



FEMA

Interagency Recovery Coordination

CASE STUDY

Emerald Coast Utilities Authority Wastewater Treatment Plant: Repair or Relocate?

A utility authority faces a difficult decision to repair or relocate an aging and vulnerable coastal wastewater treatment plant, either way fraught with public backlash and funding challenges.

Learning Objective: Consider how a local utility authority can leverage pre-disaster planning, public engagement, and post-disaster resources to mitigate its vulnerabilities to coastal hazards.

Keywords: Recovery, Resilience, Infrastructure Systems, Climate Adaptation, Hazard Mitigation, Public Information

PART ONE

Background

The Emerald Coast Utilities Authority (ECUA) was facing possibly the biggest challenge of its 25-year existence in the aftermath of Hurricane Ivan in September 2004. On one hand were the cries of impassioned locals, angry about the fouled air and water they treasured in sunny Pensacola, Florida. On the other were local politicians and civic leaders, skeptical of the feasibility and costs of improving or replacing the largest wastewater treatment facility in Escambia County, not to mention the bureaucratic challenges of doing so.

The ECUA's community was still reeling from Hurricane Ivan, a storm that brought 10–15-foot-high storm surge to the Florida Panhandle and the Mississippi, and Alabama coastlines as it made landfall on September 16, 2004. This strong Category 3 hurricane hit Florida along with three other storms – Hurricanes Charley, Frances, and Jeanne – within a two-month period, making the 2004 hurricane season particularly trying for the state.



Figure 1. Storm surge from Hurricane Ivan wreaked havoc on the coastal communities of Florida's panhandle. In Pensacola, the highwater mark of the storm surge fully engulfed the Main Street Wastewater Treatment Plant in turbulent stormwaters, causing massive damage. Source: ECUA.

Just east of the point of landfall, Escambia County bore the brunt of the most severe erosional and structural damage impacts from the storm, with Pensacola experiencing the longest duration of strong winds over 120 mph. No aspect of life was undisturbed in Pensacola. Immediate recovery efforts included replacing a portion of the I-10 bridge over Escambia Bay, 87 electric substations, 790 miles of power transmission lines, and hundreds of broken water and sewer mains. Escambia County schools were closed for four weeks with over \$20 million of uninsured damage. The damages done to the water and wastewater utilities were serious, but sadly, not the worst impacts of Hurricane Ivan. Tragically, 57 American and 67 Caribbean residents lost their lives.

Now, almost a year into the recovery process, ECUA was vying for consideration from weary county authorities on what to do about the severely damaged Main Street Wastewater Treatment Plant (MSWTP). MSWTP had been constructed in 1937 and upgraded in the late sixties. The plant was a stone's throw from the shoreline of Pensacola Bay, and less than 500 feet from the steps of Pensacola City Hall. This design was a convenience of the time, reducing costs of discharging treated sewage, but had outstayed its welcome. The facility had struggled to meet the requirements of the Florida Department of Environmental Protection (FDEP) regulation and was operating under multiple consent orders, mostly for odor control-related reasons. The aging facility regularly affronted the noses of sun-hat-wearing residents and visitors strolling on the waterfront or perusing shops downtown, earning the nickname "Old Stinky". Now, Old Stinky was no laughing matter.

Between the loss of power and the 12 feet of water that covered the treatment plant during the storm, the MSWTP was offline for 3 and-a-half days, and there were hundreds of broken sewer mains. Pensacola was flooded with a mixture of storm water, storm surge, and raw sewage, a situation with massive public health implications.

When the waters receded, ECUA's team found that there was severe rusting of the plant's equipment and electrical components and knew that they had to act. The question was, what to do? The options before the ECUA leadership included repairing the damaged facility, constructing an improved project, or permanent replacement at an alternate location.

Challenges

Reducing Pollution: Water quality was not a new issue in Pensacola Bay. While many communities in the country face pollution issues, the Pensacola area ranked No. 12 for total toxic releases per square mile, releasing a shocking 35 million pounds of industrial waste each year, according to the EPA. As early as 1999, pollution was so bad that a special grand jury was convened to assess local air and surface water quality. The jury ruled that immediate action was needed to stem the tide of pollution. Dangerous levels of toxins were causing a variety of health issues for residents. In addition, the MSWTP was in a floodplain, making it vulnerable to future storms and increasing the risks to community health.

