



# **CITY OF TRINIDAD**

DRAFT

## **BACTERIOLOGICAL WATER QUALITY SUMMARY REPORT**

**JANUARY 2007**

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## Introduction

The following draft report summarizes the various efforts the City of Trinidad and others have accomplished in determining the levels of bacteriological indicators on adjacent beaches and contributing stream, seeps and stormwater outfalls. This information will be supplemented with ongoing Proposition 50 ICWMP efforts.

## Background

The City of Trinidad is located on the Pacific Ocean, 80 miles south of the Oregon border and 320 miles north of Sacramento. Population is approximately 311 (Census 2000). It is one of California's oldest incorporated cities and one of the smallest in size (0.5 square miles). The City was the first in the State to have a Local Coastal Plan approved by the CA Coastal Commission. The City has a developed public water system but relies on individual Onsite Wastewater Treatment Systems (OWTS).

The City's planning area / Project Area included in the Prop 50 ICWMP for the Trinidad ASBS includes the seven subwatersheds that constitute the Trinidad Plateau, from the southern boundary of the Luffenholtz Creek and Two Creeks watersheds to the northern boundary of the Mill Creek watershed for a total area of 6,498 acres. This planning area was selected because it contains the tributary watersheds that have the greatest impact on the water quality in Trinidad Bay where the Trinidad kelp beds are located. The City of Trinidad and the communities of Westhaven and Moonstone and the Trinidad Rancheria are the main urban areas within the planning area.

The City of Trinidad has been grappling with water quality issues, particularly in relation to onsite wastewater treatment systems (OWTS), since at least the 1970's. By the 1950's Trinidad was subdivided into 8,000 s.f. residential lots. As a result the OWTS are at a high density. More than 50% of systems are old (e.g. pit systems), unpermitted and/or do not meet current standards This puts the Trinidad area at risk for degrading surrounding water quality and increasing public health impacts. Probably in conjunction with the development of the City's first General Plan, a report entitled '*A Facilities Study of Subsurface Disposal Systems*' was completed in 1977. This was a comprehensive report that included much of the City's Planning Area. For the report, house-to-house surveys of OWTS were conducted, along with surface and groundwater monitoring (results summarized below) and various soils evaluations. The report determined that *"during the wet season there are problems associated with current conditions"* and *"because of existing pollution levels, it is evident that long term operation of septic tanks under the existing uncontrolled situation will create environmental conflicts."* The main recommendation from this report is that a maintenance district should be formed, or some other means to enforce permitting and proper installation of OWTS, as well as to require maintenance and monitoring of systems to ensure that existing and future development does not impact water quality.

Due to budgetary reasons, changes in political attitudes, or other reasons, this recommendation is only now being implemented with the key driving force being water quality concerns. The City is in the process of developing an OWTS Management Program. An ordinance requiring operating permits for all systems in town, conditioned

on regular maintenance and proper performance, is currently going through public hearings. Although the City itself contains the highest concentration of development, it only encompasses a small portion of the watersheds affecting the Trinidad Kelp Beds ASBS and does not include the watershed that provides the City's drinking water supply. Therefore, an integrated watershed planning effort was begun, involving as a number of agencies, groups and individuals in the area that wanted to be involved. Implementation will be the key to actuating measurable water quality improvements in the area. This report was prepared, as part of this planning effort, to provide a background and summary of the bacteriological water quality monitoring data that currently existing within the Trinidad-Westhaven Integrated Watershed Planning Area.

## Historical Data

The 1977 study tested for bacteria (Fecal Coliform and Fecal Streptococci) in surface waters in various locations inside and outside of town as well as several drinking water wells (see Appendix A). The historic data is difficult to compare to the more current data and current standards, because methods and detection limits have varied over a period of 30 years. However, understanding the past is an integral part to assessing the current situation and for making future decisions. The standards outlined in the 1977 report were: *"In waters designated for contact recreation, the median fecal coliform concentration based on a minimum of not less than 5 samples for any thirty day period shall not exceed 50 [MPN]/100ml, nor shall more than 10 percent of total samples during any 30 day period exceed 400 [MPN] / 100ml."* The report also goes on to state: *"Tests of waters not used for potable or recreational uses are basically acceptable up to the limit of about 200 MPN. Readings in the range of 100 MPN with similar fecal streptococci readings indicated that pollution is present."* The results of this effort are as follows in Table 1. Drinking water wells that were tested are not shown in the table, but had similar results.

