- land acquisition (purchase of conservation easements)
- wages of employees related to land management
- landowner expenditures

Expenditures related to recreation:

- transportation
- food
- supplies (equipment/auxiliary/retail)
- services

For each category of expenditures there is an economic multiplier which shows the effect of spending the money – that is the expenditure of funds generates demand for more goods and services in the community or the region where the money is spent. For example, if a hunter or fisherman purchases supplies from a local supermarket, the employees of that supermarket are supported and they in turn have more money to spend locally on their own purchases. The estimates of the number of jobs directly supported by the expenditures and the economic multiplier effect (sales and jobs) uses the widely accepted economic model for agriculture and open space developed by Dr. Charles Goldman of the UC Cooperative Agricultural Extension Service.[3]

The expenditures are broken down into the categories as shown in Appendix 2 Table 5C – Wetland Sales and Jobs – 1998.

This study compiles economic information on all of the components of wetlands and agriculture. The study looks at expenditures, revenues and contributions of taxes or other fees to the government of Merced County and its cities. Tax revenues include property taxes for private property and in lieu taxes paid by public agencies (California Department of Fish and Game and the US Fish and Wildlife Service) to the County. The study considers the sources of revenue to the entities which spend money for habitat management including public and private investment and water wheeling and delivery charges.

2. Provide an estimate of the economic value of agriculture in Merced County

This study uses geographic data base information from the Merced County Data Services to delineate the extent of each type of agriculture now practiced in Merced County and assigns values to the agricultural production based on current data from the County Agricultural

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[3]George Goldman uses the IMPLAN system for creating regional input-output models. IMPLAN (IMpact of PLANning) is a system for IBM compatible computers of algorithms and data which allows the user to construct, with no additional data requirements, Leontief input-output models for any county (parish, borough, township), region or state in the United States. There are 521 sectors in the U.S. model, closely corresponding to the sectors in the Department of Commerce input-output model for the United States, and roughly corresponding to 3 or 4 digit level SIC code. The 1996 model for the state of California has 516 of these 528 sectors.

IMPLAN was originally started in the late 1970's by economists in the Fort Collins office of the U.S. Forest Service to meet the economic impact requirements of the Forest Service plans. It was originally on the Forest Service computer in Fort Collins and was accessible only by modem. In the mid-1980s, a version for IBM compatible personal computers was designed. The IMPLAN system was turned over to the University of Minnesota to run and in 1993 IMPLAN was privatized. It is now run by the Minnesota IMPLAN Group (MIG) in Minneapolis and this group is now responsible for the data requirements of the system. MIG has a WEB page supplying information.

Commissioner's office. See Appendix 2, Tables 2 and 5B for detail on calculation of agricultural productivity values.

3. Compare the economic impacts of two growth scenarios on wildlands and agriculture: compact urban growth vs. sprawl growth

In a manner similar to the 1995 AFT study, this study compares the impact of sprawl growth and compact growth on the local economy in terms of:

1. Loss of agricultural land (acres)
2. Loss of agricultural revenue
3. Increased urbanization in a two-mile zone of conflict around the GEA
4. Increased urbanization in a two-mile zone around existing cities and its impact on agriculture

The study compares the economic impacts of the growth anticipated between the test year (1998) and the year 2040. The end year was picked to be the same as that in the 1995 AFT study.

4. Suggest concrete measures that can be used to more permanently protect agriculture and open space resources.

The study provides lists of concrete suggestions to enhance the long-term or permanent protection of agricultural lands and wetlands areas, as well as numerous strategies from other studies to encourage compact growth through infill and more efficient land use in built-up areas (Appendix 3)

IV. Wetlands Resources Economic Values

A. Description of geographic area and resources for which economic data apply

The geographic areas to which the economic values apply are shown in Figures 1 through 3 and are listed in Text Tables 2 and 3 and the tables in Appendices 1 and 2. These areas include the federal wildlife refuges, state wildlife areas, state recreation areas, state parks, and private duck clubs and other wetlands. Figure 4 of Appendix 1 shows land status in the GEA by management entity and corresponds to Summary Table 1 of Appendix 1.

B. Expenditures for wildlife management, habitat enhancement and restoration (federal, state and private)

Expenditures for are generally reported for the period 1990 through 1999, or some portion thereof. Not all entities reported data for the entire period so there are gaps. The overall organization of the data presented in Appendix 1 is:

Expenditures for Habitat Management and Acquisition, Agency Operations and Management (one summary table and 12 supporting tables). The **summary table (Summary Table S-1)** shows all expenditures for habitat management by all agencies and sponsors for the years each entity reported. The table shows the acreage to which these expenditures applied and the annual

cost per acre per year for public and for all (public and private) expenditures. The data in the summary table are derived from each of the supporting tables.

Expenditures for Recreational Use (two Summary Tables and three supporting tables). The Summary Tables (**Summary Table R-1** is a summary of the users to public and private wetlands in the GEA and the rest of Merced County. **Summary Table R-2** is a summary of expenditures for hunting/fishing and wildlife watching in the GEA and all of Merced County (for the year 1996/97).

Entities which spend money in the GEA include the following:

Text Table 5
Merced County Wetlands Land Management and Expenditure Categories

Entity	*Lands Managed*	*Categories of Expenditures*
PRIVATE		
Private landowners and duck clubs	Miscellaneous throughout GEA (see Figures 2 and 3, Appendix 1)	Mowing, discing, irrigation, spraying weeds, plant watergrass, grazing, burning
Ducks Unlimited	Private duck clubs Public lands (through partnership agreements)	Habitat enhancement Habitat restoration water conveyance infrastructure flood relief monitoring and evaluation
California Waterfowl Association	Private lands	Habitat enhancement programs, advisory programs and direct habitat services Water conveyance infrastructure
PUBLIC/PRIVATE PARTNERSHIP		
USFWS Partners for Wildlife Program	Private ranches, duck clubs	Habitat enhancement Habitat restoration Water conveyance and drainage structures Silt removal Levees and other flood control structures Administration and engineering
PUBLIC		
USFWS	Federal refuges Private lands through partnerships	Habitat enhancement Habitat restoration

Entity	*Lands Managed*	*Categories of Expenditures*
Natural Resources Conservation Service		Agricultural Conservation Program Waterbank program Wetland reserve program Permanent easements 30-year easements
CDFG	State wildlife areas	Habitat restoration (Presley program), endangered species, research
California Wildlife Conservation Board	State Wildlife Areas Private lands (Partners for Wildlife)	Public access, water conveyance system, soil samples, planning, wetland restoration, educational center, administration and engineering
CWCB Inland Wetlands Conservation Program		Easement acquisitions Restoration projects Administration and engineering
Grassland Water District (GWD)	Public and private lands in the GEA	Water conveyance system installation and repair Water delivery Levee repair Silt removal Vegetation management Consulting, administration and engineering Education

Source: GWD and agencies listed in table.

