

# Appendix C

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## **Economic Impacts of the Proposed San Joaquin River National Wildlife Refuge Expansion**

Proposed Expansion San Joaquin River National Wildlife Refuge  
San Joaquin, Stanislaus, and Merced Counties, California



# Economic Impacts of the Proposed San Joaquin River National Wildlife Refuge Expansion

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## Introduction

Located in California's Central Valley, the San Joaquin River National Wildlife Refuge (Refuge) includes more than 10,600 acres of riparian woodlands, wetlands, and grasslands that provide habitat for migratory birds, fish, and wildlife. The U.S. Fish and Wildlife Service has proposed to expand the Refuge in order to build upon current efforts by the Service, the U.S. Bureau of Reclamation, state agencies, and local and national conservation groups, to preserve and restore a corridor of habitat along the San Joaquin River. The Service is currently in the process of developing an Environmental Assessment (EA) to determine the effects on the human environment of expanding the Refuge including whether the proposed expansion would have a significant effect on the local socioeconomic environment. The EA will assess three alternatives: the no action alternative, and two action alternatives that would expand the Refuge boundary and provide the Service authority to acquire additional lands as part of the Refuge. Under Alternative 1 (the no action alternative), the Refuge boundary would not be expanded and the Service would not pursue acquiring additional interest in lands. Under Alternatives 2 and 3, the Refuge would pursue expansion of the Refuge through fee-title and conservation easement acquisitions from willing land owners. Alternative 2 would expand the Refuge south approximately 21 miles along the San Joaquin River corridor. The proposed southern expansion area would target approximately 8.6 thousand acres in Merced, San Joaquin, and Stanislaus Counties. Alternative 3 would expand the Refuge south as in Alternative 2 and would also expand the Refuge north approximately 10 miles along the San Joaquin River corridor. The proposed northern expansion area would target an additional 4.3 thousand acres in San Joaquin County. Combined with the southern reach, Alternative 3 would target a total of approximately 12.9 thousand acres.

The purpose of this study is to evaluate the possible effects to local communities from expanding the San Joaquin River NWR. Where possible, economic effects are measured using regional economic impact analysis methods. Regional economic impact analysis provides a means of estimating how current

Refuge activities affect the local economy and how an expansion of the Refuge would affect the local economy. This type of analysis provides two critical pieces of information: 1) it illustrates the Refuge’s contribution to the local community; and 2) it can help in determining the degree of economic effects across expansion scenarios, as is pertinent when assessing the proposed alternatives.

Lands acquired through fee-title purchases would be managed by the Service and would be removed from county tax rolls. These lands would be converted from farmland to riparian and upland habitat, which could result in a loss of agricultural production income for farmers and the elimination of purchases for farming related inputs. However, restoration activities on new Refuge lands acquired through fee-title acquisition would require the purchase of labor and supplies and would support jobs and local businesses. The proposed Refuge expansion would create new recreational opportunities that are anticipated to draw additional non-local visitors to the Refuge, thus increasing economic activity associated with visitor spending in the local economy. Furthermore, the proposed expansion of the Refuge would create additional local economic activity through increased spending by the Refuge on operations and maintenance, and increased salary spending by Refuge personnel.

It is important to note that the economic value of the Refuge encompasses more than just the impacts on the regional economy. The Refuge also provides substantial nonmarket values (values for items not exchanged in established markets) through ecosystem services that directly and indirectly impact human welfare. For instance, the Refuge seeks to restore and maintain important habitat with increased suitability for wildlife species, and thereby provide enhanced wildlife-based recreation opportunities. Additionally, the Refuge conserves fragile riparian areas that naturally provide flood retention services, lessening potential damages to nearby homes, businesses, and agricultural fields. These values are addressed in this report; however, quantifying these types of nonmarket values is beyond the scope of this study. Table 1 lists the economic issues addressed in this analysis.

**Table 1.** Economic effects of the proposed expansion of the San Joaquin River NWR

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- Conservation and ecosystem service values provided by the Refuge
  - Benefits to the local community
  - Landowner compensation for fee-title and conservation easement acquisitions
  - Changes to local government revenues
  - Effects on the local agricultural industry\*
  - Effects of habitat restoration activities on the local economy\*
  - Effects of Refuge visitor expenditures in the local economy\*
  - Effects of Refuge purchases of goods and services within the local economy\*
  - Effects of Refuge personnel salary spending within the local economy\*
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\* Measured using regional economic impact analysis

This report first describes the methods used to conduct a regional economic impact analysis. Next, a description of the local communities and economy near the Refuge is presented, followed by an analysis of the economic effects listed in Table 1. The analyses presented in this study quantify the current economic contributions associated with each of the effects, and provide information about how these contributions may change under each of the proposed expansion alternatives. It is important to note that the extent and timing of land acquisitions under the proposed expansion alternatives will be determined by available budgets and by the willingness of landowners to sell their properties or enter into conservation easement agreements with the Service. Due to the size of the proposed Refuge expansion and the value of the agricultural land, it is expected that it may take up to 45 years to acquire only 50% of the proposed lands and that many of the properties within the proposed expansion areas may never be acquired by the Service. All of the analyses presented in this report are based on current land use and the current economy in the local area. The conversion of private land to Refuge land will happen incrementally over a greater than 45-year horizon; thus, the changes described in this analysis will happen slowly. Furthermore, people,

industries, and the economies they comprise change and adapt constantly; thus, it is not possible to precisely predict how the proposed expansion alternatives will affect the local economy given these circumstances.

## Methods for a Regional Economic Impact Analysis

Economic input-output models are commonly used to determine how economic sectors will and will not be affected by demographic, economic, and policy changes. The analyses presented in this report were estimated using IMPLAN (Impact Analysis for Planning), a widely used input-output software and data system. The IMPLAN platform was developed by the U.S. Forest Service and is now privately maintained and updated by the Minnesota IMPLAN Group (MIG). The IMPLAN model draws upon data collected by MIG from multiple federal and state sources including the Bureau of Economic Analysis, Bureau of Labor Statistics, and the U.S. Census Bureau (Olson and Lindall, 1999).

Economic input-output models capture the complex interactions of consumers and producers of goods and services in local economies. Economies are complex webs of interacting consumers and producers in which goods produced by one sector of an economy become inputs to another, and the goods produced by that sector can become inputs to yet other sectors. Thus, a change in the final demand for a good or service can generate a ripple effect throughout an economy. For example, if more visitors come to an area, local businesses will purchase extra labor and supplies to meet the increase in demand for additional services. The income and employment resulting from visitor purchases from local businesses represent the *direct* effects of visitor spending within the economy. Direct effects measure the net amount of spending that stays in the local economy after the first round of spending; the amount that doesn't stay in the local economy is termed a leakage (Carver and Caudill, 2013). In order to increase supplies to local businesses, input suppliers must also increase their purchases of inputs from other industries. The income and employment resulting from these secondary purchases by input suppliers are the *indirect* effects of visitor spending within the economy. Employees of the directly affected businesses and input suppliers use their incomes to purchase goods and services. The resulting increased economic activity from new employee income is the *induced* effect of visitor spending. The indirect and induced effects are known as the secondary effects of visitor spending. "Multipliers" (or "response coefficients") capture the size of the secondary effects, usually as a ratio of total effects to direct effects (Stynes, 1998). The sums of the direct and secondary effects describe the total economic impact of visitor spending in the local economy.

