CALIFORNIA REGIONAL WATER

MAY 25 2001

QUALITY CONTROL BOARD

Subject: Fwd: WQ Info & Data frm Sausal Creek
Date: 5/15/01 4:11 PM
To: 303dlist@rb2.swrcb.ca.gov

Hi Steve,

Anne Hayes here, providing the Friends of Sausal Creek monitoring data.
I am the contact person; I can be reached at

Friends of Sausal Creek
c/o Aquatic Outreach Institute
1327 S. 46th Street #155
Richmond CA 94804
(ph) 510.231.9566
anne@aoinstitute.org

The Friends of Sausal Creek have, are currently, or will soon be carrying out the following kinds of monitoring:
- Water quality (inc. flow)
- Birds (point counts)
- Macroinvertebrates
- Stream channel assessment--longitudinal profile, x-section, pebble counts
- Vegetation surveying
- Bacterial sampling

Information about each of these programs is provided below.

WATER QUALITY
Our data is included as an attachment to this email. The data is in an Excel spreadsheet. Hard copy will follow by regular mail.

Our QA procedures are limited to those implicit in the protocols we use. For our WQ data we follow the SFEI protocols.

Re metadata: We sampled in the upper, mid, and lower watershed. I will send a hard copy map showing precise locations. Dates and site names are included in the spreadsheet. Number of samples was always one at each location.

Training for our group was provided by Gwen Starrett of the WQ Control Bd and by Revital Katznelson (now of the RWQCB).

BIRD MONITORING DATA
Also included as an attachment. This is a Microsoft Word report with a table and two graphs. The table contains raw point count data.

QA consists of following the protocol. We use a point count format developed in Santa Clara County, I believe. Again, this comes from the SFEI Volunteer Monitoring protocols.

Metadata: none.

Training as above, by Gwen Starrett at a workshop held in Feb 98.

MACROINVERTEBRATES
Attached in Microsoft Word documents.
QA consisted of data review by Arlene Feng of Alameda County. Protocols were from the EPA.
Metadata: take a look at the data and let me know what you need. Hard copy of site locations to follow by mail.
Training provided by Arlene and volunteer aquatic ecologist Brian Feifarek.

CHANNEL ASSESSMENT AND VEG MONITORING
These are monitoring components that the Friends will carry out in tandem with the Sausal Creek Stream Channel Restoration Project in summer 2001. Training is being provided by Jill Marshall of the SF RWQCB and the Urban Creeks Council; coordination will be led by Kristin Hathaway of the City of Oakland. The Friends of Sausal Creek developed a vegetation monitoring plan; it is attached in a Word document.

BACTERIAL SAMPLING
The FOSC did a round of bacterial sampling using EPA Standard Operating Procedures. Total Coliform and E. coli counts exceeded acceptable levels and indicated a sewage leak which, ~~and~~ at the Friends' instigation, the city found and has since repaired. I will send hard copy by regular mail.

Thanks for soliciting this data! I am glad to have an opportunity to share it with the Board. Let me know what more you need from me (I'm sure there'll be something in the way of metadata that you need).

Best wishes,

Anne Hayes

Attachments

Water Data Spreadsht
99.02 Rpt
Bugs - 03.21.98 - by family
Bugs - 04.18.98 - by family
Bugs - 06-09-98
Revegn Monitoring Final

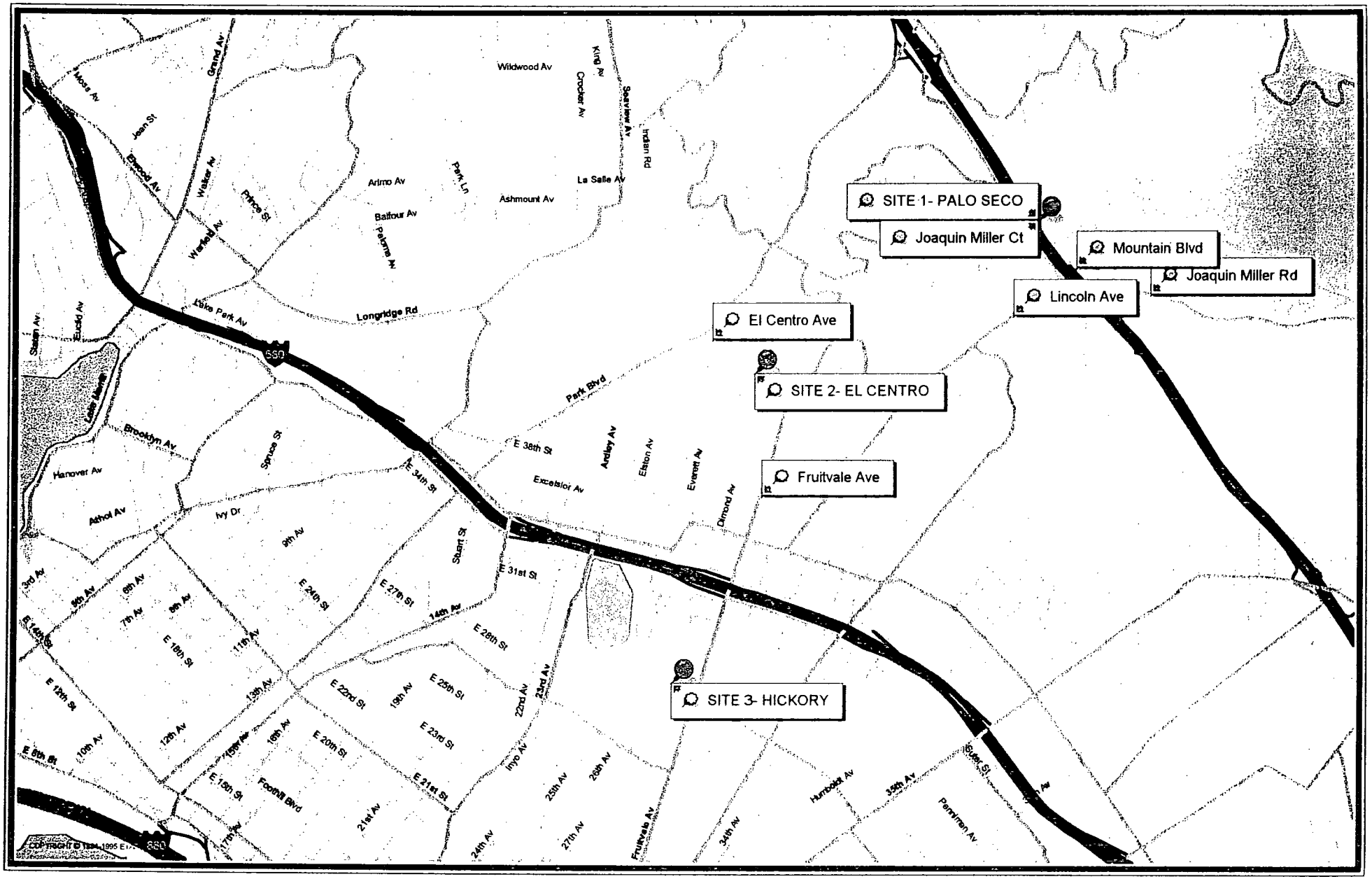
Friends of Sausal Creek
Water Quality Data

