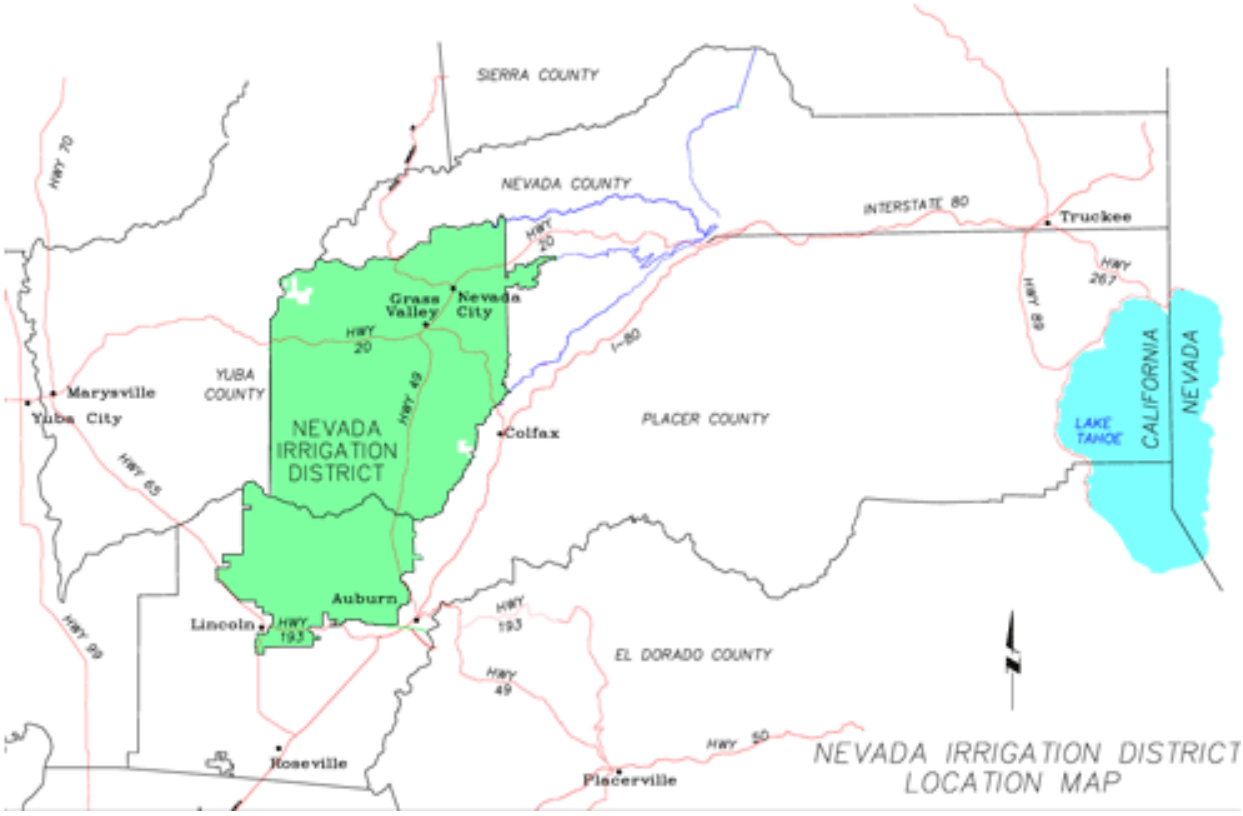
ANNEX H: NEVADA IRRIGATION DISTRICT

H.1 District Profile

Figure H.1 shows the area covered by the Nevada Irrigation District (NID).

Figure H.1. Nevada Irrigation District



Source needed

Formed in 1921, the Nevada Irrigation District (NID) is a diversified water resource agency that supplies nearly 25,000 homes, farms, and businesses in Nevada and Placer Counties in the foothills of Northern California's Sierra Nevada Mountains. The District has been serving customers in Nevada, Placer, and Yuba Counties, with about 25 percent of the district located in Placer County. NID provides service in an expansive geographic area covering 287,000 acres that makes the District one of the largest in the State of California.