For the purposes of an economic impact analysis, a region (and its economy) is typically defined as all counties within a 30-60 mile radius of the impact area. Only spending that takes place within this regional area is included as stimulating changes in economic activity. The size of the region influences both the amount of spending captured and the multiplier effects. The San Joaquin River NWR currently lies within San Joaquin and Stanislaus Counties. Under the proposed expansion alternatives, the Refuge would extend up to 1,000 acres into Merced County. Merced, San Joaquin, and Stanislaus Counties comprise the local economic region for this analysis, and the year 2009 IMPLAN v3 county-level data profiles for these three counties were used in this study. The IMPLAN county level employment data estimates were found to be comparable to the US Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System data for the year 2009. All economic impacts reported in this analysis are on an annual basis in 2011 dollars. Regional economic effects from the IMPLAN model are reported for the following categories:

- **Employment** represents the change in the number of jobs generated in the region from a change in regional output. IMPLAN estimates for employment include full time, part time, and temporary jobs.
- **Labor Income** includes employee wages and salaries, including income of sole proprietors and payroll benefits.

- **Value Added** measures contribution to Gross Domestic Product. Value added is equal to the difference between the amount an industry sells a product for and the production cost of the product, and is thus net of intermediate sales.

## Description of the Three-County Area Surrounding the Refuge

### Population

The Refuge and the lands within the proposed expansion areas are located in the northern portion of California’s Central Valley, spanning Merced, San Joaquin, and Stanislaus counties. Population statistics for these counties are provided in Table 2. This three-county area experienced tremendous growth over the past decade as restrictive land use policies have contributed to increases in housing prices in the neighboring San Francisco Bay Area (Kok and others, 2010). Between 2000 and 2010, the San Joaquin Valley grew more than 50 percent faster than the Bay Area as many households migrated east in search of more affordable housing (United States Census Bureau, 2010b). While statewide figures indicate California grew nearly 10 percent over the last decade, these three San Joaquin Valley counties experienced growth in excess of 18 percent, growing to an estimated 1.46 million residents in 2010 (United States Census Bureau, 2010b).

Population growth in the three-county area is expected to continue to grow at a rate that well exceeds statewide projections. Statewide forecasts project California will grow more than 19 percent between 2010 and 2030 (California Department of Finance, 2012). During this same time period, local growth in the three-county area is expected to approach 35 percent, with the greatest projected increases occurring in rural Merced and San Joaquin Counties (40.4 percent and 36.3 percent, respectively) (California Department of Finance, 2012).

**Table 2.** Population statistics for the three-county area surrounding the San Joaquin River National Wildlife Refuge.

	Residents 2010 <sup>a</sup>	Persons per square mile 2010 <sup>a</sup>	Percentage Population Change (2000-2010) <sup>a</sup>	Percentage Population Change (2010-2030) <sup>b</sup>
California	37,253,956	239.1	9.7%	19.5%
Merced	255,793	132.2	21.5%	40.4%
San Joaquin	685,306	492.6	21.6%	36.3%
Stanislaus	514,453	344.2	15.1%	29.3%

Sources: <sup>a</sup>(United States Census Bureau, 2010b); <sup>b</sup>(California Department of Finance, 2012)

### Employment Overview

In 2010, total employment in the three-county region was around 568,000 jobs with about half of these jobs located in San Joaquin County. Fifty-three percent of the total employment in the study area came from five main sectors: educational, health, and social services (12 percent); public administration (13 percent); retail trade (11 percent); professional, scientific, management, administration, and waste services (9 percent); and manufacturing (8 percent).

Jobs in agriculture, forestry, mining, fishing and hunting accounted for 8 percent of total employment in the study area, and collectively represented the seventh largest sector in the three-county area. In 2010, farm employment accounted for 63 percent of these jobs, with over 28,000 jobs in the three counties coming from farm employment alone. The three-county region was much more dependent on farm earnings (8 percent of total income in the three-county area from farm income) than the state of California (1 percent of total earnings from farming). Of the three counties in the study area, farm earnings

in Merced County represented the largest share of total earnings (16 percent of total earnings) and San Joaquin County reported the smallest share of earnings from farming (5 percent) (Bureau of Economic Analysis, 2012).

## Agricultural Industry

The San Joaquin Valley is one of the most productive agricultural regions in the world, and the three counties of the study region are consistently among the most productive counties in the Valley. In 2007, agricultural activities in the San Joaquin Valley were valued at \$26 billion and supported nearly 173,000 jobs (U.S. Department of Agriculture, 2007; California Employment Development Department, 2010). In terms of harvested acres, the top five crops in the three-county region in 2007 included forage (*i.e.* land used for all hay, grass silage, and greenchop), almonds, corn for silage, grapes, and cotton (U.S. Department of Agriculture, 2007).

In recent decades, agricultural production in the San Joaquin Valley has shifted away from wildlife friendly crops such as grain, hay, and alfalfa in favor of higher valued crops. This trend is most apparent in the increased production of almonds and wine grapes in the Valley. About 80 percent of all California-grown almonds are produced in the Valley, and Merced and Stanislaus Counties are some of the largest producers in the region (U.S. Department of Agriculture, 1999). Almond production in the Valley has nearly doubled over the past decade, reaching nearly 1.4 billion pounds in the 2010/2011 crop year (San Joaquin Valley Regional Planning Agencies, 2012). The California wine industry has also developed rapidly. Since the 1960s, the culture of grapes for wine production in San Joaquin County has grown dramatically in order to accommodate changing consumer preferences. In 2010, San Joaquin County was California's largest producer of grapes for wine (San Joaquin County Department of Agriculture, 2010). Table 3 shows land use and the value of agricultural products in California and in the three-county area.

**Table 3.** Land use and the value of agricultural production in California and the three-county area.

	California	Merced	San Joaquin	Stanislaus	Three-County Area
<b>Land Use, 2007<sup>a</sup></b>					
Number of Farms	81,033	2,607	3,624	4,114	10,345
Proportion of land area in farms	25%	84%	83%	82%	83%
Land in Farms (acres)	25,364,695	1,041,115	737,503	788,954	2,567,572
Croplands	9,464,647	537,716	492,032	351,195	1,380,943
Woodlands	1,270,720	3,164	4,548	7,382	15,094
Permanent pasture and rangeland	13,275,042	456,195	206,363	403,786	1,066,344
Land in farmsteads, buildings, livestock facilities, etc.	1,354,286	44,040	34,560	26,591	105,191
	<b>California<sup>b</sup></b>	<b>Merced<sup>c</sup></b>	<b>San Joaquin<sup>d</sup></b>	<b>Stanislaus<sup>e</sup></b>	<b>Three-County Area</b>
<b>Cash Receipts, 2010 (\$1,000)</b>					
Field Crops	\$3,534,345	\$329,114	\$314,357	\$234,083	\$877,554
Vegetable Crops	\$6,880,466	\$317,794	\$256,261	\$244,263	\$818,318
Fruit & Nut Crops	\$13,495,410	\$465,648	\$935,155	\$703,874	\$2,104,677
Apiary Products	\$3,751,416	\$45,855	\$76,931	\$114,363	\$237,149
Nursery Goods	\$333,476	\$27,596	\$13,349	\$48,630	\$89,575
Livestock and Livestock Products	\$8,119,467	\$1,109,815	\$417,427	\$775,745	\$2,302,987

Poultry and Poultry Products	\$1,426,520	\$430,024	\$47,313	\$406,243	\$883,580
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Sources: <sup>a</sup>(U.S. Department of Agriculture, 2009); <sup>b</sup>(California Department of Food and Agriculture, 2010); <sup>c</sup>(Merced County Department of Agriculture, 2010); <sup>d</sup>(San Joaquin County Department of Agriculture, 2010); <sup>e</sup>(Stanislaus County Department of Agriculture, 2010)

Production within the three-county area is diverse and is attributed with earning 19 percent of California’s cash receipts in 2010, or roughly \$7.3 billion (California Department of Food and Agriculture, 2010; Merced County Department of Agriculture, 2010; San Joaquin County Department of Agriculture, 2010; Stanislaus County Department of Agriculture, 2010). The top five most valuable commodities produced in the area include: milk, almonds and walnuts, poultry, cattle and calves, and grapes. County reports indicate this region produces more than half of all California poultry, cherries, asparagus, and pumpkins, and more than 90 percent of the state’s blueberries (Merced County Department of Agriculture, 2010; San Joaquin County Department of Agriculture, 2010; Stanislaus County Department of Agriculture, 2010).

