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Estimating the Regional Economic Impacts From Retiring Agricultural Land

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Estimating the Regional Economic Impacts From Retiring Agricultural Land

Introduction

Conflicts between various water uses in the western United States have existed for many years. In many areas there is simply not enough water available at critical times of the year to meet all of the needs. In these instances water must be allocated to different uses based on legal, political, economic, or some other criterion. One option that can be used to address water supply shortages in agricultural areas is retiring irrigated agricultural land. Under a land retirement scenario, irrigated land could be purchased by a government agency or some other entity and the water could be left to flow downstream for fish and wildlife habitat improvement or some other purpose. Agricultural land which uses groundwater for irrigation could also be retired to alleviate groundwater overdraft problems.

Land retirement may be considered a viable water management option when there are legal requirements for specific uses, such as minimum flows for fish and wildlife, or when the benefits of such a shift in water use are greater than the costs imposed on the activity losing water. Even though there may be sound legal and economic reasons for retiring agricultural land and shifting water use away from agricultural production to other types of uses, there could be significant regional economic impacts imposed upon the local community where the land is retired which are not reflected through a benefit/cost analysis. For example, taking irrigated land out of production will result in reduced expenditures for agricultural inputs and will most likely result in reduced regional agricultural income. Reduced expenditures and income will likely result in a decline in the overall economy of the region where the land is being retired.

The regional impacts associated with land retirement must be considered when evaluating the impacts of a land retirement alternative as part of an environmental analysis. These impacts are important to local residents and may represent a significant change in the social and economic environment.

This paper presents a general methodology for estimating the regional economic impacts from retiring agricultural land along with a hypothetical application based on the Platte River Endangered Species Recovery Program. The methodology includes some basic guidelines and areas of impact that should be considered when evaluating the regional economic impacts of land retirement. The application provides a realistic example of types of data needed to complete a regional impact analysis of land retirement.

Categories of Impacts

The regional economic impacts from retiring agricultural land can be separated into four primary categories: the impacts from reduced agricultural production inputs, impacts from reduced farm income, the impacts from income received from land payments, and the impacts from any annual maintenance expenditures or from habitat restoration associated with the new use of the retired land. The first two impacts represent losses in regional economic activity while the last two impacts represent positive regional economic influences. Retiring land from privately owned

agricultural production will also have some impact on county governments through reduced property tax payments, although some government payment programs exist which partially offset these fiscal impacts. These fiscal impacts are considered as a part of the first category of regional impacts.

Impacts from reduced agricultural production inputs

Irrigated agricultural land generates regional impacts through the demand and payments for crop production inputs, such as: labor, fertilizer, pesticides, fuel and oil, machinery, and custom work. Retiring irrigated agricultural land and converting the land to dryland production or some type of wildlife habitat will generally result in a reduction in the amount of input expenditures associated with that land, or will at least change the types of inputs required. However, expenditures associated with use of the retired land, such as the establishment of native vegetation or recreational activities, is a mitigating factor in the loss of regional activity. Estimating the change in input expenditures requires knowledge of both the level and type of expenditures under current conditions and expenditures that would be required for the land use after the land is retired.

For example, suppose land which is currently used to grow alfalfa hay and corn is proposed to be retired and the water currently used for irrigation on the land will be used for in-stream flows. Also suppose the land that was farmed will now be a part of a preserve for birds and other wildlife. The land will need establishment of a cover crop and minimal annual re-seeding and weed control. The change in input expenditures which needs to be evaluated for regional impacts is represented by the impact of total input expenditures for alfalfa and corn minus the estimated impacts of input expenditures for establishing the cover crop and annual input costs for maintenance.

Input expenditures represent demands for goods and services provided by both local and non-local retailers and wholesalers. To the extent that these goods and services are purchased from within the region, these expenditures generate positive economic impacts in the form of income and employment. The level of expenditures required for retired land which may be returned to native grass or some other dryland cover crop, will generally be much lower than for irrigated production. Therefore, land retirement will generally result in negative regional impacts with respect to the level of input expenditures.

Privately held irrigated land is generally subject to local property taxes which help fund county services. Government land retirement programs reduce the funds available for these services because government held land is not subject to the same taxation as privately held land. Payment in lieu of taxes programs exist which require the government to contribute funds to the local government to partially mitigate the fiscal impacts of land retirement. These contributions typically do not fully compensate for the loss in tax revenues. The net loss in funding for local services is a negative impact from land retirement.

Impacts from reduced farm income

Similar to the impacts from reduced input expenditures, a shift from irrigated agriculture to dryland use will generally result in lower levels of household income associated with net farm revenues. The one exception is where the irrigated operation is actually operating at a loss and, therefore, retiring the land will reduce the loss. Net farm revenues represent funds that are available for purchasing goods and services. For a family farm operation these expenditures are typically for household goods and services. Net revenues from larger operations may be reflected through re-investment in the farm operation or investment outside the farm in addition to household goods and services. If the farm is leased, then a representative lease payment would need to be subtracted (along with any other payments to the owner) from net farm income to represent local household expenditures (unless the owner receiving the lease payment lives in the study area). In any case, a reduction in irrigated acreage is likely to result in lower regional income.

Impacts from income received from land payments

Land payments made to land owners willing to sell or lease their land for retirement may generate positive regional impacts. It is unlikely that a significant portion of sale or lease payments will generate significant regional economic impacts if the land owner receiving payments lives outside the study region. If the land owner lives in the study area, but plans on taking the sale/lease payments and retiring outside of the study area, the payments will not generate regional economic impacts. However, if the land owner lives in the study area and plans to remain in the area after the land retirement payment is made, then some or all of the payment will create regional economic impacts. The extent of these impacts depend on what the sale/lease payments are used for. Payments are used to purchase goods and services sold in the region will generate regional economic impacts. If the payments are saved or used to pay off debt to financial institutions outside of the study area, then the payments will not generate regional impacts. Therefore, it cannot be assumed that all land retirement related payments will be spent in the region and will generate regional impacts.

