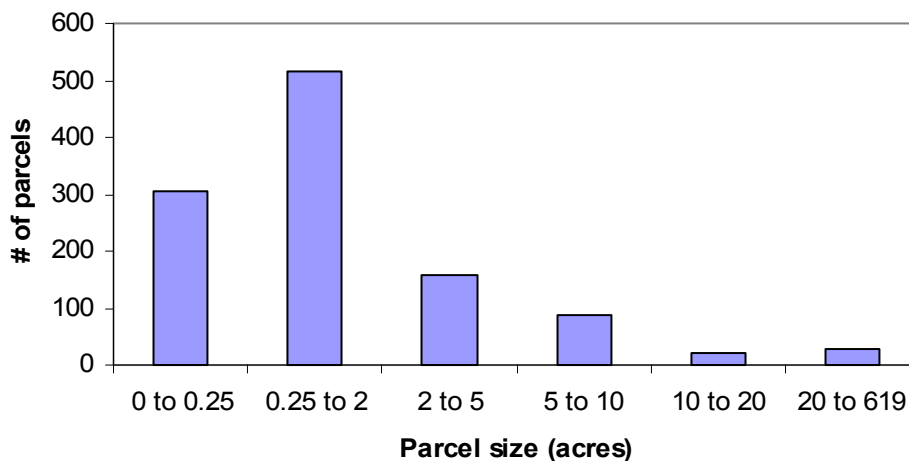


## Urbanization

Average lot sizes can be an indicator of urbanization. Throughout the watershed, 43 percent of parcels are less than 20,000 sq. ft. (0.46 acres) in size and may be considered “urban.” However, these urbanized parcels occupy only two percent of the land area in the watershed. Urbanized areas occur mainly within the Trinidad, Parker Creek, Joland Creek, and Two Creek watersheds, which encompass portions of the City of Trinidad and the communities of Westhaven and Moonstone (City of Trinidad GIS 2007; Humboldt County GIS 2005). Developed lands in Trinidad include residences as well as public facilities and commercial establishments such as retail shops and a gas station.

Lot sizes vary based on land use. Parcels used for timber production tend to be several hundred acres in size, while residential parcels in urban and suburban areas are generally one acre or smaller. Open-space and rural residential parcels tend to be between 2 and 5 acres in size on average. The overall average lot size in the planning area is 5.1 acres, illustrating the generally rural character of the watershed (City of Trinidad GIS 2007; Humboldt County GIS 2005). See Figures 8 and 9.