C. Conservation Easements (NRCS-FWS, CDFG)

A conservation easement is the transfer of a partial interest in a property from a private landowner to the government or a private non-profit entity such as a land trust. The conservation easement restricts the landowner's right to use the property so that it cannot be developed. The landowner is still permitted certain other uses, such as grazing, which are compatible with the biological or open space values the purchaser of the easement is seeking to protect. The donation (as opposed to sale) of a conservation easement can have tax benefits to the donor (e.g. the difference in value between the fair market value of the land and the value diminished by the easement is considered a charitable donation). In addition, property taxes are reduced according to the reduction in fair market value. Conservation easements are granted in perpetuity, so that the conservation easement transfers with the property each time it is sold.

The entities which have purchased conservation easements in the GEA include the NRCS, the California Wildlife Conservation Board, California Department of Fish and Game, Ducks Unlimited, and the US Fish and Wildlife Service. Supporting Table S12 of Appendix 1 shows the years, acreages and fees paid by these various entities to acquire conservation easements over portions of the GEA. In all, a total of about 64,000 acres have been acquired at a

total cost of $28 million. The average annual expenditure on such easements has been about $2.2 million since 1990.

D. Water conveyance facilities (GWD, local canal companies)

The GWD supplies irrigation water from the U.S. Bureau of Reclamation to a portion of the public and private lands within the 178,000 acres of the GEA. The GWD encompasses about 51,000 acres within the GEA (see Figure 2 of Appendix 1). Depending on the area, the water supplies permanent wetlands, or seasonal (summer or winter) flooded areas. Areas supplied include 5 public refuges and wildlife areas and 159 private duck clubs. The GWD currently maintains 160 structures for water delivery including concrete weirs, metal box weirs, concrete pipe and gates. The GWD has an annual budget of about $1.5 million which includes about $250,000 to $360,000 for structure repair and replacement (capital expenditures), silt removal and channel repair, aquatic weed control and herbicide application. The remaining budget is mainly for staff salaries and related expenses, legal, engineering and professional services related to administration, operations, and depreciation.

Revenue for the GWD comes primarily from three sources: (1) sale of water (2) standby charges applied to owners within the District and (3) conveyance charges. The GWD has a cooperative agreement with the U.S. Bureau of Reclamation (Bu Rec) to transport Central Valley Project Improvement Act (CVPIA) water to the refuges. In addition the Central California Irrigation District (CCID), San Luis Canal Company (SLCC) also transport water to public and private wetlands within the GEA through cooperative agreements with the Bu Rec.

Charges and annual revenues for the three entities providing water to the GEA area as follows:

Text Table 6
Annual Revenues for Water Transported by Public Agencies – Merced Co.

Entity	*Annual Water Supplied (After 2002) (Acre-feet)*	*Charges per Acre-foot*	*Total Revenues*
GWD	35,810	$13.75	$492,388
CCID	163,630	$4.59 - $12.75/acre-foot	$927,327
SLCC	14,000	$14.09	$197,260
Total Water Deliveries	213,440		$1,616,975

Source: Don Marciochi, Grassland Water District.

E. Land valuation, in lieu fees and property taxes

Government agencies are exempt from ordinary taxation. The agencies which have purchased land in fee or conservation easement in the GEA or elsewhere in Merced County may contribute to local government (county and city) revenue through the payment of in-lieu fees or other revenue sharing payments. For example, since 1935 the USFWS has made revenue sharing payments to counties for refuge land under its administration. The most recent revision (1978) of the original Act of Congress that created this revenue sharing provides that (1) Congress is authorized to appropriate funds to make up any shortfall in the revenue sharing fund (2) all lands administered solely or primarily by the USFWS (not just refuges) qualify for revenue sharing (3) payments to units of local government can be used for any governmental purpose. The minimum payment is 75 cents per acre for all purchased and donated land, with no minimum for public domain land. Public domain land pays 25% of net income. Purchased land pays the greatest of 3/4 of 1% of fair market value, 25% of net receipts or 75 cents per acre. FWS areas are reappraised by the Service at least once every five years. For example, in 1998 the FWS paid $92,684 to Merced County on an appraised value of $1.985 million for the San Luis and Merced National Wildlife Refuges (see Summary Table S2).

The California Department of Fish and Game has paid in lieu fees of over $50,000 per year to the County since 1995 for lands in the state wildlife areas.

F. Visitor usage and expenditures (hunting, fishing, non-consumptive recreation) – Data Sources and Methodology

The methodology used to estimate visitor usage and expenditures in the public lands and wetlands of Merced County was to (1) obtain records of actual visitor usage at each of the federal, state and private facilities for the entire county for as many years as possible between 1990 and 1999 and (2) use the US Fish and Wildlife *1996 National Survey of Fishing, Hunting and Wildlife-Associated Recreation* to calculate the expenditures related to this visitor usage.

Private duck club usage was estimated from a questionnaire that the GWD mailed to 1362 members of duck clubs in May 1998. From this mailing, 495 forms were returned by June 30, 1998. This questionnaire asked the number of days the member hunted waterfowl during the 1997-98 season in ranges from 0 to 41 or more days. From the data were tallied the total number of user days (28,465) and divided by the number of members (1,362) to give the mean number of user days per member (20.9).

Usage figures for the federal refuges and state wildlife areas were obtained directly from the respective agencies (see Tables Support R1 through Support R3 in Appendix 2, and Figures 6 and 7).

The user figures were converted into expenditures by assuming that expenditures in Merced County were proportional to the number of users (visitor-days) compared to visitor days for fishing, hunting and wildlife-associated recreation throughout California as reported in the National Survey. Wildlife-associated recreation includes bird and other wildlife watching, hiking, dog trials and nature photography. In our analysis, we have termed this "non-consumptive" recreation.

The National Survey is aggregated at a state by state level and does not discriminate visitor use at a smaller subdivision of the states (e.g. counties). However, we used the reasonable
assumption that the usage in Merced County is the proportion of total state usage as reported by the federal, state, and private facilities for Merced County. These facilities have data for usage but not expenditures. However, using the assumption that expenditures are in proportion to user days, we were able to estimate the expenditures for these recreational activities in the County (see Table R2).

Expenditures in the national survey were reported as "trip related" "equipment" and "other". Trip-related expenses include food, lodging and transportation costs. Equipment includes sporting goods equipment, clothing and other supplies related to the sport or activity being pursued. Based on the responses to the GWD questionnaire of duck club members showing that only 11% of the members who hunted in Merced County also lived in Merced County, we attributed 100% of the trip-related expenditures were spent in Merced County but only 15% of the equipment expenditures. In other words, duck club members who live out of the County are assumed to buy their hunting supplies in the county where they live.

The analysis shows that there are over 300,000 visits per year in the GEA for hunting, fishing and non-consumptive wildlife recreation, and almost 550,000 in all of Merced County. The greatest proportion of usage is for non-consumptive recreation (64% of user-days in the GEA and 78% in Merced County as a whole). The expenditure per trip is greatest for hunting ($115) and least for non-consumptive recreation ($37). Based on these usage figures, typical annual expenditures for wildlife-related recreation are about $11.4 million in the GEA and $17.5 million in all of Merced County.