For example, suppose that 20,000 acres of land are going to be retired and the average land retirement payment is going to be \$200 per acre. Also assume that the retired acreage is owned by four individuals, each owning 5,000 acres. If one of the owners is an absentee owner living outside of the impact area, then \$1,000,000 in land payments will not generate regional economic impacts. If another owner plans on retiring out of the state after they sell the land, then that represents another \$1,000,000 in land payments that will not create regional impacts. If a third landowner plans on investing one-half of the land payment outside of the region, then \$500,000 of payments will not create regional impacts. Assuming the fourth landowner is remaining in the region and will spend all of the land payment in the region, a maximum of only \$1,500,000 of the total \$4,000,000 in retirement payments for land in the study area will actually generate positive regional economic impacts (assuming all of the \$1.5 million is spent on goods and services sold in the study area).

Impacts from annual maintenance expenditures or from habitat restoration associated with the new use of the retired land

Expenditures related to the new use of the land after it is retired will create positive regional economic impacts. These expenditures may be the result of re-establishing native grass for fish and wildlife habitat, for erosion control, for water quality improvement, or some other goal. The expenditures could also be for some type of on-going annual expenditures such as weed control or ground water recharge activities. Expenditures related to the new use of retired irrigated land is a mitigating factor to the negative impacts associated with lost irrigated production, to the extent that these expenditures occur within the region under consideration.

Examples of Previous Regional Impact Studies Applicable to Land Retirement

Previous studies have been completed evaluating the regional impacts from the Conservation Reserve Program (CRP). The CRP was authorized as part of the 1985 Food Security Act (Public Law 99-198) and its primary objective was to take highly erodible land out of production, protecting the long-term productivity of the land and reducing the adverse environmental effects from wind and water erosion. Landowners participating in CRP agreed to implement a conservation plan which provided vegetative cover on the enrolled land for 10 years. In return, the federal government paid the landowner an annual contract payment which was established through a bidding process.

Clearly there are parallels in the regional economic effects of the CRP and an irrigated land retirement program. Both types of programs provide government payments in return for taking agricultural land out of production. As a result, previous regional impact analyses of CRP can be used as a basis for developing a methodology for evaluating the impacts from a land retirement program. Two CRP analyses are summarized below which highlight the issues involved with a regional impact analysis.

The regional impacts of CRP in South Dakota

A study of the regional impacts of CRP in South Dakota by Janssen, Venhuizen, and Beutler (1997) indicated that the CRP actually had a positive impact on the South Dakota economy as a result of land payments and higher crop prices. The land payments and higher prices more than compensated revenue and expenditure impacts from taking highly erodible land out of production. The study estimated that approximately 60 percent of the marginal increase in net returns was due to projected CRP payments.

The farm-sector economic impacts of CRP were based on the interaction between and changes in agricultural land use, agricultural production, commodity prices, government program payments, and CRP payments. The net effects of these interactions were estimated using the IMPLAN (IMpact analysis for PLANing) model. Estimates of crop returns and expenses were based on Cost and Return Estimator (CARE) budgets developed by the Natural Resources Conservation Service.

Estimating potential crop price effects from CRP is important because the program covers the entire country and can have a significant impact on agricultural markets. However, land retirement programs would typically be implemented within a limited area and would therefore

not be expected to have an impact on crop prices at the state or national level.

The regional impacts of CRP in North Dakota

In an analysis of the regional impacts of CRP in North Dakota (Leistriz, 1998), the direct effects of program participation on farm expenditures and income were estimated and the regional impacts of these effects were estimated. Expenditure estimates in the study were placed into three categories: 1) reduced input expenditures, 2) reduced federal commodity payments, and 3) increased CRP contract payments and upkeep costs. The sectors included in the economic impact analysis included: the retail trade sector; the finance, insurance, and real estate sector; business and personal services; and the household sector, which included net farm revenue and CRP contract payments.

The data used for the study was obtained from a survey of North Dakota CRP participants, from North Dakota Agricultural statistics, and from the USDA Farm Service Agency (formerly the Agricultural Conservation and Stabilization Service). The North Dakota survey indicated what the CRP payments would be used for, if the land owner would retire, and if they did retire would it be in the state. The agricultural statistics and Farm Service Agency data were used to determine farm related income and expenditures and the CRP payments.

The direct effects from changes in expenditures, farm income, and CRP payments were applied to an input-output model to estimate the total regional impacts of the CRP program on North Dakota. The analysis revealed that the economic effects of CRP in North Dakota were negative, but that the impacts were relatively modest. Reduced direct expenditures caused by taking CRP land out of production totaled \$55 million for the state with nearly 62 percent impacting the retail sector. However, similar to the South Dakota results the household sector was positively affected for some groups where CRP rental payments exceeded the farm income and government program payments that were foregone.

Regional impacts from changes in state and local tax receipts

The South Dakota and North Dakota impact studies summarized above generally follow the impact categories presented previously in this report, with the exception of the price effects included in the South Dakota analysis (which are assumed to be negligible with a limited site specific land retirement program). However, the impacts of changes in local property tax payments were not included in these studies because the land in CRP remained privately owned and was subject to local taxation. Therefore, this is one important difference between an analysis of CRP impacts and an analysis of land retirement impacts.

The regional impacts from changes in state and local tax payments can be handled within the multiplier framework. State and local spending can be treated as simply another sector with specific input requirements which create multiplier effects. For example, a land retirement program could reduce local property tax payments. The regional effects of reduced tax payments could then be estimated by reducing demand for state and local government sector activities by the amount of the reduced tax payments.

