

### Record Temperatures in the Fraser River

Record-high water temperatures occurred in the Fraser River from August 17 to August 20. The Fraser River Environmental Watch Program of Fisheries and Oceans Canada (DFO) monitors and predicts water temperatures in the Fraser River and its major tributaries to provide information on migration conditions that salmon encounter en route to their spawning grounds. Between August 17 - 20, average daily temperatures in the Fraser River measured at Qualark Creek (just upstream of Hope), exceeded the previous record of 21.2 °C set on August 3, 1998. A new record of 21.5 °C was set on August 18 and 19. In addition, river temperatures from August 15 to August 23 were the highest observed in the historical record (1942-2003) on these dates, with temperatures exceeding previous records (set in 1981, 1990 and 1992) by as much as 1.5 °C. Computer models predict that these high temperatures are likely to continue exceeding previous daily temperature records for a few more days until the current, cooler air temperatures and precipitation in the Fraser watershed cause river temperatures to decline to more satisfactory levels (less than 18 °C) for successful sockeye migration.

The present high Fraser River temperatures are due to a very low snowpack the previous winter and above average air temperatures and below average precipitation throughout the watershed this summer. The high river temperatures have been accompanied by almost record-low flows. High water temperatures can cause serious adverse effects on resident and migratory fish, including: increased energy expenditure; reduced swimming performance; increased susceptibility to disease; reduced reproductive success; and mortality at very high temperature levels. Some of these adverse impacts have already been observed in the Fraser River Canyon by staff of DFO's Catch Monitoring Program. Although some sockeye salmon have a healthy appearance, dead and dying fish (many with large skin and gill lesions) have been observed along the banks of the Fraser River and holding in cool-water refuges where tributary streams enter the Fraser.

The Fraser River Environmental Watch Program was initiated in 1995 to monitor and predict environmental conditions in the Fraser River and to study the resultant effects on salmon en route to their spawning grounds. The program is a collaborative effort between DFO, Environment Canada, the Department of Civil Engineering at UBC, World Weather Watch and Triton Environmental Consultants. Continuous monitoring of temperatures and flows throughout the Fraser River watershed are carried out by DFO and Water Survey of Canada. During the sockeye migration, ten-day forecasts of river flows and water temperatures are issued twice weekly using these temperature and flow data, weather forecasts, and computer models developed at DFO and UBC. The Pacific Salmon Commission incorporates these forecasts into Environmental Management Adjustment (EMA) models that predict in-river losses of sockeye salmon caused by adverse water temperature and river flow conditions. This information is then

presented to the Fraser River Panel of the Pacific Salmon Commission. These EMA estimates help the Panel account for expected en route mortalities of sockeye salmon when they make management decisions that are designed to meet spawning escapement targets.

The recent record-breaking temperatures have occurred during the peak migration of Summer-run sockeye (returning to the Stellako, Stuart, Quesnel and Chilko systems) in the Fraser River. Early Summer-run sockeye (consisting of many smaller stocks) which migrated into the Fraser River earlier than the Summer-runs, were also exposed to generally high river temperatures including the new record temperature near the end of their migration. The Pacific Salmon Commission has estimated that 30% or more of the potential spawning escapement of Summer-run sockeye and approximately 42% of Early Summer-run sockeye will die en route to their natal streams this summer.

Further information on the Fraser River Environmental Watch Program, DFO's latest upstream escapement updates, and the Pacific Salmon Commission are available at the web sites listed below.

**Fraser River Environmental Watch Program**

[http://www-sci.pac.dfo-mpo.gc.ca/fwh/index\\_e.htm](http://www-sci.pac.dfo-mpo.gc.ca/fwh/index_e.htm)

**DFO's Spawning Escapement Updates**

<http://www.pac.dfo-mpo.gc.ca/fraserriver/Escapement/Sockeyeupdate.pdf>

**Pacific Salmon Commission**

<http://www.psc.org/Index.htm>

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