

7.1 Introduction

This chapter describes the major issues and conflicts affecting the management and conditions of the CABY region. These issues and conflicts were identified in the CABY planning work groups for the water supply, water quality, environment and habitat, land use, and recreation management areas. The work groups were comprised of local experts in each of the areas with current knowledge of the watersheds and the conditions that affect water resources. The work groups focused on 14 regional watershed issues described in this chapter. However since the issues of water quality and water supply are so significant for this region, they are addressed in depth in other chapters. Please see Chapter 4 and 5 for more details regarding water quality and water supply in the CABY region.

The fundamental purpose of an IRWMP for the CABY region is to identify current and future water resource problems and develop solutions through good management practices. Consequently, the IRWMP is “issues driven” in that the current and future conditions, problems, and concerns throughout the CABY watersheds form the basis for the goals, objectives, and actions of the plan. Goals are the desirable conditions or solutions to the issues; objectives identify how the goals are attained, and actions are specific measures that will meet the objectives. Thus, the plan is a set of iterative steps illustrating the logical sequence from issues to goals to the specific actions.

Each issue is briefly described and then followed by a *Findings and Studies* section (in Chapter 4 for sediment, mercury, contamination, and temperature) that provides specific examples of the issue within the region and the sources of those findings. The studies and findings presented here only represent some of these sources; not every applicable source has been described under each issue.

7.2 Regional Watershed Issues

The major issues affecting water resources management in the CABY region are:

- Water Quality (*Sediment, Mercury, Contamination, Temperature*)
- Water Diversion
- Water Demand
- Water Rights
- Infrastructure
- Fire and Fuels
- Groundwater
- Flooding
- Instream Flow
- Habitat Alteration
- Fisheries and Aquatic Biota
- Agriculture
- Recreation
- Climate Change

7.2.1 *Sediment, Mercury, Contamination, and Temperature*

There are several significant issues of concern regarding water quality in the CABY region. Sediment, mercury, overall contamination, and water temperature are all issues in for the natural processes and human activities in the region. Chapter 4 provides specific examples of the water quality issue within the region and the sources of those findings.

7.2.2 *Water Diversion*

Water diversions and inter-basin transfers were developed to meet water supply needs for urban use, agriculture, and hydropower generation. It is expected that future water demands will dictate the need to utilize these systems and will require ongoing maintenance to meet human and environmental water demands. Water diversions cause a number of

environmental, water quality, and recreational problems due to inadequate instream flows below diversion points, and the potential introduction of foreign water into other watersheds.

Findings and Studies

Regional priorities include developing a more effective water transfer market, protecting water rights, and environmental and local economic interests, and streamlining the approval process of state and federal agencies for water transfers. Additional priorities include reducing conflicts between environmental needs and water project operations by providing water and flexibility; providing better protection for fish and habitats at critical times by supplying water in a flexible manner other than through strict requirements; and increasing water supply reliability by allowing projects to meet environmental and water supply needs at the same time.¹

It is expected that future water demands will dictate the need to utilize water diversions and systems and will require ongoing maintenance to meet human and environmental water demands.²

¹ CALFED Bay-Delta Program (2000). California's water future: a framework for action. Sacramento, CA: CALFED.

CALFED Bay-Delta Program (2000). Ecosystem restoration program plan. Sacramento, CA: CALFED.

CALFED Bay-Delta Program (2000). Record of decision. Sacramento, CA: CALFED.

² Nevada Irrigation District (NID) (1963). Federal Energy Regulatory Commission (FERC) #2266, Yuba-Bear Project. Grass Valley, CA: NID.

Nevada Irrigation District (NID). 2005. Yuba-Bear Hydroelectric Project – FERC Project NO. 2266: Draft Relicensing Plan and Schedule.

Placer County Water Agency (PCWA) (1967). Federal Energy Regulatory Commission (FERC) #2079, Middle Fork American River Project. Auburn, CA: PCWA.

Sacramento Municipal Utility District (SMUD) (2005). Federal Energy Regulatory Commission (FERC) #2101, Relicensing application for Upper American River Project. Sacramento, CA: SMUD.

7.2.3 Water Demand

Future water demands will increase in order to meet the needs of urban growth, agriculture and the environment. To meet these needs the region will need to focus on specific strategies to increase both supply and reliability. Increased storage, water use efficiency, conservation, water recycling, and conjunctive use are the programs and projects that will be pursued in the region.

Findings and Studies

Many planning documents throughout the region stress the fundamental need to meet water demands associated with all types of uses. These plans also identify the importance of increased storage and water efficiencies.³

El Dorado Irrigation District (EID) (2001). Water supply master plan. Placerville, CA: EID.

³ El Dorado County Water Agency (EDCWA) (2003). Draft Water Resources Development and Management Plan. Placerville, CA: EDCWA.

El Dorado County Planning Department (2004). El Dorado County general plan: a plan for managed growth and open roads; a plan for quality neighborhoods and traffic relief. Placerville, CA: El Dorado County.

El Dorado Irrigation District (EID) (2005). Final Urban Water Management Plan 2005 (UWMP) Update. Placerville, CA: EID.

El Dorado Irrigation District (EID) (2005). EID: 2005 Water resources and service reliability report. Placerville, CA: EID.

Nevada County and Harland Bartholomew & Associates, Inc. (1996). Nevada County general plan. Sacramento, CA: Nevada County.

El Dorado Irrigation District (EID) (2006). Recycled water program. Retrieved September 15, 2006, from <http://www.eid.org/recycled/recycled.html>.

Kennedy/Jenks (K/J) Consultants (2005). Nevada Irrigation District urban watershed management plan. Grass Valley, California: K/J Consultants.

Georgetown Divide Public Utility District (GDPUD) (2005). Urban water management plan. Georgetown, CA: GDPUD.