Table 1: Historic bacteriological indicators testing.

Test Site / No.	Fecal Coliform	Fecal Streptococci	Test Site / No.	Fecal Coliform	Fecal Streptococci
1	17	17	11a	2	2
2a	240	540	11b	3	*
2b	79	23	12a	17	14
3a	170	350	12b	7	2
4	79	240	13a	230	9
5a	79	700	13b	17	79
5b	33	240	14	2	2
6	21	170	15	23	33
7a	130	310	16	920	--
7b	2,400	240	17	49	--
8	5	5	18	33	--
9	23	330	19	5	--
10a	130	140	20	140	--
10b	49	110	21	2	--

\*Indicated insufficient sample to perform analysis.

## Baseline Data

In 2005 and 2006, City staff collected quarterly water quality data for a variety of constituents to provide baseline water quality data under a grant from the Prop 13 Coastal Nonpoint Source Program. This data is summarized in Tables 2 and 3. Some of this data is problematic. During the first quarter of sampling near the end of June 2005, not knowing what the results would be like, the samples were not diluted, so the maximum number of countable colonies was 2,419.2 MPN / 100ml; 9 of 14 (64%) samples exceeded this number and could not be included in the calculations below. Also, during other quarters, samples were sometimes replicated and sometimes retested when the numbers were high in order to confirm the results; these numbers are included in the averages below.

A map of the sampling sites is provided at the end of this document (Attachment B). Twelve of the 15 sampling sites were taken on the beaches, including two in the ocean. MIC sites represent Mill Creek; PAC sites represent Parker Creek and MMC represents McConnahas Mill Creek. The WB sites are seeps draining onto Trinidad State Beach on the west; the HB and SB sites are all seeps draining on to the beaches to the south within Trinidad Bay. The O samples represent ocean samples, and the T site is a monitoring well.

The results showed that there were significant variations in the MPNs, even for replicated samples. However, a summary of the data shows that some sites had consistently higher bacteria counts and that the counts varied fairly consistently by quarter as well. Sites HB-1, WB-1 and SB-1 were the highest contributors of Total Coliform and E. Coli, where Parker Creek and SB-1 were the largest contributors of Enterococcus. The end of the dry season (September) consistently had the highest bacteria counts, which is also the best time of the year on the Humboldt County coastline and when the most people are using the beaches and most likely to be in the water. The beginning of the wet season also had high counts, and the lowest counts were at the end of the wet season. In addition to the data shown below, there were two instances of exceedance of the ratio requirement, but there were also numerical exceedances in those same instances.

Table 2: Summary of bacteriological baseline water quality sampling by Site.

Site	Coliform			E. Coli			Entero-cocci		
	Average	# Samples	% Exceed	Average	# Samples	% Exceed	Average	# Samples	% Exceed
MIC-1	959.18	5	0.0%	41.36	5	0.0%	21.00	2	0.0%
MIC-2	685.97	6	0.0%	18.27	6	0.0%	47.67	3	33.3%
PAC-1	1,968.75	4	0.0%	79.07	6	0.0%	116.00	3	33.3%
PAC-2	1,407.25	4	0.0%	39.53	6	0.0%	244.67	3	33.3%
MMC-1	926.84	5	0.0%	40.46	5	0.0%	15.50	2	0.0%

WB-1	8,882.17	6	33.0%	271.95	8	12.5%	10.50	4	0.0%
WB-2	3,274.00	3	0.0%	1.20	5	0.0%	5.50	2	0.0%
HB-1	14,201.00	5	60.0%	524.11	7	28.6%	59.50	4	25.0%
HB-2	5,122.75	4	0.0%	118.70	6	16.7%	10.33	3	0.0%
HB-3	4,941.75	4	0.0%	135.90	6	0.0%	57.00	3	33.3%
SB-1	6,761.40	5	20.0%	148.53	7	14.3%	120.75	4	50.0%
SB-2	2,418.67	3	0.0%	28.56	5	0.0%	5.50	2	0.0%
O-1	150.75	4	0.0%	8.25	4	0.0%	41.50	2	0.0%
O-2	498.50	4	0.0%	26.50	4	0.0%	43.00	2	0.0%
T-1	1,404.00	2	0.0%	1.00	2	0.0%	1.00	2	0.0%

**State Water Quality Standards for bacteria that are not to be exceeded in recreational waters are:**

Total Coliform = 10,000 MPN/100ml

Fecal Coliform (as *Escherichia coli*) = 400 MPN/100 ml

Enterococcus (*E. faecalis*) = 104 MPN/100 ml

Fecal Coliform to Total Coliform ratio exceeds 0.1, and the Total Coliform count exceeds 1,000 MPN

Table 3: Summary of bacteriological baseline water quality sampling by quarter.

