

DRAFT

North American Subbasin Groundwater Sustainability Plan

Sections 1-3

Prepared for:

Sacramento Groundwater Authority GSA
Reclamation District 1001 GSA
South Sutter Water District GSA
Sutter County GSA
West Placer GSA

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- Appendix C: Groundwater Level and Water Quality Monitoring Well Construction Details

1. Introduction

In 2014, the Sustainable Groundwater Management Act (SGMA) was signed by the Governor of the state of California, setting the framework for local agencies to sustainably manage California's groundwater basins. To avoid potential State intervention, SGMA requires groundwater basins/subbasins designated by the California Department of Water Resources (DWR) as medium- or high-priority to follow four basic steps: 1) form Groundwater Sustainability Agency (GSA); 2) develop and adopt a Groundwater Sustainability Plan (GSP or Plan); 3) implement the Plan to achieve a sustainability goal and avoid undesirable results within 20 years; and 4) report the implementation activities to the DWR to document whether the sustainability goal and the avoidance of undesirable results has been achieved. Ultimately, five public GSAs were formed to manage groundwater in the North American Subbasin (NASb or Subbasin), completing Step 1. This GSP and adoption by each GSA will complete Step 2. This GSP will be updated every 5 years as additional information becomes available.

This GSP is a plan to provide for the sustainability of the NASb of the Sacramento Valley Groundwater Basin for the next 20 years. The NASb, designated as subbasin No. 5-021.64 by the DWR, is bounded on the north by the Bear River, on the south by the American River, to the west by the Feather and Sacramento Rivers, and on the east by the Sierra Nevada foothills (*see Figure 1-1*). The NASb was designated by DWR as a high priority subbasin and therefore the formation of GSAs and the completion of a GSP is required to avoid potential State Water Resources Control Board (SWRCB) intervention. Surrounding subbasins were also designated as medium- or high-priority and are required to comply with SGMA. The NASb groundwater is a critical resource to the Subbasin's community, economy, and environment by providing an average of 210,000 acre-feet per year (AFY) for drinking water and agriculture or about 40% of total water supply (DWR, 2019).

Agencies in the NASb have been actively managing groundwater for decades and have achieved positive groundwater management results. Groundwater levels within the Subbasin have been relatively stable for decades and have shown the ability to recover after periods of prolonged pumping and droughts. The passage of SGMA created an opportunity for a cooperative endeavor to develop a single GSP for the entire NASb. Beginning in January 2017, representatives of local agencies began coordination meetings that ultimately led to agreement to form five GSAs to cover the entirety of the Subbasin, while ensuring broad representation of the various stakeholder interests throughout the parts of the three counties comprising the NASb.

This GSP is organized into the following sections:

Section 1 – Introduction – Provides an overview of SGMA and associated requirements and introduces the contents of the Plan.

Section 2 – Agency Information – Provides a description of each GSA, contact information, implementation authority, and estimated costs for Plan implementation.

Section 3 – Plan Area – Describes the geography, historical and projected land uses, jurisdictional areas, water use sectors and water sources, existing water resources management plans, existing monitoring networks, and conjunctive use programs. The section also assesses the potential effects of implementing the Plan on water supplies.

Section 4 – Hydrogeologic Setting – Describes the geologic conditions that control how groundwater moves in the Subbasin, recharge and discharge areas, general water quality, and principal aquifers.

Section 5 – Groundwater Conditions – Describes historical and current groundwater levels, changes in groundwater storage, water quality, subsidence, change in storage, and identification of interconnected surface water and groundwater dependent ecosystems.

Section 6 – Water Budgets – Provides a historical water budget and forecasts future groundwater use for the next 50-years to assess whether groundwater conditions will remain sustainable including the influence of climate change.

Section 7 – Monitoring Networks – Describes the monitoring networks to be used to assess sustainability indicators and monitoring protocols. Establishes an annual reporting mechanism to assess the management performance and for 5-year updates of this GSP to adaptively maintain the Subbasin's sustainability.

Section 8 – Sustainable Management Criteria – Describes locally defined sustainability goals and undesirable results for the SGMA groundwater sustainability indicators. Establishes management criteria, the operating range in which groundwater levels will be maintained, in the form of minimum thresholds and measurable objectives.

Section 9 – Projects and Management Actions – Identifies projects and management actions and a plan to maintain groundwater within the defined operating range for the next 20 years. Estimated costs for implementation of these projects and management actions were developed to assess fiscal impacts and to establish a strategy of how to fund and implement projects.

Section 10 – Notice and Communications – Provides a summary of GSA activities with interested parties.

Section 11 – References – List of materials used to develop this Plan.

This Plan was developed cooperatively by the GSAs in the NASb along with input from stakeholders and in coordination with the adjacent South Yuba, Sutter, Yolo, and South American subbasins.

2. Agency Information

This section provides a description of GSAs in the NASb and their legal authority to implement the GSP, along with contact information for the basin coordinator (Agency). A cost estimate for implementing the GSP is provided along with a general description of how the GSAs plan to fund these expenses.

2.1 GSA Organization and Management Structure

Five agencies in the NASb filed with DWR to become GSAs to cover the entire NASb. DWR designated them as exclusive in 2016 and 2017. The five GSAs are listed below:

- Sacramento Groundwater Authority GSA
- Reclamation District 1001 (RD 1001) GSA
- South Sutter Water District (SSWD) GSA
- Sutter County GSA
- West Placer GSA

Figure 2-1 shows the areas covered by each GSA. All the GSAs have the legal authority to implement this GSP. A brief description of each GSA and their member agencies is provided below.

2.1.1 Sacramento Groundwater Authority GSA

The Sacramento Groundwater Authority (SGA) is a Joint-Powers Authority formed in 1998 to manage the groundwater basin in Sacramento County north of the American River. In January 2016, SGA became the exclusive GSA in conformance with SGMA for its portion of the North American Subbasin.

The SGA draws its authority from a joint-powers agreement executed by the cities of Citrus Heights, Folsom, and Sacramento and the county of Sacramento utilizing their common police powers. The signatories chose to manage the basin cooperatively by creating a governing board of directors comprised of representatives of 14 water agencies and other water users within their jurisdiction:

- California American Water
- Carmichael Water District
- Citrus Heights Water District
- City of Folsom
- City of Sacramento
- County of Sacramento
- Del Paso Manor Water District
- Fair Oaks Water District
- Golden State Water Company
- Natomas Central Mutual Water Company
- Orange Vale Water Company
- Rio Linda/Elverta Community Water District
- Sacramento Suburban Water District
- San Juan Water District
- Agriculture Interests within SGA Boundaries
- Commercial/Industrial self-supplied water users within SGA boundaries

2.1.2 RD 1001 GSA

RD 1001 is a special-purpose district that provides flood protection for approximately 43,395 acres, including the communities of East Nicolaus, Nicolaus, Pleasant Grove, Rio Oso, Trowbridge, and Verona. The Reclamation District (RD) is governed by elected board members who own property or work on land in RD 1001.

RD 1001 is delegating certain activities regarding the implementation of SGMA to the Pleasant Grove-Verona Mutual Water Company, which is located within its service area, through a separate Memorandum of Agreement (MOA).

2.1.3 South Sutter Water District GSA

SSWD is a California water district organized, existing, and operating under the provisions of the California Water District Law, California Water Code Section 34000 et seq., and is thus a local agency authorized to exercise powers related to groundwater management under California Water Code Section 10721. SSWD was established in May 1954 to develop, store, and distribute surface water to reverse the effects groundwater pumping was having on the declining groundwater levels. The SSWD GSA covers some area within Placer County that is in the SSWD boundary. Placer County and SSWD have signed a MOA describing the management of shared lands to ensure that all areas are managed appropriately.

2.1.4 Sutter County GSA

The Sutter County Board of Supervisors serves as the legislative body for Sutter County and provides policy direction for all branches of county government. The Board of Supervisors authorized the Development Services Department to submit the necessary documents to form the Sutter County GSA and oversee the preparation of the GSP and its implementation in the NASb within Sutter County that is not represented by another GSA.

Sutter County is delegating certain activities regarding the implementation of SGMA to the Natomas Central Mutual Water Company, which is located within its service area through a separate MOA.

2.1.5 West Placer GSA

The West Placer GSA was formed by five public agencies with water management or land use authority in a portion of the NASb located within Placer County. The member agencies are Placer County, the cities of Roseville and Lincoln, the Placer County Water Agency, and the Nevada Irrigation District, all of which are water purveyors. In addition, through a separate participation agreement, the GSAs will allow for California American Water (an investor-owned utility) to participate in the West Placer GSA since they are a water supplier within the West Placer GSA portion of the Subbasin. The agencies have entered into a MOA to manage the groundwater within West Placer County and have been designated by DWR as an exclusive GSA for their area.

Other local agencies that provide water to small areas of the West Placer GSA portion of the Subbasin including San Juan Water District, Camp Far West Irrigation District, Citrus Heights Water District,

RD 1001, and a land-use agency, the city of Rocklin, have agreed to allow the West Placer GSA to manage groundwater as required under SGMA on their behalf.

2.2 Plan Manager Contact Information

The five GSAs, by mutual agreement, selected SGA to be the Plan manager and lead agency for the preparation and implementation of the NASb GSP. SGA contact information is provided below:

<u>Agency Name:</u>	Sacramento Groundwater Authority	<u>Contact person:</u>	Rob Swartz
<u>Agency Address:</u>	5620 Birdcage Street, Suite 180 Citrus Heights, CA 95610	<u>Phone Number:</u>	(916) 967-7692
<u>Agency Website:</u>	https://www.sgah2o.org	<u>Email:</u>	rswartz@rwah2o.org

2.3 Implementation Authority

All five NASb GSAs (Partners) signed a MOA on January 31, 2017, for funding commitments to prepare a single GSP for the NASb.

To Be Completed. – A MOA is in process of being developed for the implementation of this GSP, which will include management of the Subbasin along with implementation of projects and management actions.

The legal authority, with specific reference to citations setting forth the duties, powers, and responsibilities of the Lead Agency, demonstrate the Lead Agency has the authority to implement the Plan.

2.4 GSP Implementation Costs

To Be Completed. - A thorough budget was developed for implementation of this GSP, which includes estimated annual operating budgets and costs for projects and management actions. A detailed budget is provided Appendix A.

3. Description of Plan Area

3.1 GSP Plan Area

The NASb encompasses about 342,000 acres in Sutter, Placer, and Sacramento counties bounded by the American, Bear, Feather, and Sacramento rivers. The Sierra Nevada foothills form the eastern boundary of the Subbasin. **Figure 3-1** shows the plan area. The eastern portion of the Subbasin is characterized by low rolling dissected uplands, while the western part is a nearly flat flood basin for the Bear, Feather, Sacramento, and American rivers. Between the rivers are several small tributaries that have low elevation and small watersheds. Most of the small tributaries drain to the Natomas Cross Canal, East Side Canal, and the Natomas East Main Drain Canal, which convey runoff to the Feather and Sacramento rivers. Some of the tributaries are used by irrigation and RDs to convey water to their customers. Several miles of agricultural drains are used by the RDs to control flooding and are also used to recapture excess applied water for reuse.

Water uses in the Subbasin include agricultural, municipal, industrial, domestic, and native vegetation and aquatic species. Some water purveyors rely exclusively on either groundwater or surface water, but most rely on a combination of surface water and groundwater.

Urban areas dominate in Sacramento County and the southeastern portion of Placer County, while the rest of the Subbasin is predominately agriculture and undeveloped land. Permanent crops dominate the western, eastern, and northern edges of the Subbasin and along the rivers, while rice and other non-permanent crops dominate the central and western portions of the Subbasin.

3.2 Adjudicated Areas

The Subbasin is not adjudicated, nor are the surrounding subbasins.

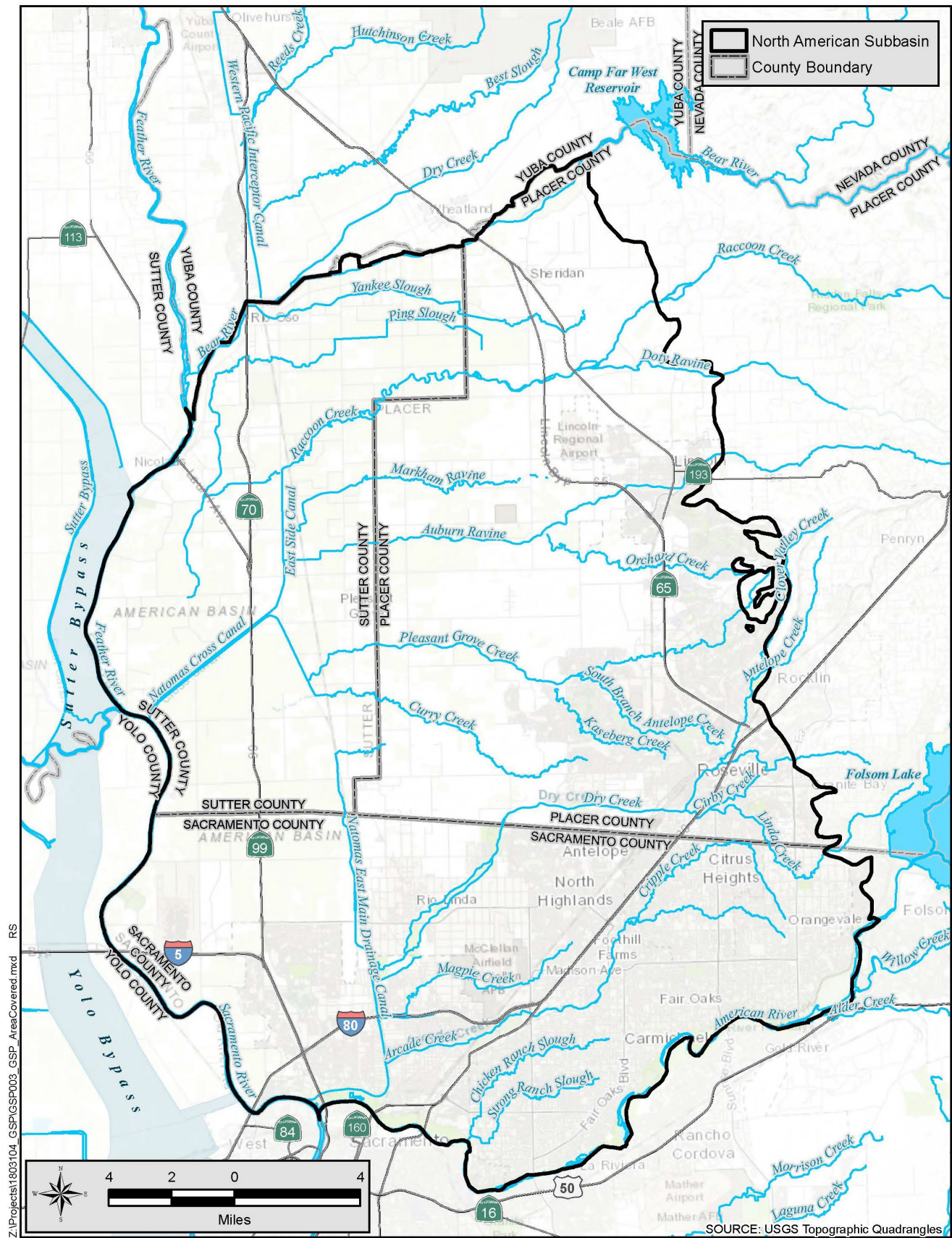


Figure 3-1. Area Covered by GSP

3.3 Jurisdictional Areas

Within the NASb, there are federal, state, county, and tribal agencies with land use jurisdictional responsibilities. Within each county, there are cities with land-use authorities and water agencies that serve water within the Subbasin. Irrigation districts are also present that provide surface water for agriculture. Within many of the irrigation districts and cities are RDs that are responsible for managing and maintaining the levees, freshwater channels, or sloughs, canals, pumps, and other flood protection structures in the area. The following sections describe the jurisdictional areas and agencies within the Subbasin. **Figures 3-2 through 3-4** show these jurisdictional areas.

