

Agencies, Organizations, and Websites Related to Water Quality Data

Florida Department of Environmental Protection
Office of Coastal and Aquatic Managed Areas
Southeast Aquatic Preserves Field Office
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The following information provides an overview of different agencies and organizations collecting water quality data within the St. Lucie River, Indian River Lagoon, Loxahatchee River, and associated watersheds. Detailed instructions for accessing water quality data are included for each organization.

1) **FDEP** Water Resource Section (STORET) database. <http://storet.dep.state.fl.us/WrmSpa/>

- 1) Go to the **station** section on the left side of the page. Click on **station**.
- 2) Next page, under box **Org ID** scroll and click on **21FLWPB**.
- 3) Next box, scroll and click on **Group 2 Impaired (or other category as needed)**.
- 4) Then down to **WBID box**, to be more specific, once there, enter number (e.g. **3194**)
Scroll down to **Submit Query** and click.
- 5) This will bring up the next page; enter **group type, e.g. Biological**, then **Characteristics**, then **Selected Characteristics**, if needed, scroll down to **Submit Query** (click).
This will bring up the requested data which can be downloaded as a text page.
- 6) You can also view **GIS maps** of the station on the same page, just click on the **view as a map section**.

For questions: contact **Chris Ashworth** at **772-398-2806**.

STORET (**S**torage and **R**etrieval data base) was developed by the USEPA and has been collecting/storing water quality data for both ground and surface water for over 30 years. The newer system of STORET was developed in 1999 and is called the modernized STORET. Database pre1999 is called Legacy STORET. Data from this system is utilized throughout the country to determine whether a water body is impaired or not thus requiring the development of Total Maximum Daily Loads (TMDLs). FDEP's STORET database utilizes the Impaired Water Rule (IWR) to guide decisions related to waters in the state as to their water quality condition, impaired or not, which can give guidance as to decision making processes for dischargers limits as well as ways to reduce pollution effecting the water quality for now and the future. The state is looking for volunteer organizations to contribute data to the system to help with this analysis. Federal grant money is available to organizations/agencies who become data providers. The goal of the system is to make data loading and information exchanges between agencies/groups in the system easier and more user friendly. The state's Surface Water Ambient Monitoring Program (SWAMP) for water quality is based on nutrient loading and is also actively involved with the TMDL process. Some parameters sampled include: Phosphorus (P), in several forms, ammonia/m in several combinations, CBOD5, dissolved oxygen (DO), pH, temperature, salinity,

clarity, solids (total and suspended), oil and grease (O and G), pesticides, volatile organics (VO), hydrocarbons, and various chlorine compounds.

Sampling techniques include instantaneous, grab, and composite depending on the compound being tested for, monitoring program, and agency/organization that samples. Means of collection include by land, bridges, docks, or boat. Samples are taken, and fixatives are added if necessary. This process stabilizes the compound being analyzed with a known acid or base so the concentration of the compound is not altered, thus the name "fixed." Holding times vary and most samples are required to be kept at 4 degrees Centigrade until analysis is performed, a requirement of The Federal Register, 40 CFR. Most samples are transported in ice until they can be stored in refrigerators until analyzed. The following meters (probes) are used to evaluate water quality: 1) Dissolved oxygen (YSI) which utilizes a diffused membrane system (probe) to measure dissolved oxygen content in water in mg/l or parts per million (ppm), 2) pH (Hach / LaMotte) utilizes an electronic probe to measure the H ion differences related to pH, 3) conductivity (YSI) measures conductivity and salinity with the same meter. All of these meters measure temperature as well. Meters must be calibrated before each day's use. These units are battery operated, and quite portable.