V. Agricultural Resources Economic Values

A. Description and mapping of agricultural resources

The footnote to Table 2B of Appendix 2 estimates the percentage of land around each city in the various crop types, based on interviews with Agricultural Commissioner and Cooperative Extension staff and review of the GIS LU 90 data. Crop types vary substantially from city to city. For example, northeast Los Banos has an estimated 80% of its farmland in low-value hay pasture use, jointly in seasonal wetlands. Atwater and Livingston, on the other hand, both have 55% of their adjoining farmlands in high-value nut production.

B. Current economic values

Text Table 7
Acreage and Value of Agricultural Crops in Merced County (1998)

Crop Type	*Harvested Acreage*	*Total Value of Crops*[a]	*Value per Acre*
Grain, seed, truck and row crops	295,756	$323,583,000; *$479,982,516*	$1,094 *$1,622*
Fruit and nut crops	115,881	$220,815,000; *$329,267,557*	$1,906 *$2,841*
Dairy, other and non-range livestock, poultry, fish farms	19,433	$768,715,000; *$1,094,204,267*	$39,557 *$56,306*
Hay pasture and range	730,938	$136,641,000; *$210,310,895*	$187 *$288*
Total in County	1,162,008	$1,449,754,000	$1,248 *$1,819*
In GEA[b]	88,401	$86,273,530 *$119,738,516*	$976 *$1,354*
In 2 mile band around GEA[c]	157,620	$237,482,090 *$329,336,571*	$1,507 *$2,089*

Sources: Merced County Department of Agriculture. *1999 Annual Report of Agriculture, Merced County* Appendix 2, Table 2A, 5A.

[a] Direct sales value is shown in regular type. Total value with economic multiplier applied is shown in *italic* type.

[b] Does not include value of the wetlands, which is calculated separately.

[c] See column 5 of Table 5A of Appendix 2 (139,659 "as" +17,961 range land/wetlands)

Table 2A of Appendix 2 provides detail on the existing agricultural sales and jobs county-wide. As reported in the County Agricultural Commissioner's report, of the county's 1,162,000 acres of farmland, nearly one-half (568,000 acres) are in range fed cattle production. Other major crop types include: hay pasture 162,900 acres; feed grains 129,900 acres; nuts 83,800; cotton 68,800 acres; vegetables 44,700; food grains 36,500; and fruits 32,000 acres. Minor amounts of acreage are also in dairy; poultry, sheep, pigs and other animal products; sugar, greenhouse, and other miscellaneous crops.

The values of these types of agricultural production, however, vary widely. For example, the huge acreage of range land produces an average value of only $96 per acre, while the value of the county's 5,684 acres of dairies averages $92,700 per acre, and poultry (2,680 acres) is a close second at an average of $87,600 per acre. In all, county-wide agriculture currently yields direct annual sales of almost $1,450 million, an average of $1,248 per agricultural acre.

When indirect economic activity is added (using the multipliers specific to each crop types as shown in the footnote), total agriculture-related sales are estimated at $2,114 million annually. The sales multipliers are from the Cooperative Extension Input-Output study of Merced County generated by George Goldman specifically for this analysis based on calculations of indirect economic activity generated by each crop type.

The number of direct farm jobs is estimated at almost 14,000; when indirect jobs are added to this, the current farm-related jobs in the county total 27,300. These direct and indirect job estimates are also from the Cooperative Extension Input-Output study, specific to each crop type.

It must be noted that the distribution of crop types and value is not equal throughout the county. Indeed, the areas close to the cities - the flat, higher quality soils areas of the county - produce the higher value crops. The footnote to Table 2B estimates the percentage of land around each city in the various crop types, based on interviews with Agricultural Commissioner and Cooperative Extension staff and review of the GIS LU 90 data.

C. Growth and Land Use Change Scenarios

1. Current General Plans (County, cities)

The third section of Table 1A of Appendix 2 estimates the currently urbanized acres of each city and the unincorporated area. The data for the cities are from the Merced County (MDSS) GIS file LU 90.dbf updated by current city zoned land use information. These data are more accurate than the 1990 GIS data, since a great deal of land in the current city boundaries has been developed since 1990. Generalized Merced County land uses were shown in Figure 1 of Appendix 1.

For the unincorporated area, the Merced County Data Services (MDSS) GIS LU 90.dbf identified 8,182 acres as residentially developed with 19,865 units. These represent urban or suburban pockets in the unincorporated area, mostly adjoining or near the cities. For purposes of this analysis, Strong Associates has also identified smaller developed rural lots (1.5 to 10 acre parcels) as a residential land use. Based on Strong Associates' "Analysis of Rural Parcels in the Central Valley," May 1999 (prepared for American Farmland Trust), we estimate an additional 9,667 acres in this use, accommodating 2,188 dwelling units. It is appropriate to count these

smaller rural lots as part of the County's current low density housing mix; very few of them are in commercial farming.

These estimates of urbanized land use provide the gross density per acre ratios, which are then used in Table 1 of Appendix 2 for projecting the impact of the low density (current average density) growth scenario.

2. Current demographics

Table 1 of Appendix 2 shows the baseline (year 1996) population for Merced County, each of its six cities and the unincorporated area. The 1996 population was 198,522 of which 125, 232 (63%) was in the six cities. Half of the city population is in the City of Merced. The population per gross acre was 4.0 for the county as a whole. Population density in the unincorporated area was 2.7 per gross acre, which includes rural residential lots of less than 10 acres. (This is calculated in the footnote to DS Table 1A.). City densities varied from a low of 4.7 per gross acre (Livingston) to a high of 6.7 per gross acre (Atwater). Overall, these densities are typical of areas that are experiencing sprawl or suburban growth. The total developed area in the county was 50,130 acres of which 15,533 (slightly less than half) was in cities. This shows the effect of the less intense and more inefficient use of the land in the unincorporated areas.

3. Additional population growth and land use conversion under current General Plans

Table 1 of Appendix 2 describes the impacts of projected population growth to the year 2040 on Merced County, including each of the six incorporated cities and the unincorporated area. Overall, the population is expected to triple from the 1996 total of almost 200,000 to over 600,000. The cities of Merced, Los Banos, and Livingston are all expected to grow by more than 400%, while Atwater and the unincorporated area are projected to just over double.

The new population (added between 1996 and 2040) totals 422,000. The major share of that is expected to be in Merced, with 187,500 new residents. The unincorporated area will account for 82,200 new residents. The other cities follow with: Los Banos, 63,600 new residents; Livingston, 38,000; Atwater, 31,000; Gustine, 10,700; and Dos Palos 9,000.

Along with the projected new population, we have estimated new jobs, totaling almost 161,400 county-wide. These jobs are proportional to population for each city, based on the ratios from the 1990 census as noted in Table 1A of Appendix 2.

4. Additional population growth and land use conversion to year 2040 (per AFT report)

This report specifically compares the impact of two growth scenarios: (1) conventional or "sprawl" growth and (2) compact growth. These scenarios are essentially the same as were defined in the 1995 American Farmland Trust study for all of the Central Valley of California.

- **Conventional or "sprawl" growth** is relatively low density and represents **the current average density per gross urbanized acre.**

- **Compact growth** assumes the potential to accommodate **10% of new residents in urban infill areas** and the remaining 90% at **densities not quite double the current average.** For this type of densification of growth to become a reality would require substantial changes in the General Plans and zoning districts of the area's cities and a reduction of the amount of growth that could occur in the unincorporated area.

