A Terrestrial Conservation Approach for Snook Habitat Management

Aaron Adams

JoEllen Wilson

Bonefish & Tarpon Trust

Background Basics

Habitat and Fisheries

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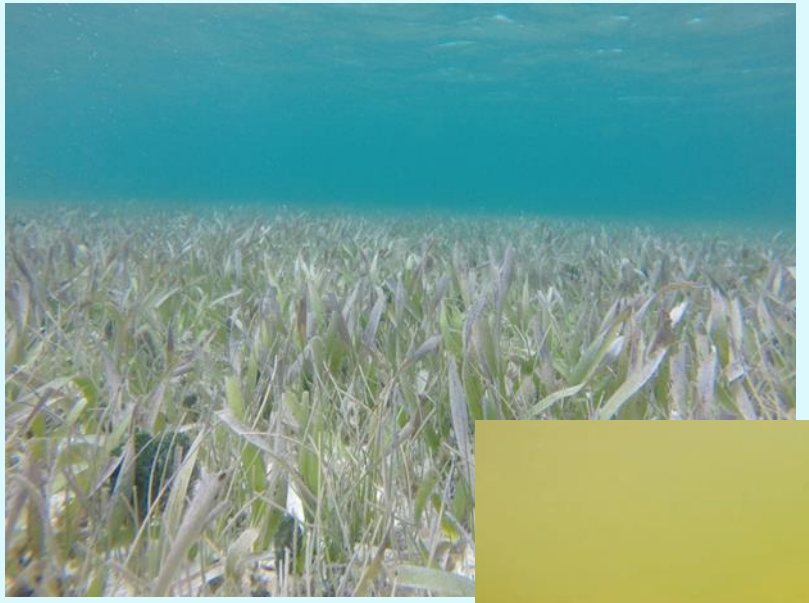
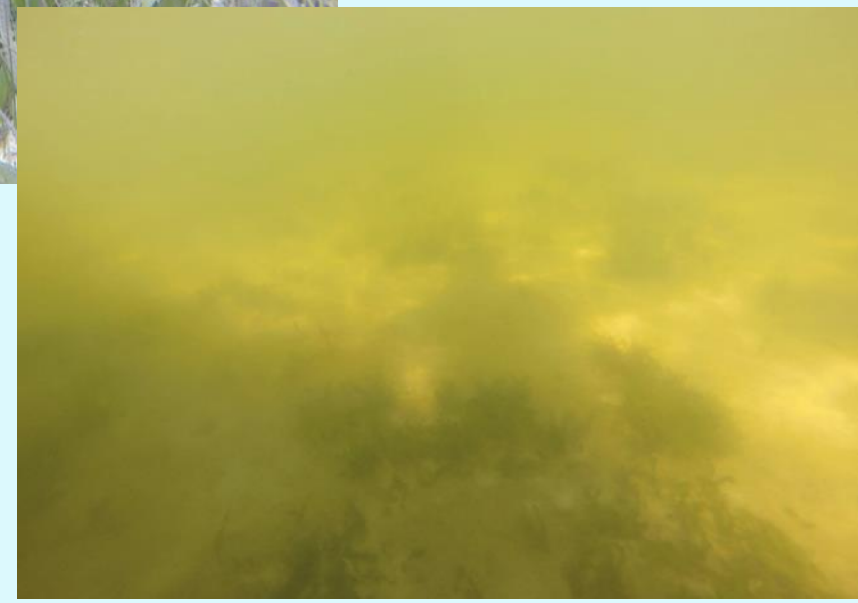
- Habitat quality influences fish health, survival, and abundance





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- Habitat connectivity influences fish health, survival, and abundance

Florida Habitat Deficit

- Lost ~ 50% of mangroves
- Lost > 2 million acres of seagrass
- Lost >9 million acres of wetlands
  - >44% of Florida's wetlands

