



DEVELOPMENT OF A
MARKET-BASED CONSERVATION PROGRAM
IN THE UPPER GREEN RIVER BASIN OF WYOMING:
FEASIBILITY STUDY



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1. BACKGROUND

The Upper Green River Basin is the headwaters of the Colorado River System and home to many wildlife species with environmental and recreational significance. The basin has recently experienced both residential growth and an energy boom from natural gas extraction. These activities have increased economic opportunities in the basin but have also placed development pressures on land and water resources.

For many years, landowners in the Upper Green River Basin have been discussing ways to generate revenue from management activities that provide social and natural resource benefits beyond the ranching community. These conversations led to exploration of a possible Payment for Ecosystem Services (PES) program, a market-based approach to provide financial compensation to private landowners for engaging in beneficial stewardship activities that maintain or enhance the provision of ecosystem services. For example, an energy company that is required by regulatory agencies to invest in conservation might pay a landowner to implement practices on their land that result in conservation outcomes. Such a program could provide an additional stream of revenue to landowners to help sustain their ranch operations, maintain and enhance natural resources in the basin, and encourage responsible energy development.

In 2011, Sublette County Conservation District, The Nature Conservancy, and researchers from the University

of Wyoming set out to assess the feasibility of establishing a PES program in the Upper Green River Basin¹. The study explored (1) which ecosystem services are highly valued by potential funders; (2) which practices can feasibly be implemented by landowners and what contract features will most induce them to participate; and (3) what features are necessary to ensure the relevant regulatory agencies sign off on conservation undertaken through the exchange. This extension bulletin reports findings from the feasibility analysis.

Ecosystem services are the benefits people obtain from ecosystems. Ecosystem services include traditional commodities such as food and fiber, regulating/provisioning services such as water purification and nutrient cycling, and cultural services such as recreation (Millenium Ecosystem Assessment 2005).

The primary method used to scope feasibility was to conduct focus groups and interviews with stakeholders in the basin and across the state of Wyoming. Focus groups were comprised of potential buyers, potential sellers, and representatives from relevant state and federal regulatory agencies to better understand what a PES program would need to look like to meet the needs of buyers, sellers, and

¹ *This effort was funded by a 2011 Conservation Innovation Grant from the Wyoming office of USDA-NRCS (CIG Grant 69-8E49-1-108.)*

regulators.² This choice of method was based on our belief that local stakeholders are best able to identify potential pitfalls and opportunities of a PES program. A program shaped to local social and environmental conditions is more likely to be successful (Pagiola et al. 2002).

This feasibility analysis concludes that a PES program has significant potential, both in the Upper Green River Basin and across the state of Wyoming. We have laid the foundational work, through outreach and concept development, for the establishment of an operational PES program. As a result of this feasibility analysis, two related projects are moving forward: the Upper Green River Conservation Exchange, with a basin focus on greater sage-grouse habitat, mule deer habitat, and water resources (water quality and timing of flows); and the Wyoming Conservation Exchange, with a statewide focus on sage-grouse habitat.³

2. THE PAYMENT-FOR-ECOSYSTEM SERVICES CONCEPT

A commonly cited definition of PES is a “voluntary transaction in which a well-defined environmental service is bought by at least one buyer from at least one provider, if and only if the provider continues to supply that service (Wunder 2005).” The unit of “currency” is often referred to as a credit.

2 Initial focus groups with landowners were held in Pinedale and Marbleton (December 2011) and with energy companies in Denver (November 2011 and April 2012); with federal and state land management agency representatives (the Wyoming Department of Agriculture, Wyoming Game and Fish Department, Wyoming Department of Environmental Quality, the U.S. Bureau of Land Management, and the U.S. Natural Resources Conservation Service) in Pinedale (September 2011) and Cheyenne (January 2012).

3 Scoping efforts attracted the attention of Environmental Defense Fund (EDF), which is establishing conservation exchanges for the greater sage-grouse and other species across the western United States, with an eye toward improving the habitat of candidate species under the Endangered Species Act. EDF is now a full partner on this project, as we work to develop the tools and infrastructure necessary to operate a conservation exchange in Wyoming.

