## 3.2 Jurisdictional Areas

In addition to the GSAs, other entities have water management authority or planning responsibilities in the Basin, as discussed below. A map of the jurisdictional areas within the Basin is shown on **Figure 3-2**.

### 3.2.1 Superior Courts

While SGMA is not intended to alter existing water rights, water use in the Basin exists within the confines of state water law and existing water rights. These rights are ultimately governed by court decisions. In Big Valley, two decrees govern much of the surface water rights allocations: Decree 3670 (1947) for Ash Creek and Decree 6395 (1959) for the Pit River. Any changes to these and any other judgments relevant to Big Valley would have to go through the superior courts.

### 3.2.2 Federal Jurisdictions

The U.S. Bureau of Land Management (BLM) and the U.S. Forest Service (USFS or Forest Service) have jurisdiction over land within the Basin including portions of the Modoc National Forest, shown on **Figure 3-2**. Information on their Land and Resource Management Plan is described in Section 3.8. The Forest Service Ranger Station in Adin is a non-community public water supplier with a groundwater well, identified as Water System No. CA2500547. (SWRCB 2021)

### 3.2.3 Tribal Jurisdictions

The U.S. Bureau of Indian Affairs (BIA) Land Area Representations database identifies one tribal property in the BVGB (BIA 2020a). Lookout Rancheria, shown on **Figure 3-2**, is associated with the Pit River Tribe. There are other "public domain allotments" or lands held in trust for the exclusive use of individual tribal members within the Basin not shown. (BIA 2020b)

### 3.2.4 State Jurisdictions

The CDFW has jurisdiction over the ACWA, as shown on **Figure 3-2**.

### 3.2.5 County Jurisdictions

The County of Modoc and the County of Lassen have jurisdiction over the land within the Basin in their respective counties as shown on **Figure 3-1** and **Figure 3-2**. Information on their respective General Plans is provided in Section 3.8 – Management Areas. Within the Basin, Modoc County includes the census-designated community of Adin and part of the community of Lookout. Within the Basin, Lassen County contains the census-designated communities of Bieber and Nubieber.

### 3.2.6 Agencies with Water Management Responsibilities

#### Upper Pit Integrated Regional Water Management Plan

Big Valley lies within the area of the Upper Pit Integrated Regional Water Management Plan (IRWMP), which was developed by the Regional Water Management Group (RWMG). The IRWMP is managed by the North Cal-Neva Resource Conservation and Development Council (North Cal-Neva), a member of the RWMG along with 27 other stakeholders. Other stakeholders include community organizations,

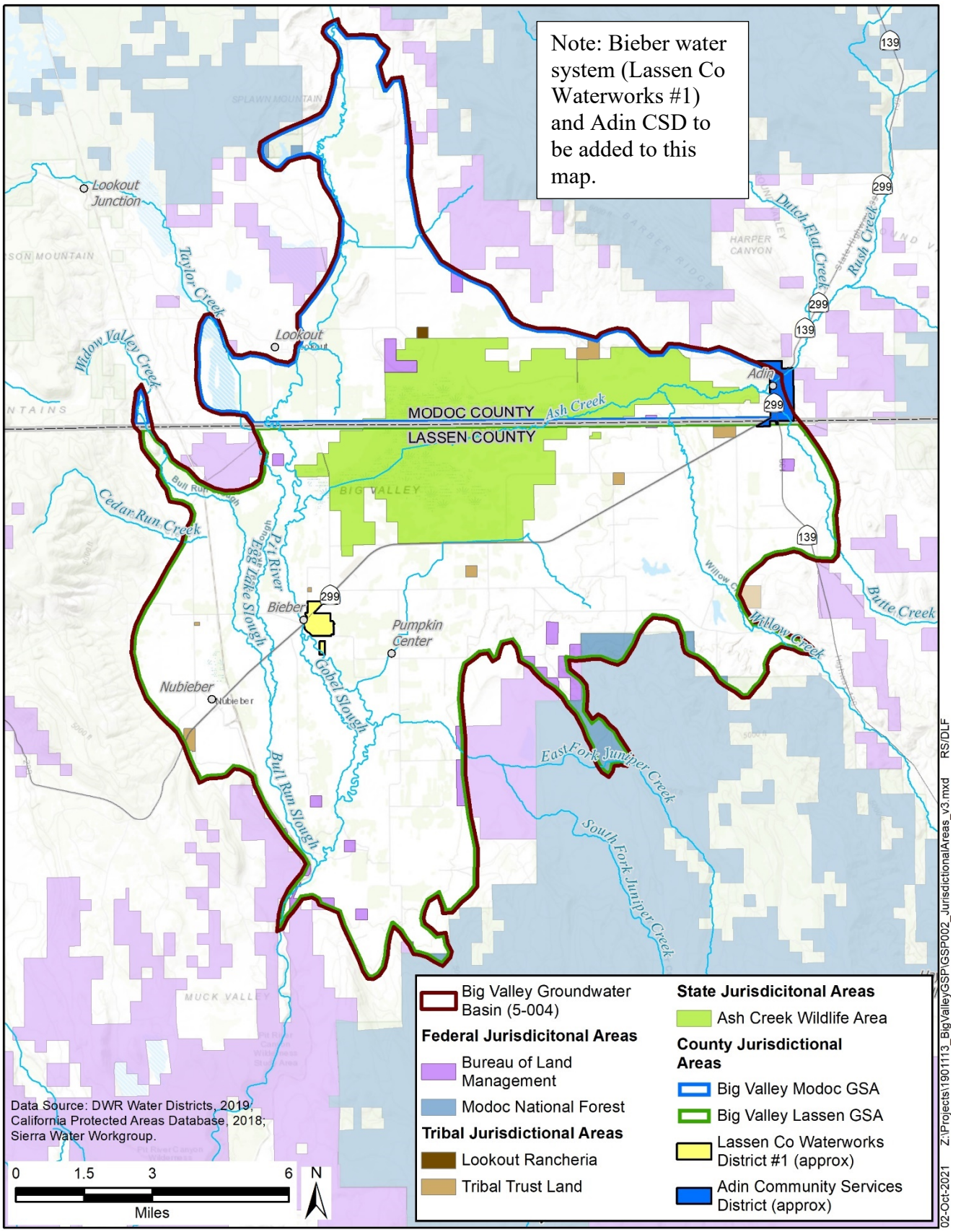



**Figure 3-2 Jurisdictional Areas**

environmental stewards, water purveyors, numerous local, county, state and federal agencies, industry, the University of California, and the Pit River Tribe. The IRWMP addresses a 3-million-acre watershed across four counties in northeastern California. **Figure 3-3** shows the Upper Pit IRWMP boundary and the BVGB's location in the center of the IRWMP area. **Figure 3-3** also shows the complete watershed that flows into the BVGB and the local watershed area. At 92,057 acres, the BVGB comprises about 3 percent of the IRWMP area at its center.

The IRWMP was established under the Integrated Regional Water Management Act (Senate Bill [SB]1672) which was passed in 2002 to foster local management of water supplies to improve reliability, quantity and quality and to enhance environmental stewardship. Several propositions were subsequently passed by voters to provide funding grants for planning and implementation. Beginning in early 2011, an IRWMP was developed for the Upper Pit River area and was adopted in late 2013. During 2017 and 2018, the IRWMP was revised according to 2016 guidelines.

