3.10 Hydrology and Water Quality

This section provides background information regarding hydrology and water quality conditions within the County, and an assessment of the potential impacts of implementing the proposed General Plan Update. Existing hydrology and water quality conditions are described in Chapter 1, Water Resources and Volume II: Detailed Watershed Characteristics and Regulatory Framework Analysis of the *Natural Resources and Hazards Report*, September 2002, which includes a discussion of watersheds and surface water, groundwater, stormwater, the regulatory framework, and policy issues. Existing utilities and service systems conditions are described in the Community Infrastructure and Services Technical Report, 2008 (Appendix Q), and in the Water Resources Technical Report, 2008 (Appendix P), which include discussions of water and wastewater system condition and capacity, storm water, and water quality. These reports, which are available for review at the Planning Division public counter at 3015 H Street in Eureka during normal business hours, or for download at http://humboldtgov.org/571/Background-Reports, are incorporated herein by reference and summarized below. Where any discrepancies may exist between the referenced material and the material presented here, the material presented here should be considered as the most up to date and is to be relied upon for the environmental setting and analyses.

3.10.1 Hydrology and Water Quality - Environmental Setting

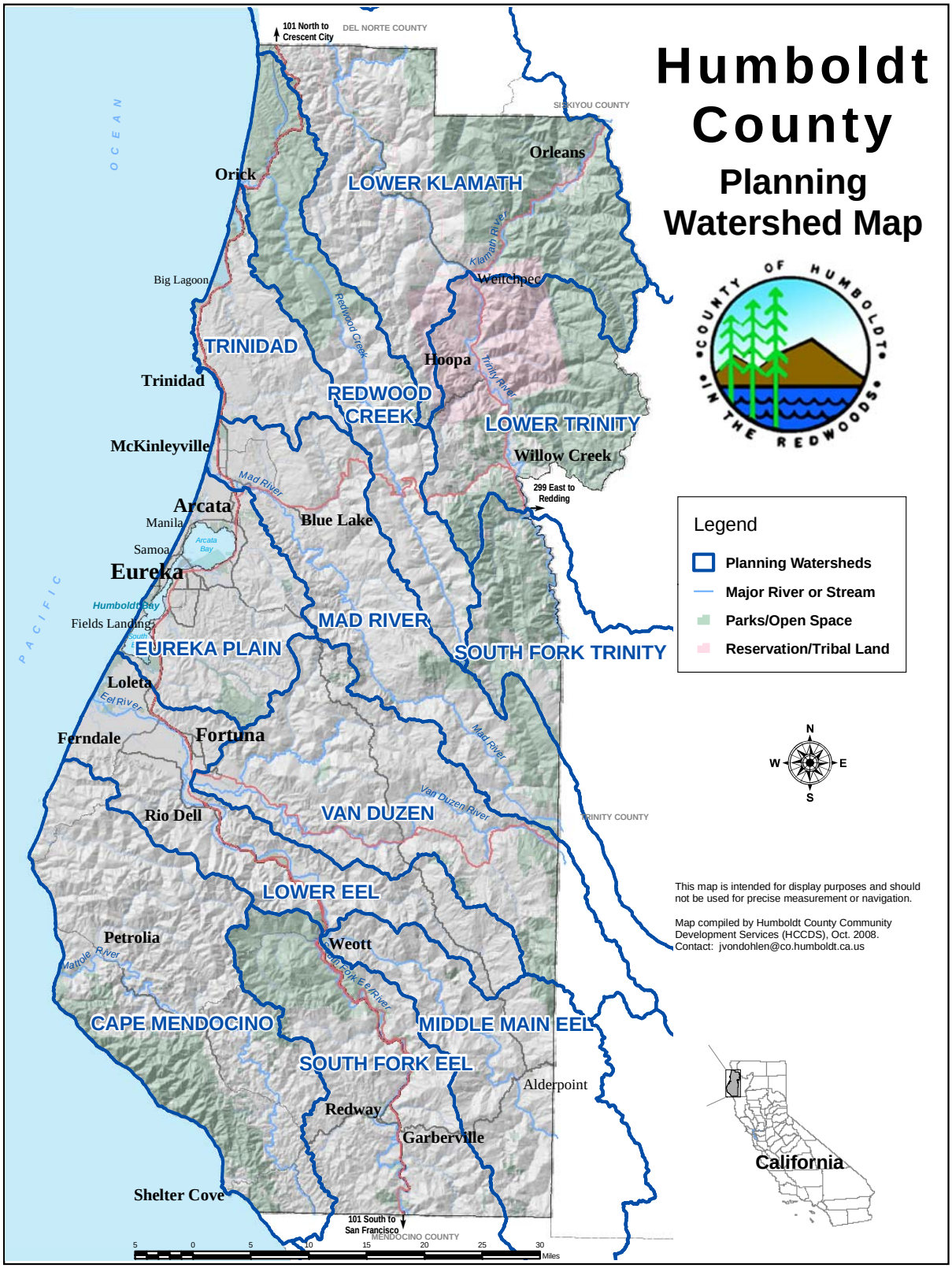
Humboldt County Watersheds

A watershed is an area of land within which all rain and snowfall drains or seeps into a particular stream, water body, or aquifer. Humboldt County is part of the California Water Resource Control Board's Klamath-North Coast Hydrologic Basin Planning Area, which includes all watersheds draining into the Pacific Ocean from the Oregon border south through the Russian River Basin. Land use planning utilizing watershed mapping allows the environment to be studied along its natural lines of division, particularly in the case of water, biological, forest, agricultural, and in some cases cultural resources. A map of the planning watersheds that are used in the General Plan Update is shown below in Figure 3.10-1. A discussion of their water quality concerns, can be found later in this section.

Humboldt County Water Quality

Nonpoint source pollution, also known as polluted runoff, is the leading cause of water quality impairments in California and the nation. Nonpoint sources, including natural sources, are the major contributors of pollution to impacted streams, lakes, wetlands, estuaries, marine waters, and ground water basins. Unlike pollution traceable to a single location or "point" (such as a wastewater treatment plant), nonpoint source pollution comes from many diffuse sources and is principally caused by stormwater, snowmelt, or agricultural runoff moving across and diffusing into the ground (Natural Resources and Hazards Report, Page 1-40). The runoff picks up natural and human pollutants and deposits them throughout the natural watershed in rivers, lakes, coastal areas, and aquifers.

Figure 3.10-1. Humboldt County Planning Watershed Map.



The United States Environmental Protection Act (US EPA) states that nonpoint source pollution is the leading cause of water quality problems. In California, nonpoint source pollution is estimated to represent 80 percent of the state's water pollution. Its effects on specific waters vary and may not always be fully assessed, but overall it has harmful effects on drinking water, recreation, fisheries, and wildlife. Nonpoint source pollution can result from a wide range of human activities, including agriculture, forestry, transportation, boating and other marine activity, and general urban activity. Suspended sediments are the largest mass of pollutants (Natural Resources and Hazards Report, Page 1-40).

Septic systems are individual wastewater treatment systems typically comprised of a septic tank and leach field, and utilized where community wastewater treatment systems are not available. Septic systems can be sources of nonpoint source pollution and are in use in each planning watershed within the County. If not properly designed or maintained, septic systems can percolate inadequately treated sewage into surface or groundwater and result in contamination. See Section 3.8, Geology and Soils, for a detailed description of existing septic systems in Humboldt County.

Total Daily Maximum Load. Section 303(d) of the federal Clean Water Act and 40 CFR §130.7 require states to identify water bodies that do not meet water quality standards and are not supporting their beneficial uses. These waters are placed on the Section 303(d) List of Water Quality Limited Segments, also known as the 303(d) List of Impaired Water Bodies. The 303(d) List identifies the pollutant or stressor causing impairment and establishes a schedule for developing a control plan to address the impairment. Placement on this list generally triggers development of a pollution control plan called a Total Maximum Daily Load (TMDL) for each water body and associated pollutant/stressor on the list.

The TMDL process leads to a "pollution budget" designed to restore the health of a polluted body of water and provides a quantitative assessment of water quality problems, contributing sources of pollution, and the pollutant load reductions or control actions needed to restore and protect the beneficial uses of an individual water body impaired from loading of a particular pollutant. More specifically, a TMDL is defined as the sum of the individual waste load allocations for point sources, load allocations for non-point sources, and natural background such that the capacity of the water body to assimilate pollutant loading (the loading capacity) is not exceeded. In other words, a TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, which will insure the protection of beneficial uses. This calculation also includes a margin of safety and consideration of seasonal variations. In addition, the TMDL contains the reductions needed to meet water quality standards and allocates those reductions among the pollutant sources in the watershed.

Table 3.10-1, Humboldt County 2006 303(D) List of Quality Limited Segments, below shows water bodies in Humboldt County that have been identified as impaired:

Table 3.10-1. Humboldt County 2006 303(D) List of Water Quality Limited Segments

TMDL Listed Water Bodies in California Water Body	Basin	TMDL Stressor	Size Affected	TMDL Completion Date
South Fork Trinity	Klamath-Trinity	Sedimentation/Siltation/ Temperature	1161 miles	2001*
Lower Trinity	Klamath-Trinity	Sedimentation/Siltation	1256 miles	2001*
Klamath River	Klamath-Trinity	Nutrients/ Organic Enrichment/Low Dissolved Oxygen Temperature	609 miles	2010 and *2019*

Table 3.10-1. Humboldt County 2006 303(D) List of Water Quality Limited Segments

TMDL Listed Water Bodies in California Water Body	Basin	TMDL Stressor	Size Affected	TMDL Completion Date
Mattole River	Mattole	Sedimentation/Siltation/ Temperature	503 miles	2003* **
Redwood Creek	Mad-Redwood	Sedimentation/Siltation/ Temperature	332 miles	1998*
Mad River	Mad-Redwood	Sedimentation/Siltation/ Temperature/Turbidity	654 miles	2007* **
Freshwater Creek	Eureka Plain	Sedimentation/Siltation	84 miles	*2011*
Freshwater Creek	Eureka Plain	Sedimentation/Siltation	12.5 miles	*Unknown*
Jacoby Creek	Eureka Plain	Sediment	19 miles	*2019*
Elk River	Eureka Plain	Sedimentation/Siltation	88 miles	*2011*
Humboldt Bay	Eureka Plain	PCB's	16075 Acres	*2019*
Lower Eel	Eel River	Sedimentation/Siltation/ Temperature	426 miles	2007* **
South Fork Eel	Eel River	Sedimentation/Siltation/ Temperature	943 miles	1999* **
Middle Main Fork Eel	Eel River	Sedimentation/Siltation/ Temperature	674 miles	2005* **
Van Duzen River	Eel River	Sedimentation/Siltation	585 miles	1999*
Clam Beach, Luffenholtz Beach, Moonstone County Park, Trinidad State Beach	Trinidad	Indicator Bacteria	2.54 miles	2019

20012 CWA Section 303(d) List Of Water Quality Limited Segments, North Coast Regional Water Quality Control Board

* On November 29, 2004, the North Coast Regional Water Quality Control Board (RWQCB) adopted via Resolution R1-2004-0087 the Total Maximum Daily Load Implementation Policy Statement for Sediment Impaired Receiving Waters in the North Coast Region, also known as the Sediment TMDL Implementation Policy. The Sediment TMDL Implementation Policy is the TMDL implementation plan for the North Coast Region's sediment impaired Waterbodies that do not have a Board-approved implementation Plan (Action Plan). The Resolution also directs RWQCB staff to develop a Work Plan that sets priorities for addressing excess sediment at a watershed-specific scale and describes how and when available authorities and permitting and enforcement tools will be used. The Regional Water Board Staff Work Plan to Control Excess Sediment in Sediment-Impaired Watersheds was completed in June 2008 via Resolution R1-2008-0057.

** Temperature TMDLs have been completed and approved by the USEPA in the year shown. However, these TMDLs do not yet have Action Plans approved by the RWQCB, and RWQCB staff do not currently have a schedule for completing these temperature TMDL Action Plans.

