



DEFENDERS OF WILDLIFE

Payments for Wildlife and Biodiversity Outcomes Under Farm Bill Programs





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Defenders of Wildlife is a national, nonprofit membership organization dedicated to the protection of all native wild animals and plants in their natural communities.

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Cover images, clockwise from top left: Ranch boys going fishing, FT Ranch, Colorado. Photo by Gary Kramer, courtesy NRCS. Common egret near rice field in Northern California. Photo by Gary Kramer, courtesy NRCS. McCloud River, California. Photo by Bruce Taylor, Defenders of Wildlife. Opposite page: Rain showers over Abert Rim, Lake County, Oregon. Photo by Bruce Taylor, Defenders of Wildlife.

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Executive Summary

THE RECENTLY-PASSED 2014 FARM BILL refined the conservation programs that reward farm and forestland owners for conservation practices. Although the funding pie is smaller, the present need for such programs is greater. The nation faces ongoing challenges that threaten to degrade our air and water resources, place wildlife in jeopardy and even reduce the efficacy of some conservation practices. In these uncertain times, innovation and efficiency are paramount to achieving desired outcomes. Many Farm Bill programs pay for ecological benefits by rewarding landowners for following specified practices that result in biodiversity or wildlife conservation. Paying landowners for the ecological conditions they create, rather than the practices they follow, can bring greater accountability to a payments program.

Practices and Outcomes

Tension exists between practice- and outcomes-based payment programs. Encouraging landowners to follow specified practices assures predictable results but may be considered rigid and inflexible. Offering payments for outcomes, however, may seem risky and undefined. Yet there is room for both methods. This paper recommends ways for the U.S. Department of Agriculture to incorporate biodiversity and wildlife outcomes into its practice-based conservation programs under the 2014 Farm Bill.

A conceptual outcome will guide the program toward achieving long-term results. Existing practices will continue to function as a basis for payment, but should guide the conceptual outcome, and strive to deliver actual tangible outcomes. Tangible outcomes relevant at the local scale should earn bonuses in addition to payments for implementing approved practices.

The Regional Conservation Partnership Program, created in the 2014 Farm Bill, is authorized to use outcomes as a payment basis. Landowners participating in the Conservation Stewardship Program, the Environmental Quality Incentives Program, or the Healthy Forests Reserve Program could incorporate outcomes into their projects for bonus payments besides compensation for approved practices.

By phasing outcomes into the existing payment structure, the Department of Agriculture could study the cost-effectiveness of programs paying for ecological benefits, guide the program toward greater results, and achieve greater conservation for biodiversity and wildlife.

Introduction

Paying landowners for *outcomes* besides payments for prescribed practices can drive a payment program toward greater achievement of biodiversity and wildlife goals.

An outcome — also known as an improved performance, result, success, or objective — refers to the measurement of actual environmental benefit.¹ In an outcomes program, a landowner or producer must show concrete measure of progress toward the specified outcome to claim the financial reward. A tangible outcome should be easy to measure, recognizable, simple to understand, and representative of an ecological role.

A “practice” — also known as method, input, or action — refers to prescribed steps a landowner may take that are assumed to result in an ecological benefit.² In a practices program, a producer is paid to follow pre-determined steps, regardless of whether such methods result in a tangible benefit.

There are advantages and disadvantages to each approach. Some experts believe that current payment approaches are practice-oriented because “we currently lack any feasible alternative.”³ Practices conform more strictly to international trade law, which requires payments for ecological benefits to be connected to “extra costs or loss of income.”⁴ Under this standard, the outcomes approach may appear to some in the international trade arena as a trade-distorting subsidy because the approach bypasses actual costs and instead bases payment on the delivery of ecological goods. Because the goals of an outcomes program can be difficult to grasp, such payments may appear at first glance to be extra funding for U.S. farmers to the detriment of foreign products.⁵

Other downsides to a purely outcomes-driven program include the difficulty of directly linking an individual landowner’s management actions to ecological benefits that may only be realized or detectible over longer time frames or broader scales. In addition, outcomes may be too general or difficult to explain; payments for practices are simpler and easier to conceive.

There is a growing interest in using outcomes, however, because of the potential for more cost-effective, transparent, and effective delivery of environmental benefits, while still harnessing market mechanisms to achieve the greatest efficiency.⁶ An outcomes program ties payment to the actual benefit desired, driving environmental efforts toward the realization of those goals. A program that pays

landowners solely for practices risks wasting funding on fruitless methods that fail to achieve real conservation for wildlife and biodiversity.

This paper does not call for the abandonment of practices-based programs. Instead, it recognizes the close and inter-dependent relationship of both outcomes- and practices-based payment programs. Measuring the environmental benefit in some capacity, whether overt or unacknowledged, is a critical part of developing a practice, and a practice is recommended when expected to achieve a desired outcome.

Correspondingly, using practices is a critical part of achieving desired outcomes. Where a practice consistently achieves a result, it may come close to being perceived as an outcome itself. The practice of seasonally flooding agricultural fields may be seen as an outcome because it specifically benefits migrating birds and represents a portion of the complexity of life and hydrological integrity in a functioning wetland ecosystem.⁷

Outcomes should be phased into conservation payment programs as a factor on which to base payments and administer the program. The exact role that outcomes play will depend on the success of existing practices, and the administrative guidance provided by the program.

To leverage the relationship between outcomes and practices, a payments program should include three levels:

1. A conceptual outcome that serves as an overarching goal;
2. The development and maintenance of practices that demonstrably contribute to the conceptual outcome;
3. Bonus payments for tangible outcomes that can be observed at the local level.

The interrelationship among these three levels will encourage measurable progress toward conservation goals without discarding the value and structure afforded by practices.

A broad, conceptual outcome can be a guidepost for conservation payment programs. When setting the conceptual outcome, program managers should look to existing guidance to help identify outcomes at this level. A conceptual outcome should be achievable, precise, and described; applicable to the region; and reflective of goals embodied in existing conservation plans, including water and air quality, and wildlife plans. Finally, the outcome should be recognizable even if not precisely measurable. In the wildlife conservation context, the conceptual outcome might be biodiversity⁸ conservation. While biodiversity conservation may be an ideal outcome on

a conceptual level, such a broad goal is difficult to measure and presents challenges in a payment program. Even when elements of biodiversity are at risk at the local level (for instance watershed functions, rare and endangered species, or basic ecological functions such as a landscape's resiliency to destructive fires) such goals remain difficult to describe in precise, definite terms. Tangible outcomes are therefore needed besides conceptual outcomes. Such concrete outcomes could be beaver dams, or keystone predator sign or observation. Where the landscape offers no single tangible outcome, the small-scale outcome could be presented as multiple outcomes including several species plus habitat characteristics. Alternatively, an index approach to the tangible outcome may be a way to actualize the broad conceptual outcome.

The 2014 Farm Bill provides authority for integrating an outcomes approach into current USDA payment programs. Applications to the Regional Conservation Partnership Program can be prioritized if they include an outcomes-based approach. The Agricultural Conservation Easements Program, the Conservation Stewardship Program, the Environmental Quality Incentives Program, and the Healthy Forests Reserve Program are programs covered⁹ under the Regional Conservation Partnership Program.¹⁰ The new language provides opportunities to nest smaller scale projects within a larger approach which could have a greater ecological benefit across the landscape.

The covered programs focus mainly on practices, but the Conservation Stewardship Program and the Environmental Quality Incentives Program offer additional funding for experimental pilot projects, which could conceivably experiment with using outcomes besides the traditional payments for practices approach. The relationship between the programs and the method by which these programs will encourage the use of outcomes in individual projects should be fleshed out with new rulemaking.



Pacific tree frog (*Pseudacris regilla*). Photo by Lauriel Amoroso.

Comparison and Relationship Between Outcomes and Practices

There are benefits and drawbacks to either a purely practices- or purely outcomes-based approach. Practices may be perceived as overly administrative and burdensome, while outcomes afford greater flexibility in achieving the desired result. However, outcomes may contain uncertainty and ambiguity, while practices are more predictable, particularly for payments for participating landowners. Given the ecological results that could be achieved when both approaches are employed together, it makes sense for a program to pay for straightforward practices, but use a conceptual outcome to guide those practices, and pay an added bonus for tangible outcomes produced.

Administrative Effort and Costs

Both practices and outcomes have administrative costs. When using practices, administrators expend resources and time on developing, teaching, and verifying the practices. Outcomes allow producers to work the land freely, which may be attractive to landowners.¹¹ Program resources are still expended on deciding on what outcomes are appropriate, and verifying that landowners reporting tangible outcomes have truth to their claims. In addition, outcomes-based approaches exhibit higher costs for administration and transactions because there is relatively little past experience to build upon, although these costs will probably decrease over time as agencies refine their outcomes and producers become more adept at achieving them.¹² When using practices and outcomes together in a program, the results of one approach can support the other, making the structure overall more cost-effective.

Getting the Greatest Ecological “Bang for the Buck”

In theory, practices are thought to be less accurate in achieving the environmental goal because the measure of success is removed from the goal. As implemented on the landscape, however, a practice-based program likely has a goal in mind. However, even a well-intentioned practice may lose sight of the desired outcome, especially when the practice is not calibrated to different local situations. Following a practice without considering a greater goal has the potential

to make the government, and by extension, the taxpayer, pay for an ecological benefit that doesn't succeed and is never delivered.

Outcomes are theoretically more accurate in achieving the environmental goal because the payment is tied to the achievement of the goal. Because the government (and taxpayer) pays only for the desired outcome, funding is not lost on goals never delivered. The difficulty arises in setting an outcome sufficiently precise and concrete to serve as a unit of payment, while retaining a broader conceptual goal that remains regionally relevant across different habitat types.¹³

A program that leverages the relationship between practices and outcomes has the greatest opportunity to achieve cost-effective ecological benefits. Practices that operate within the context of a conceptual outcome, refining their methods as needed, are more likely to deliver ecological benefits than practices operating without such guidance. Payments for tangible outcomes build on practices as an added incentive to deliver results. Payments in programs that wed practices and outcomes are more likely to get a bigger bang for the buck than programs paying for either practices *or* outcomes.