### Lassen-Modoc County Flood Control and Water Conservation District

The Lassen-Modoc County Flood Control and Water Conservation District (District) was established in 1959 by the California Legislature and was activated in 1960 by the Lassen County Board of Supervisors (LAFCo 2018). The entirety of the Lassen and Modoc counties portions of the Basin is covered by the District, extending from the common boundary northward beyond Canby and Alturas, as shown on **Figure 3-3**. In 1965, the District established Zone 2 in a nearly 1000-square mile area encompassing and surrounding Big Valley and, in 1994, the District designated the same boundaries for Zone 2 as management Zone 2A for, "…groundwater management including the exploration of the feasibility of replenishing, augmenting and preventing interference with or depletion of the subterranean supply of waters used or useful or of common benefit to the lands within the zone." These zones are shown on **Figure 3-4**.

### Watermasters

Two entities measure water diversions for reporting to the State Water Resources Control Board (SWRCB). These include the Big Valley Water Users Association and the Modoc County Watermaster. The boundaries of these two entities are shown on **Figure 3-4**.

### Lassen County Waterworks District #1

Lassen County Waterworks District #1 provides water and sewer services to the town of Bieber. The waterworks district boundary is shown on **Figure 3-2**.

### Adin Community Services District

Adin Community Services District provides wastewater services to the town of Adin. The district boundary is shown on **Figure 3-2**.

## 3.3 Land and Water Use

This section describes land use in the BVGB, water use sectors and water source types using the best available data. The most recent, best available data for distinguishing surface water and groundwater uses comes from DWR land use datasets. This data is developed by DWR "to serve as a basis for