To some extent this measure of tax impacts may not fully account for the regional impacts from reduced tax receipts. If reduced tax payments resulted in a significant decrease in the quality of public schools, reduced availability of local public services, or reduced police and fire protection, then people may be discouraged from living in the area or moving into the area which could further erode the tax base and lead to more adverse regional impacts. For example, if reduced tax receipts would result in a 50 percent reduction in the budget for local fire protection and the remaining funds were not sufficient to keep a local fire station open, then the true region impacts would be derived from closure of the fire station rather than reduced fire protection expenditures of 50 percent. Therefore, an analysis of local tax impacts must account for the extent to which the proposed change will affect the viability of providing state and local services.

Information Needed to Analyze the Regional Impacts From Land Retirement

Estimating the regional impacts from irrigated land retirement based on the categories outlined above requires detailed information about current agricultural production expenditures, net farm revenues from irrigated production on land targeted for retirement, one-time and annual expenditures (if any) associated with the new land use on the retired land, the amount of the land payments made for retiring land, and the current land tax payments and estimated payment in lieu of taxes if applicable. In addition to the above information data is needed on spending patterns of current residents, land ownership, the intent of landowners participating in the land retirement system. The information required for an impact analysis of land retirement is presented in more detail below.

1) How much will the land payments be?

The most basic piece of information needed for a land retirement impact analysis is the amount that will be paid for the land to be taken out of production. There are several possible methods of determining land payments for a land retirement program. Payments could be based on a willing seller basis, where the land payment is determined through a bidding process and the land owner that is willing to sell at the lowest price is accepted into the program. Payments could also be based on the estimated average market value where those willing to sell at the average price participate in the program. Another possibility is that a higher than average market value payment could be offered to land owners who are located on land that is specifically targeted for retirement. Last, a combination of land leases, easements, and sales could be used to achieve project goals.

If a bidding process or targeted land retirement approach is used, the value of land payments for retiring land will not be known in many cases until the program is actually implemented. If an average land value is going to be used to determine retirement payments, there is no guarantee that the average market value will result in land sales that meet the land retirement goal. However, average land value information can be used to represent a reasonable approximation of land retirement payments for an impact analysis.

Land value information can be obtained from the county assessor or real estate specialists in the area. Information from the U. S. Department of Agriculture on agricultural land values may also

be useful in helping determine a reasonable land payment from which regional impacts can be estimated. In the case where prices will be negotiated in order to meet land retirement targets, results from previous land retirement programs or site specific data can be used when available.

If resources are available, surveys could also be used to collect information on prices at which land owners would be willing to sell.

2) What will be the terms of the land retirement payments?

If a payment is a one-time land sale payment which represents a permanent change in land use from irrigated agriculture to some other use or a short term temporary lease, then the regional impacts from land retirement payments are limited to those one-time payments and loss of regional production impacts in perpetuity. If the land is retired for a specified period of time, then the payments and loss of production impacts occur over a short period of time.

The terms of retirement will also affect the magnitude of regional impacts through the likelihood of the payments being spent within the impact region. For example, if the payment is a one-time payment to keep the land out of production forever, then the land owner selling the land may be more likely to retire and spend the land payment outside of the region. A short-term land retirement arrangement implies a lower chance that the land owner will retire and move out of the area.

3) What crops are currently grown on the land targeted for retirement, what are the input expenditures for those crops, and what are the net revenues from agricultural production on that land?

The regional economic impacts attributable to agricultural production are the result of expenditures for production inputs, spending from net profits, and tax expenditures. Estimates of these expenditures are needed to determine the value of regional activity lost due to reduced agricultural production and tax receipts on the retired land. Farm budgets prepared by the county extension service, NRCS cost and return estimator budgets, and Agricultural Census and other USDA agricultural statistics can provide important information for estimating the input expenditures and revenues from crop production.

4) What will the water from the retired land be used for?

The primary objective of a land retirement program is to increase the amount of water available for another type of use. The economic impacts associated with the new water use will determine the impact of land retirement on regional output, income, and employment. If a land retirement program is targeted toward water quality and/or soil/drainage problems on a specific parcel of land, then the water may be retained within an irrigation district for use on another parcel of land that will not cause these problems. In this case agricultural input expenditures and revenues may not change significantly and there may not be regional economic impacts associated with land retirement.

Except for the case where irrigated production is shifted from one area to another within the

study region, land retirement is likely to lead to a change in the type of activity supported by the water resource. If the land retirement program requires a change in water use, then the input expenditures and income generated by the new use with land retirement must be estimated and compared to the expenditures and costs associated with irrigated agricultural production. The change in expenditures and costs are then used as the basis for estimating the regional economic impacts of land retirement.

Several different activities could potentially be enhanced by water supplies made available through land retirement. Additional stream flows or reduced groundwater use could benefit fish and wildlife, recreation, municipal water supplies, or other uses and values. These activities have different regional impacts associated with them compared to irrigated agriculture. For example, increased stream flows associated with improved fish and wildlife habitat may generate considerable benefits but may result in little or no economic activity within the study area because of few expenditures associated with that type of activity. In order to estimate the net impact from land retirement, the expenditures associated with the new water use must be known.

5) Where do the landowners receiving land retirement payments live and where will they spend their money?

For those landowners who do not live in the region where the land is being retired, land retirement payments will not generate regional economic impacts because the money does not enter the region. Payments made to landowners who reside in the study region will generate impacts if the money is spent in the region. Therefore, in order to accurately account for the regional impacts of land retirement payments, the analyst must be able to estimate the purchasing patterns of those landowners who will receive retirement payments.