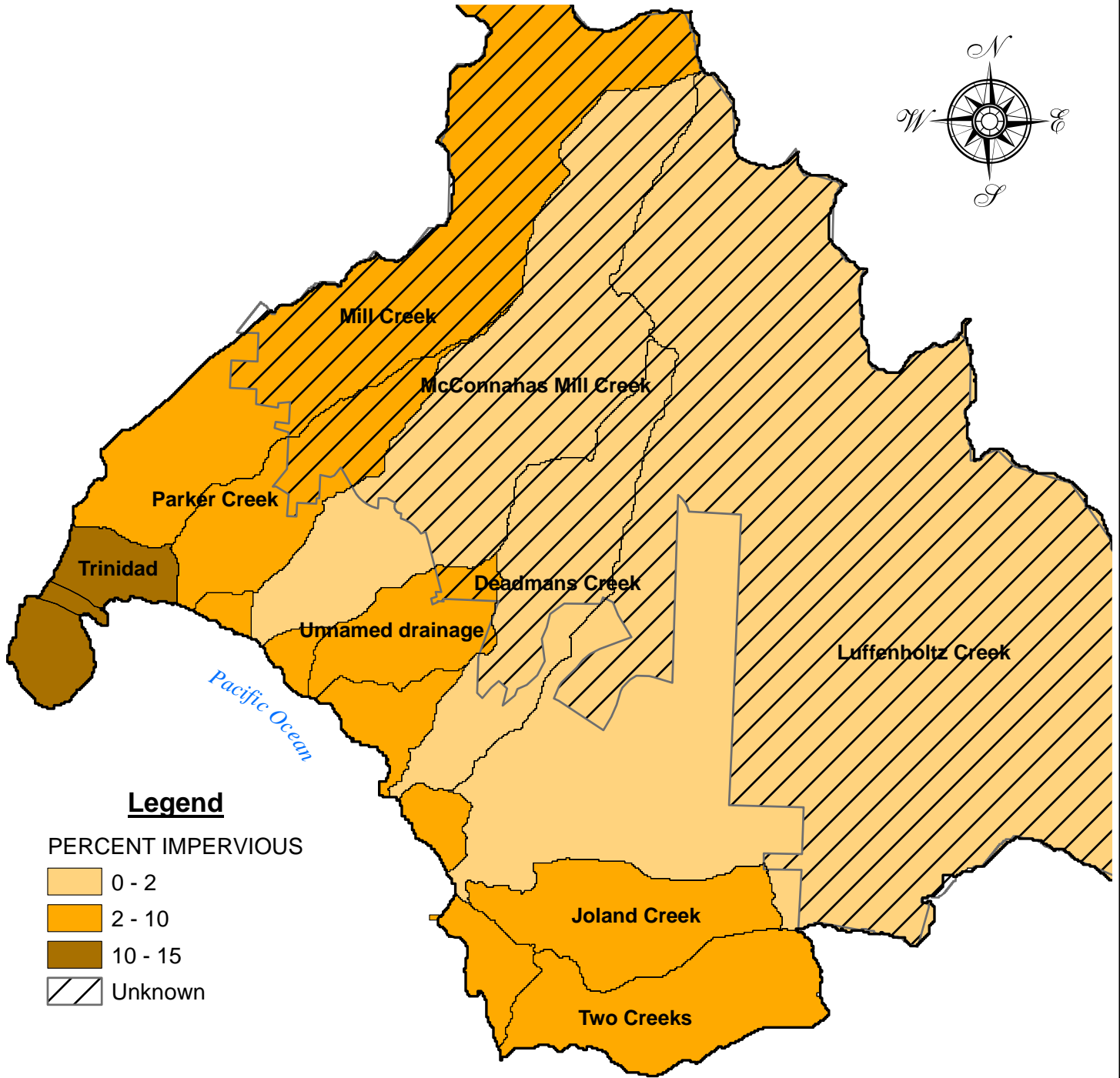


**Figure 9.** Lot sizes in Trinidad-Westhaven planning area

Impervious surfaces are another indicator of urbanization. The extent of impervious surfaces—roads, roofs, driveways, and parking lots—in the watershed is fairly small at 2.7 percent of the total area. Three of the nine main watersheds have less than two percent impervious surfaces; five are between 2 percent and 10 percent impervious; and one (Trinidad) is approximately 13 percent impervious (City of Trinidad GIS 2007; Humboldt County GIS 2005). The watersheds with the highest percentages of impervious surfaces are Trinidad, Two Creek, and the unnamed drainage north of Deadman’s Creek. These calculations do not take into account the region marked as “unknown” on Figure 10. This region is assumed to have few to no buildings or paved surfaces, based on its abundant forest cover and the fact that most urban services and public improvements are prohibited by zoning in this area. Forest roads are present in this area, however, so it should not be considered as having no impervious cover.

# Trinidad-Westhaven Coastal Watershed Project

## Fig. 10: Impervious Surfaces



[www.trinidad.ca.gov](http://www.trinidad.ca.gov)

0 3,000  
1 inch equals 3,000 feet

February 2008



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ARCATA, CA 95521 FAX: (707) 822-5786

## Open Space, Parks & Recreation

Lands designated for open space occupy a total of 164 acres in the planning area (City of Trinidad GIS 2007; Humboldt County GIS 2005). Most open space lands are located in the City of Trinidad. These include Trinidad Head, owned by the City of Trinidad and the U.S. Coast Guard; Trinidad State Beach, owned by City and California State Parks; and a number of parcels owned by the City or by private residents. The Tsurai Study Area, which includes the Tsurai village site, is classified by the City as open space. Principal uses for open space permitted by the City's Zoning Ordinance include wildlife habitat, low-intensity recreation, pedestrian walkways, removal of hazardous vegetation, and picnicking on public lands (Trinidad Zoning Ordinance Sec. 17.16.020).

Additional open-space lands are located near the southern end of the watershed and are managed by the Humboldt North Coast Land Trust for conservation purposes. These 37 acres include Baker Beach and North Luffenholtz Beach, which are popular spots for recreation (Humboldt North Coast Land Trust 2007). Luffenholtz Beach and Houda Point are County-managed parks. Generally, areas of protected open space are found on the seaward side of Highway 101.