Appropriately Calibrated to Local Conditions

Calibrating a practice to each locale is time consuming and expensive. Practices are typically developed on a larger scale and applied at the local level even if the practice is out of sync with local conditions or does not consider local knowledge. Outcomes are inherently calibrated to local

conditions because a producer is encouraged to experiment, be creative, get advice from outside experts, and delve into local knowledge to achieve the outcome.¹⁴

However, the science used to develop the practice under consideration may not be unsound when applied in the location or under certain local conditions. A program should retain practices as a unit of payment to function as a backbone, from which creativity and experimentation can help to refine further work and yield greater ecological benefits.

Quality of the Land Used to Produce Benefits

By using practices alone, the producer might apply conservation measures to lands not well suited to the intended purpose. Because the agency will pay the producer for following a prescribed practice, it does not matter whether the land is of high enough quality to produce the desired outcome. When the payment is tied to the result, however, lands with greater ecological value are more likely to produce results and will yield a higher payment.¹⁵ By offering to pay for tangible outcomes and practices there is greater incentive to incorporate ecological benefits into farm or land production, rather than relegating the environment to the fringes.

Role of the Producer

A purely practices-based approach treats the producer as an instrument, and may seem overly prescriptive, even coercive. Requiring adherence to protocols does not necessarily cultivate a commitment to the conservation of nature.¹⁶



Mule deer in velvet on FT Ranch, Colorado. Photo by Gary Kramer. Courtesy NRCS.

Using outcomes places greater responsibility with the producer and can be more attractive in its flexibility and autonomy.¹⁷ Producers know their land best, and outcomes can tap into the pride they feel when creating an ecological benefit for the public. Outcomes also promote collaboration and dialogue between producers, and between producers and conservation organizations. An outcomes approach therefore may change the relationship between the farmer and the public,¹⁸ by attributing the farmer's ecological achievements to his or her stewardship rather than a regulatory agency's mandated practice.¹⁹

Role of the Third Party Non-profit Conservation Organization

In a practices approach, conservation organizations primarily communicate with the agency to influence the selected practice. An outcomes approach encourages conservation organizations to work directly with the landowner to experiment with methods that best achieve the stipulated outcome. This approach fosters greater creativity and collaboration, and potentially changes the relationship between the parties.²⁰

Financial Risk to the Producer

Both practices and outcomes contain financial risk. Practices afford certainty in that adherence to the method will yield payment regardless of the outcome. However, following a regimented practice could interfere with other aspects of farm management, and doesn't offer the flexibility to take a different tack.²¹ An outcomes approach presents risk and flexibility. When payment is contingent on the outcome, a failure could mean that the producer is not paid. However, an outcome-based scheme affords greater flexibility, which producers find favorable.²² Diversifying the land's "products" into environmental goods and traditional crops can reduce financial risk from market and weather fluctuations that may affect other commodities in a year.²³ The risk associated with producing an ecological benefit may decrease with time and experience, as the producer becomes familiar with delivering outcomes.²⁴

A payment for ecological benefits program should mitigate financial risk where possible, especially if the perception of risk discourages participation. Incorporation of an outcomes approach within an existing practices program can introduce flexibility without abandoning the certainty associated with practice payments.

Examples and Suggestions for Structuring an Outcomes program or Key Factors Needed for a Successful Outcomes Program

Instances of ecological benefits programs that use outcomes as a basis for payment are found around the world. These research projects, many of which are from Europe and Australia, offer direction on using outcomes as a basis of payment. From these examples, it is possible to glean three components that may be useful in incorporating an outcomes-based approach within U.S. programs:

1. Set a conceptual outcome to guide the program toward achieving a broader goal;
2. Maintain a set of practices. The program should utilize functional and valuable practices but monitor these methods to ensure their conformance with the conceptual outcome;
3. Make bonus payments for tangible outcomes and increased scale. The program should pay bonuses for outcomes that are tangible, specific to the local level.

An outcomes program should therefore be nationally driven through its conceptual outcome but locally workable through its tangible outcomes. Practices should contribute to the conceptual outcome, and represent an opportunity to achieve the tangible outcome.

Set a Conceptual Outcome to Guide the Program toward Achieving a Broader Goal

*A program should set a clear conceptual outcome*²⁵

Outcomes should be sufficiently descriptive to explain the goal, but express a concise concept so that the objective is plain. The conceptual outcome should apply to wildlife conservation at the regional, or even national, level. From this greater scale, the conceptual outcome steers the development of practices and guides the selection of the tangible outcomes at the local scale.

Desirable qualities of a conceptual outcome
Expressly described
Concise and descriptive
Applicable to the landscape
Reflective of existing goals
Conceivable
Achievable

Existing programs, primarily in Europe, varied in their ability to express the desired overall conceptual outcome, and some programs neglected to expressly state any overarching goal. For instance:

The Netherlands: A project in the Netherlands was intended to conserve meadow birds on modern, intensive dairy farms, but reported no overall guiding outcome.²⁶

Germany: A project in Germany's Lower Saxony paying for conservation of grasslands expressed its goal as ecological services provided by the biodiversity of European agricultural landscapes.²⁷

A conceptual outcome should apply across the landscape, and reflect existing regional goals

In wildlife conservation, an example of a wide-reaching outcome is the conservation of native biodiversity at all regional levels. Although this goal may at first seem too broad, it is a reasonable overarching purpose for a program. Previously developed statewide or regional goals, such as State Wildlife Action Plans or eco-regional plans, are a good resource for developing a conceptual outcome.

A conceptual outcome should be achievable, and include progress indicators

Although it may not be apparent at the time of inception whether such a goal is possible, managers refine the outcome as part of an adaptive management strategy. After several years of using a conceptual outcome at a national level to guide the use of practices and results at the local level, managers should revisit the conceptual outcome to determine whether the program has made progress toward achieving the outcome. The conceptual outcome guides the use of practices; the improvement of practices and tangible outcomes may provide feedback for what we as a society are working to achieve.

Maintain a Set of Practices

A payment program should maintain a set of practices shown to be workable. Existing practices should be easy to implement, cost-effective, and verifiable. New practices that come online should strive toward these attributes. All practices within a payment program should contribute meaningfully to the outcomes. Managers should use adaptive management, and afford landowners some measure of flexibility to refine practices over time to achieve the conceptual outcome, and to allow opportunities for bonus payments when a tangible outcome results from a practice.

Some existing practices already work well at achieving outcomes, even when the outcome is left unstated. A practice developed under an older version of the Incentives Program in the Farm Bill is the flooding of agricultural fields. The practice itself is so beneficial that one might envision field flooding as an outcome itself. However, the field flooding practice could also benefit from setting both an express conceptual outcome and a tangible outcome, such as use by a priority species of shorebird. Not only does this guide the method toward increased efficacy, but the flooding practice might also shed light on what outcome the program is aiming to accomplish.

A practice can help clarify the desired outcomes

Under the National Pollutant Discharge Elimination System, the Clean Water Act requires dischargers to conform to water quality and temperature standards. The desired outcome under such a program is improved water quality. Project managers may work backwards to achieve the goal of reduced temperature, choose shade as a method to achieving that goal, and finally select tree-planting in the riparian area as a practice to produce the desired outcome.

However, improved water quality may have other desirable outcomes. Returning native salmonids to the stream could be a broader reason for using a riparian buffer to shade streams and lower water temperatures. Rebuilding a healthy

Desirable qualities of a practice
Implementable
Cost-effective
Administratively simple
Verifiable
Determined at regional level with local input
Contributes to outcomes
Sensitive to adaptive management

Desirable qualities of a tangible, payable outcome
Measurable and recognizable
Economical to study
Conceptually simple
Reflective of existing goals
Resilient to climate change
Representative of its ecosystem
Plays an ecosystem role
Adaptively managed

riparian system offers many co-benefits, including restoration of wildlife species. Looking to existing practices, even those in other regulatory systems, may prove rich fodder for conceptualizing and describing outcomes.

Other practices do not work well at achieving an outcome. Planting trees in riparian areas may not be appropriate in a habitat where trees are not a native component of the riparian biota. Another practice with high likelihood of failure is removal of invasive species without a plan to prevent re-colonization. Any program that pays for this practice expends resources without ever achieving meaningful ecological results. With climate change practices that used to work in a given area may experience a shift in effectiveness. In these scenarios, a conceptual outcome demonstrates the failure, and a tangible outcome can guide the practice toward better performance in each situation.

Sometimes, a practice like flooding of fields emerges as the prevailing factor in a program because potential outcomes depend on factors outside the landowner's control (e.g., with migrating shorebirds, conditions of the species' breeding or wintering areas). In other cases, a simple and robust outcome dominates a program because it serves as a strong indicator of ecological integrity. The presence of beaver dams can serve as a proxy for a suite of other ecological and hydrological co-benefits. No stringent practice is needed to achieve beaver dams; their presence acts as proof of a biodiversity outcome for payment. Scenarios that fall somewhere in between require a more nuanced payment program. In a program where keystone predator conservation is a desired outcome, landowners could be paid for practices such as habitat enhancements or development avoidance. They could also earn a bonus payment for a tangible outcome such as evidence that the predator had visited a certain property.

Bonus Payments for Tangible Outcomes

Besides the conceptual outcome, a program should also set specific and tangible outcomes at a local scale that can earn a bonus in addition to payments for following a practice. In an outcomes program, the conceptual outcome is the nationally driven component and the tangible outcome is defined by a local scenario.