3.3.1 Federal

The United States (U.S.) Army Corps of Engineers has jurisdictional authorities on all navigable waterways in the Subbasin. The U.S. Bureau of Reclamation (Bureau of Reclamation) allocates surface water diversions from the Sacramento and American rivers.

The federal government (Air Force) retroceded jurisdiction for all portions of the former McClellan Air Force Base during post-closure of the base. This means that the U.S. Government no longer has “federal legislative jurisdiction” over any portion of the former base, i.e., the U.S. Government does not make or enforce laws/regulations for/on this land area any longer. The McClellan Air Force Base still owns some of the parcels but will ultimately transfer those properties as cleanup is achieved.

The federal government also owns a small parcel (less than 1 acre) that is managed by Beale Air Force Base west of the city of Lincoln.

Figure 3-2 shows the federal lands in the Subbasin where the federal government may voluntarily agree to participate in administration of a GSP. Federal government officials have been invited to participate in the development of this GSP.

3.3.2 State of California

The California State Department of Transportation has authority for lands occupied by freeways and highways and maintenance yards. The State Department of Parks and Recreation has authority over the Folsom State Recreational Area, which extends along a portion of the American River west of Folsom Dam. The California State Lands Commission has authority over the Natomas Basin Conservancy area, located in the western portion of Sutter and Sacramento counties. The state also has authority over some small specific conservation land and preserves. DWR has jurisdictional authority for maintaining State Plan of Flood Control levees along the Sacramento and Feather rivers. **Figure 3-2** shows the state-owned lands in the Subbasin where SGMA does not apply, but the state government officials have been invited to assist in the development of this GSP.

3.3.3 California Native American Tribes

United Auburn Indian Community has jurisdiction over land in Placer County southeast of the city of Lincoln and northeast of the town of Sheridan, within the Subbasin. Similar to the federal government, any federally recognized Indian tribe may voluntarily agree to participate in administration of a GSP.

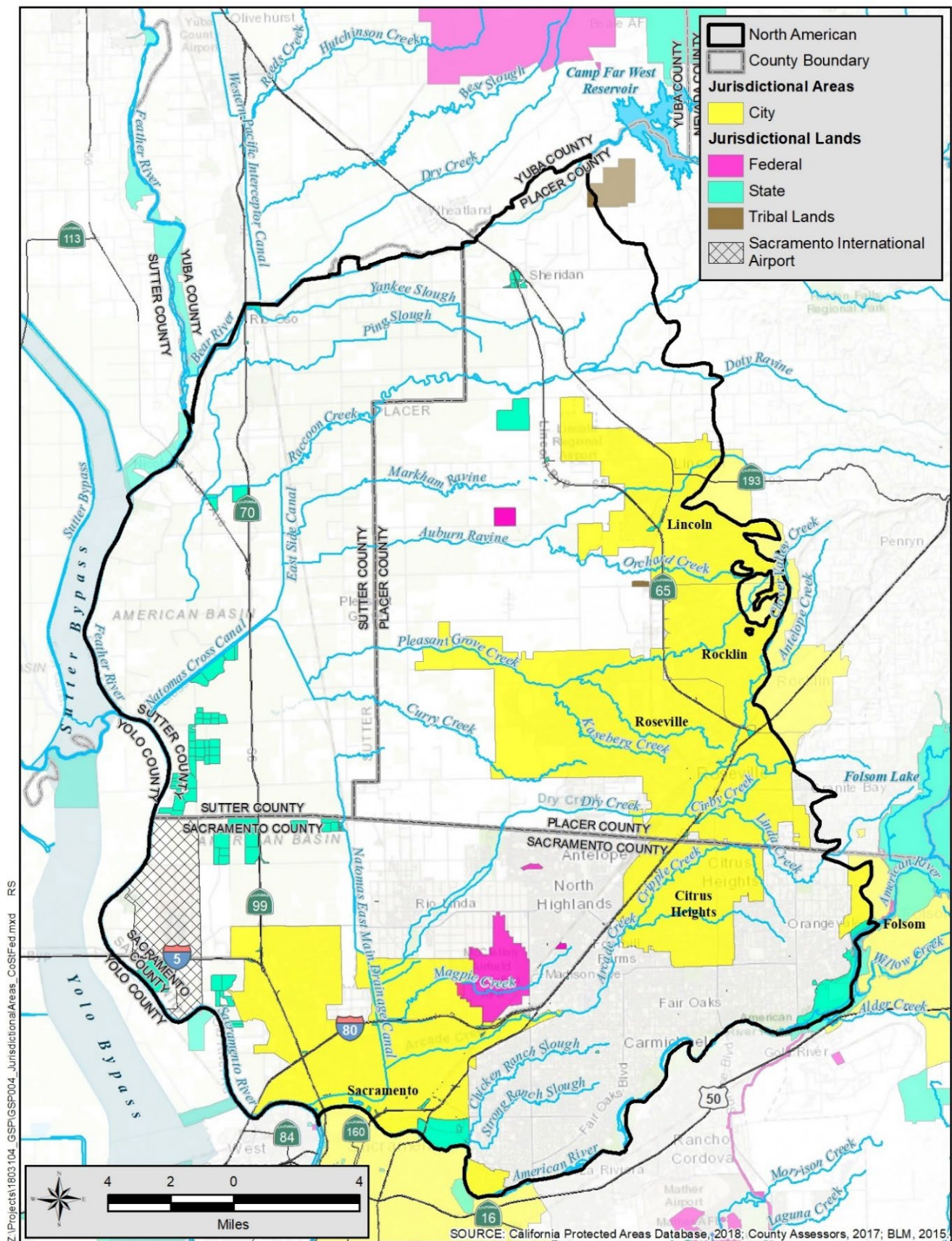


Figure 3-2. City, County, State, and Federal Jurisdictional Areas and Lands.

Tribal community members have been invited to participate in the development of this GSP and were sent public outreach information about SGMA and GSP development. **Figure 3-2** shows the tribal lands in the Subbasin.

3.3.4 County

Placer, Sacramento, and Sutter counties each cover about one-third of the NASb. **Figure 3-2** shows the county boundaries. Each of the counties has General Plans and land use authorities. Sacramento County also has land-use management authority along the American River Parkway and along Dry Creek and lands associated with Sacramento International Airport.

3.3.5 City

There are six incorporated cities within the NASb (**Figure 3-3**), including Citrus Heights, Folsom (just a small portion located within NASb), Lincoln, Rocklin, Roseville, and Sacramento. Each of the cities has land use management and planning authority granted through the state of California, which is derivative of the city or county general police power. This power allows cities and counties to establish land use and zoning laws that govern development.

3.3.6 Water Agencies

The following water agencies, water districts, city/county water departments and irrigation districts (classified as community water systems) are located within the Subbasin and provide potable water to residents (DWR, 2019). **Figure 3-3** shows the location of the water entities. Some are public entities, while others are private water companies. Their water supplies are derived from surface and groundwater or a combination of both.

- | | |
|---------------------------------|--|
| ▪ California American Water | ▪ Golden State Water Company |
| ▪ Carmichael Water District | ▪ Orange Vale Water Company |
| ▪ Citrus Heights Water District | ▪ Rio Linda/Elverta Community Water District |
| ▪ City of Folsom | ▪ Sacramento Suburban Water District |
| ▪ City of Lincoln | ▪ Sacramento County Water Agency |
| ▪ City of Roseville | ▪ San Juan Water District |
| ▪ City of Sacramento | ▪ Placer County Water Agency |
| ▪ County of Sacramento | ▪ Nevada Irrigation District |
| ▪ Del Paso Manor Water District | ▪ Placer County (Area of Sheridan) |
| ▪ Fair Oaks Water District | |

San Juan Water District (SJWD) is also a water wholesaler and provides treated surface water to Fair Oaks Water District, Orange Vale Water Company, and Citrus Heights Water District. SJWD also has interties to provide water to California American Water and the city of Roseville and a small portion of the city of Folsom (north of the American River) and periodically to another 171,000 customers in the Sacramento Suburban Water District.

There are multiple non-community non-transient water systems, mostly in the western portion of the Subbasin, that are overseen by the counties and the state.

3.3.7 Agricultural Water Providers

The Sutter County area of the NASb is almost entirely agricultural, Placer County is about 60 percent agricultural, and Sacramento County is about 20 percent agricultural. Surface water is supplied to agriculture by:

- Camp Far West Irrigation District
- Natomas Mutual Water Company
- Nevada Irrigation District
- Pleasant Grove-Verona Mutual Water Company
- South Sutter Water District

The water companies typically only supply a portion of the water supplies for agricultural use. The unmet demand is provided by privately owned wells.

3.3.8 Reclamation Districts

RDs are a form of special-purpose districts in the United States that are responsible for reclaiming and/or maintaining land for agricultural, residential, commercial, or industrial use that is threatened by permanent or temporary flooding. Within the NASb are RD 1000 along the Sacramento River and RD 1001 along the Bear, Feather and Sacramento rivers. Along the Bear River, RD 817 and RD 2103 have small areas within the NASb. Some of the RD areas overlie other water and irrigation district areas.

Figure 3-4 shows the RDs in the NASb.

3.4 Land Use Designations

In 2014, the NASb was roughly about 40 percent urban, 30 percent farmland, and less than 1 percent riparian vegetation (Land IQ, 2017). About 30 percent of the land was not classified. The total acres by each significant land use category and crops are summarized in **Table 3-1**. **Figure 3-5** shows the 2014 land use in the Subbasin.

Most of the urban development is in Sacramento County and the southeastern portion of Placer County. The population is projected to increase by about 200,000 people by 2030 (DWR, 2019), with an increase in urban development extending the urban areas to the north and west. **Figure 3-6** shows the locations of approved urban development areas in the Subbasin as identified from Placer, Sacramento, and Sutter counties, and each city's General Plans.

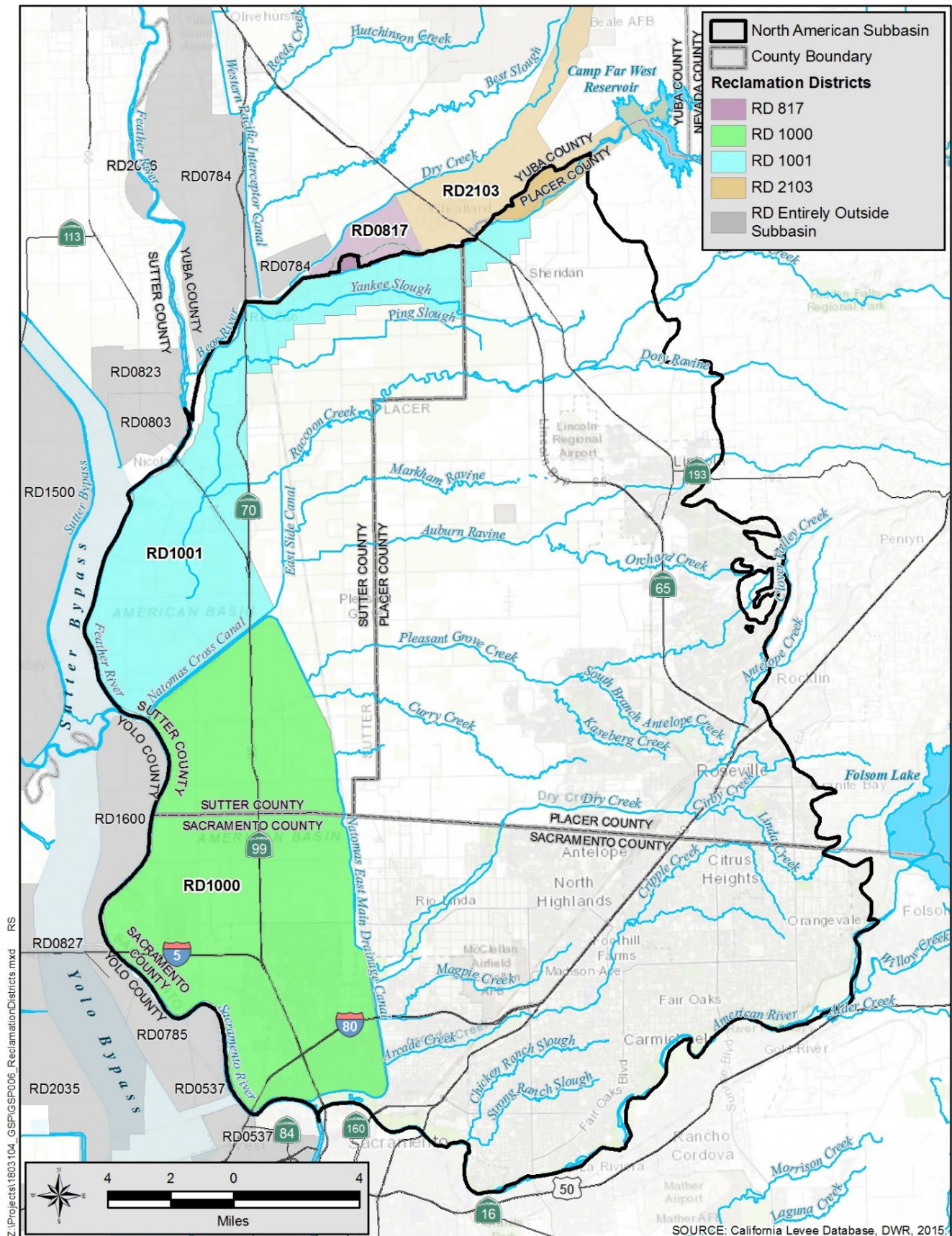


Table 3-1. Land Use Summary

Land Use	Acres	Percent
Urban	131,504	38.39%
Urban	131,504	38.39%
Agriculture	115,446	33.71%
Citrus and Subtropical	99	0.03%
Deciduous Fruits and Nuts	11,529	3.37%
Field Crops	2,867	0.84%
Grain and Hay Crops	2,242	0.65%
Idle	30,083	8.78%
Pasture	11,331	3.31%
Rice	56,316	16.44%
Truck Nursery and Berry Crops	660	0.19%
Vineyard	45	0.01%
Young Perennial	275	0.08%
Managed Wetlands	1,745	0.51%
Riparian Vegetation	1,745	0.51%
Not Classified	93,821	27.39%
No Data	93,821	27.39%
Total	342,516	100%

