

SECTION F

SALMONID HABITAT CONDITION

INTRODUCTION

The Rockport Coastal Streams WAU includes the following planning watersheds: Hardy Creek Planning Watershed, Juan Creek Planning Watershed, and Howard Creek Planning Watershed. The anadromous fish species inhabiting the Rockport Coastal Stream WAU are steelhead trout (*Oncorhynchus mykiss*) and coho salmon (*O. kisutch*). Steelhead trout are present in all three planning watersheds while coho salmon have only been observed in the Hardy Creek and Howard Creek planning watersheds. Other fish and amphibian species include prickly sculpin (*Cottus asper*), coastrange sculpin (*C. aleuticus*), Coastal giant salamander (*Dicamptodon tenebrosus*), tailed frog (*Ascaphus truei*), red-legged frogs (*Rana aurora*), southern torrent salamander (*Rhyacotriton variegatus*), and Pacific newts (*Taricha spp*). A fish habitat assessment was conducted in the Rockport Coastal Streams WAU to identify the current habitat conditions and areas of special concern regarding spawning, summer rearing, and over-wintering habitat.

Field surveys conducted to evaluate the quality and quantity of fish habitat in the Rockport Coastal Streams WAU included fish habitat typing and assessment, aquatic species distribution surveys, stream gravel permeability measurements. The fish habitat assessment evaluated spawning, summer rearing, and over-wintering habitats based on targets derived from scientific literature (Bilby and Ward, 1989; Bisson et al., 1987; Bjornn and Reiser, 1991; CDFG, 2002; Montgomery et al., 1995; Swales et al., 1988; Washington Forest Practices Board, 1997) and professional judgment. The habitat data are used to rate the quality of the habitat for the life history stages discussed above.

Aquatic species distribution surveys were conducted by the previous landowners (Louisiana-Pacific Corp.) from 1994-1996, and were repeated by MRC from 2000-2002 (MRC 2002). The study consisted of single pass electrofishing or snorkeling surveys in the summer months to assess aquatic species distribution and composition in the Rockport Coastal Streams WAU. All organisms observed were identified to the lowest possible taxonomic level.

Permeability samples were taken in one long term channel monitoring segment located in the Juan Creek Planning Watershed to determine an index of spawning gravel quality. Permeability and pool volume filled with fine sediment are stream substrate parameters which affect survival of incubating salmonid embryos. Salmonid eggs buried under as much as a foot of gravel depend on sufficient intragravel water flow for their survival and development. Fine sediment within spawning gravel can impede intragravel water flow, reducing the delivery of dissolved oxygen to eggs, which can increase mortality in the egg to emergence stage. Forest management practices may increase the delivery of fine sediment to the stream channel potentially impacting spawning gravel. The assessment of substrate permeability and composition are useful in monitoring the effects of increased sediment delivery on salmonid spawning and incubation conditions.

METHODS

Salmonid Habitat Assessment

The methods used to evaluate the habitat condition of the Rockport Coastal Streams WAU were modified from the California Salmonid Stream Habitat Restoration Manual (CDFG, 2002). Surveys were conducted during low flow conditions and described 100% of the stream channel's wetted width, including side channel habitats. Stream segments were created based on stream gradient and channel confinement (see section E "Stream Channel Condition"). Each of the selected stream segments within the planning watershed were surveyed for a minimum of 20-30 bankfull widths or until a barrier to adult migration was encountered. Fish habitat conditions were evaluated by habitat typing the majority of the fish bearing stream segments throughout the watershed. Survey efforts were focused on low gradient reaches of the stream network, as higher gradient reaches likely do not contain fish habitat.

Data collected during the fish habitat and stream channel surveys provided information on habitat type occurrence (Table F-2); pool, riffle, and flatwater frequency; pool spacing; spawning gravel quantity and quality; shelter complexity and availability (shelter rating); residual pool depths; substrate embeddedness; substrate composition; frequency of key and functional large woody debris pieces (see section D "Riparian Function" for definition of 'Key LWD' and 'Functional LWD'); overwintering substrate; side channel frequency (Table F-5) and dominant cover type (Table F-3).

Evaluations on the quality of habitat available for spawning, summer rearing, and over-wintering life stages were made based upon scientific literature and professional judgment. The criteria used to determine whether a specific variable was 'good', 'fair', or 'poor' are defined within Table F-1. Spawning habitat conditions are evaluated within tail-outs of pools, which is where salmon prefer to spawn. Spawning habitat evaluations were made based on the availability of gravel and the quality of the gravels present (gravel size and embeddedness). Summer rearing habitat conditions are evaluated on the size, depth, and availability of pools; and the complexity and quantity of cover (particularly large woody debris). Over-wintering habitat is evaluated on the size, depth and availability of pools, the proportion of habitat units with cobble or boulder-dominated substrate (over-wintering substrate), side channel frequency, and the quantity of cover (particularly large woody debris). The over-wintering scores reflect parameters measured during summer flows and may not be an accurate representation of actual over-wintering habitat conditions.

The habitat data are combined into indices of habitat quality for the different salmonid life stages. Measured fish habitat parameters were weighted and given a numeric scale to develop a quality rating for individual life history stages. Parameters were divided into subsets that correspond with individual life history stages (spawning, summer rearing, and over-wintering habitat). Parameters were scored as follows: 1 (poor), 2 (fair), and 3 (good). Parameter weights were applied to the total score calculated as shown below. The parameter codes (see Table F-1) are in bold and the weights in parentheses.

Spawning Habitat

$$\mathbf{E} (0.31) + \mathbf{F} (0.33) + \mathbf{G} (0.36)$$

Summer Rearing Habitat

$$\mathbf{A} (0.20) + \mathbf{B} (0.15) + \mathbf{C} (0.20) + \mathbf{D} (0.15) + \mathbf{F} (0.10) + \mathbf{H} (0.20)$$

Over-wintering Habitat

$$\mathbf{A} (0.20) + \mathbf{B} (0.15) + \mathbf{C} (0.15) + \mathbf{D} (0.10) + \mathbf{H} (0.20) + \mathbf{I} (0.15) + \mathbf{J} (0.05)$$

The overall score is rated as follows:

1.00 - 1.66 = Poor

1.67 - 2.33 = Fair

2.34 - 3.00 = Good

Table F-1. Fish Habitat Quality Criteria for Measured Parameters.

Fish Habitat Parameter	Feature	Fish Habitat Quality		
		Poor	Fair	Good
Percent Riffle (By length) (A)	Anadromous Salmonid Streams	>50%	25-50%	<25%
Pool Spacing (Reach length/Bankfull/#pools) (B)	Anadromous Salmonid Streams	≥6.0	3.0 - 5.9	≤2.9
Shelter Rating (Shelter value x % of habitat covered) (C)	Pools	<60	60-120	>120
% Of Pools that are ≥3 ft. residual depth (D)	Pools	<25%	25-50%	>50%
Spawning Gravel Quantity (% of Surface area) (E)	Pool Tail-outs	<25%	25-50%	>50%
Percent Embeddedness (F)	Pool Tail-outs	>50%	25-50%	<25%
Gravel Quality Rating (Substrate composition) (G)	Pool Tail-outs	Silt/Clay Sand Boulder Bedrock	Small Gravel Large Cobble	Large Gravel Small Cobble
Key LWD +root wads / 328 ft of stream. (H)	Streams < 40 ft. BFW Streams ≥ 40 ft. BFW	<4.0 <3.0	4.0-6.5 3.0-3.8	>6.5 >3.8
Substrate for Over-wintering (I)	All Habitat Types	<20% of Units Cobble or Boulder Dominated	20-40% of Units Cobble or Boulder Dominated	>40% of Units Cobble or Boulder Dominated
Percent Side Channel (By length) (J)	Anadromous Salmonid Streams	<3%	3-5%	>5%

Table F-2. Habitat types as described in the California Salmonid Stream Habitat Restoration Manual (CDFG, 2002).

HABITAT TYPES	CODES	DESCRIPTIONS
Riffle		
Low Gradient Riffle	LGR	Shallow reach with swift flowing, turbulent water; partially exposed substrate; and <4% gradient.
High Gradient Riffle	HGR	Steep reach with swift flowing, very turbulent water; high exposed substrate; and >4% gradient.
Cascade		
Cascade	CAS	Steepest riffle habitat; consisting of alternating small waterfalls and shallow pools.
Bedrock Sheet	BRS	Thin sheet of water flowing over a smooth bedrock surface.
Flatwater		
Pocket Water	POW	Swift flowing stream around boulders and obstructions creating eddies or scour holes (pockets).
Glide	GLD	Wide uniform channel bottom; low to moderate flow.
Run	RUN	Swift flowing reaches with little surface agitation and no major flow obstructions; flooded riffle.
Step Run	SRN	Sequence of runs separated by short riffle steps.
Edgewater	EDW	Quiet, shallow area along stream margins, typically associated with riffles; low water velocities
Main Channel Pool		
Trench Pool	TRP	U-shaped cross section typically flanked by bedrock walls; water velocities are swift.
Mid-Channel Pool	MCP	Large pools formed by mid-channel scours; water velocities are slow.
Channel Confluence Pool	CCP	Large pools formed at the confluence of two or more channels; higher water velocities and turbulence.
Step Pool	STP	Series of pools separated by short riffles or cascades; generally high gradient, confined streams.
Scour Pool		
Corner Pool	CRP	Lateral scour pools formed at a bend in the channel.
Lateral Scour Pool - Log Formed	LSL	Formed by flow impinging against partial channel obstruction consisting of large woody debris.
Lateral Scour Pool - Rootwad Formed	LSR	Formed by flow impinging against partial channel obstruction consisting of a rootwad.
Lateral Scour Pool - Bedrock Formed	LSBk	Formed by flow impinging against a bedrock stream bank.
Lateral Scour Pool - Boulder Formed	LSBo	Formed by flow impinging against a partial channel obstruction consisting of a boulder.
Plunge Pool	PLP	Stream passes over channel obstruction and drops steeply into stream bed below; scouring depression.
Backwater Pools		
Secondary Channel Pool	SCP	Formed outside the average wetted channel width; mainly associated with gravel bars.
Backwater Pool - Boulder Formed	BPB	Shallow pool found along channel margins; caused by eddies around a boulder obstruction.
Backwater Pool - Rootwad Formed	BPR	Shallow pool found along channel margins; caused by eddies around a rootwad obstruction.
Backwater Pool - Log Formed	BPL	Shallow pool found along channel margins; caused by eddies around a woody debris obstruction.
Dammed Pool	DPL	Water impounded from complete or nearly complete channel blockage (debris jams & rockslides).
Additional Unit Designations		
Dry	DRY	Dry stream beds.
Culvert	CUL	Culvert.
Not Surveyed	NS	Not surveyed.
Not Surveyed due to marsh	MAR	Not surveyed due to marsh.

Aquatic Species Distribution

A hierarchical framework was used to select the initial locations of survey sites in each stream. Major streams were broken into lower, middle and upper reaches. Smaller streams were divided into lower and upper reaches. One site is surveyed in each reach, resulting in 3 sites in larger streams, and 2 sites in smaller streams. Additional sites are added directly downstream and upstream of potential migration barriers to determine which salmonid species these barriers are impacting.

