CHOICES
a publication of AAEA Agricultural & Applied Economics Association
The Magazine of Food, Farm and Resource Issues

3rd Quarter 2011 | 26(3)

ENVIRONMENTAL SERVICES PROGRAMS FOR THE CHESAPEAKE BAY

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JELClassifications:Q25,Q28,Q53,Q57
Keywords: Ecosystem Services, Payment for Ecosystem Services, Water Quality, Chesapeake Bay

In December 2010 U.S. EPA published a Chesapeake Bay Total Daily Maximum Load (TMDL) defining the maximum allowable loads for nitrogen, phosphorous and fine sediment. The load reductions expected from various sources is described in Watershed Implementation Plans (WIPs) for six states and Washington, DC. The WIPs recognize that regulated "end of pipe" point sources contribute only a fraction of the total load and so include programs to limit diffuse and weather dependent loads from agriculture and low density suburban development. In general, WIPs expect agricultural land owners to implement pre-approved best management practices (BMPs) in return for payments that will offset a share of the cost to install those practices. Some states regulate the nutrient content of lawn fertilizer. However, the strategy for low density suburban lands centers on education programs to encourage suburban land owners to be "Bay friendly" in their landscape management and waste disposal behaviors.

The need for on-going adjustment of the WIPs is expressed in 2-Year Milestones that will be a check-in to assess WIPs effectiveness in meeting load reduction expectations as well as securing living resource goals such as fish and shell fish population increases and public access and use of the Bay's waters. Among many observers the concept of Payment for Environmental Services (PES) programs has drawn attention as a new way forward. Indeed, at the federal level the PES language has been embraced by the USDA and the USEPA.

The Northern Everglades Payment for Environmental Services Program was adopted as a template for an operating PES program (NE-PES) The Florida example was chosen for two reasons. First, it is a unique and fully functioning PES program for working lands . Second, the first author of this paper was instrumental in the design and launch of that multi million dollar program. (Lynch and Shabman, 2011). Based on that template, we define a PES program as one where there are contracts between a buyer of environmental services and individual landowners who agree to offer environmental services, above regulatory requirements, on agricultural and suburban lands. Payments for the services provided are made at contract specified intervals, such as at the end of a year, only when the seller can document that the services have been provided and the documentation is verified by the buyer. In our judgment the Bay's landscape, land use, and land ownership patterns will make implementation of a Florida-like PES impractical. However, the principles of PES can be adapted to the Bay circumstances and can make a significant contribution to Chesapeake Bay management. This adaptation is called the "Recognition for Environmental Services Program" (RES).

Recognition for Environmental Services

Below is a vision of how RES programs might operate. We begin by recognizing that the 64,000 square mile Chesapeake Bay watershed can be subdivided into thousands of "catchments". Each is a small watershed that varies in size from less than 1 square mile to 10 square miles. These small catchments have a single location where the rainfall on the catchment drains to a larger stream or to the Bay itself. Land uses in the catchments are of all types that exist in the Bay watershed, but due to the small size land uses are more likely to be uniform within the catchment. In a RES program land owners in a catchment would cooperatively produce nutrient and sediment reductions that benefit the Bay and estuaries, in support of the living resources of the Bay and in support of improving the environmental conditions in the catchment itself.

Catchment organizations would be formed to include landowners and would use low cost measurements to document pollutant load reductions in the catchment. The organizations would "contract" with new state-level RES programs which would formally acknowledge these catchment organizations, verify their documented water quality changes

and provide financial payments to offset costs, cash prizes and other recognition to landowners through the catchment organizations. The state RES programs could be funded by dedicated fees and general revenues, but would be created and operated outside of any existing agency or program. Alternatively, the RES concept might be applied at the local level, for example a storm water utility might recognize and reward households in a catchment with rebates on their utility bill for documented load reductions.

Technical and financial cost share assistance for imagining and implementing load reduction actions would be available through traditional programs to support the new state RES program. The actions can be on individual land parcels or can be community actions such as stream and wetlands restoration. RES recognitions would be cash prizes and noncash acknowledgments. The prizes would be lump sum payments to an organization, but would not be based on a formula that links the size of the prize to the precisely measured service levels, for reasons described below. Non cash recognitions can include, but are not limited to, awards, positive publicity, or priority in grant programs of other agencies. Local watershed improvement benefits—other environmental services—realized coincident with Bay-specific water quality improvement outcomes would be emphasized, increasing the commitment of landowners and communities to actions that would also serve the Bay-TMDLs. For that reason, RES program results should be documented in terms of downstream outcomes, or loads, and local water quality conditions. .

