SIO 199:

Yellow Snapper Density According to Site Geomorphology and Substrate Composition

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Introduction

- Remain in mangroves until they are 300 days old [1]
- Conservation resource allocation
- Abundance increases with increasing fringe area [2]
- What other factors? Physical

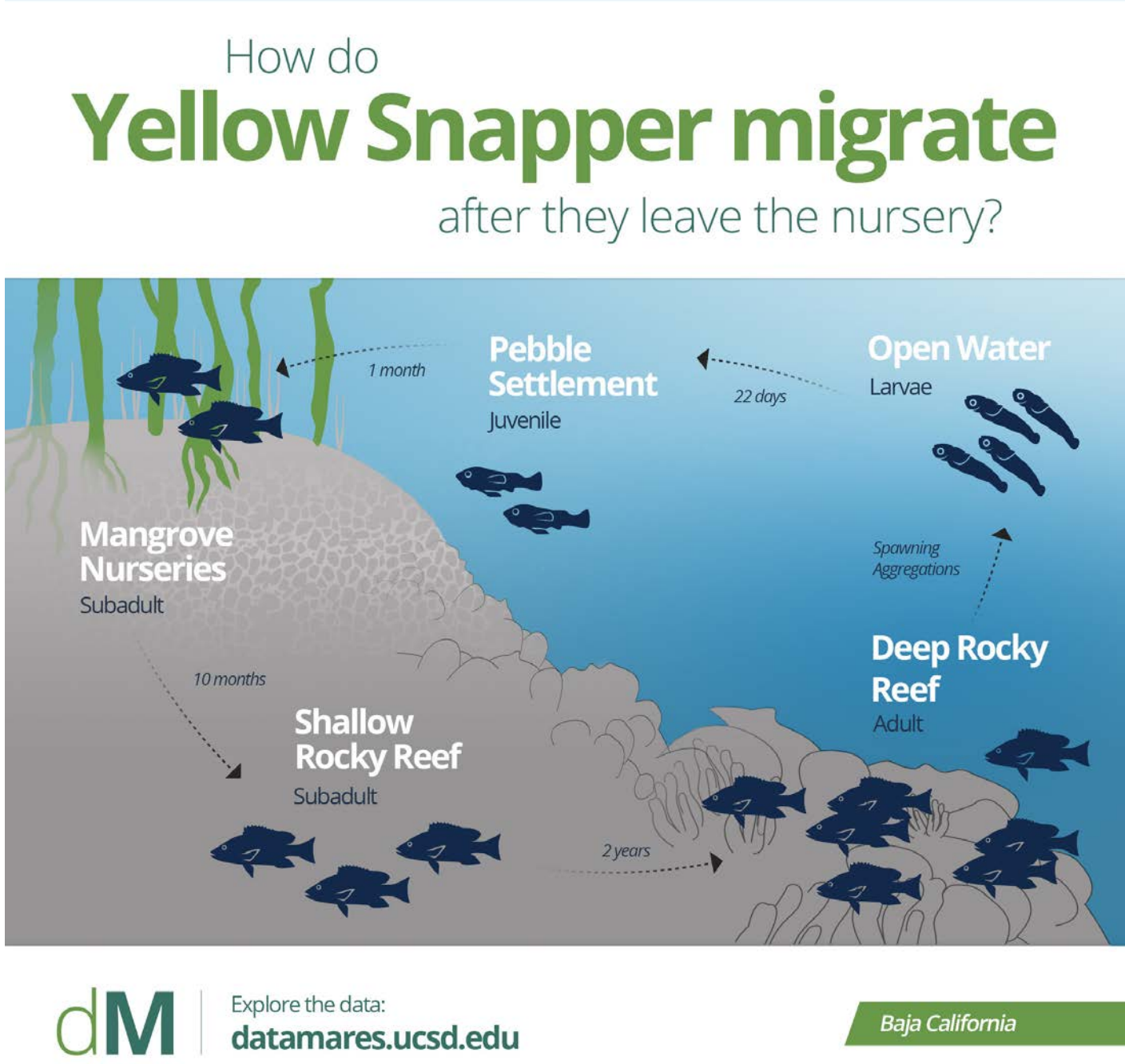
Juvenile yellow snapper

[1] (Aburto et al., 2009)
[2] (Aburto et al., 2008)