Date	Station	Location	Time	Depth (ft)	Flow (cfs)	Air Temp (C)	Water Temp (C)	DO (ppm)	pH	Conductivity	Turbidity-Measured (JTU)	Turbidity-Visual	Ammonia (reading x 1.3)ppm	Conditions	Comments
3/7/98	1	Palo Seco	10:00	1.30		11.0	10.0	10.0	7.7	600				cloudy, cold	
3/21/98	1	Palo Seco	10:15	1.30		17.0	14.0	9.6	8.0	630				cloudy	
4/4/98	1	Palo Seco	10:00	1.20		11.5	10.5	10.4	7.9	550		pretty clear		cloudy, cool	no rain
4/18/98	1	Palo Seco	9:50	1.40		12.5	10.5	10.6	8.1	620		clear, greenish		clear, sunny	
5/2/98	1	Palo Seco	14:40	1.25		20.0	14.0	9.6	8.0	690		looks clear		very light rain in a.m.	
5/16/98	1	Palo Seco	9:45	1.25		13.0	11.5	9.8	7.8			looks clear		high clouds, little sun	Meter was not working
5/30/98	1	Palo Seco	9:50	1.50		14.0	11.5	10.1	7.0		10				pH strips used/Conductivity meter not working
6/13/98	1	Palo Seco	9:55	1.25		17.5	14.0	9.8	8.0		<5	clear		high overcast	Meter was not working
7/11/98	1	Palo Seco	10:00	1.17		17.5	14.0	9.2	8.0	730	<5	colorless, clear		high overcast	
8/8/98	1	Palo Seco	10:05	1.08		16.0	15.0	8.8	7.9	740	<5			high overcast	
9/12/98	1	Palo Seco	10:05	1.25		20	15.0	8.3	8.0	740	<5			Clear & Sunny	
10/17/98	1	Palo Seco	10:00	1.17		13.0	12.0	9.2	7.7	710	<5	colorless, clear		Sunny clear skies	
11/14/98	1	Palo Seco	10:00	1.04		10.5	10.5	10.0	7.9	740	<5	Clear, colorless	0.13	Sunny and humid	
12/5/98	1	Palo Seco	9:55	1.00		6.5	7.0	11.6	7.6	630	<5	Clear, colorless	0.33	Clear and cold	
12/19/98	1	Palo Seco	9:40	0.75		4.0	8.5	11.5	8.0	680	<5	Clear, colorless	0.3	clear, sunny, cold	
01/02/99	1	Palo Seco	9:50	0.75		11.5	10.0	11.1	7.6		<5	Clear, colorless	0.3	sunny and cool	conductivity meter not working
1/30/99	1	Palo Seco	9:50	0.40		9.0	9.0	11.8	7.9	570	<5	Clear, colorless	0.65	cloudy	overflow and erosion upstream, turbidity reading visual
2/13/99	1	Palo Seco	9:50	0.95		7.0	9.5	11.7	7.9	470	10	Clear, colorless	0.13	clear and sunny	
3/13/99	1	Palo Seco	9:50	1.35		9.0	10.5	11.5	7.5	560		Clear, colorless	0.3	high overcast	Turbidity not measured due to uncertainty w/ procedure
4/10/99	1	Palo Seco	10:00	1.25		8.0	9.5	11.2	8.0	630	<5	Clear, colorless	0.3	high overcast	
5/8/99	1	Palo Seco	10:00	1.30		14.0	12.5	10.6	7.9	780	5	Clear, colorless	0.7	sunny and clear	Calibrated pH meter w/7.0 buffer solution at Station 1
6/12/99	1	Palo Seco	9:55	1.00		14.0	14.0	11.0	8.0	810	<5	Clear, colorless	0.3	sunny w/ high clouds	
7/11/99	1	Palo Seco	10:10	1.00		26.0	17.5	9.0	8.0	860	<5	Clear, colorless	0.3	sunny and clear	ammonia measured with new test kit- reading was 0ppm
8/14/99	1	Palo Seco	9:45	1.00		16.5	14.5	9.8	8.0	830	<5	Clear, colorless	0.3	sunny and clear	Nessler's ammonia reading: 0 - 0.5
3/1/00	1	Palo Seco	12:00	1.33		14.5	11.0	11.0	8.6	400			<0.1	sunny / partly cloudy	new sodium thiosulfate added; channel has changed
2/7/98	2	El Centro	12:30	6.00		17.5	14.0	9.8	8.0	290				heavy rain	training session
3/21/98	2	El Centro	11:35	5.00		19.0	14.0	11.0	8.5	610		reddish sediment			
3/21/98	2	El Centro	12:00	5.00		19.0	14.0	9.8	8.4	600				beginning to rain	2nd test at site
4/4/98	2	El Centro	11:00	5.50		16.0	12.0	10.4	8.6	540		greenish murky		cloudy, cool	no rain
4/18/98	2	El Centro	10:40	3.00		17.5	11.5	10.6	8.2	600		murky & suds		clear, sunny	wk party upstrm
5/2/98	2	El Centro	15:15	2.25		21.0	20.0	8.5	8.0	600		greenish, murky		very light rain in a.m.	
5/16/98	2	El Centro	11:00	3.25		18.0	14.0	10.0	8.0			clear, greenish		high clouds, little sun	Meter was not working
5/30/98	2	El Centro	10:35	2.50		18.8	13.5	10.0	7.0		10				pH strips used/Conductivity meter not working
6/13/98	2	El Centro	10:56	2.00		19.0	15.0	10.0	8.2		<5	green		overcast	murkier than st1/Meter not working
7/11/98	2	El Centro	11:10	2.33	1.07	21.5	17.0	10.4	8.0	550	<5	colorless, clear		clear blue sky	
8/8/98	2	El Centro	11:30	3.58	2.53	18.5	16.0	8.0	8.0	680	<5			high overcast	
9/12/98	2	El Centro	10:30	1.92	1.37	26.0	17.5	6.5	7.8	710	<5			Clear & Sunny	
10/17/98	2	El Centro	10:50	2.00	2.55	21.0	13.0	8.1	8.0	620	<5	colorless, clear		sunny Clear skies	
11/14/98	2	El Centro	10:45	1.75	0.72	14.0	11.0	10.4	8.0	590	<5	Clear, colorless	0.13	Sunny	
12/5/98	2	El Centro	11:30	1.70	1.65	11.0	8.0	10.8	8.0	600	<5	Slightly cloudy	0.65	High overcast, cold	
12/19/98	2	El Centro	11:45		0.6	8.5	9.0	10.5	8.1	630	<5	slightly cloudy	0.7	clear and cool	creek depth not measured; water too deep in culvert
1/2/99	2	El Centro	11:00	2.15	0.5	15.0	9.0	10.8	8.0		<5	slightly cloudy	0.3	sunny & mild	conductivity meter not working
1/30/99	2	El Centro	11:05	1.60	2.8	11.0	9.0	11.8	8.1	660	<5	Clear, colorless	0.3	partly cloudy	depth measured @ pool; cfs @ other end of culvert
2/13/99	2	El Centro	11:30	2.25	6.1	17.0	10.0	11.2	8.4	580	10	slightly cloudy	0.3	slightly cloudy	

Friends of Sausal Creek
Water Quality Data

Date	Station	Location	Time	Depth (ft)	Flow (cfs)	Air Temp (C)	Water Temp (C)	DO (ppm)	pH	Conductivity	Turbidity-Measured (JTU)	Turbidity-Visual	Ammonia (reading x 1.3)ppm	Conditions	Comments
3/13/99	2	El Centro	11:00	2.20	6.8	13.0	11.5	10.7	8.4	660		Clear, colorless	0.7	high overcast	Turbidity not measured due to uncertainty w/ procedure
4/10/99	2	El Centro	11:00	2.20	3.4	13.0	10.0	11.5	8.3	660	5	Clear, colorless	0.1	high overcast	Ammonia test odd colored (muddy)
5/8/99	2	El Centro	11:05	2.10	1.32	17.5	13.5	11.3	8.2	690	5	Clear, colorless	0.7	sunny and clear	
6/12/99	2	El Centro	10:55	2.30	0.74	17.5	15.0	10.0	8.2	640	<5	Green tint	0.7	sunny w/ high clouds	
7/11/99	2	El Centro	11:45	1.80	0.56	30.0	20.0	9.4	8.2	560	<5	Clear, colorless	0.7	sunny and clear	mmonia measured with new test kit - reading was 0 ppm
8/14/99	2	El Centro	10:05	3.60	0.4	21.0	16.5	9.4	7.9	520	5	Green Tint	0.1	sunny clear	
3/1/00	2	El Centro	12:30	2.42		17.5	12.0	10.0	8.3	550			<0.1	sunny / partly cloudy	new sodium thiosulfate added
4/4/98	3	Hickory	12:00	1.00		15.0	12.5	10.4	8.4	520		b/t sites 1 and 2		coudy, cool	no rain
4/18/98	3	Hickory	11:20			19.5	12.0	9.8	8.1	590		less murky		sunny, some clouds	
5/2/98	3	Hickory	15:45	1.00		20.8	16.0	8.6	8.0	580		medium murky		very light rain in a.m.	began to sprinkle
5/16/98	3	Hickory	11:45	1.00		19.0	13.5	8.8	7.9			clear and flowing		high clouds, little sun	Meter was not working
5/30/98	3	Hickory	11:10	1.00		18.5	14.0	9.6	7.0		15				pH strips used/Conductivity meter not working
6/13/98	3	Hickory	11:35	0.90		18.5	15.5	9.5	8.0		<10	clear		sunny	Meter was not working
7/11/98	3	Hickory	12:50	0.75		21.5	17.5	9.0	8.1	550				clear blue sky	
8/8/98	3	Hickory	12:30	0.81		17.0	16.0	7.6	7.8	570	<5			high overcast	
9/12/98	3	Hickory	11:30	0.67		25.0	19.0	5.8	7.8	520	<5			Clear & Sunny	Spotted Frog, tadpoles, large aquatic insect, lots of eggs
10/17/98	3	Hickory	11:45	0.58		20.5	15.0	6.0	7.7	530	<5	clear, stinky		Sunny Clear skies	
11/14/98	3	Hickory	12:30	0.65		15.0	13.0	9.4	7.8	580	<5	Clear, colorless	0.325	Sunny	
12/19/98	3	Hickory	13:15	1.05		9.5	9.5	10.2	8.0	620	<5	slightly cloudy	0.3	clear and cool	
1/2/99	3	Hickory	11:40	1.00		14.0	10.0	7.8	7.8		<5	slightly cloudy	1.3	sunny & mild	conductivity meter not working
1/30/99	3	Hickory	11:55	1.00		10.0	9.5	10.6	8.2	630	<5	Clear, colorless	0.7	mostly sunny	
2/13/99	3	Hickory	12:00	1.05		16.5	10.5	11.1	8.2	590	20	slightly cloudy	0.7	slightly cloudy	
3/13/99	3	Hickory	11:40	1.60		14.0	12.0	10.6	8.3	630	*	Clear, colorless	0.7	partly sunny	turbidity not measured due to uncertainty w/ procedure
4/10/99	3	Hickory	11:45	1.10		12.5	11.0	11.0	8.2	640	5	Clear, colorless	0.3	high overcast	Ammonia test odd-colored (muddy)
5/8/99	3	Hickory	12:15	1.05		17.0	15.5	11.0	8.1	660	5	Clear, colorless	0.7	sunny and clear	
6/12/99	3	Hickory	11:20	1.00		17.5	16.0	6.8	7.8	590	<5	slighly cloudy	2.6	high clouds, little sun	
7/11/99	3	Hickory	12:40	0.80		28.0	21.0	7.4	7.9	530	<5	Clear, colorless	0.7	sunny and clear	nmonia measured with new test kit - reading was 0ppm
8/14/99	3	Hickory	11:55	1.20		*	16.0	9.2	7.9	530	<5	Clear, colorless	0.7	sunny and clear	* air temp not recorded - thermometer left at Station 2