Source: Land IQ, 2014

The Subbasin is a significant producer of pears, prunes, rice, tomatoes for processing, walnuts, peaches, beans, row crops, corn, and grapes. Agriculture uses about 50 percent of its acreage for growing rice and 10 percent for permanent crops, including orchards and vineyards. About 10 percent of the total farmland acreage is idle.

Urban development is projected to continue to increase, which will decrease agricultural lands. This has the potential to shift surface water use on permeable land to groundwater use on non-permeable ground thus, having a negative impact on the groundwater basin. **Figure 3-6** shows the locations of future urban development areas in the Subbasin as identified in Placer, Sacramento, and Sutter counties General and Specific Plans and their proposed water sources. Planned development areas will likely use groundwater as their initial sources of supply and ultimately plan to use both surface water and groundwater as their source of supply.

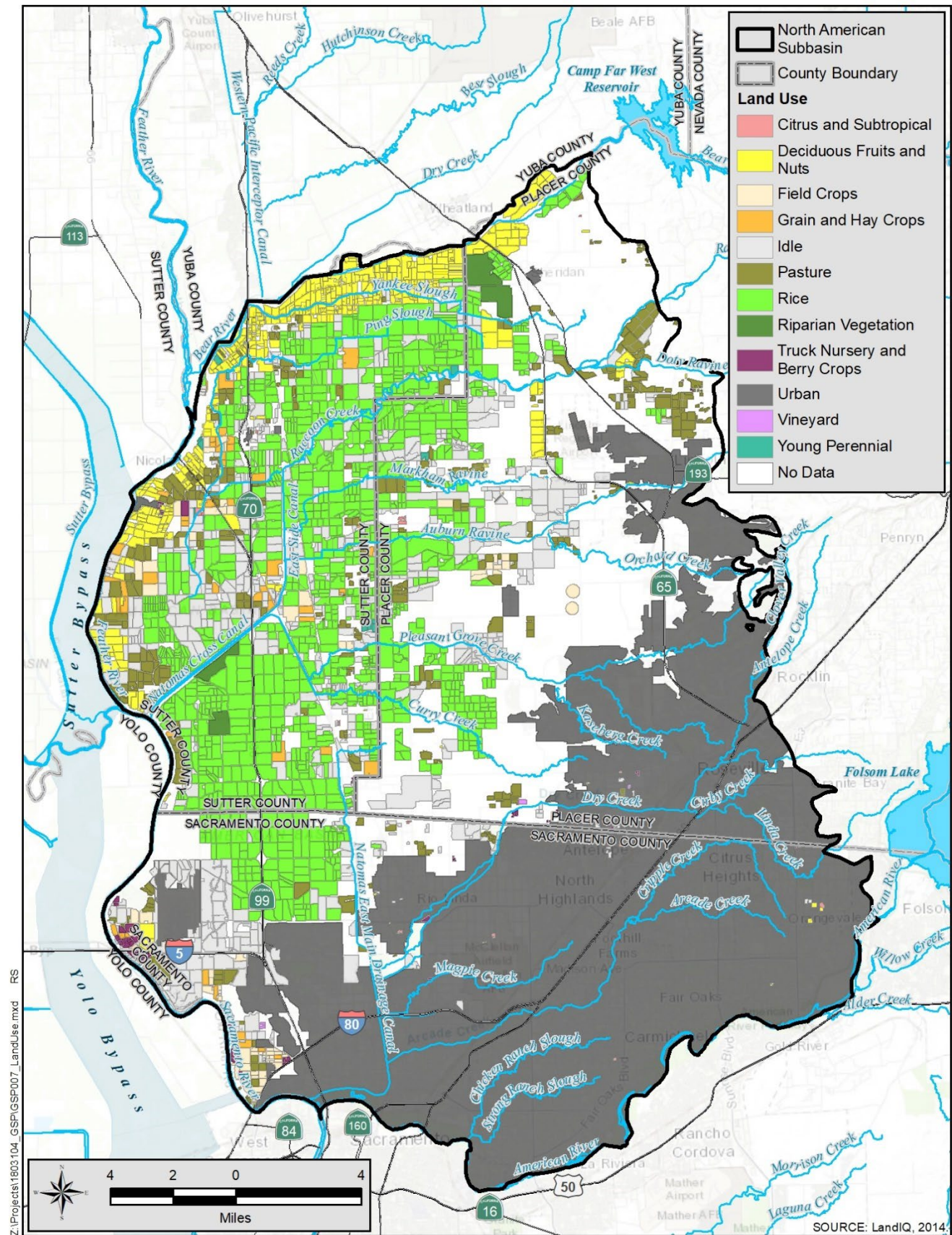


Figure 3-5. Existing Land Use Designations

3.5 Habitat Preserves and Easements

The counties in the NASb have each prepared conservation and habitat plans to assess current preserves and easements and provide goals and plans for the next 50 years to continue to increase these areas (Placer County Conservation Plan 2018, Natomas Basin Habitat Conservation Plan 2003). The Natomas Basin Habitat Conservation Plan was jointly developed by Sutter and Sacramento counties along with other parties. Currently, the NASb has about 16,900 acres of habitat conservation preserves and easements. **Figure 3-7** shows the locations of existing reserves, preserves, and easements. Some of the preserves do not have water supplies and rely on precipitation while others have surface water and groundwater.

Riparian vegetation typically occurs along the fringes of the rivers, canals, and tributaries. Natural marsh habitats are generally present near the Feather and Sacramento rivers in the area, generally known as the Natomas Basin. Key natural marsh areas include Pritchard Lake north of Sacramento International Airport and the area adjacent to Natomas Mutual Water Company's Elkhorn Pumping Plant, which also contains riparian habitat. Other natural marsh areas are scattered in approximately five small areas throughout unincorporated Sacramento County. Other habitat types include scattered pasture, idle, and ruderal lands, and include about 290 acres of grassland habitat adjacent to Natomas East Main Drainage Canal.

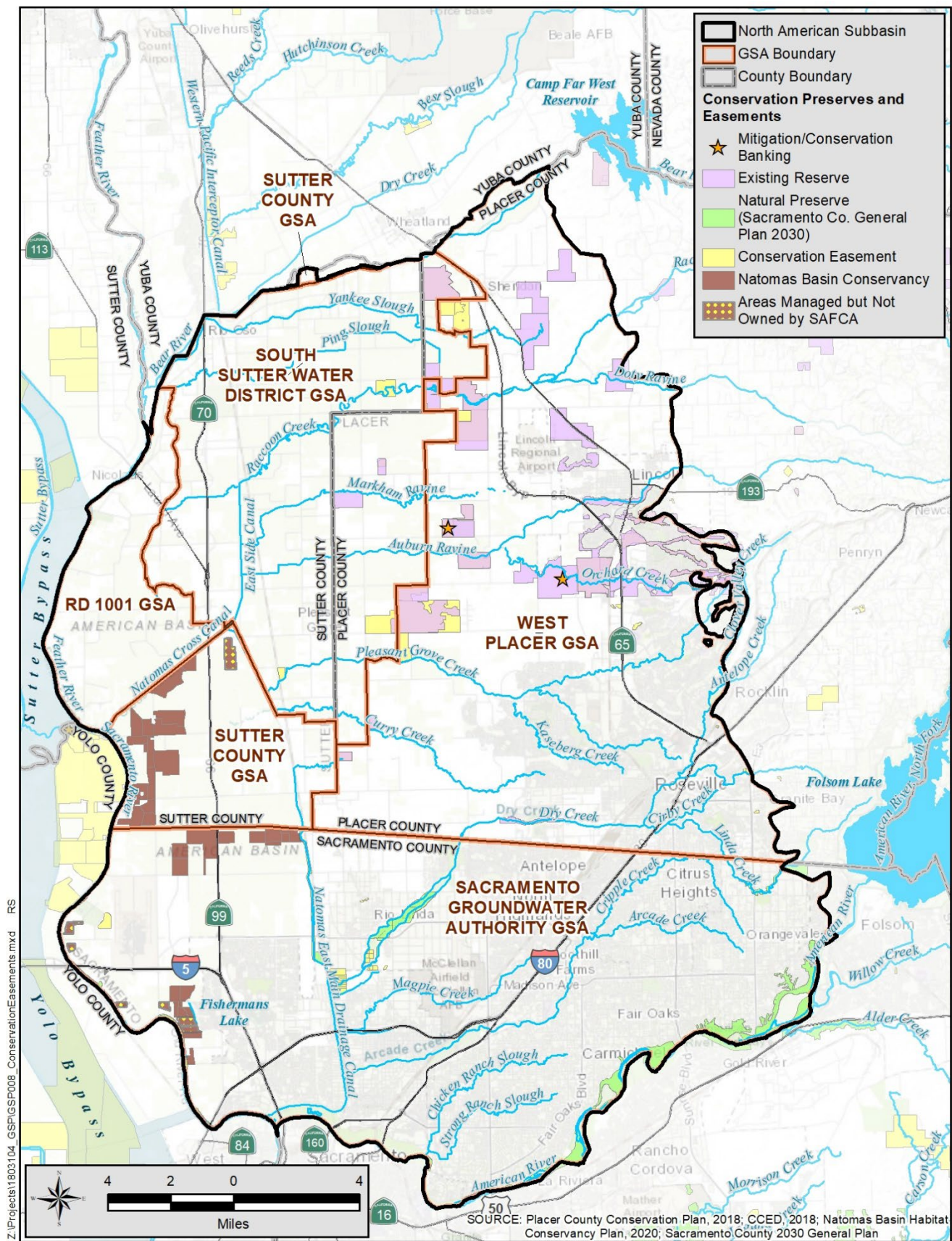


Figure 3-7. Habitat Conservation Preserves and Easements

3.6 Water Use Sectors

Water use sectors in the Subbasin are urban (industrial included in this category), domestic, agriculture, environmental (native habitat, managed wetlands, and conservation areas) and groundwater remediation sites. **Figure 3-8** shows the water use sectors in the Subbasin, except for domestic users. Some of the water use sector areas may change with time as urbanization continues (*refer to Figure 3-6*).

Environmental cleanup is in progress in the Subbasin and some sites pump and treat groundwater to remove contaminants. Some of the water is used for municipal purposes while at other facilities the treated water is discharged to surface water.

3.6.1 Urban

Land in the southern and eastern portions of the Subbasin is primarily urban and is served by groundwater and surface water, for the most part by multiple agencies, as shown on **Figure 3-8**. This widespread urban development initially used groundwater, and by the 1960s, a significant groundwater depression had developed in the Sacramento County portion of the Subbasin. By the 1980s, urban water supplies were augmented by surface water. In 1993, the Water Forum (*see* Section 3.9.2 for details) began a process to ensure a reliable water supply for the Sacramento region, including work to develop conjunctive use projects in the area, which expanded the option to use surface water. Currently, only the communities of Rio Linda, Arden, and Del Paso Manor rely solely on groundwater. **Figure 3-8** shows the water sources for urban areas.

3.6.2 Domestic

Domestic wells are used to supply groundwater to households in both urban and rural areas. They are scattered through the Subbasin.

3.6.3 Agriculture

Land in the northern and western portions of the Subbasin are predominately agriculture. A significant amount of surface water irrigates pastures, orchards, rice fields, and farms. Farmers in the Subbasin receive surface water from federal and local projects. Many also pump groundwater to augment their surface water supplies. During the dry year of 2014, surface water deliveries fell, causing farmers to rely more heavily on groundwater. Water districts, companies and irrigation districts manage surface water and encourage surface water use and basin recharge during wet years and groundwater use during dry years. **Figure 3-8** shows the availability of water sources for these agricultural areas.