The CALFED Bay-Delta Program addresses several strategies that apply to water demand: maximize the use of available water supplies through conservation, water recycling, and water quality improvements; increase the flexibility of water systems at the state, federal and local level through improvements in conveyance, storage and water project operations; develop groundwater and surface water storage projects to boost flexibility and provide additional supplies for agriculture, urban and environmental use; provide financial and technical assistance to implement half million to one million acre-feet of new, locally managed groundwater storage; pursue specific opportunities for new off-stream storage sites and expansion of existing on-stream storage sites; and reduce water demand through "real water" conservation.⁴

7.2.4 Water Rights

Water rights in the CABY region were historically given for use in mining, agriculture and hydropower. With the increase in population, regions such as CABY are struggling with the current water right system and the ability to meet the agricultural, environmental and urban demands. For these reasons water rights have become an important issue.

Placer County (1994). Placer County General Plan. Auburn, CA: Placer County.

Placer County Water Agency (PCWA) (2005). Urban water management plan. Auburn, CA: Placer County.

El Dorado Irrigation District (EID) (2006). Recycled water program. Retrieved September 15, 2006, from <http://www.eid.org/recycled/recycled.html>.

Kennedy/Jenks (K/J) Consultants (2005). Nevada Irrigation District urban watershed management plan. Grass Valley, California: K/J Consultants.

⁴ CALFED Bay-Delta Program (2000). California's water future: a framework for action. Sacramento, CA: CALFED.

CALFED Bay-Delta Program (2000). Ecosystem restoration program plan. Sacramento, CA: CALFED.

CALFED Bay-Delta Program (2000). Record of Decision. Sacramento, CA: CALFED.

Water supplies are controlled and managed under an intricate system of common law principles, constitutional provisions, state and federal statutes, court decisions, and contract agreements. Water rights provide the right to reasonable and beneficial use of the water, not ownership. As supply becomes limited, the different and often competing use of water becomes an issue. There are stakeholders in the CABY region that would like to reallocate or apply for new water rights to meet environmental needs. However, some water agencies are reluctant to change or reallocate existing water rights.

In addition to the internal water right issues, the water agencies in the CABY region are in conflict with other regions in the state regarding the area of origin statutes. The area of origin provisions were added to the water code to protect local Northern California supplies from being depleted by the projects. El Dorado County is pursuing area of origin water rights to ensure adequate supplies for future use.

Findings and Studies

Purveyors in the CABY region hold an array of pre-1914 and modern appropriative water rights. Pre-1914 rights are extremely valuable due in part to the fact that they are not subject to the permitting authority of the State Water Resources Control Board (SWRCB). Unlike modern water rights, the place and purpose of use and point of diversion of pre-1914 rights may be changed without State approval. This provides flexibility in meeting the future needs of the region. However, just as modern rights, pre-1914 water rights may be lost if not used but yet cannot be used in a manner that is wasteful, unreasonable, or contrary to public trust uses. Thus, it is a priority for local agencies to adapt their use of this water to the changing demographics of the region. For example, El Dorado Irrigation District is seeking authorization to relocate pre-1914 rights to divert into gold rush era ditches to Folsom Lake to supply the burgeoning community of El Dorado Hills. This water was historically used for mining and agriculture. Such changes in use do, however,

impose additional demands on infrastructure for conveyance, treatment, and delivery.

As for post-1914 water rights, their use is constrained by the terms of the water right decisions under which they are issued by the SWRCB. Obtaining new water rights or changing the purpose of use, place of use, or point of diversion of existing modern water rights requires SWRCB approval. This administrative process can be very expensive and time consuming.

Entities in the region may find it more advantageous to engage in water transfers with existing right holders instead of pursuing new water rights. Such arrangements do not diminish the rights of the existing holder and may offer valuable protection against forfeiture for non-use. With SWRCB approval, the water right holder may serve a different place or purpose of use or use a different point of diversion. The terms and conditions of delivery may be structured by contract between transferor and transferee.

7.2.5 Infrastructure

The existing water storage, delivery and treatment infrastructure in the CABY region will require improvements and retrofitting to address the water supply, water quality and environmental needs of the area (see Section 3.7.2 for a description of the CABY infrastructure).⁵ Some infrastructure will need to be maintained, eliminated or minimized to address water losses in canals and environmental habitat. New storage facilities and new delivery systems will need to be developed throughout the CABY region to meet the residential housing growth. Wastewater treatment infrastructure in the region is often at or exceeding capacity, impacting in-stream water quality and increasing the potential for system failures. The risk of loss and damage to the infrastructure from catastrophic fires is also a

⁵ El Dorado Irrigation District (EID) (2001). Water supply master plan. Placerville, CA: EID.

concern. Fish passage on existing infrastructure is an additional concern.

Findings and Studies

Regional priorities for improving the water storage, delivery, and treatment infrastructure include: increasing the flexibility of water systems at the state, federal and local level through improvements in conveyance, storage and water project operations; modifying the existing conveyance systems for water supply, water quality, flood protection and ecosystem benefits; and improving pumping operations of the State Water Project to increase reliability and enhance fish protection.⁶

7.2.6 Fire and Fuels

The reduction of fire fuels is critical in minimizing the risk of catastrophic wildfire. Catastrophic fires in forested areas cause substantial erosion and sediment input from burned slopes. The increased urban-wildland interface increases the risk of fire posing a real threat to the health of the watersheds. Past management activities such as overgrazing, selective harvesting, and fire suppression, along with periods of high moisture have increased the fuel loadings, and in turn, increased the risk of catastrophic fires.

Findings and Studies

The threat of catastrophic fire and the reduction of fire fuels is a concern throughout the CABY region.⁷ ⁸California has a complex

⁶ CALFED Bay-Delta Program (2000). California's water future: a framework for action. Sacramento, CA: CALFED.

CALFED Bay-Delta Program (2000). Ecosystem restoration program plan. Sacramento, CA: CALFED.

CALFED Bay-Delta Program (2000). Record of Decision. Sacramento, CA: CALFED.

⁷ El Dorado County Planning Department (2004). El Dorado County general plan: a plan for managed growth and open roads; a plan for quality neighborhoods and traffic relief. Placerville, CA: El Dorado County.

fire environment with multiple climates, landuse, diverse topography and many complex vegetation communities. To respond to this complex fire environment, custom strategies for each situation have been developed through a combination of pre-fire management, suppression, and post-fire management. These strategies are intended to lessen the costly impacts of future wildfires and offer alternatives to continually increasing suppression forces.⁹

The CABY region needs to address fuels reduction in areas of the watersheds in order to reduce the social, environmental, and economic costs of severe wildfires.