The recommendations put pressure on ECUA to reduce compliance issues and drastically improve how the agency controlled and monitored the surface water discharges from MSWTP. This posed both a challenge and an opportunity for ECUA. The authority had formed a committee in 2002 to complete a study on whether it made sense to do an in-place upgrade for the MSWTP or replace it with a new facility compliant with the FDEP's regulations. In December 2002, the committee concluded that replacing the facility was the best way forward and the ECUA board agreed. However, the board was stymied by how to fund the project and where the new facility would go. Public sentiment echoed the board's point of view — this was a nice idea, but how would it be funded? It wasn't until the city was flooded with sewage and stormwater for several days that replacing Old Stinky became an urgent priority.

Funding: The biggest challenges facing ECUA's team were funding and site selection/acquisition for any upgraded facility. An improved facility was estimated to cost \$316 million. One thing was certain, with a \$100 million operating budget, the utilities authority would be unable to fund the full recovery project without assistance from a variety of partners.

Table 1. Total Estimated Project Costs for a New Improved Facility

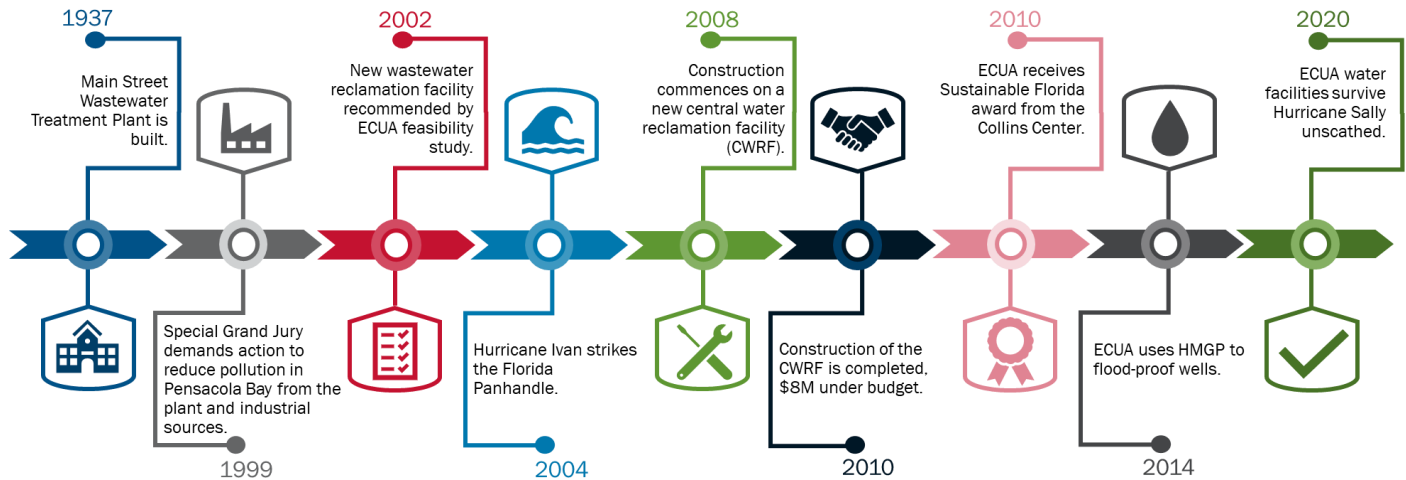
Project Components	Estimated Costs (\$M)
Demolish Main Street Wastewater Treatment Plant (MSWTP)	4.4
Replacement Water Reclamation Facility (WRF) @ 22.5 Million Gallons/Day (MGD)	123.4
Solids Drying Equipment @ 30 tons/day	20.5
Land Acquisition	20.3
Effluent Transmission System	21.8
Raw Wastewater Pumping and Transmission System	100.0
Financing and Construction Contingency	25.5
Estimated Project Total (+/-)	316.0

Site Selection and Acquisition: If a new facility were to be constructed, ECUA would need to navigate several paths. The State of Florida has advanced wastewater treatment standards that require new facilities to meet stringent guidelines for discharging into surface waters. A thorough environmental assessment would also need to be conducted for all site options, including the environmental consequences of selecting that site. Water quality, as well as the impacts on people, wildlife, and natural systems would all need to be part of the assessment.