The District is organized primarily to supply water for irrigation, municipal, domestic, and industrial purposes. NID water is available in wide areas of Nevada and Placer Counties; the district also has storage and distribution facilities in Sierra and Yuba counties.

NID collects water from the mountain snowpack on 70,000 acres of high mountain watershed and stores it in an extensive system of 10 reservoirs. As water flows to customers in the foothills through over 400 miles of canals and another 300 miles of pipeline, it is used to generate clean hydroelectric energy and to provide public recreational opportunities.

The highest elevation on NID mountain watershed is the peak of 8,373-foot English Mountain which rises east of Bowman Reservoir. The district's highest reservoir is French Lake at 6,835 feet. The district's lowest elevation water service is located about 100 miles to the southwest, at 150 feet above sea level, south of Lincoln in Placer County.

NID has been keeping weather records for Bowman Reservoir (elev. 5,650 ft.) since 1929. The 69.2-inch annual average precipitation at Bowman compares to an annual average of 56 inches at 2,700 feet near Nevada City and 52 inches at 2,400 feet in Grass Valley.

NID supplies both treated drinking water and irrigation water and treated drinking water.

Irrigation Water

NID has supplied an average 145,000 acre-feet of water per year. About 90 percent of this total is used for local agriculture and for surplus water sale outside the district.

NID serves approximately 5,400 raw water customers. Most purchase their water on a seasonal basis — the six-month irrigation season normally runs from on or about Apr. 15 through Oct. 14. Some irrigation customers purchase both summer and winter water for year-around service.

Irrigation water is used to irrigate pasture for cattle, sheep, horses and even more exotic animals such as llamas, emus, and buffalo. NID water irrigates nine golf courses. Irrigation water is used in gardens, nurseries, orchards, and vineyards for both commercial and home production. Grapes, apples, peaches, nuts, berries, corn, rice, wheat, and oats are among the many crops grown with NID water.

Irrigation water fills ponds and reservoirs for stock watering, fire suppression, and recreation. Availability of irrigation water is an important factor in the preservation of open space, and greenbelt areas.

There are an estimated 97,000 irrigable acres in the Nevada Irrigation District, about a third of which are presently in irrigation.

Treated Drinking Water

Through the years, NID has changed with the communities it serves. The District continues to supply irrigation water, as it has since the 1920s, but today's demand is for piped and treated drinking water.

Our location near the mountain snowpack, the source of our water, helps to preserve a fresh, clean tasting water that many of our customers believe is among the very best in California.

NID's treated water service areas are located in and around Grass Valley and Nevada City, Banner Mountain, the Glenbrook Basin, Loma Rica, Alta Sierra, Lake of the Pines, Penn Valley, Lake Wildwood, Smartville, and North Auburn.

Generally, treated water is available in the more populated areas. It can be very expensive to extend treated water main lines into rural areas where there are few customers to share the costs. In recent years, the district has been successful in working with local property owners to form local water quality improvement districts.

The transition to treated drinking water began in the late 1960s and early 1970s when NID constructed its first water treatment plants. Today, the district operates a network of six modern water treatment plants in Nevada and Placer counties and a small seventh plant that serves the Smartville community in the Yuba County foothills.

NID presently produces about 3 billion gallons — approximately 9,000 acre-feet — of treated drinking water per year. The district's treatment plants are operated by state-licensed and certified technicians. Water treatment processes include chlorination, coagulation, flocculation, sedimentation, and filtration.

The district operates a state-certified water laboratory where water samples from throughout the district are tested regularly.

NID treated water meets and exceeds standards set by the California Department of Health Services. As required by state law, NID produces an annual water quality report, the Consumer Confidence Report, which is distributed each spring to each treated water customer.

NID's flushing program is conducted annually in the winter months and is designed to keep treated water pipelines clean and ensure a fresh, high quality water supply.

H.1.1 Hazard Identification and Summary

The NID's planning team identified the hazards that affect the District and summarized their frequency of occurrence, spatial extent, potential magnitude, and significance specific to the District (see Table H.1).

