

A GAMMARID AMPHIPOD AS A POTENTIAL INDICATOR OF ESTUARINE CHANGE OWING TO DEGLACIATION

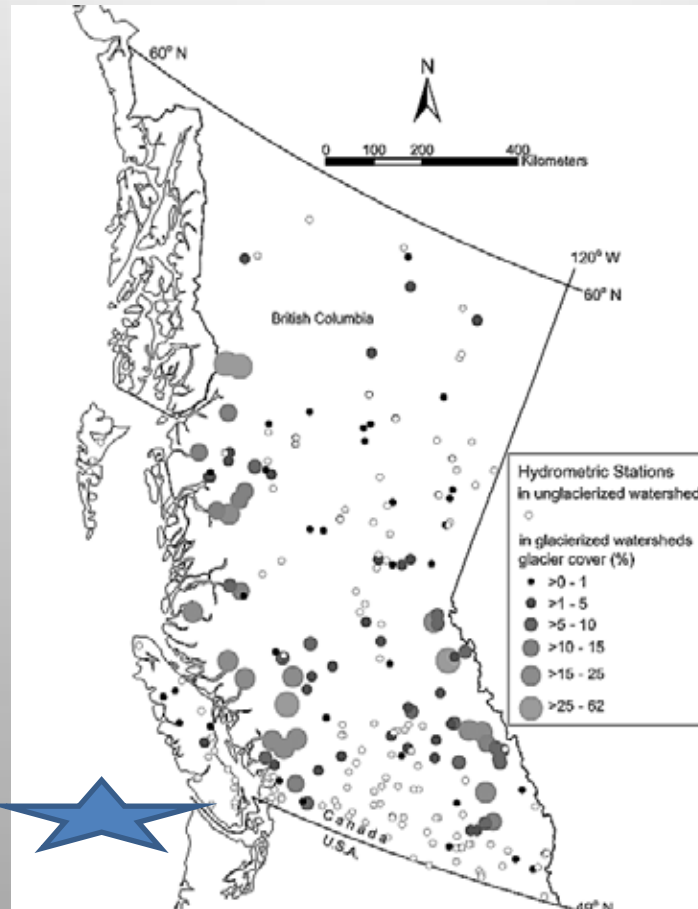
- QUESTION IS IN THE TITLE
- DEGLACIATION HAPPENING –ESTUARY ECOSYSTEM EFFECTS?
- POSSIBLE INDICATOR SPECIES IS *GAMMARUS SETOSUS*
- GAMMARID WITH CIRCUMPOLAR DISTRIBUTION
- ECOLOGY WELL KNOWN IN ATLANTIC
- NORTHEAST PACIFIC RANGE IS HOWE SOUND AND NORTH



Relationship between deglaciation, stream flow and estuarine temperatures?

AUTHORS FOUND
NEGATIVE
CORRELATION
BETWEEN AUGUST
STREAMFLOWS
AND DEGLACIATION

Squamish
Estuary is
Typical
Glacier-fed
system



Declining summer
flows could have significant
ecological effects,
particularly in relation
to stream temperature...
(Stahl and Moore 2006)



