

HEATING UP THE BATH WATER: GLOBAL WARMING AND SALMON IN THE FRASER RIVER

By Dave Levy
Advisor to Northern St'at'imc Fisheries

Global warming is a fact of aquatic life producing water temperatures that are stressing and killing salmon in the Fraser River. Most of us recall winters during our younger years that were snowier, longer, and colder than they are at present. Temperature conditions are changing in the Fraser River itself, and are predicted to increase in future. This article summarizes what we know about global warming impacts on salmon and evaluates several possible response strategies.

DFO has developed a computer model that predicts what will happen to Fraser River water flows and temperatures in future. 75 years from now we can expect to see warmer winters and reduced snow pack, something that is already happening at present. The peak freshet will occur 24 days earlier than present, since more precipitation will fall as rain, and less will be stored as snow pack.

Summer flows will be reduced, especially in tributaries, and this will dramatically affect stream-dwelling salmon populations like coho and steelhead. On average, Fraser River temperatures will increase by 2°C, with considerably higher increases in small tributary streams. 2°C doesn't sound like a lot, but keep in mind that many salmon populations in the Fraser are already pushing the limits of their thermal tolerance. In response to global warming, we can expect many of these populations to crash and some will disappear altogether.

North Pacific Ocean temperatures are predicted to warm in future, and these higher temperatures can interfere with marine migration patterns and return timing. The 2-6 week delayed return of sockeye in 2005 was most likely due to warm marine surface water temperatures in the winter of 2004-5. These exceptionally warm temperatures pushed Fraser sockeye northward, extending their migration distance and travel time back to the river mouth. The late arrival of the sockeye in 2005 had a profound impact on First Nation fisheries. These types of impacts will undoubtedly intensify as salmon in the ocean get pushed northwards as conditions get warmer.

What can we do about it? The answer unfortunately is not very much. The weak response of the international community to reduce harmful greenhouse gas emissions does not engender confidence that global warming can be reversed or even stabilized in future. Response options include "do nothing", undertake research, adapt or mitigate. The first two responses are really non-responses that characterize most of the actions taken to date. Adaptation has promise, particularly if we can develop systems to actively detect and respond to environmental changes, in effect an early warning system. An example of this approach is the Fraser River Environmental Watch program that DFO operates to monitor real-time changes in Fraser River flow and temperature conditions. When water temperatures are high, DFO reduces the Total Allowable Catch to compensate for the reduced survival of migrating spawners under warm water conditions. Mitigation attempts to counteract the impacts and fix the problems as they occur. As an example, huge volumes of cool water from the Nechako Reservoir are released into the Nechako River every summer to prevent river temperatures from exceeding 20°C, a critical temperature for adult salmon. This approach can be effective but comes with high costs.

In reality, the available responses to global warming impacts are only band-aid solutions and we should be under no illusion that we are going to fix these problems or that they will go away. We are imposing a warmer habitat on salmon species, which have evolved in cold-water environments. In general, global warming has negative impacts on animals and plants along the southern margin of their geographical distribution e.g. sockeye in the Fraser River. As temperatures increase, populations along the northern margin of their distribution can expand their range and extend into environments that were formerly unfavourable because they were too cold. Sockeye salmon in Bristol Bay in Alaska provide an example of a salmon population that will probably increase in response to global warming.

In anticipation of global warming impacts, much more effort will be required to restore depressed salmon stocks in future. Inter-sectoral water management is critical to ensure that salmon habitat requirements are met in the face of competing demands from other water users. Proactive salmon stock and habitat planning needs to be undertaken in parallel with ongoing recovery planning. Lastly, we require a Climate Change Response Strategy for the Fraser River that combines top-down (i.e. Fraser Watershed) and bottom-up (i.e. individual tributaries) planning perspectives to develop an approach for dealing with a serious fisheries threat.

I have only discussed global warming impacts in objective and dispassionate terms and have not mentioned social and cultural impacts. For peoples and Nations whose cultural identity, physical well being, and spiritual health are intimately related to salmon, global warming is indeed a tragic environmental impact.

Editors Note: Dr. Levy's report for the Sierra Club (February 2006) can be viewed in the **Publications section of the Sierra Club of BC website.**

<http://www.sierraclub.ca/bc/index.html>.

For more information contact Pete Nicklin @ (250) 392-5888 or by email

indiseaent@shaw.ca.

A Tier 1 Meeting is to be hosted by the FRAFS in Kamloops at the Days Inn, Pondersosa Room on June 20, 2006.

The Tier 1 meeting (FIRST NATION TO FIRST NATION) will be held at the Place Inn, 1285 Trans-Canada Highway West, Kamloops BC (The Days Inn has been renamed the Place Inn - the sign may be changed by then).

DATE of Tier 1 Meeting: June 20, 2006

Anticipated start / end time: 9:00 am - 3 pm

Agenda:

- FRAFS multi year AAROM proposal
- BCAFC restructure process
- C&M plan issues
- Fraser Panel technical update
- EC update
- WSP implementations issues
- Economic Opportunities update
- Other

If you have any questions, concerns, additions to the agenda or to confirm your attendance, please reply via this email or contact Deloris Charters at 250-378-4235.

If you require additional information contact Marcel Shepert, FRAFS Executive Director at 250-964-0337.