Of special note is that the RES emphasis on documentation creates a learning opportunity, a benefit essential to water quality improvement. To appreciate the need for a program that supports learning and how learning occurs consider some analogies. When consumers buy food, they learn from experience what they enjoy. When companies adopt new production practices, they observe how output quantity and quality changes. When entrepreneurs invest in new product development, they test the viability of their ideas with consumers in the marketplace. The common feature in all these examples is a feedback loop: a decision is made with an expectation of a desired outcome, realized outcomes are compared to expected ones, and future choices are modified based on what is learned about the outcome and the causal linkage between the decision and outcome. Such a feedback loop rarely is in place when the decision is controlling nutrient loads and providing other environmental services. With the exception of regulated point sources—which regularly sample and monitor effluent and can link technical changes, individuals and communities are expected to make choices—sometimes quite costly ones—without any feedback on what environmental outcomes those choices produce. Farmers, developers, and local governments implement runoff control BMPs without any observable indicator of how nutrient loads change or how water quality is or isn't improved. A positive environmental outcome might be viewed as a reward for bearing a cost of an action and can motivate further actions, but outcomes are rarely measured and reported in ways that are linked to the decisions made and reported in terms that are meaningful to those who make the decisions—there is no feedback loop. Instead, the only observable outcome to those being asked to implement nutrient control practices is the cost they bear. The creation of a feedback loop must be the focus RES design.

Getting to RES

There is no exact application of the RES program concept anywhere in the nation, although elements of the envisioned state RES programs can be found in PES and some cost share programs. Therefore, creation of operating RES programs must be preceded by a refinement of key ideas with on-the-ground demonstration projects. In parallel, there must be a process, with strong leadership, to engage all stakeholders—agencies, NGOs, landowners, communities—who together design a program that yields environmental results and is feasible to administer. That process must be linked to the demonstration areas so that there are concrete examples to inform the conceptual design discussions. This was the lesson of the Florida Ranchlands Environmental Services Project experience.

An average county in the Bay may contain a few hundred catchment watersheds, thus providing an ample array of potential places for the RES development and demonstration effort. The WIPs greatest need is to address loads of nutrients and sediment from agriculture and low density suburban land uses, as these sources create significant loads which would be difficult to regulate following the traditional regulatory structure. Therefore, catchments that have agricultural—crop and pasture—and low density suburban land uses, and have no point source discharges, would be the preferred areas for the early development and demonstration of an RES program. In many of these places watershed groups already exist, so having organizations in place may be a criterion for selecting a catchment for the demonstration program. Several general concepts for an RES program would be further refined in the development and demonstration phase and each demonstration catchment would be an experiment to inform the collaborative design process. The development of a RES program hinges on two critical elements: development of a workable environmental measurement to serve as the informational feedback loop and functional catchment organization.

Develop Environmental Service Measurement Methods

It is often argued that it is impractical to measure loads and reductions in load achieved by individual diffused sources. The default has been to promote the implementation of prescriptive BMPs that assume a fixed effectiveness of those BMPs over time, with little or no monitoring of results or even the maintenance of those BMPs. This approach to implementation persists in the WIPs, we believe, because few if any alternatives to address the measurement challenge have been put forward. RES catchment associations will have an incentive to measure water quality changes. Because roughly 70% of catchments feed a single stream with a single exit point, monitoring at a single point makes measurement technically and administratively feasible. Because cost must be low, the goal of that monitoring would be documentation of the load reduction and other environmental services that is "good enough". Good enough is when both the RES program and the watershed catchment service providers have sufficient trust that the provision of the recognized services is being realized.

RES can rely on a limited number of metrics that are proxies for services provided. The demonstration catchments would be expected to measure certain outcomes and relate those outcomes to Bay load changes and to local watershed conditions. In all places the goal will be to select the fewest number of metrics needed for documentation of water quality changes and to assure that the measurement plans give priority to cost and ease of measurement. Such measurements might include temperature, turbidity and changes in river stages, with analyses made to relate these measures to nutrients leaving the catchments, local fish habitat support or bacteria levels which determine suitability for water contact recreation. In all cases the reporting will be by the catchment organizations and the measurement and reporting methods should require real time "hands on" responsibility. There may be remote measurement and data transmission technology, but that technology cannot get in the way of people's connection to the catchment and "seeing", through the measurements made, the results of their actions. In that way, measurement can feed back to community action. For example, seeing spikes in sediment load during a rain event can lead to walking back up stream to find the sources of the sediment and then working with landowners to control the runoff.

Create Model Catchment Organizations

The Florida PES program is based on a one-on-one relationship between the entity paying for the service and individual landowners. Bay agriculture is characterized by small land holdings and part time agricultural operators. At the same time many catchments' land use is low density with dispersed homes and much turf. A program that expects a state RES program to directly "contract" with this diverse array of landowners would be administratively infeasible.

