

Marine Team: Student-led Investigations in Marine Science



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Introduction

- ▶ Marine Team is a student effort to examine spatial and temporal variation in fish diversity and recruitment within Yaquina Bay
- ▶ Conceived by Drs. Scott and Selina Heppell
- ▶ Seminar course w/sampling component
- ▶ Sampling began November 2002

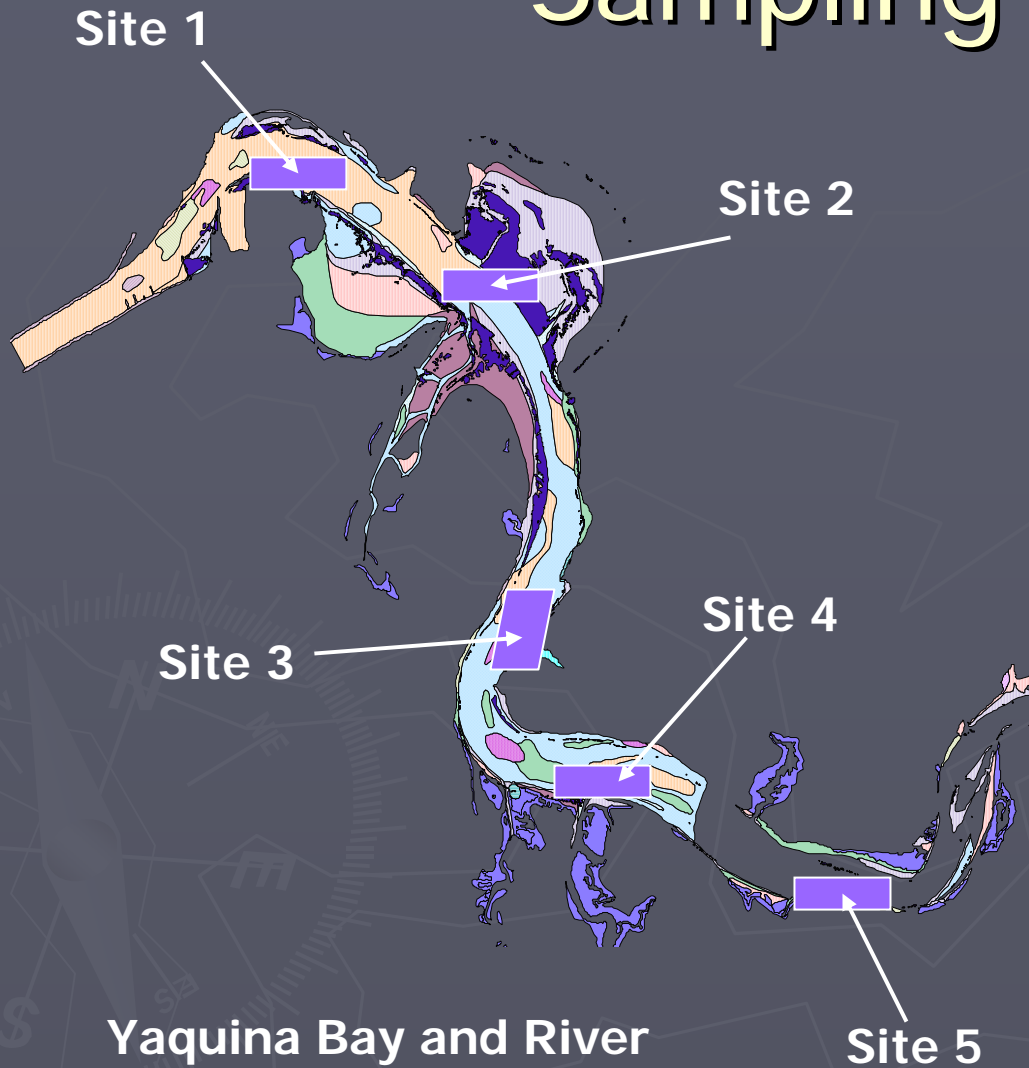
Objectives

- ▶ Provide students with hands-on marine ecology research through student-devised experiments and long-term monitoring of biotic and abiotic conditions in Yaquina Bay
- ▶ Design and execution of individual or group side projects
 - Larval fish project
 - Rockfish barotrauma study
 - English sole study
- ▶ Education and outreach through public and university seminars
- ▶ Monitoring project seeks to recreate historical survey by EPA 1967-1968 (De Ben et al. 1990)

