
Designing a Payment for Environmental Services Program for the Northern Everglades

The Florida Ranchlands Environmental Services Project designed and field tested elements of a program that would pay ranchers to improve water quality, phase, and timing by using existing water management infrastructure on ranchlands. The authors, from World Wildlife Fund and Resources for the Future, discuss the collaborative process used during the six-year pilot phase and how it built the foundation for the Northern Everglades Payment for Environmental Services Program launched in 2011.

BY SARAH LYNCH AND LEONARD SHABMAN

In January 2011, the South Florida Water Management District (SFWMD), the agency of the state of Florida responsible for improving water quality, maintaining flood control and water supply, and Everglades' restoration, issued the first solicitation under its new Dispersed Water Management—Northern Everglades Payment for Environmental Services (NE-PES) Program. The solicitation invited eligible cattle ranchers in the Northern Everglades (Figure 1) to propose water management alternatives (WMAs) that would provide the environmental services of either acre feet of water retention or pounds of nutrient (phosphorus (P) or nitrogen (N)) removed). A rancher's proposal would include separate payment requests that would reimburse costs to implement the WMA and an annual service payment to be made each year over the life of a 10-year contract. Responses to the solicitation were due in May 2011. For the first solicitation the SFWMD's fiscal year (FY) 2011 budget includes \$7 million for the design, permitting, and construction costs of selected WMAs. In addition, an estimate of the annual service payment obligation over the life of the expected contracts is \$43 million. The intention of the SFWMD, subject to available budget, is to have additional solicitations.

WMAs are combinations of construction and management practices selected and implemented by the landowner within a defined area of a working ranch (Box 1). The WMAs will change the volume and timing of water flow to Lake Okeechobee and the St. Lucie and Caloosahatchee estuaries and reduce the nutrient loads in those flows. Providing these water management services also will increase and enhance habitat for multiple species at a watershed scale. And, the environmental services payments create a new profit center for ranchers. This contribution to the financial sustainability of cow-calf operations means maintaining an extensive and low-nutrient input industry, thereby forestalling conversion to more intensive agricultural and urban land uses.

The newly created NE-PES program will become a component of the Northern Everglades and Estuaries Protection Plan (NEEPP 2007) passed by the Florida Legislature in 2007 that expanded the Lake Okeechobee

Protection Plan (Updated LOPP 2011). The focus of the NEEPP on the northern portion of the larger Everglades system is an acknowledgement that achieving the restoration goals for Everglades National Park in the southern tip of the Florida peninsula (Comprehensive Everglades Restoration Act 2001) and protecting the St. Lucie and Caloosahatchee rivers and estuaries will require improved water quality and changes to water management for Lake Okeechobee. The expectation is that on-ranch WMAs implemented in response to the NE-PES program will build on and enhance water quality and quantity management now sought through traditional agriculture best management practice (BMP) cost-share programs, and will be a cost-effective and complementary approach to public development and management of regional reservoirs, aquifer storage, and recovery wells and stormwater treatment areas (STAs).

WMAs on ranch parcels can cost-effectively produce water management services because they take advantage of existing water manage-

BOX 1: WMAs are for managing water in specific drainage areas within the larger ranch parcel. The WMAs individually or in combination can include:

- flashboard riser and/or weirs in existing uncontrolled ditches that drain by gravity from a site;
- constructing or improving earthen berms;
- constructing aboveground impoundments or enhanced utilization of existing impoundments;
- rehydration of wetlands;
- collecting surface runoff from off-site areas that typically bypass the site and diverting it to the connected onsite storage; and/or
- site improvements that increase the potential for horizontal and vertical seepage from the site.

ment infrastructure or make modest additions to that infrastructure. Furthermore, in this heavily drained, but still wet landscape, land managers have extensive experience managing water to support their agricultural enterprises. These experienced water managers, when paid under the NE-PES program for providing environmental services, will be able to blend water management for environmental services provision with water management to support the other ranch enterprises.