The North Coast Regional Water Quality Control Board (RWQCB) has developed a *Work Plan to Control Excess Sediment in Sediment-Impaired Watersheds* (April 2008), available at: http://www.waterboards.ca.gov/northcoast/water_issues/programs/tmdls/sediment_workplan/. The Work Plan was developed by RWQCB staff to fulfill the RWQCB's direction under the TMDL Implementation Policy Statement for Sediment Impaired Receiving Waters in the North Coast Region (Resolution No. R1-2004-0087). The resolution directed RWQCB staff to develop a Work Plan that sets priorities for addressing excess sediment at a watershed-specific scale and describes how and when available authorities and permitting and enforcement tools will be used to improve water quality.

As part of that effort, the RWQCB is currently developing "Measures to Control Excess Sediment," a proposed Basin Plan amendment for developing an in-stream flow water quality objective. The objective will likely be a qualitative objective to ensure that natural hydrologic connectivity is maintained and protected in a manner that produces the seasonal patterns and ranges of flow necessary to support beneficial uses. In its current form, the proposed amendment will include a prohibition against the discharge or threatened discharge of excess sediment from human

activities to waters of the state. Excess sediment is defined as soil, rock, and sediments discharged to waters of the state in an amount that could be deleterious to beneficial uses or cause a nuisance. The proposed amendment also includes an implementation plan with guidance for landowners and for RWQCB staff. Under the implementation plan, new projects will be encouraged to prevent, minimize and monitor sedimentation and use adaptive management.

The following is a discussion of water quality within the twelve Humboldt County Planning Watersheds that is summarized from the Natural Resources and Hazards Report.

South Fork Eel. The Eel River, including the Lower, Middle Main, and South Fork Eel, supports one of the largest remaining native coho salmon populations and one of the largest coastal Chinook populations in California. The South Fork Eel is designated by the USEPA as sedimentation, siltation, and temperature impaired and is considered to have more serious water quality problems than the river segments that feed it. High seasonal rainfall combined with a rapid runoff rate on unstable soils delivers large amounts of sediments to the river. Due to heavy winter rainfall running through highly unstable soils, the Eel River may transport more sediments than any other river of its size in the world. These sediments are deposited throughout the lower gradient reaches of the system. In addition, pursuant to California Water Code Section 1205, the Eel River has been declared by the RWQCB as "fully appropriated," finding that the supply of water in the stream system is being fully applied to beneficial uses where the previous water rights decisions have determined that no water remains available for appropriation.

Lower Eel. See South Fork Eel Planning Watershed above.

Middle Main Eel. The Middle Main Eel is designated as sedimentation, siltation, and temperature impaired by the USEPA. The following nonpoint source pollution issues were identified by the RWQCB staff and relate directly to concerns about the Eel River cold water fishery: stream sedimentation; past and current timber harvest practices; potential impacts from dairies and grazing; herbicide application on private and public lands; and inter-basin transfers of water. In addition, the state has declared the Eel River to be fully appropriated.

Lower Klamath. The Lower Klamath Watershed includes several important spawning tributaries for salmon and steelhead and, in combination with the Trinity River watershed, supports one of the largest runs of Chinook salmon in the state, second only to the Sacramento River watershed. Issues affecting the Lower Klamath include water quality conditions associated with the operation of the Klamath River dams, as well as timber and mining operations. Also important is the possible removal of the Klamath River dams and the struggle for scarce water resources among various interests, including Native American tribes; farmers; commercial and sport fishermen; and local, state, and federal resource managers. In addition, the state has declared the Klamath River to be fully appropriated.

South Fork Trinity. The South Fork Trinity River drains an area containing steep, unstable slopes adjacent to some of the most rapidly eroding terrain in the United States. Vegetation within the portion of this watershed located in Humboldt County consists primarily of timberlands and oak woodlands, with limited areas of chaparral. Unstable geology and erosion-producing land use practices have been blamed for the many mass-wasting events triggered by the 1964 flood, which have adversely affected the South Fork's fishery. Unpaved roads generate about twice the levels of sediment loading as timber harvesting. Roads are the most significant component of management-related sediment production. In addition, the state has declared the South Fork Trinity River to be fully appropriated.

Lower Trinity. The Trinity supports several anadromous fish populations, including Chinook salmon, coho salmon, and steelhead trout, and has the second largest run of Chinook salmon in the state in combination with the Klamath River. Sources of pollution include abandoned mine sites in the Hoopa Valley and sedimentation from natural sources, roads, and timber operations. The state has declared the Trinity River to be fully appropriated.

Van Duzen. The Van Duzen watershed maintains an aquatic habitat that supports coho and Chinook salmon, steelhead trout (particularly summer stocks), rainbow trout, pacific lamprey, as well as other species. The deposition of sediment, especially within the lower mainstream channel, can restrict passage of salmon and steelhead to spawning and rearing reaches, especially during low flow years. As a result, this watershed is 303(d) listed for sedimentation and siltation. The state has also declared the Van Duzen River to be fully appropriated.

Redwood Creek. Redwood Creek is sedimentation, siltation, and temperature impaired according to the 303(d) list. Land management patterns and practices have contributed to increased erosion beyond natural rates through landsliding and gullying and stream bank erosion. Close to 45 percent of the sediment load in Redwood Creek is directly related to soil erosion from dirt roads. The resultant erosion causes sediment to enter the stream, filling deep pools and depositing silt in spawning gravels.

Cape Mendocino. The Mattole River is designated as sediment and temperature impaired by the USEPA. The North Coast Watershed Assessment Program found that summer stream temperatures in much of the Mattole Basin are not within the range of temperatures that fully support healthy salmon and steelhead populations. The reduction of stream flow caused by human diversions results in increased in water temperatures in some areas that is not supportive of salmon and steelhead populations. Aggradation from fine sediment and the lack of logs and stumps in some stream channels has reduced channel diversity needed to support salmon and steelhead populations.

Trinidad. Water supply is an important issue in this watershed. The Luffenholtz watershed, the source of water for the City of Trinidad, is designated as a critical watershed area due to capacity and water quality concerns. The Westhaven Community Service District water system is barely able to meet current maximum day demands. The coastal beaches between Westhaven and Trinidad, including Clam Beach, Moonstone County Park, Luffenholtz Beach, and Trinidad State Beach, are impaired by indicator bacteria.

Mad River. The Mad River supports runs of anadromous salmonids including Chinook salmon, coho salmon, and steelhead and cutthroat trout. Except for cutthroat trout, all anadromous salmonids in the Mad River are federally protected. The Mad River is listed on the 303(d) list of impaired waters for sediment and temperature impairment. The primary pollution issues for the watershed are forestry-related, along with urbanization and associated industrial and public point sources (such as discharges of municipal effluent). In addition, the state has declared the Mad River to be fully appropriated.

Eureka Plain. According to the 303(d) list of impaired waters, water quality issues within the watershed include sedimentation and siltation within the Freshwater and Elk watersheds and the presence of dioxin toxin equivalents in Humboldt Bay. The upper hillslope areas of the watershed, while populated to varying degrees, are primarily occupied by timber production and harvesting activities, with coast redwood as the predominant harvested species. Freshwater streams support production of anadromous salmonids, including steelhead and cutthroat trout, coho and Chinook salmon. The deltas of the Elk River and Mad River Slough support commercial and sport shellfish production and harvesting. Past practices and continued problems with

harvesting techniques and road construction have added to stream sedimentation, in varying degrees, in all the drainages in the watershed. Storm water runoff from all watersheds draining to the Bay convey indicators of bacterial contamination that impacts shellfish harvest. Seasonal and rainfall-based shellfish harvesting closures are used to mitigate the effects of nonpoint source runoff. A shellfish Technical Advisory Committee was established in November of 1995 to address nonpoint source runoff issues. In addition, the state has declared Jacoby Creek to be fully appropriated.

Humboldt County Hydrology

Surface Water. Surface water in Humboldt County is captured within each of the watersheds that are defined above. Surface water originates as precipitation in the form of rain or snow, and flows on the surface through streams or rivers or is stored in lakes and ponds. The USEPA also defines water that flows below ground level as ground water under the influence of surface water if it has a significant occurrence of insects or other macroorganisms, algae, organic debris, or large-diameter pathogens; or if it exhibits significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions. Surface water conditions in Humboldt County are generally described in the discussion of planning watersheds above. Further detail regarding surface water conditions within each of the Humboldt County planning watersheds can be found in the *Natural Resources and Hazards Report*.

Groundwater. The western portion of Humboldt County is defined as part of the California Coastal Basin Aquifer. Individual aquifers in Humboldt County are located in the valleys of the Klamath Mountains and the Coast Ranges and are distributed along California's Pacific Coast. This region has been subjected to intense tectonic forces for millions of years leading to folding and faulting and the rise of the Klamath and Salmon Mountains in Northern California. Terrestrial, marine, and volcanic rocks deposited in intermontane valleys compose the aquifers referred to as coastal basin aquifers.

Humboldt County is in the North Coast Hydrologic Area and has four principal groundwater basins: Hoopa Valley, Mad River Valley, Eureka Plain, and Eel River Valley, and ten minor basins (see Table 3.10-3, below). The Mad River Valley, the Eureka Plain, and the Eel River Valley are a part of the Coastal Basins. The hydrologic basins in Humboldt County provide very large surface water volumes. While mean annual runoff in Humboldt County from the major rivers and streams is approximately 23 million acre feet, over 80 percent of this flow occurs during November through March, and the total potential annual groundwater yield of the entire County is only approximately 100,000 acre feet. Ground water has been developed for individual domestic requirements, the agricultural demands of the Eel and Mad River delta areas, and to provide supplements to municipal water supply. Potential concerns are saltwater intrusion in coastal areas and the effects of groundwater withdrawal on streams that rely on groundwater recharge to sustain flows during the dry season. See Figure 3.10-2 Groundwater Basins in Humboldt County and Table 3.10-3 Humboldt County Ground Water Basins for detailed information regarding Humboldt County groundwater resources.

Several communities rely on local aquifers as water sources, including the City of Arcata. Arcata reports that aquifers in its planning area are generally less than 100 feet deep. While there are approximately 60 small groundwater contamination sites in the city, the municipal water supply is not threatened. Groundwater quality is not expected to change in the near future, as few new homes and businesses are expected to withdraw water from wells. The City's water system in north Arcata is currently drawing one million of the approximately two million gallons per day which the local aquifer can provide.

Humboldt Community Services District is currently able to deliver 1,500 gallons per minute (or 2,400 acre-feet per year) to the Humboldt Hill area from wells located within the Eureka Plain groundwater basin. According to the USGS, the quality of groundwater in the Eureka Plain is generally acceptable for most uses, although concentrations of dissolved iron in water from many wells may exceed the US EPA's secondary drinking-water recommendation of 300 micrograms per liter, and ionic and bacterial levels make this groundwater unsuitable for domestic or municipal use.

McKinleyville lies within the Mad River Valley Basin, which is fed by the lower Little River and Mad River. Groundwater is primarily used for pastureland irrigation in this area, with industry and public-supply withdrawals benefiting to a lesser degree. Current rates of withdrawal do not appear to exceed recharge rates. Agricultural activities, sewage disposal, and fertilizer use deposit nutrient- and bacterium-rich water into the local aquifer, but groundwater pollution is not considered significant

The Avenue of the Giants Community Planning Area (including Stafford, Redcrest, Weott, Myers Flat, Miranda, and Phillipsville) is associated with the Eel River groundwater basins, with the prime source being the Eel-Van Duzen delta. According to the Natural Resources and Hazards Report (Page 1-38), approximately 10,000 acre-feet of the estimated annual yield of 40,000 to 60,000 acre-feet are currently being pumped for agriculture. The Eel River groundwater basin water is considered suitable for individual domestic needs as well as for irrigation. Groundwater in rural Humboldt County is generally directed to individual domestic needs and irrigation for farmed areas of the deltas and the Eel River groundwater basin's well water is considered suitable for these uses.

State law passed in 2014 (AB 1739), the Sustainable Groundwater Management Act (SGMA), is intended to achieve sustainable management of groundwater resources for long-term reliability for multiple benefits while avoiding undesirable results. The State Department of Water Resources (DWR) assigned priority ratings to groundwater basins throughout the state. Compliance with the SGMA is required for basins that are identified as "high" or "medium" priority. The Eel River Valley groundwater basin has been assigned an initial priority of "medium,". The other 13 mapped groundwater basins in the County have been given a "very low" priority, although the groundwater basin boundaries and prioritizations could change in the future based on local habitat considerations, stream flows and improved hydrologic and geologic information. The SGMA identifies two compliance options for "high" or "medium" priority basins: one is forming a Groundwater Sustainability Agency and adopting a Groundwater Sustainability Plan; and the other is for an entity to submit a Groundwater Sustainability Plan Alternative if basins conditions demonstrate that the basin has operated under sustainable yield for the past ten years.