## Economic Effects of the Proposed Expansion

### Conservation and Ecosystem Service Values

Ecosystems are integrated natural communities stemming from the interactions among and between humans, animals, and the physical environment. The natural functions maintained by a healthy ecosystem provide ecological goods and services which preserve the natural capital required to maintain biodiversity and provide for the social, cultural, and economic needs of humans. The beneficial outcomes of these ecological processes provide “provisioning services” such as food, water and timber; “regulating services” such as flood and disease regulation; “cultural services” including recreational and spiritual services; and “supporting services” such as soil formation and nutrient cycling (Millennium Ecosystem Service Assessment, 2005).

The worth of natural ecosystems stem from their implicit non-market values, which are often overlooked in private decision making processes. Since the economic value of ecosystem services is equal to the total social benefits they provide, it is important to account for both the market and non-market values of these resources (Freeman, 1993). Undervaluation of ecosystem resources is known to cause the under provision of natural capital; thus, conservation and restoration efforts usually stem from the coordination of government agencies and public trusts. Conservation easements and fee-title acquisitions can protect non-market values associated with biodiversity and wildlife abundance, maintain aesthetic beauty, and protect social and culturally significant features of landscapes and livelihoods (Ehrlich and Ehrlich, 1992; Daily, 1997; Millennium Ecosystem Service Assessment, 2005). Ecosystem services, such as flood mitigation, water purification, oxygen production, pollination, and waste breakdown, are also maintained and/or enhanced through land preservation (Millennium Ecosystem Service Assessment, 2005). These services can have significant impacts on the welfare of those living in the area and beyond.

The primary public benefit of Service conservation easements and fee-title acquisitions is enhanced and preserved wildlife habitat. Conservation easements on private lands strengthen the resiliency of species habitat and provide opportunities for wildlife movement and adaptation. Land acquired by the Refuge through fee-title purchases will be restored to provide important habitat and resources for endangered species, migratory birds, fish, and native plants. These types of habitat preservation have been shown to stabilize and increase wildlife populations (Reynolds and others, 2001). It is well documented that people derive an economic value from various wildlife-related recreation activities on National Wildlife Refuges above what they actually spend to participate in these activities (U.S. Fish and Wildlife Service (USFWS), 2003; Carver and Caudill, 2013). Further, people may derive

non-use, or passive use, economic values from simply knowing that a resource exists in a particular condition or is maintained for future generations (Krutilla, 1967). For instance, it has been found that people are willing to pay between \$13 and \$145<sup>1</sup> per year per household for the preservation of threatened, endangered and rare avian species (Richardson and Loomis, 2009). These values represent the average total economic value of the species per household and comprise both use (wildlife viewing) and nonuse (existence and bequest) values. Loomis and Richardson found that the total economic value associated with the preservation of a species is related to whether the species has use and nonuse values versus nonuse values only, whether the species is a charismatic megafauna or not, and the expected change in the size of the population of the species resulting from preservation efforts. Although estimating the economic value of preserving species in the San Joaquin Valley is beyond the scope of this analysis, the Richardson and Loomis estimates of household willingness to pay to preserve threatened, endangered and rare avian species demonstrate the value that the public places on these species and their preservation.

Another major public benefit of the proposed Refuge expansion and subsequent riparian restoration is the potential for flood mitigation. Merced, San Joaquin, and Stanislaus Counties lie in the Central Valley’s historic floodplain. This region has been historically prone to flooding as runoff from the Sierra Nevada Mountains makes its way to the Pacific Ocean through the Sacramento-San Joaquin Delta. Although catastrophic floods dating back to the mid 1800’s have been reported in the Sacramento and San Joaquin River Basins, the continued investment in flood damage protection and water supply projects have allowed extensive development of highly productive agricultural lands and the growth of urban centers within the floodplain (U.S. Army Corp of Engineers, 2009; California Department of Water Resources, 2011).

Increased development activities along these waterways have permanently altered natural flows and increased the need for integrated flood management to maximize the ecological benefits of floodplains, while reducing the loss of life and minimizing the economic impacts of flood-related natural disasters (California Department of Water Resources, 2009). Coordinated efforts by federal, state, and local agencies have incorporated structural approaches, land use management, and disaster preparedness, response, and recovery to help mitigate impacts of flood events (California Department of Water Resources, 2009). Although the construction of more than a dozen multi-use dams and over 1,600 miles of federal-state project levees in the Central Valley have helped alleviate routine seasonal flooding in the region, residual flood risk in the San Joaquin River Basin remains among the highest in the country (California Department of Water Resources, 2011).

Between 1900 and 1997, these river basins experienced 13 major floods, including the historic 1997 New Year’s Day Flood which is recorded as the most destructive in California’s history (U.S. Army Corp of Engineers, 2009). The most recent flood events occurred in 1983, 1986, 1995, and 1997, costing the public, private, and agricultural sectors of California more than \$3.1 billion in damage (U.S. Army Corp of Engineers, 2009). Table 4 provides estimates of damage incurred by Merced, San Joaquin, and Stanislaus Counties during these events. The proposed expansion and subsequent restoration of the San Joaquin River NWR is expected to reduce potential future damages from flooding events by restoring the fragile riparian areas that naturally provide flood retention services. When this land is managed as floodplain habitat as part of the Refuge, it will be removed from the rolls of "at risk" lands needing expensive flood protection, flood damage repair, and flood damage payments. Flooding on Refuge lands is welcomed as part of the natural geomorphological processes of the area.

**Table 4.** Historical Rain Flood Damage Sustained (\$1,000's)\*.

	1983	1986	1995	1997
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<sup>1</sup> Reported in 2011 dollars.

<b>Merced</b>				
Private	\$452	\$144	---	---
Public	\$935	---	---	\$799
Agricultural	---	---	\$57,348	\$10,665
<b>San Joaquin</b>				
Private	---	\$13,340	---	\$79,184
Public	\$57,000	\$14,855	---	\$13,314
Agricultural	\$220,271	---	\$6,640	\$18,857
<b>Stanislaus</b>				
Private	\$251	---	---	\$34,098
Public	\$1,301	---	---	\$32,515
Agricultural	\$27,553	---	\$77,411	\$43,211

\*Reported in 2011 dollars

Source: (U.S. Army Corp of Engineers, 2009)

## Benefits to the Local Community

Protected lands act as a buffer which benefit residents through increased biodiversity, recreational quality, and hunting opportunities on publicly accessible wildlife refuges and on some private lands (Rissman and others, 2007). It is well documented that open space carries positive values to local residents and communities, as well as to passers-by (McConnell and Walls, 2005). This is evidenced by the success of open space preservation ballot initiatives at the local, county, and state levels. Banzhaf and others (2006) point out that between 1997 and 2004, over 75 percent of the more than 1,100 referenda on open space conservation that appeared on ballots across the United States passed, most by a wide margin.

