

## APPENDIX A

### Models for carbon markets in agriculture

The agriculture industry around the country is an active “supplier” in carbon markets. The following examples of programs and projects help provide some lessons about how these markets can work for Pacific Northwest agriculture. It should be noted that some of these examples involve programs or pilot projects that have not yet resulted in documented transactions. They are, nonetheless, included because they still may provide lessons for how these programs might be designed to work for in the Northwest.

#### *a) Pacific Northwest Direct Seed – Conservation tillage:*<sup>1</sup>

One of the earliest and clearest examples of farm community use of a carbon sequestration market is a local one - the contract arranged by the Pacific Northwest Direct Seed Association (PNDSA) on behalf of local growers using no-till/low-till agriculture.

In 2002, PNDSA entered into a contract with Entergy, a New Orleans-based energy company wishing to offset its corporate climate impacts. PNDSA, in turn, contracted with 77 of its Washington, Oregon, and Idaho members to use direct seed practices on some 6,470 production acres over a 10 year period. Direct seeding sequesters 0.55 tons of CO<sub>2</sub> per acre per year (about 3,500 tons total per year) and, in return, each participating farmer receives a small annual payment. They are obligated to Entergy to sequester about 3,000 tons, providing some leeway in case of loss of acreage. The transaction helps Entergy comply with international standards (not yet required in the U.S.) for greenhouse gas emissions under the Kyoto accord and thus allows it to market its services and its stocks as environmentally responsible.<sup>2</sup> These payments to the farmers are currently very small (perhaps a bit over \$1 per acre) but as this market grows, they could become more significant in the years to come.

#### *Considerations:*

PNDSA’s program “aggregated” the credits from many small individual producers so the final “bundle” of credits could be offered for sale in an efficient manner to a large offset producer like Entergy. This would have been impractical for Entergy to accomplish and far too difficult and time-consuming for each of the producers to do on their own – especially considering the small amounts they are receiving. In addition, PNDSA’s close relationship with its member-producers made it possible to enlist their participation with an organization they already knew and could trust. The PNDSA website provides their explanation of the reasons for the success of this pioneering transaction:

“PNDSA is in a unique position to aggregate carbon credits to the benefit of the buyer and the seller. It has unique access to a large grower pool that is directly involved in practices that could generate a large portion of the carbon storage benefit agriculture is anticipated to provide. Further, as an aggregator, potential purchasers could gain access to a constant, reliable supply of carbon credits. A grower group, such as PNDSA, could represent grower interests while providing efficient access to prospective purchasers, making it cost-effective for individual farmers to quantify their sequestration and sell offsets.”

Because the per-acre value of this contract is small, it provides limited motivation for individual producers to participate – especially when participation involves a 10-year contract to continue a particular practice on their land. This means that the farmers using conservation tillage might likely use this practice regardless of the program. Since the carbon markets want to invest in practices that otherwise would not be used, the value of low-till in this program is heavily discounted, greatly reducing what farmers can get paid. According to PNW Direct Seed, they and their members are participating in this contract largely as a public education effort to highlight the environmental value of low-till agriculture. The use of a 10-year contract with the farmers also may be an issue. There was some hesitation by farmers to tie up their land in contract obligations for such a long period.

It should be noted that the carbon savings resulting from the greatly reduced use of diesel for tillage (a significant issue) was NOT included in the Entergy contract. It was made known to the buyer, but was not factored in to the price paid or tons of carbon saved by the transaction.

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***b) Northwest Neutral Carbon Offsets – Forest Practices:***<sup>3</sup>

Northwest Natural Resource Group (NNRG) is a respected local non-profit that operates a green forestry 3<sup>rd</sup> party certification program called “Northwest Certified Forestry.” They work with the national Forest Stewardship Council (FSC) (<http://www.fscus.org>), a large national forest certification program. FSC standards provide a starting point for establishing forest land management practices that could earn carbon credits. NNRG is developing protocols for small forest landowners that will improve upon these FSC standards along with a monitoring and verification criteria. They are working with FSC to establish a baseline characterization for Pacific Coast forestry, above which small forest landowners will be able to earn and be paid for carbon sequestration. And they are developing methods for aggregating offsets to make them available to larger scale purchasers.

The resulting program, Northwest Neutral Carbon Offsets, will allow small forest landowners to gain the double advantage of: a) being able to market their products as certified climate friendly, and b) being able to earn credits that can be marketed on the Chicago Climate Exchange.<sup>4</sup> The “green” marketplace for certified forest products includes carbon friendly certification and extends through the large buyers of wood products. For example, Boise, Inc. paper products are marketed as climate friendly based, in part, on the fact that the sources of their supply are certified to be climate friendly.<sup>5</sup>

Considerations:

NNRG's solid reputation among small forest landowners, particularly in Washington's Olympic Peninsula area where it originated, probably helped this project. The organization has already been providing 3<sup>rd</sup>-party certification for many Northwest forest firms which are receiving a market premium in timber markets of 2 to 6 percent and a premium in the ultimate wood products market of between 5 to 15 percent. Like PNDSA (above), NNRG already has a longstanding, positive relationship with its own forestry membership – providing services associated with green certification – and their membership trusts them. Although this program is still in development, presumably NNRG will be able to serve as an aggregator of the carbon sequestration credits provided by many small, individual forest products firms and will thus be able to provide access to much larger scale markets at higher prices.

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**c) VanderHaak Dairy – Lynden, WA – Anaerobic digester:**<sup>6</sup>

Vanderhaak Dairy is a family farm operating in Lynden, WA since 1968. In 2004, it became the first dairy in Washington to install a commercial anaerobic digester. Its digester can handle waste from 1,500 cows at three local dairies. Unprocessed manure is converted into a compost/soil amendment, bedding materials for dairy livestock, liquid fertilizer, and biogas which is used to generate electricity. Each of these products is potentially marketable.

In addition, this process removes methane and nitrous oxide emissions that would otherwise be released into the atmosphere and are considered powerful greenhouse gasses. Vander Haak Dairy is one of the first in the U.S. to register its carbon credits with the Chicago Climate Exchange. The emission reductions from this process amount to 560 tons of methane per year which is equivalent to about 10,000 tons of CO<sub>2</sub>.

Considerations:

The bulk of the \$1.2 million investment funding for this project was provided by the landowner and through private financing. But \$272,000 of this was through a USDA grant and \$160,000 through WSU's Climate Friendly Farming project. The anticipated investment payback period is 7 to 9 years. Several agencies/groups partnered with the landowner on the project, including Andgar Corporation, Whatcom County WSU Extension, the Port of Bellingham, Whatcom Conservation District, Whatcom PUD #1, Puget Sound Energy, USDA Rural Development, and WSU-CSANR's Climate Friendly Farming Project (funded by the Paul G. Allen Family Foundation). It seems likely that it might be difficult for most other producers either to assemble this capital investment or to secure this breadth of partnerships and assistance. The previous success and lessons learned from this project as a model, however, should make future efforts easier, as would an increase in the dollar value of the carbon credits that could be sold.

Contact:

Outside of the landowners themselves, one of the more knowledgeable contacts about this project is:

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**d) George DeRuyter & Sons Dairy - Outlook, WA – Anaerobic digester:**<sup>7</sup>

The DeRuyter Dairy is a 5,500-cow family-operated dairy located in Outlook, near Sunnyside, WA. The family moved from open waste storage lagoons and application to fields as fertilizer to a digester that will produce 1.2 megawatts of electricity, fiber, compost and fertilizer as well as sequestering some 20,000 plus metric tons of carbon equivalent at about \$8 per ton. Apparently, credits were sold through TerraPass,<sup>8</sup> an aggregator working through the Chicago Climate Exchange.

This project is a partnership with the Port of Sunnyside and the South Yakima Conservation District. It had an initial investment cost of \$3.2 million. The State of Washington's new Energy Freedom Loan fund<sup>9</sup> loaned the partnership \$1.9 million, with bank financing and a \$500,000 grant from USDA providing the rest of the funds needed.

Considerations:

The \$3.2 million initial investment is a steep one, even for a large dairy operation with state loan and federal grant assistance. But, like the VanderHaak dairy, the multiple lines of income from several products of the dairy will hopefully make it a profitable one. There is some cost trade-off for these digesters in that they also eliminate (or reduce) the need for a costly dairy storage lagoon and eliminate odors that can be offensive to neighbors and sometimes form the basis for nuisance complaints.

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**e) Qualco Energy – Monroe, WA – Anaerobic digester:**<sup>10</sup>

A partnership between three non-profit groups: the Sno/Sky Agricultural Alliance, Northwest Chinook Recovery, and QuiCeda Power (owned by the Tulalip Tribal Corporation) is developing a dairy waste digester project near Monroe, WA that will serve surrounding dairies and generate electricity to sell to the Snohomish County Public Utility District. The facility will receive

manure through underground lines and will return fertilizer and gas from the digester back to the farms where burning it will help them heat their own facilities (potentially including greenhouses), dry crops and run natural gas vehicles. This will, in turn, reduce greenhouse gasses while producing energy for on-farm uses.

Qualco Energy was also helped with a \$1.5 million State low interest loan through the Energy Freedom Loan fund (to the Tulalip Tribes) and a \$256,000 grant from the U.S. Department of Energy. The digester, located at the site of the former Washington State Reformatory Dairy Farm near Monroe, will have the capacity to handle manure from 2,200 cows. The digester will produce 450 Kilowatts of power – enough to power 300 homes. The power will help Snohomish PUD meet a portion of its renewable portfolio standards requirements. It will allow local farmers to grow their herds to their optimal size without being constrained by the availability of increasingly costly land in the area. And it is likely to be able to use additional, non-dairy, sources of feedstock to supply the digester's needs.

Considerations:

This project is unique in that it is a cooperative effort that has been led by several local dairy farmers whose properties are near enough to the facility to allow manure and returning gas to be piped underground to a shared facility. It is also somewhat unique in that one of the motivations is to protect water quality and fish habitat. The Tulalip Tribe is interested, among other things, in improving conditions for local endangered salmon runs. Like the other digester projects, the initial investment cost is substantial.

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**f) AGRICULTURE ASSOCIATION AGGREGATORS**

Several state and national agriculture associations have been certified as aggregators with the Chicago Climate Exchange and are offering carbon credit opportunities to their members. Each of these programs essentially incorporates the models for performance adopted by the Chicago Climate exchange, so the nature and requirements for each are quite similar. These include:

○ **National Farmers Union.**<sup>11</sup>

The National Farmers Union operates a national program approved through the Chicago Climate Exchange for carbon credits earned through no-till crop production, conversion of cropland to grass (with grazing or haying permitted), sustainable management of native rangelands, tree plantings on previously non-forested, degraded lands, and use of anaerobic manure digester systems. The program allows producers to enroll on-line by providing land descriptions, maps, and other details and providing FSA form 578 descriptions of their land, and contracts by mail. NFU then aggregates these carbon offsets and sells them on the Chicago Climate Exchange. In its first two years of operation, the program earned over \$8 million for its member producers

through this program. Aggregation fees are split among participating state Farmers Union organizations, so the program also helps support these organizations.

The North Dakota Farmers Union operates the nationwide program for NFU. It appears that the typical contracts are 5-6 years. Monitoring is kept to a minimum – the Chicago Climate Exchange accepts that if the specified practices are indeed carried out, sequestration of carbon at the agreed upon amounts is assumed to have occurred. No beginning or ending soil testing, for example, is needed, just certification that the practices have been implemented as agreed. Because there is considerable variation in the price for carbon, the price is updated each year based upon the then current price for carbon – so increases and decreases in carbon price affect what farmers receive during the contract.

One of the practice areas offered for carbon offsets by the National Farmers Union program is a Rangeland Soil Carbon Management program<sup>12</sup> through which cattle ranchers can earn carbon credits through sustainable stocking rates, rotational grazing, seasonal rotation, and the use of sustainable rangeland management planning. These practices are verified with site photographs, ranch stocking records, secondary information from agricultural extension and other agencies, and by other means. The NFU program is based on an established model used by the Chicago Climate Exchange and described on the CCX website. Credits depend upon the previous condition of the land and on its geographical location in the country.

Washington and Oregon fall within region B, where potential earnings are somewhat low, between 0.12 and 0.20 metric tons per acre per year. At \$5.00 per metric ton, a rancher could potentially earn between \$600 and \$1,000 annually on 1,000 acres. An increase in carbon prices to, say, \$30.00 per ton, however, would increase that to between \$3,600 and \$6,000. Although the amounts of money involved are, so far, and for our region, somewhat limited, they do provide some recognition and, with higher carbon prices, could become a significant motivator.

Considerations:

This program has the substantial advantage that a trusted agricultural organization representing farmers is serving as the aggregator. It has also incorporated several types of carbon sequestration into its program, thus making the program available to a broad range of farmers (though not all). Because aggregation fees help to support the NFU and its state organizations, there is a motivation for the organization to participate and cover its costs of doing so. Also, NFU's program has incorporated existing standard practices and protocols through NRCS and FSA into its program and uses standardized Chicago Climate Exchange models to make it easy for their members to participate with a minimum of monitoring intrusion. NFU's on-line applications would also seem to make the process more convenient. Finally, NFU has apparently established a typical 5-6 year contract term as one that is most practical for its participating members.

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○ ***Iowa Farm Bureau:***<sup>13</sup>

The Iowa Farm Bureau also provides carbon credit aggregation services through the Chicago Climate Exchange in a pilot project. The allowed practices and procedures are essentially like those for the National Farmers Union (both based on models accepted by the Chicago Climate Exchange). The AgraGate Corporation, aggregator, is a subsidiary of the Iowa Farm Bureau.<sup>14</sup>

Enrollees complete an application for the program with the Iowa Farm Bureau. Through 2006, over 900,000 acres had been enrolled in the program.

*Considerations:*

This program is essentially like the NFU program although the application process and the types of practices emphasized are somewhat different. Iowa Farm Bureau acts as an aggregator for its member-participants.

*Contact:*

Iowa Farm Bureau  
5400 University Ave.  
West Des Moines, IA 50266  
515-225-5431.

○ ***Kentucky Corn Growers:***<sup>15</sup>

The Kentucky Corn Growers also provides carbon credit aggregation services through the Chicago Climate Exchange. Again, the practices are those that have been modeled and accepted by the Chicago Climate Exchange (like the NFU and Iowa Farm Bureau programs).

In May 2008, a total of \$250,000 was sent out to almost 100 participating farmers in the Kentucky program.