Some researchers believe that “if it is not possible to develop relatively simple, self-monitorable, indicators as may be the case in some instances, the [outcomes]-oriented remuneration approach may not be an appropriate means of achieving desired outcomes.”²⁸ Others, while optimistic, add a cautionary note that selecting the perfect payable outcome is unlikely to occur immediately.²⁹ Instead, “an iterative, trial-and-error approach” may be necessary in the early years.³⁰ Program administrators will probably need to decide how much detail on a payable tangible outcome is “good enough.”³¹ The exact indicator selected can also be fine-tuned as the program progresses and lessons are learned at the landowner level.

The locally relevant tangible outcome should nest within the broader goal embodied in the conceptual outcome. When a program pays a landowner a bonus for a tangible outcome, the outcome must be measurable, recognizable, easy to report, and simple to understand. This is especially true when landowners are responsible for self-reporting in order to obtain the bonus payment.³² Ideally the outcome would be traceable to the producer responsible,³³ but some mobile outcomes, like wildlife, may travel to neighboring parcels where landowners who had no part in the process may claim a bonus. Positive leakage may encourage other landowners to participate when they witness a neighbor's success.

A local tangible outcome should reflect existing goals on the landscape, and draw from documents such as State Wildlife Action Plans or eco-regional plans. These plans may immediately suggest an optimal outcome for a particular locale or habitat type. However, when perusing existing goals, managers should consider whether an outcome could ultimately become obsolete due to climate change. It may be wise to choose outcomes that support the “stage” on which the “actors” may move as the climate shifts.³⁴ Selecting outcomes that are characteristics of a healthy, functioning habitat will remain a resilient indicator for ecological integrity, even as individual species shift in response to a changing climate.

Designing a System of Bonus Payments for Tangible Outcomes

The most critical, yet elusive, characteristic of a tangible outcome is that it should represent some measure of ecological integrity. Ideally the outcome selected plays a major role in the integrity of its ecosystem. Unfortunately, there is no single perfect tangible outcome that can feed directly into the biodiversity conceptual outcome.³⁵ Instead, a tangible outcome can only approximate biodiversity.

When deciding on a tangible outcome for bonus payments, managers may want to follow these basic steps:³⁶

1. Determine whether a single outcome exists that is closely tied to the system's ecological integrity;
2. If no single indicator exists, develop a multiple indicator system by identifying the species pool among several taxa, subtracting rare or common species or species not easily recognizable, and consider adding a habitat characteristic (e.g. snags, hydrology, soil chemistry) to augment the species outcomes;
3. If multiple species and characteristics lend themselves to a categorical approach, create an index of increasing conservation values, but avoid overly complex systems;
4. Field-test the single outcome, the suite of outcomes, or the index;
5. Adaptively manage the payable outcome depending on how well the tangible outcome contributes to the program's overall conceptual outcome. Although this approach to developing a tangible outcome at the local level may be time- and resource-intensive, especially at the field-testing stage,³⁷ these costs may diminish as landowners become proficient at identifying the indicators, or as third-party conservation groups expand the science supporting the selection of the payable outcomes. A workable program need not be perfect, but should respond to adaptive management and experimentation.

Types of Tangible Outcomes

Numerous examples of tangible outcomes exist and fall into distinct categories of outcomes. A payable outcome could indicate ecological integrity, such as beaver dams; multiple species and habitat characteristics that represent biodiversity

collectively; or a measurement that could be presented as a tiered system or index into which land parcels are placed according to various criteria.

There is inherent tension when selecting an indicator — between constructing the perfect detailed system (which is costly and narrowly focused, though easier to recognize) — and a general outcome (which is less costly and has a wider focus, but may prove unwieldy for monitoring and payment purposes). A program could pay a bonus to landowners whose efforts contribute to the achievement of a stated goal, such as the delisting of an endangered species, or the collective participation of a certain collective of landowners on the larger landscape scale.

Single species outcomes

Selecting a single species or single characteristic for a tangible bonus outcome can prove efficient and appropriate, especially when that species acts as an indicator of ecosystem integrity.³⁸ If an endangered or rare species is the target of conservation, such as panthers in Florida, then the species' presence could be a viable outcome for bonus payments. However, a program should consider how paying for a single species feeds into the broader conceptual outcome.³⁹ Paying bonuses for key habitat components, which would benefit other species in the ecosystem, may afford more comprehensive protection to the target species. When a single species approach is used, there is more ecological value in selecting single species that play ecosystem roles, such as pollinators, host plants, or seed dispersers, rather than selecting species that have no identified link to the greater system.⁴⁰ However, using a single species as a basis for bonus payments greatly simplifies program administration. Besides being easier to identify, a single species may tell a strong story to the public and observers of the payments program.

Beaver dams are an excellent example of a potentially successful single payable outcome because the dams also represent a great ecological benefit. Beaver fell trees and build dams, creating wetlands that may last for many years and fundamentally alter hydrology, sediments, nutrient cycling, and the basic structure of the riparian area, including the plant and animal communities.⁴¹ Areas with beaver dams may stimulate an increase in plant species richness.⁴² Dams act as a structure on which amphibians lay their eggs.⁴³ Managers could therefore pay landowners a bonus for beaver dams found on their property, which would likely add to the region's greater conceptual outcome goal.

Types of tangible, payable outcome, with examples	
Type	Example
Single species or single characteristic	Beaver dams Panther presence
Multiple species and/or multiple characteristics	Presence of plants and/or other taxa, combined with presence of snags.
Tiered approach	Presence of 4-10 species; presence of 11-20 species; presence of 21-30 species.
Index approach	Multiple criteria create distinct categories for land parcels to fall into.

Multiple outcomes

When a simple single tangible outcome, like beaver dams, is not readily available in the target habitat, a suite of multiple outcomes may be more appropriate as the basis for a bonus payment. A single payable outcome might also give rise to undesirable situations such as a landowner attracting an animal to the site by artificial means, thus distorting the relationship between the tangible outcome and the conceptual outcome.⁴⁴ Or a single tangible outcome may not by itself represent adequate progress toward the conceptual outcome. Payment for finding and protecting a turtle nest could be augmented by additional bonus payments for hatchlings from that nest.⁴⁵ Using these two tangible outcomes, the conceptual outcome is a single objective: conservation of the turtle species.

Multiple outcomes might be presented as a list of important species that must be present, a list of species representing several taxa, or may substitute or include habitat characteristics on such species lists. The inclination to develop a highly accurate set of outcomes that perfectly represent the conceptual outcome, and help drive the development of practices, should be weighed against the cost and time needed to achieve such complexity.⁴⁶

A list of multiple species to represent a tangible outcome can contain representatives from different species groupings. Landowners may then demonstrate at least some of those species to obtain the bonus payment. An outcomes-based project in Germany compiled a list of easily recognized indicator plant species, and landowners were paid if at least four species on the list were present.⁴⁷ A more complex version of the species list involves multiple taxa, and a certain number of species for each taxon must be present to obtain the bonus payment. A Swiss project paid for outcomes based on several

levels of taxonomic orders, including vascular plants, butterflies (pollinators), snails (first level consumers), and birds (top level consumers).⁴⁸ Another option is to combine indicators from one taxon with an abiotic indicator, such as snags or hydrology, to predict greater levels of complexity.⁴⁹

Tiered approach

A tiered approach builds on the multiple outcomes approach by rewarding properties based on different levels of outcomes achieved. In the German grasslands payment program mentioned earlier, landowners were paid for at least four species from a list of 43. However, producers were paid the same amount for four out of 43 as they were for 40 out of 43 species.⁵⁰ A tiered approach would increase payments according to how many species the land supported. Another German example increases the complexity of the categories by placing grasslands into a category based on the presence of at least eight forb species, and in higher categories depending on the presence of special indicators or rare species.⁵¹ A tiered approach offers an initial threshold level but encourages improvement over time, as producers strive toward greater the conservation value of higher tiers.

Index approach

An index approach enables greater categorization and may include more qualification in addition to quantification. Nicaragua has developed an environmental services index on which a parcel of land is placed according to its land uses and its potential to sequester carbon and conserve biodiversity.⁵² Landowners are then paid based on net increases along the index compared to the baseline at which the parcel originally fell on the index.⁵³ The European Farmland Index, although not administered as a payment scheme, is another example where multiple factors coalesce into a categorical index. This approach considered how agricultural intensification factors (sowing time, chemical input, decrease in non-cropped habitat, increased land drainage, type of cover crop, and increase in management) affect the key resources (diet, foraging habitat, and nesting habitat) for different bird species, resulting in a score that indicated the species' relative risk.⁵⁴

Collective payments approach

Finally, bonus payments could be made for certain non-ecologically related goals. Successful wildlife conservation is unlikely to occur with a small-scale, piecemeal approach

while these payment programs remain supplemental and local by nature.⁵⁵ A bonus payment that rewards landowners who participate collectively in a larger scale project could help address this problem. The Oregon Conservation Reserve Enhancement Program follows this approach by offering a bonus payment, besides completing specified practices, to landowners who include at least 50% of a five-mile stream segment in the program.⁵⁶ With a local approach nested within a landscape approach, landowners participating in Farm Bill programs could sign up for individual projects to receive individual payments, and also participate in a landscape project to receive additional funds based on a share of a collective payment.

Making payments to a group of landowners also addresses the problem of mobile outcomes, like wildlife that may move between properties and practices.⁵⁷ In Switzerland, researchers experimented with paying reindeer herders for carnivore offspring, as a way to compensate for future predation; payments were made to the village.⁵⁸ With a panther program, landowners who participate in a habitat conservation program could each be compensated if a panther is spotted anywhere in the contiguous parcel.