The County of Humboldt Public Works Department (HCPWD) has been acting as the lead for compliance with the SGMA for the Eel River groundwater basin. The HCPWD coordinated the formation of the Eel River Valley Groundwater Working Group to assist with a groundwater program in response to SGMA. The HCPWD received a Department of Water Resources (DWR) Prop 1 Grant to complete the Eel River Valley Groundwater Basin Assessment (Basin Assessment). The Basin Assessment is a geologic and hydrogeologic investigation to support a determination of whether or not the basin is being managed sustainably without causing undesirable results. The results of the Basin Assessment indicate that there is sufficient evidence to prepare an Alternative for compliance with the SGMA. The Alternative is intended to accomplish the same goals as a Groundwater Sustainability Plan without the formation and administration of a Groundwater Sustainability Agency. The Eel River Valley Groundwater Basin Groundwater Sustainability Plan Alternative was submitted prior to the January 31, 2017, deadline and is under consideration by DWR.

Figure 3.10-2. Groundwater Basins in Humboldt County.

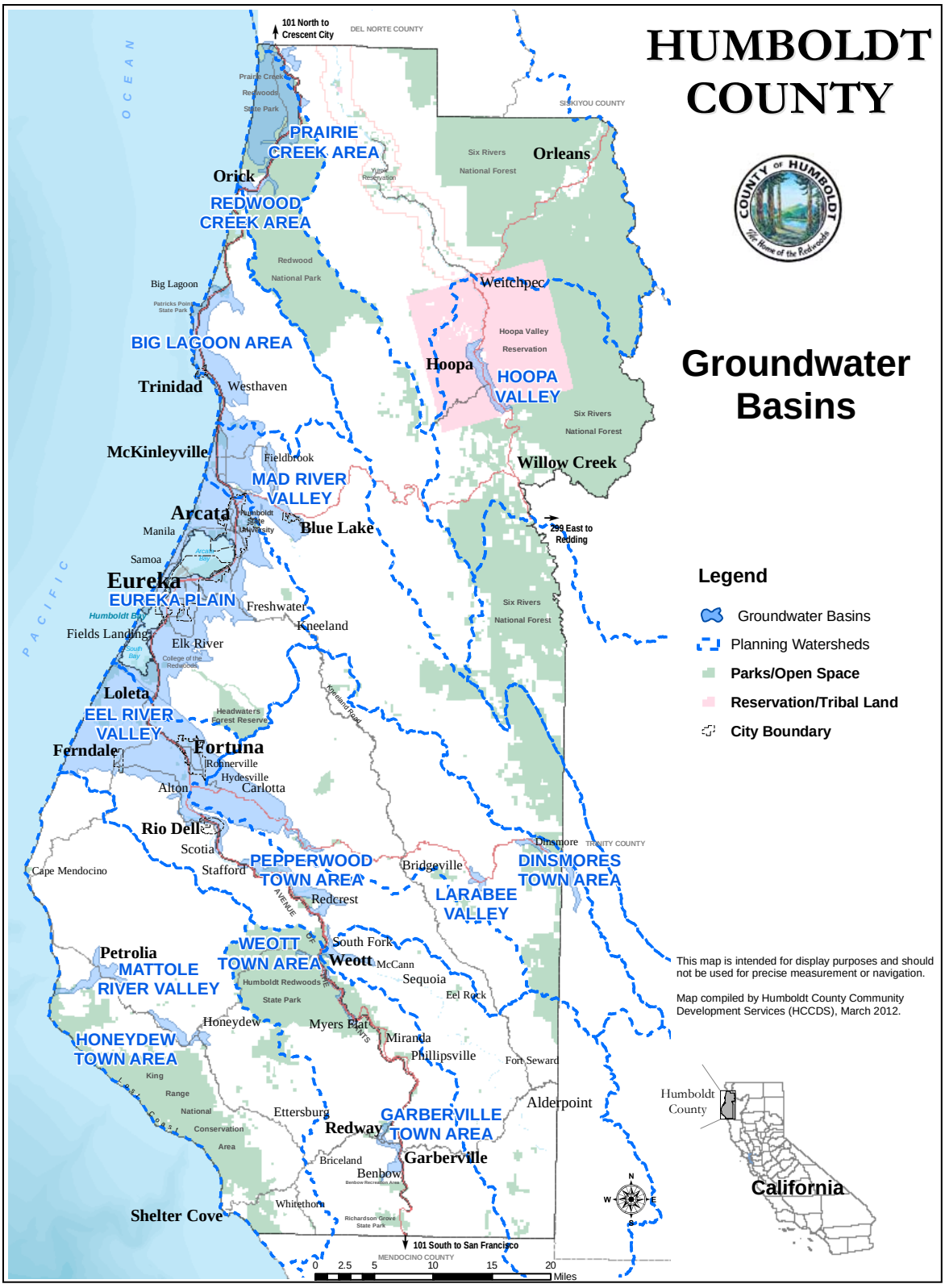


Table 3.10-3. Humboldt County Ground Water Basins.

Basin	Planning Watershed	Area (Acres)	Rain (Inches)	Extraction (Acre Feet)	Useable Storage	Well Yields (GPM)	Useable Storage	Well Completion Reports		Municipal Water Providers
								Municipal or Ag	Domestic	
Garberville	South Fork Eel	2,100	57 - 63	67	Not Available	Not Available	Not Available	Not Available	8	Garberville SD, Redway CSD
Weott	South Fork Eel	3,650	55 - 61	110	Not Available	Not Available	Not Available	Not Available	1	Weott CSD, Myers Flat MWA
Pepperwood	Lower Eel	6,290	45 - 53	947	Not Available	Not Available	Not Available	Not Available	Not Available	None
Eel River Valley	Lower Eel	73,700	41 – 55	100,000	49,000	<1,200	49,000	12	219	Loleta CSD, Del Oro Water Co. Hydesville CWD, Riverside CSD, City of Rio Dell, City of Fortuna
Big Lagoon	Trinidad	34,000	53 - 65	240	Not Available	Not Available	Not Available	Not Available	60	Big Lagoon CSD, Westhaven CSD
Dinsmore	Van Duzen	2,300	57 - 61	124	Not Available	Not Available	Not Available	Not Available	13	None
Larabee Valley	Van Duzen	970	63	Not Available	Not Available	Not Available	Not Available	Not Available	1	None
Hoopa Valley	Lower Trinity	3,900	59 - 63	316	19,200	<300	19,200	1	47	None
Redwood Creek	Redwood Creek	2,000	59 - 69	580	Not Available	Not Available	Not Available	1	11	Orick CSD
Prairie Creek	Redwood Creek	20,000	59 - 75	4	Not Available	Not Available	Not Available	Not Available	Not Available	None
Mattole	Cape Mendocino	3,150	63 - 75	147	Not Available	Not Available	Not Available	Not Available	49	None
Honeydew	Cape Mendocino	2,370	71 - 79	20	Not Available	Not Available	Not Available	Not Available	2	None
Dows Prairie School	Mad River	14,000	39 - 53	2,100	10,500	Not	10,500	6	289	None

Basin	Planning Watershed	Area (Acres)	Rain (Inches)	Extraction (Acre Feet)	Useable Storage	Well Yields (GPM)	Useable Storage	Well Completion Reports		Municipal Water Providers
								Municipal or Ag	Domestic	
Area (Mad River Valley)						Available				
Mad River Lowland (Mad River Valley)	Mad River	25,600	39 - 53	25,000	6,335	<120	6,335	1	32	City of Arcata
Eureka Plain	Eureka Plain	37,400	37 - 47	6,100	Not Available	400	Not Available	12	162	Humboldt CSD, City of Eureka

CSD – Community Services District
Source: California's Groundwater Bulletin 118 - Update 2003 Basin/Subbasin Descriptions by Hydrologic Region.

Stormwater

Stormwater Drainage Systems. Stormwater is an important factor in the distribution of sediments, chemicals, and other natural and human-produced compounds, throughout a watershed. Runoff from heavy rains picks up these potential pollutants and carries them downstream, where they may be deposited or may remain suspended in sensitive ecological areas. With Humboldt County's wet climate and large amount of land dedicated to timber production and agriculture, pollution due to stormwater runoff is a particularly important issue. The Federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA), prohibits the discharge of pollutants into waters of the United States unless the discharge complies with a National Pollutant Discharge Elimination System (NPDES) permit. Section 402(p) of the 1987 amendments established a framework for regulating municipal, industrial and construction stormwater discharges under the NPDES program. In California, the State Water Resources Control Board (SWRCB) and the nine RWQCBs issue NPDES permits. In 1999, USEPA established regulations, known as Phase II NPDES program, requiring permits for stormwater discharges from Small Municipal Separate Storm Sewer Systems (MS4; the USEPA categorizes MS4s as either "small," "medium," or "large"),and from construction sites disturbing between one and five acres of land. The Phase II requirements were developed for regulating water quality affected by smaller municipalities and construction projects not covered by the Phase I NPDES permitting requirements.

The HCPWD is responsible for storm drainage within the unincorporated areas of the County and also maintains flood control levees along the Eel River at Sandy Prairie, the Mad River at Blue Lake, and Redwood Creek at Orick. The *Community Infrastructure and Services Technical Report* found that, aside from McKinleyville and the unincorporated area around Eureka, the majority of the County does not have improved storm water conveyance systems, and what does exist varies in condition. Much of the infrastructure is very old and is reaching the end of its design life. Outside of the County's urban areas, stormwater follows a natural drainage pattern before either infiltrating or entering a waterway. The County maintains a significant number of culverts (estimated in the thousands) under County roadways. These culverts are located throughout the County's many drainage swales, creeks and streams.

In February 2013, the State Water Resources Control Board adopted the current version of the MS4 Permit. The purpose of the MS4 Permit is to control the discharge of pollutants to stormwater drainage systems which ultimately drain to natural waterways. The state has stipulated that the MS4 Permit applies to McKinleyville, the unincorporated Eureka area, and Shelter Cove within unincorporated Humboldt County. Other areas with minor amounts of drainage infrastructure but that are not subject to MSR Permit requirements include Redway, Manila, King Salmon, Fields Landing, Loleta, and Willow Creek.

The MS4 Permit requires the County to ensure that certain development projects comply with post-construction stormwater requirements based on "low impact development" (LID) standards. These standards, effective as of July 1, 2015, are intended to maintain a site's pre-development runoff characteristics by using design techniques that capture, treat, and infiltrate stormwater on site.

The MS4 General Permit specifies two size classes for post-construction requirements. Projects that create and/or replace 2,500 to 5,000 square feet of impervious surface ("small projects") will need to implement one or more designated site design measures to reduce project site runoff. Examples of site design measures include disconnection of rooftop drainage from impervious areas, tree planting and preservation, rain barrels, vegetated swales, and porous pavement.

Projects that create and/or replace 5,000 square feet or more of impervious surface ("regulated projects") will need to implement site design measures based on more detailed procedures and demonstrate compliance with runoff reduction thresholds. Some projects may be required to construct bioretention facilities. In addition, projects in the larger size category will need to comply with source control measures to minimize the contact between pollutants and stormwater runoff.

Procedures, standards, and specifications for implementing the post-construction requirements of the MS4 Permit are contained in the Humboldt Low Impact Development Stormwater Manual V2.0. This manual will also be used by the cities of Eureka, Arcata, Fortuna, and Trinidad for compliance with the MS4 Permit. Humboldt LID Stormwater Manual V2.0 and associated documents are available on the North Coast Stormwater Coalition website, http://northcoaststormwatercoalition.org/.