Quarter	Coliform	% Exceed	E. Coli	% Exceed	Enterococcus	% Exceed
1 (March)	1410.2	0.0%	27	0.0%	4	0.0%
2 (June)	>777.24*	0.0%	34.15	0.0%	NA***	NA***
3 (Sept)	7,045.61	27.8%	247.49	13.3%	140	66.7%
4 (Dec)	4,074.09	5.3%	70.87	4.4%	85.8**	21.7%**

\*Only those numbers less than 2,419 were counted, as all the rest (64%) exceeded the maximum range (2,419 MPN / 100ml) without dilution.

\*\*The average and % exceedance without the retest numbers were 119.4 and 33.3% respectively.

\*\*\* Enterococcus was not collected at all during the first round of sampling in the second quarter of 2005.

### Humboldt County Beach Monitoring Data

Humboldt County Division of Environmental Health has been monitoring ocean water quality near the mouths of several creeks on County beaches since February 2003. This program is funded by the U.S. Environmental Protection Agency Beach Environmental Assessment and Coastal Health Act (BEACH Act), through the California Department of Health Services. Weekly monitoring occurs from April through September and bi-weekly from October through March. In addition, resamples are taken two days after any exceedance. Three of the County's monitoring locations fall within Trinidad's project area. These include Moonstone Beach near Little River, Luffenholtz Beach near Luffenholtz Creek and Trinidad State Beach near Mill Creek. The following is a summary of those monitoring data.

- Moonstone: 166 total sample dates; 14 exceedances; 8.4%
- Luffenholtz: 162 total sample dates; 11 exceedances; 6.8%
- Mill Creek: 158 total sample dates; 5 exceedances; 3.2%

Most of the exceedances were due to Enterococcus. The following table shows exceedances in each area by type.

Table 4: Beach monitoring exceedances by indicator type.

Site	Total Coliform	Ratio*	Fecal Coliform (E. coli)	Enterococcus	Total Exceedances
Moonstone	1	4	5	7	14
Luffenholtz	0	1	0	11	11
Mill Creek	0	1	0	5	5

\*Fecal Coliform:Total Coliform ratio exceeds 0.1, and the Total Coliform count exceeds 1,000 MPN.

In addition to the above summary of all the data since 2003, it can also be shown that the bacteria counts have been increased over those years. If just the past two years data are considered (2005 and 2006), the results are as follows:

- Moonstone: 82 total sample dates; 9 exceedances; 11.0%
- Luffenholtz: 81 total sample dates; 7 exceedances; 8.6%
- Mill Creek: 77 total sample dates; 3 exceedances; 3.9%

Although Mill Creek / Trinidad State Beach does not quite meet the 4% criteria overall, looking at the weekly monitoring itself (which varied somewhat between April or May and September or October), without the bi-weekly winter monitoring, the percentages are higher. For Mill Creek for all years, there were 110 weekly samples with 5 exceedances (4.5%). However, there were no exceedances in 2003. For 2004 there were 2 exceedances in weekly 32 samples (6.3%); in 2005 there were 2 exceedances in 27 weekly samples (7.4%) and in 2006 there was 1 exceedance in 25 weekly samples (4.0%). A similar situation occurs for the other two creeks, but they are already above the 4% criteria without further breakdown.

### First Flush Data

A 'first flush' event was sampled in October 2005 after one inch of rain fell in the first major storm of the season. The sampling location was in a storm drain at the intersection of Galindo and Van Wycke Streets in the City of Trinidad. This spot is approximately 400 feet 'upstream' of the City's stormwater outfall on Launcher Beach. The bacteria sampling results are given in Table 5 below

Table 5: Bacteriological sampling results from the 2005 'first flush' storm event.