Homathko River estuary on Bute Inlet is fed by many icefields

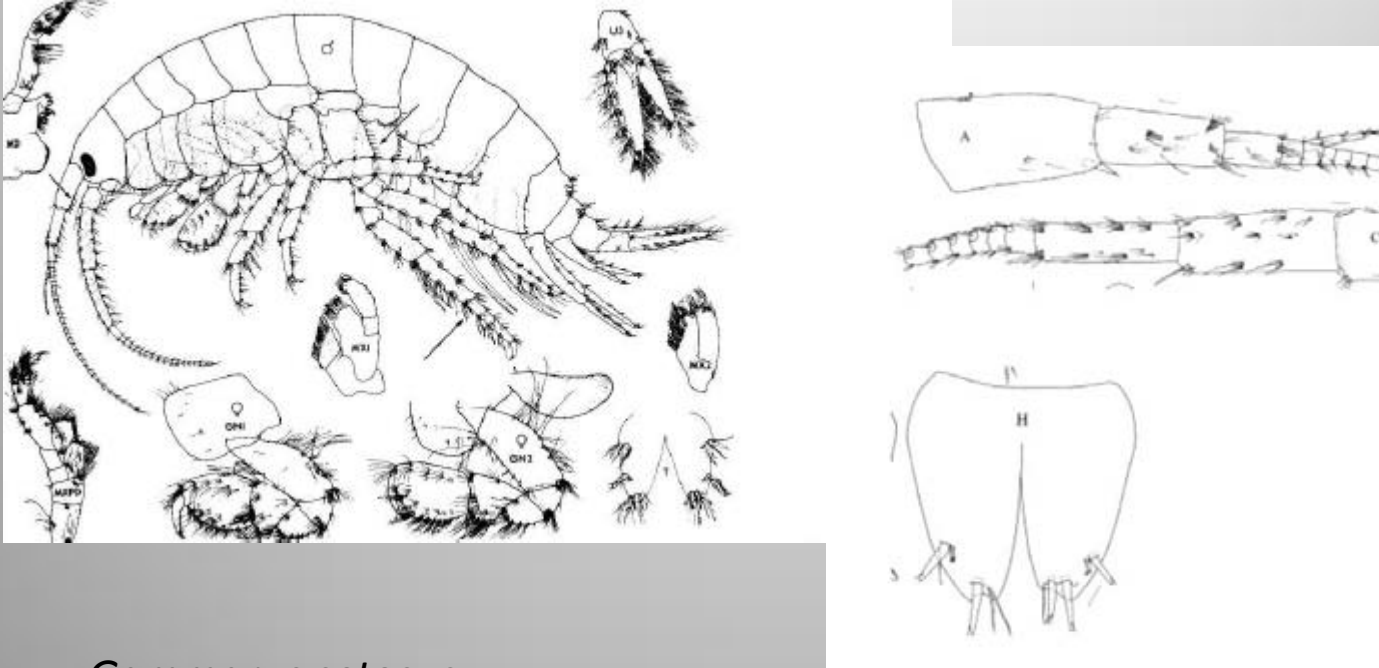


Squamish River estuary (winter scene back in the day) and one of the glaciers feeding it

Tantalus Range (BT Heli website)



