

# Tampa Bay Tidal Tributary Initiative



Public Summary Document to accompany the Tampa Bay Tidal Tributary  
Habitat Initiative Project: Final Report and Management Recommendations

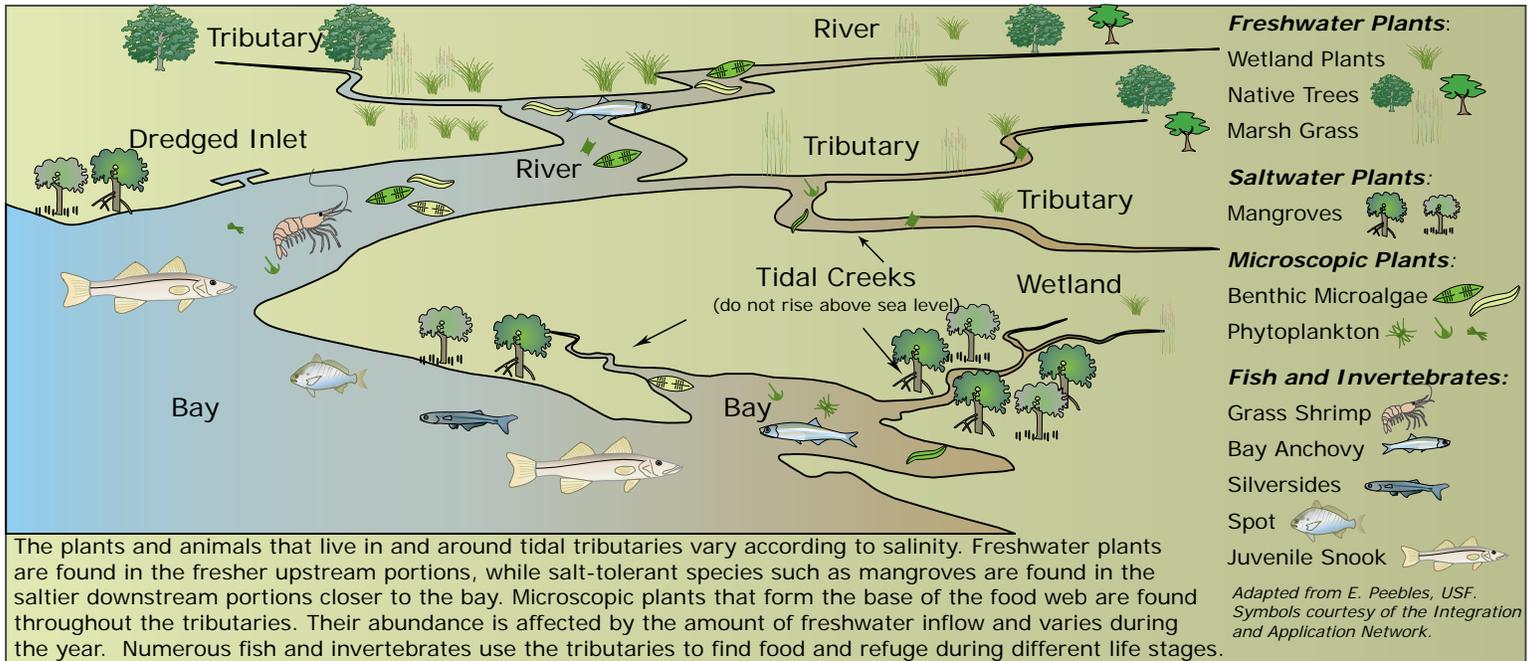
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**Tidal tributaries** within the Tampa Bay estuary vary widely. Some are heavily influenced by tides, and have a complete estuarine salinity gradient ranging from completely fresh in the upper reaches to bay saltwater conditions, while others are entirely subject

to the circulation of the adjacent tidal waters. These systems include coastal and riverine creeks with and without direct freshwater input, dredged inlets, and other "backwaters" - collectively termed "tidal tributaries" in this report.

Previous research has focused on

large rivers and the open bay; however, few studies have focused on smaller, low-salinity backwaters within the estuary. A major goal of this study was to describe the relative importance of these tidal tributaries to the overall Tampa Bay ecosystem.



## Tidal Tributaries are Unique

There are more than 300 creeks and tributaries within the Tampa Bay watershed, including more than 150 that are tidally influenced. Scientists studied nine creeks for this project and learned that each one was unique.

The abundance and richness of nekton (fish and invertebrates) collected, as well as water and sediment quality, varied widely by tributary. Many nekton species move between tidal tributaries and adjacent habitats as water flows change. Therefore, each of the tributaries is valuable to the ecosystem overall and deserves appropriate protection.



Fisheries scientists use seine nets to collect fish and invertebrates in tidal tributaries. The scientist below shows off a large catch of bay anchovies.