Sampling of water in the state of Florida is broken down into five basins. The basin which includes The St Lucie River and Indian River Lagoon is Basin 2 (Impaired 2). All sampling conducted from the FDEP Southeast District Surface Water Ambient Monitoring Program (SWAMP), located in Port St. Lucie, is directly related to the Total Maximum Daily Load (TMDL) program which is to evaluate the water quality in the basin and set limits that should be achievable in the future. The TMDL program sampling portion is based on a 10 year schedule that is entering into its second five year phase. Parameters sampled for are broken down into Strategic Monitoring Plan (SMP)-Sampling Kits. Kit A is for fresh water, Kit B saltwater, Kit C freshwater metals, and Kit D saltwater metals. Elements and compounds tested for are numerous and include: alkalinity, ammonia, BOD-5day, calcium, chlorophyll-a, chloride, color, fecal coliform, fluoride, magnesium, nitrite-nitrate, orthophosphate-filtered, phaeophytin-a, potassium, sodium, sulfate, total dissolved solids, total kjeldahl nitrogen, total phosphorus, total suspended solids, and turbidity. Some parameters such as those related to salt compounds are not sampled for in the saltwater kits. Metals are similar but differ slightly. Arsenic, cadmium, copper, lead, and silver are the freshwater metals of concern. Add chromium in the saltwater sampling and take away the copper. Field parameters that are measured are DO, pH, salinity, sample depth, Secchi disk, specific conductivity, and of course, temperature. These are all measured with one instrument, an YSI multi-meter, except for the depth readings. The meter is calibrated before each use for parameters measured which include DO, and Ph (three buffers) which are logged into a calibration log. All samples are fixed in the field with the appropriate acid/base, if required, iced in coolers, and shipped to the central state lab in Tallahassee for analysis. The only parameter that is tested outside the state lab is fecal coliform which is collected in a Whirl- Pac, iced, and taken to a local lab (Flower's Chemical Labs) located at 8253 South US 1, Port St Lucie, FL (772-343-8006) for analysis due to the short holding time of 6 hours.

Twenty samples are required per year; usually 25 are taken to provide adequate back-up. At least 1 sample per season is taken to ensure a representative sampling regime. All samples are grab samples taken at the surface of the water. Locations vary from sampling site to sampling site, and

are sampled from various points which include boats, bridges, docks, and land. All sites have been GPSed for location, and directions are available to locate each site (Info will be available in the Water Quality Folder for easy access and reference). The Southeast District personnel collect samples for the entire Southeast Region which stretches all the way to the lower portion of the Florida peninsula. Data are also provided by SFWMD (they share info for the database). The Southeast District Branch Office of DEP personnel only collect the samples and data. FDEP Central Office personnel interpret and utilize the analyzed data for the TMDL program whose one goal is to eventually, at minimum, meet National Water Quality Standards. (Data, maps, and information related to water quality have been sent to our office by Chris Ashworth for guidance, locations, and directions related to sampling points. This information is available in the water quality folder. Future conferences and meetings need to be conducted to help establish a link for future water quality meetings and library references. I have reviewed much of this info during our recent meeting and it appears to be well organized, easy to follow, and informative. Documents and spreadsheets have been placed in the FDEP file. Sampling of the St. Lucie River was completed as of November 30, 2007. Resumption of sampling is unknown.

2) SFWMD

Martin/St. Lucie Service Center (Stuart): **1-800-250-4100**

West Palm Beach Office: **1-800-432-2045**

The West Palm Office has a well established reference library located in Building B2, First Floor. Contact **Olga Cruz 1-800-432-2045 Ext: 6075** to access the library.

To access water quality data go to the DBHYDRO Browser page or go to www.sfwmd.gov and click on the DBHYDRO section.

Instructions to access and retrieve data are as follows:

- 1) Once on the main page, go to the left side, click on **Technical Data and Documents**.
- 2) Next, go to the **Environmental Database section (DBHYDRO)**,
Click on **more**.
- 3) **DBHYDRO section** scroll down to **Top SFWMD Data Sources**, click on
Water Quality Monitoring.
- 4) Once in this section click on **The Database**.
- 5) This takes you to **DBHYDRO (Browser)**, click on the **DEHYDRO Browser Menu**.
- 6) Then click on **Water Quality and Other Data**. Go to and click **county**.
- 7) Next utilize the **project code** (e.g. **WQM, SLT, and SE**) in the block, or scroll and
choose **county**, (e.g. **St Lucie**) and click.
- 8) Scroll down and **choose from several blocks as you descend down the page**, and click
next.
- 9) Choose **parameters** and click **next**, data will appear. You can view and download data
several ways, you decide.

For questions: contact **Boyd Gunsalus** at the Martin/St. Lucie Service Center **1-800-250-4100 ext: 3606**.