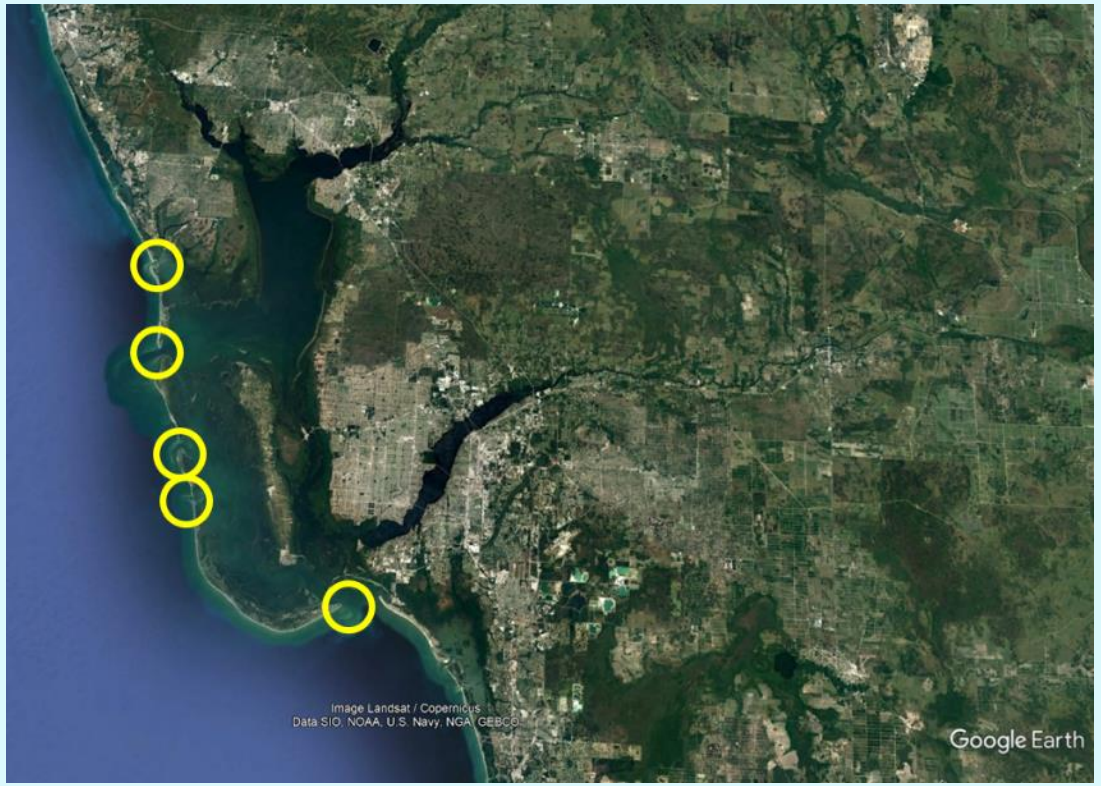
Water Quality

- Alteration in freshwater flow
  - Timing
  - Amount
  - Quantity
- Increase in nutrients
  - Cause/enhance harmful algal blooms
    - Red Tide
    - Brown Tide
- Contaminants
  - Pharmaceuticals, PFAS, metals, pesticides, herbicides, …

Snook Habitats

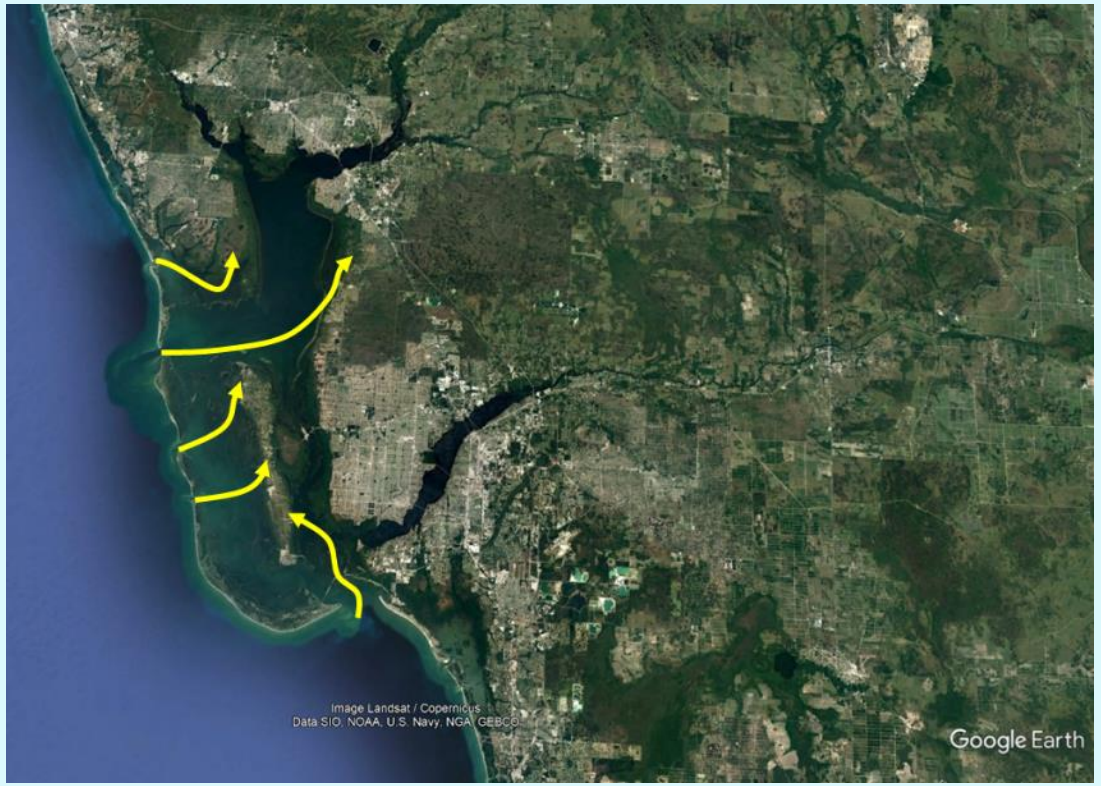
Snook Life History

- General Spawning Patterns
  - Inlets
  - Ebbing tide
  - Dusk
  - Summer (warm, rainy season)