The Humboldt County Code addresses nonpoint source pollution and sedimentation under Title III, Land Use and Development Division 3, Building Regulations Section 331-12, Grading, Excavation, Erosion, and Sedimentation Control (hereafter, County Grading Ordinance)l. Grading permits are intended to control and reduce erosion, reduce sediment delivered to drainages and streams, and protect fish habitat and other biological resources. According to the County Grading Ordinance, projects larger than one acre or that meet other criteria specified in the erosion and sediment control plan requirements must include implementation measures "based on recommendations contained in the latest edition of the State of California Erosion and Sediment Control Handbook or State Water Resources Control Board Best Management Practice Construction Handbook", or equivalent best management practice erosion and sediment control guides, to prevent sedimentation or damage to onsite and offsite property.

For small projects that do not require a grading permit and for building permits that do not also require a grading permit, applicants can agree to adhere to a list of erosion control standards and specify implementation measures from a list provided by the County that will be used to comply with Erosion and Sediment Control Standards in the County's Grading Ordinance. The 2016 California Green Building Standards (Chapter 4, Residential Mandatory Measures, Section 4.106, subsections 1 through 3, Site Development, which took effect in January 2017) relating to new construction, add to and compliment the procedures described above and specify more rigorous storm water management criteria to prevent erosion and retain sediment on site. Requirements for projects less than one acre within MS4 areas will be subject to much more stringent requirements.

Timber and agricultural production are important industries in Humboldt. Timber and agricultural practices have the potential to impair water quality and contribute to water quality violations in Humboldt County. These practices include timber harvesting, grazing, and dairy operations. These land use activities can also be sources of nutrients and contribute to temperature impairments.

Timber harvest and management activities are subject to the Z'berg-Nejedly Forest Practice Act of 1973, or the Forest Practice Act. The California Department of Forestry and Fire Protection (CAL FIRE) regulates timber harvest activities pursuant to the California Forest Practice Rules (Title 14, California Code of Regulations, Chapters 4, 4.5 and 10), which implement the Forest Practice Act. The Forest Practice Rules contain regulations regarding direct and cumulative impacts to watersheds from sediment, water temperature, organic debris, chemical contamination, and peak flow. A timber harvest plan must comply with the quantitative or narrative water quality objectives set forth in the RWQCB Water Quality Control Plan for the North Coast Region, or Basin

Plan. Activities which are not exempt from the local regulation pursuant to Public Resources Code Section 4516.4 are subject to County grading, excavation, erosion, and sedimentation control regulations.

The Humboldt County Resource Conservation District (HCRCD) is a special district that was formed in 1987 to assist private landowners in voluntary planning, design, and installation of soil and water conservation practices in Humboldt County. Recognizing the potential water quality effects of agricultural operations, the HCRCD has received grants to help local dairies improve their operations and water quality by implementing state of the art water quality management systems. The grant provides funding to support practices and demonstrations such as manure distribution, heavy use area protection, roof runoff management, and waste storage structures. The HCRCD provides design services, permitting help, and on selected projects, cost share payments to a dairy operator for project implementation. The HCRCD recently began providing custom nutrient management plans to local dairy operators. The purpose of nutrient management plans is to adequately supply nutrients for plant production and to properly utilize manure or organic by-products as a plant nutrient source, while minimizing agricultural nonpoint source pollution of surface and ground water resources.

Flooding. Flood hazards in Humboldt County are attributable to rivers and streams, dam failure, and coastal high water hazards (tsunamis and flood tides), with river flooding being by far the most prevalent. Flooding is a concern for many waterways in Humboldt County, including the Eel River (including the Van Duzen and South Fork), the Mad River, Eureka Plain (especially Freshwater and Jacoby Creeks), and the Trinity River.

Seventy percent of precipitation in Humboldt County occurs from November to March, and major floods have resulted from a succession of intense rainstorms during these months. The two worst floods in Humboldt County history occurred in December 1955 and December 1964, causing tens of millions of dollars in damage and numerous fatalities.

The 1955 flood occurred following weeks of above-normal precipitation in the County, with rainfall measurements in Cummings reaching as high as 24 inches over three days. Flood damage in the Eel River Basin exceeded $22 million, with one reported fatality and 43,000 acres flooded. Heavy debris carried by high velocity river flows is faulted for much of the damage.

Heavy rains accompanied by runoff from an unusually large snowpack led to the flooding of the Mad and Eel Rivers in 1964. Total damages reached $100 million, with entire communities (including Pepperwood, the site of the 1955 fatality) being destroyed and 19 fatalities recorded. Millions of board feet of lumber, thousands of acres of prime farmland, and 4,000 head of livestock were also lost.

Floods are commonly described as having a 10-, 50-, 100-, or 500-year recurrence interval, meaning that floods of these magnitudes have (respectively) a 10, 2, 1, or 0.2 percent chance of occurring on average in any given year. These measurements reflect averages of likelihood of occurrence, but it is possible that two or more rare floods (with a 100-year or higher recurrence interval) could occur within a short period of time.

Assigning recurrence intervals to the discharges of historic floods is valuable both as a rough comparison among the magnitudes of different flood intervals on a given waterway, as well as a way of showing the intensity of a storm over a large area. The recurrence intervals shown for various waterways in Humboldt County in December 1964 point to the relative effects the storm had on different watersheds. For example, flooding along the Eel River was much more severe than along Jacoby Creek, even when factoring in their size difference.

Standard measurement of floodplains includes demarcation of areas expected to be flooded during floods with these recurrence intervals, as determined by the Army Corps of Engineers. The Federal Emergency Management Agency (FEMA) has adopted the 100-year (1 percent annual chance) flood as the base for floodplain management purposes. FEMA has mapped flood-prone areas. The maps provide the basis for regulating floodplains in conformance with the National Flood Insurance Program. The County has adopted floodplain regulations in order to continue participation in the federal flood insurance program.

Humboldt County's 100-year floodplains are shown in Natural Resources and Hazards Report Volume 1, Figure 11-1. As shown on these maps, the largest 100-year floodplain areas are the Eel River delta and Lower Eel River up to its confluence with the South Fork Eel; the Van Duzen River upstream of its confluence with the Lower Eel River; the region between the lowest five miles of the Mad River and the northern end of Humboldt Bay; the Mad River ten miles upstream of its mouth; the downstream ends of the Elk River, Salmon Creek, and Freshwater Creek (on the Eureka Plain); and the Maple Creek delta in the Trinidad planning watershed. The Natural Resources and Hazards Report, Vol. 1 discusses FEMA's designated 100-year flood zones in Humboldt County's planning watersheds, with respect to Community Planning Areas (CPAs) and other populated areas.

Other flooding concerns include ocean storm surges and dam failure. Storm surges occur when coastal storms produce large ocean waves that sweep across coastlines, inundating low-lying areas and causing flooding. If a storm surge occurs at the same time as high tide, flooding is more extensive. Dams provide some degree of flood control but also present a possible hazard in the event of failure. Hazards from dam failure are those associated with the downstream inundation that would occur given a major structural failure of a nearby impoundment. Such failures would most likely be caused by geologic phenomena including seismic events and slope stability problems. Five dams are located in adjacent counties on rivers that drain into Humboldt County, and the failure of any one of these structures could significantly impact Humboldt County. Trinity Dam and Ruth Dam pose the most substantial risk due to their large volumes and, in the event of a failure, short downstream warning times. The County maintains emergency response plans for the Trinity, Ruth (Matthews), Scott, Copco, and Iron Gate dams. Chapter 8, Dam Failure, of the 2014 Humboldt Operational Area Hazard Mitigation Plan, provides a detailed discussion of dam failure hazards and potential impacts to Humboldt County resulting from dam failure. The Humboldt Operational Area Hazard Mitigation Plan is available on the internet at http://humboldtgov.org//506/Local-Hazard-Mitigation .

3.10.2 Hydrology and Water Quality - Standards of Significance

This analysis uses the significance criteria from the California Environmental Quality Act (CEQA) Guidelines, Appendix G. The proposed General Plan Update would result in a significant impact related to hydrology and water quality if it would:

a) Violate any water quality standards or waste discharge requirements.
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
f) Otherwise substantially degrade water quality.
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows.
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
j) Inundation by seiche, tsunami, or mudflow.

Items "a", "c" and "f" are discussed together in Impact 3.10.3.1, Degrade Water Quality or Exceed Waste Discharge Requirements, Item "b" is discussed in Impact 3.10.3.2, Deplete Groundwater Supplies or Interfere With Groundwater Recharge, Items "d" and "e" are discussed in Impact 3.10.3.3, Alter the Existing Drainage Patterns or Exceed the Capacity of Stormwater Drainage Systems, and Items "g" through Items "j" are discussed as part of Impact 3.10.3.4, Housing within a 100-year Flood Hazard Area or Expose People or Structures to Flooding from Levee or Dam Failure, Tsunami, or Mudflow.

3.10.3 Hydrology and Water Quality - Impacts and Mitigation Measures

Impact 3.10.3.1: Degrade Water Quality or Exceed Waste Discharge Requirements

Implementation of the General Plan Update could result in increased stormwater runoff; mobilization of sediment, household chemicals, metals, hydrocarbons, nutrients and other pollutants; sanitary sewer overflows; and vegetation removal; all of which can have potentially significant impacts on water quality.

This impact analysis addresses items "a", "c", and "f" of the significance standards listed in Appendix G of the CEQA Guidelines as provided in Section 3.10.2 above. Pursuant to these standards, the proposed County General Plan Update would have a significant impact if it would:

a) Violate any water quality standards or waste discharge requirements.
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.
f) Otherwise substantially degrade water quality.

Development allowed under the General Plan Update would result in impervious surfaces in the form of new structures, roadways, parking areas, and supporting. New surfaces such as roofs; concrete or asphalt sidewalks, parking lots or roads; as well as areas of compacted soil would

likely be impervious to rainwater. Stormwater moves over impervious surfaces and collects natural and human generated substances such as sediment, nutrients, and trace metals, and carries them to the drainage system and eventually to wetlands, streams, rivers, and coastal waterways. Impervious surfaces increase the amount of stormwater runoff and significantly impede or prevent the natural percolation of rainwater into the soil, resulting in higher levels of mobilized sediment and other pollutants entering receiving water bodies as a nonpoint source pollutant, thereby decreasing the quality of receiving waters.

Based on DOF projections, approximately 1,721 new housing units will be constructed by the planning period population peak, 2028. Approximately 90 percent of those units are expected to be located within more urbanized areas (Community Planning Areas and Coastal Zone Areas), and approximately 10 percent would be located within rural areas outside community planning areas.

In an analysis comparing the stormwater runoff between lower and higher density development, the USEPA found that "with more dense development, runoff rates per house decrease by approximately 74 percent from the least dense scenario; for the same amount of development, denser development produces less runoff and less impervious cover than low-density development; and for a given amount of growth, lower-density development uses more of the watershed" (Protecting Water Resources with Higher-Density Development, US EPA, Findings/Discussion page 26).

Projected growth during the General Plan Update planning period may result in the use of materials and substances that could impair water quality. Land Use activities could involve the storage and handling of materials and substances such as automotive fluids, fertilizers, and household cleaners that, if used improperly, could be mobilized by stormwater and impair water quality. Sediment sources, besides construction sources noted above, could include landslides, roads and parking lots, unprotected slopes, and disturbed areas. Organic compound sources derive from automotive fluids on roads and parking areas, pesticides and herbicides. Nutrients include fertilizer in lawns and gardens, food waste, discharges from septic and sewer systems, and sediment. Trace metals sources include oil and grease, compounds on roads and parking lots, roofing, construction sites, and industrial and commercial uses. Land use activities can also result in the removal of vegetative cover along watercourses, which can result in increased water temperatures with detrimental effects on fish and other aquatic organisms.

Increases in receiving water temperatures can also result from the intensification of stormwater flows which would be a consequence of an increase in impervious surfaces. Impervious surfaces act as heat collectors that warm urban runoff as it passes over them. Elevated temperatures can also be caused by increased flows that result in wider and shallower stream channels. Elevated temperatures disrupt aquatic organisms that have finely tuned temperature limits, such as trout, salmon and the insects on which they feed, by decreasing the amount of dissolved oxygen in the water column which can lead to a shift in algae growth.