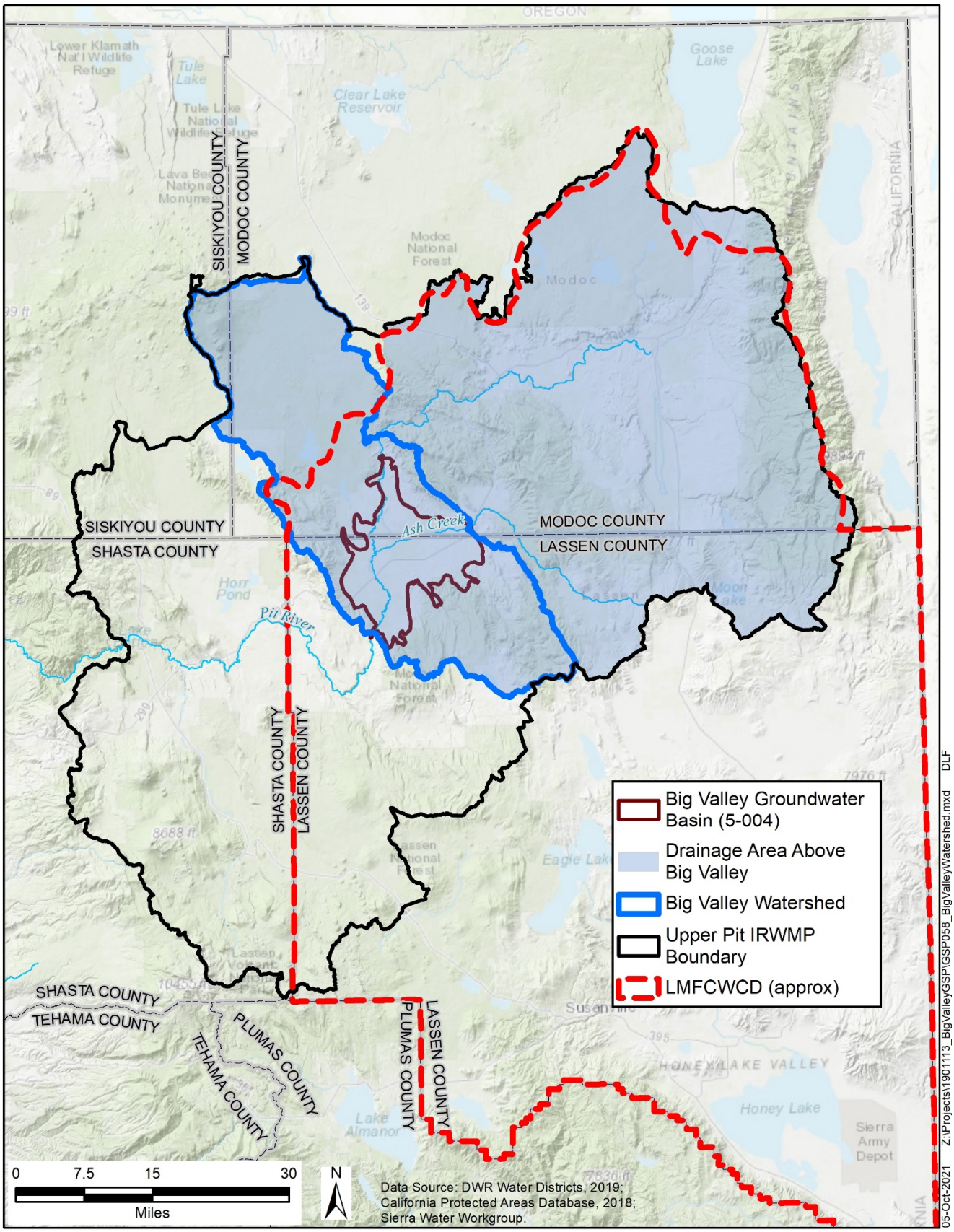



**Figure 3-3 Upper Pit IRWMP, Watershed, and LMFCWCD Boundaries**

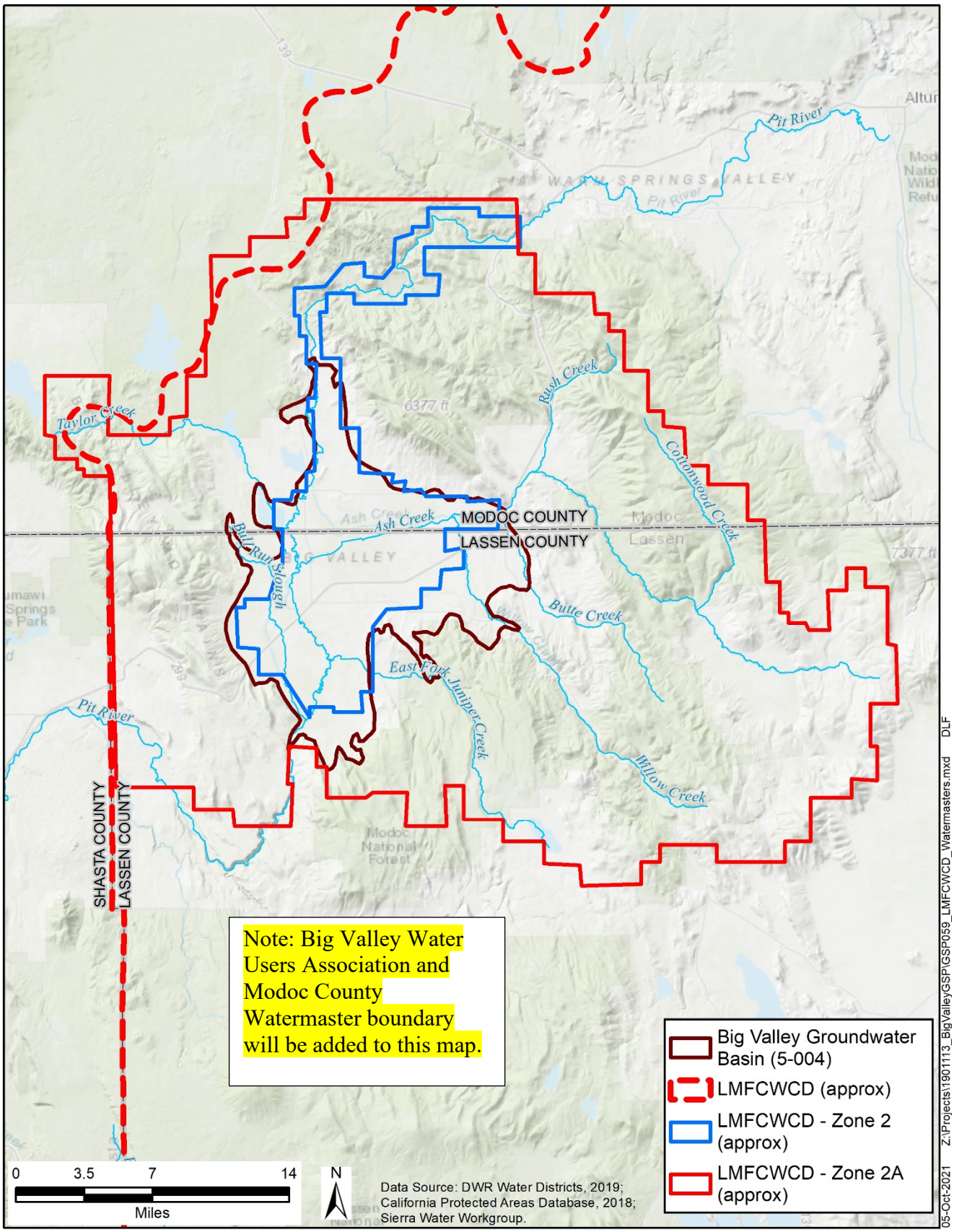



**Figure 3-4 LMFCWCD Zones and Watermaster Service Areas**

calculating current and projected water uses." Surveys performed prior to 2014 were developed by DWR using some aerial imagery with significant field verification. These surveys also included DWR's estimate of water source.

Since 2014, DWR has developed more sophisticated methods of performing the surveys with a higher reliance on remote sensing information. These more recent surveys do not make available the water source. **Table 3-1** is a listing of the years for which surveys are available.

**Table 3-1 Available DWR Land Use Surveys**

| Year | Modoc County | Lassen County | Water Source Included |
|---|---|---|---|
| 1997 | Yes | Yes | Yes |
| 2011 | Yes | No | Yes |
| 2013 | No | Yes | Yes |
| 2014 | Yes | Yes | No |
| 2016 | Yes | Yes | No[a] |

Note:
[a] DWR provided the GSAs hybrid a hybrid dataset with the 2011 and 2013 water sources superimposed onto the 2016 land use
Source: DWR 2020d

Land use in the BVGB is organized into the water use sectors listed in **Table 3-2**. These sectors differ from DWR's water use sectors identified in Article 2 of the GSP regulations because DWR's sectors don't adequately describe the uses in Big Valley. **Figure 3-5** shows the 2016 distribution of land uses and **Table 3-2** summarizes the acreages of each. Several data sources were used to designate land uses as described below, including information provided by DWR through a remote sensing process developed by Land IQ. (DWR 2016d) Other data sources are described below.

- **Community** This is non-agricultural, non-industrial water use in the census-designated places of Bieber, NuBieber and Adin, although some of these areas may also have some minor industrial uses. These community areas were delineated using the areas designated as "urban" by DWR (2016d). DWR's data included the areas north and northeast of Bieber (area of the former mill and medical center) as "urban." For this GSP, those areas were re-categorized from urban to industrial, as that is more descriptive of the actual land use. In addition, parcels that make up the core of Nubieber were included as community.
- **Industrial** There is limited industrial use in the Basin. The DWR well log inventory shows 6 industrial wells, all located at the inactive mill in Bieber. The areas north and northeast of Bieber, including the former mill and the medical center have been categorized as industrial. In addition, the parcels associated with railroad operations in Nubieber were added. There is some industrial use associated with agriculture but that is included under the agricultural water use sector.

- **Agricultural** Agricultural use is spread across the Basin and was delineated using DWR's (2016g) land use data[10].
- **State Wildlife Area** The area delineated in **Figure 3-5** is the boundary of the ACWA, located within the center of the Basin. The area includes some wetlands created by the seasonal flow of 6 streams and year-round flow from Ash Creek. The area also has upland habitat.
- **Managed Recharge** Flood irrigation of some fields and natural flooding of lowland areas provides recharge to the Basin even though it is not of a formalized nature that would put it into this managed recharge category. Some of the future projects and management actions in this GSP include managed recharge.
- **Native Vegetation** Native vegetation is widespread throughout the Basin. Many of the areas under this category also have domestic users. Native vegetation and domestic land uses are categorized together because it is not possible to distinguish between the two with readily available data.
- **Domestic** This sector includes water use for domestic purposes, which aren't located in a community service district. Domestic use generally occurs in conjunction with agricultural and native vegetation and is best represented on the map categorized with native vegetation, as most of the agricultural area is delineated by field and does not include residences.

**Table 3-2 2016 Land Use Summary by Water Use Sector**

| Water Use Sector | Acres | Percent of Total |
|---|---|---|
| Community[a] | 250 | <1% |
| Industrial | 196 | <1% |
| Agricultural | 22,246 | 24% |
| State Wildlife Area[b] | 14,583 | 16% |
| Managed Recharge | - | 0% |
| Native Vegetation and Rural Domestic[c] | 54,782 | 60% |
| **Total** | **92,057** | **100%** |

Notes:
[a] Includes the use in the communities of Bieber, Nubieber and Adin
[b] Made up of a combination of wetlands and non-irrigated upland areas
[c] Includes the large areas of land in the Valley which have domestic wells interspersed
Source: Modified from DWR 2020d

Many of the lands within the Basin are enrolled in the Conservation Reserve Program (CRP) and Wetlands Reserve Program (WRP). The CRP is a land conservation program administered by the Farm Service Agency (FSA). In exchange for a yearly rental payment, farmers enrolled in the program agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality. Contracts for land enrolled in the CRP are from 10 to 15 years in length. The WRP is a similar program for wetlands was available for enrollment until February

[10] This dataset has been identified as being inaccurate and has been included as a data gap.

