# CHAPTER 10. LAND USE AND OWNERSHIP

## 10.1. INTRODUCTION

Most of the land along the San Joaquin River is under private ownership, and the primary land use is agricultural. This land use and ownership has greatly influenced the evolution of the San Joaquin River corridor, and will continue to impose constraints to restoration along the river in the future. However, there are opportunities associated with land use and ownership along the San Joaquin River that will assist restoration efforts. Additionally, restoration activities may conflict with local regulations (e.g., county General Plans), as well as add new constraints to the existing land uses. Therefore, the goals of this chapter are to: (1) provide a history of the valley's land use and ownership, (2) describe, delineate, and evaluate current land use, ownership, and regulatory jurisdictions, in each study reach, and (3) analyze land use and ownership opportunities and constraints to restoring the San Joaquin River within the study reach. To achieve these goals, we present an historical chronology and a quantitative description of land use and ownership along the river. Then, based on this information, and on observations of restoration efforts on other San Joaquin River tributaries, we end the chapter with a summary of opportunities and constraints imposed by and on land use and ownership on the San Joaquin River. These opportunities and constraints will play key roles in developing and implementing restoration strategies on the San Joaquin River.

### 10.1.1. A Brief History of Land Use and Land Ownership

Under historical unimpaired conditions, the valley floor of the San Joaquin River basin contained four major environments: upland grassland prairie, tule marsh/flood basins, riparian forest, and aquatic areas. The grassland prairie environment was the first to be altered in the late 1700's with the introduction of exotic grasses (Bakker 1971, cited in Gutierrez and Orsi 1998). Tule marsh/flood basin reclamation began in the late 1800's with levee construction along the rivers, blocking off sloughs, draining marshes, and removing the tules. The riparian forest was first impacted by clearing timber to fuel the steamers plying the waterways of the San Joaquin River; impacts culminated with the first wave of farmers cultivating drier riparian areas situated on natural levees along the river. The aquatic environment was first impacted by the formation of irrigation and canal companies that diverted water upriver to be used on non-riparian or reclaimed riparian lands. Completion of the Central Valley Project and State Water Project greatly increased water diversions from the San Joaquin River, removing most of the flows responsible for maintaining the river in a healthy condition. A short history of land use in the San Joaquin River Basin is summarized as follows:

- Prior to the arrival of Spanish missionaries and explorers in the late 1770s, the Yokut Tribe subsisted on plants, animals, and fish along the San Joaquin River corridor. The Southern Valley Yokuts inhabited the Tulare Lake basin, while the Northern Valley Yokuts inhabited the San Joaquin Valley. Both tribes had similar land use and subsistence patterns, with the notable exception that the Northern Valley Yokuts had greater access to acorns and salmon than the southern tribe (Wallace 1978). Most land use was passive, gathering acorns, tule roots, grass seeds, and eggs, as well as hunting waterfowl and larger land mammals. Intentional burning of tule marshes is often cited as a Yokut land use practice, but whether this was true or merely supposed by early American settlers is uncertain. Harvesting of willows and grasses, however, was common; willows and grasses were primarily used for basketry.
- From 1772 to 1821, Spanish missions were established along coastal California. Spanish missionaries and explorers introduced cattle, horses, and exotic annual grasses (e.g., wild

oats), which spread rapidly through the San Joaquin Valley. The exotic annual grasses and weeds began to replace the native grasses over much of the historic grassland prairies (Gutierrez & Orsi 1998).

- From 1832 to 1844, the Hudson Bay Company's southern fur trapping brigade set up its headquarters at French Camp near Stockton, to commercially exploit beaver and otter (Mackie 1997). While the fur trapping period was short, the trappers shot large quantities of deer and elk for subsistence, as well as for hides. At this time, malaria was introduced to the Yokut people, whose population was decimated by an 1833 epidemic (Wallace 1978, Gutierrez & Orsi 1998).
- At approximately the same time (1835), the first land grant was issued in the San Joaquin Valley by the Mexican government. By 1843, the mission lands were secularized, and a campaign of privatizing land for cattle production was underway. After the Bear Flag Revolt in 1846, the United States imposed military rule, by which time the Mexican government had awarded 341,794 acres in land grants. These land grants were issued to just 12 Californio rancheros in the San Joaquin River Basin (Minnick 1982, Perez 1996).
- In 1848, gold was discovered; the impact on rivers draining into the San Joaquin Valley began with placer mining, followed by construction of dams, ditches, and diversions to hydraulically mine the hill slopes. The mining debris washed into the rivers leaving a covering of silt and debris referred to as "slickens" in its wake. While hydraulic mining was prohibited in 1893, dredging of river bottoms in the lower courses of the rivers entering the San Joaquin Basin persisted until the 1950s (Rawls & Orsi 1999).
- In 1850, California became the 31st state. The Arkansas Act of 1850 granted all "swamp and overflowed lands" to the State of California, which could sell the land to private individuals if it would be reclaimed. A new wave of land privatization ensued. The population of the San Joaquin Valley was only 21,000 persons, with only 3,000 acres under cultivation (raising wheat and other seasonal grains). During this era of dry land grain farming, tule marshes were drained and leveed, creating vast land holdings that supported cattle and hogs. Mr. Henry Miller, of Miller and Lux, vigorously acquired riparian lands and water rights along the San Joaquin River that would eventually total 900,000 acres (CSDE 1942, Fox 1987, Rose 1992, Vileisis 1997).
- In 1871, the Central Pacific Railroad arrived in the San Joaquin Valley. At the same time, construction of the San Joaquin and Kings River Canal began, which signaled the end of dry land farming. The era of appropriated water rights and irrigation, new concepts to the American farmer, began by utilizing water rights developed earlier for hydraulic mining. Throughout the 1870s, canal companies and irrigation districts were formed, and in 1878, William Hall (State Engineer for California) began studies to improve irrigation, drainage, and navigation in the San Joaquin River. By 1880, the population increased to 150,000, with 2,000,000 acres under cultivation. With the passage of the 1887 Wright Irrigation Act, approximately fifty active irrigation districts were formed in the Central Valley, building more than six hundred dams. Canals delivered irrigation water to non-riparian lands where fruit and vegetables were raised. By 1892, the large landholdings in the San Joaquin Valley led the nation in wheat in production (CSDE 1942, Fox 1987, Patterson 1989, Rose 1992). Intensive farming required more water than could be supplied from surface sources, and ground water pumping escalated, which drastically decreased groundwater elevations. Underground water deposits were overdrawn, and by 1936, lands that were intensively farmed earlier were abandoned. In 1921, the State funded the Marshall Plan to develop a comprehensive water development plan to resolve the recurring problems of floods and droughts, and also to devise a system to move surplus water in the north to the south in the Central Valley.

- In 1935, the Federal Government took over the Central Valley Project, and three years later, the US Bureau of Reclamation (Reclamation) entered into a contract to construct Shasta Dam. In 1939, a contract was issued for constructing Friant Dam. Friant Dam was completed two years later and began delivering water into the Friant-Madera Canal and Friant-Kern Canal by 1948. After construction of Friant and Shasta dams, over 5 million acre feet of water could be released through a network of canals and riverbeds that run almost the whole length of the Central Valley. In 1951, the Central Valley Project was completed, and 98% of the San Joaquin River water was diverted into the Friant-Kern and Friant-Madera Canals to irrigate upland agricultural lands (CSDE 1942, Rose 1992). The completion of the Friant Unit of the Central Valley Project provided the final impetus for ultimate agricultural expansion of the San Joaquin Valley. However, the completion of Friant Dam and the associated diversion canals did not occur without a significant environmental cost, as portions of the San Joaquin River were dewatered downstream of Friant Dam, extirpating salmon and steelhead populations, and degrading habitat along the riparian corridor.

## 10.2. OBJECTIVES

The objective of this chapter is to identify and describe restoration opportunities and constraints resulting from land use and ownership that would influence restoration strategies of the Restoration Plan. Specific to land use and ownership, the April 2000 Scope of Work lists several objectives:

- Describe, evaluate, and map other existing and potential land uses within the pre-dam 100-year floodplain.
- Describe and map land ownership patterns which differentiate public and private land

To achieve these objectives, primary information needs are: 1) the extent of the pre-dam 100-year floodplain to define the study area boundary, 2) public versus private land ownership within the study area boundary, 3) types of land use within the study area boundary, and 4) a discussion of existing and potential future opportunities and constraints resulting from potential activities of the Restoration Plan.

## 10.3. STUDY AREA BOUNDARY

The length of the study area is defined as the San Joaquin River basin, from Friant Dam down to its confluence with the Merced River. The width of the study area varies depending on source of the data utilized. The Bureau of Reclamation provided land ownership data for properties along the river; therefore, for analyzing opportunities and constraints due to land ownership, the study area width is defined by extending an approximate boundary line at least ½ mile from the San Joaquin River's centerline. This creates at least a 1-mile wide study area width that extends from Friant Dam to the confluence of the Merced River. For land use, data was compiled from the Department of Water Resources; this data covered an area approximately 1,500 feet or greater beyond the river centerline on both banks, for a total study area width of at least 3,000 feet.

## 10.4. DATA SOURCES AND METHODS

Land use data were provided by the Department of Water Resources (DWR) as described above (approximately 3,000 ft width along the river). Land ownership data for the study area (covering a width approximately 1-mile wide along the river) was provided by the Bureau of Reclamation, the San Joaquin River Parkway and Conservation Trust, and the State Lands Commission. Data sources and methods are described in more detail below.

### 10.4.1. Land Use

Present day land use practices were compiled from DWR's GIS databases for Merced (1995), Madera (1995), and Fresno (1994) counties. Land use types were inventoried by the following broad land uses: agricultural, open space, and urban. Each of these broad land uses was further subdivided into "types". For agricultural land use, subdivision types include:

- Annual crops, such as field crops (cotton, sweet corn, sugar beets, dry beans, and safflower), truck, nursery and berry crops (lettuce, bell peppers, strawberries, melons, nursery products, eggplant, garlic, onions, asparagus, squash, broccoli, peas, and tomatoes), pasture (forage, irrigated, and range lands, and may include alfalfa, clover, and other native or mixed pasture plant species), grain and hay crops (alfalfa, barley, wheat, oats, and other mixed grain and hay), and rice.
- Vineyards, such as raisin, table, and wine grapes.
- Orchards, such as citrus and subtropical crops (kiwifruit, lemons, nectarines, olives, and oranges), deciduous fruit and nut crops (almonds, apples, sweet cherries, dried figs, peaches, persimmons, pistachios, plums, pomegranates, and walnuts).
- Semi-agricultural and incidental to agriculture, such as apiary products, cattle, poultry, dairy, and wool. This category also includes other agriculture-related infrastructure such as agricultural disposal areas, equipment maintenance areas, and storage areas.

Open space lands were also subdivided into these types:

- Idle land, such as cropland that is fallow but has been farmed within the past 3 years, or land that is being prepared to be placed in agricultural production.
- Native vegetation, such as wetland/marsh, grassland, shrub/brush, and forest plant communities.
- Aquatic environments, such as lakes, reservoirs, rivers, canals, and open water created by mining operations.

The urban land uses include the following subdivision types:

- Residential, such as homes, apartments, and trailer parks.
- Commercial, such as malls, small businesses, and retail and wholesale stores.
- Industrial, such as factories, manufacturers, and service industries.
- Landscaped, such as lawns, golf courses, and cemeteries.
- Vacant, such as unpaved lots, railroad rights-of-way, parking lots, paved roads, and airport runways.

Once these layers were imported into Arc-Info, a centerline was drawn and offset approximately 1,500 ft on either side of the river to define the width of the study area boundary. These offset lines were smoothed as necessary, and we then verified that the lines fell entirely within the available land use GIS information. Based on this study area boundary, a query was performed to identify the acreages for the broad land uses (Agricultural, Open Space, and Urban), as well as for the subdivision types for Agricultural and Open Space land uses. The acreages for each land use type were summed and tabulated for each of the five reaches between Friant Dam and the Merced River confluence. Note that the data used in this analysis is from 1994 and 1995, and because land use in the study area changes from year to year based on a variety of market and landowner factors, the analytical results in Section 10.5.1 should be considered representative, not absolute.

#### 10.4.1.1. Land use production values

A production value (in average annual dollars per acre) was estimated for crops that are grown in the land use types described above. These production values were estimated using data from California Agricultural Statistic Service (2001) for Fresno, Madera, and Merced counties. The crops were organized by the DWR land use classifications *Standard Land Use Legend*, July 1993. The annual $/acreage estimates were then averaged to get production values that represent the study area (Table 10-1). Note that all of the crops listed may not be included in the project area.

*Table 10-1: Summary of production values by agricultural product.*

| Agricultural Product | Production Value ($/acre-year) |
|---|---|
| *Field crops* (cotton, sweet corn, sugar beets, dry beans, and safflower) | $1,051 |
| *Truck, nursery, berry crops* (lettuce, bell peppers, strawberries, melons, nursery products, eggplant, garlic, onions, asparagus, squash, broccoli, peas, and tomatoes) | $5,249 |
| *Pasture* (forage, irrigated, and range lands, and may include clover and other native or mixed pasture plant species) | $80 |
| *Grain and hay crops* (alfalfa, barley, wheat, oats, and other mixed grain and hay) | $398 |
| *Rice* (milling rice only) | $1,078 |
| *Vineyards* (raisin, table, and wine grapes) | $3,713 |
| *Citrus and subtropical crops* (kiwifruit, lemons, nectarines, olives, and oranges) | $4,355 |
| *Deciduous fruit and nut crops* (almonds, apples, sweet cherries, dried figs, peaches, persimmons, pistachios, plums, pomegranates, and walnuts) | $4,098 |

### 10.4.2. Land Ownership

Land ownership data were compiled from the Bureau of Reclamation's database (2001) for lands within a 1-mile corridor of the San Joaquin River. Data depicting lands owned by the San Joaquin River Parkway and Conservation Trust was provided by GreenInfo (2002). Lands surveyed by the State Lands Commission, for fee title and public trust easement boundaries between Friant Dam and Herndon, were added (State Lands Commission, 1992). Data provided by the San Joaquin River Parkway and Conservation Trust was also added to the database. In the land use acreage tables that follow, parentheses signify the last year each data set was updated. Data from the 1989-1992 State Lands Boundary Survey located the State's fee title (low water) and Public Trust easement (high water) claims, and were used as a baseline for property boundaries from Friant Dam to Herndon on both sides of the river. The State Lands surveys ended at Herndon; however, the absence of surveys downstream does not imply that the State does not have a claim to river bottomlands, just that those

claims have not yet been quantified. Downstream of Herndon, all data were used as provided by Bureau of Reclamation, including the few locations where data overlapped in Fresno and Madera counties.

Land ownership was separated into two broad classifications: private and public. Private lands (urban, industrial, agricultural, etc) were not subdivided any further. However, public lands were delineated into Federal lands (Bureau of Reclamation and US Fish and Wildlife Service), State Lands Commission public trust and fee title lands, other State and County lands (Department of Fish and Game, San Joaquin River Levee District, Fresno County Parks), and those lands owned by the San Joaquin River Parkway and Conservation Trust.

## 10.5. ANALYTICAL RESULTS

Results of the GIS queries for land use and land ownership are presented in two sections below.

### 10.5.1. Land Use

Land use maps were overlain onto USGS 7.5 minute quadrangle sheets (Figures 10-1a through Figure 10-1q), and land use acreages were tabulated by reach for the different land uses described in Section 10.4.1 (Tables 10-2 through 10-6).

*Table 10-2. Acreage of land use and land use types on the San Joaquin River for Reach 1.*

| Land Use | Acreage | | | |
|---|---|---|---|---|
| | **Left-Bank (acres) *** | **Right-Bank (acres) *** | **Total (acres)** | **Percent of Reach total** |
| **Agricultural** | | | | |
| *Annual Crops* | 744 | 528 | 1,271 | 8 % |
| *Vineyards* | 1,331 | 1,604 | 2,935 | 19 % |
| *Orchards* | 307 | 635 | 941 | 6 % |
| *Semi- or incidental to agriculture* | 54 | 97 | 151 | 1 % |
| *TOTAL AGRICULTURAL:* | *2,435* | *2,864* | *5,299* | *34.8 %* |
| **Open Space** | | | | |
| *Idle* | 24 | 11 | 35 | 0 % |
| *Native Vegetation* | 3,068 | 4,162 | 7,230 | 47 % |
| *Aquatic Environments* | 581 | 483 | 1,064 | 7 % |
| *TOTAL OPEN SPACE:* | *3,674* | *4,656* | *8,329* | *54.6 %* |
| **Urban** | | | | |
| *Typical urban lands* | 1,074 | 540 | 1,614 | 10.6 % |
| *TOTAL URBAN:* | *1,074* | *540* | *1,614* | *10.6 %* |
| **Total for Reach 1** | **7,183** | **8,060** | **15,242** | **100 %** |

* Left bank and right bank designations assume one is looking in the downstream direction.

*Table 10-3. Acreage of land use and land use types on the San Joaquin River for Reach 2.*

| Land Use | Acreage | | | |
|---|---|---|---|---|
| | Left-Bank (acres) * | Right-Bank (acres) * | Total (acres) | Percent of Reach total |
| **Agricultural** | | | | |
| *Annual Crops* | 1,986 | 1,632 | 3,618 | 38 % |
| *Vineyards* | 790 | 885 | 1,675 | 18 % |
| *Orchards* | 1,145 | 180 | 1,325 | 14 % |
| *Semi- or incidental to agriculture* | 16 | 6 | 22 | 0 % |
| *TOTAL AGRICULTURAL:* | *3,937* | *2,703* | *6,640* | *70 %* |
| **Open Space** | | | | |
| *Idle* | 28 | 117 | 145 | 2 % |
| *Native Vegetation* | 1,649 | 1,085 | 2,734 | 29 % |
| *Aquatic Environments* | 0 | 0 | 0 | 0 % |
| *TOTAL OPEN SPACE:* | *1,677* | *1,202* | *2,879* | *30 %* |
| **Urban** | | | | |
| *Typical urban lands* | 14 | 9 | 23 | 0 % |
| *TOTAL URBAN:* | *14* | *9* | *23* | *0 %* |
| **Total for Reach 2** | **5,628** | **3,914** | **9,542** | **100 %** |

* Left bank and right bank designations assume one is looking in the downstream direction.

*Table 10-4. Acreage of land use and land use types on the San Joaquin River for Reach 3.*

| Land Use | Acreage | | | |
|---|---|---|---|---|
| | Left-Bank (acres) * | Right-Bank (acres) * | Total (acres) | Percent of Reach total |
| **Agricultural** | | | | |
| *Annual Crops* | 2,716 | 2,906 | 5,622 | 67 % |
| *Vineyards* | 0 | 0 | 0 | 0 % |
| *Orchards* | 0 | 24 | 24 | 0 % |
| *Semi-agricultural* | 33 | 13 | 46 | 1 % |
| *TOTAL AGRICULTURAL:* | *2,749* | *2,943* | *5,692* | *68 %* |
| **Open Space** | | | | |
| *Idle* | 15 | 52 | 67 | 1 % |
| *Native Vegetation* | 928 | 862 | 1,790 | 21 % |
| *Aquatic Environments* | 26 | 0 | 26 | 0 % |
| *TOTAL OPEN SPACE:* | *969* | *913* | *1,882* | *22 %* |
| **Urban** | | | | |
| *Typical urban lands* | 735 | 100 | 835 | 10 % |
| *TOTAL URBAN:* | *735* | *100* | *835* | *10 %* |
| **Total for Reach 3** | **4,453** | **3,956** | **8,409** | **100 %** |

* Left bank and right bank designations assume one is looking in the downstream direction.

*Table 10-5. Acreage of land use and land use types on the San Joaquin River for Reach 4.*

| Land Use | Acreage | | | |
|---|---|---|---|---|
| | Left-Bank (acres) * | Right-Bank (acres) * | Total (acres) | Percent of Reach total |
| **Agricultural** | | | | |
| *Annual Crops* | 1,891 | 26,396 | 28,287 | 51 % |
| *Vineyards* | 0 | 7 | 7 | 0 % |
| *Orchards* | 64 | 0 | 64 | 0 % |
| *Semi-agricultural* | 86 | 81 | 168 | 0 % |
| *TOTAL AGRICULTURAL:* | *2,041* | *26,484* | *28,526* | *51 %* |
| **Open Space** | | | | |
| *Idle* | 111 | 2,026 | 2,137 | 4 % |
| *Native Vegetation* | 9,676 | 15,389 | 25,065 | 45 % |
| *Aquatic Environments* | 0 | 13 | 13 | 0 % |
| *TOTAL OPEN SPACE:* | *9,787* | *17,428* | *27,215* | *49 %* |
| **Urban** | | | | |
| *Typical urban lands* | 66 | 156 | 223 | 0 % |
| *TOTAL URBAN:* | *66* | *156* | *223* | *0 %* |
| **Total for Reach 4** | **11,894** | **44,068** | **55,964** | **100 %** |

***** Left bank and right bank designations assume one is looking in the downstream direction.

*Table 10-6. Acreage of land use and land use types on the San Joaquin River for Reach 5.*

| Land Use | Acreage | | | |
|---|---|---|---|---|
| | Left-Bank (acres) * | Right-Bank (acres) * | Total (acres) | Percent of Reach total |
| **Agricultural** | | | | |
| *Annual Crops* | 367 | 7,090 | 7,456 | 32 % |
| *Vineyards* | 0 | 44 | 44 | 0 % |
| *Orchards* | 0 | 28 | 28 | 0 % |
| *Semi-agricultural* | 0 | 583 | 583 | 3 % |
| *TOTAL AGRICULTURAL:* | *367* | *7,745* | *8,111* | *35 %* |
| **Open Space** | | | | |
| *Idle* | 1,350 | 57 | 1,407 | 6 % |
| *Native Vegetation* | 7,986 | 5,416 | 13,402 | 58 % |
| *Aquatic Environments* | 81 | 4 | 85 | 0 % |
| *TOTAL OPEN SPACE:* | *9,417* | *5,477* | *14,894* | *64.5 %* |
| **Urban** | | | | |
| *Typical urban lands* | 1 | 109 | 111 | 0.5 % |
| *TOTAL URBAN:* | *1* | *109* | *111* | *0.5 %* |
| **Total for Reach 5** | **9,785** | **13,331** | **23,116** | **100 %** |