A PES program could potentially provide benefits to many stakeholder groups in the conservation community; however, as with any conservation program, the details are what will determine success or failure. The magnitude of benefits to different stakeholder groups depends on the institutional design of the exchange. Following are the basic relationships of various stakeholder groups to the PES program concept.

LANDOWNERS. Agricultural producers would be the potential credit “sellers” in a PES program. Their role is to generate credits by implementing management practices on their land to maintain or enhance wildlife habitat and water resources that generate measurable outcomes. A PES program could provide landowners with an additional stream of revenue to help them continue their ranching operations as a viable business.⁴

CREDIT BUYERS. The “buyers” in the PES program would be energy companies or other development interests seeking to offset their environmental impact by funding conservation-enhancing activities elsewhere (off-site mitigation). They could also be local/national conservation foundations or others looking for ways to support the high-quality recreational and environmental amenities that characterize the basin.

REGULATORY AGENCIES. Federal and state regulatory agency approvals can be necessary for the success of a PES program in two ways. First, a state or federal land management agency may own the land (surface or mineral rights) on which a disturbance occurs. Credit generation on public lands would also require approval from the land management agency. In either case, the land management agency would need to approve participation in the PES program to ensure they have met their stewardship obligations. Second, agencies have some ability to influence the management of public resources on private land. The most notable example is USFWS’ authority under the Endangered Species Act (ESA) to regulate “take” of threatened and endangered species.

4 USDA noted that environmental markets have the potential to be economic drivers in rural areas (USDA 2008).

A PES program clearly has potential to create new incentive for conservation on public and private lands. The question is whether a PES program could in practice benefit the Upper Green River Basin. What would such a program need to look like to be successful?

3. ECOSYSTEM SERVICES OF INTEREST AND GEOGRAPHIC SCOPE

The feasibility analysis focused on Sublette County, the northernmost portion of the Upper Green River Basin (Figure 1) in southwestern Wyoming. Total population in the county is 8,792 and land area is approximately 3.1 million acres (U.S. Census Bureau 2009). There are 398 farms and ranches in Sublette County, covering approximately 600,000 acres of deeded land and 2.5 million acres of public land (NASS 2014). Ranch operations in the basin primarily graze livestock and grow native grass/introduced hay mixes.

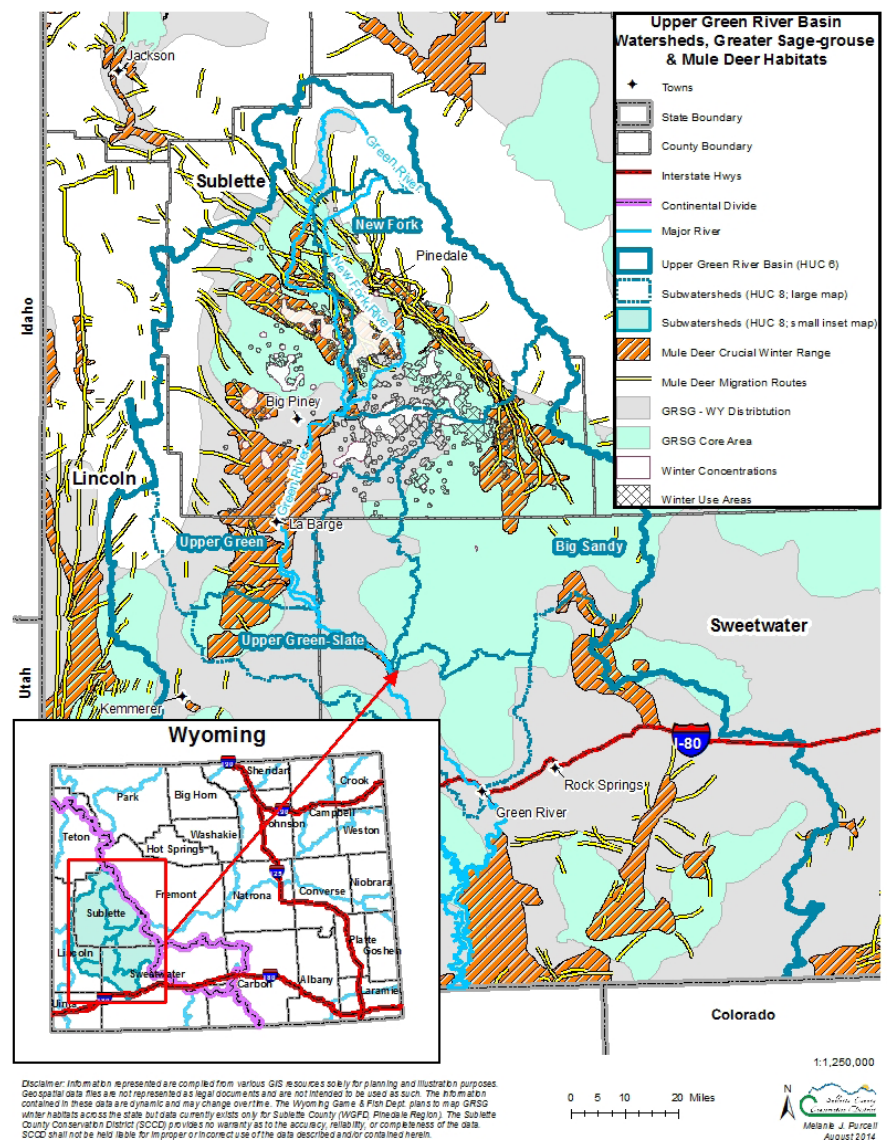
Scoping efforts identified three ecosystem services most likely to be of interest to buyers, sellers, and regulators.