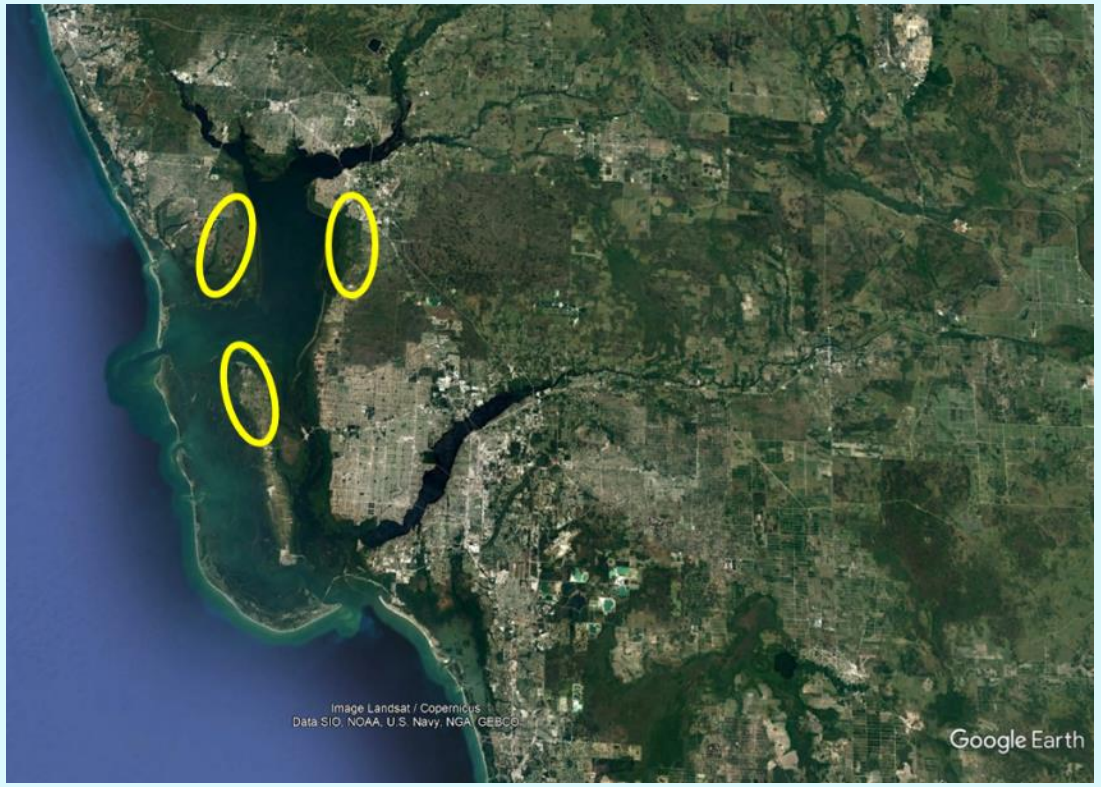
Snook Life History

- Larvae
  - ~18 day pelagic larval duration
  - Settlement in wetlands, creeks

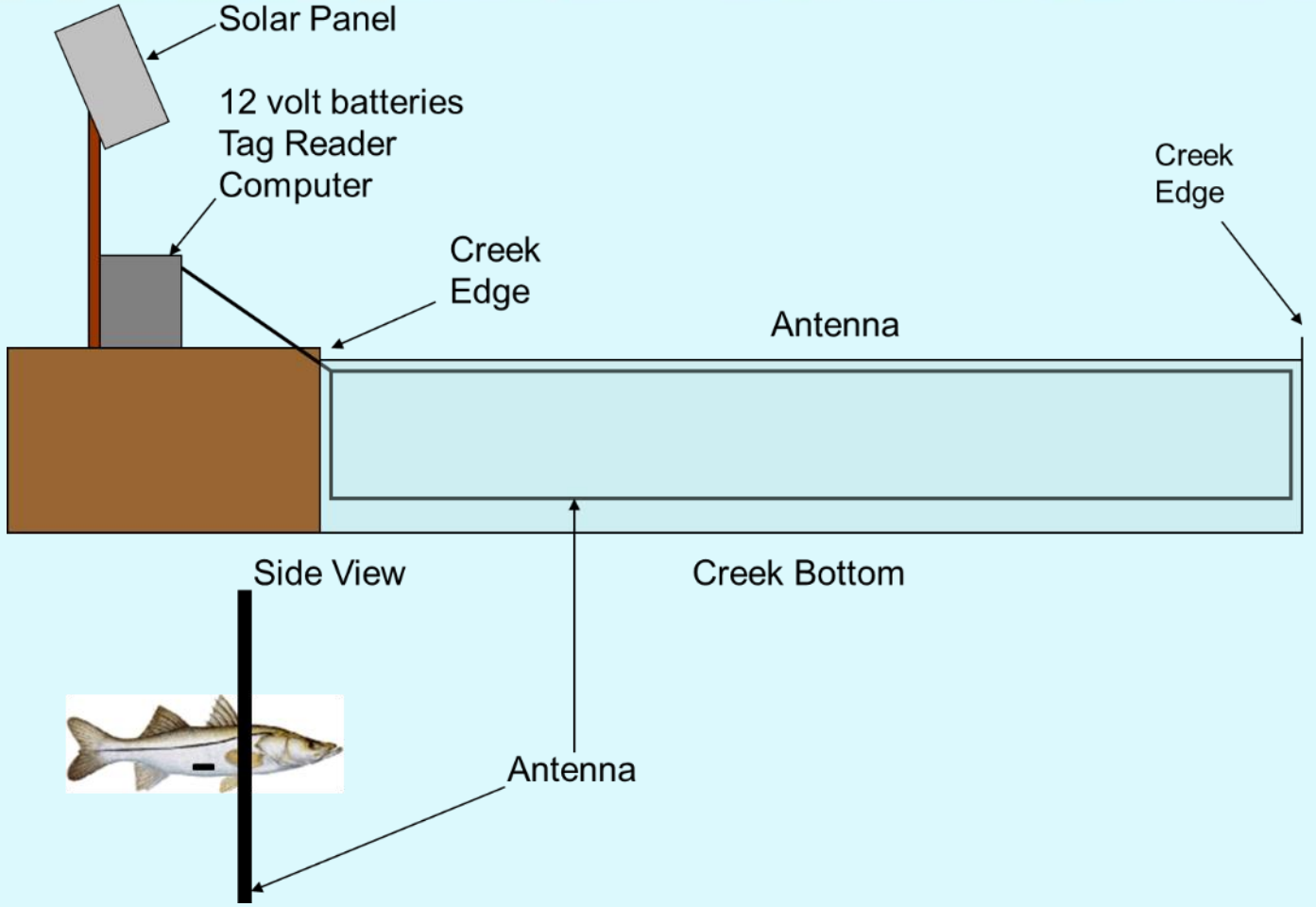


Snook Life History

- Juveniles
  - Mangrove wetlands, creeks
  - First two years



Creek Use Patterns



Creek Use Patterns

- 1-year old snook
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  - Late spring, early summer
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- 1-year old snook
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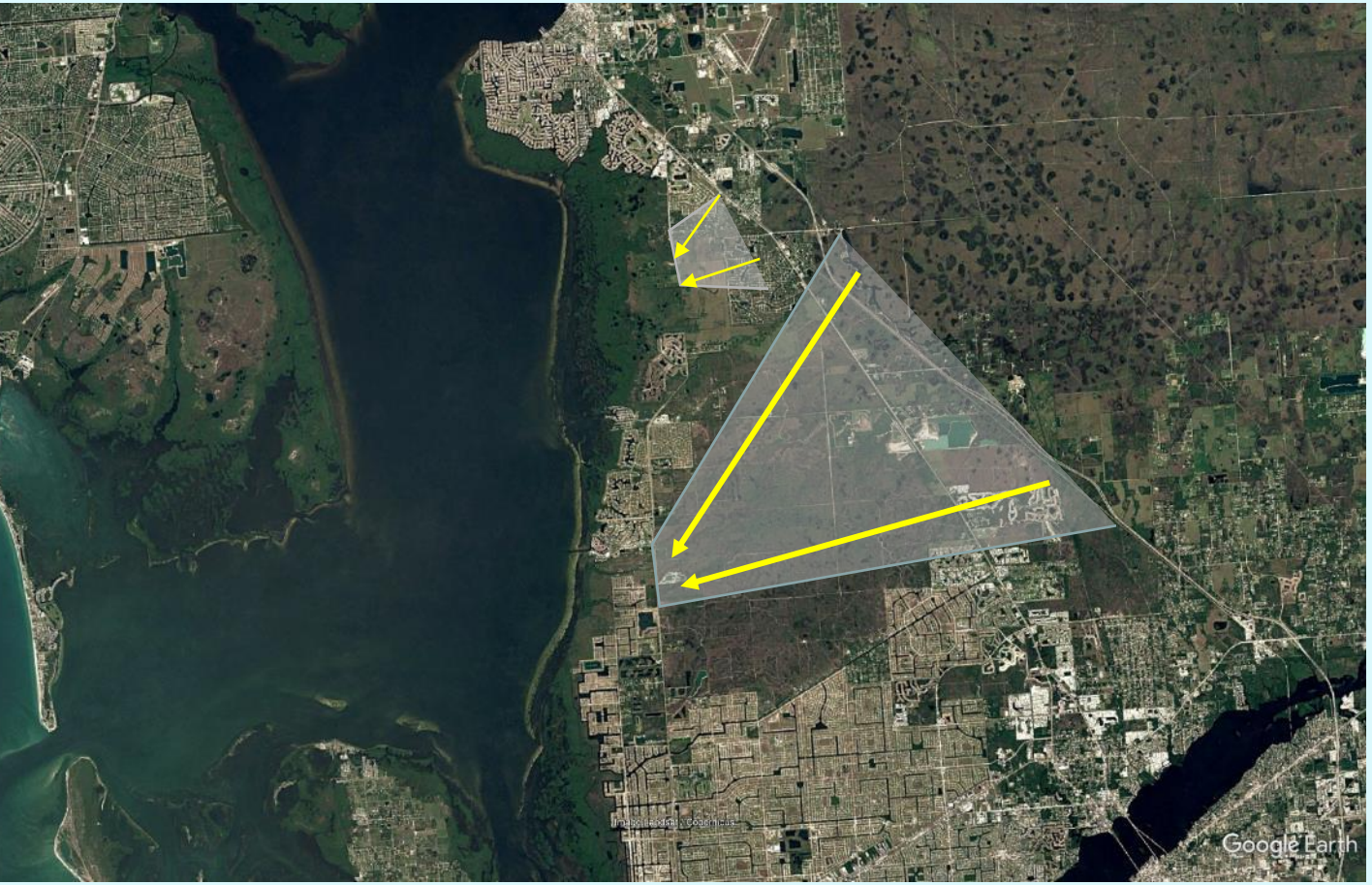
- 2-year old snook
  - 34.5% emigrated
  - Late spring, early summer
  - High return rate

Water Flow Alterations Impact Snook Diet



Differences in Diet