Note that the study assumes that the growth will occur according to California Department of Finance projections. The study deliberately does not include a *reduced growth scenario* because the intent of the study is to show how the physical and financial impact of growth that is predicted to occur can be reduced by concentrating that growth more efficiently.

D. Economic Model

1. Inputs to the model (demographics, public service and infrastructure revenues and costs, local expenditures for goods and services)

The model is an input-output model (see Footnote 3) which includes information on:

- population (Appendix 2 Table 1, 1A, 1B)
- housing units (Appendix 2 Table 1, 1A)
- jobs (Appendix 2 Table 1, 1A, 2)
- acres of developed land (residential, commercial, industrial, other) (Appendix 2 Table 1, 1A, 2
- agricultural sales (Appendix 2 Table 2A, 2B,
- multiplier showing the effect of additional spending induced by direct sales (Appendix 2 Table 2B)
- annual city revenues (taxes, benefit assessments, licenses and permit fees, fines and forfeitures, use of money and intergovernmental funds transfers, fees for services and other revenues) (Appendix 2 Table 3A, 3C)
- annual city costs (general government, public safety, transportation, community development, enterprise, culture and leisure, public utilities, and other costs) (Appendix 2 Table 3B)
- city annualized capital costs for public infrastructure (sewer mains, roads, storm drains, fire stations) (Appendix 2 Table 3D)annual county revenues (taxes, special benefit assessments, license and permit fees and franchises, fines, forfeitures, penalties, use of money, state and federal subventions, service fees, bond sales and other miscellaneous revenues) (Appendix 2 Table 4, 4A, 4C)annual county costs (general government, public protection, public roads, health care, public assistance, education, recreation and debt service). (Appendix 2 Table 4, 4B, 4C)

The model assigns the expenditures for wetlands and wildlife habitat into standard economic categories to which multipliers, developed by the Cooperative Extension Input-Output Study (George Goldman) can be applied. These are divided into:

- land expenditures (structures, maintenance, acquisition (easement and fee), wages and salaries of public employees, and expenditures by private landowners (duck clubs) (See Table Appendix 2, Table 5C)
- recreation expenditures by users of the wetlands complex (transportation, equipment, food, retail and services). (See Table Appendix 2 Table 5C)

2. Economic Analysis using Model Outputs (See Appendix 2 Summary Tables and all other Appendix 2 Tables)

a. Present Day – Economic value of wetlands uses vs. public costs (Summary Tables, Appendix 2 Tables 4F, 5)

The economic value of the GEA wetlands complex, including land management, acquisition, and recreational use, as shown in Appendix 2 Tables 5 and 5C, is about $27.7 million annually and accounts for about 600 jobs. With multipliers applied, this value jumps up to $40.9 million and 800 jobs. The comparable figures for all of Merced County are $36.5 million of direct expenditures (753 jobs) and $53.4 million (1100 jobs) with multipliers applied. For the GEA wetlands, this works out to an average of about $318 per acre of stimulation to the local economy. In contrast, the cost to local governments to serve this vast wetlands complex is low – only about $160,000 per year in County administrative costs and sheriff's patrol, or about $1.24 per acre (Appendix 2 Table 4F).

b. Present Day — Economic value of agriculture vs. cost of services by local government (Summary Tables, Table 4E)

The present day value of agriculture in Merced County as a whole on about 1.16 million acres is about $2.1 billion with multipliers applied and supplies over 27,000 jobs. (Summary Tables of Appendix 2). Within the 179,464 acres of the GEA, the agriculture accounts for almost $120 million in annual sales (with multipliers applied) and about 2500 jobs (Summary Tables, Table 5 of Appendix 2). The average value per acre of economic stimulation provided by agriculture is $1,819 ($2,113 billion/1.162 million acres), whereas the cost to local government (county) to provide services to agriculture is only about $3.6 million per year (Appendix 2 Table 4E) or $3.07 per acre. These services comprise the agricultural commissioner's office, the cooperative extension service, county administrative cost and sheriff's patrol.

c. Economic value of urbanization vs. cost of services by local government (Table 1, 1A of Appendix 2)

Under the growth scenarios to the year 2040 projected by the State of California Department of Finance, the existing revenues to the cities of $86.1 million per year will increase under either the low or compact density scenario to about $229 million per year. The revenues are slightly higher under the compact scenario because the property tax revenue for infill is greater than for annexation. The existing costs to the cities of about $84.3 million to provide

services yields a net positive revenue to the cities of about $1.85 million (Summary Tables of Appendix 2).

Overall, sprawl growth would consume twice as much land over the 44 year period and result in a large net annual loss to cities in the costs to serve new development vs. the revenue produced. The Summary Tables shows a net revenue *loss* to the cities of $53.6 million annually or a loss of $158 per capita to serve 94,195 acres of conventional sprawl growth (-$569/acre). In contrast, compact growth, even under the conservative case study scenario, would have a net revenue benefit to the cities of $6.3 million per year on 47,097 acres or $19 per capita (+$134/acre). This is a total net difference of $703 per acre between the conventional and compact growth scenarios. This striking difference is due to two factors: (1) the saving of 47,000 acres of farm land under the compact compared to sprawl scenario and the fact that this land remaining in production continues to produce revenues for the County of some $115 million per year and (2) the relatively lower cost to local government to provide infrastructure (roads, sewer, water, storm drainage) to more compact development.

E. Target year scenarios

1. Land use conversion (loss of wetland and agricultural acreage) (Summary Tables of Appendix 2)

a. Conventional growth

If growth occurs according to the sprawl growth scenario, the added population of 421,934 by the year 2040 will require a total of 94,127 new acres of urbanized land. (See Summary Tables of Appendix 2). The population estimates are assigned to each city are based on California Department of Finance projections . See the discussion in Appendix 2 Section 1.

b. Compact growth

Under the compact scenario, the new population would only require 47,063 acres of new urbanization, of which about 32,000 acres are in cities and 15,000 are in the unincorporated county.

2. Economic impacts – conventional vs. compact growth scenarios

3. Wetlands (loss of acreage, revenue, total economic effect)

a. GEA — Wetland, Rangeland and Agriculture

The impact on the wetlands from the two growth scenarios is shown in Appendix 2 Tables 4F and 5 and the Summary Tables of Appendix 2. Appendix 2 Table 4F shows an existing revenues to local governments from the wetlands and recreational uses of about $273,000 per year or about $2.11 per acre. This revenue comes from property taxes on the assessed value of private lands, in lieu fees paid to local governments by the federal and state governments. The only local government costs to serve these areas are the costs to county government to provide sheriff patrol and related administrative cost. The costs to serve these areas now is about $160,000 per year or about $1.24 per acre. This is a net benefit to local government of about $113,000 per year or about 87 cents per acre per year.