GREATER SAGE-GROUSE HABITAT. Alteration and degradation of sagebrush habitat has reduced the amount of viable sage-grouse habitat across the western U.S. The sage-grouse now occupies only 56 percent of its historic range (USFWS 2013). Wyoming is home to approximately one-third of the entire sage-grouse population; one of the primary habitat management areas identified by Bureau of Land Management (BLM) and Wyoming Game and Fish Department (WGFD) is in the Upper Green River Basin (BLM 2010). The expansion of oil and natural gas facilities and other land-use changes in the basin have the potential for further major impact on sagebrush habitat. (See Figure 1.)

The sage-grouse is a candidate species under the ESA. The FWS has announced it will make

a listing decision on the sage-grouse in 2015. It is believed a listing under the ESA would result in major limitations on many human activities in Wyoming and elsewhere in the sage-grouse range. Sage-grouse leks are often found near wet areas, which are predominantly privately owned (SGI 2014). Developing incentives for maintaining and enhancing high-quality sage-grouse habitat on private lands is therefore important to the species.

MULE DEER HABITAT. Mule deer migration routes in the basin have been affected by energy and residential development (Sawyer et al. 2014). Mule deer have also been identified as a species of interest for the WGFD and



Source: Melanie Purcell, Sublette County Conservation District.
Figure 1. Ecosystem services of interest.

hunters alike. This region encompasses the Red Desert to Hoback mule deer migration corridor recently documented and mapped by Wyoming scientists (Sawyer et al. 2014).

HYDROLOGIC SERVICES. The Upper Green River Basin is the uppermost headwaters for the Colorado River System and produces about 1.2 million acre-feet of surface water per year. Surface water flows are highly affected by annual climatic variability; water supplies in “wet” years can be 3-5 times greater than dry years (ECONorthwest 2006), and changes in reservoir and irrigation management can affect availability and timing of flows. Landowners in the basin would like to be recognized for the non-agricultural benefits their land and water resource management generate for society.

The potential for enhancing or maintaining already existing high-quality ecosystem services in the Upper Green River Basin for sage-grouse habitat, mule deer habitat, and hydrologic services is significant.

4. STAKEHOLDER PERSPECTIVES ON THE PES PROGRAM CONCEPT

Following are key findings from our focus groups and interviews.

ECOSYSTEM BENEFITS

PERSPECTIVE POTENTIAL BENEFITS. The Upper Green River Basin has an abundant natural resource base. The basin is home to the largest mule deer herd in the U.S. and has the longest documented big game migration route in the continental United States. The basin possesses excellent sage-grouse habitat and is a headwaters to the Colorado River System. The Upper Green River Basin has also experienced significant energy development in recent decades. One of the largest U.S. natural gas reserves is located in the basin.

