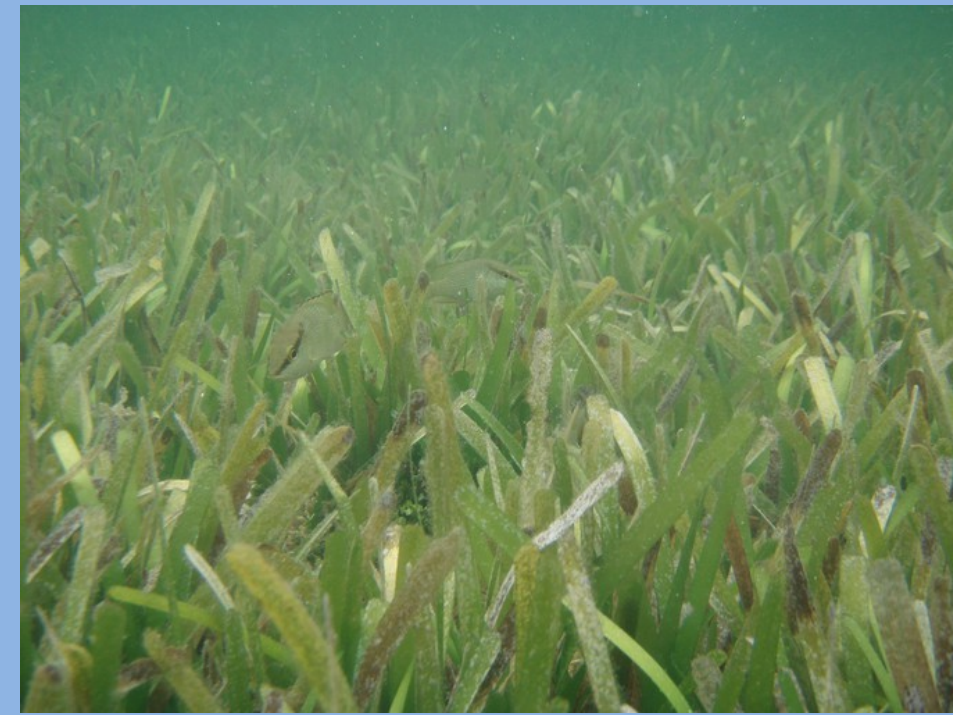


Diel Habitat Utilization of Fish and Decapod Species in Great Lameshur Bay, St. John, USVI



Elizabeth Pudlak*, Matthew Cheung, Paul Bologna
 Marine Biology and Coastal Sciences, Department of Biology and Molecular Biology
 Montclair State University



Introduction

Coastal habitats serve as some of the most productive systems as they are essential feeding, refuge and nursery habitats. These ecosystems, however, are being greatly impacted by both natural and anthropogenic disturbances. With increasing coastal population, these habitats are facing degradation. Mangrove, seagrass and coral habitats are essential for fish and decapod communities. Understanding these habitats and the species utilizing them can further conservation efforts.

The U.S. Virgin Islands is home to the UNESCO biosphere reserve. Mangrove (*Rhizophora mangle*), seagrass (*Thalassia testudinum*) and unvegetated habitats at Great Lameshur Bay were observed for diel habitat utilization of fish and decapod species. These three adjacent habitats can produce an essential linkage that may allow these communities to thrive. This area previously faced two hurricanes which impacted the mangrove and seagrass habitat. The mangrove has done little to recover which could cause a possible impact on habitat usage. Further analysis of fish and decapod species utilization in these habitats can reveal species preference and any possible impact degradation has on the communities.