Another possible discrete but collective goal for which landowners could be paid a bonus is the delisting of endangered species in a certain area. If the conceptual outcome is biodiversity conservation, then the delisting of a particular species could be a bonus reward, in which all landowners that participated (through Habitat Conservation Plans or Safe Harbor Agreements, among other regulatory tools) may share. The Oregon Chub was recently proposed for delisting.⁵⁹ A bonus payment to landowners within the fish's range could be made upon achieving this milestone. Landowners operating within existing endangered species' range may be interested in not only implementing species-benefitting practices in return for payment, but also working toward the payable outcome of delisting.

Program Administration and Payments

Administrative decisions can help incorporate outcomes into a payments program with relatively little disruption to existing practice-based approaches, based on some ideas listed below.

Allowing landowners to self-report, with verification

Setting up landowners to self-monitor and self-report can cut down on costs and make the program easier to administer.⁶⁰ Enlisting landowners to monitor and report the

outcomes that support payment is a common tool in European outcomes-based projects.⁶¹ Researchers verified landowner claims to judge how well the self-reporting system functioned. Sometimes, third party experts assisted landowners in developing methods that would ultimately achieve greater outcomes and result in greater payment.⁶² To retain program credibility, administrators can use spot checks to ensure landowners are correctly counting indicators and reporting correctly.

Using auctions to set the price per unit

Landowner payments could be established by using auctions to set an initial price. Usually the price must be tied to actual costs income foregone. How much a landowner should be paid for producing 10 nests of endangered birds or for 10 out of 48 indicator species should be tied to what society will pay for such "products." An auction approach can help set the price early in a program, after which the agency can set a backstop against which the price cannot rise. In an Australian auction-based approach, landowners submitted applications proposing a price for conserving land, and agency staff conducted assessments of how much ecological preservation or benefit would result from the proposal.⁶³ Successful applications helped set the price early in the program, and the approximate price could be carried forward in non-auction settings.

Payments for ecological benefits must be tied to actual costs and income foregone to comply with international trade law.⁶⁴ Eventually trade law experts may realize these payments are not necessarily trade-distorting subsidies,⁶⁵ but for the time being payments should conform to this model.

Mitigating risks by allowing shorter-term projects

Certain measures and structures within a payment for ecological benefits program can mitigate the financial risk that can dissuade landowners from participating. Short-term projects may not allow enough time to realize the goals of producing an outcome, while longer-term projects may require too much of a commitment. However, a program should allow short-term projects in the early stages of an outcomes program, but provide the opportunity to renew a project to capture the benefits of a longer time scale. Administrators can also reduce financial risk to landowners in an outcomes program by taking weather into account, should extraneous factors impact producers' ability to deliver.⁶⁶ Evaluating producers relative to each other tends to even out these natural fluctuations.⁶⁷

Payment structure

Even lands of varying quality have the potential to produce ecological outcomes. A program aiming to pay for ecological benefits, therefore, should reward actions that *enhance* benefits (also known as net gain or ecological lift), and actions that *maintain* lands with existing value (no net loss). Payments intended to prevent ecological decline are relatively rare.⁶⁸ The Eugene Water and Electric Board in Oregon directs payments toward preservation of existing high value watershed areas to conserve hydrological benefits in a manner that also recognizes that a preservation model conserves many co-benefits, such as wildlife habitat and carbon sequestration.⁶⁹

Combining a reward for enhancement and maintenance is possible in a payment program. In the English Hay Meadows project,⁷⁰ landowners were placed into three categories (high conservation value; low value; and potential value). Owners of high value and low value parcels were paid per hectare for both the quality of the meadow and enhancement actions. Payments therefore encouraged the continued existence of the valuable meadows, rather than solely rewarding landowners for increasing the ecological lift. Owners of meadows with potential conservation value were paid per hectare for enhancement only, but presumably could aim

toward a category in which they would eventually be paid for maintenance.

Whether in ecological lift or maintenance of existing value, paying a baseline amount for practices with a bonus for outcomes can help mitigate the risks presented by payments solely for outcomes.⁷¹ Although payments should include some financial security for the landowner,⁷² baseline payments risk not incentivizing delivery of the outcome.⁷³ The baseline payment could therefore be adjusted over time to constitute a greater or lesser proportion of the overall payment made to the producer, if delivery of the outcome proves more or less difficult.⁷⁴ Baseline payments could eventually be phased out as landowners learn how to produce the outcome and become more comfortable with the biodiversity outcome concept.⁷⁵

Transitioning towards greater emphasis on payment for outcome could be assisted by bookkeeping and accounting. A program could continue to pay producers for practices, but also track the unit of outcomes delivered compared to the overall amount paid. The payment would therefore remain tied to costs and income foregone, but the program could gain appreciation for the price of the desired outcomes. Alternatively, a program could pay for practices up to a threshold, at which point it would pay for outcomes. These accounting methods offer a way to transition to outcomes with minimal upheaval.



Environmental specialist and NRCS employee examine plant life and stream flow in a Utah creek where the Goshute Tribe hopes to re-introduce the native Bonneville cutthroat trout. Photo by Ron Nichols. Courtesy NRCS.

Authority for an Outcomes Approach under the 2014 Farm Bill

Once a conceptual outcome is set, effective practices are in place, and payable tangible local outcomes are decided upon, program administration choices will fall into place and payment structure will reflect the outcome's structure. If the outcome is a single species or characteristic, the payments will likely be made on a 1:1 ratio. With tiered or index outcomes, payments will be made according to the tiers or categories in the index, with increased payments made to higher levels of ecological benefit

Payment structures can vary from a simple payment per unit of indicator⁷⁶ to more complex strategies. A landowner with ten beaver dams may be paid the same as a landowner with nine beaver dams, but both should be paid more than a landowner with a single beaver dam. The tiered or index approach, wherein a landowner is placed into a category based on the presence of multiple indicators, has a built-in payment structure.

Payment programs may remain static through time, or may require landowners to take additional action to remain in the program. The threshold-and-ratchet approach is somewhat similar to the index approach, whereby multiple indicators coalesce around performance thresholds. Unlike an index, which allows a landowner to advance to higher categories, a ratchet approach⁷⁷ raises the bar each year to ensure the producer continuously moves toward greater ecological benefit production.⁷⁷ Requiring at least four plants out of a list of 28 chosen indicators is an initial eligibility threshold, but with the ratchet effect, that number could be increased over the years so producers are constantly required to strive for greater benefit, and do not lapse into expecting payments for an outcome already achieved.⁷⁸ The Conservation Stewardship Program, with its eligibility requirement to meet a threshold and subsequent requirement to increase the stewardship, follows this basic formula.

By using both practices and outcomes in an ecological benefits program, managers can harness the relationship between the two approaches to the greatest effect. By retaining practices, the program will remain relatively stable. But by phasing in the conceptual outcome and the tangible outcomes that are payable as bonuses to the landowner, such a program will refine its practices and ultimately become more accountable for delivering actual ecological benefits. This basic structure is practicable but likely more effective than a program that pays for practices alone. The 2014 Farm Bill contains some favorable language that could support the proposed programmatic changes.

The new Regional Conservation Partnership Program (RCPP) allows NRCS to pool funds from the Agricultural Conservation Easement Program (ACEP), the Conservation Stewardship Program (CSP), the Environmental Quality Incentives Program (EQIP), and the Healthy Forests Reserve Program (HFRP).⁷⁹ NRCS can prioritize partnership applications that include outcome-based measures⁸⁰ or scale up local initiatives by involving numerous landowners in a region. Landowners may also apply to the lower level programs to conduct various activities in return for payment; there are opportunities for outcomes to be incorporated into these projects. RCPP, as an operative umbrella for the covered programs, should also provide guidance on the conceptual outcome, the relationship between outcomes and practices, and a framework for identifying payable outcomes tangible at the local level.

The Regional Conservation Partnership Program and its Covered Programs

ACEP, CSP, EQIP, and HFRP are covered programs under RCPP, meaning that 7% of funding from each is to be provided annually for projects under the RCPP umbrella.⁸¹ EQIP enrolls eligible land for compensation.⁸² The application processes for the CSP and EQIP require landowners to meet certain eligibility requirements,⁸³ and the agency will rank applications based on conservation and financial factors (CSP)⁸⁴ or cost-effectiveness and efficiency (EQIP).⁸⁵ Under HFRP, private lands that will contribute to the conservation of endangered or rare species are eligible for enrollment,⁸⁶ particularly those lands that preserve biodiversity and sequester carbon.⁸⁷

RCPP allocates funding from the covered programs toward special larger-scale projects⁸⁸ managed by "eligible partners" such as conservation organizations or other governmental agencies.⁸⁹ These partners apply to RCPP and compete in an auction process to gain access to the additional funding.⁹⁰ Producers may then participate in these projects, and can receive financial and technical assistance from the agency.⁹¹

Under RCPP, the secretary "*may* give a higher priority to applications that provide innovation in conservation methods and delivery, *including outcome-based performance*

measures and methods . . . ”⁹² RCPP also encourages scaling projects up to a regional level. The secretary may extend priority to those applications that contain “a high percentage of producers in the area to be covered . . . ”⁹³ A project managed by a conservation organization enrolling land into easements across a larger land scale could cause greater conservation value, and might make additional payments to landowners for observed tangible outcomes.

The Use of Outcomes in Covered Programs

EQIP, CSP, and HFRP are primarily focused on practices to achieve conservation.⁹⁴ However, there are several options for incorporating an outcomes-based payment into the existing structure.