In an RES program, "catchment organizations" serve as an intermediary and coordinator between the RES program and providers of load reduction services. Landowners within a catchment, acting in concert through a catchment organization, jointly produce water quality improvements—nutrient and sediment reductions—that benefit the Bay and estuaries by meeting the TMDL. Watershed catchment organizations would be expected to secure commitments to land and water management from small agricultural land owners and suburban land owners. In order to develop broad-based local support and credibility, the organizations would be developed and managed by local citizens and be independent of any advocacy groups—environmental, agricultural, and so on.

Many actions like lawn grooming and fertilization practices do not result in any out of pocket expenses, but would be particularly amenable to local education and oversight by the watershed group. If costs are required, the organizations could apply on behalf of the individuals in the catchment for technical support and financial assistance, and would be able to provide that assistance themselves. This same organization could motivate community scale as opposed to individual actions, such as stream restoration.

As described above, the organization would document the load reductions using low cost measurements of water quality improvements attributable to the RES program. However, by virtue of its relationship with the land owners, the catchment organization would be aware of the landowners who made the improvements that earned the recognition for the RES and could appropriately distribute any RES cash prizes and recognitions to landowners in the catchment community. We believe collective uses of such funds and social acknowledgments at the community scale could be a powerful incentive to action.

In contrast, a PES is based on the admittedly unrealistic assumption that financial payments linked to environmental services provided are not only a necessary, but also sufficient, incentive for landowners to provide services. In the Bay watershed the land holdings are small, the uses are varied, the farmers are part time and many of the required actions will be on suburban landscapes. Therefore, RES would still require cost share to offset some costs which may

be required to motivate action. However, an RES organization would also receive cash prizes and noncash recognition on behalf of landowners within a community, with the expectation—to be discussed and tested in the demonstration phase—that recognition from outside can motivate action by communities and individuals.

Downstream Bay concerns about nutrient loads should not dominate the agenda of the catchment organizations. To generate local support and commitment, catchment organizations will increase attention to and recognition of locally important watershed improvement benefits that will motivate cooperative action by also emphasizing local efforts to improve local water quality conditions such as sediment loads and habitat. These efforts will produce local benefits including increased stream access, improved aesthetics, more frequent opportunities for water contact recreation from reduced bacteria loads, and fishing which depends on the flow regime.

The literature in behavioral economics, anthropology, and sociology—especially community organizing, and other disciplines offers evidence that communities of individuals can and do organize themselves to meet a common goal—in this case an environmental outcome—even if the benefits of that outcome do not always align with those who bear the costs. Eleanor Ostrom (2010) summarizes one strand of that literature as follows: "The crucial factor is that a combination of structural features leads many of those affected to trust one another and to be willing to do an agreed-upon action that adds to their own short-term costs because they do see a long-term benefit for themselves and others and they believe that most others are complying."

The way that a catchment organization would form and function will differ, perhaps radically, by land use and owner characteristics. Therefore Ostrom's general statement can be made operational for an RES if the demonstration phase develops model organizations for suburban land owners, crop farmers and cow–calf pasture operations. The models will need to accommodate different business objectives, such as profit or "hobby farming", and different demographic characteristics of the landowners because the diversity of landscapes in the Bay catchments is matched by the diversity among the land owners themselves.

Concluding Observations

Realistically, a wholly new program does not emerge based on a "better" idea—nor should it. Innovation demands a demonstration that a different way forward is administratively feasible and will yield superior environmental results. As such, the feasibility and merit of RES programs for the Chesapeake Bay watershed must be tested and debated, supported by a field demonstration, and vetted through a stakeholder design process.

Such a process will require financial support, recognizing that in the current budget setting where existing agency program budgets are being frozen or reduced, it is not likely that significant revenues will be made available for the design of a demonstration program. However, some watershed innovation grant programs in the USDA and EPA may be employed, particularly if matched with support from a nonprofit foundation. The funds for such a process will be needed to support the testing and development of the monitoring protocols and to motivate and then provide leadership to the collaborative process itself.

Before a collaboration process can begin, there must be mutual trust among those who would be expected to participate in that process. Current circumstances surrounding the Bay TMDL and WIPs as of this writing have not yet fostered complete trust by all parties. Here again we believe that the small scale of these catchments offers opportunity. We believe the small size of such catchments, roughly the same scale as one might push a stroller or walk their dog is key to establishing necessary dialog and trust within each catchment community. Because there are literally tens of thousands of these catchments, certainly a few hundred exist where a critical mass of landowners would be interested in trying. And we believe in turn that recognition and appreciation at such community scale can be no less powerful than cash payments.

For More Information

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