Current Map
Sausal Creek - Water Monitoring Sites



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Friends of Sausal Creek Monitoring Sites

(1) **Palo Seco Trailhead**
Joaquin Miller Park

From Berkeley
Take Highway 13 to the Joaquin Miller/Lincoln Boulevard exit. At the stop, turn left. Go about 200 feet, to the next stop sign, and turn left again, across the freeway. Turn left once more at the next stop, on to Mountain Boulevard. Follow Mountain down a steep drop. At the foot of the hill is a crosswalk and a small cul-de-sac; turn right into the cul-de-sac, which is called Joaquin Miller Court. You'll see the parking area and the trailhead where the road ends.

From Oakland
Take Lincoln Boulevard across Highway 13 to Mountain Boulevard. Turn left and follow directions above.

(2) **Dimond Recreation Center**
3680 Hanly Road

From Berkeley/Oakland
Exit 580 at Fruitvale Avenue
Turn left on Fruitvale Avenue and head east toward the Oakland Hills
Pass Dimond Park on the left and continue up the hill. The road changes into Lyman. (Fruitvale will go off to the right.)
Take the first left off of Lyman onto Waterhouse Rd.
Bear left at the first intersection onto Hanly Road. (Waterhouse will go off to the right.)
The Recreation Center is on the left side at 3680 Hanly Road.

From the Hills
Exit 13 at Park Blvd.
Turn left on Mountain and another left onto Park Blvd.
Traveling away from the hills, come down to El Centro. Turn left.
El Centro comes into Hanly. The park is on your right.

(3) **Private Residence West of 580**
From Berkeley/Oakland
Exit 580 at Fruitvale Avenue. Turn right on Fruitvale Avenue and head west toward the bay. About a quarter mile down on the right is Hickory Street. Turn right. The house is number 2607, toward the end of the cul-de-sac.

Friends of Sausal Creek Bird Monitoring

Annual Report

February 16, 1999

In an effort to expand our knowledge about birds that use the Sausal Creek watershed, members of the Friends of Sausal Creek have been conducting monthly point counts for the past year. We have used our point count data in the compilation of a watershed bird list and to develop information on the relative abundance of different species. In the future, we will use our data to monitor general trends in our bird populations. Additionally, we hope to use our point count data to help judge the success of our restoration efforts.

Point counts are widely used and provide extremely useful information. Raw point count data gives us a fairly accurate indication of the relative abundance of different bird species. However, over time, the same individuals are often counted repeatedly and only a proportion of the total population of a given species is counted. Point counts also tend to over-represent highly visible or vocal birds and under-represent those species that are less likely to make their presence known. For example, male Anna's hummingbirds are highly territorial and are often noticed because they are busy patrolling and defending their territories. In contrast, the varied thrush is fairly common in winter but is seldom counted because their winter vocalizations are soft and they tend to lurk in the bushes rather than perching where they can be seen. Raw point count data should be adjusted to take the limitations of the method into account, especially when measuring species diversity and population trends. We are currently researching adjustment methods.

Over the past year we have been monitoring birds at seven sites located in Dimond Park, Dimond Canyon, and Joaquin Miller Park. Six of these sites are located within 100 feet of Sausal Creek and the seventh is located within 300 feet of Palo Seco Creek. Vegetation at the sites varies from open lawns with exotic trees to fairly dense oak and bay woodland. Our raw point count data is presented in Table 1. We have counted a total of 809 birds and positively identified a total of 41 different species. The number of species and total number of individuals counted varies from site to site, as do diversity measures for each site (Figure 1). These variations can be partially accounted for by the fact that the number of site visits varies widely between certain sites. However, differences between some sites seem to be attributable to more than the number of site visits. Counts at sites 1 and 4 may be higher because these are both open areas, where birds are relatively easy to spot. These sites also contain a diversity of vegetation types and, therefore, a diversity of bird habitat. Counts at site 3 may be low because this site is located in a stand of bay forest, where visibility is poor and vegetation diversity is low. This site is also located near a check dam on the creek and water noise drowns out all but the closest birds.

An analysis of relative species abundance across point count sites (Figure 2) shows that:

- Our most abundant species are American robins, Steller's jays, chestnut-backed chickadees, and song sparrows.
- California towhees, spotted towhees, western flycatchers, ruby-crowned kinglets, and Anna's hummingbirds are all common in the watershed.
- Scrub jays, black phoebes, dark-eyed juncos, warbling vireos, Bewick's wrens, common ravens, Allen's hummingbirds, and Townshend's warblers are fairly common.
- Uncommon birds include swifts, swallows, red-shafted flickers, house finches, and yellow warblers.
- Our rarest birds include the Cooper's hawk, hermit thrush, varied thrush, wrentit, golden-crowned sparrow, and the brown creeper.

Common name	Code	Site #							Total/all sites	Species
		1	2	3	4	5	6	7		% Total
Allen's hummingbird	ALHU	4	1		5				**10**	1.4
American goldfinch	AMGO				4				**4**	.56
American robin	AMRO	49	18	6	21	1	9	2	**106**	14.9
Anna's hummingbird	ANHU	10	1		9				**20**	2.8
band tailed pigeon	BTPI				2	4	2		**8**	1.1
Bewick's wren	BEWR	4	3	1	3			1	**12**	1.7
black phoebe	BLPH	3			13				**16**	2.2
brown creeper	BRCR	1							**1**	.14
California towhee	CATO	13	7	4	14	3	9	4	**54**	7.6
chestnut-backed chickadee	CBCH	13	11	10	17	1	22	4	**78**	11
common bushtit	COBU	1					1		**2**	.28
common raven	CORA	2	1	4	5				**12**	1.7
Cooper's hawk	COHA				3				**3**	.42
dark-eyed junco	DEJU	15						1	**16**	2.2
double crested cormorant	DCCO	1							**1**	.14
downy woodpecker	DOWO	2			2		1		**5**	.70
golden-crowned sparrow	GCSP				1				**1**	.14
hermit thrush	HETH				3				**3**	.42
house finch	HOFI	3			1				**4**	.56
lesser goldfinch	LEGO	4							**4**	.56
mallard	MALL	4							**4**	.56
mourning dove	MODO	4			2		2		**8**	1.1
red-breasted nuthatch	RBNU	1	2		2		1	1	**7**	.98
red-shafted flicker	RSFL	2	1				1		**4**	.56
rock dove	RODO	4					1		**5**	.70
ruby-crowned kinglet	RCKI	11	5	5	5		1	1	**28**	3.9
scrub jay	SCJA	8	3		4	1	1		**17**	2.4