The NE-PES program differs in significant ways from the more traditional approaches to secure environmental services from agriculture. First, the ranchers would receive the annual service payment each year of the contract only after documentation that the contracted service was provided. This can be contrasted with BMP cost-share programs. In the BMP programs, a landowner receives a payment to partly offset the cost for installing one or more practices, such as, but not limited to, those in Box 1, but without an annual payment. In the traditional programs, the environmental results from BMPs are general expectations of performance, while in the NE-PES program, the expected services are based on site-specific assessments of the proposed WMA and its operations. Also, in many states, Florida excepted, BMP programs assume that the landowner operates and maintains the practice over time rather than conduct regular on site verification. Finally, many BMP programs assume that the environmental changes predicted to occur at the site are being realized, while in the NE-PES program, there is an annual verification of the rancher's compliance with contract obligations.

Second, the NE-PES program payments are made for services that are above and beyond regulatory expectations. The Florida Department of Agriculture and Consumer Services (FDACS) and U.S. Department of Agriculture (USDA) cost-share programs available in the Northern Everglades are expected to assist landowners in meeting such expectations. Third, many land retirement programs, such as the Wetlands Reserve Program (WRP), are being relabeled as PES programs. However, the NE-PES program, unlike the WRP, commits to maintaining a working landscape and allows landowners to actively manage water based on the level of the payment received and not be limited to what might be achieved by physical restoration of pre-disturbance conditions at the specific site.

Many PES experiments and pilot projects have been tried or are underway. Perhaps unique in the nation, the NE-PES program is now an operating program. However, it too had its origins in a pilot project, the Florida Ranchlands Environmental Services Project (FRESP) (see www.fresp.net). The experiences and lessons learned from the six-year FRESP pilot (2005-2011) were critical to the successful creation of the NE-PES program. The FRESP vision of a PES program for water management services on working ranchlands was the product of a

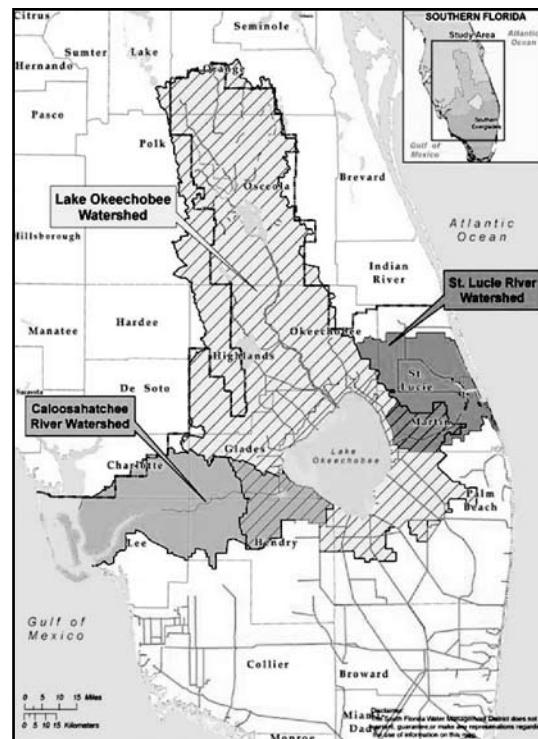


Figure 1: Solicitation area for the NE-PES program.

collaborative process that included eight volunteer ranchers, World Wildlife Fund (WWF), the SFWMD, the FDACS, the Florida Department of Environmental Protection (FDEP), the USDA Natural Resources Conservation Services (NRCS), the MacArthur Agro-Ecology Research Center (MAERC), and the University of Florida Institute of Food and Agricultural Sciences (referred to hereafter as the FRESP collaborators). In the initial years, the program design elements were generally agreed to, and then over the years, they were refined and concepts were tested by learning from the actual experience of eight volunteer ranchers as they designed, permitted, constructed, and monitored WMAs on portions of their ranches. Through a learn-by-doing approach, key, and often site-specific, PES program design challenges were worked through. Putting ranch water management pilot projects in the ground first and building a program design out of that experience provided proof of concept, increased the chances of designing a program acceptable

to both buyers and sellers, and garnered public support for an on-ranch PES approach for securing water management services.

