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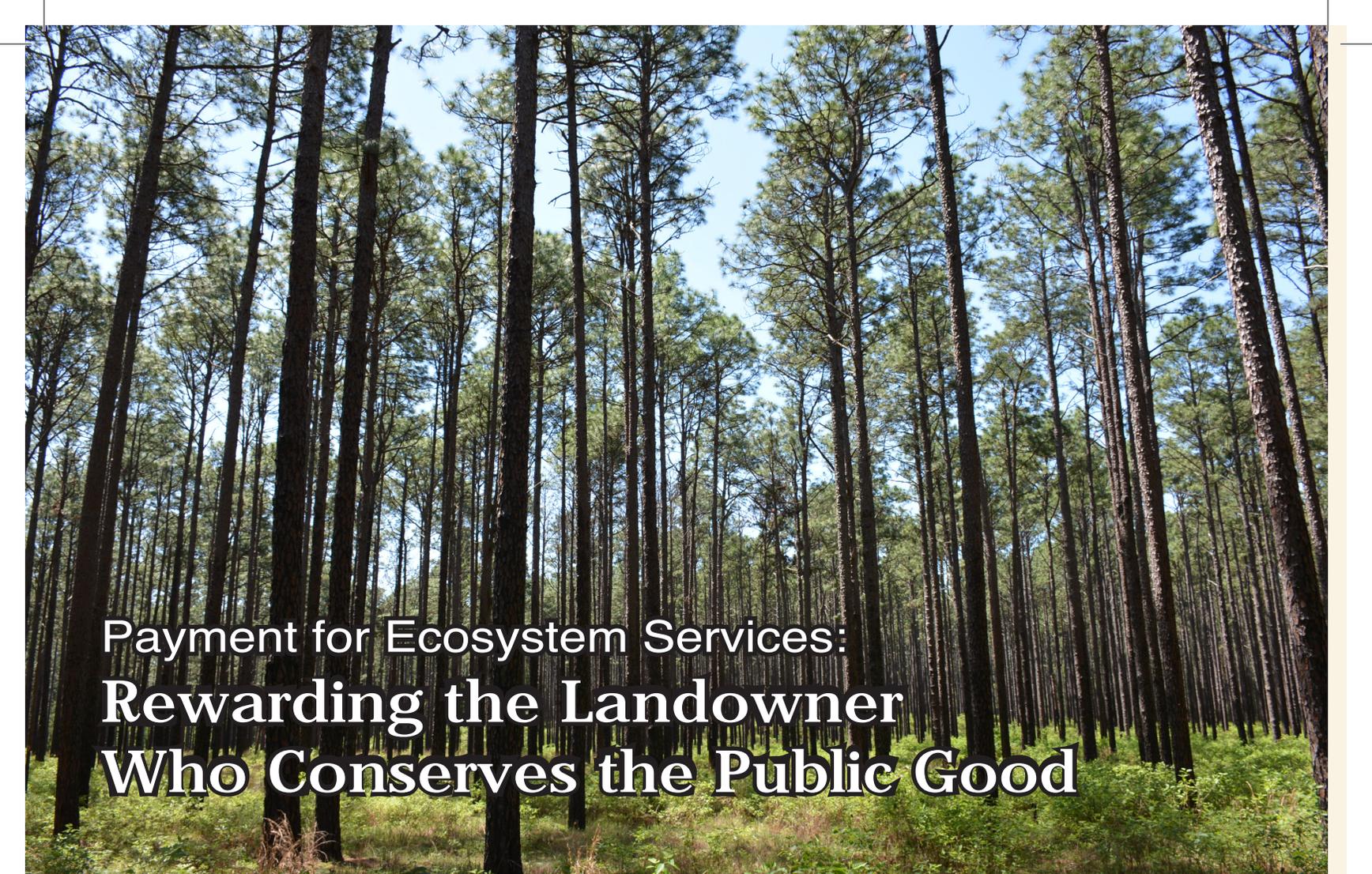
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Payment for Ecosystem Services: Rewarding the Landowner Who Conserves the Public Good

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It has been said that money doesn't grow on trees, but any forest landowner or manager will tell you that's not exactly true—especially when observing a harvesting operation or managing dues from your hunting lease. While timber production and recreation are the most frequently monetized services provided by forests, what about the other goods and services they provide on a continuing basis? Are you or other forest landowners in your area being monetarily rewarded for soil stability, flood control, water filtration, air quality, and the other critical services—known as ecosystem services—provided by forests?