Under the conventional growth scenario the 94,195 acres of additional urbanization by the year 2040 will include 7,810 acres of rangeland and wetlands, and 1,953 acres of agricultural lands **within the GEA** based on discussions with the City of Los Banos about where the growth will occur. Under the compact growth scenario about 3,900 acres of the wetlands area and 976 agriculture acres would be lost to urbanization. (Appendix 2 Summary Tables and Table 5). These values are, respectively, 6 and 3% of the existing range and wetland area in the GEA (total 128,893 acres). Including agricultural land, the increase in urbanized land in the GEA would be 4881 acres under the compact scenario and 9,763 under the sprawl scenario.

Note that most of the acreage affected is combined range/wetlands, converting an estimated 20% of the GEA total in this land use under the low density scenario. These lands are dual use, and their conversion will thus result in a loss of farm sales as well as wetlands economic activity, as discussed below.

The conversion of agricultural and range lands will result in loss of farm-related economic activity. Currently, the GEA generates an estimated $119.7 million in direct and indirect annual farm sales and supports 2,487 total farm-related jobs. By 2040 with low density development, on the basis of the acreage of farmland lost there would be a loss of $11.8 million (10%) in total direct and indirect agricultural sales and a loss of 243 farm-related jobs. Compact development would reduce those losses to $5.9 million in total annual agricultural sales and 122 jobs.

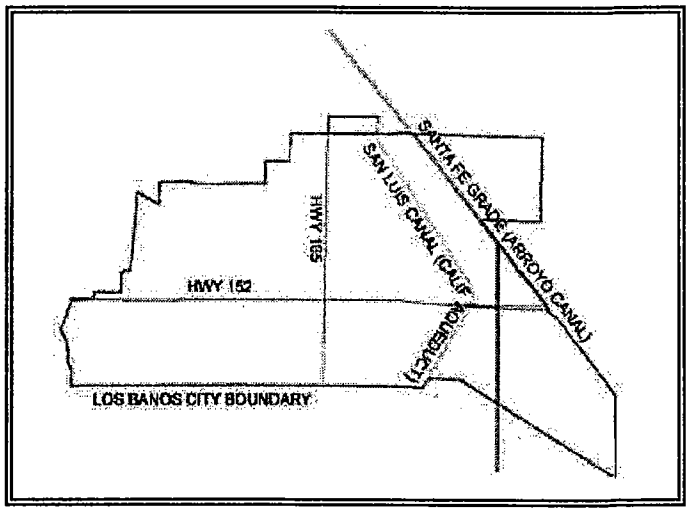
The potential urbanization of wetlands would also reduce the economic benefits of recreation and government and private investment in these areas. Current direct and indirect benefits from the wetlands are estimated at $40.9 million in annual sales and 798 jobs. Using a direct proportional extrapolation from the acreage lost with urban conversion by 2040 shows that under low density development, wetland-related sales would drop by $2.5 million (10%) annually and jobs by 85. Under compact density, sales would be reduced by an estimated $1.2 million (5%) annually and jobs by 42. Combined, the conversion of farmlands and wetlands within the GEA would result in direct and indirect annual sales losses of $14.3 million under low density development compared to $7.1 million with compact development.

b. Band Around the GEA

Recall that we had defined a two-mile band of land around the core area of the GEA in the earlier land planning guidance study. In the long term, it is essential that this band contain only resource beneficial or resource neutral uses to protect the integrity of the interior of the refuge complex as a whole. The growth of the City of Los Banos directly to the east is a particular threat to both the band and the GEA interior, and can isolate the North from the South Grasslands. Thus, urbanization in the band is almost of equal importance to urbanization within the GEA complex in its potential adverse effects on the wetlands complex.

The net loss to the focus area band from with the urbanization of another 5000 to 7000 total acres under the compact scenario and 10,000 to 14,000 under the sprawl scenario increases the total urban land within the band from the current 1.4% to as much as 10% (see Text Table 8, below).

The 1995 "*Grassland Water District Land Planning Guidance Study*" studied the effectiveness of a one-mile and a two-mile band of only compatible (agriculture, open space) uses around the wetlands. The study showed that the two mile buffer was substantially more effective in protecting the core, or interior of the refuge. Using the model of a two-mile buffer, we attempted to estimate where growth would occur in relation to the buffer – specifically, within a corresponding two mile ring or "doughnut" around existing city boundaries. Text Table 8 summarizes this analysis. Text Table 8 shows that within the 160,000-acre area that corresponds to a two-mile band around the GEA, the present 2187 acres of urban land (1.4% of total area) could grow to as much as 9300 acres(5% urban) under the compact scenario and as much as 16,400 acres (10% urban) under the low-density "sprawl" scenario. Correspondingly, of the 167,600 acres that form a two-mile ring around the six cities, the percentage of land that is urban is expected to grow from the present 7% up to as much as 45% under the low-density scenario. The intersection of the growth zone around cities with the two-mile band around the GEA (and in the case of Los Banos, the GEA interior as well), corresponds to a potential "zone of conflict" — see Figure 8.



Los Banos boundaries delimiting "Zones of Conflict"

Of the six cities in Merced County, Los Banos, Gustine and Dos Palos have city spheres that include a portion of the two-mile GEA band. Growth in unincorporated areas such as Volta could also have adverse consequences on the wildlife refuge areas. Los Banos presents the greatest problem with lands within both its current city boundary and its sphere that are either directly within the GEA area or its two-mile band. The current Los Banos General Plan prohibits growth east of the Santa Fe Grade and discourages non-compatible uses east of the San Luis Canal, both of which are intended to slow down encroachment on the nearby wetlands complex (see Figure 8 of Appendix 1). However, General Plans are re-written on a 5 or 10-year cycle. Land use restrictions, such as conservation easements, that are more permanently preventive of growth in the east/north direction are needed to prevent encroachment and fragmentation of the wetlands complex in the long term.

Text Table 8
Effect of City and Non-city Growth on GEA Two-mile Band (1996-2040)

	Year 1996 (Acres)	*Year 2040 (Acres)*		*Comment*
		Sprawl Growth	*Compact Growth*	
GEA				
Within 2-mile band around GEA	160,359	160,359	160,359	
City land within 2-mile band				
Non-urban	31,678	20,503	26,866	
Urban	1550	12,726[a] 8,548 (Appendix 2 Table 2B)[b]	6363[b] 4,274 Appendix 2 Table 2B	20% of 63,632 acres of city growth is in GEA band (sprawl) 20% of 31,816 acres (compact)[g]
Total	33,230	33,230	33,230	
Unincorporated urban land in band	638	1,528 (Appendix 2 Table 2)[c]	764[c]	5% of 30,563 acres of growth in the unincorporated County is in the GEA band[c] (sprawl) 5% of 15,281 acres (compact)
Total urban land in band	2187	12,263 - 16,441	7225 - 9314	6-7 fold increase (sprawl) 3-4 fold increase (compact)
Percent of Band that is Urban Land	1.4%	8 - 10%	4 - 5%	
CITIES				
Acres within 2-mile radius of city limits	167,606	167,606	167,606	
Urban lands	12,341 (7%)	75,973 = 12,341+63,632 (45%)	44,157 (=12,341+31,816 (26%) see Appendix 2 Table 1)	

See Figure 8 of Appendix 1

[a] The 20% is the ratio of total city land in GEA band to total land in band 33,229/160,359

[b] Based on interviews with the cities, the only cities where growth is projected to occur in the direction of the GEA and band are Los Banos if it grows to the northeast and Gustine.