Recreational resources in the watershed are directly linked to the natural and cultural resources unique to the region. Visitors and residents appreciate and value the scenic ocean views, uncrowded beaches, and redwood forests that are the hallmarks of California's North Coast. Trinidad has a small year-round population, but experiences a continual flow of tourist traffic throughout the year by visitors who come to experience the beauty of the area. Most recreation in the area involves outdoor activities associated with coastal resources such as fishing, kayaking, surfing, boating, hiking and camping (Sloan and Rocha 2007). Recreational facilities include the pier on Trinidad Bay; Trinidad Head and City trails, picnicking and hiking areas near Luffenholtz Beach and in Trinidad State Beach; improved beach access trails at Houda Point, Luffenholtz Beach, Baker Beach, and Old Home Beach; and campgrounds at Patrick's Point State Park (located just north of the planning area).

A number of pedestrian/bicycle trails are located in coastal areas. Trails are concentrated in the City of Trinidad, particularly in the vicinity of Trinidad Head and throughout the Tsurai Study Area. Additional trails are found at Luffenholtz Beach, Baker Beach, and Houda Point. The Humboldt North Coast Land Trust owns and maintains the beach access trails at Baker Beach and Houda Point. Beach access trails help to direct visitors around dense vegetation, cultural areas and private property, and provide the public with scenic viewpoints. Trails are an important component of the Coastal Conservancy's mandate to provide and maintain beach and coastal access. Throughout the watershed, trails are often the only way to access beaches due to steep bluffs, dense vegetation and rocky terrain (Sloan and Rocha 2007). Trinidad's trail system continues to be improved through marker placement and new connections in accordance with the City's trails management plan and General Plan.

## Fisheries, Agriculture & Mining

Trinidad is mostly known for its seasonal crab fishing, which commences annually in December and terminates in July. Trinidad Pier is also used to accommodate landings of salmon, ling cod,

rockfish, bottom fish, surf fish, albacore and other sport fish. The harbor supported a commercial salmon fishing fleet until the commercial salmon fishery was restricted due to endangered species listings of coho salmon and declining stocks in west coast rivers. Dungeness crab supports a multimillion dollar commercial industry in California with the bulk of all statewide landings in Eureka, Crescent City, Trinidad Bay, and Fort Bragg. Between 1991 and 2001, the annual volume of crab landings in Trinidad varied significantly, ranging from 400,000 to 1,300,000 lbs. (Pacific Affiliates 2007). Variations in harvest levels are typical for the fishing industry, which is subject to random cycles in oceanographic conditions. In 2000 a total of 38 vessels, all commercially registered, delivered landings to Trinidad (Pacific Affiliates 2007).

In 2004, 2005, and 2006, 1,721,214 lbs, 1,247,218 lbs, and 672,217 lbs of crab were landed at Trinidad Pier, respectively. In 2004, 2005, and 2006, 22,357 lbs, 18,753 lbs, and 20,478 lbs of rockfish were landed at Trinidad Pier, respectively (Pacific Affiliates 2007).

The protected harbor and pier at Trinidad Bay offer deep water angling for salmon, ling cod, bottom fish and rockfish, as well as crabbing, clamming, and surf fishing. In 2000, Trinidad residents purchased four sports fishing licenses for Alaskan fisheries. Trinidad had at least three sport fishing vessel permits in 2003. Currently, there are seven charter vessels that are used for sport fishing in the summer; in the winter, four of the vessels are converted back to commercial crab fishing boats. These reported numbers are very low as they include only residents within the City and do not reflect the many other Humboldt County residents and out-of-area visitors using the facility (Pacific Affiliates 2007).

Sportfishing is also conducted in Trinidad Bay by the members of the Yurok Tribe and Trinidad Rancheria. Nontribal and tribal fishermen, including members of the Trinidad Rancheria, may utilize marine and stream resources for subsistence means from the areas surrounding Trinidad. The government is committed to protect biological resources for the benefit of the tribe. The term “recreational” is applied by the California Department of Fish and Game to fishermen who do not earn revenue from their catch but rather fish for pleasure and/or subsistence.

No significant agricultural operations, other than timber harvesting, occur within the planning area. There are no parcels zoned for agricultural production in the watershed. Recreational horse riding is popular in the Trinidad area and there are a number of horse stables within the region. Surface water runoff from stables occurs in close proximity to springs and creeks in the Westhaven area and may be a contributing factor to high fecal coliform counts found at local beaches during “first flush” and large runoff events. There are limited numbers of other livestock kept within the planning area, primarily chickens, ducks, geese, goats.