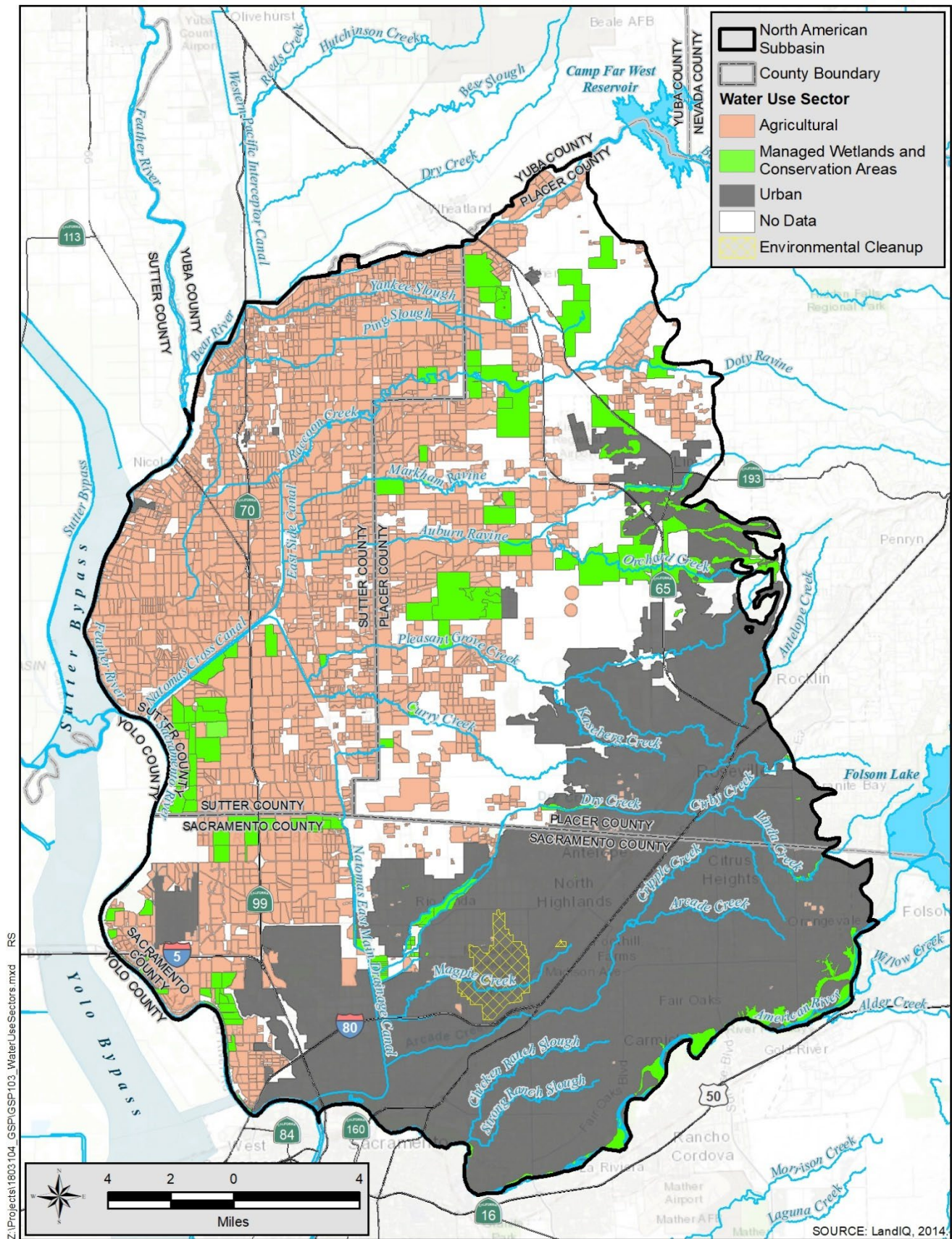


Figure 3-8. Water Use Sectors

3.6.4 Environmental

Rivers and streams in the Subbasin support more than 40 species of native and nonnative fish, including naturally spawning fall-run Chinook salmon, steelhead, and American shad. Several of these species are of primary management concern because of their declining numbers or their importance to recreational/commercial fisheries. Auburn Ravine in Placer County is also a habitat area for Chinook salmon and steelhead. The banks of the many rivers and streams within the Subbasin provide riparian habitat, both scrub and forest consisting of cottonwood, valley oak, and willow, with occasional white alder, box elder, and Oregon ash. Emergent marsh habitat is found in still or slow-moving shallow water located on the edges of the rivers and on the banks of open water areas. These areas constitute less than one percent of the total NASb area. **Figure 3-9** shows vegetation and wetlands (NCCAG, 2018). Groundwater pumped and used to support some of the habitat preserves in Sutter and Sacramento counties is shown on **Figure 3-7**.

3.6.5 Groundwater Remediation

The federal government is in the process of remediating groundwater contamination beneath and near the former McClellan Air Force Base. Some of the cleanup involves pumping, treating, and discharging the treated groundwater to surface water. Pumping of the groundwater for cleanup of contaminants is relatively small, on the order of about 2,000 AFY and is expected to continue for about 30 to 200 years.

Aerojet also is performing groundwater remediation and is pumping wells north of the American River, in the vicinity of Fair Oaks and Carmichael and extracts about 3,000 AFY.

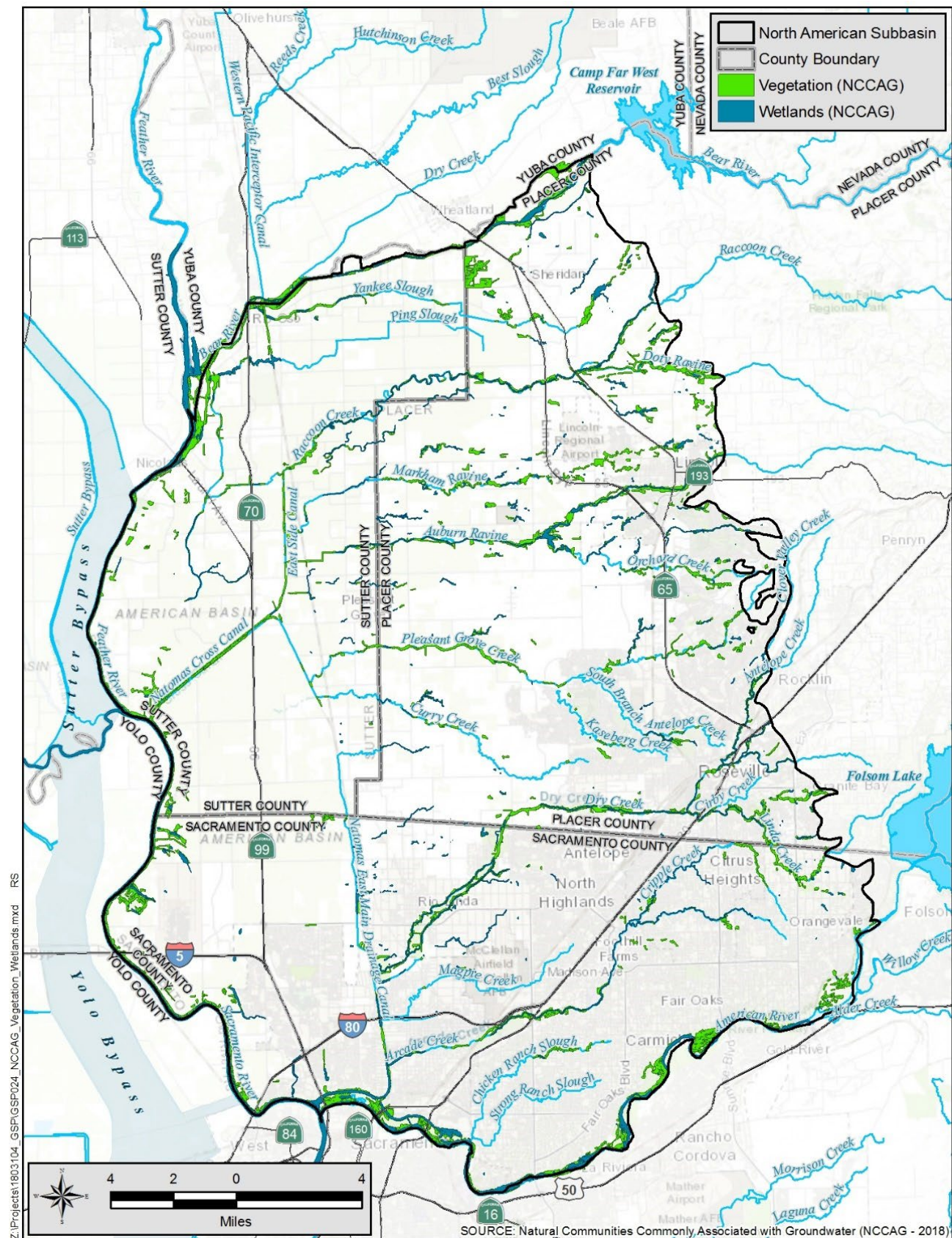


Figure 3-9. Natural Communities Commonly Associated with Groundwater

3.7 Water Source Types

In general, water agencies in the NASb meet water demands with a mixture of surface water and groundwater. Groundwater is used to supply about 40 percent of the water needs in the Subbasin, with about 60 percent being surface water (DWR, 2019). Both the cities of Roseville and Lincoln are using recycled water and are planning to increase this use. Irrigation and RDs also reuse runoff from agricultural fields.

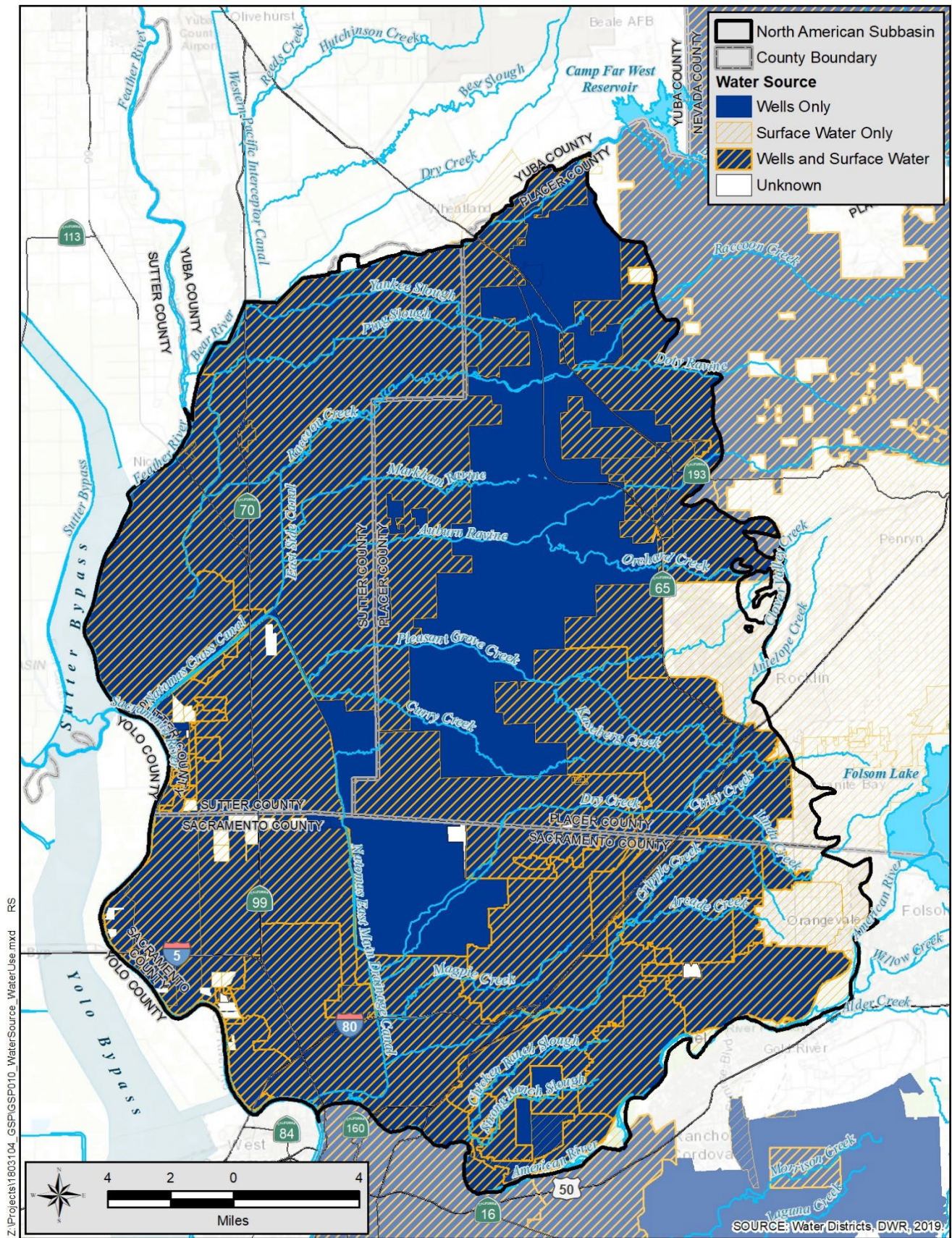
Water source types in the Subbasin are groundwater and surface water, with limited recycled water (treated wastewater) use at this time. Excess applied water to agricultural lands is reused by the irrigation and RDs. **Figure 3-10** shows the areas and water supply source types in the Subbasin. Due to the limited recycled water use and the extensive water reuse in the Subbasin, areas with these sources are not shown on **Figure 3-10** but are described in the following text. Most urban areas in Placer County, other than for the city of Lincoln, utilize surface water for their primary needs and only use groundwater during emergency, drought or other conditions. In Sacramento, most urban areas conjunctively use groundwater during dry periods and use surface water when abundant. **Figure 3-10** shows where groundwater is the sole source of water in the Subbasin. Some of the water source type areas shown on **Figure 3-10** may change as areas are developed as shown (*refer to Figure 3-6*). Most of the agricultural have groundwater and surface water sources and, therefore, can conjunctively use these resources to manage groundwater in those areas.

3.7.1 Groundwater

There are about 13,600 wells in the Subbasin, of which about 3,800 are production wells and include domestic, agricultural, and municipal water supply wells (DWR WCR, 2019). Wells were classified by DWR as production wells if the well casing was greater than or equal to 4 inches, and the total depth was greater than or equal to 22 feet. Most of the production wells in the Subbasin are domestic wells, which may be classified as de-minimis extractors who pump less than 2 AFY. **Table 3-2** summarizes the types of well categories.

