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Market-based Wildlife Mitigation in Wyoming

A PRIMER



THE MITIGATION INITIATIVE



UNIVERSITY OF WYOMING

MARKET-BASED WILDLIFE MITIGATION IN WYOMING: A PRIMER

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Emilene Ostlind (photo credit)

I. PAYMENTS FOR ECOSYSTEM SERVICES MARKETS FOR MITIGATION

Energy development is a significant contributor to economic growth in the state of Wyoming. However, the disturbance it causes on the landscape can lead to wildlife habitat loss and degradation of land, water, and air resources. Federal and state land management agencies regulate how energy companies can proceed with development to reduce the effects of development on the landscape.

Mitigation programs generally follow the mitigation hierarchy to avoid, minimize, and then compensate for any damages that occur. A development entity must first avoid and then minimize impacts. When avoidance and minimization are not possible, then the developer may compensate for unavoidable impacts. It is generally preferred for compensatory mitigation to be in-kind, meaning that the substitute resources are physically and biologically the same or closely approximate those that are impacted.

An emerging trend in mitigating for energy development is Payments for Ecosystem Services (PES). Ecosystem services are the benefits that people derive from ecosystems. These include commodities (such as food and fresh water), regulating services (such as flood regulation and water purification), supporting services (such as nutrient cycling and soil formation), and cultural services (such as spiritual and recreational).² Ecosystem services affected by energy development in Wyoming include wildlife habitat, air quality, and those provided by water, such as water quality and quantity and riparian habitat.*

PES is a market-based approach to provide financial incentives or compensation to private landholders for engaging in environmentally or socially beneficial activities that might not otherwise be undertaken or continued. Under a PES market, a seller implements best management practices on his land that, according to the best available science, will result in provision of an ecosystem service. The landowner receives a credit that he can then sell to a buyer interested in acquiring conservation. 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.”³

Mitigation Hierarchy:

- (a) Making efforts to avoid impacts
- (b) Minimizing remaining impacts and
- (c) Compensating for unavoidable impacts

Source: Ref. 1

Ecosystem Services:

The benefits that people derive from ecosystems, including commodities, regulating services, and cultural services

Source: Ref. 2

* For background on the mitigation hierarchy and terms such as “in kind,” see Ref. 5.

Payments for Ecosystem Services:
A market-based approach to providing financial incentives or compensation to private landowners for engaging in environmentally or socially beneficial activities that might not otherwise be undertaken or continued

This primer examines three types of PES markets that can be used for compensatory mitigation: mitigation banks, conservation banks, and habitat exchanges. The rules governing the establishment and management of each type of PES market vary, depending on their purpose, but all have the same goal: to protect, preserve, and enhance habitat at the lowest possible cost by introducing market-based elements to conservation policies. The sections that follow provide greater detail and specific examples of these three types of PES markets.

NECESSARY COMPONENTS OF ANY PES MARKET

Approximately 40,000 acres are being protected or restored annually in the U.S. through mitigation banks, conservation banks, and voluntary PES markets similar to the ones discussed in this primer.⁴ However, establishing a PES market can be challenging for several reasons. First, the “good” that is being traded is difficult to quantify, as are the impacts being offset by the trade. Second, ecosystem services are often taken for granted. As such, it can be difficult to find entities that are willing to pay to protect them. Following is a list of features that PES markets, including the three types discussed in the following sections, must consider to be successful.

Conservation Goals. Should a PES market fund conservation practices that *Maintain* existing levels of ecosystem condition, or should practices be required to *improve* ecosystem condition? Improvement in ecosystem condition, known as additivity or ecological uplift, is most desirable from a conservation perspective and generates the biggest “bang” per conservation dollar spent. However, there can be good reasons to support the use of PES markets to maintain existing ecosystem services. For example, landowners can often document that they have already been implementing conservation practices that provide ecosystem services at a cost to ranch profits. In other instances, requiring improvements (additivity) would preferentially provide payments to landowners who have not been good stewards of the land, while limiting opportunities for those who have. Finally, in situations where the possibility of habitat loss or fragmentation exists, for instance from development of agricultural land to subdivision, maintaining the current level of ecosystem services could be considered an improvement over an alternative outcome of development.

Governing Body. Every PES market needs a body that establishes credit-trading rules and ensures that they are administered consistently and transparently. In most but not all cases, state and federal agency guidelines govern how mitigation PES markets are established and subsequently governed. If some or all buyers are involved in the market for compensatory mitigation purposes, then the relevant state and federal agencies will need to sign off on the structure of the market as well as on protocols for measuring and monitoring conservation.

Willing Sellers. Sellers in PES markets are generally landowners engaged in agricultural production or entrepreneurs who have acquired land in order to capitalize on mitigation markets. They implement best management practices designed to maintain or enhance the provision of ecosystem services on their land. Participation in PES markets can provide agricultural producers with an additional stream of revenue that may allow them to continue operating as they currently are, rather than succumb to financial pressures to sell off portions of their land.

Willing Buyers. Buyers in PES markets are often energy companies, real estate developers, or other development interests who need to acquire credit for compensatory mitigation. (Alternatively, such buyers could pursue other mitigation options, including habitat improvement projects on- or off-site or payment of in-lieu fees.[†]) Companies may wish to participate in PES markets to improve their public image. Environmental foundations or individuals may choose to participate in PES markets because they view it as an efficient, cost-effective way to achieve their conservation goals.

Defined Ecosystem Services. It is important for any PES market to define the ecosystem service that is being provided and paid for and to understand, to the extent possible, the linkages between practices implemented on the ground and ecosystem services that result. For example, a landowner might be paid through a PES market to install wildlife-friendly fencing on his property to facilitate pronghorn antelope migration. By how much does this practice result in an improvement in wildlife habitat? Questions about the linkages between practices undertaken and resulting provision of ecosystem service must be answered before a PES market can be implemented.

Value for Ecosystem Services. The price of an ecosystem service can be established through bilateral negotiation between the buyer and seller or through some sort of auction mechanism. However the price is determined, there are some bounds on what it might be. An upper bound on the price is the value to the buyer of the ecosystem service being provided. For example, if an energy company seeks to acquire off-site mitigation credits before new drilling is permitted, the costs associated with postponing drilling represent the value to the buyer of investing in the ecosystem service. A lower bound on the price is the cost to the landowner of implementing the conservation practices necessary to achieve provision of the ecosystem service.

An additional element to consider in valuing ecosystem services in a PES market is the risk associated with non-attainment. For example, is a seller required to demonstrate that her conservation practices have resulted in provision of the ecosystem service before she receives a credit? If so, then the price established in the PES market will need to be high enough to compensate the seller for any failed conservation practices that have already occurred. The cost of a credit incorporates the risk that credits are not generated for weather-related or other reasons. In addition, credit prices are subject to normal market forces, and if there is low demand for credits, prices will be low.

Metrics and System for Quantifying Credits. The unit of trade in a PES market is a credit. For wildlife, a credit is often one unit of high-quality habitat for the species of interest. The number of credits generated per acre increases with habitat quality and/or occupancy rate. Similarly, the number of credits needed to mitigate a disturbance corresponds with habitat quality and/or impact to a species. The ecosystem services lost from destroying one acre of habitat at a development site does not, however, always equal those of one restored/enhanced/created acre at another site. A credit buyer seeking mitigation for a disturbance on

[†] “In-lieu fees” are a type of compensatory mitigation where developers pay a fee to a government agency or non-profit that uses the funds to engage in activities that offset project impacts.

one acre of high-quality habitat may need to purchase enough credits to pay for preserving or enhancing two acres of high-quality habitat elsewhere. This is referred to as the compensation ratio, or credit ratio. In this instance, the compensation ratio would be 2:1. Compensation ratios can be set for a number of reasons, including uncertainty of ecological success, temporal lags in ecological maturity, or distances between the impact and compensation sites.

Standardized Protocols and Operating Procedures. Buyers, sellers, and regulatory agencies must be assured that their roles and responsibilities, the rules, procedures, and contracts under which transactions take place, and credit measurement and reporting are standardized and transparent. They must also have confidence in the quality standards associated with credits. For example, what conservation practices must be implemented for a seller to acquire a credit? What are the ecological metrics of conservation success? What development rights or assurances does a buyer purchase when buying a credit? These items are necessary to establish confidence on the part of all market participants—investors and regulatory agencies in particular—that transaction costs will be minimal and that conservation will be achieved.

Defined Geographic Scope. The geographic scope of the market is defined by the ecosystem services of interest. The market should be sized so that the practices sellers undertake have a positive impact on the ecosystem service for which the market is designed. If a PES program is designed to address water quality in a watershed, then the watershed itself is the natural geographic scope of the market. Actions undertaken by, for example, landowners in the watershed to reduce temperature and/or sediment loads compensate for decreases in water quality made by polluters also located in the watershed.