There is one surface mining operation currently operating in the planning area. Trinidad Quarry is located approximately 3,000 feet northeast of Highway 101 at the City of Trinidad, in the Parker Creek watershed. The quarry has been in use since the late 1890s. It is currently operated by Mercer Fraser Company with an annual production of 20,000 cubic yards of greywacke sandstone. Approximately 10 acres of land are affected by the quarrying activities. Operations do not require any water diversions. Surface runoff from mining operations that disturb more than one acre of ground are regulated by the North Coast Regional Water Quality Control Board and require a Waste Discharge Permit. Turbid water in Parker Creek was traced to ponds and runoff

emanating from the quarry.

### Harbor Facilities

The only harbor in the area is on Trinidad Bay, located immediately east of Trinidad Head. As described earlier, the port was historically used for exchanges of lumber, shingles and gold mining supplies as well as a whaling station. In 1946 the Hallmark family purchased the lands around the harbor and constructed a fishing pier. The commercial and sport fishing industries continued to increase for the next 40 years. In 1999, the Trinidad Rancheria purchased the property and retains ownership to this day. The Rancheria operates the pier, boat launch, restaurant, bait shop and other facilities in the harbor area. A fleet of commercial fishermen uses the pier during the winter for crab fishing and during the summer for salmon fishing. Recreational fishing for salmon and other fish species occurs year-round. The HSU Marine Lab has their water intake pipe on the pier and there is also a CICORE Water Quality monitoring station located there. The pier area is also a popular point of departure for recreational boating activities such as whale-watching, kayaking and sight-seeing cruises.

Harbor activities remain important to the Trinidad economy despite a recent decline in commercial salmon fishing due to dwindling stocks, increased operating costs, additional government restrictions and the listing of several salmon species under the Endangered Species Act. The primary activities at Trinidad Harbor are now the winter Dungeness crab commercial season and summer sport fishing. There are currently 100 mooring sites in the harbor, 17 of which are occupied by local commercial fishermen and the remainder of which are used by recreational fishermen (Pacific Affiliates 2007). Harbor facilities and services include a boat sling launcher, tackle/bait and gift shop, a 540-foot pier, skiff dock and rental, a water taxi service to transport boat owners to boat moorings, a two-bedroom vacation rental, and an 80-seat restaurant (the “Seascape”). The dock, commercial fish landing facilities, and mooring area are leased to the Rancheria by the City.

Public access is maintained throughout the harbor area, allowing for public usage of the adjacent beaches, trails, pier, and Trinidad Head as well as boat launching to Trinidad Bay. Portions of harbor-area properties have been designated Open Space or Special Environment for protection of the natural resources.

### **2-5 Demographics**

The population of the region is concentrated in two areas: Trinidad and Westhaven, both located near the coastline. Trinidad’s population was estimated by the California Department of Finance at 311 persons in 2007. Westhaven is represented by the Westhaven-Moonstone U.S. Census Designated Place, which covers a majority of the planning area. Census data from 2000 indicate that the population of Westhaven-Moonstone is 1,044 (U.S. Census American FactFinder 2000). The upper portions of the watershed consist mainly of private timber lands, and are thus largely unpopulated.

Census data indicate that Humboldt County’s population increased by 16.4 percent between 1980 and 2000. The population is expected to grow by 11.5 percent between 2000 and 2020.

Some of this growth may occur in the Westhaven area, but little growth is expected for the City of Trinidad. Between 1990 and 2000, the population of Trinidad decreased from 362 to 311 (U.S. Census American FactFinder 1990, 2000), mostly due to decreasing household size. Similarly, the population of Westhaven decreased from 1,109 in 1990 to 1,044 in 2000 despite additional housing being built over that period.

Westhaven has been determined to be an economically disadvantaged community. Median household income (MHI) is the criterion for disadvantaged community status. A region with an MHI less than 80% of State average (\$37,994) is considered disadvantaged. Within the watershed planning area, only the City of Trinidad has a MHI (\$40,000) above the median level (\$38,000). The Westhaven-Moonstone area is considered a disadvantaged community with a MHI of \$36,000 (City of Trinidad 2005). The Trinidad Rancheria, with the MHI at \$12,188, qualifies as a severely disadvantaged community. Humboldt County is also considered a disadvantaged area, with a MHI of \$31,226 according to the 2000 U.S. Census. The Trinidad Rancheria, a federally recognized Native American tribal government is an environmental justice community according to the EPA Environmental Justice Criteria.