A survey site contains a minimum of two consecutive habitat sequences (pool-riffle sequences) and has a minimum length of ninety feet. The survey method used to determine the aquatic species present is single pass electrofishing or snorkeling. The effort put forth at each survey site is not sufficient to delineate the absence of a species. If future fishery research develops reasonable methods to determine the probability that a species is absent, these methods will be incorporated into future distribution surveys.

Prior to initiating surveys water quality is measured using a Horiba™ U-10 Water Quality Checker. Measurements taken are water temperature (°C), conductivity (microS/cc), dissolved oxygen (mg/L), and pH. Air temperature is measured with a pocket thermometer and water visibility is estimated. Stream discharge is estimated or measured with a Swoffer™ Model 2100 flow meter. The actual physical parameters measured at each site vary depending on equipment availability. Horiba™ U-10 Water Quality Checkers were not used prior to the surveys in 2000.

Diving (snorkeling) is used to assess species presence when stream conditions are considered adequate or when elevated stream temperatures have the potential to adversely impact the health of the animals being electrofished. The basic survey unit for diving consists of a minimum of two pools, however if riffles are deep enough to allow underwater observation these units are sampled.

Permeability Samples

Stream gravel permeability samples were collected on one stream monitoring segment in the Rockport Coastal Streams WAU. The stream gravel permeability was measured using a 1-inch diameter standpipe similar to the standpipe discussed in Terhune (1958) and Barnard and McBain (1994) with the exception that our standpipe is smaller in diameter. We used the smaller diameter standpipe because we hypothesize that it creates fewer disturbances to the stream gravel when inserted.

An electric pump was used to create the water suction in the standpipe for the permeability measurements. The permeability measurements were taken at a depth of 25 centimeters, near the maximum depth of coho and steelhead spawning. The permeability measurements were taken in 15 pool tail-out sections along the monitoring segment. At each pool tail-out sampled permeability measurements were taken at 2 randomly selected sites within the tailout using a 4x4 grid overlay (16 total potential locations with number one being on the upstream right bank and number 16 being on the downstream left bank). This gave a total of 30 permeability sites along each monitoring segment in 2006.

The median permeability measurement for each permeability site in the monitoring segment was used as representative of the site. To characterize the entire monitoring segment the natural log of the mean of the median permeability measurements was determined. The natural log of the permeability is used because of a relationship developed from data from Tagart (1976) and McCuddin (1977) (Stillwater Sciences, 2000) to estimate survival to emergence from permeability data. This relationship equates the natural log of permeability to fry survival ($r^2 =$

0.85, $p < 10^{-7}$). This index needs further improvements, but is currently all we have for interpreting permeability information and biological implications. This relationship is:

$$\text{Survival} = -0.82530 + 0.14882 * \ln \text{ permeability}$$

It is important to understand that the use of this survival relationship is only an index of spawning gravel quality in the segment. The permeability measurements were taken in randomly selected pool tail-outs and are not indicative of where a salmon may select to spawn. Furthermore, spawning salmon have been shown to improve permeability in gravel where a redd was developed (MRC, 2000). Therefore the survival percentage developed is only indicative of the quality of potential spawning habitat and not as an absolute number.

RESULTS AND DISCUSSION

Salmonid Habitat Condition

The Rockport Coastal Streams WAU is comprised of three planning watersheds of which all were surveyed for fish habitat and aquatic species distribution. The results are discussed by segment. Tables F-3 through F-5 summarize the 2006 fish habitat assessment data. A total of 33 segments were evaluated. The habitat parameters used to evaluate individual stream segments can be found in Table F-5 and a summary of the habitat ratings corresponding to each life history stage can be found in Table F-4. Table F-3 summarizes the percent of dominant cover types found in pool, riffle, and flatwater habitats.

Map F-1 was generated using data collected during the aquatic species distribution surveys. If no barrier to adult migration was found, then the upper extent of salmonid (steelhead and coho) distribution is mapped as far upstream as juveniles have been found. In most circumstances this is close to the actual extent of salmonid distribution. However, in some streams salmonid distribution may extend further upstream.

There is a taxonomic uncertainty that is important to note. Juvenile steelhead and resident rainbow trout cannot be distinguished between in the field. For the purpose of this report, *Oncorhynchus mykiss* juveniles are referred to as “steelhead” if there is not a known migration barrier downstream. If there is a migration barrier downstream the juveniles are referred to as “rainbow trout”. Some streams lack aquatic species distribution information. Data from six years of aquatic species distribution surveys (MRC 2002) are located in Appendix F. The Site ID’s presented in Appendix F are also depicted on Map F-1.

Table F-3. Percent of dominant cover types found in pool, riffle, and flatwater habitats of the Rockport Coastal Streams WAU, 2006.

Segment	Pool		Riffle		Flatwater	
	Dom. Cover	Percent	Dom. Cover	Percent	Dom. Cover	Percent
RH01	LWD	50	Bubble Curtain	38	LWD	67
RH03	LWD	82	LWD	41	-	0
RH05	LWD	73	SWD	55	SWD	100
RH09	LWD	91	Boulder	38	Bedrock Ledge	100
RH10	LWD	75	LWD	73	-	0
RH11	LWD	54	LWD	64	-	0
RH22	LWD	70	Boulder	30	-	0
RH23	LWD	100	LWD	88	-	0
RJ01	LWD	33	LWD	29	LWD	50
RJ02	SWD	33	Rootwad	24	Boulder	50
RJ03	LWD	45	SWD	45	Rootwad	50
RJ06	LWD	45	Bubble Curtain	78	Rootwad	100
RJ07	LWD	33	Bubble Curtain	55	Rootwad	100
RJ08	Bedrock Ledges	50	Boulder	67	Aquatic Vegetation	100
RJ10	SWD	67	Boulder	60	Boulder	75
RJ11	Boulder	50	Boulder	89	-	0
RJ12	Boulder	64	Boulder	80	LWD	100
RJ14	Boulder	55	Boulder	80	-	0
RJ15	LWD	78	Boulder	63	-	0
RJ16	LWD	50	LWD	50	-	0
RJ19	Boulder	50	Boulder	67	-	0
RJ22	LWD	50	SWD	64	SWD	50
RJ23	LWD	71	LWD	53	LWD	100
RJ26	LWD	73	LWD	33	SWD	100
RJ27	LWD	100	Boulder	38	Boulder	100
RJ28	SWD	40	SWD	50	-	0
RW01	LWD	71	Terrestrial Vegetation	25	Rootwad	50
RW03	LWD	80	Boulder	30	Boulder	50
RW05	LWD	67	Boulder	50	-	0
RW07	Boulder	57	Boulder	50	-	0
RW10	LWD	74	Boulder	41	Boulder	50
RW11	LWD	44	Boulder	56	LWD	100
RW14	LWD	50	Boulder	38	LWD	50

Table F-4. Summary of Fish Habitat Ratings for Three Life History Stages of the Rockport Coastal Streams WAU, 2006.

Segment	Spawning Habitat Score	Spawning Habitat Rating	Summer Rearing Habitat Score	Summer Rearing Habitat Rating	Over-wintering Habitat Score	Over-wintering Habitat Rating
RH01	2.67	Good	2.00	Fair	1.80	Fair
RH03	1.67	Fair	1.70	Fair	1.60	Poor
RH05	1.67	Fair	1.55	Poor	1.45	Poor
RH09	2.67	Good	1.60	Poor	1.50	Poor
RH10	2.34	Good	1.55	Poor	1.45	Poor
RH11	2.34	Good	1.55	Poor	1.45	Poor
RH22	1.67	Fair	1.55	Poor	1.45	Poor
RH23	1.67	Fair	1.55	Poor	1.45	Poor
RJ01	1.67	Fair	1.90	Fair	1.80	Fair
RJ02	1.67	Fair	1.35	Poor	1.40	Poor
RJ03	1.67	Fair	1.55	Poor	1.55	Poor
RJ06	2.67	Good	1.65	Poor	1.45	Poor
RJ07	2.67	Good	2.00	Fair	1.80	Fair
RJ08	2.31	Fair	1.65	Poor	1.45	Poor
RJ10	2.03	Fair	1.55	Poor	1.75	Fair
RJ11	2.03	Fair	1.55	Poor	1.70	Fair
RJ12	1.67	Fair	1.35	Poor	1.60	Poor
RJ14	2.36	Good	1.65	Poor	1.75	Fair
RJ15	2.00	Fair	1.65	Poor	1.60	Poor
RJ16	2.03	Fair	1.55	Poor	1.75	Fair
RJ19	1.67	Fair	1.55	Poor	1.60	Poor
RJ22	1.67	Fair	1.35	Poor	1.30	Poor
RJ23	1.67	Fair	1.55	Poor	1.45	Poor
RJ26	1.36	Poor	1.75	Fair	1.65	Poor
RJ27	1.36	Poor	1.55	Poor	1.45	Poor
RJ28	1.36	Poor	1.20	Poor	1.15	Poor
RW01	2.34	Good	1.90	Fair	1.90	Fair
RW03	2.31	Fair	1.65	Poor	1.60	Poor
RW05	1.98	Fair	1.55	Poor	1.75	Fair
RW07	1.67	Fair	1.40	Poor	1.45	Poor
RW10	2.34	Good	1.75	Fair	1.65	Poor
RW11	1.36	Poor	1.35	Poor	1.45	Poor
RW14	1.67	Fair	1.40	Poor	1.30	Poor

Table F-5. Summary of Fish Habitat Parameters of the Rockport Coastal Streams WAU, 2006.