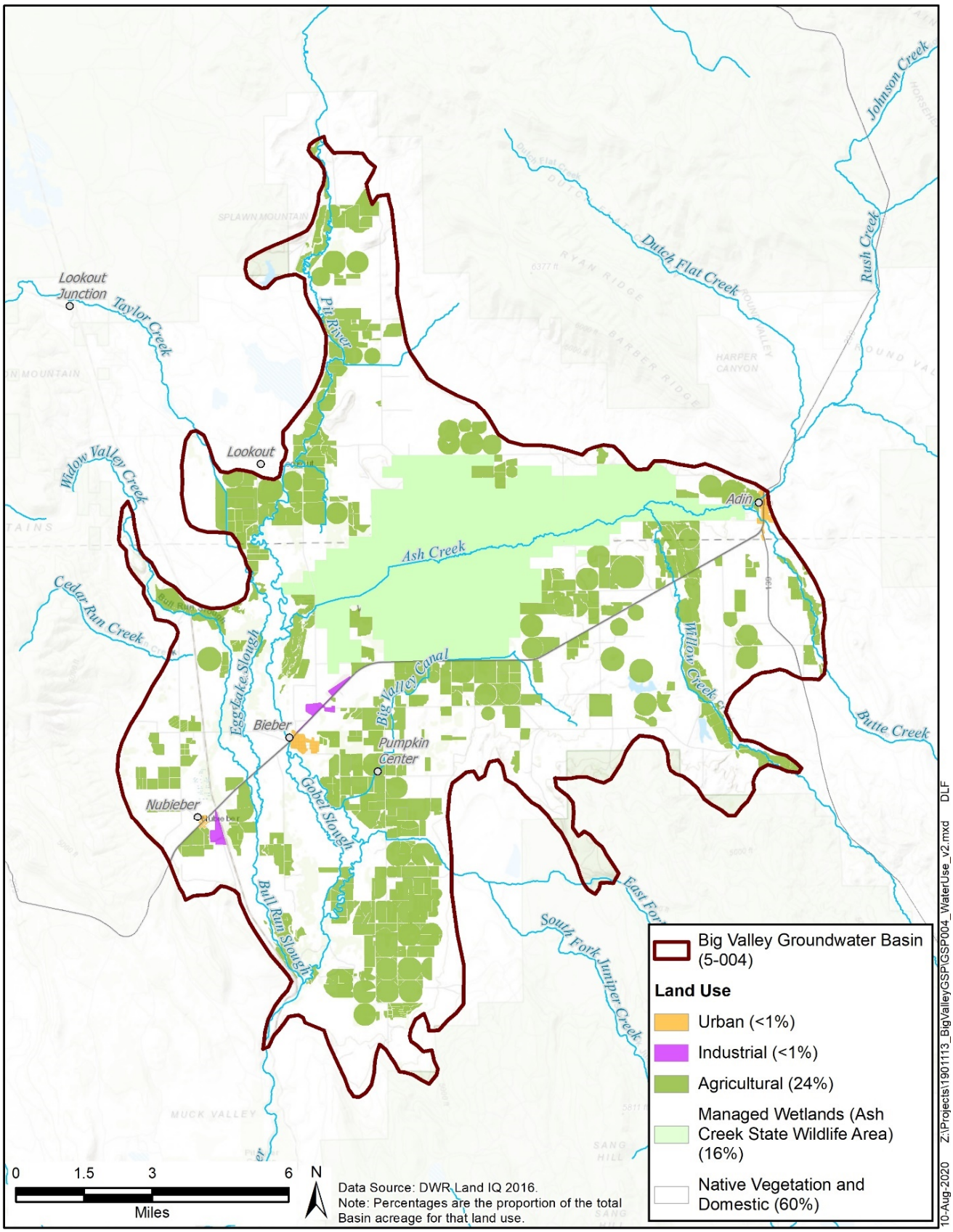



**Figure 3-5 Land Use by Water Use Sector**

7, 2014. Land enrolled in the program before the end date continues to be enrolled until the termination of the contract 10-15 years later.

In addition to the uses described above, Tthe Big Valley GSAs are aware of illegal land use activity within the Basin (i.e., unlicensed marijuana growers) which is likely having a negative impact on surface water quality and quantity within the Basin. This illegal activity is occurring both within the alluvial portion of the Basin and the upstream watershed and often includes groundwater use and illegal diversions of surface water. Lassen and Modoc counties have limited staff to monitor and report this situation and enforcement action is within the purview of state and federal agencies. These agencies include the Bureau of Cannabis Control, CDFW, State Water Board and the BLM. To date, these state and federal agencies have not taken aggressive enforcement action against this illegal activity and according to county staff (Norwood 2021), the problem is getting noticeably worse over time. The timing and volume of these illegal diversions cannot be quantified at this time.

### 3.3.1 Water Source Types

The Basin has two water source types: groundwater and surface water. Recycled water[11] and desalinated water are not formally utilized in the Basin nor is stormwater used as a formal supplemental water supply at the time of the development of this GSP. Informal reuse of irrigation water occurs with capture and reuse of tail water by farmers and ranchers. Storm water is stored in reservoirs for future use as a formal water source. **Figure 3-6** and shows an estimate of the distribution of water sources to lands throughout the Basin. Chapter 6 – Water Budget provides details on how the sources were mapped for this figure.

There are three public water suppliers (as designated by the State Water Board) in the Basin use groundwater: Lassen County Waterworks District #1 in Bieber, the Forest Service Ranger Station in Adin and the California Department of Forestry and Fire Protection (CAL FIRE) conservation camp west of the BVGB. The conservation camp is located outside the Basin boundary, but their supply well is inside the Basin and the water is pumped up to the camp. Many domestic users have groundwater wells, but there are some surface water rights from Ash Creek and the Pit River that are designated for domestic use. The ACWA is fundamentally supported by surface water, but the CDFW does have three wells that are utilized in the fall for habitat enhancement.

## 3.4 Inventory and Density of Wells

### 3.4.1 Well Inventory

The best available information about the number, distribution and types of wells in Big Valley comes from well completion reports (WCRs) maintained by DWR[12]. The most recent catalog of WCRs was provided through their website (DWR, 2018c) as a statewide map layer. This data includes an inventory

[11] Recycled water generally refers to treated urban wastewater that is used more than once before it passes back into the water cycle. (WateReuse Association, 2020)

[12] All water well drillers with a C57 drilling license in California are required to submit a well completion report to DWR whenever a well is drilled, modified, or destroyed.