A well-designed PES program could help energy companies meet off-site mitigation requirements mandated by relevant permitting agencies in a scientifically robust fashion, and in a way that preserves the basin’s abundant natural resource base. A well-designed PES program could also provide a

scientifically defensible way for non-mitigation buyers to support conservation efforts in the basin.

SELLER (LANDOWNERS) PERSPECTIVE

Landowners see a PES program as a way to be recognized for the high-quality habitat and natural resource amenities that they provide through good stewardship of their land and water resources.

MARKET DESIGN PREFERENCES. Landowners like the idea of a “two-sided” market in which private companies pay for conservation, unlike many existing conservation programs that are government-funded. Many landowners prefer term leases to permanent easements, and shorter-term leases (of five to ten years) to longer ones (twenty years or longer).⁵ Program administration should be as local as possible. Landowners prefer to be paid (at least in part) at the start of the contracting period, so they have cash flow to fund the practices that need to be undertaken to generate conservation.

REGULATORY ASSURANCES. A Candidate Conservation Agreement with Assurances (CCAA) is a tool used by USFWS to provide incentives for non-Federal property owners to conserve candidate species with the intent of removing or reducing threats to the species so that listing may not be necessary. A CCAA provides landowners with assurances that, if they engage in voluntary conservation activities specified in the CCAA and the species of interest later becomes listed, they will not subsequently be required to implement additional conservation measures to protect the species (USFWS 2011). With this type of agreement in place, a landowner could continue to manage ranch operations as described in the CCAA management plan in the event the sage-grouse is listed as threatened or endangered under the ESA.

⁵ A survey of landowners in Sublette County designed to elicit their preferences on contract design for a PES program found no preference for short-term contracts relative to long-term contracts, though landowners considering selling their ranch operations did express a preference for shorter contract length (Duke et al. 2015).

For the sage-grouse habitat ecosystem service, a PES program would be most appealing to landowners if coupled with a programmatic agreement like a CCAA. The thought is that, if landowners agreed to conservation measures through a CCAA, they might be paid for them through the PES program. Regulatory assurances such as CCAs are necessary to maintain active and efficient habitat markets. Without them, buyers and sellers are less likely to participate.

PUBLIC LANDS. Ranches in the Upper Green River Basin rely on their public land grazing permits to operate a viable ranching business. Landowners are concerned that increased pressure from some environmental groups to remove grazing from public lands could result in loss of those permits. Without their federal grazing leases, most ranches in the basin would be unable to continue operations. Landowners would prefer contracts that coupled their involvement in a PES program with grazing permit renewal.

ALLOCATION OF RISK OF NON-ATTAINMENT. Payments to landowners for the management actions they perform that enhance the ecosystem service can be approached in two ways. The first, pay-for-practice, compensates landowners for implementation of management practices regardless of the outcome. The second, pay-for-performance, compensates landowners for measurable outcomes. Landowners understand the benefits of a conservation exchange based on pay-for-performance rather than pay-for-practice (stronger ecosystem service protection and greater support from regulatory agencies and environmental organizations for the conservation exchange concept). However, pay-for-performance also places the risk on landowners if conservation outcomes are not achieved. If the risks are significant, many landowners will choose not to participate, even if credit prices are higher to reflect the risks. Pay-for-practice would be the preferred alternative for most landowners. A pay-for-performance structure that releases some credits for sale initially, before conservation outcomes have been realized, would provide landowners with cash flow to

fund management practices and might be an acceptable alternative to some.

ADDITIONALITY. Landowners believe credits should be awarded through a PES program for maintenance and preservation of existing high-quality habitat rather than just for “uplift;” only awarding credits for uplift would punish landowners who have already been good stewards of the land. Note that other stakeholders would also support awarding credits for maintenance and preservation. Preserving existing upland sagebrush habitat that is at risk of being degraded is often easier than recovering lost habitat, especially in the arid, harsh environments of Wyoming.

What is additionality? USDA has said additionality in conservation programs occurs when a voluntary payment causes a change in practice that leads to improved environmental performance (Claassen et al. 2014). Under this definition, a commitment to continued management of high-quality habitat could be considered additional. For example, in areas where the threat of habitat loss or fragmentation exists from subdivision development, maintaining the current level of ecosystem services could be considered an improvement over an alternative outcome of development.

