

## Alberta River Water Quality Bacterial Sub-Index: The Effects of Wastewater Treatment Plant Upgrades, Flow, and Other Basin Influences on Water Quality in the Bow, Red Deer, and North Saskatchewan Rivers

Upgrades to municipal wastewater treatment facilities in Calgary (1997), Red Deer (1999), and Edmonton (1998) helped improve river water quality downstream of these cities until 2003. Enhanced treatment processes are designed to reduce the amount of nutrients and bacteria released by wastewater treatment plants to rivers. Resulting water quality improvements are reflected in the Bacterial Sub-index component of the Alberta River Water Quality Index, as shown below. However, several other sources, including storm sewers, combined sewer outfalls, and surface runoff from agricultural fields or natural ecosystems, can contribute bacteria to rivers. After 2003, Bacterial Index ratings at downstream sites were generally lower for all three rivers. Reasons for this are not immediately clear, although precipitation events and associated runoff may be partly responsible. During recent years, Bacterial Index ratings for all three downstream sites have demonstrated increasing tendencies. These are maintained during the current reporting period (09-10), in which values for downstream sites on the Bow and Red Deer Rivers continued to improve, while the North Saskatchewan site remained relatively high. These scores may reflect fairly low precipitation during the 09-10 reporting period, which would reduce the contribution of bacteria from a variety of non-point sources.

