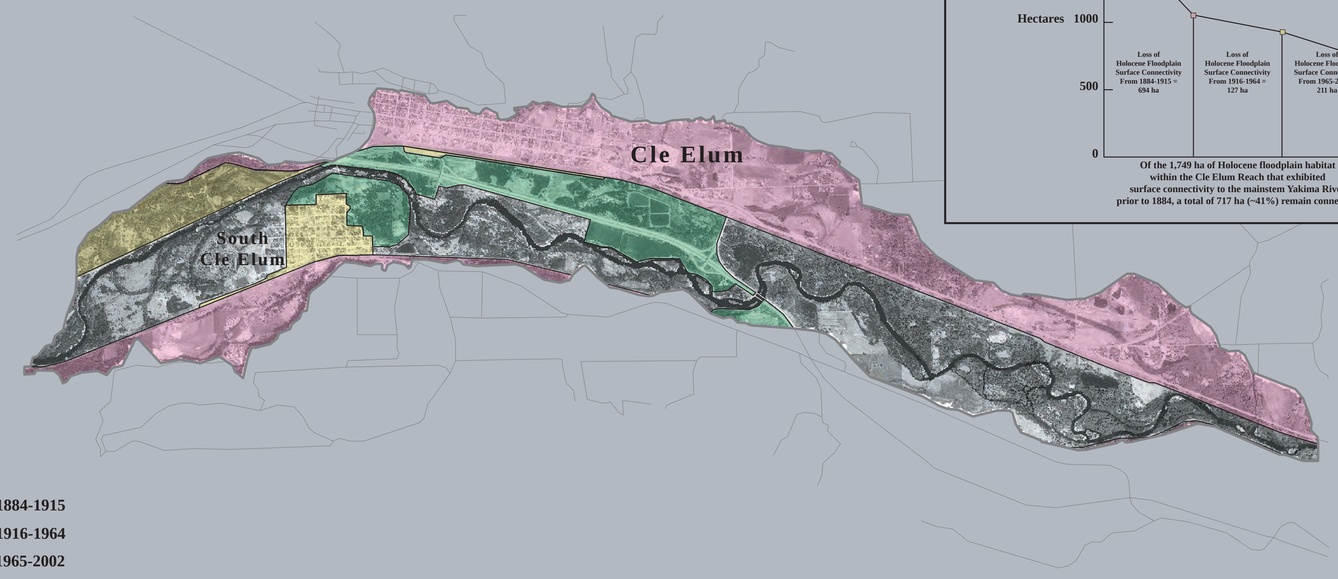
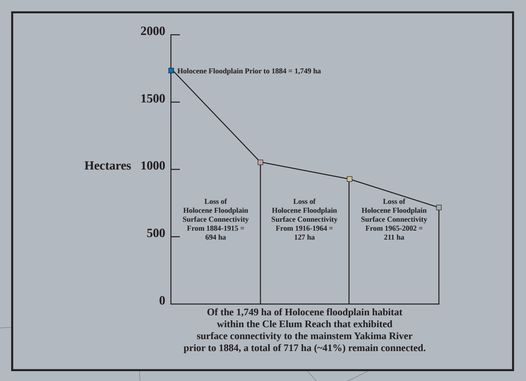
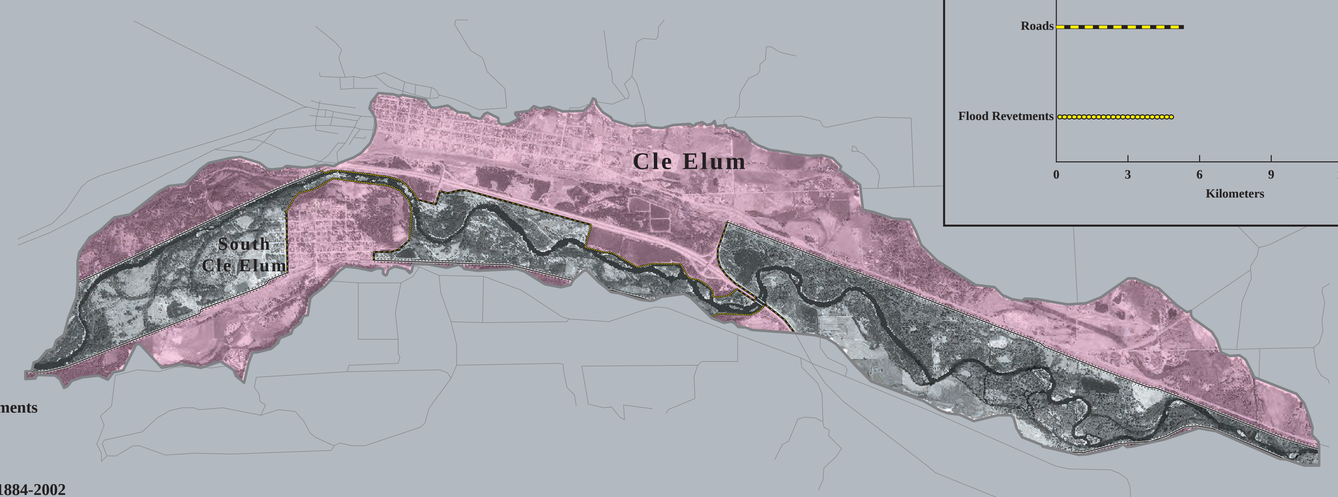
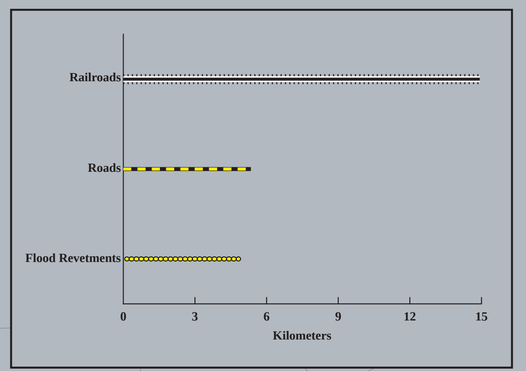
Loss Of Lateral Connectivity
To The Cle Elum Holocene Floodplain
From 1884 To 2002