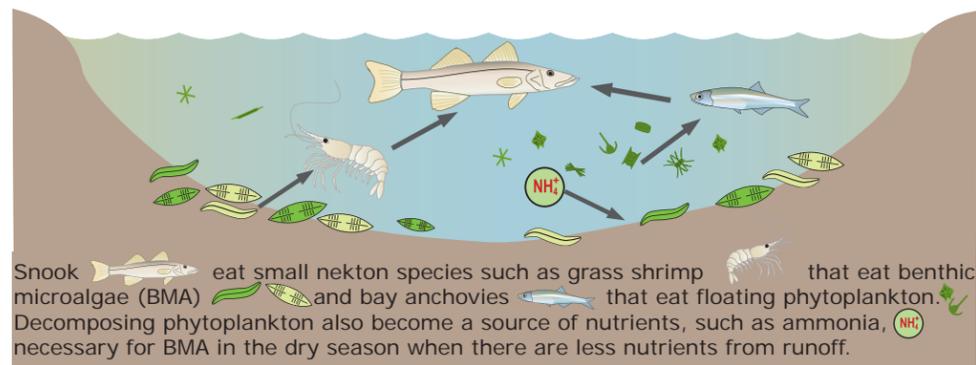
## Project Objectives

- Determine the relative importance of tidal tributaries as fish habitat in Tampa Bay;
- Compare effects of habitat parameters (watershed condition, water quality, structural habitat) on fisheries use in impacted and unimpacted tidal tributaries;
- Develop measurable goals, management recommendations, and a pilot tidal tributaries management strategy based on study results; and
- Communicate results to environmental scientists, managers and the public to support informed decision-making regarding preservation and/or restoration of tidal tributaries.

## Main food source for tributary fish is benthic microalgae

An exciting component of this project involved studying the food web in the tidal tributaries to determine the most important food sources for fish and invertebrates. Scientists did this by examining the ratio of stable isotopes in fish to identify the types of plant and animal materials that were consumed. Plant material serves as an important base for estuarine food webs. Different plants have unique isotopic "signatures" that travel up the food web to higher levels. By analyzing fish tissue, a scientist can tell, for example, that a snook ate a bay anchovy that had eaten phytoplankton.

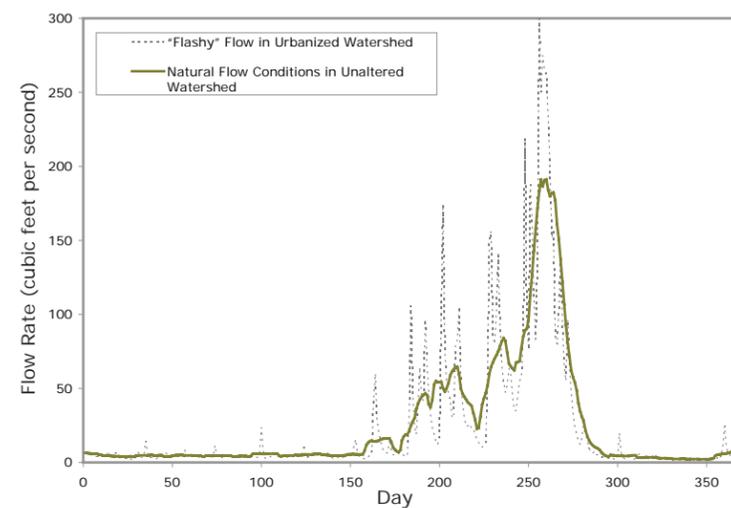
Scientists learned that the most common plant sources were phytoplankton and benthic microalgae (BMA). Phytoplankton are microscopic plants that float in the water column. BMA is a form of phytoplankton that lives on or near the bottom sediments. In contrast, decomposing leaves and needles (detritus) from land-based plants, such as mangroves, oaks and pines, seem to be less important. While shoreline plants along the tributary beds are valuable for other reasons, it seems that phytoplankton production plays a larger role in tidal tributary food webs.



## "Flashy" water delivery threatens benthic microalgae

Benthic microalgae (BMA) rely on nitrogen derived from the break down of phytoplankton in sediments during the dry season. When tributaries are highly altered, the delivery of water from the surrounding watershed becomes more pulsed or "flashy." During the dry season, water levels can greatly decrease. In the rainy season, there may be rapid and large flows of

freshwater that can scour out the creek beds and flush out the BMA that is vital to the food web. It may also create areas that are too deep for sunlight to penetrate to the bottom of the beds. Reducing "flashiness" and restoring the water delivery to more normal conditions may help ensure that there are adequate food sources for fish and invertebrates within tidal tributaries.



In urbanized watersheds with more impervious surfaces, such as roads and roofs, there are higher volumes of runoff delivered to the tributaries over shorter time periods, shown as the sharp peaks in the graph. In contrast, vegetated shorelines in unaltered watersheds are able to absorb more of the rainfall. Water then percolates to the receiving tributary through the groundwater aquifer more gradually.

## Scientists sampled 9 creeks within Tampa Bay ecosystem



Grassy Creek flows into an embayment. Question Mark, Dogleg, Rice, and Riverview Park West Creeks all flow to a mainstem river - the Alafia River.