Defined Temporal Scope. Do credits purchase a conservation action or easement that will last forever, or “in perpetuity,” or are credits temporary, expiring after one, five, or perhaps twenty years? Perpetual credits may be preferred from a conservation perspective, but there may also be good reasons to consider temporary credits. First, temporary credits may be sufficient if the impacts are expected to be temporary (for example, during the drilling phase of natural gas development). Second, they may be easier to obtain, especially if private landowners are reluctant to enter into a perpetual contract. Third, even willing private landowners may be unable to commit to a perpetual contract if their mineral rights are owned by somebody else. Finally, temporary credits may provide additional flexibility to achieve conservation goals, for example, by allowing credits to be sited in new locations in response to climate change or improved scientific understanding of species’ habitat. Proponents of temporary credits have proposed structures with a rolling issuance of credits, so that a permanent disturbance would be mitigated through a series of temporary credits blinking in and out in perpetuity.

Monitoring, Verification, and Adaptive Management. Monitoring and compliance are important components of a PES market. They ensure that the seller is fulfilling the stipulations of the PES contract. The buyer, who may have other options for obtaining additional mitigation credits, must be assured that her financial support results in the designated ecosystem service. This component of PES works to ensure that conservation is achieved as cost-effectively as possible. Monitoring and verification can help to improve our

understanding of what conservation practices result in desired ecological outcomes and allow for the adjustment of standards and practices over time.

Summary. Although the definition of PES markets and the description of their basic components provided above are generally accepted, there is significant variation in how PES markets for compensatory mitigation are implemented. Much depends on the ecosystem service that is affected by development and its federal regulatory requirements. Following this section are descriptions of mitigation banking, conservation banking, and habitat exchanges, all of which are PES markets designed to enhance or preserve habitat.

Box 1. Agency Support for Ecosystem Markets

The Environmental Protection Agency advocates for and has supported the use of ecosystem service markets for many years, most notably through air quality allowance trading systems started in the late 1990s and, for the past ten years, water quality. Recently, additional federal agencies have increased their support for environmental markets to assist in conservation on private lands. In 2007, the U.S. Fish and Wildlife Service (USFWS) and the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), together with the Association of Fish and Wildlife Agencies (representing state natural resource management agencies), signed a Memorandum of Understanding to indicate their support for habitat credit trading programs (see Section IV). In the 2008 Farm Bill, Congress directed the USDA to establish technical guidelines for measuring environmental services benefits associated with conservation on private land to enable farmers, ranchers, and forest landowners to participate in environmental service markets. The Farm Bill also authorized creation of the Office of Environmental Markets, whose purpose is to support the development of emerging markets for carbon, water quality, wetlands, and biodiversity. The USDA has also recognized the potential for environmental markets to be economic drivers in rural areas of the U.S.

Sources: Refs. 6–8



II. WETLAND & STREAM MITIGATION BANKING

Mitigation banking—the sale of credits to compensate for unavoidable impacts to wetlands, streams, or other aquatic resources from development activity—is the genesis of environmental credit trading. Section 404 of the Clean Water Act (CWA) requires mitigation for impacts on aquatic environments. In the 1970s, developers implemented numerous small mitigation projects that were often executed concurrently with development and were ultimately ecologically ineffective.⁹ Starting in the 1980s, the permitting authority for Section 404, the U.S. Army Corps of Engineers (USACE), began to promote a policy for larger mitigation sites, which the agency called “banks,” from which multiple developers could purchase offsets. In addition to being the oldest payment for ecosystem services market in the U.S., wetland mitigation banking has the most robust and prescriptive guidelines.

COMPONENTS OF MITIGATION BANKS

Conservation Goals. The goal of wetland and stream mitigation banking is “no net loss,” or maintaining the level of ecosystem services that the aquatic system provides within a watershed. Restoration is the preferred means of generating credits, as the likelihood of success for maintaining ecosystem functions and services is greater than that for wetland enhancement, establishment, or protection.¹¹ Some benefits to the banking approach are: 1) it centralizes mitigation sites—potentially in ecologically important areas—and ensures they are professionally managed; 2) it reduces mitigation planning for the developer, thereby promoting faster permitting; 3) it is generally more cost-effective, due to more efficient implementation of mitigation practices; and 4) credits ideally are “in the bank” before the development occurs, ensuring no net loss—even temporarily—of ecosystem function.¹⁰

Governing Body. Section 404 of the CWA requires mitigation for impacts to wetlands, streams, and other aquatic resources, and the USACE is responsible for Section 404 permitting. In 1995, the USACE formalized its Federal Guidance for the Establishment, Use and Operation of Mitigation Banks, which has served as the basis for many subsequent environmental credit-trading regimes. These guidelines were further clarified in the USACE’s 2008 Compensatory Mitigation Guidelines.

Willing Sellers. A bank sponsor is responsible for establishing and operating a mitigation bank. A bank sponsor can be the same entity as the developer, as in the case of a public or private entity that establishes the bank to offset impacts of their own project (for example, a highway authority establishing a mitigation bank to offset impacts at another site where

Mitigation Bank:
A site where restoration, creation, enhancement and, in exceptional circumstances, preservation of wetlands and/or other aquatic resources has occurred expressly for the purpose of providing compensatory mitigation in advance of authorized impacts to similar resources

Source: Ref. 10

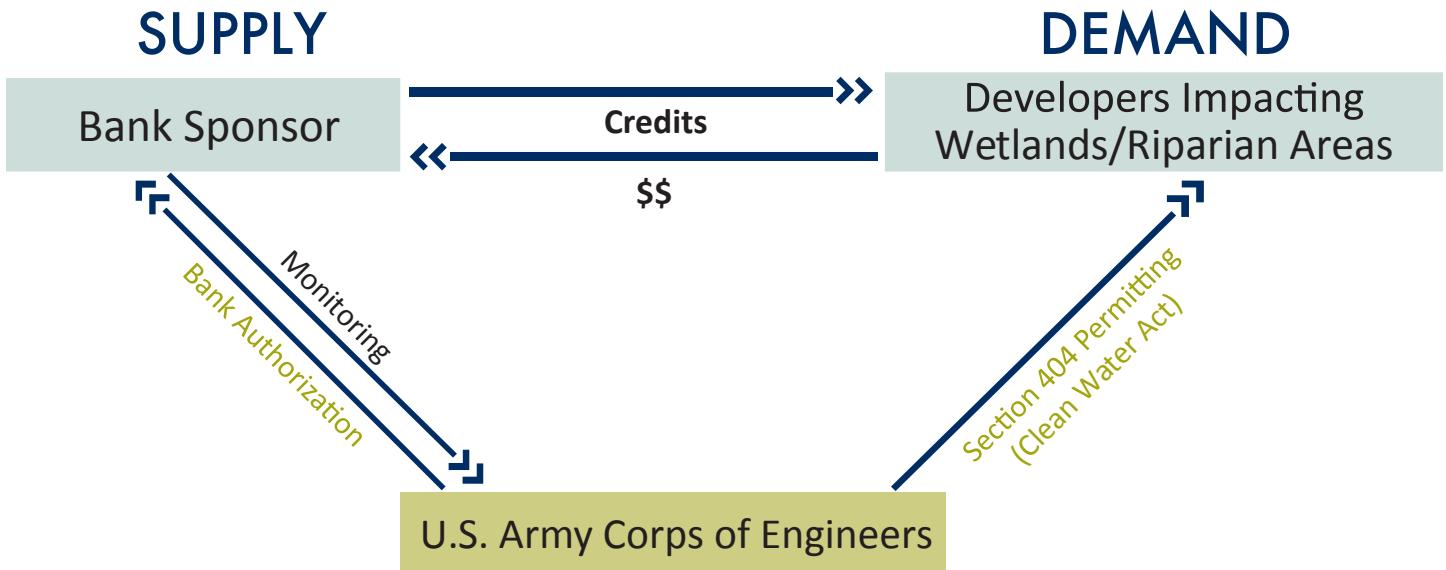


Figure 1. Mitigation bank structure.

they are building a new road). More commonly, the bank sponsor is a public or private entity that establishes the bank with the intent of selling credits to developers who are impacting a similar resource.

Willing Buyers. Section 404 of the CWA dictates that anyone (e.g., developers) who will disturb wetlands or other aquatic resources must obtain a permit from the USACE and create a mitigation plan that outlines how they will avoid or minimize impacts. If, after implementing that plan, they will have remaining unavoidable impacts, they obtain approval from the USACE to provide compensatory mitigation, which could be through on-site mitigation activities, developer-sponsored restoration activities, in-lieu fees, or mitigation bank credit purchases.

To use mitigation bank credits to meet compensatory mitigation requirements, developers must document baseline conditions on the impacted site and describe the number and type of credits that they will purchase. Typically, the buyer is required to purchase in-kind compensation credits from a bank within the same watershed as the proposed development. At the point of sale, liability for mitigation is transferred from the buyer to the seller.¹¹

Defined Ecosystem Services. Mitigation banks cover wetlands, streams, or other waters in the United States. These ecosystems provide important ecosystem services, including floodwater storage, water filtration, and fish and animal habitat.