The data needed to estimate these spending patterns may be very difficult to obtain, except through a survey of potential program participants. Land ownership data from the county assessor which indicates the location of the owner could be used to estimate the number of owners who live in the study region. However, this information does not help estimate the number of those who will move outside of the region once they get their land retirement payment.

6) What proportion of income is currently spent within the study area and what types of goods and services are purchased by the current land owners? What will the proportion be after land retirement?

The value of goods and services purchased inside the study region by farm operators for household goods and services (goods and services other than agricultural inputs) under current conditions provides a baseline level of impacts from net farm revenues without land retirement. These expenditures need to be grouped into categories of goods and services in order to correctly reflect the regional impacts from these expenditures. Different expenditures categories will have different regional impacts associated with them.

If survey data on spending patterns of local households are not available, then professional

judgement must be used to estimate the amount that will actually be spent in the region. The percentage of income spent on different categories of expenditures could be estimated from the U.S. Bureau of Labor Statistics Consumer Expenditure Survey. Those expenditures associated with goods and services that would be expected to be purchased from nearby suppliers, such as groceries and gasoline, could be considered as a local purchase while other items that may be purchased from more distant suppliers such as vehicles could be considered out-of-region expenditures.

7) What are the local tax payments from current land use and how will they change with the new land use after the land is retired?

Tax payments to local governments from agricultural land owners help support local services and infrastructure, such as roads and schools. Therefore, retiring agricultural land will adversely affect the funds available for these services. Tax rate information from the county assessors office can be used to estimate the reduced tax payments associated with retiring agricultural land. For qualifying land, the Payment in Lieu of Taxes (PILT) program can partially reduce the fiscal impacts of land retirement on local governments.

PILT payments are federal payments computed and disbursed by the Bureau of Land Management (BLM) to local governments. The payments provide additional support to local governments that have eligible Federal land within their boundaries. Payment eligibility is reserved for local governments (usually counties) that provide services related to public safety, environment, housing, social services, and transportation, and that contain nontaxable Federal lands. The PILT Act (P.L. 97-258, as amended) identifies several categories of lands that are eligible for payments. These include Federal lands in the National Forest System and the National Park System, lands administered by BLM, lands in Federal water resource projects, dredge areas maintained by the U.S. Army Corps of Engineers, inactive and semi-active Army installations, Federal lands acquired after December 30, 1970 as additions to lands in the National Park System or National Forest Wilderness Areas, Federal lands in the Redwood National Park or lands acquired in the Lake Tahoe Basin, and some other donated lands.

PILT payments are based on the number of acres of Federal entitlement land within each county. The amount of qualifying land is multiplied by a dollar amount per acre set by law and payments are subject to limitations based on population. Congress sets annual PILT program funding limitations which may also affect the amount of the payments under the program. BLM calculates and distributes PILT payments to all eligible counties and units of local government.

Some states also have PILT programs where state agencies make payments to local governments for state owned land. However, in most cases the federal and state PILT payments combined will not completely compensate for the loss in property tax revenues to local governments. Therefore, the difference between tax revenues from privately owned agricultural land and PILT payments must be estimated to evaluate the impacts of land retirement on local services.

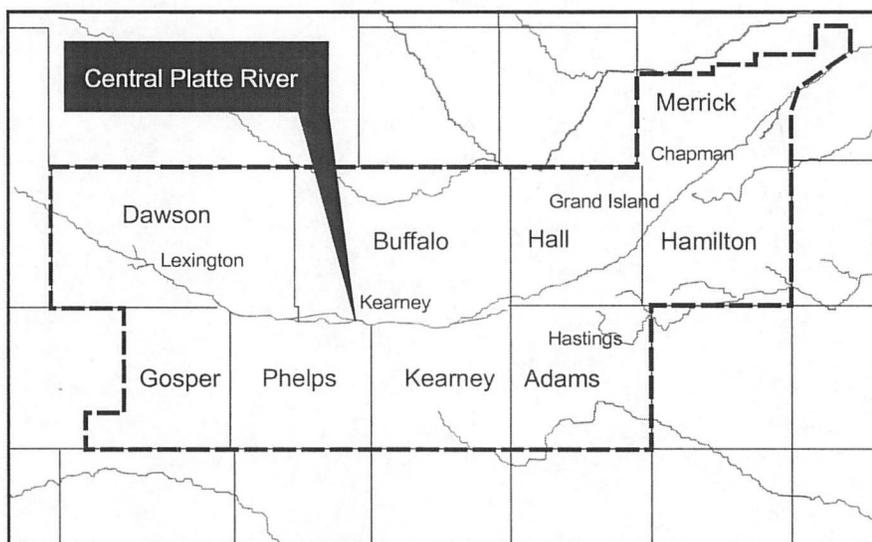
Application: Land Retirement in the Platte River Basin

Background

As a case study, the Platte River Endangered Species Recovery Program (Program) will be used. This Program is a Cooperative Agreement (CA) between the states of Colorado, Nebraska, Wyoming and the DOI to participate in and implement activities designed to aid in the recovery of four target species: the whooping crane, interior least tern, piping plover, and pallid sturgeon. One of these activities is to acquire land for habitat along the Central Platte River in Nebraska. Parcels have been identified for illustrative purposes and will be the basis for this case study.

The study area is located in central Nebraska within an area commonly known as the Big Bend Region. The nine-county area includes Adams, Buffalo, Dawson, Gosper, Hall, Hamilton, Kearney, Merrick and Phelps counties and is illustrated in Figure A-1. The study area is about 5,633 square miles or 3.6 million acres with a 2000 estimated population of 187,688 people¹.

