

Examination of Temporal and Spatial Variability in Salinity in Three Tampa Bay Tributaries

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Abstract:

Anthropogenic effects on river inflows to estuaries become more important as potential changes to these inflows may result from global warming, and do result from land use changes and water supply withdrawals associated with increasing population. We examine the responses in salinity to flows in three tributaries to Tampa Bay, one unimpounded and two impounded tidal rivers. It was found that seasonal differences in flow are much more important to salinity variation than spring and neap tide elevation differences in the rivers. In the Alafia River at the upstream location, variability in surface salinity declines with increasing flows as salinity drops, while in the upstream bottom and downstream surface and bottom, variability increases with increasing flow. In the Hillsborough River at the upstream location, both surface and bottom variability drop as flows increase, while in the downstream location, both surface and bottom variability increase with flows up to a certain point, after which as flows continue to increase salinity variability declines as salinity declines. In the Tampa Bypass Canal, variability increases as flows increase. Responses in salinity to sudden extreme changes in flows vary within the three systems as well. In the Alafia River and Hillsborough River, little response occurs in the upstream, where salinities are typically low, and the responses downstream are similar in the two rivers. In the Tampa Bypass Canal, the responses in the upstream and downstream are very similar, and these responses are also similar to those found in the downstream locations of the other two rivers. The responses to flow changes are very different within the three systems, and typically between upstream and downstream locations within a single river, so that similar flow changes will result in very different responses in salinity within the three systems, and within a single system dependent upon location.