



VOLUNTARY PAYMENT FOR ECOSYSTEM SERVICES (PES) PROGRAMS

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Sustainable Conservation

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I. EXECUTIVE SUMMARY

In the spirit of moving the field of Ecosystem Services forward, Sustainable Conservation has written a primer on voluntary Payment for Ecosystem Services (PES) programs. We wish to share our most meaningful lessons learned regarding what needs to be in place for a voluntary, non-grant funded PES program to successfully operate. This primer is grounded in the real-life successes and challenges of our four-year endeavor in the Mokelumne River Watershed, California. We have written this primer because we wish to see our colleagues succeed in creating voluntary incentives for restoration and subsequently protect and enhance the precious natural resources that we all depend upon. Our lessons learned will be valuable to keep in mind when piloting voluntary endeavors, particularly with private investors.

Sustainable Conservation sought to go beyond public funding sources for habitat restoration and water quality improvements, and attract private sector investors to participate. While there were substantive results from our endeavors, including development of a riparian ecosystem function quantification tool, we conducted several purposeful analyses that revealed insurmountable barriers. Consequently, we decided not to establish a stand-alone PES program in the Mokelumne River Watershed.

Part of collaboration is to enable others to benefit from wisdom learned along the way, and it is through this intention that Sustainable Conservation is sharing its most meaningful lessons learned regarding what needs to be in place for a non-grant funded PES program to successfully operate:

#1. The business case for private sector investment in Ecosystem Services must be clearly linked to risk reduction. Risk to operations, supply chain, reputation or regulatory compliance needs are the most compelling factors for the private sector to invest. While investment in risk reduction can be voluntary, the risk needs to be real and urgent to investors, or perceived as imminent.

#2. The shared interest between project providers' environmental goals and project investors' needs must be identified prior to designing the PES program itself. A program proponent should work iteratively with both sides of supply

and demand. While it is not possible to guarantee that demand will continue indefinitely over time in a voluntary setting, balancing investors' motivations with project providers' interests can help ensure there will be a sufficient volume of demand for projects that will produce desirable environmental benefits.

#3. When setting up a PES Program, all parties – the initial program proponents, project providers, and investors – need to mutually agree upon a PES administrator. The PES administrator needs to be an entity that can implement the articulated program vision, have the technical capacity to use quantification tools, coordinate with stakeholders across the region/watershed, and engage private and public investors. Trust and capacity are fundamental.

#4. There must be a high volume of projects and technical proficiency to help offset the transaction cost of using quantification tools to measure environmental benefit. A PES program needs an administrative structure that can be self-funded over the long-term by using a fee structure that is considered reasonable by project providers and investors.

II. BACKGROUND

In 2011, Sustainable Conservation set out to create the first voluntary Payment for Ecosystem Service (PES) program for habitat restoration and water quality in the Mokelumne River Watershed. Our underlying goal was to create a new incentive for California landowners to implement restoration projects, as well as a mechanism to enable payment for the services provided.

A PES program is an exchange in which a well-defined ecosystem service, such as cold water temperature or sediment reduction, is bought by investors from project providers. PES can be voluntary or part of a regulatory solution. As a best practice, metrics for a PES program are pre-defined by both project providers and investors, and a quantification tool is developed to measure the uplift in specific benefits provided. It is essential to have investors involved with pre-defining the desired benefits at an early stage to ensure there will be ample participation in the PES program. Their desires must be balanced with the natural resource goals that local stakeholders and project providers want to measure and improve.

While voluntary PES programs for restoration have been implemented in other parts of the United States and studied in academic settings, this effort was the first of its kind for California. In particular, Sustainable Conservation sought to go beyond public funding sources for habitat restoration and water quality improvements, and attract private sector investors to participate.

To ground this effort and build buy-in, Sustainable Conservation collaborated with local stakeholders on a regular basis to articulate a shared vision which included: a) accelerated community-based restoration, b) increased public and private investment for local projects, and c) a mechanism to transfer resources from investors to providers in exchange for quantified environmental outcomes.

Over the course of four years, Sustainable Conservation and a core team of partners built a riparian ecosystem function quantification tool and developed a program operations and management system that would enable consistent tracking and reporting of environmental benefits for project providers and investors. We also worked on designing the PES program and administrative structure to be self-funded over the long term. We conducted an analysis to estimate ongoing costs of running a PES program, which informed revenue requirements that would need to be generated through fees. This administrative structure, once operational, would have provided the mechanism to buy and sell units of environmental benefits generated from restoration and stewardship activities in the Mokelumne River Watershed.

While there were substantive results from our endeavors, we conducted several purposeful analyses that revealed insurmountable barriers. Consequently, we decided not to establish a stand-alone PES program in the Mokelumne River Watershed.

