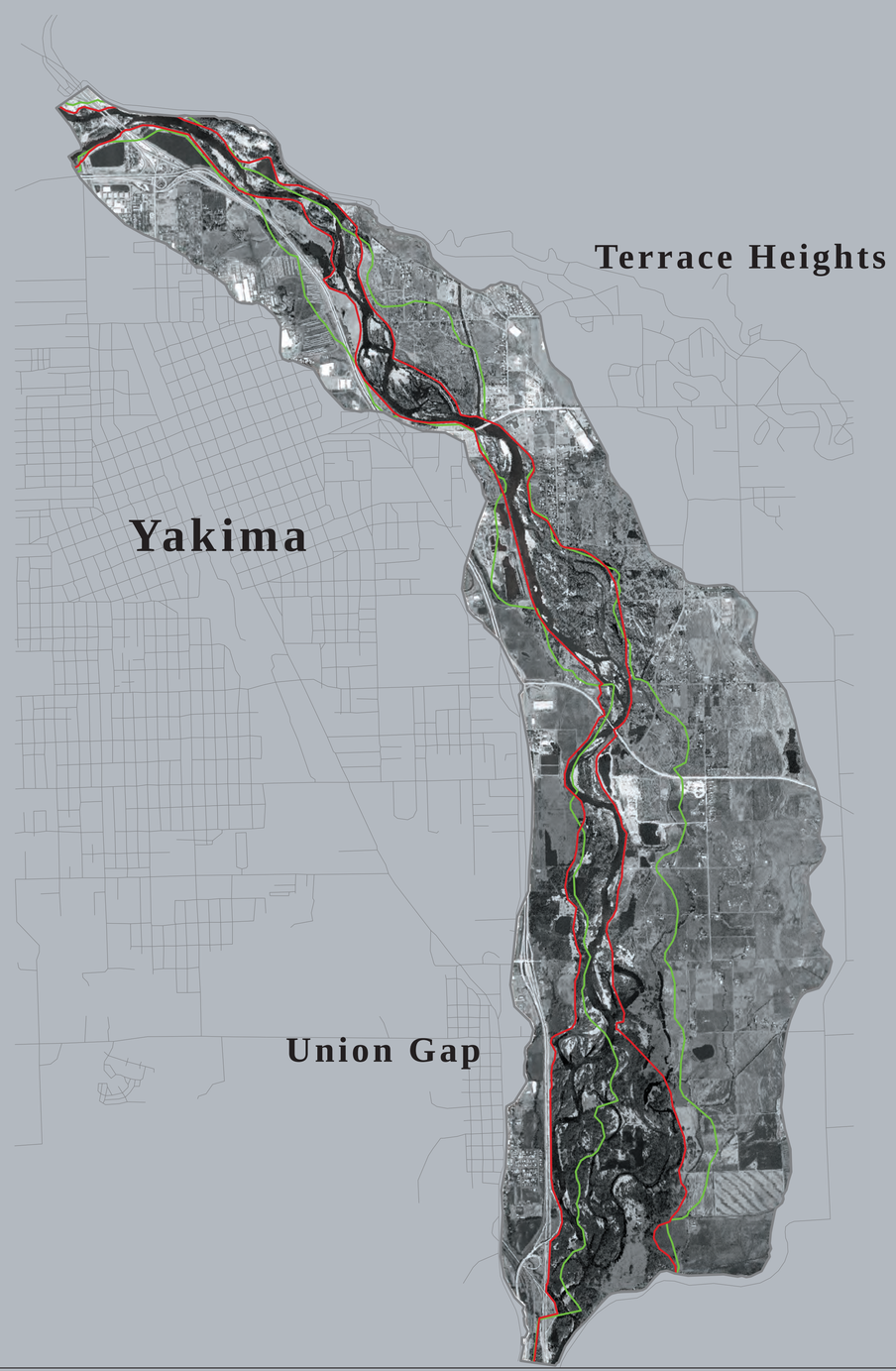
Bureau of Reclamation. 1993. Yakima Project (Third Draft). Bureau of Reclamation History Program [Online]. Available at http://dataweb.usbr.gov/html/Yakima.htm, accessed 3.26.01.

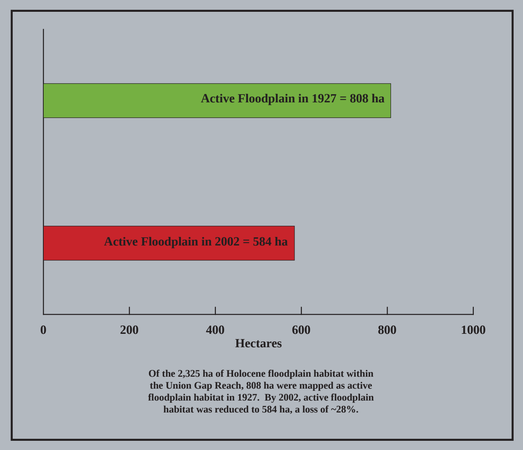
Lyman, W. D. 1919. *History of the Yakima Valley, Washington.* Vol. 1. S. J. Clarke Publishing Company.

Tuck, R. L. 1995. Impacts of irrigation development on anadromous fish in the Yakima River Basin, Washington. Masters Thesis, Central Washington University.

Plate XXI. Loss of lateral connectivity to the Union Gap Holocene floodplain and the anthropogenic features responsible for that loss.

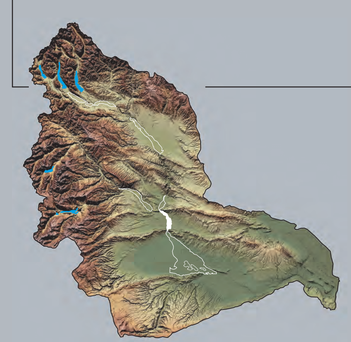
Loss Of Active Floodplain
Within The Union Gap Reach From 1927 To 2002





Of the 2,325 ha of Holocene floodplain habitat within the Union Gap Reach, 808 ha were mapped as active floodplain habitat in 1927. By 2002, active floodplain habitat was reduced to 584 ha, a loss of ~28%.

Active Floodplain-1927
Active Floodplain-2002



Position of the Union Gap Reach within the Yakima Basin.

Conversion Constants
Multiply Hectares by 2.47 to obtain Acres
Multiply Kilometers by 0.621 to obtain Miles

N
W
E
S

0 .4 .8 1.2 1.6 km
0 1 mi

Cartography By
Douglas J. Eitemiller

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Plate XXII. Loss of active floodplain within the Union Gap reach from 1927 to 2002.