*Considerations:*

This program shares the same advantages and issues as the Iowa and NFU programs

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***g) OTHER AGGREGATOR PROGRAMS FOR AGRICULTURE:***

There are several other companies, consultants, and non-profits that also offer aggregator services for carbon offset programs certified by the Chicago Carbon Exchange. Some of these, in addition to the ones mentioned, handle or may specialize in purchasing and aggregating credits for agricultural producers. Some examples include: ■ AgraGate Climate Credits

Corporation (a subsidiary of the Iowa Farm Bureau);<sup>16</sup> ▪ Tatanka Resources, a Missouri-based aggregator for forests;<sup>17</sup> ▪ National Carbon Offset Coalition;<sup>18</sup> ▪ First Capitol Risk Management, carbon trading services;<sup>19</sup> and ▪ Michigan Delta P2/E2 program for forest offsets.<sup>20</sup> ▪ Delta Institute programs for agriculture.<sup>21</sup>

## APPENDIX A ENDNOTES

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- <sup>1</sup> See PNDSA website at: <http://www.directseed.org/carbonhistory.html#carbonhistory>. Some information for this section also came through personal communication with Russ Evans of PNDSA.
- <sup>2</sup> See Entergy website regarding awards and recognition: [http://www.energy.com/about\\_energy/awards.aspx](http://www.energy.com/about_energy/awards.aspx).
- <sup>3</sup> See NNRG's Northwest Neutral website at: <http://www.nnrg.org/innovations/NW-Neutral>.
- <sup>4</sup> The Chicago Climate Exchange is the US-based carbon credit exchange that is currently responsible for most carbon credit trades in the United States. See: <http://www.chicagoclimatex.com>.
- <sup>5</sup> See the Boise sustainability website at: <http://www.boiseinc.com/sustainability/Certification.html>. And CCX news release at: [http://www.chicagoclimatex.com/news/press/release\\_20080724\\_BoisejoinsCCX.pdf](http://www.chicagoclimatex.com/news/press/release_20080724_BoisejoinsCCX.pdf).
- <sup>6</sup> See discussion at the Clean Air Pass website at: <http://www.cleanairpass.com/cap/projects/projects.jsf>. A case study of the Vander Haak Dairy system is provided on the Combined Heat and Power website at: [http://www.chpcentermw.org/rac\\_profiles/northwest/VanderHaakDairyCaseStudy.pdf](http://www.chpcentermw.org/rac_profiles/northwest/VanderHaakDairyCaseStudy.pdf). Also, an aerobic digester technology is explained on the WSU Climate Friendly Farming website at: <http://cff.wsu.edu/Project/dairy.html>.
- <sup>7</sup> See the project description on the TerraPass website at: <http://www.terrapass.com/projects/details/george-deruyter-and-sons-dairy.html>.
- <sup>8</sup> See the TerraPass website at: <http://www.terrapass.com>.
- <sup>9</sup> See Puget Sound Business Journal, 7/21/06, <http://seattle.bizjournals.com/seattle/stories/2006/07/24/story12.html>.
- <sup>10</sup> See Qualco Energy website at: <http://www.qualcoenergy.com/qualcoenergy.htm>. Also see article in the Puget Sound Business Journal, 7/21/06, <http://seattle.bizjournals.com/seattle/stories/2006/07/24/story12.html> and article in Biomass Magazine, October 2008, [http://www.biomassmagazine.com/article.jsp?article\\_id=2062&q=&page=2](http://www.biomassmagazine.com/article.jsp?article_id=2062&q=&page=2). Several dairy digesters are now in place around the region: [http://www.epa.gov/outreach/agstar/pdf/digesters\\_dairy.xls](http://www.epa.gov/outreach/agstar/pdf/digesters_dairy.xls). Another local example includes: CalGon Dairy near Salem OR (no indication that actually has applied for carbon offsets). [http://www.harvestcleanenergy.org/enews/enews\\_0605/enews\\_0605\\_Salem\\_Digester.htm](http://www.harvestcleanenergy.org/enews/enews_0605/enews_0605_Salem_Digester.htm).
- <sup>11</sup> Materials for this section can be found at: National Farmers Union website at: <http://nfu.org/issues/environment/carbon-credits>, and at North Dakota Farmers Union site at: <http://carboncredit.ndfu.org/>. Also see the Chicago Carbon Exchange soil offset program described at: [http://www.iowafarmbureau.com/special/carbon/pdf/carbon07/CCX\\_Soil\\_Offsets.pdf](http://www.iowafarmbureau.com/special/carbon/pdf/carbon07/CCX_Soil_Offsets.pdf)
- <sup>12</sup> See information on Chicago Climate Exchange site at: [http://www.chicagoclimatex.com/docs/offsets/CCX\\_Rangeland\\_Soil\\_Carbon.pdf](http://www.chicagoclimatex.com/docs/offsets/CCX_Rangeland_Soil_Carbon.pdf). Also see the descriptions for the NFU Native Rangelands Management program at the North Dakota Farmers Union site at: <http://carboncredit.ndfu.org/>
- <sup>13</sup> See Iowa Farm Bureau Carbon Credit Aggregation Program at: <http://www.iowafarmbureau.com/special/carbon/default.aspx>.
- <sup>14</sup> See: <http://www.agragate.com>.
- <sup>15</sup> See: Kentucky Corn Growers Carbon Trading Program at: <http://www.kycorn.org/ccx/index.htm>.
- <sup>16</sup> See: <http://www.agragate.com>.
- <sup>17</sup> See: <http://agebb.missouri.edu/agforest/archives/v11n4/v11n4.pdf>.
- <sup>18</sup> See: <http://www.ncoc.us>.
- <sup>19</sup> See: <http://www.firstcapitolrm.com/carbonoffset.shtml>.
- <sup>20</sup> See: <http://www.deltacarbon.org/aggregation/documents/XFO-ManagedForestContractP2E2.pdf>.
- <sup>21</sup> See: <http://delta-institute.org/>.



## APPENDIX B

### **Models for water quality trading with agriculture**

The following collection of trades and programs are examples of trading efforts that involved or involve water quality transactions with agricultural producers. While this list is by no means complete, it does provide examples that illustrate issues we might potentially face here in the Northwest. It is relevant to note that none of the water quality trading schemes found in this review have apparently involved point to non-point trades with forest lands.

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<b>m) Red Cedar River Nutrient Trading Pilot – City of Cumberland, WI:</b>	<b>16</b>
<b>n) Previous water quality trading pilot efforts in Washington State:</b>	<b>16</b>

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#### ***a) Great Miami River Watershed:<sup>1</sup>***

Over 80 percent of the private land in the Great Miami River watershed in Ohio is in agricultural use. The watershed covers some 3,800 square miles and crosses 15 counties. It also has 314 regulated point sources that discharge pollutants. Seventy percent of the population lives in urban areas covering about 5 percent of the total land base. This watershed is believed to be a significant contributor to pollution in the Gulf of Mexico.

Anticipating stricter state-wide nutrient pollution standards in 2005, the Miami Conservancy District (MCD), a regional government agency, assembled a broad group of stakeholders in the watershed to create a trading program. By allowing point sources to avoid large investments in wastewater treatment facilities, the program is saving local utility ratepayers some \$300 million over the next 20 years and providing substantial funding to local farmers in exchange for improved conservation practices. In 2006, USDA-NRCS also provided a three-year grant of \$1 million. MCD serves as a non-regulatory, third party broker by obtaining credits through contract with agricultural producers who implement BMPs that reduce phosphorous and nitrogen in the watershed. MCD aggregates those credits and then sells them to regulated point source dischargers under separate contract.

Producers and local conservation districts apply for funding in response to an RFP offered by MCD. Those projects that result in the highest reductions in phosphorous and nitrogen per dollar cost are approved through a decision process by a broadly representative advisory group that establishes criteria and actually approves applications. MCD, in turn, separately contracts with point source polluters for their sale and thereby recoups its investment. MCD also establishes rules for the approval of transactions, including trading ratios (to insure against uncertainty), certification of credits, liability and recovery of funds from failed projects.

The following practices are considered eligible for this program:

- Animal waste storage structure
- Settling basins and filter strips
- Critical area protection
- Off-stream watering and stream crossing stabilization
- Roof and gutters
- Water diversions
- Grassed waterways
- Water and sediment control basins
- Erosion control structures
- Wetland treatment facilities
- Manure and mortality composting facilities
- Heavy use areas
- Swine manure aeration systems
- Tile outlet control for liquid manure

Considerations:

Along with the point sources, wastewater authorities, MCD, USEPA, Ohio EPA, Ohio Department of Natural Resources, and other affected governments and agencies, agriculture was closely involved in the initial development and is involved in the operation of this program:

- The Ohio Farm Bureau Federation and local county Farm Bureaus participated in development of the program, participate in project selection and establishing criteria, and help facilitate and enlist agricultural participation;
- EQIP funds contribute to this program, so USDA Farm Service Agency helps assure that farmers are eligible for EQIP;
- The County Soil and Water Conservation Districts participated in program development, advise and support farmers to identify and install BMPs, and help quantify credits for the program;
- USDA Natural Resources Conservation Service also participated in program development and helps to quantify credits; and, of course,
- Individual producers are implementing the BMPs to create these credits, with the help of conservation districts and NRCS.

MCD initially purchases the credits, so it essentially establishes their price (in \$ per pound of pollutant discharge prevented). The RFP system places farmers in direct competition with one another and has tended to keep the price of credits very low, despite the very large savings for point source polluters these credits provide. It is theoretically possible to cover up to 100 percent of the cost of installing BMPs under the program, but agricultural participation has been

somewhat limited. Efforts are now underway to improve this structure so as to provide greater encouragement for farmer participation.<sup>2</sup>

About five to 10 percent of the BMPs are monitored each year. This adds to program administrative cost but provides some assurance that producers are complying with their contracts.

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***b) Alpine Cheese Company, Sugar Creek, OH:***<sup>3</sup>

The Alpine Nutrient trading program in Sugar Creek Watershed, Ohio was initially driven by a single point source – the Alpine Cheese Company – under a single point source National Pollutant Discharge Elimination System (NPDES) permit. The company had phosphorous discharge levels of 225 parts per million (ppm) and was required to reduce that to 1 ppm. The last 3 ppm of that requirement were very difficult and costly to achieve through a technological fix (filtering) and this limitation was preventing the company from expanding its operations, creating new jobs, and creating increased demand for local milk.

Alpine filtered their phosphorous down to 3 ppm, and then provided funding to pay local farmers to reduce phosphorous to remove the remainder. The Holmes Soil and Water Conservation District provided technical assistance to farmers in implementing BMPs, brokered transactions, , and developed measures for conservation and cost-share. Ohio State University did monitoring, research, planning, and public education.

Farmers in the basin are paid to adopt BMPs such as grazing plans, biofilters, contour farming, no-till, cover crops, fencing, etc.

Considerations:

Because the point source initially involved is a cheese factory that provides an important market for local dairies in the same watershed, this project was particularly logical – everyone involved could immediately see the mutual economic benefit of making a deal. (Additional point sources are invited to join as the project proceeds.) There were immediate, recognizable economic benefits for the community in facilitating the expansion of the cheese factory (including 12 new jobs at the factory itself and a stronger local market for milk from local farmers).

Local farmers, particularly in the dairy industry, were already familiar with and already had a positive relationship with Alpine Cheese. And the local conservation district was also trusted and so was a natural choice to serve as a broker in transactions with farmers and to help them implement the conservation practices required. Finally, OSU Extension was also trusted in the

community so was a logical choice to assist with monitoring, research, planning and education. Note that this area includes many conservative Amish farmers who wanted a low level of outsiders on their farms – but some level of outside monitoring/involvement was necessary. The program was able to sort out this concern by involving trusted, existing community institutions like the SWCD and Extension.

Success of this project required Ohio EPA to be willing to accept the plan as sufficient over an initial five year period. If there is reasonable success in the first five years, they will fine-tune and proceed for an additional renewal period.

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***c) Kalamazoo River Demonstration – MI:***<sup>4</sup>

The Kalamazoo River watershed (draining into Lake Michigan) covers some 2,000 square miles in SW Michigan with parts of 10 counties. Eight percent of the watershed is urban, with about 57 percent in crops and livestock pasture, 21 percent forested, and 3 percent wetland. The watershed has over 50 NPDES permitted point source dischargers including municipal wastewater treatment plants and industrial sites.

The project calls for non-point source participants to reduce two pounds of phosphorous for each one pound credited for the point source permit. Such trading ratios (which are a common element in the water quality trades described here) are designed to compensate for uncertainties in these transactions – especially where there is more geographical distance in the watershed between the point source purchaser and the non-point source provider. They also provide a net environmental benefit to the watershed that helps justify and support the trading arrangements with the public. In this case, the 2 for 1 trading ratio could result in a net 50 percent overall reduction of pollutants in the Kalamazoo watershed below those called for in the TMDL.

The project met with initial resistance that was ultimately dispelled by providing accurate public information and employing a broad-based Steering Committee that includes the Michigan Department of Agriculture, Michigan Farm Bureau, USDA/NRCS, Michigan Integrated Food & Farming Services, and Michigan Agricultural Stewardship Association. The project also involved a broad partnership that included the above groups as well as the Michigan Department of Environmental Quality and various local groups and interests. The program pays farmers to use improved livestock practices like exclusion from waterways, grassed swales and limestone filters for diversion of and treatment of feedlot runoff, and soil fertility sampling to optimize fertilizer application. Technical assistance to farmers is provided the NRCS and local conservation districts and conservation plans and engineering designs are approved by certified NRCS planners.

Non-point source “credits” generated by the project are “banked” with the Steering Committee and then “sold” to point sources that contribute funding to support the project.

Considerations:

Among the issues and barriers that were addressed in this project were the following:<sup>5</sup>

- “It is rare to find accurate, (if any), historical data for specific sites that might impact how baselines and timelines are established. This often resulted in discounting factors applied in addition to the trading ratio to account for uncertainty.
- “Credibility of the credit generator and/or the credit marketer is important for a successful market. The non-traditional and lasting partnerships formed during the process transcended many of these related concerns.
- “Any and all uncertainties must be recognized and addressed to the satisfaction of all parties. Broad-based participation and an open dialogue allowed consensus to be reached on a wide range of programmatic and technical issues.
- “Identification of real or potential political and legal obstacles at local, state and national levels must be addressed. Community-based trading initiatives can only succeed if the regulatory framework and clear legal authority are present. The project achieved the former through an open, Steering Committee process; state of Michigan water quality trading rules are now pending which will provide the latter.
- “Risks (liability, accountability, etc.) are present for the credit purchaser and generator that often are not readily shared. Service Agreements (private contracts) between user and generator define these issues for both parties, and participation by a third party (e.g., USDA Natural Resources Conservation Service) minimizes these risks.”