It is also well documented that open space and protected natural areas can increase surrounding property values (see McConnell and Walls, 2005 for a comprehensive review). The reciprocating value of open space on property values will vary depending on landscape characteristics and location attributes (for example, distance to the conserved area) (Kroeger, 2008). The permanence of the open space is also an influencing factor. Typically, open space that is permanently protected (such as refuge lands and lands protected with perpetual conservation easements) will generate a higher enhancement value of local properties than land that has the potential for future development (Geoghegan and others, 2003). A recent study by Taylor et al. determined the effect of National Wildlife Refuges on nearby homeowners' property values (2012). This national study included all refuges located within two miles of an urbanized area, and specifically included the San Joaquin River NWR. The study found that homes in the Nevada and California region that are located within 0.5 miles of a National Wildlife Refuge and within 8 miles of an urban center are valued 3% to 6% higher as a result of the open space amenities provided by the Refuge. This translates to an average of \$7.6 million in total property value increases per Refuge.

In addition to directly affecting homeowners surrounding the Refuge, conservation easement and fee-title purchases would also inject new money into the local economy. The sale of conservation easements and fee-title lands provides landowners with additional revenue. Some percentage of these funds may be spent in the local economy, including purchasing new real estate, consumer goods, or services in the local area.

## Landowner Compensation

The Service proposes to acquire land through fee-title purchase or through conservation easements from willing sellers. For fee-title acquisitions, land owners would be compensated for the fair market value of the land, which is the competitive price the land would sell for on the open market. In the case of fee-title acquisition, land owners would forfeit all rights of ownership and turn the property over to the Service. In the case of conservation easements, landowners would be compensated for the fair market

value of the easement. The fair market value of a conservation easement is determined through an appraisal process. An appraiser estimates how much the land would sell for unencumbered by the conservation easement (the “before” value) and how much the land would sell for with the conservation easement in place (the “after” value). The value of the conservation easement is equal to the before value minus the after value, or the difference in the fair market value of the property with and without the easement. Landowners may also choose to donate conservation easements to the Service. The donation of a conservation easement may qualify as a tax-deductible charitable donation, which may result in Federal income tax benefits. The sale of a conservation easement for less than its fair market value (called a “bargain sale”) may also qualify for tax deductions. Landowners may be able to claim a charitable income-tax donation equal to the difference between the fair market value and the bargain sale price of their easement. Income from the sale of a conservation easement may be taxable<sup>2</sup>.

Conservation easements reduce the value of an encumbered property. A conservation easement will reduce the fair market value of an estate, because the easement permanently removes some of the estate’s development potential and may place additional use restrictions on the land. The reduction in value depends on the potential development value of the land and the level of restriction agreed upon in the easement. In general, an easement on land located in an area with high development pressure will have a greater effect on the value of the land than an easement on land located in an area with low development pressure, and an easement that is more restrictive will have a greater effect on the value of the land than an easement that is less restrictive. The Service will purchase easements at their appraised fair market value; therefore, easements on lands with high development pressure will receive higher payments.

## Changes to Local Government Revenues

Local governments collect revenue through intergovernmental transfers, property taxes, sales taxes, personal income taxes, and other charges, such as permitting. These revenues are then spent to provide community services such as fire and police services, schools, infrastructure, and public spaces. Local government cost-to-revenue ratios are largely determined by land uses within their jurisdictions. Areas with residential development tend to have high cost-to-revenue ratios because these areas require the greatest number of municipal services. Conversely, areas with predominately agricultural and open-space uses tend to have lower cost-to-revenue ratios (American Farmland Trust, 2001). Like agricultural properties, National Wildlife Refuges tend to require fewer local government services and thus represent lower costs to local government. However, National Wildlife Refuges do not pay property taxes on their holdings. Property taxes constitute the largest source of local governments’ own revenue (Urban Institute and Brookings Institution, 2008). The purchase of fee-title lands at fair market value will reduce the amount of property tax revenue collected by local governments in the three-county area. Under federal fee-title ownership, counties would qualify for reimbursement of some property tax revenue foregone under the Refuge Revenue Sharing Act (RRS) of 1935, which allows the Service to make annual payments to local governments in areas where fee-title purchases have removed land from the tax rolls. Under provisions of the RRS Act, local counties receive an annual payment for lands that have been purchased by full fee-title acquisition by the Service. Payments are based on the greater of 75 cents per acre or 0.75% of the fair market value. The exact amount of the annual payment depends on Congressional appropriations, which in recent years have tended to be substantially less than the amount required to fully fund the authorized level of payments. For the years 2001 through 2009, RRS payments averaged 46.5% of the full 0.75% of the fair market value. In fiscal year 2009, actual RRS payments were 30.7% of authorized levels, and in fiscal year 2010, actual RRS payments were 21.6% of authorized levels.

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<sup>2</sup> Please note that the Service does not give tax advice. Landowners considering entering into a conservation agreement with the Service should consult a tax advisor or attorney for advice on how a conservation easement would affect their taxes and estate.

For most types of properties, county assessors use fair market value to determine property tax liabilities. The fair market value of land is the amount that a property is estimated to sell for. For agricultural land, this value includes both the productive value of the land and any speculative value associated with the possibility of developing the land. In California, property taxes are limited by Proposition 13 and the California Land Conservation Act (commonly referred to as the Williamson Act). Under Proposition 13, properties are reassessed to the current fair market value only upon a change in ownership or upon the completion of new construction, and property tax liabilities may increase annually by no more than two percent to adjust for inflation (California Board of Equalization, 2009). This unique property tax law means that longtime property owners tend to have property tax liabilities that are substantially lower than the current fair market value of their property. Parcels classified as agricultural, which account for 81% of the parcels in the proposed southern expansion area and 78% of the parcels in the proposed northern expansion area (ParcelQuest, 2012), are assessed either under Proposition 13 or under the Williamson Act. The Williamson act enables agricultural landowners to enter into contracts with their county government that require them to restrict land use on their parcel to agricultural or open space uses. In return, landowners receive special assessments on their land that are based only on the productive value of the land rather than the full fair market value (State of California Department of Conservation, 2012).

It is expected that easements would account for approximately 5% of the acquired lands in the proposed expansion area. For lands under conservation easements, landowners would remain responsible for all property taxes. Conservation easements reduce the fair market value of these properties by removing the speculative value associated with possible development; however, conservation easements generally do not affect the productive value of agricultural land. Because the majority of agricultural properties in the proposed expansion areas are assessed under the Williamson Act (61% of agricultural parcels in both the proposed southern and northern expansion areas), conservation easements are expected to have little to no impact to the current property tax base for the three-county area.

Full fee-title purchases would account for the remaining 95% of the acquired lands in the proposed expansion area. For these lands, private property tax payments would be replaced by RRS payments. In 2011, property taxes totaled \$447,483 and \$257,869 for the parcels located in the proposed southern and northern expansion areas, respectively (Merced County Treasurer-Tax Collector, 2012; San Joaquin County Office of the Treasurer, 2012; Stanislaus County Treasurer / Tax Collector, 2012). Table 5 shows 2011 property taxes paid by county for properties located within each of the proposed expansion areas. Property taxes in the proposed expansion areas averaged \$34.92 per acre; however, per acre property tax values varied substantially from parcel to parcel, ranging from less than \$4 per acre to more than \$500 per acre on agricultural properties.

**Table 5.** 2011 property taxes paid for properties within the proposed expansion areas.

	Southern Expansion Boundary	Northern Expansion Boundary
Merced	\$10,947	\$0
San Joaquin	\$110,113	\$257,869
Stanislaus	\$326,423	\$0
Total	\$447,483	\$257,869

Sources: (Merced County Treasurer-Tax Collector, 2012; San Joaquin County Office of the Treasurer, 2012; Stanislaus County Treasurer / Tax Collector, 2012)

Note: Property tax values are the sum of total property taxes paid on all parcels for which some portion of the parcel is contained within the proposed expansion boundaries. For many of these parcels, only a small portion of the parcel (e.g. only the riparian area) is actually included in the proposed expansion boundary.