Parameter	Result	Units	Limit	MCL
Total Coliform	16,000	MPN / 100ml	10	10,000 / 100 ml
Fecal Coliform	800	MPN / 100ml	10	400 / 100 ml

### ASBS Exception Request Data

The kelp beds around Trinidad Head were designated as an Area of Special Biological Significance in 1974. A recent SWRCB reconnaissance survey of the small ASBS (approx. 2 mi<sup>2</sup>) found a total of 53 drainages just within this area (17 discharges, 7 stream outlets and 29 springs / seeps were inventoried) (Final Report: Discharges into State Water Quality Protection Areas, July 2003). In 2005 the City of Trinidad (and the

Humboldt State University Marine Laboratory and the Trinidad Rancheria) was notified by the State Water Resources Control Board that all discharge into the ASBS must cease. The City, along with the other two entities within the Trinidad Kelp Beds ASBS, applied for an exception request. In order to meet the requirements a major suite of water sampling occurred on May 23, 2006 in nine locations around the City, all discharging to adjacent beaches (see Appendix B). Sampling occurred after more than three days without rain, and after 0.3" of rainfall. The bacteriological indicator results are provided in Table 6 below. Many of the samples exceeded the maximum detection range, and the majority of them exceeded the single sample standards for contact recreational waters.

Table 6: Bacteriological sampling results from various locations near the shoreline.

Site	Description	Total Coliform	E. Coli	Entero	Total Coliform	E. Coli	Entero
		MPN/100ml	MPN/100ml	MPN/100ml	Retest	Retest	Retest
1	Storm Drain	> 24,192	1,187	2,064	> 24,192	1,376	2,143
1d	Duplicate	> 24,192	11,199	12,033			
2	Sea Water	256	20	< 10	689	20	41
3	Storm Drain	> 24,192	14,136	15,531	> 24,192*	12,033*	10,462*
4	Creek	> 24,192	1,050	1,401	> 24,192	< 10	135
5	Creek	5,172	860	1,785	12,033	422	1,391
5d	Duplicate				19,863	414	1,296
6	Seep	5,794	288	620	> 24,192	20	52
7	Pier Runoff	6,131	443	110			
8	Sea Water	233	20	20			
9	Storm Drain				> 24,192	20	695

\*Standing water only for the retest.

### Next Steps

In addition to applying for the Exception Request, the City has spearheaded a comprehensive watershed planning and restoration effort in an approximately 6,500-acre project area. This effort has been funded (receiving the top score in the State on the application request) through the Proposition 50 Integrated Coastal Watershed Planning Grant. The focus on these efforts are on assessing the three greatest threats to the Kelp Beds ASBS, drinking water sources and other surface, ground and ocean waters (not in any particular order): 1) sediment; 2) stormwater; and 3) OWTS. This program will expand the baseline water quality monitoring, previously implemented within the City throughout the seven watershed project area (see Appendix C). The purpose of the proposed Prop 50 monitoring is to further assess the pollution sources and isolate problem sub-watersheds in order to prioritize future implementation projects. This will provide a larger dataset of baseline water quality conditions that can be used to assess the effectiveness of future restoration efforts. Detailed source tracking is an identified need that will supplement and focus these ongoing efforts. This will be the focus of future grant applications.