The Keiser & Associates report on the project at the Environmental Trading Network<sup>6</sup> describes the issues in this project for agriculture as follows:

“For the agricultural sector, the concepts of: a) having recognized and trusted contacts to serve as the communicators for the project, and; b) providing a degree of anonymity for site owners proved largely successful. Approaches that stress what is in the best interest of the farm, the farmer and the landowner are likely to be well received. Anything else will be typically viewed as inappropriate and thus not likely successful. Agricultural improvements, potentially funded through outside sources, can provide financial benefits to on-farm operations as well as credits that become a marketable commodity. Commodities are well understood by agriculture. Publicity (good or bad) for the farming community, however, tends to make producers shy away from programs that are regulatory in nature, especially as they may pertain to their operations and defined environmental impacts. Private contracts with trading credit users, rather than the inclusion of the farmer in a point source permit, are a much preferred approach for agriculture to participate in trading.”

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***d) Lower Boise River Effluent Trading:***<sup>7</sup>

The Lower Boise River Watershed drains about 64 miles of river basin extending eastward from the confluence with the Snake River and about 1,290 square miles including of Idaho's most populous areas along the I-90 corridor in and around the city of Boise and including, important agricultural areas in Ada and Canyon Counties. An expectation that a restrictive Total Maximum Daily Load (TMDL) for phosphorous that would require up to an 80 percent reduction in Phosphorous loads drove the study of a means to ameliorate its impacts . (Delay in that TMDL delayed implementation of the trading framework.) Participants included Idaho Department of Environmental Quality, USEPA Region 10, Idaho Soil Conservation Commission, Idaho Clean Water Cooperative, NRCS, Idaho Rivers United, Bureau of Reclamation, several municipal governments (Boise, Nampa, Middleton, Star, Notus, and Parma and the Association of Idaho Cities), several industrial stakeholders (Simplot, Micron, Idaho Power Company), and several agricultural stakeholders, including:

- Idaho Water Users Association
- Idaho Farm Bureau, Pioneer Irrigation District
- Payette River Water Master,
- Ada and Canyon Soil Conservation Districts.

The Idaho Soil Conservation Commission created a list of surface irrigated cropland BMPs approved for credits, including sediment basins, filter strips, irrigation systems, constructed wetlands, and crop sequencing. Measurement was on a watershed scale with each BMP assigned an "effectiveness ratio" and an uncertainty discount (the discount being eliminated if the farmer implemented a fully certified nutrient management plan). Some 22 typical BMPs were listed as potentially controlling phosphorous (practices such as: buffer strips, filter strips, grassed waterways, irrigation systems, irrigation water conveyance, mulching, nutrient management residue management, sediment basins, waste storage, etc.) Trades could be between point sources, directly between point and non-point, or between a point source and an organized group of non-point sources (such as an irrigation district<sup>8</sup>).

While it is not clear that there have been active trades under this program, the State of Idaho did follow up on the Lower Boise project and Idaho's Division of Environmental Quality has adopted a water quality pollutant trading handbook that now spells out how such trades can be made in the State of Idaho.<sup>9</sup>

***Considerations:***

The Lower Boise project did succeed in drawing a diverse interest group together to lay the foundations for possible future trades. Clearly this effort benefited from the early participation of both the agriculture and environmental communities. The use of irrigation districts as potential brokers or aggregators also suggests how local government, private, or non-profit groups representing (and having the trust of) the agriculture community may be able to play an important role. And the involvement of the Soil Conservation Commission and NRCS was also potentially a positive given their well-known traditional non-regulatory role, their long-standing

relationship with the agriculture community, and their expertise in designing, implementing and understanding the use of BMPs.

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**e) Clean Water Services - OR - Tualatin Basin Shade Credit Temperature Trading**

**Program:**<sup>10</sup>

The Tualatin River travels some 80 miles and drains some 712 square miles in Northwestern Oregon including some of the more heavily populated areas of the State as well as some of the most productive agricultural lands. Clean Water Services (CWS), a local public wastewater utility, serves some 500,000 customers in 12 local cities (Beaverton, Tigard, Tualatin, Hillsboro, King City, Forest Grove, Sherwood, Cornelius, Banks, Gaston, Durham, and North Plains) in the Portland suburban area and manages four treatment plants subject to NPDES permit.

A new TMDL issued in 2002 substantially limited CWS pollution impacts on the Tualatin. (Chief among these was temperature, although bacteria, DO, ammonia, and phosphorus are also addressed). CWS had the option of spending about \$150 million (and substantial annual operating cost) on an effluent refrigeration system. Instead, they decided on an approach that would pay farmers (and others) to plant trees in riparian areas to cool the water naturally. They provide two agriculture-related programs:

- Enhanced Conservation Reserve Enhancement Program (ECREP) substantially adds to payment levels currently available under the existing Conservation Reserve Enhancement Program (in view of higher land costs in the area). These increased payment levels, along with strong technical assistance and suitable plant materials, are designed to provide additional inducement for farmers to participate in establishing CREP buffers of 35 feet or more.
- Vegetated Buffer Areas for Conservation and Commerce (VEGBACC) is a less generous program that does not include CREP contributions but helps farmers plant trees in riparian buffers narrower than the 35 foot minimum under the CREP program.

CWS surveyed agricultural producers and designed the programs to address the concerns that were expressed in the survey. Both programs are voluntary – with the VEGBACC program designed to provide a less remunerative option for farmers who do not wish to live with some of the restrictions of CREP. Both programs provide suitable plant materials and technical assistance. Both offer conservation easement options, if desired, and offer possible services to transfer and protect water rights.

Among the advantages of these programs and of CWS's approach is that the result is much more beneficial for the overall health of this watershed, addressing a host of additional issues beyond the water temperature limitation that initially drove its creation. Many of the indirect benefits (like habitat creation, for example) are not easily quantifiable. Rather than spending \$150 million on a refrigeration facility, since 2004, CWA has spent about \$4.3 million on all four of

its watershed programs (of which ECREP and VEGBACC are just the agriculture components), a substantial savings for ratepayers.<sup>11</sup>

Considerations:

The CWS program does not involve specific “trades” between point sources and non-point sources. Rather it is a regulated point source achieving compliance with its NPDES permit by establishing and funding a more effective voluntary, watershed-wide program designed to reduce load levels to a level that will allow it to operate. Nonetheless, it amounts largely to the same thing – providing financial and other incentives to non-point sources in exchange for their producing improved environmental quality.

From an agriculture perspective, CWS created a “souped up” version of CREP (ECREP) and a less restrictive version (VEGBACC) to interest additional farmers to participate. Until this program was in place, not one Multnomah County farmer had enrolled in CREP. There were, however, 27 ECREP projects in 2008,<sup>12</sup> testifying to the program’s ability to meet the needs of farmers. The program uses known institutions (like the soil and water conservation districts and NRCS) and piggy-backs on known programs (like CREP) to build a system with which farmers can easily interact.

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- or -

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***f) Rahr Malting Company - MN<sup>13</sup>***

The Rahr Malting Company decided to build its own, new wastewater treatment facility (with discharge into the Minnesota River) rather than continue to send its wastewater to the metropolitan facility in the local town of Shakopee, MN. Because the entire potential load for dissolved oxygen (CBOD5) and phosphorous for the Minnesota River was already allocated to the Shakopee municipal treatment plant and treatment could not reduce its pollutant discharge to zero, Rahr needed an innovative solution. The answer was a permit that conditioned Rahr’s discharge upon its reducing upstream pollution loading by an amount equal to the discharge of the new plant. Rahr created a program to fund BMPs in agricultural lands upriver, including: options reducing sheet, rill, and gully erosion and stabilization of gully and bank erosion, exclusion of livestock from streams and riparian zones, rotational grazing and wetland treatment for storm runoff. These particular BMPs were chosen because they will produce the right kind of effect, because they would be additional to what farmers were typically already doing, and because they could be easily and visually tracked and monitored and subject to contracts with Rahr.



Rahr worked with the Coalition for Clean Minnesota River (a broad-based local group) to identify potential trades. Using a ratio of two pounds reduced for each one pound credited as an offset, as of January 2002 it had exceeded its required goal of offsetting 150 pounds per day of CBOD5 (dissolved oxygen) with direct trades at four sites up the river for total offsets of 204 pounds per day.

All four of the projects that achieved these savings involved agricultural land. Two of them converted existing farmland back into floodplain by restoring vegetation and applying conservation easements. Two other project sites (on 8-Mile Creek and Rush River) appear to have worked to the advantage of the farms by stabilizing eroding stream banks – one of which was advancing toward a feedlot and barn at a rate of eight feet per year, the other of which was threatening a farmer’s house. Banks at these two sites were planted with hybrid poplar and other vegetation, re-contoured, and stabilized with root-wads and timber cribbing and cattle were fenced and excluded. Maintenance was the landowner’s responsibility under the contract with Rahr. These were direct contract transactions between Rahr and the farmers – apparently with some assistance provided by the Coalition for a Clean Minnesota River. Other than the participating farmers, it does not appear that local agriculture groups were involved.

Considerations:

Rahr’s choice of which BMP practices would be included is interesting – based in part on ease of verification and contracting (as well, of course, as ones that would produce the needed offsets). This clearly produced the type of projects that were selected – essentially riparian restoration projects rather ongoing conservation management practices continuing over time. Also, the choice of practices that were not already commonly in use in the watershed is instructive. Typically, if pollution credits earned with BMP’s are to be sold and counted in a trading scheme, they need to be “additional” to what one might expect the landowner to do without such a sale. The Rahr approach to this was fairly simple.

This example does not involve creation of a broad public program. Rather the Rahr Company program is more like a few semi-private transactions between the point source and a few farmers. The regulatory authorities were, of course, involved. It does not appear that there was any broad involvement in the design or operation of the program by the agriculture industry generally. Finally, it is to be noted that two of the four projects took land out of agriculture with restoration projects. The other two, on the other hand, appear to have helped keep land in agriculture by stabilizing eroding stream banks.

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**g) Red Barn Trading Company - PA<sup>14</sup>**

Red Barn Trading Company is a private, for-profit environmental credit trading service associated with the established Lancaster, PA agricultural consulting firm of Red Barn Consulting with an existing agricultural client base of some 500 operators. Red Barn Trading serves as a broker, working with its existing client base of farmers to help them produce credits that will be certified under the new Pennsylvania Chesapeake Bay Watershed program. In particular, Red Barn's client farmers are exporting poultry manure from Chesapeake Bay Watershed soils that are too nutrient rich out to locations where the soils are nutrient poor and can be sold with no harm to the watershed.

Among the buyers was the Township of Fairview, in York County, PA which became the first municipality in the Chesapeake Bay Watershed to meet its water quality improvement requirements entirely through water quality trading. It did so at a cost that is 75 percent less than the \$6.4 million that would have been required to upgrade its existing sewage treatment system. As aggregator, Red Barn reduces risk a municipality might face dealing directly with farmers. It establishes the relationships with farmers and takes on risk that one or more of the individual transactions with farmers may not work out. For a seller (in this case, the Township of Fairview) this then becomes a clean, trouble-free transaction with a predictable outcome and a single, large contractor. It turns out, however, that the transaction may not have been as profitable for Red Barn as hoped, so there is some question about the future for their effort.

**Considerations:**

This example illustrates the possibilities of entrepreneurship on the part of potential brokers or aggregators of pollution credits. Because of its preexisting consulting relationship with local farmers and experience, Red Barn knew it was possible to simply ship manure to an adjacent watershed in better pollution shape and sell it. Combined with what it would be paid by the municipal point source client, the transaction made sense. Other opportunities of this type may exist for private business in the future.

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**h) Southern Minnesota Beet Sugar Cooperative - MN<sup>15</sup>**

In 1999, the Southern Minnesota Beet Sugar Cooperative (SMBSC) and the Minnesota Pollution Control Agency (MPCA) announced a deal that would allow SMBSC to offset its wastewater discharge by working with farmers to implement BMPs in the watershed. The SMBSC is a farmer-owned cooperative whose members grow sugar beets in Southwestern Minnesota. The deal allowed the factory to build a new treatment plant and increase its output of sugar products by 40 percent even though no new discharge into the Minnesota River could be allowed. To avoid additional pollution load, SMBSC contracted with farmers to provide offsets, particularly

phosphorous. Environmental and river advocacy groups participated, along with SMBSC, MPCA and other affected local governments, in the design of this program.

SMBSC created a trust fund of \$300,000 to implement non-point projects. A board was created to oversee the program including SMBSC's consultant, a conservation district official, a watershed coordinator, and an environmental advocate. As a result of these transactions, SMBSC is able to discharge 5,000 pounds of phosphorous per year. In the first two years it offset these discharges by contracting with its member-growers to grow spring cover crops on about 36,000 acres upstream. BMPs authorized by the permit include cattle exclusion from streams, buffer strips, constructed wetlands, set-asides, alternative water conveyance, and cover cropping. SMBSC contracts with landowners in the Minnesota River Basin to accomplish the offsets and is required to monitor the results. Modeling formulas determine how much phosphorous is prevented from entering the river basin as a result of the practices.

In addition to the water quality benefits, some air quality benefits were also realized. The cooperative's previous practice of storing wastewater until it could be used to spray irrigate some 500 acres of alfalfa and grassland during the growing season was creating nuisance odor problems and the new facility allowed them to discontinue this practice.

Considerations:

The motivation for participation in this project is like that in the Alpine Cheese Company example (described above) but even stronger, since the NPDES permit applicant is a cooperative owned by the farmers. It appears that they were able to meet their need for BMP coverage within the ranks of their own member-farmers who would have had multiple motivations: helping their cooperative, helping their bottom line, reducing environmental worries, and good citizenship.

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***i) Chesapeake Bay Nutrient Trading – VA, MD, PA & DC<sup>16</sup>***

Virginia, Maryland, Pennsylvania, and Washington, DC came together to create the Chesapeake Bay Program which has developed guidelines for reducing nutrients in the bay. A collective cap was established on nitrogen and phosphorous with formal allocations for each state and basin. If the nutrient reduction goals are not achieved by 2010, TMDLs will be imposed. Under the guidelines, each State is to adopt its own rules and trades are likely to occur within each state, at least initially. Thus these guidelines provide a basic outline for water quality trading in a pre-TMDL situation.

The guidelines specify that the buyer should be ultimately responsible for complying with its own permit requirements, should be given time to correct for noncompliance when a seller defaults, and should be able to take legal action against the defaulting seller. Depending on the contract, a seller could potentially become liable for penalties, for the return of the trading money, and for loss of potential certification for future trades. Each State is responsible for certifying contracts.

The guidelines recommend that point source purchasers be required to do self monitoring of water quality on a monthly basis and non-point sources on a seasonal basis. Non-point monitoring should also include annual site visits to assure BMPs are still functioning, with credits calculated annually. An online trading Registry called NutrientNet may become a mechanism for identifying trading partners. (See: <http://www.nutrientnet.org>.)