Sampling is conducted on weekly and monthly timetables and divided into several categories. Contractors conduct all sampling for the SFWMD. TetraTech collects water quality samples for SLT. SFWMD lab analyzes all samples taken. The Lab is located on Skees Road, West Palm Beach, Florida. The categories that are included are 1) **WQM** Includes Canals-23, 24, 25, 44, and Gordy Road (Ten Mile Creek). Sampling frequencies are once/month for grab samples, and weekly, utilizing a composite sampler, which is flow proportioned to allow for loading calculations, concentrations, and a representative sample, over time, usually a 24 hour sampling event. Brands of composite samplers utilized include Isco and Sigma. 2) **STL** (Urbanized Tributary Network) Currently 19 stations along the St Lucie River are sampled bi-weekly. Stations 14-19 have the capability to monitor flow and rainfall. 3) **SE** (St. Lucie Estuary) sampling is conducted by in water body sampling (boat), grab samples only. Stations 6, 12, 13 are located in the North Fork. Funding is provided by the St. Lucie Issue Team, state funding, 50% match. HRI (Harbour Ridge) is in the St. Lucie Upper Estuary, and SE03 is located at Roosevelt Bridge (Stuart).

Analysis of data is ranked from 1 to 21, 1 being the poorest water quality. Data is utilized for funding and research. After concentrations are determined in samples, loadings are calculated utilizing flow data mentioned earlier in the SFWMD section, where available. Loading calculations are critical for pollution control and monitoring to help determine the impact of canal discharges, urban run-off, agricultural run-off, and overall precipitation results. Of course, these factors effect salinity changes, nutrients, and other issues that result from solids in the water column and those that settle out. Samples are and have been taken from Canals C-24, 25, and 26 and are related to the majority of nutrient compounds. Loading calculations are in process at the present time and will be utilized in a project or plan to reduce overall nutrient loading into the St Lucie River. A plan for 75% reduction of nutrients is in the works statistically to help measure and reduce impacts to the river. A more realistic 25-50% reduction is the workable plan.

There are numerous projects one of which is the STA at 10 Mile Creek. The project has been completed, but does need to have some improvements made to the dike walls (structure) due to engineering concerns related to leaks or possible breeches. The purposes of impoundment projects are to hold water, during storm events, and possible discharge waters, to prevent possible nutrient overloads to creeks/ivers as well as salinity, ph, and temperature changes. These types of systems should enable the controlled release of water to help reduce impacts as well as treatment thru biological action and settling to help reduce water pollution effecting water quality for aquatic species and humans. Projects are planned for other discharge points which include the C-23 and C-24 Canals.

The North Everglades Legislation Bill contains three areas to be funded and addressed. These include building water quality construction projects, some similar to the ones just mentioned, and alternative technologies, research, and monitoring. Another avenue involves the St. Lucie Issue Team which is to address the water quality of The St. Lucie Estuary over an 8 year period with 27 million dollars in funding. There are 107 projects, either in the works or planned, for future projects to improve water quality which involve canals, sprayers, etc. Other organizations that work with the SFWMD program include the Environmental Resources Association (ERA) and Coastal Ecosystems. Staff working on water quality issues at SFWMD (Martin/St. Lucie Service

Center) includes Boyd Gunsalus, Bob Welch (Environmental Scientist), Pat Gustel (Lead Planner), and Yongshan Wan (Supervisory Professional).

Water quality sampling includes standard field parameters such as temperature, pH, DO, specific conductivity, and clarity (Secchi Disk). Other lab analyzed parameters include: Nitrogen Oxides (NOX), Nitrite/Nitrate (NO₂/NO₃), Chlorophyll-a, b, and c, Total Kjeldahl Nitrogen (TKN), Orthophosphate (PO₄), Total Phosphates (TPO₄), Phaeophytin-a, Carotene, Volatile Suspended Solids (VSS), Total Suspended Solids (TSS), and Ammonium (NH₄). All sampling is conducted by contracted companies. Grab samples are taken as well as composite samples, which consist of automated mechanical samplers that are placed at various, sampling sites. Usually these are powered by rechargeable batteries or a 110 volt electrical outlet, if available. Personnel program the samplers for duration and frequency, refrigerate the sampler with ice, or provide electrical refrigeration to keep samples at the required 4 degrees Celsius until removed from the sampler, fixed if necessary, iced, and transported to the lab for analysis.