***** Left bank and right bank designations assume one is looking in the downstream direction.

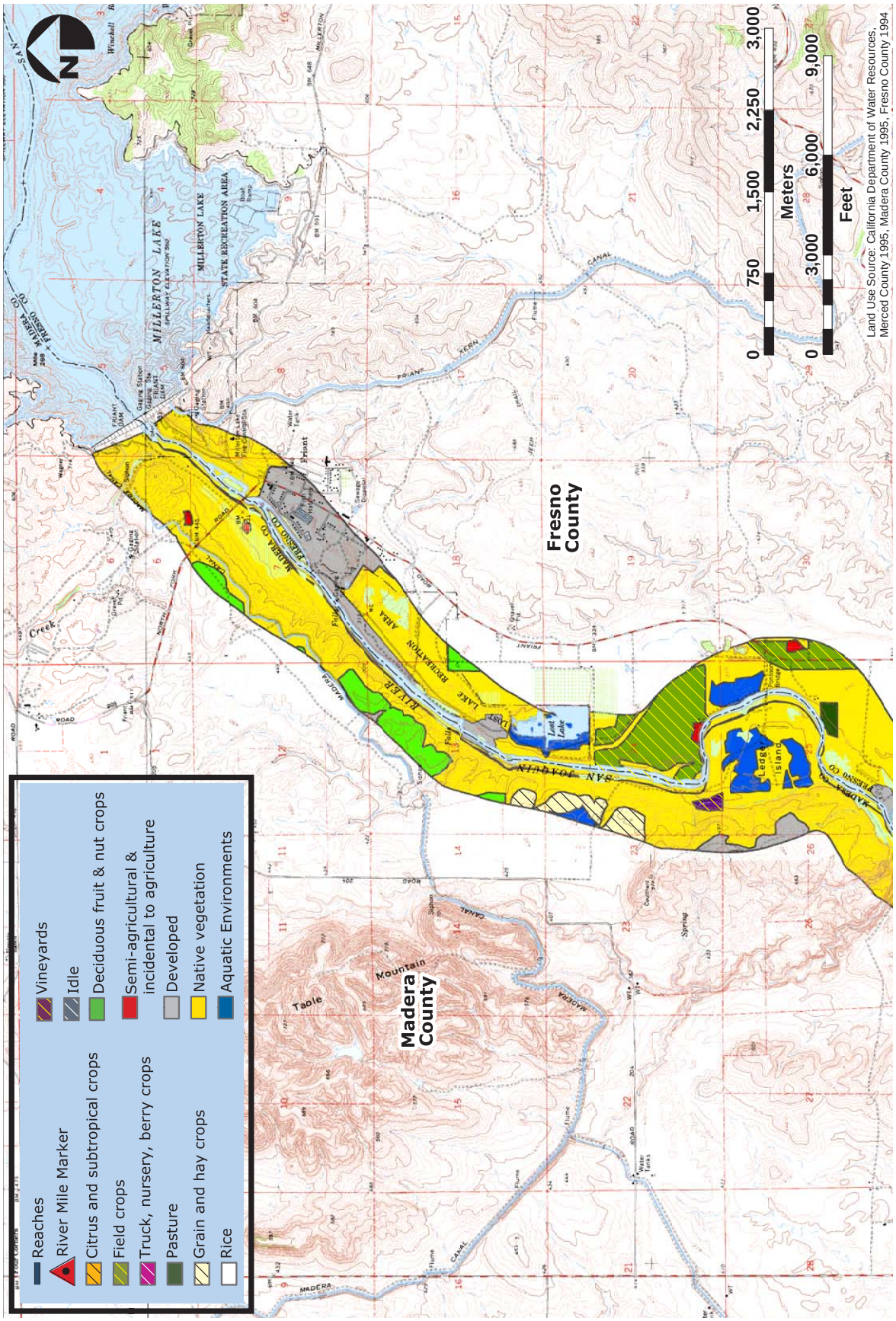


*Figure 10-1a. Land use along the San Joaquin River (Reach 1a)*

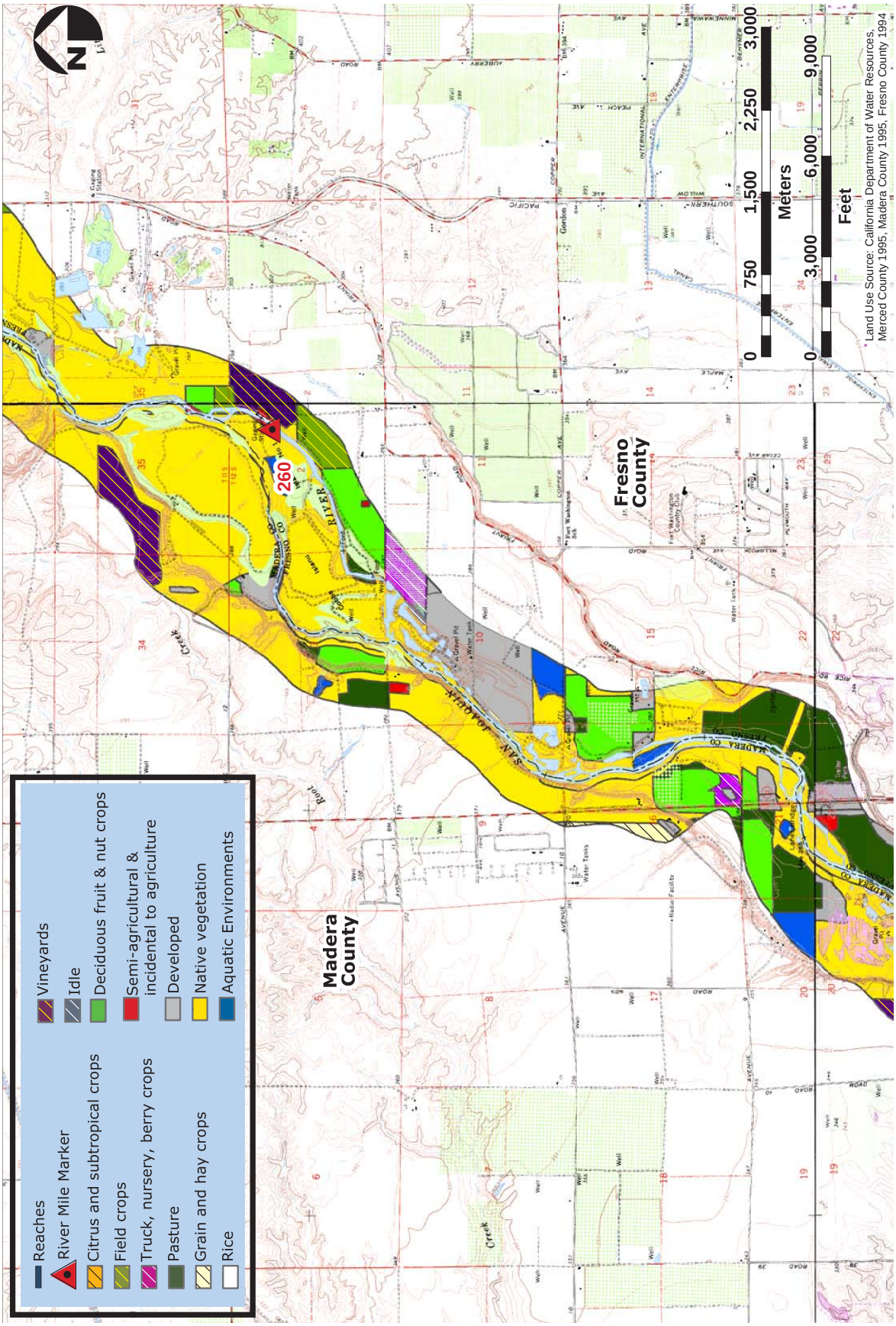


*Figure 10-1b. Land use along the San Joaquin River (Reach 1a)*

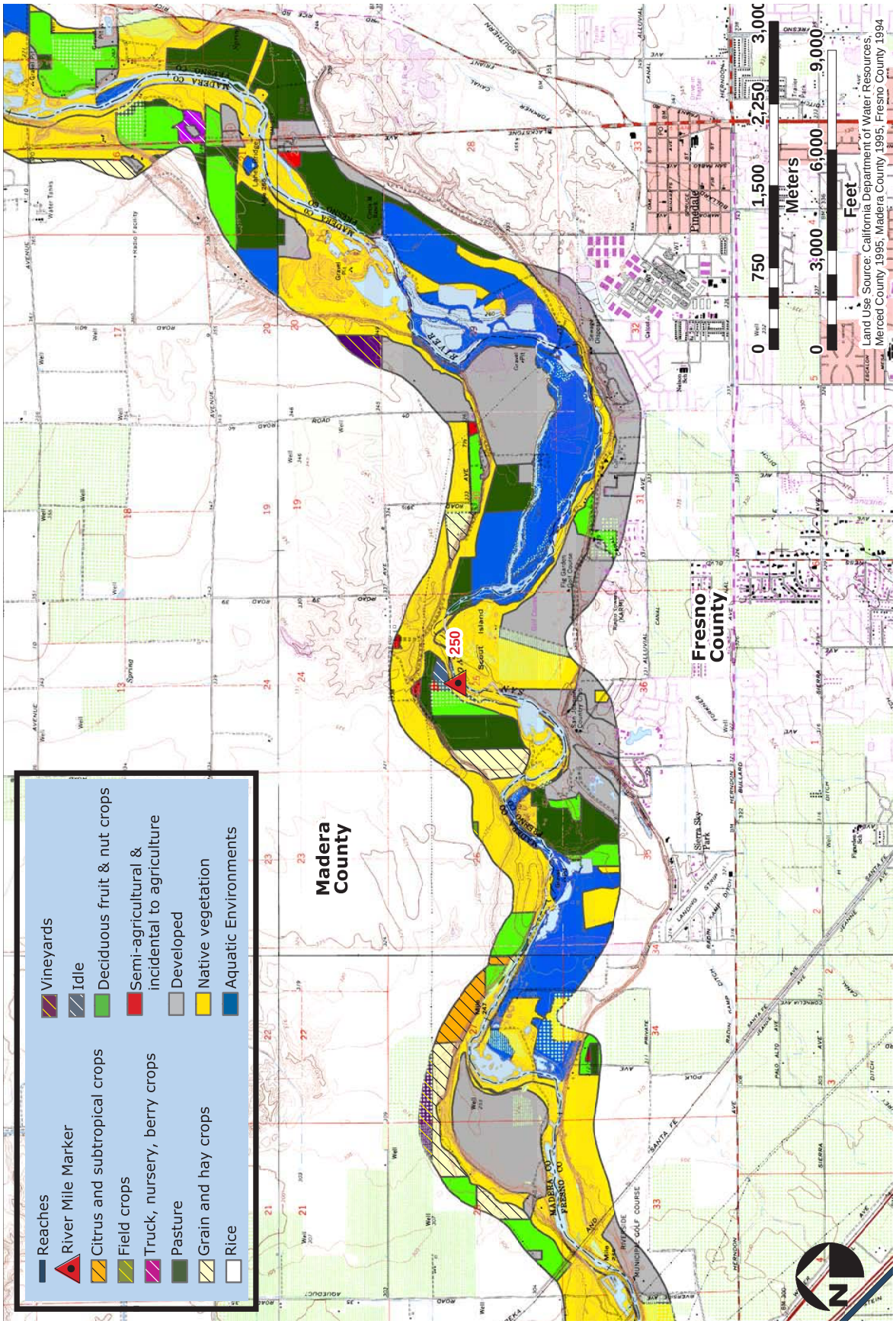


*Figure 10-1c. Land use along the San Joaquin River (Reach 1a)*

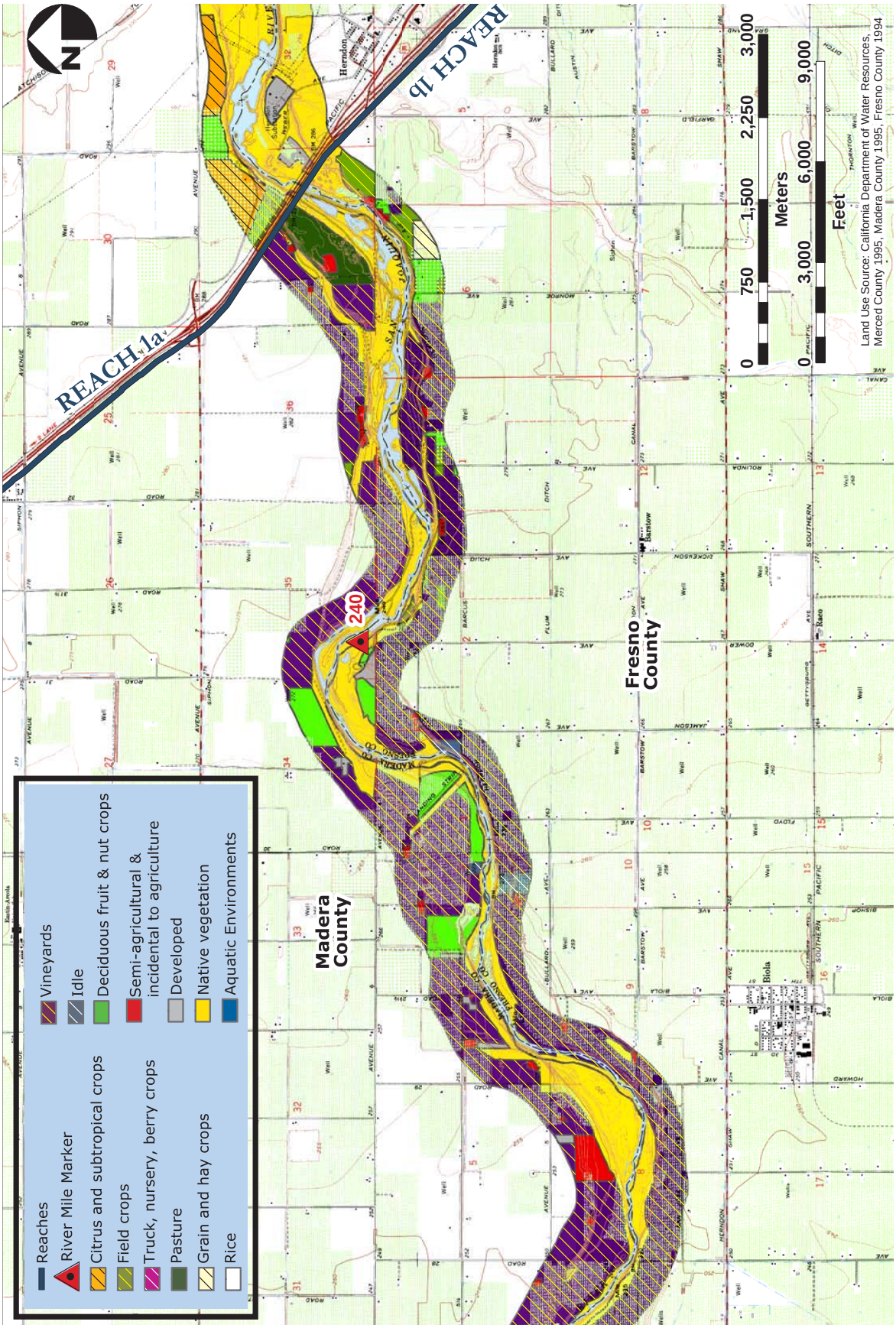


*Figure 10-1d. Land use along the San Joaquin River (Reach 1a & 1b)*

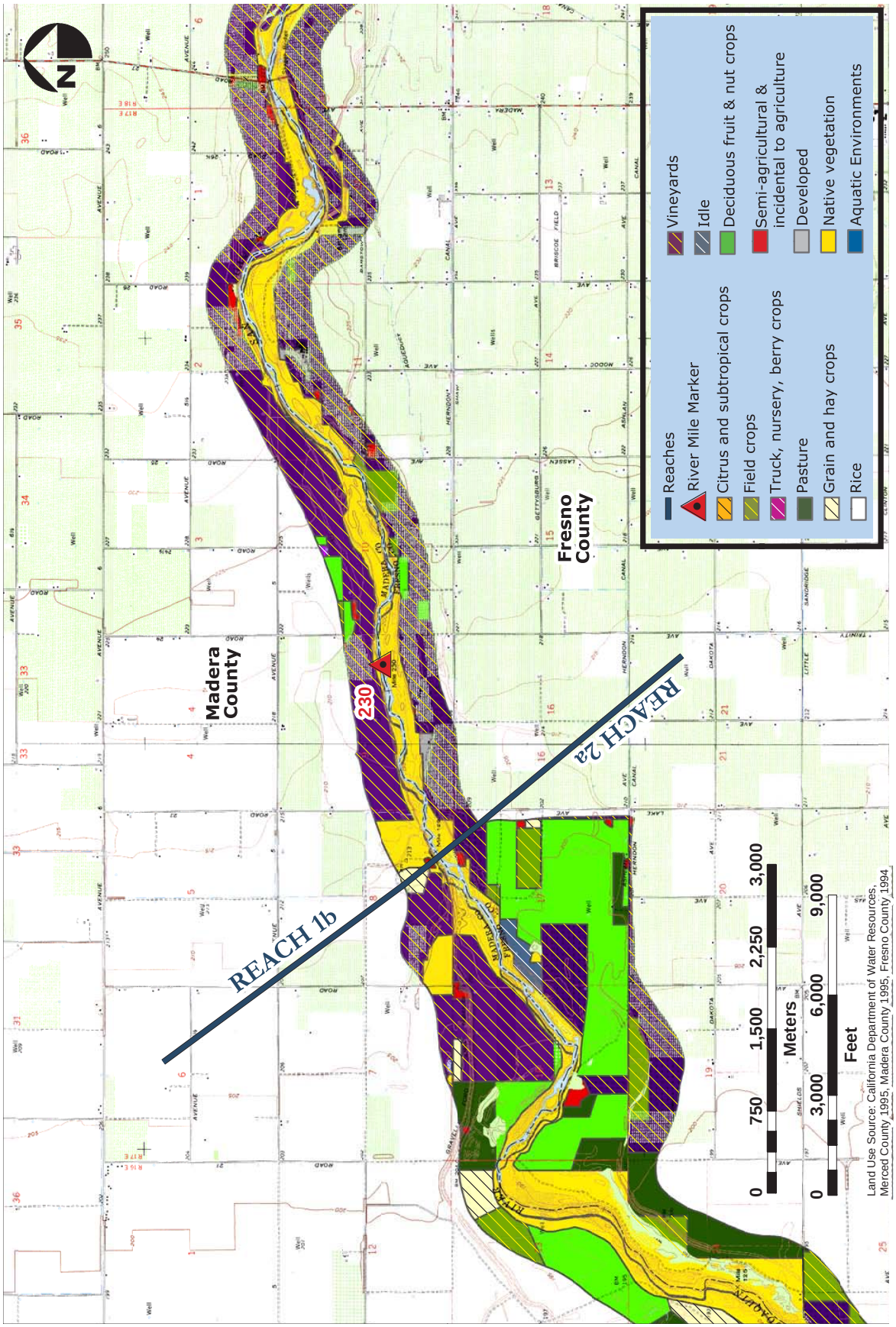


*Figure 10-1e. Land use along the San Joaquin River (Reach 1b & 2a)*

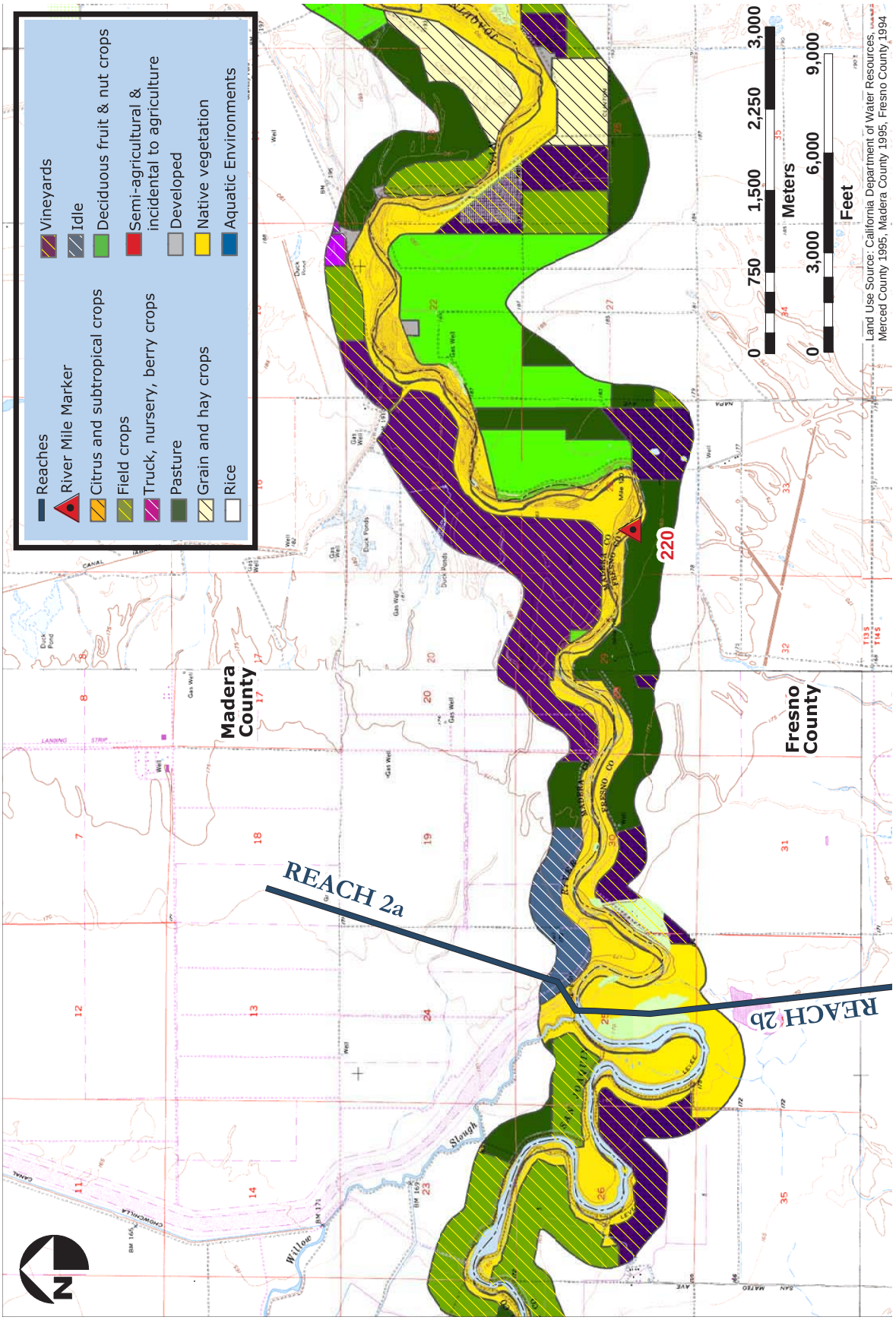


*Figure 10-1f. Land use along the San Joaquin River (Reach 2a & 2b)*

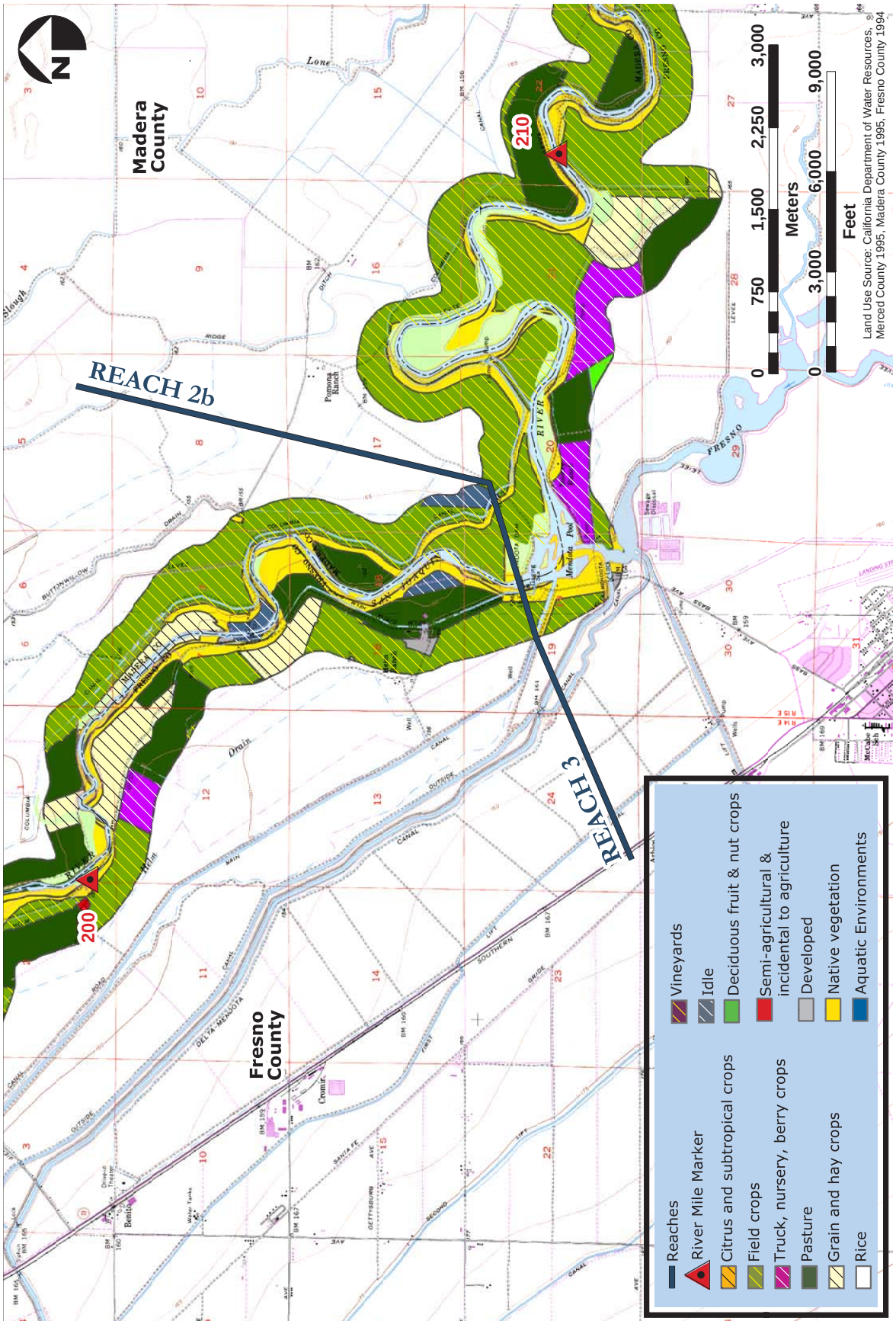


*Figure 10-1g. Land use along the San Joaquin River (Reach 2b & 3)*

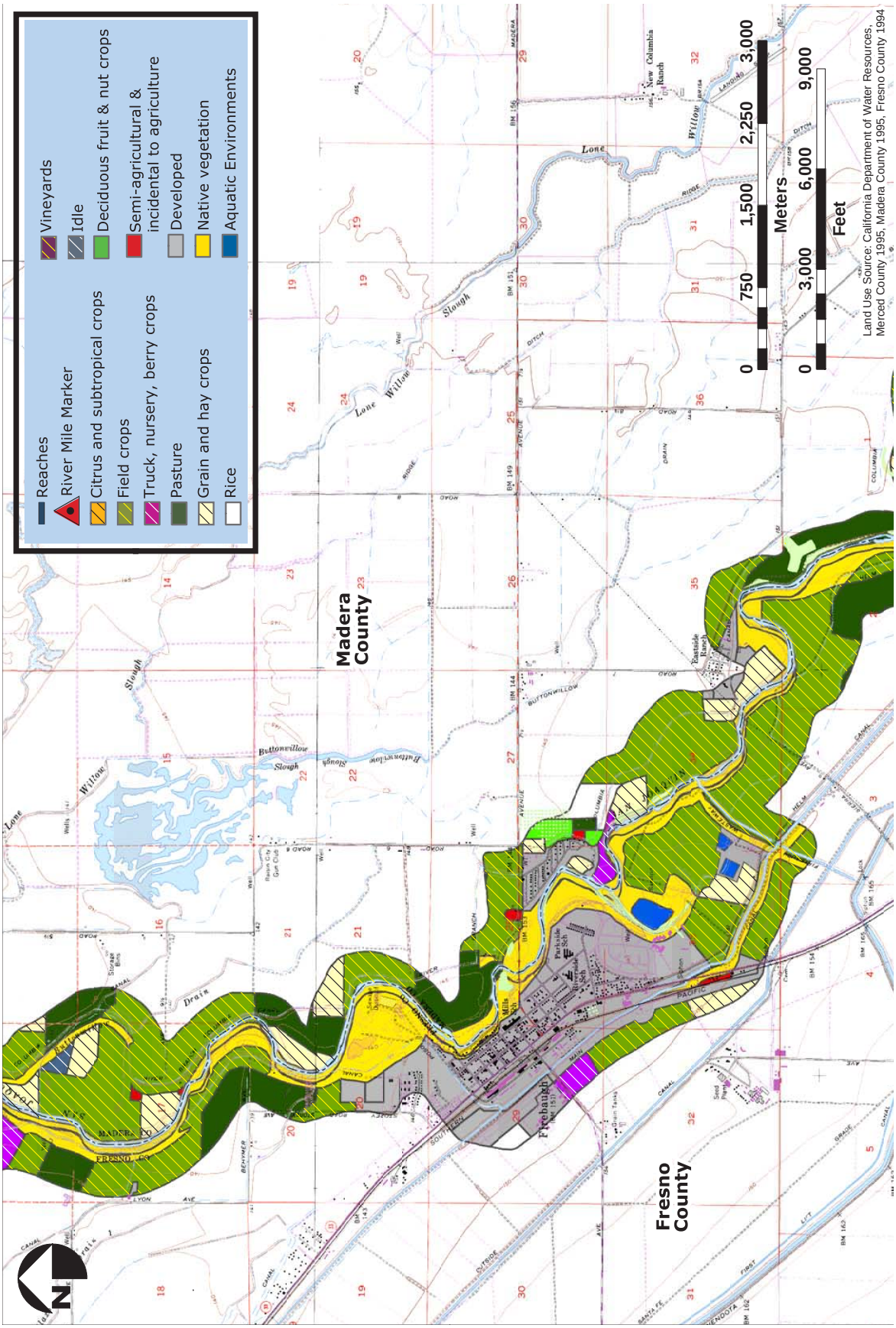


*Figure 10-1h. Land use along the San Joaquin River (Reach 3)*

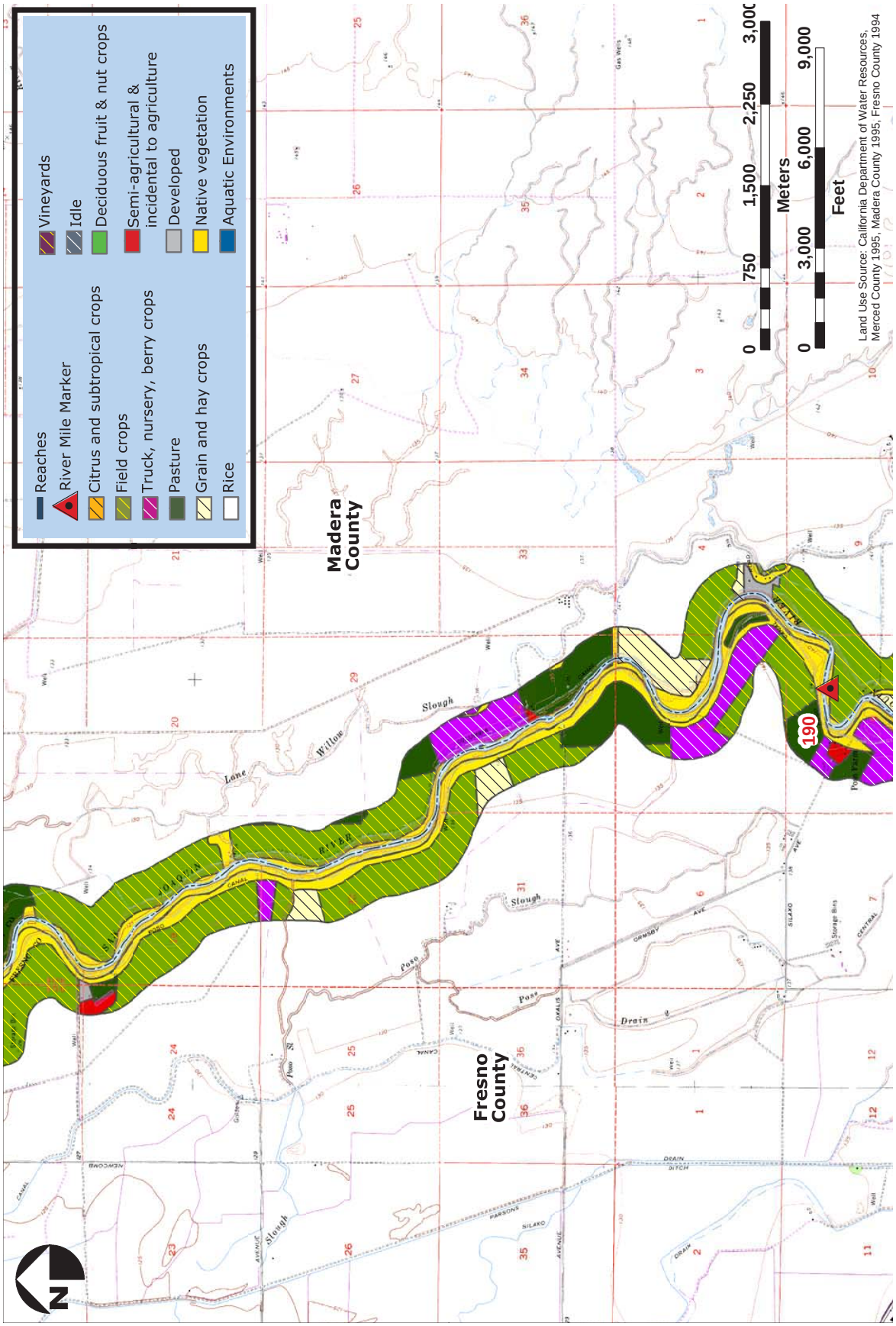


*Figure 10-1i. Land use along the San Joaquin River (Reach 3)*

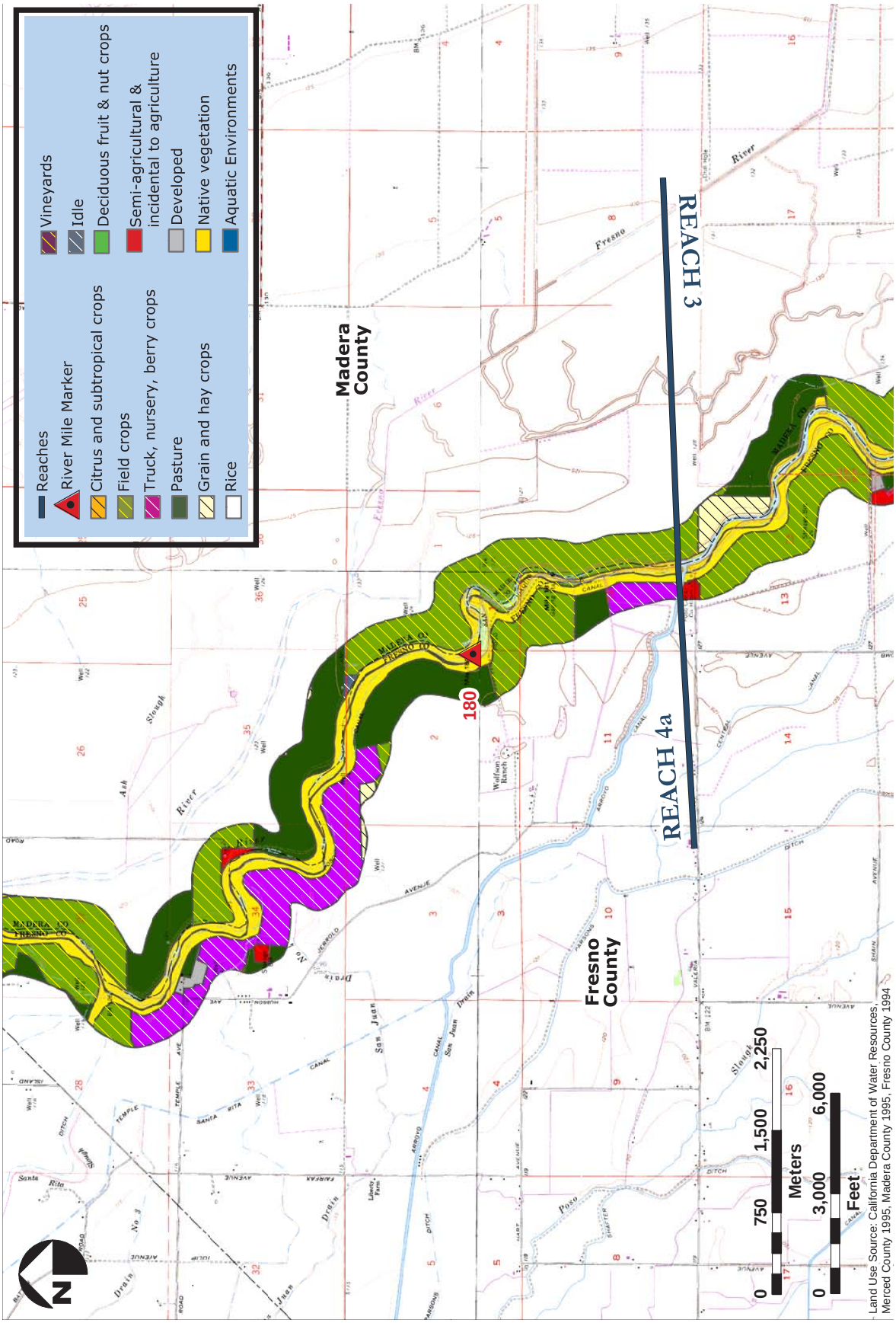


*Figure 10-1j. Land use along the San Joaquin River (Reach 3 & 4a)*

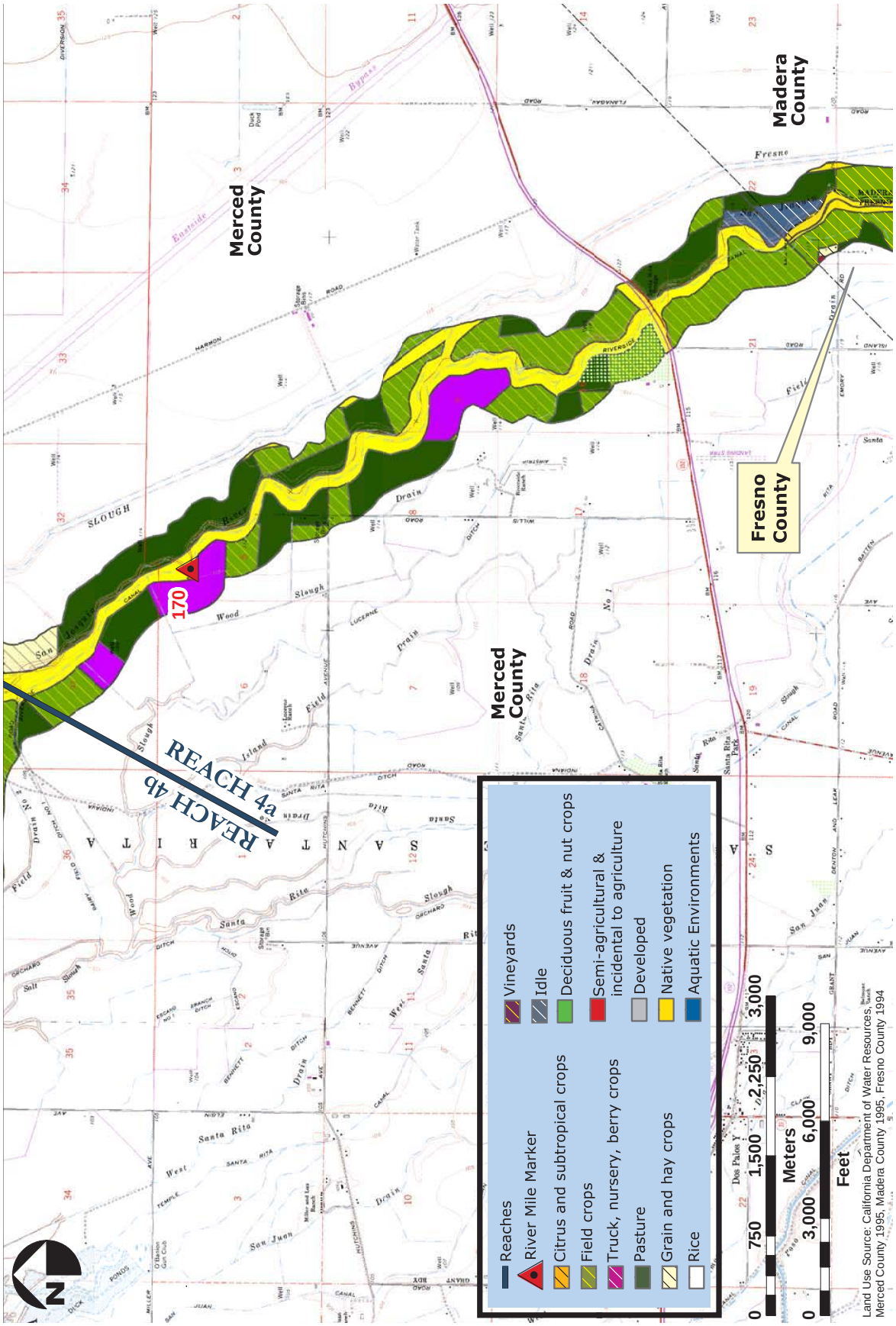


*Figure 10-1k. Land use along the San Joaquin River (Reach 4a & 4b)*

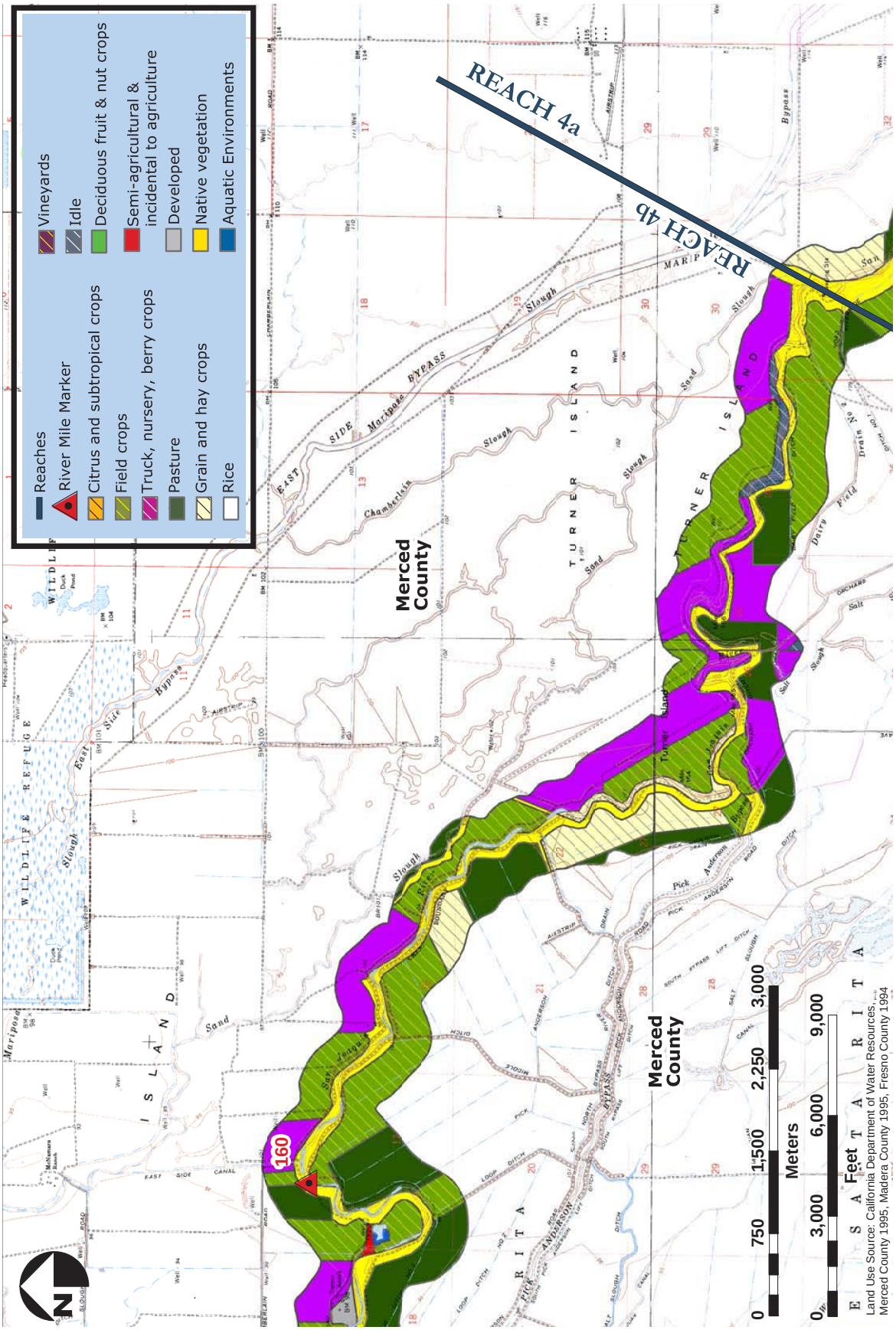


*Figure 10-11. Land use along the San Joaquin River (Reach 4a & 4b)*

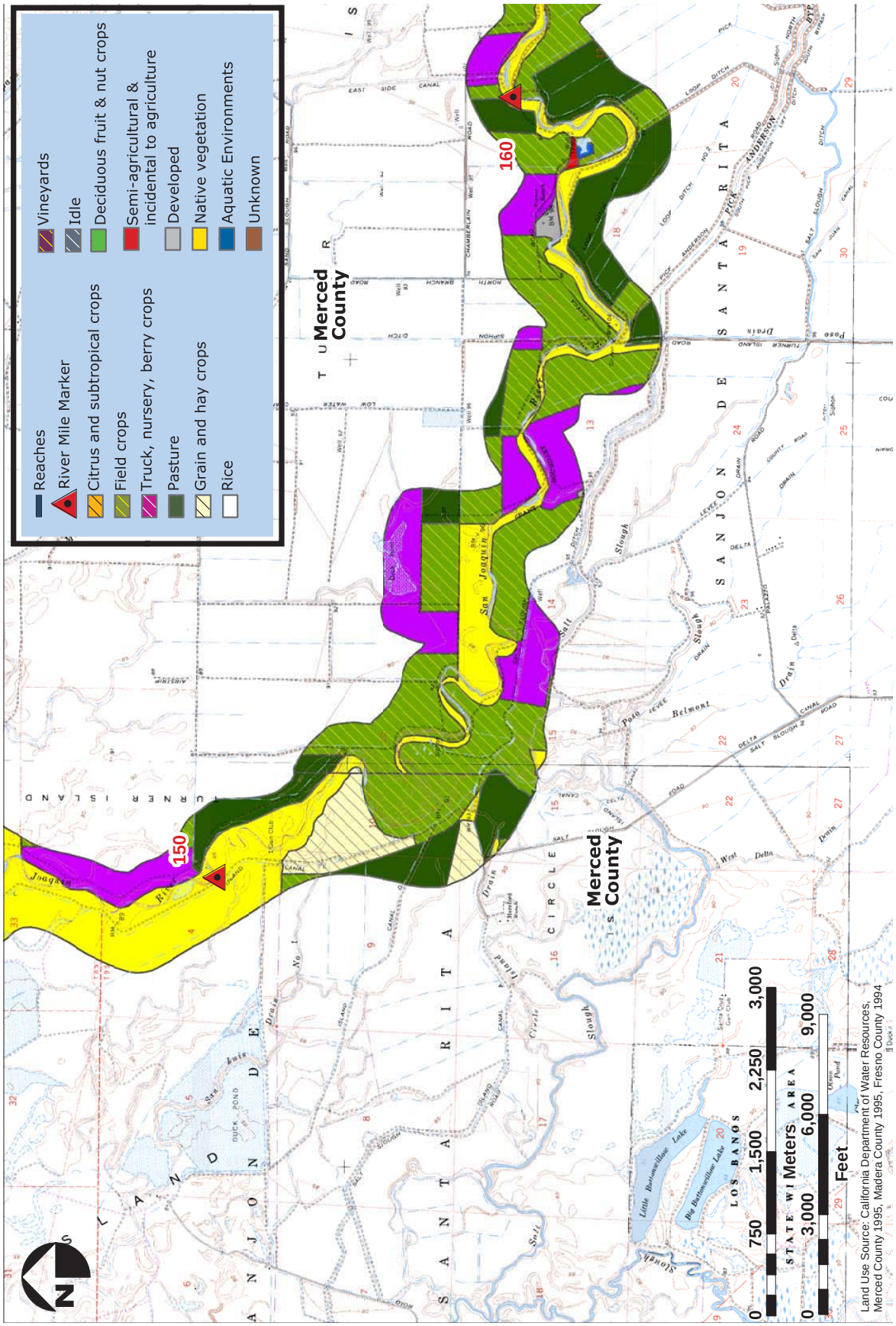


*Figure 10-1m. Land use along the San Joaquin River (Reach 4b)*

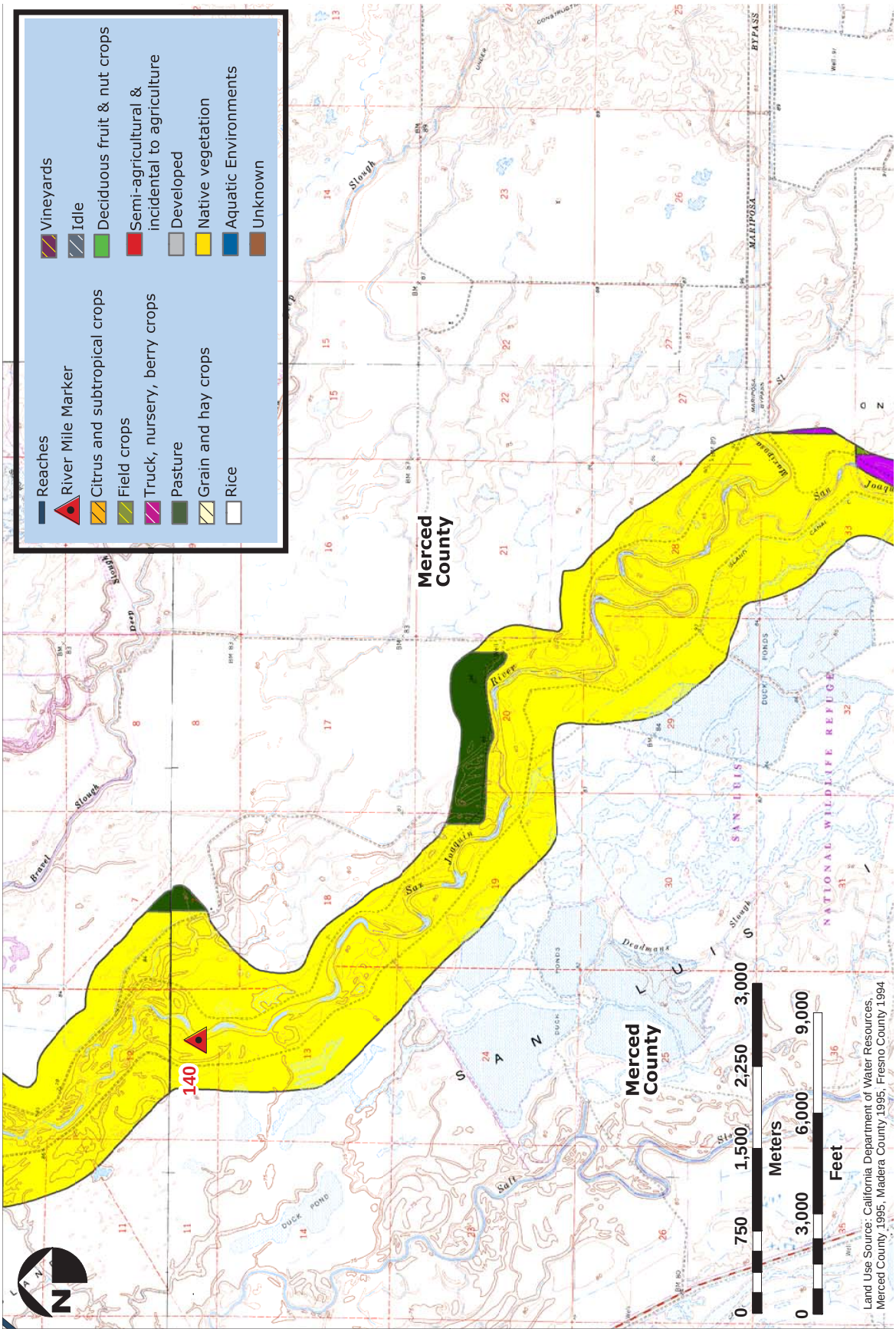


*Figure 10-1n. Land use along the San Joaquin River (Reach 4b)*

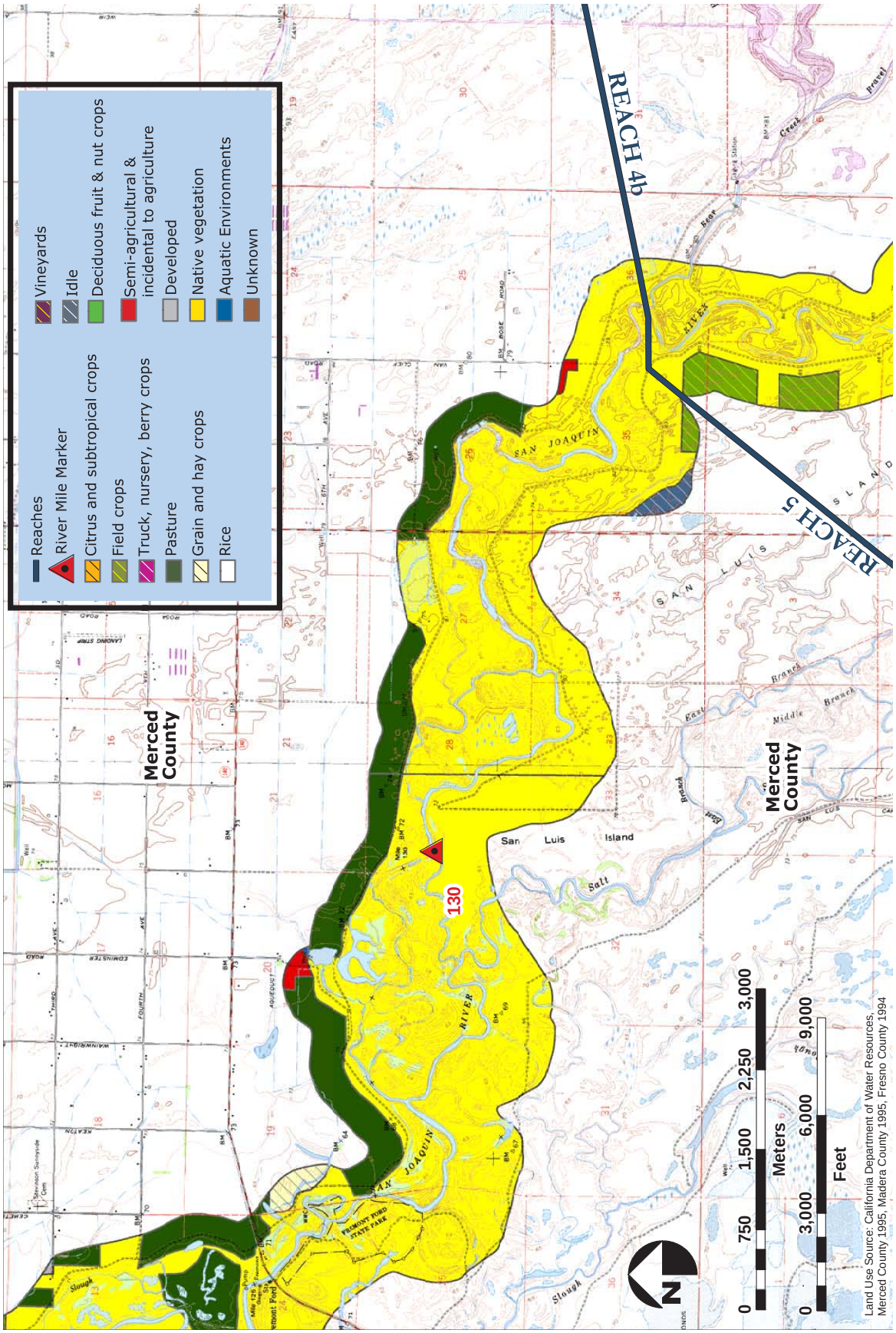


*Figure 10-1o. Land use along the San Joaquin River (Reach 4b & 5)*

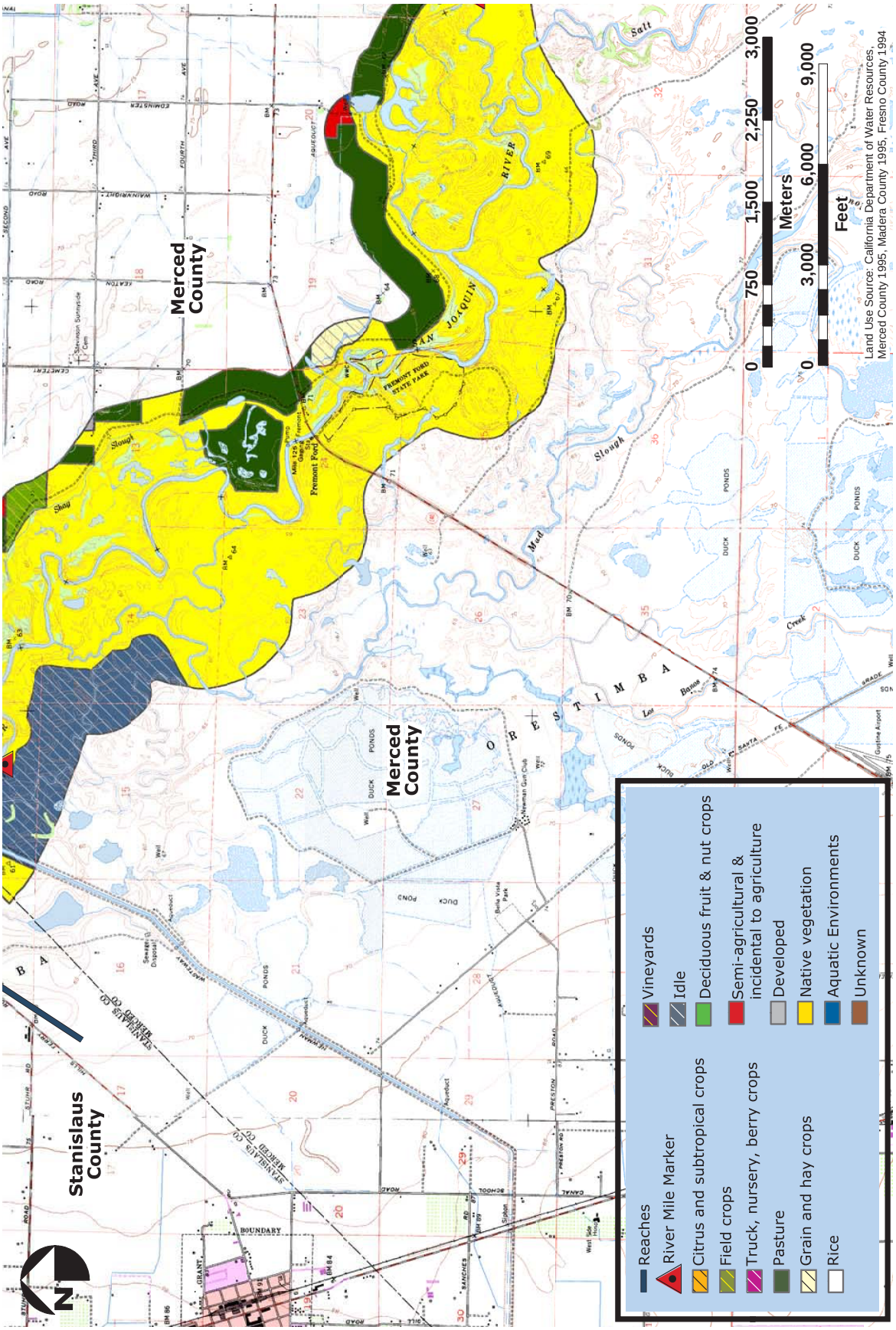


*Figure 10-1p. Land use along the San Joaquin River (Reach 5)*

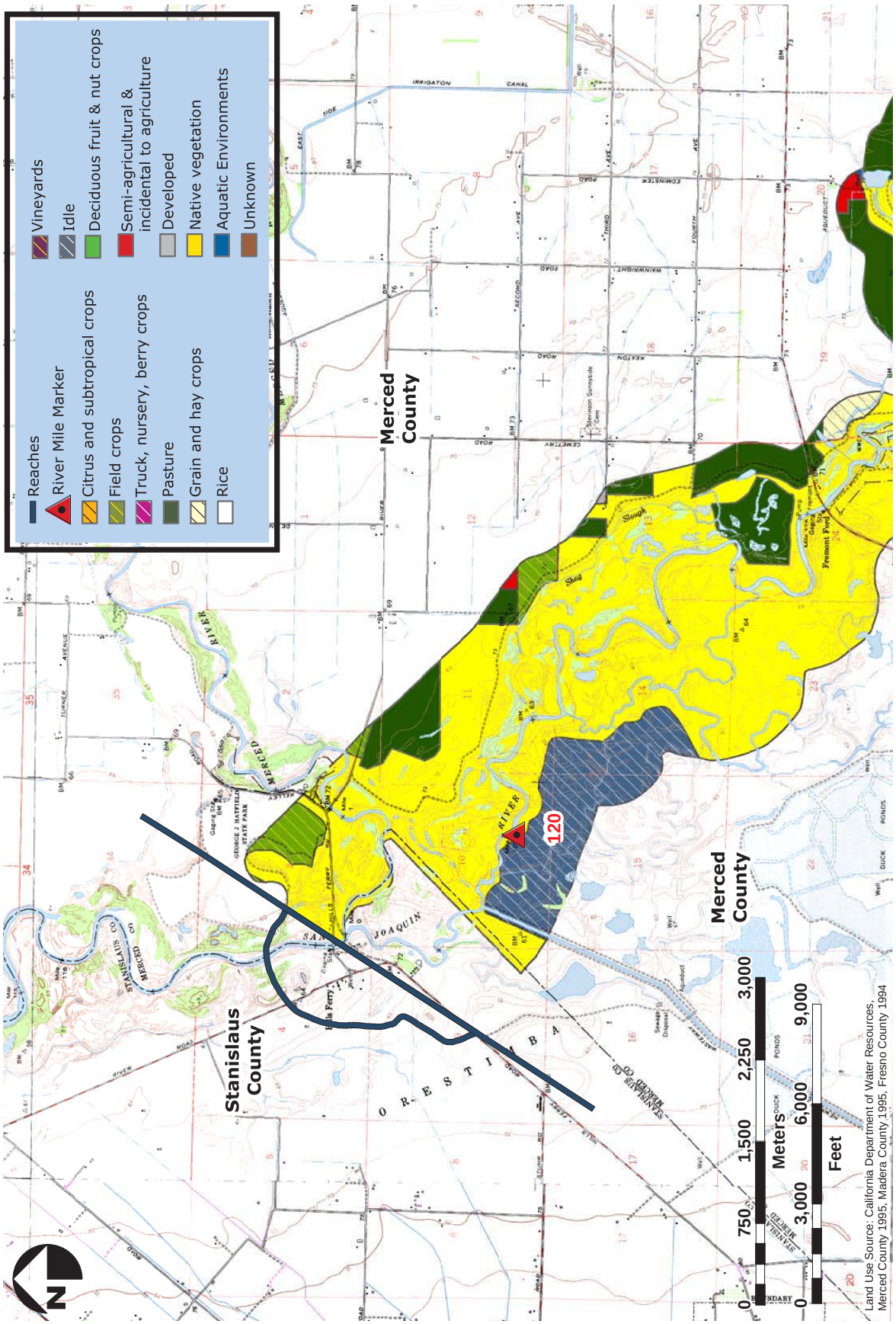


*Figure 10-1q. Land use along the San Joaquin River (Reach 5)*

For the land use analysis, the study area is 112,273 acres; the percent area occupied by each reach is as follows: Reach 1- 13.6%; Reach 2- 8.5%; Reach 3- 7.5%; Reach 4- 49.8%; Reach 5- 20.6%.