Value for Ecosystem Services. Prices are established via bilateral negotiations between the buyer and seller.

Standardized Protocols and Operating Procedures. The process for mitigation bank approval begins when a bank sponsor submits a prospectus to the USACE that explains

the proposed bank. The USACE convenes an Interagency Review Team (IRT) composed of federal, state, local, and/or tribal regulatory agency representatives to provide technical assistance and assist in the review of proposed banking documents. After the initial review and a brief public comment period, the USACE must then determine if the proposed site has suitable aquatic resources (or potential for them), is of adequate size, and is compatible with adjacent land uses, among other assessment criteria. If the USACE deems the site acceptable and the bank sponsor wants to proceed, the bank sponsor consults with the IRT while crafting the mitigation banking instrument, which is a legally binding document that formalizes all components of the bank.

Metrics and System for Quantifying Credits. There is no nationally prescribed credit system or methodology for calculating mitigation bank credits, and there are hundreds of stream/wetland assessment tools currently in use.¹² Whatever methodology is used, it should be consistent for both calculating debits (impacts) and credits. While the ecosystem function that the wetland or riparian area provides (or “lift” gained by the project) is the intended credit metric, a more easily quantifiable metric that is often used is wetland or riparian acreage or linear feet.

The USACE requires a minimum 1:1 acreage or linear foot compensation ratio.¹¹ That is, for every one acre of wetlands habitat disturbed, one acre of the same type of wetland habitat is restored or created. At times, an alternative compensation ratio is set, such as 1:3. Compensation ratios are project-specific and can vary for a number of reasons (see Section I).

Defined Geographic Scope. A geographic service area indicates the area in which mitigation bank credits may be sold. The USACE promotes a watershed approach to credit trading; banks should be located in the same watershed as the impacted site to better compensate for lost ecosystem services in that area.[‡] There is flexibility, however, for the Interagency Review Team to consider the economic viability of the bank when setting service area boundaries.¹¹ Service areas are at times split into primary and secondary service areas. The primary service area is closest to and/or most ecologically similar to the site. The secondary service area is within the same watershed but farther removed. Credit purchasers seeking offsets to impacts within the secondary service area generally have higher compensation ratios; that is, for every 1 acre impacted, they may have to purchase 4 acres of credits, while in the primary service area the compensation ratio may be more like 1:1.2.

Defined Temporal Scope. The USACE dictates that mitigation bank sites generally must be permanently conserved, or “in perpetuity,” under a conservation easement, title transfer, or restrictive covenant. In addition, mitigation banking policies dictate that most sites should be self-sustaining after reaching a certain ecological threshold, and active long-term management should be minimized. The bank sponsor must provide for any long-term maintenance, unless responsibility is transferred to another entity, such as a land manager.

Establishment (creation):
The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist

Restoration:
The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource

Enhancement:
The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function

Source: Ref. 11

[‡] This is most often represented as the 8-digit Hydrologic Unit Code, or HUC. At times, Environmental Protection Agency ecoregions are also taken into consideration.



To be certain that impacts will be offset, mitigation bank credits should be fully mature (i.e., the ecosystem services sought should be fully functioning) before their sale. However, market realities dictate that this is not often the case.⁹ To make a bank economically viable, bank sponsors sometimes receive “advance crediting” upon approval of the banking instrument. A credit release schedule then allows for phased credit releases when ecological milestones are met.¹¹

Monitoring, Verification, and Adaptive Management. The bank sponsor is responsible for following a monitoring plan outlined in the banking instrument. Monitoring is required for at least five years and longer for projects that are slow to mature, such as forested wetlands and bogs.¹¹ The banking instrument outlines the frequency with which the bank sponsor submits monitoring reports.

Bank sponsors must secure funds to monitor and maintain the bank throughout its operational life. The end of the operational life of a bank occurs when the credits are sold out or the site is ecologically mature and self-sustaining to the degree outlined by the banking instrument. Financial assurances can therefore be phased out once a project has reached maturity, if there are no permanent management activities. Though management activities may phase out, the conservation easement or other title instrument prohibiting development on the site remains in place.

The USACE 2008 compensatory mitigation guidelines provide for adaptive management, and—with the approval of the USACE—information gathered through monitoring can lead to site modifications, design changes, revisions to maintenance requirements, revised monitoring requirements, or revised performance standards.

MITIGATION BANK EXAMPLE

As of 2011 there were 563 active mitigation banks in the United States, 53 that were pending, and 148 that were sold out.¹⁴ While currently there are no mitigation banks in Wyoming, there are a number in surrounding states; an example is presented in Table 1.

Table 1. Nevada Spring Creek Mitigation Bank (Montana)

Year established	2005
Habitat	Valley wetlands and stream riparian areas
Bank size (acres)	377 acres; 10,950 linear feet of spring-fed creek and associated riparian areas
Bank sponsor	Ecosystem Investment Partners
Management activities	<ul style="list-style-type: none">• Stream re-channelization and restoration; restoration of natural water flow patterns• Removal of weedy plants, change of grazing patterns, and planting of native species• Five years of post-implementation monitoring
Credit system	<ul style="list-style-type: none">• 76 wet meadow wetland credits have been released• 23 credits have been purchased• There is potential for up to 185.5 credits to be available
Service area	<ul style="list-style-type: none">• Upper Clark Fork, Middle Clark Fork, Flint-Rock, Bitterroot, and Blackfoot drainages

Sources: Refs. 15 and 16

MITIGATION BANKING IN WYOMING

Approximately 2 percent of Wyoming's land area is wetland habitat, but this small percentage of habitat is disproportionately important to water quality, watershed function, and wildlife. Wetlands are an important resource for 90 percent of Wyoming's wildlife, and 70 percent of its bird species depend primarily on wetland or riparian ecosystems.¹⁷ Wetlands and riparian areas also provide flood control, aquifer recharge, and erosion control to the state.

In the past, wetlands mitigation for development projects in Wyoming—ranging from energy development to subdivisions, highways, and reservoirs—has been done not through banks but through project-by-project wetlands creation, restoration, or enhancement (see, for example, Ref 18). To meet the growing need for a consistent methodology for calculating debits and credits that can be used statewide for stream mitigation practices, in February 2013 the USACE released the final Wyoming Stream Mitigation Procedure (WSMP).¹³ Previous to the release of this policy, there was no credit methodology specific to Wyoming.

There are currently no mitigation banks in Wyoming but two proposed banks are undergoing permitting with the USACE. The first mitigation bank under development in Wyoming is the Sweetwater River Conservancy's Dumbell Ranch Mitigation Bank, which would be



Table 2. Dumbell Ranch Mitigation Bank

Year established	In development
Habitat	Rolling sagebrush steppe: arid grassland and shrubland communities dominate the upland vegetative cover; lower elevations support desert shrublands
Bank size (acres)	2,759
Proposed management activities	<ul style="list-style-type: none"> • Restoring and enhancing wetlands, stream channels, riparian habitat, and upland buffers • Specific wetland enhancements could include seeding and planting wetland herbaceous and shrub species and creating topographical diversity on the site • Additional activities identified to possibly restore or enhance habitat include planting shrubs in the riparian area, excluding grazing from the riparian area, sloping eroding banks and using bio-engineered stabilization techniques, and creating in-stream channel improvements
Credit system	<ul style="list-style-type: none"> • Credit-debit procedures will be established in the Mitigation Banking Instrument process; it is likely the Wyoming Stream Mitigation Procedure will be used
Service area	<ul style="list-style-type: none"> • The Sweetwater River Conservancy has proposed a combination of 8- and 10-digit hydrologic unit codes (HUCs) for their service area (10-digit HUCs are finer scale than 8-digit HUCs): see Ref. 20 for Service Area map

Sources: Refs. 19 and 20

located along the Sweetwater River in Natrona County.¹⁹ Potential credit buyers include energy or other developers who would need to offset riparian or wetland impacts on another site within the service area (Table 2).²⁰ The prospectus for this bank was released in May 2013, and the draft Mitigation Banking Instrument is expected to become available in 2013.

The other potential Wyoming mitigation bank is the A Cross Bank in Carbon County near Encampment. Florida-based A Cross Holdings, LLC (a subsidiary of Rock Creek Capital) has started the permitting process for this bank. The bank sponsor plans to sell its credits to energy developers, particularly the oil and gas industry.²¹ It is anticipated that A Cross holdings will submit a draft mitigation banking instrument in 2013.



Table 3. A Cross Mitigation Bank

Year established	In development
Habitat	Streams, wetlands, and upland buffer areas; sub-irrigated high valleys, mid-elevation forests and shrublands, and foothill shrublands Level IV ecoregions
Bank size (acres)	Unknown
Proposed management activities	<ul style="list-style-type: none"> • Restoration of natural channel morphology • Improvement of instream habitat • Wetland enhancement • Mitigation of erosion and decreased sedimentation • Control of noxious weeds
Credit system	<ul style="list-style-type: none"> • Though initial project documents cited use of the Montana Stream Mitigation Procedure, it is likely with the development of the Wyoming Stream Mitigation Procedure that they will switch to this methodology • Intent that credits be sold to oil and gas developers and other development interests in Wyoming
Service area	<ul style="list-style-type: none"> • Initial proposed Primary Service Area includes North Platte River watershed in the state of Wyoming and the statewide extent of sub-irrigated high valley, mid-elevation forest, shrubland, and foothill shrubland ecoregions; Secondary Service Area includes the reach of the Missouri River Watershed in Wyoming that is outside of the primary service area

Note: When A Cross developers submit a draft Mitigation Banking Instrument to the USACE, the size and details of the bank, including service area, will likely change from what is depicted here.

