

## Payments for Ecosystem Services in Florida's Landscape: Concepts and Principles

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### Introduction

Ecosystem services are the benefits that ecosystems provide humans (USDA, 2025). Florida is known for its diverse landscape, which includes valuable ecosystem services such as water storage, soil conservation, and biodiversity (Wallace et al., 2023). A Payment for Ecosystem Services (PES) policy approach aligns economic incentives with environmental goals, encouraging landowners to participate in conservation while potentially reducing the cost of land use (Polasky et al., 2014; Shabman & Lynch, 2013).

This publication is the first article of a series titled *Payments for Ecosystem Services in Florida's Landscape*. It introduces the concept of PES and is intended for extension agents, government decision-makers, landowners, and researchers to help them understand the concepts and principles underlying PES programs and how they contribute to both previous and ongoing conservation efforts in Florida.

### Definition and Critical Needs of PES Programs

When landowners maintain healthy ecosystems on their property, they provide valuable services that benefit society - from clean water to wildlife habitat. However, these ecosystem services are not typically bought and sold in markets, and landowners usually face costs in maintaining them. Without compensation for these costs, landowners have little financial reason to protect and maintain the ecosystem services (Frey et al., 2021).

To address this challenge, Payment for Ecosystem Services (PES) programs enable those who benefit from ecosystem services (such as the general public) to compensate the landowners who provide them. Through PES, landowners can voluntarily enhance ecosystem services and receive compensation through various channels, such as tax benefits, legal agreements, grants, direct payments, or environmental market credits (Farley & Costanza, 2010). Compared to a mandatory regulatory approach, PES programs have the potential to achieve the same policy goal with lower costs if designed properly (Jack et al., 2007).

There are four key principles for PES programs (Wunder, 2015):

- **Voluntary Participation:** Participation in the PES program is voluntary, unlike those mandated by government regulations.
- **Clearly Defined Provider:** The person or group providing the service must be clearly identified, and the benefits they provide must be measurable or tied to specific land management practices.

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- **Buyer and Seller Agreement:** There must be at least one buyer and one seller, who agree on conditions for payments based on the services provided.
- **Low Transaction Costs:** Transaction costs refer to costs beyond the price of the goods or services themselves. Under a PES program, these costs can include 1) contract negotiation costs; 2) costs of measuring and validating ecosystem services; and 3) costs of monitoring and enforcement.

In Florida, multiple PES program focus on promoting sustainable land management practices that enhance ecosystem services like water conservation, and wildlife habitat conservation (Wallace et al., 2023). Example programs include the Northern Everglades Payment for Environmental Services Program (NE-PES), Florida Ranchlands Environmental Services Projects (FRESP), and Florida Panther Payment for Ecosystem Services Pilot Program (Bohlen et al., 2009).

Each of these programs is designed to focus on the enhancement of ecosystem services particularly relevant to that area. Using the Northern Everglades Payment to Ecosystem Services (NE-PES) program as an example, Table 1 summarizes its key components. Since 2011, the NE-PES program has facilitated collaboration between water managers and ranchers to enhance water storage, water quality and habitat improvement in the Northern Everglades (Boughton et al., 2019). Ranchers receive payments based on the water services they provide, as determined by the quantity measurements, water flow monitoring, and verification reports from the management agency.

**Table 1.** Components of the Northern Everglades Payment for Environmental Services (NE-PES) Program

Component	NE-PES Program
Goals	<ul style="list-style-type: none"> <li>• Enhance water quality and quantity management.</li> <li>• Nutrient removal.</li> <li>• Enhance habitats for various species, contributing to biodiversity.</li> </ul>
Managing Agencies	<ul style="list-style-type: none"> <li>• South Florida Water Management District (SFWMD).</li> <li>• Florida Department of Environmental Protection (FDEP).</li> <li>• Florida Department of Agriculture and Consumer Services (FDACS).</li> </ul>
Buyer	South Florida Water Management District
Sellers	<p>Ranchers who meet the following criteria:</p> <ul style="list-style-type: none"> <li>• Have lands classified as ranchlands and be engaged in the production of beef cattle;</li> <li>• Be located within the Northern Everglades;</li> <li>• The ranchlands containing the proposed water management alternatives (WMAs)—defined as combinations of construction and management practices selected by the landowner and implemented within a defined area of a working ranch—should have been enrolled, or the enrollment process initiated, by the solicitation release date.</li> </ul>