For each land use summarized in Tables 10-2 through Table 10-6, we plotted the percentages of each reach's land use in an attempt to normalize the data and account for differences in land use study width (thus area) variations by reach (Figure 10-2). In other words, Figure 10-2 compares the relative proportion of a given land use between reaches (e.g., which reaches are dominated by orchards versus which reaches are dominated by annual crops). Combining all reaches, the breakdown by land use is 49% in open space, 48% in agriculture, and 3% in urban. Of the agricultural land use areas (combined for all reaches), annual crops comprised 86.2%, vineyards comprised 8.7%, orchards comprised 4.4%, and semi-agricultural or incidental to agriculture uses comprised 0.7% of the land use. The results of this analysis will be applied in discussing opportunities and constraints to restoration at the end of the chapter.

### 10.5.2. Land Ownership

Land ownership data were overlain on USGS 7.5 minute quadrangle sheets (Figures 10-3a through Figure 10-3q); land ownership acreages were tabulated by reach for the different land ownership types described in Section 10.4.2 (Tables 10-7 through 10-11).

*Table 10-7. Acreage of land ownership types along Reach 1 of the San Joaquin River.*

| Land Ownership | Acreage | | | Percentage | |
|---|---|---|---|---|---|
| | Left-Bank (acres)** | Right-Bank (acres)** | Total (acres) | Reach | Entire Study Area |
| **Public Ownership** | | | | | |
| *Federal lands* | 171 | 0 | 171 | 0.6% | 0.1% |
| *State, County, and Special District lands* | 0 | 0 | 0 | 0.0% | 0.0% |
| *San Joaquin River Parkway and Conservation Trust**** | 2,360 | 243 | 2,603 | 8.9% | 2.2% |
| *State Lands Commission Ordinary Low Water** | 62 | 149 | 211 | 0.7% | 0.2% |
| TOTAL PUBLIC OWNERSHIP: | 2,593 | 392 | 2,985 | 10.2% | 2.5% |
| | | | | | |
| **Private Ownership** | | | | | |
| *Agricultural, urban, and industrial* | 11,069 | 15,161 | 26,230 | 89.8% | 22.0% |
| TOTAL PRIVATE OWNERSHIP: | 11,069 | 15,161 | 26,230 | 89.8% | 22.0% |
| | | | | | |
| **Total ownership in Reach 1 Study Area:** | **13,662** | **15,553** | **29,215** | **100%** | **24.5%** |
| | | | | | |
| **Public Trust Easement*** | | | | | |
| *State Lands Commission Ordinary High Water* | 100 | 131 | 231 | N/A | N/A |
| TOTAL PUBLIC TRUST: | 100 | 131 | 231 | N/A | N/A |

* Only mapped to Herndon; additional lands subject to State Lands Commission claims have not been mapped to date.
** Left bank and right bank designations assume one is looking in the downstream direction.
*** Includes California Department of Fish and Game and other public parklands.