Physical Predictors

- Substrate composition

- Geomorphology
  - Temp, waves, tides, wind, currents, etc.
  - Affect coastal geomorphology



Methods

- Data provided by dataMares: fish density for 49 sites
- Data provided by Aburto et al. 2008: fringe length and substrate
- Data collected: mouth length, site area and perimeter
- 3 Geomorphology ratios used
- Divide into rocky and sandy

Geomorphological ratios

- Mouth to Fringe [3]
  - “openness”

Low

High

[3] (Bird et al., 2008)

Geomorphological ratios

- Perimeter to Area [4]
  - complexity

Low

High

[4] (Heltzer et al., 1999)

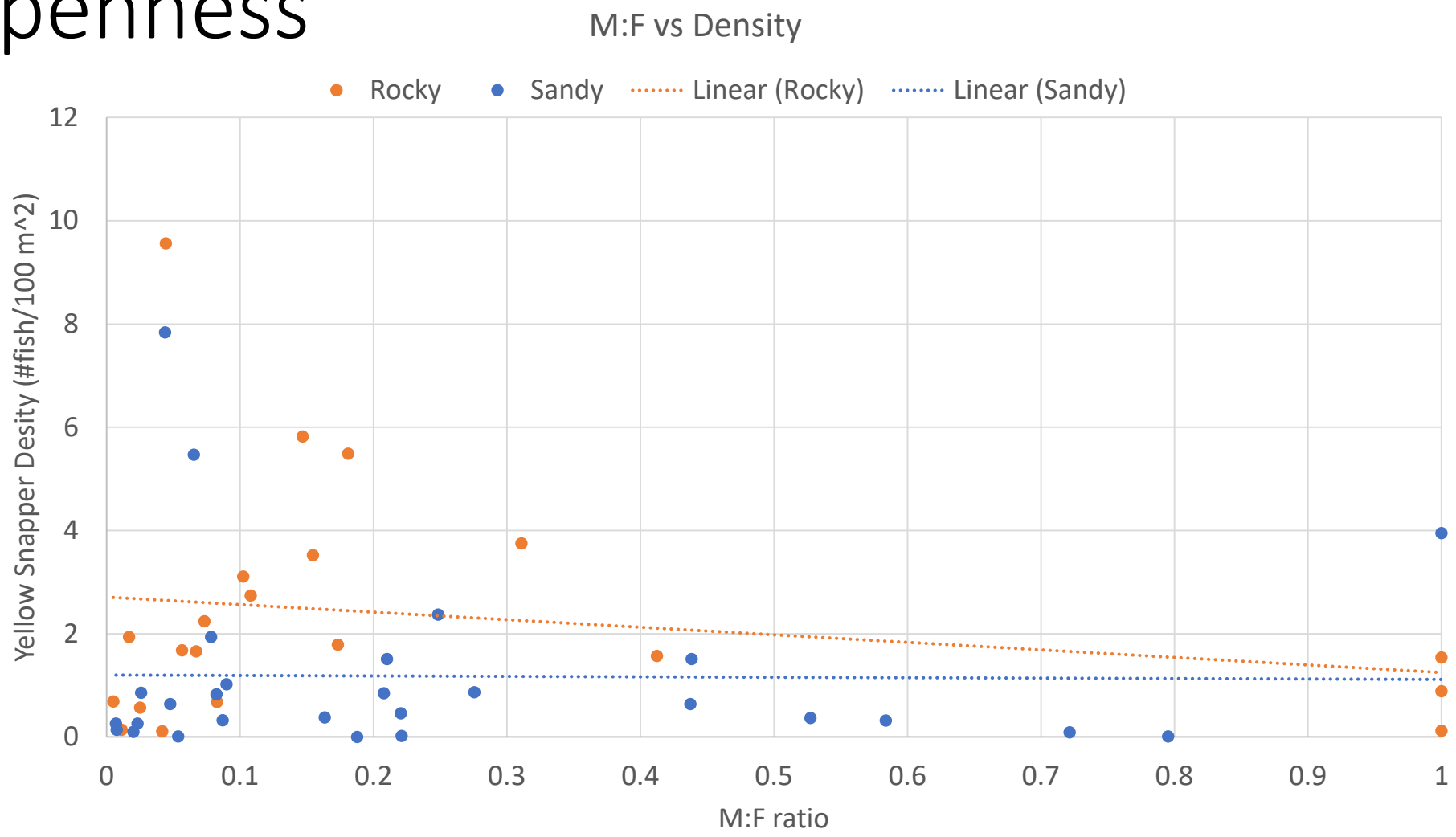
Geomorphological ratios

- Fringe to Area
  - Habitat percentage

Results

- Correlation analysis between ratios, and substrate composition.

“Openness”