3) **Florida Oceanographic Society (FOS)** <http://www.floridaoceanographic.org/water.htm>

St. Lucie River / Indian River Lagoon Water Quality Data and Environmental Projects and Activities Nice graphics with a rating of A to F. Weekly water quality reports and data are easily accessible. Lake Okeechobee levels and canal discharge information is also available on the home page. Canal discharges and water level data for C-23, 24, 25, and the St. Lucie Canal (C-44) are found on the site. Links to various other sites such as FWC/FWRI (Fish and Wildlife Research Institute), and the SFWMD can also be accessed. Just point and click. Data and information pages can be easily viewed on screen.

Water quality data is available, as stated above, on the Weekly River Data page. Parameters sampled include temperature, salinity, dissolved oxygen (DO), pH, and clarity. Explanations of the importance of each sampled parameter and the scientific definitions are provided on separate easy to read pages. Data are used to report the weekly status of the St Lucie River and estuary for anyone who accesses the website and to help in monitoring the watershed for future environmental analysis and action. Water quality data is collected by **The Citizens Volunteer Water Quality Monitoring Network**. The name speaks for itself.

Oyster Bed (gardening) is a project under development and monitored in the Indian River Lagoon/St Lucie River. Volunteers are utilized and are key to the success of the project (Volunteer Oyster Gardening Project). Water quality parameters at these sites include salinity, temperature, and Secchi disk (clarity). Every 6 months turbidity, NO₃, and phosphates will be monitored utilizing a colorimetric (Field Hach 850 meter). The project began in May of 2007. **Heather Hitt** of FOS is the lead for this project. Grants have been applied for to receive funding for the oyster bed projects thru NOAA/NEP. If approved, funding will begin January 1, 2008. Another agency grant submission includes one with the FWC, and if approved/funded will start July 2008. Current funding for FOS and projects is derived from the Community Fund for Palm and Martin Counties, IRL Plates Fund, and one mitigation project and various donations. Another organization that is involved is Estuarine, Coastal, and Ocean Services, Inc. (ECOS)

(Grant Gilmore) 772-562-9152. Studies were conducted involving larval fish (croakers, drum) and their food source, copepods. **Dan Haurert** from SFWMD was also involved.

The Florida Oceanographic Coastal Center located on Hutchinson Island, south of the Jensen Beach Causeway, is the headquarters of the Florida Oceanographic Society. This 56 acre site is located between the Atlantic Ocean and Indian River Lagoon on South Hutchinson Island. The facility consists of trails, a library, Children's Activity Pavilion, Rays and Reefs Pavilion, and The Frances Langford's Visitor Center. Land and some buildings at this facility were originally donated by Francis Langford herself. Guided tours available by boat / kayak on the lagoon help to educate people about aquatic life and habitats that are present in the lagoon and man's impact on the ecosystem. Environmental education is a key component at the facility both indoors and out which includes a beautifully landscaped self guided trail showcasing native plants and trees which displays various plaques, signs, and kiosks. A 90 minute guided tour is also available. Various environmental talks, meetings, and programs are given regularly at the center and many are televised on a local public access channel for everyone to view. Numerous dive and research projects are ongoing. Currently included on the list is the CMEP- Coastal Marsh Enhancement Project. The list and explanations of each project or related activity is available on the FOS website site or by contacting the center. The center is open 7days a week.

Hours of operation: 10am -5pm Monday thru Saturday, Sunday 12pm-4pm. The center is located at 890 NE Ocean Boulevard (A1A), Stuart, Florida, 34996.

For questions: contact **Heather Hitt (772)-225-0505 Ext: 112**

4) USGS www.usgs.gov

Available data bases include: **National Water Quality Assessment Data Warehouse (NAWQADW)**, Nutrients National Synthesis, Data on Nutrients in The Streams, Rivers, and Groundwater of the United States **Web Site: National Water Quality Information System (NWQIS) Site: <http://nwis.water.data.usgs.gov/usa/nwis/qwdata>** and **USGS Surface Water Data for Florida Gauging Station Network** Records of flow/depth at various gauging stations.