Current National Forest policies on fire and fuels include: treating fuels to reduce wildland

fire intensity and rate of spread; treating fuels in a cost-efficient manner to maximize program effectiveness; and actively restoring fire-adapted ecosystems by making demonstrated progress in moving acres out of unnaturally dense conditions.¹⁰

7.2.7 Groundwater

Due to the fractured nature of the geology in the CABY region, groundwater uses for potable water supplies are limited primarily to residential wells. Loss of recharge to the fractured rock aquifer could result in “mining” of groundwater. Potential contamination from septic systems or injection of contaminated surface water into fractured rock aquifers is also a concern. There is a limited amount of information on the groundwater system in this region. The lack of understanding of recharge processes and locations, and the hydrologic properties of fractured-rock aquifers at local and regional scales puts the groundwater resource at risk in terms of long-term sustainability.

Findings and Studies

Groundwater contributions to surface flows are important to quantify because many rivers depend upon groundwater contributions as baseflows and for temperature regulation. The baseflows of rivers help maintain the ecology and habitats of aquatic systems.¹¹

Present knowledge of groundwater hydrology in the CABY region is not very extensive, and efforts should be made to gather more information.^{12, 13} New information can help

General Plan Advisory Committee (1973, currently updating). Amador County general plan. Jackson, CA: Amador County.

Placer County (1994). Placer County General Plan. Auburn, CA: Placer County.

Nevada County and Harland Bartholomew & Associates, Inc. (1996). Nevada County general plan. Sacramento, CA: Nevada County.

⁸ Rainey, Jason (Executive Director, South Yuba River Citizens League). Personal Interview. April 25, 2006.

Templin, Bill (American River Watershed Group). Personal Interview. April 27, 2006.

Leimbach, Julie (Sierra Nevada Alliance). Personal Interview. April 27, 2006.
Osterholm, Lesa (Watershed Coordinator, Bear River Watershed Group). Personal Interview. April 28, 2006.

⁹ California Department of Forestry and Fire Protection (CDF) (2002). Fire and resource assessment program- land cover mapping and monitoring program (LCMMP). Retrieved August 15, 2006, from <http://frap.cdf.ca.gov/data/frapgisdata/select.asp>.

California Department of Forestry and Fire Protection (CDF) (2005). Fire and resource assessment program - land cover mapping and monitoring program (LCMMP). Retrieved August 8, 2006, from <http://frap.cdf.ca.gov/data/frapgisdata/select.asp>.

California Department of Forestry and Fire Protection (CDF) (2005). Nevada-Yuba-Placer Fire Management Plan 2005. Auburn, CA: Nevada-Yuba-Placer Unit.

California Department of Forestry and Fire Protection (CDF) and California Board of Forestry (1996). California Department of Forestry fire plan. Sacramento, CA: CDF.

¹⁰ USDA Forest Service, Pacific Southwest Region (2004). Sierra Nevada Forest Plan Amendment: Final Supplemental Environmental Impact Statement. Vallejo, CA: USDA Forest Service.

¹¹ Conklin, Martha. (2006). Groundwater Contributions to Baseflow in Sierra Nevada Rivers: Processes, Flow Paths and Residence Times, ongoing project. University of California, Merced.

¹² Rainey, Jason (Executive Director, South Yuba River Citizens League). Personal Interview. June 7, 2006.

inform future management and conservation efforts. There is also a lack of data on accurate groundwater estimation and water balance modeling, especially during dry years. As climate warming continues, it is urgent to improve our understanding of mountain-block hydrology and to assist in providing better information to decision makers about the implications of likely climatic and hydrologic shifts.¹⁴

Excessive groundwater pumping is said to occur in some parts of the CABY region, although metrics are not quantified. This is important especially in the Cosumnes River watershed because of its potential effects on the high-quality vernal pool habitat located at the downstream end of the watershed.¹⁵ Gravity-fed horizontal wells are the primary source of water for Forest Service facilities development, and will continue to be in the future.¹⁶ Further knowledge of groundwater systems will help direct this development as well as inform future management and conservation efforts in the region.

7.2.8 Flooding

Localized impacts to property and infrastructure from flood events are different from out-of-channel flows for environmental purposes. This issue focuses on localized flooding due to reduced channel capacity from sedimentation and encroachment into the floodplains. Lack of emergency notification has become a significant problem in the region.

¹³ Templin, Bill (Watershed Coordinator, American River Watershed Group). Personal Interview. June 7, 2006.

¹⁴ Baker, Stephen (President, Ground Water Watch). Personal Interview. April 27, 2006.

¹⁵ Eaton, N., Swenson, R., Reiner, R., Calegerie, V., Cox, R., Epstein, A., Tam, C. and Little, H. (2000). Cosumnes River project plan update. San Francisco, CA: The Nature Conservancy of California.

¹⁶ USDA Forest Service, El Dorado National Forest (n.d.). El Dorado National Forest Land and Resource Management Plan. Placerville, CA: USDA Forest Service.

Findings and Studies

Flooding has not historically been a severe problem in the CABY region, but runoff peaks have increased with climate change and growth and development in the planning area. New development converts permeable landscapes to less permeable areas and therefore causes increased and more immediate runoff. The lower watershed areas have the greatest risk of infrastructure damage from flooding.¹⁷

A widely acknowledged consequence of climate variability and change is an overall increase in average yearly temperature. This increase and the resulting changes in precipitation are associated with increased and more variable annual flood peaks.¹⁸ Infrastructure and emergency planning must accommodate such changes. There have been instances where flooding has caused wastewater treatment plants in the CABY region to go off-line because of infrastructure damage or to avoid potential damage. Such flooding also causes untreated water to enter water bodies.¹⁹

7.2.9 Instream Flow

Environmental flows are needed throughout streams and below dams and diversions to sustain aquatic ecosystems in a healthy condition, allow for fish passage, sediment transport and geofluvial processes, and develop and maintain riparian habitat and other wetlands.