Table 3-2. Well Type Summary

Well Type	Count	Percent
Production - Domestic	2,563	19%
Production - Agriculture	847	6%
Production - Municipal	372	3%
Production Well Total	3,782	28%
Monitoring	2,558	19%
Remediation	809	6%
Other/Abandoned/Unknown	6,471	48%
TOTAL	13,620	100%



3.7.2 Surface Water Sources

The SGA area of the NASb derives most of its surface water from the American and Sacramento rivers. The eastern two-thirds of the SGA region lies within the lower American watershed, and surface water served to that area typically comes from the American River. Seven agencies within the SGA boundaries identified in **Table 3-3** have water rights on the American River—Carmichael Water District, city of Folsom, city of Sacramento, and San Juan Water District (SGA, 2014).

Within the SGA GSA, Natomas Mutual Water Company (NMWC) has been using mostly surface water for many years, pursuant to riparian claims and water rights dating back to 1916 on the Sacramento River. In 1964, NMWC executed a settlement agreement with the Bureau of Reclamation to accommodate the development and operation of the Central Valley Project. The settlement agreement provided a supplement supply (Project Water: previously stored water from Shasta Reservoir) during times determined by the parties that the water rights were deficient. The senior water rights of NMWC and the security of the settlement contract have provided for a secure surface water supply for agricultural use which incidentally provides recharge to the groundwater basin. Water is diverted from the Sacramento River system at four points within the NASb: two diversions from Natomas Cross Canal, and two from the Sacramento River near the Sutter-Sacramento county line and near Elkhorn Road. About 75 percent of the water demand in the service area is met with surface water while groundwater makes up the remaining portion of the demand.

Within RD 1001 GSA, Pleasant Grove-Verona Mutual Water Company has an identical settlement arrangement as NMWC identified above except the quantities are less and the specific details of the water rights are slightly different. Surface water is diverted from the Sacramento River through the Natomas Cross Canal.

SSWD holds post-1914 appropriative water rights to store up to 102,100 AFY of water in the Camp Far West Reservoir located approximately six miles east-northeast of the city of Wheatland (*refer to Figure 3-3*), as well as direct diversion rights for the diversion and use of water from the Bear River and other small streams transecting the District. Pursuant to an agreement between Camp Far West Irrigation District (CFWID) and SSWD during the construction and enlargement of the reservoir, CFWID is entitled to the first 13,000 AF released from the reservoir each year to satisfy its senior water rights along the Bear River. CFWID also holds direct diversion water right licenses for small streams transecting the district service area. SSWD only provides surface water to agricultural users to meet about one-third of water demand, with the remaining two-thirds being met from private groundwater wells.

In addition to its rights and licenses on the Bear River and small streams, SSWD receives supplemental sources of surface water from Nevada Irrigation District (NID) via releases to Auburn Ravine except during the driest years. The amount of water received from NID ranges from zero to 20,000 AFY. The principal raw water delivery outside of the NID has been to SSWD.

Surface water is brought into the Placer County portion of the NASb by the city of Roseville, NID, Placer County Water Agency (PCWA), and San Juan Water District. The city of Roseville and San Juan Water District divert water from the American River from Folsom reservoir. PCWA's surface water

supply sources consist of water purchased from PG&E from the Yuba and Bear rivers, Middle Fork Project water from the upper American River, and Central Valley Project water from the American River (Brown & Caldwell 2006). NID's primary source of supply is local surface water derived principally from the Yuba River, Bear River, and Deer Creek watersheds that are diverted and stored under the NID's pre-1914 and post-1914 appropriative water rights. The water rights allow for a diversion of up to 450,000 AFY. NID has an extensive system of small storage reservoirs. Through PCWA water rights and an agreement with the city of Roseville, the city treats surface water and delivers potable water to the California American Water service area in Placer County. The city of Lincoln purchases treated surface water from PCWA. PCWA also treats NID surface water to potable standards for delivery to NID areas within the city of Lincoln.

There are other small diverters of surface water with riparian water rights in the NASb. No attempt was made to identify and locate their diversion for this GSP from the SWRCB databases.

3.7.3 Recycled Water

Wastewater from urban areas and new developments will be treated at one of six wastewater treatment plants (WWTPs). **Figure 3-11** shows the location of the WWTPs. Five of the WWTPs are in the NASb, while one, the Sacramento Regional WWTP, is located outside of the Subbasin, in the South American Subbasin, as shown on **Figure 3-11**. The Sacramento Regional treatment plant receives water from the SGA area as well as other areas in Sacramento County. Interior urban water use, which originated from both groundwater and surface water supplies, is exported outside of the Subbasin to the Sacramento Regional WWTP.

Treated wastewater from the five WWTPs in the Subbasin is reused for irrigation of beltways, golf courses, and some agriculture along with some water features at golf courses. In 2016, about 23,000 AF of wastewater was treated by the cities of Lincoln and Roseville, of which about 3,600 AF was reused. Excess treated water, about 6,000 AF, was discharged into Dry and Pleasant Grove Creeks and Auburn Ravine (GEI SBR, 2018). The city of Roseville's Dry Creek WWTP is required to release an average of 10,000 AF for environmental purposes. The Urban Water Management Plans for the cities of Lincoln and Roseville detail reuse of the water currently being discharged to the creeks, other than flows that are committed for environmental purposes. Placer County operates the Sheridan WWTP, which does not discharge to nearby creeks but uses the water for irrigation of pasture. Wastewater from the Auburn area, which is outside of the Subbasin, is treated and then discharged to Auburn Ravine and enters the Subbasin near the city of Lincoln. Water from the northern portions of Auburn are sent to the city of Lincoln's WWTP and is discharged to Auburn Ravine via Orchard Creek. In 2016, about 1,300 AF was discharged and potentially entered the Subbasin from Auburn.

Table 3-3. Water Supply Sources

Individual Agencies by GSA	Groundwater	Surface Water					
		American River		Sacramento River		Bear River	
		Water Rights	Contracts and Agreements	Water Rights	Contracts and Agreements	Water Rights	Contracts and Agreements
SGA GSA							
Carmichael WD	x	x					
City of Folsom		x	x				
City of Sacramento North	x	x		x			
California American Water - Arden Area	x						
Del Paso Manor Water District	x		x				
Sacramento Suburban WD - Town & Country	x		x				
Golden State Water Company - Arden Town	x						
SCWMD - Arden Park Vista	x						
Portion of Natomas MWC	x(1)			x	x		
Sacramento Suburban Water District – North Service Area	x		x				
California American Water - Antelope and Lincoln Oaks	x						
Rio Linda/Elverta Community Water District	x						
Sacramento International Airport	x			x	x		
SCWMD - Northgate	x						
Citrus Heights Water District	x		x				
Fair Oaks Water District	x		x				
Orange Vale Water Company	x		x				
SJWD - Sacramento County		x	x				
WP GSA							
Placer County (Sheridan)	x	x					
City of Roseville	x		x				
Placer County Water Agency	x	x	x	x			
SJWD - Placer County Retail Area	x		x				
Nevada Irrigation District	x		x			x	x
Camp Far West Irrigation District						x	x
SSWD GSA							
SSWD	x(1)					x	x
RD1001 GSA							
Pleasant Grove-Verona Mutual Water Company	x(1)			x	x		
Sutter County GSA							
Portion of Natomas MWC	x(1)			x	x		

(1) Groundwater is used by landowners within company boundaries but is pumped from privately owned wells.

x = Existing available water supply

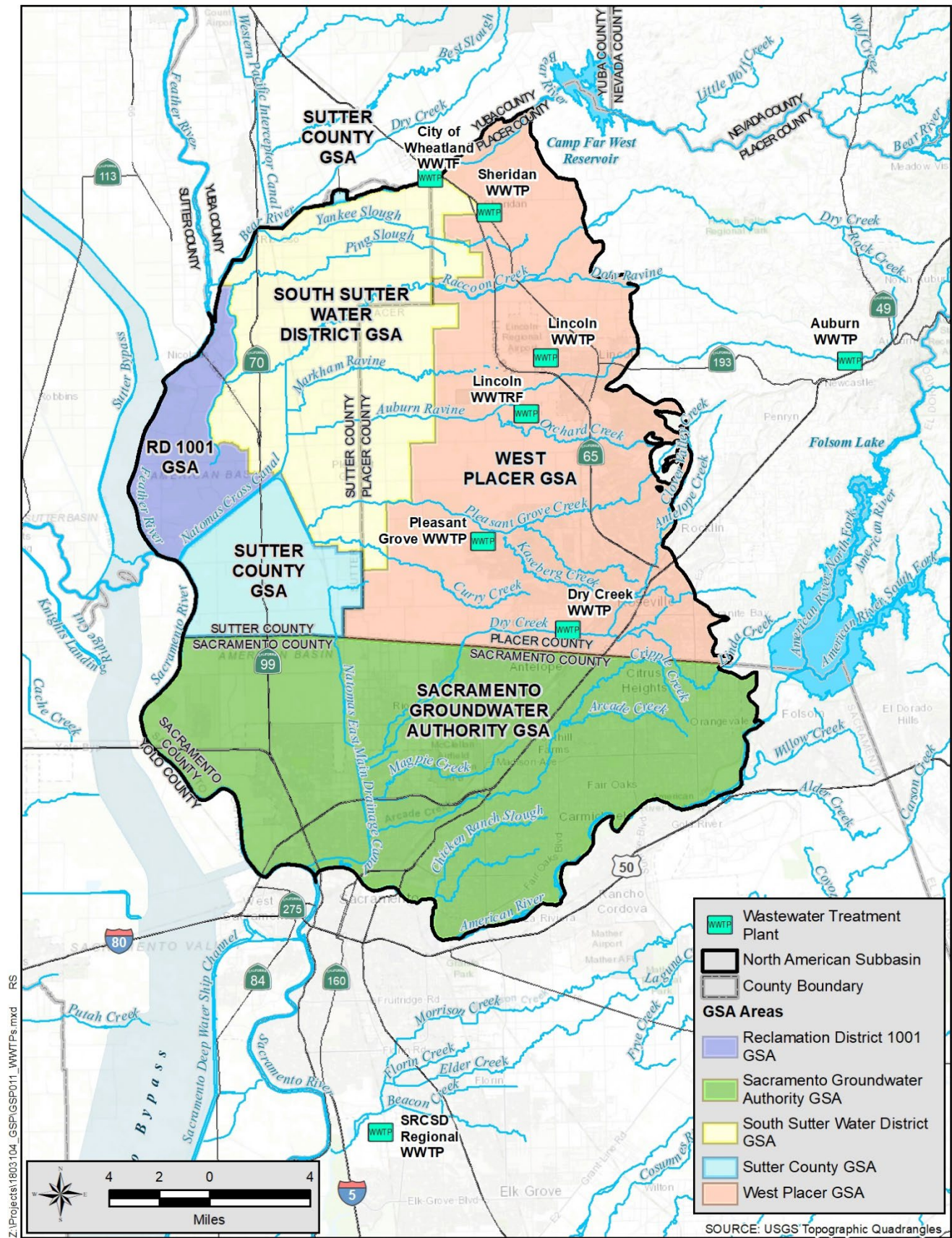


Figure 3-11. Wastewater Treatment Plants

3.7.4 Water Reuse

Excess applied surface water from agricultural fields either percolates into the soils or is returned to drains where it is recaptured by the RDs in the Subbasin. Shallow groundwater may also discharge to these drains, but only in areas where the groundwater surface is near the ground surface. In SSWD and RDs 1001 and 1000, excess applied surface water from agricultural fields is recaptured by drains and returned to the conveyance system to meet further water demands downstream.

Natomas Mutual Water Company has developed a complex closed system of unlined canals, laterals, drains, and lift pumps that circulate surface water around the service area. This system allows water users to take water from the system at any time during the irrigation season. The system also captures all return flow and recirculates it into the system for use by others. During a normal irrigation season, no agricultural drainage water returns to the Sacramento River until after October 15 each year.

3.8 Density of Wells

Groundwater in the Subbasin is used for municipal, industrial, irrigation, domestic, stock watering, frost protection, and other purposes. **Table 3-2** provides a summary of the number of wells by general type in the Subbasin. It should be noted that the number of wells is based on well logs filed and contained within DWR's Water Well Drillers Reports and may not reflect the actual number of active wells. Some wells contained in DWR files may have been destroyed, mis-located, mis-classified, constructed into granites beneath the Subbasin and are very old and may no longer be active.

Figures 3-12 and 3-14 show the density of domestic wells, as refined by GSP efforts, and production and municipal wells (from DWR database) per square mile and the minimum depths of the wells.

Appendix B provides a description of the methods used to refine density and minimum depths of the domestic well database.