song sparrow	SOSP	16	18	11	11	5	7	2	**70**	9.8
spotted towhee	SPTO	8	5	8	2	5	4	2	**34**	4.8
Steller's jay	STJA	29	14	7	18	1	19	6	**94**	13.2
Townshend's warbler	TOWA	4	1		2			1	**8**	1.1
unidentified	UNID	3	5+	4	11	20			**43**	
unidentified cormorant	UNCO				1				**1**	
unidentified goldfinch	UNGO	3	2		11		3		**19**	
unidentified hummingbird	UNHU	6	1	2	16	1	2	2	**30**	
unidentified swallow	UNSW				2		2		**4**	.56
unidentified swift	SWIF				2				**2**	.28
unidentified warbler	UNWA	3	1	1					**5**	
unidentified woodpecker	UNWO				3				**3**	
varied thrush	VATH	1							**1**	.14
warbling vireo	WAVI	5	3	2	4				**14**	1.9
western flycatcher	WEFL	9	2	4	8	1	4		**28**	3.9
white-crowned sparrow	WCSP	1	2		1		1		**5**	.70
Wilson's warbler	WIWA	1	5			2	2		**10**	1.14
wrentit	WREN					1			**1**	.14
yellow warbler	YEWA		1		2				**3**	.42
yellow-rumped warbler	YRWA	1							**1**	.14

Total species/site*	**32**	**20**	**11**	**29**	**11**	**19**	**11**	
Total birds/site	**249**	**113**	**69**	**210**	**46**	**95**	**27**	
Species diversity/site*	**2.84**	**2.5**	**2.23**	**2.88**	**2.15**	**2.32**	**2.17**	
Total birds identified*								**708**
Total birds censused								**809**

*With the exception of the unidentified swallows and swifts, birds identified to genus only are not included in these totals and calculations since they may belong to a fully identified species.

Table 1. Raw point count data, 2/98-1/99

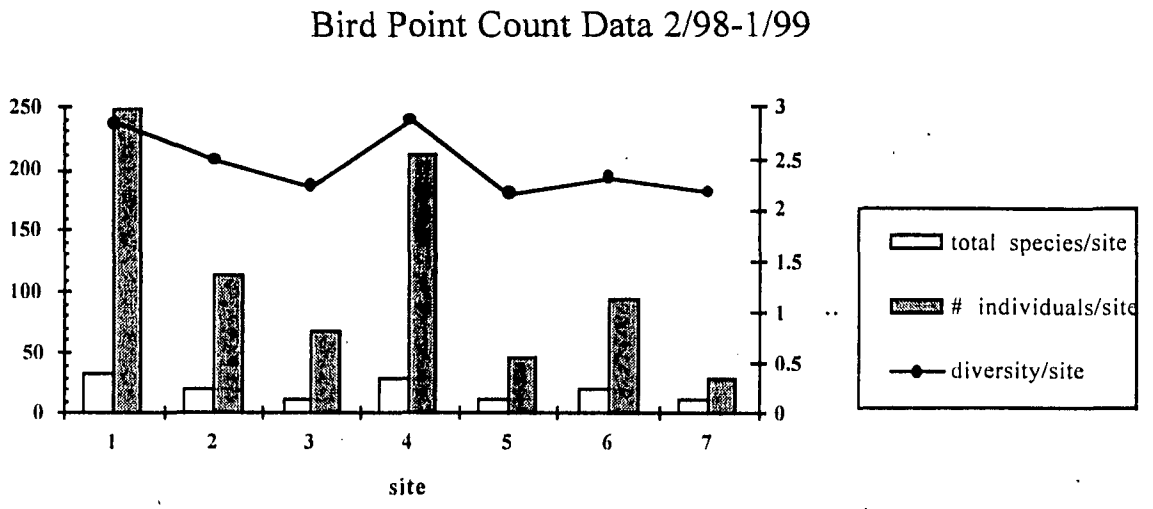


Figure 1. Between site variations in counts of total species, total individuals, and measurement of diversity.

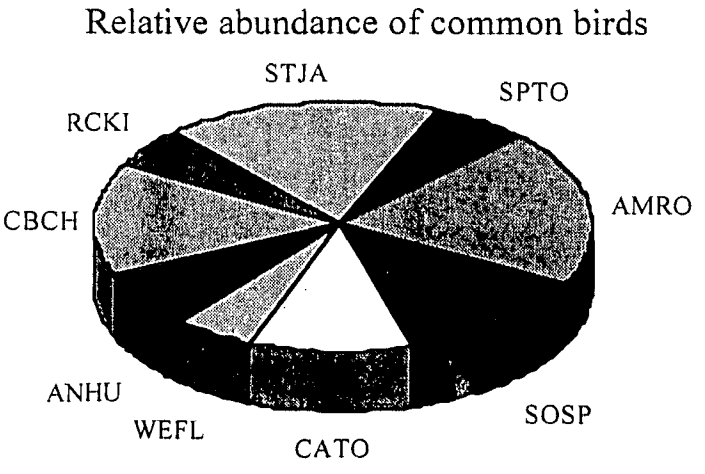


Figure 2. Relative abundance of the most common birds in the upper Sausal Creek watershed.

Results of the 3/21/98 sampling on Sausal Creek upstream of Dimond Park

Order	Family	Genus	Number found
Sample 1			
Ephemeroptera	Baetidae	Baetis (?)	6
Diptera	Chironomidae		4
" "	Heptageniidae	Ironodes	1
Sample 2			
Ephemeroptera	Baetidae	Baetis (?)	5
Diptera	Chironomidae		5
Plecoptera	Chloroperlidae	Sweltsa	1
" "	Heptageniidae	Ironodes	2
Trichoptera	Lepidostomatidae	Lepidostoma	1
Sample 3			
Ephemeroptera	Baetidae	Baetis (?)	9
Diptera	Chironomidae		4
Plecoptera	Chloroperlidae	Sweltsa	3
Coleoptera	Elmidae (adult)		1
Arachnida	Hydracarina (mite)		4
" "	Hydropsychidae	Hydropsyche	1
Trichoptera	Lepidostomatidae	Lepidostoma	11
" "	Nemourida		3
Oligochaete ? (v. slender)			1
Sample 4			
Ephemeroptera	Baetidae	Baetis (?)	13
" "	Heptageniidae	Ironodes	2
Trichoptera	Lepidostomatidae	Lepidostoma	2
Oligochaete ? (v. slender)			1
Sample 5			
Ephemeroptera	Baetidae	Baetis (?)	1
Diptera	Chironomidae		12
Plecoptera	Chloroperlidae	Sweltsa	1
" "	Heptageniidae	Ironodes	1
Trichoptera	Hydropsychidae	Hydropsyche	1
Oligochaete ? (v. slender)			2

Quick scan of pool kick (not at all quantitative!)

Ephemeroptera	Baetidae	Baetis (?)	present
Plecoptera	Chloroperlidae	Sweltsa	present
Odonata-Zygoptera	Coenagrionidae	Argia	abundant
" "	Heptageniidae	Ironodes	present
Trichoptera	Lepidostomatidae	Lepidostoma	abundant
" "	Nemouridae		present
Oligochaete ? (v. slender)			present