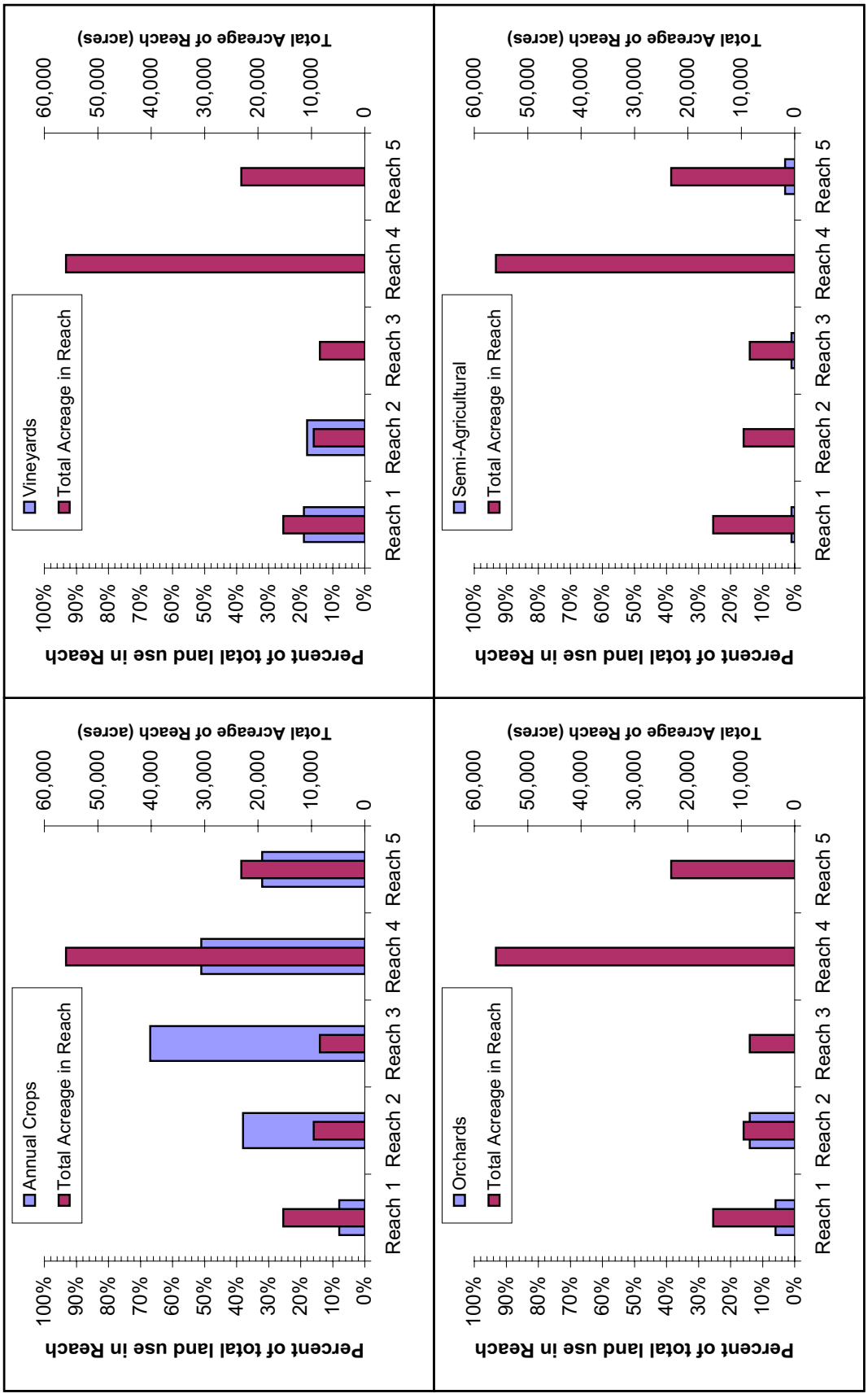


*Figure 10-2a. Land use distribution between reaches for idle, native vegetation, aquatic environments, and urban land uses.*

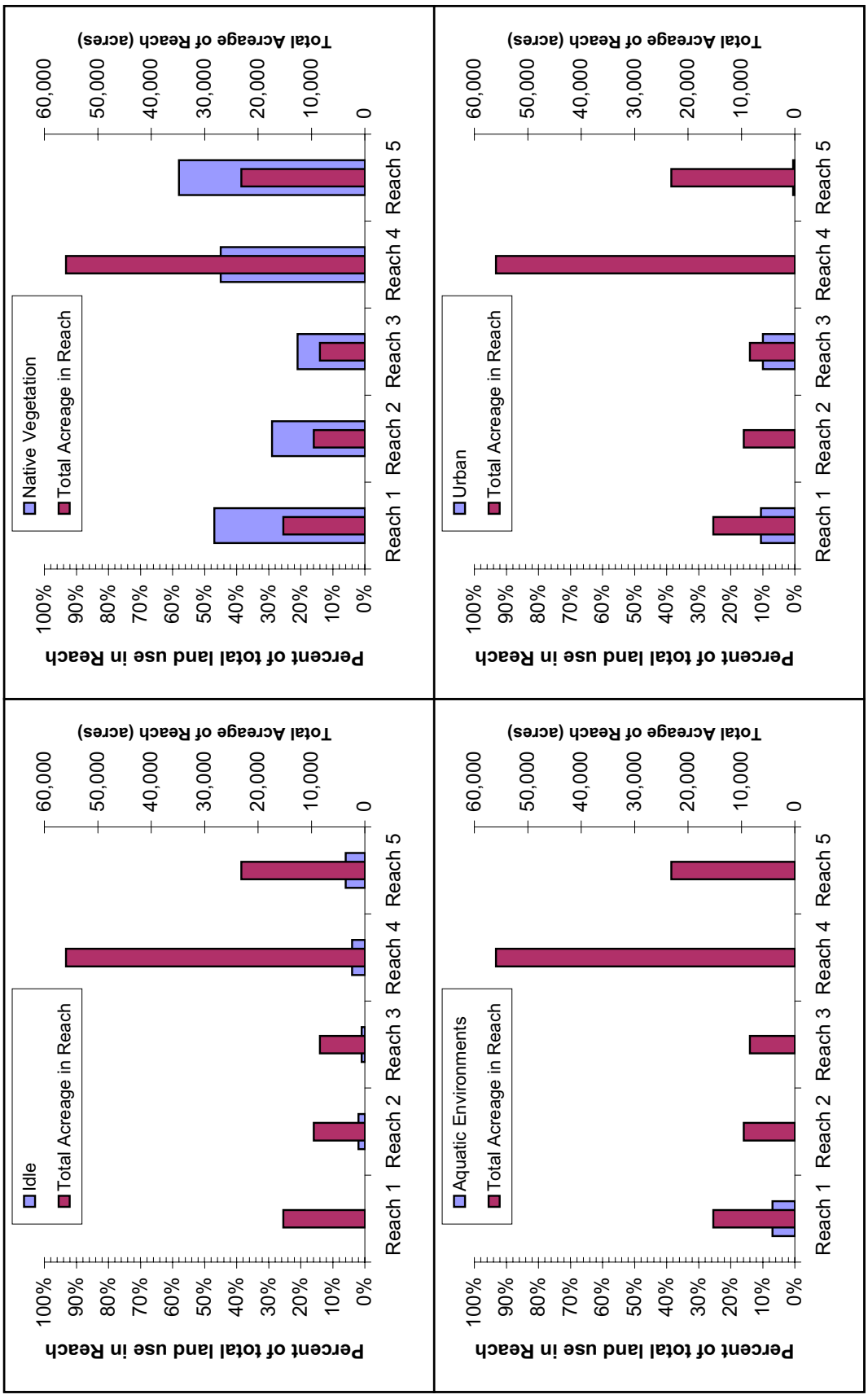


*Figure 10-2b. Land use distribution between reaches for idle, native vegetation, aquatic environments, and urban land uses.*

*Table 10-8. Acreage of land ownership types along Reach 2 of the San Joaquin River.*

| Land Ownership | Acreage | | | Percentage | |
|---|---|---|---|---|---|
| | Left-Bank (acres) ** | Right-Bank (acres) ** | Total (acres) | Reach | Entire Study Area |
| **Public Ownership** | | | | | |
| *Federal lands* | 64 | 20 | 84 | 0.4% | 0.1% |
| *State, County, and Special District lands* | 668 | 0 | 668 | 3.1% | 0.6% |
| *State Lands Commission Ordinary Low Water** | 0 | 0 | 0 | 0.0% | 0.0% |
| TOTAL PUBLIC OWNERSHIP: | 732 | 20 | 752 | 3.5% | 0.7% |
| **Private Ownership** | | | | | |
| *Agricultural, urban, and industrial* | 9,812 | 11,108 | 20,920 | 96.5% | 17.5% |
| TOTAL PRIVATE OWNERSHIP: | 9,812 | 11,108 | 20,920 | 96.5% | 17.5% |
| | | | | | |
| **Total ownership in Reach 1 Study Area:** | **10,544** | **11,128** | **21,672** | **100%** | **18.2%** |
| **Public Trust Easement*** | | | | | |
| *State Lands Commission Ordinary High Water* | N/A | N/A | N/A | N/A | N/A |
| TOTAL PUBLIC TRUST: | N/A | N/A | N/A | N/A | N/A |

* Only mapped to Herndon; additional lands subject to State Lands Commission claims have not been mapped to date.
** Left bank and right bank designations assume one is looking in the downstream direction.

*Table 10-9. Acreage of land ownership types along Reach 3 of the San Joaquin River.*

| Land Ownership | Acreage | | | Percentage | |
|---|---|---|---|---|---|
| | Left-Bank (acres) ** | Right-Bank (acres) ** | Total (acres) | Reach | Entire Study Area |
| **Public Ownership** | | | | | |
| *Federal lands* | 28 | 0 | 28 | 0.2% | 0% |
| *State, County, and Special District lands* | 34 | 0 | 34 | 0.2% | 0% |
| *State Lands Commission Ordinary Low Water** | 0 | 0 | 0 | 0% | 0% |
| TOTAL PUBLIC OWNERSHIP: | 62 | 0 | 62 | 0.4% | 0.0% |
| **Private Ownership** | | | | | |
| *Agricultural, urban, and industrial* | 7,475 | 8,833 | 16,308 | 99.6% | 13.7% |
| TOTAL PRIVATE OWNERSHIP: | 7,475 | 8,833 | 16,308 | 99.6% | 13.7% |
| | | | | | |
| **Total ownership in Reach 1 Study Area:** | **7,537** | **8,833** | **16,370** | **100%** | **13.7%** |
| **Public Trust Easement*** | | | | | |
| *State Lands Commission Ordinary High Water* | N/A | N/A | N/A | N/A | N/A |
| TOTAL PUBLIC TRUST: | N/A | N/A | N/A | N/A | N/A |

* Only mapped to Herndon; additional lands subject to State Lands Commission claims have not been mapped to date.
** Left bank and right bank designations assume one is looking in the downstream direction.

*Table 10-10. Acreage of land ownership types along Reach 4 of the San Joaquin River.*

| Land Ownership | Acreage | | | Percentage | |
|---|---|---|---|---|---|
| | Left-Bank (acres) ** | Right-Bank (acres) ** | Total (acres) | Reach | Entire Study Area |
| **Public Ownership** | | | | | |
| *Federal lands* | 5,552 | 2,278 | 7,830 | 20.3% | 6.6% |
| *State, County, and Special District lands* | 0 | 0 | 0 | 0.0% | 0.0% |
| *State Lands Commission Ordinary Low Water** | 0 | 0 | 0 | 0.0% | 0.0% |
| TOTAL PUBLIC OWNERSHIP: | 5,552 | 2,278 | 7,830 | 20.3% | 6.6% |
| **Private Ownership** | | | | | |
| *Agricultural, urban, and industrial* | 13,720 | 16,965 | 30,685 | 79.7% | 25.7% |
| TOTAL PRIVATE OWNERSHIP: | 13,720 | 16,965 | 30,685 | 79.7% | 25.7% |
| | | | | | |
| **Total ownership in Reach 1 Study Area:** | **19,272** | **19,243** | **38,515** | **100%** | **32.3%** |
| **Public Trust Easement*** | | | | | |
| *State Lands Commission Ordinary High Water* | N/A | N/A | N/A | N/A | N/A |
| TOTAL PUBLIC TRUST: | N/A | N/A | N/A | N/A | N/A |

* Only mapped to Herndon; additional lands subject to State Lands Commission claims have not been mapped to date.
** Left bank and right bank designations assume one is looking in the downstream direction.

*Table 10-11. Acreage of land ownership types along Reach 5 of the San Joaquin River.*

| Land Ownership | Acreage | | | Percentage | |
|---|---|---|---|---|---|
| | Left-Bank (acres) ** | Right-Bank (acres) ** | Total (acres) | Reach | Entire Study Area |
| **Public Ownership** | | | | | |
| *Federal lands* | 4,536 | 0 | 4,536 | 33.7% | 3.8% |
| *State, County, and Special District lands* | 3,347 | 805 | 4,152 | 30.9% | 3.5% |
| *State Lands Commission Ordinary Low Water** | 0 | 0 | 0 | 0.0% | 0.0% |
| TOTAL PUBLIC OWNERSHIP: | 7,883 | 805 | 8,688 | 64.6% | 7.3% |
| **Private Ownership** | | | | | |
| *Agricultural, urban, and industrial* | 100 | 4,665 | 4,765 | 35.4% | 4.0% |
| TOTAL PRIVATE OWNERSHIP: | 100 | 4,665 | 4,765 | 35.4% | 4.0% |
| | | | | | |
| **Total ownership in Reach 1 Study Area:** | **7,983** | **5,470** | **13,453** | **100%** | **11.3%** |
| **Public Trust Easement*** | | | | | |
| *State Lands Commission Ordinary High Water* | N/A | N/A | N/A | N/A | N/A |
| TOTAL PUBLIC TRUST: | N/A | N/A | N/A | N/A | N/A |

* Only mapped to Herndon; additional lands subject to State Lands Commission claims have not been mapped to date.
** Left bank and right bank designations assume one is looking in the downstream direction.

*Table 10-12. Summary of land ownership types for all five reaches of the San Joaquin River study area.*

| Land Ownership | Acreage | | | |
|---|---|---|---|---|
| | Left-Bank (acres) ** | Right-Bank (acres) ** | Total (acres) | Percentage |
| **Public Ownership** | | | | |
| *Federal lands* | 10,351 | 2,298 | 12,649 | 10.6% |
| *State, County, and Special District lands* | 4,049 | 805 | 4,854 | 4.1% |
| *San Joaquin River Parkway and Conservation Trust* | 2,360 | 243 | 2,603 | 2.2% |
| *State Lands Commission Ordinary Low Water** | 62 | 149 | 211 | 0.2% |
| TOTAL PUBLIC OWNERSHIP: | 16,882 | 3,495 | 20,317 | 17.0% |
| **Private Ownership** | | | | |
| *Agricultural, urban, and industrial* | 42,176 | 56,732 | 98,908 | 83.0% |
| TOTAL PRIVATE OWNERSHIP: | 42,176 | 56,732 | 98,908 | 83.0% |
| | | | | |
| **Total ownership in Reach 1 Study Area:** | **58,998** | **60,227** | **119,225** | **100%** |
| **Public Trust Easement*** | | | | |
| *State Lands Commission Ordinary High Water* | 100 | 131 | 231 | N/A |
| TOTAL PUBLIC TRUST: | 100 | 131 | 231 | N/A |

* Only mapped to Herndon; additional lands subject to State Lands Commission claims have not been mapped to date.
** Left bank and right bank designations assume one is looking in the downstream direction.

The land ownership study area encompasses 119,225 acres, of which 83.0% is held privately and 17.0% is held publicly. Review of Figures 10-3a through Figure 10-3q illustrates that the irregularity of the study area boundary is due to the irregularity of land ownership boundaries; therefore, the results should not be considered as precise as presented in Tables 10-7 through 10-12. A better use of these data is to infer trends in land ownership among and between reaches. The public lands in the San Joaquin River Parkway and Conservation Trust were tabulated separately because the data were readily available from the Trust, and the Trust is a significant river corridor landowner in Reach 1. Other parks in downstream reaches were not singled out due to their small size; thus, they were grouped into the State, County, and Special District category. The percent of land ownership varies between reaches due to variability in study area width, with Reach 1 containing 24.5% of the land ownership acreage, Reach 2 containing 18.2%, Reach 3 containing 13.7%, Reach 4 containing 32.3%, and Reach 5 containing 11.3%.

The State Lands Commission identified their fee title lands (ordinary low water) and public trust easement lands (ordinary high water) in the portion of Reach 1 between Friant Dam and Herndon (Table 10-7). Fee title lands encompass approximately 211 acres, and the public trust easement encompasses approximately 231 acres. The State Lands Commission has not quantitatively claimed the remainder of Reach 1, or any of Reaches 2 through 5.

Land ownership data were analyzed similarly as the land use data to observe differences in ownership between the five reaches (Figures 10-4a and 10-4b). A first analysis illustrates the differences in private and public land ownership for all five reaches (lower two charts in Figure 10-4b). Private lands comprise over 97% of all land ownership in Reaches 1 through 3; private land decreases to 80% in Reach 4 and 35% in Reach 5. Public ownership is less than 3% in Reaches 1 through 3, and

