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# A STRATEGY TO RECLAIM WETLANDS AND BALANCE BIOMASS LOST TO THE COOLING PROCESS OF A NUCLEAR POWER GENERATING STATION

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Restoration of 20,000 acres of historic wetlands and contiguous upland boundaries is part of a grand-scale estuary enhancement and recovery program, implemented in New Jersey and Delaware by the Public Service Energy and Gas Company (PSE&G). The project is providing a very positive and refreshing signal from the energy industry that wetlands stewardship and cooperation are alive and well.

The energy enhancement program (EEP) is a voluntary initiative offered by PSE&G in preparation for the reauthorization of required state and federal water discharge permits and to address environmental impacts resulting from cooling nuclear generators with biologically rich river water. Entrainment and impingement of aquatic fauna, juvenile and larval stages of fish and eggs have always been a concern with flow-through water cooling systems in the production of electricity by nuclear power generation and the attendant, required cooling processes. The Salem Generating Station, which came on line in 1971, uses a pressurized, hot water, flow-through system. One and a half million gallons of Delaware Bay water per minute are required to cool the facility. The river waters are rich in a wide diversity of aquatic flora and fauna resulting from good wetlands productivity from the rich riverine and estuarine areas adjacent to and north of the generating station. An innovative, rotary, 3/8-inch mesh screen strains and carries away macro vertebrate and invertebrate organisms; other larger restrainers and noise devices ahead of the rotary screen exclude larger fin fish, turtles, and crabs. Organisms smaller than 3/8 inch pass through the screen and cooling system and are sacrificed to the process. Their remains are recycled back into the bay waters.

Restoring mass quantities of biota lost as a known consequence of a nuclear energy electric production system is exactly what the industry, with the help of the New Jersey Department of Environmental Protection and others, hopes to accomplish. Bruce Freeman, former marine fishery administrator in New Jersey, now director in North Carolina, worked closely with PSE&G scientists, Fish and Game staff, university and extension workers, and surrounding communities to develop a biological production model to replace what was being lost or removed from the system, along with all the multiplier effects of the energy web, to predict loss and possible recovery. An evaluation system was developed to test and constantly monitor the success of the project.

The EEP provides a unique opportunity to begin to reestablish historic wetlands lost over the past 150 years to agricultural methods used to dike and drain wetlands in an effort to encourage other drier site native grass species best suited for the production of salt hay. Vast areas of naturally occurring wetlands had been relandscaped to favor more desirable high marsh grasses, *Spartina patens* and *Disticalis spicata*, at the expense of the loss of the predominant low marsh grass, *Spartina alternaflora*. Thousands of acres were diked, drained, and intensively farmed until recently for hay production and dried grasses for other interesting and historic uses. PSE&G proceeded to work with the communities in the selected area to purchase land, easements, and conservation rights of contiguous land to allow for the ultimate inclusion of up to 20,000 acres of wetlands and upland buffers in New Jersey and Delaware.

Installation of five fish ladders in the bi-state area, relinking the bay with anadromous fish spawning grounds, added credence and interest and enthusiasm to the project. Unique, large-scale community efforts were the very basis needed to initiate the project, purchase the land, and provide special assurance that this project was in the best interest of the public and especially the Delaware Bay aquatic resource system. Public meetings were held, the New Jersey State Fish and Game Council and university classes met and were taught at the site in a special effort to keep the public fully informed, involved, and knowledgeable. The in-depth, broad-based ground work was successful in incorporating public interest in the solution to the problem—and it worked!

The reversion of land from the private domain back to the public domain, reestablishment of the integrity of the historic wetlands, guaranteeing the installation of fish ladders, noise makers, upgrading of screening, and limitation of water in the flow-through process in a voluntary manner have created an image of good stewardship and community partnership. The implementation of continuous monitoring system will help to prepare the EEP for use as a national model for the restoration of similar areas with attendant environmental impact concerns.

What is shared in this discussion is what Extension does best: bridging the gap between research and the public, identifying and facilitating good stewardship and cooperation by helping others to define values and responsibilities with meaningful solutions to large-scale problems yielding the highest possible positive impact on the management of natural resources and, ultimately, on the quality of life for all.