To access water quality data:

- 1) Go to <http://fl.water.usgs.gov>
- 2) Go to the left of the Florida map
- 3) Scroll down to **real time data center**
- 4) Next, down to **water quality (click)**
- 5) Go down page to **Field/Lab Samples (click)**
- 6) Check county box, then **(click) submit**
- 7) Select/ **(click)** county of choice (eg. St. Lucie County) Then **(click) submit**
- 8) Go to choose output, leave setting as it is set then **submit**
- 9) Data for individual sites section, **(click)** on **Site** Number then retrieve water quality samples.

- 10) (Click) on **Inventory of Water Quality Data** then **(click) Submit** this will bring up North Fork St. Lucie River data.

For questions: contact **Leroy Pearman** (Data center) **(407) 803-5577 (Orlando office)**

Gauging stations that automatically record water depth (gauge height), water temperature, salinity, and specific conductivity at the surface and bottom and transfer data via satellite to the USGS for data recording (real time) include one at Midway Road (North Fork St Lucie River), Prima Vista Blvd (North Fork St Lucie River), Palm City Bridge (St. Lucie River), and Loxahatchee River (Mile 9.1) near Jupiter, Florida. This data system is new and very user friendly.

To access the real time data related to these stations:

- 1) Go to www.usgs.gov **(click)**
- 2) Go to the Florida map on the right side of the page **(click)**
- 3) Under **Real Time Information** (left side of page) **click** on **Real Time Water Data**
- 4) Utilize map on left, under **Daily Stream Conditions**, **point** and **click** at desired sites.
- 5) Data page will be revealed. **Point** and **click** for format desired.

5) Southeast Watershed Assistance Network

<http://swan.southeastwaterforum.org/resources/categories.asp?catid=120>

This site provides information about related water quality database sites and also provides direct links to those sites. This site serves as a conduit to other environmental links/agencies making access and information readily available.

6) USEPA (STORET) Database <http://www.epa.gov/storet>

Data is also available on the FDEP (STORET) (site # 1). State format is user friendly. This site provides Florida water quality data and national water quality results. EPA personnel often do not conduct actual field testing rather compile data into their system. Individual states most often regulate and enforce environmental laws and programs on their own according to their laws and federal regulations unless EPA feels it needs to intervene or their help is requested by the state, complainant, or a civil action (law suit).

7) St. Lucie County Health Department www.stluciecountyhealth.com/index.html

Bacteriological and salinity results for the Atlantic Ocean, Indian River Lagoon, and North Fork St. Lucie River

For questions: contact Jim Moses (Director) St Lucie County Health Department **(772) 873-4931**

The health department's goals include protection of human health, guidance, and leadership when it comes to health issues or crisis, disease prevention and control, and the environmental health that affects St Lucie County residents and visitors. Health care services that are provided by the County Health Department include: tracking, preventing, treating, and stopping the spread of communicable diseases. Treating diseases for mothers and children, promoting healthy lifestyles, providing treatment, education, and guidance to the public concerning sexually transmitted diseases (STDS) is also foremost.

One of the other programs established in 2000 is to routinely sample water in the river and at beaches for bacteria which includes Fecal Coliform and Enterococcus. They are indicator species for water quality related to human health for pathogens and may also be red flags for the general health of the river. Sampling is conducted by four health department personnel and members of the St Lucie County Sheriff's Department. Ocean water samples are taken at Pepper Park, Jetty Park Beach (Ft. Pierce Inlet area), Frederick Douglass Memorial Park, and Walton Rocks Beach (map provided on website). Sample results are posted on their website and are assessed a rating of Good, Moderate, or Poor. Actual data results can be obtained from the county by contacting them directly. If results are in the poor range resampling may be performed to verify the numbers or a health advisory will be issued immediately. Beach water quality sampling is conducted weekly. River sampling is conducted monthly at varying locations. The records and sampling (data) compiled by the Health Department can only compliment and help provide trend analysis information related to fresh water discharges and weather affecting the water quality of the lagoon and estuary.