Fiscal year 2011 RRS payments to San Joaquin and Stanislaus Counties for the San Joaquin River NWR totaled \$41,288, and averaged \$5.78 per acre. In fiscal year 2011, RRS payments were appropriated at 21.6% of the approved value. If RRS payments had been 100% appropriated, payments to San Joaquin and Stanislaus Counties for the San Joaquin River NWR would have totaled \$191,148 (an average of \$26.75 per acre). Assuming that average per acre RRS payments for the newly acquired lands would be similar to current RRS payments and that the average per acre property taxes of acquired lands would be similar to current average property taxes within the proposed expansion areas, average per acre declines in county government revenues would range from approximately \$8.17 per acre to \$34.92 per acre. The low estimate assumes 100% appropriation of RRS funds, whereas the high estimate is equal to the full value of lost property tax revenues and assumes 0% appropriation of RRS funds. Given the declining trend in RRS appropriations, average per acre revenue reductions are likely to be closer to the high estimate.

Property taxes and land values are in constant flux and are likely to change substantially within the 45+-year expansion horizon; thus, these estimates only represent an approximation of the possible effects to local government revenues. Furthermore, property taxes vary substantially from property-to-property based on length of ownership, participation in the Williamson Act, and, if applicable, the value of agricultural production; thus, actual effects to local government revenue will depend on the level of property taxes paid on the actual parcels that are purchased from willing sellers.

## Effects on the Local Agricultural Industry

The majority of the land acquired under Alternatives 2 and 3 will be agricultural lands. Removing land from agricultural use could result in direct losses in agricultural production and employment which could in turn result in secondary losses to agricultural support sectors due to a reduction in purchases of farming related inputs. This section provides a snapshot of the current economic contribution of croplands in the three-county area. Possible economic effects of the proposed future land acquisitions are discussed, but the economic impacts are not estimated because the needed assumptions are immense and speculative. The degree of economic impacts associated with the conversion of croplands to Refuge lands will be a function of the specific lands that are acquired, the time at which they are acquired, farming technology, commodity markets, and the evolution of the regional economy. Additionally, landowners are financially compensated when they enter into a purchase or easement agreement with the Service. Though it is unknown how those dollars would be spent, it is common for landowners to use their allotment to purchase additional lands for agricultural production. This can include lands that are currently in production as well as lands that are idle.

Current economic contributions of croplands in the three-county area were estimated in IMPLAN using total output values for oilseed, grain, cotton, sugar beet, vegetable and melon, fruit, tree nut, and other crop farming (primarily hay and alfalfa). Economic contribution analyses differ from economic impact analyses in that they address the importance or contribution of an **existing industry** to a local economy, rather than the impact of new or additional final demand (Minnesota IMPLAN Group, 2012). Table 6 summarizes the results of the contribution analysis for the three-county area. Croplands in the three-county area account for approximately 1.6 million acres of production<sup>3</sup> and over \$3.2 billion in direct output<sup>4</sup>. These croplands directly account for an estimated 17.4 thousand jobs, \$1.2 billion in labor income, and \$1.6 billion in value added to the local economy. Secondary or multiplier effects of crop

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<sup>3</sup> Acres of production include acres planted in double crops, triple crops, mixed crops, and intercropped, and thus may be greater than total acres of cropland. For example, an acre may have a double crop that is planted to two consecutive crops in the same season, such as corn followed by dry beans. The single acre of cropland in this example would count as two acres of grain production.

<sup>4</sup> Output is equal to sales plus or minus changes in inventory.

production account for an additional estimated 13.3 thousand jobs, \$573.7 million in labor income, and \$1.1 billion in value added to the local economy. Accounting for both direct and secondary effects, cropland farming in the three-county area contributes an estimated total of 30.8 thousand jobs, \$1.8 billion in labor income, and \$2.7 billion in value added to the local three-county economy.

Table 6. Current economic contribution of cropland farming in the three-county area.

	Oilseed	Grains	Cotton	Sugar Beets	Vegetables and melons	Fruit	Tree nuts	Other crops	Total Croplands
<b>Three County Area</b>									
Acres of production	9,036	681,188	60,156	4,787	87,061	141,396	354,501	289,336	1,627,460
Output (Millions \$2011)	\$4.2	\$202.8	\$36.9	\$1.9	\$774.1	\$1,087.7	\$984.4	\$146.3	\$3,238.3
Output per 1000 acres of production	\$0.46	\$0.30	\$0.61	\$0.40	\$8.89	\$7.69	\$2.78	\$0.51	\$1.99
Employment (# full & part time jobs)									
Direct contribution	37	2,825	116	44	1,946	3,531	8,454	490	17,443
Secondary contribution	12	637	124	7	3,162	4,671	4,227	521	13,361
Total contributions	49	3,462	240	51	5,108	8,202	12,681	1,011	30,804
Labor Income (Millions \$2011)									
Direct contribution	\$0.4	\$21.2	\$6.9	\$0.4	\$247.1	\$441.3	\$450.6	\$23.8	\$1,191.7
Secondary contribution	\$0.5	\$26.4	\$5.3	\$0.3	\$132.0	\$201.8	\$185.2	\$22.2	\$573.7
Total contributions	\$0.9	\$47.6	\$12.2	\$0.7	\$379.1	\$643.1	\$635.8	\$46.0	\$1,765.4
Value Added (Millions \$2011)									
Direct contribution	\$2.2	\$81.3	\$16.5	\$0.8	\$384.1	\$549.3	\$555.9	\$46.6	\$1,636.7
Secondary contribution	\$1.1	\$60.8	\$10.9	\$0.6	\$261.5	\$370.3	\$341.3	\$46.1	\$1,092.6
Total contributions	\$3.3	\$142.1	\$27.4	\$1.4	\$645.6	\$919.6	\$897.2	\$92.7	\$2,729.3

A geographic information system (GIS) was used to determine total acres and acres of production for croplands within the proposed expansion areas and within the three-county area (data compiled by Justin Epting, USFWS)<sup>5</sup>. This data is presented in Table 7. Croplands within the proposed expansion area

<sup>5</sup> Landcover type and landuse were determined by synthesizing several different spatially explicit datasets. For Stanislaus and Merced counties, the primary data source was the Land Use Survey data from the California Department of Water Resources California Department of Water Resources, 2002, Land Use Survey: 2002 Merced County, accessed online May 4, 2012, at <http://www.water.ca.gov/landwateruse/lusrvymain.cfm>, California Department of Water Resources, 2004, Land Use Survey: 2004 Stanislaus County, accessed online May 4, 2012, at <http://www.water.ca.gov/landwateruse/lusrvymain.cfm>. This dataset is a comprehensive assessment and survey of agricultural lands throughout the entire county that includes land-based surveys and interviews of farmers. Data were collected in 2004 for Stanislaus County and 2002 for Merced County. Data for San Joaquin County were considered too out-of-date for incorporation in this analysis and were substituted with data from the United States Department of Agriculture's National Agricultural Statistics Service National Agricultural Statistics Service, 2010, San Joaquin County land use data, accessed online May 4, 2012, at <http://www.nass.usda.gov/>. These data were acquired in 2010 from remote sensing analysis of satellite imagery. San Joaquin County landuse data were also improved by

for Alternative 2 (the southern expansion area) include approximately 4.9 thousand acres (6.6 thousand acres of production) and produce an estimated \$9.8 million in direct output. These croplands account for 0.4% of total cropland acres, 0.4% of the total acres of production, and 0.3% of total output in the three-county area. The addition of the proposed northern expansion area adds 1.9 thousand acres (1.7 thousand acres of production) and an estimated \$4.8 million in direct output. Including the southern and northern expansion areas, croplands within the proposed expansion area for Alternative 3 account for 0.5% of total cropland acres, 0.5% of the total acres of production, and 0.5% of total output in the three-county area.