English is the predominantly spoken language in the watershed. According to Census 2000 data, 91 percent of Trinidad residents and 95 percent of Westhaven-Moonstone residents speak only English at home. Although Spanish and other languages are spoken by a handful of residents, the vast majority of those residents also reported that they speak English “very well” (U.S. Census American FactFinder 2000).

## **2-6 Water Sources and Supplies**

Water suppliers in the planning area include the City of Trinidad and Westhaven Community Services District (CSD), in addition to smaller private and individual systems serving Moonstone Heights and other residential areas. The City of Trinidad diverts 30 million gallons of water per year from Luffenholtz Creek. The Trinidad system serves approximately 310 hook-ups and supplies water to the City, the Trinidad Rancheria, and some Westhaven residents along the two-mile transmission line from the treatment plant to the City. The Westhaven CSD obtains its water from local springs and a groundwater well. The District serves approximately 210 households in the southern section of Westhaven. The Moonstone Heights water system is also fed by springs and serves approximately 15 connections (City of Trinidad 2005). In total, over half of the residents of the watershed are on these three systems. The remaining residents are on individual spring and groundwater well systems or individual creek diversions. All of these systems rely on local water resources from surface waters or groundwater aquifers, which are typically fairly shallow. Many of these systems are vulnerable to contamination from sediment and OWTS effluent.

Water quality from local springs is generally good to excellent, depending on the depth of the spring. Shallow springs from clay hardpans are generally clean, but can be contaminated by upslope activities and can suffer from reduced flow during the dry season. Deeper springs that derive from the seam between the marine terrace soils and the Franciscan layer are typically of higher quality, provide a more reliable year round supply, and are less susceptible to the effects of human activities. Water diverted from creeks is highly susceptible to pollution from upslope

activities. The City of Trinidad must treat the water from Luffenholtz Creek for high tannin levels and sediments during the rainy season, especially when the first storms of the season wash sediments accumulated throughout the dry season into the creek (City of Trinidad 2005). Luffenholtz Creek is designated as a critical water supply by Humboldt County.

### Predicted Water Use Over the Next 20 Years

Water delivered by the Trinidad public water system has progressively increased since 1989. In this year 26 million gallons were delivered into the system, the majority of which was utilized for residential purposes. In 1989 there were 269 metered hook ups in the city. Between 1989 and 1999 the number of hook ups has risen in relative proportion to the amount of water being used. In 1997 the number of metered hook ups was recorded at 319 with a total water use of 28 million gallons. Again the majority of water used in this year was for residential purposes. The water data collected does show some discrepancies in 2000, the number of hookups in the city went down to 308 while the total water used in the system went up to 36 million gallons, an increase of 6million gallons since 1999. This increase could be attributed to the opening of more commercial uses as it is unlikely that water use could have increased by such a high level in a single year. The following year (2001) saw another increase of 4 million gallons. Further research is being undertaken to identify the cause of this rise. A high percentage of Trinidad's water is currently unaccounted for, which could indicate leaks in the system.

Due to the decreasing population in the area and limited potential for future development the amount of water used is likely to remain relatively stagnant over the next 20 years, particularly within the City limits. Between 2003 and 2007 the data collected from the public water authority revealed that water use has actually been decreasing over this period. Forty-five million gallons were recorded as being used in 2003, while in 2007 the water delivered by the system was recorded at 37 million gallons, a reduction of 8 million gallons. There are only a small number of developable plots left in Trinidad and the majority of these are zoned as Urban Residential. Within Trinidad, there are still a couple of relatively large, vacant Planned Development Parcels in the main part of town and the Harbor Area is zoned commercial, but future development is limited by septic and parking requirements. A higher proportion of developable property exists in the Westhaven area.

New LAFCO rules implemented beginning in 2001 prohibit the City from hooking up any additional water customers outside of City limits without annexation except in emergency situations such as contaminated well water. There is currently little financial incentive for the City to annex additional property. It may be considered in the future, but much of the land adjacent to the City is already developed and connected to City water. Future water demand outside the City will be significantly affected by the outcome of the County's General Plan update that is currently ongoing. The County is considering three alternatives, one that is more restrictive of development, one that allows significantly more development and one in the middle. Staff's recommendation is for this middle option, which will not significantly alter development patterns within the project area. Most new development will be required to construct groundwater wells or develop springs to serve the project, as the Westhaven Community Services District, which gets approximately 30% of its water from a groundwater well, is currently at capacity. The area is generally water rich with over 50 inches of rain per

year, but local soil conditions dramatically affect the availability and quality of water supplies. Climate change, which may affect water use patterns as well as the amount and timing of rainfall, could impact future water supplies. It is an issue that has been taken into consideration in developing implementation projects and which should be considered for future, projects, but is beyond the scope of this document to analyze.