There have been a number of water quality trading efforts around the Chesapeake, but without a great deal of success – mostly because the water quality limits that would drive those trades have been slow to be imposed. Chesapeake Bay trading advocates believe that developing common rules across the various states whose waters drain into the Bay will motivate polluters to reduce their discharges even before the rules require it. USDA/NRCS indicated their faith in this concept with a recent Conservation Innovation Grant of \$500,000 to support the effort in a project by several groups in the area.

Considerations:

There is some analogy between the Chesapeake Bay situation and our own Puget Sound – each is a large estuary fed by a multitude of individual rivers. While we do not have the multi-state issues for Puget Sound (we do have international impacts from Canada), the struggle to clean up the Sound still involves working in a multitude of separate watersheds and the Chesapeake Bay experience seems potentially relevant. For example, the monitoring and legal responsibility guidelines may generally suggest a minimum level of performance requirements for a trading program that we might expect in a program locally.

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***j) New York City Watershed Program - NY<sup>17</sup>***

New York City and its surrounding suburbs get their drinking water from reservoirs located further upstate in the Catskill and Delaware Watersheds. These watersheds cover some 1,900 square miles, but New York owns less than 10 percent of the land, the balance belonging to some 77,000 local and additional summer residents. There are some 350 farms in the area which represent an important economic base for the region. By 1993, it was apparent that action needed to be taken to protect the City's water supplies which had increasing evidence of

microbial contamination. It was estimated that the cost of building a water treatment facility was between \$3 and \$8 billion. Annual operating costs would be in the hundreds of millions.

Thus motivated, New York City entered into negotiations with leaders in the communities in the Watershed to develop a program that would protect the City's water supplies while also supporting and improving the quality of life in the Watershed. This resulted in a multi-part program that, among other things, includes the following:

- Full compensation is provided to agricultural landowners for implementing BMPs that protect water quality. The Watershed Agricultural Council (<http://www.nycwatershed.org/index.htm>) works with the farm community and, as of June 2000, had 318 farms in the program or over 90 percent participation.<sup>18</sup>
- A purchase of development rights program allows farmers to keep their land in agriculture in the face of considerable development pressure from recreational, retirement, and other buyers and prevents the fragmentation of the land base which would make protection of water quality impossible.
- An economic development program is provided to improve farm profitability and help farmers remain in business and on the land.
- An enhanced CREP program that pays the full cost of CREP installation and provides a bonus for signing. (Riparian practices can pay as much as 150 percent of the cost of installation.)

Considerations:

By most standards, this program has been a success with over 90 percent of the farmers implementing BMPs in the Watershed. Why?

A key consideration has to be money – with the drinking water of New York City at stake and \$3 to \$8 billion to be saved, clearly there was motivation to do this right. Still, less dramatic, but nonetheless very large savings have also been involved in other similar water quality trading programs included among the examples discussed here – but they did not necessarily produce the level of agriculture participation that occurred in the Catskill and Delaware Watershed communities.

A contributing feature of the NYC Watershed program was probably its comprehensiveness. The program deals with the direct BMPs needed to secure the needed water quality, but it also provides long-term guarantees through purchased easements assuring that land will remain in farming. This probably makes it easier for farmers to consider long-term BMP participation. At the same time, the program also greatly enhanced the payment for CREP participation. And it provides comprehensive economic development help to assure a profitable future for agriculture. All of these, taken together, have probably provided a confidence in the future needed to assure broad participation by farmers.

Finally, it clearly helps that the program can pay 100 percent (and, at times 150 percent) of the cost of BMP implementation. In many cases the actual, personal cost and effort involved in these practices probably exceeds the simple cost of initial installation. The Watershed Project had enough resources to place “cost-share” at a level that would insure broad participation by the community.

The analogy to our situation in Washington and Oregon may be imperfect. But we do have a strong desire to save our region's salmon. We also have considerable pressure to clean up Puget Sound. And our many 303(d) listed waterways and existing or likely TMDLs here would suggest that the will to make similar changes here might be possible.

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**k) Tar-Pamlico Basin - NC<sup>19</sup>**

The Tar-Pamlico is the fourth largest river basin in North Carolina and a contributor to estuaries that are a part of US EPAs National Estuary Program. The river is 180 miles long and its watershed covers 5,440 square miles and includes habitat for nine State or federally listed threatened or endangered species and two national wildlife refuges.

The Tar-Pamlico Basin Association is a group of point source dischargers in North Carolina who have a joint cap for nitrogen and phosphorous and represent some 94 percent of the point source discharge flows in the Basin. If they exceed their joint cap, they are required to pay a fixed per-kilogram price (\$29/kg in 2004) to the North Carolina Agricultural Cost Share Program (NCACSP). NCACSP then pays farmers up to 75 percent of the cost of installing BMPs that address these pollutants. Because caps were stepped down from initial levels, the Association's members have been able to reduce their discharges sufficiently without actually being required to contribute to the NCACSP. Nonetheless, they have provided \$1.4 million to NCACSP for demonstration projects, estuary nutrient modeling and trade identification, and the program is in place in case of need.

NCAVSP is a State program that provides assistance to farmers implementing BMPs – supplementing federal programs like the Environmental Quality Incentives Program (EQIP). It is administered throughout the State through the Soil & Water Conservation Districts. Completed BMPs are subject to random checks by district personnel to assure contract compliance and farmers who fail to maintain them are subject to repay some or all of the original funds. Between the start of the program in 1984 through 6/30/05, over 45,000 contracts had been approved for BMPs saving an estimated 7.2 million tons of soil.. The program is mostly supported by appropriations from the State, but supplemented by the Tar-Pamlico Basin Association's contributions, when they occur.

Considerations:

This approach really amounts to a tax on point source dischargers to the extent that they exceed their cap on pollution. It uses North Carolina conservation district infrastructure and simply pays an appropriate amount into the existing programs. One of the interesting aspects of this

(and perhaps of some of the other programs described here) is that the Tar-Pamlico Basin Association and its municipal point source members are very probably supportive of State appropriations to the NCACSP since reduced pollution in the Basin reduces the likelihood that there will be a need for them to contribute to the fund themselves.

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***l) Piasa Creek Watershed Project - IL<sup>20</sup>***

As a permit condition for the Illinois-American Water Company, the Illinois Environmental Protection Agency approved an agreement between Illinois-American and the Great Rivers Land Trust (GRLT) designed to prevent non-point sediment discharge into the Mississippi River through a combination of land acquisitions and BMPs. The Company avoided installing a costly lagoon opposed by the public and was allowed to discharge its residual back into the River.

The arrangement calls for non-point sediment reductions to be achieved through the use of such practices as stream bank stabilization, silt basins, dry dams, terraces, grassed waterways, filter strips, and grade control structures. It also involves land acquisitions by the Great Rivers Land Trust (GRLT) that were funded through the project. GRLT worked through the local county Soil & Water Conservation Districts to identify cooperating landowners and to estimate sediment reductions achieved through BMPs. Landowners are responsible for maintenance of the sediment control structures built on their land.

Considerations:

This program included the Great Rivers Land Trust as a partner because there was a fair amount of outright land acquisition involved in the program. Some land was clearly taken out of agriculture, although it is not clear how much. In some cases, however, the program simply paid for the described conservation practices, working through the local conservation districts.

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***m) Red Cedar River Nutrient Trading Pilot – City of Cumberland, WI*<sup>21</sup>**

The City of Cumberland, WI pays farmers in the Red Cedar River tributary to the Hay River to use no-till on lands that test high for phosphorous and nutrient management planning to avoid building an expensive upgrade for their sewage treatment plant. Each year they contract with about 22 farmers in the watershed and have been able to obtain 5,000 pounds of phosphorous credit, allowing them to avoid the upgrade. The Barron County Land Conservation Department serves as liaison with the farmers and verifies the BMPs for the program.

The Red Cedar Watershed drains 1,800 square miles and 93 percent of the phosphorous in the watershed comes from non-point sources. There are 18 municipalities in the watershed contributing point source pollution.

The program pays \$18.50 per acre for no-till, and \$15.00 per acre for conservation tillage. No-till is credited with three tons of soil saved per acre and conservation tillage with two tons saved per acre. Each ton saved is credited for four pounds of phosphorous reduction. Farmers sign up for three years and are responsible for completion of their contracts – but they do not receive payment until it has been verified that the practice has been implemented. Cumberland can cease trading at any time if it installs appropriate phosphorous removal equipment.

***Considerations:***

This program depended on the Land Conservation Department, which was a credible contact for the farmers in the region. It also established a clear, per-acre price to be paid for a very specific, well understood, and easily verifiable BMP.

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***n) Previous water quality trading pilot efforts in Washington State*<sup>22</sup>**

(1) Chehalis River: The Chehalis River was considered for a trading program, but later rejected. The allocated contribution by non-point sources on the Chehalis River above the Skookumchuck



was zero and all of the potential point source purchasers and the sections of the river with the least assimilative capacity were above the Skookumchuck, so any trades would have resulted in unacceptable levels of pollutants in this river section. Thus, a trading program was determined not to be feasible in 1996.

(2) Puyallup River: A study was also completed for a project on the Puyallup based on biochemical oxygen demand and ammonia. Two point sources would have qualified for permit modification for point source to point source trading, but the economic needs of the point sources changed and no trades occurred. It is not clear that point to non-point trading was seriously involved in this study.

(3) Yakima River: The Yakima River TMDL apparently set attainment targets rather than load allocations on the Yakima River, thus making it difficult for individual point-sources to identify cost savings and benefits. So, while the Yakima does seem like a reasonable prospect for water quality trading, what has emerged is a water (quantity) trading network called the Yakima Water Exchange. Advocates claim the same network could be used to address water quality, but the primary mission is facilitation of exchanges of water and water rights in the Yakima Basin among willing participants. Trading is not necessarily focused on trading for purposes of water quality.

(4) Spokane River: In September 2005, Ross & Associates Environmental Consulting prepared a report for US EPA to assess the appropriateness of the Spokane River Watershed for water quality trading for phosphorous. Their conclusion was that it appeared that trading with non-point sources of phosphorous in the watershed appeared viable, but that, among other things, trading would depend upon real controls being implemented that required the reductions for the point sources in the watershed. As of the date of this writing, it does not appear that any trades have taken place – possibly because TMDL limits on the Spokane River are not stringent enough to require point sources to trade.

Considerations:

The Washington Department of Ecology is seeking a candidate site for a water quality trading demonstration project. But the above three Washington examples suggest that not just any site will do. On the Chehalis, the locations of the potential point and non-point participants proved unworkable. On the Puyallup, point sources to point source trades were apparently the extent of the interest. And on the Yakima, the interest was limited to water rights trading and transfers. For these transactions to work in each individual watershed, the physical, economic, and community interest issues need to come together in the right way, in each particular watershed under consideration. And, of course, for the Spokane, until there are sufficiently restrictive cap requirements in place, point sources will have little motivation to trade.

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## **APPENDIX B ENDNOTES**

<sup>1</sup> Materials for this section came from: a) The website of the Miami Conservancy District's Water Quality Credit Trading Program: [http://www.miamiconservancy.org/water/quality\\_credit.asp](http://www.miamiconservancy.org/water/quality_credit.asp), and the links there provided; b) "Water Quality Trading and Offset Initiatives in the US: A Comprehensive Survey," Breetz, Vanden, Garzon, Jacobs, Kroetz, & Terry (Dartmouth College Hanover, New Hampshire, 8/5/04) and available on line at: <http://www.dartmouth.edu/~kfv/waterqualitytradingdatabase.pdf>; and, c) "Preliminary Economic Analysis of Water Quality Trading Opportunities in the Great Miami River Watershed, Ohio," (Kieiser & Assoc., 6/23/04) on line at: [http://www.envtn.org/docs/Great-Miami\\_Trading\\_Analysis.pdf](http://www.envtn.org/docs/Great-Miami_Trading_Analysis.pdf).

<sup>2</sup> Personal communication with Brian Bandt, Director with American Farmland Trust's Agricultural Conservation Innovation Center: <http://www.farmland.org/resources/innovation/default.aspx> who has been involved with development of this program.

<sup>3</sup> Materials for this section were based upon an 8/24/06 PowerPoint presentation by Richard Moore of the Dept. of Human and Community Resource Development at Oregon State University to be found on line at: [http://www.envtn.org/ETN\\_workshop/Presentations/Microsoft%20PowerPoint%20-%20Alpine\\_ETN\\_8\\_24\\_06\\_Moore.pdf](http://www.envtn.org/ETN_workshop/Presentations/Microsoft%20PowerPoint%20-%20Alpine_ETN_8_24_06_Moore.pdf) and "A Plan to Reduce Phosphorous Loading and Improve Stream Ecological Function in the Middle Fork and Adjoining Watersheds of the Sugar Creek Watershed" (1/1/06) to be found on line at:

[http://www.epa.state.oh.us/dsw/WQ\\_trading/alpine%20cheese%20trading%20plan%201%201%2006.pdf](http://www.epa.state.oh.us/dsw/WQ_trading/alpine%20cheese%20trading%20plan%201%201%2006.pdf)

<sup>4</sup> Materials for this section were based upon: a) Material at the Michigan Department of Environmental Quality website at: [http://www.michigan.gov/deq/0,1607,7-135-3313\\_3682\\_3719-14305--,00.html](http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3719-14305--,00.html); b) A report "Kalamazoo Water Quality Trading Demonstration Project" (Kieiser & Associates) at the Environmental Trading Network website at: <http://www.envtn.org/wqt/programs/kazoo.htm>, and c) "Water Quality Trading and Offset Initiatives in the US: A Comprehensive Survey," Breetz, Vanden, Garzon, Jacobs, Kroetz, & Terry (Dartmouth College Hanover, New Hampshire, 8/5/04) and available on line at: <http://www.dartmouth.edu/~kfv/waterqualitytradingdatabase.pdf>.

<sup>5</sup> See: "Kalamazoo Water Quality Trading Demonstration Project" (Kieiser & Associates) at the Environmental Trading Network website at: <http://www.envtn.org/wqt/programs/kazoo.htm> pg. 8.

<sup>6</sup> Id. At p.10

<sup>7</sup> Materials for this section were based upon: a) "Lower Boise River Effluent Trading Demonstration Project: Summary of Participant Recommendations For a Trading Framework" (Ross & Assoc. Sept. 2000) found at the EPA website at:

[http://yosemite.epa.gov/r10/oi.nsf/Webpage/Lower+Boise+River+Effluent+Trading+Demonstration+Project/\\$FILE/summary.pdf](http://yosemite.epa.gov/r10/oi.nsf/Webpage/Lower+Boise+River+Effluent+Trading+Demonstration+Project/$FILE/summary.pdf), and b) "Water Quality Trading and Offset Initiatives in the US: A Comprehensive Survey," Breetz, Vanden, Garzon, Jacobs, Kroetz, & Terry (Dartmouth College Hanover, New Hampshire, 8/5/04) and available on line at: <http://www.dartmouth.edu/~kfv/waterqualitytradingdatabase.pdf>.

