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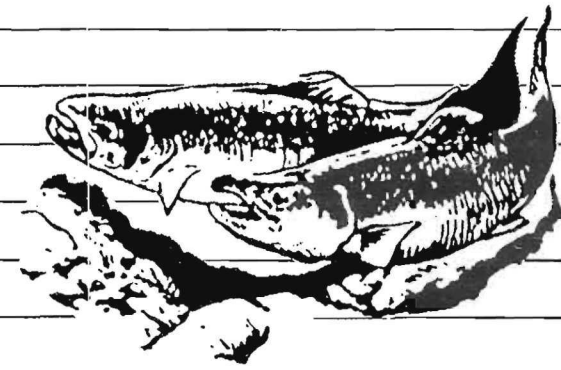

Juvenile Spotted Seatrout Use Different Habitat Zones of a Shallow Nearshore Seagrass Meadow

Spotted seatrout (*Cynoscion nebulosus*) utilize seagrass habitat during all stages of their life cycle, but seagrasses are considered an especially important habitat for juvenile seatrout. The role of seagrass ecosystems as nursery habitat for spotted seatrout is believed to be related to the provision of abundant food and cover associated with the submerged vegetation. We examined the abundance and distribution of juvenile spotted seatrout in adjacent habitat zones of a nearshore seagrass meadow at Cedar Keys National Wildlife Refuge, Florida, during a 6-week period from 5 August to 20 September 1992.

Seagrass Habitat Zones Sampled for Young Spotted Seatrout

Moving seaward from the shoreline, the zonation of the nearshore margin of the seagrass meadow consists of a fringing sand zone (sand), a *Halodule wrightii* (hal) zone, and a *Thalassia testudinum* (thal) zone. Because of the large width of the *Thalassia* zone, two different bands of this zone were examined, a shallow band directly adjacent to *Halodule* (thal 1), and a deeper band further from shore (thal 2).

The habitat zones exist along an intertidal exposure gradient. The frequency and duration of tidal exposure increases moving shoreward. Average depth increases moving seaward from about 40 cm in the sand, to 54–55 cm in the *Halodule* and first *Thalassia*, and to 65 cm in the second *Thalassia*. Mean water temperatures (30–33° C) increase moving shoreward, as does the variation in water temperature. Salinity averaged 25 ppt during the study period.

The density of the seagrass shoots is greatest in the *Halodule* (3000 shoots/m^2), intermediate in the *Thalassia* (800–900 shoots/m^2), and nonexistent in the sand zone which is only vegetated ephemerally. Though shoot density is greatest in the *Halodule*, seagrass biomass density is greatest in the *Thalassia*. This is because of the much wider and more robust blades of *Thalassia* as compared with the narrow-bladed *Halodule*. Canopy height is greatest in the *Thalassia* zone (19–21 cm), and decreases moving shoreward to *Halodule* (15 cm) and the sand zone (0 cm).

Juvenile spotted seatrout were sampled at random locations both among and within habitat zones and bands by using a bag seine (15 m long, 6 mm-mesh wings, 3 mm-mesh bag). Nets were pulled parallel to the shoreline in each zone over an area of 200 m^2, after which the ends were encircled and pursed.

Juvenile Spotted Seatrout Found Only in Vegetated Habitat Zones

No juvenile spotted seatrout were captured in the fringing sand zone. Comparison of the abundance of juvenile seatrout in the vegetated zones indicated

that the total numbers of individuals declined moving from *Halodule* (hal) to shallow *Thalassia* (thal 1) to deep *Thalassia* (thal 2; Figure). However, because of the abundance of seine hauls in which no seatrout were captured, the differences in mean number of seatrout captured in each of the vegetated zones were not statistically significant (Kruskal-Wallis test, $P = 0.42$).