Table H.1. NID—Hazard Summaries

Hazard	Probability of Occurrence	Spatial Extent	Potential Magnitude	Significance
Agricultural Hazards				
Avalanche				
Dam Failure	Unlikely	Significant	Critical	Medium
Drought	Likely	Extensive	Catastrophic	High
Earthquake	Unlikely	Extensive	Critical	High
Flood (100-year)				
Flood (Stormwater)	Likely	Limited	Limited	Medium
Human Health Hazards:				
West Nile Virus				
Landslide				
Severe Weather:				
Extreme Cold/Freeze				
Extreme Heat				
Fog				
Heavy Rain/ Thunderstorm/Hail/ Lightning/Wind	Likely	Extensive	Critical	Medium
Snow				
Tornado				
Soil Hazards:				
Erosion				
Expansive Soils				
Volcano				
Wildfire	Occasional	Limited	Limited	Medium

Guidelines for Hazard Rankings

Frequency of Occurrence:
Highly Likely—Near 100 percent probability in next year
Likely—Between 10 and 100 percent probability in next year or at least one chance in ten years
Occasional—Between 1 and 10 percent probability in next year or at least one chance in next 100 years
Unlikely—Less than 1 percent probability in next 100 years

Potential Magnitude:
Catastrophic—More than 50 percent of area affected
Critical—25 to 50 percent
Limited—10 to 25 percent
Negligible—Less than 10 percent

Spatial Extent:
Limited—Less than 10 percent of planning area
Significant—10-50 percent of planning area
Extensive—50-100 percent of planning area

Significance (subjective):
Low, Medium, High

Source: Nevada Irrigation District

Impacts of past events and vulnerability to specific hazards are discussed below (see Section 4.1 Hazard Identification for more detailed information about these hazards and their impacts on Placer County).

H.2 Vulnerability Assessment

The intent of this section is to assess the District's vulnerability separate from that of the planning area as a whole, which has already been assessed in Section 4.3 Vulnerability Assessment in the main plan. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

H.2.1 Assets at Risk

This section considers the District's assets at risk. Table H.2 lists District assets identified by representatives from the NID as important to protect in the event of a disaster.

Table H.2. NID—Critical Facilities and Other District Assets

Name of Asset	Type	Replacement Value	Displacement Cost	Hazard Specific Info
Rollins Power House	Critical Facilities	$13,475,728		Earthquake, Flood, Fire
Combie South Power House	Critical Facilities	$4,095,002		Earthquake, Flood, Fire
Rollins Reservoir	Critical Facilities	$67,520,547		Earthquake, Flood
Combie Reservoir	Critical Facilities	$5,627,736		Earthquake, Flood
North Auburn Water Treatment Plant	Critical Facilities	$11,357,311		Earthquake, Flood, Fire
Water Canal System	Critical Facilities	$58,364,373		Earthquake, Flood
Orr Creek Reservoir	Critical Facilities	$10,539		Earthquake, Flood
Pickett Reservoir	Critical Facilities	$3,274		Earthquake, Flood

Source: Nevada Irrigation District

Several state or federally listed species may be found within the District boundary. These are identified, along with other species of concern found in the District, in Table H.3.

Table H.3. Species of Concern in the Nevada Irrigation District

Common Name	Scientific Name	Federal Status	State Status

Sensitive habitats in the District include the following:

- Central Valley drainage hardhead/squawfish stream
- Great Valley mixed riparian forest
- Northern basalt flow vernal pool
- Northern claypan vernal pool
- Northern hardpan vernal pool
- Sycamore alluvial woodland

This is an example using someone else's data:

Please provide data specific to the District

Growth and Development Trends

Population growth and development trends within NID boundaries are covered in Section 4.3.2 of the main plan and in the individual annexes of the incorporated communities falling within the service area of the District**.**

Elaborate on any trends specific to the District????????????

H.2.2 Estimating Potential Losses

Dam Failure

A dam failure can range from a small uncontrolled release to a catastrophic failure, caused by prolonged rainfall and flooding. The primary danger associated with dam failure is the high velocity flooding of those properties downstream of the dam. Dam failure flooding varies by area depending on which dam fails and the nature and extent of the dam failure and associated flooding.