There was also the important aspect of public involvement in the decision — the public would make or break the project depending on their acceptance or rejection of the site selected. **ECUA would need to work with its public information officer to ensure the public understood the reasoning of replacing the facility and generate buy-in. Simultaneously, ECUA would have to work with FEMA and other federal and state agencies to permit the site, mitigate potential hazards, and coordinate the effort among all government partners.**



Figure 2. ECUA Main Street Wastewater treatment plant's location in downtown Pensacola, on the shores of Pensacola Bay. Source: Google Earth.



PART TWO

Actions

ECUA started by engaging a variety of community leaders, enlisting them in the effort. Public buy-in was critical for successful project implementation. ECUA's executive director and public information officer attended countless meetings with representatives from neighborhoods all around Escambia County, private industry, civic organizations, the Northwest Florida Water Management District, state officials, and others providing project information while demonstrating unity of effort. Together, they detailed the damage wrought by Hurricane Ivan, the ensuing vulnerabilities of the community regarding wastewater treatment, and outlined the proposed replacement project, its costs, and benefits. A 30-minute PowerPoint presentation told the story efficiently and decisively. FEMA officials also held public meetings to solicit input from the community as to how the agency could best support the area's recovery efforts.

FEMA helped provide support for ECUA's public engagement throughout the post-disaster recovery planning effort. ECUA strove to help the public understand the value of improving wastewater treatment facilities and kept them informed throughout the process. Through public meetings, ECUA learned that many residents thought relocating the plant would mean relocating the pollution and odors along with it, but they warmed to the idea of replacing the facility with a better one. **Their outreach turned public opinion about upgrading the plant from a good idea to an immediate priority.**

With the ECUA board and the public supportive of replacing — rather than restoring — the current plant, ECUA set out on the largest public works project in the history of Escambia County. Because of the 1999 Grand Jury recommendations and the 2002 internal study, ECUA already had a facility plan for a replacement project when Hurricane Ivan struck. They funded the recovery project as an "Improved Project" with assistance from FEMA's Public Assistance and Interagency Recovery Coordination teams. The engineering team called the new project the "Central Water Reclamation Facility" (CWRF), a neutral name that avoided the controversial "relocation" terminology.

ECUA staff and consultants worked with the Florida Department of Emergency Management (FDEM) and FEMA representatives to develop a post-disaster recovery plan and complete an environmental assessment. This allowed ECUA to 1) become eligible for FEMA Public Assistance grants and 2) to use the funds to relocate the facility, rather than restoring it at its original site.

The authority set minimum site criteria for the Improved Project and used a scoring matrix to determine the best site for the facility. The evaluation factors included usable acreage, average grade, existing development, proximity to potable water wells, impact to nearby residents, wetland influence, access to truck/rail routes, presence of historic landmarks/endangered species/flora, and other unique opportunities.

Once suitable sites for the CWRP and transmission routes were selected, the properties were acquired through purchase and use of eminent domain. Site acquisition was funded through the State Revolving Fund and legislative appropriations from the state. Relocating the wastewater treatment plant was beneficial in several ways, including:

- 1) Locating the facility out of the coastal floodplain, with a minimum elevation of 50 feet
- 2) Eliminating discharge into Pensacola Bay
- 3) Creating opportunities for reclaimed water re-use, thereby reducing groundwater usage

ECUA leadership utilized the opportunities under the Improved Project type to design the CWRP to withstand a 190 mph Category 5 hurricane, drastically reducing the likelihood of any future wastewater service outages. ECUA also designed three new regional lift stations to have the following key features:

- Hurricane resistant construction
- Elevated electrical components
- Emergency power generators
- Redundant pumps

With the Florida DEP's advanced wastewater treatment regulations in mind, ECUA began to evaluate how reclaimed water could be reused at the new site. Early engagement with International Paper and Gulf Power secured these companies as partners. Reclaimed water, sometimes referred to as "gray water," is sent to the nearby power plant and paper mill to be used as cooling water or within a manufacturing process, reducing these industries' use of freshwater from the Sand-and-Gravel Aquifer by nearly 20 million gallons per day. **One hundred percent of the outflow from the plant is reclaimed water, fully addressing public fears of future pollution in the river systems.** Total project costs were estimated to be \$316 million. Funding was leveraged from the State of Florida, Northwest Florida Water Management District, EPA's State Revolving Fund, FEMA Public Assistance from DR-1551-FL, general funds from Escambia County and the City of Pensacola, and a bank loan.

Table 2. Sources of Funding Leveraged to Plan and Construct the CWRP.