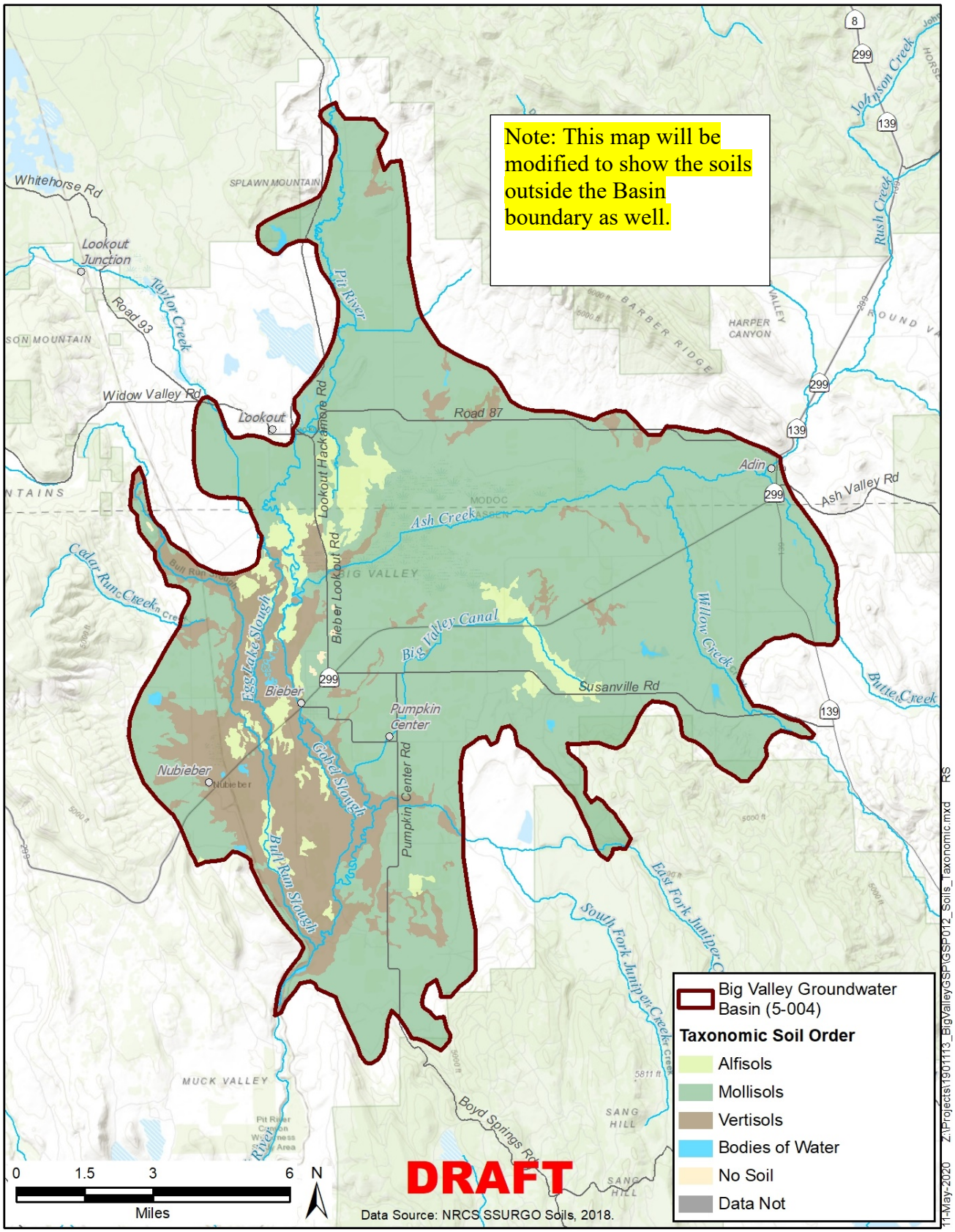
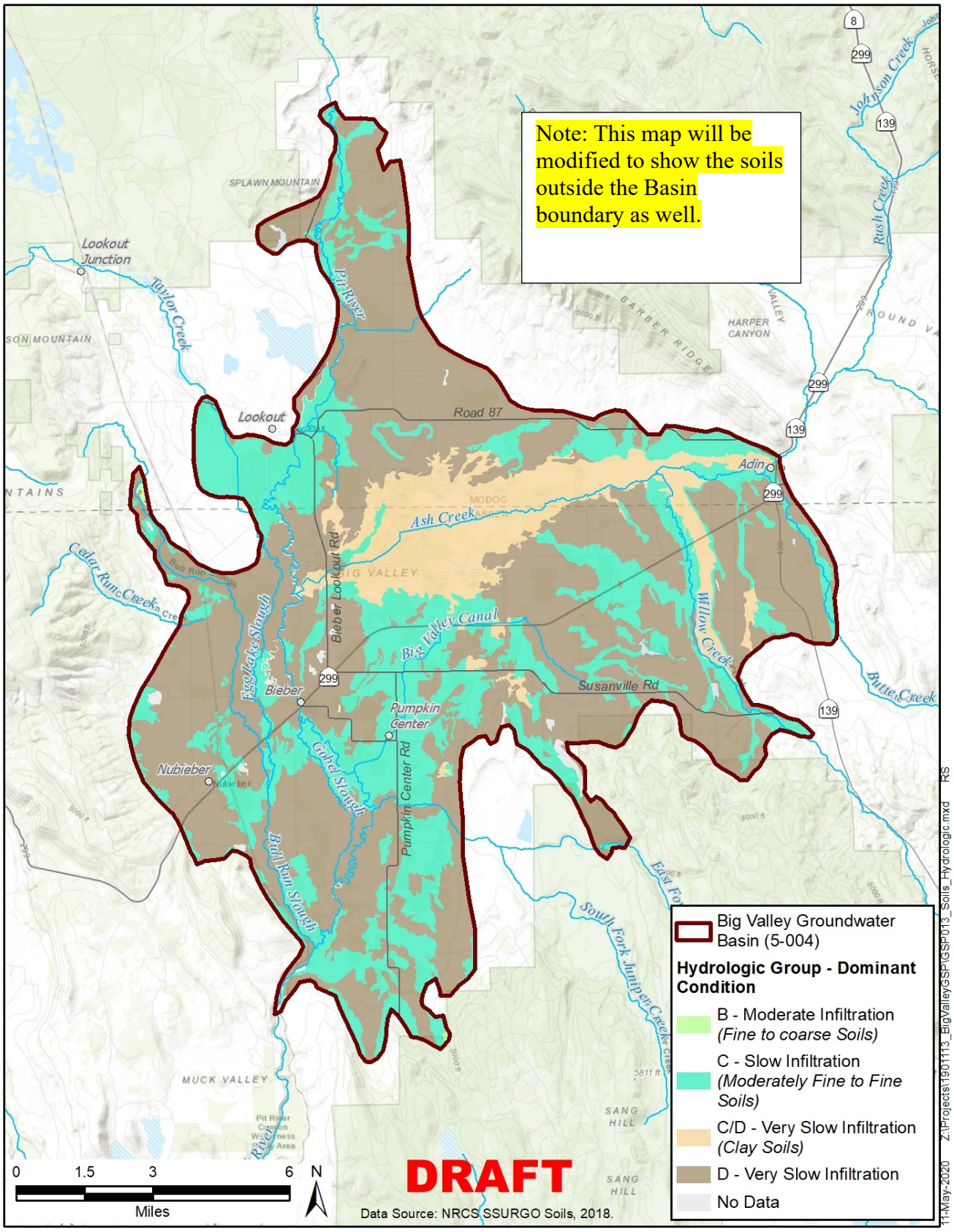



**Figure 4-9 Taxonomic Soils Classifications**




5455
5456 **Figure 4-10 Hydrologic Soils Group Classifications**

BVGB and to the west of Adin. It should be noted that the SAGBI is a large-scale, planning level tool and does not preclude local site conditions that are good for groundwater recharge.