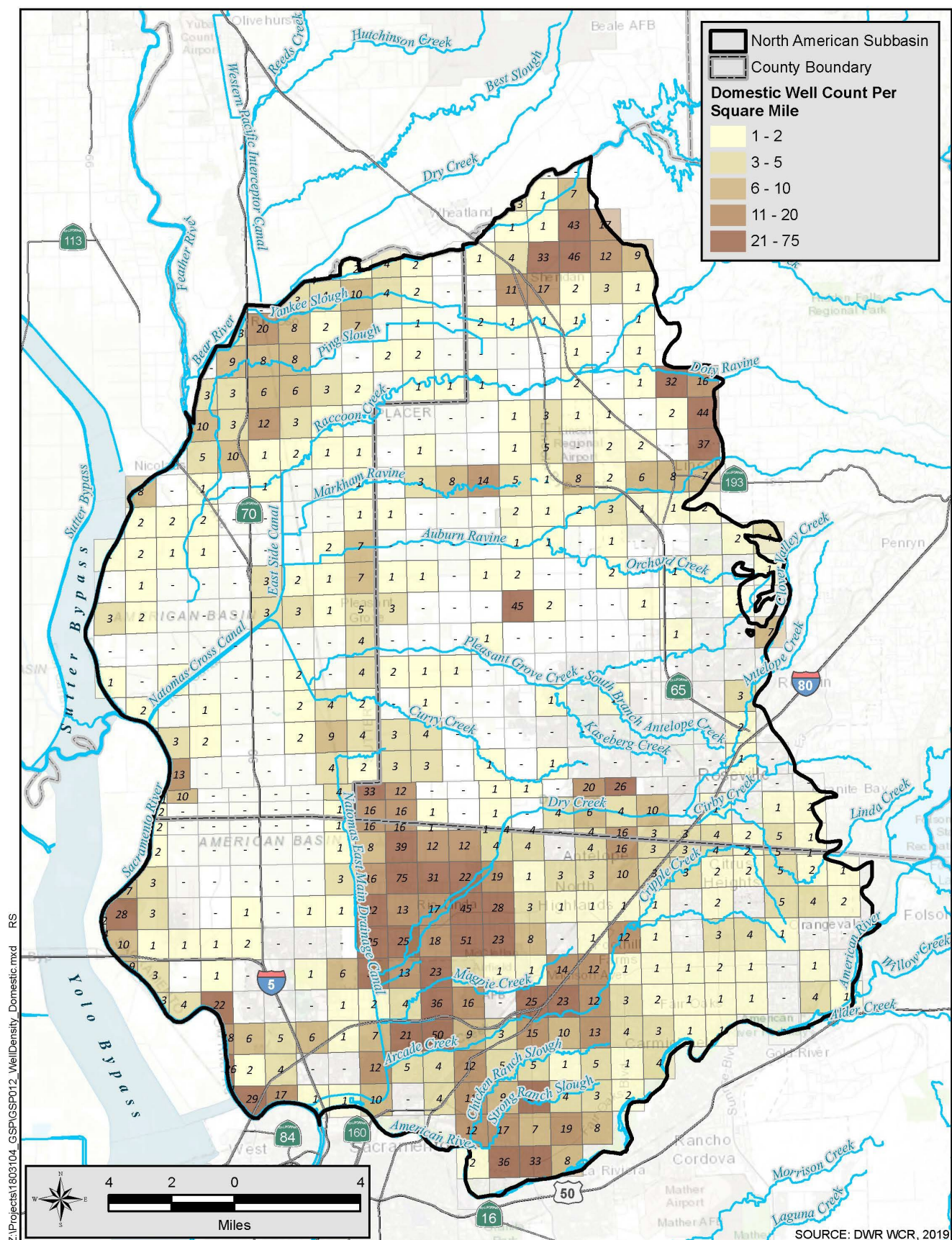


Figure 3-12. Density of Domestic Wells Per Square Mile

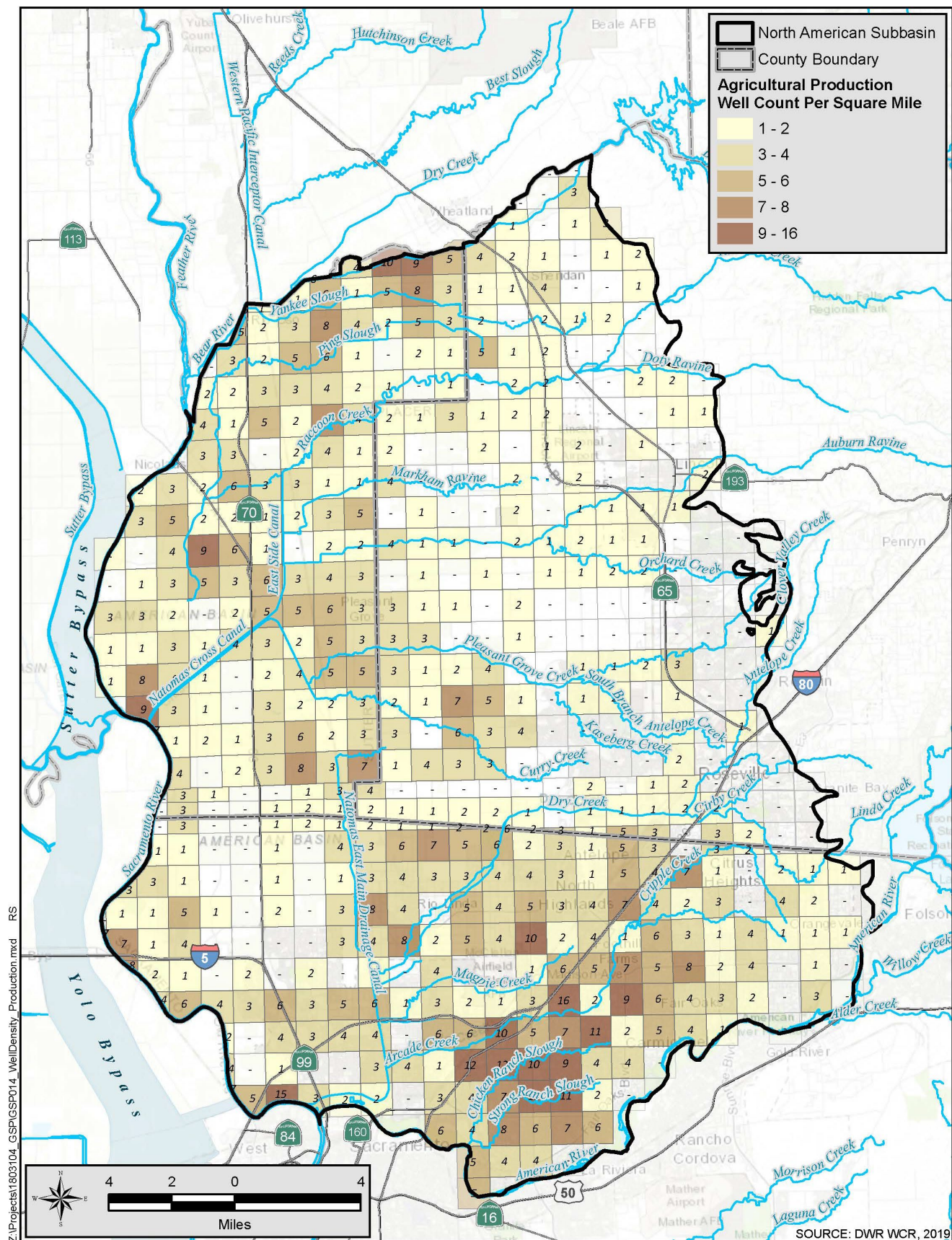
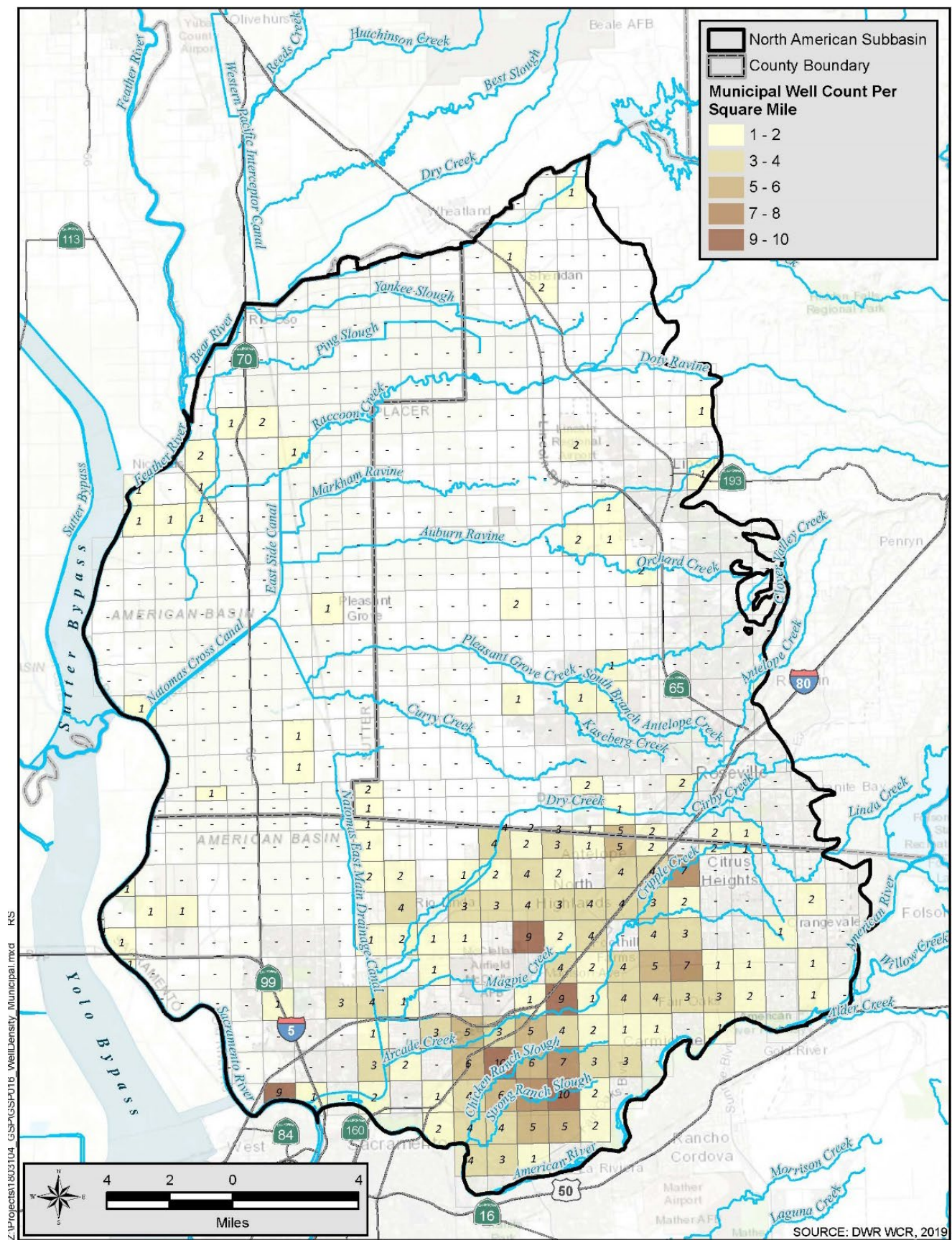


Figure 3-13. Density of Production Wells Per Square Mile



3.9 Existing Water Resources Management Plans

The Subbasin has many water resources management plans that cover activities that induces additional complexity to managing water resources. The following subsections provide a summary of other existing plans that the GSAs considered in the development of this GSP to manage groundwater resources in the Subbasin.

3.9.1 Groundwater Management Plans

In 1992, the California State Legislature enacted Assembly Bill (AB) 3030, and in 2002 the Legislature enacted Senate Bill (SB)1938. SB 1938 provides that the adoption of a groundwater management plan will be a prerequisite to obtaining funding assistance for groundwater projects from funds administered by DWR. These two pieces of legislation were incorporated into the State Water Code, Section 10753, to encourage local public agencies/water purveyors to voluntarily adopt formal plans to manage groundwater resources within their jurisdictions. **Table 3-4** provides a list of these groundwater management plans that separately covered the entire NASb. These existing groundwater management plans will be replaced with this GSP. Natomas Mutual Water Company has also prepared a groundwater management plan for its service area.

Table 3-4. Groundwater Management Plans

Groundwater Management Plan	AB3030	SB1938
SGA GMP 2014	x	x
Sutter County GMP 2012	x	x
WPC GMP 2007	x	x
SSWD GMP 2009	x	x

3.9.2 Water Forum Agreement

Representatives of water suppliers, local governments, citizens groups, environmental organizations, and businesses began the Water Forum in 1993 with the goal of developing a plan to ensure reliable long-term water supplies while protecting the lower American River. Following more than 6 years of analysis, professionally facilitated discussion, and negotiations, 40 diverse stakeholder groups signed the Water Forum Agreement (WFA) in April 2000 (Water Education Foundation, 2002). An Environmental Impact Report for the WFA was completed in October 1999. The WFA included the following co-equal objectives:

- Provide a reliable and safe water supply for the region's economic health and planned development through the year 2030
- Preserve the fishery, wildlife, recreational, and aesthetic values of the lower American River

To achieve its objectives, WFA signatories approved an integrated package of seven elements:

- Increased surface water diversions
- Actions to meet customer needs while reducing diversion impacts in drier years

- Support for improved pattern of fishery flow releases from Folsom Reservoir
- Lower American River habitat management
- Water conservation
- Groundwater management
- Water Forum Successor Effort

The Water Forum effort continues today, with many successes and some ongoing challenges to meeting its objectives. Most importantly, a majority of the signatory stakeholder groups are still focused on supporting and achieving the WFA's objectives more than 20 years after its execution. While each of the elements of the WFA is critical to achieving its co-equal objectives, the groundwater management element is most relevant to local groundwater management efforts and to this GSP. The groundwater management element provides a framework for protecting and using groundwater in a sustainable manner. The WFA is currently being updated and will reflect the enactment of SGMA.

3.9.3 American River Basin Integrated Regional Water Management Plan

The greater Sacramento area has been involved in integrated water planning and implementation for two decades. In 2001, water suppliers in the Sacramento area formed the Regional Water Authority (RWA) as a joint powers authority to help implement elements of the Water Forum Agreement. RWA developed the first American River Basin Integrated Regional Water Management Plan (IRWMP) in 2006, with updates in 2013 and 2018. The IRWMP area includes SGA and West Placer GSAs.

Integrated Regional Water Management is an effective way to address complex water resources challenges and is driven by stakeholders that identify major water and related resource management issues and their proposed solutions. It maximizes economic and societal benefits in an equitable manner while maintaining the ecosystem critical to water resource sustainability.

The IRWMP identifies specific projects and implementation programs and agreements between different affected agencies to identify projects to put conjunctive use in place. The intended purpose of the IRWMP is to provide and encourage regional opportunities for water resources planning and project development.

3.9.4 North Sacramento Valley Integrated Regional Water Management Plan

The North Sacramento Valley IRWMP covers a large planning area and includes the Sutter County portion of the NASb and RD 1001, Sutter County, and portions of the SSWD GSA areas.

The IRWMP also includes specific projects and implementation programs and agreements between different affected agencies to identify projects to put conjunctive use in place.