- Number of full stomachs
  - Less Degraded Creeks
    - Creek 1 = 41% full
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  - More Degraded Creeks
    - Creek 3 = 29% full
    - Creek 4 = 23% full

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- Number of prey species in stomachs
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    - Creek 1 19
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Fishery Management

Fishery on the Edge?

- Tightly regulated
  - Closed seasons: 4.5 – 7 months
  - Small slot: 71 – 81cm TL
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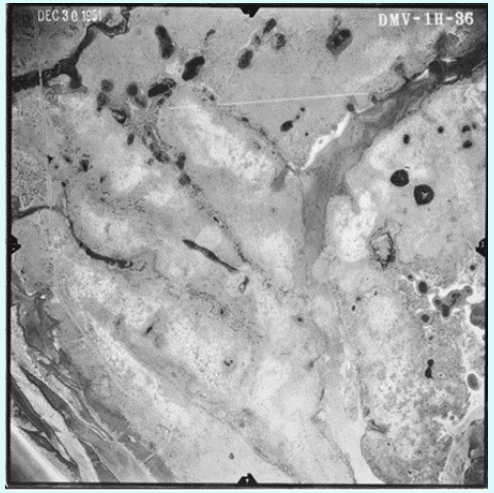
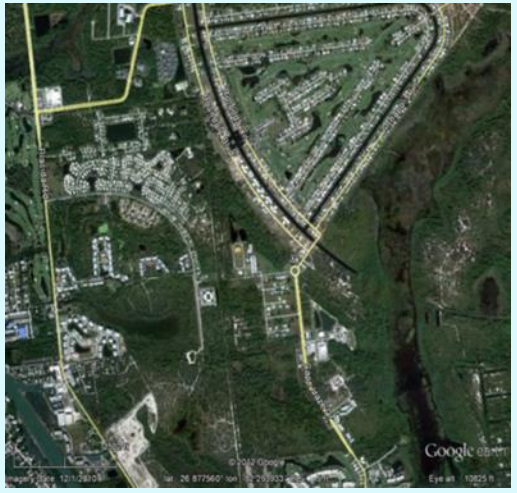
  - **Top culprit = habitat loss/degradation**