Findings and Studies

¹⁷ Nevada County Resource Conservation District (NCRCD) (2004). Bear River watershed management plan. Grass Valley, CA: NCRCD.

¹⁸ California Department of Water Resources (DWR) (2006). Progress on incorporating climate change into management of California's water resources: technical memorandum report. Sacramento, CA: DWR.

¹⁹ Osterholm, Lesa (Manager Resource Conservationist, Nevada County Resource Conservation District). Personal Interview. June 7, 2006.

Regional priorities include: improving ecosystem health by increasing instream flows, where necessary, to achieve targeted benefits; reducing conflicts between environmental needs and water project operations by providing water and flexibility; providing better protection for fish and habitats at critical times by providing water in a flexible manner other than through strict requirements; and increasing water supply reliability by allowing projects to meet environmental and water supply needs at the same time.²⁰

Water management projects (reservoirs and dams) have blocked the normal migration routes and reduced water flow, forcing fish to move to less desirable habitats, and negatively affecting their reproduction. Dams and impoundments together with degraded conditions above and below dams, have led to a loss of about 90 percent of the historic fishery habitat throughout the Sierra. Appropriate instream-flow regimes below impoundments are critical to aquatic ecosystems.²¹

Aquatic wildlife and plants have adapted to certain ranges of conditions of flow and environmental characteristics that depend partly on flow. Humans modify flows in streams and rivers primarily by removing water from watercourses, or altering the flows through water storage and diversion. This modification can be extreme resulting in the potential for significant effects on aquatic communities both near the modification (e.g., a dam) or further downstream.

²⁰ CALFED Bay-Delta Program (2000). California's water future: a framework for action. Sacramento, CA: CALFED.

CALFED Bay-Delta Program (2000). Ecosystem restoration program plan. Sacramento, CA: CALFED.

CALFED Bay-Delta Program (2000). Record of Decision. Sacramento, CA: CALFED.

²¹ SNEP Science Team and Special Consultants (1996). Summary of the Sierra Nevada ecosystem project report. *Centers for Water and Wildland Resources*. Davis: CA: University of California.

Deer Creek Coordinated Resource Management Plan (2004). Nevada County, CA

Flows in the managed portions of the Yuba River (all except the North Yuba above New Bullards Bar Reservoir) have been the subject of considerable contention primarily because water withdrawals from the basin and low flows at critical times for fisheries have endangered the native fish and other aquatic fauna of the river. Low flows in the summer also mean a greater chance of injurious and lethal water temperatures for aquatic organisms as the water warms in the sun, and is kept warm by the surrounding roughly 10,000-acre moonscape called the "Yuba Goldfields".

Although there is controversy about the extent to which the water management agencies are causing harm to the "beneficial uses" of the Yuba waters, it is clear that there are negative impacts at specific locations (e.g., salmon passage past Daguerre Point and Englebright dams). The flows in the Lower Yuba are far from the natural condition, and there have also been times during the summer when too little water has been released from Englebright Dam, or too much diverted just before Daguerre Point Dam, resulting in rapidly warming low flows that pose severe risks to anadromous and non-anadromous fish below the diversions. However, a number of recent actions are designed to lessen the impacts of water management activities. Two of these actions include the Proposed Yuba River Accord, which provides a substantial additional river flow for the lower Yuba River fishery and the recent completion of the Narrows 2 Full Flow Bypass Project that maintains river flow during uncontrollable power plant outages

The Proposed Yuba River Accord innovatively improves fishery habitat conditions through higher instream flows while improving water reliability through conjunctive use of surface and groundwater supplies. Since 2006, the river flow has been maintained to the higher Accord flow schedules while the environmental review process proceeds. The Accord consists of a fisheries agreement, a water purchase agreement and a conjunctive use agreement that are scheduled to be approved in early 2008. The revenues received from transferred water are planned to be used

on important items including conjunctive use, flood control and continued fishery studies.

For the upper and middle Bear, optimum flows and their timing have not yet been determined. Minimum flows in the Bear Valley reach are currently maintained at 5 cfs year round. Minimum flows between Drum and Rollins generally result in conditions that are too warm for trout, and will likely need to be increased in conjunction with FERC relicensing. Minimum releases below Rollins (10 cfs) and Combie reservoirs (5 cfs) from about June to November result in warm water temperatures that are suitable only for bass or other warm water species. Improved flows in the Bear River and ideally in the salmon-accessible foothill creeks such as Secret Ravine/Dry Creek, Coon Creek, and Dry Creek (running through Beale Air Force Base and the Spenceville Wildlife Area) would benefit trout and anadromous fisheries and habitat of the lower Bear River. Efforts by Placer County (through its Placer Legacy Program) to restore habitat along Coon Creek and the Bear River as well as efforts by the Dry Creek Conservancy and Auburn Ravine/Coon Creek Workgroup would also benefit from the re-routing and improved timing of flows.²²

7.2.10 Habitat Alteration

Land use changes can impact threatened and endangered species or species of concern and reduce the amount of available habitat. Land use changes can also reduce groundwater infiltration, increase erosion and sedimentation, and increase pollution loading. One of the primary concerns related to habitat alteration is the invasion of exotic (non-native) plant and animal species.

Findings and Studies

²² Yardas, D., and Eberhart, A. (2005). *Awakening the Bear: assessing flow improvement needs in northern California's Bear River problemshed*. Prepared for Environmental Defense Western Resources Program. Oakland, California: Sierra Club.

Habitat alteration due to landuse change is a concern throughout the CABY region.^{23, 24} Habitat is a key component to ecosystem health and vitality. Water quality is intimately related to the native vegetation and terrestrial ecology of the entire watershed. Native plants and trees adjacent to streams and rivers serve to collect and filter the water funneling through a network of stream channels into the creek system. Plant roots absorb and slow the rate of runoff, releasing water into the streams, groundwater, and back into the atmosphere through evapotranspiration. Root systems serve as cohesive networks that protect nutrient rich surface soils and maintain bank integrity, thereby reducing excessive rates of sedimentation. Tree canopies create a microclimate maintaining cooler temperatures, reducing moisture loss to evaporation and providing protection to young trees and heat-sensitive understory plants. Riparian vegetation also provides nutrients and habitat for fish and wildlife, thus supporting a diversity of life. Oak woodlands, grass savannas, and riparian communities of the entire foothill region are the most ecologically transformed ecosystem. These areas have been converted for rangeland, agricultural uses, and

²³ El Dorado County Planning Department (2004). *El Dorado County general plan: a plan for managed growth and open roads; a plan for quality neighborhoods and traffic relief*. Placerville, CA: El Dorado County.