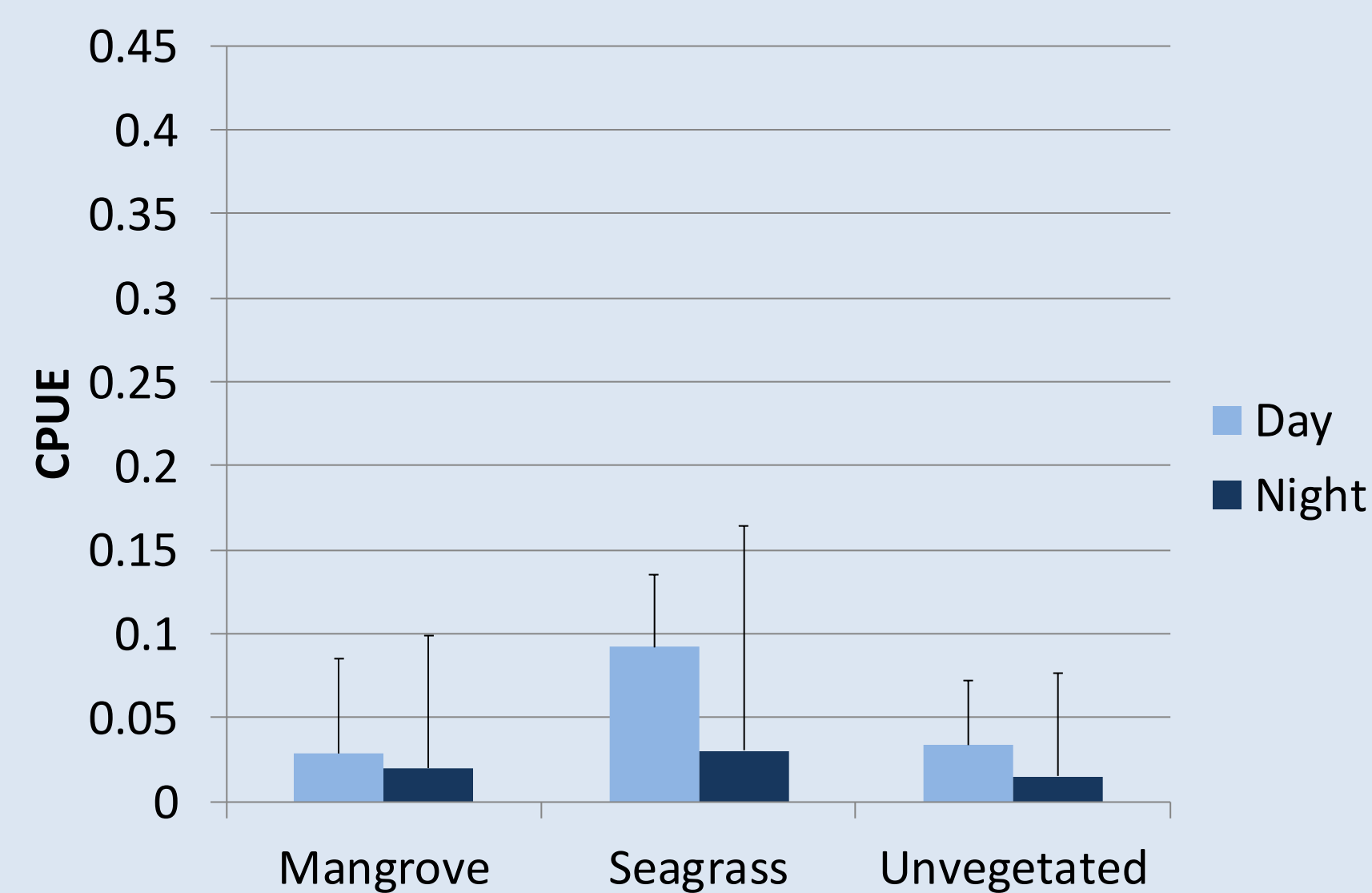
Methods

- Seagrass (*Thalassia testudinum*), mangrove (*Rhizophora mangle*) and unvegetated habitat were assessed in Great Lameshur Bay
- Minnow traps (18" inch with 2.54cm opening) were distributed among habitats (18 total traps)
- Collected at dawn and dusk
- YSI collected dissolved oxygen, temperature, and salinity
- Counted, measured, and identified fish and decapod species