Funding Sources	Amount (\$M)
Escambia County	7.0
City of Pensacola	Annual funding
State of Florida Grant Funds	20.9
Northwest Florida Water Management District	4.9
FEMA	Approx. 134.0
EPA State Revolving Fund (SRF) Loans	30.0
Bank Loan	129.7
Total Funding Secured	326.5+



Figure 3. Completed Central Water Reclamation Facility (CWRF) site layout. Source: ECUA.

Construction of the CWRF and its transmission mains began in 2008. Construction was completed on August 30, 2010, on-time and under budget. The large and complex project required careful coordination among numerous contractors and subcontractors. ECUA notes that using a pre-qualification process streamlined the way approved contractors could bid to construct project components, ultimately saving the authority time and money.

Results

Several factors contributed to the success of the project, but two stand out — pre-planning and public involvement. ECUA notes that being prepared with the Facilities Plan for the project when Hurricane Ivan struck enabled the authority to be ready to rebuild more resiliently. Without this pre-planning based on a known vulnerability, the prospect of developing a long-term strategy to replace the MSWTP while simultaneously managing immediate recovery efforts to bring wastewater services back online would have been overwhelming, and likely would not have happened. Likewise, getting the project off the ground required substantial buy-in from local politicians, their constituents, and the business community. ECUA's board, executive director, and public information officer's outreach to the public and legislative representatives successfully enlisted them in the urgent cause of replacing the MSWTP.



Figure 4. ECUA, state, and local leaders break ground at the new CWRF site. Source: ECUA.

ECUA emphasizes the benefits of constructing the CWRP included, among others,

- **Public Health:** Elimination of risk of a public health catastrophe, better water supply, and elimination of former surface water discharges that impacted bay area residents' health,
- **Economic:** Accelerated economic development, increased property values, increased tax base, and more employment opportunities within Escambia County,
- **Quality of Life:** Odor abatement, enhanced core area of downtown, and new frontier of development/recreation opportunities in City of Pensacola,
- **Reliable Water Treatment:** Greatly reduced maintenance costs, reduced vulnerabilities, and enhanced regulatory compliance (including meeting the state's advanced wastewater treatment discharge standard) for ECUA's systems, and
- **Private Sector Partnerships:** Opportunity for local paper and energy industry to reuse reclaimed water, reducing water withdrawal from the freshwater aquifer.

In 2010, ECUA received the Sustainable Florida award from the Collins Center. In 2012 and 2013, ECUA received the Silver and Gold Peak Performance Awards, respectively, by the National Association of Clean Water Agencies (NACWA) in recognition of outstanding compliance with its National Pollutant Discharge Elimination System permit. ECUA's success in replacing the aging and polluting plant set off a trend in Escambia County, encouraging other public authorities and private industries to clean up their act. Some locals believe the area has rounded a corner on its biggest environmental issues, sparking a downtown development and investment boom.

Due to capacity and knowledge built during the MSWTP replacement project, ECUA has had continued success utilizing FEMA's Hazard Mitigation Grant Program (HMGP) to reduce the vulnerability of its infrastructure systems. In 2014, ECUA used the HMGP to fund over \$200,000 in flood-proofing improvements to wells in the area, and in 2019 was approved for \$1.1 million in HMGP assistance to install bypass valves that will further prevent CWRP system outages.

The outcomes of ECUA's work to improve the resilience of their water and wastewater infrastructure systems are evident. When Hurricane Sally hit in September 2020, the Central Water Reclamation Facility sat high and dry, providing continuous services to its customers.

Lessons Learned

- Pre-planning by the local utility authority to address its known vulnerabilities significantly reduced recovery time, from a 20-year timeline down to a 5-year timeline, kick starting economic, health, and environmental recovery.
- ECUA officials believe that getting the entire community involved, including community, local, state, private, and federal partners is crucial. They note the public's support was instrumental in securing the momentum needed to carry the project through to completion, making a strong case for the involvement of the public information officer in pre- and post-disaster recovery planning. Coordinating with these partners ultimately enabled ECUA to take advantage of post-disaster opportunities to build resilience.
- Actions taken by the local government to reduce pollution and vulnerabilities in its wastewater and industrial systems had rippling positive impacts on dependent ecosystems, businesses, and residential health throughout the Gulf Coast, leading to enhanced economic growth opportunities for the area.

