

FINAL REPORT

Coastal Springs Restoration Project January 1996 - October 1997 96-CZ-15-05-19-01-021

The springs of Crystal River have earned international fame as a diving/snorkeling destination to view their first magnitude flow and the large manatee herd that winters there each year. The local economy has evolved around this tourist influx and a number of dive shops, hotels, restaurants, and gift shops have developed to cater to these visitors.

In 1991, local dive shop operators came before the Citrus County Tourist Development Council (TDC) to express their concern over the decline of water visibility due to increased sedimentation in and around the springs. The causes of this decline are many (aquatic plant herbicide application, stormwater runoff, sediment buildup from development related erosion) and the resultant impact threatened to reduce tourist related revenue.

The TDC, in cooperation with the City of Crystal River, chose to explore the possibility of restoring the springs through sediment removal. An Interlocal Agreement between Citrus County and the City of Crystal River was entered into on April 28, 1992. This agreement authorized \$70,000 of TDC funding to the City for hiring consultants through contract for removal of silt from Hunter and Kings Springs. The City retained Hartman & Associates Inc., to study the feasibility, prepare applications to the Florida Department of Environmental Protection (FDEP), Army Corps of Engineers (ACOE), U.S. Fish and Wildlife Service (USFWS), and Florida Department of Natural Resources (FDNR) and obtain appropriate permits or authorizations from these agencies. Applications were submitted to FDEP in January 1993 and ultimately, FDEP issued permit 092246943 for Hunter Spring on September 15, 1993 and 092246993 for Kings Spring on October 29, 1993.

Due to complications with the proposed sediment disposal site, the original permits had to be revised. The City, through the efforts of the consultant, Hartman & Associates, ultimately received permits from the FDEP and the ACOE in fall 1994. Estimates for completion of the projects, as designed, was \$362,000. Even with the funding pledged by the Southwest Florida Management District through the Crystal River/Kings Bay SWIM program and additional TDC funds, the project's cost exceeded available funding.

Therefore, in December 1994, Citrus County submitted a grant request to the Florida Department of Community Affairs (DCA) for funding under the Florida Coastal Management Program (FCMP). In July 1995, DCA advised Citrus County that the project was eligible but needed some adjustments to meet the parameters of the monitoring procedures. One of these adjustments regarded the existing Interlocal Agreement and the designation of the City as primary party. As recipient of the grant, primary control of the project needed to be transferred to Citrus County. The existing Interlocal Agreement with the City of Crystal River was revised in December 1995. The cost of the project was still a concern.

In a search for additional funding, the City applied for a Florida Pollution Recovery Program grant administered by the FDEP. Allen Burdett, Restoration Manager of the FDEP SW District, in reviewing the project and its estimated cost, offered to assist in exploring alternatives to reduce the overall cost. A meeting was held in January 1996 to explore this avenue.

The meeting in January, attended by all involved parties, proved to be a breakthrough in reducing overall costs. One of the principal modifications was the shifting of the de-watering site and spoil site

from the City owned property east of US 19 to an existing borrow pit within the Crystal River State Buffer Preserve located west of Dixie Shores Drive. This greatly reduced the transmission distance and cost, and also eliminated the need to construct a de-watering system.

Matt Clemons, Manager of the Crystal River State Buffer Preserve, was receptive to the proposal since the spoil could be directed to form a littoral shelf within the pit, thus enhancing its environmental productivity. In anticipation of this modification, SWFWMD staff agreed to conduct a survey to determine the size of the pit and available free board.

To take advantage of the savings created with the new disposal site, permit modifications were once again needed. This time County staff developed the modification applications. A follow up meeting between County, City, and SWFWMD staff was held to determine the next course of action. It was felt that since available funding now exceeded the expected cost, the project could be expanded to include other areas of need. Since setup is one of the greatest factors in overall cost, incorporation of a Lyngbya algae project could expand both available funds and overall benefit to Kings Bay.

Both the Springs restoration and Lyngbya project are formal SWIM projects and are incorporated in the Crystal River/Kings Bay Surface Water Improvement and Management Plan. A Cooperative Agreement between the District and the City of Crystal River formalized the District's funding of this project.

The application to modify the Hunter Springs permit was submitted to FDEP and ACOE on May 31, 1996. The Kings Spring permit, which includes the Lyngbya pilot project additions was submitted on June 17, 1996. The permit modifications were approved by FDEP on July 23, 1996 and by the ACOE on September 11, 1996.

The project target areas lie within manatee winter zones. By both Federal and State rule activities, such as the spring restoration project, cannot be conducted during the winter season since it may disturb the large wintering manatee population which use the springs as a warm water refugia. Because of the limited time left before the October 1, 1996 manatee winter zone start date, it was decided to target a Spring 1997 implementation date.