Segment	Length of surveyed habitat (ft.)	A. Percent Pool:Riffle: Flatwater by segment length	B. Pool Spacing	C. Mean Pool Shelter Rating	D. Percent of all pools with residual depth >3 ft.	E. Percent Spawnable	F. Percent Embeddedness	G. Dominant Tailout Substrate	H. Key LWD + Rootwads / 328ft.	I. Percent Over-wintering Substrate	J. Percent Side Channel by segment length	Mean Residual Pool Depth (ft.)	Functional LWD / 328ft.
RH01	1180	48:37:16	2.4	158	0	66	25-50	Lg. Gravel	0.2	17	0	1.8	13.9
RH03	906	42:58:0	2.7	142	0	38	>50	Sm. Gravel	0.8	0	0	1.4	35.1
RH05	822	29:67:4	4.9	165	0	40	>50	Sm. Gravel	0.4	0	0	1.5	35.1
RH09	1007	41:53:6	2.8	113	18	66	25-50	Lg. Gravel	0.1	5	4	1.8	24.8
RH10	993	33:67:0	3.4	160	8	60	>50	Lg. Gravel	0.3	4	0	2.0	37.7
RH11	959	31:69:0	3.2	148	8	51	>50	Lg. Gravel	0.7	8	0	1.6	42.8
RH22	761	30:70:0	3.5	155	0	35	>50	Sm. Gravel	0.4	10	0	1.7	34.0
RH23	668	25:75:0	3.7	144	11	38	>50	Sm. Gravel	0.5	0	0	1.9	36.3
RJ01	928	47:45:8	2.7	137	0	41	>50	Sm. Gravel	0.0	0	0	1.8	59.0
RJ02	2342	38:57:5	3.9	113	17	25	>50	Sm. Gravel	0.1	0	22	1.9	20.4
RJ03	3239	31:57:12	4.2	125	9	41	>50	Sm. Gravel	0.1	2	20	2.0	25.3
RJ06	970	42:55:3	3.2	136	9	66	25-50	Lg. Gravel	0.3	0	0	2.3	27.1
RJ07	875	50:47:4	2.8	164	8	62	25-50	Lg. Gravel	0.3	0	0	2.1	21.0
RJ08	946	41:51:8	4.8	150	13	51	25-50	Sm. Gravel	0.1	0	0	2.1	18.7
RJ10	833	25:53:22	3.8	155	0	44	>50	Lg. Gravel	0.0	60	0	1.5	9.5
RJ11	1075	30:70:0	5.8	147	13	27	>50	Sm. Cobble	0.1	24	7	1.8	6.4
RJ12	911	31:62:7	3.6	118	9	46	>50	Sm. Gravel	0.4	50	0	1.8	29.5
RJ14	797	38:62:0	3.6	130	0	47	25-50	Lg. Gravel	0.3	50	0	1.7	24.3
RJ15	832	25:75:0	4.9	127	11	45	25-50	Sm. Gravel	0.4	24	0	1.6	20.5
RJ16	795	29:71:0	4.9	135	11	42	>50	Lg. Gravel	0.4	53	0	1.7	30.1
RJ19	845	20:80:0	5.0	159	0	27	>50	Sm. Gravel	1.1	23	0	1.7	29.9
RJ22	1834	27:64:9	4.9	116	0	32	>50	Sm. Gravel	0.3	0	0	1.1	12.7
RJ23	1253	32:61:8	5.2	129	0	35	>50	Sm. Gravel	0.5	0	0	1.4	29.8
RJ26	535	47:42:10	3.2	153	10	21	>50	Sm. Gravel	0.9	0	0	1.6	38.6
RJ27	662	21:71:8	4.9	133	0	15	>50	Sm. Gravel	0.3	0	0	1.2	30.7
RJ28	675	9:91:0	11.3	84	0	20	>50	Sm. Gravel	0.2	0	0	0.9	22.8
RW01	1004	47:43:9	2.6	154	21	60	>50	Lg. Gravel	0.2	11	10	1.9	16.3
RW03	1108	32:51:17	3.7	159	0	60	25-50	Sm. Gravel	0.2	26	0	1.8	22.5
RW05	877	27:73:0	5.1	166	0	54	>50	Sm. Gravel	0.5	42	0	1.4	33.3
RW07	938	10:90:0	8.9	143	0	27	>50	Sm. Gravel	0.3	27	0	1.4	20.3
RW10	1217	43:50:17	2.9	142	0	59	>50	Lg. Gravel	0.7	18	0	1.3	26.4
RW11	839	12:82:6	5.6	113	0	14	>50	Sm. Gravel	0.7	21	0	1.4	24.6
RW14	868	11:79:10	7.2	123	0	28	>50	Sm. Gravel	0.8	11	0	0.9	20.8

Hardy Creek Planning Watershed***Hardy Creek (Segment RH01)***

The segment surveyed consisted of 48% pool, 37% riffle, and 16% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a moderate frequency of riffle habitat. The majority of pools were lateral scour pools formed by logs (38%, Figure F-1). The dominant cover available to fish in pools in the segment was LWD (50%, Table F-3). The mean residual pool depth was 1.8 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was high (158), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.2 pieces per 328 feet) observed in the segment. However, 38% of pools were formed by LWD and there were 13.9 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was large gravel and the embeddedness rating was moderate (25-50%).

Spawning Habitat

Spawning habitat in the segment appeared to be good due to a high percentage of spawnable gravels available to fish in tailouts (66% of tailout area), the dominant tailout substrate size (large gravel) was within the preferred range of salmonids, and the spawning gravels were slightly embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was fair due to a high shelter rating and a moderate frequency of pools. However, there were minimal amounts of key LWD and an absence of pools with residual depths ≥ 3 feet.

Over-wintering Habitat

Over-wintering habitat in the segment was fair due to a high shelter rating and a moderate frequency of pools. However, there were minimal amounts of key LWD, minimal over-wintering substrate, and an absence of side channels and pools with residual depths ≥ 3 feet.

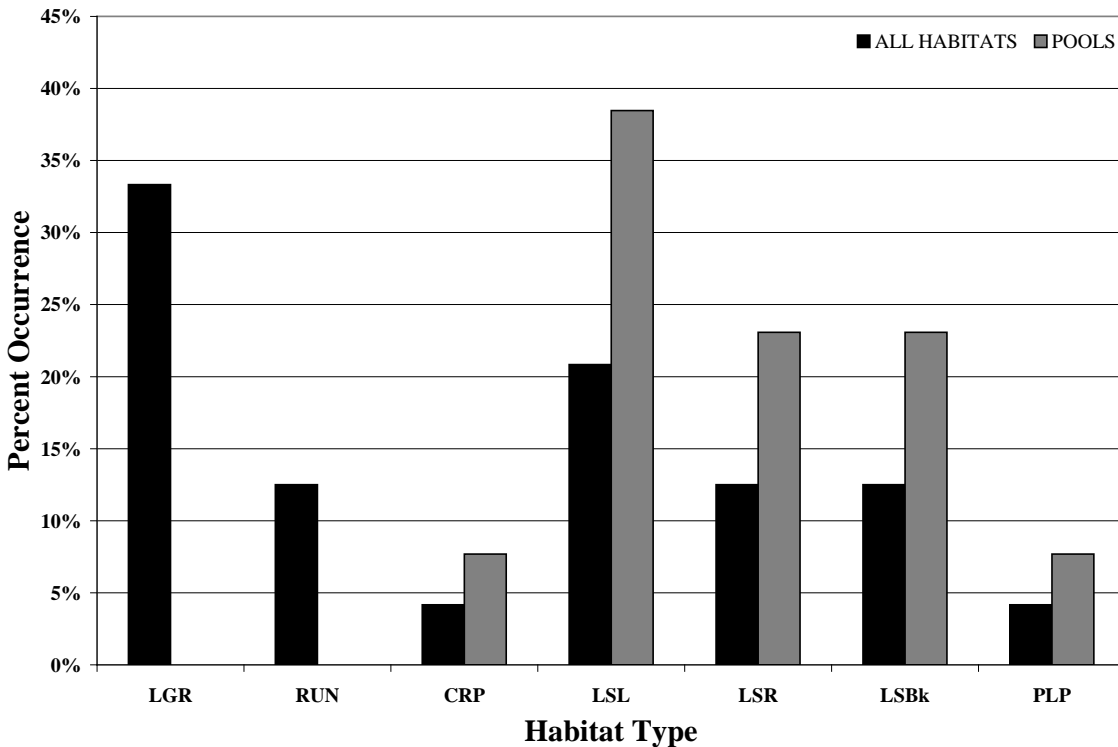


Figure F-1. Percent occurrence of habitat types surveyed in segment RH01 within the Rockport Coastal Streams WAU, 2006.

South Fork Hardy Creek (Segment RH03)

The segment surveyed consisted of 42% pool, 58% riffle, and 0% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle habitat. The majority of pools were plunge pools (47%, Figure F-2). The dominant cover available to fish in pools in the segment was LWD (82%, Table F-3). The mean residual pool depth was 1.4 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was high (142), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.8 pieces per 328 feet) observed in the segment. However, 35% of pools were formed by LWD and there were 35.1 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment appeared to be fair due to a moderate percentage of spawnable gravels available to fish in tailouts (38% of tailout area). However, the dominant tailout substrate size (small gravel) was slightly smaller than the preferred range of salmonids, and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was fair due to a high shelter rating and a moderate frequency of pools. However, there were minimal amounts of key LWD and an absence of pools with residual depths ≥ 3 feet.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to minimal amounts of key LWD, an absence of side channels, and an absence of over-wintering substrate and pools with residual depths ≥ 3 feet. However, there was a high shelter rating and a moderate frequency of pools.

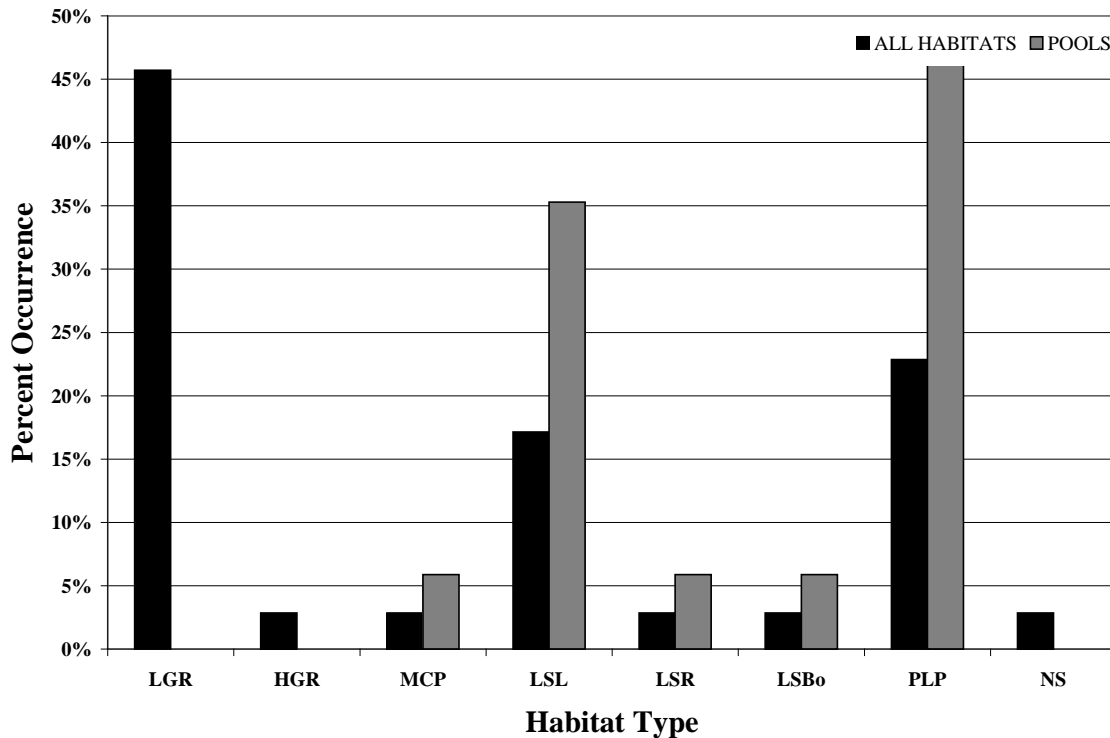


Figure F-2. Percent occurrence of habitat types surveyed in segment RH03 within the Rockport Coastal Streams WAU, 2006.