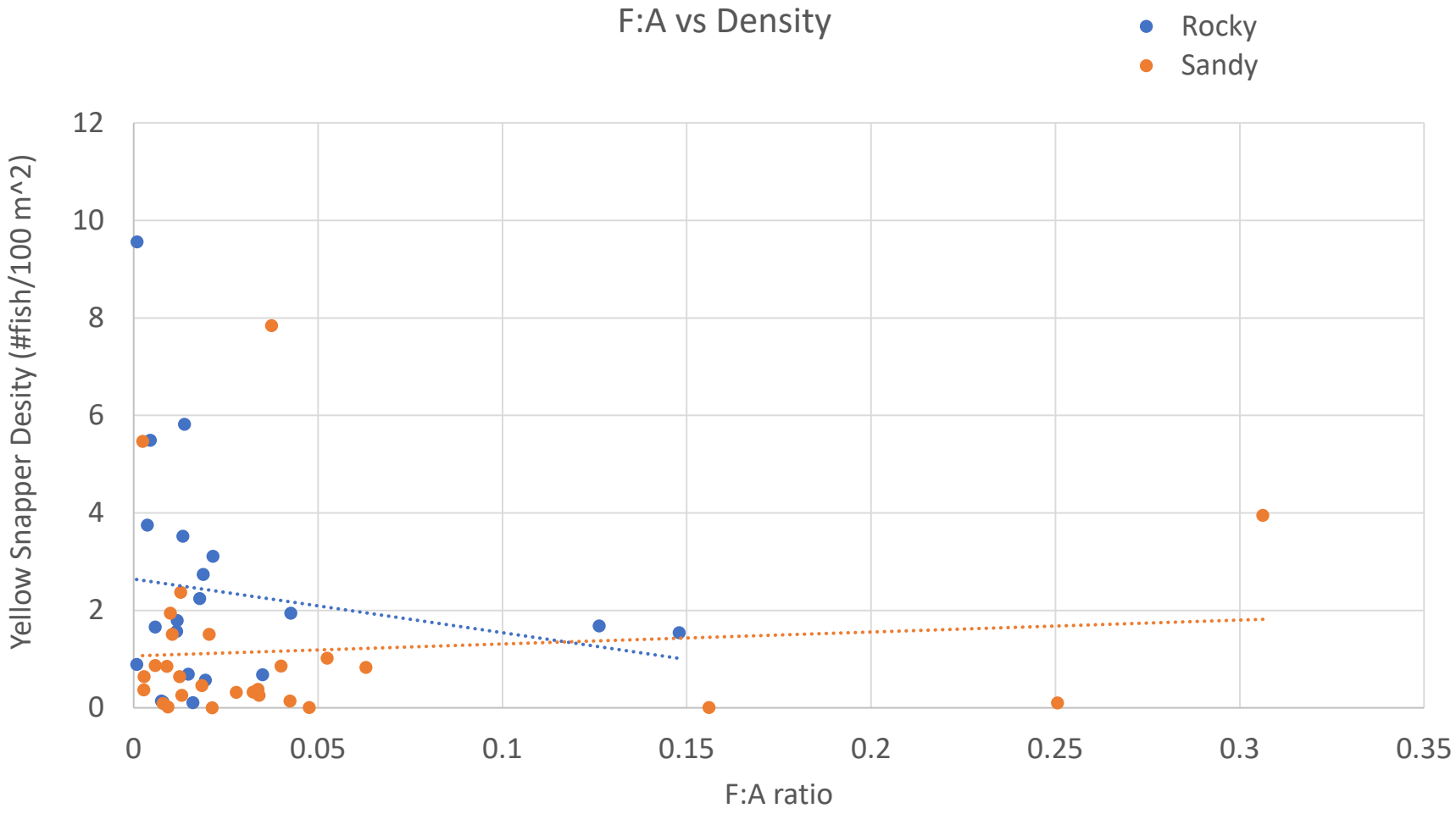


t = -0.83
p = 0.4

Ho: ϱ = 0, Ha: ϱ ≠ 0

$t_{crit} = t_{0.05,(2),48} = 2.01$

Proportion of Habitat

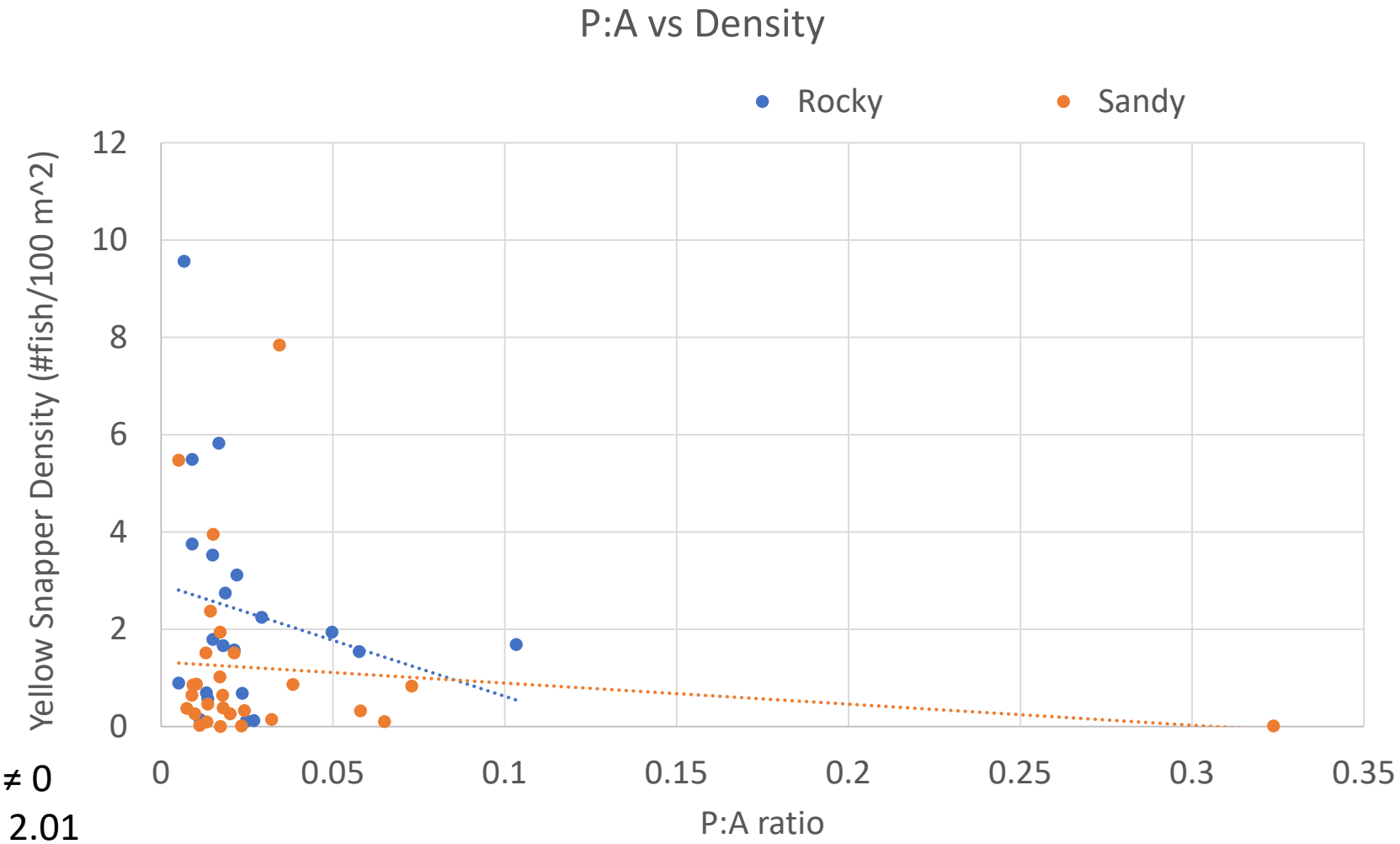


t = -0.30
p = 0.7

Ho: ϱ = 0, Ha: ϱ ≠ 0

t_{crit}= $t_{0.05,(2),48}$= 2.01

Complexity



t = -1.14