**Table 7.** Current land use within the proposed expansion areas.

	Alternative 2 Southern Expansion		Alternative 3 Southern & Northern Expansion	
	(acres)	(percent of three-county area)	(acres)	(percent of three-county area)
Total Croplands	4,951	0.4%	6,847	0.5%
Single crops:				
Oilseeds	0	0.0%	31	0.3%
Grains	703	0.2%	1,203	0.3%
Vegetables and melons	208	0.3%	494	0.6%
Fruit	129	0.1%	350	0.2%
Tree nuts	687	0.2%	687	0.2%
All other crops (including hay and alfalfa)	1,444	0.6%	2,106	0.9%
Double and Triple crops:				
Grain with grain	1,386	1.1%	1,386	1.1%
Grain with vegetables	336	7.0%	336	7.0%
Fallow	58	0.3%	255	1.5%

Data compiled by Justin Epting, USFWS; Source: (California Department of Water Resources, 2002; California Department of Water Resources, 2004; National Agricultural Statistics Service, 2010)

Note: Acres of cropland for Alternatives 2 and 3 do not include 2068 acres of agricultural land that is currently owned by River Partners, Inc. This land, located in Stanislaus County, is already being removed from agricultural production and being restored by River Partners, Inc. with grant monies from the State of California, the Bureau of Reclamation and other Federal funding sources. Although this land is currently in agricultural production, the removal of this land from agricultural production is imminent and unassociated with the proposed San Joaquin NWR expansion.

Note: Due to the size of the proposed Refuge expansion and the value of the agricultural land, it is expected that it may take up to 45 years to acquire 50% of the proposed lands and that many of the properties within the expansion areas may never be acquired by the Service.

As was noted, the amount of agricultural land within the proposed expansion areas that will be converted to Refuge land is uncertain, and conversion is expected to occur gradually over the next 45 years. It is estimated that it would take up to 45 years to acquire 50% of the lands within the proposed expansion areas, and that 95% of these lands would be acquired through fee-title purchases. Only croplands and lands currently in riparian and grassland vegetation will be considered for conversion to

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incorporating county-wide parcel data of urbanized areas. Additional improvements to all datasets were made based on expert opinion and manual interpretation of aerial photography from 2010.

Refuge lands (i.e. urban and industrial lands as well as lands in other agricultural uses will not be considered for acquisition). The percent of each land type converted and the rate of conversion will depend on willing sellers and available budgets.

When possible, the Service will prioritize non-agricultural land in water and wetlands first, followed by land classified as riparian or grassland. These lands are the least expensive for the Service to purchase and restore, and they have the highest wildlife values. Water, wetland, riparian, and grassland acquisitions would have no economic impacts to the agricultural sector. The Service will give next priority to lands in wildlife-friendly crops, including grain, hay, and alfalfa. Although lands in wildlife-friendly crops account for 79% and 78% of total acres of agricultural production in the proposed expansion areas for Alternatives 2 and 3, respectively, these crops account for only 21% and 18% of total output within the proposed expansion areas. Per 1000 acres of production, wildlife-friendly croplands contribute between 4 and 5 jobs, \$70 thousand and \$205 thousand in labor income, and \$209 and \$413 thousand in value added to the local economy. Lands in vegetable, melon, fruit, and tree nut production account for 75% and 79% of total cropland output in the proposed expansion areas for Alternatives 2 and 3, respectively. Although they will be considered, these high-valued croplands are less likely to be acquired. Per 1000 acres of production, vegetable, melon, fruit and tree nuts contribute between 36 and 59 jobs, \$1.8 million and \$4.5 million in labor income, and \$2.5 and \$7.4 million in value added to the local economy.

## Effects of Habitat Restoration Activities on the Local Economy

The San Joaquin River NWR has been actively restoring riparian forest, upland, and wetland habitats along the San Joaquin River for the past ten years. To date, 2,200 acres of former agricultural or other lands with low wildlife-use values have been restored, providing important habitat and resources for endangered species, migratory birds, fish, and native plants. The Refuge has also restored 5 miles of levees, providing flood refugia and protective cover for endangered species including riparian brush rabbits and woodrats. Restoration of current land holdings is nearly complete, and no further restoration is planned under Alternative 1 (the no action alternative). Under Alternatives 2 and 3, all agricultural lands acquired by the Refuge would be restored.

Refuge restoration projects are funded through grants, and project dollars are directly spent in the local economy. The Service has traditionally contracted with local restoration groups to plan and implement restoration on the Refuge. Recent Refuge restoration has been led by River Partners, Inc., a non-profit organization committed to restoring riparian habitat for wildlife. This local organization and other local conservation groups would continue to participate in Refuge restoration if the proposed expansion is approved. In addition to directly supporting jobs with local conservation groups, restoration activities on the Refuge indirectly support local businesses that supply materials and equipment such as seeds, nursery products, irrigation supplies, and earth moving equipment, and many of the input suppliers and laborers utilized in restoration efforts overlap with the agricultural industry.

For this analysis, the economic impacts of restoration for the proposed Refuge expansion are estimated using historical data provided by the Refuge and by River Partners, Inc. Based on this data, restoration on the Refuge is classified into two categories: restoration of acquired agricultural lands and restoration of levees. Levees are restored on river miles adjacent to acquired lands at a rate of approximately 1 mile for every 440 acres acquired. Restoration of acquired agricultural lands costs \$6,000 per acre and produces a self-sustaining forest in a three-year period. In the first year of restoration, the area is prepared and planted. In the second and third years, the area is maintained through irrigation and weeding. Restoration of levees costs \$150,000 per mile and follows the same three-year planting-to-maintenance-to-self-sustaining process. The distribution of expenditures and use of labor for each acre and mile of restored lands tends to be largest in the first year of restoration and smaller in years two and three. For this analysis, it is assumed that in any given year there will be an equal distribution of acres in each

phase of the restoration process. The number of acres restored each year will vary and will be dependent on available funding and the rate and extent of acquisitions. The Refuge is currently spending about \$1 million per year in grant money on restoration. Restoration within the current Refuge boundaries is nearly complete, so restoration expenditures are not included in Alternative 1. For Alternatives 2 and 3, it is expected that future grant funding would continue to average about \$1 million per year. At this funding rate, an average of 150 acres of acquired lands and 1/3 mile of levee would be restored per year.

To estimate the economic impacts of \$1 million in restoration expenditures, cost data provided by River Partners were used to determine the mix of products and services required to complete each restoration project, and these expenditures were input into IMPLAN to estimate the indirect and induced effects (secondary impacts) of \$1 million in restoration expenditures. Direct impacts were estimated using employment figures, labor expenditures, and non-labor expenditures provided by River Partners. All impacts are reported as average impacts per year. It is expected that average impacts per year would be similar under Alternatives 2 and 3; however, in the long-run it is expected that the Service would be actively restoring the Refuge for a greater number of years under Alternative 3.