The district's highest dam is the rock fill-earth core dam at Rollins Reservoir, built in 1965 and standing 242 feet tall. The Jackson Meadows dam (1965) is second highest at 195 feet, Scotts Flat dam (1965) is 175 feet and the Bowman South Arch dam (1925) is 171 feet high.

French Dam, constructed in 1858-59, is the district's oldest dam still in use. Other dams that originated in the 1800s include the Bowman Rockfill dam (1872), and Faucherie, Sawmill and Jackson, all constructed prior to 1880. In the lower division, Van Giesen Dam at Combie Reservoir is the oldest, built in 1928.

Vulnerability to dam failures is generally confined to the areas subject to inundation downstream of the facility. Based on analysis provided in the Placer County General Plan Background Report, only five dams within Placer County have the potential to affect more than 100 persons: Folsom Dikes No. 5 & 6; Lake Tahoe Dam; Camp Far West Dam; Lake Combie Dam; and

Rollins Reservoir Dam. Of these five, a failure of Rollins Reservoir or Combie Dams could potentially impact areas within the NID. Failure of Dutch Flat Forebay could also potentially impact services provided by NID.

Drought

The impact of a drought on the District is primarily one of water supply. Most water provided by the NID comes from snowmelt from their high mountain watershed. A multiple year drought can severely compromise the water supply within the district. In 1991-1992, drought conditions severely impacted the District and other areas of Placer County and surrounding California foothills. This drought, considered the driest period on record in 15 years, resulted in loss of crops and severe economic impacts to the agricultural industry.

Most recently, after 2 years of below-average rainfall and very low snow-melt run off, Governor Schwarzenegger in June of 2008 declared a state of emergency for drought conditions statewide. The final California Department of Water Resources showed snowpack water content at only 67 percent of normal. With the unknowns of drought and globally changing climate conditions, the NID more than ever is promoting waster conservation to its customers.

Please provide data specific to the District.

Severe Weather: Heavy Rain/Thunderstorm/Hail

Heavy rain, thunderstorm activity, and hail usually occur on an annual basis in the NID service area. Often during these events, the Raw Water Distribution system can be impacted However, the District did not identify any past events resulting in significant damage. Heavy runoff from storm activity can cause excessive water in District canals resulting in an overtopping of the canal. An overtopping will washout the canal berm resulting in flood damage and interruption of the water supply.

Other Hazards

While of lower planning significance to the District relative to other hazards, the following information about earthquake, flood, and wildfire should still be noted:

Earthquake

Damage to critical infrastructure resulting in loss or interruption of drinking water and raw water supplies is a primary concern to the district from a damaging earthquake. Extreme earthquake would cause a dam failure endangering the life and health of downstream inhabitants.

Flood

Flooding and soil erosion due to heavy rains and snow runoff have been a historical problem throughout Placer County. Abundant snowfall in the mountains combined with rain and steep

terrain can mean rapid runoff and flooding. Water flow can be high in peak runoff periods with historical downstream flooding. The primary impacts from flooding within the district include damage to roads, utilities, bridges; and flooding of homes, businesses and critical facilities. Flooding has also caused canals to overtop and erosion of the canal levees.

The most recent flood event to impact the District is the late December floods of 2005. Excessive rain for a prolonged period caused severe flooding in the Sierra foothills, in and around Placer County. Impacts included damage to the District's canal system as well as damage to roads and properties throughout District boundaries.

NID suffered the loss of a canal berm on the Combie Ophir IV Canal resulting in damage and flooding on private property

Wildfire

All communities within the northwestern portion of Placer County served by the NID are listed on the National Fire Plan's "Communities at Risk" list as set forth in Section 4.3.2 of the main plan.

Over one hundred years of aggressive fire suppression under the national fire suppression policy has rendered wildlands severely overgrown. Much of the private land in the District's area is in the wildland urban interface with increasing residential development.

As more people move into the area and impacts from recreational demands increase, there will be more human-caused wildfire starts each year. And, the increased number of widely scattered homes within the District adds greatly to the danger, complexity, and cost of fighting these fires.