In 1934, the *Journal of Forestry* published an article by Aldo Leopold titled *Conservation Economics*. In this Depression-era article, Leopold decried the fact that public funds were necessary to fix or “cure” critical conservation problems on private land in the

United States.

Leopold eloquently argued for preventing land and conservation problems rather than curing after the fact. For example, public funds were being used in the 1930s to plant trees in some areas and build dams in others to “cure” soil erosion due to hillside farming and the over-grazing of pastures. Leopold pointed out that it would be much less expensive and much more effective if the erosion was prevented by ensuring that landowners were rewarded for forestry and farming practices that produced stable soils, clean water, high quality wildlife habitat, and other desirable products and services from the land.

Fundamentally, Leopold was arguing for the protection of ecological public goods through what is now known as “payment for ecosystem services.” Payment for ecosystem services (PES) comprises a diverse array of strategies that provide financial incentives to landowners or land managers whose management decisions produce benefits that would otherwise go unrewarded.

As stated by Leopold (1934, underscore added): “This paper forecasts that conservation will ultimately boil down to rewarding the private landowner who

conserves the public interest. It asserts the new premise that if he fails to do so, his neighbors will ultimately pay the bill. It pleads that our jurists and economists anticipate the need for workable vehicles to carry that reward.”

In recent years, ‘workable vehicles’ to reward landowners who ‘conserve the public interest’ have become more numerous and more diverse for many highly interdependent reasons. For example, there is an increasing awareness that ecosystem services are essential for human survival and prosperity in the long run. The Millennium Ecosystem Assessment (2005) stated that “The human species, while buffered against environmental changes by culture and technology, is fundamentally dependent on the flow of ecosystem services.” Awareness of this long-term dependency is increasing at local, regional, and global scales, and in nearly all societies and demographic groups.

Threats to ecosystem services have increased greatly in recent years. This includes increased human population and associated environmental impacts, as well as pressures for more developed land uses. From 1997 to 2017, Texas lost more than 2 million acres of land to non-agricultural use (Smith,

2019), and as the projected population continues to expand over the next 30 years, so too will the conversion of working forests and agricultural lands to housing and other uses that are deemed “higher and better” from a financial standpoint (see Beuter and Alig 2004, Wear and Newman 2004, and Kline et al. 2004). Developed land values have sky-rocketed in many areas, while current and projected timber revenues have been decreasing in real terms. The result has been a very high level of pressure on sustainably managed forests as a long-term land use. The need to monetize ecosystem services associated with forests has therefore increased very significantly in recent years.

Thankfully, communication technology now allows much more effective and inexpensive information flow among potential buyers/supporters of ecosystem services and landowners, land managers, and others who influence their production and use. Needs and opportunities can be more effectively and inexpensively communicated, and these ‘workable vehicles’ can be developed and implemented more easily at all geographic levels.

Our goal is to provide landowners and managers with a diverse typology of approaches to monetize forest and working-land-based ecosystem services to reward landowners for conservation decisions, practices, and land uses that conserve the public interest in a variety of ways and geographic scales. If, as stated by Leopold, conservation ultimately ‘boils down’ to rewarding the private landowner who conserves the public interest, these ‘workable vehicles’ are intended to carry that reward in monetary terms.

These workable vehicles have come a long way in the 85 years since Conservation

Economics was published. As of 2018, there were more than 550 PES programs across the globe, with combined annual payments of over \$36 billion (Salzman, et. al. 2018). The monetization of these services may involve payments, of course, but they also include indirect payments to landowners. For example, in 2014, participants of 58 different state property tax programs across the U.S. amassed more than \$1.6 billion in annual property tax reduction (Kilgore, et. al. 2017).

At the end of this article is a graphic containing the basic types of ‘workable vehicles’, with a brief explanation of each basic type, and an example at three geographic scales. A digital version of this typology, as well as links to each of the examples, can be accessed at www.forecosystemservices.weebly.com.

We hope the typology will promote a greater understanding of the increasing opportunities available to forest landowners and managers, which may also promote ideas for new types of vehicles and/or hybrid vehicles suitable for specific conservation issues, management goals, or geographic areas. In fact, there are already examples of such ‘blended’ or ‘hybrid’ vehicles that do not fit neatly within our typology. For example, the Malua Wildlife Habitat Conservation Bank incorporates aspects of direct purchase, voluntary credit trading, as well as eco-marketing (Kenny, 2008).