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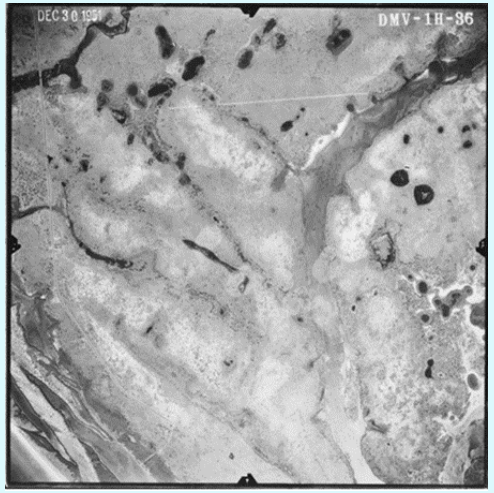
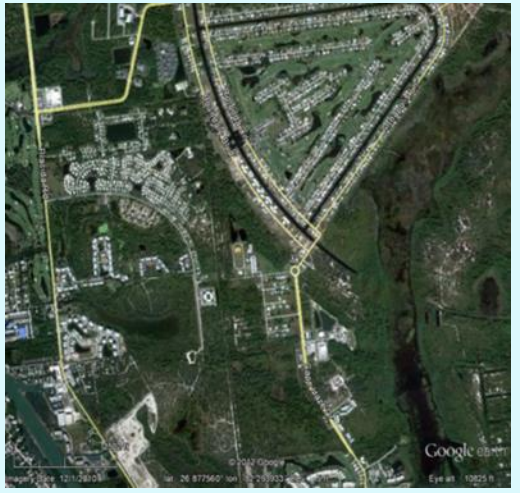
  - **Top culprit = habitat loss/degradation**
- Management response to population decline = restrict harvest





Management Recognition

- “It is the author’s opinion that if declines in the snook population have occurred, they are more likely due to alterations of the habitat produced by (human) habitation and development in Florida, than to fishing.” Marshall **1958**

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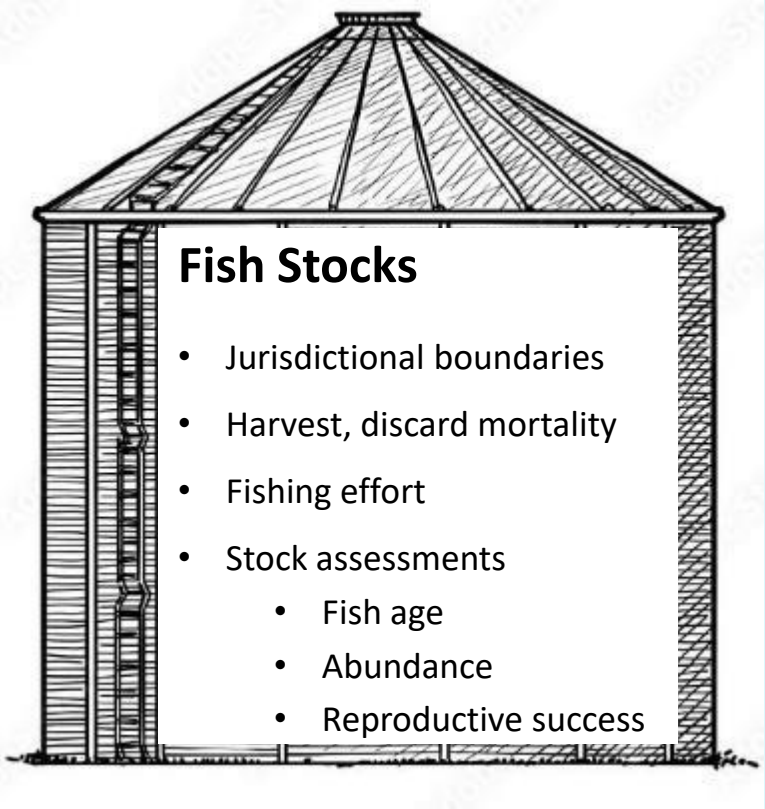
- “Rational fisheries management cannot occur unless the habitat of the resource is managed as well.” Bruger and Haddad **1985**

Current Status of Fishery Management

What About Habitat?

Information Silos



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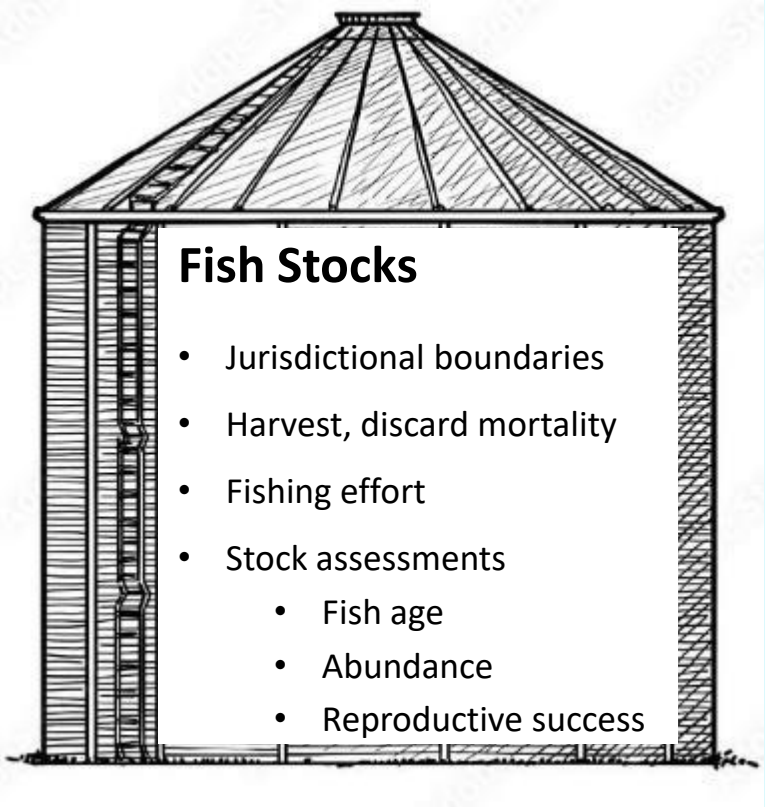

