# Recent Measurements of Salinity, Flow and Sea Level Variability in Western Basins of Florida Bay


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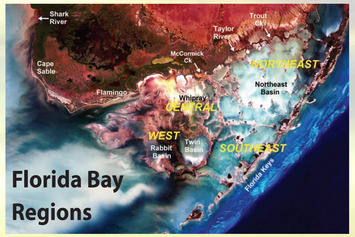
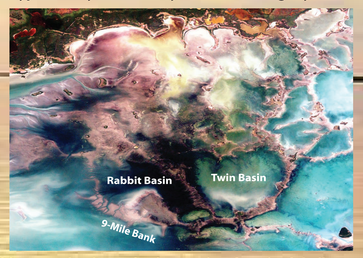
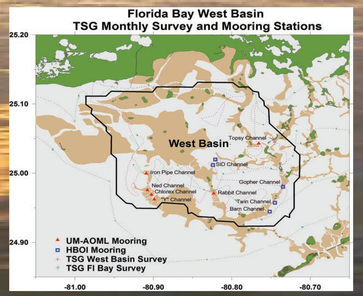
As part of our collaborative effort to better understand circulation and exchange processes throughout Florida Bay we have recently made direct measurement of volume and salt transports through nine of the larger flow channels connecting the western basins to surrounding regions. Measurements took place over the June to November wet season of 2004 and the following December to June dry season of 2005.




The basins are separated from the southwest Florida shelf waters by 9-Mile Bank to the west and from the southeast sub-region of Florida Bay by Twin Key Bank. To the north lies a broad bank region separating the basins from the north-central region of the bay where hypersalinity is commonly observed during dry seasons.




Rabbit Key and Twin Key basins consist of a pair of shallow water bodies adjacent to the western boundary of Florida Bay and enclosed by expansive mud banks that can be partially exposed at times of low water.




Location of Rabbit Key and Twin Key basins within the western sub-region of Florida Bay. Current and salinity time series were made during wet (Jun to Nov 2004) and dry (Dec 2004 to Jun 2005) seasons in channels connecting the basins to surrounding regions. Mooring locations are shown with solid triangles and squares. Shown with solid line is the vessel track of the salinity surveys.

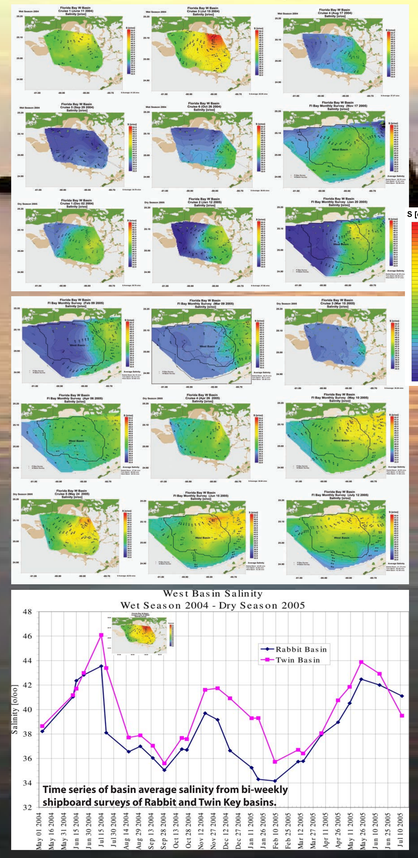
The western basins serve as a transition zone for water exchange between the southwest shelf and more restricted, poorly flushed inner basins of Florida Bay.

Exchange of western basin waters takes place through a series of flow channels through the shallow banks, as well as directly over the banks when water levels are sufficiently deep.

High resolution spatial salinity surveys were made at approximately 2 week intervals over the study period and sea level measurements were made continuously throughout both seasons.


Shelf and oceanic transport of Shark River discharge and riverine inputs from the west Florida coast southward to the western Florida Bay region can have a considerable effect in moderating the development of hypersalinity in Florida Bay.

## Salinity Study



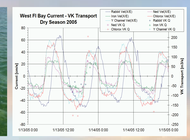




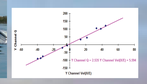
Time series of basin average salinity from bi-weekly shipboard surveys of Rabbit and Twin Key basins.

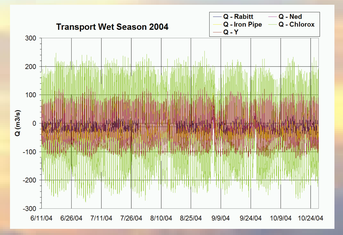
These results clearly show that shelf and oceanic transport of Shark River discharge and riverine inputs from the west Florida coast southward to the western Florida Bay region can have a considerable effect in moderating the development of hypersalinity in Florida Bay.