BUYER (INDUSTRY AND OTHER CONSERVATION INVESTORS) PERSPECTIVE

METRICS AND MEASURABLE RESULTS. Industry and other investors seeking to increase conservation want to see the maximum possible environmental return on their investments, or “bang for their buck.” They like a focus on metrics and measurable results, so they can demonstrate to shareholders, donors, and regulators that their funding has resulted in the expected conservation benefits.

SOURCE OF COMPENSATORY MITIGATION. If energy companies implement new development projects in the basin, they will likely face permitting requirements from regulatory agencies requiring them to perform off-site mitigation. A well-designed PES program could provide

a way for these companies to fulfill their compensatory mitigation obligations.⁶

REGULATORY ASSURANCES. Just as for landowners, regulatory assurances are key for energy companies who want to know that conservation undertaken through a PES program would fulfill USFWS requirements even if a species such as sage-grouse is listed.

FEDERAL AND STATE AGENCIES

Each ecosystem service has its own set of regulatory drivers. Given the intense focus directed toward improving sage-grouse habitat in Wyoming, the sage-grouse habitat ecosystem service is more likely than the other two services analyzed here to see active trading in the near future. Regulatory agencies are looking for ways to provide incentives for private landowners to maintain or enhance sage-grouse habitat in Wyoming. Energy companies are looking for ways to continue resource extraction in spite of the potential sage-grouse listing under the ESA. While concerns about declining mule deer habitat and impaired hydrologic services are increasing, a driver for establishing a market for these services (e.g., a regulatory or administrative mandate) is not yet apparent. Observations on federal and state agency perspectives are therefore limited to the sage-grouse ecosystem service.

WYOMING GAME AND FISH DEPARTMENT. In 2008, WGFD coordinated development of the Wyoming Governor's Greater Sage-Grouse Core Area Strategy designed to protect existing high-quality sage-grouse habitat in the State (Mead 2011). WGFD could likely support a well-designed PES program that improves sage-grouse habitat provided it complements the Core Area Strategy.

Wyoming's Energy Strategy, released by the governor's office in 2013, identifies establishment of a statewide mitigation framework as a high priority.

⁶ See Hansen et al. (2013) for more information on the use of conservation (or habitat) exchanges as a tool for market-based wildlife mitigation.

U.S. FISH AND WILDLIFE SERVICE. USFWS recently issued a framework providing principles, standards, and recommendations for sage-grouse habitat mitigation programs (USFWS 2014). This framework recommends mitigation programs achieve net benefit for the species, integrate existing processes to the extent practical, provide economic incentives to private landowners and industry to undertake conservation, and apply program rules consistently and fairly across different disturbance types. A PES program with market protocols and ecological assessment tools designed to meet these goals will be more likely to receive USFWS approval than one without them.

U.S. BUREAU OF LAND MANAGEMENT. BLM has an interest in both sides of a PES program.

On the "debit" side, much disturbance on the landscape occurs in the context of development of minerals on BLM lands. BLM is updating its mitigation policies and is expected to soon provide further guidance on what features mitigation programs need to have moving forward (BLM 2010).

On the "credit" side, agricultural producers with federal grazing authorization are interested in generating credits by making improvements not only on private lands but also potentially on leased BLM lands. BLM is considering what credit generation on federal lands could look like to be consistent with the agency's multiple use doctrine.

GENERAL FEASIBILITY OBSERVATIONS

THE CONSERVATION EXCHANGE CONCEPT. The two conservation exchange efforts (collectively called the Exchange) that are moving forward as a result of this feasibility analysis contain two additional features not shared by all PES programs. First, a central tenet of the Exchange is robust and scientifically defensible calculation of a credit. In the Exchange, a credit is quantified, tracked, and verified using ecological assessment tools that use sets of measurements to evaluate vegetation and environmental conditions as they relate to resource quality and quantity, over space and time.