Water samples are collected at 14 sites in the North Fork of the St. Lucie River as well as the Indian River Lagoon. Samples are collected at the surface for the same bacteria mentioned at the four beach sites. They are collected utilizing a pole, approximately 5 feet long, with a 500 ml bottle attached, and transferred to a 100 ml plastic bottle (pre-fixed with Sodium Thiosulfate) and delivered to Harbor Branch Environmental Lab, in Fort Pierce, for analysis. Analysis must be started within 6 hours after sampling and kept at the standard 4 degrees Celsius till analyzed. Four health department personnel sample at these locations. If information is needed regarding sampling protocol, sites, etc.. Samples are taken once per month, 12 times per year. A salinity reading is also taken as well as temperature at the surface. Temperature is read at the beginning of the sampling regime and when completed. Chain of custody sheets have been placed in the DOH Water Quality Documents folder. Sampling locations in the North Fork and IRL are listed on the sheets.

A health advisory would be issued if bacteria results came back poor and/or resampling may be conducted. Actual results may be obtained by contacting the director of the Health Department as mentioned earlier in this section St. Lucie Department of Health's address: 5150 NW Milner Drive, Port St. Lucie, FL 34983.

For questions: contact **Jennifer Whigham (Environmental Specialist I) (772-873-4931** at extension **4898)**

8) **Marine Resources Council (MRC)** <http://www.mrcirl.org/>

For questions: contact Jim Egan (Executive Director)/ **Beth McMillen** (Assistant Director)
(321) 725-7775

The organization is active in protecting and monitoring the Indian River Lagoon and its related watersheds. Currently, their site contains nine environmental programs, most of which are accessible. The organization maintains a water quality monitoring network (**Lagoonwatch**) which contains numerous sampling sites along the lagoon from north to south. Current data is available for these sites directly on the web site, listed under **Indian River Lagoon Watch**. Sampling parameters consist of a total of four: pH, clarity, salinity, and dissolved oxygen (DO), and an overall condition (A-F), which are presented monthly in table and map format, sampling is conducted weekly and averaged monthly in the final report. Temperature and weather conditions may also be recorded. At a few specific sites nutrients are also sampled. Water quality data is easily accessible for the period of July 2004 to present for the monthly map reports which cover an area from Scottsmoor in the northern lagoon to Sebastian River in the south. Data and sampling are also conducted monthly in the North Fork of the St. Lucie River for fecal and total coliform. All data is provided to the FDEP STORET database for future use in analysis. Data are also shared with the Loxahatchee River District and available on the MRC site or from their office. Data are derived from the District's sampling of the Loxahatchee River/Indian River Lagoon and their tributaries.

The MRC water quality program was established in 1989 in conjunction with the then Florida Department of Environmental Resources (FDER). Today the Lagoonwatch sampling program is supported by the Indian River Lagoon Program (IRLP) and the U. S. Environmental Protection Agency (USEPA). Long range goals include providing these programs/agencies with info (water quality data) of "known quality" to help to determine seasonal and temporal trends. Data collected by MRC, mostly by volunteers, over 80 strong, is a major asset due to its uniqueness, remote sampling sites, and tributaries not often sampled by other organizations and agencies. Data are available from 1991 to present. A fact sheet is also provided to help educate the public and sampling personnel as to the meaning and application of each parameter sampled (Available in the Water Quality Documents folder). The information was originally found on the **Fact Sheet** provided on the MRC site located on **The Indian River Lagoonwatch** page. Scroll down to **Water Quality Test Fact Sheet** (Also available in the Water Quality Documents folder) and click **Safety Guidelines**. Sampling methods and techniques are covered to inform sampling personnel, and to also provide info to the general public regarding the field tests mentioned earlier.

Dissolved oxygen and salinity are tested utilizing a modified form of the Winkler (titration) Method. Though this is not a Federal Register 40 CFR EPA approved method, it will generate fairly accurate reading if the tests are conducted in a proficient manner. pH is determined with a colorimetric method, fairly accurate yet not an approved method. Electronic probe for pH and membrane sensor meter are usually the approved choices when dealing with NPDES sampling. Since the MRC tests are not conducted at permitted facilities, 40 CFR guidelines are not required, but would be preferred. Electronic meters are more accurate and require less labor intensive steps, but are not as cost effective.