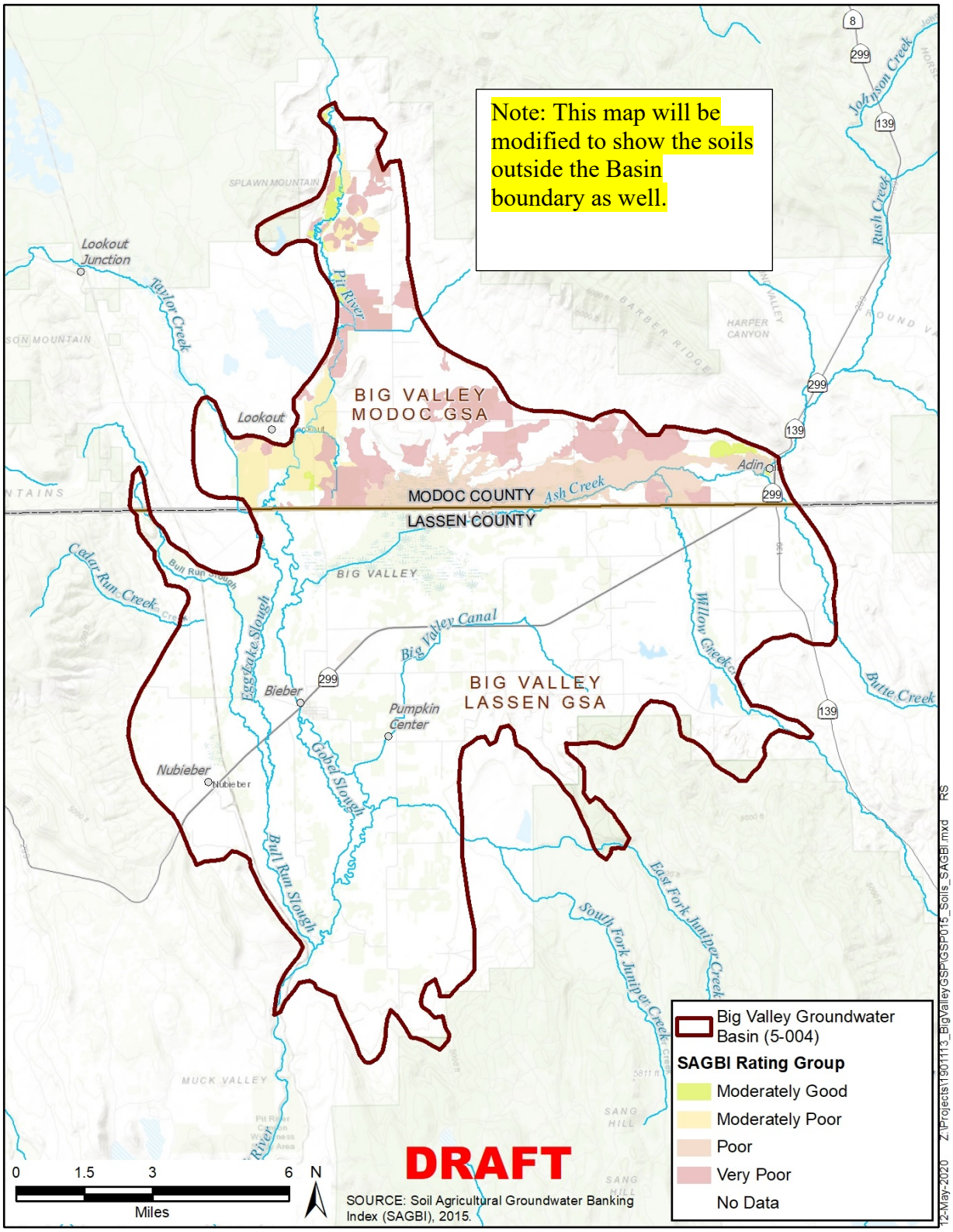



**Figure 4-11 SAGBI Classifications**

## 4.6 Beneficial Uses of Principal Aquifer

Primary beneficial uses of groundwater in the BVGB include agricultural, environmental, municipal and domestic uses. A description of each is provided below.

### Agricultural

Agricultural users get their supply from surface water diversions, groundwater, or a combination of the two. **Figure 3-6** from the previous chapter illustrates DWR's estimate of the primary source being used around the Basin. The primary crops are grain and hay crops (primarily alfalfa) with some wild rice.

### Industrial

Industrial groundwater use is limited in the BVGB. According to DWR well logs, six industrial wells have been drilled, all of them near Bieber at Big Valley Lumber, which is not currently in operation. **Figure 3-5** shows some areas of industrial use, but more use is likely present throughout the Basin as agricultural users have some associated industrial needs.

### Environmental

Environmental uses for wetland and riparian botanical and wildlife habitat occur ~~primarily~~ within the ACWA in the center of the Basin, near the overflow channels adjacent to the Pit River in the southern portion of the Basin and along the riparian corridors of some of the minor streams that flow into Big Valley. Additionally, private lands throughout the Basin provide for environmental uses, including thoase enrolled in the CRP and WRP programs discussed in Section 3.3.

### Municipal

The State Water Board recognizes three public water systems that use groundwater under the purview of the DDW: Lassen County Waterworks District #1 (LCWWD#1) which serves the community of Bieber, the Forest Service Station in Adin which provides groundwater to a non-community, non-transient population and the CAL FIRE conservation camp west of the Basin whose well is located within the Basin boundary.

### Domestic

Domestic users include residents that use their own well for household purposes. The BVGB has a population of about 1,046. With the 312 Bieber residents receiving water from municipal supply, the majority of the remaining 734 residents are domestic users.

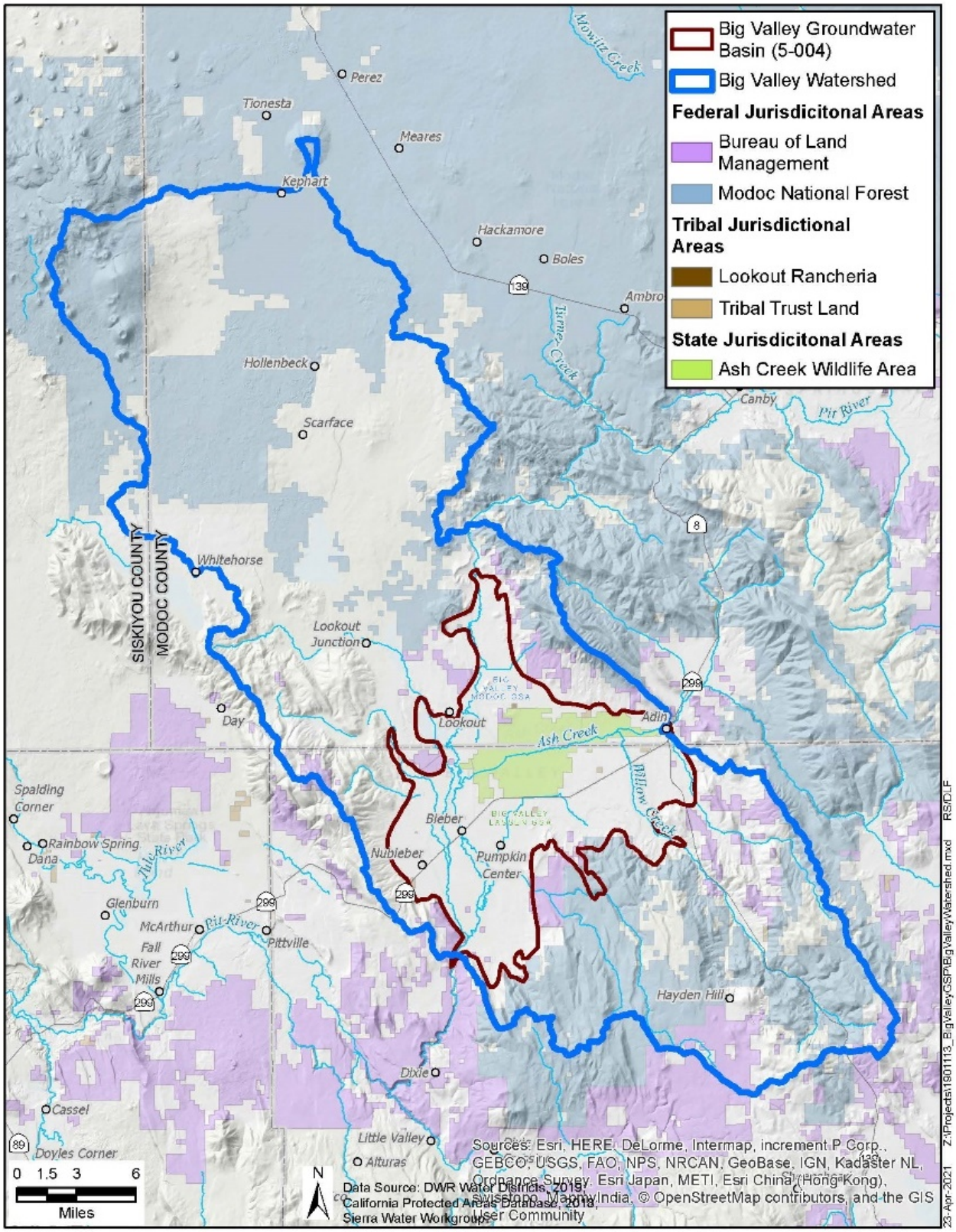
# 9. Projects and Management Actions §354.44

Through an extensive planning and public outreach process, the GSAs have identified an array of projects and management measures that may be implemented to meet sustainability objectives in the BVGB. Additionally, numerous state and federal programs are available in the Basin to help meet the sustainability goals. Some of the projects can be implemented immediately while others will take significantly more time for necessary planning and environmental review, navigation of regulatory processes and implementation. The Big Valley Basin is relatively small, and while recharge does occur within the Basin itself, significant recharge comes from the extensive uplands surrounding the Basin. Projects will be located within the greater Big Valley watershed boundary shown in **Figure 9-1**.