Although water demand is predicted to remain steady or decline over the next 20 years, this trend may change. Water usage depends not only on population but on conservation measures and water supply management strategies; some of these are recommended by the ICWMP, but public participation and future needs are unpredictable. If demand increases it is possible that additional water supplies will need to be utilized for Trinidad or Westhaven. Currently there are no imports or exports of water beyond the project area boundaries, although the City imports Luffenholtz water. There are occasional proposals to hook up to the Humboldt Bay Municipal Water District in McKinleville 10 miles to the South. Most residents are against this idea for the same reasons they are generally against a sewage treatment plant - due to the exorbitant costs and potential growth inducing impacts. The City recently sold property along Mill Creek, but retained its old water rights from when that creek was the City's main water supply. The City is also consistently seeking grant funding to upgrade its aging water plant; additional storage capacity is a significant part of those efforts. A water supply analysis is beyond the scope of this Plan, as its primary focus is to improve existing water quality in the Trinidad-Westhaven region. Water supply for the City of Trinidad will be addressed as part of the City's General Plan Update.

## **2-7 Water Quality**

Watersheds that exhibit high levels of turbidity during storm events are: Two Creek, Joland Creek, Luffenholtz Creek, and Parker Creek. High levels of turbidity contribute to bacterial contamination by providing a medium on which bacteria can grow. High turbidity levels also create periods when Trinidad's water treatment plant cannot process raw water due to elevated turbidity levels. Prolonged elevated turbidity can impact the City's water supply and water reserves for emergency fire suppression. Turbidity in private domestic water sources similarly affects users in terms of increasing the cost of processing raw water to make it potable. Water quality problems in private sources cause some landowners to request connection to the City of Trinidad or Westhaven Community Services District (WCSD). WCSD is operating at full capacity and cannot add more water hookups, so contamination of water sources is a serious health issue for residents within the WCSD service area. Turbidity monitoring data and a discussion of the findings of the turbidity monitoring are included in Appendix H.

For the wastewater component, the City completed four water sampling events that included the entire planning area. Constituents sampled included temperature, pH, conductivity, turbidity, nutrients (ammonia, nitrate, ortho-phosphate) and bacteria. Samples were collected after three storm events throughout the winter and once during the summer dry season. In addition, a fluorometer was purchased after the first event and used to attempt to detect optical brighteners from laundry detergent to confirm human origin of the bacteria pollution. Although these data have not yet been analyzed, preliminary assessment shows that bacteria was variable, but several creeks had consistently higher counts – in particular, Two Creek, Joland Creek, Parker Creek and parts of Luffenholtz Creek. In terms of seasonal differences, the dry season samples generally



had the lowest results except for the seeps. There were problems during all the winter sampling events, with averages that were in exceedance of bacterial contact recreational standards. The water quality of samples taken during storm events following a long dry spell was the worst. Reports from each of the wastewater sampling events are included in Appendix D of this document. Additional water quality data analysis and source tracking of problem OWTS is currently being undertaken as part of a Clean Beaches Grant that was awarded to the City.

Table 1 summarizes a variety of rankings that were compiled for our “station sites” where habitat assessments were completed. Figure 11 illustrates the bacteria readings that were found during sampling. The sampling sites are coded according to the creek name and whether the sample was taken in the lower (L) or upper (U) part of the creek. Creek names are abbreviated as follows:

MC = Mill Creek  
PC = Parker Creek  
MM = McConnahas Mill Creek  
DC = Deadman’s Creek  
UC = unnamed creek  
LC = Luffenholtz Creek  
JC = Joland Creek  
TC = Two Creek

Ranking categories across the top of the table are as follows:

A = Rank of average total coliform count  
B = Rank of average fecal coliform count  
C = Rank of average Enterococcus count  
D = Rank of all bacteria  
E = Rank of percentage exceedances of bacterial standards  
F = Rank of average fluorometer readings  
G = Rank of average turbidity readings  
H = Rank of sum of all nutrient samples  
I = Rank of average ammonia levels  
J = Rank of average nitrate levels  
K = Rank of average Ortho-phosphate levels  
L = Rank of total habitat quality score  
M = Sum of all the above rankings  
N = Final ranking based on the sum of all the rankings