South Fork Hardy Creek (Segment RH05)

The segment surveyed consisted of 29% pool, 67% riffle, and 4% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle habitat. The majority of pools were lateral scour pools formed by logs (36%, Figure F-3). The dominant cover available to fish in pools in the segment was LWD (73%, Table F-3). The mean residual pool depth was 1.5 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was high (165), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.4 pieces per 328 feet) observed in the segment. However, 36% of pools were formed by LWD and there were 35.1 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment was fair due to a moderate percentage of spawnable gravels available to fish in tailouts (40% of tailout area). However, the dominant tailout substrate size (small gravel) was slightly smaller than the preferred range of salmonids, and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor to minimal amounts of key LWD and an absence of pools with residual depths ≥ 3 feet high. However, there was a high shelter rating and a moderate frequency of pools.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to minimal amounts of key LWD, an absence of side channels, and an absence of over-wintering substrate and pools with residual depths ≥ 3 feet. However, there was a high shelter rating and a moderate frequency of pools.

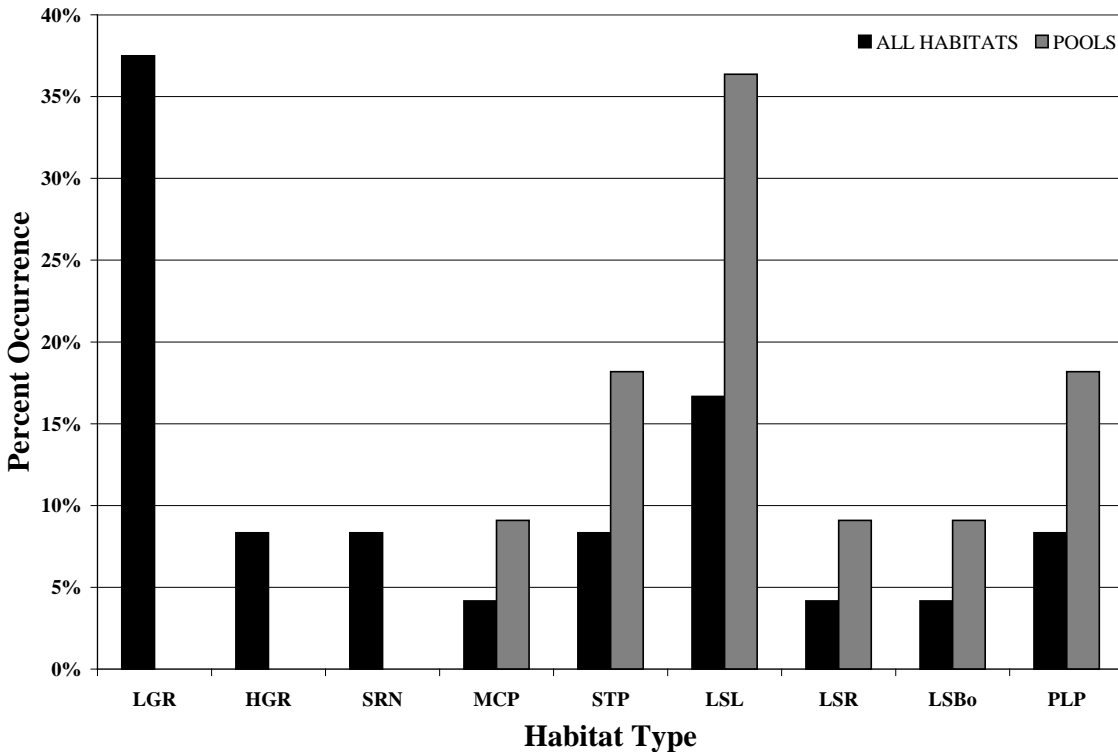


Figure F-3. Percent occurrence of habitat types surveyed in segment RH05 within the Rockport Coastal Streams WAU, 2006.

Hardy Creek (Segment RH09)

The segment surveyed consisted of 41% pool, 53% riffle, and 6% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle habitat. The majority of pools were lateral scour pools formed by logs (45%, Figure F-4). The dominant cover available to fish in pools in the segment was LWD (91%, Table F-3). The mean residual pool depth was 1.8 feet, with 18% of pools having residual depths ≥ 3 feet. The shelter rating was moderate (113), mainly due to an availability of cover. There were minimal amounts of key LWD (0.1 pieces per 328 feet) observed in the segment. However, 45% of pools were formed by LWD and there were 24.8 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was large gravel and the embeddedness rating was moderate (25-50%).

Spawning Habitat

Spawning habitat in the segment appeared to be good due to a high percentage of spawnable gravels available to fish in tailouts (66% of tailout area), the dominant tailout substrate size (large gravel) was within the preferred range of salmonids, and the spawning gravels were slightly embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD and a low occurrence of pools with residual depths ≥ 3 feet. However, there was a moderate shelter rating and a moderate frequency of pools.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to minimal amounts of key LWD, minimal over-wintering substrate, and a low occurrence of pools with residual depths ≥ 3 feet. However, there was a moderate frequency of side channels, a moderate frequency of pools, and a moderate shelter rating.

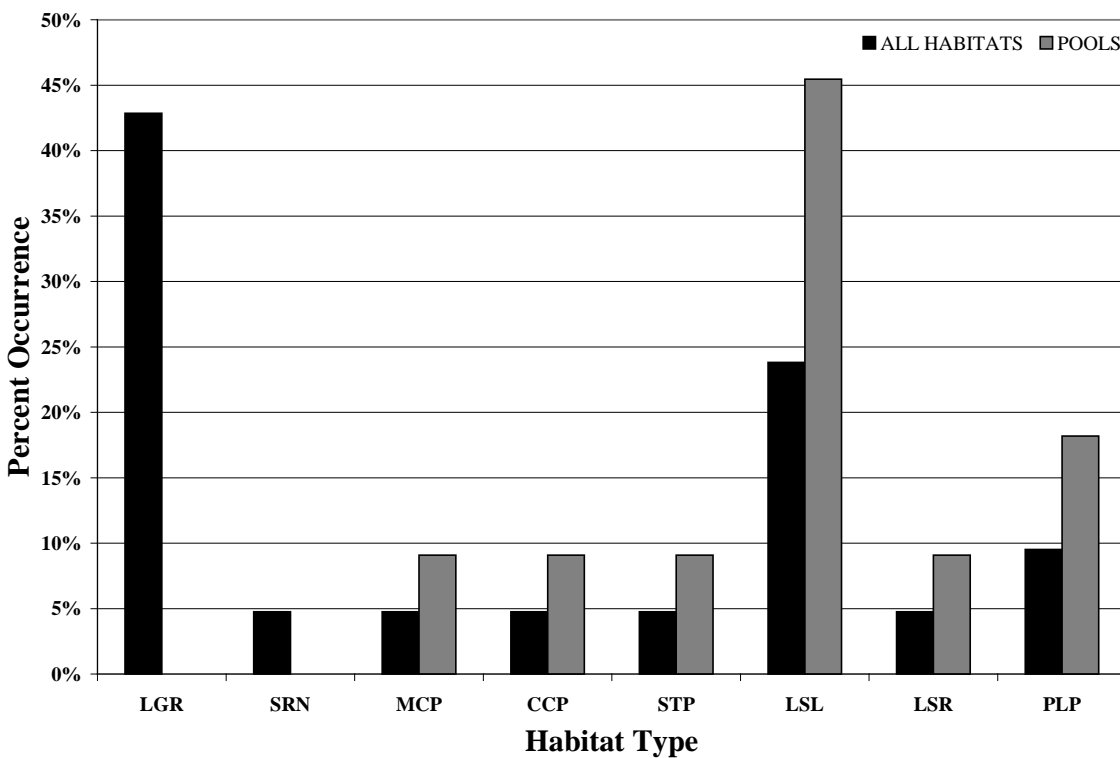


Figure F-4. Percent occurrence of habitat types surveyed in segment RH09 within the Rockport Coastal Streams WAU, 2006.

Middle Fork Hardy Creek (Segment RH10)

The segment surveyed consisted of 33% pool, 67% riffle, and 0% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle habitat. The majority of pools were lateral scour pools formed by bedrock (33%, Figure F-5). The dominant cover available to fish in pools in the segment was LWD (75%, Table F-3). The mean residual pool depths was 2.0 feet, with 8% of pools having residual depths ≥ 3 feet. The shelter rating was high (160), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.3 pieces per 328 feet) observed in the segment. However, 33% of pools were formed by LWD and there were 37.7 pieces

of functional LWD per 328 feet surveyed. The dominant tailout substrate was large gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment was good due to a high percentage of spawnable gravels available to fish in tailouts (60% of tailout area) and the dominant tailout substrate size (large gravel) was within the preferred range of salmonids. However, the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to a low occurrence of pools with residual depths ≥ 3 feet and a minimal amount of key LWD. However there was a high shelter rating and a moderate frequency of pools.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to minimal amounts of key LWD, minimal over-wintering substrate, a low occurrence of pools with residual depths ≥ 3 feet, and an absence of side channels. However, there was a moderate frequency of pools and a high shelter rating.

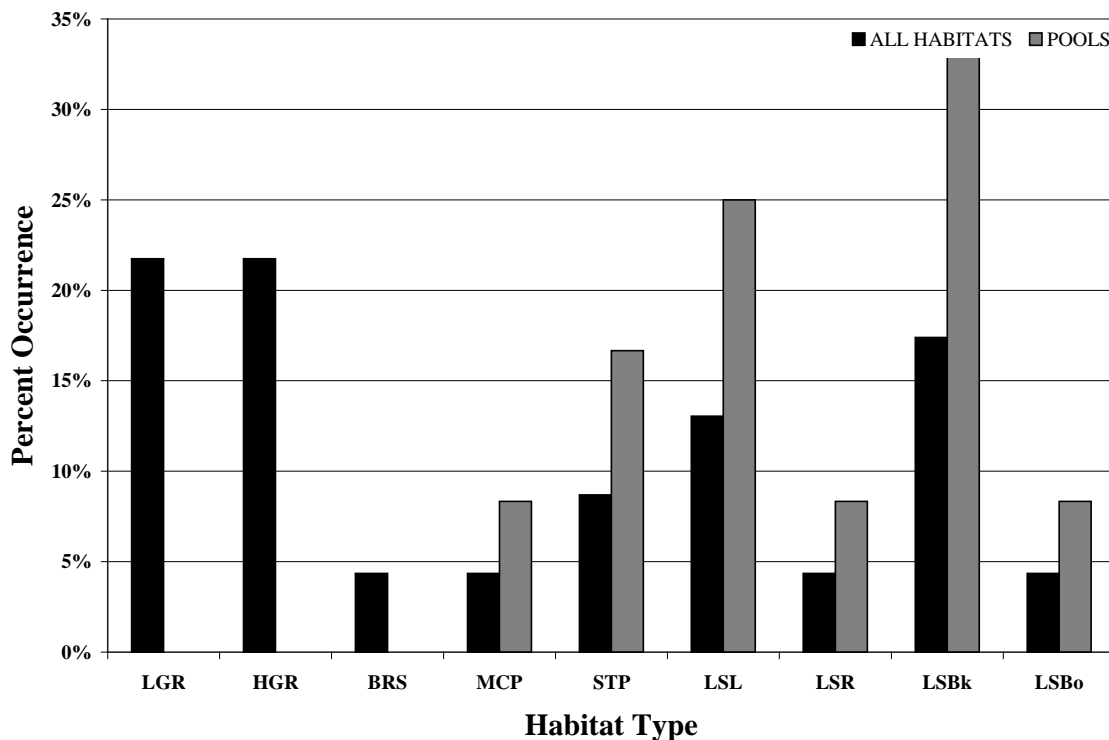


Figure F-5. Percent occurrence of habitat types surveyed in segment RH10 within the Rockport Coastal Streams WAU, 2006.