In this article we will discuss the FRESP process, how it built the foundation for the NE-PES program, and focus on three of the design challenges: defining the commodities that would be paid for; methods for documentation that the service was provided; and determining how payment for services would be made. Three points of intersection with regulatory programs created challenges that garnered special attention of the FRESP collaborators. First, any PES process cannot tolerate a lengthy regulatory review that imposes high costs on the PES program applicants. The need was to expedite the wetlands permitting process, while at the same time assuring that the WMAs were compliant with federal and state wetlands protection requirements and with the federal Endangered Species Act. Second, the commitment that payment should only be for services that were “above and beyond regulatory requirements” needed to be made operational. Third, because the NE-PES program is a contract between a buyer and landowners, landowners would not enter into a contract unless there were assurances that they would be safe from any unanticipated endangered species or wetlands regulatory requirements at the end of the contract. The complexity of designing regulatory approaches to meet these three challenges will be discussed in an article in a future issue of this newsletter.

A COLLABORATIVE APPROACH TO PROGRAM DESIGN

In 2003, WWF, along with six ranchers, formed an ad hoc group to identify and explore together opportunities to recognize and enhance both the ecological value and the economic viability of cattle ranching as a land use in the Northern Everglades region. This shared interest resulted in a 2005 study, which evaluated the potential for changes in water man-

agement on ranchlands to provide water and P retention services in a cost-effective manner, when compared to other options available to agencies of the state. While demonstrating the potential of on-ranch water management, the assessment also identified a daunting list of program design challenges that would need to be addressed—some typical of PES schemes in general and some specific to the Florida situation. The need to address these design challenges demanded a process where respected representatives of the ranch community, agencies of the state of Florida, who would be the buyers of service, and the environmental community could openly discuss and come to agreement on each of the PES design elements. The FRESP collaboration launched in 2005 became that process when all the relevant parties signed a memorandum of understanding agreeing to work together to design a PES program. Over the duration of the operation, the FRESP received funding from two NRCS conservation innovation grants, the SFWMD, the FDACS, and the W.K. Kellogg Foundation. Participants used a large portion of the funds to install the WMAs on the ranches and to collect and manage hydrological and water quality data from each site. The authors of this article provided the overall project management, with substantial in-kind services from the state and federal agencies. Learning from the operational, monitoring, and contract design experience of the eight pilot ranch WMAs, the FRESP collaborators incorporated those lessons into the design of the program that became the NE-PES program.

“The design of such programs must be a shared responsibility of multiple partners, bringing different skill sets and perspectives, with the time and resources to identify and field test options, and the space to honestly and frankly discuss program design issues with each other.”

PES DESIGN LESSONS

Define the Environmental Commodities

Critical to the design of any PES program is a clear definition of the commodities the buyer is willing to purchase. Equally important, in a program where the payment is for performance, the commodity needs to be defined in a way that the service can be measured. Throughout the FRESP pilot phase, collaborators worked to refine the commodity definitions in ways that were understood by the buyers and sellers and were measurable given real-world ranch conditions. The result was that the NE-PES program solicitation defines two commodities that a rancher can produce.

- *Water retention* holds back on-ranch stormwater that would have flowed into the surface water drainage system. The service is produced by maximizing evapotranspiration (ET) and groundwater seepage. In low lakewater conditions, the buyer may ask for water detention (slow down rate of surface water flow) from the WMA site for base flow maintenance.

- *Nutrient removal* occurs when the WMA diverts off-site water from a public canal or river onto the WMA and returns the water with reduced nutrients to the regional system via gravity outfall structures.