Yaquina Bay Monitoring Project

- ▶ Established a regular survey to evaluate changes in the abundance and distribution of fishes in Yaquina Bay at multiple time scales: Monthly, Seasonally, Annually
- ▶ Comparing monthly results to EPA survey (De Ben et al. 1990)
 - Study conducted in 1967-68 investigated spatio-temporal fluctuation in the distribution and abundance of demersal fish and epibenthic crustaceans in Yaquina Bay

Sampling Sites



► 5 sites

- Sites 2, 3 most diverse
- Site 4 above Oregon Oyster Farms
- Site 5 located adjacent to bird restoration project

Methods



- ▶ Monthly Sampling
 - High tide, weather cond.
- ▶ 21 ft. Boston Whaler
- ▶ Otter trawl 16ft.
- ▶ Abiotic conditions measured with model 85 YSI meter
 - Temp, Salinity, DO
- ▶ All fish classified, measured and released
- ▶ 5 sites within Yaquina Bay

Fish Diversity

► Many Previous Studies

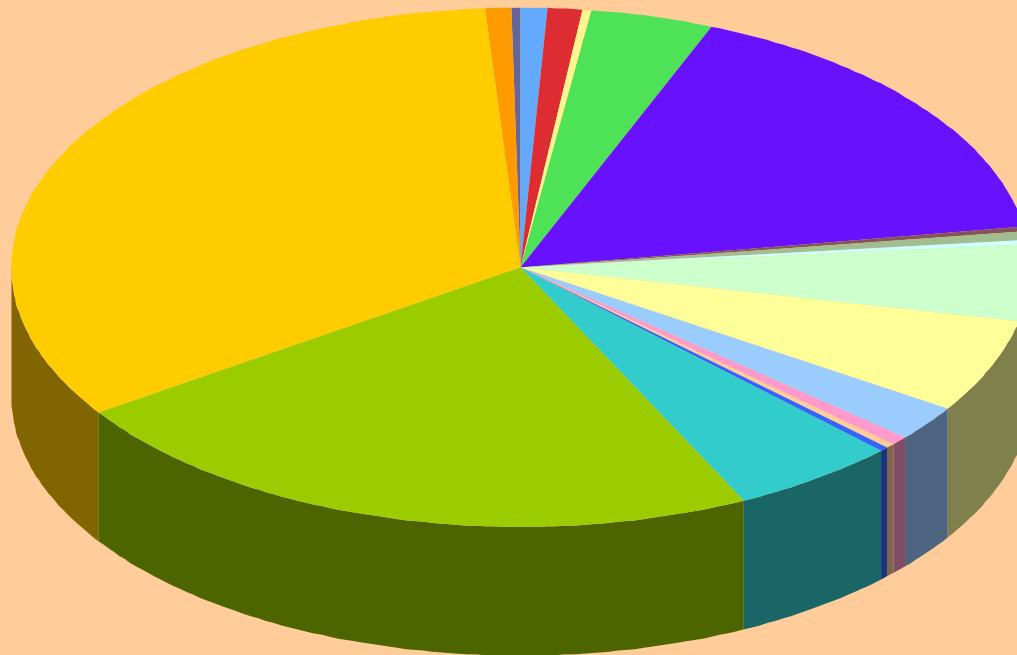
- Ichthyoplankton (Pearcy and Myers 1974; Boelhart and Mundy 1987), juvenile flatfishes (Spencer et al. 2005; Westrheim 1955; Olsen and Pratt 1973; Rosenberg 1982), shallow-water intertidal ichthyofauna (Bayer 1981), Clupeidae (Stienfeld 1972), Embiotocidae (Swedberg 1966; Gnose 1967; Wares 1971), and Cottidae (Olson 2004).