Middle Fork Hardy Creek (Segment RH11)

The segment surveyed consisted of 31% pool, 69% riffle, and 0% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle habitat. The majority of pools were lateral scour pools formed by logs (46%, Figure F-6). The dominant cover available to fish in pools in the segment was LWD (54%, Table F-3). The mean residual pool depth was 1.6 feet, with 8% of pools having residual depths ≥ 3 feet. The shelter rating was high (148), mainly due to

good cover complexity and availability. There were minimal amounts of key LWD (0.7 pieces per 328 feet) observed in the segment. However, 46% of pools were formed by LWD and there were 42.8 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was large gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment was good due to a high percentage of spawnable gravels available to fish in tailouts (51% of tailout area) and the dominant tailout substrate size (large gravel) was within the preferred range of salmonids. However, the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to a low occurrence of pools with residual depths ≥ 3 feet and a minimal amount of key LWD. However, there was a high shelter rating and a moderate frequency of pools.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to a minimal amount of key LWD, minimal over-wintering substrate, a low occurrence of pools with residual depths ≥ 3 feet, and an absence of side channels. However, there was a high shelter rating and a moderate frequency of pools.

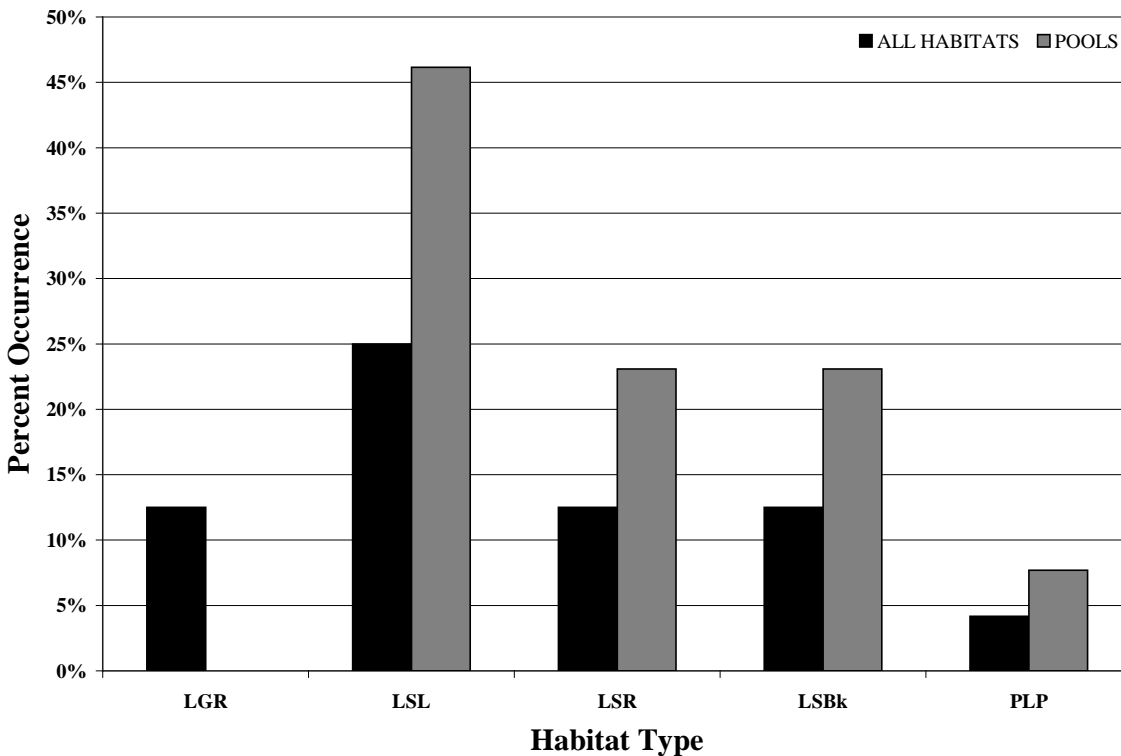


Figure F-6. Percent occurrence of habitat types surveyed in segment RH11 within the Rockport Coastal Streams WAU, 2006.

North Fork Hardy Creek (Segment RH22)

The segment surveyed consisted of 30% pool, 70% riffle, and 0% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle habitat. The majority of pools were lateral scour pools formed by logs (60%, Figure F-7). The dominant cover

available to fish in pools in the segment was LWD (70%, Table F-3). The mean residual pool depth was 1.7 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was high (155), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.4 pieces per 328 feet) observed in the segment. However, 60% of pools were formed by LWD and there were 34.0 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment was fair due to a moderate percentage of spawnable gravels available to fish in tailouts (35% of tailout area). However, the dominant tailout substrate size (small gravel) was slightly smaller than the preferred range of salmonids, and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to a minimal amount of key LWD and an absence of pools with residual depths ≥ 3 feet. However, there was a high shelter rating and a moderate frequency of pools.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to a minimal amount of key LWD, minimal over-wintering substrate, and an absence of pools with residual depths ≥ 3 feet and side channels. However, there was a high shelter rating and a moderate frequency of pools.

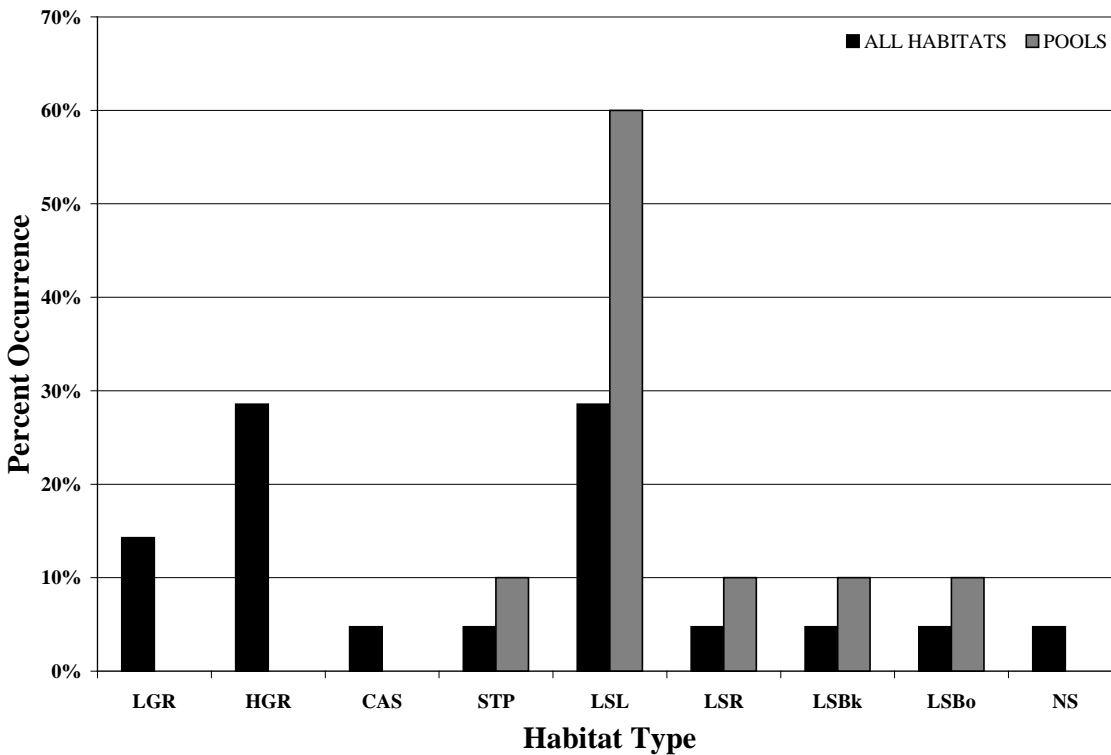


Figure F-7. Percent occurrence of habitat types surveyed in segment RH22 within the Rockport Coastal Streams WAU, 2006.

North Fork Hardy Creek (Segment RH23)

The segment surveyed consisted of 25% pool, 75% riffle, and 0% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered low with a high frequency of riffle habitat. The majority of pools were lateral scour pools formed by logs (78%, Figure F-8). The dominant cover available to fish in pools in the segment was LWD (100%, Table F-3). The mean residual pool depth was 1.9 feet, with 11% of pools having residual depths ≥ 3 feet. The shelter rating was high (144), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.5 pieces per 328 feet) observed in the segment. However, 78% of pools were formed by LWD and there were 36.3 pieces of functional LWD per 328 feet. The dominant tailout substrate was small gravel and the embeddedness rating was high ($>50\%$).

Spawning Habitat

Spawning habitat in the segment was fair due to a moderate percentage of spawnable gravels available to fish in tailouts (38% of tailout area). However, the dominant tailout substrate size (small gravel) was slightly smaller than the preferred range of salmonids, and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to a low occurrence of pools with residual depths ≥ 3 feet and a minimal amount of key LWD. However, there was a high shelter rating and a moderate frequency of pools.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to an absence of side channels and over-wintering substrate, a low occurrence of pools with residual depths ≥ 3 feet, and a minimal amount of key LWD. However, there was a high shelter rating and a moderate frequency of pools.

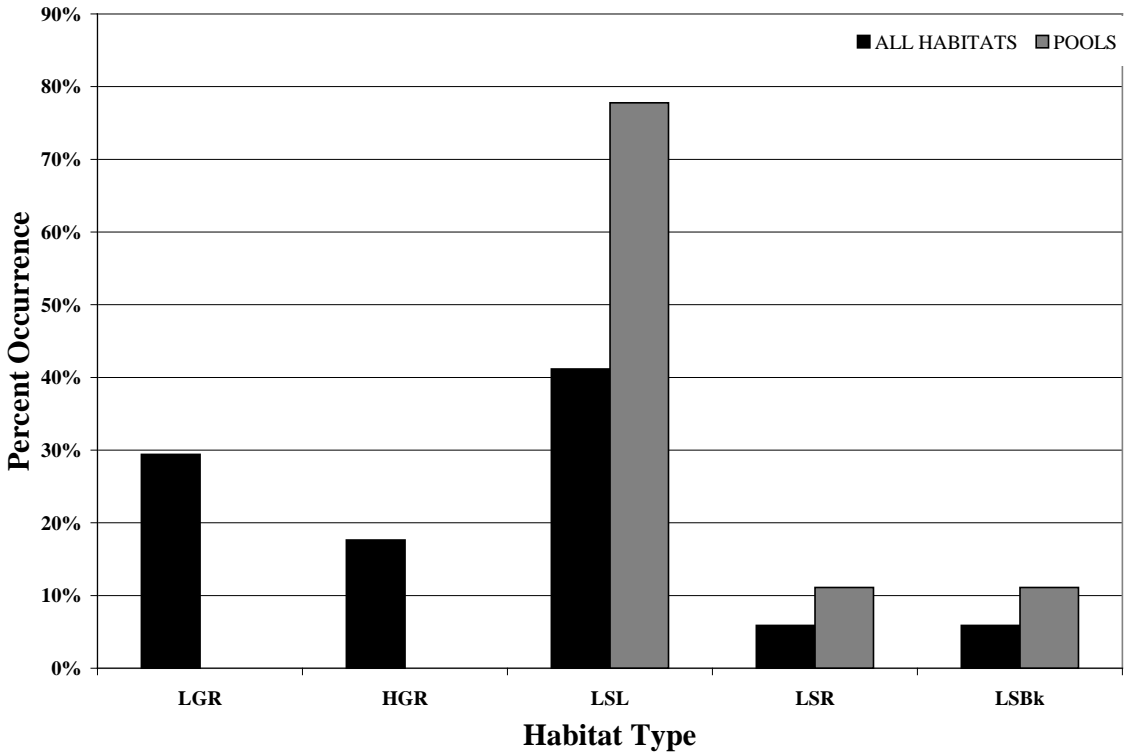


Figure F-8. Percent occurrence of habitat types surveyed in segment RH23 within the Rockport Coastal Streams WAU, 2006