<sup>8</sup> "Water Quality Trading in the United States, (June, 2005), Cynthia Morgan and Ann Wolverton Working Paper # 05-07, accessible through USEPA site at:

<http://yosemite.epa.gov/ee/epa/eed.nsf/WPNumberNew/2005-07>.

<sup>9</sup> See: "Pollutant Trading in Idaho: A Step-by-Step Agricultural Community Guidebook" to be found on line at: [http://www.deq.state.id.us/water/prog\\_issues/waste\\_water/pollutant\\_trading/index.cfm](http://www.deq.state.id.us/water/prog_issues/waste_water/pollutant_trading/index.cfm).

<sup>10</sup> Materials in this section are based upon: a) "Watershed-based Permitting Case Study: Tualatin River Watershed, Oregon" (EPA 2007) on line at: [http://www.epa.gov/npdes/pubs/wq\\_casestudy\\_factsht4.pdf](http://www.epa.gov/npdes/pubs/wq_casestudy_factsht4.pdf); b) Clean Water Services, "Sustainable Integrated Watershed Management in the Tualatin Basin", 2008; and, c) West Multnomah Soil & Water Conservation District website at: <http://www.westmultconserv.org/swcd/index.php?id=183>

<sup>11</sup> For a map and details on projects in the Tualatin Basin, see the CWS website at:

<http://www.cleanwaterservices.org/PlansAndProjects/Projects/default.aspx>.

<sup>12</sup> Personal communication between Bobby Cochran, Environmental Marketplace Analyst for Clean Water Services, May 12, 2008 with Catherine Bombico of Evergreen Funding Consultants.

<sup>13</sup> Materials for this section were based upon: a) "Pollutant Trading to Improve Riparian Habitats" (Stormwater, SW Jan./Feb. 2006), see: [http://www.gradingandexcavation.com/sw\\_0601\\_pollutant.html](http://www.gradingandexcavation.com/sw_0601_pollutant.html); b) Rahr Malting Company "trading" permit – MPCA Fact Sheet (1997) at: <http://www.pca.state.mn.us/water/pubs/rahrtrad.pdf>; and, c) "Water Quality Trading and Offset Initiatives in the US: A Comprehensive Survey," Breetz, Vanden, Garzon, Jacobs, Kroetz, & Terry (Dartmouth College Hanover, New Hampshire, 8/5/04) and available on line at:

<http://www.dartmouth.edu/~kfv/waterqualitytradingdatabase.pdf>

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<sup>14</sup> Materials in this section based on the Red Barn Trading Company website at: <http://www.redbartrading.com/index.html> and on two Katoomba Group Ecosystem Marketplace website articles: “U.S. WQT: Growing Pains and Evolving Drivers” at: [http://ecosystemmarketplace.com/pages/article.news.php?component\\_id=5796&component\\_version\\_id=8501&language\\_id=12](http://ecosystemmarketplace.com/pages/article.news.php?component_id=5796&component_version_id=8501&language_id=12), and: “Pennsylvania Water Deal: Blip or Boom?” at: [http://ecosystemmarketplace.com/pages/article.news.php?component\\_id=5905&component\\_version\\_id=8654&language\\_id=12](http://ecosystemmarketplace.com/pages/article.news.php?component_id=5905&component_version_id=8654&language_id=12).

<sup>15</sup> Materials for this section were based upon: “Water Quality Trading and Offset Initiatives in the US: A Comprehensive Survey,” Breetz, Vanden, Garzon, Jacobs, Kroetz, & Terry (Dartmouth College Hanover, New Hampshire, 8/5/04) and available on line at: <http://www.dartmouth.edu/~kfv/waterqualitytradingdatabase.pdf>; and, News Release from Minnesota Pollution Control Agency (5/12/99) at: <http://www.pca.state.mn.us/news/may99/nr51299.html>.

<sup>16</sup> Materials for this section were based upon: a) “Water Quality Trading and Offset Initiatives in the US: A Comprehensive Survey,” Breetz, Vanden, Garzon, Jacobs, Kroetz, & Terry (Dartmouth College Hanover, New Hampshire, 8/5/04) and available on line at: <http://www.dartmouth.edu/~kfv/waterqualitytradingdatabase.pdf>; b) The Chesapeake Bay Program website at: <http://www.pca.state.mn.us/news/may99/nr51299.html>; c) Katoomba Group Ecosystem Marketplace news “Chesapeake Bay Water Scheme Gains Traction” Steve Zwick, (6/25/08) at: [http://ecosystemmarketplace.com/pages/article.news.php?component\\_id=5921&component\\_version\\_id=8744&language\\_id=12](http://ecosystemmarketplace.com/pages/article.news.php?component_id=5921&component_version_id=8744&language_id=12).

<sup>17</sup> Materials for this section were based upon: a) “Water Quality Trading and Offset Initiatives in the US: A Comprehensive Survey,” Breetz, Vanden, Garzon, Jacobs, Kroetz, & Terry (Dartmouth College Hanover, New Hampshire, 8/5/04) and available on line at: <http://www.dartmouth.edu/~kfv/waterqualitytradingdatabase.pdf> b) The New York City Watershed Agricultural Council website at: <http://www.nycwatershed.org>; c) “Watershed Progress: New York City Watershed Agreement,” a description of the project at the EPA website at: <http://www.epa.gov/OWOW/watershed/ny/nycityfi.html>.

<sup>18</sup> Personal communication with Watershed Council Chair, Dick Combe.

<sup>19</sup> Materials for this section were based upon: a) “Water Quality Trading and Offset Initiatives in the US: A Comprehensive Survey,” Breetz, Vanden, Garzon, Jacobs, Kroetz, & Terry (Dartmouth College Hanover, New Hampshire, 8/5/04) and available on line at: <http://www.dartmouth.edu/~kfv/waterqualitytradingdatabase.pdf>; b) North Carolina Agricultural Cost Share Program described at: <http://www.enr.state.nc.us/dswc/pages/agcostshareprogram.html>; c) “Tar-Pamlico River Basin Nutrient Reduction Trading Program” article on the NC Division of Soil & Water Conservation website at: <http://www.enr.state.nc.us/dswc/pages/tar-pamlico.html>.

<sup>20</sup> Materials for this section were based upon: a) “Water Quality Trading and Offset Initiatives in the US: A Comprehensive Survey,” Breetz, Vanden, Garzon, Jacobs, Kroetz, & Terry (Dartmouth College Hanover, New Hampshire, 8/5/04) pg. 110, available on line at: <http://www.dartmouth.edu/~kfv/waterqualitytradingdatabase.pdf>; b) See also the website of the Great Rivers Land Trust: [http://www.greatriverslandtrust.com/fall\\_2001.htm](http://www.greatriverslandtrust.com/fall_2001.htm).

<sup>21</sup> Materials for this section were based upon: a) “Water Quality Trading and Offset Initiatives in the US: A Comprehensive Survey,” Breetz, Vanden, Garzon, Jacobs, Kroetz, & Terry (Dartmouth College Hanover, New Hampshire, 8/5/04) pg. 110, available on line at: <http://www.dartmouth.edu/~kfv/waterqualitytradingdatabase.pdf>; b) City of Cumberland, WI Report and memo from Barron County Soil and Water Conservation Department found at: [http://www.dnr.state.wi.us/runoff/pt/cumberland\\_pt\\_report.pdf](http://www.dnr.state.wi.us/runoff/pt/cumberland_pt_report.pdf); c) Katoomba Group Ecosystem Marketplace website at: [http://ecosystemmarketplace.com/pages/marketwatch.transaction.other.php?component\\_id=1926&component\\_version\\_id=3050&language\\_id=12](http://ecosystemmarketplace.com/pages/marketwatch.transaction.other.php?component_id=1926&component_version_id=3050&language_id=12).

<sup>22</sup> Materials for this section were based upon: a) “Water Quality Trading and Offset Initiatives in the US: A Comprehensive Survey,” Breetz, Vanden, Garzon, Jacobs, Kroetz, & Terry (Dartmouth College Hanover, New Hampshire, 8/5/04) pg. 332-334, on line at: <http://www.dartmouth.edu/~kfv/waterqualitytradingdatabase.pdf>. For the Puyallup, see also: Agreement on the allocation of the Puyallup River TMDL at: [http://www.ecy.wa.gov/programs/wq/tmdl/puyallup/puy\\_bod\\_allo.pdf](http://www.ecy.wa.gov/programs/wq/tmdl/puyallup/puy_bod_allo.pdf). For the Yakima, see also the Yakima Water Exchange website at: <http://www.roundtableassociates.com/ywe/ywe.htm>, and see the Yakima River Water Bank Project – summary at: <http://www.roundtableassociates.com/ywe/Bank%20Documents/Summary%20Yakima%20water%20bank%20accomplishments1.pdf>. The Ross & Associates report for the Spokane River is at: [http://www.client-ross.com/spokane-river/docs/Spokane%20River%20Trading%20Analysis\\_Final%20Report.pdf](http://www.client-ross.com/spokane-river/docs/Spokane%20River%20Trading%20Analysis_Final%20Report.pdf).

## APPENDIX C

### **Models for wetland and aquatic resource mitigation markets and agriculture**

With large sums of money currently being spent by transportation, housing, commercial, and other developers on various kinds of environmental mitigation,<sup>1</sup> it is worth considering how (or if) wetland and other mitigation funding might help create an open, viable, conservation services market in which agricultural producers could participate and to which the environmental services they can provide could contribute.

The programs and “markets” described below are structured in various ways. Some have occurred through mitigation banks, some through government in-lieu fee programs, and some by way of direct trades or other programs. Funding for them is, for the most part, grounded in public demand that we stop the loss of wetlands and aquatic resources and the implementation of that demand through the Clean Water Act and similar laws. Wetland mitigation, because of its current requirement for acre-for-acre replacement leaves limited opportunities for agriculture. So not all of these examples clearly involve agriculture – but there may be lessons to be learned for such involvement:

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#### ***a) Montana Wetland Legacy program and In-Lieu-Fee program - MT*<sup>2</sup>**

As its name suggests, the goal of the Montana Wetlands Legacy (MWL) program is the protection, restoration and enhancement of wetlands. MWL is a program managed by the Montana Department of Fish, Wildlife and Parks. In coordination with the wetlands protection effort, however, MWL also has other funding with which it works broadly across the landscape to assure that lands surrounding those wetlands are also healthy – including working with local farmers and ranchers using surrounding watershed lands. Some 800,000 acres of surrounding watershed lands have been protected or improved through use of leases, easements, cooperative agreements, and fee acquisition. Some examples of particular interest to agriculture include:

- a. **Gordon Ranch**: To help protect the large areas of prairie grasslands needed for key species of prairie-dependant wildlife, MWL entered into a 15,000-acre conservation easement with the Gordon Cattle Company. This protects the large areas needed as well as some 400 acres of wetlands included in the easement. Under the easement, the Gordon family will continue with their traditional grazing management of the ranch.
- b. **McMaster Ranch**: MWL participated in the outright acquisition by BLM of the 5,636 acre McMaster Ranch. The conservation motive was the protection of fish and wildlife habitat on the Ranch. Additionally, however, the BLM will now maintain a federally managed grass bank on the property that will provide a cattle grazing alternative for area ranchers using the public lands and improve grazing management on public leases in the Elkhorn Mountains.
- c. **Granger Ranch**: Motivated by a desire to protect and restore a large wetland at the headwaters of O’Dell Creek, MWL is developing a conservation easement with the Granger Ranch, a Montana cattle operation that has been in the same family for five

generations. The Granger easement will also facilitate continuation of livestock production and other traditional agricultural uses on the ranch.

- d. Ward Ranchland Exchange: When the Ward family found it necessary to place their 2,200 acre ranch on the shore of Hauser Lake, near Helena, MT, on the market, MWL participated in a multi-party transaction that involve BLM, The Conservation Fund, several local ranchers, and the Ward family. BLM acquired the Ward property which had high conservation values. But in exchange, and to pay for the acquisition, BLM sold several smaller parcels that were already in public ownership to several private ranchers – usually to ranches that had grazing leases on the lands. The result for local agriculture was no net increase in public ownership and no net loss of agricultural land, while several farmers in the area got the chance to acquire range properties important to their operations.

MWL is funded through several sources, one of which is the Montana In-Lieu-Fee Aquatic Resource Mitigation Program (ILF Program) resulting from an agreement with agencies of the State of Montana and the U.S. Corps of Engineers (which oversees the national no-net-loss of wetlands policy). The goal of this agreement was:

“ . . . to establish an additional voluntary mechanism to compensate for aquatic resource impacts and losses resulting from regulated activities in Montana and to provide greater flexibility for project mitigation to permittees.”

Under the agreement, the In-Lieu-Fee option is only made available to permittees after avoidance and minimization of wetland impacts have been accomplished and when there is no practical opportunity for on-site compensatory mitigation or when in-lieu-fee is environmentally preferable to on-site compensatory mitigation. The agreement specifies that In-Lieu-Fee funds must be used for:

“ . . . activities directly related to physical aquatic habitat and resource establishment, restoration, enhancement, and protection to include the following: land acquisition, purchase of permanent easements, purchase of water rights, in-stream flow leasing, development of mitigation and monitoring plans, permit fees, implementation of physical mitigation and monitoring, administrative costs, and long -term management of mitigation parcels.”<sup>3</sup>

Funds must be spent in the watershed in which they were generated and based on priority watershed needs determined by the In-Lieu-Fee committee, which reviews and recommends projects on a case-by-case basis. And the protection of sites funded through In-Lieu-Fee compensatory mitigation funds must be permanent.

#### Considerations:

The Montana In-Lieu-Fee program, together with its funding for the Montana Wetlands Legacy program – particularly as it plays out for agriculture – illustrates opportunities and limitations in the possible use of in-lieu-fees. Simply paying a fee – even a rather substantial one – can often be preferred by a developer over being responsible for creating and shepherding the performance of a compensatory wetland. On the other hand, as the agreement with the Corps of Engineers illustrates, there is natural concern that the environmental damage that is done by the development actually get replaced and ultimately functions as well as what was destroyed. So the agreement with the Corps of Engineers is fairly specific about how these funds will be spent.