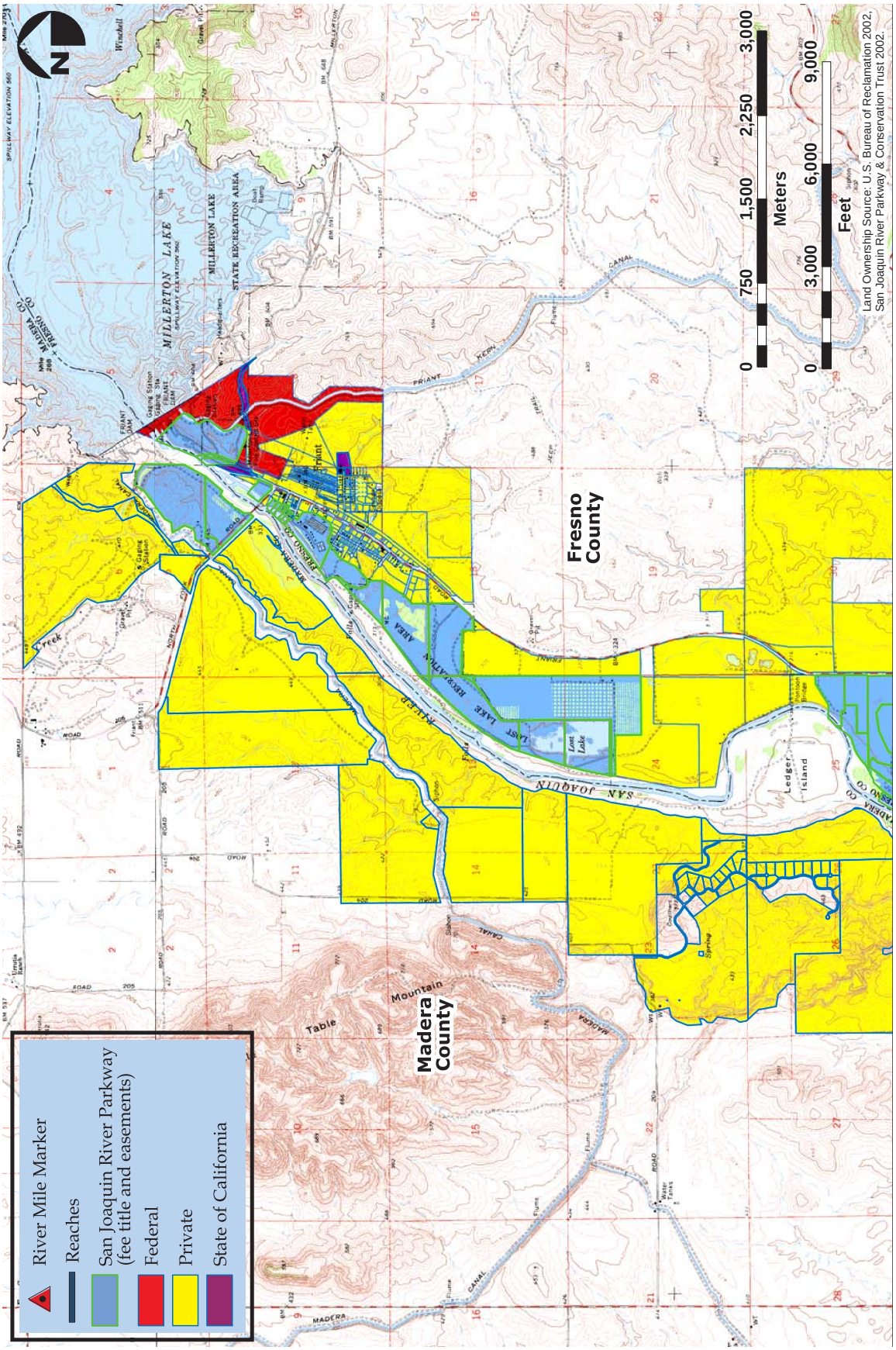


*Figure 10-3a. Land ownership along the San Jaoquin River (Reach 1a)*

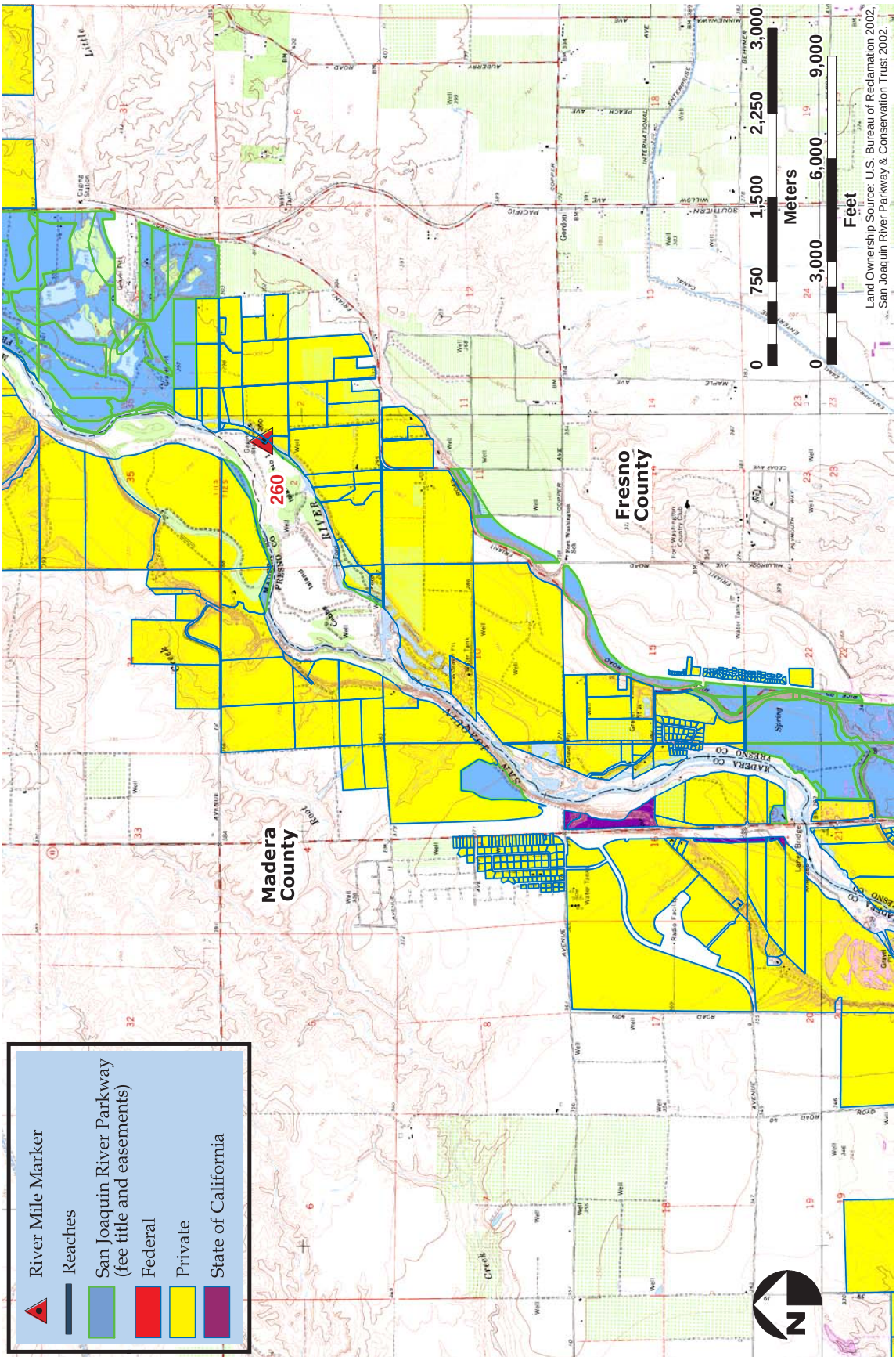


*Figure 10-3b. Land ownership along the San Jaoquin River (Reach 1a)*

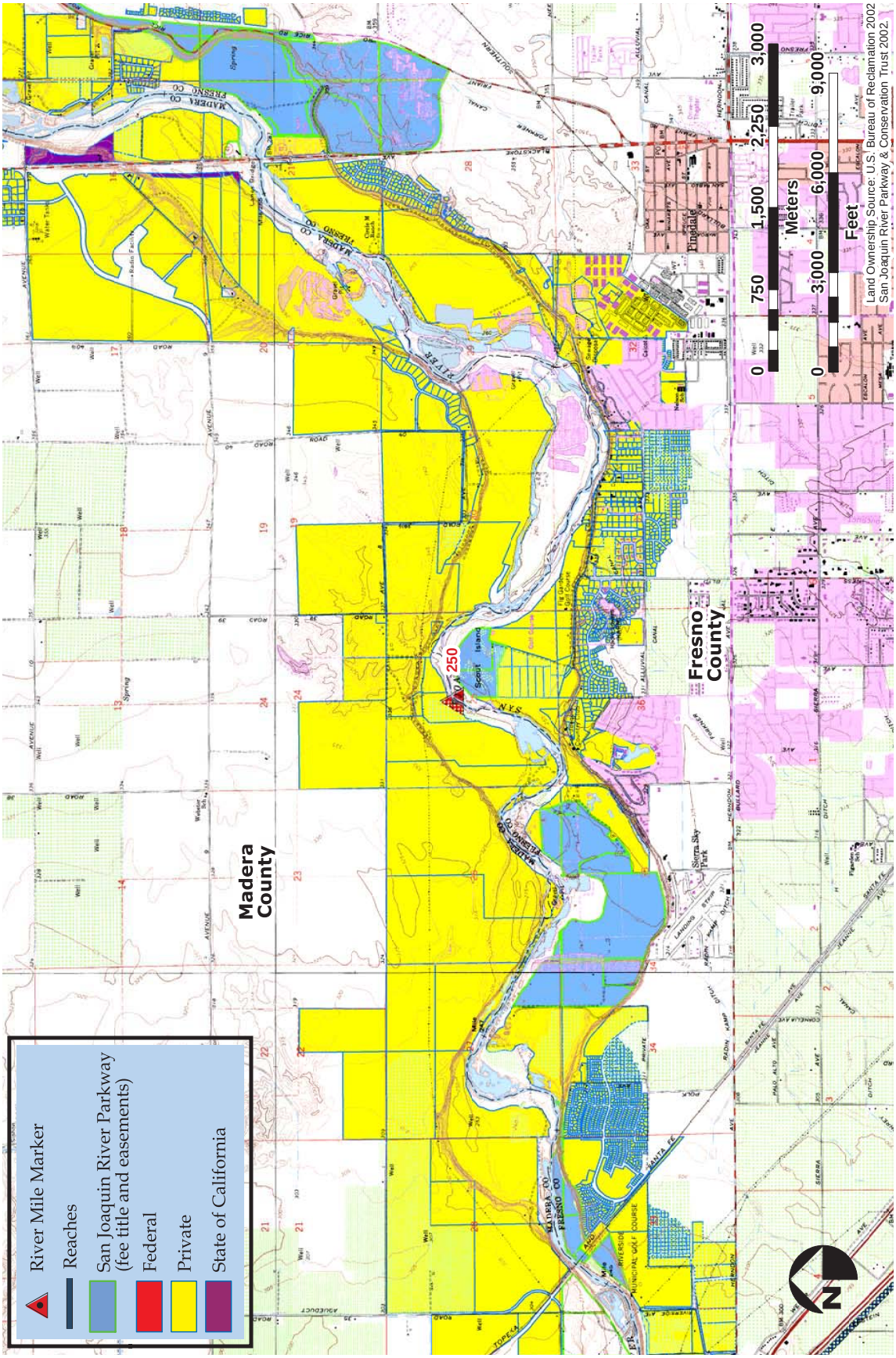


*Figure 10-3c. Land ownership along the San Jaoquin River (Reach 1a)*

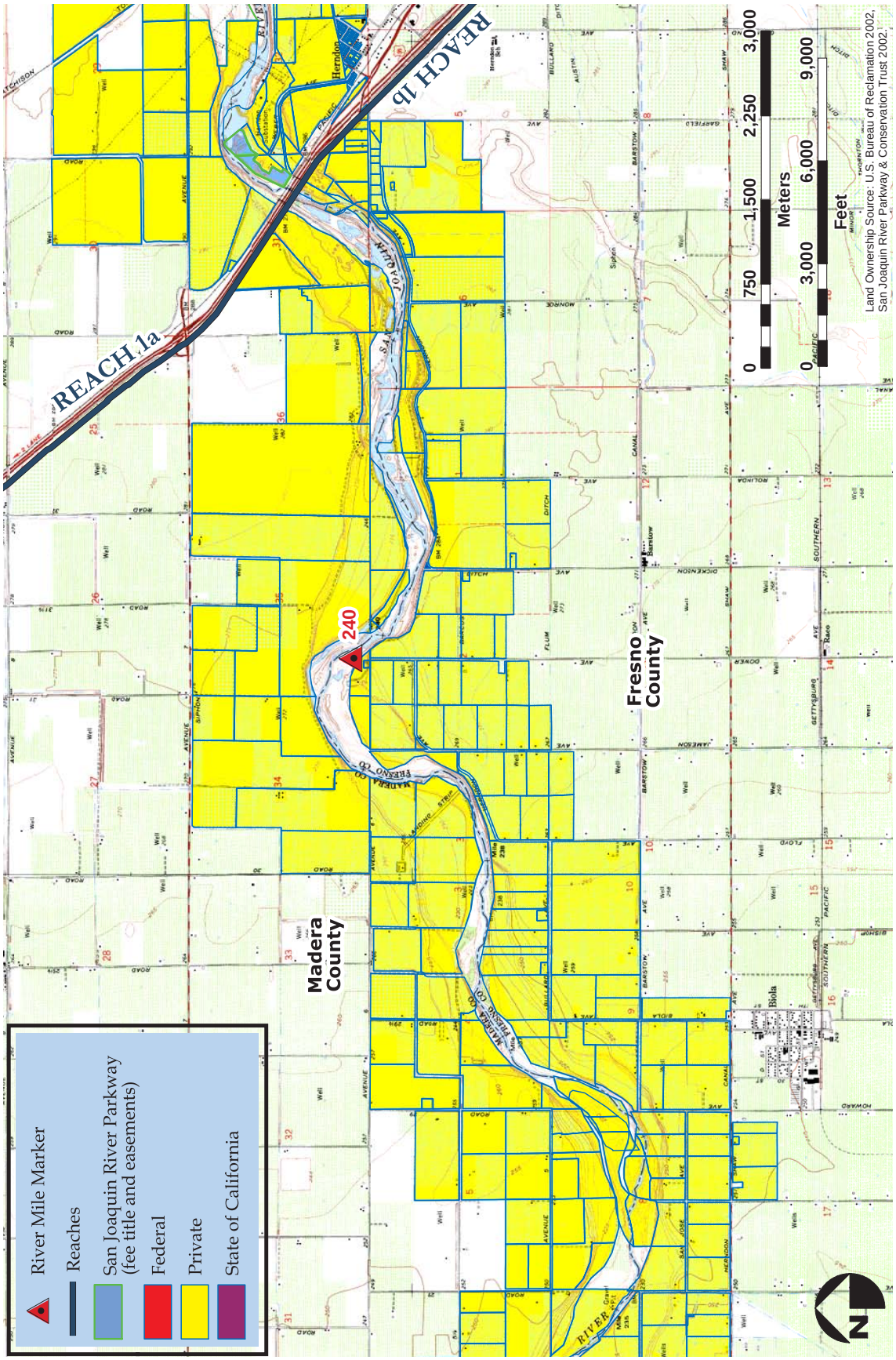


*Figure 10-3d. Land ownership along the San Jaoquin River (Reach 1a & 1b)*

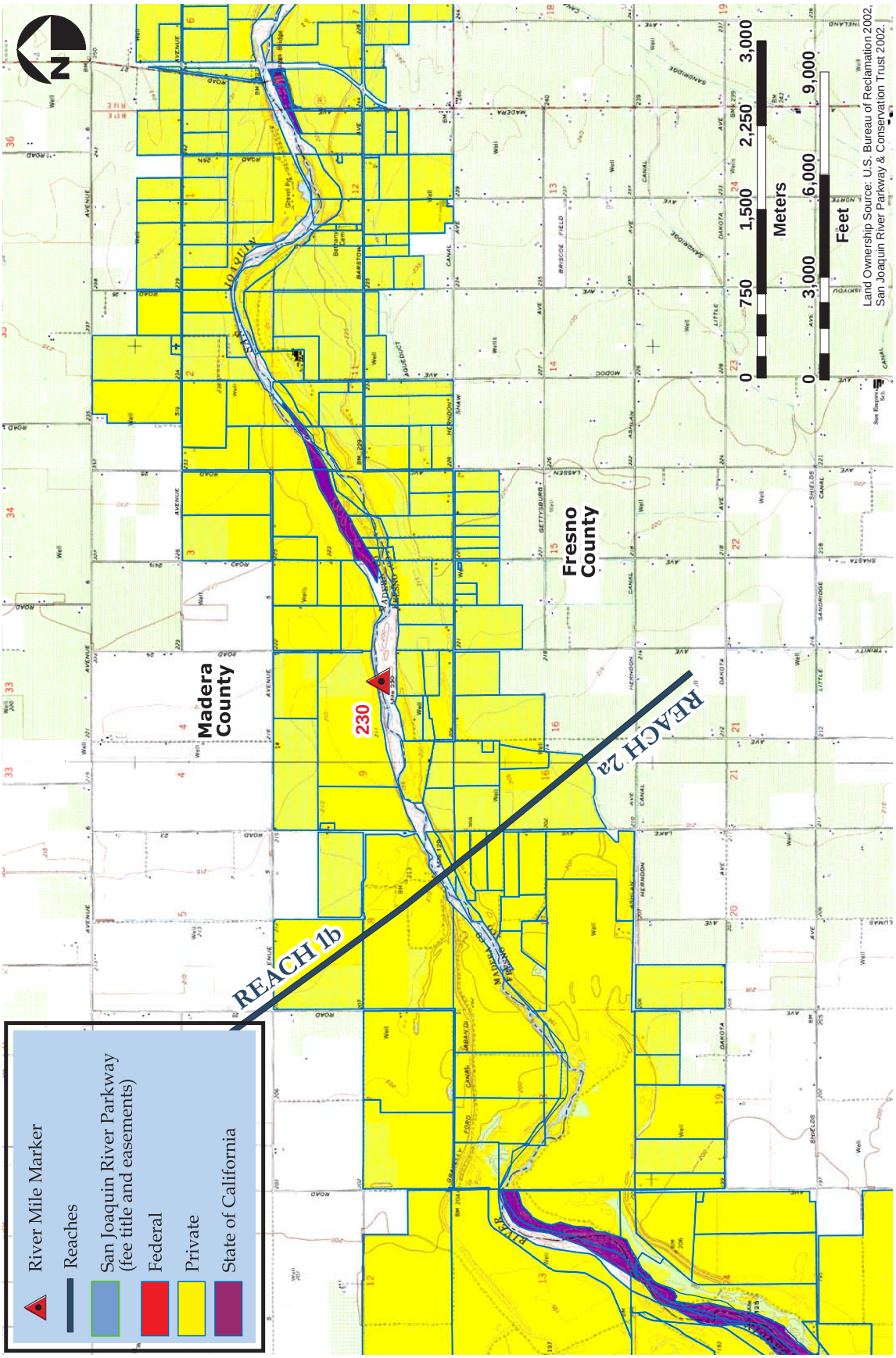


*Figure 10-3e. Land ownership along the San Jaoquin River (Reach 1b & 2a)*

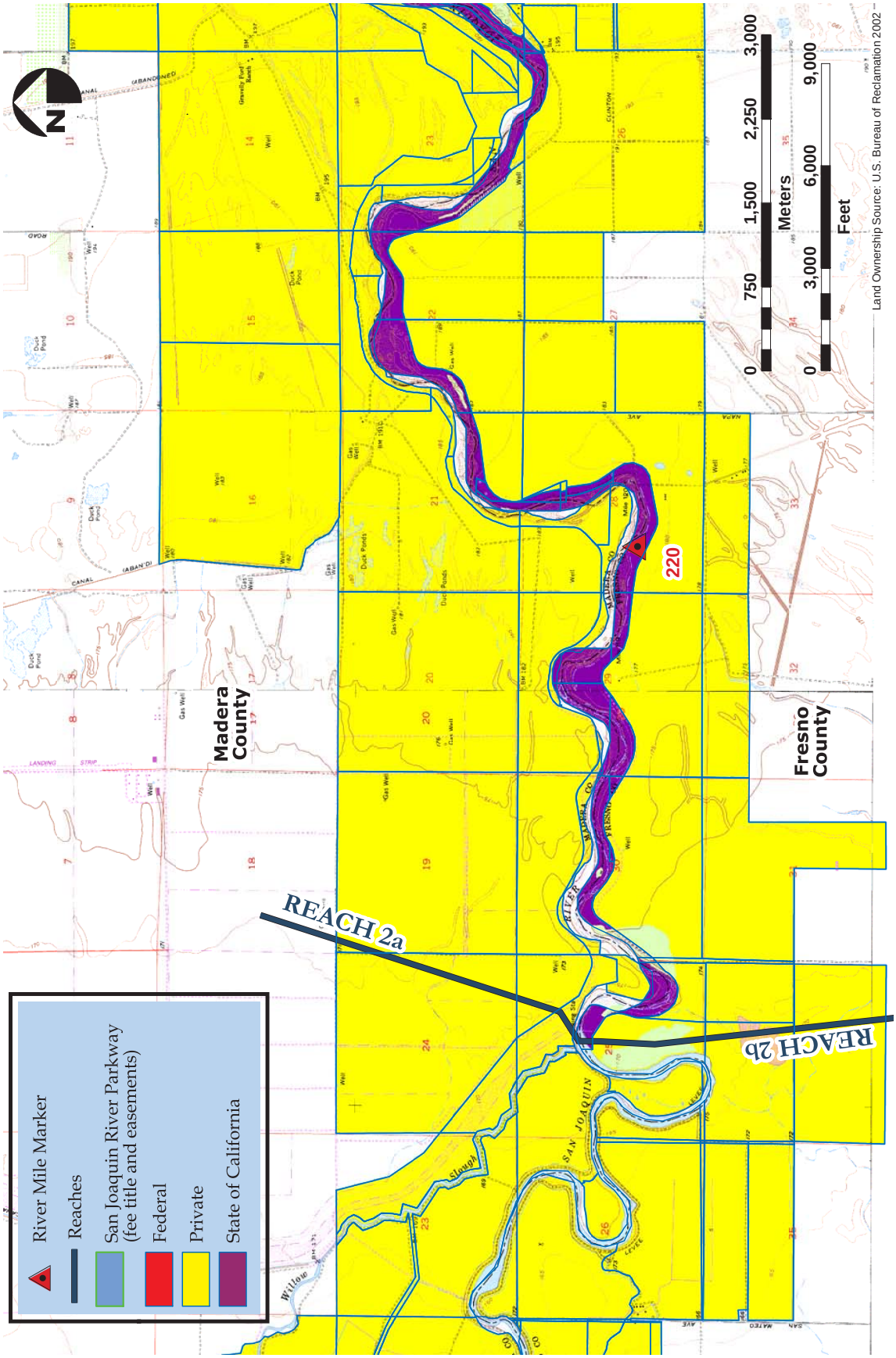


*Figure 10-3f. Land ownership along the San Jaoquin River (Reach 2a & 2b)*

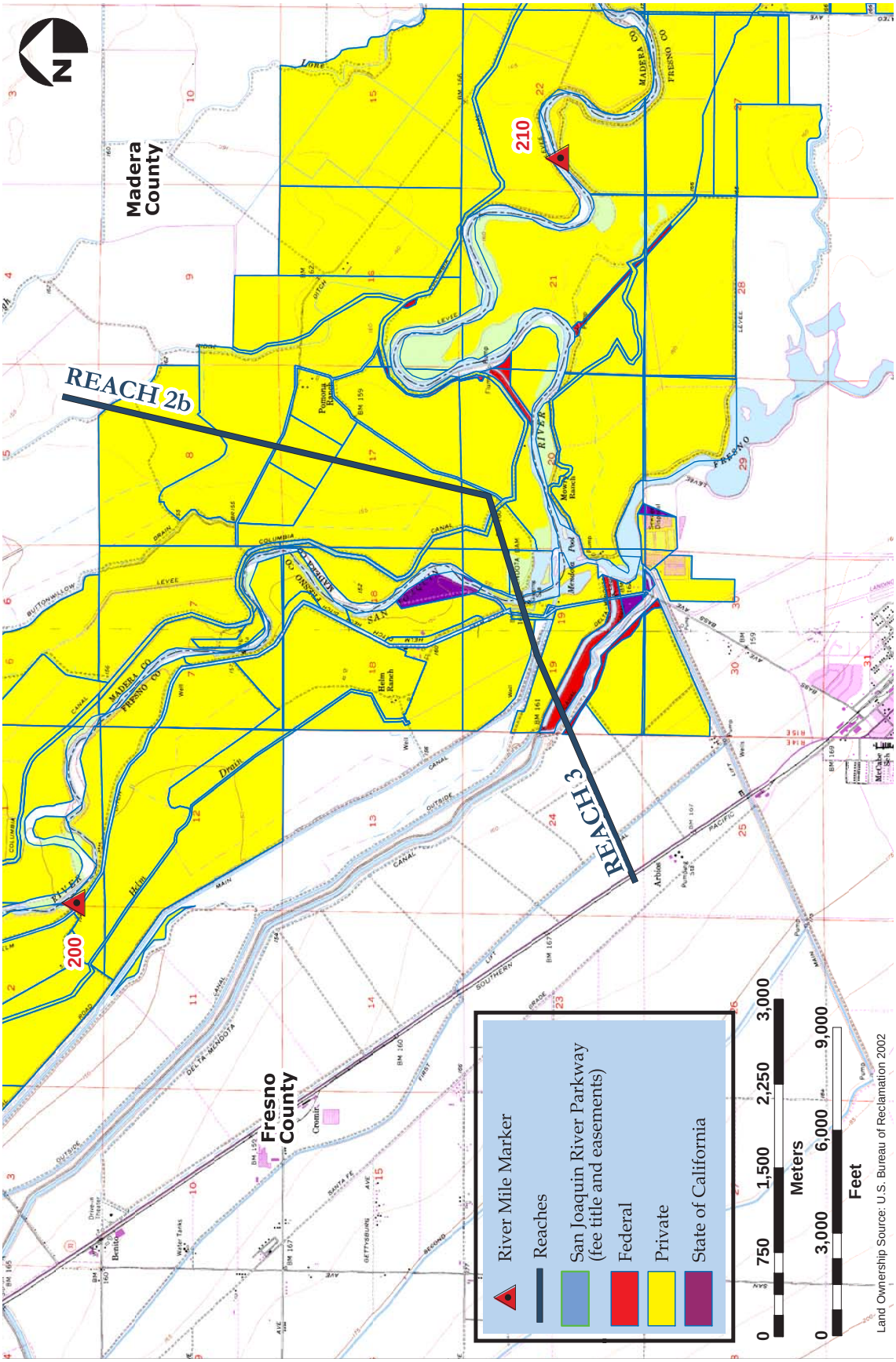


*Figure 10-3g. Land ownership along the San Jaoquin River (Reach 2b & 3)*

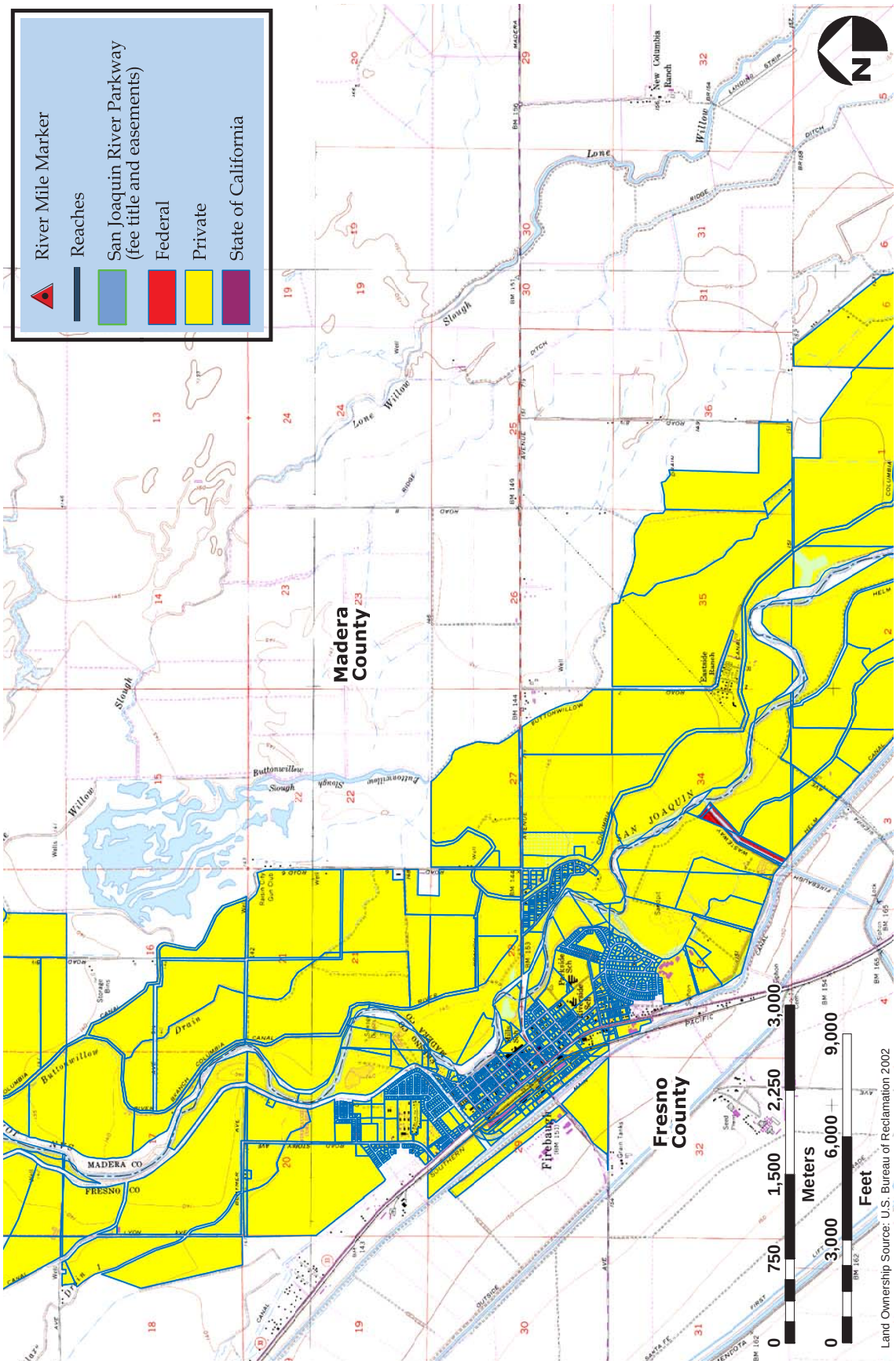


*Figure 10-3h. Land ownership along the San Jaoquin River (Reach 3)*

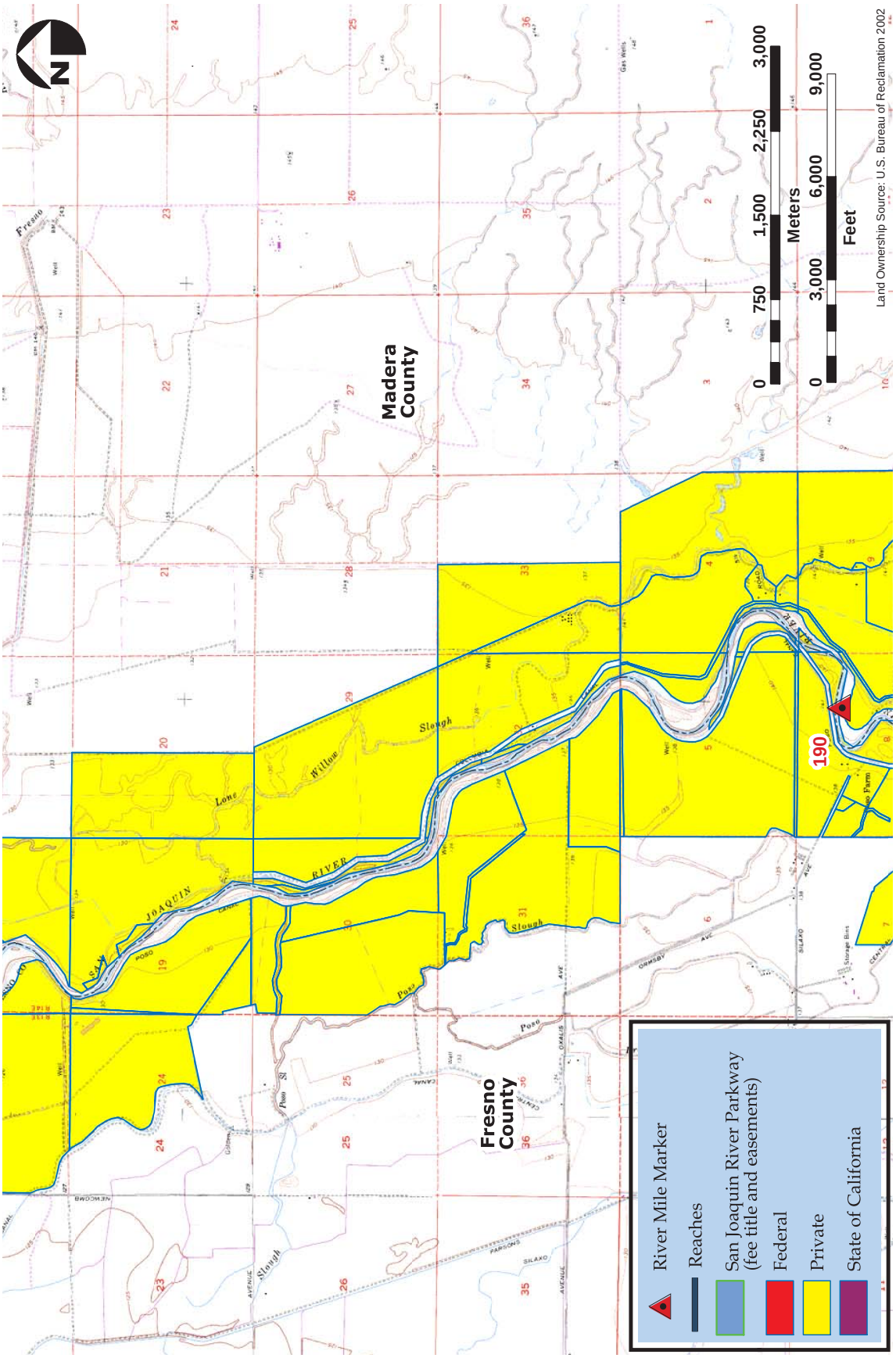


*Figure 10-3i. Land ownership along the San Jaoquin River (Reach 3)*

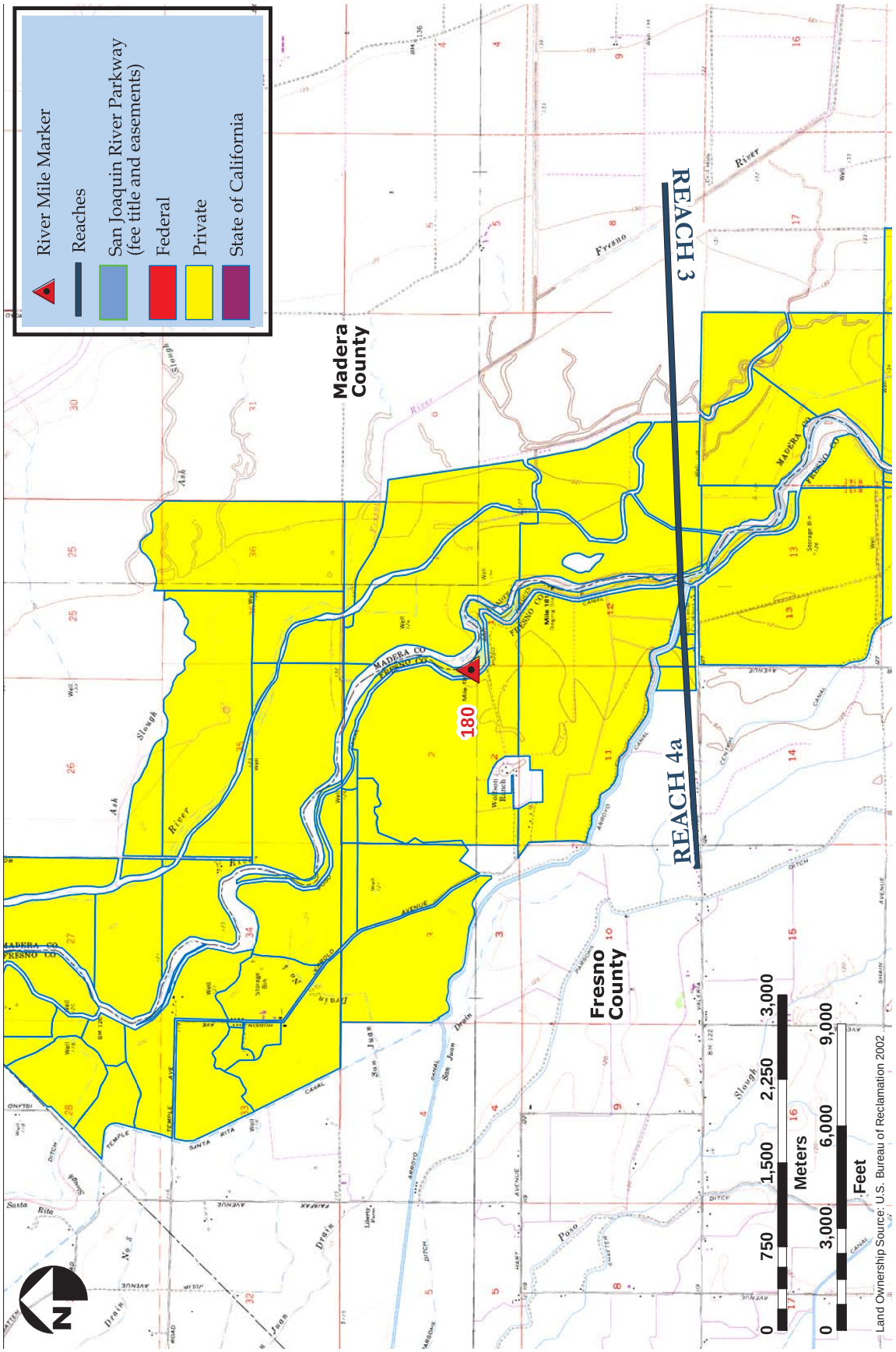


*Figure 10-3j. Land ownership along the San Jaoquin River (Reach 3 & 4a)*

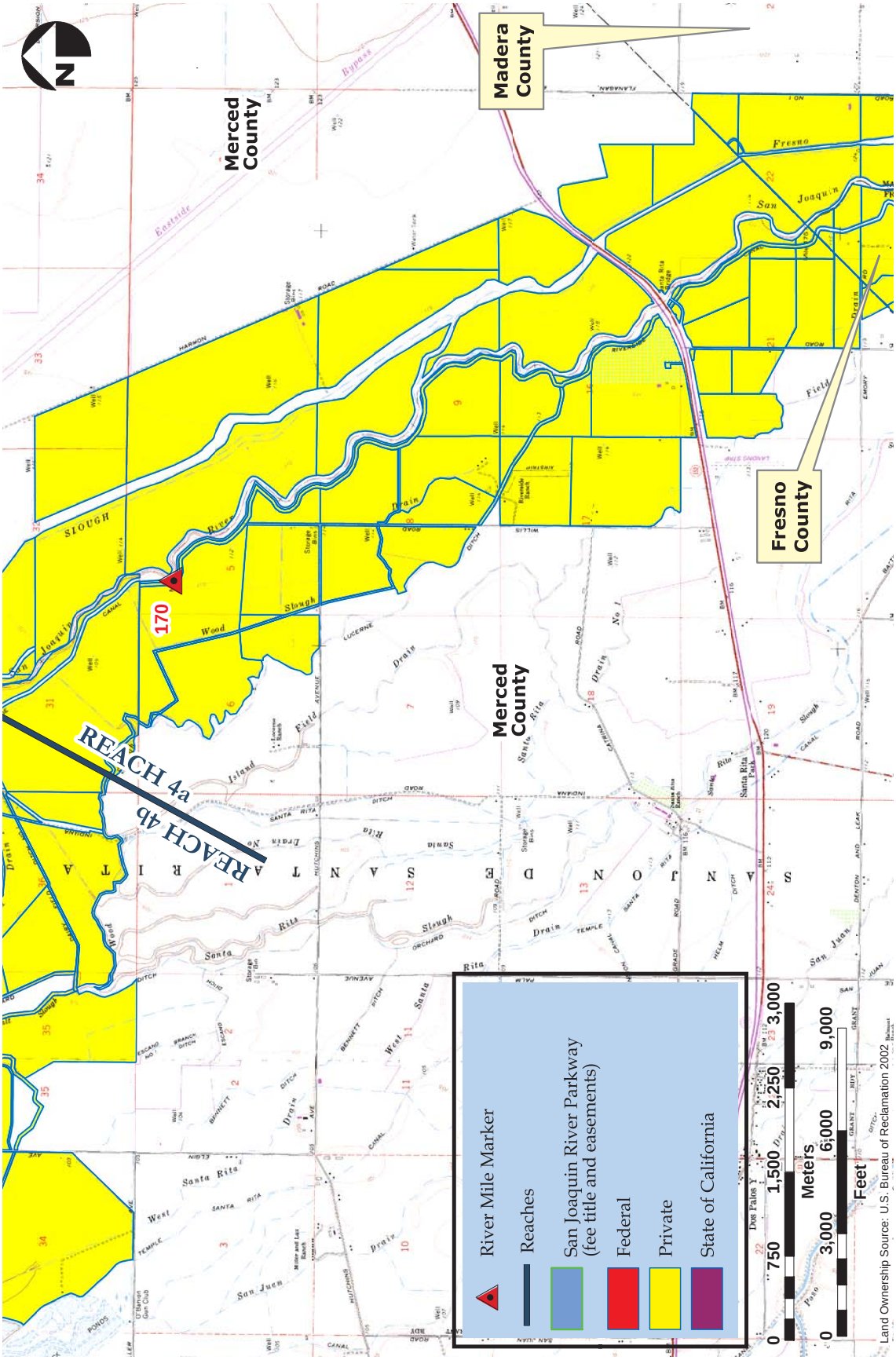


*Figure 10-3k. Land ownership along the San Jaoquin River (Reach 4a & 4b)*

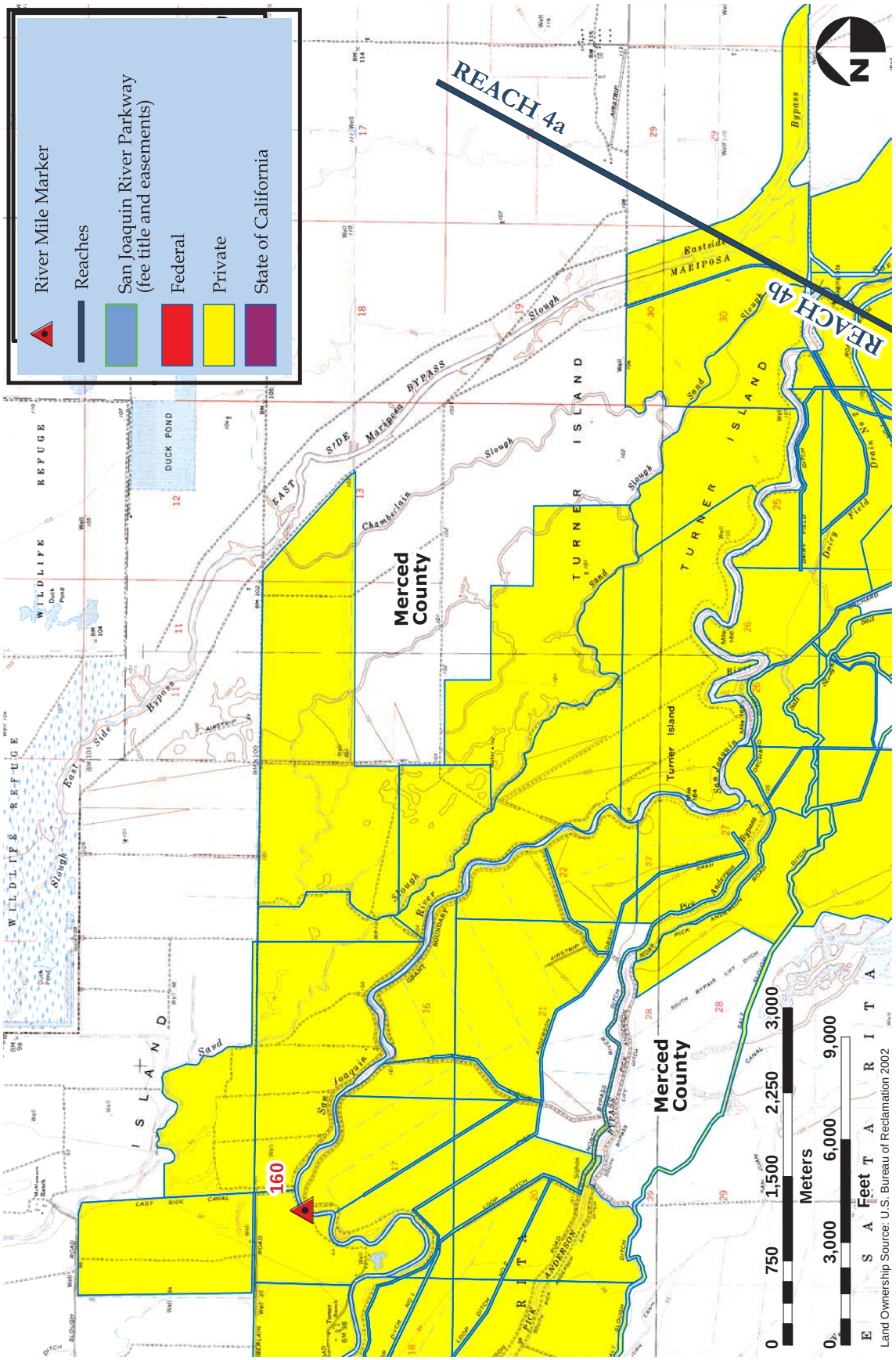


*Figure 10-31. Land ownership along the San Jaoquin River (Reach 4a & 4b)*

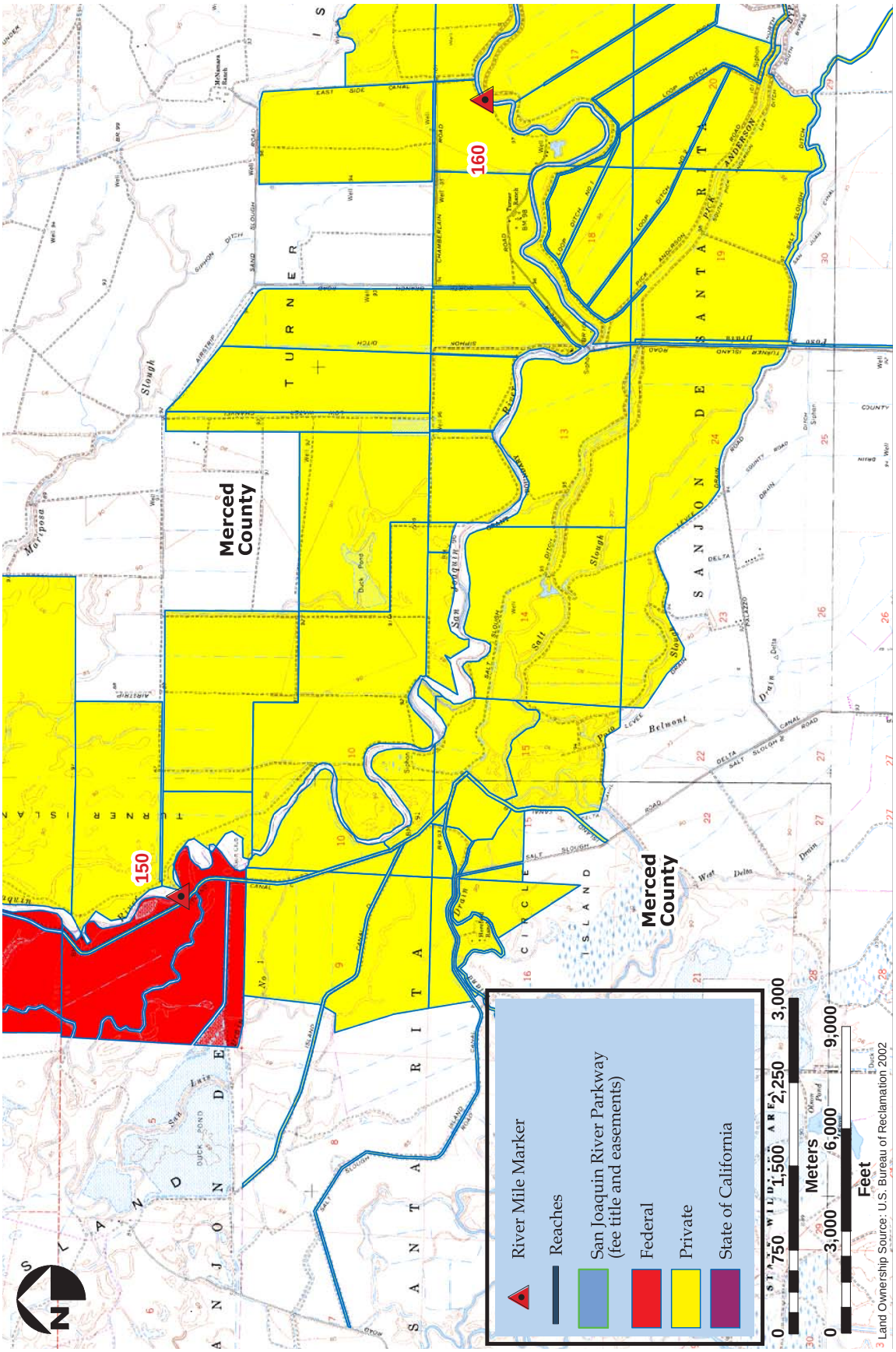


*Figure 10-3m. Land ownership along the San Jaoquin River (Reach 4b)*

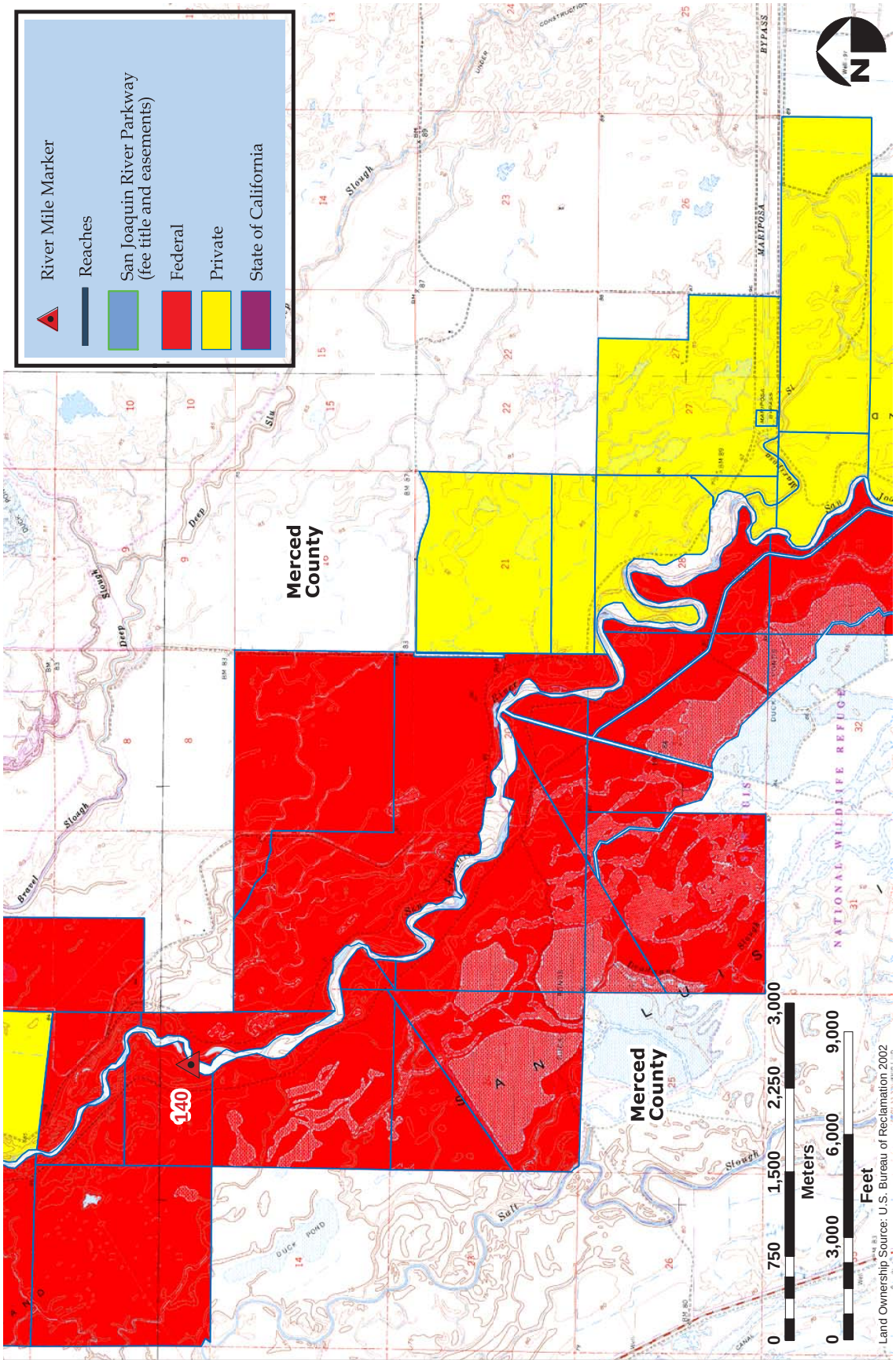


*Figure 10-3n. Land ownership along the San Jaoquin River (Reach 4b)*

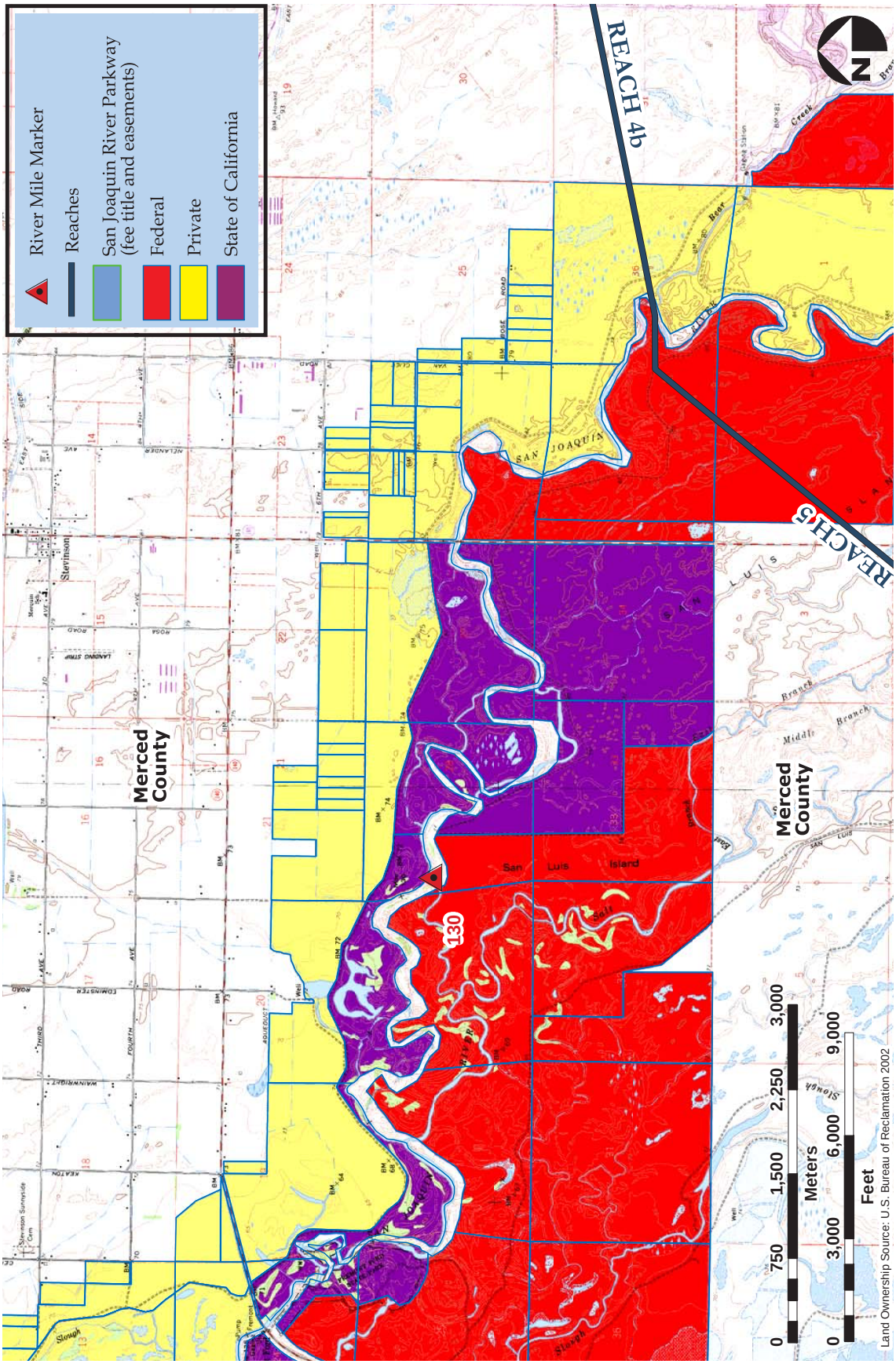


*Figure 10-3o. Land ownership along the San Jaoquin River (Reach 4b & 5)*

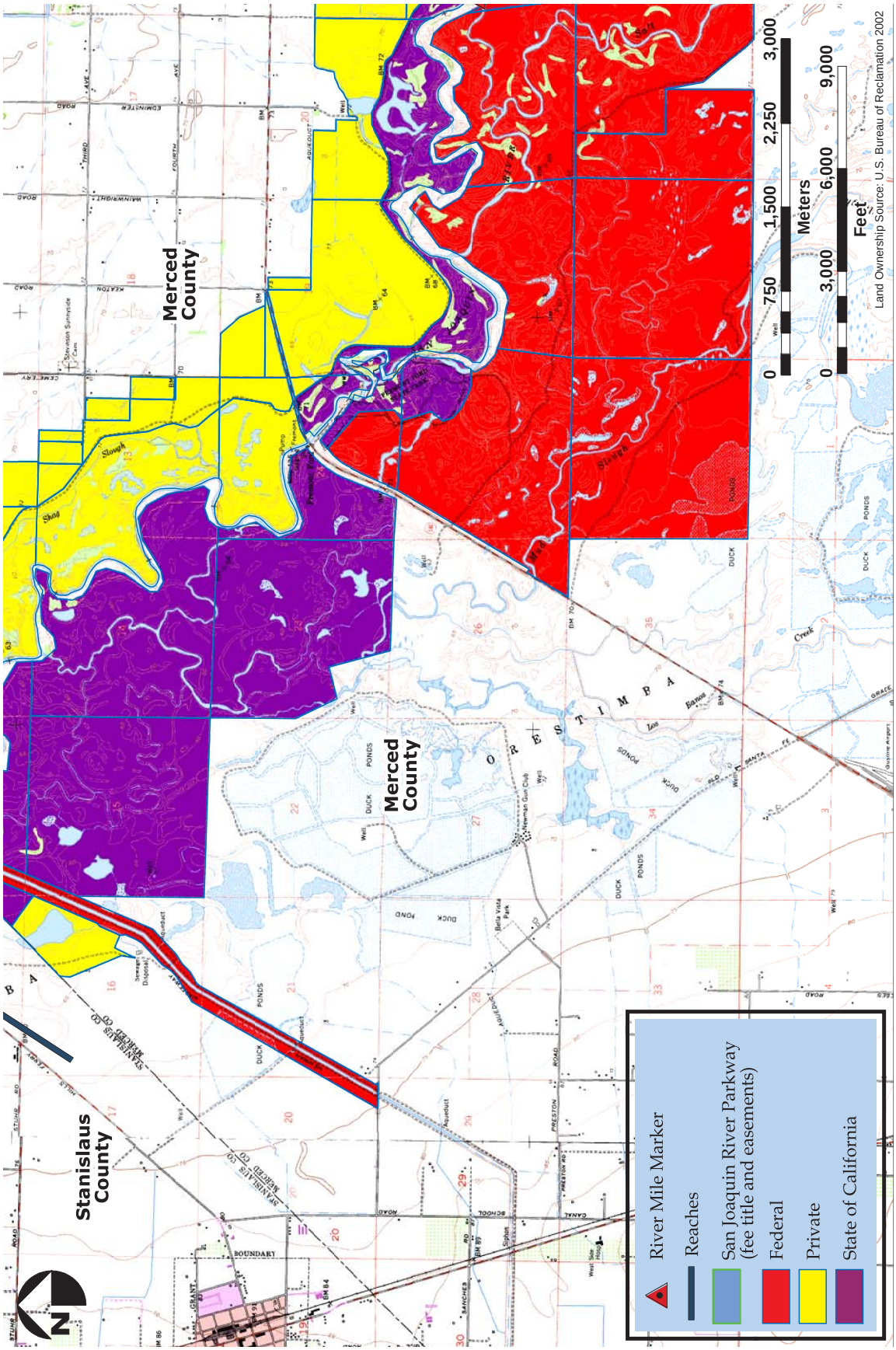


*Figure 10-3p. Land ownership along the San Jaoquin River (Reach 5)*

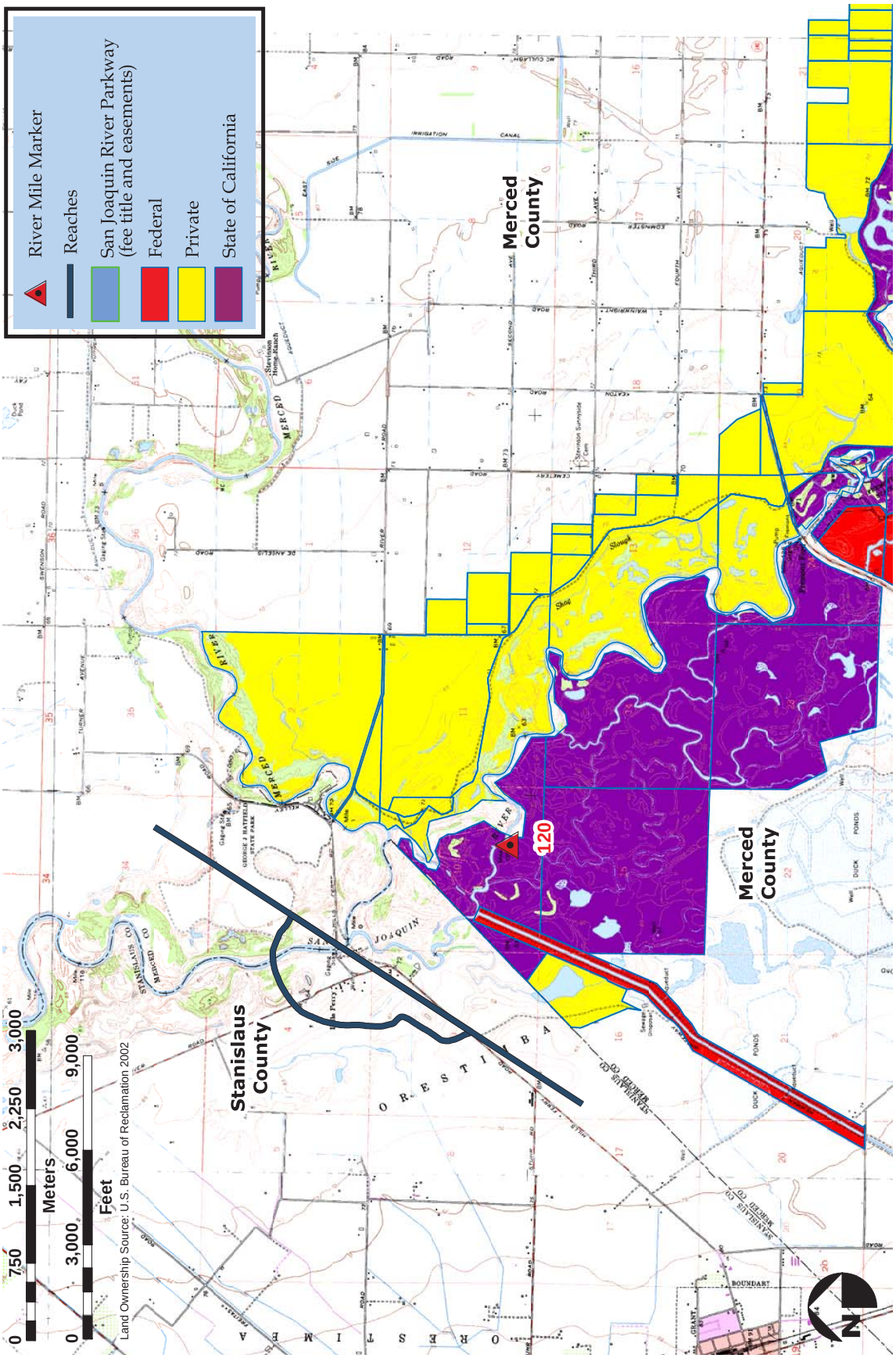


*Figure 10-3q. Land ownership along the San Jaoquin River (Reach 5)*

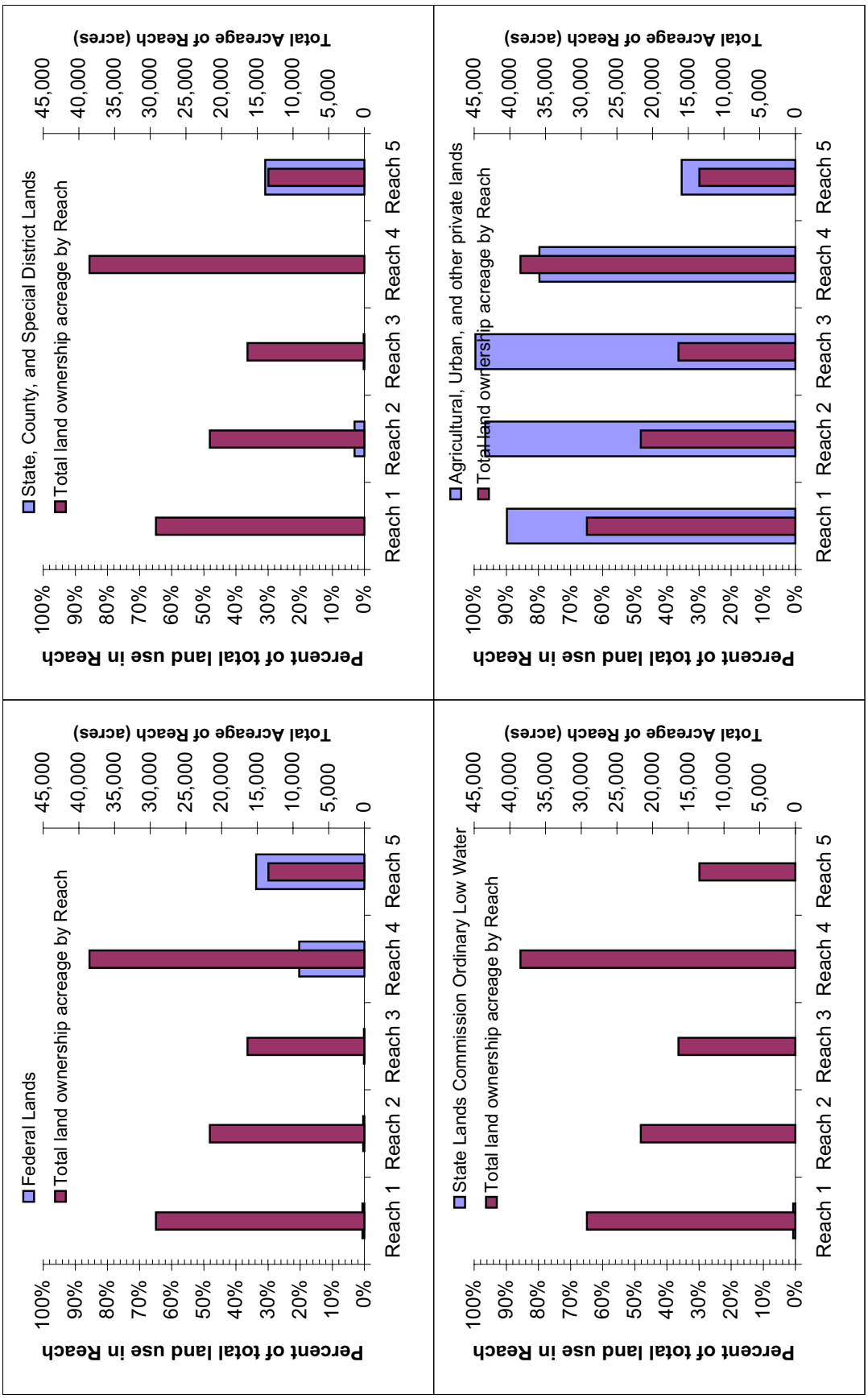


*Figure 10-4a. Public and private land ownership distribution between reaches.*

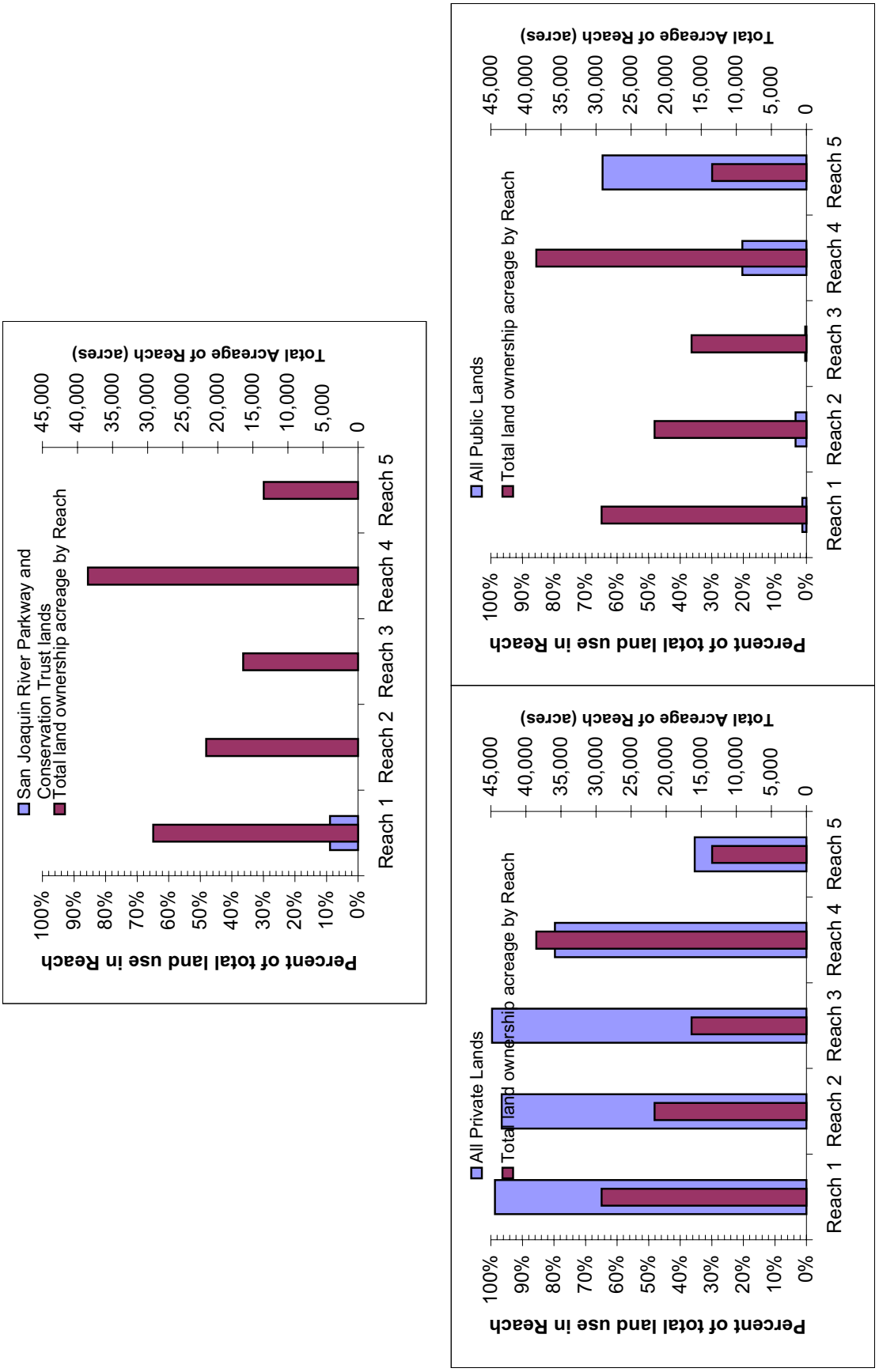


*Figure 10-4b. Public and private land ownership distribution between reaches.*