These commodity definitions reflect the experience of the FRESP pilot projects, seven of which were water retention WMAs and one was a nutrient removal WMA. Given the dense network of public canals in south Florida, some ranches have the capacity to pump in public water and run it through a pasture or marsh area and then exit back into the public canal. However, far more common, are situations where on-ranch stormwater is being retained.

Measurement for Contract Compliance

Initially, the FRESP team expected to link the rancher's payment to realized acre-feet of water retention or pounds of nutrients retained each year. For the water retention WMAs, a tool was being developed to analyze data provided from stage recorders strategically placed in the WMA; the analysis of the data would yield a measure of water retention realized during the course of the water year. At the same time, for nutrient removal WMAs, it was expected that a reduction in nutrient loads could be determined using measures of flow and concentration of nutrients in the diverted water and flow measures and nutrient concentration in the return discharge.

However, early discussions among the FRESP collaborators indicated that both buyer and seller were concerned that water retention services provided in any year would vary as a result of rainfall in that year. Also, the nutrient removal services would be affected as pumps could only be operated when water levels in canals reached a certain elevation. From the buyer's perspective, the budget requirements to honor contracts would fluctuate unpredictably with the weather, and there was no way the agencies could prepare budgets or secure additional funds to accommodate such fluctuations. Ranchers, as sellers, preferred a fixed annual income source to smooth out the more variable annual income and cash flow realized from cattle, citrus, and sod sales.

This mutual preference of the buyer and seller to establish a contract that set a fixed annual service payment had far-ranging implications for providing documentation of service provision. In effect, the services that would be the basis for the contract had to be agreed to before the contract was signed and then the annual payments would be made if the terms of the contract were honored. The FRESP collaborators addressed this need in two parts. First, the contract would be based on a model prediction of average annual water retention or nutrient removal service expected during a 10-year rainfall period of record. The model predictions would be made using WMA site-specific conditions, e.g., size, soils, vegetation, topography, and existing and proposed water management infrastructure. The payment would be a fixed annual service payment recognizing that in any one year a rancher might fall short of or exceed the service level commitment, but over the life of the 10-year contract, the average service level would be provided.

Second, the payment was now decoupled from the actual service provision, so there had to be a way to demonstrate that the rancher was providing the service, subject to rainfall, as specified in the con-

tract. In the NE-PES program, contract compliance for receiving the annual payment requires that the rancher provide evidence that the operation and maintenance of the WMA was as specified in the contract. In addition, for the water retention service, the daily surface water stage is measured and related to pump and rainfall records to determine whether the stage inside the WMA varies logically with rainfall and pumped water inputs, i.e., the water was being retained. For nutrient removal WMAs, the pump records will show whether the pumps were running as required when the canal reached stages that in the contract were supposed to trigger pump operations.

Establishing the Payment

In the NE-PES program, the annual service payment is not based on a price per unit of service provided times the service provided. Instead, during the solicitation process, rancher applicants will submit, along with their proposed WMA design, a payment request in two parts. The first part is an estimate of the expected costs of design, permitting, and construction of the WMA to be reimbursed as justified by the submission of receipts to support actual costs incurred. The second part of the payment request is for a lump sum annual service payment, but there is no expectation that the service payment request has to be justified to the buyer in the proposal, however, contract compliance documentation as described above will have to be provided annually to receive the service payment. In making the application request for funding, the ranchers may consider a needed return to land ownership and management that justifies participation in the NE-PES program; possible loss of production on the WMA in certain years of the contract (depending on rainfall); operation and management costs for a WMA; the costs for monitoring and reporting required as a condition for payment (contract compliance reporting); and possible cost for pasture reestablishment in certain WMA areas and other costs incurred at the end of the contract. However, these are only possible considerations and are not part of the submission. It is up to the buyer to determine whether the level of estimated service and the combined payment request is a cost-effective way to secure the services.