Juan Creek Planning Watershed***Juan Creek (Segment RJ01)***

The segment surveyed consisted of 47% pool, 45% riffle, and 8% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a moderate frequency of riffle habitat. The majority of pools were mid channels pools (44%, Figure F-9). The dominant cover available to fish in pools in the segment was LWD (33%, Table F-3). The mean residual pool depth was 1.8 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was high (137), mainly due to good cover complexity and availability. There was an absence of key LWD (0.0 pieces per 328 feet) in the segment. However, 33% of pools were formed by LWD and there were 59.0 pieces of functional LWD per 328 feet. The dominant tailout substrate was small gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment was fair due to a moderate percentage of spawnable gravels available to fish in tailouts (41% of tailout area). However, the dominant tailout substrate size (small gravel) was slightly smaller than the preferred range of salmonids, and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was fair due to a high shelter rating and a moderate frequency of pools. However, there was an absence of pools with residual depths ≥ 3 feet and key LWD.

Over-wintering Habitat

Over-wintering habitat in the segment was fair due to a high shelter rating and a moderate frequency of pools. However, there was an absence of side channels, pools with residual depths ≥ 3 feet, over-wintering substrate, and key LWD.

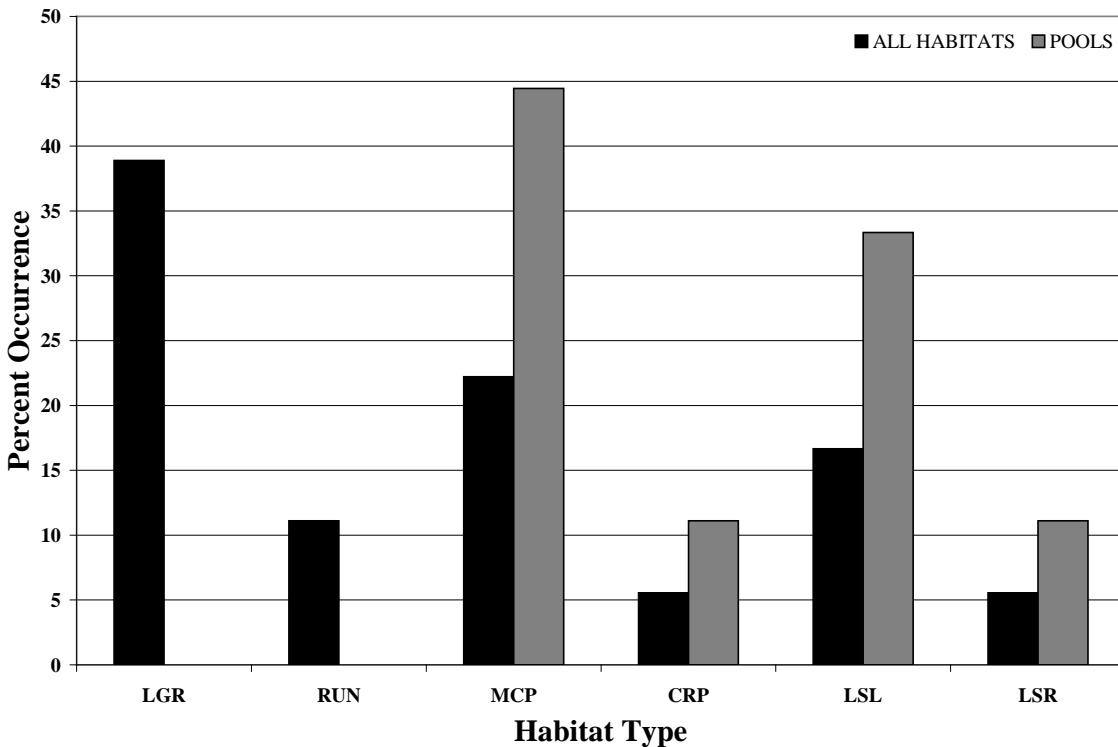


Figure F-9. Percent occurrence of habitat types surveyed in segment RJ01 within the Rockport Coastal Streams WAU, 2006.

Juan Creek (Segment RJ02)

The segment surveyed consisted of 38% pool, 57% riffle, and 5% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle habitat. The majority of pools were mid channels pools (39%, Figure F-10). The dominant cover available to fish in pools in the segment was SWD (33%, Table F-3). The mean residual pool depth was 1.9 feet, with 17% of pools having residual depths ≥ 3 feet. The shelter rating was moderate (113), mainly due to an availability of cover. There were minimal amounts of key LWD (0.1 pieces per 328 feet) observed in the segment. However, 17% of pools were formed by LWD and there were 20.4 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment was fair due to the moderate percentage of spawnable gravels available to fish in tailouts (25% of tailout area). However, the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD and a low occurrence of pools with residual depths ≥ 3 feet. However, there was a moderate shelter rating and a moderate frequency of pools.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to minimal amounts of key LWD, a low occurrence of pools with residual depths ≥ 3 feet, and an absence of over-wintering substrate. However, there was a high frequency of side channels, a moderate frequency of pools, and a moderate shelter rating.

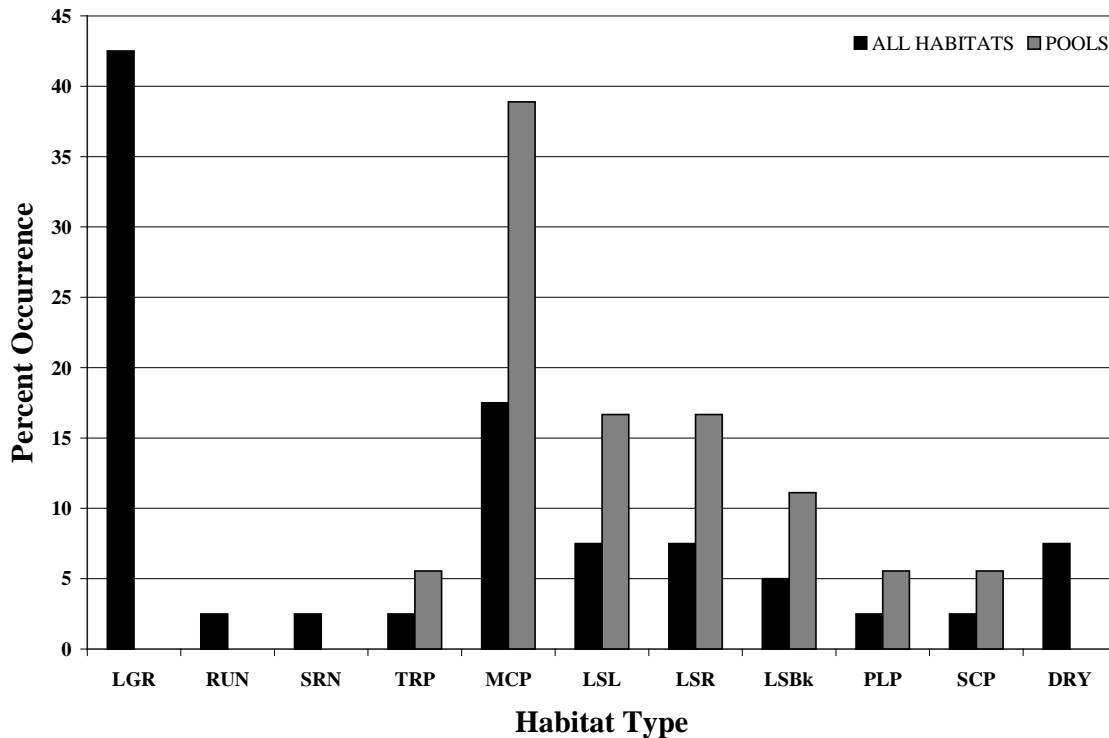


Figure F-10. Percent occurrence of habitat types surveyed in segment RJ02 within the Rockport Coastal Streams WAU, 2006.

Juan Creek (Segment RJ03)

The segment surveyed consisted of 31% pool, 57% riffle, and 12% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle habitat. The majority of pools were lateral scour pools formed by logs (57%, Figure F-11). The dominant cover available to fish in pools in the segment was LWD (45%, Table F-3). The mean residual pool depth was 2.0 feet, with 9% of pools having residual depths ≥ 3 feet. The shelter rating was high (125), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.1 pieces per 328 feet) observed in the segment. However, 57% of pools were formed by LWD and there were 25.3 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment was fair due to the moderate percentage of spawnable gravels available to fish in tailouts (41% of tailout area). However, the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD and a low occurrence of pools with residual depths ≥ 3 feet. However, there was a moderate frequency of pools and a high shelter rating.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to minimal over-wintering substrate and key LWD, and a low occurrence of pools with residual depths ≥ 3 feet. However, there was a high frequency of side channels, a high shelter rating, and a moderate frequency of pools.

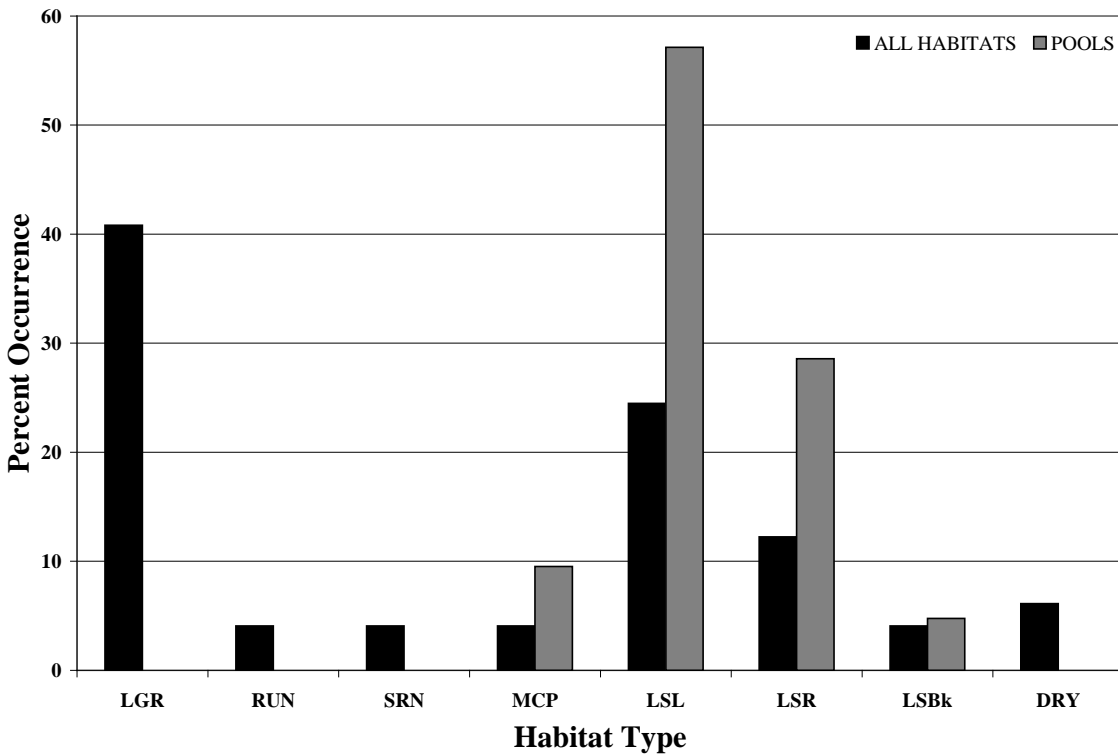


Figure F-11. Percent occurrence of habitat types surveyed in segment RJ03 within the Rockport Coastal Streams WAU, 2006.

