Effects of Fishing Traps On Black Sea Bass’ Essential Fish Habitat

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UMES
Since the 1970’s research has shown a strong relationship between fish and structurally complex benthic habitat.

Complex bedforms are important for fishes recruitment, survival, and site fidelity, especially for open local populations (e.g. BSB).

- Essential Fish Habitat

Benthic complex habitats have been strongly associated with fish abundance and biodiversity.
What is Complexity?

Open Bottom

Cobble

Rocky Bedforms

Complex Live-Bottom

Benthic habitat structures within the DMAB are composed of isolated ship wrecks and rocky bedforms.

- Gorgonians
- Scleractinian corals
- Clionia sponge
- Bryozoans

Structures are highly fragmented.

Region is considered data poor.
BSB & Structure

- BSB are a migratory stock,
  - Shallower/near-shore waters during spring – fall
  - Deeper/off-shore waters during winter

- Approximately 50% of BSB return within 60 km of their summer site,
  - <30% return within 6 km
  - >95% of the N. Carolina population return

- Spring – fall months BSB exhibit strong site fidelity
  - Smaller and female BSB showed a (high)range of 1.2 km²
  - Dominant male showed a range of <0.2 km²

Fabrizio, M.C. et al. 2014. Fishery Bulletin 112(1)
Economic Importance

- **Local fish:**
  - Black sea bass
  - Tautog
  - Red hake
  - Silver hake
  - Striped bass

- **American lobster**
- **Jonah crab**
- **Atlantic cod**
- **Rose fish**
- **Croaker**
- **Eels**

- **Traps** are the second most common type of commercial fishing gear used in the USA,
  - Yielding 199,419 metric tons
  - Valued at 1.04 billion dollars

- **1000-1300 active traps in the DMAB**

- **Little is known regarding trap – habitat interactions.**

Anatomy of a Rig

GoPro®

2.5 kg

Field of View

P20 P17 P13 P9 P5 P1

27 - 34 m

2.4 m

18 m
A trap's drag duration significantly increases the likelihood of habitat interaction:

- No/minimal drag: <1% chance
- With drag: 50% chance

N=196
$R^2=0.73$
$P<0.001$
Trap Impacts
Trap Conclusions

- A trap's drag duration significantly increases the likelihood of habitat interaction:
  - No/minimal drag: <1% chance
  - With drag: 50% chance

- Interactions:
  - Running over coral:
    - Break
    - Strip
  - Running over epifauna:
    - Sea stars
    - Anemones
    - Bryozoans
    - Crabs

- Drag durations have a positive correlation to trap position.
Can sea whips be used as a bioindicator to assess relative health of a patch reef?

- Sea whip health index (H.I.)
  - 1 – no damage
  - 2 – mild; >10 damage
  - 3 – moderate; 25-50% damage
  - 4 – major; 50-75% damage
  - 5 – severe; >75% damage

Are there differences in H.I.s between patch reefs?
Sea Whip H.I.s

1: no damage

2: mild

5: severe

5: severe
Is the degree of abundance and biodiversity of biogenic epifauna essential to BSB abundance?

- Quadrate and video abundance surveys:
  - Kathleen Riggens wreck: 1991
  - Pharoby wreck: 1980
  - Liz Palmer wreck: 1915
  - Vandelay wood wreck: unknown est. >100 years

Are there differences between biogenic epifauna between artificial reefs and natural rock bottom?

- Quadrat analysis
Will implementing a ‘mosaic stepping stone’ style corridor artificial reef increase BSB abundance?

Pharoby N

- Large: 16>9>4>1
- Med: 9>4>1 -> 140 blocks
- Small: 4>1 -> 75 blocks needed
Future Research

- Is barren complex bedforms sufficient to increase BSB abundance?

- Will increasing connectivity increase BSB productivity?

- What is the biofouling rate of gorgonians and Scleractinian corals?
Any Questions?

- Acknowledgements
  - Brad Stevens
  - Jeremiah Kogon
  - Rom Lipcius
  - Billy MacMahon
  - Jim Britt
  - Edvis Gecys

Atlantic Coastal Fish Habitat Partnership

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