Table 8 summarizes the estimated average annual economic impacts of restoration activities on the Refuge. Direct employment effects include jobs for River Partners managers, scientists, field staff, and administrators, and were calculated by converting the average number of labor hours per \$1 million of restoration expenditures to jobs. Under Alternatives 2 and 3, restoration would directly account for an estimated 5 jobs. In addition to permanent staff, River Partners hires large crews of seasonal field workers to complete each restoration project. Field workers are hired for an average of 150 weeks of full-time employment per \$1 million in restoration expenditures. Including seasonal field workers, restoration work under Alternatives 2 and 3 are estimated to contribute \$370.0 thousand in labor income, and \$370.0 thousand in value added in the local economy each year. Secondary or multiplier effects would generate an additional 12 jobs, \$541.6 thousand in labor income, and \$786.1 thousand in value added per year. Accounting for both the direct and secondary effects, restoration activities on the Refuge would generate estimated average annual economic impacts of 17 jobs, 150 weeks of full-time seasonal field employment, \$911.6 thousand in labor income, and \$1,156.1 thousand in value added to the local three-county economy.

**Table 8.** Average annual impacts of Refuge restoration expenditures \*.

	Employment (# full & part time jobs)	Labor Income (Thousands \$2011)	Value Added (Thousands \$2011)
<b>Alternatives 2 and 3</b>			
Direct effects **	5	\$370.0	\$370.0
Secondary effects	12	\$541.6	\$786.1
<b>Total effect</b>	<b>17</b>	<b>\$911.6</b>	<b>\$1,156.1</b>

\*Average annual impact estimates are based on an average of \$1 million in restoration expenditures per year.

\*\*Direct employment effects (jobs) do not include seasonal field labor. Field labor accounts for an additional 150 weeks of full-time employment per \$1 million in restoration expenditures. Direct labor income includes wages paid to seasonal field crews.

### Effects of Refuge Visitor Expenditures in the Local Economy

Spending associated with recreational visits to national wildlife refuges generates significant economic activity. The FWS report “Banking on nature—the economic benefits to local communities of National Wildlife Refuge visitation” estimated the impact of national wildlife refuge visitation to local economies (Carver and Caudill, 2013). According to the report, more than 34.8 million visits were made

to national wildlife refuges in FY 2011 which generated \$2.4 billion of sales and economic output in regional economies. Accounting for both the direct and secondary effects, spending by national wildlife refuge visitors generated nearly 35,000 jobs, and over \$792.7 million in labor income (Carver and Caudill, 2013). Approximately 72 percent of total expenditures were from non-consumptive activities, 21 percent from fishing, and 7 percent from hunting (Carver and Caudill, 2013).

Up until recently, the San Joaquin River NWR was closed to public access. In March of 2011, the Refuge opened the Pelican Trail for public use. The Pelican Trail includes 4-miles of looping trails through wetland, riparian, and river-side habitats, and features interpretive riparian plantings, a large parking area, bathrooms, kiosks, and picnic tables. In fiscal year 2011, the Refuge received 10,200 visits. This section presents an analysis of the economic impacts to the three-county area of current Refuge visitation.

To determine the local economic impacts of visitor spending, only spending by persons living outside the local area are included in the analysis. The rationale for excluding local visitor spending is twofold. First, money flowing into the local area from visitors living outside the local area (hereafter referred to as non-local visitors) is considered new money injected into the local economy. Second, if residents of the local economy visit the Refuge more or less due to management changes or expanded recreational opportunities, they will correspondingly change how they spend their money elsewhere in the area, resulting in no net change to the local economy. These are standard assumptions made in most regional economic analyses at the local level. Currently, about 30% of visits to the Refuge are by non-local visitors.

A visitor usually buys a wide range of goods and services while visiting an area. Major expenditure categories include lodging, restaurants, supplies, groceries, and recreational equipment rental. In this analysis we use the average daily visitor spending profiles from the Banking on Nature report (Carver and Caudill, 2007) that were derived from the 2006 National Survey of Hunting, Fishing and Wildlife Associated Recreation (NSHFWR). The NSHFWR reports trip related spending of state residents and non-residents for several different wildlife-associated recreational activities. For each recreation activity, spending is reported in the categories of lodging, food and drink, transportation, and other expenses. Carver and Caudill (2007) calculated the average per-person per-day expenditures by recreation activity for each FWS region. Residents were defined as living within 30 miles of the refuge and nonresidents as living outside the 30 mile radius (Carver and Caudill, 2007). For this analysis, non-local visitors match the nonresident spending profile definition. Therefore, we used the spending profile for nonresidents for FWS Region 1 (the region San Joaquin River NWR is located in). The Consumer Price Index Inflation Calculator (U.S. Bureau of Labor Statistics, 2012) was used to update the 2006 spending profiles to 2011 dollars. The average daily nonresident spending profile for non-consumptive wildlife recreation (observing, feeding, or photographing fish and wildlife) was used for all Refuge activities (\$121.59 per visitor day). Visitor spending profiles are estimated on an average per day (eight hours) basis. Visitors to the San Joaquin NWR spend an average of four hours on the Refuge per visit. Table 9 shows the current number of non-local visitor days for the San Joaquin River NWR.

**Table 9.** Current San Joaquin River NWR visitation.

	Total number of visits	Percentage non-local visits (%)	Total number of non-local visits	Number of hours spent at Refuge	Number of non-local visitor days <sup>a</sup>
<b>Current visitation (Alternative 1)</b>	10,200	30%	3,060	4	1,530

<sup>a</sup>One visitor day = 8 hours.

Total spending by non-local Refuge visitors was determined by multiplying average non-local visitor daily spending by the number of non-local visitor days. The economic impacts associated with current non-local Refuge visitation were estimated using IMPLAN and are summarized in Table 10. Currently, non-local Refuge visitors spend approximately \$186 thousand in the local economy annually. This spending directly accounts for an estimated 1 job, \$49.9 thousand in labor income, and \$82.2 thousand in value added. Secondary or multiplier effects generate an additional 1 job, \$30.3 thousand in labor income, and \$52.3 thousand in value added. Accounting for both the direct and secondary effects, spending by non-local visitors currently generates total economic impacts of 2 jobs, \$80.2 thousand in labor income, and \$134.5 thousand in value added to the local three-county economy.

**Table 10.** Current average annual impacts of non-local visitor spending.

	Employment (# full & part time jobs)	Labor Income (Thousands \$2011)	Value Added (Thousands \$2011)
<b>Current Impacts (Alternative 1)</b>			
Direct effects	1	\$49.9	\$82.2
Secondary effects	1	\$30.3	\$52.3
Total effect	2	\$80.2	\$134.5

There are minimal recreation opportunities in the areas surrounding the Refuge, and it is anticipated that the proposed expansion would draw additional visitors to the Refuge. Newly acquired and restored riparian Refuge lands would provide additional water access points, trails, and wildlife viewing opportunities. Although changes in visitation under the proposed expansion alternatives are uncertain, the Refuge anticipates that visitation to the Refuge would double and triple under Alternatives 2 and 3, respectively. Additional non-local visitors would be drawn to the Refuge following the completion of new access points and visitor opportunities. In the long run, economic impacts associated with non-local Refuge visitation for Alternatives 2 and 3 are expected to be double and triple current impacts.

### Effects of Refuge Purchases of Goods and Service within the Local Economy

The San Joaquin River NWR purchases a wide variety of supplies and services for Refuge operations and maintenance activities, and many of these supplies and services are purchased within the local three-county area. Refuge purchases made in the three-county area contribute to the local economic impacts associated with the Refuge. This section presents an analysis of the economic impacts to the three-county area of current Refuge non-salary expenditures.