A possible ecosystem indicator



Gammarus setosus

Circumpolar at
high latitudes

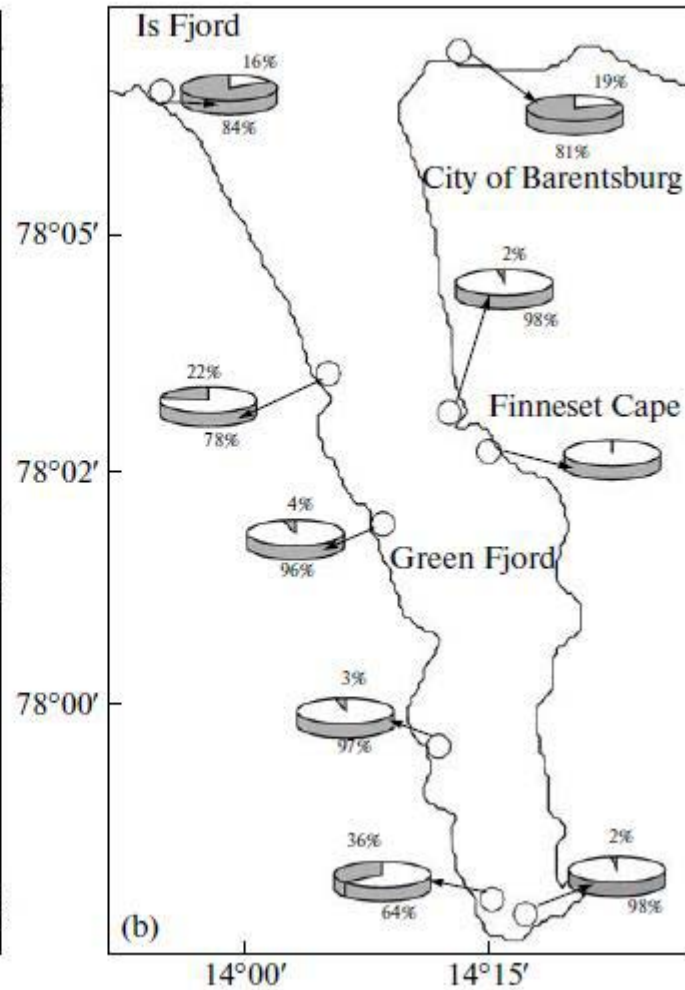
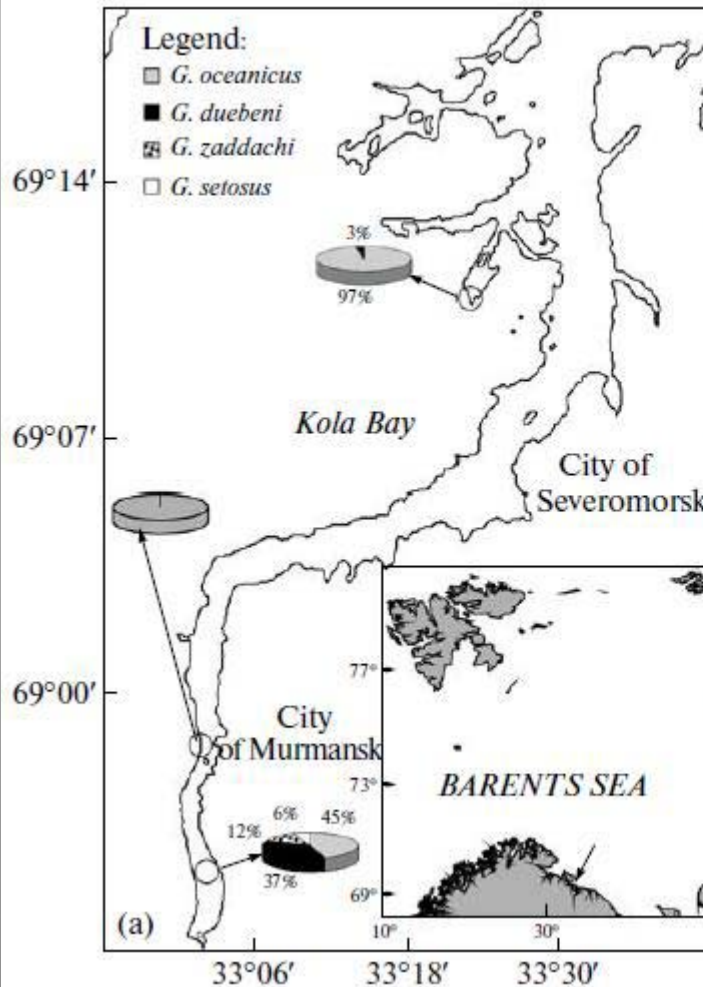
Eogammarus confervicolus

