Table 1. Rearing densities of smolt sized steelhead in Santa Cruz County streams (source: Harvey and Stanley Associates, 1984).

Stream	Average Number of Smolt Size Fish per 100 feet
San Vicente	40.9
San Lorenzo River	29.8
Aptos (Nisene Marks, upstream from 2nd Bridge)	24.0
Zayante	22.0
Carmel	21.8
Valencia (downstream of Valencia Road)	17.0
Browns	16.5
Corralitos	16.1
Valencia average	15.0
Baldwin	13.8
Valencia (up flume road 0.75 miles	13.0
Newell	13.0
Shingle Mill Gulch	12.7
Bear	12.0
Fall	12.0
Soquel West Fork	11.3
Aptos (County Park above railroad crossing)	11.0
Boulder	10.5
Mill (San Lorenzo)	10.5
Aptos Average	9.6
Bean	9.5
Majors	9.4
Jamison	8.0
Hester	7.0
Laguna	7.0
Aptos (just above Valencia)	6.0
Aptos (Nisene Marks, upstream from Steel Bridge)	6.0
Bates	6.0
Liddell	6.0
Pescadero	6.0
Ramsey	6.0
Soquel East Fork	6.0
Kings	5.0
Liddell West Fork	5.0
Moore's Gulch	5.0
Gamecock	4.0
Hinkley	3.0
Liddell East Fork	3.0
Lockhart Gulch	3.0
Soquel	3.0
Carbonera	1.7
Aptos (below Valencia)	1.0

Notes: Numbers shown in red are within the Aptos/Valencia Creek watershed

Table 2. Aptos Creek Watershed Pool Characteristics

	Aptos Creek						Bridge	Valencia Creek			Trout
	A-1	A-2	A-3	A-4	A-5	A-6	Creek	V-1	V-2	V-3	Creek
Reach Length (ft)	1,649	7,134	8,340	10,366	9,251	7,952	6,461	5,599	12,581	9,232	7,018
Estimated Flow (cfs)	nm	2.5	nm	2.5	1.3	1.0	1.0	0.5	0.5	0.5	0.1
Mean Width (ft)	28.8	12.6	14.7	12.8	10.5	8.3	7.8	6.8	6.3	6.9	3.6
Average Pool spacing (ft)	na	183	203	247	189	209	294	na	na	3077	7018
Mean Length of Pools (ft)	na	77	124	88	71	37	25	na	na	25	10
Number of Pools	0	39	41	42	49	38	22	0	0	3	1
% pools by length	0%	42%	61%	36%	38%	18%	9%	0%	0%	1%	0
% pools with mean depth >=1.5 ft	*	26%	29%	29%	2%	8%	0%	*	*	0%	+
% pools with mean depth >= 2 ft	*	5%	2%	10%	0%	3%	0%	*	*	0%	+
% pools with maximum depth >= 3ft	*	29%	44%	40%	14%	11%	0%	*	*	0%	+

Notes: ft: feet
cfs: cubic feet per second
nm: not measured
na: not applicable, habitat type did not occur in stream reach
*no pools present
+only single pool identified in Trout Creek

Table 3. Depth Characteristics by Habitat Type and Reach

	Aptos Creek						Bridge Creek	Valencia Creek			Trout Creek	Mangels Creek
	A-1	**A-2**	**A-3**	**A-4**	**A-5**	**A-6**	**B-1**	**V-1**	**V-2**	**V-3**	**T-1**	**M-1**
	Average of Mean Depth											
Flatwater	0.25	0.55	0.58	0.60	0.43	0.46	0.36	0.15	0.24	0.23	0.06	n.a.
Pool	n.a.	1.34	1.28	1.37	0.99	1.02	0.81	n.a.	n.a.	0.60	1.30*	n.a.
Riffle	0.30	0.35	0.30	0.28	0.33	0.25	0.20	0.15	0.25	0.26	0.06	n.a.
	Average of Maximum Depth											
Flatwater	1.10	1.11	1.05	1.05	0.86	1.26	0.93	0.30	0.70	0.53	0.26	n.a.
Pool	n.a.	2.92	3.04	2.81	2.27	2.13	1.80	n.a.	n.a.	1.30	2.30*	n.a.
Riffle	0.60	0.55	0.64	0.68	0.85	1.05	1.75	0.33	0.68	0.50	0.20	n.a.