Rulemaking could help to explain that outcomes are among acceptable payment opportunities. CSP payments are partially tied to conservation activities,⁹⁵ a term which includes “conservation systems, practices, or management measures.”⁹⁶ Conservation systems are defined as “a combination of conservation practices, management measures, and enhancements used to address natural resource and environmental concerns in a comprehensive, holistic, and integrated manner.”⁹⁷ Similarly, landowners participating in a ten-year agreement with HFRP must both specify practices, and explain how agency payments will support the “adoption or implementation of the approved conservation treatment identified in the restoration plan.”⁹⁸ A “conservation treatment” is defined as “conservation practices, measures, activities, and works of improvement that have the purpose of alleviating resource concerns, solving or reducing the severity of natural resource use problems, or taking advantage of resource opportunities, including the restoration, enhancement, maintenance, or management of habitat conditions for HFRP purposes.”⁹⁹ New rules could expand these definitions to explain that outcomes are an acceptable means of payment-based solutions to natural resource use problems.

Despite the initial focus on practices, distinct opportunities to use outcomes exist in the covered programs, particularly in CSP, which may be thought of as a hybrid between practices and outcomes. The ranking process for covered programs implies the use of outcomes as a basis for payment. CSP ranks applications by how well the proposal “increase[s] conservation performance”¹⁰⁰ and EQIP ranks applications by “cost-effectiveness.”¹⁰¹ Although the factors of performance and effectiveness relate to the concept that outcomes encourage payment for actual results, the application ranking process occurs before a project begins and so cannot consider actual

performance. However, those applications that propose to make payments in part based on outcomes should reasonably be ranked as scoring higher in performance and effectiveness. New rules could help expressly endorse the logic of ranking higher those applications including an outcomes approach.

A subprogram of EQIP for developing innovative conservation tools, the Conservation Innovation Grants (CIG), may offer the best opportunity to phase outcomes into the covered programs. CIG offers funding to experimentally advance innovative methods,¹⁰² which could conceivably include the use of outcomes-based payments. Landowners, perhaps with the help of third party non-profit conservation groups, could develop payable outcomes tangible at a local level and experiment with additional payments on top of a contract primarily using practices. Rulemaking could flesh out the relationship between the express priority for outcomes in RCPP and how these outcomes would be funded through its covered programs.

EQIP and HFRP limit remuneration to costs or income foregone,¹⁰³ and this technical limitation presents a challenge for an outcomes-based bonus payment. The reason to incorporate outcomes into a payment scheme is to reward the landowner without regard to how much it cost, harnessing the ingenuity of the producer. Funds for experimental ideas under the covered programs are exempt from this requirement, an exception that could be clarified via rulemaking. Even if all outcome bonuses must be ultimately tied to costs and income, there are several bookkeeping options to employ, whereby the payment is technically based on costs and income but the calculation incorporates delivery of the outcome to study program cost effectiveness. Such an accounting approach could help pave the way toward a future in which payment for outcomes becomes acceptable.

The Conservation Stewardship Program relaxes the strict rule limiting payments to costs and income foregone. Existing regulations tie payments to income foregone, but only to the extent practicable, and consideration of expected environmental benefits is included in payment basis.¹⁰⁴ The new law maintains a similar calculation, basing reimbursement on costs, income foregone, expected conservation benefits, how well conservation will be addressed, the stewardship level maintained over the project period, and integration of conservation activities across the agricultural operation.¹⁰⁵ These factors draw outcomes into consideration when formulating payment; however, a purely outcomes-based payment does not reward *efforts* toward a result, but is *contingent* on that desired result. It might be possible for part of the funding,

tied to costs and income, to go toward rewarding practices, while a portion of the funding is allocated, but reserved, for outcome based payments, only upon achievement of those environmental benefits. Rulemaking could flesh out how an overall payment made by CSP is parsed between rewarding practices with reimbursement of costs and income, and rewarding ecological outcomes by paying a bonus for particular tangible results.¹⁰⁶

The limit to income forgone is further complicated specifically in EQIP by a special rule that allows the agency the discretion to “accord great significance to a practice that . . . promotes” certain factors, including “wildlife habitat development, including pollinator habitat.”¹⁰⁷ If a producer foregoes income in favor of increasing pollinator habitat, ultimately the payment must be based on a calculation of that lost income. But it’s possible that “significance” accorded equates to an increased or added payment, and therefore the outcome of pollinator presence could become a factor when calculating the final payment.

The agency should implement an outcomes payment program alongside its existing program paying for practices,

set a broad conceptual outcome and set parameters for selecting tangible local outcomes that would be payable as bonuses, and explain how practices will relate to the conceptual outcome and achieve locally relevant tangible outcomes.

Landowners participating in ACEP could join a project seeking to scale up conservation benefits, with a bonus payment for tangible outcomes resulting from the larger areas of land conserved. Landowners participating in the CSP, EQIP, or HFRP could incorporate outcomes as allowed by regulation, or perhaps as part of an experimental pilot project on top of a practices-based project. Initiatives funded under these covered programs through RCPP could explain how the project contributes to a broad conceptual outcome and how the practices employed are also expected to deliver a payable tangible outcome. The secretary could prioritize those applications presenting a coherent plan to involve outcomes, and those applications that involve several landowners contributing to regional conservation. The agency could finally make bonus payments to landowners who deliver locally relevant tangible outcomes, and those landowners participating in an effective larger strategy.



Native grasses and forbs are part of the planting mixture in a conservation buffer along Bear Creek in central Iowa. Photo by Roger Hill. Courtesy NRCS.

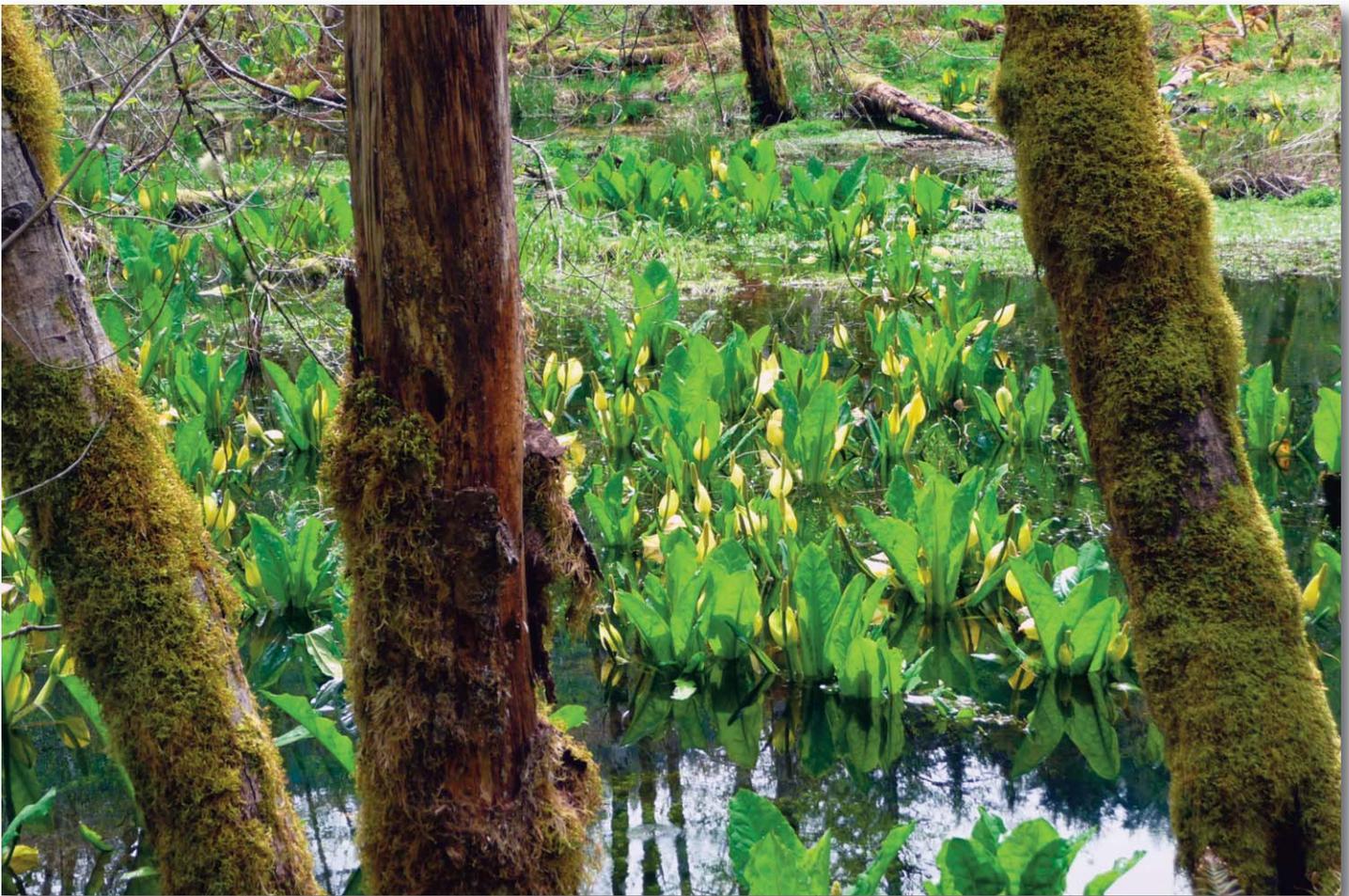
Conclusion

Outcomes- and practices-based payment programs have a close and inter-dependent relationship. While outcomes offer a way to connect payments to tangible results, following a practice can be a critical part of achieving desired outcomes. Introducing an outcomes-based payment structure under the Farm Bill should be undertaken gradually, giving the program a chance to develop workable processes. A practice-based payment approach should be retained, particularly where practices work well and are closely linked to the desired outcome.

A strong conceptual outcome guiding the program can help keep practices on target. Tangible outcomes payable at the local level will identify practices that may need to be refined to produce the desired benefit. Practices reciprocate by aiding in the identification of outcomes that are tangible, concrete, and measurable, particularly where it may not be

clear what a program is truly aiming for. Selecting a tangible outcome on which to base the bonus payment can be difficult, but adaptive management will adjust the process as knowledge and experience grow.