Northeast Pacific

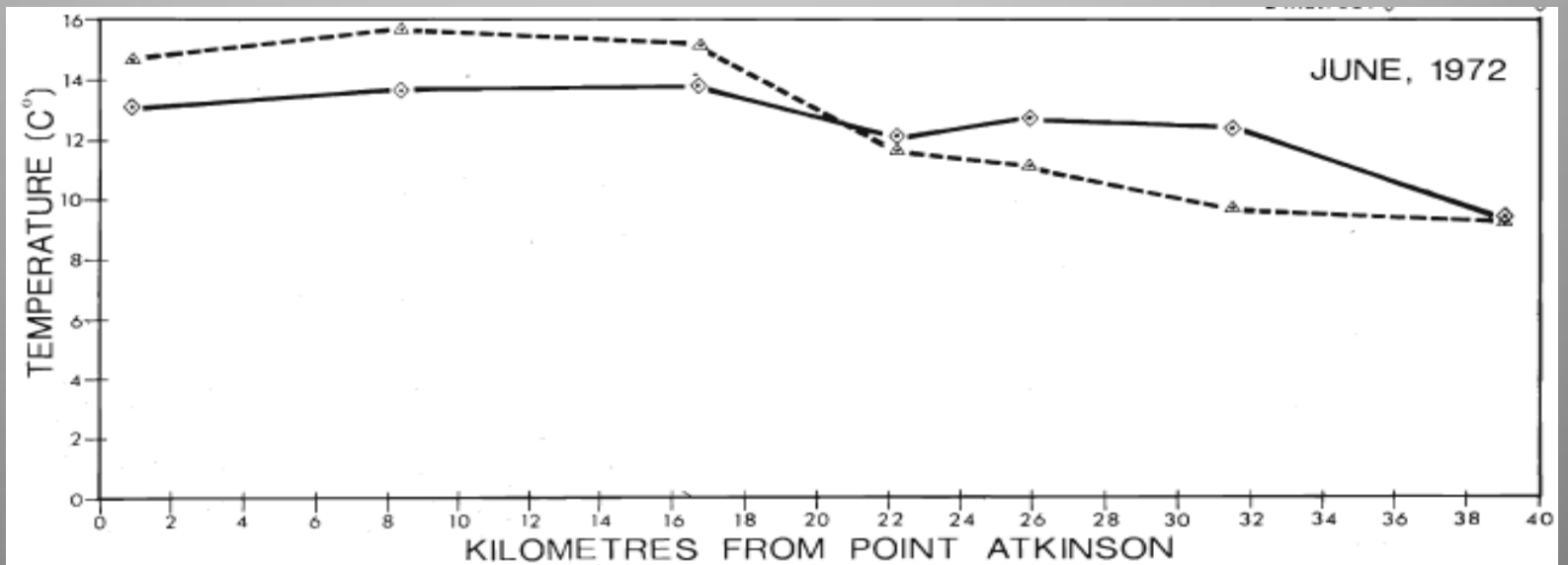
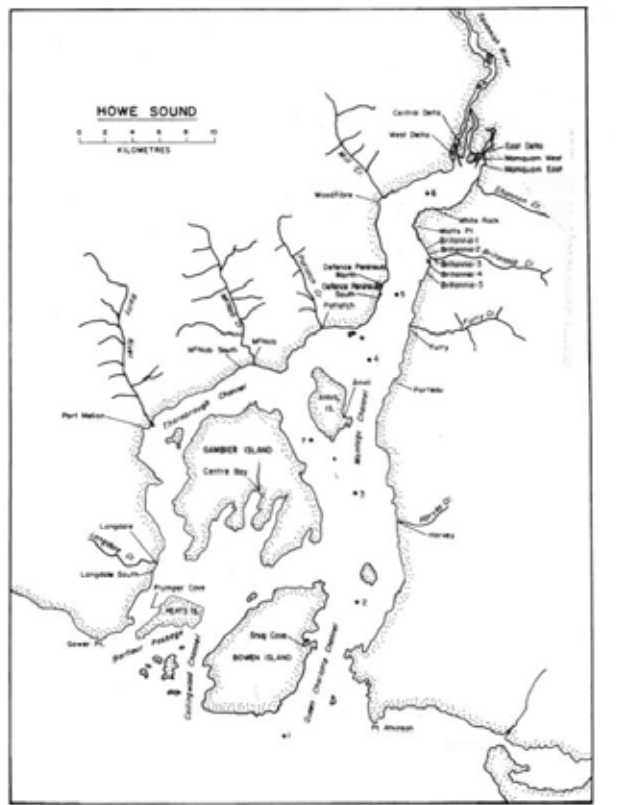
- *G. setosus* can be identified in the field with a hand lens – it is hairy tailed
- *E. confervicolus* , the other expected species, has just a few bristles
- *G. SETOSUS*:IN BC: SQUAMISH, HOMATHKO , KITIMAT RIVER ESTUARIES
- WHICH ARE GLACIAL FED SYSTEMS. SQUAMISH IS END OF SOUTHERN RANGE.