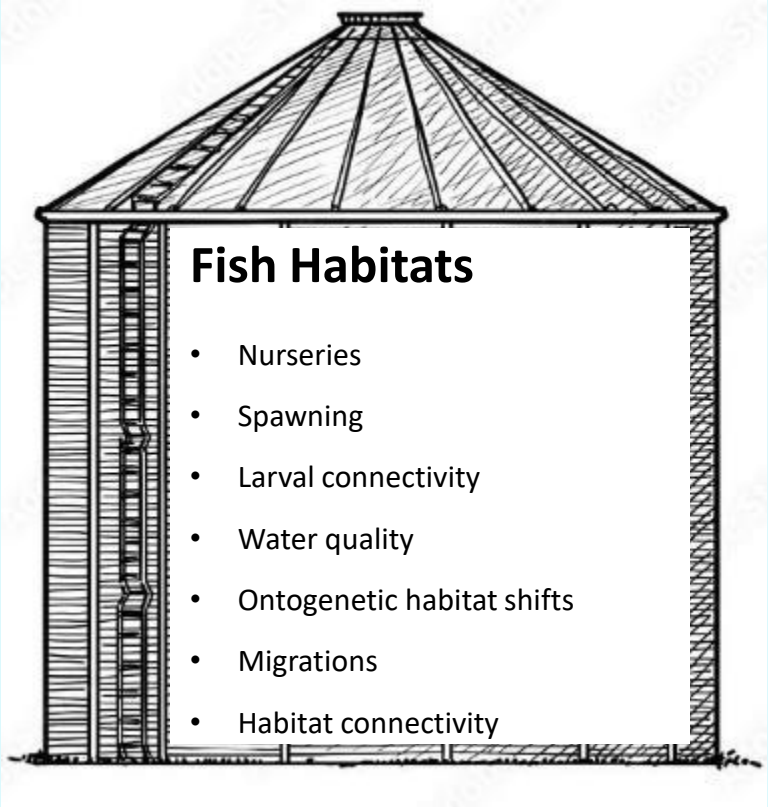

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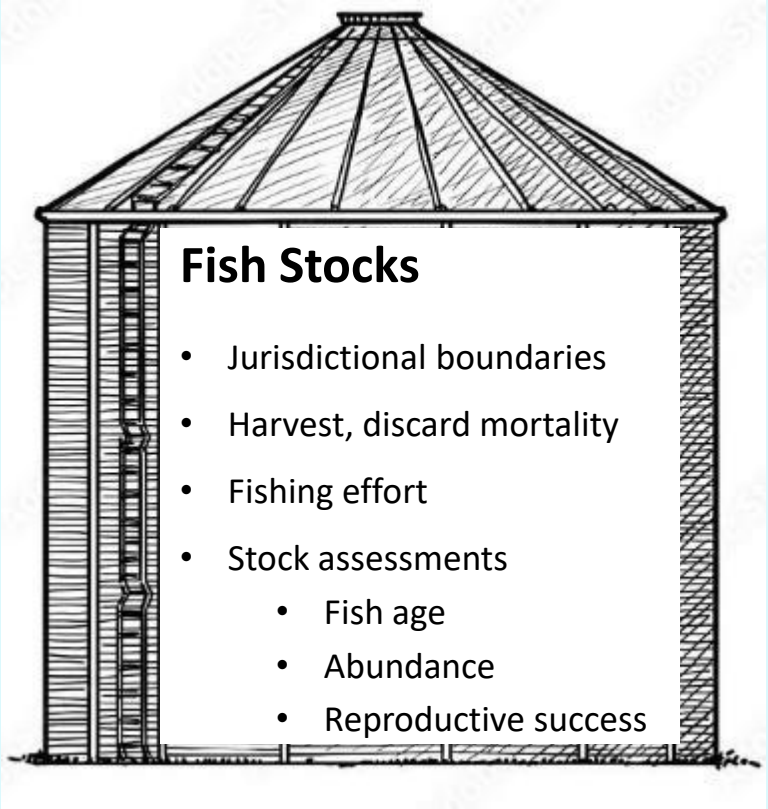
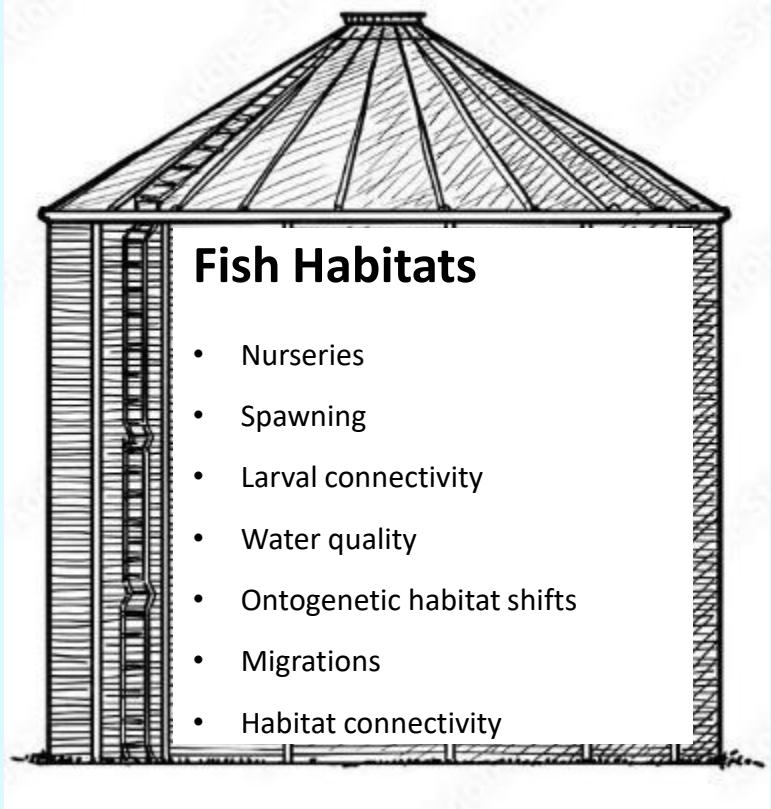