**Table 1.** Water quality sampling results (wastewater component)

<b>Site</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>	<b>N</b>
<b>MCU-1</b>	1	2	1	1	1	1	2	3	1	4	9	2	28	1
<b>MCL-1</b>	3	7	7	6	6	3	5	1	3	2	11	1	55	2
<b>LCU-1</b>	6	5	4	4	3	2	9	2	2	3	14	3	57	3
<b>MMU-1</b>	2	1	2	2	1	12	4	4	4	10	10	6	58	4
<b>MML-1</b>	5	6	5	5	4	10	6	7	9	9	7	4	77	5
<b>DCU-1</b>	4	3	3	3	4	14	3	11	13	11	8	8	85	6
<b>PCU-1</b>	9	4	6	7	6	5	8	5	5	5	13	13	86	7
<b>LCL-1</b>	8	8	8	8	9	4	11	6	6	8	5	9	90	8
<b>DCL-1</b>	7	9	9	9	6	9	7	10	14	7	1	5	93	9
<b>PCL-1</b>	10	10	10	10	10	6	10	14	7	14	6	10	117	10
<b>TCU-1</b>	11	13	11	12	12	11	1	12	8	13	3	12	119	11
<b>JCL-1</b>	14	14	14	14	13	7	13	8	12	1	4	11	125	12
<b>TCL-1</b>	13	12	13	13	14	8	12	13	11	12	2	7	130	13
<b>JCU-1</b>	12	11	12	11	11	13	14	9	10	6	12	14	135	14





The North Coast Regional Water Quality Control Board recognizes the following beneficial uses for surface waters in the Trinidad Hydrologic Unit – Big Lagoon and Little River Hydrologic Areas (uses marked with an asterisk are specific to the goals of the ICWMP):

- **MUN** Municipal and Domestic Supply\*
- **AGR** Agricultural Supply
- **IND** Industrial Service Supply
- **PRO Industrial Process Supply**
- **GWR** Groundwater Recharge
- **FRSH** Freshwater Replenishment
- **NAV** Navigation
- **REC-1** Water Contact Recreation\*
- **REC-2** Non-Contact Water Recreation\*
- **COMM** Commercial and Sport Fishing\*
- **COLD** Cold Freshwater Habitat\*
- **ASBS** Preservation of Areas of Special Biological Significance\*
- **WILD** Wildlife Habitat\*
- **RARE** Rare, Threatened, or Endangered Species\*
- **MAR** Marine Habitat\*
- **MIGR** Migration of Aquatic Organisms\*
- **SPWN** Spawning, Reproduction, and/or Early Development
- **EST** Estuarine Habitat
- **WQE Water Quality Enhancement**
- **AQUA** Aquaculture
- **CUL** Native American Culture\*
- **SHELL** Shellfish Harvesting

The nonpoint source pollution reduction measures proposed by this Plan will assist in maintaining the desired water quality for these beneficial uses.

## **2-8 Ecological Processes and Environmental Resources**

The resource of primary importance within the planning area—the Trinidad Head CCA and ASBS—is described in Section 2-3. This section provides an overview of other major habitats and natural resources found in the Trinidad-Westhaven region.

### Protected Species

The watershed is home to a number of plants and animals that are listed as “species of special concern” by the California Department of Fish and Game. These include the following (Sloan and Rocha 2007):

- Southern torrent salamander (*Rhyacotriton variegates*)
- Coast cutthroat trout (*Oncorhynchus clarkia clarkia*)
- Western tailed frog (*Ascaphys truei*)

- Oregon coast Indian paintbrush (*Castilleja affinis* ssp. *litoralis*)
- Running pine (*Lycopodium clavatum*)
- Flaccid sedge (*Carex leptalea*)
- White footed vole (*Arborimus albipes*)
- Tracy's romanzoffia (*Romanzoffia tracyi*)
- Pacific gila (*Gilia capitata* ssp. *pacifica*)
- Wolf's evening primrose (*Oenothera wolffi*)
- Fork-tailed storm-petrel (*Oceanodroma forcata*)