Distribution in two Russian fjords

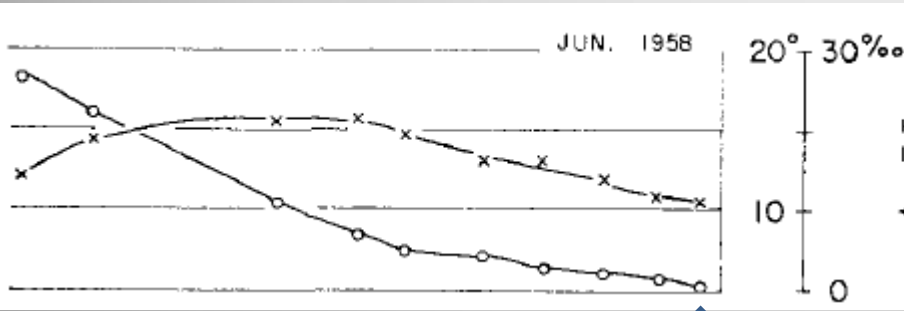
IKKO, LYUBINA



DISTRIBUTION IN HOWE SOUND RELATED TO
DISCHARGE OF SQUAMISH RIVER WATER
(LEVINGS AND MCDANIEL 1976)

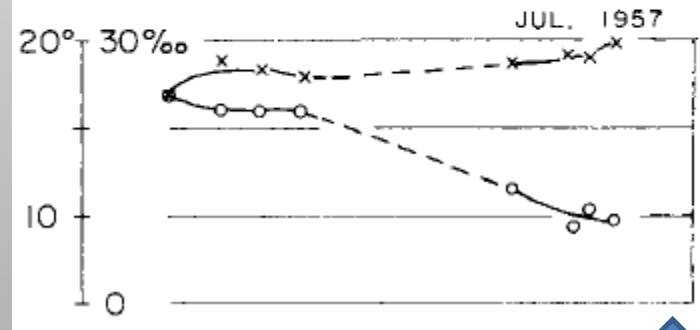
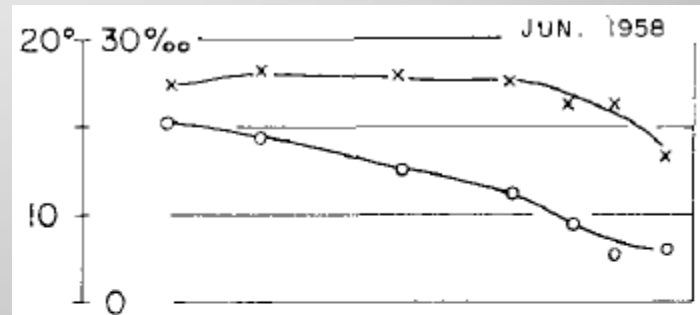