A viable structure for introducing outcomes is available under existing Farm Bill conservation payment programs. Though rulemaking will be needed to clarify relationships between the programs and how bonus payments might work, the prospect of using outcomes is expressed in the Regional Conservation Partnership Program, with favorable language in the covered programs. By paying bonuses for outcomes or for regional conservation, the Farm Bill is poised to introduce outcomes as a feasible method for rewarding conservation activities, and could ultimately bring enhanced guidance and effectiveness to ecological benefit payment programs.



A wetland ecosystem in April, near Mt. Hood in Oregon. Photographed at Cascade Streamwatch Trail, part of Wildwood Recreation Site, near Welches, Oregon. Photo by Bruce Taylor, Defenders of Wildlife.

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A Florida panther kitten waits in the family den for the return of its mother. Photo by Mark Lotz, Florida Fish and Wildlife Conservation Commission.



A native bee feeds on nectar in a clover field, Charles City, Virginia. Photo by Lynda Richardson. Courtesy NRCS.

Appendix: Summary of Programs Surveyed

Australia Bush Tender

Outcomes desired:	Indicator chosen:	Additional considerations on indicator choice:
Biodiversity conservation on private land.	Biodiversity Benefits Index, calculated: <ol style="list-style-type: none"> Multiply the parcel's biodiversity significance by the ecological lift provided by the farmer; Divide by the bid price offered to protect and enhance the parcel. 	
Administration:	Payment structure:	Scale considerations:
Biodiversity significance and projected ecological lift were calculated by the government, and not communicated to the landowner. Therefore, landowner was in the dark about whether her bid was competitive, and bid was therefore based on opportunity costs alone.	The government used a fixed budget and purchased the most valuable lands, based on the most cost effective bid that provided biodiversity significance and improvement in habitat (i.e. the most "bang for the buck").	Incorporates smaller scale and spatially dispersed private holdings, to increase conservation overall.
Result:	Citation:	
Pilot program deemed a success; future suggestions include having a reserve price to avoid collusion among bidders.	Gary Stoneham, Vivek Chaudhri, Arthur Ha, and Loris Strappazon, Auctions for conservation contracts: an empirical examination of Victoria's Bush Tender trial, 47(4) The Australian Journal of Agricultural and Resource Economics 477-500 (2003).	

Australia Bush Tender

Outcomes desired:	Indicator chosen:	Additional considerations on indicator choice:
Decrease dryland soil salinity, support local timber economy, while minimizing water impacts.	Planting area of reforestation projects, and use of a model to determine the environmental benefits of the particular planting.	Planting area was used as an indicator to estimate off-site impacts to dryland soil salinity and water yield.
Administration:	Payment structure:	Scale considerations:
<p>Landowners identify areas they will create forest plantations and submit a bid to the government. The agency selected bids, and conducted limited site visits.</p> <p>Landowners still unaware of their "score" which may be less important the widespread benefit of soil salinity reduction (as opposed to highly rare species that a landowner could hold hostage in return for higher payments); knowing one's contribution to soil salinity could encourage landowner participation.</p> <p>Plantation participation required 20-30 year commitment.</p>	<p>Government accepts or rejects bids based on cost-benefits of economics and environmental return.</p> <p>Basically participants are paid to plant trees.</p>	<p>The model used to anticipate each plantation's expected benefits operated at a relatively fine scale.</p> <p>While an individual forester may consider his land to be worth \$x, on the regional scale the salinity benefits may be many times that perceived amount.</p>
Result:	Citation:	
	Lowell, K., Drohan, J., Hajek, C., Beverly, C., Lee, M., 2007. A science-driven market-based instrument for determining the cost of environmental services: a comparison of two catchments in Australia. Ecological Economics 64, 61–69.	

England Hay Meadows

Outcomes desired:	Indicator chosen:	Additional considerations on indicator choice:
Conservation of species rich meadows.	<p>Three categories of meadow:</p> <ol style="list-style-type: none"> 1. Flower-rich meadows of high conservation value; 2. Meadows of lower value but with some conservation interest; 3. Meadows of limited conservation value but with potential to increase with management; <p>Improved. No conservation value.</p>	<p>A meadow was placed into a category based on the species present (i.e. a meadow with only species from Group 1 was an Improved meadow with no conservation value, while a meadow with species from Groups 3, 4, or 5 might be worthy of a higher category).</p> <p>Classification of the meadow was also flexible if there were rich edges or plant indicators of diverse habitat types, and if the farmer was willing to follow management guidelines.</p>
Administration:	Payment structure:	Scale considerations:
<ul style="list-style-type: none"> • The Hay Meadow Project administrators surveyed a database to identify potential meadows, then assessed farmer interest and conducted site visits to place meadows into categories and get farmers to make agreements. • Farmers may also negotiate specific variations in the standard agreement. 	<ul style="list-style-type: none"> • Categories A and B meadows are paid per hectare for their quality and may additionally be paid per hectare for management enhancement • Category C meadows are paid per hectare only for management enhancement. 	<p>Underlying scale considerations were prioritization of high value meadows, and using a map to show the distribution of each plant community.</p>
Result:	Citation:	
Long term result unknown.	<p>Buckingham, H., J. Chapman, and R. Newman. 1998. Meadows Beyond the millennium: the future for hay meadows in the Peak District National Park. Available at http://resources.peakdistrict.gov.uk/pubs/hmp/hmp.pdf</p>	

European Farmland Bird Index

Outcomes desired:	Indicator chosen:	Additional considerations on indicator choice:
Biodiversity health on farmland.	Habitat characteristics expressed as a "Farm Bird Risk Matrix".	<ul style="list-style-type: none"> • Agricultural intensification factors (sowing time, chemical input, decrease in non-cropped habitat, increased land drainage, type of cover crop, and increase in management) are assessed as to how they affect species key resources (diet, foraging habitat, and nesting habitat). • Higher scores on the index indicate greater risk.
Administration:	Payment structure:	Scale considerations:
Not administered as a payment scheme.	Not administered as a payment scheme.	The Index is calculated at a regional, or pan-European, scale by calculating the geometric mean from each species' trend.
Result:	Citation:	
	<p>Butler, S., J. Vickery, and K. Norris. 2007. Farmland biodiversity and the footprint of agriculture. <i>Science</i> 315: 381-384.</p> <p>Butler, S.J., L. Boccaccio, R.D. Gregory, P. Vorisek, and K. Norris. 2010. Quantifying the impact of land-use change to European farmland bird populations. <i>Agriculture, Ecosystems and Environment</i> 137: 348-357.</p>	

Lower Saxony German grasslands

Outcomes desired:	Indicator chosen:	Additional considerations on indicator choice:
Plant biodiversity (high species richness) and endangered species.	43 easily recognized indicator species, 4 of which must be present for payment.	<ul style="list-style-type: none"> Indicators selected based on a method to determine species present, ease of identification, and field testing with farmers. Common species included on the indicator list to allow farmers to more easily reach the threshold of 4 species needed for payment.
Administration:	Payment structure:	Scale considerations:
Farmers participated in a training program, to familiarize farmers with indicator species and to discard indicators that were consistently difficult to recognize.	This was a study amidst a scheme in which payment made for presence of at least 4 out of the 43 possible indicators.	<ul style="list-style-type: none"> Indicators functioned well at small and large scales, with no great difference, likely due to the homogeneity of the habitat type targeted. Doubt is expressed that the scheme can be used to indicate the presence of other taxa.
Result:	Citation:	
Number of indicators found to be correlated with total number of species and with species of concern.	Burchard Wittig et al., An Indicator species approach for result-oriented subsidies of ecological services in grasslands – A study in Northwestern Germany, 133 Biological Conservation 186 (2006).	

Lower Saxony German grassland auctions

Outcomes desired:	Indicator chosen:	Additional considerations on indicator choice:
Ecological services provided by biodiversity in European agricultural landscapes.	Three levels of grassland quality: <ol style="list-style-type: none"> E1=at least 8 forb species present in each plot; E2=8 forbs present, plus 2 out of 40 indicator species; E3=8 forbs present, plus 2 plants indicating rare grassland communities. 	<ul style="list-style-type: none"> Grasslands are presumed to provide ecological services; the indicators are presumed to represent the types of grasslands that provide services. The 40 indicators selected based on representation of the desired site conditions, high frequency, ease of identification. Repeating auctions over time could risk participants learning the optimal bid, rather than bidding based on individual factors.
Administration:	Payment structure:	Scale considerations:
<ul style="list-style-type: none"> Training program for farmers on how to recognize plants and rank sites. Farmers submit bids based on number of sites and their set price for maintaining the sites. Spot-checks for subset of sites by researchers acting as would agency personnel confirmed conformity to the grassland quality levels. 	<ul style="list-style-type: none"> Total budget capped; first auction maxed out higher quality sites first before accepting bids for lower quality land; second auction allocated the budget equally among the levels. Farmers set own price, presumed based on their opportunity costs and their perception of how much each quality site should receive. 	Unclear whether scale plays a role in accepting bids.
Result:	Citation:	
This outcomes approach was combined with an auction.	Sebastian Klimek, Anne Richter gen. Kemmermann, Horst-Henning Steinmann, Jan Freese, and Johannes Isselstein, Rewarding farmers for delivering vascular plant diversity in managed grasslands: a transdisciplinary case-study approach, 141(11) Biological Conservation 2888-2897 (2008).	