p = 0.2

Ho: ϱ = 0, Ha: ϱ ≠ 0

$t_{crit} = t_{0.05,(2),48} = 2.01$

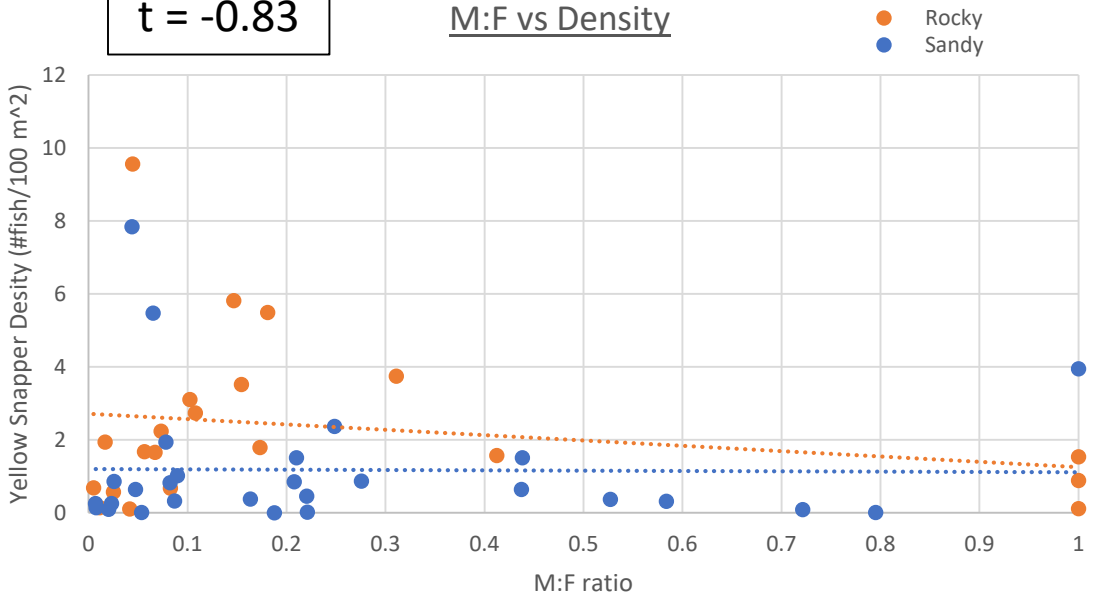
Results

Ho: ϱ = 0, Ha: ϱ ≠ 0

$t_{crit} = t_{0.05,(2),48} = 2.01$

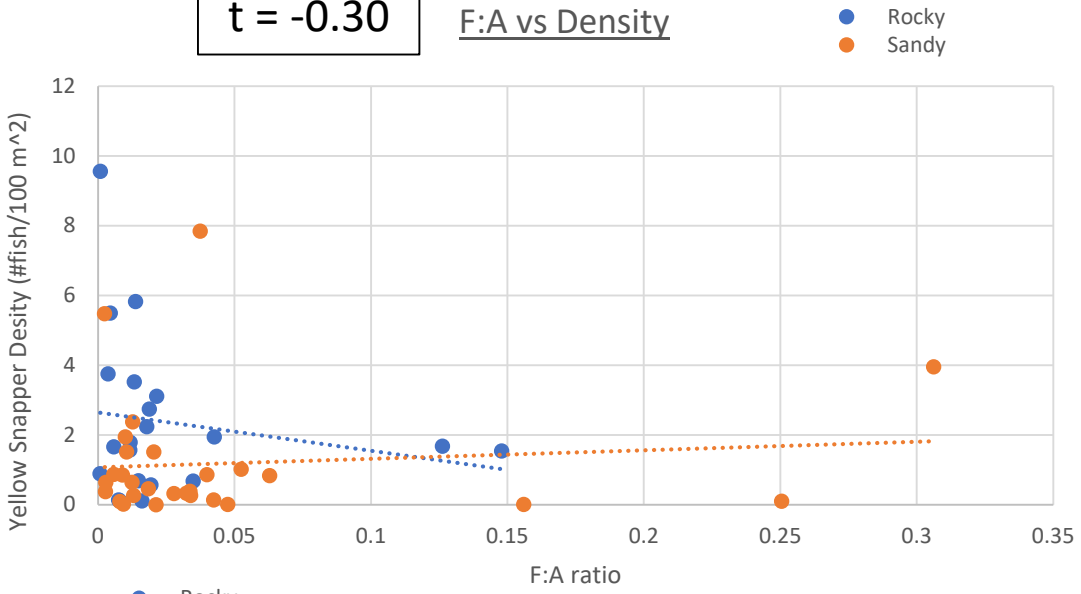
t = -0.83

M:F vs Density

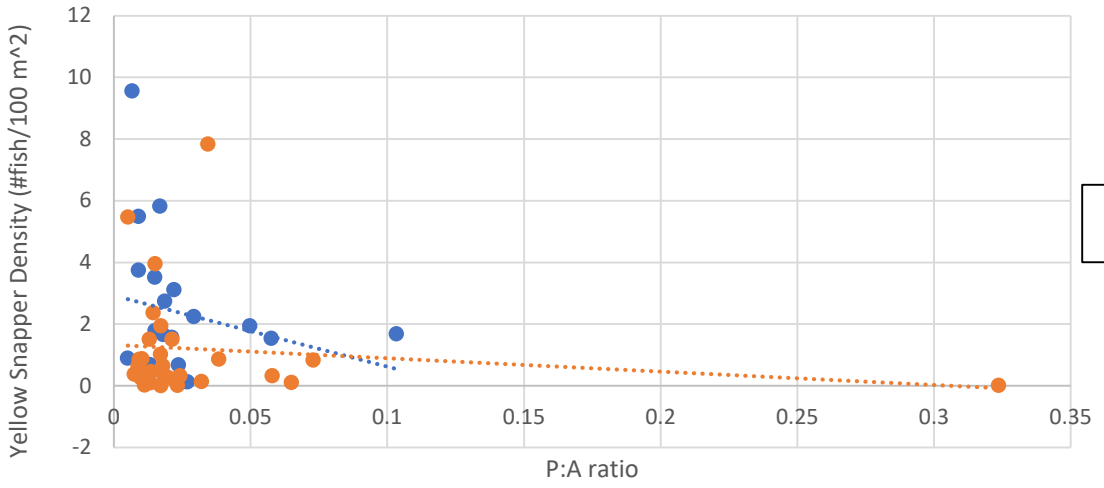