Temperatures in other glacier-fed fjords and those without glaciers

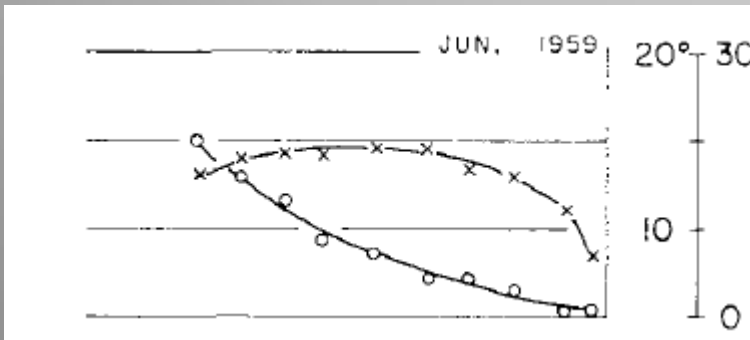


G. setosus present

X - temperature, o - salinity



Jervis Inlet –non glacial
(faunal survey incomplete)

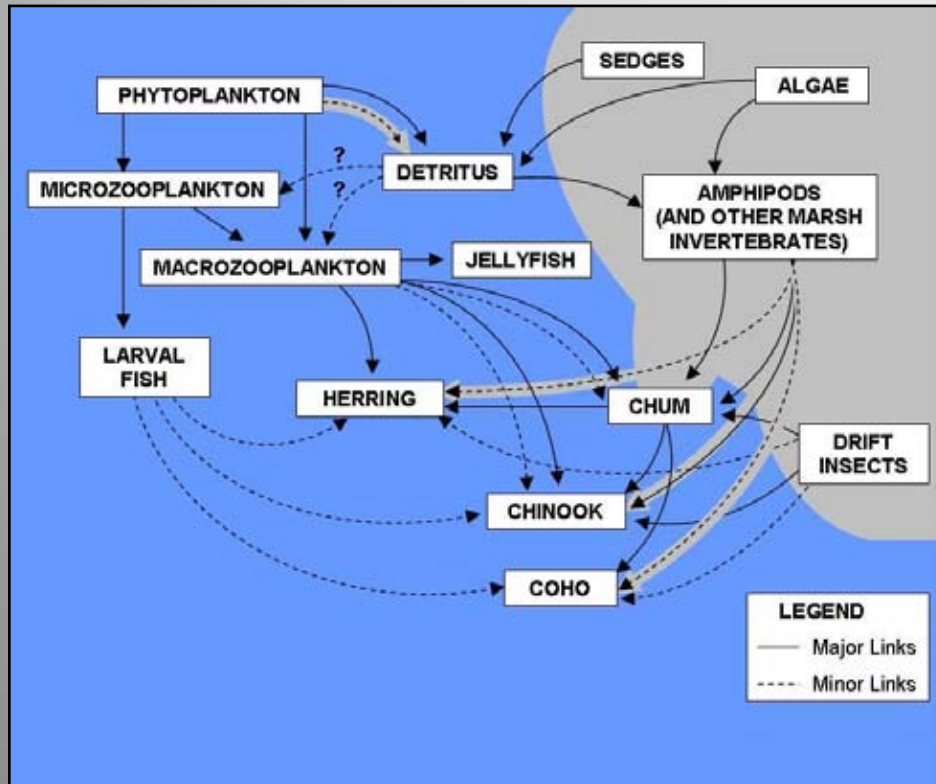


Bute and Knight Inlet -glacial
Pickard, 1961

Implement the Beast as an Indicator ?

- Agreement on what the indicator goal is (maintain natural invertebrate community structure?)
- Confirm temperature tolerances and influence of temperature on metabolic rate
- Consider the disadvantages –e.g. how many amphipods to examine to effectively determine community structure?
- Advantages – well known link to vegetation and sensitive to some pollutants

Additional rationale: importance of amphipods in the salmonid food web ?



Paradigm of the detritus-based food web supporting salmonids involves amphipods

AND

was discovered right here in Squamish!

However food webs in the numerous other glacier-fed estuaries in BC have not been studied so lots of baseline work to do

DFO 1972 based on work by John Sibert (Pacific Biological Station) and the author among others

Next steps?

Synoptic survey of BC and Alaska glacier fjord estuaries

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