General Plan Advisory Committee (1973, currently updating). *Amador County general plan*. Jackson, CA: Amador County.

Placer County (1994). *Placer County General Plan*. Auburn, CA: Placer County.

Nevada County and Harland Bartholomew & Associates, Inc. (1996). *Nevada County general plan*. Sacramento, CA: Nevada County.

²⁴ Barbour, M., B. Pavlick, F. Drysdale, and S. Lindstrom (1993). *California's changing landscape diversity and conservation of California vegetation*. pp. 90-107. Sacramento, CA: California Native Plant Society.

Beedy, T. and Brussard, P. (2002). *Nevada County natural resources report: A scientific assessment of watersheds and ecosystems*. Nevada City, CA: Nevada County Planning Department.

Deer Creek Coordinated Resource Management Plan (2004). Nevada County, CA

residential and industrial developments. Riparian habitats in the foothill zones have also been impacted by species reduction, exotic species, and removal of vegetative cover.

Removing native plants or trees through vegetation clearing, grading, or timber harvest can have a cumulative impact that is often unrecognized. For example, soil erosion can cause increased nutrients and algae blooms in streams; increased turbidity in the stream can reduce sunlight and the rate of photosynthesis in algae and other autotrophs; and increased soil deposited on the stream substrate reduces macroinvertebrate habitat. Therefore, erosion can impact the beginning of the aquatic food chain and subsequently affect the entire food web.²⁵

The introduction of exotic plant, animal, and insect species, whether intentional or not, can cause disruptions such as competition, predation, hybridization, and the introduction of diseases. Nonnative species compete with native species for moisture, nutrients, sunlight, and space and can adversely influence establishment rates for new plantings, foods, and habitat. They usually do not have natural predators, so their numbers go unchecked and they can out-compete the native species.²⁶

The removal of large trees through logging raises the potential for changes and possible damaging alterations in a number of ways. The heavy equipment used to clear brush and remove trees disturbs the topsoil and the organisms in the topsoil, and affects slope and soil stability. This disruption has the potential to affect the propagation and sustainability of new growth as well as determine the type of plant species that will generate. Timber harvesting can also *potentially* increase sediment yields 4 to 78 times more than under

normal forest conditions (see sediment issue 5.2.1). In addition, as the forest canopy is opened, more light is allowed to reach the forest floor. This increased light leads to moisture loss due to evaporation and contributes to the growth of drier, more fire susceptible underbrush. Logging tends to leave large slash piles (twigs, bark, needles, dry branches) behind which can increase the speed at which fires spread. Logging on private lands can also lead to the formation of roads in areas that were previously roadless, allowing for greater and more frequent human access and associated impacts.²⁷

7.2.11 Fisheries and Aquatic Biota

There is a significant loss of native fish and habitat in the CABY region due to historic land and water use activities. Aquatic biota, such as amphibians and benthic invertebrates, are also jeopardized and the loss of this important biota has negative impacts on fisheries. Protection of native and anadromous fish and their habitat, fish passage, and maintenance of healthy fisheries are related to water flows, water quality and overall river conditions throughout the CABY region.

Findings and Studies

Threats to fisheries and aquatic biota are a concern throughout the region.^{28 29 30}

²⁷ SNEP Science Team and Special Consultants (1996). Summary of the Sierra Nevada ecosystem project report. *Centers for Water and Wildland Resources*. Davis: CA: University of California.

²⁸ Placer County and Auburn Ravine/Coon Creek Coordinated Resources Management Plan Planning Group (2002). Auburn Ravine/Coon Creek ecosystem restoration plan. Retrieved April 20, 2006, from <http://www.placer.ca.gov/planning/legacy/ar-cc-erp/sum-contents.pdf>.

Deer Creek Coordinated Resource Management Plan (2004). Nevada County, CA

²⁹ The Upper Yuba River Studies Program (UYRSP) Team (2003). Interim report: summary of current conditions in the Yuba River watershed. Marysville, CA: UYRSP.

²⁵ Harrington, Jim and Born (1999–2000). Measuring the health of California's streams and rivers. Sacramento, CA: Sustainable Land Stewardship International Institute.

²⁶ SNEP Science Team and Special Consultants (1996). Summary of the Sierra Nevada ecosystem project report. *Centers for Water and Wildland Resources*. Davis: CA: University of California.

Amphibian species at all elevations have severely declined throughout the Sierra Nevada. At higher elevations, introduced fish seem to be the primary cause for loss of mountain yellow-legged frog populations throughout its historic range. Causes for the decline of amphibians at lower elevations (such as the red-legged frog) are still unknown. Local degradation of habitats in the Sierra Mountain Range has generally led to significant impacts on aquatic invertebrates, which make up the vast majority of aquatic species in the region. The aquatic invertebrate fauna as a whole remains largely unknown, and only a fraction of the species diversity in the range has been identified or studied. In addition to more widely known aquatic habitats, such as stream and lakes, many invertebrate species occur in highly localized places such as intermittent streams, ephemeral ponds, fens, bogs, springs, and small wetlands. Many species are known only from single sites. Due to food chain relationships, impacts to invertebrates have significant cascading effects on other animals, including amphibians and birds. The introduction of non-native fishes (primarily trout) has also greatly altered aquatic ecosystems through impacts on native fish, amphibians, and invertebrate assemblages. Altered habitats are often linked to successful establishment of non-native species.³¹

Salmonoid (anadromous) fish reproduce in mountain streams, with subsequent migration

³⁰ El Dorado County Planning Department (2004). El Dorado County General Plan: a plan for managed growth and open roads; a plan for quality neighborhoods and traffic relief. Placerville, CA: El Dorado County.