[c] These values are calculated as 5% of the total amount of growth calculated for the unincorporated area in Appendix 2 Table 2B (30,563 acres for sprawl growth) and (15,281 acres for compact growth).

4. Agriculture (loss of revenue, costs vs. revenues, total economic effect)

Based on these percentages, Text Table 9 below projects the acreage and value of the agricultural land around the six cities where the projected urban growth will occur.

Text Table 9
Effect of Sprawl Vs. Compact Growth on Agriculture

Scenario	*Sprawl Growth*			*Compact Growth*		
	Total	*In Cities*	*Unincorp*	*Total*	*In Cities*	*Unincorp*
Urban Acres 1996[a]	50,130	22,875	27,255	50,130	22,875	27,255
Urban Acres 2040[a]	144,325	86,507	57,818	97,227	54,691	42,537
New Urban Acres 2040[a]	94,195	63,632	30,563	47,097	31,816	15,281
Loss of Ag Acreage	86,385 (7.4%)			43,192 (3.7%)		
Loss of Wetlands[b]	9,763			4,881		
Loss of Ag Income[c]	$229.2 million			$114.6 million.		
Loss of Ag Jobs[d]	2,709			1,355		
Net Annual Revenue/ Cost in 2040	($53.63 million net loss)			$6.3 million net gain		

[a] Summary Tables, Appendix 2
[b] Table 5, Appendix 2
[c] Agricultural income includes direct and indirect annual sales of agricultural products, and personal income
[d] Table 2B, Appendix 2

5. Urban lands (costs vs. revenues, total economic effect)

These effects are fully described in **Appendix 2** and are summarized below in Text Tables 10, 11 and 12.

Text Table 10
Effect of Sprawl Vs. Compact Growth in City and County Revenues

Scenario	*Sprawl Growth*			*Compact Growth*		
	Total	*In Cities*	*Unincorp*	*Total*	*In Cities*	*Unincorp*
Urban Acres 1998	50,130	22,875	27,255	35,734	22,875	12,859
Urban Acres 2040	144,325	86,507	57,818	81,968	54,691	42,537
New Urban Acres 2040	94,195	63,632	30,563	47,097	31,816	15,281
Net Annual Revenue/ Cost in 2040 (Cities)	($51.8 million) loss			$8.2 million		
Net Annual Revenue/cost in 2040 (County)	($10.9 million) loss			($8.9 million) loss		

Source: Appendix 2, Summary Table B

City Fiscal Impacts

Population and employment growth in the county's cities will increase both revenues and costs to the city governments, under any development scenario. Table 3 of Appendix 2 estimates the total new revenues and new costs anticipated due to population growth between 1996 and 2040 for each city.

Under the low density scenario, all of the cities would produce less new revenue than the new costs involved. For the cities combined, the estimated net annual shortfall is $53.6 million. This net shortfall is 23% of the $229 million of new revenues generated. On a per capita basis, the average city resident would produce a $158 net annual shortfall.

The compact density scenario, on the other hand, generates small net revenue surpluses for almost all of the cities (the exception being Livingston), with the combined total net annual surplus of $8.2 million, about 2.5% over the revenues. The average city resident would generate a $19 net annual surplus. Some of the revenues and costs are the same or minimally affected by density, while others vary considerably: Revenues and costs estimated on an average per resident or per employee basis increase in direct proportion to the increase in population, regardless of density.

Property tax revenues vary somewhat due to differences in tax share distribution. The compact scenario yields almost $1.0 million more in annual revenues due to the cities receiving a higher share of property tax in infill areas than in new annexations. The biggest differences between the scenarios are the costs that are based on the acreage affected and capital improvements required. The low density option requires an estimated $73.3 million in acre-

related costs and $55.9 million in annualized capital costs, compared to $36.6 million and $33.5 million respectively for the compact scenario.

Capital costs of new services are calculated on an annualized basis in Table 3D of Appendix 2, based on a Strong Associates case study. (We have assumed the costs will be the same for these new capital improvements in all of the cities.) As shown, at current average densities, internal acre-related capital costs include: sewer systems, at $1,400 per acre; roads and storm drains, at $5,000 per acre; and fire station, at $500 per acre. These total $703/acre on an annualized basis (financed over 20 years at 8% interest). Spine infrastructure for sewer mains and arterial roads are an additional $2.24 million per mile in one-time costs, which converts to $1,726 per acre, or to $176/acre on an annualized basis. Although most of these costs relate to acreage, we have assumed that the compact density would cost slightly more (an added 20%) per new acre served, since quantity of development per acre will be almost doubled.

The low density scenario would involve an estimated $55.9 million annually to cover these capital improvements. The compact density alternative would cost an estimated $33.5 million.

County Fiscal Impacts

The County's revenues and costs are affected by growth both within the cities and in the unincorporated area. Most of the County's revenues and costs will be nearly the same under the two alternative scenarios, as shown in Table 4 of Appendix 2.

Average revenues from new residents are estimated at $359.9 million annually, and from jobs, $32.5 million - the same under both scenarios. Property taxes are almost the same under both scenarios - $28.4 million annually from the low density option vs. $28.0 million from the compact approach - with the difference due to a lower county share from infill development.

The County will lose net revenue from conversion of farmlands and wetlands. For the low density option, these lost revenues are estimated at $786,000 and $6,800, whereas for the compact scenario, the losses would be $393,000 and $3,400 annually (see Tables 4E and 4F of Appendix 2).

Average costs to serve residents, at $404.0 million, and for job-related services, at $21.2 million, are the same for both scenarios. Road cost is the significant difference between the two scenarios in impact on County government (see discussion below). With estimated road costs of $133 per urbanized acre, the low density approach would increase costs by almost $4.1 million annually, whereas the compact density alternative would cost $2.0 million. (See Table 4B of Appendix 2).

In all, the growth generated by the low density approach will produce estimated revenues of $421.1 million, exceeded by costs of $429.3 million, yielding a net annual deficit of $8.2 million. Under the compact density option, revenues are almost identical, at $421 million, while costs are estimated at $427.3 million, reducing the county's net annual deficit to $6.2 million. (See Summary Tables of Appendix 2). Together with existing development, total revenues to the County in 2040 under the low density scenario will be $607.8 million, exceeded by costs of $638 million for a net annual deficit of $10.9 million. Under the compact scenario, the revenues

would be the same as under low density, but the costs would be about $636 million, reducing the annual deficit to $8.9 million.

VI. Conclusions and Recommended Strategies to be implemented by local government and stakeholders (et al)

A. Comparison of economic effect of growth scenarios

The full economic impact of this explosive growth on the wetlands is difficult to predict. Broadly, if non-compatible urban development encroaches on the wetlands so as to reduce its utilization by wildlife, then recreational usage could be expected to decline, and public funds for habitat management may be more difficult to obtain. The impact will depend on how closely this growth encroaches on the boundaries of the refuges, or whether it, as in the case of Los Banos, divides the North from the South Grasslands.