The examples we provide are not exhaustive, and we do not focus on whether the vehicles used as examples in the typology are effective (i.e., we are not advocating specific vehicles as more effective than others). We, therefore, use Leopold’s term ‘workable’ only in the sense that these vehicles are being used today.

As you explore these examples, we encourage you to contemplate incentives best

sued for modern conservation challenges and how new, customized iterations of these ‘workable vehicles’ can be developed based on conservation needs and management goals. We believe this was Leopold’s intent when he stated that his paper “pleads that our jurists and economists anticipate the need for workable vehicles to carry that reward.”

Whether we call them “workable vehicles” or “market-like instruments,” forest landowners should see increasing opportunities for income for conserving the public interest. We must continue to work together—through university research and outreach, as well as through public agencies and private sector groups—to develop and share these vehicles. Keeping healthy, productive forests on the landscape is a goal that’s too important to not do well—and as stated by Benjamin Franklin, “Well done is better than well said.”

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What Are Ecosystem Services?

The Millennium Ecosystem Assessment (2005) defined ecosystem services as the “benefits that people receive from ecosystems.” The Assessment placed ecosystem services into four categories:

Provisioning Services

- Food
- Fiber
- Fuel
- Timber
- Wildlife

Regulating Services

- Erosion control
- Flood control
- Air quality
- Water quality



Supporting Services

- Nutrient cycling
- Soil formation
- Biodiversity

Cultural Services

- Recreation
- Aesthetics
- Spiritual beliefs

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	Basic Types of ‘Workable Vehicles:’ <i>Our typology includes examples that reflect public and private involvement, direct and indirect reward systems, and emphasis on a single as well as multiple conservation values.</i>	Examples by Geographic Scale		
		Local Community or sub-state level	Regional State, Multi-state, or National	Global Multiple Nations
Direct Purchase and/or Payments	Land Purchase: <i>The buyer may be public or private. Ownership may be permanent, or the buyer may sell the land with permanent restrictions on future use.</i>	New York City Watershed Program	USDA Healthy Forests Reserve Program	Rainforest Trust
	Purchase of Development Rights: <i>The buyer acquires the right to limit or prevent certain types of developed land uses in the future.</i>	Town of Dunn Land Trust Commission	New York State Department of Agriculture and Markets Land Trust Grants	Natura 2000
	Purchase of Long-term Easements: <i>The buyer acquires long-term restrictions on land use and/or management practices that conserve the public interest.</i>	Baraboo Range Protection Program	USDA Agricultural Conservation Easement Program	United Nations Development Program Debt for Nature Swaps
	Payment for Products, Access, or Other Rights/ Services: <i>This includes many private and public sector arrangements and deals that monetize specific values.</i>	X-Bar Ranch Nature Retreat	USDA Conservation Reserve Enhancement Program	United Nations FAO REDD+ framework
Offsets	Regulatory Offsets: <i>Government regulations or judicial rulings may require public agencies and/or private firms and individuals to mitigate for land use in other areas.</i>	City of Logan Australia vegetation offsets	Forest Vegetation Restoration Fee	European Union Habitat Directive
	Voluntary Offsets: <i>Individuals, private companies, governments and/or NGOs may voluntarily create protected areas that are set aside for conservation practices.</i>	Ecological Society of America offset for annual meeting	Wal-Mart Acres for America	The Nature Conservancy Carbon Offset Program
Credit Trading	Regulatory Cap: <i>A market-based transaction through which entities may purchase credits from others who meet regulatory compliance restrictions established by law.</i>	Tokyo Cap-and-Trade Program	Northeast Regional Greenhouse Gas Initiative	European Union Emissions Trading System
	Voluntary Cap: <i>A initiative by which entities voluntarily reduce or mitigate environmental impacts without the mandate of law.</i>	Kalamazoo River Watershed nutrient trading program	Columbian Voluntary Carbon Market Platform	Cool Effect
Eco-labeling	<i>This vehicle type includes “green” marketing and certification for product differentiation, value added, and/or preferred supplier status.</i>	Sustainability at Work Certification	Blue Angel	Bird Friendly Coffee
Taxes	Property Tax Incentives: <i>Exemptions may be used, or current valuation may be used to lower property taxes for specific land uses.</i>	Agriculture, Timberland, and Wildlife Management Special Use Appraisal	Maine Land Use Programs	None currently identified as of 12/10/2020
	Other Tax Incentives: <i>Conservation practices, conservation easements or donation of land may be used to lower state or federal income taxes.</i>	Columbia Land Conservancy	Georgia Conservation Tax Credit Act of 2006	None currently identified as of 12/10/2020