Results of the 4/18/98 sampling on Sausal Creek — Palo Seco branch

Order	Family	Genus	Number Found
Sample 1			
Ephemeroptera	Baetidae	Baetis	22
Diptera	Chironomidae	(no ID)	12
Coleoptera	Elmidae	(no ID)	2
(phylum/class? Nematomorpha)	horsehair worm		1
Trichoptera	Hydropsychidae	Hydropsyche	3
Trichoptera	Lepidostomatidae	Lepidostoma (L)	14
Plecoptera	Nemouridae	Malenka	4
Plecoptera	Perlidae	Calineuria	4
Trichoptera	Rhyacophilidae	Rhyacophila	4
Sample 2			
Ephemeroptera	Baetidae	Baetis	22
Diptera	Chironomidae	(no ID)	2
Plecoptera	Chloroperlidae		1
Coleoptera	Elmidae	(no ID)	7
Ephemeroptera	Heptageniidae	Ironodes	1
(phylum/class? Nematomorpha)	horsehair worm		1
phylum/class Crustacea	Isopoda (sow bugs)		1
phylum Annelida /class Oligochaeta	large worm		3
Trichoptera	Lepidostomatidae	Lepidostoma (L)	67
Trichoptera	Lepidostomatidae	Lepidostoma (P)	1
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	4
Plecoptera	Nemouridae	Malenka	2
Plecoptera	Perlidae	Calineuria	2
Trichoptera	Rhyacophilidae	Rhyacophila	1
phylum Annelida /class Oligochaeta	small worm		1
Diptera	Tipulidae	Hexatoma	2
Diptera	Tipulidae	Tipula	1
Trichoptera	Uenoidae	Neophylax	1
Sample 3			
Ephemeroptera	Baetidae	Baetis	46
Plecoptera	Chloroperlidae		1
Coleoptera	Elmidae	adult (no ID)	4
Ephemeroptera	Heptageniidae	Ironodes	6
Coleoptera	Hydrophilidae	Hydrobiomorpha (L)	1
Trichoptera	Hydropsychidae	Hydropsyche	7
phylum/class Crustacea	Isopoda (sow bugs)		1
phylum Annelida /class Oligochaeta	large worm		1
Trichoptera	Lepidostomatidae	Lepidostoma (L)	15
Trichoptera	Lepidostomatidae	Lepidostoma (P)	8
Plecoptera	Nemouridae	Malenka	13
Plecoptera	Perlidae	Calineuria	2
Trichoptera	Rhyacophilidae	Rhyacophila	1
phylum Annelida /class Oligochaeta	small worm		1

Legend: L = larva
P = pupa
A = adult

aoi shared:watershed awareness programs:sausal creek wap:monitoring:data:bugs data:bugs - 04.18.98 - by family

Coleoptera	Stratomyidae	Caloparyphus? (L)	1

Legend: L = larva
P = pupa
A = adult

13 June 1998: Palo Seco site, stream crossing above parking area.
Air temp. 15 deg C. Water temp. 12 deg C.
Weather: overcast and calm
Monitors: Brian Feifarek, Carol Kuelper, Denise Hilton, Penny Brown, Ed Wilkinson, Emma Brown, Karen Hoffman, Asa Bradman
Notes: Three samples.

Order	Family	Genus	# in Sample
Sample 1:			
Aquatic oligochaete			1
Ephemeroptera	Heptageniidae	Ironodes	12
Ephemeroptera	Baetidae	Baetis	182
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	2
Trichoptera	Lepidostomidae	Leptidostoma	44
Trichoptera	Uncertain-- saved for ID: large case builder		3
Plecoptera	Nemouridae	Malenka	7
Plecoptera	Perlidae	Calineuria	17
Plecoptera	Chloroperlidae	Sweltsa	1
Diptera	Chironomidae		9
Diptera	Simuliidae		8
Trichoptera	Rhyacophilidae	Rhyacophila	7
Trichoptera	Hydropsychidae	Hydropsyche	1
Coleoptera	Elmidae (adults)		16
Diptera	Stratiomyidae	Stratiomys	1
Diptera	unknown		1
Diptera	Tipulidae	Tipula	2
Sample #2:			
Aquatic oligochaete			1
Ephemeroptera	Heptageniidae	Ironodes	11
Ephemeroptera	Baetidae	Baetis	64
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	2
Trichoptera	Lepidostomidae	Leptidostoma	18
Trichoptera	Uncertain-- saved for ID: wood case		1
Plecoptera	Nemouridae	Malenka	8
Plecoptera	Perlidae	Calineuria	10
Diptera	Simuliidae		18
Trichoptera	Rhyacophilidae	Rhyacophila	2
Coleoptera	Elmidae (adults)		3
Isopoda	(Crustacea)		2
Sample #3:			
Ephemeroptera	Heptageniidae	Ironodes	10
Ephemeroptera	Baetidae	Baetis	81
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	3
Trichoptera	Lepidostomidae	Leptidostoma	14
Trichoptera	Uncertain-- saved for ID		2
Plecoptera	Nemouridae	Malenka	13
Plecoptera	Perlidae	Calineuria	9

Diptera	Chironomidae		1
Diptera	Simuliidae		19
Trichoptera	Rhyacophilidae	Rhyacophila	2
Trichoptera	Hydropsychidae	Hydropsyche	1
Coleoptera	Elmidae (adults)		12
Diptera	Stratiomyidae	Stratiomys	1
Isopoda	(Crustacea)		1
Odonata	Anisoptera		1

12 July 1998: Dimond Recreation Center site, 50 m above concrete apron and below most downstream iron check dam. (the usual place)
Air temp: 21 C. Water temp: 19 C
Weather: Clear and mostly calm, occasional light breeze. Beautiful day!
Monitors: Emma Brown, Bob Branstrom, Brian Feifarek
Notes: Two samples taken.

Sample 1:

Aquatic oligochaete			1	
Ephemeroptera	Baetidae	Baetis	68	
Trichoptera	Hydroptilidae	(preserved for ID)	3	
Diptera	Chironomidae	larvae	15	
Diptera	Chironomidae	pupae	2	
Diptera	Simuliidae	2000-5000 estimate		
Coleoptera	Dytiscidae?	(preserved for ID)	1	
Planaria (flatworm)			3	
Aquatic Mites			11	
Mollusca	Gastropoda	(snails)	2	

Sample 2:

Aquatic oligochaete			3	
Ephemeroptera	Baetidae	Baetis	70	
Diptera	Chironomidae	larvae	12	
Diptera	Chironomidae	pupae	3	
Diptera	Simuliidae		500 estimate	
Coleoptera	Dytiscidae?		2	
Planaria (flatworm)			6	
Aquatic Mites			4	
Mollusca	Gastropoda	(snails)	4	
Trichoptera	Lepidostomidae	Leptidostoma	7	
Trichoptera	Case maker	Uncertain-- saved for ID	1	
Plecoptera	Nemouridae	Malenka	2	
Plecoptera	Chloroperlidae	Sweltsa	1	
Odonata	Coenagrionidae	Argia	1	

16 Aug 1998: Dimond Recreation Center site, 50 m above concrete apron and below most downstream iron check dam. (the usual place)
Air temp: 19 C. Water temp: 16 C
Weather: Clear and calm, sunny day. Stream flow is very low.
Monitors: Emma Brown, Brian Feifarek, Cliff Baker, Penny Brown, Ed Wilkinson, Carol Kuelper, Dawn Hester, Mary ?, Mike Grayson
Additional notes: Lots of detritus in stream-- bay laurel, Acacia leaves and seed pods. Many Simuliidae pupae were certainly overlooked because of detritus and pickers not having a clear search image for them. The Baetis are very small, probably many more passed through the net. Two samples.

Sample 1:

Ephemeroptera	Baetidae	Baetis		131 (estimate)
Diptera	Chironomidae		larvae	24
Diptera	Simuliidae			100 (estimate)
Planaria (flatworm)			48	
Aquatic Mites				13
Trichoptera	Lepidostomidae	Leptidostoma		4
Odonata	Coenagrionidae	Argia		2
Coleoptera	Elmidae	(adults)		3

Sample 2:

Ephemeroptera	Baetidae	Baetis		62
Diptera	Chironomidae		larvae	28
Diptera	Simuliidae	larvae		54
Diptera	Simuliidae	pupae		3
Trichoptera	Lepidostomidae	Leptidostoma		1
Odonata	Coenagrionidae	Argia		3
Coleoptera	Elmidae	(adults)		2
Coleoptera	Hydrophilidae	larvae		2
Isopoda	(Crustacea)			1
Planaria (flatworm)			43	
Aquatic Mites				29
Thread worm				1

20 Sept 1998. Palo Seco sampling site, just below stream crossing (usual site).
Air temp: 17 C Water Temp: 13.5 C
Weather: Sunny, calm.
Monitors: Emma Brown, Carol Kuelper, Ed Wilkinson, Clem Welsh, Brian Feifarek
Notes: Two samples taken. Low discharge, but plenty for sampling. Dimond site is too dry for sampling.