New development under the General Plan Update would involve construction activities which typically involve soil disturbance resulting from grading, excavating and trenching within a project site. Stormwater runoff from construction sites can contain sediments mobilized due to of these activities. Spills or leaks from heavy equipment and machinery, staging areas, or building sites can also enter runoff. Typical pollutants may include petroleum products and heavy metals from equipment, and construction materials such as paints, solvents, and cleaning agents. Sediment from erosion of graded or excavated surface materials, leaks or spills from equipment, or inadvertent releases of construction materials may degrade water quality if runoff containing the sediment enters receiving waters in sufficient quantities to exceed water quality objectives.

Based on the 303(d) list above, most watersheds within Humboldt County are impaired by sedimentation, siltation, and temperature. In addition, Humboldt Bay is impaired by polychlorinated biphenyls (PCBs), which have been demonstrated to cause cancer and other serious non-cancer health effects, and coastal beaches between Westhaven and Trinidad are impaired by bacteria. Water quality in streams would be further affected by polluted runoff from urban and rural growth during the General Plan Update planning period. The loading of pollutants typically increases in the downstream direction as development density increases towards the bottom of the watershed. The local receiving waters (e.g., Humboldt Bay, the Eel River delta, and the Pacific Ocean) would be affected substantially more when the urbanized areas of separate watersheds that outlet to the same receiving water body.

Water quality could also be affected by the reuse of treated wastewater from sewer plants and graywater for agriculture, landscaping, and as a replacement for other non-potable water demands, which has been identified as a way to reduce water consumption. Depending on the extent of treatment that is applied to the wastewater, over-application can result in excessive runoff entering waterways, or the leaching of constituents contained in the wastewater (such as salts, nutrients, estrogenic substances, and pharmaceuticals) to the groundwater.

Water quality may also be degraded where historical development on small lots has resulted in a high concentration of older septic systems that may not have been designed and constructed using current standards, or are not regularly maintained or upgraded. Organisms associated with human waste may become present in surface water and groundwater when the septic treatment process is not completed due to a faulty system. Septic systems are utilized on rural properties throughout the County and in numerous, less dense urban areas that do not have municipal wastewater systems, such as Orick, Willow Creek, and Westhaven.

Section 3.8, Geology and Soils, describes the existing conditions relating to the use of on-site septic systems in Humboldt County and the existing programs in place to regulate the development of use of such systems. Pursuant to Assembly Bill 885, a bill passed in 2000 relating to onsite sewage systems (AB 885), the SWRCB has developed statewide regulations for onsite wastewater treatment systems. Pursuant to Assembly Bill 885, Humboldt County has prepared a Draft Local Agency Management Program (LAMP) for managing onsite wastewater (septic) treatment systems. Humboldt County is writing one to comply with the state mandate contained in the Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems (OWTS Policy , State Water Resources Control Board Resolution NO. 2012-0032, http://www.waterboards.ca.gov/water_issues/programs/owts/board_adopted_policy.shtml)).

Analysis of Relevant General Plan Update Policies

The General Plan Update contains policies intended to reduce sediment in runoff water and protect soils in agricultural areas, as well as on slopes. These same policies direct new development into areas with suitable soils and serve to minimize erosion. General Plan Update implementation measures would result in an update to the grading and zoning ordinance to address soil erosion and to require erosion control measures for all grading activities. By appropriate designation of land uses, the General Plan Update would reduce sedimentation impacts associated with new development activities. The County has adopted several ordinances to address the potential for increased sedimentation from new development, including grading, excavation, erosion, and sedimentation control, geological hazards, and Streamside Management Area (SMA) regulations, which would be amended, pursuant to WR-IMx1, Update Water Quality Regulations, to reflect policies contained in the Water Resources and Conservation and Open Space Elements.

Water Resources Element. The following Water Resources Element policies, standards and implementation measures are intended to reduce water quality impacts. Water Resources (WR) Policy WR-P3, Proactive Protections, directs the County to focus regulatory attention and educational efforts in specified watersheds where threats to water quality (such as the sources of sediment, siltation, and temperature analyzed above) would have potentially significant cumulative effects. Policy WR-P4, Critical Municipal Water Supply Areas, would require that the County designate all or portions of watersheds as "Critical Water Supply Areas" if cumulative impacts from land uses within the area have the potential to significantly impact the quality or quantity of municipal water supplies. Policy WR-P5, Critical Watershed Areas and would require that the County designate all or portions of watersheds as "Critical Watersheds" if cumulative impacts from land uses within the area have the potential to create significant environmental impacts to threatened or endangered species, including coho salmon or steelhead habitat. Pursuant to Standard WR-S3, Development within Critical Watershed Areas, performance standards that would apply to ministerial and discretionary development would be adopted by ordinance, and would require that projects be designed to avoid the take of endangered or threatened species by reducing cumulative impacts to aquatic habitat to below levels of significance. Discretionary development would also be subject to supplemental permit conditions. WR-P5 WR-S3has the potential to apply to all planning watersheds within Humboldt County as each contains either coho salmon or steelhead habitat that could be affected by cumulative impacts from land uses within the watershed.

Policy WR-Px2, Mitigate Controllable Sediment Discharge Sites, requires that discretionary development involving a site identified as part of the TMDL Controllable Sediment Discharge Inventory be conditioned to mitigate (meaning to eliminate or avoid) sediment. Policy WR-P8, Erosion and Sediment Discharge, states that all projects requiring a grading permit must comply with performance standards adopted to minimize erosion and the discharge of sediments into surface runoff, drainage systems, and water bodies. Standard WR-S8, Erosion and Sediment Discharge, requires that ministerial and discretionary project must conform to grading ordinance standards for erosion and sediment control. Policy WR-P9, County Facilities Management**,** requires design, construction, and maintenance of County buildings, roads, bridges, drainages, and other facilities to minimize stormwater runoff erosion and discharge of sediments and other pollutants. Policy WR-P36 Erosion and Sediment Control Measures, requires that erosion and sediment control measures be incorporated into development design and improvements. Policy WR-P30, Natural Stormwater Drainage Courses, requires that natural drainage courses be retained and protected from development impacts that would alter the natural drainage courses, increase erosion or sedimentation, or have a significant adverse effect on flow rates or water quality. Policy WR-P30 further requires that natural vegetation within riparian and wetland protection zones be maintained to preserve natural drainage characteristics and that storm water discharges be dissipated so that they do not contribute to additional erosion, and filtered and cleaned of pollutants where feasible.

Policy WR-P31, Downstream Stormwater Peak Flows, requires that peak downstream stormwater discharge shall not exceed the capacity limits of off-site drainage systems or cause downstream erosion, flooding, habitat destruction, or impacts to wetlands and riparian areas. Further, WR-P31also requires that new development must demonstrate that post-development peak flow discharges will mimic natural flows to watercourses and avoid impacts to Beneficial Uses of Water. Policies WR-P34, Commercial and Industrial Activities, WR-P35, Oil/Water Separation, and WR-P39, Reduce Toxic Runoff, are intended to minimize storm water contamination from commercial, industrial, and residential uses and from new parking lots.

Policy WR-P38, Storm Drainage Impact Reduction, requires the use of Low-Impact Development (LID) standards to reduce the quantity and increase the quality of stormwater runoff from new developments in watersheds with known significant cumulative impacts from stormwater runoff. For all other watersheds, the policy requires the preparation of storm drainage development guidelines with incentives to encourage LID standards to reduce the quantity and increase the quality of stormwater runoff from new developments. This policy would allow the County to facilitate development that incorporates project elements to reduce storm water flow and would therefore reduce sedimentation, siltation, and the transmission of pollutants through the storm water system. In addition, Implementation Measure WR-IM25, Drainage Ordinance, requires that the County develop and maintain an ordinance that regulates stormwater drainage consistent with the General Plan.

Standard WR-S7, Total Maximum Daily Loads (TMDLs) Implementation, specifies that discretionary development within watersheds containing impaired water bodies as defined under Section 303(d) of the federal Clean Water Act and governed by TMDL implementation plans shall be conditioned to reduce or prevent further impairment consistent with applicable TMDLs. This standard, along with Policy WR-P38, Storm Drainage Impact Reduction, will limit further degradation of impaired waters that could occur because of discretionary projects, but would not reduce or prevent further degradation from ministerial permits. Implementation Measure WR-IM10, TMDL Controllable Sediment Discharge Inventory and Reduction Program**,** requires the County to map impaired water bodies as defined under Section 303(d) of the federal Clean Water Act with associated impairment parameters, water quality objectives, and pollution budgets contained in TMDL implementation plans, and to seek funding to identify controllable sediment discharge sites and establish a program to prioritize, treat, monitor, and subsequently reevaluate such sites.

Implementation Measure WR-IMx, Graywater Re-use Standards, requires the County to update and amend the existing County Code to implement the revisions to the State California Plumbing Code, Title 24, Part 5, Chapter 16A regarding Graywater Standards, as reflected in SB1258. Implementation Measure WR-IMx1,Update Water Quality Regulations, requires the County to amend the Grading, Excavation, Erosion, and Sedimentation Control Regulations and Division 1, Planning Zoning Regulations Chapter 6 - General Provisions and Exceptions Section 314-61.1 Streamside Management Area Ordinance to reflect the new erosion, sediment control, vegetation, restoration, and stormwater drainage policies and standards contained in the Water Resources Element, and the Biological Resources Chapter of the Conservation and Open Space Elements and evaluate as part of the five-year Housing Element Update to determine if additional measures are needed to protect water quality. Implementation Measure WR-IMx2, Unpermitted Development Ordinance for Critical Watersheds, requires the County to prepare an ordinance to provide increased enforcement capabilities for un-permitted development within critical watershed areas if the development impacts water resources, and to work with the State Departments of Water Resources, and Fish and Wildlife, to address illegal water diversions and over-subscribed water right allocations.

Conservation and Open Space. The Biological Resources Section of the Conservation and Open Space Element contains policies relating to SMAs, and which also relate to wetland, and riparian buffer areas. These policies establish setbacks, maintain natural vegetation, and allow filtration and infiltration of stormwater. Planned development within and adjacent to SMAs and other wet areas would be subject to protections contained in Biological Resources (BR) Policies BR-P4, Development within Stream Channels, BR-P5, Streamside Management Areas, BR-P6, Development within Streamside Management Areas, and Policy BP-P7, Wetland Identification. These policies would require that the County continue to identify SMAs and other data regarding intermittent streams with in-channel wetland characteristics and riparian vegetation

(SMAs are further defined in Standard BR-S5, Streamside Management Areas Defined). These policies as well as associated standards limit development within stream channels and SMAs to essential non-disruptive projects consistent with Standard BR-S6, Development in Stream Channels, and BR-S7, Development within Streamside Management Areas, and where mitigations have been provided to minimize any adverse impacts.

When permitted development occurs within SMAs, Standard BR-S9, Erosion Control, is imposed to limit potential impacts due to sedimentation. In addition, the presence of wetlands near project areas shall be determined during the project review process and wetlands, as defined by Standard BR-S11, Wetlands Defined, would be protected pursuant to Standard BR-S10, Development Standards, consistent with the standards for SMAs, including buffers and setbacks where appropriate. Policy BR-P11, Agency Review, requires that the County request Department of Fish and Wildlife, and other appropriate trustee agencies, to review development plans within streamside management and sensitive habitat areas, and National Marine Fisheries Service or U.S. Fish and Wildlife Service to review development plans within critical habitat areas where a federal permit or funding is involved. This policy also states that recommendations to reduce potential impacts below levels of significance shall be considered during project approval.

Safety Element. Safety Element policies would also contribute to the protection of water quality. Safety (S) Policy S-P1, Reduce the Potential for Loss, would require that new development be planned to reduce the potential risks resulting from natural and manmade hazards such as steep slopes and unstable soils areas, which would have secondary benefits to the environment, especially in terms of reduced sedimentation from erosion and improved water quality. Standard S-S1, Geologic Report Requirements, would require the preparation of geologic reports that would disclose site conditions that could contribute to sedimentation and siltation.

