

Habitat Related Differences in Condition of Fish Collected from Prince William Sound

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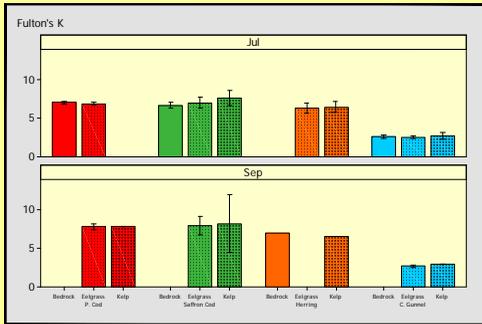


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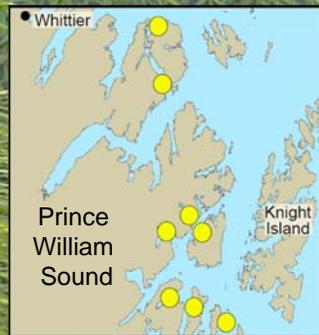


Fulton's K



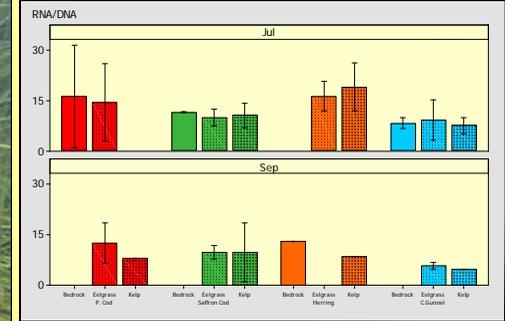
Fulton's K, the ratio of the wet mass to length, is a traditional measure of fish condition. It assumes that a heavy fish is a healthy fish. For a given species it does not differ among habitats, but gadids increased K between July and September.

Problem: Scientists often relate habitat quality to fish condition. However, there are many different measures of fish condition that measure different qualities of fish. These include Fulton's K, energy density, RNA/DNA and measures derived from bioelectrical impedance (BIA). Our objective was to compare condition indices using different species collected at different times in different habitats.



- We beach seined three different habitats (bedrock: solid pattern in graphs, eel grass dotted pattern and kelp box pattern) in each of 8 locations in PWS.
- Sampling was done at two different times July (top panels in graphs) and September (bottom panels).
- We compared the condition of Pacific cod (Red bars in graphs), saffron cod (Green bars) and herring (Orange bars) and crescent gunnels (Blue bars).
- Fish were analyzed for proximate composition, energy content, dry mass, and RNA/DNA in the lab.
- BIA parameters were measured in the field.

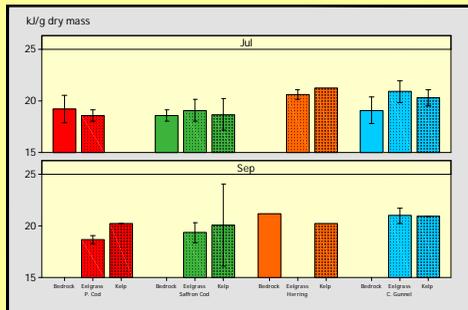
RNA/DNA



RNA/DNA reflects relative growth rates based on the idea that DNA content is fixed by cell number and variation in RNA reflects variation in the rate of protein synthesis. There were no changes in RNA/DNA across habitats or months in any species.



Energy Density

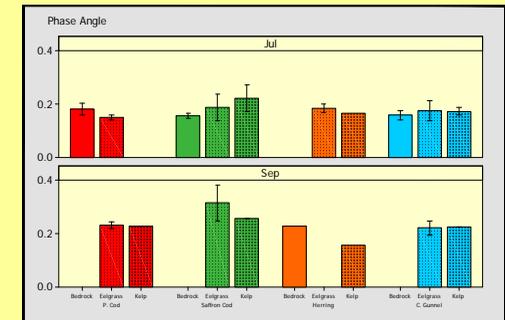


Energy density is the mass specific energy content, variation in density relates to variation in lipid. For a given species there are no differences among habitats and only gunnels changed with time.

DISCUSSION

- There were more differences related to phase angle than any other measure of condition.
- The significance of phase angle for saltwater fish is currently unknown. In freshwater studies decreasing phase angle has been observed among adult chinook salmon as the migrate upstream.
- Lab studies are currently underway to determine how phase angle predicts nutritional status and disease intensity in saltwater fish.
- Ultimately the condition data described here will be related to observations of fish abundance and habitat quality.

BIA - Phase Angle



Phase angle is a BIA-derived measure that reflects the ratio of intracellular to extracellular water volumes. Significant increases in phase angle were detected between July and September for all species except herring. In July P. cod from bedrock sites had significantly higher phase angle.