Second, to the extent possible in the harsh, arid ecosystems of the Upper Green River Basin and Wyoming, credits will be sold based on achievement of conservation outcomes. The Exchange thus aims to be a pay-for-performance conservation program rather than solely a traditional pay-for-practice program. While these two features will no doubt increase the cost and complexity of generating conservation, all indications from USFWS and BLM are that PES programs focused on mitigation of candidate species such as sage-grouse will need to demonstrate robust science and conservation outcomes. Whether the relevant regulatory agencies for mule deer habitat and hydrologic services will have similar requirements has not yet been fully explored.

COMPONENTS OF A WELL-FUNCTIONING MARKET.

All well-functioning environmental markets possess the following components:

- Well-defined market scope. Over what geographical area and timing can trading occur? In the sage-grouse mitigation context, for example, how far away from the disturbance can offsetting credits be generated? Further, can a credit generated this year be used to offset a disturbance generated next year, and vice versa?
- Generally agreed-upon definition of the “good.” Buyers, sellers, and regulators must agree on what is being traded. In the ecosystem services context, this means they must trust the tools and quality control provisions established to quantify, verify, and track ecosystem service condition before and during a contract.⁷
- Market protocols that ensure low transaction costs, transparency, and accountability. It must be relatively easy and inexpensive for buyers and sellers to participate in the market. This includes robust

⁷ Project partners have developed ecological assessment tools and market protocols for the sage-grouse ecosystem service. These documents are available for download from the project website www.wyomingconservationexchange.org. Quantification tools for mule deer and hydrologic services are under development.

contracting, minimal uncertainty regarding the roles and responsibilities of market participants, and transparent governance of the marketplace.

- Adaptive management. The rules that govern the marketplace must be sufficiently flexible to adapt to updates in science and policy.

These components are so deeply embedded in markets for conventional commodities that we do not think about them. For new markets developed around goods that have not historically been traded, such as ecosystem services, each component requires careful attention. Further, even if these four components and the relevant regulatory agency approvals are in place, markets still might not develop. These components set the stage for trading, but there is no guarantee buyers and sellers will find mutually agreeable contract terms and price.

IMPORTANCE OF STAKEHOLDER “BUY-IN.” For any PES program in which participation is voluntary, market design must be reasonable from the perspective of potential buyers and sellers. Market design must also be reasonable from the perspective of agencies responsible for maintaining relevant environmental standards. If stakeholder recommendations can be incorporated into market design without sacrificing compliance with relevant environmental standards, incorporating these standards will increase participation and the amount of conservation undertaken. Informing stakeholders about a PES program and soliciting feedback on design increase the likelihood that the program, once implemented, will be successful.

EFFICACY OF MARKET-BASED CONSERVATION PROGRAMS. One outstanding question is whether market-based conservation is in fact preferable to more traditional forms of regulation to protect species habitat and other ecosystem services. Economists maintain that environmental markets ensure ecosystem service provision at lowest cost; however, they also note (and others agree) that, absent full scientific understanding of how management practices undertaken translate into actual conservation outcomes, environmental markets

may not be best in all circumstances. Market protocols and contracts must be carefully designed to ensure economic incentives are aligned with desired ecological outcomes. To our knowledge, there are no ex-post analyses of already-existing market-based conservation programs that might help to shed light on these issues. Any PES program should therefore encourage collection of data that will contribute to our understanding of whether market-based conservation programs are effective.

5. CONCLUSIONS

Stakeholder focus groups and interviews indicate past conservation projects in the basin associated with mitigation of energy impacts have not always been well-received. Moving forward, agricultural producers and energy companies would like to know that money spent on conservation stays within their communities and that conservation actions benefit their intended purpose. Agricultural producers, energy companies, and regulators would also like to see measurable results from investments

in conservation, whether the conservation is driven by regulatory mitigation requirements (as is likely for sage-grouse habitat) or not (as is likely for mule deer habitat and hydrologic services).

There is significant potential in Wyoming for a well-designed, market-based PES program that produces quantifiable conservation outcomes. PES programs and specifically the Exchange can be an innovative way to collaborate and create conservation actions locally through science and accountability. Programs that pay for current conservation practices tend to generate a “snapshot in time” as there is little way of knowing whether the practice is continued after payment. A well-designed PES program can help verify outcomes, including outcomes of maintenance activities, by creating a market that evaluates pre- and post-habitat and resource conditions over time.

For more information, please see the project website: <http://www.wyomingconservationexchange.org>.

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