Fish Stocks

- Jurisdictional boundaries
- Harvest, discard mortality
- Fishing effort
- Stock assessments
  - Fish age
  - Abundance
  - Reproductive success



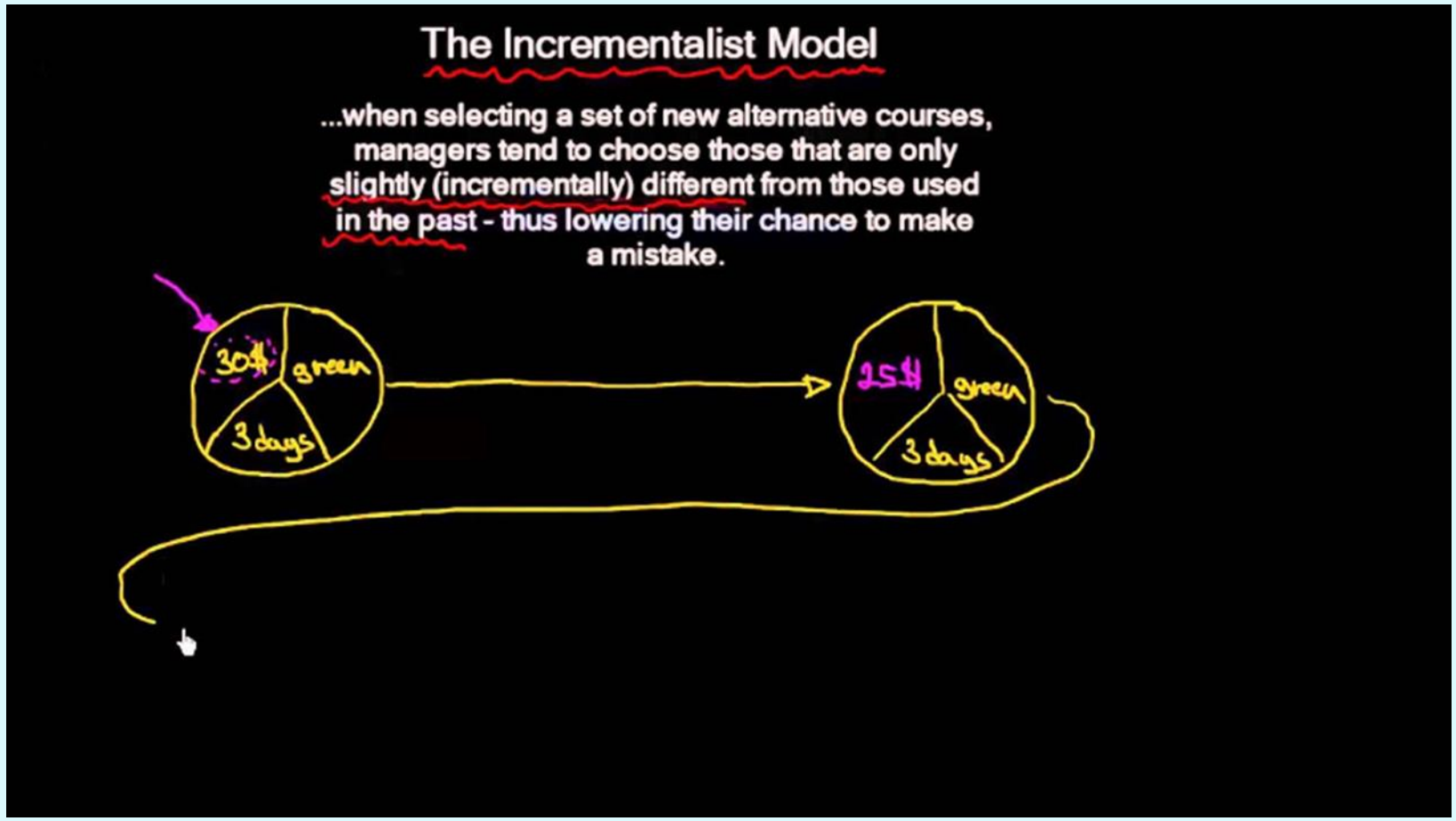
Fish Habitats

- Nurseries
- Spawning
- Larval connectivity
- Water quality
- Ontogenetic habitat shifts
- Migrations
- Habitat connectivity

Recreational Fishers

- Economic value
- Cultural value
- Local Ecological Knowledge
- Education and engagement
- Partners in advocacy