but begins to increase in Reach 4 (20%), and continues to increase in Reach 5 (65%). These public lands are largely US Fish and Wildlife refuges and California State Parks. Because the State Lands Commission has not issued claims to the ordinary low water in most reaches, the percentage of public lands is actually lower than it should be in all reaches. The lands classified as State, County, and Special District Lands in Reach 2 are entirely those lands on the river comprising the San Joaquin River Levee District.

The findings of this land use and ownership analysis are used to discuss opportunities and constraints in Section 10.7. Opportunities and constraints may apply to potential future restoration opportunities, as well as to existing and future land use and ownership. We discuss both in Section 10.7, emphasizing the opportunities and constraints on future restoration activities.

## 10.6. REGULATORY CONSIDERATIONS

Local, State and Federal land use and environmental regulations will significantly influence future restoration of the San Joaquin River; these regulations present additional opportunities and constraints to restoration efforts. County, State, and Federal agencies impose regulatory restrictions or mandates on land use (including restoration activities), and these are reviewed in this section. In addition to the general discussion of regulations for Fresno, Madera, and Fresno counties, we have included applicable objectives and policies that may affect restoration actions. These objectives and policies were obtained from the counties' General Plans, available on the Internet (see URL address in Literature Cited section).

### 10.6.1. County Regulations

A General Plan is a legal document, required by State law (California General Code Section 65300 et seq.), that serves as the "constitution" for land use by the local government. Every General Plan must have the following components (among others): (1) a land use element that designates the distribution and intensity of all lands uses in its jurisdiction; (2) a conservation element that addresses conservation, development, and use of natural resources including water, forests, soils, rivers and mineral deposits; and (3) an open space element that describes measures that: (a) preserve open space for protection of natural resources such as wildlife habitat, and (b) manage resources such as agriculture, outdoor recreation, and public health and safety from geologic hazards, flooding and fires. When approving a land use project, decision makers must make a Finding that the proposed land use conforms to the General Plan's goals and policies.