Notes: * single pool measured in Trout Creek
n.a. habitat type did not occur in stream reach

Table 4. Pool Primary Formation Factors by Reach

Habitat Unit Type	Number of Pools					
	Aptos Creek A-2	Aptos Creek A-3	Aptos Creek A-4	Aptos Creek A-5	Aptos Creek A-6	Bridge Creek B-1
Backwater Pool-Log Formed		1				
Dammed Pool		2				
Lateral Scour Bedrock Formed	14	23	30	27	15	7
Lateral Scour Boulder Formed				4	6	2
Lateral Scour Log-enhanced	6	6	4	8	5	4
Lateral Scour Pool	1		1			
Lateral Scour Root-wad enhanced	8	5	2	1	3	
Mid-Channel Pool	5	2	2	6	3	1
Plunge Pool					5	7
Secondary Channel Pool				1		
Step Pool		1			1	1
Grand Total	34	40	39	47	38	22
% pools formed by woody debris	41%	30%	15%	19%	21%	18%
mean length woody debris pools (feet)	72	63	76	48	49	
mean length bedrock pools (feet)	89	160	97	88	35	
woody debris pools, % by length	34%	18%	12%	11%	27%	23%
bedrock pools, % by length	41%	73%	79%	69%	38%	38%

Table 5. Habitat Type Summary by Reach

	Aptos Creek						Bridge Creek	Valencia Creek			Trout Creek	Mangels Creek
	A-1	**A-2**	**A-3**	**A-4**	**A-5**	**A-6**	**B-1**	**V-1**	**V-2**	**V-3**	**T-1**	**M-1**
	Number of Habitat Units											
Culvert								3			1	1
Flatwater	2	38	22	47	38	46	36	13	36	60	19	
Pool		39	41	42	49	38	22			3	1	
Riffle	1	27	31	28	28	50	45	12	31	54	15	2
LDA					1	14	6	0	13	3	5	3
Lagoon	1											
Dry											2	7
Other								1				1
	Percentage by Length											
Culvert	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%	2%	2%
Flatwater	51%	44%	21%	52%	45%	48%	45%	62%	73%	67%	68%	0%
Pool	0%	42%	61%	36%	38%	18%	9%	0%	0%	1%	0%	0%
Riffle	2%	14%	19%	13%	17%	27%	37%	26%	23%	29%	8%	2%
LDA	0%	0%	0%	0%	0.2%	7%	10%	0%	3%	3%	1%	8%
Lagoon	47%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Dry	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	21%	83%
Other	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	6%

Notes: cfs – cubic feet per second
ND – not determined
LDA – large debris accumulation

Table 6. Shelter Characteristics by Reach.

	Aptos Creek						Bridge Creek	Valencia Creek			Trout Creek
	A-1	A-2	A-3	A-4	A-5	A-6	B-1	V-1	V-2	V-3	T-1
Number of units surveyed	4	25	21	21	24	41	21	6	12	16	11
Number of pools surveyed	0	12	12	9	13	17	10	0	0	3	1
Number of units with "high" shelter complexity	0	4	2	0	4	7	2	0	1	0	0
Number of units with "medium" shelter complexity	1	10	12	17	17	28	13	0	4	12	1
Number of units with "low" shelter complexity	3	11	7	4	3	6	6	6	7	4	10
% of all units with "low" shelter complexity	75%	44%	33%	19%	13%	15%	29%	100%	58%	25%	91%
% of pools with "low" shelter complexity		25%	33%	33%	15%	12%	20%	na	na	33%	0%
% pools with 20% or lower shelter coverage		33%	50%	78%	46%	18%	40%	na	na	100%	0%
% pools with large woody debris as cover component		25%	58%	33%	31%	35%	60%	na	na	33%	100%
Average of % Unit with Shelter											
All Habitat Types	19%	29%	30%	23%	30%	32%	25%	6%	16%	21%	4%
Pools	0%	37%	25%	22%	29%	33%	30%	n.a.	n.a.	20%	35%*
Flatwater	5%	24%	32%	22%	35%	34%	22%	5%	16%	17%	2%

Notes: * single pool measured in Trout Creek
n.a. habitat type did not occur in stream reach

Table 7. Aptos Creek Watershed Shelter Components.