Even so, however, the agreement also provides the In-Lieu-Fee program with some latitude to use various funds in ways that result in the broad protection of aquatic resources – using a variety of tools. The program, taken as a whole, does provide some clear benefit to agricultural landowners. It is not yet clear the extent to which arrangements of this kind may be able to free up, at least to a limited degree, some of the current spending that is now largely required to be simple acre-for-acre wetland replacement – but any such “freeing up” is certain to be controversial and, at times, simply not lawful under §404 the Clean Water Act.

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***b) Kentucky Wetland and Stream Mitigation Fund - KY<sup>4</sup>***

Kentucky has had an in-lieu fee mitigation program since 1998, but in 2000, the State of Kentucky specifically created the “Kentucky Wetland and Stream Mitigation Fund” designed to use moneys resulting from permit requirements arising out of environmental concerns – particularly wetland mitigation. Because the funding source requires that it be spent for aquatic resource mitigation, the projects funded are also so limited, to: “restoring, creating, enhancing, or preserving the Commonwealth’s wetlands or streams . . .” The program works mostly with private landowners on in-stream or riparian projects. All projects must be protected by easements or ownership along the stream and riparian corridor. This program has become substitute for mitigation banks in Kentucky, since it has few mitigation banks banking acquisitions in anticipation of future need. The plan is to have a mitigation bank available in each of the major watersheds in the State. The primary driver behind the program is the Kentucky Department of Transportation which has a powerful need to efficiently mitigate the impacts of its projects.

Considerations:

It appears that some of the Kentucky “mitigation bank” projects funded by this program occurred on agricultural lands.<sup>5</sup> The mitigation projects they are undertaking seem to include both wetlands and stream restoration/protection. This does include stabilization and replanting of eroding and degraded riparian zones that could help stabilize adjacent agricultural fields. They also insist on permanent protection of the restored area with outright purchase or an easement for a distance of at least 25 feet and preferably 50 feet both sides, which could take meaningful amounts of land out of agriculture. However, funding through this program would potentially match and combine with other funding sources that could provide additional upland benefit through the use of traditional BMPs and potentially through the use of purchased development rights. Since this program is largely funded by funds from aquatic mitigation sources, the program’s expenditures seem pretty limited to the purpose stated.

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c) ***North Carolina Ecosystem Enhancement Program - NC<sup>6</sup>***

North Carolina's Ecosystem Enhancement Program is a broad partnership between agencies, interests, and developers to create a comprehensive one-stop fee-in lieu site for environmental mitigation needs of all types in the State. The mission is broad:

“. . . restore, enhance, preserve, and protect the functions associated with wetlands, streams and riparian areas, including but not limited to those necessary for the restoration, maintenance and protection of water quality and riparian habitats throughout North Carolina.”

In accomplishing this mission, the program incorporates four in-lieu fee programs:

1. A “Stream and Wetland” in-lieu fee program,
2. A “Riparian Buffer Mitigation” in-lieu fee program,
3. A “North Carolina Department of Transportation Stream and Wetland” in-lieu fee program, and
4. A “Nutrient Offset” in-lieu fee program.

The overall focus of the program is on wetlands and riparian function. And the program requires, before any work will be done in a wetland or riparian restoration project, that the property be either owned outright by the State or the landowner provides a perpetual conservation easement covering the area of the restoration action. Project work is paid for by the program and easements (or acquisitions) are purchased at fair market value.

The Nutrient Offset program is actually administered by the North Carolina Dept. of Environment and Natural Resources Division of Water Quality which, among other things, pays farmers to implement appropriate BMPs to accomplish the needed nutrient reductions required. This program only applies in the Neuse and the Tar Rivers. It also appears that the Ecosystem Enhancement Program also completes wetland and riparian projects (using easements, etc. as described above).

Considerations:

The North Carolina approach incorporates a broad partnership to draw most environmental mitigation funding into a single agency that can then plan on a watershed basis and achieve the most targeted, strategic restoration projects in providing mitigation. The key limitation is that its focus on riparian and wetland mitigation and requirements of acquisition or easement limit the program's utility for agriculture, with the exception of the Nutrient Offset program. So, for farmers disinclined to the use of easements and without riparian or wetland properties to protect or improve, the program has limited application outside the Tar and Neuse River basins.

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d) **In-lieu fee Aquatic Resource Mitigation Fund - NH**<sup>7</sup>

New Hampshire has adopted an in-lieu fee “Aquatic Resource Mitigation” (ARM) fund. The fund is used when regulation requires a developer to perform compensatory mitigation but such mitigation is not practicable – usually because the project is a small one that would have difficulty finding an appropriate site. The developer is instead allowed to pay an in-lieu fee to the fund which takes on responsibility for replacing the functions and values that have been damaged.

An evaluation of the damaged aquatic resources is performed to determine the functions and values that have been lost – called a “functional assessment.” According to the ARM press release announcing adoption of rules in 2006: “By pooling funds from many projects, the ARM fund has the potential for long term environmental results from wetland mitigation that considers watershed goals . . .” The State pools the funds collected and then, based on appropriate watershed priorities, funds conservation in the watershed that is seen as most important and strategic.

New Hampshire’s rules define “compensatory mitigation” somewhat broadly. Env-Wt 101.17: “Compensatory mitigation” means creation of a new wetland, restoration of a wetland, or preservation of land to offset the impact of a project by replacing or partially replacing wetlands functions and values lost due to the project, or by substituting the value added to a wetland or wetland system for the functions or values lost.”

Landowners can apply to the ARM fund to have a wetland replacement project completed on their land. The general compensatory mitigation program does include the acquisition of easements on buffers on uplands to prevent development that would compromise the wetland.

Considerations:

This program may be typical. It seems clear that projects completed will be (as they must) focused on wetland function replacement. But among the projects allowed for wetland mitigation are those that involve conservation of undeveloped uplands with conservation easements that will protect the function of the actual wetland. And a broad definition of “compensatory mitigation” may leave open the possibility of the use of these services being provided on traditional agricultural lands. Since this program is for small parcels (presumably ones that are beneath the Corps of Engineers jurisdiction).



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***e) Oregon Department of State Lands in-lieu fee program - OR<sup>8</sup>***

Oregon has a wetland mitigation in-lieu fee program for small projects that do not fit the Corps of Engineers requirements. The program will only pay for actual creation, restoration, or enhancement of wetlands. Properties involved are required to be protected by perpetual easement. Other property acquisitions or easements are not allowed unless they are closely associated with an actual creation, restoration, or enhancement of a wetland. The goal of the program is to use in-lieu fee funds from small projects to replace those losses with more larger and more effective sites at appropriate locations.

On January 4, 2008, Oregon reported interagency recommendations on the use of in-lieu fee funding for all types of projects.<sup>9</sup> The interagency recommendations call for scrupulous use of funds to serve the purpose for which they are intended, but encourage purposeful leveraging of various sources of funds to achieve ecological gains. Funds for wetland mitigation could be used, for example, in conjunction with other, non-wetland funds where both together achieve an optimal outcome.

Considerations:

Oregon's program illustrates the limitations of current wetland funding – when the loss is clearly a wetland loss, the funds will be clearly designated for wetland replacement, not separated into environmental functions that could readily be supplied by most farmers.

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***f) State department of transportation programs:***

One of the biggest needs for mitigation arises out of the many state highway projects under constant construction nationwide. In response to this need, state highway departments have become very creative and determined to produce the wetland mitigation they need. The Federal Highway Administration provides a complete, on line, catalogue of these programs.<sup>10</sup> Informational contact would be with the individual state highway program listed. For the most part, these programs currently offer little opportunity for agriculture.

## APPENDIX C ENDNOTES

<sup>1</sup> An estimated \$350 million is spent annually on environmental mitigation just on public transportation projects in the Puget Sound Basin alone. Ibid, note 9.

<sup>2</sup> See generally, Montana Wetlands Legacy website at: <http://www.wetlandslegacy.org/index.html>. See specifically the Gordon Cattle Company Conservation Easement project at: <http://www.wetlandslegacy.org/gordon.html>; Public-Private Partnership: Protects Historic Working Ranchland, Wildlife Habitat, & Recreation Areas in Western Montana, found at: <http://www.wetlandslegacy.org/public-private.html>; Odell Creek Headwaters Wetland & Conservation Easement Project, at: <http://www.wetlandslegacy.org/odell-creek.html>; Ward Ranchland Exchange, at: <http://www.wetlandslegacy.org/ward-ranch.html>; and materials on Montana's In-Lieu-Fee Aquatic Resources Mitigation Program. See explanation at: <http://www.wetlandslegacy.org/inlieunext.html>. And see the Montana In-Lieu-Fee Program agreement at: <https://www.nwo.usace.army.mil/html/od-rmt/pn/ilfdraftmoa.pdf>.

<sup>3</sup> This language seems pretty typical of most such agreements. See: "The Status and Character of In-Lieu-Fee Mitigation in the United States" (Environmental Law Institute, June 2006) pg. 31-32. This report can be downloaded for free from the ELI website at: [http://www.elistore.org/reports\\_detail.asp?ID=11151](http://www.elistore.org/reports_detail.asp?ID=11151).

<sup>4</sup> "The Status and Character of In-Lieu-Fee Mitigation in the United States" (Environmental Law Institute, June 2006) pg. 31-32. This report can be downloaded for free from the ELI website at: [http://www.elistore.org/reports\\_detail.asp?ID=11151](http://www.elistore.org/reports_detail.asp?ID=11151); "Kentucky Department of Fish and Wildlife Resources' In-lieu Fee Program for Stream and Wetland Mitigation," at <http://www.watersheds.ky.gov/NR/rdonlyres/CB4CDD7D-DA51-4DD8-A2A8-2ABE1EB7649C/0/KentuckyDepartmentofFishandWildlifeResources.doc>; The Kentucky Department of Fish and Wildlife Resources Stream and Wetland Restoration Program at: <http://www.kdfwr.state.ky.us/streamandwetlandrestoration.asp?lid=1928&NavPath=C101C552C639>; Mill Branch Stream Restoration Project, NRCS web pages at: <http://www.ky.nrcs.usda.gov/news/BlacksideDACE.html>; Kentucky's Fees In-Lieu of (Mitigation) Programs, PPT presentation by Jennifer Garland, (11/17-18/05) at: <http://www.water.ky.gov/NR/rdonlyres/4F3553D9-E6CB-4DE8-AB5C-AEB467E1BBB9/0/404FILO.ppt>; and, Kentucky Wetland and Stream mitigation fund project descriptions in Federal Highway Administration website at: <http://www.fhwa.dot.gov/environment/wetland/scanrpt/ky.htm>.

<sup>5</sup> Kentucky Wetland and Stream mitigation fund project descriptions in Federal Highway Administration website at: <http://www.fhwa.dot.gov/environment/wetland/scanrpt/ky.htm>, Pg. 3.

<sup>6</sup> See the description of North Carolina's Ecosystem Enhancement Program – particularly their in-lieu fee component. <http://www.nceep.net/pages/mitigate.htm> and linked pages. Also see paper "Applying Lessons Learned from Wetlands Mitigation Banking to Water Quality Trading" pp. 24-25, (Abt Associates, 2/28/05) on line at: [http://www.abtassociates.com/reports/WQT\\_Lessons\\_from\\_Wetlands\\_Mitigation\\_Banking.pdf](http://www.abtassociates.com/reports/WQT_Lessons_from_Wetlands_Mitigation_Banking.pdf). Also see 9/11/2008. See NC DENR Division of Water Quality Non-point Source Management Program website at: <http://h2o.enr.state.nc.us/nps/whatisnps.htm>. Finally, see the MOU with the Corps of Engineers that creates the program at: [http://www.nceep.net/images/WRP\\_MOU.pdf](http://www.nceep.net/images/WRP_MOU.pdf).

<sup>7</sup> See: New Hampshire "Environmental Fact Sheet" on Aquatic Resource Mitigation (2008) at: <http://des.nh.gov/organization/commissioner/pip/factsheets/wet/documents/wb-17.pdf>, New Hampshire DES adopts new environmental mitigation rules – press release (12/14/06) at: <http://des.nh.gov/media/pr/documents/061214.pdf>, and NH Compensatory Mitigation Information and Checklist at: <http://des.nh.gov/organization/commissioner/pip/factsheets/wet/documents/wb-16.pdf>. Also see the regulations for the program at: PART Env-Wt 807 .01 – 19 on line at: <http://des.nh.gov/organization/commissioner/legal/rules/documents/env-wt100-800.pdf>.

<sup>8</sup> The Oregon Department of State Lands payment in lieu wetland grant program described at: <http://www.oregon.gov/DSL/PERMITS/pil.shtml>, and associated links.

<sup>9</sup> See: "Pubic Funds to Restore, Enhance, and Protect Wetland and At-Risk, Threatened and Endangered Species Habitats: Appropriate Uses of these funds in Species and Wetland Mitigation Projects" (Interagency report January 4, 2008) at: <http://www.fws.gov/oregonfo/LandAndWater/Documents/PublicFunding-final.pdf>

<sup>10</sup> See the Federal Highway Administration's list of domestic state highway department wetland programs at: <http://www.fhwa.dot.gov/environment/wetland/scanrpt/index.htm>.

## APPENDIX D

### Models for habitat mitigation markets and agriculture

The demand for environmental mitigation does not end with wetlands replacement. Damage to other kinds of environmental values can call for mitigation as well – most notably when that damage occurs to a clearly identified and limited habitat for wildlife that may go beyond wetlands.

Again, these “markets” are structured in various ways. But in this case, their funding is grounded in public demand that we protect wildlife, especially endangered wildlife. Implementation of that demand is through various state and federal laws, most notably through the Endangered Species Act.<sup>1</sup> Note that the agriculture examples typically involve some kind of easement.

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- ***Hickory Pass Ranch - TX<sup>2</sup>***

The Johnston family of Hickory Pass Ranch faced a struggle to remain economically viable and pass their land on to future generations. The ranch is located in the Hill Country, near Austin, Texas. In addition to supporting a 3,000 acre cattle operation, the Ranch is also excellent habitat for the endangered golden-cheeked warbler and so of considerable interest to the U.S. Fish and Wildlife Service. Unfortunately, the Service did not have the funds to buy the property and the Johnston’s didn’t want to sell – preferring that it stay in ranching and pass intact to their three daughters.

Rather than selling the property, the landowner entered into a conservation easement and committed to using standard stewardship management practices. In exchange, U.S. Fish & Wildlife Service will certify the creation of “conservation credits” that can be sold to businesses, developers, and local governments that need to mitigate their impacts on other habitat areas in the region. A draft Regional Habitat Conservation Plan for Williamson County, TX, indicates that the Johnston family may receive payments for these credits through the HCP alone amounting to some \$7 million over the next few years. In addition, it appears the bank received payments for adverse impacts of a key state highway, a major county road, and a private development.