Juan Creek (Segment RJ06)

The segment surveyed consisted of 42% pool, 55% riffle, and 3% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle habitat. The majority of pools were lateral scour pools formed by logs (64%, Figure F-12). The dominant cover available to fish in pools in the segment was LWD (45%, Table F-3). The mean residual pool depth was 2.3 feet, with 9% of pools having residual depths ≥ 3 feet. The shelter rating was high (136), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.3 pieces per 328 feet) observed in the segment. However, 64% of pools in this segment were formed by LWD and there were also 27.1 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was large gravel and the embeddedness rating was moderate (25-50%).

Spawning Habitat

Spawning habitat in the segment appeared to be good due to a high percentage of spawnable gravels available to fish in tailouts (66% of tailout area), the dominant tailout substrate size (large gravel) was within the preferred range of salmonids, and the spawning gravels were slightly embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD and a low occurrence of pools with residual depths ≥ 3 feet. However, there was a moderate frequency of pools and a high shelter rating.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to an absence of side channels and over-wintering substrate, a minimal amount of key LWD, and a low occurrence of pools with residual depths ≥ 3 feet. However, there was a high shelter rating and a moderate frequency of pools.

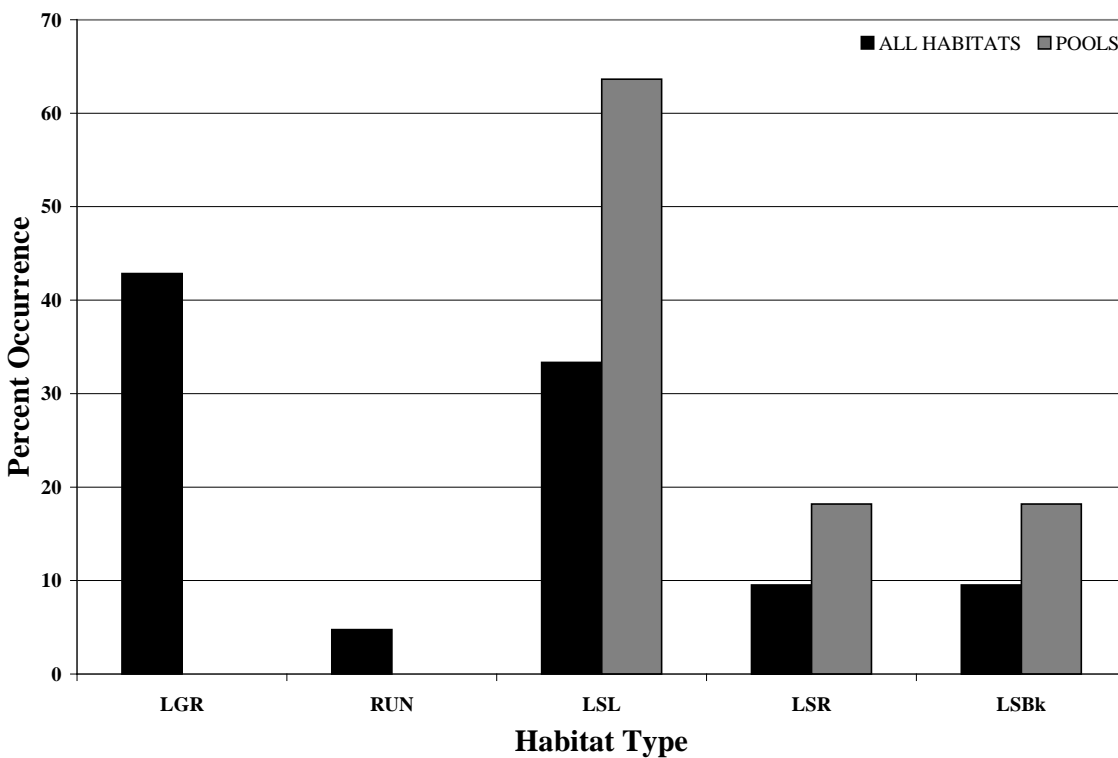


Figure F-12. Percent occurrence of habitat types surveyed in segment RJ06 within the Rockport Coastal Streams WAU, 2006.

Juan Creek (Segment RJ07)

The segment surveyed consisted of 50% pool, 47% riffle, and 4% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered high with a moderate frequency of riffle habitat. The majority of pools were lateral scour pools formed by logs (50%, Figure F-13). The dominant cover available to fish in pools in the segment was LWD (33%, Table F-3). The mean residual pool depth was 2.1 feet, with 8% of pools having residual depths ≥ 3 feet. The shelter rating was high (164), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.3 pieces per 328 feet) observed in the segment. However, 50% of pools in this segment were formed by LWD and there

were also 21.0 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was large gravel and the embeddedness rating was moderate (25-50%).

Spawning Habitat

Spawning habitat in the segment appeared to be good due to a high percentage of spawnable gravels available to fish in tailouts (62% of tailout area), the dominant tailout substrate size (large gravel) was within the preferred range of salmonids, and the spawning gravels were slightly embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was fair due to a high frequency of pools and a high shelter rating. However, there was a minimal amount of key LWD and a low occurrence of pools with residual depths ≥ 3 feet.

Over-wintering Habitat

Over-wintering habitat in the segment was fair due to a high shelter rating and a high frequency of pools. However, there was an absence of side channels and over-wintering substrate, a minimal amount of key LWD, and a low occurrence of pools with residual depths ≥ 3 feet.

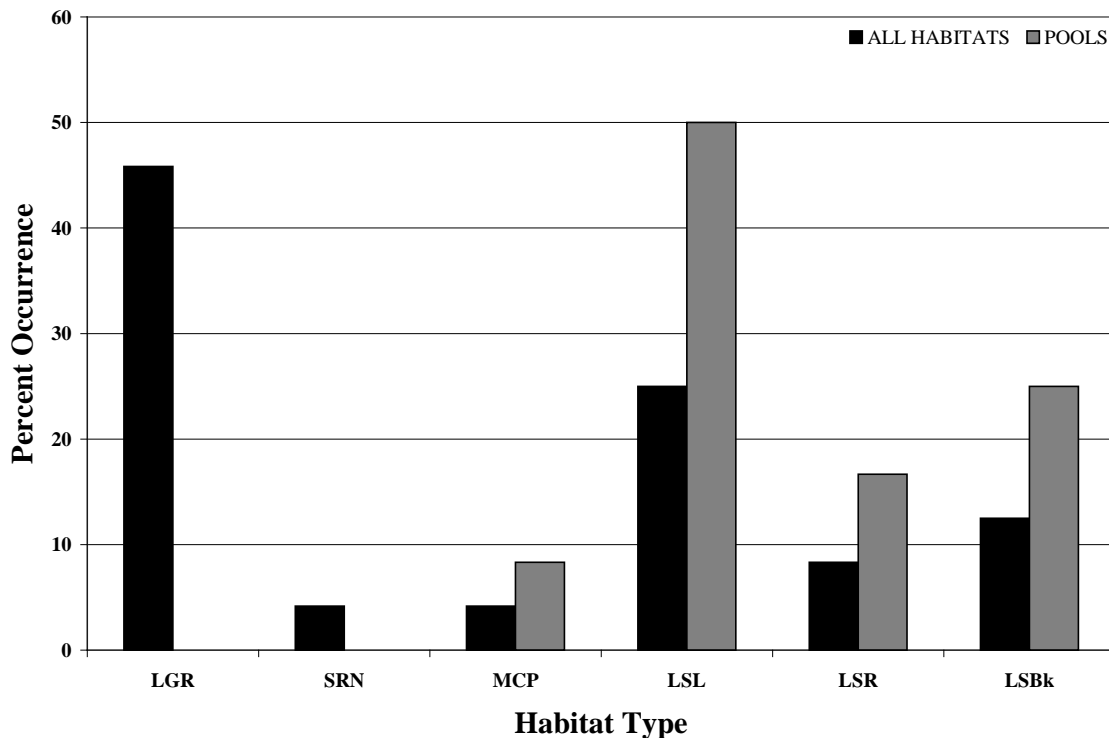


Figure F-13. Percent occurrence of habitat types surveyed in segment RJ07 within the Rockport Coastal Streams WAU, 2006.

Juan Creek (Segment RJ08)

The segment surveyed consisted of 41% pool, 51% riffle, and 8% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle habitat. The majority of pools were lateral scour pools formed by bedrock (50%, Figure F-14). The dominant cover available to fish in pools in the segment was bedrock ledges (50%, Table F-3). The mean residual pool depth was 2.1 feet, with 13% of pools having residual depths ≥ 3 feet. The shelter rating was high

(150), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.1 pieces per 328 feet) observed in the segment. However, 13% of pools in this segment were formed by LWD and there were 18.7 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was moderate (25-50%).

Spawning Habitat

Spawning habitat in the segment appeared to be fair due to a high percentage of spawnable gravels available to fish in tailouts (51% of tailout area) and the spawning gravels were slightly embedded. However, the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD and a low occurrence of pools with residual depths ≥ 3 feet. However, there was a moderate frequency of pools and a high shelter rating.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to an absence of side channels and over-wintering substrate, a minimal amount of key LWD, and a low occurrence of pools with residual depths ≥ 3 feet. However, there was a high shelter rating and a moderate frequency of pools.