	Aptos Creek						Bridge Creek	Valencia Creek			Trout Creek
	A-1	A-2	A-3	A-4	A-5	A-6	B-1	V-1	V-2	V-3	T-1
Frequency of Occurrence	Number of Habitat Units										
Undercut bank	1	11	5	7	2	8	4	4	3	4	2
Small woody debris	2	20	16	10	9	22	10	5	11	12	3
Large woody debris	0	3	10	5	6	13	8	1	5	5	3
Root mass	0	2	2	1	0	3	0	2	0	0	0
Terrestrial vegetation	3	19	7	5	8	9	4	4	7	7	0
Rooted aquatic vegetation	1	2	1	0	0	0	0	2	0	1	0
Floating aquatic vegetation	0	0	0	0	0	0	2	0	0	0	0
Surface turbulence	2	9	8	13	14	22	7	0	4	8	0
Substrate (diameter>5")	2	19	18	21	23	35	17	0	5	10	0
Bedrock ledge	0	6	5	4	11	8	4	1	2	1	1
Other	0	0	0	0	0	0	0	0	0	0	0
Total Surveyed Units	4	25	21	21	24	41	21	6	12	16	11
Areal Extent	Percent of Total Cover Area										
Undercut bank	0%	20%	9%	11%	1%	6%	12%	17%	9%	11%	4%
Small woody debris	7%	18%	13%	5%	9%	9%	8%	44%	36%	18%	26%
Large woody debris	0%	7%	21%	8%	8%	12%	15%	3%	20%	10%	64%
Root mass	0%	3%	4%	2%	0%	2%	0%	4%	0%	0%	0%
Terrestrial vegetation	86%	23%	3%	5%	5%	2%	4%	26%	16%	7%	0%
Rooted aquatic vegetation	5%	1%	0%	0%	0%	0%	0%	4%	0%	1%	0%
Floating aquatic vegetation	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Surface turbulence	1%	2%	7%	14%	9%	10%	4%	0%	2%	12%	0%
Substrate (diameter>5")	1%	16%	21%	45%	49%	54%	47%	0%	16%	36%	0%
Bedrock ledge	0%	10%	22%	10%	18%	5%	9%	2%	1%	5%	6%
Other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 8. Substrate Characteristics by Reach.

	Aptos Creek						Bridge Creek	Valencia Creek			Trout Creek
	Aptos Creek A-1	**Aptos Creek A-2**	**Aptos Creek A-3**	**Aptos Creek A-4**	**Aptos Creek A-5**	**Aptos Creek A-6**	**Bridge Creek B-1**	**Valencia Creek V-1**	**Valencia Creek V-2**	**Valencia Creek V-3**	**Trout Creek T-1**
Areas with Spawning Gravel Surveyed	0	13	9	21	16	13	2	0	4	2	0
Spawning Gravel Area (square feet)	0	260	252	455	213	138	23	0	14	7	0
Spawning Area (square feet) per 100 feet	0.0	3.6	3.0	4.4	2.3	1.7	0.4	0	0.1	0.1	0
Average spawning site size (square feet)	0	20	28	22	13	11	12	0	3.5	3.5	0
Pool Tail Embeddedness (%)	**Number of Habitat Units**										
0-15%	n.a.	8%	0%	14%	28%	41%	10%	n.a.	n.a.		n.a.
16-30%	n.a.	41%	46%	30%	36%	27%	30%	n.a.	n.a.	100%	n.a.
31-50%	n.a.	30%	49%	47%	32%	19%	40%	n.a.	n.a.		n.a.
>50%	n.a.	22%	5%	9%	4%	14%	20%	n.a.	n.a.		n.a.
Number of Pools Surveyed	0	37	39	43	47	37	20	0	0	3	0
Spawning gravel embeddedness (%)	**Number of Habitat Units**										
0-15%	n.a.	23%	11%	33%	75%	31%	100%	n.a.	75%	50%	n.a.
16-30%	n.a.	69%	89%	52%	25%	46%	0%	n.a.	25%	50%	n.a.
31-50%	n.a.	8%	0%	14%	0%	15%	0%	n.a.	0%	0%	n.a.
>50%	n.a.	0%	0%	0%	0%	8%	0%	n.a.	0%	0%	n.a.