**Appendices**

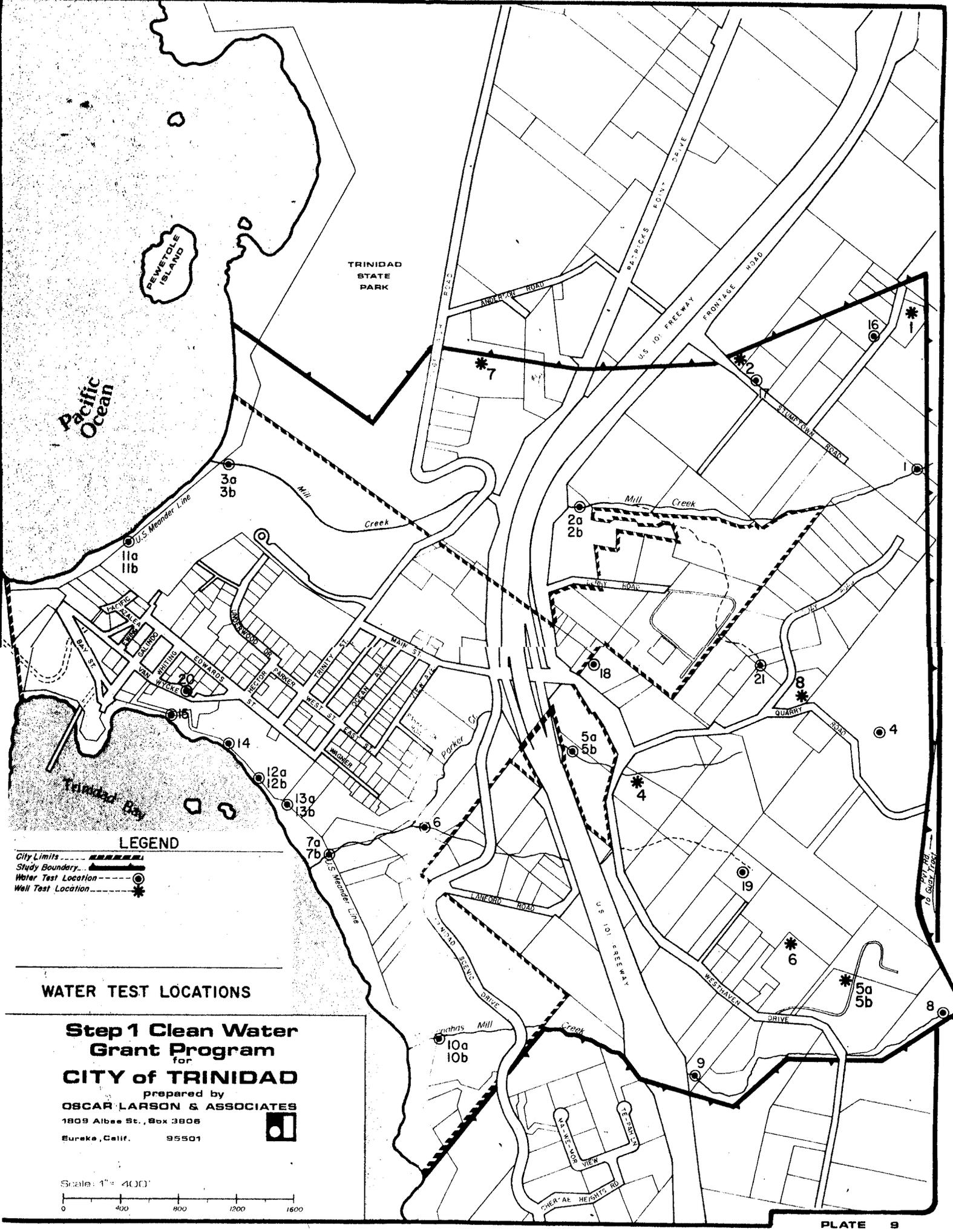
- A. 1977 Septic Report Sampling Locations Map
- B. – Prop 13 Sampling Locations (including the County's AB 411 Mill Creek site)
  - ASBS Monitoring Locations Map
- C. Prop 50 ICWMP Monitoring Locations Map
- D. Charts of Prop 13 sampling results – available upon request

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**APPENDIX A**

1977 Septic Report Sampling Locations Map

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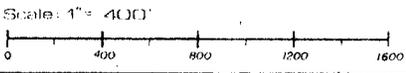


**LEGEND**

- City Limits ..... [dashed line symbol]
- Study Boundary ..... [solid line symbol]
- Water Test Location ..... [circle with dot symbol]
- Well Test Location ..... [asterisk symbol]

**WATER TEST LOCATIONS**

**Step 1 Clean Water Grant Program**  
 for  
**CITY of TRINIDAD**  
 prepared by  
**OSCAR LARSON & ASSOCIATES**  
 1809 Albee St., Box 3808  
 Eureka, Calif. 95501



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**APPENDIX B**

Prop 13 Sampling Locations (including the County's AB 411 Mill Creek site)  
& ASBS Monitoring Locations Map

