WA-30-1030

93-e08

Horseheaven/Klickitat Water Quality Management Area

(WRIA 30 and 31)
by
Bob Cusimano
Watershed Assessments Section
EILS Program
October 11, 1993

Surface Water Resources

The surface water resources in the Horseheaven/Klickitat Water Quality Management Area include the Columbia River which runs along the southern border, the Klickitat River, and a number of small streams. Streams in Horseheaven Hills (east of Bickleton and southwest of Kennewick) are mostly ephemeral and only flow during periods of heavy rain and snowmelt (Molenaar, 1982). Alder Creek and Rock Creek are the only perennial streams in the Horseheaven area and drain 196 and 213 square miles, respectively. Both discharge to the Columbia. The only major river basin in the management area is the Klickitat River which drains 1,350 square miles. The following discussion does not include any information on the Columbia River.

Hydrology

Alder and Rock Creeks have "flashy" discharge. For example, monthly maximum discharge in Alder Creek ranges from 8,500 cfs in December to near 0 for May through November. In contrast to the Alder and Rock basins, the Klickitat basin has more precipitation, and streams in the upper basin have longer flow durations (Brown, 1979). Streams in the lower basin are fed by direct runoff, irrigation drainage, and ground water, and have good sustained flow throughout the year (Brown, 1979). Monthly average flows for the Klickitat River are lowest in August and September with a 7Q10 low flow of 537 cfs near Pitt, Washington (at about river mile 6) (Williams and Pearson, 1985).

Land-Use

Agriculture is the dominant land-use in the Horseheaven/Klickitat Water Quality Management Area. Wheat is the main crop in the Horseheaven Hills area. In order to grow wheat, farmers irrigate the fields by pumping water from the Columbia River (Molenaar, 1982). The upper Klickitat basin is mostly forest, while the lower basin is used for irrigated farming (Brown, 1979).

Freshwater Classification

The Little Klickitat and its tributaries are Class AA. All other streams or river segments in the management area, including the Columbia River, are Class A.

Water Quality-Limited Sections

There are no waterbody segments in the management area listed on the 303(d) list.

Summary of Water Quality

In general, water quality in the Horseheaven/Klickitat Water Quality Management Area appears to be good. However, little long-term or intensive survey water quality information exists for the area. The major water quality problems in the management area are elevated stream temperatures (Mathews, 1992), periodic high sediment loads (Bambrick and Mathews, 1993), some stream segments with elevated fecal coliform concentrations (Brown, 1979) and possible nutrient loading from point and nonpoint sources (Brown, 1979; and Joy, 1986).

Mathews (1992) measured temperature at 22 sites within the Big White Salmon River, Little Klickitat River, Ahtanum Creek, Cowiche Creek and Taneum Creek Drainages. He found that the Big White Salmon River (WRIA 29) and Little Klickitat River (WRIA 30) basins had the highest observed daily water temperatures (ranged 16.0 to 26.0°C), and seven of nine study streams in these basins exceeded temperature water quality standards. High summer air temperatures were found to be a significant factor in causing high stream temperatures, however, high levels of streamside disturbance may also be a contributing factor. Some of the highest stream temperatures were found in streams such as West Prong and Butler Creeks (tributaries to the Little Klickitat), and Rattlesnake Creek (tributary to the Big White Salmon), which had experienced the most human disturbances (e.g., riparian tree harvest, road/skid trails near the stream, or channel modifications). In contrast, a tributary to the Big White Salmon--Buck Creek, which had the least amount of human disturbance, had the lowest maximum water temperature in the area. Mathews concluded that moderating features such as riparian zone shade, stream flow, stream depth, and groundwater inflow are needed to maintain temperatures favorable to cold water, aquatic ecosystem health.

Bambrick and Mathews (1993) identified excessive levels of in-channel fine sediment in tributaries to the Little Klickitat River, and portions of Ahtanum Creek (WRIA 37). The authors recommended that best management practices be implemented in the watershed. Further, they recommended installing instream sediment traps to decrease severe sediment loading in the following tributaries to the Little Klickitat: Mill Creek, Bowman Creek, and West Prong.

Historically, moderately high levels of fecal coliform bacteria in the Klickitat River have been attributed to numerous home sites and their related septic systems and cattle grazing along the river and some of its tributaries (Brown, 1979).

Joy (1986) conducted receiving water surveys on the Little Klickitat River in the vicinity of the Goldendale wastewater treatment plant. He found that technology-based NPDES permit limits protect water quality in the river. The only potential water quality problem identified would be from excessive nutrient loading from lagoon discharge during low-flow periods, which could cause eutrophication. Nutrient loading from fertilizers and manure waste may also contribute to increased productivity in this and other streams in the management area (Brown, 1979).

Conclusions and Recommendations

The major water quality problems in the Horseheaven/Klickitat Water Quality Management Area appear to be related to nonpoint sources of pollution due to agricultural activities and other streamside disturbances (e.g., road building). Elevated stream temperatures and periodic high sediment loads appear to be the most significant water quality problem in the area and pose a significant threat to the future of salmonid habitat. Moderate loading of fecal coliform and nutrients from agricultural activities is a lesser problem.

The water quality parameters that may benefit from management actions in the basin are temperature and total suspended sediments (or other sediment loading parameters). Additional water quality surveys may not be necessary unless formal TMDLs for these parameters are pursued. Nonpoint controls which mitigate loading of sediments and decrease water temperatures (e.g., increase riparian zone buffer and streamside shading) should be implemented in the management area.

REFERENCES

Bambrick, F.D., and J.M. Mathews, 1993. Fine Sediment Levels in Substrates of the Little Klickitat River and Ahtanum Creek Drainages. Yakima Indian Nation Natural Resources Division, Timber, Fish and Wildlife Program. 4 pp.

Brown, J.C., 1979. Geology and Water Resources of Klickitat County. Water Supply Bulletin No. 50. Washington State Department of Ecology, Olympia, WA. 413 pp.

Joy, J., 1986. Goldendale Wastewater Treatment Plant/Little Klickitat River Receiving Water Studies and Total Maximum Daily Load Evaluation. Technical Memorandum to Jim Milton, State of Washington Department of Ecology, Olympia, WA. 11 pp.

Mathews, J.M., 1992. Eastern Washington Stream Temperatures and Variables Influencing Them. Yakima Indian Nation Natural Resources Division, Timber, Fish and Wildlife Program. 9 pp.

Molenaar, D., 1982. Water in the Horseheaven Hills, South-Central Washington. Water Supply Bulletin 51. Washington State Department of Ecology, Olympia, WA. 121 pp.

Williams, J.R., and H.E. Pearson, 1985. Streamflow Statistics and Drainage-Basin Characteristics for the Southwestern and Eastern Regions, WA. Volume II. Eastern Washington. U.S. Geological Survey Open-File Report 84-145-B. 662 pp.