Given the limited financial resources available for conservation activities, we wish to see our colleagues succeed in both creating new incentives for voluntary stewardship and restoration, and maximizing environmental benefits. As such, we offer a primer on voluntary PES programs grounded in our real-life experience. This case study highlights successes and challenges, and provides lessons for practitioners to keep in mind as we collectively move the field of Ecosystem Services forward.

III. PRIMER

Ecosystem Services Defined

Ecosystem services are the valuable benefits that nature provides such as clean drinking water purified by functioning wetlands and riparian forests, abundant crops and native wildflowers pollinated by native bees and honey bees, and bountiful fish populations living in intact rivers. Healthy ecosystems provide these benefits for free, while degraded or modified landscapes require restoration and ongoing stewardship activities to reinstate nature's benefits to society.

Since investing in restoration and stewardship is often more cost-effective than man-made or hardscape solutions to the problem of degraded environmental services, Sustainable Conservation seeks to create incentives that reward restoration and lead to increased production of ecosystem goods and services.

Spectrum of Conservation Incentives

There are many types of incentives that encourage and reward a variety of ecosystem stewardship activities which provide valuable benefits to society. These incentives vary according to their surrounding regulatory context and as a result, also vary in the degree of precision that is required for measuring environmental benefits. On one end of the conservation incentive spectrum, market recognition programs can offer a higher premium for producing goods that benefit the environment. Measurement of environmental benefits is often qualitative, with producers providing a report of actions taken to comply with certification or labeling requirements.

At the other end of the incentive spectrum, in the regulatory context, mitigation and credit trading offset programs are set up to compensate for expected adverse impacts to the environment and preserve, enhance, restore or create a wetland, stream, or habitat area in a similar nearby ecosystem. In some cases, a mitigation bank will be established in a specific area to concentrate overall conservation benefits instead of separate actors providing random acts of restoration across a fragmented landscape.

A voluntary PES program falls in the middle of the conservation incentive spectrum. A PES program is an exchange in which a well-defined ecosystem service is bought by at least one investor from a minimum of one provider. Metrics are pre-defined by investors and providers, and a quantification tool is developed to measure the uplift in specific benefits provided by restoration activities. When PES programs are voluntary in nature, demand for services needs to be coupled with a risk reduction need of the private sector investor.

MARKET RECOGNITION	VOLUNTARY ACTIONS	REGULATORY COMPLIANCE
<ul style="list-style-type: none"> • Organic certification • Green labeling 	<ul style="list-style-type: none"> • Donated easements • Stewardship ethic • Peer pressure • Payments for ecosystem services 	<ul style="list-style-type: none"> • Mitigation banking • Credit trading



A few examples of restoration and stewardship activities eligible for a voluntary PES program include riparian restoration projects that:

- Reduce supply chain and operational risks to companies or public utilities by protecting and ensuring clean water.
- Reduce possible regulatory or reputational risks to company facilities, manufacturing plants, and public utilities by protecting cold water temperatures. This benefits entities that require thermal discharges to streams or rivers for ongoing operations.

By investing in projects that improve resource conditions, such as water quality impairments, this can prevent the need for regulation and protect public perception of an entity.

Key Parties Defined, with Mokelumne Examples

This section describes the key parties and resources of a voluntary PES program, and grounds these definitions with what transpired in the pilot Mokelumne PES program:

PES Program Proponent: This will typically be a local stakeholder group or conservation organization interested in improving financial incentives for restoration and other land management activities in a specific region. The PES proponent is also often involved with developing a quantification tool, or contracting with a partner to conduct tool development.

In the Mokelumne PES program, Sustainable Conservation and Environmental Defense Fund were the initial PES proponents that organized a core team of partners. From 2011 – 2015, we collaborated with Environmental Incentives, Stillwater Sciences, the Sierra Nevada Conservancy, The Nature Conservancy (TNC) California and two watershed groups – Amador Calaveras Consensus Group and the Lower Mokelumne River Watershed Stewardship Steering Committee. The two watershed groups were comprised of landowners, an agricultural trade association, a local Resource Conservation District, water authorities, environmental organizations, state and Federal resource agencies, a municipal water utility district, and technical service providers.

Together, we articulated a vision of accelerated community-based restoration, increased investment from beneficiaries to landowners and restoration practitioners, and quantified environmental outcomes.

Shared desired outcomes included:

- Increased public and private investment in quantified ecosystem services provided by landowners and land managers implementing restoration practices in a voluntary setting;
- Corporate investment from downstream beneficiaries;
- Improved effectiveness of public natural resource agency grants;
- A user-friendly, predictive quantification tool to improve the ability of project investors to target their resources to projects that achieve more environmental outcomes for the investment; and
- A management system with verification and monitoring guidance so that project outcomes are consistently reported and tracked over time.