General Plan Advisory Committee (1973, currently updating). Amador County general plan. Jackson, CA: Amador County.

Placer County (1994). Placer County General Plan. Auburn, CA: Placer County.

Nevada County and Harland Bartholomew & Associates, Inc. (1996). Nevada County general plan. Sacramento, CA: Nevada County.

³¹ SNEP Science Team and Special Consultants (1996). Summary of the Sierra Nevada ecosystem project report. *Centers for Water and Wildland Resources*. Davis: CA: University of California.

to the ocean and final migration back to the mountain streams for reproduction. Water management projects (reservoirs and dams) have blocked the normal migration routes, forcing fish to move to less desirable habitats, and negatively affecting their reproduction. Dams and impoundments together with degraded conditions above dams, have led to a loss of about 90 percent of the historic fishery habitat throughout the Sierra. Fish once native to most major Sierran rivers north of the Kings River, are now nearly extinct. In the CABY region, the most drastic habitat cutoff has been Folsom Dam and the associated Nimbus Dam on the Lower American River. This infrastructure project cut off approximately 138 miles of upstream salmonid habitat; river miles now available to the fall-run Chinook on the American River are the lower 23 miles below Nimbus Dam.

In the lower Yuba River and Deer Creek, the primary species of concern identified by the Department of Fish and Game (DFG), U.S. Fish and Wildlife Service (USFWS) and National Oceanic & Atmospheric Administration (NOAA)-Fisheries are fall and spring-run Chinook salmon and steelhead trout. Fall-run Chinook salmon are the most abundant anadromous fish in the lower Yuba River and are a candidate species under the Federal Endangered Species Act. Spring-run chinook salmon are listed as threatened under both the State and Federal Endangered Species Acts due to significant population declines throughout its range. Steelhead trout are listed as threatened under the Federal Endangered Species Act, also due to significant population declines.³²

The CALFED Ecosystem Restoration Program has identified the upper Yuba River (all forks) as location of the greatest opportunity for salmonids' reintroduction in the Sierra Nevada. CALFED commissioned a local stakeholder process (The Upper Yuba River Studies Program) to examine feasibility of fish passage at Englebright dam. To date, several million dollars has been invested by federal and state agencies examining the feasibility of salmon

³² *Deer Creek Coordinated Resource Management Plan* (2004). Nevada County, CA

re-introduction to the Middle and South Yuba rivers. Many CABY Planning Committee member organizations are represented in the UYRSP process.

7.2.12 *Agricultural Interests*

James Marshall discovered gold in 1848 at Coloma, on the South Fork of the American River. This started the California gold rush of 1849, leading to statehood and settlement. Gold miners built the initial water delivery system of ditches and flumes for use in mining operations. As the miners became outnumbered by agriculturalists settling in the foothills areas, the system was used to deliver water to crops and growing population centers. Over the years agriculture obtained resources to improve systems, install reservoirs, and increase delivery capabilities. In part, these upgrades allowed urban areas to access these systems.

Residential raw water delivery was eliminated in the mid 20th century, due to the growing concern over water borne diseases. This switch required water purveyors to install and maintain treatment facilities. Some purveyors were able to separate raw water from potable water deliveries by re-piping much of their delivery systems, but others kept to a single pipe system, delivering potable water to all customers. In the later case all customers, agriculture and residential, had rate increases to pay for the treatment costs. Partly due to this rising cost of water, a number of growers went out of business and the land was developed; it was more profitable to grow houses than to grow crops. In the CABY region, this has resulted in decreased parcel sizes, decreased agricultural production, increased population, and increased demand on water resources. This urban style development in rural areas has caused dramatic losses in oak woodland rangeland previously available for livestock grazing and wildlife. The growth in residential use and urban areas has furthered the conflicts between agriculture and urban development due to the need for potable water and increase in demand. Additionally, a dramatic change in the voting base has, in the last 20 years, allowed for greater development in these formerly rural areas. Agriculturalists

are concerned with urban development and increased demand for treated water for human consumption, which could result in dramatic increases in raw water costs and limited availability of water for agricultural usage. This type of impact could irreversibly affect the economic viability of agricultural operations.

In recent years, urbanization has been identified as a non-point source for pollution entering surface and ground water sources through storm water systems draining to creeks. There is continued confusion in the CABY region whether water quality contaminants are caused by agriculture and/or urban development, both using the same water conveyance systems. Agriculture in the CABY region is small in numbers and use the least amount of pesticides, if any, compared to almost every other county in the State. (see CA. Dept of Pesticide Regulations annual reports) Agricultural production in the CABY region consists mainly of timber production, livestock grazing, vineyards, orchards, Christmas trees, nursery stock and some vegetable crops, mainly organic which use little to no pesticides at all. Currently, 51% of all pesticide use in the CABY region is from residential usage and second to that is pesticide usage from municipalities. Regional topography, soil types and lack of available land limit the size of commercial agriculture and, as a result, commercial agriculture is now interspersed with residential holdings. As a result of the Central Valley Regional Water Quality Control Board's required and costly water quality testing by agriculture, water quality contaminants can mistakenly be blamed on agriculture when the sources are more likely to be from urban centers. Agriculture is required by law to report all materials used on producing land, while residential users, often using the same materials, do not have to file reports nor are they properly trained in the usage of pesticides. Therefore, based on the type of agriculture in the CABY region and little to none pesticide use, it is exceedingly difficult to determine if agriculture has an impact on water quality in the CABY region or not.

Finally, a number of growers in the CABY region are not supplied by water purveyors, depending on ground water wells to support their irrigation and livestock water needs. As mentioned in Chapter 3, the groundwater system in the CABY region is fractured rock and little attempt has been made to quantify ground water capacity, rate of recharge, level of drought tolerance and impacts from adjacent developments. As housing developments using large number of wells in concentrated areas access water from the fractured rock, conflicts have developed and are increasing with farmers and ranchers. Established agriculture producers see more houses grow around their agricultural fields and rangeland, while their wells go dry. Increased understanding of ground water and impacts would greatly reduce these conflicts and provide guidance to county planning departments.