#### Considerations:

The Hickory Pass Ranch case illustrates the possibility for a win-win that can help keep farms in profitable private ownership while also serving environmental needs. Had the U.S. Fish & Wildlife Service had the money, and had the landowner been inclined, this long-standing family ranching operation could have ended up in public ownership. Instead, using a conservation marketplace, it remained in private agriculture. Apparently the management required is somewhat detailed, but the landowner is receiving substantial payment – hopefully in amounts that are worth the effort. This is also an illustration of how an operating agricultural operation can itself potentially become a conservation bank.

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• **Gordon Dairy – Grays Harbor County, WA**<sup>3</sup>

Jay Gordon, the highly respected Executive Director of the Washington State Dairy Federation, is himself operator of a multi-generational family dairy farm near Elma WA. A small patch of the Gordon farm turned out to be a critical habitat area for migratory trumpeter swans whose numbers have been in decline and whose habitat had been affected by removal of dams on the Elwha River which drains out of the Olympic National Park into the Strait of Juan de Fuca along the North shore of Washington’s Olympic Peninsula. Working with the Trumpeter Swan Society and using dam removal mitigation funding from the National Parks Foundation, the Gordon family sold a 55-acre easement on the key property. The easement basically requires that the land continue to be managed for sustainable livestock grazing in the same way the family had been doing as long as they had been in operation.

Payment for the easement was made in a single lump sum, but Gordon wanted to translate that payment into a permanent, income-producing asset for the farm that would be of use, not just to him, but also to future generations that would also live with the easement. Accordingly, he invested the easement payment in a large working barn-storage structure that will be of continuing economic value to the farm business in the years to come.

Considerations:

The translation of the lump sum payment into a farm income producing asset by the landowner, in this example, was a creative way to address discomfort with the permanency of the easement, even though the requirements of the easement should not disrupt farming activities in the foreseeable future.

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• **Farming for Wildlife – Skagit County, WA**<sup>4</sup>

Skagit County farmers Dave Hedlin, Gail Thulen, and Alan Mesman will, together, earn some \$350,000 for three years of labor, expense, and the use of 210 acres (70 acres each) of their land in an innovative integration of active agriculture with environmental services. Hedlin, Thulen,

and Mesman farm the rich Skagit River Delta – an area of tidal estuary and wetland that was diked by settlers when the Valley was settled in the 1860s.

The land they have dedicated to this project has been planted with clover and grass to enrich the soil. About 1/3 will be flooded at appropriate depths to produce habitat that is critical for migratory birds which are in decline specifically because of loss of local wetlands. Another 1/3 will be mowed. And 1/3 will be grazed by livestock or planted with row-crops. These three areas will be rotated so that the birds have habitat available for their migratory stopover, and the farmers take advantage of what they believe will be a substantial increase in fertility and soil productivity in the years when the land comes back from wetlands.<sup>5</sup> In effect, the birds become another rotational crop for the farmers to manage and for which they receive payment. And, for Hedlin, the project will also allow him to shift his 70 acres into organic vegetable production while being paid for the use of the land during the delay required for certification.

This project is a pilot in partnership with The Nature Conservancy and is funded with private and public funds including a grant from the U.S. Environmental Protection Agency. If it proves out in practice to be productive for agriculture, the goal is to potentially interest other farmers in the Valley to participate as well.

Considerations:

This pilot project was, of course, funded through public and private conservation investment, not through money generated by a formal marketplace. But if the practice of rotating agricultural lands with “walking wetlands” works as anticipated – with the farmers reaping a significant enhancement in productivity – it could turn out to pay for itself in the normal marketplace. In addition, the project provides “green market” for these farmers to the extent that they participate in direct sales to consumers. It could also prove to be a way to integrate certain types of wetlands and aquatic resource mitigation into traditional farming operations.

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• **Van Vleck Ranch – Sacramento County, CA**<sup>6</sup>

The Van Vleck Ranch runs 1,500 to 1,700 head of cattle on some 10,000 acres (about ½ of which is leased) in Eastern Sacramento County, CA. The family has been in business here for 150 years. But with high feed costs, fewer grazing acres available with farmers planting grain crops on land previously in irrigated pasture, and a drought, the operation has been struggling this year.

To supplement their income, the family recently sold a conservation easement that preserves 775 acres of their land for a conservation bank that includes the protection of wildlife habitat, a

vernal pool, and Swainson's hawk migration habitat. The purchaser was Westervelt Ecological Services, a real estate development firm involved in conservation banking. With approval of the transaction by the U.S. Corps of Engineers and other regulatory authorities, Westervelt will, in turn, be able to sell conservation banking credits to offset their environmental impacts caused by projects in other parts of the region. The arrangement is a joint venture between Westervelt and the Van Vleck Ranch.

The family will still graze cattle on the land and, according to Stanley Van Vleck: “(The arrangement) allows us to continue using the land in the way that we have for 150 years. Here's something where we can create, in perpetuity, benefits for the community. It also benefits our operations.”

Considerations:

The joint venture arrangement between an experienced conservation banker and a private landowner suggested by this example seems useful – allowing the landowner to get on with the business of agriculture while allowing the conservation banker to deal with the details of regulatory approval, sale of credits, etc, and still getting the landowner payment for the environmental services provided.

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• **Bryte Ranch Conservation Bank – Sacramento County, CA<sup>7</sup>**

The Bryte Ranch is a family operation in Sacramento County, CA. Their property contained one of the largest vernal pools in the region. Their grazing on the surrounding property helped maintain unique vernal pool vegetation. The family partnered with a real estate brokerage firm, Charter Properties of Sacramento, to establish a bank that would allow them to continue to use the land for agriculture while receiving income from the sale of conservation credits.

Considerations:

There isn't a great deal of information about this example, but what there is suggests that it might be useful to illustrate, again, mixed conservation and agricultural uses allowing the landowner to extract income from both. Another interesting feature is the involvement of a real estate broker as a professional consultant in arranging this transaction.

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Phone: 916-489-6600

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- **Campbell Ranch Conservation Bank**<sup>8</sup>

William and Buel Campbell, brothers now in their 70s, wanted to remain in sheep ranching while protecting their land for the long term. Their property is located in rural Solano County, CA and has been in their family for about 100 years. Fortunately, their land contains vernal pools and associated habitat which are an endangered ecosystem in California.

Working with a real estate firm: “Real Estate Solutions,” they learned about conservation banking and were able to become certified by the U.S. Fish & Wildlife Service as a conservation bank by placing a conservation easement on 160 acres of their land and committing to the continued use of conservation management. They will continue to graze sheep on the land and saw this as a solution for earning capital on the property without hurting the ranch.

U.S. Fish & Wildlife Services spokesman Jim Nickles commented: “We’ve found that selectively done and managed in a way that’s wildlife-friendly, grazing is good for vernal pool habitat.”

Considerations:

This is another example of a real estate firm providing consulting services for the landowner’s establishment of a conservation bank and of the possibilities for integrating active agriculture with the marketing of conservation values for an additional source of farm revenue.

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- **Fitzgerald Ranch Conservation Bank**<sup>9</sup>

Marden Wilber was looking for ways to add to the income of his 803-acre California cattle operation located near Clements in San Joaquin County, CA. He learned that a conservation bank (Wildlands, Inc) would pay to set it up as a conservation bank for the protection of vernal pools on his property. Wilber decided not to establish easements on the surrounding lands as buffers, but did protect 37 acres of pools and surroundings ground on which he became eligible to sell mitigation credits. The bank is intended to protect California tiger salamander, western spadefoot toad, and vernal pool fairy shrimp as well as plants associated with vernal pool habitat. The easement does not apply to the surrounding lands. Those lands continue as grazing lands.

This bank was created by the landowner directly so the owner could realize the full value of the property while remaining in agriculture. Conservation banking was appealing because it allowed

continued ranching without additional restriction while and provided additional revenue. The owner received 62 credits on the 37 acres and will receive about of \$65,000 per credit.

Considerations:

This landowner elected not to include the adjacent grazing lands in the easement but sold into the bank only protection for the pools themselves. Apparently there were delays and complications in dealing with the U.S. Fish & Wildlife Service that slowed the initial marketing of the credits.

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• **Southlands Forest – Decatur, GA**<sup>10</sup>

In the 1990's, International Paper (IP), a large timber landowner in the U.S. South, was struggling to deal with 18 family groups of endangered Red-Cockaded Woodpecker located on 1,300 acres of timberlands in four states – GA, LA, SC, and AL. This put a good deal of their land off limits. It seemed theoretically possible to simply move the bird groups to a single location and thereby free up the balance of their land for harvest and development. But in practice, the birds either don't survive such a voyage or they simply fly away when relocated. Instead, IP decided to simply breed the birds on a single 5,300 acre parcel of ground that was particularly well suited to Woodpecker habitat. The company turned this area, called the Southlands Forest Preserve, into perfect woodpecker habitat, relocating birds where necessary and possible. As of December 2003, they had 12 family groups located there and the project was progressing nicely with a goal of establishing 24-30 groups.

The idea behind the venture is based on an agreement with the U.S. Fish & Wildlife Service that sets the Southlands Forest aside as a conservation bank and allows the family groups located there to be used (and sold) as offset credits to mitigate for the loss of family groups located elsewhere. This, then, allows IP to fully utilize their lands in other locations and, when populations increase sufficiently, to potentially sell credits to others as well. Since woodpecker credits are said to be worth \$150,000 to \$250,000 each (per group), this turned out to be a highly profitable venture. And, because the birds are grouped together in a single, protected location, their population is growing, is healthy, and is much more likely to survive than if it had been left in isolated groups as it was before the project began.

Considerations:

This venture was one that was supported by the environmental group, Environmental Defense and by USF&WS because the smaller populations of birds seemed doomed, in any case. It worked for this very large landowner, but might not translate to a smaller landowner. While harvest is obviously limited on the Southern Forest preserve site, there is still some selective harvest taking place there and natural resource income being realized.



Contact:

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• **Wildlands, Inc. – WA, OR, GA, NC, CA<sup>11</sup>**

Wildlands, Inc. is a conservation and wetlands mitigation banking firm headquartered in California but also involved in banking efforts here in the Pacific Northwest. They have projects in Skagit County (Nookachamps Mitigation Bank<sup>12</sup>), Snohomish County (Blue Heron Slough Conservation Bank) and Kitsap County (Blackjack Creek Mitigation Project).

Wildlands combines agriculture with conservation in a way that suggests possibilities for ag. The firm runs its own 600-head Hereford-Angus cattle operation, a herd of goats, and longhorn cattle to maintain grass heights at levels to meet habitat goals and the animals suppress invasive plants. This complements and enhances their habitat conservation objectives. Their Sacramento River Ranch in California is planted in 570 acres of wheat, 700 acres of walnuts, and 1,232 acres of irrigated hay, including 640 acres of organic alfalfa and grass hay. Wildlands says: “Relatively minor adjustments to irrigation schedules; weed control practices, and mowing patterns can make a field livable for threatened and endangered species.” They also have an on-site nursery for native plants like elderberries, oaks, cottonwoods, wild rose, ash and willows for restoration projects. According to Steve Morgan of Wildlands, about 10 percent of the conservation banks in California are joint ventures between landowners and conservation bankers.<sup>13</sup>

In addition to using agriculture as a tool to improve conservation values on banked lands, Wildlands also partners with ranchers wishing to increase revenue and protect their land. For example, an adjacent rancher might sell a conservation easement on some of his land and contract to use specified sustainable management practices in exchange for compensation by Wildlands that helps the rancher to sustain his cattle operation.

Considerations:

Wildlands’ operation suggests models for agriculture in two ways: With appropriate legal protections and conservation management, environmental values produced on (and integrated with) active agriculture can also be sold by the landowner as a conservation bank without unduly disrupting the agricultural operation. It also suggests that there are probably opportunities for landowners to work with existing conservation banking firms to form partnerships profitable for both that still allow a traditional farm or ranch to continue in operation.

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## ENDNOTES

<sup>1</sup> (7 U.S.C. § 136, 16 U.S.C. § 1531 et seq.) There are also state endangered species acts that drive such mitigation.

<sup>2</sup> Texas's Hickory Pass Ranch program is discussed in a US Fish & Wildlife Services press release (4/11/08) at: <http://www.fws.gov/news/NewsReleases/R2/BC6C6868-4DDC-4892-BC6B96EDA824DB4A.html>, in the Williamson County, TX, Regional Habitat Conservation Plan at: [http://www.williamson-county.org/Portals/0/Departments/Conservation\\_Foundation/RHCPExecSummary.pdf](http://www.williamson-county.org/Portals/0/Departments/Conservation_Foundation/RHCPExecSummary.pdf), and in Environmental News Service (4/12/02) at: <http://www.ens-newswire.com/ens/apr2002/2002-04-12-09.asp#anchor7>. Also see: "A Practical Guide to Habitat Conservation Banking Law and Policy" Ruhl, Glen, & Hartman (ABA, Natural Resources & Environment, Summer 2005) on line at: <http://www.law.fsu.edu/faculty/profiles/ruhl/2005-HabitatBanking20NRESummer.pdf>. Also see "Landowners Bank on Conservation" (ELR 8/04) on line at: <http://www.forest-trends.org/biodiversityoffsetprogram/BBop%20library%20/United%20States%20-%20All%20Not%20Printed/Landowners%20Bank%20on%20Conservation.pdf>.

<sup>3</sup> American Farmland Trust participated in developing this transaction. The best source of information would be making contact with Jay Gordon as indicated.

<sup>4</sup> The Farming for Wildlife project was written up in the New York Times article: "Farmers and Conservationists For a Rare Alliance," Jessica Kowal (New York Times, 12/27/06), at: <http://www.nytimes.com/2006/12/27/us/27farm.html?partner=rssnyt&emc=rss>.

<sup>5</sup> In the Tule Lake National Wildlife Refuge in Northern CA, a similar practice has been underway for several years. Farmers report better yields with fewer pest problems. New York Times article, Ibid. Also see article in Sightings "Back to the Birds" (The Nature Conservancy) at: <http://www.nature.org/magazine/summer2007/misc/art20866.html>.

<sup>6</sup> The Van Vleck conservation easement/bank story was reported in the Sacramento Business Journal for 9/19/08 at: <http://www.bizjournals.com/sacramento/stories/2008/09/22/story8.html?b=1222056000^1703114&t=printable>.

Also see Westervelt site at: <http://www.westerveltecologicalservices.com/projects/>.

<sup>7</sup> See article in Outdoor California (May-June 2004 pg. 28) by Tina Bartlett at:

[http://www.dfg.ca.gov/ocal/archives/M\\_J\\_04\\_28-31.pdf](http://www.dfg.ca.gov/ocal/archives/M_J_04_28-31.pdf).