Anthropogenic Features
Responsible For The Loss Of Lateral Connectivity
To The Cle Elum Holocene Floodplain



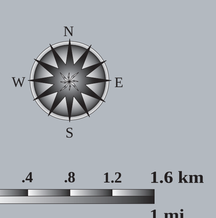


Position of the Cle Elum Reach within the Yakima Basin.

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

©2002 Not to be reproduced without permission

The Cle Elum Reach

By

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

Also located within the Glacial Landscape (plate II), the Cle Elum Holocene floodplain encompasses a land area of 1,749 hectares. Like the Easton floodplain, glacial features deposited during the Pleistocene period influence the fluvial geomorphic processes at work here. Three sequences of glacial drift and their associated moraines provide the primary elevation gradient that separates the geomorphic floodplain from the adjacent uplands. Lacustrine sediments, glacial, fluvial and colluvial deposits have been identified within the Cle Elum floodplain (Tabor et al. 1982). These deposits reflect the work of geomorphic processes that create distinct differences between the Easton and Cle Elum floodplains, and all floodplains located further downstream.

Construction of the NPRR through this reach in 1886 significantly reduced lateral connectivity across the Cle Elum Holocene floodplain. Because the railroad provided protection from all but the largest flood events, it helped facilitate development of those lands situated behind its bed. For example, the city of Cle Elum emerged north of the tracks while agricultural ventures and industrial development spread across other disconnected portions of the floodplain. Furthermore, the NPRR crossing at the Teanaway River necessitated the realignment and structural confinement of its confluence with the Yakima River, consequently simplifying the habitat mosaic of the lower Teanaway River floodplain. The CMStP&PRR was built in 1908, and skirted the southern edge of the floodplain, further reducing the surficially connected portion to 1,055 hectares.

The continued expansion of the county and city road systems and the placement of large levees further confined the Yakima River near the town of South Cle Elum between 1916 and 1964. Furthermore, a large flood event in 1948 necessitated the rebuilding and realignment of the NPRR in the northwestern portion of the floodplain, which further reduced lateral connectivity. By 1964, the area of surficially connected Holocene floodplain within the Cle Elum reach had decreased to 928 hectares.