The FRESP collaborators settled on a solicitation process where ranchers submitted payment requests in their proposals. This was used instead of either one-on-one negotiations between the buyer and each prospective seller or announcing a per-unit service price. Neither the buyer nor most sellers found one-on-one negotiations attractive—the former for reasons of administrative burden and the latter for reasons of perceptions of unfairness and inequity, if different ranchers received different payments in such negotiations. The FRESP collaborators did consider having the buyer announce a per-unit price for each service. However while the SFWMD had experience owning and managing facilities, e.g., above-ground reservoirs and STAs, that produced water and nutrient retention, the unit costs resulting from these projects were not a benchmark for on-ranch water management services. While measured in the same units—acre-feet and pounds of nutrients retained—the commodity produced by ranchers was not viewed by the buyer as equivalent to that produced by regional projects. On-ranch water management contracts were not permanent, did not provide inter-annual storage, and were outside real-time operational control of the SFWMD. Nor did the payments made to FRESP pilot ranchers provide guidance for setting a unit price. Payments in the

pilot program emerged from one-on-one negotiations that focused on the use of the rancher's land for the pilot project and a payment for the ranchers' time in meetings, phone calls, and individual consultations needed to support the collaboration. In the end, the buyer's preference for a competitive proposal process was adopted as the method for establishing service payment levels for the first solicitation.

CONCLUSIONS

The results of the first solicitation under the NE-PES program will not be known until July 2011. Nonetheless, to the best of our knowledge, the NE-PES program represents a pioneering attempt to implement what has most often been simply a conceptual idea—a PES program at a watershed scale. In the spirit of learning by doing, the FRESP team plans to conduct a post-solicitation evaluation to gather perspectives from agency staff involved in the solicitation process, engineering firms that assisted ranchers in preparing proposals, and the ranchers who applied, as well as those that choose not to apply. From this review, suggestions for future solicitations will be developed. There is already one lesson to be drawn. The design of such programs must be a shared responsibility of multiple partners, bringing different skill sets and perspectives, with the time and resources to identify and field test options, and the space to honestly and frankly discuss program design issues with each other. As the examples in this article illustrate, initial ideas for defining services, documenting services, and payment approaches were all revised through such discussions. In a future issue of this newsletter, we will describe how FRESP collaborators identified and then found ways to address state and federal regulatory hurdles to the implementation of the NE-PES program. ■

Acknowledgements

We would like to acknowledge collaboration partners who have contributed to the FRESP and our understanding of PES programs: ranchers, J. Alderman, J. Collins, C. Lightsey, G. Lollis, J. Payne, C. Syfrett, W. Williamson, J. Wohl; scientists, P. Bohlen (MAERC), M. Clark, A. Guzha, and S. Shukla, UF-IFAS, and H. Swain, Archbold Biological Station; agency personnel, R. Budell (FDACS), F. Nearhoof (FDEP), B. Whalen, (SFWMD), and G. Hendricks and B. Reck (USDA NRCS); and the FRESP Field Team, S. Hollingsed, R. Mesmer, and N. Singh. Funding for the FRESP from the USDA NRCS, the SFWMD, the FDACS, and the W.K Kellogg Foundation is greatly appreciated. The opinions expressed are those of the authors and not necessarily those of the funders or other collaboration partners.

REFERENCES

- Florida Ranchlands Environmental Services Project website, at <http://www.fresp.net> (last visited May 7, 2011).
- Mehlman David et al., Farming for Wildlife: Using the Farm Bill to Create Wetland Habitat on Working Farms, 33 NAT'L WETLANDS NEWSL. 22 (Jan.–Feb. 2011).
- South Florida Water Management District, Florida Department of Agriculture and Consumer Services, and Florida Department of Environmental Protection, 2011 Lake Okeechobee Protection Program Update (March 2011), at http://my.sfwmd.gov/portal/page/portal/xrepository/sfwmd_repository_pdf/lopp_update_2011.pdf.