Figure A-1



Three land acquisition scenarios have been identified for the Program. It is not certain if the one chosen here or any of the three will actually be used to acquire land for the above purpose. The scenario chosen for this case study is referred to as the segment method whereby selected habitat areas would be near or adjacent to existing protected habitat areas. The selection process of example acquisition parcels was based on the location of existing protected habitat lands using 1998 GIS land coverage data provided by the US Fish and Wildlife Service (USFWS). Three segments plus an area called Cottonwood Ranch are targeted for acquisition under the segment plan. Segment A and Segment B consist of approximately 2,615 acres each, Segment C consists

¹Bureau of Census, 2000.

of approximately 2,558 acres and Cottonwood Ranch consists of approximately 2,650 acres. The total amount of acres covers the amount needed for the first increment of the Program as identified in the CA. To manage for sediment in the channel, an additional segment of approximately 1,618 acres has been targeted for acquisition.

Cottonwood Ranch is already acquired, so the remaining acres will be converted somewhere within the study area to provide habitat for the target species. The schedule for implementation will certainly effect acreage, costs and the construction schedule. The proposed implementation schedule is:

Cottonwood Ranch:	2001-2006
Segment A:	2004
Segment B:	2006
Segment C:	2006
Sediment Segment:	2006

Model

Impacts will be analyzed using IMPLAN, an input-output model first developed by the US Forest Service. The IMPLAN model uses the U.S. Department of Commerce national input-output model to estimate flows of commodities used by industries and commodities produced by industries. The data used in this analysis is 1995 IMPLAN data and structural matrices. Social accounts are included in the IMPLAN database for each region of consideration. Social accounts represent the flow of commodities to industry from producers and consumers as well as consumption of the factors of production from outside the region. Social accounts are converted into input-output accounts and the multipliers for each industry within the region. These multipliers represent the demand generated for goods and services from an industry and, in response, demand generated for other goods and services from those industries, and so on. The percentage of expenditures in each category that would remain within the region and expenditures that would flow outside the region are also accounted for in the IMPLAN model.

Regional impacts are determined by the interdependence of production and consumption sectors within a region. Industries must purchase inputs from other industries, or potentially from within their own industry, for use in the production of outputs which are sold either to other industries or final consumers. Thus, a set of I-O accounts can be thought of as a "snapshot" of an impact area's economic structure. Flows of industrial inputs can be traced via the I-O accounts to show linkages between the industries composing the regional economy. The accounts are also transformed into a set of simultaneous equations that permit the estimation of economic impacts (changes in employment, income, etc.) resulting from changes in purchases of goods and services within the impact area. Economy wide regional impacts, measured as changes in jobs and income, of each potential operational change can be measured by applying the direct effects of irrigation, recreation, and construction expenditures to the model for each region.

Land Acquisition

A land acquisition for habitat element will occur in the Program. The regional impacts associated with restoration and management as well as the impacts of acquiring that land were analyzed. The costs for the actual land acquisition portion were input into the Personal Consumption Expenditure (PCE) category for medium income households sector. Several assumptions regarding the acquisition of habitat land for the Program are made and listed below.

Land Acquisition Assumptions

- The remaining habitat acquisitions (i.e., after Cottonwood Ranch²) will be in fee simple title and will occur in the Central Platte Habitat region.
- Outright purchase of land will cost approximately \$1,688³ per acre –this is a combination of 50% accretion, 25% grassland, and 25% cropland including surveys, appraisals, and administrative costs.⁴
- Accretion land sells for \$1,500 per acre, grassland for \$800 per acre and cropland for \$2,000 per acre.⁵
- For the Platte River Proposed Program, property taxes associated with acquired land habitat purchases will be paid by an outside entity as long as the Program is in place. Therefore, these are not considered in the regional impact analysis
- Approximately 50% of acquisition payments will stay within the region.⁶
- It is assumed that those areas which are cleared and lowered will require annual mechanical maintenance.
- It is estimated that those scenarios that contain pulse flows would require annual mechanical maintenance on approximately 25 percent of the acreage per area, whereas those scenarios that do not have pulse flows would require annual mechanical maintenance on 100 percent of the acreage.

²Cottonwood Ranch was acquired previously by Nebraska Public Power District (NPPD) in 1992, so its acquisition is not considered a cost of the Program.

³Estimate includes boundary surveys, appraisals, negotiations, and administration costs.

⁴Letter to Dale Strickland from Harvey L. Wittmier, Chief, Division of Realty, USFWS, for Finance Committee, February 11, 2000.

⁵Revisions to letter suggested by Mark Czaplewski, Central Platte Natural Resources District, March, 2000 and comparison to 7/95-6/98 Nebraska qualified agricultural land sales data.

⁶The UNL Farm Real Estate Market Development Survey, 1998-1999 and 2000-2001 estimates that percentage of active farmer/rancher purchases of land in Nebraska over the past two decades is much higher.

The payments to landowners that are estimated for this analysis are presented in Table A-1.

Table A-1: Payments to Landowners

	Acres	Total Cost	Amount entered into IMPLAN
Segment Plan (With Pulse Flows, All Clearing and Leveling, No Annual Maintenance, Full Sediment Source)	9,406	\$15,877,328	\$7,938,664
Cottonwood Ranch	2,570		\$0 ¹

Restoration and Management (R&M)

Total restoration and management is for the first thirteen years of the Program (first increment). These costs are based on the per acre cost of converting different types of land cover including agriculture. The direct effects are input into the IMPLAN model in the Agricultural, Forestry and Fishery Services sector which represents the sector where restoration and management costs occur. The specific acreage, costs, and land cover types are in Attachment 1. The implementation schedule is also taken into account for these totals.