The total economic effects of this change are difficult to quantify. In the earlier discussion, it was estimated that on the basis of acreage alone, loss direct sales and total revenues due to urban development would reduce the economic values within the GEA by about 10% in 2040 compared to 1996. While the total urbanized land within the GEA in 2040 would only be 5652 - 10,534 acres[5] (3 to 6 percent of the total acreage), there could effects in addition to the direct loss of productivity on urbanized lands. Effects on the *remaining* lands include threshold effects related to fragmentation of habitat, increased number of roads, domestic pets, pollution and illegal hunting. In addition, the increase in intensity of land uses in the band from the present 1.4% to as much as 8 to 10% may begin to affect the integrity of the wetlands complex by direct incursions, introduction of more exotic species, effects on water quality or more subtle effects. As reported in the 1995 Land Planning Guidance Study, many studies of conservation biology have shown that many wildlife refuges lose a number of their key species over time if they are not large enough or are not protected from outside effects by a large enough buffer. These effects are seen even in refuges of hundreds of thousands or even millions of acres. On the level of watersheds, at least one study (E. Strecker, pers. comm.) showed that biodiversity in streams drops sharply when as little as 5% of its area is impervious surface.

If the increase in urban land, however modest, results in decreased utilization by wildlife, then this will negatively impact the amount of valid public recreational use of these lands that are dependent upon healthy wildlife populations. In particular, if growth of Los Banos toward the east were to fragment and isolate the North from the South Grasslands, this could have a profound effect on the movement of waterfowl between different parts of the refuges they now utilize on a daily basis (Grassland Land Planning Guidance Study, 1995, Fleshkes, J. 1992). In addition, there may be more public pressure to decrease the levels of public expenditure in the wetlands at both the state and federal level. This is in direct contradiction to the other economic indicators from this study which show that if anything, the levels of public expenditure in the wetlands should increase. If the level of expenditure declines, then this may create a positive feedback loop in which the resources are negatively impacted further and more incentive is created for further urban development at the expense of wildlife habitat.

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[5]10,534 acres urbanized = 771 existing urban + 9,763 new urban (sprawl growth). 5,632 acres urbanized = 771 existing urban + 4,881 new urban (compact growth).

B. Economic Implications for Planning

Table 11 summarizes the economic impact of the various land uses and growth types.

Text Table 11
Economic Impact of Land Use Types on Local Government
Existing Revenue vs. Cost by Land Use

	Agriculture	*Wetlands*	*Cities Only*	*All Urban*	*County*	*Co Urban*	*All Merced*
Revenue ($1000's)	$12,194	$272	$86,125	$279,874	$206,215	193749	$292,340
Cost ($1000's)	$3,562	$160	$84,274	$289,442	$208,890	205168	$293,164
Net Revenue	$8,632	$112	$1,851	($9,568)	($2,675)	($11,419)	($824)
Revenue/Cost Ratio	3.42	1.70	1.02	0.97	0.99	0.94	1.00
Area (ac)	1,162,000	129,000	22,875	50,130	1,162,000	27255	1,184,875
Population			125,232	198,522	198,522	73290	323,754
Net Revenue per capita			$14.78	($48.20)	($13.47)	($155.81)	($2.55)
Net Revenue per acre	$7.43	$0.87	$80.92	($190.86)	($2.30)	($418.97)	($0.70)

Source: Appendix 2 Summary Table B, Tables 4E, 4F.

Text Table 11 gives the economic picture today of the economic impact of land uses on local government. In Text Table 11 net revenue is the *difference* between the total cost of local government to provide services and infrastructure to the various land uses and the revenue that each land use type produces. The revenue/cost ratio is total revenue *divided by* total cost. Net revenue per acre is the net revenue divided by the total number of acres of that land use category. It can be seen from Text Table 11 that agriculture and wetlands have a highly positive revenue to cost ratio. That is, for example, agriculture produces $3.42 of revenue to local government for every dollar it costs to serve agriculture. Wetlands produce $1.70 of revenue for every dollar of cost – less than agriculture because their productivity and market value is less, but they demand very little in the way of urban services. In addition, these two land uses produce a modest net revenue per acre. The economic value of agriculture is also much higher than for wetlands in terms of stimulation of the local economy ($317/acre for wetlands, $1,819 average for agriculture) because of the much higher value of agricultural commodities in the marketplace.

In contrast, all types of urban development are a "break even" proposition or are negative. Considering the cities only (city population and city-provided urban services) the revenue/cost ratio is very slightly positive. Also, within the cities only there appears to be a net revenue per acre of about $81. However, this is misleading because the cities populations also utilize many services provided only by the County such as District Attorney, assessor, courts and judicial services, elections etc. Looking at the entire County urban population, there is already a large net deficit in the cost per acre to provide services to its urban population – the County and cities spend $190.86 more per acre to serve their urban population than they get back in revenue. This amount grows to $418.97 per acre looking only at the County serving the unincorporated population – since that illustrates that it is the most expensive and inefficient to serve this far flung scattered population compared to the more concentrated population in cities.

Text Table 12
Economic Impact of Land Use Types on Local Government – Effect of Growth to 2040 on Revenue vs. Cost by Land Use

	Existing	*2040 Sprawl*	*2040 Compact*
Revenue ($1000's)	$292,340	$942,360	$943,272
Cost ($1000's)	$293,164	$1,005,015	$943,988
Net Revenue	($824)	($62,655)	($716)
Revenue/Cost Ratio	1.00	0.94	1.00
Urban Area (ac)	50,130	144,325	97,228
Population	198,522	620,457	620,457
Net Revenue per	($4.15)	($100.98)	($1.15)
Net Revenue per	($16.44)	($434.12)	($7.36)

Source: Appendix 2 Summary Table B Table, Tables 4E, 4F.

In Text Table 12 net revenue per urban acre is the net revenue divided by the total number of acres that are urban under each scenario. When one now considers the effect of the two growth scenarios on local government economics, Text Table 12 depicts the following: at present there is a net deficit to local governments (city and County together) to provide urban services to the urban population. This impact is negative (a deficit) whether one considers the cost per capita (population) or the cost per acre. When one compares the exist deficit per acre ($16.44) with the comparable value in the year 2040 this value ($-16.44) grows to -$434.12 under the sprawl growth scenario but shrinks to -$7.36 per acre under the compact growth scenario. The sprawl scenario shows that continued growth at the current average density per

gross urbanized acre is so inefficient that unless revenues (fees and taxes) are raised substantially, local governments will fall farther behind in their ability to provide capital improvements and services.

The improvement (from -$16.44 per acre to -$7.36 per acre) under the compact growth scenario shows that marked effect that even a modest effort at making growth more compact would have in reducing the costs of infrastructure (e.g. roads, sewer, water, storm drainage). Even with the tripling in population under either growth scenario, serving the new population at increased compact densities is so much more efficient than serving the present population that the overall cost to serve each person or each dwelling unit (or acre) drops. Note that even under the compact scenario as depicted in this study, the net impact of the growth on local government is still negative (a net loss).

Sprawl growth would also consume twice as much land over the 44 year period. The difference in net revenue between the sprawl and compact scenarios is also related to: (1) the saving of 47,000 acres of farm land under the compact compared to sprawl scenario and (2) the fact that this land remaining in production continues to produce revenues for the County of some $115 million per year.