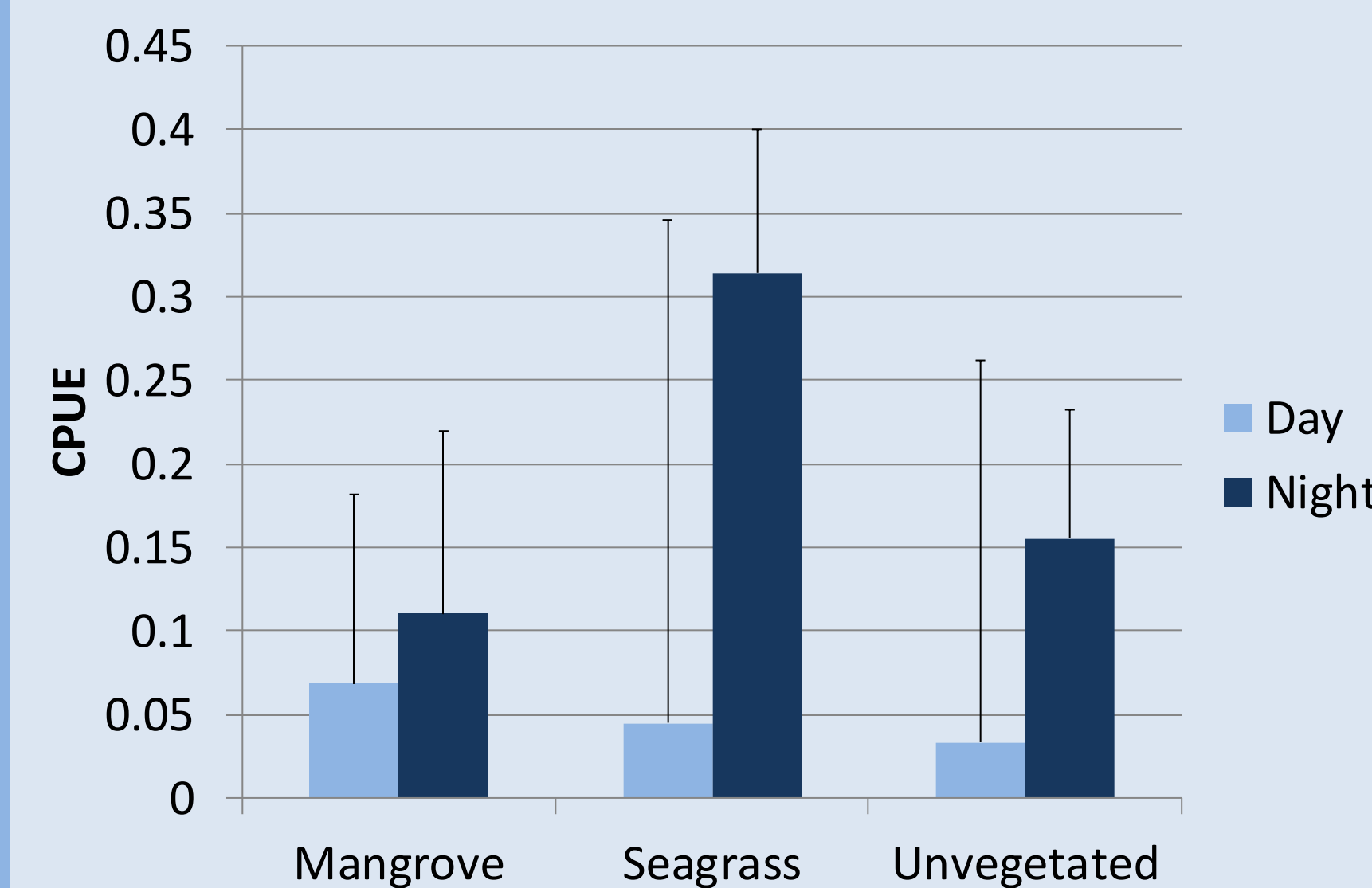
Abstract

Diel habitat utilization was assessed using minnow traps in mangrove (*Rhizophora mangle*), seagrass (*Thalassia testudinum*) and unvegetated habitats at Great Lameshur Bay in St. Johns, United States Virgin Islands. Catch per unit effort (CPUE) was calculated for fish and decapod species utilizing the habitats during both day and night. Individual species were analyzed and found to possess different diel habitat utilization. *Ocyurus chrysurus*, the most abundant fish species captured, was found to utilize every habitat during both day and night except the mangrove habitat at night while the second most abundant fish, *Halichoeres bivittatus*, was mainly found in seagrass habitats during the day. *Haemulon flavolineatum* equally utilized unvegetated and mangrove habitats but was only present during the night. Fish CPUE was highest in seagrass during the day while the second highest fish CPUE was unvegetated day which could indicate a possible connection between the two adjacent habitats. Decapod CPUE was significantly higher at night than during the day, while the highest decapod CPUE occurred in seagrass during the night. Decapod CPUE was overall higher than fish CPUE. Further analysis revealed that decapod species dominated seagrass habitats at night while fish species dominated seagrass habitats during the day, indicating possible niche partitioning. Both the fish and decapod CPUE at the mangrove habitat during the night was higher than during the day which may be due to increased daytime predation allowing for fish and decapod species to take refuge during the day allowing for night-time activity.

Average Fish CPUE



Average Decapod CPUE



Fish Taxa (most abundant)

- Yellow Tail Snapper- *Ocyurus chrysurus*
- Slippery Dick- *Halichoeres bivittatus*
- Bucktooth Parrotfish- *Sparisoma radians*
- BeauGregory- *Stegastes leucostictus*
- French Grunt- *Haemulon flavolineatum*

Decapod Taxa (most abundant)

- Hermit Crab- *Paguristes spp.*
- Mud Crab- *Xanthidae*
- Swimming Crab- *Portunus sayi*



YSI Averages				
Time Recorded	DO (mg/L)	DO%	Salinity (ppt)	Temperature (°C)
Mangrove Dawn	4.59	66.45	34.15	25.80
Mangrove Dusk	4.84	77.33	36.83	30.17
Unvegetated Dawn	5.55	83.75	35.35	26.00
Unvegetated Dusk	6.75	107.13	36.00	28.90
Seagrass Dawn	5.56	82.23	35.38	25.90
Seagrass Dusk	7.12	109.83	35.97	27.87



Results/Discussion

Between the three habitats during multiple diel cycles, 14 fish species were collected within the traps, with a total of 58 individuals. Calculations indicate that seagrass habitat during the day had the highest CPUE (0.0921) while the unvegetated habitat during the day was the second highest (0.0339). Unvegetated habitat at night was significantly lower in CPUE (0.0156).

There were 10 decapod species captured with 219 individuals. The CPUE was much higher in seagrass habitats at night (0.3233). All three habitats at night showed the highest CPUE compared to the day.

When comparing sites, time of day and species there is a high amount of variation. Decapods in general had a higher CPUE than fish. There are some relationships when looking at individual habitat-diel categories. Seagrass habitat during the day were dominated by fish species. This could indicate a relationship between diel utilization of fish and decapod species. This could be due to a variety of reasons such as increased predation during the day or the need to feed at night influencing fish and decapod species to become more active at night. The high fish CPUE between seagrass day and unvegetated day could indicate a connected relationship due to close proximity. All species found in unvegetated habitat during the day was also found in seagrass habitat during the day. Further research would need to be done to indicate relationships between habitat and species utilization.