Sources: Refs. 21 and 22

Mitigation banks are likely to be the first credit trading markets in Wyoming, and their design will set a precedent for credit trading in other environmental markets, such as conservation banks and habitat exchanges.



III. ENDANGERED & THREATENED SPECIES CONSERVATION BANKING

Conservation banking is a tool used to offset impacts to threatened or endangered species under the Endangered Species Act (ESA), or other species of conservation concern. The “bank” is a parcel of land that is protected and managed permanently for the target species to offset impacts to the same resource values on a different parcel of land. While *mitigation* banks are created to offset impacts to wetlands, *conservation* banks offset impacts to threatened or endangered species.

The rationale for conservation banks follows that of mitigation banks: conservation efforts can be centralized within large reserves in important habitat areas, rather than mitigation being piecemeal at impact sites.²³ Developers are drawn to this approach because they can meet mitigation requirements through one transaction that involves pre-approved credits. Landowners can also benefit from conservation banking because it provides a means for them to turn the presence of threatened or endangered species into a source of revenue, rather than a liability.²⁴

Sections 7 and 10 of the ESA provide the legal underpinning for conservation banking. Section 7 prohibits federal agencies from authorizing, funding, or carrying out any activities that will jeopardize threatened or endangered species or impact their critical habitat. Section 7(h) provides criteria for exemptions. A federal agency must provide or ensure “reasonable mitigation and enhancement measures” to receive an exemption. Section 10 outlines a process for private landowners to receive an “incidental take” permit, or a permit to harm or disturb a listed species. To apply for an incidental take permit, landowners must prepare Habitat Conservation Plans (HCPs), which outline the impact of the harm or disturbance on the species and how impacts will be minimized or mitigated. For federal agencies (Section 7) or private landowners (Section 10), purchasing conservation bank credits is one way to provide mitigation for impacts to endangered species.

Beyond the ESA, the National Environmental Policy Act (NEPA) environmental impact statement (EIS) process can also identify purchase of conservation bank credits as a way to offset impacts.²⁴ In addition to federal mandates, state or local regulations may also have requirements that can be met through conservation banking. California established a conservation banking policy in 1995 and has been a leader in conservation bank design and implementation.²⁵

Conservation Bank:
A parcel of land containing natural resource values that are conserved and managed in perpetuity, through a conservation easement held by an entity responsible for enforcing the terms of the easement, for specified listed species and used to offset impacts occurring elsewhere to the same resource values on non-bank lands

Source: Ref. 24

COMPONENTS OF CONSERVATION BANKS

Conservation Goals. The goal of all conservation banks is to offset adverse impacts to a threatened or endangered species.²⁴ This goal does *not* require no net loss of habitat. Therefore, preservation of existing high-quality habitat to mitigate for loss of lower quality, isolated, and/or fragmented habitat is encouraged as a means of generating credits; creation, restoration or enhancement of high-quality habitat are not required, though they are options for generating bank credits.²⁴

Governing Body. The U.S. Fish and Wildlife Service (USFWS) is responsible for threatened and endangered species management and therefore conservation bank approval. In 2003, the USFWS published conservation banking guidelines, which provide a consistent structure for establishing and operating conservation banks.²⁴ While the guidelines are intended to provide consistency among banks, they also promote flexibility in banking mechanisms, recognizing that different species have different habitat and management needs.

Willing Sellers. Like mitigation banks, conservation banks are sponsored by public or private entities that seek to create credits to offset their own projects on different sites or sell credits to developers.

Willing Buyers. A conservation bank credit buyer is generally an entity that has been approved by the USFWS to harm or disturb (“take”) a species and seeks to compensate for that take. The number of credits required to compensate for the take must be negotiated with the USFWS. As in mitigation banking, the liability for mitigation is transferred from the credit buyer to the seller at the point of sale.

Defined Ecosystem Services. Threatened or endangered species and their habitat is the ecosystem service targeted by conservation banks. While it is also possible to establish conservation banks for candidate species, to date none has been created for this purpose (see Section IV).

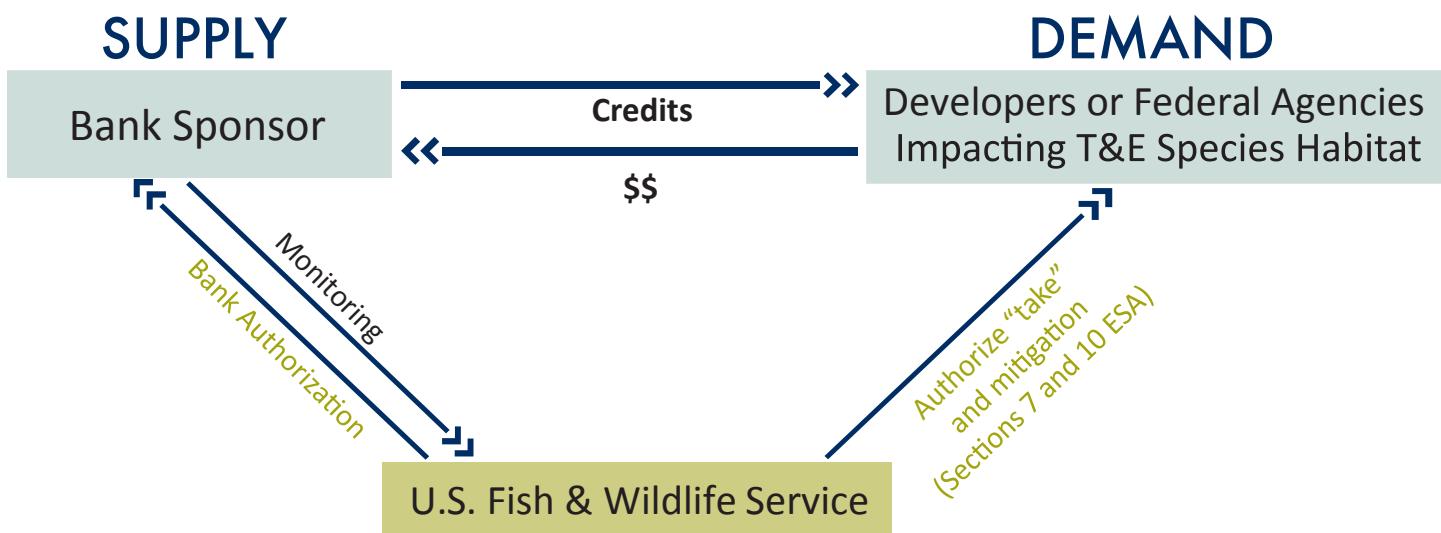


Figure 2. Conservation bank structure. Note differences between this and Figure 1: demand is for endangered or threatened species habitat, rather than wetlands; the U.S. Fish and Wildlife Service is the authorizing agency, rather than the U.S. Army Corps of Engineers; and the legislative underpinning is the Endangered Species Act, rather than the Clean Water Act.

Value for Ecosystem Services. Conservation bank credit prices are negotiated on a bilateral basis between the buyer and seller.

Standardized Protocols and Operating Procedures. The process for establishing a conservation bank follows that of a mitigation bank. First, a prospectus is submitted. The USFWS must then determine if the bank meets the conservation needs of the targeted species and evaluate the bank site to determine if it is of adequate size to protect the species, what the adjacent land uses are, and if it is located in a core habitat area.²⁶ If the bank proposal is found to be acceptable, the USFWS establishes an interagency Conservation Bank Review Team (CBRT) to oversee the establishment and eventually the use and operation of the bank.²⁴ The bank sponsor then works with the CBRT to create a more detailed and legally binding Conservation Banking Agreement.

Metrics and System for Quantifying Credits. Each bank establishes and defines its own credit system, including what type of credits it sells and metrics to determine the amount of earned credits. Activities that can generate credits include “preservation, enhancement, restoration, and/or establishment of habitat for species.”²³ Examples of credit units are an acre of habitat for a species, a habitat unit that supports a breeding pair, or another measure of habitat or its value to the targeted species.²³ Credits should be biologically equivalent to and measured the same way as species impacts from the development activity.²⁴ The USFWS determines compensation ratios for each buyer.

Defined Geographic Scope. Conservation bank service areas should be based on the conservation needs of the target species, encompassing the appropriate “physical and ecological attributes such as watersheds, soil types, species recovery units, and/or species and population distributions.”²³ If available, a species’ recovery plan and associated recovery units may provide guidance for establishing a service area.²⁴ As with mitigation banks, how service area boundaries are drawn impact the economic viability of the bank.