Frog and McMullen Creeks flow into embayments. Wildcat and Curiosity Creeks flow into the Little Manatee River, a mainstem river.



## Tributary water quality poorer in more developed areas

The condition of the surrounding watershed can impact the health of tidal tributaries. The project team examined the land uses and intensity of development within 300 feet of the tidal tributaries and within the entire basins that drain to each tributary. Although all of the tributaries are affected by some degree of development, some are more impacted than others.

and compared it to water and sediment quality measurements collected in 2006. As development increased, especially within a 300-foot buffer area, the concentration of nutrients increased. High levels of nutrients, such as nitrogen and phosphorous, can lead to algal blooms, which rob the water of oxygen and harm aquatic life. Sediments in more developed areas were also more contaminated than in more natural areas.

Scientists used an index to categorize the degree of development intensity



Water quality in the less developed tidal tributaries (above left) was better than in more urbanized areas (above right).

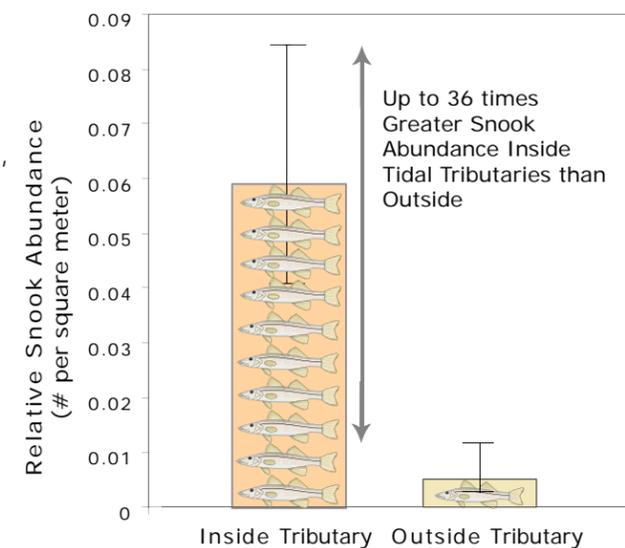


## Tidal tributaries may be "nursery" habitat for young snook

Scientists used 30-foot seine nets to collect fish and invertebrates from inside nine tidal tributaries and in the adjacent receiving waters. The catch within the tributaries was mostly resident species (those found in tidal tributaries throughout their entire lives), with some transient species (those found in tributaries for only part of their lives).

Fish communities differed significantly between the nine tributaries studied, with the differences associated with variations in pH, salinity, temperature, and other physical and chemical characteristics.

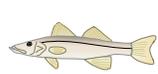
The fish and invertebrate communities within the tributaries also differed from those outside the tributaries. In particular, common snook, a valuable recreational species, was more abundant inside the tributaries than outside. Scientists believe these backwater areas are particularly important for juvenile snook.



Juvenile snook were more abundant inside the tidal tributaries sampled than outside. The graph shows the number of snook caught per square meter, plus a margin of error (shown as the bars extending outside the boxes).

# Tampa Bay Tidal Tributary Management Recommendations

The Tampa Bay Tidal Tributary project was an important step in learning more about tidal tributaries and their role in the estuarine environment. While this project intensively studied nine tidal tributaries, the vast majority have not been researched. Because each of the tributaries, creeks, and inlets are unique, it is valuable to learn the individual characteristics of each before impacts occur. The project team developed the following general management recommendations that can be applied to all of Tampa Bay's tidal tributaries:



## Maintain Connectivity

between open bay waters, tidal rivers, and smaller, tidal tributaries to allow fish movement, water flow, and nutrient flux.

Fish require a mosaic of habitats throughout their life cycle, and management should be based on a system-wide scale. This concept is important in terms of a landscape's connectivity to surface waters, as well as for hydrologic processes in the watershed that promote desirable conditions for fish and invertebrates in the tributaries.



## Reduce "Flashiness"

of water flow to tidal tributaries, to promote natural hydrologic patterns and foster productivity of benthic microalgae and the animals that eat it. Protecting and restoring natural wetlands, marshes, and riparian corridors in tidal tributary watersheds, as well as considering additional methods of water retention and gradual release throughout their basins, are primary recommendations.



## Track Conditions

of nursery functions and physical parameters in Tampa Bay tidal tributaries by monitoring freshwater inflow, watershed development, water quality indicators, and fisheries use.

This recommendation would allow for broader-based studies and assessment of minor tidal tributary systems whose functions are not yet defined.



## Improve Public Education

and stewardship of tidal tributaries by promoting an "Adopt-a-Creek" project. Tidal tributaries are often overlooked in management scenarios. Promoting their importance as sentinel habitats in the public perception can lead to improved management of these critical systems.



# Tampa Bay Tidal Tributary Project Team

## Project Management and Background

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Pinellas County Environmental Fund



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## Technical Report available at:

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