<sup>8</sup> See article in San Francisco Chronicle, 5/6/05, Erin Hallissy, "Brothers turn ranch into conservation bank" at: <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2005/05/06/BAGC8CL3NA1.DTL&type=printable>. Also see Real Estate Solutions, Inc., website materials at: <http://www.r-e-solutions.org/crcb.htm>.

<sup>9</sup> See "A Nationwide Survey of Conservation Banks," (NOAA Fisheries, Northwest Fisheries Science Center, Prepared by: Stratus Consulting Inc., Boulder, CO), (303) 381-8000 Pg. A-25 at: [http://www.st.nmfs.noaa.gov/st5/documents/Stratus%20Consulting\\_Conservation%20Banking\\_Final.pdf](http://www.st.nmfs.noaa.gov/st5/documents/Stratus%20Consulting_Conservation%20Banking_Final.pdf). Also see a broadcast by California Heartland "Conservation Cowboys" on the Marden Wilber Ranch at: [http://www.californiaheartland.org/this\\_season/episode\\_911/transcript.htm](http://www.californiaheartland.org/this_season/episode_911/transcript.htm).

<sup>10</sup> See "A Nationwide Survey of Conservation Banks," (NOAA Fisheries, Northwest Fisheries Science Center, Prepared by: Stratus Consulting Inc., Boulder, CO), (303) 381-8000 Pg A-67 at: [http://www.st.nmfs.noaa.gov/st5/documents/Stratus%20Consulting\\_Conservation%20Banking\\_Final.pdf](http://www.st.nmfs.noaa.gov/st5/documents/Stratus%20Consulting_Conservation%20Banking_Final.pdf). Also see Ecosystem Marketplace "Banking on Endangered Species Conservation" by Robert Bonnie, at:

[http://www.ecosystemmarketplace.com/pages/article.news.php?component\\_id=639&component\\_version\\_id=712&language\\_id=12](http://www.ecosystemmarketplace.com/pages/article.news.php?component_id=639&component_version_id=712&language_id=12) and New America Foundation "Making Money in Environmental Derivatives," 3/1/02, at: [http://www.newamerica.net/publications/articles/2002/making\\_money\\_in\\_environmental\\_derivatives](http://www.newamerica.net/publications/articles/2002/making_money_in_environmental_derivatives).

<sup>11</sup> Much of the material in this section comes from Wildlands' website which discusses their relationship with agriculture at: <http://www.wildlandsinc.com/agriculture.html>.

<sup>12</sup> At the moment, mitigation banks are the subject of some controversy in Skagit County. Several farm groups (including Skagitonians to Preserve Farmland, Skagit County Farm Bureau, and Friends of Skagit County) recently appealed County approval for a bank owned by a different company, the Clear Valley Environmental Farm, on the basis that it is not an allowed land use in an agricultural zone. See "Appeal Filed Against Wetland Mitigation Bank," Cookson Beecher (Capitol Press, 4/11/08) at:

<http://www.capitolpress.info/main.asp?SectionID=94&SubSectionID=801&ArticleID=40795&TM=54254.46>.

<sup>13</sup> See Sacramento Business Journal at:

<http://www.bizjournals.com/sacramento/stories/2008/09/22/story8.html?b=1222056000^1703114&t=printable>.

## **ADDITIONALITY**

Jan Lewandrowski  
Economist  
USDA, Global Change Program Office

Prepared for Agriculture's Role in Mitigating Climate Change Workshop  
American Farmland Trust/Farm Foundation/USDA Economic Research Service

August 13-14, 2008

Washington, DC



Based on bills introduced in the 110<sup>th</sup> Congress, the greenhouse gas (GHG) mitigation approach with the most legislative support is some form of a cap-and-trade system.<sup>1</sup> The bills that have been introduced generally do not include agriculture under the cap but would allow farmers to voluntarily participate in the system. Specifically, farmers who can demonstrate that they have reduced emissions or increased carbon sequestration in accordance with specified criteria can receive offset-credits, which can then be sold to entities in covered sectors to help them meet their emissions reduction obligations. One criterion included in several draft bills but not clearly defined is “additionality.”

The additionality criterion for crediting or rewarding economic entities for undertaking actions or projects that reduce emissions or increase carbon sequestration attempts to distinguish between actions or projects that are motivated by a given policy from actions or projects that have already happened or will occur anyway (i.e., without the policy). The criterion requires that to be credited or rewarded, actions or projects must be taken as a result of the policy being implemented. Actions or projects that have already been taken or will be taken even if the policy is not implemented are not credited or rewarded because their GHG benefits exist, or will exist, independent of the policy.

Farmers and ranchers have a number of options for changing production practices and/or land uses in ways that lower GHG emissions or increase carbon sequestration (for example, adopting no-till crop systems and shifting cropland to permanent grass or trees). A number of studies have concluded that given appropriate incentives to adopt these practices and land uses, agriculture could provide significant quantities of GHG mitigation at relatively low cost.<sup>2</sup> The additionality issue has been central to the debate over how agricultural offsets should be included in a national greenhouse gas mitigation policy because many farmers have already adopted these practices and land uses and so their ability to participate in a GHG mitigation program will depend on how additionality is treated.

### **Key issues related to additionality:**

#### *Choice of Baseline*

To determine whether an action or project that reduces GHG emissions or increases carbon is a response to a GHG mitigation policy (i.e., is additional) it is necessary to have a baseline (or point of reference). The baseline serves to establish what would have happened in the absence of the GHG mitigation policy. Two common choices are a “historical” baseline and a “business as usual” (BAU) baseline. A “historical” baseline compares current and future GHG emissions with emissions at some time in the past. This could be a specific point in time, such as a given year, or a representative period of time, such as an annual average over a period of several years. In contrast, a BAU baseline is an assessment of future conditions and incorporates anticipated trends in key variables as well as the effects of existing policies and expected policy changes. By comparing an alternative scenario with a BAU scenario, one can assess the additional impacts from the alternative over and above what is anticipated will happen anyway. A common BAU scenario for agriculture is the official USDA baseline.

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<sup>1</sup> As of June 30, 2008, 13 bills have been introduced in the 110th Congress that, if enacted, would establish a regulatory framework for reducing U.S. GHG emissions. Of these, nine would establish a cap-and-trade system and 10 either explicitly allow or include an option for agriculture and forestry to provide offset credits.

<sup>2</sup> As a recent example, a 2005 study by EPA estimated that if CO<sub>2</sub> was priced \$15 (\$30) per metric ton, actions in the agriculture and forestry sectors could offset 10 (25) percent of U.S. GHG emissions.

While a baseline is needed to determine what actions or projects are additional in the context of a given policy, there is no scientific basis for using any particular year or scenario as a benchmark for mitigating GHG emissions. Hence, any baseline for GHG mitigation will be to a degree subjective. In historical baselines this means that the distinction between actions and projects that are additional from those that are not can be somewhat arbitrary. BAU baselines have the additional challenge of having to specify what would have happened in a future that never occurred. Trying to assess or verify what is additional in this situation is at best guessing and at worst gaming.

### *Penalizing Early Actions*

A point often raised in discussions about GHG mitigation policy is that any approach chosen should not penalize entities that undertake desired activities or projects prior to the policy being implemented. The point is often characterized as not “penalizing good actors for doing the right thing early.” If additionality is applied strictly, future climate change mitigation policies will not credit or reward early actions. Simply put, past decisions on the part of farmers to adopt production practices or land uses that reduce GHG emissions or increase carbon sequestration have been completely voluntary and based on economic and policy conditions that existed at the time. Hence, these decisions reflect what farmers felt was in their best economic interest and crediting or rewarding them under a new climate change mitigation policy would be submitting the policy to a form of rent seeking—in this case, providing payments for benefits that already exist.

### *Avoiding Moral Hazard*

While it may be desirable not to reward entities for actions or projects they have already done or plan to do anyway, policies with additionality requirements run a moral hazard risk. Specifically, an additionality provision can create an incentive for entities who are already behaving in ways that would be rewarded under a new policy to change their behavior to position themselves to respond to the policy when it is implemented.

For example, consider a cap-and-trade framework that allows farmers who adopt permanent no-till cropping systems after a specified date to sell the resulting increases in soil carbon sequestration as off-set credits to entities in other sectors. If this date can be anticipated, farmers who have practiced continuous no-till since before that date will have an incentive to switch to conventional tillage in order to be able to “adopt” no-till in response to the program. If this happens the effect is to encourage farmers to take actions that emit carbon from soils and then to reward them to take actions that puts the carbon back in soils.

### **Potential policy approaches to additionality:**

There are several relatively straight forward approaches to address additionality in the context of including agricultural offsets in a GHG cap-and-trade system. These approaches are briefly discussed below. As is often the case, the optimal approach, or combination of approaches, will involve a trade-off between program cost and the need for high quality of offsets (i.e., it will cost more to produce more accurately measured, verified and tracked offset credits).

### *Limit Entry*

A relatively cost-effective approach to implementing an additionality criterion in a cap-and-trade system is to limit entry. There are a number of options for limiting entry but a common choice has been to specify a threshold date, typically in the recent past, by which actions that occur after that date are considered additional and those that occur before it are not. By way of an example, lands put into no-till systems prior to the threshold date cannot produce additional offset credits and lands put into no-till after that date can. Putting the threshold date in the past effectively addresses the moral hazard issue because entities cannot change their behavior retroactively. Limiting entry also allows for flexibility in acknowledging early actions since more early actions can be recognized as additional by simply pushing the threshold date further back in time.

There are two weaknesses with using limiting entry as an additionality criterion for agricultural offsets. First, the large majority of farmers who have already adopted practices and land uses that would generate offset credits have done so in the absence of an offset market. Hence, specifying a threshold date in past will reward some farmers for actions that have already happened. To the degree this occurs, limiting entry in this way can be viewed as assuming away the requirement that offsets be additional. The second weakness is that any form of limiting entry will be to a degree arbitrary and thus subject to influence by parties with a stake in where or how it is determined.

#### *Document Justification*

The approach most likely to ensure that agricultural offsets are truly additional is to require each offset to be adequately documented. The purpose of the documentation is to assure potential buyers that agricultural offsets actually exist (i.e., they are accurately measured, verified and tracked) and have been generated as a result of implementing a policy.

The documentation approach has several benefits. First, provided the documentation requirements are sufficiently rigorous, the offset credits will be of high quality and hence of most interest to entities that must reduce emissions under the cap. A second benefit is that the focus of the program can be on demonstrating GHG mitigation rather than on identifying reductions associated with specific actions and projects. If this is the case, the approach will encourage farmers to look at their entire operation for innovative ways to mitigate GHG emissions. The likely result will be the broadest set of offset generating activities and projects. Finally, there will almost certainly be significant economies of scale in developing the procedures, tools and expertise needed to adequately document agricultural offset credits (including those related to the measurement, verification and tracking). For single applications, the costs of developing these procedures, tools and expertise may well be prohibitive. With additional applications, however, the fixed costs get spread out over more actions and projects and experience will reduce the time needed to produce and process the documentation. These economies mean that the approach can be designed to encourage private sector participation in developing and marketing documentation products and services.

The main drawback of the documentation approach is that it is likely to be the most costly in time and resources to implement—at least to start. Specifically, it will be necessary to develop the requirements and procedures to govern the measurement and verification of offsets and to establish a system for tracking offsets over time. A second weakness of the documentation approach is that it does not address the moral hazard issue, although, this could be addressed by incorporating some form of limiting entry.

### *Discount Credits*

A third approach to the additionality issue is to let the market determine the degree to which the operating rules of a cap-and-trade system ensure that agricultural offsets are actually the result of the policy. Presumably entities in covered sectors will have to meet hard emissions reduction targets but the operating rules of a cap-and-trade system can still allow for agricultural offsets of varying qualities. As noted above, with respect to additionality, the process of establishing a baseline is unavoidably subjective, there is a bias against early actions, and there is a bias toward moral hazard. In balancing these considerations policymakers will also have to contain program costs and consider the views of interested stakeholders.

Given the above considerations, it is likely that a cap-and-trade system that includes agricultural offsets will include at least some that are not strictly additional. It is also likely that additionality would be easier to prove for some offsets (say those related to installing an anaerobic waste digester) than others (say those related to changes in tillage systems).

If this is the case, the market for agricultural offsets would discount agricultural offsets to reflect their value relative to actual emissions reductions in the covered sectors. The actual discount, or set of discounts, would depend in part on the operating rules of the system. For example, if the rules allowed farmers to provide documentation to establish additionality, the related offsets could be equivalent to an emissions reduction. If the rules relied on rules-of-thumb, then there might be coefficient to indicate how many offsets unit are, on average, equivalent to unit of emissions reduction.

The fundamental limitation of this approach is that it does not distinguish between activities that would have happened in absence of the offset credit and activities that require the offset credit to be profitable. By discounting all activities, the activities at the margin of economic viability will be made uneconomic. Activities that would have happened anyway, will still occur. The end result is that fewer additional actions will be taken and a greater proportion of the offset pool will be associated with actions that would have occurred in absence of the offset credit.

### *Accept It and Adjust National/Project Goals*

A final approach to the additionality issue in GHG mitigation policy is to accept it and to adjust national mitigation goals to accommodate the consequences. If the overall policy objective is to mitigate GHG emissions, then one option is to implement a cap-and-trade system that simply encourages entities to change their behavior in ways that, on average, reduce emissions or increase sequestration. The focus would be on achieving a national GHG mitigation goal and the cap-and-trade system would be the instrument chosen to achieve the goal. It would not be necessary, however, that each emission reduction and offset credit generated within the system actually exists.

Such an approach would require an independent assessment of whether or not the mitigation goal was being achieved. In the United States, the annual EPA inventory of GHG emissions and sinks could serve this function. If the annual inventory indicated that the national GHG mitigation goal was not being reached, the cap could be adjusted.

The benefits and weaknesses of this approach are largely a matter of perspective. The approach explicitly accepts that entities will be rewarded for offsets that do or will exist in the

absence of a GHG mitigation policy. Those who favor a strict linkage between the number of offset credits in a cap-and-trade system and the actual units of emissions reduction and carbon sequestration created will see the approach as ignoring the additionality issue. Those who do not feel a strict linkage is necessary will see the main benefit as the time and resources savings associated with not having to specify relative to what an action or project is additional. Also, this approach addresses the moral hazard issue because farmers who have already adopted production practices and land-uses that reduce emissions or sequester carbon would be eligible to receive offset credits.

**References:**

United States Environmental Protection Agency. 2005. Greenhouse Gas Mitigation Potential in U.S. Forestry and Agriculture. EPA 430-R-05-006, (November).