Defined Temporal Scope. Lands in a conservation bank must be permanently conserved and managed for the species, and the bank sponsor will often place the bank in conservation easement. The bank sponsor also details what management activities will take place on the land to generate and maintain credits in perpetuity. All conservation banks require some form of continual habitat management, for example, invasive species management or replication of natural disturbance regimes.²⁴

Like the USACE for mitigation banks, the USFWS utilizes credit release schedules for conservation bank credits. Phased credit releases can occur if a banker chooses to improve only a portion of the bank and then later on improves additional lands. In addition, when there is uncertainty surrounding species numbers and presence, initial credit releases can be conservative, with additional credits made available if monitoring or improvements yield more certainty of population size.

Monitoring, Verification, and Adaptive Management. Conservation Bank Agreements include monitoring and reporting requirements that are bank-specific. At a minimum, most banks will monitor for vegetative characteristics, the presence of invasive species, water

quality, and presence of the target species.²⁴ Bank sponsors are responsible for monitoring and submit results to the CBRT.

Bank sponsors must guarantee funding to maintain the bank in perpetuity. The USFWS suggests this is supplied through a “non-wasting endowment,” where the interest of an account is used to fund operation, management, and monitoring activities for the bank.²⁴ This endowment can be established with a portion of the money received through the sale of conservation bank credits. It is also the responsibility of the bank sponsor to set up a credit tracking and accounting system.²⁴

The USFWS 2003 Conservation Banking Guidelines allow for adaptive management, though not much is said on this topic. Phased establishment of credits provides for adaptation of conservation practices or accounting, as developers—with approval of the USFWS—can modify practices based on results of previous rounds of management.

Box 2. Is it possible to site conservation banks on federal lands?

Conservation banking on federal lands is permitted under the USFWS 2003 banking guidance, though the guidance cautions that, “there may be special considerations concerning applicability of conservation banks on Federal lands.”

The guidance prohibits conservation banks on lands that were previously designated for conservation purposes, so it could be argued that any federal lands under management of an agency with a conservation mandate should be excluded. In addition, all federal agencies are required to protect threatened or endangered species and are prohibited from undertaking activities that will jeopardize them or their habitat: establishing a conservation bank on federal lands therefore seems redundant to protections and management activities that perhaps should already be taking place.

Another issue with siting conservation banks on federal lands is that the bank sponsor would not have any land costs, and therefore credit prices would likely be lower than similar credits generated on private land. This could undermine markets and disincentivize conservation banking on—and therefore species protection on—private lands, while simultaneously encouraging federal agencies to fund conservation projects through private sources.

Despite these drawbacks, federal land agencies often do not have the staff or capital to enact and maintain comprehensive endangered species habitat restoration projects. Private financing via conservation banks on federal lands may be a way to address budget shortfalls and create a net gain for the species.

The issue of siting conservation banks on federal lands will likely need to be sorted out in Wyoming, as the company proposing the first conservation bank in Wyoming, the Sweetwater River Conservancy, is considering restoring habitat on Bureau of Land Management (BLM) lands in Wyoming to sell credits generated from these activities to private developers.

Sources: Refs. 9, 24, 27

CONSERVATION BANKS VS. MITIGATION BANKS

Conservation banking is related to mitigation banking but differs in a few critical ways (see Table 4). Of note, the differing goals of the programs lead to different types of credit generation activities and management plans.

Table 4. Comparison of Mitigation Banking, Conservation Banking, and Habitat Exchanges

	Mitigation Banking	Conservation Banking	Habitat Exchanges
Conservation Goals	No net loss of wetland function	Improved survivorship of targeted species	Preservation and improvement of habitat for candidate species and, if possible, preclude the need to list the species
Supporting Legislation	Section 404 of Clean Water Act	Sections 7 and 10 of the Endangered Species Act	None
Governing Body	U.S. Army Corps of Engineers	U.S. Fish and Wildlife Service	Most likely that each exchange will have a governing body that has been delegated some authority by the U.S. Fish and Wildlife Service through a programmatic agreement
Defined Resource	Wetlands, streams, and riparian areas	Threatened and endangered species habitat	Candidate species habitat
Value for Ecosystem Services	Credit price set through bilateral negotiations	Credit price set through bilateral negotiations	Credit price set through negotiation with program administrator or through auction
Standardized Protocols and Operating Procedures	2008 Compensatory Mitigation Rule; Mitigation Banking Instrument	2003 Guidance for the Establishment, Use, and Operation of Conservation Banks; Conservation Banking Agreement	USFWS is considering developing guidelines
Activities that Generate Credits	Restoring, enhancing, or creating wetlands preferred; preservation allowed only in rare cases	Preserving existing habitat most common; enhancing, restoring, or creating habitat allowed	Enhancing or preserving existing habitat
Example Credit Types	Acres of in-kind wetland; linear feet of stream	Acres of habitat; amount of habitat needed to support breeding pair	Functional acres of habitat
Defined Geographic Scope	Watershed, based on U.S. Geological Survey hydrologic unit codes (HUCs) in combination with Environmental Protection Agency ecoregions	Encompasses the appropriate watersheds, soil types, species recovery units, and/or species and population distributions, based on the conservation needs of the target species	Encompasses the appropriate watersheds, soil types, species recovery units, and/or species and population distributions, based on the conservation needs of the target species
Defined Temporal Scope	Perpetuity; site should be self sustaining	Perpetuity; often requires continuous management in perpetuity	Perpetuity or term leases (for example, 5, 10, or 20 years)

CONSERVATION BANK EXAMPLE

As of October 2011, the USFWS had approved 105 conservation banks in 10 states; nearly a third of these banks are in California.¹⁶ The conservation banks protect 90,000 acres for 60 different threatened or endangered species.²³ An example of a conservation bank in the Rocky Mountain West is presented in Table 5.

CONSERVATION BANKING IN WYOMING

While there are currently no active conservation banks in Wyoming, the Sweetwater River Conservancy (see Section II) intends to establish species conservation banks as well as wetlands mitigation banks. There are a number of threatened, endangered, or candidate species with suitable habitat on the Sweetwater Conservancy properties (Table 6).

Table 5. East Plum Creek Conservation Bank (Colorado)

Year established	2003
Species of interest (status)	Preble's meadow jumping mouse (threatened)
Bank size (acres)	25.3
Bank sponsor	CO Department of Transportation
Management activities	<ul style="list-style-type: none">• Installing and maintaining check dams to protect riparian habitat and assist with groundwater recharge• Controlling invasive species and weeds that may threaten habitat or populations of Preble's mouse in the bank area• Maintaining and restoring areas of riparian and upland vegetation within the bank area• Helping maintain the natural condition of the bank by removing trash periodically
Credit system	<ul style="list-style-type: none">• 1 credit = 1 acre, for a total of 25.3 credits• 25 percent of credits awarded at signing of agreement; other credits awarded for meeting success criteria in the areas of<ul style="list-style-type: none">○ groundwater recharge○ restoring vegetation and weed control, and○ the distribution and population size of Preble's jumping mouse• In the primary service area, 1:1.5 disturbance to credit purchase ratio; in the secondary service area, 1:3 ratio
Service area	<ul style="list-style-type: none">• Primary service area: entire Plum Creek watershed within Douglas County• Secondary service area: adjacent watersheds in Douglas and Elbert Counties where future transportation projects may take place

Source: Ref. 28

Table 6. Sweetwater River Conservancy Conservation Bank

Year established	In development
Species of interest	Greater sage-grouse, black-footed ferret, wild horses, bald eagles, golden eagles, whooping cranes, dace, Canada lynx, Preble's jumping mouse, pikeminnow, razorback sucker, butterfly plant, penstemon blowout, Ute ladies' tresses
Habitat	Wyoming Basin's Rolling Sagebrush Steppe and Foothill Shrublands and Low Mountains ecoregions
Bank size (acres)	~100,000
Proposed management activities	<ul style="list-style-type: none"> Restoration and renewal of threatened and endangered species habitat, riparian corridors, and upland resources Specific activities include restoring native vegetation, excluding cattle, mitigation of erosion, and removal of noxious weeds
Credit system	<ul style="list-style-type: none"> Possible credit buyers include oil, gas, coal, and wind energy industries or other infrastructure developers
Service area	<ul style="list-style-type: none"> Proposed: Known ranges of the species in Wyoming

Source: Ref. 27, www.sweetwaterriverconservancy.com





IV. HABITAT EXCHANGES

Habitat exchanges are a third type of market-based PES mechanism through which energy companies and other development interests can pursue mitigation credits. While mitigation banks and conservation banks are enabled by federal legislation and subject to approval and governance procedures dictated by the USACE and the USFWS, habitat exchanges are not. Federal government agencies have not yet published guidelines for habitat exchanges, though the USFWS is currently considering developing guidelines or a rulemaking for what it calls “pre-listing conservation markets”—habitat exchanges coupled with regulatory assurances for participants.^{29,30} Pilot transactions in habitat exchanges that are currently in development will likely inform any guidelines that the USFWS develops in the coming years.