Assumptions associated with restoration and management:

- It will cost \$850 per acre for leveling unvegetated channel, \$1,100 per acre for clearing and leveling riparian land covered with shrubs, and \$1,900 per acre for clearing and leveling riparian lands covered with trees.
- It will cost \$100 per acre to restore native grasses from agriculture.
- Without pulse flows, it will cost \$100 per acre per year to manage lands converted to bare sands.
- Without pulse flows, it will cost an average of \$100 per acre per year to manage lands converted to wet meadow (management practices include intermittent contouring, seeding and burning).
- With pulse flows, it will cost \$110 per acre per year manage lands converted to bare sand, native grasses and wet meadows, using the same management practices as above.
- It will cost \$200 per acre per year to manage abandoned sand and gravel operations (harrow and herbicide).
- There will be no agricultural production nor grazing on lands converted to wet meadow or native grasses in the managed habitat areas.
- There will be agricultural losses associated with land conversions from mown wet meadow to wet meadow, agriculture to wet meadow, and herbaceous to wet meadow.
- Costs associated with Cottonwood Ranch were determined from an existing study.⁷

⁷“Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes.” Western Ecosystems Technology, Inc. January 2000.

Table A-2: Restoration and Management Costs

Segment Plan	Restoration Cost	Management Cost	Sediment	Cottonwood Ranch	Total R&M
With Pulse Flows, All Clearing and Leveling, No Annual Maintenance, Full Sediment Source	\$2,349,175	\$463,188	\$2,278,409	\$1,673,874	\$6,764,646

Recreation

The expenditure data presented in the tables below are entered into the IMPLAN model for the sector best represented by that expenditure. The change in visitation is multiplied by the total expenditures to estimate the direct changes in recreation and, through the IMPLAN model, the indirect impacts that may occur throughout the region from the direct change are estimated. Since recreation changes occur on an annual basis, the number of years that recreation would change (i.e., after the particular element associated with the change in recreation is implemented) is applied. Recreational visitation to the Middle Platte River for hunting and birdwatching will come online when the segment plan is fully implemented in 2006.

Expenditure data for wildlife viewing in the Middle Platte River Basin area was taken from a 1998 study conducted by Fermata, Inc.⁸ Hunting expenditure data in the Middle Platte Basin were obtained from the 1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (National Survey) which was conducted by the US Fish and Wildlife Service and the Bureau of the Census. Information on the number of recreationists who originate from outside of the local spending area was obtained from the Fermata study which estimated that approximately 75-80 percent of visitors to the Middle Platte River are from outside the region. It is assumed that the changes that occur in the Middle Platte recreation area would not change the percentage of regional visitation. These percentages are accounted for in Tables A-3 and A-4 below.

⁸Platte River Nature Recreation Study: The Economic Impact of Wildlife Watching On the Platte River in Nebraska. Fermata, Inc., 1998.

Table A-3: Trip-related birdwatching expenditures in Middle Platte River Basin (1996)

<u>Expenditure</u>	<u>Avg exp. per day</u>
Personal vehicle/fuel	\$6.86
Hotel	\$19.01
B&B	\$0.58
Camping	\$0.28
R/V Park	\$0.10
Restaurants	\$13.84
Groceries	\$2.58
Equipment	\$1.14*
Souvenirs	\$4.60
Entrance/Registration fees	<u>\$3.23</u>
Total	\$52.22

* It is assumed that only 1/3 of equipment is purchased in the study area

Table A-4: Trip-related hunting expenditures for Middle Platte (1996)

<u>Expenditure</u>	<u>Avg. exp per day</u>
Food-groceries	\$6.57
Food-restaurant	\$5.38
Lodging	\$3.98
Gasoline and oil	\$8.33
Automobile repair	\$5.32
Privileges and fees	\$0.78
Heating and cooking fuel	\$0.74
ammunition/misc equipment*	<u>\$3.58</u>
Total	\$34.68

* Hunting equipment includes guns, rifles, ammunition, bows, decoys, game calls, telescopic sights, hunting dogs, hunting knives, camping gear, vans, and trail bikes

Hunting and Birdwatching Blind Construction

Blind construction costs are a one-time cost based on the number of new blinds that may be built on the acquired habitat lands. The number of blinds is based on converted river frontage footage (where the channel is greater than 500 ft in width) to wet meadow that would be available due to the newly restored and managed habitat lands. River frontage footage was estimated by the Reclamation GIS specialists. It is assumed that there may be four (4) hunting blinds per mile and one (1) bird-viewing blind per mile. This information was provided through interviews with USFWS, Nebraska Public Power District, Nebraska Game and Parks, and Central Nebraska Public Power and Irrigation District. Each blind may translate into increased visitation of 95

days per hunting blind and 800 days per birdwatching blind⁹ and thus, spending in the area. The blinds also have construction related impacts which are input into the IMPLAN model under the sector “new farm structures.” The costs associated with blind construction are displayed in Table A-5. These costs were multiplied by the number of potential blinds that could be constructed on the acquired lands. The number of potential blinds based on converted river frontage are displayed in Table A-6. Cottonwood Ranch is included under the same assumptions as the other acquired lands i.e., 4 hunting blinds per mile and 1 bird-viewing blind per mile.

Table A-5: Estimated Capital Cost to Construct a Hunting and a Bird Watching Blind

<u>Cost Item</u>	<u>Hunting Blind – Cost</u>	<u>Bird Watching Blind - Cost</u>
Capacity in persons	6	23
Size of parking pad	20' x 20'	40' x 40'
Parking Pad and 280 foot sidewalk, 4 feet wide	\$4,500	\$9,000
Blind - Ground level, handicapped accessible	\$1,000	\$3,833
Subtotal	\$5,500	\$12,833
Administrative (5%)	\$275	\$642
Total Capital Cost	\$5,775	\$13,475

Source: Based on information from Nebraska Game and Parks Commission obtained via telephone, Kearney, Nebraska.