► Species Classification

- Year-round residents
- Entering Bay to spawn
- Spawn offshore and enter the bay as ichthyoplankton
- Juveniles utilizing the bay as a nursery habitat

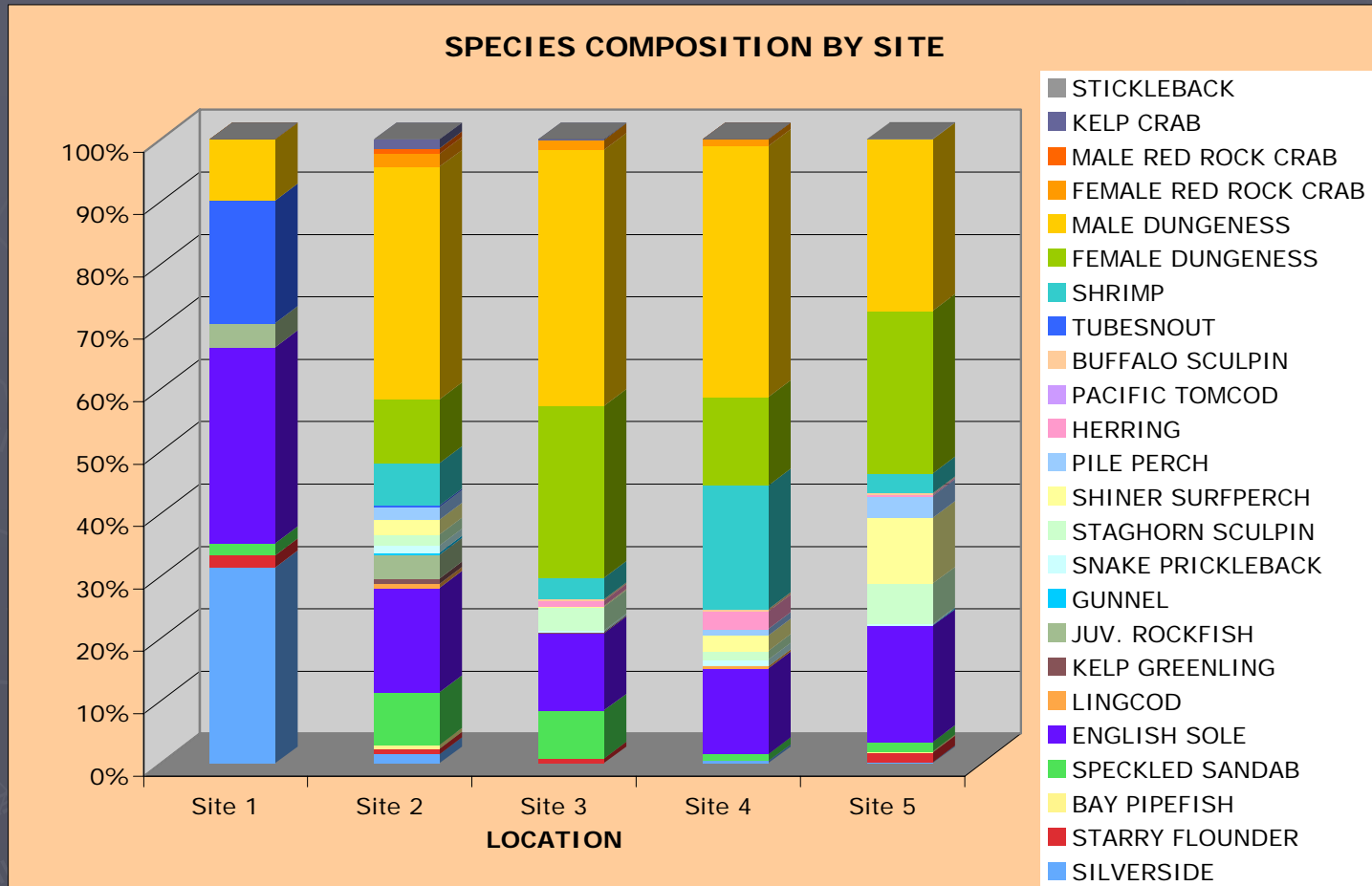
Results

Total Species Diversity Yaqina Bay 2004



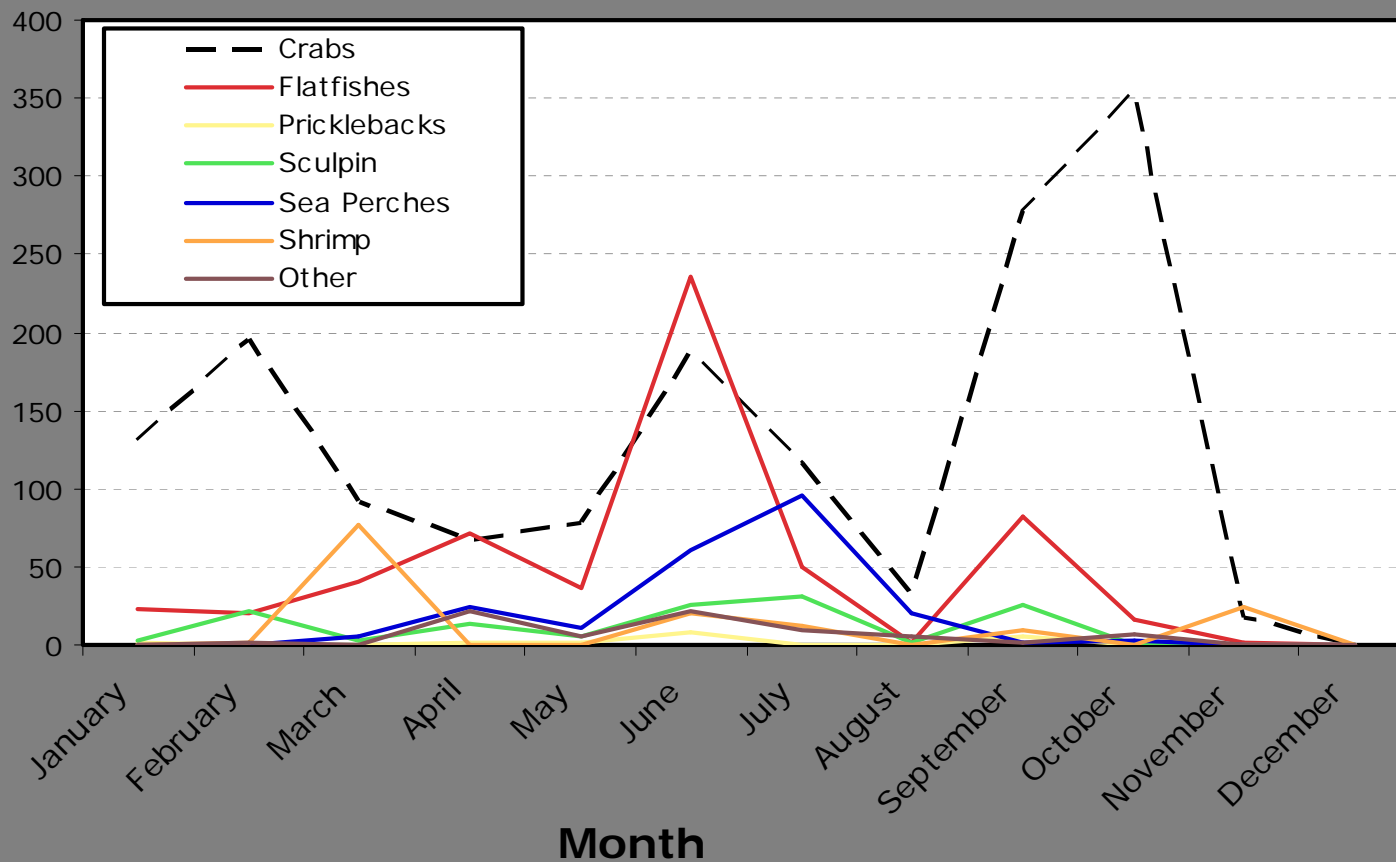
- SILVERSIDE
- STARRY FLOUNDER
- BAY PIPEFISH
- SPECKLED SANDAB
- ENGLISH SOLE
- LINGCOD
- KELP GREENLING
- JUV. ROCKFISH
- GUNNEL
- SNAKE PRICKLEBACK
- STAGHORN SCULPIN
- SHINER SURFPERCH
- PILE PERCH
- HERRING
- PACIFIC TOMCOD
- BUFFALO SCULPIN
- TUBESNOUT
- SHRIMP
- FEMALE DUNGENESS
- MALE DUNGENESS
- FEMALE RED ROCK CRAB
- MALE RED ROCK CRAB
- KELP CRAB
- STICKLEBACK