Impact 3.3.1 Wastewater Services in Section 3.3, Utilities and Services, provides a detailed analysis of wastewater treatment plant capacity. A number of WWTPs in Humboldt County are currently not meeting North Coast RWQCB permit requirements for wastewater treatment and disposal. Regarding these existing permit violations, the North Coast RWQCB has issued orders that contain programs and timelines for permit compliance, and monitors the efforts of operators to meet North Coast RWQCB requirements. The Community Infrastructure and Services Element of the General Plan Update was developed to provide policies and programs to ensure service capacity keeps pace with development, thereby minimizing the chance for a sanitary sewer overflow with accompanying water quality impacts. If it were not feasible to increase capacity, several policies would ensure that approved development is limited to available permitted capacity. Policy IS-P1, Coordination with Service Providers, requires that the County cooperate with wastewater system operators to system needs and service limitations consistent with the Plan and capital improvement plans. Policy IS-P4, Requirements for Discretionary Development, requires that service needs be assessed with discretionary development and to only approve development where service can be adequately provided or would otherwise not impact health, welfare and safety or future infrastructure plans. Policies IS-P8, Infrastructure and Services Capacity, and IS-P9, Capacity of Facilities and Land Use Decisions, require that the County monitor wastewater service capacity in coordination with service providers.

Impact 3.8.3.4, Septic Suitability in Section 3.8, Geology and Soils, provides a detailed analysis of development on soils incapable of adequately supporting the use of septic systems. That analysis identifies a series of policies that ensure that waste discharge associated with the use of on-site septic systems complies with state laws and addresses the siting of proposed new systems and the identification of existing failed septic systems. Policies that lessen the potential effects of

new on-site septic systems include IS-P20, On-Site Sewage Disposal Requirements, Policy WR-P14, Pathogen and Nutrient Discharge from Septic Systems, RL-P2, Water Withdrawal, and, Implementation Measure; WR-IM5, Septic Systems. Policy WR-Px6, Graywater and Alternative Disposal Systems, call for supporting programs and ordinance revisions that modify the permit process for graywater and other alternative disposal systems to make such systems more accessible to individual households. Implementation Measure WR-IM5, Septic Systems, directs the County to pursue the abatement of failing septic systems that have been demonstrated to represent a health and safety hazard.

Conclusion

A significant portion of Humboldt County drains to watersheds that are impaired by sedimentation, siltation, and temperature a. As a result, development that is projected to occur during the General Plan Update planning period could further degrade impaired water bodies. To address this, the General Plan Update focuses regulatory attention and protections in watersheds where future development would result in cumulative water quality impacts

The General Plan Update policies propose to lessen potential impacts by conducting planning on a watershed basis and focusing regulatory efforts within impaired watersheds; updating sediment and erosion control regulations to reflect the new Water Resources and Conservation and Open Space Element standards described above;, controlling the discharge of other pollutants (such as oils, fertilizers, pesticides and other chemicals, encouraging low-impact development design to reduce stormwater flows and improve water quality, and implementing a drainage ordinance to regulate stormwater drainage consistent with the General Plan.

While these policies and programs would reduce some of the adverse impacts to water quality associated with non-point source pollution from projected development r during the General Plan Update planning period, clear standards would need to be established to implement sediment and erosion controls, and additional implementation measures would be required to amend the grading ordinance, low impact development standards would be required to be mandatory within impaired watersheds. Without clear standards and additional storm drainage protections, especially within impaired watersheds, projected development during the planning period could substantially degrade water quality, result in substantial erosion or siltation on- or off-site, or violate water quality standards or waste discharge requirements. As a result, development under the GPU could result in potentially significant hydrology and water quality impacts.

Mitigation

Mitigation 3.10.3.1.a. The following policy and implementation measure shall be added to the Water Resources Element to lessen impacts resulting from erosion, sedimentation, and siltation:

> ***WR-Px. Continue to Implement Water Quality Regulations.*** *Continue to implement Division 3, Building Regulations, Section 331-12, Grading, Excavation, Erosion, and Sedimentation Control Regulations, and Division 1, Planning Zoning Regulations Chapter 6 - General Provisions and Exceptions Section 314-61.1 Streamside Management Area Ordinance.*

Mitigation 3.10.3.1.b. The following policy shall be modified to apply to all development in order the Water Resources Element to improve water quality within watersheds subject to TMDL Controllable Sediment Discharge Inventories:

WR-Px2. Mitigate Controllable Sediment Discharge Sites. ***Proposed*** ~~*Discretionary*~~ *development* ***applications*** *involving a site identified as part of the TMDL Controllable Sediment Discharge Inventory shall be conditioned to reduce sediment discharge.*

Level of Significance after Mitigation

The proposed mitigations would demonstrate that the County will continue to implement and strengthen existing regulations that are intended to reduce water quality impacts. Adoption of the additional or revised policies described in the above Mitigation Measures would therefore minimize water quality impacts of future land uses and development to the extent practicable. However, without quantifiable thresholds, there is no guarantee that even with the adoption and implementation of these mitigations would reduce this impact to a less than significant level. Therefore, this impact remains **significant and unavoidable**.

Impact 3.10.3.2: Deplete Groundwater Supplies or Interfere With Groundwater Recharge

Implementation of the General Plan Update would result in additional development that could impact groundwater recharge and supply.

This impact analysis addresses item "b" of the significance standards listed in Appendix G of the CEQA Guidelines as provided in Section 3.10.2 above. Pursuant to these standards, the proposed County General Plan Update would have a significant impact if it would:

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

As described in Impact 3.10.3.1, Degrade Water Quality or Exceed Waste Discharge Requirements, implementation of the General Plan Update would result in the construction of additional impervious surfaces that would increase stormwater flows. Impervious surfaces would also decrease the land area available for the infiltration of rainwater by the soil, thereby reducing groundwater recharge. The development of streets and drainage systems, as well as construction on hillsides that typically require the construction of retaining walls and subsurface drainage features, can also divert groundwater to surface drainage systems and further minimizes groundwater recharge.

Approximately 1,721 housing units are projected to be developed by the General Plan Update planning period population peak. Of the 1,721 new units, approximately 1,378 would be located within the groundwater basins listed in the Setting Section above, of which 133 would likely need to utilize on-site groundwater wells or surface water diversions. The following table lists the allowable units that could be constructed within each groundwater basin. It should be noted that additional non-residential development would also be expected to be developed within and these groundwater basins, with similar impacts.

Table 3.10-4. New Housing Units (2028) within Humboldt County Groundwater Basins.

Groundwater Basin	Predominant Planning Watershed[1]	Inside Service Area	Outside Service Area
Garberville Town Area	1-South Fork Eel	71	6
Weott Town Area	1-South Fork Eel	3	0
Eel River Valley	2-Lower Eel	80	5
Pepperwood Town Area	2-Lower Eel	0	1
Dinsmores Town Area	7-Van Duzen	0	1
Larabee Valley	7-Van Duzen	0	0
Prairie Creek Area	8-Redwood Creek	0	0
Redwood Creek Area	8-Redwood Creek	3	0
Honeydew Town Area	9-Cape Mendocino	0	0
Mattole River Valley	9-Cape Mendocino	0	0
Big Lagoon Area	10-Trinidad	0	3
Mad River Valley	11-Mad River	292	17
Eureka Plain	11-Mad River	729	167
Total		**1,177**	**201**

1. Groundwater basins as mapped by the Department of Water Resources and cross planning watershed boundaries.
Source: Humboldt County Planning and Building Department, 2017

Approximately 75 percent of projected residential development would occur within the service area of the Humboldt Bay Municipal Water District (HBMWD), including approximately 86 percent of planned development within the Eureka Plain Planning Watershed and 96 percent within the Mad River Planning Watershed. The HBMWD Groundwater Management Plan (April, 2006) indicates that "groundwater recharge is achieved by inundation of the recharge areas in the Mad River channel" through the District's operation of Matthews Dam and Ruth Lake (Section 5.3, Operation of Matthews Dam and Ruth Lake). As a result, additional development within the basin would not have a direct impact on the volume of groundwater available to HBMWD, but additional development adjacent to the Mad River channel could have an impact on the quality of the groundwater. In addition, planned development within the Eureka Plain and Mad River Planning Watersheds could impact the recharge of the Mad River Valley and Eureka Plain groundwater basins not related to the HBMWD operation of Matthews Dam.

All of the water service areas directly overlie or are adjacent to one of the groundwater basins listed in the Setting Section above except the Miranda Community Services District (CSD), Resort Improvement District (RID) No. 1 (Shelter Cove), Willow Creek CSD (water and wastewater service areas), Alderpoint County Water District (CWD), Benbow Water Company, Orleans CSD, and Phillipsville CSD. Urban levels of development are planned within each of these service areas, and rural levels of development are also planned in areas that overlie other groundwater basins. Within watersheds dominated by permeable soils, the development of additional impervious surfaces and the conversion of forest and agricultural lands could reduce groundwater recharge areas. As a result, impacts to groundwater supplies and private well

production could occur in areas where groundwater wells are used by municipal, residential, and agricultural uses.

Table 3.10-4, New Housing Units within Humboldt County Groundwater Basins, above, displays available information about each Humboldt County groundwater basin and indicates that that Mad River Valley, Eel River Valley, and Eureka Plain are the most developed basins in terms of the number of municipal, agricultural, and domestic wells. A review of water level data available from the California Department of Water Resources Water Data Library, which maintains groundwater level data for 18 wells in the County (http://www.water.ca.gov/waterdatalibrary), seems to indicate that groundwater surface elevations in the County are generally stable. However, available information regarding Humboldt County groundwater aquifer production or capacity is not sufficient to support conclusions regarding groundwater capacity. Better estimates of groundwater supply are needed to ensure that wells associated with new housing units outside the boundaries of water services providers would not surpass the capacity of a particular aquifer under various future rainfall scenarios.

In addition, the development of new groundwater wells has the potential to intercept contaminated groundwater from historic land uses in the area. Applications for new well permits are submitted to the Department of Health and Human Services Public Health Branch, Environmental Health Land Use Program. The Land Use Program follows the procedures established in Title VI - Water and Sewage, Division 3, Wells, of the Humboldt County Code. The County Code applies the Department of Water Resources Water Well Standards (Bulletins 74-81 & 74-90 combined). Division 3, Wells, of the County Code and Bulletins 74-81 and 74-90 establish minimum application requirements and standards for well installation that are intended to protect the health, safety, and general welfare of County residents.

As described in the earlier section, the Eel River Valley Groundwater Basin (Basin) as "medium" priority requiring a groundwater sustainability planning. Humboldt County has prepared a Groundwater Sustainability Plan (GSP) Alternative in collaboration with stakeholders representing agricultural, municipal, and environmental interests, as the local response to the Sustainable Groundwater Management Act (SGMA).

The GSP Alternative found that groundwater levels at the Basin scale have been generally stable, including during the droughts of 1976-1977 and 1987-1992, and recent drought conditions from 2013 through 2015. Well elevation levels generally do not drop below a minimum elevation during droughts. Groundwater use is a small percentage of annual recharge and a small percentage of groundwater storage volume. Water use within the Basin over the next five years is projected to be closely comparable to existing conditions. The position of the seawater/freshwater transition zone mapped in 2016 is comparable to the extent measured in 1975.

Existing data indicate acceptable water quality and the absence of a contaminant plume affecting water supplies. The underlying conditions for potential land subsidence are not present. Late-summer low-flows are a concern in the Lower Eel River and Lower Van Duzen River; however, the primary anthropogenic factors are upstream diversions, sedimentation and post-flood sediment deposits, and changing forest composition at the watershed scale. Multiple lines of evidence demonstrate that groundwater use within the Basin is not causing undesirable results associated with beneficial uses of interconnected surface waters.

Based on the GSP Alternative, Humboldt County concludes Humboldt County concluded, that the Basin is being managed sustainably for beneficial uses without undesirable results, and a GSP

Alternative is the most appropriate compliance option for achieving the goals of SGMA. This GSP Alternative includes a goal-setting framework that is appropriate for Basin conditions and the current state of scientific data and understanding, along with a monitoring plan and commitments for annual reporting and a five-year assessment.

Analysis of Relevant General Plan Update Policies

Potential impacts to new development supplied domestic water from on-site water wells resulting from the General Plan Update is addressed through the following policies, standards and implementation measures. Implementation Measure WR-IM11, Watershed Data, seeks funding to support studies relating to water quality and quantity as well as to identify and map important groundwater recharge areas. A number of other policies and programs that are intended to protect water resources, and groundwater in particular, include: WR-P1, Sustainable Management, directs that land use decisions conserve, enhance, and manage water resources on a sustainable basis. Policy WR-P2, Protection for Surface and Groundwater Uses, requires that impacts on beneficial uses are mitigated (meaning eliminated or avoided) during the review of discretionary permits. WR-P12, Groundwater Quality Protection, protects groundwater from contamination that could result from discretionary commercial and industrial development. Finally, Implementation Measure WR-IM12, Sustainable Groundwater Management Plans, supports the development of Sustainable Groundwater Plans consistent with state law.