Sample 1:

Ephemeroptera	Heptageniidae	Ironodes	18
Ephemeroptera	Baetidae	Baetis	29
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	2
Trichoptera	Lepidostomidae	Leptidostoma	82
Trichoptera	Uncertain- large case builder pupa		1
Trichoptera	Rhyacophilidae	Rhyacophila	8
Trichoptera	Hydropsychidae	Hydropsyche	33
Plecoptera	Nemouridae	Malenka	33
Plecoptera	Perlidae	Calineuria	12
Plecoptera	Chloroperlidae	Sweltsa	1
Diptera	Chironomidae		4
Diptera	Simuliidae		1
Coleoptera	Elmidae (adult)		8
Coleoptera	Elmidae (larvae)		4
Diptera	Tipulidae	Tipula	1
Isopoda	(Crustacea)		5
Planaria (flatworm)			1

Sample 2:

Aquatic oligochaete			5
Ephemeroptera	Heptageniidae	Ironodes	32
Ephemeroptera	Baetidae	Baetis	28
Ephemeroptera	Leptophlebiidae	Paraleptophlebia	5
Trichoptera	Lepidostomidae	Leptidostoma	67
Plecoptera	Nemouridae	Malenka	37
Plecoptera	Perlidae	Calineuria	12
Diptera	Chironomidae		8
Diptera	Simuliidae		1
Trichoptera	Rhyacophilidae	Rhyacophila	3
Trichoptera	Hydropsychidae	Hydropsyche	133
Coleoptera	Elmidae (adults)		5
Coleoptera	Elmidae (larvae)		4
Diptera	Tipulidae	Tipula	2
Isopoda	(Crustacea)		2
Planaria (flatworm)			2
Aquatic Mites			1

Introduction

Riparian vegetation provides critical food and shelter for California's wildlife, as well as regulating and cooling stream waters and filtering pollutants. Vital nutrients for the stream community, which includes invertebrates, amphibians and fish, are provided by native plant species. Vegetation also influences stream flow patterns.

The Sausal Creek watershed provides some of the last remaining habitat within Oakland's city limits for a diversity of native plant species. The majority of these species (68 %) are listed as rare, threatened, or endangered at the local and regional level. One of the Friends of Sausal Creek's (FOSC) goals is to protect, enhance, and restore watershed native biodiversity; the watershed's native plant communities and species provide the basis for this biodiversity. The revegetation aspect of the upcoming channel restoration project along Sausal Creek has the potential to reestablish native vegetation and habitat, thereby enhancing native biodiversity in an area heavily compromised by invasive exotic vegetation. In addition, native rainbow trout are currently found in Sausal Creek in Dimond Canyon. Revegetation of the creek banks with native riparian vegetation should provide enhanced fish habitat along the restored reaches of the creek.

Basis for the Development of Management Objectives

The revegetation site consists of approximately 75,000 square feet of riparian corridor located along Sausal Creek in Dimond Canyon, Oakland, California (Alameda County) at approximately 300' above sea level. The project area begins at El Centro Avenue, extends upstream for approximately 1400', and is located on the right side of the creek as one faces upstream. A wide trail parallels the creek through the area. The canyon bottom, including the creek, varies in width from approximately 50-100', thus the revegetation site width varies from approximately 25-60'. The canyon walls begin as fairly gentle slopes but become generally steeper, to the point of precipitous rocky outcrops, in places upstream. Soils, derived primarily from sandstone and shale, include thick alluvial deposits in the canyon bottom; shallower upland soil types make up the canyon walls. Sausal Creek has downcut to depths ranging from 3 feet to greater than 10 feet throughout the project area and is essentially divorced from its former floodplain in most places, except during extreme precipitation events.

Invasive exotics have severely compromised native vegetation in Dimond Canyon. While native species make up half of the total number found in a recent vegetation survey of the site, their coverage is disproportionately small. The native overstory is most fully intact, dominated by coast live oak and alder in the lower reaches of the project area and by California bay in the upper reaches. Buckeye and several large willows also occur, as well as exotic acacia and elm. Overstory cover ranges from 0% to approximately 80% and is at its most dense where bays dominate. Except for a few younger individuals, alders and willows are not regenerating due to stream incision. Competition and canopy cover are likely factors in the low regeneration rates of other overstory species. While there are few oak seedlings or saplings, bay and buckeye seem to be faring somewhat better.

Except for areas where thickets of mounding Himalayan berry, elm sprouts, and broom occur the shrub layer is very sparse. Native shrubs are scattered throughout the project area and include toyon, dogwood, coyote brush, snowberry, and poison oak, with the last occurring most frequently. Few overarching shrubs occur along the stream banks.

The herbaceous layer is overwhelmingly dominated by exotics. Algerian ivy, Himalayan berry, and cape ivy dominate most of the project area and *Tradescantia* is also common. The exception to this rule is a small areawithin the restoration reach that burned several years ago in an accidental fire. The fire destroyed the ivy and set back the Himalayan berry growing in this area. Today this site is dominated by a tangled mix of native herbaceous species that occur nowhere else in the revegetation area including *Phacelia californica*, *Vicia* sp., *Cardamine californica*, and *Calystegia purpurata*. Poison oak and snowberry also occur here. That these species likely persisted in the seedbank for many years is very encouraging for future restoration efforts. It is also encouraging to see that in other spots within the revegetation area, where ivy has been cleared, other native ground layer species, such as *Polypodium* ferns and miner's lettuce, are making a comeback. Due to the vast expanses of ivy, other exotic herbaceous

species have had a hard time gaining a foothold in the project area. However, exotic thistles, hemlock, forget-me-nots, and Stebbin's grass, among others, occur along the road leading up the canyon.

In summary, while the native overstory remains relatively intact, most tree species are not regenerating well. The shrub layer is practically non-existent in most of the project area and the ground layer is overwhelmingly dominated by a few exotic species. Vegetative diversity, in terms of both structure and species composition, is highly compromised throughout the revegetation site.

Management Objectives

The revegetation component of the Sausal Creek Channel Restoration Project has the following objectives.

- To enhance biological diversity in the Sausal Creek riparian corridor. Restoration efforts will concentrate on re-establishing native riparian plant communities, improving wildlife habitat, stabilizing stream morphology, and reducing erosion.
- To reduce the population of invasive non-native vegetation so that no mature individuals remain following project completion and the future total cover of seedlings reaching maturity is less than 10 % of the total area of the site.
- To minimize disturbance to the riparian corridor by creating a vegetative buffer between the trail and stream.

Monitoring Design

The revegetation monitoring program is based on the management objectives and is designed to demonstrate that those objectives have been met. The monitoring program will:

- Survey existing vegetation including any rare plants and sites.
- Sample percent cover and species richness for existing and planted vegetation (trees, shrubs, herbaceous species and non-native plants) and monitor changes in these measurements over time.
- Sample for survival and mortality of planted vegetation.
- Monitor site changes using photomonitoring.

Each of these components is described below.

Survey of Existing Vegetation

Conduct a preliminary qualitative survey of the revegetation site to insure that interesting and significant species are noted and preserved during the restoration project. A list of species present on the site will be generated.

Sample Percent Cover and Species Richness

Three sampling methods will be tested in the field to determine which will be most effective for project monitoring purposes. Testing criteria include simplicity of method, how easily volunteer monitors can be trained in its use, and its effectiveness in measuring parameters of interest.

1. Line Intercept Method

   A series of transects are established throughout the study site. Using a measuring tape, the intercept distance is recorded for each plant or species that intercepts a transect. The accumulated length for any species divided by the length of the transect multiplied by 100 is expressed as percent cover for that species.

2. Modified Line Intercept Method

   A series of transects are established throughout the study site. Vegetation samples consist of 15 foot transect segments. For each sample, the cover class of each plant species directly under or above each transect segment is recorded. The data is recorded as a simple table with rows for each species, columns for each segment, and with the cells containing the recorded cover class (from trace to 100%) for the taxa in that segment.

3. Quadrat Method
A systematic sample of "X#" quadrats (1.5m long by 0.5m wide) along an "Xm" transect. A baseline is laid across the population to be sampled, either through its center or along one side of it. Transects run perpendicular to the baseline beginning at randomly selected points along the baseline. To place transects, locate a random number between 0 and X (max # of transects -1). For example, if the number is 1, the first transect will be at 1m along the baseline, with subsequent transects beginning at 11m, 21m, etc. For quadrat selection, randomly select a beginning point within the first 5m segment of the transect (choose a number between 0 and 4). The remaining quadrats are then placed at 5m intervals after that. Transects are placed on one side of the line, with the long side following the habitat gradient for most accurate results. The data sheet will include columns for acronyms of plant species, dead and inorganic materials, slope, aspect, quadrat #, stratum, etc.