The Refuge currently spends an average of \$400 thousand annually on non-salary expenditures. Major local expenditures include services and supplies related to habitat and grounds improvements and treatments, equipment and structure maintenance and repair, office supplies, equipment purchases, and environmental and other technical consulting services. Table 11 provides a breakdown of current non-salary expenditures by expenditure category. To determine the local economic impacts of non-salary expenditures, only expenditures made within the local three-county area are included in the analysis.

**Table 11.** Breakdown of current non-salary Refuge expenditures.

Expense Category	Average Annual Percent of Non-Salary Expenditures	% Spent in the Local Three-County Area
Habitat and grounds improvements and treatments (not including acquired lands restoration)	30%	75%
Equipment Maintenance and Repair	25%	100%

Vehicle Maintenance and Repair	10%	100%
Maintenance and Repair of Structures	10%	100%
Heavy equipment purchasing/leasing	5%	100%
Environmental and other Technical Consulting Services	4%	45%
Travel	1%	0%
All other expenses (e.g. overhead, office supplies, utilities, etc.)	15%	100%

The economic impacts associated with current non-salary Refuge expenditures were estimated using IMPLAN and are summarized in Table 12. Currently, non-salary Refuge expenditures made in the local three-county area total approximately \$357 thousand per year. This spending directly accounts for an estimated 5 jobs, \$201.3 thousand in labor income, and \$221.7 thousand in value added. Secondary or multiplier effects generate an additional 2 jobs, \$78.8 thousand in labor income, and \$139.0 thousand in value added. Accounting for both the direct and secondary effects, non-salary Refuge expenditures currently generate total economic impacts of 7 jobs, \$280.1 thousand in labor income, and \$360.7 thousand in value added to the local three-county economy.

**Table 12.** Current average annual impacts of Refuge non-salary expenditures in the local three-county area.

	Employment (# full & part time jobs)	Labor Income (Thousands \$2011)	Value Added (Thousands \$2011)
<b>Current Impacts (Alternative 1)</b>			
Direct effects	5	\$201.3	\$221.7
Secondary effects	2	\$78.8	\$139.0
<b>Total effect</b>	<b>7</b>	<b>\$280.1</b>	<b>\$360.7</b>

Refuge personnel estimate that long-run non-salary costs associated with Refuge operations and maintenance will increase by approximately 10% under both Alternatives 2 and 3. In the long run, economic impacts associated with additional non-salary expenditures are expected to add less than one new job, and approximately \$28 thousand in additional labor income and \$36 thousand in additional value added to the local economy.

### Effects of Refuge Personnel Salary Spending within the Local Economy

Refuge employees reside and spend their salaries on daily living expenses in communities near the Refuge thereby generating impacts within the local economy. Household consumption expenditures consist of payments by individuals and households to industries for goods and services used for personal consumption. Salary expenditures made by Refuge personnel contribute to the local economic impacts associated with the Refuge. This section presents an analysis of the economic impacts to the three-county area of current Refuge personnel salary expenditures.

Currently, Refuge salaries total \$255 thousand per year and average \$65 thousand per full-time employee. The IMPLAN modeling system contains household income consumption spending profiles that account for average household spending patterns by income level. These profiles also capture average annual savings and allow for leakage of household spending to outside the region. The IMPLAN household spending pattern for households earning \$50-75 thousand dollars per year was used to reflect the average salary of full-time permanent employees at the Refuge.

The economic impacts associated with spending of salaries in the local three-county area by Refuge employees are summarized in Table 13. These impacts only include secondary effects on non-Refuge jobs created as Refuge employees spend their salaries in the local three-county area. Currently, salary spending by Refuge personnel generates secondary effects (i.e. additional non-refuge jobs in the local economy) of 2 jobs, \$68.9 thousand in labor income, and \$123.6 thousand in value added to the local three-county economy.

Table 13. Current average annual impacts of salary spending by Refuge personnel.

	Employment (# full & part time jobs)	Labor Income (Thousands \$2011)	Value Added (Thousands \$2011)
<b>Current Impacts (Alternative 1)</b>			
Direct effects	0	\$0.0	\$0.0
Secondary effects	2	\$68.9	\$123.6
Total effect	2	\$68.9	\$123.6

The Refuge anticipates hiring an additional full-time GS-11 biologist under Alternatives 2 and 3, and an additional full-time GS-9 law enforcement officer under Alternative 3. Based on FY 2012 salary charts, it is estimated that annual salaries for these new positions would increase total salary expenditures by \$77 thousand and \$141 thousand for Alternatives 2 and 3, respectively, bringing total salary expenditures to \$332 thousand under Alternative 2 and \$396 thousand under Alternative 3. In the long-run, economic impacts associated with spending of salaries in the local three-county area by additional Refuge employees is expected to increase by as much as 1 job, between \$21 thousand and \$37 thousand in additional secondary labor income effects, and between \$38 and \$68 thousand in additional secondary value added to the local economy for Alternatives 2 and 3, respectively.

## Summary

The Service has proposed to expand the San Joaquin National Wildlife Refuge through fee-title purchases and conservation easements from willing sellers. The Service will purchase land and easements slowly as budgets and willing sellers allow. It is estimated that it may take up to 45 years to acquire only 50% of the proposed lands and that many of the properties within the proposed expansion area may never be acquired.

Lands acquired through fee-title purchases would be managed by the Service and would be removed from county tax rolls. Reductions in county taxes would be partially replaced by RRS payments; though, given the declining trend in RRS appropriations, RRS payments are expected to make up only a small portion of the reduction in property taxes collected.

The majority of the acquired land will be native riparian and grassland properties and land in agricultural production. Of those acres currently in production, the Service intends to target lands that are in wildlife-friendly crops such as grain, hay, and alfalfa. These crops have relatively low economic contributions compared to other high-valued crops grown in the region, so targeting wildlife-friendly croplands will minimize impacts to the local agricultural sector. Acquired agricultural lands would be converted from farmland to riparian and upland habitat, which could result in a loss of agricultural production income for farmers and the elimination of purchases of farming-related inputs. Payments to landowners for conservation easement and fee-title purchases would substitute the loss of agricultural income. The degree of economic impacts associated with the conversion of croplands to Refuge lands will be a function of the specific lands that are acquired, the time at which they are acquired, farming technology, commodity markets, and the evolution of the regional economy, which are all highly uncertain over the 45<sup>+</sup>-year expansion horizon. Restoration activities on Service lands will support jobs

and generate income and value added in the local economy through the purchase of materials and services from local businesses. Many of the same businesses and employees that could be adversely impacted by reduced agricultural activity will be positively impacted by restoration activities, thus limiting the overall impact on the agricultural sector.

The proposed expansion of the Refuge will have numerous public benefits. Restoration of wildlife habitat will increase conservation and ecosystem service values by enhancing and preserving wildlife habitat and providing flood mitigation services, and adjacent land owners may experience increased property values through their proximity to permanently protected lands. Newly acquired and restored riparian Refuge lands would provide additional water access points, trails, and wildlife viewing opportunities which will benefit local residents. These new and/or enhanced recreational opportunities are also anticipated to draw additional non-local visitors to the Refuge, thus increasing economic activity associated with visitor spending in the local economy. Furthermore, the proposed expansion of the Refuge would create additional local economic activity through increased spending by the Refuge on operations and maintenance, and increased salary spending by Refuge personnel.

The effects of the proposed San Joaquin River NWR expansion are complex and speculative. There are many variables at play, and it is not possible to precisely predict the economic impacts of the proposed expansion. The conversion of private land to Refuge land will happen incrementally over a greater than 45-year horizon; thus, the changes described in this analysis will happen slowly, giving the local economy time to adjust. Over time, losses in local government revenues and agricultural production will be offset by gains from restoration activities and spending generated through Refuge visitation and operations. These changes are well within the normal evolution of an economy.

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