



Southeast District
Assessment and Monitoring Program

Ecosummary

C-44 Canal

Martin County

March 2001



Summary: The C-44 canal provides a navigable connection between Lake Okeechobee and the St. Lucie estuary. Current water quality status: **POOR**.

are high in the Borrow Canal, and to prevent backflow into the Borrow Canal when levels in C-44 are high.

The C-44 Canal, also known as the St. Lucie Canal or Okeechobee Waterway, is a man-made canal located entirely within the boundaries of Martin County. The St. Lucie Canal (C-44) was begun in 1916 as an improved way to divert floodwaters from Lake Okeechobee, and was originally designed to enter Manatee Pocket instead of the South Fork of the St. Lucie River. The canal was completed by 1924. The original flow capacity was 5,000 cfs with the lake at stage height 15.6-ft. In 1933 the construction of 16 fixed spillways was approved to reduce shoaling and in 1937 the canal was deepened to 6 ft to provide a navigable connection to the lake. The canal was enlarged to its present day depth and capacity (8 ft and 9,000 cfs) in 1949.

The C-44 Canal has been a source of contention since its construction. Next to the permanent opening of the St. Lucie Inlet which changed the St. Lucie from a freshwater river to a brackish estuary, the construction of the C-44 has had the greatest impact on the St. Lucie Estuary - and nearly all of that impact has been bad. Records show that people have been complaining about the discharges to the estuary as far back as the early 1950s (Gunther and Hall, 1963). There are numerous problems associated with the C-44 Canal. These include delivery of too much freshwater to the St. Lucie Estuary to control water levels in Lake Okeechobee; when the lake gets too high the C-44 and the Caloosahatchee Waterway (which connects Lake Okeechobee to the Gulf of Mexico at Fort Myers) are the main arteries used to move massive amounts of water. Large releases of freshwater into the estuaries causes salinity to drop rapidly, killing many types of estuarine organisms. In addition, high flow rates in C-44 result in erosion and transport of sediment into the estuary in quantities that not only can smother benthic habitats but also adversely

The C-44 Canal starts at Lake Okeechobee at Port Mayaca and runs east to connect to the South Fork of the St. Lucie River. The C-44 drainage basin is 185 square miles. C-44 flows both east and west, delivering local basin runoff both to Lake Okeechobee and the St. Lucie Estuary, on an about equal basis. There are three major structures along the St. Lucie Canal: the S-308, S-153, and S-80. The S-308 is a lock and dam structure at the western end of C-44 on the lake. The S-80 structure, completed in 1944, is also a lock and dam located at the eastern end of C-44. The S-153 controls water levels in the Levee 65 Borrow Canal, located north of C-44 along the edge of the lake. The S-153 is designed to discharge to C-44 (up to 4400 cfs) when levels

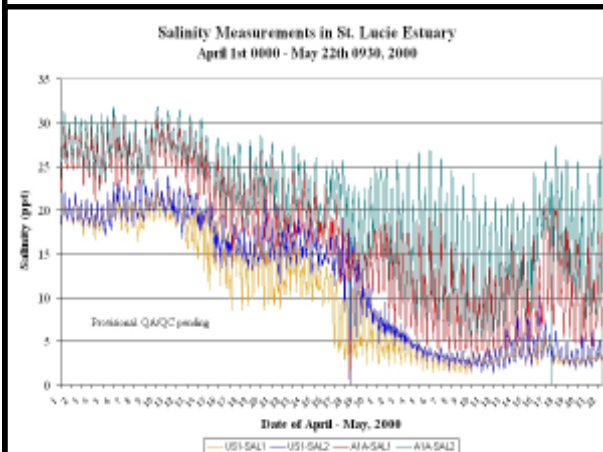


S-80 Structure at the east end of C-44, during a high-flow discharge in the May 2000 drawdown of Lake Okeechobee.



affect navigation by filling in channels. However, release of water from Lake Okeechobee is not the only water quality problem associated with C-44 because C-44 also provides drainage for the C-44 basin (117,000 acres). Large quantities of freshwater can still be delivered to and damage the estuary even when water is not being released from the lake.

Moderate flood control releases are made when the lake schedule is exceeded by one foot or less. Full releases are made when the lake is exceeded by more than one foot. During all other times, the structure is used to maintain a tail water stage of 14.5 feet, when water is available. The S-153 structure maintains upstream water control stages in the Levee 65 Borrow Canal. It is operated to maintain an optimum headwater elevation of 18.8 through automatic controls. When the headwater elevation rises to 19.1 feet the gates will open 6 inches per minute, and when the headwater elevation rises or falls to elevation 18.8 the gates become stationary. When the headwater elevation falls to 18.6 the gates will close at 6 inches per minute. The S-80 structure works in



RECOMMENDATIONS: Nutrient concentrations should be reduced to benefit both the St. Lucie estuary and Lake Okeechobee. Large, episodic releases of freshwater to the estuary from the Lake and from C-44 basin runoff need to be controlled and curtailed.

Lake Okeechobee is a large, shallow, eutrophic lake located in south-central Florida and is a major feature of the Kissimmee-Okeechobee Everglades System. With a surface area of 669 square miles, an average depth of 2.7 meters, and a maximum water storage capacity of 1.05 trillion gallons, it is the second largest freshwater lake in the continental United States, second only to Lake Michigan. Lake Okeechobee's drainage basin covers more than 4,600 square miles, with an extensive network of monitoring sites that provide data for flood control, water supply, and water quality. Major uses of the lake are fish and wildlife habitat, flood control, agricultural, urban and industrial water supply, prevention of saltwater intrusion, navigation, recreation, as well as a source of water for the Everglades.

coordanance with the S-308 and controls the easterly discharge of Lake Okeechobee to tide water. It also provides a means for passing boat traffic through the Okeechobee Waterway.

Mean concentration of total phosphorus and inorganic nitrogen (1989-1998) was 0.14 and 0.26 mg/l, respectively. However, within C-44 mean concentrations do not accurately reflect actual C-44 nutrient loading because water quality samples are collected even when the water in the canal is in fact Lake Okeechobee water (during releases). An estimate of the total P concentration in C-44 corrected for lake water is a much higher 0.23 mg/l, similar to that measured in C-23 and C-24 (0.25 and 0.24 mg/l, respectively). Because C-44 has historically flowed both toward the estuary about half the time and toward the lake the other half of the time, C44 currently delivers not only a substantial nutrient load to the estuary, but also to Lake Okeechobee as well.

Clearly, in order to restore both Lake Okeechobee and the St. Lucie Estuary, nutrient loading from C-44 needs to be reduced. This can be accomplished, in part, via the construction of large reservoirs and appropriate Stormwater Treatment Areas (STA's) under the auspices of the Comprehensive Everglades Restoration Plan (CERP). These CERP reservoirs will also make large strides in restoring a natural salinity envelope in the estuary. However, even the most optimisitic design scenario under CERP will remove only about half of the required nutrient load to affect restoration. The remainder of this reduction will have to come from conscientious implementation of basin-wide Best Management Practices (BMP's).

For more information regarding other waterbodies mentioned in this ecosummary please visit our website at: www.dep.state.fl.us. Information about CERP may be found at www.evergladesplan.org or at the SFWMD page at: www.sfwmd.gov.