	<ul style="list-style-type: none"> <li>• Be in compliance with SFWMD rules and regulations and federal wetlands regulations with regard to all of the lands in his or her ownership.</li> </ul>
Defined Ecosystem Services Eligible for payment	<ul style="list-style-type: none"> <li>• Amount of retained water (per acre-ft) in Northern Everglades</li> <li>• Amount of nutrient (lbs. of phosphorus or nitrogen) removed from off-ranch water</li> </ul>
Payment rule	<ul style="list-style-type: none"> <li>• Payment for the costs of design, permitting, and construction, reimbursed through the submission of receipts to support actual costs incurred.</li> <li>• A lump sum annual service payment covering project operation and maintenance.</li> <li>• Payments for water retention and nutrient reduction for verified amount.</li> </ul>

Note: Data compiled from Shabman & Lynch (2013), Shabman et al., 2015, and Lomeu et al. (2022).<sup>6</sup>

## Conclusion

In this article, we introduced the key concepts and principles of Payments for Ecosystem Services (PES), a policy approach that encourages landowners and other ecosystem service providers to maintain and restore ecosystem services. These programs provide mechanisms that use economic tools to increase the provision of ecosystem services. In Florida, initiatives like the Northern Everglades Payment for Environmental Services Project (NE-PES) have enabled ranchers to manage their lands sustainably, showcasing the potential of PES to transform conservation efforts in the state. The design and technical aspects of the NE-PES program in Florida will be examined in the follow-up article, “*Payments for Ecosystem Services in Florida’s Landscape: Introduction to the Northern Everglades Payment for Environmental Services Program.*”

For additional information, contact official state agencies: the Florida Department of Environmental Protection (FDEP), Florida Department of Agriculture and Consumer Services (FDACS), and Florida’s Water Management Districts.

## Reference

Bohlen, P. J., Lynch, S., Shabman, L., Clark, M., Shukla, S., & Swain, H. (2009). Paying for environmental services from agricultural lands: An example from the northern Everglades. *Frontiers in Ecology and the Environment*, 7(1), 46–55. <https://doi.org/10.1890/080107>

- Boughton, E. H., Quintana-Ascencio, P. F., Jenkins, D. G., Bohlen, P. J., Fauth, J. E., Engel, A., Shukla, S., Kiker, G., Hendricks, G., & Swain, H. M. (2019). Trade-offs and synergies in a payment-for-ecosystem services program on ranchlands in the Everglades headwaters. *Ecosphere*, 10(5), e02728. <https://doi.org/10.1002/ecs2.2728>
- Farley, J., & Costanza, R. (2010). Payments for ecosystem services: From local to global. *Ecological Economics*, 69(11), 2060–2068. <https://doi.org/10.1016/j.ecolecon.2010.06.010>
- Frey, G. E., Kallayanamitra, C., Wilkens, P., & James, N. A. (2021). Payments for forest-based ecosystem services in the United States: Magnitudes and trends. *Ecosystem Services*, 52, 101377. <https://doi.org/10.1016/j.ecoser.2021.101377>
- Jack, B. K., Kousky, C., & Sims, K. R. (2008). Designing payments for ecosystem services: Lessons from previous experience with incentive-based mechanisms. *Proceedings of the national Academy of Sciences*, 105(28), 9465-9470.
- Lomeu, A., Shukla, A., Shukla, S., Kiker, G., Wu, C.-L., Hendricks, G. S., Boughton, E. H., Sishodia, R., Guzha, A. C., Swain, H. M., Bohlen, P. J., Jenkins, D. G., & Fauth, J. E. (2022). Using biodiversity response for prioritizing participants and service provisions in a payment-for-water-storage program in the Everglades basin. *Journal of Hydrology*, 609, 127618. <https://doi.org/10.1016/j.jhydrol.2022.127618>
- Polasky, S., Lewis, D. J., Plantinga, A. J., & Nelson, E. (2014). Implementing the optimal provision of ecosystem services. *Proceedings of the National Academy of Sciences of the United States of America*, 111(17), 6248–6253. <https://doi.org/10.1073/pnas.1404484111>
- Shabman, L., & Lynch, S. (2013). Moving from Concept to Implementation: The Emergence of the Northern Everglades Payment for Environmental Services Program. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2318133>
- Shabman, L., Lynch, S., & Boughton, E. H. (2013). Acquiring Water Services From Northern Everglades Ranchlands: Assuring buyers that they get what they paid for. *Rangelands*, 35(5), 88-92.
- USDA. 2025. Retrieved February 6, 2025, from <https://www.climatehubs.usda.gov/ecosystem-services>.
- Wallace et al. (2023). *FA252/FA252: How Ecosystem Services are Measured and Why it Matters for Florida*. Ask IFAS - Powered by EDIS. <https://doi.org/10.32473/edis-FA252-2023>.
- Wunder, S. (2015). Revisiting the concept of payments for environmental services. *Ecological economics*, 117, 234-243. <https://doi.org/10.1016/j.ecolecon.2014.08.016>,