Incrementalism is not Sufficient



Paradigm Shift Required

Paradigm Shift: a fundamental change in approach or underlying assumptions

A Terrestrial Approach

Incorporating Habitat

Umbrella Species

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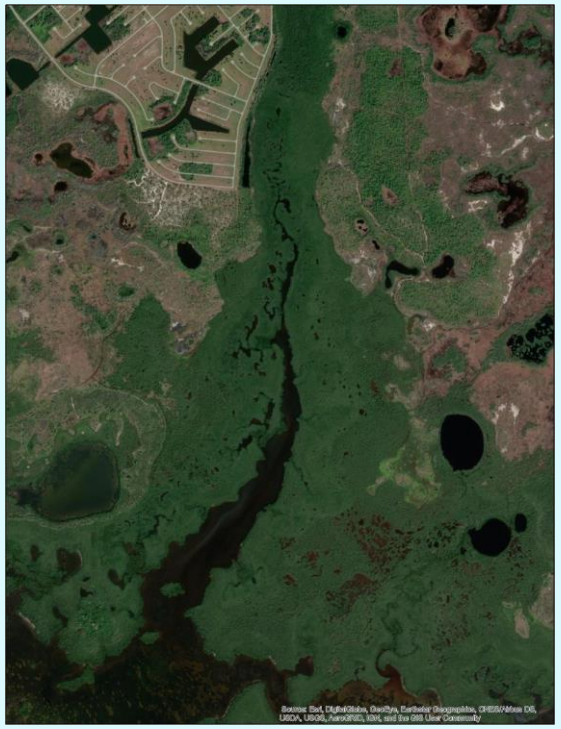
- Protecting juvenile snook habitats provides protection for >55 native species



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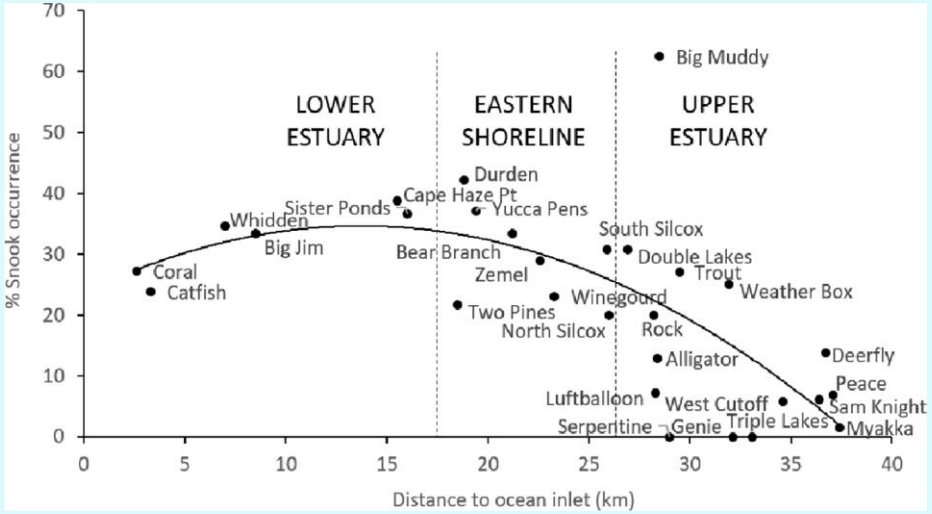

A Terrestrial Approach

Incorporating Stakeholders

Fisheries Economic Importance

- Florida markets itself as the Fishing Capital of the World

BTT.ORG

https://myfwc.com/conservation/value/saltwater-fishing/
https://www.bonefishtarpontrust.org/downloads/research-reports/stories/BTT%20-%20Keys%20Economic%20Report.pdf

Fisheries Economic Importance

- Florida markets itself as the Fishing Capital of the World
- Recreational saltwater fishery > $11 billion
  - >100,000 jobs
  - Florida Keys flats fishery > $465 million
  - Everglades region > $1 billion

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Flagship Species

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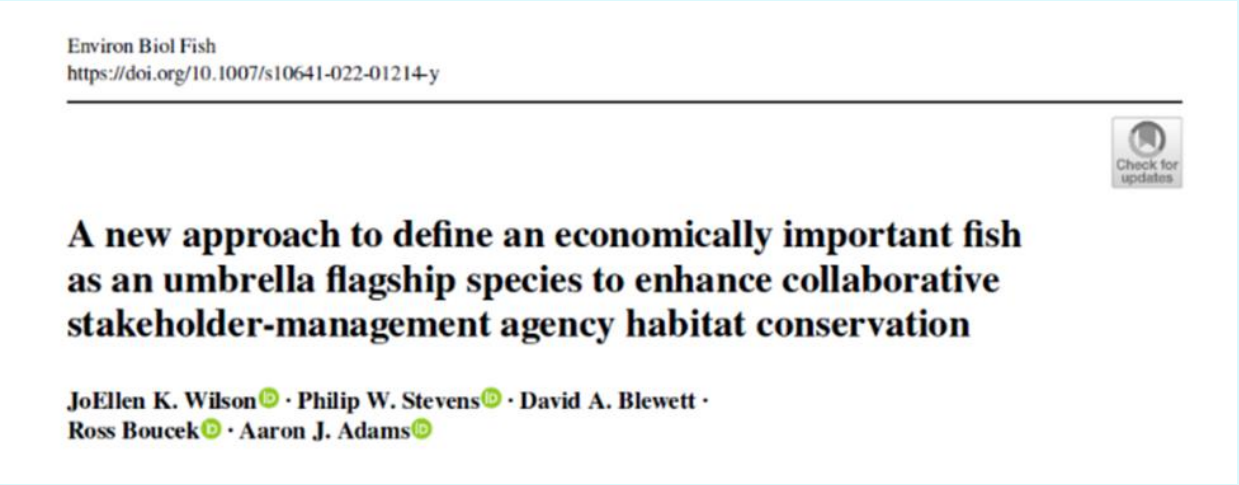
  - 2016 Florida Snook Symposium: Top angler concern = juvenile habitats
- “FWC fisheries management will go where the fishermen lead us” Jim Estes, FWC, **2021**

Complementary Approach to Stock Assessment

- Informed by terrestrial conservation
- Habitat-based
- Stakeholder engagement



Environ Biol Fish
https://doi.org/10.1007/s10641-022-01214-y

Check for updates

A new approach to define an economically important fish as an umbrella flagship species to enhance collaborative stakeholder-management agency habitat conservation

JoEllen K. Wilson · Philip W. Stevens · David A. Blewett · Ross Boucek · Aaron J. Adams

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Bonefishtarpontrust.org

Aaron@bonefishtarpontrust.org