Additionally, the bank swallow (*Riparia riparia*) occurs in the watershed and is listed as “threatened” under the California Endangered Species Act (Dyett & Bhatia 2002). Federally listed species found in the greater Trinidad region include the following (Sloan and Rocha 2007; Dyett & Bhatia 2002):

- Tidewater goby (*Eucyclogobius newberryi*)
- Northern California steelhead (*Oncorhynchus mykiss*)
- California coastal chinook salmon (*Oncorhynchus tshawytscha*)
- Loggerhead turtle (*Caretta caretta*)
- Green turtle (*Chelonia mydas*)
- Leatherback turtle (*Dermochelys coriacea*)
- Olive ridley sea turtle (*Lepidochelys olivacea*)
- Marbled murrelet (*Brachyramphus marmoratus*)
- Western snowy plover (*Charadrius alexandrinus nivosus*)
- Bald eagle (*Haliaeetus leucocephalus*)
- Brown pelican (*Pelecanus occidentalis*)
- Short-tailed albatross (*Phoebastria albatrus*)
- Northern spotted owl (*Strix occidentalis caurina*)
- Steller sea lion (*Eumetopias jubatus*)

With the exception of steelhead and chinook salmon, none of these species has Critical Habitat designated in the Trinidad-Westhaven area. Luffenholtz Creek is federally designated Critical Habitat for chinook salmon and steelhead, both of which are listed as “threatened” under the federal Endangered Species Act (70 Federal Register 170 pp. 52488-52586). Coho salmon, which are listed as “threatened” under the State Endangered Species Act, also occur along the Trinidad-Westhaven coast. However, migration barriers, such as culverts under Highway 101, restrict anadromous fish to the lowermost parts of the watershed or exclude them altogether. Resident population of rainbow trout (steelhead that do not migrate) and coastal cutthroat trout live in all the creeks within the project area. .

Green Diamond Resource Company, the largest landowner in the watershed has filed Habitat Conservation Plans with the Environmental Protection Agency for the northern spotted owl, northern California steelhead and California coastal chinook salmon (72 Federal Register 37 pp. 8393-8394; 67 Federal Register 159 pp. 53567-53568).

## Riparian Areas

Riparian zones include the vegetation communities that grow along the banks or edges of streams. Riparian habitats typically include a dense understory of shrubs and vines sheltered by overstory vegetation provided by tree species such as willows. Approximately 11 percent of vegetation cover in the watershed is comprised of riparian vegetation (Dyett & Bhatia 2002). Riparian areas are critical to many wildlife species, as they provide cover and nesting habitat for birds and create corridors for animal movement. These areas are important for wildlife migration and dispersal. Additionally, riparian vegetation enhances fish habitat by providing shade and woody debris. Although the entire area has been logged in the past, the project area generally has good riparian cover, averaging around 50%-80% depending on the area and the watershed.

## Forests and Vegetation Cover

The predominant tree species throughout California's North Coast comprise the redwood series, Douglas fir-tan oak series, Oregon white oak series, purple needlegrass series, tan oak series, and coast live oak series. The dominant tree series within the Trinidad-Westhaven watershed are Sitka spruce along the coast and redwood for inland areas. A successional cover throughout the region comprises the red alder series and a variety of shrubs (Sloan and Rocha 2007). Oak woodlands, pine forests, coastal scrub, annual grasses, fir forests and riparian environments are also found in the study area (Dyett & Bhatia 2002). Riparian trees mostly consist of alders and conifers. The majority of the upper watershed is forested and used for commercial timber production (see Section 2-4). Trinidad is one of the few areas that redwoods grow all the way down to the coastline. Vegetative cover is generally very thick except where disturbed due to the high rainfall. Berries (black, salmon, thimble) and ferns (sword, lady, deer) make traversing open spaces difficult. Some invasive species occupy the planning area, most notably *cotoneaster* and English ivy.

## Groundwater

Background groundwater information is limited to data from existing wells on individual parcels, and statements obtained from landowners or from Humboldt County Health Department files. These data indicates a great range of depths to groundwater throughout the study area due to the variability of the geology and soils. It is not possible to establish groundwater contours based upon this limited data. However, it is noted that groundwater has been observed by residents at depths ranging from ground surface level to more than 200 feet below the surface. In general, water tables east of Highway 101 are high with much surface water in evidence often as a result of local clay hardpans near the soil surface. The portion of the study area west of Highway 101 has low water tables because of the substantial sandy terrace deposits underlying the main portion of the Trinidad and other western areas. Availability of water from existing wells is influenced by underlying clay layers.