3.9.5 Urban Water Management Plans

The Urban Water Management Planning (UWMP) Act was developed in response to the state's water shortages, droughts, and other factors. Every urban water supplier that provides over 3,000 AF of water annually or serves more than 3,000 urban connections is required to submit a UWMP. UWMP requirements include updating water shortage contingency plans, extended drought risk assessments, and energy intensity reporting. Required elements of an UWMP include a report on the progress that urban water suppliers are making in meeting their water use targets, current and projected water demands, current and projected water sources, water management actions to improve supply reliability, and an evaluation of the sufficiency of supplies to meet the forecasted demands under both normal and drought conditions. Entities within the NASb with UWMPs include:

▪ California American Water	▪ Fair Oaks Water District
▪ Carmichael Water District	▪ Nevada Irrigation District
▪ Citrus Heights Water District	▪ Orangevale Water Company
▪ City of Folsom	▪ Placer County Water Agency
▪ City of Lincoln	▪ Rio Linda/Elverta Community Water District
▪ City of Roseville	▪ Sacramento County Water Agency
▪ City of Sacramento	▪ Sacramento Suburban Water District

3.9.6 Agricultural Water Management Plans

The Water Conservation Act of 2009 (SB X7-7) requires agricultural water suppliers serving more than 25,000 irrigated acres (excluding recycled water deliveries) to adopt and submit to DWR an Agricultural Water Management Plan (AWMP). These plans must include reports on the implementation status of specific Efficient Water Management Practices that were required under SB X7-7.

Required components of the plans include:

- Annual water budget
- Identification of water management objectives to improve system efficiency
- Quantification of water use efficiency with all water uses being accounted for including; crop water use, agronomic use, environmental use, and recoverable surface flows
- A Drought Plan for periods of limited water supplies that describes actions for drought preparedness

Districts within the NASb which have adopted AWMPs are:

- SSWD
- Natomas Mutual Water Company
- Nevada Irrigation District

3.9.7 Salt/Nutrient Management Plan

In February 2009, the SWRCB adopted Resolution No. 2009-011, which established a statewide Recycled Water Policy. Central to this Policy was the requirement that local water and wastewater

entities, together with local salt- and nutrient-contributing stakeholders, develop a Salt and Nutrient Management Plan for specified groundwater basins and subbasins in California. The plans include management strategies, plans for stormwater and recycled water use, a monitoring program, and an antidegradation analysis. In response, the Sacramento Valley Water Quality Coalition was formed to perform studies and to represent growers in the Sacramento Valley, including the NASb. The Coalition developed a Groundwater Quality Assessment Report (CH2MHill, 2016) and a Comprehensive Groundwater Quality Management Plan. The Groundwater Quality Management Plan presents a baseline picture of groundwater quality, establishes a framework under which salt and nutrient issues can be managed, and streamlines the permitting process of new recycled water projects while meeting water quality objectives and protecting beneficial uses. This plan excluded areas where rice is grown.

The California Rice Commission also prepared a Groundwater Quality Assessment Report (CH2MHill, 2013). Rice is primarily grown in eight Sacramento Valley counties (Butte, Colusa, Glenn, Placer, Sacramento, Sutter, Yolo, and Yuba). Rice lands overlie eleven Sacramento Valley Groundwater Basin, including the North American Subbasin. The California Rice Commission was issued rice-specific Waste Discharge Requirements (WDR) which requires groundwater trend monitoring and reporting at representative wells (one well is sampled in the NASb). Rice acreage has been identified as having a low vulnerability for nitrates.

3.9.8 Water Quality Control Plan for the Sacramento River Basin

The Central Valley Regional Water Quality Control Board (CVRWQCB) prepared a Water Quality Control Plan for the Sacramento River Basin and the San Joaquin River Basin (Basin Plan). The objective of the Basin Plan is to show how the quality of the surface water and groundwater in the Sacramento Region should be managed to provide the highest water quality reasonably possible. Water uses and water benefits vary depending upon the location in the basins. Water quality is an important factor in determining use and benefit. For example, drinking water must be of higher quality than the water used to irrigate pastures. Both are legitimate uses, but the quality requirements for irrigation are different from those for domestic use. The Basin Plan recognizes such variations.

The Basin Plan lists beneficial users, describes the water quality, which must be maintained to allow those uses, and contains an implementation plan, SWRCB, and CVRWQCB plans and policies to protect water quality, and statewide surveillance and monitoring as well as regional surveillance and monitoring programs.

Present and potential beneficial uses for inland waters in the basins are surface water and groundwater as municipal (water for community, military, or individual water supplies); agricultural; groundwater recharge; recreational water contact and non-contact; sport fishing; warm freshwater habitat; wildlife habitat; rare, threatened, or endangered species; and; spawning, reproduction, and/or early development of fish.

Water Quality Objectives for both groundwater (drinking water and irrigation) and surface water are provided.

3.10 Existing Water Resources Monitoring Programs

Existing management and monitoring plans in the NASb are described below. Some of the programs will be incorporated into the GSP monitoring network or were used to develop this GSP.

3.10.1 Groundwater Level Monitoring Programs and Networks

Historical groundwater level data measurements were made by DWR, SGA, local water districts, and the United States Geological Survey (USGS).

Groundwater level monitoring is being performed by designated monitoring entities in the NASb as part of the California Statewide Groundwater Elevation Monitoring (CASGEM) program. This network of groundwater level monitoring wells provides data that is the foundation for many groundwater management decisions. Designated monitoring entities include; SGA, Placer County, city of Roseville, SSWD, and Sutter County. DWR also continues to monitor groundwater levels in the Subbasin. The CASGEM groundwater level monitoring network and others are shown on **Figure 3-15**.

Appendix C provides the monitoring well construction details. Many of the wells are dedicated nested monitoring wells (small diameter wells that are screened opposite individual aquifers). The NASb GSAs rely upon these dedicated monitoring wells to assess the groundwater conditions in the basin since these wells are not affected by local pumping, as are the voluntary wells that are commonly active pumping wells. SSWD, RD 1001, and the Sutter County GSAs use more voluntary wells than dedicated monitoring wells.

Groundwater level monitoring is also performed as part of DWR and the Bureau of Reclamation's Water Transfer Program, which allows for three categories of transfers: 1) groundwater substitution, 2) cropland idling and crop shifting, and 3) reservoir storage releases. Groundwater substitution transfers make surface water available for transfer by reducing surface water diversions and replacing that water with groundwater pumping. The monitoring of groundwater levels is required as part of the transfer agreement. The monitoring networks developed for the water transfers include the groundwater production wells participating in the transfer and additional monitoring wells to assess the effects of the transfer. The monitoring frequency varies from weekly to monthly. Monitoring begins just prior to the start of water transfer pumping and continues until groundwater levels have recovered to their seasonal highs the following spring.

The USGS monitors thousands of wells across the nation. The extensive water data, which includes manual measurements of depth to groundwater in wells throughout California, are stored in the National Water Information System online database (<https://waterdata.usgs.gov/nwis>). The database stores historical observations of active and discontinued sites in addition to current conditions with measurements transmitted hourly. Groundwater level measurements at these wells are taken approximately once per quarter. The USGS actively monitors 10 well sites within the NASb.

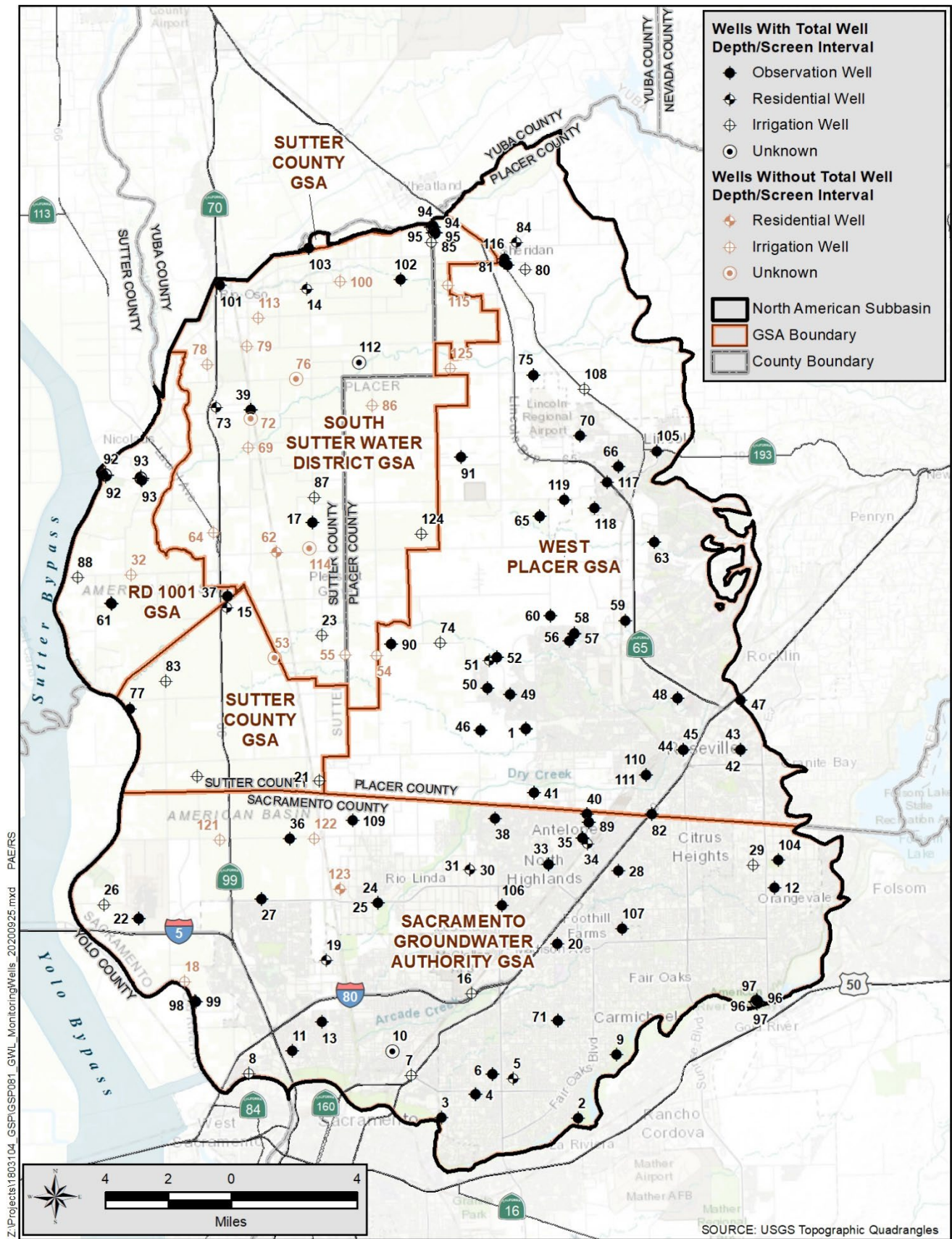


Figure 3-15. Groundwater Level Monitoring Network

3.10.2 Groundwater Quality Monitoring Programs and Network

Groundwater quality is monitored under several different programs and by different agencies, as described below:

- Municipal and community water purveyors collect water quality samples on a routine basis for compliance monitoring and reporting to the SWRCB's Division of Drinking Water.
- The USGS collects water quality data under the Groundwater Ambient Monitoring and Assessment (GAMA) and National Water Quality Assessment programs.
- The Irrigated Lands Regulatory Program required the development of a Salt Nutrient Management Plan and, more recently, the development of a Groundwater Trend Monitoring Work Plan to identify wells for sampling and a groundwater quality monitoring protocol. Plans were due by September 17, 2017.
- West Placer selectively monitors 16 dedicated monitoring wells on an annual basis to assess water quality trends in wells that are approaching or have exceeded the maximum contaminant levels (MCLs) and for select water quality constituents with pending MCLs.

Figure 3-16 shows the locations of the water quality monitoring wells used for the programs described above. **Appendix C** provides the water quality monitoring well construction details.

In addition to these monitoring programs, there are multiple sites groundwater quality samples are collected and analyzed as part of investigation or compliance monitoring programs through the Central Valley Regional Water Quality Control Board.

3.10.3 Surface Water Monitoring Networks

DWR, USGS, and Placer County maintain surface water gages along the rivers, creeks, and sloughs in the NASb with publicly available data online. Depending on the station, they may measure only the level of water (stage) or the discharge. **Figure 3-17** shows the location of these gages. This GSP uses the data collected by these agencies from some of these gages.

Surface water diversions into the Subbasin are also monitored by SSWD, NMWC, Pleasant Grove-Verona Mutual Water Company, Nevada Irrigation District, and Placer County Water Agency, cities of Sacramento and Roseville, San Juan Water District, and Carmichael Water District.

3.10.4 Precipitation Monitoring Network

Precipitation is measured at 29 stations located in the NASb, although many of the stations do not have a long period of record. **Figure 3-16** shows the location of these stations. This GSP uses the data collected by various agencies that maintain and report the data.

The closest station to the NASb with a long period of record, dating back into the 1880s, is the Sacramento 5ESE station, which is just south of the Subbasin but is likely representative due to its geographic location. The average precipitation, using the state climatologist definition of a recent representative period of years, water year 1988-89 through 2008-09 is 18.65 inches, at this location. **Figure 3-18** shows the precipitation by water year (October 1–September 30 of any given year).