Survival and Mortality of Planted Vegetation
Assessment of survival and mortality will consist essentially of recording kind and number of plants installed as part of the revegetation project and returning periodically to count how many have survived. The steps that will be taken are as follows:

- A list of target species for survivorship monitoring will be generated within the first season, and permanent monitoring areas will be designated for each of the selected species.
- Individuals of each species will be tagged at outplanting and the number of individuals and percent cover will be recorded at that time.
- Post-project data collection will entail counting planted individuals and recording whether or not they survived and percent cover for surviving individuals.
- Recruitment of additional species will be also recorded, along with identification of other species in the plot, the number of individuals per species and combined percent cover.

Photomonitoring
Photographs will be used to document the following:

- Location of study site. Take photographs at the parking lot and along the trail to the study site. At the monitoring site, photographs taken from a boundary of the population or study site facing both toward and away from the site can help locate the site if other monuments are lost.
- Transects and macroplots. Photographs are taken at each end of a transect or at the four corners of a macroplot. Helps relocate the transect or plot and provide a visual record of general conditions.
- Habitat conditions. Photographs of general habitat can help monitor changes in plant cover, weed invasion and disturbances.
- Population conditions. Plant height, flowering effort, plant size, and levels of herbivory are some of the conditions that can be illustrated.

Timing of Monitoring

Sampling should occur during the season in which plants can most easily be identified and biomass is the greatest, usually in late spring or early summer. Thereafter, remonitoring should occur at the same phenological stage.

- Pre-project cover and species richness data will be collected in March/April and then in August/September of 2001.
- Post-project cover and species richness data will then be collected twice annually in 2002 and 2003 in March/April and in August/September.
- Survivorship monitoring will be conducted annually from May through September, depending on the peak blooming time for the individual species, for a period of at least three years following outplanting.

Intended Data Analysis Approach

Percent cover and species richness will be compiled for native and non-native species at revegetation sites. Changes in percent cover and species richness will be used as indicators for changes in biodiversity. Data on survival and mortality for outplantings will also be compiled and analyzed. Data will be presented in graphical form. Grouping sites based on similarity cluster analysis will be used for community classification.

References

Cox, George. *Laboratory Manual of General Ecology*. Wm. C. Brown Publishers. 1996.
Elzinga, Caryl, Salzer, D., Willoughby, J., *Measuring and Monitoring Plant Populations*. 1999.
Vegetation Management Monitoring Handbook. GGNRA. 1995-96.
Crissy Field Restoration Project Monitoring Plan. GGNRA. 2000.

EPA Region 9 Laboratory - Richmond, CA
Summary of Analytical Results

Site: Sausal Creek
Case No.: R99W03
SDG No.: 99069B
Report Date: 3/11/99

Analyses: Colilert
Matrix: Water

Concentration in: Most Probable Number (MPN) per 100 ml

Station Location	Diamond		Sloan		Hickory	
Sample ID	AH1		AH2		AH3	
Date of Collection	3/10/99		3/10/99		3/10/99	
Analyte	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Total coliforms	2400		34000	d	26000	d
E. coli	160		5100	d	5300	d

Station Location	Hickory		Peroly		Blank	
Sample ID	AH3R (replicate)		AH4			
Date of Collection	3/10/99		3/10/99		3/10/99	
Analyte		**Q**		**Q**		**Q**
Total coliforms	23000	d	46000	d	0	
E. coli	5900	d	18000	d	0	

d - diluted 1:100
Q - Laboratory Data Qualifiers

EPA Region 9 Laboratory - Richmond, CA
Summary of Analytical Results

Site: Sausal Creek
Case No.: R99W03
SDG No.: 99076A
Report Date: 3/18/99

Analyses: Colilert
Matrix: Water

Concentration in: Most Probable Number (MPN) per 100 ml

Station Location	Diamond		Sloan		Hickory	
Sample ID	AH1		AH2		AH3	
Date of Collection	3/10/99		3/10/99		3/10/99	
Analyte	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Total coliforms	3100	d	32000	d	60000	d
E. coli	120		14000	d	15000	d

Station Location	Peroly		Peroly		Blank	
Sample ID	AH4		AH4R			
Date of Collection	3/10/99		3/10/99		3/10/99	
Analyte		**Q**		**Q**		**Q**
Total coliforms	7800	d	10000	d	0	
E. coli	650		690		0	

d - diluted 2:100
Q - Laboratory Data Qualifiers

Day 3

EPA Region 9 Laboratory - Richmond, CA
Summary of Analytical Results

Site: Sausal Creek
Case No.: R99W03
SDG No.: 99083A
Report Date: 3/25/99

Analyses: Colilert
Matrix: Water

Concentration in: Most Probable Number (MPN) per 100 ml

Station Location	Diamond		Sloan		Hickory	
Sample ID	DS1		DS2		DS3	
Date of Collection	3/24/99		3/24/99		3/24/99	
Analyte	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Total coliforms	5250	d	99315	d	70680	d
E. coli	248		32440	d	32440	d

Station Location	Peroly		Blank	
Sample ID	DS4			
Date of Collection	3/24/99		3/24/99	
Analyte		**Q**		**Q**
Total coliforms	7985	d	0	
E. coli	1120		0	

d - diluted 2:100
Q - Laboratory Data Qualifiers

USEPA REGION 9 LABORATORY
REPORT NARRATIVE

Case Number:	**R99W03**
Program:	**Water**
Report Date:	**3/25/99**
Analysis:	**9223 (Colilert)**

SAMPLE NUMBERS:

CLIENT SAMPLE ID	LABORATORY SAMPLE ID
DS1	AB21740
DS2	AB21741
DS3	AB21742
DS3R	N/A
DS4	AB21743
Blank	AB21744

GENERAL COMMENTS

The five water samples listed above were received from Anne Hayes of the Aquatic Outreach Institute on 3/24/99. Sample DS3R, which was a duplicate of DS3, was dropped and broken prior to analysis. (See chain-of-custody)

The requested analyses were total coliforms and *E. coli*. The samples came from Sausal Creek. These are the third of five sets of weekly samples.

SAMPLE RECEIPT AND PRESERVATION

The samples were collected and hand-delivered to the laboratory by Anne Hayes. The samples were adequately chilled. The required holding time to bacterial analysis for surface waters is 8 hours. The samples were collected between 0743 and 0830. Analysis began at 1320 - within the holding time for all samples.

ANALYTICAL COMMENTS

The samples were analyzed using Colilert for total coliforms and *E. coli*. Enumerations were performed using the Quanti-tray 2000 system. The samples were run as both full volume and 2:100 dilutions to ensure countability for results over 2400 per 100 ml.

QA/QC SUMMARY

All method QC criteria were met.

Questions concerning the data can be addressed to Andrew Lincoff at (510) 412-2330.

Day 4

EPA Region 9 Laboratory - Richmond, CA
Summary of Analytical Results

Site: Sausal Creek
Case No.: R99W03
SDG No.: 99092A
Report Date: 4/2/99

Analyses: Colilert

Matrix: Water

Concentration in: Most Probable Number (MPN) per 100 ml

Station Location	Diamond		Sloan		Sloan	
Sample ID	AH1		AH2		AH2R	
Date of Collection	3/31/99		3/31/99		3/31/99	
Analyte	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Total coliforms	12000	d	46000	d	46000	d
E. coli	1200		10000	d	11000	d

Station Location	Hickory		Peroly		Blank	
Sample ID	AH3		AH4			
Date of Collection	3/31/99		3/31/99		3/31/99	
Analyte		**Q**		**Q**		**Q**
Total coliforms	46000	d	22000	d	0	
E. coli	9300	d	1300		0	

d - diluted 1:100
Q - Laboratory Data Qualifiers

Day 5

EPA Region 9 Laboratory - Richmond, CA
Summary of Analytical Results

Site: Sausal Creek
Case No.: R99W03
SDG No.: 99097C
Report Date: 4/8/99

Analyses: Colilert
Matrix: Water

Concentration in: Most Probable Number (MPN) per 100 ml

Station Location	Diamond		Sloan		Hickory	
Sample ID	DS1		DS2		DS3	
Date of Collection	4/7/99		4/7/99		4/7/99	
Analyte	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Total coliforms	10000	d	6700	d	14000	d
E. coli	1700		1300		1200	