A County's Zoning Ordinance and parcel specific map are its most important tools for implementing its General Plan. State law mandates that development within counties be consistent with their General Plan. Because Fresno and Madera counties share a common boundary along the San Joaquin River, their General Plan policies affect land use along the river. Additionally, the General Plan policies make special note of land use restrictions along the river corridor that may affect present and future land use, including restoration activities. A General Plan's land use policies are not the total extent of local regulatory oversight to land use; resource protection policies, described in the conservation and open space elements of a General Plan, must also be reviewed. The entire General Plan should be reviewed to ensure compliance with its policies. The local Zoning Ordinance should be consulted, along with regulations promulgated by State and Federal resource agencies.

#### 10.6.1.1. Fresno County General Plan, 2000

The Fresno County General Plan was updated in October 2000. In the study area, Fresno County's land use jurisdiction lies to the south and west of the San Joaquin River centerline, through Reaches

1, 2, 3 and into 4A. The General Plan contains 27 primary land use designations and three overlay designations (an overlay land use designation modifies the policies, standards, or procedures established for the underlying primary land use designation). One of the three overlay designations is for the San Joaquin River corridor. Each primary land use designation is defined in terms of allowable uses and intensity standards. The land use designations are implemented largely through the zoning ordinance. The following review of the Fresno County General Plan has identified allowable uses, and relevant goals, polices and implementation programs to be considered when assessing opportunities and constraints for potential future restoration activities on the San Joaquin River.

Within the Fresno County General Plan, two chapters influence restoration on the San Joaquin River: the Agriculture and Land Use chapter, and the Conservation and Open Space chapter (the use of the term "chapter" is interchangeable with "element"). Agricultural land produces crops and livestock, and contains necessary agricultural commercial centers, processing facilities, and certain semi-agricultural activities. Conservation and Open Space areas are those that are essentially unimproved and are planned to remain open in character, providing for:

- the preservation of natural resources;
- the managed production of resources, parks and recreation, thus protecting and enhancing cultural resources and providing recreational opportunities;
- the protection of the community from natural and manmade hazards.

The primary overlay on these two uses (Agricultural and Open Space) is the San Joaquin River Corridor Overlay, which provides for agricultural activities with incidental homesites, sand and gravel extraction, various recreational activities, wildlife habitat areas, and uses which serve the San Joaquin River Parkway. Within each chapter are one or more categories of use, which are discussed in the following sections. Because these uses are those contained in the corresponding General Plan of each county, the uses do not necessarily directly match with the land use designations used in the mapping exercise in Section 10.5.

#### 10.6.1.1.1. Agriculture and Land Use Chapter: Agriculture

Agriculture is essential to the visions and goals of the Fresno County General Plan; that focus is reflected in its land use policies that guide decisions to minimize the conversion of productive agriculture land, to protect agricultural activities from incompatible land uses, and to control expansion of non-agricultural development onto productive agricultural lands. Excerpts from the Fresno County General Plan that may affect restoration activities are as follows:

<u>Goal LU-A</u> *"To promote the long-term conservation of productive and potentially-productive agricultural lands"...*

- Policy LU-A.2 "The County shall maintain agriculturally-designated areas for agriculture use and shall direct urban growth away from valuable agricultural lands"…
- Policy LU-A.12 "In adopting land uses policies, regulations and programs, the County shall seek to protect agricultural activities from encroachment of incompatible land uses."
- Policy LU-A.13 "The County shall protect agricultural operations from conflicts with non-agricultural uses by requiring buffers between proposed non-agricultural uses and adjacent agricultural operations."
- Policy LU-A.16 "The County should consider the use of agricultural land preservation programs that improve the competitive capabilities of farms and ranches, thereby ensuring long-term conservation of viable agricultural operations. Examples of programs to be

considered should include: land trusts; conservation easements; dedications incentives; new and continued Williamson Act contracts; Farmland Security Act contracts; the California Farmland Conservancy Program Fund; agricultural education programs; zoning regulations; agricultural mitigation fee program; urban growth boundaries; transfer of development rights; purchase of development rights; and agricultural buffer policies."

- Policy LU-A.17 "The County shall accept California Land Conservation contract on all designated agricultural land subject to location, acreage, and use limitations established by the County."
- Policy LU-A.20 "The County shall adopt and support policies and programs that seek to protect and enhance surface water and groundwater resources critical to agriculture."
- Program LU-A.C "The County shall develop and implement guidelines for design and maintenance of buffers to be required when new non-agricultural uses are approved in agricultural areas."

#### 10.6.1.1.2. Agriculture and Land Use Chapter: River Influence Areas (overlay)

The San Joaquin River overlay provides for multiple uses including agriculture, sand and gravel mining, and recreation, but simultaneously, development is constrained by a high water table, poor drainage, and natural hazards such as flooding. Policies in this section seek to preserve and enhance the county's river influenced areas by avoiding adverse impacts from development and encouraging environmentally-friendly recreational and agricultural activities.

Goal LU-C *"To preserve and enhance the value of the river environment as a multiple use, open space resource; maintain the environmental and aesthetic qualities of the area; protect the quality of and quantity of the surface and groundwater resources; provide for long term preservation of productive agricultural land; conserve and enhance natural wildlife habitat; and maintain the flood-carrying capacity of the channel at a level equal to the one (1) percent flood event (100 year flood)."*

- Policy LU-C.2 "Within the San Joaquin River Corridor Overlay, the County shall accommodate agricultural activities with incidental homesites, recreational uses, sand and gravel extraction, and wildlife habitat and open space areas."
- Policy LU-C.3 "The County may allow by discretionary permit commercial activities needed to serve San Joaquin River Parkway visitors,"…"consistent with the objectives and policies of the San Joaquin River Parkway Master Plan."
- Policy LU-C.8 "Fresno County shall take into consideration the presence of the regulatory floodway or other designated floodway, the FEMA-designated 100-year floodplain, estimated 250-year floodplain, the Standard Project Flood, and the FMFCD Riverine Floodplain Policy in determining the location of future development within the San Joaquin River Parkway area. Any development sited in a designated 100-year floodplain shall comply with regulatory requirements at a minimum and with the FMFCD Riverine Floodplain Policy criteria, or requirements of other agencies having jurisdiction, were applicable."
- Policy LU-C.9 "The County shall administer its land use regulations in the San Joaquin River Corridor Overlay to preserve and protect identified wildlife corridors along the San Joaquin River. The County shall administer these regulations in consultation with the San Joaquin River Conservancy."
- Policy LU-C.10 "The County shall its land use regulations in the San Joaquin River Corridor Overlay to preserve and protect natural reserve areas in the San Joaquin River Parkway,

principally in those areas adjoining the wildlife corridor along the river where the largest acreage's of highest quality habitat exist. The County shall administer these regulations in consultation with the San Joaquin River Conservancy."

- Program LU-C.B "The County shall work with the San Joaquin River Parkway and Conservation Trust, San Joaquin River Conservancy, City of Fresno, and other interested agencies and organizations to implement the San Joaquin River Parkway Master plan."

#### 10.6.1.1.3. Open Space and Conservation Chapter: Water Resources

This section governs surface and groundwater resources in the county.

Goal OS-A *"To protect and enhance the water quality and quantity in Fresno County's streams, creeks, and groundwater basins."*

- Policy OS-A.19 "The County shall require the protection of floodplain lands and, where appropriate, acquire public easements of purposes of flood protection, public safety, wildlife preservation, groundwater recharge, access, and recreation."
- Policy OS-A.20 "The County shall support the policies of the San Joaquin River Parkway Master Plan to protect the San Joaquin River as an aquatic habitat, recreational amenity, aesthetic resource, and water source."
- Program LU-C.B "The County shall work with the San Joaquin River Parkway and Conservation Trust, San Joaquin River Conservancy, City of Fresno, and other interested agencies and organizations to implement the San Joaquin River Parkway Master plan."

#### 10.6.1.1.4. Open Space and Conservation Chapter: Mineral Resources

Policies in this section intend to preserve the future availability of mineral resources; along the San Joaquin River, this mineral resource is commercial grade aggregate. Policies in this section also seek to promote the orderly extraction of mineral resources while minimizing the impact of these activities on surrounding land uses and the natural environment.

Goal OS-C *"To conserve areas identified as containing significant mineral deposits and oil and gas resources for potential future use, while promoting the reasonable, safe, and orderly operation of mining and extraction activities within areas designated for such use, where environmental, aesthetic, and adjacent land use compatibility impacts can be adequately mitigated."*

- Policy OS-C.1 "The County shall not permit incompatible land uses within the impact area of existing or potential surface mining areas."
- Policy OS-C.2 "The County shall not permit land uses incompatible with mineral resource recovery within area designated as Mineral Resource Zone 2 (MRZ-2)."
- Policy OS-C.8 "The County shall, where feasible along the San Joaquin River, site recreational trails, bikeways, and other recreation areas at least three hundred feet from the edge of active aggregate mining operations and separate them by physical barriers."
- Policy OS-C.9 "The County shall require that any proposed changes in land use within areas designated MRZ-2 along the San Joaquin and Kings Rivers comply with the provisions of the State Surface Mining and Reclamation Act (SMARA)."
- Policy OS-C.10 "The County shall not permit land uses that threaten the future availability of mineral resource or preclude future extraction of those resources."

#### 10.6.1.1.5. Open Space and Conservation Chapter: Wetland & Riparian Areas

Because of urbanization and agriculture, the broad floodplains in the San Joaquin Valley have been reduced to narrow floodways along each river, as part of regional flood control efforts. Policies in this section seek to protect riparian and wetland habitats in the county while allowing compatible uses where appropriate.

Goal OS-D *"To conserve the function and values of wetland communities and related riparian area throughout Fresno County while allowing compatible uses where appropriate. Protection of these resource functions will positively affect aesthetics, water quality, floodplain management, ecological function, and recreation/tourism."*

- Policy OS-D.1 "The County shall support the "no-net-loss" wetlands policies of the US Army Corps of Engineers, the US Fish and Wildlife Service, and the California Fish and Game."
- Policy OS-D.2 "The County shall require new development to fully mitigate wetland loss for function and value in regulated wetlands to achieve "no-net-loss" through any combination of avoidance, minimization, or compensation."
- Policy OS-D.3 "The County shall require development to be designed in such a manner that pollutants and siltation do not significantly degrade the area, value, or function of wetlands."
- Policy OS-D.4 "The County shall require riparian protection zones around natural watercourses and shall recognize that these areas provide highly valuable wildlife habitat. Riparian protection zones shall include the bed and bank of both low- and high-flow channels and associated riparian vegetation, the band of riparian vegetation outside the high-flow channel, and buffers of 100 feet in width as measured from the top of the bank of unvegetated channels and 50 feet in width as measured from the other edge of the dripline of riparian vegetation."
- Policy OS-D.6 "The County shall require new private or public developments to preserve and enhance existing native riparian habitat unless public safety concerns require removal of habitat for flood control or other purposes. In cases where new private or public development results in modifications or destruction of riparian habitat for purposes of flood control, the developers shall be responsible for creating new riparian habitats within or near the project area. Adjacency to the project area shall be defined as being within the same watershed sub-basin as the project site. Compensation shall be at a ratio of three acres of new habitat fore every one acre destroyed."
- Policy OS-D.7 "The County shall support the management of wetland and riparian plant communities for passive recreation, groundwater recharge, nutrient storage, and wildlife habitats."
- Policy OS-D.8 "The County should consider the acquisition of wetland, meadows, and riparian habitat areas for parks limited to passive recreational activities as a method of wildlife conservation."
- Program OS-D.A "The County shall work toward the acquisition by public agencies or private non-profit conservation organizations of creek corridors, wetlands, and areas rich in wildlife or of a fragile ecological nature as public open space where such areas cannot be effectively preserved through regulatory process. Such protection may take the form of fee acquisition or protective easements and may be carried out in cooperation with other local, State, and Federal agencies and private entities. Acquisition shall include provisions for maintenance and management in perpetuity."

- Program OS-D.A "The County shall adopt an ordinance for riparian zones identifying allowable activities in riparian protection zones and allowable mitigation techniques."

#### 10.6.1.1.6. Open Space and Conservation Chapter: Fish & Wildlife Habitat

Policies in this section seek to protect natural areas and to preserve habitat diversity in the county.

*Goal OS-E "To help protect, restore, and enhance habitats in Fresno County that support fish and wildlife species so that populations are maintained at viable levels."*

- Policy OS-E.1 "The County shall support efforts to avoid the "net" loss of important wildlife habitat where practicable."
- Policy OS-E.2 "The County shall require adequate buffer zones between construction activities and significant wildlife resources, including both onsite habitats that are purposely avoided and significant habitats that are adjacent to the project site, in order to avoid the degradation and disruption of critical life cycle activities such as breeding and feeding. The width of the buffer zone should vary depending on the location, species, etc. A final determination shall be made based on informal consultation with the US Fish and Wildlife Service and/or the California Department of Fish and Game."
- Policy OS-E.6 "The County shall ensure the conservation of large, continuous expanses of native vegetation to provide suitable habitat for maintaining abundant and diverse wildlife populations, as long as this preservation does not threaten the economic well-being of the county."
- Policy OS-E.10 "The County shall support State and Federal programs to acquire significant fish and wildlife habitat areas for permanent protection and/or passive recreation use."
- Policy OS-E.11 "The County shall protect significant aquatic habitats against excessive water withdrawals that could endanger special-status fish and wildlife or would interrupt normal migratory patterns."
- Policy OS-E.12 "The County shall ensure the protection of fish and wildlife habitats from environmentally-degrading effluents originating from mining and construction activities that are adjacent to aquatic habitats.
- Policy OS-E.13 "The County should protect to the maximum extent practicable wetlands, riparian habitat, and meadows since they are recognized as essential habitats for birds and wildlife."
- Policy OS-E.14 "The County shall require a minimum 200-foot wide wildlife corridor along particular stretches of the San Joaquin River and Kings River, whenever possible. The exact locations of the corridors should be determined based on the results of biological evaluation of these watercourses."
- Policy OS-E.16 "Areas that have unusually high value for fish and wildlife propagation should be preserved in a natural state to the maximum possible extent."
- Policy OS-E.17 "The County should preserve, to the maximum possible extent, areas defined as habitats for rare or endangered animal and plant species in a natural state consistent with State and Federal endangered species laws."
- Policy OS-E.18 "The County should preserve areas identified as habitat for rare or endangered plant and animal species primarily through the use of open space easements and appropriate zoning that restrict development in these sensitive areas."

#### 10.6.1.1.7. Open Space and Conservation Chapter: Parks and Recreation

Policies in this section seek to enhance recreational opportunities in the county by encouraging further development of public and private recreation lands, and by requiring development to help fund additional parks and recreation facilities.

*Goal OS-H "To designate land for and promote the development and expansion of public and private recreational facilities to serve the needs of residents and visitors."*

- Policy OS-H.11 "The County shall support the policies of the San Joaquin River Parkway Master Plan to protect the San Joaquin River as an aquatic habitat, recreational amenity, aesthetic resource, and water source."
- Policy OS-H.12 "The County shall in conjunction with the San Joaquin River Conservancy rehabilitate and improve existing recreation areas and facilities along the San Joaquin River at the earliest possible time, particularly Lost Lake and Skaggs Bridge Regional Parks."
- Policy OS-H.13 "The County shall require that structures and amenities associated with the San Joaquin River Parkway be designed and sited to ensure that such features do not obstruct flood flows, do not create a public safety hazard, or result in a substantial increase in off-site water surface elevations, and that they conform to the requirements of other agencies having jurisdiction."
- Program OS-H.A "The County shall work with local, State, and Federal agencies to complete a comprehensive inventory of all parks and recreation areas and services in the county and to identify other areas suitable for park acquisition and development as funds permit."
- Policy OS-I.6 "The County shall coordinate development of its Recreational Trail Master Plan with the San Joaquin River Conservancy concerning the proposed multi-purpose trail between Highway 99 and Friant Dam in the San Joaquin River Parkway."
- Program OS-I.B "The County shall investigate the potential of various land use controls for reserving areas for trails such as the acquisition of easements, open space and floodplain zoning, and subdivision control."

### 10.6.1.2. Madera County General Plan Policy Document, 1995

The Madera County General Plan Policy Document, adopted in October 1995, is a stand-alone document that is part of the Madera County General Plan. In the study area, Madera County's land use jurisdiction lies to the north east of the San Joaquin River centerline, and continues downstream from Friant Dam through Reaches 1, 2, 3 and, 4A. The Madera County General Plan is organized differently from the Fresno County General Plan, but shares many of the same components. The Madera County General Plan contains a section that incorporates the San Joaquin River Parkway Plan. The San Joaquin River Parkway Plan is discussed below.

#### 10.6.1.2.1. San Joaquin River Parkway Plan

The San Joaquin River Parkway Task Force, an advisory body created by State statute in 1990, adopted the San Joaquin River Parkway Plan in 1992. The Parkway Plan is a conceptual, long-range planning document intended to help preserve, enhance, and provide for enjoyment of the natural landscape of the San Joaquin River corridor. As proposed in 1992, the parkway would include the San Joaquin River and approximately 5,900 acres of land on both sides of the river between Friant Dam and the Highway 99 crossing, as well as the existing 17-acre Skaggs Bridge Regional Park at

the Highway 145 crossing. Approximately 1,900 acres of the parkway would be located in Madera County and 4,000 acres in Fresno County.

Portions of the proposed parkway are currently managed for recreational or natural resource protection, conservation, and education purposes, although other parts are privately owned and used for other purposes. Approximately 4,650 of the 5,900 acres within the proposed parkway are private land. The Parkway Plan includes the following six fundamental goals (San Joaquin River Conservancy, 1993):

- Preserve and restore a riparian corridor of regional significance along the San Joaquin River from Friant Dam to the Highway 145 crossing.
- Protect wildlife species that depend on or prefer the river environment for at least part of their existence.
- Provide for conservation, education, and recreation, particularly a continuous trail, in a cooperative manner with affected landowners.
- Protect irreplaceable natural and cultural resources in a way that will also meet people's recreational and educational needs.
- Protect existing undeveloped areas of the river bottom, which should remain non-urbanized and be retained in open space or agriculture if feasible.
- Provide land use and management policies for the San Joaquin River and areas of the river bottom included in the parkway that will enhance the attractiveness of the Fresno-Madera metropolitan area and enhance the quality of life of its residents.

More specific goals, objectives, and policies are included in various elements. The Land Use Element in the Parkway Plan defines land use designations, and includes goals, objectives, and policies for natural resources, flood management, and recreation areas. The Parkway Plan also includes a Mineral Resources Element and a Plan Implementation Element that address land acquisition and a parkway managing entity. The Parkway Plan addresses other land uses, including agriculture, commercial services, and public services facilities. As a result of the San Joaquin River Parkway Plan, the San Joaquin River Conservancy was created in 1993 to acquire, manage, and operate parkway lands.

#### 10.6.1.2.2. Recreation and Cultural Resources Chapter: Public Recreation and Parks

*Goal 4A "To designate land for and promote the development and expansion of public and private recreational facilities to serve the needs of residents and visitors."*

- Policy 4.A.3. The County shall support and participate in the development of the San Joaquin River Parkway.
- Policy 4.A.7. The County shall encourage Federal, State, and local agencies currently providing recreation facilities to maintain, at a minimum, and improve, if possible, their current levels of service.

*Implementation Program*

- The County shall work with local, State, and Federal agencies to complete a comprehensive inventory of all parks and recreation areas and services in the county and to identify other areas suitable for park acquisition and development. The County shall consider preparation of a County park and recreation master plan to provide a policy framework for independent implementation by the cooperating agencies.

#### 10.6.1.2.3. Agriculture and Natural Resources Chapter: Agriculture

*Goal 5.A "To designate adequate agricultural land and promote development of agricultural uses to support the confined viability of Madera County's agricultural economy."*

- Policy 5.A.l. The County shall maintain agriculturally-designated areas for agricultural uses and direct urban uses to designated new growth areas, existing communities, and/or cities."
- Policy 5.A.2. The County shall discourage the conversion of prime agricultural land to urban uses unless an immediate and clear need can be demonstrated that indicates a lack of land for non-agricultural uses.
- Policy 5.A.12. The County shall actively encourage enrollments of agricultural lands in its Williamson Act program, particularly on the edges of new growth areas.
- Policy 5.A.13. The County shall require development within or adjacent to designated agricultural areas to incorporate design, construction, and maintenance techniques that protect agriculture and minimize conflicts with adjacent agricultural uses.

#### 10.6.1.2.4. Agriculture and Natural Resources Chapter: Water Resources

*Goal 5.C "To protect and enhance the natural qualities of Madera County's streams, creeks and groundwater."*

- Policy 5.C.l. The County shall protect preserve areas with prime percolation capabilities and minimize placement of potential sources of pollution in such areas.
- Policy 5.C.2. The County shall minimize sedimentation and erosion through control of grading, cutting of trees, and removal of vegetation, placement of roads and bridges, and use of off-road vehicles. The County shall discourage grading activities during the rainy season, unless adequately mitigated, to avoid sedimentation of creeks and damage to riparian habitat.
- Policy 5.C.6. The County shall require that natural watercourses are integrated into new development in such a way that they are accessible to the public and provide a positive visual element.
- Policy 5.C.8. The County shall support the policies of the San Joaquin River Parkway Plan to protect the San Joaquin River as an aquatic habitat and a water source.

*Goal 5.D "To protect wetland communities and related riparian areas throughout Madera County as valuable resources.*

- Policy 5.D.l. The County shall comply with the wetlands policies of the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the California Department of Fish and Game. Coordination with these agencies at all levels of project review shall continue to ensure that appropriate mitigation measures and the concerns of these agencies are adequately addressed.
- Policy 5.D.2. The County shall require new development to mitigate wetland loss in both regulated and non-regulated wetlands through any combination of avoidance, minimization, or compensation. The County shall support mitigation banking programs that can provide the opportunity to mitigate impacts to rare, threatened, and endangered species and/or the habitat, which supports these species in wetland and riparian areas.
- Policy 5.D.3. Development should be designed in such a manner that pollutants and siltation will not significantly adversely affect the value or function of wetlands.

- Policy 5.D.4. The County shall require riparian protection zones around natural watercourses. Riparian protection zones shall include the bed and bank of both low and high flow channels and associated riparian vegetation, the band of riparian vegetation outside the high flow channel, and buffers of 100 feet in width as measured from the top of bank of unvegetated channels and 50 feet in width as measured from the outer edge for the canopy of riparian vegetation. Exceptions may be made in existing developed areas where existing development and lots are located within the setback areas.
- Policy 5.D.5. The County shall strive to identify and conserve remaining upland habitat areas adjacent to wetlands and riparian areas that are critical to the feeding or nesting of wildlife species associated with these wetland and riparian areas.
- Policy 5.D.6. The County shall require new private or public developments to preserve and enhance existing native riparian habitat unless public safety concerns require removal of habitat for flood control or other public purposes. In cases where new private or public development results in modification or destruction of riparian habitat for purposes of flood control, the developers shall be responsible for creating new riparian habitats within or near the project area at a ratio of three acres of new habitat for every acre destroyed.
- Policy 5.D.7. The County shall support the management of wetland and riparian plant communities for passive recreation, groundwater recharge, nutrient catchment, and wildlife habitats. Such communities shall be restored, where possible.
- Policy 5.D.8. The County shall support the goals and policies of the San Joaquin River Parkway Plan to preserve existing habitat and maintain, enhance, or restore native vegetation to provide essentially continuous riparian and upland habitat for wildlife along the river between Friant Dam and the Highway 145 crossing.

*Implementation Programs*

- 5.1 The County shall inform the public and prospective developers about those sections of the California Fish and Game Code that apply to diversion or obstruction of stream channels and pollution of waterways with detrimental material. This shall be done through distribution of educational materials with building permits and as a part of project review.
- 5.2 The County shall work toward the acquisition by public or private, non-profit conservation organizations of creek corridors, wetlands, and areas rich in wildlife or of a fragile ecological nature as public open space where such areas cannot be effectively preserved through the regulatory process. Such protection may take the form of fee acquisition or protective easements and may be carried out in cooperation with other local, State, and Federal agencies and private entities. Acquisition should include provisions for maintenance and management in perpetuity.
- 5.3 The County shall adopt an ordinance for riparian protection zones identifying allowable activities in riparian protection zones and allowable mitigation techniques.

#### 10.6.1.2.5. Agriculture and Natural Resources Chapter: Fish and Wildlife Habitat

*Goal 5.E "To protect, restore, and enhance habitats that support fish and wildlife species so as to maintain populations at viable levels."*

- Policy 5.E.l. The County shall identify and protect critical nesting and foraging areas, important spawning grounds, migratory routes, waterfowl resting areas, oak woodlands, wildlife movement corridors, and other unique wildlife habitats critical to protecting and sustaining wildlife populations.

- Policy 5.E.2. The County shall require development in areas known to have particular value for wildlife to be carefully planned and, where possible, located so that the reasonable value of the habitat for wildlife is maintained.
- Policy 5.E.3. The County shall encourage private landowners to adopt sound wildlife habitat management practices, as recommended by the California Department of Fish and Game officials and the U.S. Fish and Wildlife Service.
- Policy 5.E.4. The County shall support preservation of the habitats of rare, threatened, endangered, and or other special status species. The County shall consider developing a formal habitat conservation plan in consultation with Federal and State agencies, as well as other resource conservation organizations. Such a plan would provide a mechanism for the acquisition and management of lands supported by threatened and endangered species.
- Policy 5.E.5. The County shall support the maintenance of suitable habitats for all indigenous species of wildlife through maintenance of habitat diversity.
- Policy 5.E.6. The County shall ensure the conservation of sufficiently large, continuous expanses of native vegetation to provide suitable habitat for maintaining abundant and diverse wildlife, if this preservation does not threaten the economic well-being of the county.
- Policy 5.E.7. The County shall support the preservation or reestablishment of fisheries in the rivers and streams within the county, whenever possible.
- Policy 5.E.8. The County shall ensure close monitoring of pesticide use in areas adjacent to habitats of special status plants and animals.
- Policy 5.E.l0. Prior to approval of discretionary development permits involving parcels within a significant ecological resource area, the County shall require, as part of the environmental review process, a biotic resources evaluation of the sites by a qualified biologist. The evaluation shall be based upon field reconnaissance performed at the appropriate time of year to determine the presence or absence 6f rare, threatened, or endangered species of plants or animals. Such evaluation will consider the potential for significant impact on these resources and will either identify feasible measures to mitigate such impacts or indicate why mitigation is not feasible.
- Policy 5.E.l1. The County shall provide for a minimum 200-foot wildlife corridor along the San Joaquin River between Friant Dam and the Highway 145 crossing, consistent with the San Joaquin River Parkway Plan. The County shall require a buffer with a minimum width of 150 feet between existing or planned urban or suburban uses. Exceptions may be necessary where the minimum width is infeasible due to topography or other physical constraints. In these instances, an offsetting expansion on the opposite side of the river should be provided.

*Implementation Programs*

- 5A. The County shall initiate detailed inventories of ecologically significant resource areas, including unique natural areas, wetland areas, riparian areas, habitats of rare, threatened, endangered, and other uncommon and special-status species. The inventory should be conducted as area plans, specific plans, planned unit developments (UD) or other planning projects are considered by the County. The inventory should be based on the California Wildlife Habitats Relationships (WHR) system and shall identify appropriate buffer zones around the identified resource areas in order to account for periodic, seasonal, or ecological changes. The maps should be revised on a regular basis to reflect the availability of new information from other agencies, changes in definition, or any other changes.

- The County shall maintain current maps that indicate the extent of critical habitat for important fish and game species, as these maps are made available by the California Department of Fish and Game (CDFG). The relative importance of these game species shall be determined by the County, in consultation with CDFG, based on relevant ecological, recreational, and economic considerations. These maps shall be used by the County to evaluate proposed area plans, specific plans, and any project development proposals to determine compatibility of development with maintenance and enhancement of important fish and game species.
- The County shall investigate costs and possible funding sources for development of a habitat conservation plan.

#### 10.6.1.2.6. Agriculture and Natural Resources Chapter: Vegetation

*Goal 5.F "To preserve and protect the valuable vegetation resources of Madera County."*

- Policy 5.F. 1. The County shall encourage landowners and developers to preserve the integrity of existing terrain and natural vegetation in visually-sensitive areas such as hillsides, ridges, and along important transportation corridors.
- Policy 5.F.3. The County shall support the preservation of outstanding areas of natural vegetation, including, but not limited to, oak woodlands, riparian areas, and vernal pools.
- Policy 5.F.5. The County shall establish procedures for identifying and preserving rare, threatened, and endangered plant species that may be adversely affected by public or private development projects. The County shall consider developing a formal habitat conservation plan in consultation with Federal and State agencies, as well as other resources conservation organizations. Such a plan would provide a mechanism for the acquisition and management of land supporting threatened and endangered species
- Policy 5.F.6. The County shall require that new development preserve natural woodlands to the maximum extent possible.

*Implementation Programs*

- 5.7 The County shall prepare and maintain an updated list of State and Federal rare, threatened, and plant species known or suspected to occur in the county. The following other uncommon or special status species which occur or may occur in the county should also be included on the list: 1) plant species included in the California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California; 2) species of special concern as designated by California Department of Fish and Game; and 3) California Fully Protected animals as defined by California Fish and Game Code. In addition to updating the list as new information becomes available, the list should be reviewed and amended at least once every two years.

#### 10.6.1.2.7. Agriculture and Natural Resources Chapter: Open Space

*Goal 5.H "To preserve and enhance open space lands to maintain the natural resources of the county."*

- Policy 5.H.l. The County shall support the preservation and enhancement of natural land forms, natural vegetation, and natural resources as open space. To the extent feasible, the County shall permanently protect as open space areas of natural resource value, including wetlands preserves, riparian corridors, woodlands, and floodplains.

- Policy 5.H.2. The County shall require that new development be designed and constructed to preserve the following types of areas and features as open space to the maximum extent feasible:
  a. High erosion hazard areas;
  b. Scenic and trail corridors;
  c. Streams and streamside vegetation;
  d. Wetlands;
  e. Other significant stands of vegetation;
  f. Wildlife corridors; and
  g. Any areas of special ecological significance.
- Policy 5.H.3. The County shall support the maintenance of open space and natural areas that are interconnected and of sufficient size to protect biodiversity, accommodate wildlife movement, and sustain ecosystems.
- Policy 5.H.4. Recognizing the importance of both public and privately-owned open space, the County shall encourage both private and public ownership and maintenance of open space.
- Policy 5.H.5. The County shall require that significant natural, open space, and cultural resources be identified in advance of development and incorporated into site-specific development project design.