MRC also publishes a newsletter entitled “The Marker” which covers many topics related to the environmental state of the Indian River Lagoon, as well as topics affecting it. The organization utilizes a vast volunteer base for its activities and causes. You can join as well if you are interested. The water quality sampling events make use of human resources to help cover and expand large sampling areas. Much of the sampling conducted in the lagoon, from Vero Beach to Stuart / St. Lucie Inlet in the south, is a great asset for data and monitoring the water quality. MRC’s website is very user friendly, basically pick the topic, point and click. The organization maintains an excellent site for quick evaluations of basic water quality on a month by month basis.

MRC is also heavily involved in shoreline restoration programs. **Andrew Hardy** is the Field Consultant. A Mangrove planting project was recently completed where 5500 Mangrove seeds were planted to help improve fisheries habitat and establish more bank/shoreline protection (wave impact reduction/erosion control).

A major “Pepper Busting” program is being conducted where 703,355 ft/squared of Brazilian Pepper has already been removed. **Christopher Lindo** is the Shoreline Restoration Coordinator for the project. Funds are being provided by the **USFWS** and the **IRLP**. These are just a few examples of the many environmentally based programs conducted by MRC in conjunction with other agencies/organizations.

Water quality information gathering and monitoring is conducted in the North Fork of the St. Lucie River as well. Field chemistry/parameters include pH, DO, temperature, turbidity, and salinity. Sampling also includes fecal coliform and total coliform. All sampling is conducted from a boat and is conducted once per month. Field sample results for the IRL are published monthly in/on their website as well as in the local newspaper Florida Today (Brevard County paper). North Fork data is published thru FOS and the Stuart News (Martin County paper). All data is submitted to the FDEP to be entered into the STORET data base system. Samples collected for coliform are analyzed by Everglades Lab in West Palm Beach. Locations of sampling sites have been provided by MRC for our reference document (see MRC folder in Water Quality documents section). Funding for MRC is provided by SJWMD and NEP/IRLP. Goals for the future include public awareness, funding, water quality improvement, and a reference data base to verify improvements and water quality issues. Also, to maintain a consistent and ever improving volunteer base for sampling collections, cost savings, and community awareness and support. Other project and organizational goals have been mentioned earlier and on the MRC website.

The water quality contact is **Michael Wielenga**. He is also the coordinator for the Indian River Lagoonwatch. Sampling in The Loxahatchee River includes and is limited to the same field chemistry parameters as in the North Fork and IRL.

Loxahatchee River

9) **Loxahatchee River District** www.loxahatcheeriver.org

The District lab (Wild Pine Lab) and volunteers (**Riverkeepers**) sample both the Lower Indian River Lagoon and the Loxahatchee River. This practice was established in 1971 to document and monitor the condition and health of the river system to help in understanding the needs and the extent of impacts upon water quality. Approximately 40 sampling sites are utilized for water sampling by land and boat.

For questions: contact **Dave Porter** (Volunteer Water Quality Monitoring Coordinator) **(561) 747-5700 ext: 127** e-mail: cypress@loxahatcheeriver.org

Water quality analyses include field chemistry/parameters: temperature, pH, salinity, DO, total depth, specific conductivity, Secchi disk, and Photosynthetically Active Radiation (PAR). Some of the readings are obtained with a hydrolab, multi-probe meter, which was discussed earlier in this document. PAR is measured with 3 LI-COR spherical sensors to measure light penetration as related to sea grass development. Other samples are taken and analyzed for various compounds including both nutrients and other in/organics: These include turbidity, TSS, color, fecal coliform, total coliform, NH₃, TKN, TP, NO₂/NO₃, alkalinity, chlorophyll-a, and TOC. The parameters are sampled in both watersheds. Locations of sampling sites are provided in the Water Quality Folder related to this basin. Samples are taken bi-monthly (every other month).

The Loxahatchee River District has its own lab (Wild Pine) where qualified personnel conduct the analysis for the water quality parameters mentioned above, except TOC which is analyzed by Harbor Branch Environmental Lab. Wild Pine Lab is located at 2500 Jupiter Park Drive, Jupiter, FL 33458.. A comprehensive water quality report on the state of the Loxahatchee River system is available on their site. Data collected for the year 2006 was utilized to evaluate and determine impacts related to water quality of the river system and projects and plans to improve the overall health of the Loxahatchee River watershed. A monthly water quality report is also available. Lab reports and water quality results and data are available by request from lab personnel by phone or e-mail.