Netherlands Meadow

Outcomes desired:	Indicator chosen:	Additional considerations on indicator choice:
Conserve meadow birds on modern, intensive dairy farms.	Breeding success of 28 meadow bird species using incubated clutches.	Measuring hatched clutches did not work well because chicks fledged before verification and project was more subject to potential fraud.
Administration:	Payment structure:	Scale considerations:
Farmers reported the numbers, which were then verified by researchers acting as simulated agency personnel.	Simple payment per clutch; initially based on time and expenses farmers spent finding clutches, settled on a price at which farmers were willing to search for clutches.	None
Result:	Citation:	
Payment scheme resulted in greater meadow bird conservation on the farm-scale. Conservation on a larger scale is unknown.	C.J.M. Musters et al., <i>Breeding Birds as a Farm Product</i> , 15 <i>Conservation Biology</i> 353 (2001). Verhulst, J., D. Kleijn, and F. Berendse, 2007. Direct and indirect effects of the most widely implemented Dutch agri-environment schemes on breeding waders. <i>Journal of Applied Ecology</i> 44: 70-80.	

Sweden carnivores

Outcomes desired:	Indicator chosen:	Additional considerations on indicator choice:
Conservation of carnivores on domesticated reindeer herd rangelands.	Number of offspring of carnivore species (wolverine, lynx, wolves).	
Administration:	Payment structure:	Scale considerations:
Herders have a role in monitoring.	<ul style="list-style-type: none"> • Payment made even if no predation occurs; intended to anticipate future predation on reindeer herd. • A cap on the payments, beyond which the reindeer herders were not paid. Eventually removed the cap, and saw increase in predator numbers, but not enough to say cap was the cause. • \$29K per certified carnivore reproduction. • Occasional additional payment of \$10K for lone wolverines, and \$5K for lone lynx. • Payment made to village, which had authority on how to use or distribute the money. 	None; tied to reindeer herding rangelands.
Result:	Citation:	
<ul style="list-style-type: none"> • Herders were compensated for future carnivore damage to livestock. • The program seemed to increase the incentive to let carnivores live and reproduce, but some instances of poaching indicated some individual herders were not convinced. • But there were transaction costs to the conservation agency. • It was difficult to parse payments to individuals when paying a group for the overall outcome. 	Astrid Zabel and Karin Holm-Muller, <i>Conservation Performance Payments for Carnivore Conservation in Sweden</i> , 22 <i>Conservation Biology</i> 247 (2008).	

Swiss farmlands, considering scale

Outcomes desired:	Indicator chosen:	Additional considerations on indicator choice:
Grassland biodiversity.	Species richness of various taxa.	Different trophic levels chosen: <ul style="list-style-type: none"> • Vascular plants • Butter flies (pollinators) • Snails (first level consumers) • Birds (top level consumers)
Administration:	Payment structure:	Scale considerations:
Farmers were advised by ecological and agricultural experts on developing a farm practice that would benefit biodiversity. Agreements lasted at least 6 years.	General payments made to compensate for practices. Additional payments made for each parcel enrolled in the program, based on its category.	<ul style="list-style-type: none"> • Care taken to group plots together and in areas where surrounding land is less intensive (e.g. in terms of fertilizer). • Evaluate quantity and distribution of the plot within the farm as an eligibility criteria. • Implementing the program on more than 12% of the farm meant an additional bonus for the farmer.
Result:	Citation:	
The study suggests the outcome-oriented approach enhanced diversity for plants and snails. Some bird species indicated an increase in richness. Butterfly species decreased across the landscape irrespective of outcome-oriented approach.	Roth, T., V. Amrhein, B. Peter, and D. Weber. 2008. A Swiss agri-environment scheme effectively enhances species richness for some taxa over time. <i>Agriculture, Ecosystems and Environment</i> 125(1-4): 167-172.	

Notes

1. See Rob J.F. Burton and G. Schwarz, Result-oriented agri-environmental schemes in Europe and their potential for promoting behavioral change, 30 *Land Use Policy* 628-641 (2013) (hereinafter “Burton & Schwarz 2013”) at 630 (lamenting the proliferation of nomenclatures).

2. Where there is a direct quote to the literature, we have kept the original term. Where we refer to studies and literature, we exchange their term and replace it with “outcome” or “practice” for consistency’s sake.

3. Burton & Schwarz 2013.

4. Administrators should be aware that an outcomes approach may conflict with the General Agreement on Tariffs and Trade (GATT). During the Uruguay round of GATT in 1994, the member parties wanted to make sure payments for measures are not trade distorting. See Annex 2, Section 12(a) (“Eligibility for such payments shall be determined as part of a clearly defined government environmental or conservation programme and be dependent on the fulfilment of specific conditions under the government programme, including conditions related to production methods or inputs”), (b) (“The amount of payment shall be limited to the extra costs or loss of income involved in complying with the government programme”) (GATT, 1994, p. 63).

5. There may be a shift toward thinking of outcome-oriented approaches as not necessarily trade-distorting. See Burton & Schwarz 2013, at 629. The problem remains, however, that the World Trade Organization (WTO) requires such payments to be tied to additional cost and income foregone, while the thrust of an outcomes program is to tie payments to actual results, regardless of costs and income foregone. Though beyond the scope of this paper, the intersection of outcomes and international trade law bears further inspection. Despite the reluctance of the WTO to recognize payment for ecological benefits as a valid form of compensation other than a subsidy, the path seems paved toward outcomes replacing practices in the future. The European Union continues to use what are essentially practice-based methods. See Council Regulation 1698/2005/EC (agri-environmental measures are mandatory for European Union (EU) members but are still primarily based on practices). However, numerous examples in this paper show the EU is trying to move toward an outcomes-based approach.

6. Burton & Schwarz 2013, at 629-630, 631.

7. See e.g., Jim Robbins, Paying Farmers to Welcome Birds, *The New York Times* (April 14, 2014), available at http://www.nytimes.com/2014/04/15/science/paying-farmers-to-welcome-birds.html?smid=fb-share&_r=0 (The Nature Conservancy’s BirdReturns program pays farmers for flooding their fields during migration season).

8. Biodiversity is the variety of life at multiple levels including at the molecular, organism, population, species, ecosystem, and landscape levels. As used here, “biodiversity” may be thought of as closely related to the concept of “ecological integrity.”

9. 2014 Farm Bill, Sec. 1271A(1).

10. 2014 Farm Bill, Sec. 1271D(c)(1).

11. Burton & Schwarz 2013, at 632.

12. See Burton & Schwarz 2013, at 632.

13. See e.g., Astrid Zabel & Brian Roe, Optimal design of pro-conservation incentives, 69 *Ecological Economics* 126-134, at 127 (2009) (hereinafter “Zabel & Roe 2009”).

14. Furthermore, this local knowledge and skill will develop over time, in the same way that farmers’ expertise in producing traditional crops increases with greater experience and knowledge over time. See Burton and Schwarz 2013, at 631.

15. See Burton & Schwarz 2013, at 632.

16. C.J.M. Musters, M. Kruk, H.J. DeGraffe, and W.J. Terkeurs, Breeding birds as a farm product, 15 *Conservation Biology* 363-369 (2001) (hereinafter “Musters et al. 2001”) at 364. See also Burton & Schwarz 2013, citing R.J.F. Burton and U. Paragahawewa, Creating culturally sustainable agri-environmental schemes, 27 *Journal of Rural Studies* 95-104 (2011).

17. Burghard Wittig, Anne Richter gen. Kemmermann, and Dietmar Zacharias, An indicator species approach for result-oriented sub-

sities of ecological services in grasslands — A study in Northwestern Germany, 133 *Biological Conservation* 186-197 (2006) (hereinafter “Wittig et al. 2006) at 187.

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19. Burton & Schwarz 2013, citing R.J.F. Burton C. Kuczera, and G. Chwarz, Exploring farmers’ cultural resistance to voluntary agri-environmental schemes, 48 *Sociologia Ruralis* 16- 37 (2008).

20. See Burton & Schwarz 2013 at 632.

21. See Burton & Schwarz 2013 (hereinafter “Matzdorf and Lorenz 2010), at 633-634.

22. Burton & Schwarz 2013, at 634, citing Matzdorf and Lorenz 2010 at 542.

23. Burton & Schwarz 2013, at 634, citing Klimek et al 2008.

24. Burton & Schwarz 2013, at 634.

25. See Zabel & Roe 2009, at 133 (indicating that “if there is no clear objective for the environmental output of the scheme” then “an incentive payment scheme is not advisable.”).

26. Musters et al. 2001 (“We studied the possibilities for conserving meadowbirds on modern, intensive dairy farms in the Netherlands.”).

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29. Zabel & Roe 2009, at 129.

30. Zabel & Roe 2009, at 129.

31. See Burton & Schwarz 2013, at 637-638.

32. Wittig et al. 2006; Klimek et al. 2008.

33. Burton & Schwarz 2013, citing B. Gerowitt, J. Isselstein, and R. Marggraf, Rewards for ecological goods — requirements and perspectives for agricultural land use, 98 *Agriculture, Ecosystems and Environment* 541-547 (2003).

34. See Mark G. Anderson and Charles E. Ferree, Conserving the stage: Climate change and the geophysical underpinnings of species diversity, *PLoS ONE* 5(7): e11554 (2010), available at <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0011554>.

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36. The idea for this step-wise system comes from Wittig et al. 2006, at 189, but is heavily modified.

37. See Wittig et al. 2006 at 188-189.

38. See e.g. U.S. Fish and Wildlife Service, Draft guidance on selecting species for design of landscape-scale conservation (2012), available at <http://www.fws.gov/landscape-conservation/pdf/DraftTechnicalGuidanceJuly2012.pdf>.

39. See e.g. Daniel Rubinoff, Evaluating the California Gnatcatcher as an umbrella species for conservation of Southern California Coastal Sage Scrub, 15 *Conservation Biology* 1374-1383 (2001).

40. Burton & Schwarz 2013, citing A. Hoft and B. Gerowitt, Rewarding weeds in arable farming — traits, goals and concepts, *Zeitschrift fur Pflanzenkrankheiten und Pflanzenschutz* 517-526 (2006).