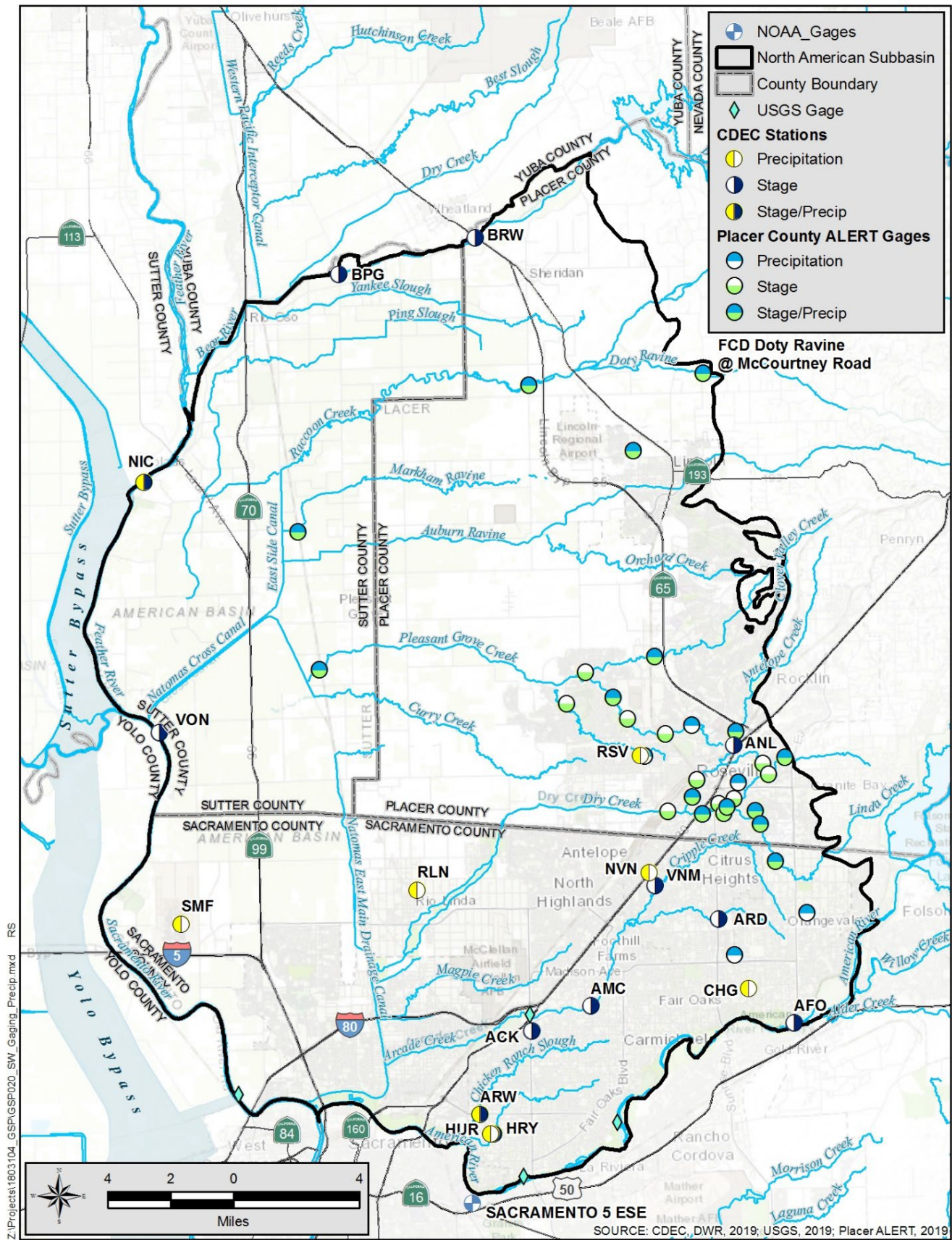


Figure 3-17. River Gages and Precipitation Stations

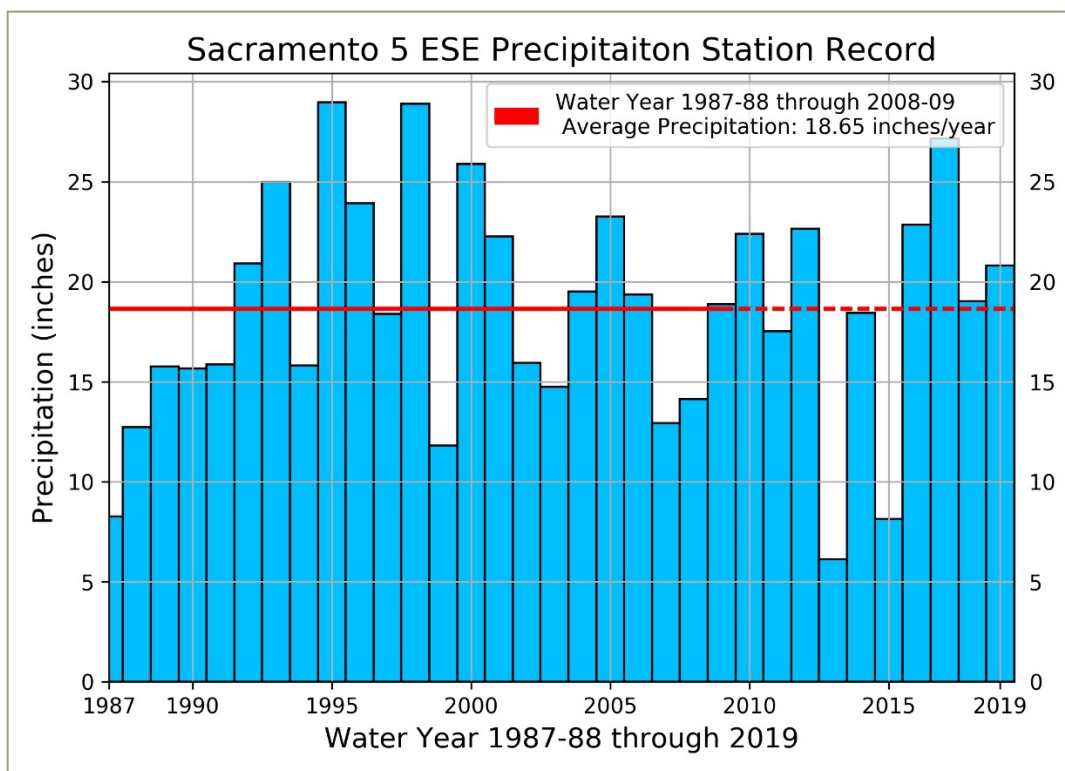


Figure 3-18. Water Year Precipitation

3.10.5 Subsidence Monitoring Network

DWR established a Sacramento Valley-wide benchmark network in 2008 and then resurveyed the benchmarks in 2017 to assess if and where subsidence occurred (DWR, 2018). DWR plans to resurvey this benchmark network about every 5 years or as funding is appropriated.

DWR constructed and monitors for subsidence at the Sutter extensometer (SUT Ext), located near the western edge of the Subbasin, near the Natomas Cross Canal at Highway 99 as shown on **Figure 3-19**. A nearby monitoring well SUT-P (11N04E04N005M) provides groundwater levels to assess if subsidence is related to changes in groundwater levels.

This GSP relies on data from these benchmarks and the extensometer and plans to incorporate them as part of the monitoring network for the NASb, as measured or coordinated by DWR. **Figure 3-19** shows the location of these benchmarks and the extensometer.

3.11 Limits to Operational Flexibility

To Be Completed.

3.12 Conjunctive Use Programs

Conjunctive use is the planned, coordinated use of groundwater and surface water to optimize available water supplies. Surface water is used when it is available, and groundwater is used when surface water supplies are reduced or not available. The aquifer is utilized as a storage reservoir that can be recharged from precipitation, subsurface inflow, applied surface water, or injection wells. This stored water is then available when needed.

In 1993, the Water Forum began a process to ensure a reliable water supply for the Sacramento region, including work to develop conjunctive use projects in the area. This resulted in the formation of SGA in 1998. SGA focused the effort started by earlier agencies to manage groundwater in the Sacramento County portion of the NASb. Since the 1990s, SGA and its member agencies have managed groundwater and implemented conjunctive use projects, thereby reversing the decline of groundwater levels in the North Basin.

Currently, NASb member agencies, as a whole, meet water demands with a mixture of a little more than half surface water and a little less than half groundwater. To the extent practicable, the agencies maximize the use of surface water in wet years to maximize the amount of groundwater stored in the basin. The SGA and Regional Water Authority (with members agencies in the South American and Consumes subbasins and surrounding watersheds) members are committed to expanded conjunctive use operations and are investigating a variety of ways to recharge water into the available storage space in the NASb. Most of the recharge occurring through current conjunctive use is from in-lieu recharge (i.e., this is recharge that occurs naturally from rivers, streams, and surface percolation by simply reducing groundwater extractions).

The SGA has also embarked upon a Water Accounting Framework (WAF) that has been used by SGA member agencies in the Sacramento County portion of the Subbasin to ensure a safe and sustainable water supply for the greater Sacramento region by encouraging water purveyors to “bank” water in the basin, when available, for use during dry periods. This includes the establishment of a WAF that supports groundwater banking programs by setting forth rules for operating a model groundwater bank and monitoring the basin to ensure its sustainability as the program is implemented. Since 2007, SGA has maintained an accounting of groundwater “deposits” and “withdrawals” associated with implementing their conjunctive use program.

Well ahead of any formal type conjunctive use programs, SSWD was formed for the purpose of developing surface water supplies to offset the decline of groundwater levels. The first year of operation of Camp Far West Reservoir and associated facilities was 1964. The operation of these facilities was successful in reversing the decline of groundwater levels such that by 1970 the potential of drainage problems were identified if greater quantities of groundwater were not put to use.

Although not a formal program, water and irrigation districts and mutual water companies that provide surface water for agricultural use in the NASb also provide conjunctive use by increasing their deliveries of surface water during times of surplus, thereby reducing the amount of groundwater pumped by private well owners.

3.13 Land Use Plans

Land use management and planning authority is granted through the state of California and is derivative of a city's or county's general police power. This power allows cities and counties to establish land use and zoning laws that govern development. Agencies with land use authority in the NASb are the cities of Citrus Heights, Folsom, Lincoln, Rocklin, Roseville, and Sacramento along with counties of Placer, Sacramento, and Sutter. The cities of Roseville and Sacramento are considered charter cities, which provides them with additional constitutional freedoms to govern municipal affairs even if a conflict with state law exists.

General Plans and UWMPs have been developed by the cities of Citrus Heights, Folsom Lincoln, Roseville, and Sacramento along with Sutter, Placer, and Sacramento counties. Their planning horizons (out to 2030 or 2035) include the anticipated planned growth in the region.

Water purveyors also have a voice in land use planning, but not necessarily an authority. Because they provide water supply, any new development is required to prove adequate water supply will be made available to serve the project and, therefore, may affect land use. Proof of adequate water supplies is required under SB 610 and SB 221, which are intended to assist water suppliers, cities, and counties with integrating water and land use planning. SB 221 prohibits a city or county from approving a residential subdivision of more than 500 units unless there is written verification that sufficient water supply for 20 years is, or will be, available. SB 610 requires retail water agencies with responsibility under prescribed circumstances to prepare water supply assessments for the purpose of predicting and ensuring long-term (20-year) water supply reliability for those projects that are subject to the California Environmental Quality Act (CEQA).

It should be noted that California American Water and Golden State Water Company, although not public water agencies, have similar authority to the public water agencies for the determination of adequate water supplies for new developments.

Water supplies for new developments (*refer to Figure 3-6*) will be a mixture of surface water and groundwater. In Placer County, the development near and south of Pleasant Grove Creek will be provided with surface water. Those in the Lincoln area will be a mixture of surface water and groundwater. The early phases of the Sutter Pointe development in Sutter County will rely on groundwater and ultimate planned combination of groundwater and surface water to meet the needs of the community. Surface water would be obtained from NMWC. Planned development areas within Sacramento County will likely use groundwater as their initial sources of supply and ultimately plan to use both surface water and groundwater as their source of supply.

3.14 GSP Implementation Effects on Land Use

To be Completed.

3.15 GSP Implementation Effects on Water Supply

To Be Completed.

3.15.1 Urban Water Supply

To Be Completed.

3.15.2 Agricultural Water Supply

To Be Completed.

3.15.3 Potential Groundwater Dependent Ecosystems Water Supply

To Be Completed.

3.16 Well Permitting

DWR has responsibility for developing standards for wells for the protection of water quality under California Water Code Section 231. All counties and cities and water agencies, where appropriate, were required to adopt a well ordinance that meets or exceeds DWR's Water Resources Bulletin 74-81, "Water Standards: State of California" and Bulletin 74-90. Four agencies have well-permitting authority in the NASb for both new and replacement wells and well destruction.

- The **Placer County Water Well Construction Ordinance** provides the minimum requirements for construction, repair, and destruction of water wells, cathodic protection wells, and monitoring wells. Whoever wishes to drill a well within the county's boundaries, except for those within the city of Roseville, must first obtain a County Environmental Health permit. Placer County administers the well permitting program for the entire county, except for lands within the city of Roseville. Any wells planned within the city of Lincoln must first be approved by the city prior to the issuance of a County Environmental Health permit.

- **Roseville’s Environmental Utilities Engineering Division** is the permitting agency for wells located within Roseville’s city limits. To permit a well in Roseville, a Well Construction Application and Permit Form must be filed with the Environmental Utilities Department.
- The **Sacramento County Environmental Management Department (SCEMD)** approves permit applications for a new well or to deepen, reconstruct, recondition, or destroy a well. Any well that is constructed in Sacramento County must have a permit from the Environmental Management Department prior to the start of construction unless it is specifically exempted in the Sacramento County Code. The conditions and process for obtaining well permits are governed under Sacramento County Code, Title 6, Chapter 6.28.
 - Section 0.25 defined a “prohibition area” as that portion of the unincorporated territory of the county bounded on the east and south by the former McClellan Air Force Base, on the south by Sacramento city limits, on the west by Dry Creek Road, and on the north by I Street. No permits shall be issued for, and no person shall dig or drill a new water well within the prohibition area.
 - The permit requires that any applicant shall contact the CVRWQCB to assess the potential for groundwater contamination in the vicinity of the well and can require special sanitary seal requirements to prevent the spread of contaminants.
 - SCEMD also, when required, requests copies of CEQA documentation prior to the approval of the permits.
- **Sutter County Environmental Health Division (SCEHD)** is the well-permitting agency for Sutter County. One permit application is used for a new well or to deepen, reconstruct, recondition, or destroy a well. The permit application requires a site plan showing the location of the well and the accessor’s parcel number. The design and construction of the well shall be in conformance with the California Department of Water Resources Bulletin 74-81, “Water Standards: State of California” as outlined in the County of Sutter Department of Public Works Improvement Standards (2005, rev. 2010).

All of the permitting agencies have requirements for well head protection including minimum well heights, well seals and concrete pads to surround the well and to promote drainage away for the wells.

None of the well permitting agencies coordinates with county or city land developers. There are no setbacks or special investigation requirements for construction of supply wells near the rivers or tributaries.

3.17 Land Use Plans Outside of the NASb

This GSP has not evaluated land use implementation plans outside the Subbasin and will be done by GSAs within other subbasins and documented in their GSPs.