For questions: contact **Susan Noel (561) 747-3027 ext: 122 Fax: (561) 747-5709 e-mail: Susan@loxahatcheeriver.org** or **Lorene Bachman** (Laboratory Manager) **(561) 747-5700 ext: 122**

One major improvement and goal of the District is underway and gaining ground with the replacement of on-lot septic systems with centralized sewage treatment. A major wastewater treatment plant already exists (9 million gallons a day (MGD)) with plans for expansion to 11 MGD to keep up with the increased sewerage of areas in the region. Over 60,000 residences have been connected already and the plan is to continue until at least the year 2012, eventually sewerage the entire region. This will help to reduce the impacts of on-lot systems which may include elevated bacteria counts and nutrient loading to the river and tributaries.

Another project involves seagrass evaluation. Reporting of temporal and spatial variations of different species of grasses is covered. Goals include documenting the distribution, density, and species variety of seagrasses to help better evaluate the health of the grasses and the water

quality of the Loxahatchee River system and southern Indian River Lagoon. This, of course, will aid in the planned improvements for the water quality as well as aquatic species habitat.

Water quality monitoring program improvements included the establishment of an automated sampling system (**Datasound**) in 2004. Monitoring and sampling equipment are located in several areas of the river system. Every 15 minutes, temperature, depth, and salinity are recorded. Every 4 hours water samples are collected by automated samplers. Wild Pine Lab analyzes the samples for such parameters as nutrients and solids. A list of parameters was itemized earlier in this section. Locations of sampling equipment include Station 25 (Southern IRL), North Bay (NB) Central Embayment Seagrass Bed, the mouth of Kitching Creek (KC), and surface and substrate recordings at Station 89 (Wild and Scenic River Upper Reach). Continuous monitoring will provide a representative overview of the water quality which in turn provides overall water quality data for better management and monitoring of the river systems.

An environmental/education center “The River Center” is scheduled to open in 2008 providing an example of the entire river system thru education, displays, tours, and presentations. This type of facility can only help to improve the public awareness of the problems, natural wonders, and benefits provided by our rivers and estuaries which effect both man and natural communities.

10) FDEP (St. Lucie Office)

Sampled for several water quality parameters in the Loxahatchee River as well. Procedures and sampling protocol are identical to those mentioned earlier in the DEP section related to the North Fork of the St. Lucie River. Data is also stored in STORET and can be accessed as shown earlier in section **3) FDEP**.

Samples collected included the field parameters: DO, pH, salinity, sample depth, Secchi depth, specific conductivity, and temperature. Samples taken to be analyzed in the lab included: alkalinity, NH₃, BOD-5day, chlorophyll-a, fecal coliform, fluoride, NO₂/NO₃, orthophosphate-filtered, phaeonphytin-a, TKN, TOC, TP, TSS, and turbidity. Sampling conducted by FDEP in the Loxahatchee River (Group 2) was completed November 30, 2007. Excel spreadsheets are available in the Water Quality folder which specifies all parameters and agency/organizations that sample them.

Overview

An organizational time table for meetings, regarding water quality results and ongoing water quality topics and issues, should be assembled to better allow contributing agencies and organizations conference time to discuss the water quality issues related to the St Lucie River, Indian River Lagoon, and Loxahatchee River.

Cooperation, communication, and brain-storming thru correspondence and regular meetings can only help in understanding the underlying causes and effects on the water quality in these basins to in turn help address and solve the problems facing them. An agenda needs to be established

after data is interpreted and meetings conclude the exact direction or directions needed to improve the water quality of the watersheds/ basins for the present and future. This will help in the establishment of programs, sampling regimes, and possible funding sources to support an active, organized, productive, and forward thinking team with accomplishable goals utilizing current tools, resources, and funds to build with and grow.

As shown, in both spreadsheet format and in this document, sampling redundancy does occur across the board at varying agencies/organization in these river basins. A consorted effort involving cooperation, communication, and information sharing can help to reduce these sampling overruns to help expedite data collection/interpretation thus reducing expenses workloads, and help to initiate new programs and studies.