*Implementation Programs*

- 5.9 The County will review and revise the planned zoning districts of the Zoning Ordinance to add provisions for the protection of significant natural, open space, and cultural resources.

#### 10.6.1.2.8. Agriculture and Natural Resources Chapter: Mineral Resources

*Goal 5.J "To encourage commercial mining operations within areas designated for such extraction, where environmental, aesthetic, and adjacent land use compatibility impacts can be adequately mitigated, and to provide for the timely rehabilitation and appropriate reuse of mining sites."*

- Policy 5J.l. The County shall require new mining operations to be designed to provide a buffer between existing or likely adjacent uses, minimize incompatibility with nearby uses, and adequately mitigate their environmental and aesthetic impacts. The buffer area shall be zoned Agricultural, Rural, Exclusive-20 Acre or -40 Acre.
- Policy 5J.2. The County shall discourage the development of incompatible land uses in areas that have been identified as having potentially significant mineral resources, except where the California Department of Mines and Geology agrees that economic or environmental considerations make mineral extraction infeasible.
- Policy 5J.3. The County shall discourage the development of any uses that would be incompatible with adjacent mining operations or would restrict future extraction of significant mineral resources.
- Policy 5.IA. The County shall require that new non-mining land uses adjacent to existing mining operations be designed to provide a buffer between the new development and the mining operations.
- Policy 5.1.5. The County shall coordinate its mineral extraction policies and regulations with Fresno County, the City of Fresno, and Merced County. The County shall refer applications for mining operations in locations near or adjacent to a city or another county to the affected city or county for review and comment.

#### 10.6.1.2.9. Health and Safety Chapter: Flood Hazards

*Goal 6.B "To minimize the risk of loss of life, injury, damage to property, and economic and social dislocations resulting from flood hazards.*

- Policy 6.B.3. The County shall restrict uses in designated floodways to those that are tolerant of occasional flooding and do not restrict or alter flow of flood waters. Such uses may include agriculture, outdoor recreation, mineral extraction, and natural resource areas.
- Policy 6.BA. The County shall require that all development within areas subject to 100-year floods be designed and constructed in a manner that will not cause floodwaters to be diverted onto adjacent property or increase flood hazards to other areas.
- Policy 6.B.5. The County shall require flood control structures, facilities, and improvements to be designed to conserve resources, incorporate and preserve scenic values, and to incorporate opportunities for recreation, where appropriate.
- Policy 6.B.6. The County shall require that flood management programs avoid alteration of waterways and adjacent areas, whenever possible.

### 10.6.1.3. Merced County Year 2000 General Plan

The Merced County Year 2000 General Plan was adopted in December 1990. In the San Joaquin River study area, Merced County's land use jurisdiction includes half of Reach 4A and all of Reach 5. The General Plan recognizes two primary categories of land uses: urban and rural. The Merced County General Plan's goals, objectives, and policies should be referenced when considering land use changes for restoration, to ensure that proposed changes are in compliance with the General Plan. The following subsections refer to the Merced County General Plan.

#### 10.6.1.3.1. Open Space and Conservation Chapter

The Open Space Chapter is a plan for the comprehensive and long-range management, preservation, and conservation of "open-space lands." This chapter contains provisions for managing and conserving Merced County's natural resources, and the protection of life, health, and property from natural hazards. The natural resources addressed in this chapter include land, water, plant, animal, cultural, archaeological, scenic resources and air quality. This chapter's policies are designed to ensure that the development of Merced County will not significantly interfere with or destroy valuable natural resources, and that development will occur with recognition of sensitive resources and hazardous conditions. The purpose of the General Plan is to maintain the natural topography, vegetation, wildlife and scenic beauty of Merced County to the greatest extent possible, while recognizing that Merced County must balance needs for affordable housing and economic opportunities.

*Goal 1 "Habitats which support rare, endangered or threatened species are not substantially degraded."*

*Objective 1.A: "Rare and endangered species are protected from urban development and are recognized in rural areas."*

- Policy 1 "Recognize as significant wetland habitats those areas which meet the definition of having a high wetland habitat value based on the Adamus methodology and based on the Army Corps of Engineers delineation method."
- Policy 9 "Significant aquatic and waterfowl habitats should be protected against excessive water withdrawals which would endanger or interrupt normal migratory patterns."

*Objective 1.B: "Local, State and Federally managed lands are recognized."*

- Policy 10 "Special agricultural commercial uses that are directly related to an a part of an agricultural enterprise or operation, and characteristically specific commercial or industrial uses in rural areas should not be located adjacent to Federal or State wildlife refuges."
- Policy 11 "The division of parcels which is determine to result in non-agricultural uses should be avoided, adjacent to Federal or State wildlife refuge areas."
- Policy 13 "Minimize the fiscal impact to the County from State and Federal programs which result in the purchase of property in fee title through the use of mutual aid agreements, required subvention payments and any other available means determined to be acceptable by the Board of Supervisors."

*Goal 2 "Soil, water, mineral, energy, historical and air resources are properly managed."*

*Objective 2.A: "Soil resources are protected from erosion, contamination and other effects that substantially reduce their value."*

- Policy 4 "Flood control alterations to existing waterways which contain important riparian vegetation should avoid significant vegetation impacts and avoid soil loss through sensitive project design and implementation."

*Objective 2.B: "Surface and ground water resources are protected from contamination, evaporation and inefficient use."*

- Policy 5 "Ensure that land uses and development on or near water resources will not impair the quality or productive capacity of these resources."

*Objective 2.C: "Significant mineral resources are recognized and responsibly managed."*

- Policy 14 "Promote the orderly development of mineral resources while preserving local values for recreation, watershed, wildlife habitat, and agricultural uses."
- Policy 15 "Strict control should be maintained on sand and gravel extractions in streambed channels and within areas designated as having sensitive open space resources."

*Goal 3 "Open space for recreation, aesthetics and protection from hazards."*

*Objective 3.A: "Recreational lands are available for local and regional needs."*

- Policy 3 "Establish and continue to develop a system of local and regional parks, and other recreation areas throughout the County which balance the relative importance of direct site access with management of sensitive wildlife resources."

*Objective 3.B: "Lands with high aesthetic value are properly managed."*

- Policy 7 "Stream corridors should be maintained in a natural conditions and retain the general character of natural slopes and formations."
- Policy 8 "Regional parks should be used to preserve areas of natural scenic beauty."

*Objective 3.C: "Open space lands are used for public protection purpose."*

- Policy 13 "Agriculture shall be considered a compatible land use in public and private recreation areas which must be protected and buffered."

#### 10.6.1.3.2. Agriculture Chapter

The purpose of this Chapter is to define policies that improve the viability of agricultural operations and promote the conservation of agricultural land.

Goal 1 *"The financial viability of the agricultural sector is improved."*

Objective 1.C: *"Programs are considered which reduce the tax burden on farmland and aid in the conservation of agricultural lands if investigation indicates such programs benefit the general welfare of the County."*

- Policy 5 "Support appropriate efforts by private conservation organizations to utilize conservation easements as a tool for agricultural conservation."

Goal 2 *"Productive agricultural lands are conserved."*

Objective 2.A: *"Agricultural areas are protected from conversion to non-agricultural uses."*

Goal 3 *"Land uses which are potentially disruptive to the agricultural economy are properly located and operated."*

Objective 3.D: *"Non-urban land uses that conflict with agriculture are properly located."*

- Policy 5 "Weigh the economic benefits of surface mining with the preservation of agriculture when considering mineral excavation proposals on land classified for agriculture uses."

Goal 4 *"The management of water resources to benefit the agricultural community is improved."*

Objective 4.B: *"Agricultural and related activities are protected from flooding."*

- Policy 5 "The County will encourage implementation of programs for improved flood protection."

### 10.6.2. State of California

There are many State environmental laws and regulations that may require some level of compliance or consideration during the planning or implementation of the San Joaquin River restoration effort. This section identifies the three primary State agencies whose jurisdiction affects land use along the San Joaquin River, and thus may effect restoration. They are: State Lands Commission, Department of Fish and Game, and Department of Water Resources Reclamation Board.

The State Lands Commission represents the public's property interests in that portion of the San Joaquin River which was navigable in its natural condition. In 1857, the steamer *Gipsey* navigated the San Joaquin River upriver to within 3 miles of Millerton (Rose 1992), thus the entire study area is considered navigable by the State. While the State Lands Commission claims a property interest in the bed of the San Joaquin River, its specific boundaries throughout the study reaches have not been determined for all reaches. Restoration projects that could physically affect either the footprint of the public's property interest, its mineral assets, or protected Public Trust resources would first have to locate the State Lands boundaries to determine if State lands were affected, and then obtain a Lease from the State Lands Commission.

The purpose of the Department of Fish Game Streambed Alteration Program is to protect the State's fish and wildlife resources and their habitat. Restoration of the San Joaquin River will likely require physical manipulation of existing fish and wildlife habitats. Therefore, the Department of Fish and Game will function as a Trust Agency under the California Environmental Quality Act (CEQA) and as Lead Agency under the Streambed Alteration Program. The Department of Water Resources

Reclamation Board regulates a designated floodway along the San Joaquin River, which it is charged with maintaining. Physical activities within the designated floodway, such as excavation, grading, earth moving, and riparian planting would most likely require an Encroachment Permit from the Reclamation Board.

Other State agencies that may have jurisdiction over a portion of some restoration projects would be:

- Central Valley Regional Water Quality Control Board
- California Department of Transportation
- California Department of Conservation
- State Historic Preservation Office
- San Joaquin Valley Unified Air Pollution Control District

### 10.6.3. Federal Government

There are also many Federal environmental laws and regulations that may require compliance or consideration during the planning or implementation of the San Joaquin River restoration effort. This section identifies the two primary Federal agencies whose jurisdiction affects land use along the San Joaquin River, and therefore may effect restoration. They are: Army Corps of Engineers (ACOE) and the United States Fish and Wildlife Service (USFWS). The ACOE regulates dredging and fill activities that affect navigable waters such as the San Joaquin River. If restoration activities will expand, fill, or reconstruct the area occupied by bed and banks of the San Joaquin River, the ACOE will have jurisdiction over these phases of restoration. Working in tandem with the ACOE is the USFWS to ensure that fish and wildlife resource and their habitats are not jeopardized by actions authorized by the ACOE. Compliance with the myriad of Federal laws triggered by the involvement of these two agencies may affect the suitability or prioritization of lands to be used or acquired for restoration, as well as the scope and expense of restoration activities.

## 10.7. OPPORTUNITIES AND CONSTRAINTS

Based on the land use, land ownership, and regulatory compliance, we will discuss opportunities and constraints of potential restoration actions. Opportunities and constraints will strongly influence development of a restoration strategy, and may influence prioritization of restoration action and location. For each of the three factors, a short discussion of the considerations used to develop opportunities and constraints is provided, followed by an initial list of opportunities and constraints. This list is by no means comprehensive; rather it represents our current understanding based on available information on the San Joaquin River, as presented in preceding sections of this chapter, and on our experience derived from similar restoration planning efforts on other tributaries of the San Joaquin River.

### 10.7.1. Land Use

The existing natural or undeveloped land area upon which to base the San Joaquin River Restoration Plan is extremely small; thus, natural, undeveloped, and developed land area will likely need to expand significantly as the Restoration Plan is implemented. Natural land area has not been topographically altered, nor had significant removal of natural vegetation. Undeveloped land may be include lands that has had some topographic and vegetation changes, but has not undergone extensive changes from agriculture, urban, or other uses. Grazing on lands with natural topography would be considered “undeveloped”. Developed land area has had extensive topographic changes (land

leveling, protection by dikes or levees, wetlands drained), and vegetation changes (riparian vegetation removed). Much of the historic San Joaquin River corridor is developed. The need for an expanded land base for future restoration does not necessarily require public land ownership; conservation easements can be purchased from private landowners, and private land ownership and certain land uses can be compatible with the Restoration Plan. As illustrated by the joint use of the Yolo Bypass for agriculture and floodplain/floodway, agricultural land uses are not universally incompatible with restoration efforts.

Land value is based on the "highest and best" uses allowed on that property, not just the current use. In determining the value of agricultural lands, land and crop are separate components. To determine the value of land, we must consider: (1) mineral resource value, if any, underlying the agricultural use, (2) the land's suitability to a particular crop, (3) whether an annual crop will be harvested before the land or easement is purchased, and, (4) in the case of vineyards and orchards, the age, variety, and condition of the vines or trees, which are assessed separately. Lands used for semi-agricultural and incidental agricultural, such as producing animal commodities, would also be higher value lands, making them less suitable for restoration purposes. Table 10-1 provides approximate crop values, but land values would need to be determined on a site-by-site basis. To determine an accurate value of agricultural lands, the water sources (wells versus riparian versus irrigation district) for the agricultural use should be considered, as well as if land use is restrained, pursuant to Williamson Act contracts. [The Williamson Act encourages farmland preservation by giving a tax break to farmers who agree to keep their property in agriculture for ten years or more. The Act allows counties to assess farmland according to agricultural use rather than the land's speculative value for urban development; the State reimburses counties for some of the lost property tax revenue. In exchange for lower taxes, agricultural landowners commit their land to farming for ten years.] In assessing the value of acquiring agricultural lands, two additional issues may affect cost: (1) whether the value of water rights can be severed from the underlying value of the land, which could be reduced, and (2) whether purchasing a conservation easement is an alternative to outright purchase of the land.

The use and valuation of land can affect the priority placed on lands in the Restoration Plan. Lands used for public facilities, or for commercial, industrial or residential uses, are not suitable for restoration, due to their high value and other intended uses as per the counties' General Plans. Agricultural and open space lands are of lower value and lack infrastructure; thus restoration is more compatible land use under existing General Plan policies.

### 10.7.2. Land Ownership

Based on present-day private land ownership in the study area, land is limited for implementing potential components of the San Joaquin River Restoration Plan (e.g., restoring riparian habitat or floodplains). Therefore, those lands that can serve as a land base for the restoration effort are primary opportunities. These lands include the San Joaquin River Parkway, Fremont Ford State Park, and the San Luis National Wildlife Refuge. Additional land acquisition and/or conservation easements will be required to implement certain components of the Restoration Plan.

One important criterion for land acquisition is a willing seller, which can be an opportunity or constraint depending on landowner willingness. Land ownership was divided into four classes in the study area: (1) lands that are subject to the Public Trust Doctrine, where both ownership and use rights are held publicly, (2) lands that are subject to the Public Trust Doctrine, where the dominant property right is held publicly and the subservient right is held privately but is encumbered by an easement, (3) public lands not subject to the Public Trust, and (4) wholly private lands (also not subject to the Public Trust). Lands subject to the Public Trust Doctrine, and where fee title is also held publicly, should pose greater opportunities for restoration of those lands. Similarly, lands that

are held publicly, but are not subject to the Public Trust Doctrine, should also have greater restoration opportunities, unless overriding land use would conflict with restoration activities. Lands that are held privately in fee title, yet encumbered with an easement under the Public Trust, will have more opportunity for restoration than those lands that are completely privately owned. The opportunity to restore private lands that are not subject to the Public Trust Doctrine will be determined by either (1) the willingness of the landowner to sell the land, (2) to sell a conservation easement on the land, or (3) to retain the land but agree to change their land use to be more compatible with the Restoration Plan.

#### 10.7.2.1. Lands Subject to the Public Trust Doctrine

On September 9, 1850, California became a state, acquiring land ownership up to "ordinary high water" of all lands under its tidal or navigable waters. In 1872, California Civil Code 830 was enacted, whereby the State relinquished subservient fee title of its private proprietary rights to land above the "ordinary low water" to adjoining upland property owners on navigable waterways; the State did retain its dominant fee interest in lands beneath the ordinary low water. Land title relinquished in the 1872 act is still encumbered by the public's dominant property rights, as an easement. In 1857, the steamer *Gipsey* navigated the San Joaquin River upriver to within 3 miles of Millerton (Rose 1992). Consequently, as far upstream as Millerton, lands that were formerly inundated by the San Joaquin River at ordinary high water under natural channel conditions are lands that are still subject to the Public Trust Doctrine. The State is still a property owner of those lands that naturally are inundated by ordinary low water, and the State holds a public easement over the use of those lands that were formerly beneath the ordinary high water. Therefore, as affirmed by the Court in 1983 (National Audubon Society v Superior Court, 33 Cal. 3d 419, 1983), all State and local governmental bodies with jurisdiction over the San Joaquin River have a duty when exercising their police powers, to make land use or resource decisions, and to protect the people's common heritage in its waterways, consistent with purposes of the trust (CSLC 1993, Slade 1997). The Public Trust Doctrine will significantly moderate constraints to developing and implementing the Restoration Plan.

#### 10.7.2.2. Public Lands

Public land is owned and operated by local, State, and Federal authorities. Entities holding land in the study area include: Fresno, Madera, and Merced counties; irrigation districts; the Lower San Joaquin River Levee District; flood control districts; the California Department of Fish and Game; the California Department of Parks and Recreation; the California Department of Water Resources, the California Department of Transportation; California State Lands Commission; the San Joaquin River Conservancy; the U.S. Bureau of Reclamation; and the U.S. Fish and Wildlife Service (USFWS). Land owned by public entities has the greatest potential for restoration if restoration does not conflict with the principal use of these lands. The greatest constraints to utilizing public lands for restoration would be determining who assumes responsibility for habitat maintenance, who provides public access, and who assumes liability should damage to private property or injury to the public occur.

#### 10.7.2.3. Private Lands

Private lands are either encumbered or free of an easement under the Public Trust Doctrine. Private lands can be further classified by whether they are owned by a non-profit entity or by private parties. There are numerous non-profit corporations that preserve and restore open space and natural habitats (e.g., The Nature Conservancy), and lands owned by these private non-profit lands are very compatible with restoration of the San Joaquin River. Some possible constraints to utilizing non-profit lands would be funding limitations to non-profit corporations, construction and maintenance of restored lands on private property, and limiting or preventing public access to restored lands.

Private landowners in the study area are presently engaged in agricultural, commercial, industrial, or residential land uses. These landowners may support purchase of fee title or conservation easement for their land for restoration projects, but factors that influence landowner support may include: (1) how much revenue they could generate from the sale of their land or by assuming a conservation easement as opposed to continuing to use their land, (2) potential impact of restoration activities on their adjacent lands, and/or (3) potential impact on their adjacent lands from increased public access to the river. Private lands that are used as open space could be the most desirable lands to acquire or use as they have the fewest physical, economic, and regulatory constraints to restoration. In acquiring private lands, water source, crop potential, zoning, and underlying mineral rights will affect their value.

### 10.7.3. Regulatory Factors

The ability to use land is restricted by local, State, and Federal regulations. Depending on a particular parcel's site conditions and location, government regulations can restrict or preclude economically viable uses such as residential, commercial, industrial, or agricultural use. Regulations tend to constrain land use to a greater degree in river, riparian, wetland, and floodway areas, thus reduce the value of the land. Regulations are usually in place to protect river, riparian, wetland, and floodway values; therefore, converting these lands to restoration uses is more compatible than converting agricultural or urban land. Regulations protecting river, riparian, wetland, and floodway values represent a restoration opportunity. These regulations also represent a constraint to non-restoration land uses. Lands use can also be constrained by easements, such as the open space, floodway, or conservation easements, and in Williamson Act contracts.

Certain lands may also be designated for specific purposes that restrict their use, such as the Reclamation Board's designated floodway on the San Joaquin River, CALTRANS' right-of-way easement areas, and the lands designated in the San Joaquin River Parkway Master Plan. These lands again present opportunities for restoration, because restoration would be more closely agree with the land use restriction of these easements, and in some cases, may support the original intent of the easement. Lands that are undeveloped but contain habitat that would be protected by regulations (e.g., a potential aggregate mine in a valley oak woodland) would require environmental compliance, preservation areas, and setbacks due to local, State and Federal regulations; therefore, the value of these lands should be estimated accordingly based on these regulations.

### 10.7.4. Summary

Considering the above factors, the following opportunities and constraints were identified:

#### 10.7.4.1. Opportunities

- The Reach 1 study area contains 9,600 acres that are potentially suitable for acquisition and restoration (8,329 acres of open space and 1,271 acres of annual crops). Of these potentially suitable lands, there are 3,215 acres of Reach 1 that are owned by public agencies and the San Joaquin River Parkway and Conservation Trust. Additionally, the 1992 State Lands Commission boundary study indicated that 442 acres are encumbered by the Pubic Trust Doctrine (211 acres of fee title, 231 of public trust easement). Reach 1 provides an excellent opportunity for additional restoration due to (1) the creation and support of the San Joaquin River Parkway Master Plan, (2) the establishment of the San Joaquin River Conservancy, and (3) the ongoing efforts of the San Joaquin River Parkway and Conservation Trust. The San

Joaquin River Parkway Master Plan has been incorporated into the General Plan for Madera County. The Master Plan area is currently 2,603 acres, and is proposed to encompass an area of 5,900 acres.

- Fresno County and Madera County are committed to working with many agencies and groups (including the San Joaquin River Parkway and Conservation Trust, the San Joaquin River Conservancy, the City of Fresno, and other interested agencies and organizations) to implement the San Joaquin River Parkway Master Plan. The counties' commitment is a significant opportunity for restoration and preservation in Reach 1 of the San Joaquin River. The existing parkway provides a land base upon which low-lying lands can be acquired to expand the park upstream and downstream, creating a river corridor parkway of regional significance along the San Joaquin River.
- A historical park along the San Joaquin River, near Firebaugh in Reach 3, has been proposed by the City of Firebaugh. There have also been recent efforts to increase public access and create trails along the San Joaquin River between Firebaugh and Mendota. This local support for these projects provides a significant opportunity to improve river conditions in Reach 3, which has the least amount of public land on the entire river.
- The General Plans for Fresno and Madera counties have goals and policies to protect the San Joaquin River environment (Reaches 1, 2, 3, and part of 4A) from development, and where appropriate, to acquire lands or public easements for flood protection, wildlife preservation, recreation, and open space that cannot be protected by other regulations. These goals and policies are opportunities for restoration.
- Conservation easements present a tremendous opportunity for mutually beneficial partnerships between riverside landowners and restoration proponents. Conservation easements can be quite flexible, maintaining private ownership while retaining many landowner uses and rights, thus enabling restoration and preservation. Additionally, conservation easements can facilitate enlarging floodway capacity and storage, thus reducing potential flood risks to downstream landowners. Conservation easements also maintain land under private ownership and on the tax rolls.
- Conservation easements and/or land purchases, combined with floodway expansion, can reduce flood impacts and levee failures in downstream reaches. Additionally, expanding the floodway offsets conveyance capacity that may occur from increased riparian vegetation in the floodway. Those lands that are marginal farmlands (due to frequent flooding or poor soil quality) are less valuable, thus are purchase or easement opportunities because landowners are often more amenable to sale or conservation easement, and the loss of agricultural production is smaller.
- In Reach 1, abandoned aggregate mines provide an opportunity for purchasing low cost lands and wetlands adjacent to the river, because most of the mined land's commercial value has been removed. While inexpensive to purchase, reclamation of mined areas is costly, and usually requires large volumes of aggregate to be imported to properly restore the property. However, existing wetlands can be improved, floodways and floodplains can be restored, and riparian areas can be expanded. These restoration efforts would also provide a buffer between the river corridor and residential areas on the uplands, and the still active aggregate mines.
- With a few exceptions, urban encroachment into the floodway has not occurred because large flood events continue to occur periodically, and development is often constrained or prohibited in the FEMA-designated 100-year floodplain and in the Reclamation Board

Designated Floodway. Therefore, improving flood control release capacity through the San Joaquin River would not require the expensive constraint of moving urban infrastructure out of the floodway.

- Open space and annual crop land uses provide opportunities for riparian restoration or floodway expansion due to their lower fee title and/or conservation easement costs; restoring areas with these land uses would also minimize impacts on regional agricultural production. Opportunities for riparian restoration by reach are shown in Table 10-13.

*Table 10-13. Land available for riparian restoration, based on its land use.*

| Reach | Total Acreage | Open Space Acreage | Annual Crops Acreage |
|---|---|---|---|
| 1 | 9,600 | 8,329 | 1,271 |
| 2 | 6,497 | 2,879 | 3,618 |
| 3 | 7,505 | 1,882 | 5,622 |
| 4 | 55,351 | 27,202 | 28,287 |
| 5 | 22,351 | 14,895 | 7,456 |

- Reaches 4B and 5 contain large tracts of land that are part of the San Luis National Wildlife Refuge and the Fremont Ford State Park, including 16,518 acres owned by the USFWS and the State of California; these lands provide a significant opportunity for a land base for restoration on the lower San Joaquin River. This land base provides the opportunity for expansion of seasonally flooded wetland and riparian habitat in Reaches 4B and 5.
- Identification and remediation of land uses along the San Joaquin River corridor that contribute to poor water quality should be prioritized in the Restoration Plan, because multiple benefits can be achieved (e.g., improved water quality, improved floodway capacity, improved riparian habitat). Lands in this category have not been identified in this Background Report; given time constraints, they may be difficult to incorporate within the initial phases of the Restoration Plan.
- Rapid population growth may be considered an opportunity for additional parkway expansion in the greater Fresno urban area, and in downstream communities (Mendota, Firebaugh). Additional parkway lands will be important for meeting the future recreational use demand of these rapidly growing, surrounding areas.
- Exercising the State Lands Commission sovereign land claim to Reaches 1B through Reach 5, via an extended boundary study, would increase the land base for restoration in downstream reaches. To our knowledge, the State Lands Commission has not indicated any intention of continuing this study downstream.

#### 10.7.4.2. Constraints

- Based on land use and land ownership, the most formidable constraint to restoration on the San Joaquin River is the limited land base for the river corridor. Agricultural land use and ownership ranges from 35% to 99.6% percent for the five reaches of the study area. Because the restoration program does not own the land needed to restore the San Joaquin River, substantial areas of land will likely need to be acquired (either by fee title or by conservation easement from willing sellers) to implement the Restoration Plan.

- Agricultural production is another important constraint that the restoration program will need to resolve during implementation. Adjoining counties generally do not support land acquisition and/or conversion that result in a decrease in tax revenue. Additionally, conversion of agricultural land to riparian or floodway habitat potentially conflicts with Fresno, Madera and Merced counties' General Plans. These General Plans require that counties maintain agriculturally designated areas for agriculture use, and to protect those lands from encroachment of incompatible land uses. Restoration of the San Joaquin River could be regarded as an incompatible land use. In addition to county regulations, the Farm Bureau, stakeholder groups, and a large portion of the general public generally and vigorously oppose conversion of agricultural lands.
- While the Fresno, Madera, and Merced counties' General Plans contain policies to protect riparian habitat and wetlands, inconsistencies within the General Plans are numerous (e.g., agriculture within the riparian zone, etc). These inconsistencies will need to be resolved, perhaps by having all three counties incorporate the San Joaquin River Parkway into their general plans.
- Certain agricultural lands in the study area may not be available to restoration because their continued use as agricultural land may be dictated by agricultural preservation programs, including land trusts, conservation easements, Williamson Act contracts, Farmland Security Act contracts, and the California Farmland Conservancy Program Fund.
- In Reach 1 of the San Joaquin River floodway, aggregate mining is often incompatible with restoration efforts, and thus aggregate mining will likely represent a constraint to future restoration efforts. To protect the future availability of mineral resources and to prevent activities that would preclude future extraction of those resources, the Fresno, Madera and Merced counties' General Plans do not allow land uses that are incompatible with mineral resource recovery. Restoration of the San Joaquin River could be regarded as an incompatible land use because the aggregate resources protected by restoration efforts would not be available for future extraction. Additionally, the mineral resource lands in the study area may not be available for restoration purposes (e.g., gravel pit filling) because their continued availability for mineral extraction may be dictated by regionally significant mineral resource designations.
- Increased high flow releases for restoration purposes may cause downstream property damage. Owners and operators of upstream dams are typically not liable for property damage during flood control releases (act of God); however, liability may be a concern during intentional high flow releases for habitat restoration purposes.
- Increased riparian vegetation in the floodway may reduce flood conveyance capacity in the San Joaquin River flood control system. Fresno, Madera, and Merced counties require that all development within areas subject to 100-year floods be designed and constructed in a manner that will not cause floodwaters to be diverted onto adjacent property, or that will increase flood hazards to other areas. Restoration projects may sometimes conflict with this requirement, particularly if the project's goals are to encourage floodplain inundation, sediment transport, and/or channel migration. These conflicts are constraints that will need to be resolved to implement the Restoration Plan.
- Restoration projects and increased public access to the river increase potential conflicts with private land ownership. While many aspects of increased public access to the river corridor are positive, constraints are inherent as well. Littering, camping, and vandalism are common impacts on private lands adjoining public lands; minimizing these adverse impacts to adjacent private landowners typically requires increased law enforcement.

- If existing land uses adversely affect listed species or their habitats, restoring the Federally listed species (spring-run Chinook salmon, winter-run steelhead trout) may restrict land uses designated as critical habitat for these species. Areas under potentially restricted land uses also present a constraint to restoration.
- In Reach 1, aggregate mining activities are often incompatible with restoration efforts along the river. Older, in-river mining pits have not been reclaimed, and recent mining pits have been reclaimed with water depths that are too deep to be of much ecological value. Additionally, "off-channel" mining pits are often breached or captured by the river during large flood control releases. If existing Conditional Use Permits and Reclamation Plans for aggregate mining allow these deep pits in the future, the problems resulting from pit breaching, predators, and water hyacinth will continue to constrain restoration efforts on this reach of the San Joaquin River.
- While the land base for potential restoration is substantial, in Reaches 4 and 5, project levees isolate the USFWS' refuges (historic flood basin areas) from the river. Therefore, the project levees also act as restoration constraints. Restoration goals, such as improving floodplain inundation and increasing flood residence time, may be incompatible with certain aspects of refuge management.
- The area's rapid population growth may be considered a constraint, because additional people will cause additional stress on river resources (e.g., commercial-grade aggregate) and on river recreational opportunities. More people will likely result in higher user impacts on parkway lands, as well as secondary impacts to both private and public lands. Rapid population growth will also increase the competition for land, increasing land values and potentially making restoration more costly.

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