Different-Sized Spotted Seatrout Utilize Different Habitat Zones

Mean spotted seatrout total length (TL) from the *Halodule* zone was 42 mm, while mean TL from the *Thalassia* zone was 60 mm. Despite small sample size, the comparison of mean TL for these two zones was statistically significant (t-test, $P = 0.01$).

One interpretation of the above finding could be that juvenile spotted seatrout recruit to the *Halodule* zone first or preferentially, and then with greater size move to *Thalassia*. In contrast with the above idea, it is also possible that seatrout recruit equally to both zones but experience greater growth in *Thalassia*. The first scenario seems more likely to us. Multiple spawning, common for the spotted seatrout, makes the co-occurrence of several first year-class cohorts very likely. Sequential habitat use may be related to differing levels of environmental stress, amounts and types of structural cover, water depth, food resources, and degree of biological interaction (competition, predation) among habitat zones.

Information To Be Used for Habitat Suitability Index Model, and May Aid Resource Managers

Results of this study indicate that juvenile spotted seatrout utilize the interior of nearshore seagrass beds, but not the fringing unvegetated areas shoreward of the seagrass meadows. In addition, the sequential use of *Halodule* and then *Thalassia* seagrasses with increasing size has been suggested. The alternative and conflicting idea that differential growth may be occurring in the different habitat zones, in absence of sequential use, is also possible. Further study of spotted seatrout in various seagrass habitats is necessary. Ideas and information generated by this study will be useful in future studies, will be of use in evaluating and improving HSI models for spotted seatrout, and will also be of aid to managers of estuarine areas where spotted seatrout are important both ecologically and economically.

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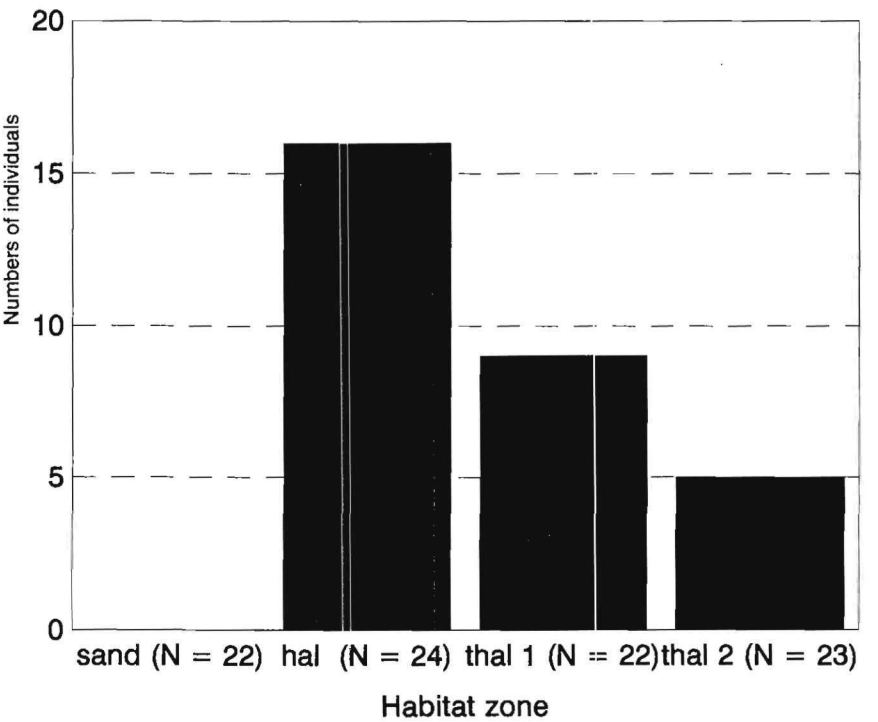

Figure. Total numbers of spotted seatrout (*Cynoscion nebulosus*) in four seagrass habitat zones (sand = fringing sand, hal = Halodule, thal 1 = shallow Thalassia, thal 2 = deep Thalassia). N = total number of seine hauls in each zone.