Forest overgrowth due to the efficiency of modern firefighting techniques, and to society's current election to limit forest thinning and harvesting, is a serious problem. If wildfire does not impact the forest first, native insects will eventually kill millions of trees. Explosions in insect populations usually start during a drought, when the lack of water combined with too many trees per acre render the trees to weak to fight off the insect attacks. Without a change in management practices on public lands, there is little hope of avoiding a kill off of trees similar to the kill off experienced by other national forests.

The most notable recent wildfire to impact the District was the Washoe Fire in August 2007. This fire occurred in the wildland urban interface area of the Tahoe Park and Tahoe Woods subdivisions, along the west shore of Lake Tahoe. Although no lives were lost, the fire destroyed 5 residential structures and encompassed 19 acres. Power and gas utilities incurred damages. There were also losses to timber assets, loss of watershed protection, and loss of the aesthetic value of a scenic corridor. This event caused major disruptions to the west shore and Tahoe City traffic and business on a busy summer weekend. Highway 89 in West Lake was closed for a period of time.

H.3 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities: administrative and technical mitigation capabilities: fiscal mitigation capabilities: mitigation outreach and partnerships: and other mitigation efforts.

H.3.1 Regulatory Mitigation Capabilities

Table H.4 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the NTFPD.

Table H.4. NID's Regulatory Mitigation Capabilities

Regulatory Tool	Yes/No	Comments
General plan	No	
Zoning ordinance	No	
Subdivision ordinance	No	
Site plan review requirements	Yes	
Growth management ordinance	No	
Floodplain ordinance	No	
Other special purpose ordinance (stormwater, water conservation, wildfire)	Yes	
Building code	No	
Erosion or sediment control program	No	
Storm water management program	Yes	
Capital improvements plan	Yes	
Economic development plan	No	
Local emergency operations plan	Yes	
Other special plans	No	
Flood Insurance Study or other engineering study for streams	No	

Source: NID

As indicated above, the District has several programs, plans, policies, codes, and ordinances that guide hazard mitigation. Some of these are described in more detail below.

NID Urban Water Management Plan, 2005

NID's Urban Water Management Plan addresses many issues related to the sound and sustainable use of water. These include information relating to water sources, reliability planning, water use provisions, water demand management measures, and water shortage contingency plan.

Drought Contingency Plan, 1992

The Alpine Meadows Drought Contingency Plan supplements urban and agricultural plans and identifies drought caused water shortages and water demand reduction goals within the District during a drought.

H.3.2 Administrative/Technical Mitigation Capabilities

NID is governed by a five-member Board of Directors, elected to four-year terms by District voters. The board is the District's policy-making body and policy is carried out by approximately 175 full- and part-time employees. Members of the board are elected from within and represent five geographical divisions within the district.

As a state agency, NID operates under rules and regulations adopted under authority conferred by the California Water Code. NID is headquartered at an 18-acre site located on West Main Street in Grass Valley. The District also operates a maintenance yard on Gold Hill Road near Lincoln and a Hydroelectric Department office off Interstate 80 near Colfax.

Table H.5 identifies the personnel responsible for activities related to mitigation and loss prevention in NID.

Table H.5. NID's Administrative and Technical Mitigation Capabilities

Personnel Resources	Yes/No	Department/Position	Comments
Planner/Engineer with knowledge of land development/land management practices	Yes	Chief Engineer/Assist. General Manager	
Engineer/Professional trained in construction practices related to buildings and/or infrastructure	Yes	Engineering Department/Maintenance Department Deputy Manager	
Planner/Engineer/Scientist with an understanding of natural hazards	No		
Personnel skilled in GIS	Yes	Engineering/Sr. Drafter	
Full time building official	No		
Floodplain Manager	No		
Emergency Manager	Yes	Management/Assist. General Manager	
Grant writer	No		
Other personnel	Yes	Trained Staff	
GIS Data	Yes		
Warning Systems/Services (Reverse 9-11, cable override, outdoor warning signals)	No		

Source: NID

H.3.3 Fiscal Mitigation Capabilities

Table H.6 identifies financial tools or resources that the District could potentially use to help fund mitigation activities.