The General Plan Update also contains policies intended to address groundwater supply associated with rural development reliant upon on-site sewage disposal. For the zoning and subdivision of all areas designated for rural residential development the Rural Land Chapter of the Land Use Element contains Rural Land (RL) Policy RL-P2, Water Withdrawal, which requires an assessment of the cumulative impacts of water withdrawal from surface and groundwater sources. Additionally, WR-P6, Subdivision Water Supply, requires that any subdivision of land shall be conditioned to require evidence of sufficient water supply during drought conditions to meet the projected demand associated with the proposed subdivision. Under this policy, sufficient water supply shall include the requirements of the proposed subdivision and existing and planned future uses. A written service letter from a public water system written in conformance with this policy is required prior to subdivision development. Subdivisions to be served through on-site water supplies or private water systems must provide evidence of sufficient water supply to the County Department of Environmental Health. Standard RL-S4, Subdivision Standards, establishes standards for rural subdivisions, including the use of current standards of the Division of Environmental Health as proof of adequate water for domestic use.

The Housing Element also contains Housing Policy H-P29, Reduce and Avoid Impacts to Biological Resources, which requires that the County refer all building permit applications that would result in the withdrawal of water from perennial streams or rivers, or from wells within 100 feet of a perennial stream or river, or from springs within 100 feet of a perennial stream or river, to the Department of Fish and Wildlife for comments and recommendations.

Finally, with Policy WR-Px1, Requirements for Water Storage in Flow Impaired Watersheds, the County will require new development that is proposed within flow impaired watersheds, that will not be served by public water, and that seeks to rely upon surface water, to install water storage capable of providing 100 percent of the necessary water storage volume for the summer low-flow season. In addition, a forbearance agreement eliminating water withdrawals during low-flow season is required as a performance standard for the project.

Although there is no indication that wells have yet been impacted, saltwater intrusion is a concern in coastal areas that utilize groundwater for municipal or agricultural purposes or that

may be subject to the effects of sea level rise. Policy WR-P13, Saltwater Intrusion, requires that discretionary projects involving groundwater withdrawals in proximity to coastal areas shall demonstrate that groundwater supplies will not be adversely affected by saltwater intrusion.

Under Implementation Measure WR-IM8, Watershed Planning, the County is tasked with maintaining relevant land use data on watershed basis to support watershed based management and decision-making processes. Consistent with that measure, Implementation Measure WR-IM11, Watershed Data, directs the County to seek and secure funding to evaluate the quality and quantity of water resources in each of the watershed basins, and to support studies that correlate the quality and quantity of water captured, stored, and contained within watersheds to the needs of beneficial water uses by residents, local industry, agriculture, and the natural environment. This measure also seeks to identify and map important groundwater recharge areas. In addition, through Implementation Measure WR-IM12, Sustainable Groundwater Plans, the County would support the development of Sustainable Groundwater Plans consistent with California Water Code.

Conclusion

Development allowed under the General Plan Update could result in significant impacts to groundwater recharge and groundwater supplies. To address this, the General Plan Update provides protections for groundwater basins within critical watersheds and assesses potential cumulative impacts to groundwater as part rural subdivisions and zone reclassifications.

In addressing depletion of groundwater supplies or interference with groundwater recharge, the General Plan Update approach was to develop a comprehensive set of policies, standards and implementation measures that would safeguard against depletion of or interference with groundwater as a consequence of new development that may occur under the Plan. Among these are policies directly related to groundwater supply protections such as: RL-P2, WR-P6, and RL-S4. Requirements for water storage in flow impaired watersheds is addressed by WR-Px1. Finally, a watershed approach to groundwater supply issues is included with Implementation Measures WR-IM8 and WR-IM11.

Most of the County's watersheds are listed on the 303(d) list of impaired water bodies because of high water temperatures associated with low streamflows, While WR-PX1 will reduce impacts of new development on temperature-impaired watersheds to less than significant levels by disallowing water withdrawl from streams during the dry months, the GPU does not include policies that encourage existing and new development to enhance groundwater storage capacity.

Mitigation

Mitigation 3.10.3.2.a. The following policy shall be added to the Water Resources Element to improve groundwater recharge capacity:

> **WR-Px. Enhance Groundwater Recharge Capacity**. Encourage watershed management practices that enhance infiltration of rainfall into the groundwater.

Level of Significance after Mitigation

Adoption of the policies, standards, and implementation measures identified above as well as Mitigation Measure 3.10.3.1.a would reduce adverse impacts to groundwater resources and

wells that may result from development allowed under the General Plan Update to a **less than significant level**.

Impact 3.10.3.3: Alter the Existing Drainage Patterns or Exceed the Capacity of Stormwater Drainage Systems

Implementation of the General Plan Update would result in additional impervious surfaces and soil compaction that could result in increased stormwater runoff that alters drainage patterns and that could exceed existing stormwater drainage capacity.

This impact analysis addresses item "d" and "e" of the significance standards listed in Appendix G of the CEQA Guidelines as provided in Section 3.10.2 above. Pursuant to these standards, the proposed County General Plan Update would have a significant impact if it would:

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

As described in Impact 3.10.3.1: Degrade Water Quality or Exceed Waste Discharge Requirements, implementation of the proposed General Plan Update would result in additional impervious surfaces and the compaction of soils adjacent to developed areas that would increase peak flow rates of stormwater runoff. In addition to reducing water quality, such development could alter drainage patterns and potentially increase runoff in volumes that would exceed the existing stormwater drainage systems in the County.

In undeveloped areas, rainfall collects and flows at a natural rate through the soil as subsurface flow and on the surface through natural drainages. In contrast, developed areas, where portions of the land surface are covered by impermeable surfaces, have less capacity to store rainfall. Impermeable surfaces such as roads, roofs, parking lots, and sidewalks store little water, reduce infiltration of water into the ground, and accelerate runoff to ditches and streams. Even in areas with low density development, where lawns and other permeable landscaping would be common, rainfall can saturate thin soils and produce overland flow which runs off quickly. Because of accelerated runoff from development or construction activities, the peak discharge, volume and frequency of floods could increase in nearby streams (U.S. Geological Survey Fact Sheet 076-03, Effects of Urban Development on Floods, https://pubs.usgs.gov/fs/fs07603/).

Specific construction projects are not contemplated as a part of the General Plan Update; however, there will be construction activities in support of growth projected to occur during the planning period. Land-disturbing construction activities associated with such development would likely include grading and excavation, construction of new building foundations, roads, driveways, and trenches for utilities, and could result in the localized alteration of drainage patterns. Temporary ponding and/or flooding could result from such activities, from temporary alterations of the drainage system (reducing its capacity for carrying runoff), or from the temporary creation of a sump condition due to grading.

Pursuant to the Humboldt County Code and the National Pollutant Discharge Elimination System (NPDES) permit program administered by the state, Stormwater Pollution Prevention Plans are prepared and Best Management Practices (BMPs) are required to be implemented for

construction sites greater than one acre. In compliance with grading permits, the development of future land uses as designated in the proposed General Plan Update would continue to implement BMPs, such as the following examples:

- Minimizing disturbed areas. Clearing of land is limited to that which will be actively under construction in the near term, new land disturbance during the rainy season is minimized, and disturbance to sensitive areas (e.g., steep slopes and natural watercourses) or areas that would not be affected by construction is minimized.
- Stabilizing disturbed areas. Temporary stabilization of disturbed soils is provided whenever active construction is not occurring on a portion of the site, and permanent stabilization is provided by finish grading and permanent landscaping.
- Protecting slopes and channels. Outside of the approved grading plan area, disturbance of natural channels is avoided, slopes and crossings are stabilized, and increases in runoff velocity caused by the project is managed to avoid erosion to slopes and channels.
- Controlling the site perimeter. Upstream runoff is diverted around or safely conveyed through the project and is kept free of excessive sediment and other constituents.
- Controlling internal erosion. Sediment-laden waters from disturbed, active areas within the site are detained.

Implementation of appropriate BMPs as part of compliance with construction permits would reduce the potential for the development of future General Plan Update land uses to substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in flooding on or off site.

Impact 3.10.3.1, Degrade Water Quality or Exceed Waste Discharge Requirements, above, provides a description of the regulations contained in f the Humboldt County Code that address nonpoint source pollution and sedimentation under Title III, Land Use and Development Division 3, Building Regulations Section 331-12, Grading, Excavation, Erosion, and Sedimentation, and Section 314-61.1 Streamside Management Area Ordinance. These regulations are intended to reduce erosion and sedimentation and protect stream courses and wetland areas.

Analysis of Relevant General Plan Update Policies

The proposed General Plan Update includes goals and policies that reduce the potential for the substantial alteration of existing drainage patterns through development, which could result in runoff and flooding on or off site. The Land Use Element, Water Resources Element and Safety Element, various goals and policies to reduce such impacts.

Community Infrastructure and Services Policy IS-P9, Capacity of Facilities and Land Use Decisions, evaluate the capacity and sizing of drainage facilities to determine adequacy for proposed land uses and discretionary development. Policy IS-P16, Drainage and Flood Control, and Implementation Measure IS-IM13, Drainage and Flood Control Plan, directs the County to develop and maintain a countywide drainage and flood control plan to guide capital improvements and maintenance. These policies and programs provide that drainage facilities are planned with development and limit the likelihood that runoff water would exceed the capacity of existing or planned stormwater drainage systems.

The Conservation and Open Space Element also contains protections to prevent alteration of existing drainage patterns by development that could result in flooding on or off site. Biological Resources Chapter Policy BR-P4, Development within Stream Channels, specifies that

development within stream channels shall only be permitted when there is no lesser environmentally damaging feasible alternative, and where the best feasible mitigation measures have been provided to minimize adverse environmental effects. Standard BR-S9, Erosion Control, requires that development within Streamside Management Areas minimize land clearing and vegetation removal; long slopes be minimized to increase infiltration and reduce water velocities down cut slopes by such techniques as soil roughing, serrated cuts, selective grading, shaping, benching, and berm construction and control concentrated runoff.

The Water Resources Element has a goal to utilize natural drainage and onsite infiltration, WR-G9, Storm Drainage, and contains specific policies and standards to minimize the alteration of existing drainage patterns through development which could result in flooding on or off site. Policy WR-P30, Natural Stormwater Drainage Courses, requires that natural drainage courses be retained and protected from development impacts on flow rates or water quality. Policy WR-P31, Downstream Stormwater Peak Flows, requires that peak stormwater discharge not exceed the capacity limits of off-site drainage systems or cause downstream erosion, or flooding. Additionally, under this policy new development shall demonstrate that post-development peak flow discharges will mimic natural flows to watercourses and avoid impacts to Beneficial Uses of Water. Policy WR-P32, New Drainage Facilities, specifies that where it is necessary to develop additional drainage facilities, they shall be designed to be as natural in appearance and function as is feasible; all drainage facilities shall be designed to maintain maximum natural habitat of streams and their streamside management areas and buffers; and detention/retention facilities shall be managed in such a manner as to avoid reducing streamflows during critical low-flow periods. Policy WR-P38, Storm Drainage Impact Reduction, requires the use of Low-Impact Development (LID) standards to reduce the quantity and increase the quality of stormwater runoff from new development and redevelopment projects in areas within the County's MS4 boundary or as triggered under other Regional Water Board permits. This policy also states that for all other watersheds, the County is directed to develop storm drainage development guidelines with incentives to LID standards to reduce the quantity and increase the quality of stormwater runoff from new developments. The County's intent to develop and utilize low impact development standards is further echoed in Implementation Measure WR-IM26, Low Impact Development Methods, which requires projects to utilize best management practices for Low Impact Development to meet surface water run-off standards.