Table A-6: Estimated Number of Hunting and Birdwatching Blinds

<u>Segment Plan and Cottonwood Ranch</u>	<u>Hunting Blinds</u>	<u>Birdwatching Blinds</u>
With Pulse Flows, All Clearing and Leveling, No Annual Maintenance, Full Sediment Source	42	10

Agriculture

Including Cottonwood Ranch, there are approximately 1,168 acres land that will be retired and converted under the segment plan. This Program is large-scale and attempts to keep third party impacts at a minimum, thereby converting or retiring a small amount of irrigated acreage relative to the total amount of acres being converted. The acreage will be retired on the restoration and management schedule and is accounted for appropriately. That is, irrigated acreage from the segment plan is scheduled to be taken out of production in 2006, in which case impacts will

⁹Hazen and Sawyer. Identification and Evaluation of Potential Third Party Impacts and Mitigation Strategies Related to the Habitat Component of the Proposed Platte River Recovery Program, June, 2000.

occur for only 8 years of the Program. Cottonwood Ranch's irrigated acreage is scheduled to go out of production around 2002, so these impacts will be seen in 12 out of 13 years of the Program. Agricultural land is not taken out of production under the sediment portion of the plan.

Table A-7: Estimated Agricultural Changes in Area and Revenues

Net Changes in Segment Plan				
IMPLAN Sector	Acres	Gross Revenue	Production Cost	Net Revenue
Forage	-459	-\$42,278	-\$7,688	-\$34,590
Feed Grains	-105	-\$41,449	-\$19,707	-\$21,742
Oil Crops	-66	-\$19,793	-\$6,441	-\$13,352
Total	-630	-\$103,520	-\$33,836	-\$69,684

Net Changes in Cottonwood Ranch				
IMPLAN Sector	Acres	Gross Revenue	Production Cost	Net Revenue
Forage	-179	-\$3,122	-\$238	-\$2,884
Feed Grains	-233	-\$91,960	-\$43,723	-\$48,237
Oil Crops	-125	-\$37,200	-\$12,106	-\$25,095
Total	-537	-\$132,282	-\$56,067	-\$76,216

Results

The results of the impact analysis are presented in Table A-8. Direct, indirect, induced and total impacts are reported in terms of Sales or industry output which represents the value of an industry's total production; Income which includes employee compensation (wages and salaries of workers and benefits such as health and life insurance and retirement payments), plus proprietary income (self-employed workers payments); Indirect business taxes which consist of excise taxes, property taxes, fees, licenses, and sales taxes paid by businesses; and Employment which includes full- and part-time workers.

Table A-8

Average Annual Total Impacts for Land Retirement Habitat Area	<u>Direct</u>	<u>Indirect</u>	<u>Induced</u>	<u>Total</u>
Sales	\$1,343,340	\$164,949	\$251,755	\$1,760,044
Income	\$330,293	\$51,510	\$90,428	\$472,230
Indirect Business Taxes	\$59,667	\$8,666	\$17,847	\$86,181
Employment	20.9	2.3	4.8	28.0

Impacts are positive because the costs associated with increased recreation, payments to landowners, and construction heavily outweigh the losses in agricultural production. The direct impacts are a large part of the total impacts and produce a relatively small amount of indirect and induced impacts.

Summary

This paper has presented a general methodology for estimating the regional economic impacts from retiring agricultural land along with a hypothetical application based on the Platte River Endangered Species Recovery Program. Many analyses of the impacts from reduced agricultural acreage assume that all of the impacts are negative. However, there can also be some offsetting positive regional impacts from land retirement. The basic information needed to evaluate the regional impacts of land retirement include: the amount that will be paid for the land to be taken out of production, the terms of the land retirement payments, the agricultural revenues and crop production expenses associated with the land targeted for retirement, the use of water that would be made available if land is retired, and the pattern of spending that would be expected from those who receive land retirement payments. Using this information, the true regional economic impacts of retiring agricultural land can be estimated.

References

Bureau of Census, 2000.

Fermata, Inc. Platte River Nature Recreation Study: The Economic Impact of Wildlife Watching On the Platte River in Nebraska, 1998.

Hazen and Sawyer. Identification and Evaluation of Potential Third Party Impacts and Mitigation Strategies Related to the Habitat Component of the Proposed Platte River Recovery Program, June, 2000.

Janssen, L., L. Venhuizen, and M. Beutler. 1997. "Economic Impacts of Post-CRP Policy Options in South Dakota," selected paper for the Western Agricultural Economics Association 1997 Annual Meeting, July 13-16, Reno/Sparks, Nevada.

Leistritz, F. L. 1998. "Using Input-Output (I-O) Analysis in Evaluating Conservation Programs and Projects: Lessons Learned from Evaluation of the Conservation Reserve Program (CRP)," paper presented at the American Agricultural Economics Association Meetings, symposium on Challenges and Solutions in Using Input-Output Analysis for Conservation Programs and Projects, Aug. 2-5, Salt Lake City, Utah.

The UNL Farm Real Estate Market Development Survey, 1998-1999 and 2000-2001.

Western Ecosystems Technology, Inc. "Draft Habitat Management Methods for Least Terns, Piping Plovers, and Whooping Cranes." January 2000.