Notes: n.a.: no pools or no spawning areas occurring in stream reach

Table 9. Canopy Characteristics by Reach

	Aptos Creek						Bridge Creek	Valencia Creek			Trout Creek
	A-1	**A-2**	**A-3**	**A-4**	**A-5**	**A-6**	**B-1**	**V-1**	**V-2**	**V-3**	**T-1**
Average canopy (percent)	68%	60%	61%	67%	56%	64%	48%	70%	70%	72%	66%
Maximum canopy (percent)	90%	95%	95%	95%	95%	95%	98%	85%	95%	95%	95%
Minimum canopy (percent)	50%	5%	0%	10%	10%	5%	5%	45%	25%	10%	0%
% of units with 55-85% canopy	50%	40%	41%	42%	47%	46%	36%	82%	64%	48%	47%
Dominant Canopy Species	**Number of Habitat Units**										
Alder	3	33	20	29	17	30	2	8	9	19	3
Blackberry	0	0	0	0	0	0	0	0	0	0	1
Box elder	0	0	0	0	0	0	0	2	1	0	0
Dogwood	0	1	0	0	0	0	0	0	0	0	0
Large woody debris	0	1	2	0	3	8	2	0	2	1	0
Maple	0	3	5	6	8	17	3	0	8	6	4
Oak	0	0	0	0	0	0	0	0	0	0	2
Redwood	0	2	4	5	12	9	38	0	7	10	7
Sycamore	0	1	0	0	0	0	0	0	0	0	0
Tan oak	0	1	8	8	11	4	3	1	6	9	1
Willow	1	6	1	0	0	4	1	0	1	1	0
Witch hazel	0	0	0	0	0	0	1	0	0	0	0
Total Surveyed Units	4	48	40	48	51	72	50	11	34	46	18

Table 10. Potential Migration Barriers

Stream Reach	Location	Survey Date	Habitat Unit Number	Survey Distance (feet)	Photo #	Type	Barrier Degree Adult	Degree Upstream Juvenile
A-1	N 36° 58.414" W 121° 54.226'	28-Aug-01	2	1012	7	Weir	Low Flow	Most Flows
A-3	N 36° 59.378" W 121° 54.462'	27-Aug-01	107	9420	18	LDA	Low Flow	Most Flows
A-5	N 37° 01.908' W 121° 53.453'	30-Aug-01	396	34324	24,1	LDA	Low Flow	No Obstruction
A-5	N 37° 01.876' W 121° 53.315'	30-Aug-01	410	35486	2	LDA	Most Flows	Near Complete
A-6		30-Aug-01	414	35699		LDA	Low Flow	Low Flow
A-6	N 37° 01.848' W 121° 53.175'	30-Aug-01	426	36260	3	LDA	Undetermined	Undetermined
A-6	N 37° 01.851' W 121° 53.000'	30-Aug-01	438	37235	4	LDA	Low Flow	No Obstruction
A-6	N 37° 01.841' W 121° 53.023'	3-Oct-01	439	37257		LDA	No Obstruction	No Obstruction
A-6		3-Oct-01	470	39350	21	LDA	Low Flow	No Obstruction
A-6	N 37° 02.070' W 121° 52.691'	3-Oct-01	478	39724	23,24	LDA	Near Complete	Near Complete
A-6		7-Oct-01	484	40220		LDA	Low Flow	Low Flow
A-6		7-Oct-01	518	41699	3	LDA	Low Flow	Low Flow
A-6	N 37° 02.411' W 121° 52.291'	7-Oct-01	520	41767	4	LDA	Low Flow	Low Flow
A-6		7-Oct-01	522	41891	5	LDA	Low Flow	Most Flows
A-6		7-Oct-01	544	42936	6	Cascade	Most Flows	Most Flows
A-6	N 37° 02.622' W 121° 52.156'	7-Oct-01	554	43356		LDA	Most Flows	Near Complete

Table 10. Potential Migration Barriers (continued)

