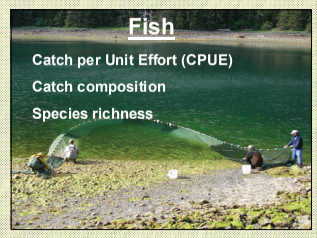
Monitoring Eelgrass and Associated Fish Assemblages in Southeastern Alaska

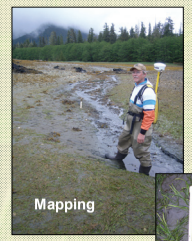
P. M. Harris, A. D. Neff, S. W. Johnson, J. F. Thedinga
NOAA Fisheries, Alaska Fisheries Science Center, Auke Bay Laboratories, Juneau Alaska

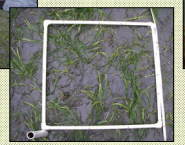
Objectives

- Establish baseline eelgrass and associated fish data to track long-term effects that may result from local versus regional or global change.
- Examine variability in eelgrass characteristics and fish assemblages to determine an appropriate monitoring schedule.

Methods







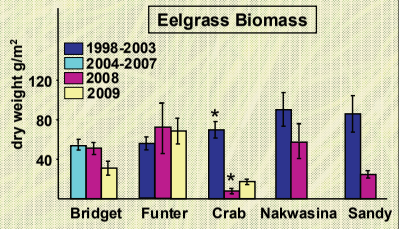
Catch composition = Pacific herring, shiner perch, chum salmon

Results

Undeveloped Sites

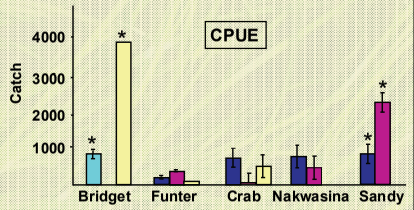
Eelgrass

- Interannual changes in bed area ranged from 21% to +27%.
- Beds were significantly smaller at two sites, larger at two sites and stable at one compared with baseline areas.
- Density, biomass, and cover were correlated and had high annual variability (≤ 87%).
- Density and biomass in 2008 declined in three beds and were stable in two.



Fish

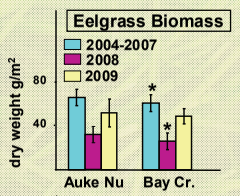
- CPUE was highly variable at all sites.
- Significantly large CPUE at two sites were caused by large numbers of transient species (juvenile chum salmon and Pacific herring).
- Catch of resident species were similar among years, except at one site where catch declined in 2008 coincidentally with significant eelgrass decline.



Developed Sites

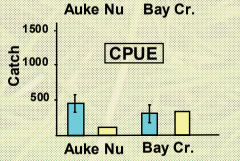
Eelgrass

- Area of both beds decreased in 2008/2009.
- Both beds had similar patterns of lower biomass, density, and percent cover in 2008 and partial recovery in 2009.
- Canopy height was the most stable characteristic at both sites.

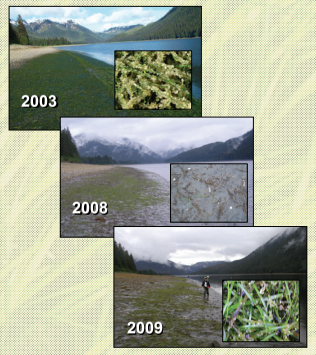


Fish

- CPUE at Auke Nu decreased by 78% in 2009 on western side of the bed where eelgrass density was reduced to 0; catch composition changed.



Changes at Crab Bay



Significant decline in eelgrass in 2008 was probably caused by ice scour the previous winter; bed showed partial recovery in 2009.

Changes at Auke Nu Cove

Two commercial facilities built 2004-2008; 5% of eelgrass bed filled

Siltation in eastern portion of the bed

Eelgrass absent from western portion of the bed

Conclusions

- **Eelgrass beds are dynamic.**

  High interannual variability in eelgrass characteristics requires a multiple year baseline. and several years of subsequent data to examine long term change in an eelgrass bed.

  Declining trends in eelgrass density, biomass and cover in 2008 and some rebound in 2009 in 5 of 7 beds may indicate a regional effect that was exaggerated by a local effects (e.g. ice scour or siltation).

- **Fish schooling and transient behavior resulted in highly variable catches.**

  Changes in catch of resident species may be the best indicator of habitat change.

- **Fish respond to changes in eelgrass.**

  Large declines in catch accompanied significant declines in eelgrass density and biomass.

- **Continued monitoring is necessary.**

  Periodic resampling of eelgrass beds in this study will allow resource managers to track long-term changes and to better understand the effects of local versus regional or global change.

Contact pat.harris@noaa.gov