Construction of I-90 and its associated gravel pit ponds and flood revetments dominated lateral confinement processes from 1965 to the present. Additionally, the integration of waste disposal systems for the cities of Cle Elum and South Cle Elum required effective flood revetments around treatment ponds built on the floodplain. Currently, only 41% (717 hectares) of the Cle Elum Holocene floodplain remains surficially connected to the mainstem Yakima River.

Results from the GIS analysis of the hydrologically active portion of the Cle Elum Holocene floodplain show a reduction from 498 hectares in 1942 to 334 hectares within the present period. At this time, 33% of the active floodplain habitat present in 1942 has been lost (plate XIV).

Recorded discharge for the Yakima River at the Cle Elum gauging station (YUMW) during the time the 1942 aerial photography was made, measured 2,370 cfs. Discharge records at the same station during the time the 1993 aerial photography was made measured 2,900 cfs. Therefore, a comparison of all channel types within this reach can be made between the last two periods (appendix I). From 1942 to 1993 the eupotamon decreased in length by approximately 15%. Much of this loss is probably due to the NPRR realignment after the 1948 flood. Eupotamon side channel lengths decreased by 39%; this loss was most likely the result of several side channel complexes being disconnected from the construction of I-90 and attendant floodplain mining activities. The length of parapotamon channels increased by 11%, and probably results from the disconnection of eupotamon side channels at their top end. Springbrook channels decreased by 24% between 1942 and 1993. Plesiopotamon channels decreased in length by 53%, probably the result of a decreased frequency of overbank scouring flows, as in the Easton reach. We recorded no paleopotamon channels or outflow channels in either period of our analysis within the Cle Elum reach. Tributary lengths increased marginally (2%), a result of the shifting Teanaway and Yakima river confluence.

References

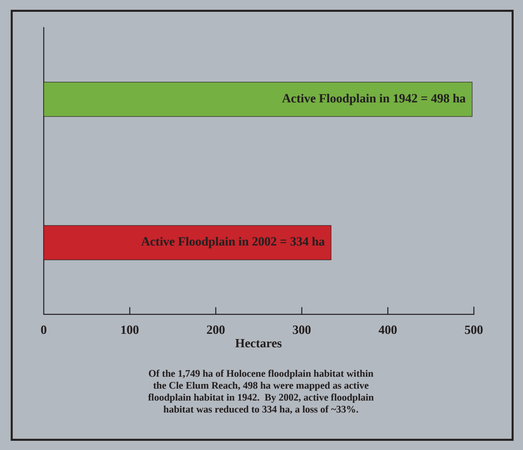
Tabor, R. W., R. B. Waitt, Jr., V. A. Frizel, Jr., D. A. Swanson, G. R. Byerly, and R. D. Bentley. 1982. Geologic Map of the Wenatchee 1:100,000 Quadrangle, Central Washington. USGS Miscellaneous Investigations Series. Map 1-1311.

United States Geologic Survey. 1902. Mount Stuart 1:125,000 Quadrangle, Washington.

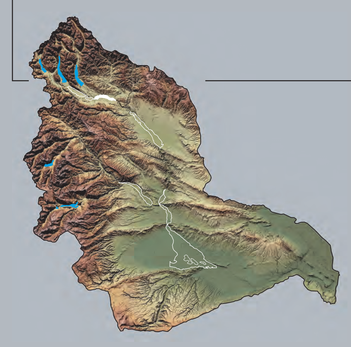
Stephenson, A. E., D. J. Eitemiller, and M. L. Uebelacker. 1998. The Teanaway River Project: A Landscape History. On file at Central Washington University Department of Geography and Land Studies.

Plate XIII. Loss of lateral connectivity to the Cle Elum Holocene floodplain and the anthropogenic features responsible for that loss.

Loss Of Active Floodplain
Within The Cle Elum Reach From 1942 To 2002



Of the 1,749 ha of Holocene floodplain habitat within the Cle Elum Reach, 498 ha were mapped as active floodplain habitat in 1942. By 2002, active floodplain habitat was reduced to 334 ha, a loss of ~33%.



Position of the Cle Elum 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

produced by
YAKIMA REACHES PROJECT
reaches
CWU

©2002 Not to be reproduced without permission

Plate XIV. Loss of active floodplain within the Cle Elum reach from 1942 to 2002.