Additional Resources

- [New Treatment Plant Has Origins in Ivan's Fury | WUWF](#)
- [Emerald Coast Utilities Authority Central Water Reclamation Facility - Water Technology \(water-technology.net\)](#)
- [Financing Disaster Recovery and Resilience Mitigation for Water and Wastewater Utilities. EPA. 2016.](#)

Addendum A. Federal Resources for Building Water and Wastewater Utility Resilience

Nearly 500 water utilities are located along the U.S. Gulf of Mexico, along with another 2,500 near enough to the shore to be vulnerable to hurricanes. Nearly all face similar challenges to ECUA's Main Street Wastewater Treatment Plant, including sea level rise and heavy precipitation which add stress to aged drainage systems, which may result in overwhelmed freshwater intakes, saltwater intrusion into drinking water supplies, underutilized water systems due to declining population sizes, and/or loss of commerce for some areas that experience frequent flooding. Leveraging available funding sources and investing in resilience may help lower risks for similarly situated utilities. The following resources may provide technical assistance, grant, and finance opportunities for improving the resilience of water utility systems. This is an incomplete list, and resource availability and eligibility requirements may change.

FEMA

- [FEMA Resources for Climate Resilience](#)
- [Public Assistance Program and Policy Guide](#), v4.
- [Hazard Mitigation Grant Program](#).
- [Building Resilient Infrastructure and Communities \(BRIC\) Program](#). [BRIC Technical Criteria](#).

U.S. Environmental Protection Agency (EPA)

- Drinking Water State Revolving Fund
- [Clean Water State Revolving Fund](#). [Funding resilient infrastructure and communities using the Clean Water State Revolving Fund](#).
 - Since this recovery effort, FEMA and EPA have collaborated to forge a [Memorandum of Understanding \(MOU\)](#) to help speed up assistance provided on water infrastructure projects. The non-federal portion of a State Revolving Fund can now be used towards the cost-share needed for a FEMA Public Assistance project. States and localities are urged to talk with EPA and FEMA about utilizing this mechanism to address water infrastructure recovery needs.
- Water Security Division [Drinking Water and Waste Water Resilience Technical Assistance](#).
- [CREAT Risk Assessment Application for Water Utilities](#).
- [Resilient Strategies Guide for Water Utilities](#).
- [Route to Resilience 2020 for Drinking Water and Wastewater Utilities](#).
- [Watershed Management Optimization Support Tool](#).

U.S. Department of Agriculture

- Rural Utilities Service's Water and Environmental Programs (WEP)
- Emergency Community Water Assistance Grant
- USDA Rural Development has over 40 additional programs to support investments in infrastructure, housing, and economic and community development projects in rural areas.

U.S. Small Business Administration

- [Business Physical Disaster Loans and Economic Injury Disaster Loans](#) (can be used by private utilities).

U.S. Department of Housing and Urban Development

- [Community Development Block Grant – Disaster Recovery Program \(CDBG-DR\)](#).
- [Community Development Block Grant – Mitigation Program \(CDBG-MIT\)](#).

National Fish and Wildlife Foundation

- [National Coastal Resilience Fund.](#)

National Oceanic and Atmospheric Administration

- [Green Infrastructure Effectiveness Database.](#)
- [Water Resources Dashboard.](#)
- [Digital Coast.](#)

Addendum B. Sources Cited

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- [Hurricane Ivan Spurs Effort to Construct Pensacola Wastewater Reclamation Facility:](#) Florida Journal of Water Resources.
- https://www.epa.gov/sites/production/files/2016-12/documents/carr_and_palmer_pdf.pdf
- [Emerald Coast Utilities Authority Central Water Reclamation Facility - Water Technology \(water-technology.net\)](#)
- [Hurricane Ivan 10 Years Later - Cleaning Up And Moving Forward | WUWF](#)
- [Escambia County haunted by pollution, 20 years after grand jury report \(pnj.com\)](#)
- [ECUA Receives National Award for Cantonment Facility: NorthEscambia.com](#)
- [New Treatment Plant Has Origins in Ivan's Fury | WUWF](#)
- [Map of Success Stories | Federal Funding for Water and Wastewater Utilities in National Disasters \(Fed FUNDS\) | US EPA](#)
- Data from EPA's Safe Drinking Water Information System and Clean Water Needs Survey, 2012.
- ["Building Resilience to Climate Change: Information Needs of Small to Medium Size Water System Mangers in the Gulf Coast Region," SCIPP filling the gaps. NOAA.](#)
- Interview with ECUA employees in October 2020.