Although the Big Valley area is extremely rural and economically disadvantaged, and resource capacity is limited, there are several local, state and federal agencies that can assist in project development.

Project implementation will also be impacted by funding acquisition. **Table 9-1** lists current state and local funding sources that can be targeted to support project planning and implementation.

With a proactive approach to identify projects for increased recharge and conservation in the Big Valley Basin and surrounding watershed, it is envisioned that the GSAs will be successful in remaining a sustainable groundwater basin. With the possible exception of a large surface water storage project such as Allen Camp Dam, the projects and management measures describe in this chapter are expected to work in combination and should be considered as a whole rather than dependent on any single strategy. Should sustainability not be realized, additional projects and management actions will be considered and developed as appropriate. A timeline for projects can be found in **Table 9-2**~~-~~. The Regulations require details about each project to satisfy§354.44. Most of those details ~~and additional details fulfilling state requirements~~ can be found in **Table 9-3**. One of the items not included in **Table 9-3** is §354.44(b)(7) is a description of the legal authority required for each project. The GSAs have the legal authority to coordinate and/or implement each of the projects described based on their authority under SGMA and state law. Some of these projects include aspects that will be implemented on private and public land. In those cases, permission and authority to implement the project will be obtained from the land owner.




6733
6734 **Figure 9-1 Big Valley Watershed Boundary**

6735 **Table 9-1 Available Funding Supporting Water Conservation**

| Funding Program Title | Managing Agency | Description of Funding |
|---|---|---|
| Wetlands Reserve Program, Crop Reserve Program, Environmental Quality Improvement Program | NRCS (website) | Cost share funding for wide array of soil, water and wildlife conservation practices. Funding priorities developed locally. |
| Conservation Innovation Grants | NRCS (website) | Supports development of new tools, approaches, practices and technologies to further conservation on private lands. |
| Partners for Fish and Wildlife Program | US Fish and Wildlife Service (website) | Private land meadow, forest, or rangeland restoration, conservation easement. |
| State Water Efficiency and Enhancement Program (SWEEP) | California Dept of Food and Agriculture (CDFA) (website) | Supports implementation of water saving irrigation systems. |
| Healthy Soils Program | CDFA (website) | Supporting management and conservation practices for enhancing soil health (which includes water holding capacity). |
| Farmer/Rancher and/or Professional + Producer grants | Western Sustainable Agriculture Research and Education (website) | Farmer-driven innovations in agricultural sustainability including profitability, stewardship and quality of life. |
| Alternative Manure Management Program (AMMP) (link) | CDFA (website) | Financial assistance for non-digester manure management. |
| Sustainable Groundwater Management | DWR (website) | Planning and implementation grants supporting sustainable groundwater management. Disadvantaged communities and economically distressed areas. |
| State Forest Health Program | CAL FIRE (website) | Improve forest health throughout California. |
| USDA for household well deepening | USDA Rural Development (website) | No interest loan up to $11K to improve existing domestic wells. |

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6738 **Table 9-2 Projects and Potential Implementation Timeline**

| No. | Category | Description | Estimated Time for Potential Implementation (years) | | |
|---|---|---|---|---|---|
| | | | 0-2 | 2-8 | >8 |
| 1 | 9.1 Recharge Projects | AgMAR | X | X | X |
| 2 | | Drainage and Basin Recharge | X | X | X |
| 3 | | Ag Injection Wells | | | X |
| 4 | 9.2 Research and Data Development | Stream Gages | X | | |
| 5 | | Refined Water Budget | X | X | |
| 6 | | Agro-Climate Station | X | | |
| 7 | | Voluntary Installation of Well Meters | X | X | |
| 8 | | Adaptive Management | X | X | X |
| 9 | | Mapping and Land Use | X | X | |
| 10 | 9.3 Increased Storage Capacity | Expanding Existing Reservoirs | | X | |
| 11 | | Allan Camp Dam | | | X |
| 12 | 9.4 Improved Hydrologic Function | Forest Thinning and Management | X | X | X |
| 13 | | Juniper Removal | X | X | X |
| 14 | | Stream and Meadow Restoration | X | X | X |
| 15 | 9.5 Water Conservation | Irrigation Efficiency | X | X | |
| 16 | | Landscaping and Domestic Water Conservation | X | X | |
| 17 | | Conservation Projects | X | X | |
| 18 | 9.6 Education and Outreach | Public Communication | X | | |
| 19 | | Information and Data Sharing | X | X | |
| 20 | | Fostering Relationships | X | | |
| 21 | | Compiling Efforts | X | X | |
| 22 | | Educational Workshops | X | | |

6739 Note: AgMAR = Agricultural Managed Aquifer Recharge

6740 **Table 9-3 Required Elements for Projects and Management Actions**
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| Project | Brief description | Circumstances under which the project will be implemented | Public notification process | Permitting and regulatory process | Benefits | Schedule | Estimated cost |
|---|---|---|---|---|---|---|---|
| 9.1 Basin Recharge Projects | Agricultural Managed Aquifer Recharge is the practice of using excess surface water (when available) and applying it to agricultural fields to intentionally recharge groundwater aquifers | AgMAR will be performed during winter months during high surface flows. The nature, frequency and timing of these flows will be evaluated through a Water Availability Analysis (WAA). | Notification of available water and success of this projects will be communicated at public GSA meetings. Agreements will be made between the GSAs and interested producers. | Following development of the WAA, an AgMAR permit for surface water diversions can be solicited from the State Water Board. Currently this permitting process can take 6-18+ months and cause significant economic burden to the applicant. An organized application for Basin-wide winter diversions by the GSAs could lessen some of the regulatory burden since they qualify for a streamlined process but a waiver of fees for extremely disadvantaged communities working to improve groundwater recharge may also be needed. | Irrigating every 5-7 days for roughly 10 weeks in the winter/spring would benefit 2-5 AF of water per acre. Previous research has quantified that over 90% of water is recharged to deep aquifers or available in the soil profile with AgMAR. The limitation to this project is available winter for recharge but a project goal of 1,000 acres per year could provide roughly 10,000 AF of water per year benefit. | Water budget planning and permitting will take 6-18 months and possibly more depending on the case load at the department of water resources. After an off-season water budget is completed, permitting can be distributed to the GSAs for winter recharge location selection. AgMAR could start being used at productive scale by 2024 if all processes go smoothly. | The cost to develop the WAA is still being developed but may be covered under existing grants from DWR. The cost of submitting a streamlined permit will also be developed, including fees. |
| 9.2 Research and Data Development | Stream gages are scientific instruments used to collect streamflow and water quality data to decrease scientific uncertainty in order to inform water management decisions. Agri-climate/CIMIS stations are helpful in monitoring for climactic factors such as temperature, humidity, wind speed, etc. and overall help refine estimates of ET in the Basin. Refining the water budget for the Basin will improve the accuracy with which management decisions are made because many of the assumptions used to generate the water budget stem from data gaps that need to be addressed, or other efforts to collect and analyze data submitted through other regulatory programs. | In addition to the continued use of existing stream gages which monitor many of the seasonal streams that contribute inflow to the Big Valley Basin, stream gages may be installed if locations and need are determined. Presently, Modoc County is working to install an additional stream gage where the Pit River enters the Basin. Data from agri-Climate/CIMIS stations may be utilized in order to make water management decisions with regard for climactic factors such as wind, rain etc. Adaptive management will be employed throughout the implementation process to allow for management decisions to reflect the best available data as more information comes available. Employing adaptive management strategies will expand our capacity to conduct research and data development, also. Refining the water budget will be done as more data becomes available through the combination of the data development projects described previously. | All research and data development progress will be shared at public GSA meetings. Data collected from gaging stations will be publicly available. | We will continue to work with DWR to ensure compliance with any relevant laws and to obtain any necessary permits related to stream gage installation and maintenance, as well as for other projects that fall under adaptive management strategies and the water budget. | Decreasing data gaps would decrease reliance on assumptions to govern groundwater management decisions. As more data becomes available, more accurate estimates of evapotranspiration would allow for more precise water budgeting estimates. | Gaging stations being installed where necessary early in the planning process in order to decrease uncertainty related to streamflow. They will be monitored throughout. Adaptive management strategies are anticipated to be employed throughout the GSP development and implementation phases. Refining the water budget is important early on in order to create a GSP that best reflects existing conditions in the Basin and which may be referenced in the future to perform adaptive management. | Funding is available for the development of new gaging stations. Maintenance costs may vary, but 1 estimate projects the annual maintenance cost for a single gage to be around $15,000.<br>Funding for projects related to adaptive management and refining the water budget will be acquired as necessary. Presently, there is funding to maintain or install flow meters on private wells. More funding is likely available for similar projects, such as refining mapping and land use designations within the Basin. |