Habitat exchanges are a tool that can be used for protection of candidate species.[§] A candidate species is one for which the USFWS has enough scientific data to warrant listing as threatened or endangered under the ESA but does not do so because other higher priority species take precedence. Ideally, presence on the candidate list helps the USFWS, landowners, and other resource managers identify and prioritize conservation efforts that are likely to remove the need for listing.³¹ A recent court settlement requires the USFWS to make a final determination on ESA status for 251 candidate species between 2011 and 2016.³²

When habitat exchanges are used for mitigation, they are generally coupled with regulatory assurances that efforts taken to preserve a candidate species will be recognized in the event that the species is later designated as threatened or endangered. A Candidate Conservation Agreement (CCA) is an agreement between the USFWS and other entities (generally other federal agencies and states) to voluntarily undertake conservation measures that are likely to remove or reduce threats to the habitat of a species, with the goal of eliminating the need to list the species in the future. A Candidate Conservation Agreement with Assurances (CCAA) is a similar agreement targeted to private lands. A CCAA provides signatories with assurances that if they undertake the conservation activities specified in the CCAA and the species of interest later becomes listed, they will not subsequently be required to undertake additional conservation activities to protect the species.³¹ Note that should a species be listed, habitat exchanges are also intended to continue functioning.

§ Conservation banks can also be established for candidate species, but none has been to date. It may be the case that without the strong regulatory driver created by a species listing there is too much market uncertainty for potential bank sponsors to justify trying something new. If the Sweetwater River Conservancy develops a species conservation bank for greater sage-grouse (discussed in Section III), it would be the first conservation bank in the nation developed for a candidate species.

Habitat Exchanges:
Habitat exchanges (also called wildlife habitat exchanges or habitat credit trading schemes) are PES markets in which units of habitat are traded but which are not governed by the guidelines established for mitigation banks or conservation banks

Pre-Listing Conservation Markets:
Habitat exchanges coupled with regulatory assurances for participants that efforts taken to preserve a candidate species will be recognized in the event that the species is later designated as threatened or endangered

Ref. 29

Candidate species:
A species that the USFWS has enough scientific data to warrant listing as threatened or endangered under the ESA but does not do so because other higher priority species take precedence

COMPONENTS OF HABITAT EXCHANGES

Conservation Goals. The purpose of establishing a habitat exchange for a candidate species in advance of a listing decision is to implement conservation as an offset to disturbance elsewhere in a species' habitat range, in an effort to eliminate the need to list the species.

The USFWS has stated that voluntary conservation actions for unlisted species are a good idea for several reasons. First, voluntary pre-listing conservation improves habitat as early as possible, which provides more potential benefit for the species. Second, habitat improvements resulting from voluntary conservation agreements may eliminate the need for a listing at all. Third, avoiding a listing eliminates the need for potentially more costly regulations imposed on landowners and other regulated interests. Finally, avoiding a listing allows the USFWS to devote its limited financial and personnel resources to other species more in need of attention and allows states to retain primary management authority over the species' habitat.²⁹

Governing Body. A habitat exchange has a program administrator that manages the transaction on both the supply and demand sides of the market. The program administrator reviews project plans to ensure all requirements for generating credits are being met and manages the verification process to enroll land from participating landowners. It also evaluates, in consultation with USFWS, how many credits are generated from the landowners' activities and how many credits buyers need. The program administrator ensures proper monitoring of land management practices and habitat condition. The

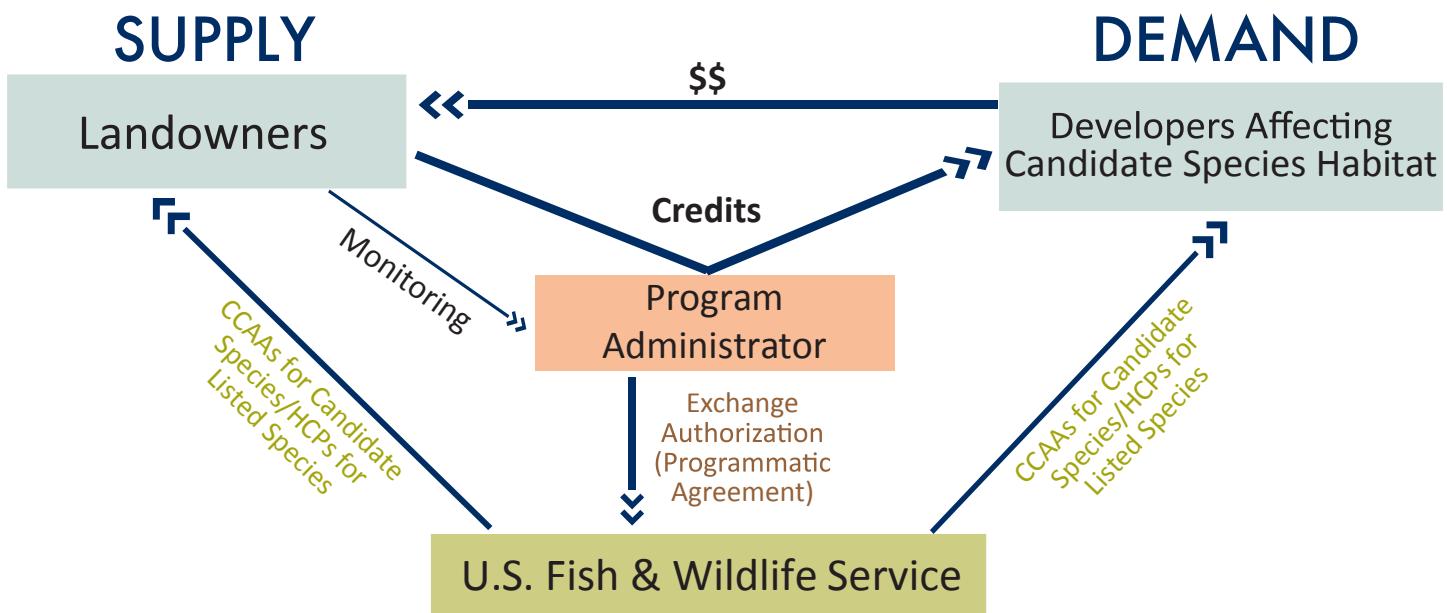


Figure 3. Habitat exchange structure. Unlike conservation and mitigation banks, habitat exchanges have a program administrator who facilitates some aspects of trades between credit buyers and sellers. In addition, the good in demand is candidate species habitat, rather than threatened or endangered species habitat, as it is for a conservation bank. Habitat exchanges can be coupled with Candidate Conservation Agreements/with Assurances (pre-listing) or Habitat Conservation Plans (post-listing).

program administrator of a habitat exchange is authorized by the USFWS to perform these responsibilities through a programmatic agreement. A program administrator can be a private entity, for-profit or non-profit, or a government agency.

Willing Sellers. Habitat exchange sellers are likely to be private landowners who implement best management practices that maintain or enhance high-quality habitat.

Willing Buyer. A habitat exchange buyer is likely to be an entity that seeks mitigation for development activities that will harm the habitat of a candidate species. Because the species at issue are not listed as threatened or endangered, such mitigation buyers must generally proffer a voluntary plan for mitigation to the relevant resource management agencies. A habitat exchange is one type of plan that such mitigation buyers might put forth as their proposed strategy for off-site mitigation.

The process of determining how many credits a buyer must purchase in a habitat exchange is anticipated to be similar to that of mitigation and conservation banks. For example, baseline conditions on the disturbed site must be documented, and generated credits must be at a site that is similar to (and in relatively close proximity to) the site where disturbance occurs. Further, the USFWS or some entity appointed to work on its behalf must approve all aspects of credits traded under a habitat exchange.

Defined Ecosystem Services. Candidate species and their habitat is the ecosystem service targeted by habitat exchanges.

Value for Ecosystem Services. The program administrator might negotiate the price with credit buyers and sellers. Alternatively, credit price might be determined in an auction setting. It is also an option for the buyer and seller to arrange prices bilaterally, if that is preferred.

Standardized Protocols and Operating Procedures. Although there are no federal agency guidelines governing habitat exchanges, the relevant federal and state agencies must still approve an exchange. For example, if the species at issue is a candidate species for which market participants request regulatory assurances that actions taken through the habitat exchange will be adequate even if the species is listed, then the USFWS must approve all features of the habitat exchange, including market design and rules of operation.

Metrics and System for Quantifying Credits. Credit quantification on both the credit and debit sides takes into account both landscape and site conditions to determine the quality of habitat on a site. The landscape quality and site acreage are combined to create “functional acres of habitat.” Compensation ratios are determined in advance of transactions, during market design, based upon habitat quality in different locations. Compensation ratios can be set for a number of reasons (see Section I).

Defined Geographic Scope. Habitat exchange service areas should be based on the conservation needs of the target species, with some consideration of the economic viability of the bank.