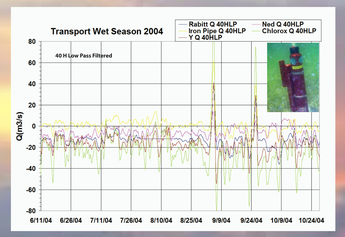
## Transport Study

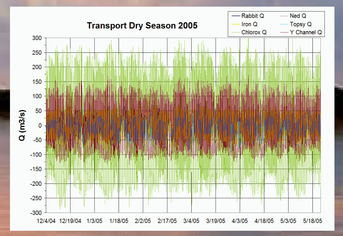



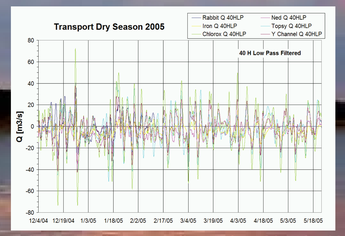




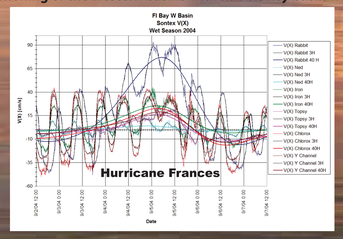



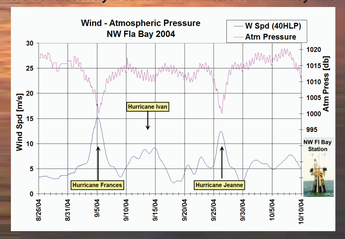



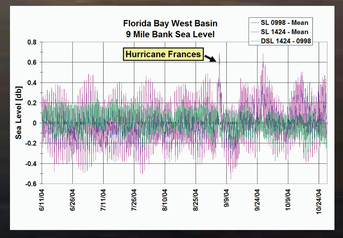



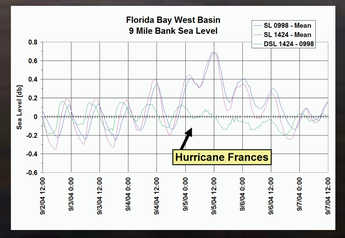




Initial results show a vigorous exchange between the western basins and the surrounding regions driven by tide and wind forced transports. The exchange of Rabbit Key basin waters with the southwest shelf caused considerable freshening of the western basins with Rabbit Key basin waters consistently fresher than waters of Twin Key basin.



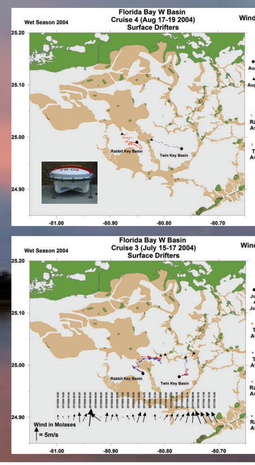



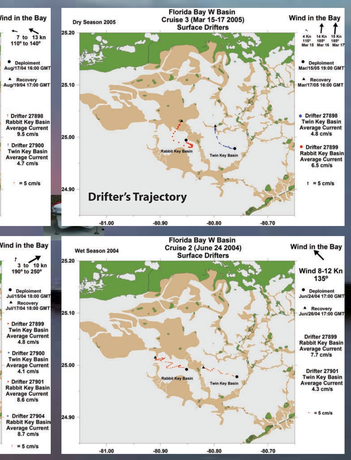




All channels display significant mean outflows in both basins, which suggests there may have existed mean inflows over the broad banks. Basin interior circulations were a mixed response to tide and wind forcing in Rabbit Key basin, but were primarily wind driven in Twin Key basin. This indicates strong frictional dampening of the semi-diurnal and diurnal tidal wave moving into the basins from the Gulf by the shallow Twin Key Bank separating the two basins.

## Interior basin circulation observed with shallow drifters.



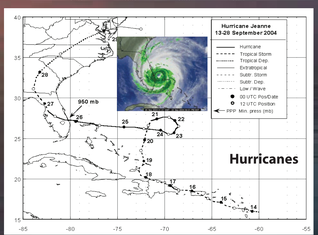



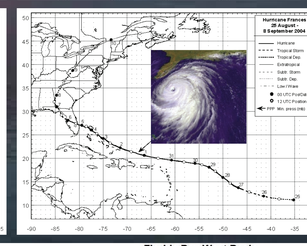



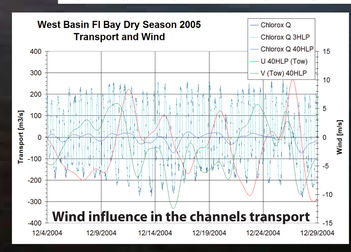


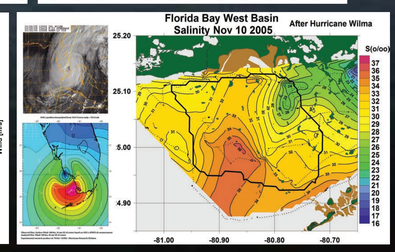





These observations provide a comprehensive data set for use in calibration and validation of the Florida Bay hydrodynamic model.