Station Location	Hickory		Peroly		Blank	
Sample ID	DS3R		DS4			
Date of Collection	4/7/99		4/7/99		4/7/99	
Analyte		**Q**		**Q**		**Q**
Total coliforms	14000	d	12000	d	0	
E. coli	1300		1600		0	

d - diluted 1:100
Q - Laboratory Data Qualifiers

Geometric Mean

EPA Region 9 Laboratory - Richmond, CA
Summary of Analytical Results

Geometric Mean of Five Weekly Samples

Site: Sausal Creek
Case No.: R99W03
Report Date: 4/8/99

Analyses: Colilert
Matrix: Water

Concentration in: Most Probable Number (MPN) per 100 ml

Station Location	Diamond		Sloan		Hickory	
Sample ID	1		2		3	
Dates of Collection	3/10/99 - 4/7/99		3/10/99 - 4/7/99		3/10/99 - 4/7/99	
Analyte	**Result**	**Q**	**Result**	**Q**	**Result**	**Q**
Total coliforms	5400		32000		37000	
E. coli	400		7900		7800	

Station Location	Peroly					
Sample ID	4					
Dates of Collection	3/10/99 - 4/7/99					
Analyte		**Q**		**Q**		**Q**
Total coliforms	15000					
E. coli	1900					

Q - Laboratory Data Qualifiers

TABLE 3-1 WATER QUALITY OBJECTIVES FOR COLIFORM BACTERIA [a]

BENEFICIAL USE	FECAL COLIFORM (MPN /100ML)	TOTAL COLIFORM (MPN/100ML)
Water Contact Recreation	log mean < 200 90th percentile < 400	median < 240 no sample > 10,000
Shellfish Harvesting[b]	median < 14 90th percentile < 43	median < 70 90th percentile < 230[c]
Non-contact Water Recreation[d]	mean < 2000 90th percentile < 4000	
Municipal Supply:		
- Surface Water[e]	log mean < 20	log mean < 100
- Groundwater		< 1.1[f]

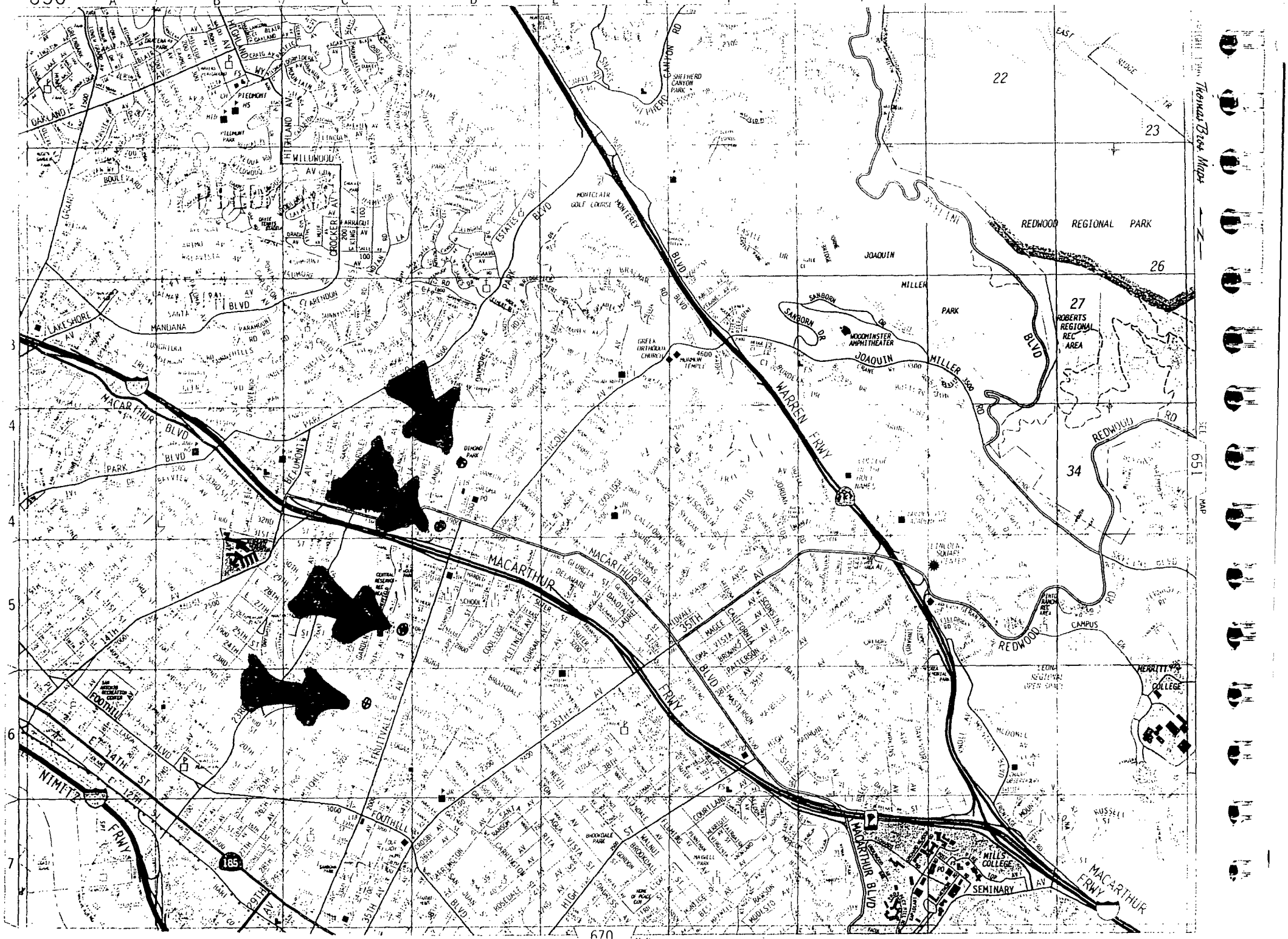
FAX TRANSMITTAL # of pages 1
To Anne Hayes From John Bower
Dept/Agency Aquatic Outreach Tech. Phone # 415/904-5229
Fax # 510/231-5703 Fax #

NOTES:
a. Based on a minimum of five consecutive samples equally spaced over a 30-day period.
b. Source: National Shellfish Sanitation Program.
c. Based on a five-tube decimal dilution test or 300 MPN/100 ml when a three-tube decimal dilution test is used.
d. Source: Report of the Committee on Water Quality Criteria, National Technical Advisory Committee, 1968.
e. Source: DOHS recommendation.
f. Based on multiple tube fermentation technique; equivalent test results based on other analytical techniques, as specified in the National Primary Drinking Water Regulation, 40 CFR, Part 141.21(f), revised June 10, 1992, are acceptable.

TABLE 3-2 U.S. EPA BACTERIOLOGICAL CRITERIA FOR WATER CONTACT RECREATION[1,2] (IN COLONIES PER 100 ML)

	FRESH WATER		SALT WATER
	ENTEROCOCCI	E. COLI	ENTEROCOCCI
Steady State (all areas)	33	126	35
Maximum at:			
- designated beach	61	235	104
- moderately used area	89	298	124
- lightly used area	108	406	276
- infrequently used area	151	576	500

NOTES:
1. The criteria were published in the Federal Register, Vol. 51, No. 45 / Friday, March 7, 1986 / 8012 - 8016. The Criteria are based on:
(a) Cabelli, V.J. 1983. Health Effects Criteria for Marine Recreational Waters. U.S. EPA, EPA 600/1-80-031, Cincinnati, Ohio, and
(b) Dufour, A.P. 1984. Health Effects Criteria for Fresh Recreational Waters. U.S. EPA, EPA 600/1-84-004, Cincinnati, Ohio.
2. The U.S. EPA criteria apply to water contact recreation only. The criteria provide for a level of protection based on the frequency of usage of a given water contact recreation area. The criteria may be employed in special studies within this region to differentiate between pollution sources or to supplement the current coliform objectives for water contact recreation.


650
A
B
C
D
E
F
Thomas Bros Maps
MACARTHUR BLVD
WARREN FRWY
REDWOOD REGIONAL PARK
ROBERTS REGIONAL REC AREA
MILLER PARK
WOODMINSTER AMPHITHEATER
JOAQUIN MILLER RD
REDWOOD RD
MACARTHUR FRWY
NIMITZ FRWY
FOOTHILL BLVD
FRUITVALE AV
MILLS COLLEGE
SEMINARY AV
MONTCLAIR GOLF COURSE
SHEPHERD CANYON PARK
PIEDMONT HS
PIEDMONT PARK
DIMOND PARK
CENTRAL RECREATION CENTER
SAN ANTONIO RECREATION CENTER
LAKESHORE AV
PARK BLVD
HIGHLAND AV
CROCKER AV
ESTATES DR
SANBORN DR
CAMPUS DR
HERRITT COLLEGE
22
23
26
27
34
651
670
MAP