Stream Reach	Location	Survey Date	Habitat Unit Number	Survey Distance (feet)	Photo #	Type	Barrier Degree Adult	Degree Upstream Juvenile
B-1	N 37° 01.860' W 121° 54.095'	5-Oct-01	11	711	12,13	LDA	Low Flow	Most Flows
B-1		5-Oct-01	24	1,544	15,16	LDA	Most Flows	Most Flows
B-1		5-Oct-01	33	1,895	17	Cascade	Low Flow	Most Flows
B-1		5-Oct-01	40	2,203	18	Cascade	Low Flow	Most Flows
B-1		5-Oct-01	74	3,778	22	LDA	Complete	Complete
V-1		1-Oct-01	2	70	3,4,5	Culvert	Low Flow	Low Flow
V-1		1-Oct-01	6	1108	7,8	Culvert	Low Flow	Low Flow
V-1		1-Oct-01	8	1512	9,10,11	Culvert	Most Flows	Most Flows
V-2		1-Oct-01	2	5724	18	Cascade	Low Flow	Most Flows
V-2	N 36° 58.733' W 122° 53.116'	1-Oct-01	7	6818	21	LDA	Low Flow	Most Flows
V-2	N 36° 58.900' W 121° 52.693'	1-Oct-01	28	10405	3	LDA	Low Flow	Most Flows
V-3	N 36° 59.881' W 121° 52.142'	2-Oct-01	1	20577	8,9	Culvert	Low Flow	Low Flow
V-3	N 37° 00.739' W 121° 52.457'	2-Oct-01	84	26883	14	LDA	most Flows/complete	Most Flows/complete
M-1		4-Oct-01	4/5	679	6		Complete	Complete
M-1	N 36° 58.971' W 121° 54.093'	4-Oct-01	11	1190	9		Complete	Complete

Table 11. Limiting Factors

Stream Reach	Primary Limiting Factor	Secondary Limiting Factors
A-1	Sediment	Rearing cover
A-2	Sediment	Rearing cover
A-3	Sediment	Rearing cover
A-4	Sediment	Rearing cover
A-5	Sediment	Rearing cover
A-6	Adult migration access	Sediment
B-1	Sediment	Adult migration access
V-1	Sediment	Adult migration access
V-2	Adult migration access	Sediment
V-3	Adult migration access	Sediment, low stream flow
Mangels Creek	Lack of summer flow	
Trout Creek	Sediment	Adult migration access, low stream flow

Table 12. Trout Observed during Habitat Inventory by Reach

	Aptos Creek						Bridge Creek	Valencia Creek			Trout Creek	Mangels Creek
	A-1	**A-2**	**A-3**	**A-4**	**A-5**	**A-6**	**B-1**	**V-1**	**V-2**	**V-3**	**T-1**	**M-1**
Trout 4 in. or less (TL in.)	0	31	58	609	1143	146	59	0	79	34	0	0
Trout over 4 in. (TL in.)	0	16	22	27	20	21	10	0	13	10	0	0
Sum of Habitat Length (feet)	1649	7134	8340	10366	9251	7952	6461	5599	12581	9232	7018	1452
Y-O-Y/100 feet (<4 in.)	0.00	0.43	0.70	5.87	12.36	1.84	0.91	0.00	0.63	0.37	0.00	0.00
Older trout/100 feet (>4 in.)	0.00	0.22	0.26	0.26	0.22	0.26	0.15	0.00	0.10	0.11	0.00	0.00

Notes: in.: inches
TL: total length
Y-O-Y: young-of-year

	Aptos Creek						Bridge Creek	Valencia Creek			Trout Creek
	A-1	**A-2**	**A-3**	**A-4**	**A-5**	**A-6**	**B-1**	**V-1**	**V-2**	**V-3**	**T-1**
Y-O-Y/100 feet (<4 in.)	0.00	0.43	0.70	5.87	12.36	1.84	0.91	0.00	0.63	0.37	0.00
Spawning Area (square feet) per 100 feet	0.0	3.6	3.0	4.4	2.3	1.7	0.4	0	0.1	0.1	0
% units with pool tail embeddedness <=15%	n.a.	8%	0%	14%	28%	41%	10%	n.a.	n.a.		n.a.
% spawning areas with embeddedness <=15%	n.a.	23%	11%	33%	75%	31%	100%	n.a.	75%	50%	n.a.

Notes: in.: inches
TL: total length
Y-O-Y: young-of-year