| Project | Brief description | Circumstances under which the project will be implemented | Public notification process | Permitting and regulatory process | Benefits | Schedule | Estimated cost |
|---|---|---|---|---|---|---|---|
| 9.3 Increased Surface Water Storage Capacity | Surface water storage may be used to reduce reliance on groundwater by providing an alternative water source. Presently, Robert's Reservoir and several others including the Inverson, Silva and BLM reservoirs mitigate potential overdraft. As water levels in streams and other water courses diminish during the dry months, existing diversions may not adequately meet the needs of users. Expanding the capacity of these reservoirs and possibly constructing new reservoirs such as the Allan Camp Project would allow additional water from snowmelt and storm events to be stored. This would help circumvent reliance on groundwater and would provide reliable supplies of surface water for users. | Projects intended to increase surface water storage will be implemented when it is economically advisable to do so and when they may help mitigate Basin overdraft. | Pursuant to environmental review, these projects will have opportunities for public comment and project documents will be made publicly available whenever appropriate. Both National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) compliance mandate opportunities for public comment. | Permitting for surface water storage projects will be subject to NEPA and CEQA depending on whether the project sites are located on federal or state land respectively. | Increasing the capacity to store surface water by capturing runoff could reduce reliance on groundwater during summer months. Further, increasing surface water storage would improve water security during dry years. | The timeframe for largescale infrastructure projects would likely be upwards of 8 years, as the regulatory and environmental review processes generally require extensive coordination between agencies and stakeholders for planning and compliance. | Large infrastructure projects can be quite expensive. $1 in May 1981 had the same buying power as $2.97 in April 2021. A ballpark estimate of the capital costs for the Allan Camp Project in its entirety would amount to approximately $344,041,830, with the dam and reservoir component amounting to an additional $174,487,500. These figures are Funding may be available from the federal government in the form of loans under the Small Reclamation Projects Act of 1956. The cost associated with expanding existing reservoirs depends on the method employed. Sediment removal typically costs between "$8,000 and $32,000 per acre foot," (Lund 2014) and would be done infrequently. Increasing dam height typically costs between "1,700 to $2,700 per acre foot" (Lund 2014). |
| 9.4 Improved Hydrologic Function and Upland Recharge | Upland forest recharge enhancement occurs in conjunction with vegetation management and forest fuels reduction by increasing snow water content and reducing dense forest canopy and associated evapotranspiration | Upland forest recharge will take place will be enhanced by implementation of forest health and fuels reduction projects within the Big Valley watershed. Such projects are on-going and in varying stages of planning and implantation. Support from GSAs and local, state and federal partners will increase implementation rate and scope. Water availability and recharge enhancement will be realized along with fire/fuels and wildlife habitat benefits. | On federally-managed lands public notification of projects will be conducted under NEPA by the Modoc National Forest or Applegate BLM. State funded projects will follow CEQA public notification process. Opportunities on private land be communicated by GSAs, Pit Resource Conservation District and other state and local entities. | Projects permitting will vary by land ownership. On federal lands: NEPA and applicable federal land policies. On private lands: state forestry rules are applicable and programs such as CAL FIRE's Forest Health Program will help clarify and streamline permitting processes. | Snow water content has been shown to increase by 33 to 44% from a dense conifer canopy to an open area. Surface run-off has also been shown to respond to treatments. Recharge figures are difficult to quantify, but even a modest increase in recharge over 10% of the potential upland recharge area could result several thousand AF of water. | The initial upland forest recharge project "Wagontire Project" is scheduled for implementation in 2022 and is expected completion in a 2- to 4-year window. | Project costs vary by site, but an estimated average is from $500 to $650 per acre. |
| 9.5 Water Conservation Projects | Water conservation and water use efficiency projects would primarily be adopted by growers and homeowners on their private property. Infrastructure improvements, while requiring capital outlay are not subject to permitting or public environmental review. | Project implementation will be voluntary with cost-share incentives. Projects will be implemented on a site-by-site basis and designed for overall production and economic efficiency, along with water use savings. | Notification of opportunity to participate will be through local agricultural organizations, extension outreach meetings and by sponsoring agencies. Broad public notification of individual projects is not required. | Projects in this category such as upgrading irrigation infrastructure, irrigation management techniques, home landscaping, etc. are generally not subject to permitting requirements. | Some practices have been shown to result in efficiency increases in the range of 10% at the field scale. Multiplied over a number of farms, water use savings could be significant. | Irrigation infrastructure and water use efficiency incentives are on-going. UC Cooperative Extension has submitted a grant proposal to SWEEP to initiate an outreach education program in 2022. | Costs vary widely. New irrigation infrastructure on a field scale can exceed $100,000. Soil moisture meters for irrigation scheduling can be in the $100's to $1,000's of dollars per farm. Landscaping and homeowner water efficiency projects in the $100's to $1000's per home. |
| 9.6 Education and Outreach | Education and outreach efforts can drive beneficial changes in patterns of use and protect water resources. Existing efforts employed by the GSAs include outreach about funding opportunities that support water conservation methods, coordinating information sharing efforts and facilitating informational meetings with stakeholder groups. | As an essential part of sustainability, outreach and education will be conducted throughout the development of the GSP, with many opportunities for public engagement. | Public information is available through the Big Valley GSP communication portal, accessible at bigvalleygsp.org. Informational brochures will be distributed to interested parties to make information about the GSP more accessible. | Public engagement is important to the regulatory process of SGMA and other acts that the GSP may be subject to. However, education and outreach are an incredibly important part of meeting the sustainability goals of this GSP, especially as it relates to equity and inclusion. | Public involvement in the GSP development is crucial in attaining sustainability. Research (OECD 2015) has shown that here are many social, economic and environmental benefits to education and outreach efforts in water management. These benefits can vary widely, but generally include increased levels of social cohesion, equity and conflict avoidance, improved water use efficiency and improved water quality. | Ongoing efforts to engage the public in outreach and education programs related to groundwater management are essential as part of the Groundwater Sustainability Plan. The anticipated timeline for outreach and education efforts is indefinite, but it is especially important throughout the planning and implementation process of the GSP. | Costs may vary depending on program type. |