Functional acres of habitat:

A measure of ecological currency that includes both habitat quantity (acres) and quality (conservation value)

For example, a 10-acre parcel of high-quality habitat and a 15-acre of medium-quality habitat might each qualify as 10 “functional” acres, for a total of 20 functional acres across the two parcels

Defined Temporal Scope. Credits traded through habitat exchanges may be temporary (5, 10, or 20 years) or they may be perpetual, supported by permanent easements.

Monitoring, Verification, and Adaptive Management. Compliance monitoring (to ensure that activities outlined in the contract are undertaken) and effectiveness monitoring (to determine whether the conservation activities resulted in the desired outcomes in habitat) occur during the life of the contract. When contracts are temporary rather than perpetual, standards for contracts that begin in future years can be updated to reflect new scientific information that arises as a result of monitoring activities.

HABITAT EXCHANGES VS. CONSERVATION BANKS

Habitat exchanges place emphasis on the importance of net benefits to species, quantification of the relationship between conservation activities and habitat improvements, and standardization and transparency in market design. A few key differences between habitat exchanges and conservation banks are (see also Table 4):

- **The status of the species at issue:** Conservation banks are a USFWS-approved mechanism primarily for mitigation of habitat loss for species listed as threatened or endangered under the ESA. Habitat exchanges can be used for any species, whether it has been listed by USFWS or not. (Habitat exchanges used for threatened and endangered species must fulfill all of the requirements of a conservation bank. See Box 3 for an example.)
- **The voluntary nature of participation:** Habitat exchanges are voluntary in the sense that market participants are looking for a way to preserve species habitat before they are strictly required to do so under the ESA. In contrast, conservation banks are usually created in response to credit demand from buyers required to provide some form of compensatory mitigation under the ESA.
- **The presence of a program administrator:** A habitat exchange has a program administrator who manages some aspects of the transaction on both the supply and demand sides of the market, whereas a conservation bank sponsor must design a valuation system and keep track of credits. The program administrator coordinates the actions of buyers and sellers, if there are multiple market participants, whereas a conservation bank tends to have just one buyer and seller.
- **Contract length:** All contracts within conservation banks are permanent easements. Habitat exchanges may have term leases (contracts for 5 or 10 years, for example) instead of, or in addition to, permanent easements. However, it is important to recall that any points of flexibility relative to conservation banking, such as contract length, must be approved by any regulatory agencies that are relevant to the transaction.

In spite of these differences, it is worth noting that nothing prevents a conservation bank from selling credits into a habitat exchange. The habitat exchange would need to support permanent easements, since a conservation bank is designed to generate permanent easements. There would also need to be coordination between the credit valuation systems

of the conservation bank and habitat exchange, to ensure that the credits generated by the conservation bank and credits generated by other sellers into the habitat exchange represented a common currency.

HABITAT EXCHANGE EXAMPLES

Habitat exchanges are in their infancy. Below (and in the next section) are examples of pre-listing habitat exchanges and how these markets are being coupled with various types of regulatory assurances, with the goal of increasing conservation to avoid ESA listing.

Lesser prairie-chicken. The lesser prairie-chicken is a candidate species whose range encompasses a broad expanse of land across Colorado, Kansas, New Mexico, Oklahoma, and Texas. Increases in cultivated cropland and energy development are a major cause of decline or threat in the species' range.³³ The USFWS is scheduled to make a listing decision for lesser prairie-chicken in March 2014, and it is hoped that development of voluntary conservation measures such as habitat exchanges will eliminate the need for a listing. A number of efforts to prevent a listing of the species are currently underway.





CEHMM In-Lieu Fee Program: In New Mexico, a CCA/CCAA regulatory structure for the lesser prairie-chicken is in place, though it is not coupled with a habitat exchange. Rather, the permit holder of the CCAA, the Center of Excellence for Hazardous Materials Management (CEHMM), operates a fee-based program. Oil and gas companies that have signed onto the CCA or CCAA pay fees on a sliding scale according to habitat quality to CEHMM for structures that they build. (For example, an oil and gas company would pay \$20,000 for a well pad and road located in high-quality chicken habitat.) CEHMM issues RFPs for prairie chicken conservation projects with the money gained from these development activities. A committee of biologists determines which projects to undertake based on biological efficacy. In short, CEHMM acts as a broker for conservation, as in a habitat exchange, but without a tradable unit of conservation (e.g., a credit) mediating the transaction.³⁵ Landowners who sign onto the CCAA are also required to implement a variety of conservation measures that benefit the lesser prairie-chicken.

Range-wide Conservation Plans: There are also two efforts underway to create a range-wide conservation plan for the lesser prairie-chicken (Table 7). The Western Association of Fish and Wildlife Agencies (WAFWA) is coordinating one plan, which would include what they refer to as a “mitigation unit market.”³³ A group of stakeholders is developing another conservation plan for the lesser prairie-chicken that also includes a habitat exchange (LEPC Stakeholder Conservation Strategy). Environmental Defense Fund (EDF), a national non-profit environmental organization with an interest in market-based approaches to environmental stewardship, is involved in developing the second conservation plan.³⁴ Both plans include regulatory assurances intended to motivate potential buyers and sellers to participate and meet agencies’ statutory requirements. USFWS is currently reviewing and evaluating both the WAFWA and stakeholder plans. It is possible that both could be implemented.

Table 7. Mitigation Unit Market (Western Association of Fish and Wildlife Agencies [WAFWA] Conservation Plan) and Lesser Prairie-Chicken Habitat Exchange (LEPC Stakeholder Conservation Strategy)

	WAFWA Mitigation Unit Market	LEPC Stakeholder Conservation Strategy
Year established		In development
Species of interest (status)		Lesser prairie-chicken (candidate species)
Habitat	Sandy soils supporting shinnery oak-bluestem and sand sage-bluestem communities in high plains regions	
Bank size (acres)		Not yet determined
Program administrator	WAFWA and the Foundation for Western Fish and Wildlife	Not yet determined
Management activities	<ul style="list-style-type: none"> • Native grassland restoration • Prescribed burning • Appropriate grazing practices • Fence removal and woody species (mostly eastern red cedar and mesquite) removal 	
Credit system	<ul style="list-style-type: none"> • The number of credits that must be purchased to offset an impact are based on the quantity and quality of the disturbed habitat. 	
Credit markets	<ul style="list-style-type: none"> • Two separate mitigation unit markets, one with long-term (permanent) units, to mitigate 25% of impacts, and another with short-term units (minimum five years), to mitigate 75% of impacts. Impacts are considered permanent until remediated, but impact units can be transferred to new impacts once remediation is documented. 	<ul style="list-style-type: none"> • Permanent and temporary contracts, with offsets equal to the impacts in term length. (A permanent disturbance must be offset with a perpetual credit, but a five-year disturbance only requires a five-year credit.)
Credit verification	<ul style="list-style-type: none"> • If the species is not listed, WAFWA or state fish and wildlife agencies will verify. If the species is listed, USFWS will also have the opportunity to review verifications with WAFWA or state fish and wildlife agencies. 	<ul style="list-style-type: none"> • An independent third party will verify all credits.
Credit price determination	<ul style="list-style-type: none"> • Impact and conservation costs are tied to habitat management costs. Those costs may change based on cost of inflation and input from committees representing industry, agriculture, and conservation organizations. 	<ul style="list-style-type: none"> • Credit price is entirely market-based (negotiated between buyer and seller; the exchange does not act as broker for transactions).
Service area	<ul style="list-style-type: none"> • Service area encompasses Colorado, Kansas, New Mexico, Oklahoma, and Texas. • Range-wide exchange but with service areas in which localized trading occurs; trading across service areas will be possible if sufficient conservation has been achieved in a particular service area. 	

Sources: Refs. 33, 34

Note: Table 7 indicates differences between the WAFWA Conservation Plan Mitigation Unit Market and the LEPC Stakeholder Conservation Strategy Habitat Exchange. When neither market is indicated, the information applies to both markets.



Box 3. Utah Prairie Dog Habitat Credits Exchange

The Utah Prairie Dog Habitat Credits Exchange is a hybrid between a conservation bank and the habitat exchanges described in this section. It is governed by a Conservation Banking Agreement but has the broker structure that is more commonly observed among habitat exchanges.

The Utah prairie dog was listed as threatened by USFWS in 1973. It is the only species mentioned in this section that has been designated by USFWS as threatened or endangered. As a consequence of its threatened status, USFWS requires that a Conservation Banking Agreement govern market-based mitigation for the prairie dog. There are three conservation banks established to preserve prairie dog habitat across its habitat in southwestern Utah. A fourth program, the Utah Prairie Dog Habitat Credits Exchange, has also been established to protect prairie dog habitat.