Most types of agriculture in the CABY region will continue to struggle for economic viability due to competition from urban development and high land prices. Agriculture, especially rangeland, currently benefits communities with “open space”, supports an abundance of wildlife and plant habitat, provides community firebreaks, vegetation to support soil and filter surface water and support a rural lifestyle important to many while producing food and fiber for the mass populations.

Finding and Studies

The people of the CABY region have supported and continue to support agricultural ventures. This is evidence by the fact that most of the counties in the region have a “Right to Farm” ordinance (El Dorado County Ordinance, Nevada County Ordinance, Placer County Ordinance, and Yuba County Ordinance). These ordinances allow growers to continue practices without hindrances from neighboring parcels. Situations have occurred across California where farmers have been cited and/or arrested, due to complaints from neighbors, for performing management practices that have been apart of their operation for a number of years. This is usually due to a home being built next to a farming operation and the home owner not being aware of the practices employed by the

neighboring parcel. Currently, this “Right to Farm” must be presented by real estate agents to all potential customers.

EID formed a number of customer committees to look at the rate structure to determine if the rates were fair and adequate in 2000. One such committee was composed of farmers, the County Agricultural Commissioner, UC Cooperative Extension County Director, and other private citizens. As a part of this committee sample costs studies were developed for apples, pears, and wine grapes grown in the District (Frost, William, Karen Klonsky, and Richard De Moura. 2000. Sample costs to produce apples: Sierra Nevada Foothills five acre orchard. Frost, William, Karen Klonsky, and Richard De Moura. 2000. Sample costs to produce pears: Sierra Nevada Foothills five acre orchard. Hirschfelt, Donna, William Frost, Karen Klonsky, and Richard De Moura. 2000. Sample costs to produce wine grapes: Sierra Nevada Foothills, Zinfandel Variety - 5 acre vineyard.) The results of the studies suggest that wine grapes are marginally profitable while apples and pears will lose money if all components are accurately itemized and tracked. The way these operations stay in business is that most owners do not bill the time they work the operation. These studies strongly suggests that if ranchers have increase to their cost in just a few areas then most will no longer be economically viable. This includes increases to water treatment and/or delivery.

Further, agriculture does have a strong impact on the local economy. This includes the timber industry as well as such phenomena as Apple Hill. Timber has been the largest agricultural commodity in the Sierra Foothill Region. (See crop reports for numbers.) The Apple Hill region is the largest direct ranch marketing area in the United States. People from all over the world come to the region to experience the Apple Hill phenomenon during the fall. The impact to the local economy is estimated to be \$15 million per year (county crop report, SACOG?).

7.2.13 Recreational Interests

Recreation such as rafting, equestrian use hiking, camping, off-road vehicle use and swimming are very popular in the CABY region and can provide a large economic benefit to the area. However, recreation is also an issue in the CABY region because of the ways in which it impacts the environment.

Water and air quality are those habitat values most often hurt by recreational use. Motorized vehicle use on and off water bodies can cause water quality problems such as microbial contamination, heavy metal and hydrocarbon pollution, and/or erosion. Erosion is often a result of heavy and irresponsible off-road vehicle use and of poorly-maintained or “unofficial” hiking trails. This erosion can completely destroy a natural stream environment.

In addition, recreational interests are not always compatible. Inadequate toilet facilities in heavy use areas can result in coliform/e-coli contamination, which can prevent recreationists from using water bodies for swimming or other contact use. Another example is that of off-road vehicle use and hiking. Because of the noise and other by-products of the off-road use, and the expectations of hikers of a quiet, natural habitat in which to walk, it is difficult to resolve these two forest uses. This represents a major challenge to resource managers: experience expectation.

Another challenge is the flow regime on hydroelectric-regulated river reaches: it can be unpredictable, at inadequate or too large of volumes, and sometimes too volatile to be useful for whitewater recreation and, in some cases, recreational fishing. The economics of this management challenge, as well as that of tourism use and the local economy, must be balanced.

7.2.14 Climate Change

The earth’s climate has changed measurably on a global and regional scale since the pre-

industrial era,³³ and Climate change is one of the most serious and unpredictable issues faced by water managers and stakeholders of the CABY region. The Sierra Nevada produces 60% of California’s water supply and holds much of it in the State’s largest “reservoirs:” the snow fields of the high elevations. Of all the hydrologic and ecological changes predicted to occur because of climate change, the Sierra Nevada faces the most drastic changes in hydrologic regime as the climate warms and becomes more variable. These snow fields will become less reliable as a water supply source; more precipitation will fall as rain as opposed to snow, and the snow that does fall will melt earlier and more rapidly, presenting State water managers and valley inhabitants with the double threat of increased flood danger and decreased total water storage. Additionally, climate change threatens the delicate balance of many Sierran ecosystems – home to threatened and endangered species and a recreation site for millions of California residents annually.

Findings and Studies

Studies of the effects of climate change on the natural environment are in their infancy in the CABY region. Regional stakeholders feel that preparing for climate change is of great importance. Demonstrating this value, stakeholders advocated for the integration of the WEAP model and of the El Dorado County Drought Study (see Chapter 9) into the IRWMP. Both of these efforts emphasize preparedness for the variety of outcomes of a warming and potentially highly variable climate, better preparing the region for the potential effects of climate change.^{34 35}

There are both scientific and social consequences associated with climate change, including an increase in average air temperature (between 1.4 and 5.8 °C from 1990

³³ IPCC (2001). *Climate Change 2001: Synthesis Report*.

³⁴ Brown and Caldwell (2006). *El Dorado County western slope drought analysis, phase one report*.

³⁵ Purkey et al (2006). *Integrating a Climate Change Assessment Tool into Stakeholder-Driven Water Management Decision-Making Processes in California*.

to 2100³⁶), sea level rise, changes in water-dependant economic sectors (namely agriculture), a change in ecosystem diversity and productivity, effects on human health, and the regional and statewide response to a changing climate and the social equity associated with the adaptations. Though not all of these effects will be felt by CABY stakeholders directly (in the case of sea level rise, for example), their collective effect will be felt throughout the State and the country.