Results



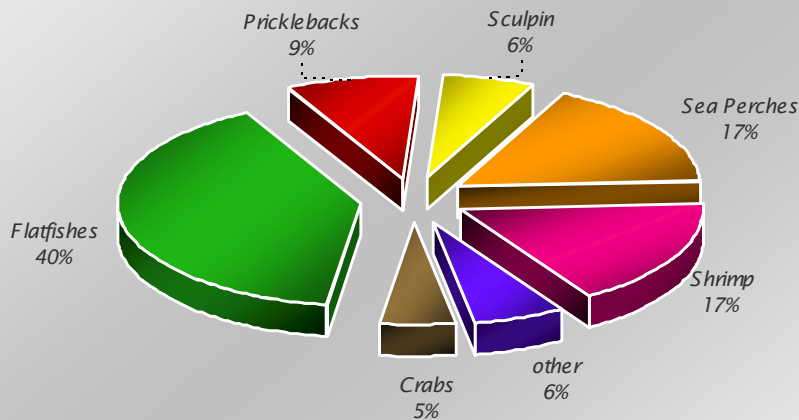
Results

**Temporal Variation of Species Within Yaquina Bay
2004**

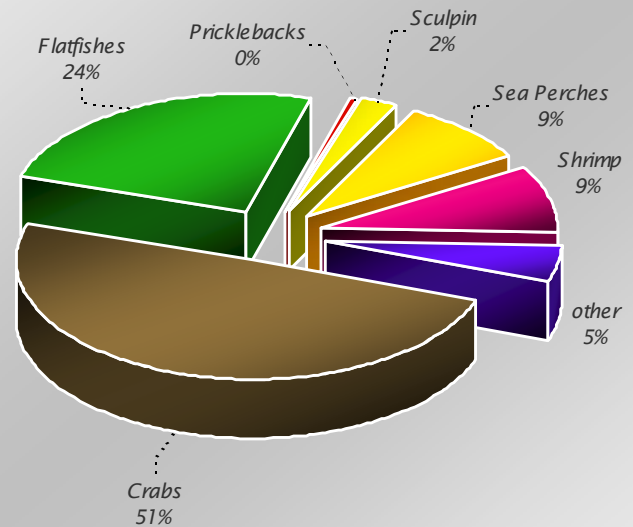


Changes Since EPA Study

Species Composition Yaquina Bay 1967-68



Species Composition Yaquina Bay 2003-05



Data from De Ben et al. 1990

Discussion

- ▶ Major Similarities Between 67-68 and 2003-05
 - Dungeness crab males more abundant than females
 - Flatfishes (Pleuronectiformes) and Sea Perches (Embiotocidae) predominate demersal fish catch

- ▶ Major Differences Between 67-68 and 2003-05
 - Shifts in relative proportion of crustaceans and flatfishes
 - Less species diversity
 - ▶ 24 species down from 62 species
 - ▶ Flatfishes, Sea Perches, Crabs

Remaining Questions?

- ▶ Differences in length frequency distributions
- ▶ Examining impact of physical changes within Yaquina Bay
 - Dredging, Construction, etc.
- ▶ Correlating abiotic and biotic interactions
 - Yearly variation correlated with PDO index
- ▶ Limitations of our dataset
 - Some species not available to sampling device
 - ▶ Rockfishes, Salmonids, etc.

Conclusion

► Products

- Long-term dataset coupled with opportunity for students to experience field sampling, data collection and analysis, etc.
- Development of weekend curriculum for K-12 teacher continuing education that highlights the physical and biological attributes of Yaquina Bay
- Description and analysis of larval fish recruitment in Yaquina Bay (manuscript in prep.)

► Future Work

- Abiotic correlations
- Fine-scale variation
- Continued sampling??

Acknowledgments



- ▶ Oregon Sea Grant
- ▶ Hatfield Marine Science Center
- ▶ CIMRS
- ▶ Numerous Undergrad and Graduate Students

Questions???