The Utah Prairie Dog Habitat Credits Exchange was established in 2007 with initial financial assistance from a Natural Resources Conservation Service (NRCS) Conservation Innovation Grant. The Utah Prairie Dog Habitat Credits Exchange has purchased 720 credits (covering 200 acres) from private landowners. Of these credits, 77.87 have been purchased by two development interests to compensate for destruction of prairie dog habitat elsewhere in the prairie dog's range. These credits were sold in two easement transactions. The remaining 642.13 credits are still available for purchase. The Panoramaland and Color Country Resource Conservation & Development Councils (RC&Ds) act as a broker for the transactions. The RC&Ds enroll landowner acres in the exchange and calculate how many credits each parcel should receive and it also determines how many credits a development entity seeking mitigation credits must purchase. These determinations are subject to USFWS approval and are dependent on how many prairie dogs are present and the quality of habitat being lost to development.

Sources: Refs. 36–38

HABITAT EXCHANGES IN WYOMING

The Upper Green River Basin is the headwaters for the Colorado River System and home to many bird and wildlife species with environmental and recreational significance. In recent decades, the basin has also experienced an energy boom from natural gas extraction. This activity has increased economic opportunities but has also placed development pressures on natural resources, specifically wildlife habitat.

A broad coalition of scientists, wildlife managers, and landowners are developing the Upper Green River Conservation Exchange (UGRCE), a PES market, as one approach to mitigate these development pressures.³⁹ The focus of this market is wildlife habitat (greater sage-grouse and mule deer) and riparian function (water quantity, quality, and timing of flows).

Sublette County Conservation District, the University of Wyoming, The Nature Conservancy, EDF, and landowners in the region are currently involved in establishing the UGRCE. Environmental Incentives, a firm that has facilitated establishment of environmental markets elsewhere in the western United States, and Parametrix, a firm that is providing technical assistance to the Exchange's science committee, are assisting. Relevant federal and state land management agencies have also been involved in discussions.

The idea for this market started as a grassroots initiative among Upper Green River Basin landowners seeking recognition for the fish and wildlife habitat their ranching operations provide. For example, the flood irrigation methods generally utilized in the basin for hay production provide wetlands for migratory birds, and hay meadows provide forage for ungulates. If these contributions were recognized, agricultural producers might realize an additional stream of revenue that would help them maintain their ranching operations and stave off financial pressures to sell land to developers.⁴

Landowners will be the sellers in the UGRCE and will implement practices on their land that maintain or enhance wildlife habitat and water resources. Buyers in the market are expected to be energy companies seeking compensatory mitigation for their energy development activities. Additional buyers may be local/national environmental foundations and second homeowners in the basin looking for ways to support the high-quality recreational and environmental amenities that characterize the basin.

The UGRCE is focused on achieving conservation and mitigation outcomes as cost-effectively as possible. Wildlife biologists and hydrologists are developing quantification tools to determine the value of ecological services provided through the market. Market protocols are also in development to define the roles of buyers and sellers, explain how monitoring will take place, and detail market governance.

Finally, the market will be structured so that energy companies and landowners who participate are able to comply with current and future regulations, including a CCA and a CCAA for those trading greater sage-grouse credits.

Table 8. Upper Green River Conservation Exchange (Wyoming)

Year established	In development; pilot transactions planned for 2013
Species/habitat of interest	Greater sage-grouse, mule deer habitat, and riparian function
Exchange size (acres)	Not yet determined
Program administrator	Not yet determined
Management activities	<ul style="list-style-type: none"> Possible activities for greater sage-grouse include wind-to-solar power conversions on pumps for livestock watering wells, grazing management, and control of invasive species Possible activities for mule deer include grazing management Possible activities for riparian function include revegetation to reduce sedimentation and altered timing of flows
Credit system	<ul style="list-style-type: none"> For sage grouse, the credit ratio (in development) will be consistent with the Wyoming Governor's core area strategy The credit ratio and credit structure for each ecosystem service will be informed by quantification tools currently being developed by science committees Temporary credits in addition to perpetual credits are anticipated Intended that credits be sold to oil and gas developers and other development interests in Wyoming as well as conservation buyers that have other motivations than compensatory mitigation
Service area	<ul style="list-style-type: none"> Upper Green River Basin (Sublette County) in southwestern Wyoming

Sources: Refs. 39–41



CONCLUSION: GREATER SAGE-GROUSE MARKETS IN WYOMING?

The current greater sage-grouse range extends across 11 states in the western United States and two Canadian provinces.⁴² In 2010, the USFWS designated the greater sage-grouse as a candidate species that warranted listing as threatened or endangered under the ESA but whose listing was precluded by higher priorities.⁴³ In 2015, the USFWS is scheduled to provide a decision on whether the greater sage-grouse should be listed as threatened or endangered.⁴²

Economically it is in the best interest of the state and its industries to have robust sage grouse populations that do not require ESA listing, and there have been a number of proactive conservation measures implemented that could be linked with some kind of market-based credit trading system.

CORE AREA POLICY

In 2008, Governor Dave Freudenthal released a state Executive Order establishing a core area policy to conserve greater sage-grouse in critical habitat areas. In 2011, Governor Matt Mead extended the policy.⁴⁴ The Bureau of Land Management (BLM) has also adopted the core area policy in Wyoming.⁴⁵ In short, the policy provides a map of areas designated to be critical to sage grouse and limits development in those areas unless developers can demonstrate they “will not cause decline in greater sage-grouse populations.”⁴⁴

Conservation banks or habitat exchanges that generate credits on non-core area lands could provide offsets for development activities on core lands in the same service area. Credits could also be used to offset impacts to sage-grouse on non-core lands to meet other mitigation requirements. It is unlikely that landowners in currently designated core areas would be able to take part in conservation banking or habitat exchanges for sage-grouse, as the policy implies that their land already counts toward sage-grouse mitigation by avoiding disturbance.

GREATER SAGE-GROUSE CCAA

In December 2012, the USFWS and the State of Wyoming issued a draft CCAA for the greater sage-grouse in Wyoming.⁴² The CCAA dictates what private landowners need to do on their lands in exchange for assurances that they can continue to operate as they currently



do if the sage-grouse is listed. Most of the ranching operations in the Upper Green River Basin rely heavily on public grazing allotments. Thus, a CCA between the USFWS and the BLM explaining how the BLM will implement ESA management of greater sage-grouse on the public lands that it manages will also be required. An ideal outcome of a CCA and CCAA would be that enough acreage is signed up that the need for listing is precluded.

One opportunity that stakeholders in the Upper Green River Basin have is to couple a CCAA and CCA with a habitat exchange through the Upper Green River Conservation Exchange (see Section IV). Similar discussions are taking place for the greater sage-grouse across its 11-state range, including in Colorado and Nevada.

WYOMING ENERGY STRATEGY

Governor Matt Mead's "Wyoming's Action Plan for Energy, Environment and Economy" makes developing a Wyoming off-site mitigation banking framework a statewide objective. In the energy policy, the phrase "mitigation banking" encompasses "conservation banking" and "habitat exchanges," that is, credit trading to offset impacts to species habitat.⁴⁶ As part of implementing the energy strategy, it is likely the state will pursue creation of a credit trading market, with greater sage-grouse in mind.

THE PATH FORWARD

For credit trading to be most successful, it should be part of a larger conservation strategy that identifies important habitat in advance of development.⁴⁷ The Governor's sage-grouse core area policy is, in essence, a regional conservation plan, as is the draft statewide CCAA. The Nature Conservancy's "Development by Design" work also focuses on landscape-scale conservation planning by mapping priority habitats and energy development potential to determine the best areas for both conservation and development.⁵⁸ For PES markets to go forward in Wyoming, they should dovetail with broad conservation strategies to target the most critical lands for conservation. PES will also be most effective if the mitigation hierarchy is used to first avoid and then minimize impacts to the target species, before attempting to compensate for impacts that remain.

The conservation credit trading models described in this primer must walk a fine line between ecological and economic viability. It is tempting to set up a payment for ecosystem services market and, upon successful market transactions, deem it a success. It is important, however, for not only financial but ecological success to be considered and monitored. Now that mitigation and conservation banks are better established, there may be sufficient data and experience with the credit trading concept to analyze the ecological functions of these banks. Are they meeting their intended ecological aims? The USACE's 2008 rule is meant to improve compensatory mitigation project performance and accountability, but little research has been done to aggregate wetland bank success and see if the rule is meeting its intended aim. More research is needed to assess whether mitigation and conservation banks are providing their promised levels of mitigation and conservation.

Proponents of habitat exchanges emphasize quantifying habitat improvements and providing net benefits for at-risk species. However, this type of PES market is largely untested. Will the additional flexibility in contract length and emphasis on regulatory assurances attract additional private landowners, thereby protecting and/or enhancing more habitat for at-risk species? Or will the lack of permanent easements harm species and reduce conservation certainty in the long run? These are open questions.

The different models of market-based conservation described in this primer demonstrate the potential for markets to assist development entities in meeting their mitigation requirements as cost-effectively as possible. They also suggest how markets might increase overall conservation activity. Federal and state natural resource managers can benefit from the variety of approaches that have been utilized so far, as they build on what has been learned to achieve cost-effective and ecologically successful mitigation and to create meaningful conservation opportunities for the future.

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