Attachment

Clearing and Leveling Restoration Costs for Segment A				
Land Cover Type Affected		Acres Affected	Cost Per Acre	Total Restoration Cost Per Management Area
Shrubs to Bare Sand	SH/Shrubs inside Floodplain	105.9	\$1,100	\$116,490
Woody to Bare Sand	WO/Wooded Riparian	25.5	\$1,900	\$48,450
Herbaceous to Wet Meadow	H/Herbaceous Riparian	19.5	\$850	\$16,575
Shrubs to Wet Meadow	SH/Shrubs inside Floodplain	58.9	\$1,100	\$64,790
Wooded to Wet Meadow	WO/Wooded Riparian	350.9	\$1,900	\$666,710
Mown Wet Meadow to Wet Meadow	MWM/Mown Wet Meadow	171.7	\$100	\$17,170
Total		732.4		\$930,185

Clearing and Leveling with Pulse Flows
Annual Management Costs for Segment A

Land Cover Type Affected		Acres Affected	Cost Per Acre	Annual Management Cost Per Management Area
Shrubs to Bare Sand	SH/Shrubs inside Floodplain	105.9	\$110	\$11,649
Woody to Bare Sand	WO/Wooded Riparian	25.5	\$110	\$2,805
Herbaceous to Wet Meadow	H/Herbaceous Riparian	19.5	\$110	\$2,145
Shrubs to Wet Meadow	SH/Shrubs inside Floodplain	58.9	\$110	\$6,479
Wooded to Wet Meadow	WO/Wooded Riparian	350.9	\$110	\$38,599
Mown Wet Meadow to Wet Meadow	MWM/Mown Wet Meadow	171.7	\$110	\$18,887
Total		732.4		\$20,141*

* Assume 25% of area needs annual mechanical maintenance

Clearing and Leveling

Restoration Costs for Segment B				
Land Cover Type Affected		Acres Affected	Cost Per Acre	Total Restoration Cost Per Management Area
Woody to Native Grasses	WO/Woody Riparian	86.9	\$1,900	\$165,110
Woody to Wet Meadow	WO/Woody Riparian	306.9	\$1,900	\$583,110
Mown Wet Meadow to Wet Meadow	MWM/Mown Wet Meadow	206.5	\$100	\$20,650
Total		600.3		\$768,870

Clearing and Leveling with Pulse Flows Annual Management Costs for Segment B				
Land Cover Type Affected		Acres Affected	Cost Per Acre	Annual Management Cost Per Management Area
Woody to Native Grasses	WO/Woody Riparian	86.9	\$110	\$9,559
Woody to Wet Meadow	WO/Woody Riparian	306.9	\$110	\$33,759
Mown Wet Meadow to Wet Meadow	MWM/Mown Wet Meadow	206.5	\$110	\$22,715
Total		600.3		\$16,508*
*Assume 25% of area needs annual mechanical maintenance				

Clearing and Leveling Restoration Costs for Segment C				
Land Cover Type Affected		Acres Affected	Cost Per Acre	Total Restoration Cost Per Management Area
Shrubs to Bare Sand	SH/Shrubs inside Floodplain	16.3	\$1,100	\$17,930
Woody to Bare Sand	WI/Woody on Island	12.0	\$1,900	\$22,800
Woody to Wet Meadow	WO/Woody Riparian	76.1	\$1,900	\$144,590
	WI/Woody on Island	205.1	\$1,900	\$389,690
Agricultural to Native Grasses	SB/Soy Beans	52.9	\$100	\$5,290
	CO/Corn	105.2	\$100	\$10,520
	MF/Mown Field	61.4	\$100	\$6,140
	OC/Other Crops	13.5	\$100	\$1,350
Shrubs to Wet Meadow	SH/Shrubs inside Floodplain	47.1	\$1,100	\$51,810
Total		589.6		\$650,120

Clearing and Leveling with Pulse Flows
Annual Management Costs for Segment C

Land Cover Type Affected		Acres Affected	Cost Per Acre	Annual Management Cost Per Management Area
Shrubs to Bare Sand	SH/Shrubs inside Floodplain	16.3	\$110	\$1,793
Woody to Bare Sand	WI/Woody on Island	12.0	\$110	\$1,320
Woody to Wet Meadow	WO/Woody Riparian	76.1	\$110	\$8,371
	WI/Woody on Island	205.1	\$110	\$22,561
Agricultural to Native Grasses	SB/Soy Beans	52.9	\$110	\$5,819
	CO/Corn	105.2	\$110	\$11,572
	MF/Mown Field	61.4	\$110	\$6,754
	OC/Other Crops	13.5	\$110	\$1,485
Shrubs to Wet Meadow	SH/Shrubs inside Floodplain	47.1	\$110	\$5,181
Total		589.6		\$16,214

Sediment Augmentation Plan--Full Sediment Source Clearing and Leveling				
Land Cover Type Affected		Area (Acres)	Cost Per Acre	Total Annual Cost Per Management Area
Woody to Bare Sand	WO/Woody Riparian	871.7	\$1,900	\$1,656,230
Wet Meadow to Bare Sand	H/Herbaceous Riparian	7.9	\$850	\$6,715
Herbaceous to Bare Sand	H/Herbaceous Riparian	245.2	\$850	\$208,420
Shrubs to Bare Sand	SH/Shrubs	120.8	\$1,100	\$132,990
Total		1245.7		\$2,004,355

Annual Management Costs for Sediment Augmentation Plan with Pulse Flows				
Land Cover Type Affected		Acres Affected	Cost Per Acre	Annual Management Cost Per Management Area
Shrubs to Bare Sand	SH/Shrubs inside Floodplain	120.9	\$110	\$13,299
Herbaceous to Bare Sand	HI/Herbaceous on Island	245.2	\$110	\$26,972
Woody to Bare Sand	WO/Wooded Riparian	871.7	\$110	\$95,887
Wet Meadow to Bare Sand	H/Herbaceous Riparian	7.9	\$110	\$869
Total		1245.7		\$34,257*
*Assume 25% of area needs annual mechanical maintenance				