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56. See Oregon Department of Agriculture, The Conservation Reserve Enhancement Program: Partnerships that benefit Oregon's watersheds and agriculture (April 2005), available at http://www.oregon.gov/ODA/NRD/docs/pdf/water/crep_brochure_4_05.pdf.
57. For further discussion see Burton & Schwarz 2013, at 635.
58. Astrid Zabel and Karin Holm-Muller, Conservation Performance Payments for Carnivore Conservation in Sweden, 22 *Conservation Biology* 247 (2008).
59. U.S. Fish and Wildlife Service, Proposed Rule for removing the Oregon Chub from the list of endangered and threatened wildlife, 79 Fed. Reg. 7136, 50 C.F.R. § 17 (Feb. 6, 2014).
60. See Klimek et al 2008, at 2894; Wittig et al 2006; see also Burton & Schwarz 2013, at 635, for an overview.
61. See e.g., Musters et al. 2001; Verhulst et al. 2007.
62. Roth et al. 2008.
63. Gary Stoneham, Vivek Chaudhri, Arthur Ha, and Loris Strappazon, Auctions for conservation contracts: an empirical examination of Victoria's Bush Tender trial, 47 *The Australian Journal of Agricultural and Resource Economics* 477-500 (2003) (hereinafter "Stoneham et al. 2003"); K. Lowell, J. Drohan, C. Hajek, C. Beverly, and M. Lee, A science-driven market-based instrument for determining the cost of environmental services: a comparison of two catchments in Australia. 64 *Ecological Economics* 61 — 69 (2007) (hereinafter "Lowell et al. 2007").
64. See *supra*, note 4.
65. See *supra*, note 5.

66. Burton & Schwarz 2013, citing O. Loisel and B. Elyakime, Incentive contract and weather risk, 35 *Environmental and Resource Economics* 99-108 (2006).
67. Zabel & Roe 2009, at 131-132. Drawbacks to this approach are that, because producers are rated as a group, there may be incentive to remove the “curve wreckers” or band together to keep the curve low. This approach works best with large numbers of heterogeneous participants.
68. See e.g., Susan Lurie, Drew E. Bennett, Sally Duncan, Hanna Gosnell, Maria Lewis Hunter, Anita T. Morzillo, Cassandra Moseley, Max Nielsen-Pincus, Robert Parker, and Eric M. White, PES marketplace development at the local scale: The Eugene Water and Electric Board as a local watershed services marketplace driver, 6 *Ecosystem Services* 93-103, at 96 (2013) (“Seeking to avoid degradation in a watershed that is generally in very good condition is a departure from many PES schemes, which often rely on restoring degraded lands and determining additionality — improvement above a less-than-optimal baseline—as a basis for payment”) (hereinafter “Lurie et al. 2013”).
69. Lurie et al. 2013, at 97.
70. Buckingham et al. 1998.
71. See e.g., T. Roth, V. Amrhein, B. Peter, and D. Weber, A Swiss agri-environment scheme effectively enhances species richness for some taxa over time, 125 *Agriculture, Ecosystems and Environment* 167-172 (2008) (hereinafter “Roth et al. 2008”).
72. See e.g., Zabel & Roe 2009, at 128.
73. Burton & Schwarz 2013, at 636.
74. See Zabel & Roe 2009, at 128.
75. Burton & Schwarz 2013, at 637.
76. Musters et al. 2001; Verhulst et al. 2007.
77. Zabel & Roe 2009, at 132.
78. Zabel & Roe 2009, citing R. Opperman, *Ergebnisorientierte Forderung artenreichen Grünlands in der Praxis — Erfahrungen aus 3 Jahren landesweiter Anwendung in Baden-Württemberg*, Institut für Landschaftsökologie u. Naturschutz ILN, Singen (2003).
79. See Agricultural Act of 2014, 113 Pub L. 79 (hereinafter “2014 Farm Bill”), Sec. 1271A (1)(A)-(D) (defining “covered program”); Sec. 1271B(d)(3)(C) (requiring an application to the Regional Program to include an indication of which covered programs will be used).
80. 2014 Farm Bill, Sec. 1271B(d)(4)(E).
81. 2014 Farm Bill, Sec. 1271D(c)(1).
82. 2014 Farm Bill, Sec. 2301.
83. Applicants to the Stewardship Program must first meet certain eligibility requirements, and payments are measured against a “stewardship threshold.” A “stewardship threshold” is defined as “the level of natural resource conservation and environmental management required, as determined by NRCS using [conservation measurement tools (CMT) developed by NRCS], to conserve and improve the quality and condition of a natural resource.” 7 C.F.R. § 1470.3. A producer is eligible for the Stewardship Program if he can demonstrate that he at least meets the stewardship threshold for two priority resource concerns and, then the contract itself is intended to meet the threshold for one other concern by the end of the contract period. 16 U.S.C. § 3838f(a)(1)-(2), 7 C.F.R. § 1470.20(b)(1)-(2); see also 7 C.F.R. 1470.20(a)-(b). Eligible applicants under the Incentives Program may apply under 16 U.S.C. 3839aa-5(a)(1).
84. 7 C.F.R. § 1470.20(c)(2)-(4).
85. 16 U.S.C. 3839aa-3(b)(1); 2014 Farm Bill, Sec. 2204(1); see also 16 U.S.C. § 3839aa-2 (d)(1) (“Payments are provided to a landowner to implement one or more practices under the program.”).
86. 16 U.S.C. § 6572(b). The 2014 Farm Bill did not alter the Forests Program in any way pertinent to this discussion. See 2014 Farm Bill, Sec. 8203.
87. 16 U.S.C. § 6572(c).

88. 2014 Farm Bill, Sec. 1271D(c)(1).

89. 2014 Farm Bill, Sec. 1271A(4).

90. 2014 Farm Bill, Sec. 1271B(d)(1).

91. 2014 Farm Bill, Sec. 1271C(a).

92. 2014 Farm Bill, Sec. 1271B(d)(4)(E), emphasis added. Note that the use of the word “may” makes this priority discretionary.

93. 2014 Farm Bill, Sec. 1271B(d)(4)(B).

94. Payments in the Stewardship Program are specifically tied to “installing and adopting additional conservation activities.” 7 C.F.R. § 1470.24(a). The Incentives Program helps producers to, among other things, “install and maintain conservation practices that sustain food and fiber production while . . . developing and improving wildlife habitat . . .” 16 U.S.C. § 3839aa(3)(B), 2014 Farm Bill, Sec. 2201(1)(C); see also 16 U.S.C. § 3839aa-2(f); 2014 Farm Bill, Sec. 2203(4) (At least 5% of the Incentives Program funds will go toward “practices benefiting wildlife habitat” under the Wildlife Habitat Incentives Program); 16 U.S.C. § 3839aa-2(g); 2014 Farm Bill, Sec. 2203(5) (Under the Wildlife Habitat Incentives Program, payments are made “for conservation practices that support . . . wildlife habitat . . .”). The Forests Program shares costs with a landowner to implement practices. 7 C.F.R. § 625.9(b)(4) (“A 10 — year cost-share agreement will . . . Specify the requirements for operation and maintenance of applied conservation practices); 16 U.S.C. § 6573(b) (practices that will “restore and enhance habitat” for the target species are described in a “restoration plan.”).

95. 7 C.F.R. § 1470.24(a) (“installing and adopting additional conservation activities”).

96. 16 U.S.C. § 3838d(2).

97. 7 C.F.R. § 1470.3.

98. 7 C.F.R. § 625.9(b)(4), (7).

99. 7 C.F.R. § 625.2.

100. 16 U.S.C. § 3838f(b)(1)(B); 2014 Farm Bill, Sec. 2101(a); 7 C.F.R. 1470.20(c)(2)(ii).

101. 16 U.S.C. 3839aa-3(b)(1); 2014 Farm Bill, Sec. 2204(1).

102. In the Stewardship Program, there is opportunity for producers to be compensated for “research and demonstration activities; or [p]ilot testing of new technologies or innovative conservation activities.” 7 C.F.R. § 1470.24(c). Grants are available under the Incentives Program to, among other things, “carry out projects that . . . facilitate on-farm conservation research and demonstration activities; and facilitate pilot testing of . . . innovative conservation practices.” 16 U.S.C. § 3839aa-8(a)(2)(E)-(F); 2014 Farm Bill, Sec. 2207(1)(C).

103. The definition of “payment” within Incentives Program is itself confined to “financial assistance provided to a producer for performing practices” and includes “incurred costs” and “income foregone.” 16 U.S.C. § 3839aa-1(3); 2014 Farm Bill, Sec. 2202(1); see also 16 U.S.C. § 3839aa-2(d)(2). Similarly, the Forests Program pays landowners in its ten-year agreements for half of the costs associated with implementing approved conservation practices. 16 U.S.C. § 6574(c). This technicality likely arises from international trade law, which views outcomes payments as possible illegal subsidies. See *supra*, note 4.

104. According to existing regulations, a Stewardship Program payment cannot be made when “there is no cost incurred or income foregone . . .” 7 C.F.R. § 1470.24(f)(3). But another existing rule only requires payment based on costs and foregone income “to the maximum extent practicable” and includes “environmental benefits” as another basis for payment. 7 C.F.R. § 1470.24(a)(4)(i)-(iii). The somewhat contradictory nature of these regulations could be explained with new rules, particularly in light of the new law

105. 2014 Farm Bill, Sec. 1238G(d)(2).

106. A bonus payment exists in the new law for certain crop-rotation practices. 2014 Farm Bill, Sect 1238G(e). This bonus model could be incorporated into rules connected with Sec. 1238G(d)(2) to provide for additional funds dispersed to those landowners who achieve specified tangible outcomes.

107. 16 U.S.C. § 3839aa-2(d)(3); 2014 Farm Bill, Sec. 2203(3)(A).