The key point is that agriculture and wetlands are compatible uses to each other. Agriculture of all types is a productive use within the wetlands complex and especially in the two-mile band we have defined around the wetlands to protect the core area from the effects of urban encroachment.

About 8% of all of the County's agriculture takes place within the GEA and another 14% within the two mile band. Within the GEA portion about 44% of the 88,401 acres of non-wetlands is grazing land and within the band only 11% of the 160,359 acres is grazing land and the rest is higher value agriculture. Considering the difference in total economic values and in net revenue to local government ($7.43 for agriculture vs. $0.87 per acre for wetlands), buffer lands should be kept in agriculture and lands within the wetlands complex which are purchased for conservation easement should be allowed to continue as agriculture if that agriculture is compatible with wetland use (e.g. small grain crops), to preserve their economic productivity unless this is completely incompatible with wildlife utilization.

The overall impact over time, beyond 2040 will depend on many factors, including whether growth has become more compact by that time, and whether the intense growth pressures on the Central Valley continue. This analysis has confirmed that for Merced County, agriculture, in contrast to the bulk of urban growth, has a net positive economic impact on local government and generates over $2 billion per year in county economic productivity. Likewise, in contrast to the common view of wetlands as a "wasteland" suitable only as habitat for ducks, this study shows that wetlands too have a net positive economic impact on local governments and represent substantial public and private expenditures and local economic activity. These substantial economic values of non-urban uses emphasize the importance of their long-term protection in future land use planning decisions.

C. Strategies to protect wetland uses and infrastructure

The following are a preliminary (rather than an exhaustive) list of suggested means to better protect wetland uses and their infrastructure.

- Adequate supply of water of sufficient quality at affordable price (should not be shorted in State or federal water plans, or re-allocated for urban uses at a higher price)
- Protection of one to two mile band around the "core" area with only compatible uses (agriculture, open space uses) inside the band
- Permanent protection of more lands through progressive public purchase by fee or conservation easement. Concentrate purchase on lands with low agricultural value or allow continuation of agriculture if not entirely incompatible with wildlife usage.
- Continuation of seasonal land use diversification (e.g. flooded for duck clubs in fall, winter; agriculture in summer)
- General Plan policies (e.g. City of Los Banos) and case-by-case local land use planning decisions should be directed away from any further encroachment on the GEA.
- Increase level of public expenditure for wetlands, including the rate of in lieu fees paid to local government. Currently, the level of in lieu fees paid by federal and state agencies to Merced County is extremely low in comparison to the property taxes paid by either agriculture or development (see Table Text-12 below)

Text Table 13
Revenue per Acre from Property and In-lieu Property Taxes

Entity	*Type of Revenue*	*Total Revenue*	*Acres*	*Revenue per Acre*
Cities – developed	property tax	$5,164,699	22,875	$225.78
County– developed	property tax	$19,069,090	27,255	$699.65
County – Ag	property tax (1% of A.V.)	$38,260,680	1,162,008	$32.93
County+cities – developed	property tax	$24,233,789	50,130	$483.42
GWD – private wetland	property tax (1% of A.V.)	$232,416	38,602	$6.02
Federal/State	in lieu	$146,897	56,177	$2.61

Source: Appendix 2, Tables 3A and 4A.

Private landowner partnerships to make use of other federal sources of money such as endangered species funds, USDA Wetland Reserve and Conservation Reserve Programs

VII. Reference

A. Persons and Organizations Consulted

American Farmland Trust
Erik Vink, Policy Director, Davis Field Office

California State Parks Department
Joe Hardcastle, District Head
Dave Gould, Chief Ranger, Four Rivers District
Jean Leavitt, Administrative Chief

California Department of Fish and Game
John Beam, Los Banos Wildlife Area Manager
Joyce Bigham
Leslie Howard, North Grasslands Wildlife Area Manager
Dave Smith

California Wildlife Conservation Board
Jim Sorro

Central Valley Habitat Joint Venture
Ruth Ostroff
Mike Eichholz

Ducks Unlimited
Fritz Reid, Director of Conservation Planning
Jim Gleason, Director of Development

Grassland Water District
Dean Kwasny, Biologist
Don Marciochi, General Manager
Dave Widell

Great Valley Center
Carol Whiteside, Executive Director

City of Los Banos
Lynn Azevedo, Planning Director

Merced County
Robert Smith, Director of Planning
Robert King, Planner

Merced Data Special Services (MDSS)

U.S. Fish and Wildlife Service
San Luis National Wildlife Refuge
Mike Chouinard

Sue Lackey

Strecker, Eric. Water quality consultant, Seattle, WA.

B. Bibliography

Allen, J., M. Cunningham, A. Greenwood and L. Rosenthal. 1992. "The Value of California Wetlands: An Analysis of their Economic Benefits". Report of The Campaign to Save California Wetlands.

American Farmland Trust. 1998. *A Landscape of Choice: Strategies for Improving Patterns of Community Growth.*

American Farmland Trust. 1997. *Saving American Farmland: What Works.* 334 pp.

American Farmland Trust. 1997. Farmland Protection Program. Fact Sheet.

American Farmland Trust. 1995. Alternatives for Future Urban Growth in California's Central Valley: The Bottom Line for Agriculture and Taxpayers.

Association of Bay Area Governments. 1985. *Jobs/Housing Balance for Traffic Mitigation.*

California Center for Land Recycling (CCLR). 1998. "Land Recycling and the Creation of Sustainable Communities. Policy Paper Series 01.

California, State of. Growth Management Council. 1993. *Strategic Growth: Taking Charge of the Future, A Blueprint for California.*

Local Government Commission. 1992. *Land Use Strategies for More Livable Places*

Loomis, J. T. Wegge, M. Hanemann and B. Kanninen. 1990. "The Economic Value of Water to Wildlife and Fisheries in the San Joaquin Valley: Results of a Simulated Voter Referendum".

Thomas Reid Associates. 1995. *Grassland Water District Land Planning Guidance Study.* Report prepared for the Grassland Water District.

Urban Research Associates. 1992. "Demography and Economic Development in Los Banos, California, The State of the City". Report prepared for the City of Los Banos.

U.S. Department of the Interior, U.S. Fish and Wildlife Service. 1997. "1996 National Survey of Fishing, Hunting and Wildlife Associated Recreation"

C. Report Preparers

The report is published by:

Grassland Water District
22759 Mercey Springs Road
Los Banos, CA 93635
(209) 826-5188
e-mail: info@Grasslandwetlands.com

The report is prepared by:

Thomas Reid Associates
560 Waverley Street, Suite 201
Palo Alto, CA 94301
(650) 327-0429
www.TRAenviro.com

Karen G. Weissman, Ph.D., Principal and Principal Investigator
e-mail: Weissman@TRAenviro.com
Meg Peterson, GIS and mapping
Thomas Reid, Principal, quality control.

The Economics Supporting Study is by:

Strong Associates
240 41st Street
Oakland, CA 94611
(510) 428-2904

David Strong, Principal Investigator
e-mail: thestrongs@pacbell.net
Madge Strong, editing
Toby Goldman (consultant) GIS