t = -0.30

F:A vs Density



P:A vs Density

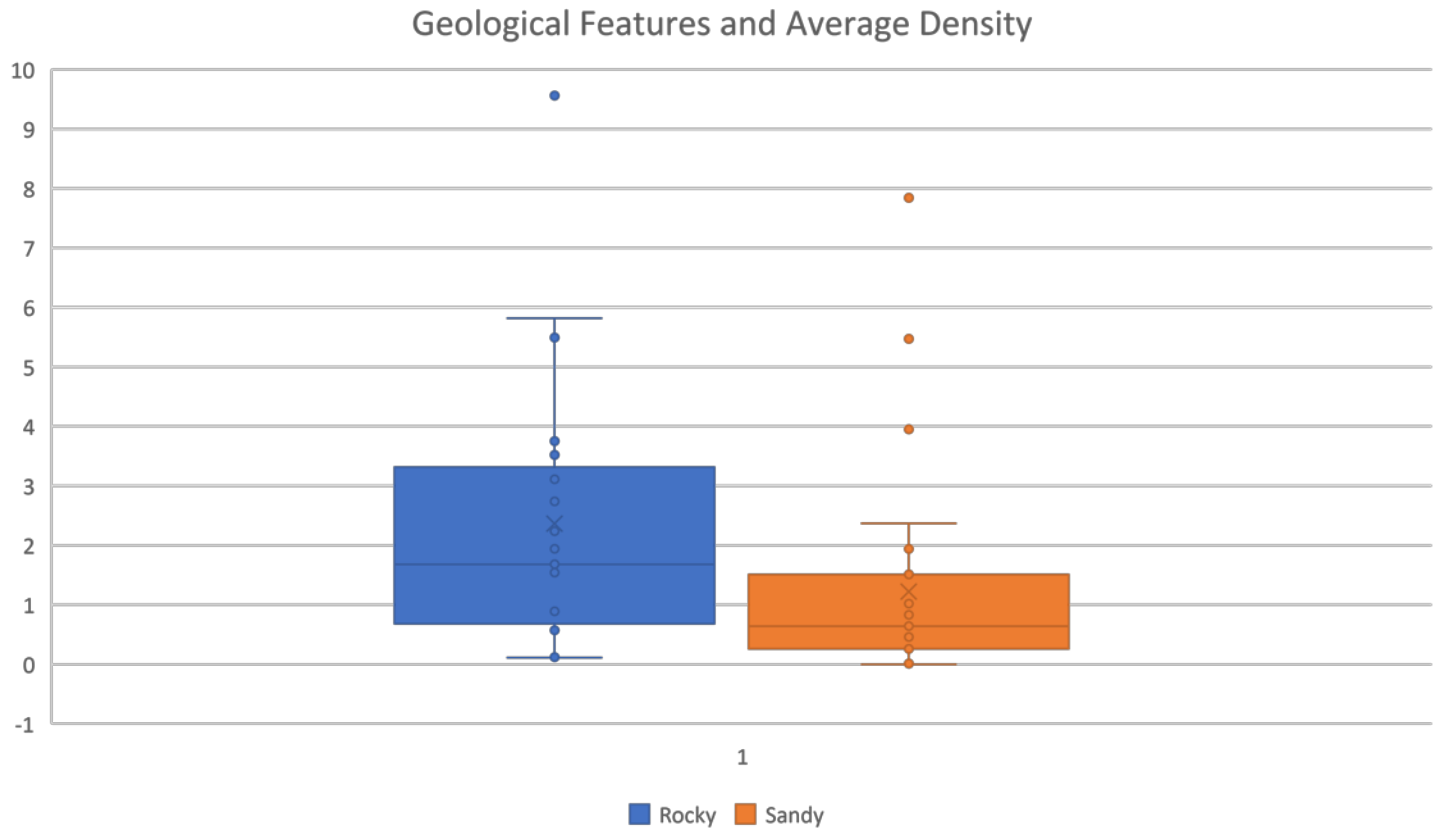


t = -1.14

t_{crit} >> t

Fail to reject Ho

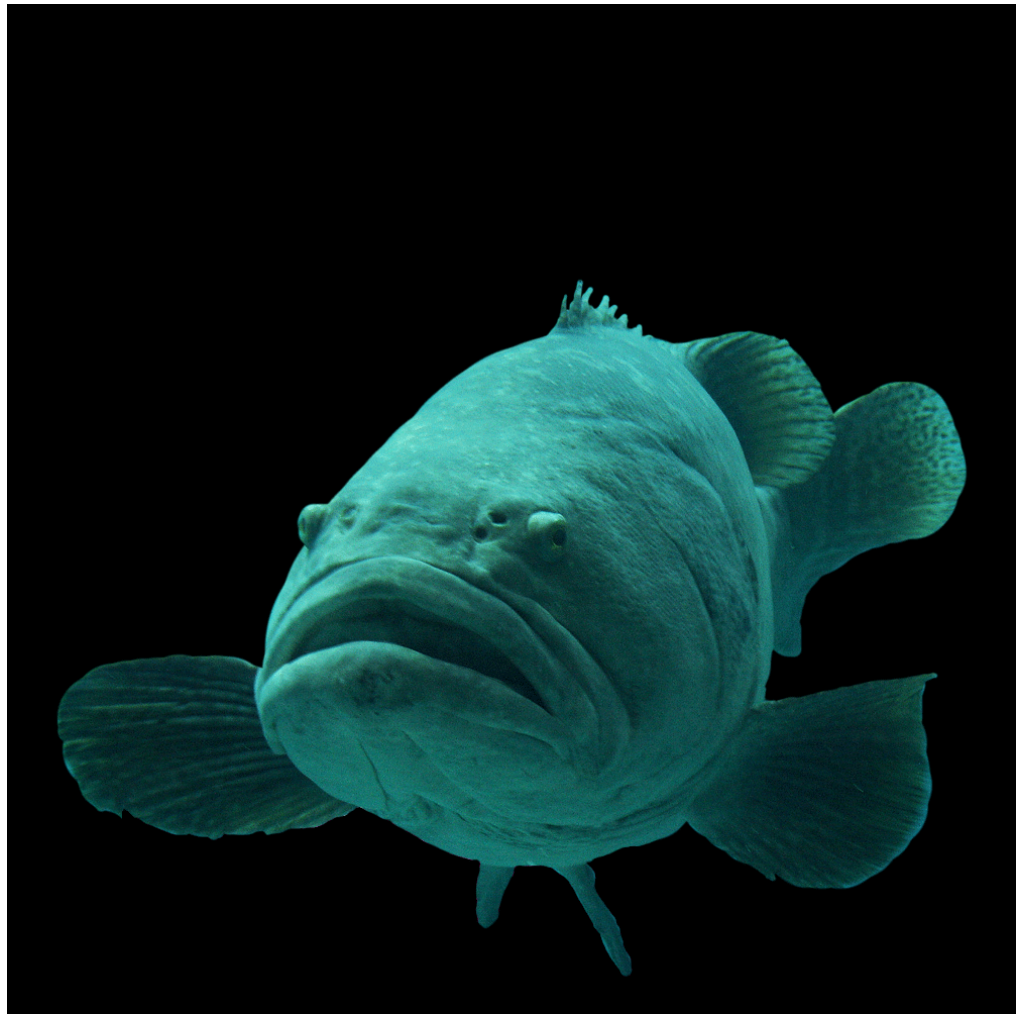
Substrate Composition



Conclusions/Future

- Did not reject Ho

- Continued analysis of data/results
  - Looking at phys. factors independently
  - Size of mangroves
  - Different statistical tests



Full References

- [1] Aburto-Oropeza, Octavio, et al. “Recruitment and Ontogenetic Habitat Shifts of the Yellow Snapper (Lutjanus Argentiventris) in the Gulf of California.” *SpringerLink*, Springer-Verlag, 8 Aug. 2009, link.springer.com/article/10.1007/s00227-009-1271-5.

- [2] Aburto-Oropeza, Octavio, et al. “Mangroves in the Gulf of California Increase Fishery Yields.”*PNAS*, National Academy of Sciences, 29 July 2008, www.pnas.org/content/105/30/10456.full.

- [3] Bird, E. C. F. *Coastal Geomorphology: an Introduction*. John Wiley & Sons, 2008.

- [4] Helzer, Christopher J., and Dennis E. Jelinski. “The Relative Importance of Patch Area and Perimeter-Area Ratio to Grassland Breeding Birds.” *Ecological Applications*, vol. 9, no. 4, 1999, p. 1448., doi:10.2307/2641409.