Conclusion

The proposed General Plan Update policies described above reduce the potential for the substantial alteration of existing drainage patterns through development that could result in flooding on or off site and additional sources of pollution. The Community Infrastructure and Services Element provides for a drainage and flood control plan limit the likelihood that runoff water would exceed the capacity of existing or planned stormwater drainage systems. The Conservation and Open Space Element contains standards for erosion control and to control concentrated runoff. The Water Resources Element contains requirements for low impact development standards in urbanized areas and incentives for their use elsewhere; requires that natural drainage courses be retained, and establishes requirements for downstream peak stormwater flows by policy. Adoption of the policies, standards, and implementation measures identified above would reduce adverse effects relating to the alteration of drainage patters or increased runoff from development allowed under the General Plan Update to a **less than significant level**.

Mitigation

None required.

Impact 3.10.3.4: Housing within a 100-year Flood Hazard Area or Expose People or Structures to Flooding from Levee or Dam Failure, Tsunami, or Mudflow

Implementation of the General Plan Update would result in additional development located in areas subject to flooding, tsunami, and mudflows.

This impact analysis addresses item "g" through "j" of the significance standards listed in Appendix G of the CEQA Guidelines as provided in Section 3.10.2 above. Pursuant to these standards, the proposed County General Plan Update would have a significant impact if it would:

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows.

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

j) Inundation by seiche, tsunami, or mudflow.

A significant flood hazard exists along the County's major rivers. Population increases as anticipated in the General Plan Update may result in additional life and property being exposed to these hazards. Floodplain or floodway encroachment could alter flood-carrying capacity along watercourses, possibly creating additional hazards. Residential land uses designations planned in areas subject to flooding would have the highest potential to expose populations to risk of flooding.

Flooding can inundate and cause water damage to structures, bury structures, knock them off their foundations, or completely destroy them by the impact of high velocity water and debris, which can include sizable boulders. Impacts resulting from flooding include the loss of life and/or property; health and safety hazards; disruption of commerce, water, power, and telecommunications services; loss of agricultural lands; and infrastructure damage. Areas at the greatest risk of flooding include the lowlands near the Eel River (including the Van Duzen and South Fork), the Mad River, Eureka Plain (especially Freshwater and Jacoby Creeks), and the Trinity River. The following table contains a listing of projected new dwelling units on parcels that are within or touch the FEMA 100-Year Flood Zone or Floodway.

Table 3.10-5. Projected Additional Housing Units within 100-Year Flood Zone.

Planning Watershed	Projected Additional Housing Units - 2028
1 - South Fork Eel	20
2 - Lower Eel	4
3 - Middle Main Eel	0
4 - Lower Klamath	0
5 - South Fork Trinity	0
6 - Lower Trinity	0
7 - Van Duzen	0
8 - Redwood Creek	0
9 - Cape Mendocino	0
10 - Trinidad	0
11 - Mad River	30
12 - Eureka Plain	27
Total	**81**

Source: Humboldt County Planning and Building Department

Dam failure would cause a flood hazard similar to that described above, except that inundation would occur more rapidly. There are 20 dams of concern that are either in Humboldt County or impound rivers that flow through the County (see Humboldt Operational Area Hazard Mitigation Plan Update Volume 1: Planning-Area-Wide Elements-Chapter 8. Dam Failure, Table 8-1. Dams in the Planning Area or with Inundation Areas that extend into the Planning Area (in order of storage capacity) http://www.humboldtgov.org/DocumentCenter/Home/View/1003). A failure of any of these dams would threaten life and property to some degree. Dam failure inundation areas affect lands planned for development along the Klamath, Trinity, and Mad Rivers, including Willow Creek, Orleans, and Glendale. Resource lands adjacent to the Middle Fork and Lower Eel River could also be affected by dam failure on that river. The time from dam failure until the resulting floodwaters reach developed portions of the County will be five and one half hours on the Mad River (Robert W. Matthews Dam), about six hours on the Eel River (Van Arsdale Dam), and seven hours on the Trinity River (multiple dams, see Humboldt Operational Area Hazard Mitigation Plan Update Chapter 8. Dam Failure, Section 8.2.5 Warning Time). The Humboldt County Emergency Operations Plan contains response procedures that would be implemented in the event of dam failure. The potential effects of flooding from dam failure (additional to current baseline conditions) are not considered to be significant.

Mass movement (a collective term for landslides, debris flows, falls and sink holes, and which are caused by a combination of geological and climate conditions, as well as the encroaching influence of urbanization pursuant to Part 2, Chapter 12 of the Humboldt Operational Area Hazard Mitigation Plan, 2014, which provides more information regarding mass movement) are common in Humboldt County and occur particularly in response to intense, short-duration storms, and in combination with larger earthquakes. The most recent mass movement events in the County occurred during the winter storm of 2005-06. Humboldt County was declared and designated a county for "California Severe Storms, Flooding, Mudslides, and Landslides" by FEMA after this event. This designation was in large part due to the record high rains and winds of the 2005-06 winter storms resulting in thousands of large and small-scale landslides along every

major transportation corridor of the County (U.S. Highways 101, 299, 96 and 36). In the winter of 1996-97, a mudslide that started in timberlands above the community of Stafford was approximately 100 yards wide and destroyed seven homes. Mass movement is a major hazard concern throughout Humboldt County that cannot be eliminated. Based upon the projected distribution of development consistent with the General Plan Update, new development could occur within throughout the County that could be subject to impacts from mass movement. It would be possible to reduce this impact to future development through site-specific geologic investigations. In most cases, landslides can be mitigated using the findings of geologic investigations and current design and construction methods.

The Section 3.8.1 Geology and Soils -Environmental Setting of the Geology and Soils describes the seismic setting in Humboldt County, tsunamis that have occurred within the County in the past and the likelihood of tsunamis in the future. Impact 3.8.3.1, Exposure to Seismic-Related Hazards, analyzes tsunami hazard associated with the General Plan Update and determined that tsunamis are a significant hazard in Humboldt County due to its proximity to the Cascadia Subduction Zone. Implementation of the General Plan Update could result in new land uses and development in close proximity to the Pacific Ocean, Humboldt Bay, and the low-lying areas near the shore, and therefore would potentially expose people and structures to the risk of tsunamis generated primarily by high-magnitude earthquakes. Recent studies indicate there is potential for a tsunami from 10 to 30 feet above mean sea level, possibly higher, to impact the Humboldt coast, affecting an area similar to, but slightly larger than the FEMA 100-year flood plain. Of note is that the potential for the highest tsunami waves is from a near-source Cascadia Subduction Zone event, resulting in a very short response time, on the order of 15 minutes, possibly less.

Tsunami inundation areas lie almost exclusively within the Coastal Zone, where they are addressed as part of the Hazards section of the certified Local Coastal Program and the Coastal Act. Most existing and planned development that is located within mapped tsunami evacuation areas is located within the Humboldt Bay segment of the Humboldt County Coastal Zone. The tsunami hazard policy in the Humboldt Bay Area Plan was amended in 2012 to prohibit new habitable living space below the predicted tsunami run-up elevation calculated at maximum tide plus a minimum of three (3) feet to account for future sea level rise and one foot of freeboard space, as well as other measures to reduce tsunami hazard (Section 3.17(B)(3)). Humboldt County was awarded a grant from the California Coastal Commission in 2014 to amend the Humboldt Bay Area Plan, which will include the completion (or substantial progress towards completion) of a Tsunami Safety Plan based on the Tsunami-Ready Guidelines of the National Weather Service, for each Humboldt Bay Area Plan community. The grant also includes developing tsunami safety mapping and policy options for updating the Local Coastal Plan tsunami hazards policy. The grant requires that the County incorporate tsunami inundation mapping, and review and revise as necessary tsunami hazard and risk analysis and policies developed for the Samoa Town Master Plan, as well as the ongoing work of other agencies conducting accurate tsunami inundation mapping for all potential annual occurrence rates for Humboldt Bay. This new tsunami hazard policy will likely serve as the template for updates to other Coastal Zone segments within the County.

Humboldt County Code Division 3, Building Regulations, Chapter 5, Flood Damage Prevention is applied to all lands situated within the areas of special flood hazard as identified on the Federal Insurance Administration's Federal Insurance Rate Maps (FIRM) for Humboldt County. These regulations are intended to protect lives and property from flood hazards and require that building permit applications be compared to the flood hazard maps published by FEMA to determine whether a proposed new residence will be located in an area with potential flood hazards. If the residence appears to be subject to flood hazards, the applicant is required to

submit a site specific engineering analysis to ensure the design of the structure meets federal requirements for flood hazard protection before approving the building permit.

Analysis of Relevant General Plan Update Policies

The flood plain management measures in the General Plan Update will serve to reduce unnecessary exposure to flood hazards from new development, and may over time reduce the overall risk to the population. The dam failure contingency plans contained in the Hazard Mitigation Plan outline an emergency response that is designed to reduce the impacts on life and property in the event of dam failure. The Safety Element contains policies and standards that are intended to identify geologic hazards, such as the potential for mudflows, and specify mitigations to reduce risk to life and property.

The following Safety Element policies and standards address the potential for flood hazards. Policy S-P10, Federal Flood Insurance Program, requires the County to participate in the Federal Flood Insurance Program and maintain Flood Damage Prevention regulations in the County Code to regulate land uses in flood hazard areas in order to minimize loss of life and property and public flood-related expense. This policy ensures that all flood prone areas within the County would continue to be identified through the establishment of flood-risk zones. Policy S-P11, Flood Plains, requires that the County plan agricultural lands that are in mapped floodplains for continued agricultural use. This policy ensures that agricultural areas can continue to provide flood relief to developed areas that are outside the flood zone.

The Safety Element contains Standard S-S1, Geologic Report Requirements, which requires reports addressing geologic hazards and geologic conditions. This standard continues to implement current building regulations that minimize risks to life and property and assure stability and structural integrity in areas subject to geologic hazard. Standard S-S2, Landslide Maps, specifies the use of California Division of Mines and Geology, North Coast Watersheds landslide mapping as information in the review of developments. Policy S-PX2, Prohibition of Residential Subdivisions within Floodplain, prohibits an increase in residential density wholly within the 100 year floodplain unless the potential for loss of life and property can be reduced to less than significant levels. Additionally, Policy S-PX3, Construction Within Special Flood Hazard Areas, requires that construction within the 100-Year Flood Boundary comply with the County's Flood Damage Prevention Regulations. Regarding tsunami hazards, Safety Element Policy S-P8, Earthquake Mitigation Planning, states that the potential for a local earthquake in excess of magnitude 9.0 shall be considered in disaster planning, risk assessment, and pre-disaster mitigation efforts.

Conclusion

The Water Resources Element comprehensively deals with water management and conservation issues, and incorporates various policies and implementation measures that would serve to prevent potential impacts to water resources. The Water Resource Element and Safety Element policies (S-P10, Federal Flood Insurance Program; S-P11, Flood Plains; S-PX2, Prohibition of Residential Subdivisions within Floodplain; and S-PX3, Construction Within Special Flood Hazard Areas.) and standards (S-S5, Flood Regulations. S- S8, Flooding and Drainage Management Activities) would serve to further flood hazard delineation, thus supporting other plan elements designed to avoid placing housing in the 100-year flood hazard area. The policies, standards and implementation measures would serve to avoid exposing people or structures to a significant risk of loss, injury or death involving flooding, including flooding because of the failure of a levee or dam, or from inundation by seiche, or mudflow. However, the County does not yet

have equivalent policies to avoid damage from tsunami hazards. Mitigation is required to prevent damage from tsunami hazards.

Mitigation

Mitigation 3.10.3.4.a. The following Safety Element implementation measure shall be added to require the County address new development in tsunami hazard areas:

> ***S-S7. Tsunamis.*** *New development below the level of the 100-year tsunami run-up elevation shall be limited to public access, boating, public recreation facilities, agriculture, wildlife management, habitat restoration, and ocean intakes, outfalls, pipelines, and dredge spoils disposal.*

Level of Significance after Mitigation

Adoption of the policies, standards, and implementation measures identified above as well as Mitigation Measure 3.4.3.4.a, in concert with current and updated policies contained in the Hazards section of the certified Local Coastal Program and the Coastal Act, would reduce to a **less than significant level** adverse impacts relating to development within the 100-year flood hazard area as well as exposure to damage from the failure of a levee or dam, or inundation by tsunami, or mudflow**.**