An Invitation to Bid package was prepared and advertised on December 22, 1996. The County's Bid Committee received and opened two bids on January 17, 1997.

The two bids were reviewed by staff from the County, City of Crystal River, Southwest Florida Water Management District, and University of Florida Institute of Food and Agricultural Sciences. It was determined that the bid from Energy Resources, Inc. should be selected. Written confirmation from the SWFWMD project manager was received on January 31, 1997. The Citrus County Board of County Commissioners formally approved the selection at their February 25, 1997 meeting.

A contract was offered and executed between Citrus County and Energy Resources, Inc. on February 27, 1997. A letter of agreement between the contractor and the owner of Roy Thomas Road was executed on May 5, 1997. An 18 inch culvert under State Road 44 West to allow access to the application site was installed by Citrus County Department of Public Works staff on March 24, 1997. Signage explaining the project was developed and installed at the Hunter Springs Park and other highly visible locations. A handout was also developed for distribution to local marinas, dive shops, and the Chamber of Commerce. A refuge permit was applied for and issued by the USFWS.

The contractor established a staging area and began fusing pipe in April 1997. The dredging rig arrived in late April and work on the Kings Spring portion of the project commenced in May 1997.

The initial work involved volunteer divers from the local dive shops. The divers used handheld vacuum tubes attached to the dredge head to vacuum deep within the spring vents and the many crevices and holes present in the main and auxiliary springs. This focused work proved so successful that the planned two day period was expanded to over seven days.

After the diver assisted vacuuming was completed, conventional dredging commenced. The project was deemed complete on June 3, 1997 and documentation indicates over 4,000 yd³ of detritus sediment was removed in this phase alone.

Since the amount of material removed exceeded the original Hartman & Associates estimates, an amendment of the contract was drafted to allow a flat fee for more detritus removal at a later date. This amendment was executed by the Citrus County Board of Commissioners and the contractor on June 3, 1997.

The contractor relocated the dredge to Hunter Springs and began work in mid-June. By June 27th the work was completed. Again, documentation submitted by the contractor shows materials removed totaled over 4,000 yd³, well over the original estimates.

Replanting of native vegetation (*Vallisneria* and *Sagittaria*) was conducted in July. The contractor then moved on to the Crystal Cove area to begin a pilot *lyngbya* algae project wherein algal mats would be suction-dredged with a follow-up replanting of native vegetation.

On August 1st the Lieutenant Governor visited Crystal River and attended a presentation on the project. Lt. Governor MacKay also toured Kings and Hunter Springs by boat to observe the results first hand.

Early in the *lyngbya* project, it became obvious that the method utilized did not achieve a high removal rate of the *lyngbya*. This was due to the loose nature of the mats which quickly broke up and rose into the water column. A number of modifications were tried but removal rates never exceeded 70% which was too low to accommodate replanting. For this reason, only six (6) acres were vacuumed.

During the final month, the contractor returned to the Kings Spring area. Authorization for removal of up to 2,000 yd³ was given and by the end of September, an additional 2,174 yd³ was removed. The contractor has now demobilized and submitted invoices for final payment.

Press coverage of the project to date has been supportive and a number of front page articles in both the St. Petersburg Times - Citrus Times, and the Citrus County Chronicle have occurred.

Early reports from the local dive shops report that visibility within the Kings Spring area has improved since the work was completed. The City of Crystal River has reported similar results including the opening of a smaller spring within the swimming area. Though the long term impacts of this project remain to be seen; overall, this project has served well as a model for intergovernmental coordination and coastal spring restoration.

A summary of the project's funding, costs, and results is provided below:

Available Funding:

\$ 50,000 from the Department of Community Affairs - Florida Coastal Management Program Grant
\$ 70,000 from the Tourist Development Council

\$300,000 from the City of Crystal River (\$50,000 - City \$250,000 - District)

Total - \$420,000

Expenditures:

Checks for modification of permits	\$ 350.00
Fort Island Trail Modification	\$ 3,930.44
Mobilization/Demobilization (60% paid to date)	\$103,744.00
Kings Spring Project	\$ 37,508.00
Hunter Springs Project	\$ 53,055.00
Lyngbya Pilot Project (3 acres)	\$ 68,211.00
Lyngbya Pilot Project (3 additional acres)	\$ 68,211.00
Kings Spring (2,000 cubic yds.) @ \$12.00/yd	\$ 24,000.00
Total	\$359,009.44

Remaining funds will be used for future Kings Bay lyngbya project.

Final Results:

Sediments removed from Kings Spring area:

1 st Phase	4,074 yd ³	
2 nd Phase	2,174 yd ³	Total: 6,248 yd ³

Sediments removed from Hunter Springs: 4,098 yd³

Acres of Lyngbya vacuumed within Crystal Cove: 6 acres¹

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