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**LEGEND**

**LOCATIONS**

- MIC-1 STREAMS
- HB-1 BEEPS
- T-1 MONITORING WELLS
- O-1 OCEAN
- ASBS Sampling
- COUNTY AB411 SITE



City of Trinidad

**WATER QUALITY  
SAMPLING LOCATIONS**

Prop 13, ASBS and  
AB 411

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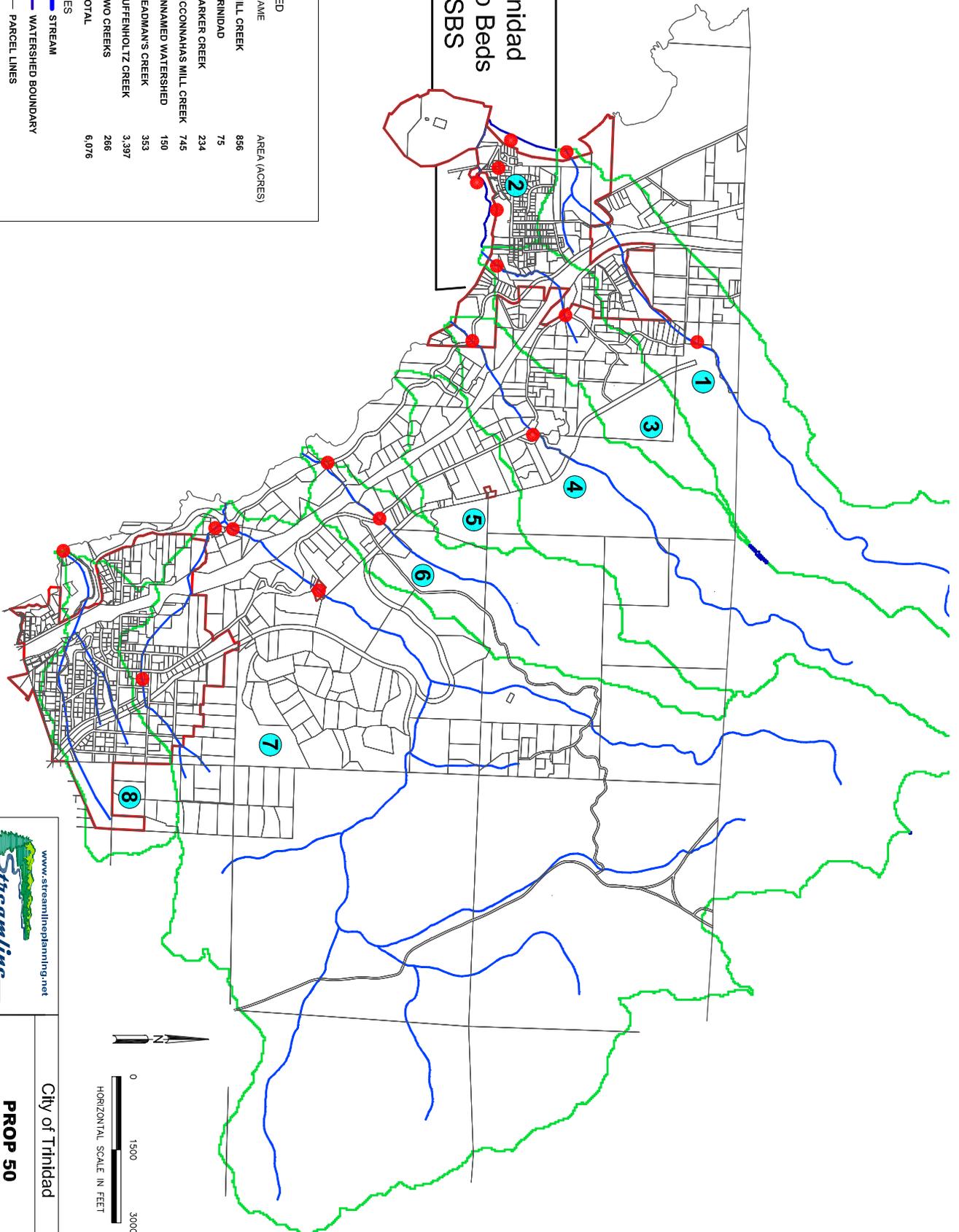
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**APPENDIX C**

Prop 50 ICWMP Monitoring Locations Map

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# Trinidad Kelp Beds ASBS



**LEGEND**

WATERSHED	
NAME	AREA (ACRES)
1 MILL CREEK	856
2 TRINIDAD	75
3 PARKER CREEK	234
4 MCCONNAHAS MILL CREEK	745
5 UNNAMED WATERSHED	150
6 DEADMAN'S CREEK	353
7 LUFFENHOLTZ CREEK	3,397
8 TWO CREEKS	266
<b>TOTAL</b>	<b>6,076</b>

BOUNDARIES	
	STREAM
	WATERSHED BOUNDARY
	PARCEL LINES
	SAMPLE LOCATIONS

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City of Trinidad  
**PROP 50**  
**SAMPLING LOCATIONS**  
 Humboldt County, California