Project Providers: Project providers will be either public or private landowners, and represent the supply side of the PES program. Project providers conduct activities to improve agreed upon ecosystem services on their landscapes, and provide the benefits desired by project investors. All project providers submit projects to be approved by the PES administrator (defined below) for an incentive payment in exchange for providing the project's quantified outcomes.

In the Mokelumne River PES program, private landowners acted as project providers during the pilot phase.

Project Investors/Beneficiaries: Public and private entities represent the demand side of the PES program and invest in the projects managed by the PES program because they benefit from their results, including risk reduction and/or improved certainty of ongoing operations.

In the Mokelumne River Watershed, Sustainable Conservation interviewed public and private entities as potential investors, including:

- Businesses and public actors operating in or directly dependent on the Lower Mokelumne watershed for natural resources. We spoke with two crop associations, two major wineries, one irrigation district, one utility, and one city entity.

- Businesses downstream of the Lower Mokelumne watershed, dependent on natural resources from the Lower Mokelumne, but that do not recognize the direct link. We spoke with two multi-national food & beverage companies with manufacturing facilities in the East Bay; and one salmon fishing boat and gear company.
- Businesses completely outside of the Lower Mokelumne watershed with no operations or suppliers in the region. Their only connection is through customers in the watershed who may buy their products. We spoke with two major beverage companies.

PES Administrator: This will be an entity or set of entities set up to: a) implement the articulated program vision, b) have the technical capacity to use a quantification tool, c) coordinate with stakeholders across the region/watershed, and d) engage private and public investors in transactions of ecosystem services.

In the Mokelumne River watershed, we did not hire nor establish a PES administrator for the program because there was not enough demand by investors to support a program.

PES Program Location: This is a defined area in which there are degraded environmental services that will be improved by stewardship and restoration projects at a lower cost than hardscape solutions. These enhanced environmental services will provide benefits to local and downstream entities.

In our case, the Mokelumne watershed provides significant environmental and economic benefits to the state and region, including hydroelectric energy, high value crops, timber, habitat for wildlife, and recreational benefits such as whitewater rafting and trout fishing. The river delivers drinking water to 1.4 million people and provides agricultural water supply and storage to irrigate over 700,000 acres of vineyards, walnuts, almonds, cherries and other crops.

Quantification Tool: A PES program will have a quantification tool that is designed to measure specific outcomes provided by restoration and other land management activities. The tool will incorporate a set of metrics (such as water quality, sedimentation, or shade) that is ideally agreed upon by investors and providers, so that the tool can measure the uplift in services desired by both parties. This tool will help the PES administrator to quantitatively evaluate the respective benefits of each project, and predict environmental outcomes over

time before investment decisions are made, enabling projects to be prioritized for public and private investment, as well as investors' understanding of the environmental return in exchange for their funding.

In the Mokelumne PES program, we began tool development after identifying project providers' priorities and desired outcomes for the watershed. Detailed information about the Mokelumne Riparian Habitat Quantification Tool can be found here: bit.ly/ripariantool.

The quantification tool did not reflect investors' interests, as those were identified later in the process.

IV. OUTCOMES OF THE VOLUNTARY MOKELUMNE PES PROGRAM

Mokelumne PES Program Strengths

#1. Cross-sector Collaboration: Our effort convened stakeholders that had not previously worked together. It proved to be a successful model for building coordination and communication across groups working in a diverse watershed to address natural resource concerns facing forests, ranches, and agricultural lands. The stakeholder working group developed: a) an action plan outlining ongoing coordination to share opportunities, successes, and lessons learned from restoration efforts, quantify the results, and explore collective funding, and b) a commitment to implementing the action plan.

#2. Value of the Regional Quantification Tool: In the Lower Mokelumne riparian ecosystem, we developed a riparian ecosystem function quantification tool that took into account the characteristics typical of riparian ecosystems across the broader Central Valley in California. Subsequent to our pilot, the Central Valley Habitat Exchange has adapted the tool for its own use. The quantification tool also provides value to public agencies, such as the US Fish and Wildlife Service (USFWS), Natural Resources Conservation Service (NRCS), and East Bay Municipal Utility District (EBMUD), who need to evaluate and prioritize projects eligible for limited grant funding. There is great potential with this tool, provided that there are the staff resources to utilize it to screen eligible projects.

#3. Operations Manual: We created an Operations Manual that established rules for how a transaction of environmental benefit can be exchanged with guidance for each

step necessary to do a transaction. Furthermore, we developed operational assumptions about the costs to administer a PES program, including the number of projects that can be supported annually and administrative staff costs per project.