One of the most major effects of climate change on the CABY region will be that of the predicted changes in hydrologic regime. “Warmer-wetter” (as in rain versus snow) and “warmer-drier” regimes are both posited as a possible effect of climate change on California’s Sierra Nevada. In either case, the Sierra Nevada snowpack is projected to decline between 25 and 40 percent in the next 50 years.³⁷ Water managers in the region are faced with growing populations throughout the region, and indeed throughout the State. Conservation has been the most useful and most efficient and economic tool in stretching water supplies in the last few decades, and will be essential in dealing with climate change scenarios. These water managers and CABY stakeholders are also prepared to examine other opportunities in managing a potentially dwindling resource in the face of a growing population. Other options could include investigation into ground water storage, opportunities for cooperative resource use with nearby agencies (including those on the valley floor), storage augmentation, and the expansion of recycled water usage.

7.3 Regional Watershed Resource Conflicts

CABY stakeholders recognize that scarcity—either real or perceived—can lead to a

³⁶ Ibid. IPCC (2001).

³⁷ Sierra Nevada Alliance (2005). *Sierra Climate Change Toolkit*.

competitive atmosphere that has a tendency to degrade collaborative processes. Conflict can arise from such circumstances, particularly if stakeholder interests are not clearly identified and if protocols are undeveloped for minimizing the impact that “conflicts” can have on the entire CABY IRWM Planning and Implementation process. In an effort to minimize the deleterious impacts of resource conflicts, the CABY stakeholders have identified several topics of resource use and management that, if improperly addressed, can produce contention and conflict in the CABY region. Because the CABY IRWM planning effort was jointly conceived and initiated by a broad coalition of stakeholders, we have confidence that the CABY IRWM Plan, our governance structure, and our founding charter will serve as a strong guide to reach understanding of each of the resource conflicts outlined below. The major conflict issues identified thus far are population growth and land use, new dam construction, and FERC Relicensing.

7.3.1 Growth

Population growth is one of the most controversial issues in the CABY region. The strong economy of the Sacramento Metropolitan Area (of which the CABY region is a part) has experienced a significant increase in population over the last decade. New residents create a demand for more housing, more roads, more goods and services, and more water. Although a strong economy is vital to the quality of life in the Sacramento area, unplanned and unfettered growth can undermine the foundations of a healthy environment. A damaged environment will, in turn, harm economic growth. Some of the major questions facing the CABY region are:

- How can the region address growth without significantly impacting the region’s natural resources and local economy?
- Is local and regional economic vitality and sustainability dependent on an expansion of residential housing?
- How can we better facilitate dialogue between regional water experts represented by CABY, and decision-

makers less attuned to long-term water supply realities?

Water agencies, as directed by elected public officials, will continue to explore and implement water supply options identified in the CABY IRWMP to meet projected population demands although some argue that meeting water supply needs facilitates growth. Regardless, growth has consequences on the CABY region, which the IRWMP need to address:

- Fragmentation and/or loss of open space and biodiversity;
- depletion of water resources;
- degradation of air quality;
- degradation of water quality;
- increased generation of waste; and
- use of raw water versus tertiary treated water.

Potential Solution

The IRWMP will address growth issues through projects and programs that make better use of existing water supplies and link the consequences of land use decisions, water management and the environment. The CABY stakeholder process will strive to include more land use agencies in the decision making process.

7.3.2 *New Dam Construction*

The construction of new dams to provide additional water supply in the region is a major conflict between water agencies and environmental stakeholders.

As climate changes and population growth continues, the demand for new supplies and more reliability is requiring water agencies to evaluate all water supply options. This includes water recycling, conservation, conjunctive use, transfers and new storage.

Although the CABY stakeholders support many water supply options identified in the IRWMP, most environmental stakeholders in the CABY region would not support any new on-stream water storage. Existing dams have caused significant environmental damage in the region. Dams segment river systems, trap

sediment, alter in-stream water flows, and block migration of fish species. Existing reservoirs have also provided significant benefits such as power generation, consistent fishery and recreational flows. There is a significant conflict between the benefits and ecological impacts of new dams. Similarly, there are differing perspectives on the economic costs of new dam construction versus other approaches for meeting water demands.

Potential Solution

The IRWMP includes all options for addressing water supply needs in the region. However, the CABY regional entity will address all projects individually and strive for stakeholder consensus and support. Projects that do not achieve stakeholder consensus will not be included in the IRWMP.

7.3.3 *FERC Relicensing*

The hydropower dams on the Yuba, Bear, and American Rivers were licensed almost 50 years ago and are all being relicensed between 2000 and 2016. Hydropower relicensing is a once-in-lifetime opportunity to address the different interests of power generation, ecosystem health, water reliability, and recreational opportunities in river stretches impacted by hydropower facilities. While this is an opportunity for collaboration and increasing our knowledge of our CABY watersheds, the relicensing can also be a potential source of conflict. Hydropower licensees, regulatory agencies, tribes, recreation interests and non-governmental organizations all advance objectives in relicensing negotiations and sometimes these objectives conflict with each other. Particularly controversial issues include: instream flow quantity, variability, and temperature; recreational flows; and maintenance of Forest Service lands where much of the hydropower facilities are situated. The challenge is to find common ground and solutions that everyone can live with in order to reach a settlement between all parties.

In the CABY region, El Dorado Irrigation District, SMUD and PG&E have reached the

final stages of relicensing for the Upper American River Project. The Placer County Water Agency Middle Fork American Project; PG&E's Drum-Spaulding Project; and Nevada Irrigation District's Yuba-Bear project are just starting their relicensing processes in 2007 and will finish in 2013. Yuba County Water Agency's Bullard's Bar project license expires in 2016. These relicensings will dictate the conditions of operating these hydropower facilities and the health of the river ecosystems for the life of their licenses, which can extend from 20 to 50 years.

Potential Solution

The IRWMP will not directly address the conflict of FERC relicensing, however it will provide valuable resource data through the implementation of projects such as water quality monitoring, sediment transport, mercury impacts and habitat needs. The IRWMP will also provide tools for data management, dissemination and climate change analysis.

