The mighty Fraser River and its estuary

John S. Richardson, PhD
University of British Columbia
Fraser River

234,000 km²

~3972 m³/s

7th largest in North America, by discharge and 25th in the world

Inputs and changes to source areas (headwaters) leads to cumulative impacts downstream.

Fraser River at Hell’s Gate

June through September
Temperature increases and flow timing lead to:

- Problems with migration timing and success
- Water supplies for industry
- Changes in water quality
- Increased oxygen demand in the depositional reaches


Changes to Habitat
Low flow channels of the Fraser River

photo: © Laura L. Rempel
A poorly studied ecosystem – falling between the “cracks”

42 species known from the lower Fraser (below Hope)
6 of them are introduced species
Only 9 of them are salmonids, and only 5 of those are harvested commercially

Redside shiner
White sturgeon  Endangered!

Estimated commercial gillnet harvest (tonnes) of sturgeon in the Fraser River, 1880-1993 (data from B.C. Commercial Catch Statistics; includes green and white sturgeon catches)
Richardson JS, Lissimore TJ, Healey MC & Northcote TG. 2000. Fish communities of the lower Fraser River (Canada) and changes through time. *Environmental Biology of Fishes* 59:125-140
Relative Biomass of fishes

- 1973
- 1994
- 2001

Site 1
- juvenile salmonids
- Cottidae (sculpins)
- Cyprinidae (minnows)
- Catostomidae (suckers)
- Osmeridae (smelts)
- others
- Starry flounders

Site 4

Circle size scaled to total biomass

Richardson et al. 2000.; plus unpublished data
How to compare?

Controls? No
Reference sites? No
Long-term records? No

We need another way to determine how the ecosystem is faring – and some further monitoring.
Conclusions

Basin-wide changes, linked to development in source areas

Habitat change – dykes, channel training, development

A lack of study of large rivers and estuaries