#4. Program Evaluation: As we began to evaluate the potential of the voluntary PES program, we recognized that demand did not match the project supply. This helped us to determine that while we would not set up a program, we would stay involved in our pilot region to learn from the experience and share the knowledge with our conservation peers. From these experiences, we learned how to assess the feasibility of a PES program, key drivers for private investment, and requirements for tool utilization.

Primary Barrier to Success

Mismatch Between Project Providers and Private Sector Interests:

We initiated our pilot in the Mokelumne by first engaging with local stakeholders and potential project providers. This profoundly shaped the vision of the PES program as well as the development of the quantification tool.

In hindsight, we would have greatly benefited from engaging with the private sector concurrently with the local stakeholder outreach effort. This would have enabled us to factor in their primary motivation for participation – risk reduction to their supply chain and overall operations, specifically protecting ample water supply in the region. We learned these companies were not motivated to invest in restoration projects that created an uplift in habitat values (including shade and large woody debris) nor water quality (sediment reduction and cold water temperatures) because those environmental benefits did not mitigate any risks to their bottom line nor address longer term business viability.

By the time we understood this, the quantification tool had already been comprehensively developed and we had already begun to create a pipeline of possible projects. Without demand from the investor side, it did not make sense to establish an administrator for this voluntary PES program. It also limited tool adoption to public natural resource agencies and the Central Valley Habitat Exchange, who all have goals specific to riparian habitat ecosystem health and were interested in the metrics that we had developed. While it will be put to good use by the Central Valley Habitat Exchange, who aims to more effectively target public and

mitigation restoration funding and achieve the biggest environmental bang for the buck, it did not achieve our goal of attracting private sector investment to the region.

V. KEY LESSONS LEARNED

In moving this field forward, we encourage our colleagues to keep these essential lessons in mind when creating new PES programs for restoration and stewardship:

#1. The business case for investment in Ecosystem Services must be clearly linked to risk reduction. A key driver for engaging conservation funders from the public or private sector is demonstrating that investment in Ecosystem Services would result in risk reduction to their operations, supply chain, reputation or regulatory compliance needs. While risk reduction can be voluntary, the risk needs to be real and urgent to investors, or perceived as imminent.

#2. The shared interest between stakeholders' environmental goals and investors' needs must be identified prior to designing the PES program.

During the discovery phase, we recommend identifying investor priorities and local stakeholder goals concurrently. There has to be demand for the types of projects that will be offered. Conversely, we do not recommend letting investor priorities get too far ahead of the supply side because then there may not be buy-in for providing projects. For long-term success, a PES program proponent should work iteratively with both the supply and demand sides.

Balancing investors' motivations and project providers' interests should help ensure both a sufficient volume of projects that produce the desired environmental benefits and the possibility of sustained investment from public and private buyers over time. Aligning supply and demand will also enable prioritization of which metrics to include during development of a quantification tool. With a tool, the PES program administrator can model the uplift in services from proposed project, investors can evaluate the environmental return on investment and how it reduces their risk, and providers can adjust their restoration activities to ensure the incentive is worthwhile. Ultimately, the services the community wanted to provide in the Mokelumne, while well-matched for public sector agency interests, were not compatible with the interests of the private sector investors.

#3. When setting up a PES Program, all parties need to agree upon a PES administrator. It is important to include the initial program proponents, project providers and investors in making this decision so that the entity has the capacity and is trusted by all parties involved. The PES entity can be a single organization or a set of players that are working together and holding the shared vision. The PES administrator needs to be able to articulate the program vision, have technical capacity to use a quantification tool, coordinate with stakeholders across the region/watershed, and engage private and public investors. The staying power of this entity is essential for long-term success.

#4. There must be a high volume of projects and technical proficiency to help offset the transaction cost of using a quantification tool. Administrative feasibility plays a big role in the long-term success of a PES program. A PES program needs an administrative structure that can be self-funded over the long-term by using a fee structure that is considered reasonable by project providers and investors and can sustain the administrator's activities. In most cases, project providers and investors would pay either a flat fee or percentage of a project cost to pay for the PES administrator to calculate a project's (or set of projects') benefits and facilitate the transaction of payment for ecosystem services. The more projects that are evaluated using a quantification tool, the easier it is to offset the transaction cost of the staff time required to use it.

VI. CONCLUSION

While creating incentives for rewarding restoration is complex and dependent on a variety of local and downstream factors, we learned many valuable lessons that universally apply to voluntary PES programs. One must evaluate local conditions, and the pressures faced by internal and external actors concurrently. When partnering with private sector investors, identification of potential risk reduction is paramount. If the alignment between environmental challenges faced by local stakeholders and risk reduction concerns of investors cannot be agreed upon, a voluntary PES program is not the appropriate conservation approach to pursue. We hope these lessons provide guidance to our colleagues and help ensure success in future conservation incentive endeavors.