Table H.6. NID's Fiscal Mitigation Capabilities

Financial Resources	Accessible/Eligible to Use (Yes/No)	Comments
Community Development Block Grants	No	
Capital Improvement Project Funding	Yes	On Board approval
Authority to levy taxes for specific purposes	Yes	CFDs only
Fees for water, sewer, gas, or electric services	Yes	Water only
Impact fees for new development	Yes	Water capacity charges
Incur debt through general obligation bonds	Yes	
Incur debt through special tax bonds	Yes	
Incur debt through private activities	No	
Withhold spending in hazard prone areas	No	

Source: NID

H.3.4 Mitigation Outreach and Partnerships

Cosumnes, American, Bear, and Yuba (CABY) Integrated Regional Water Management Plan is identified by the District as examples of successful partnering with other agencies

H.3.5. Other Mitigation Efforts

The District is involved in a variety of mitigation activities including several projects, which include:

- Combie North Powerhouse Replacement Project
- NID Regional Water Supply Project
- Cement Hill Water Supply Project
- DS Canal Flume Replacement Project
- Cole Siphon Replacement Project
- Rock Creek Bypass Encasement Project
- Lincoln Canal Encasement Project
- North Auburn Highway 49 Transmission Project
- Woodrose Way Pipeline Replacement Project
- Lower Cascade Canal Project
- E. George Water Treatment Plant expansion

H.4 Mitigation Strategy

H.4.1 Mitigation Goals and Objectives

The Nevada Irrigation District adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

H.4.2 Mitigation Actions

The planning team for the NID identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, partners, potential funding, estimated cost, and schedule are included.

1. Portable Generator Project

Hazards Addressed: Power outages as a result of severe storms or fires

Issue/Background: The North Auburn Water Treatment Plant serves approximately 6700 people with domestic drinking water in the North Auburn area. Extensive power outages in the area can occur as the result of fires, severe storms, acts of terrorism and other unforeseen disasters. During periods of extended power outages water supplies can run low and additional water cannot be processed for consumptive use without electrical power. Nevada Irrigation District is studying the advantages of portable generators and stationary generators and how best to add address these electrical power issues.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Nevada Irrigation District's Engineering Department

Responsible Office: Nevada Irrigation District.

Cost Estimate: Approximately $400,000.

Benefits (Losses Avoided): Continued water service to 6700 people, including Auburn Faith Hospital, during catastrophic events.

Potential Funding: Unknown.

Schedule: Next one to two year

2. Canal Culvert Replacement Program

Hazards Addressed: Flooding.

Issue/Background: Canal crossings are facilitated with numerous culverts throughout the Placer County area. These culverts are often undersized, aged, and failing. During heavy storm

and rain conditions these culverts backup water causing flooding and overtopping of the canal upstream of the culvert. Overtopping on a canal often results in erosion of the canal berm and possible property damage. Nevada Irrigation District is currently engaged in a culvert replacement project aimed at resolving these issues.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Nevada Irrigation District's Engineering and Right-of-Way Departments.

Responsible Office: Nevada Irrigation District and associated property owners.

Cost Estimate: Costs vary at each culvert replacement; however, the estimated cost to replace the average large culvert is about $12,000.

Benefits (Losses Avoided): Life Safety; Reduction in property loss.

Potential Funding: Unknown.

Schedule: Next 5 to 10 years.

3. Reservoir Cleaning

Hazards Addressed: Flooding and erosion

Issue/Background: Small reservoirs located within the canal system are filling in with sediment from continued years of use. Adequate reservoir storage is very beneficial during storms and heavy rain. As the reservoir accumulates sediment water storage is reduced and the ability to regulate water efficiently is diminished. Reduced reservoir storage can result in upstream canal overtopping and property damage. Nevada Irrigation District has initiated a small reservoir cleaning program to alleviate this problem.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Nevada Irrigation District's Engineering and Maintenance Departments.

Responsible Office: Nevada Irrigation District.

Cost Estimate: Approximately $15,000 per reservoir.

Benefits (Losses Avoided): Associated property damage.

Potential Funding: Unknown.

Schedule: Next three to five years.