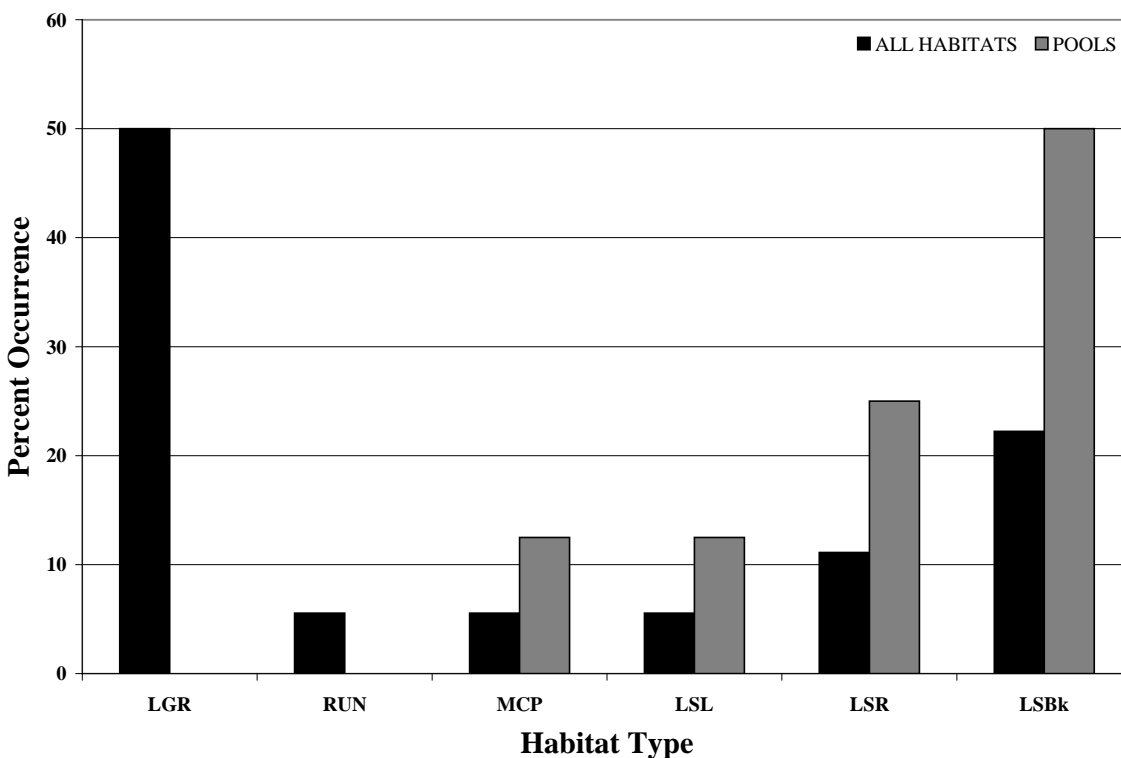


Figure F-14. Percent occurrence of habitat types surveyed in segment RJ08 within the Rockport Coastal Streams WAU, 2006.

Juan Creek (Segment RJ10)

The segment surveyed consisted of 25% pool, 53% riffle, and 22% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle

habitat. The majority of pools were lateral scour pools formed by logs (33%, Figure F-15). The dominant cover available to fish in pools in the segment was SWD (67%, Table F-3). The mean residual pool depth was 1.5 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was moderate (155), mainly due to good cover complexity and availability. There was an absence of key LWD (0.0 pieces per 328 feet) in the segment. However, 33% of pools were formed by LWD and there were 9.5 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was large gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment was fair due to a moderate percentage of spawnable gravels available to fish in tailouts (44% of tailout area) and the dominant tailout substrate size (large gravel) was within the preferred range of salmonids. However, the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to an absence of key LWD and pools with residual depths ≥ 3 feet. However, there was a moderate frequency of pools and a high shelter rating.

Over-wintering Habitat

Over-wintering habitat in the segment was fair due to a high shelter rating, a high occurrence of over-wintering substrate, and a moderate frequency of pools. However, there was an absence of side channels and key LWD, and an absence of pools with residual depths ≥ 3 feet.

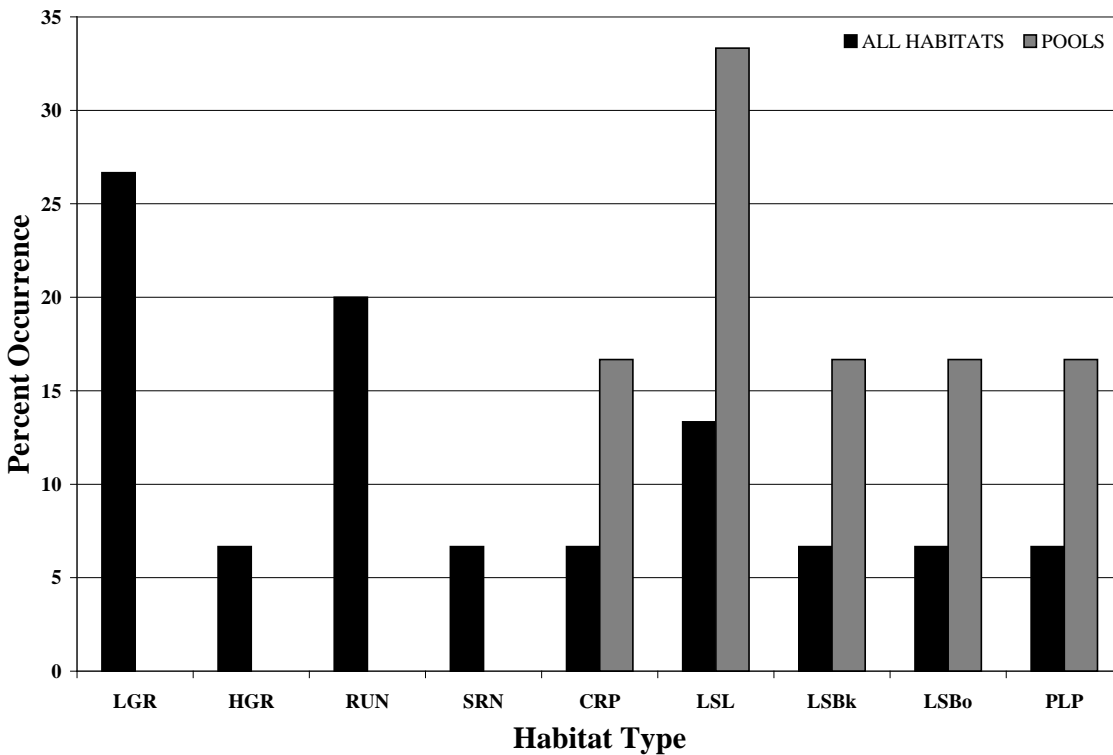


Figure F-15. Percent occurrence of habitat types surveyed in segment RJ10 within the Rockport Coastal Streams WAU, 2006.

Juan Creek (Segment RJ11)

The segment surveyed consisted of 30% pool, 70% riffle, and 0% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate and there was a high frequency of riffle habitat. The majority of pools were lateral scour pools formed by bedrock (50%, Figure F-16). The dominant cover available to fish in pools in the segment was boulder (50%, Table F-3). The mean residual pool depth was 1.8 feet, with 13% of pools having residual depths ≥ 3 feet. The shelter rating was high (147), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.1 pieces per 328 feet) observed in the segment with none of the pools formed by LWD. However, there were 6.4 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high ($>50\%$).

Spawning Habitat

Spawning habitat in the segment was fair due to the moderate percentage of spawnable gravels available to fish in tailouts (27% of tailout area). However, the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to an absence of key LWD and a low occurrence of pools with residual depths ≥ 3 feet. However, there was a moderate frequency of pools and a high shelter rating.

Over-wintering Habitat

Over-wintering habitat in the segment was fair due to a high shelter rating, a moderate occurrence of over-wintering substrate, a high frequency of side channels, and a moderate frequency of pools. However, there was an absence of key LWD and a low occurrence of pools with residual depths ≥ 3 feet.

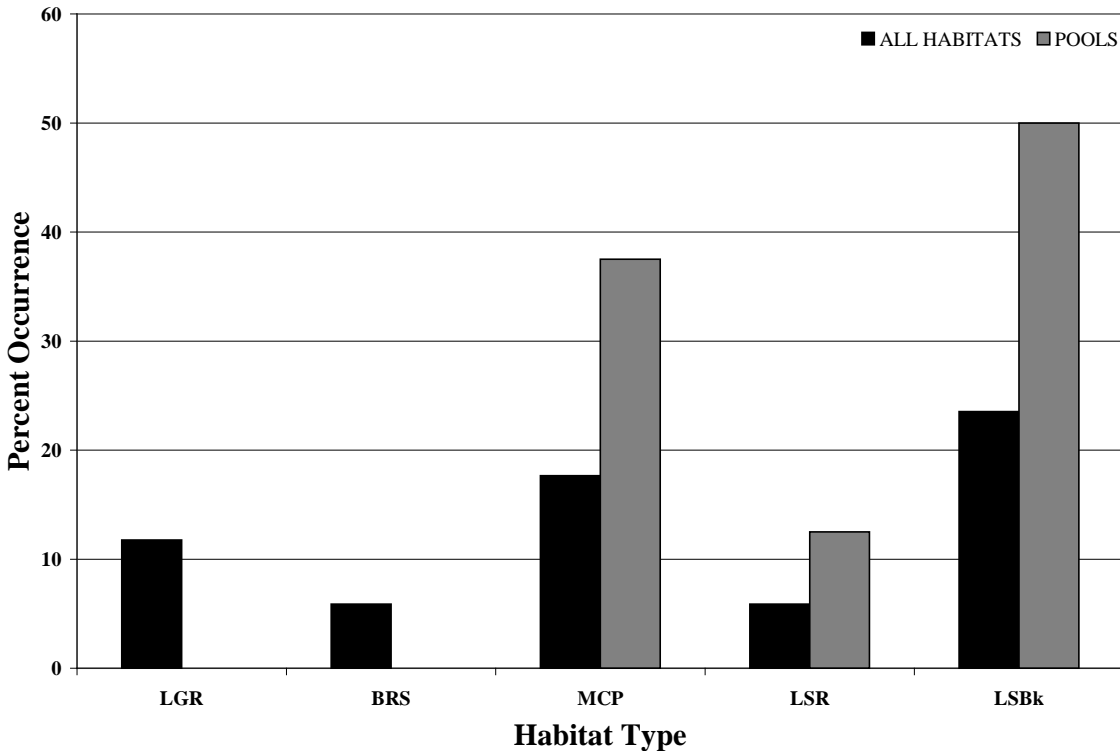


Figure F-16. Percent occurrence of habitat types surveyed in segment RJ11 within the Rockport Coastal Streams WAU, 2006.

Juan Creek (Segment RJ12)

The segment surveyed consisted of 31% pool, 62% riffle, and 7% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle habitat. The majority of pools were lateral scour pools formed by boulders (45%, Figure F-17). Boulder was the dominant cover available to fish in pools in the segment (64%, Table F-3). The mean residual pool depth was 1.8 feet, with 9% of pools having residual depths ≥ 3 feet. The shelter rating was moderate (118), mainly due to an availability of cover. There were minimal amounts of key LWD (0.4 pieces per 328 feet) observed in the segment. However, 9% of pools in this segment were formed by LWD and there were also 29.5 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment was fair due to the moderate percentage of spawnable gravels available to fish in tailouts (46% of tailout area). However, the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to a minimal amount of key LWD and a low occurrence of pools with residual depths ≥ 3 feet. However, there was a moderate shelter a moderate frequency of pools.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to an absence of side channels, a minimal amount of key LWD and a low occurrence of pools with residual depths ≥ 3 feet. However, there was a high occurrence of over-wintering substrate, a moderate shelter rating, and a moderate frequency of pools.

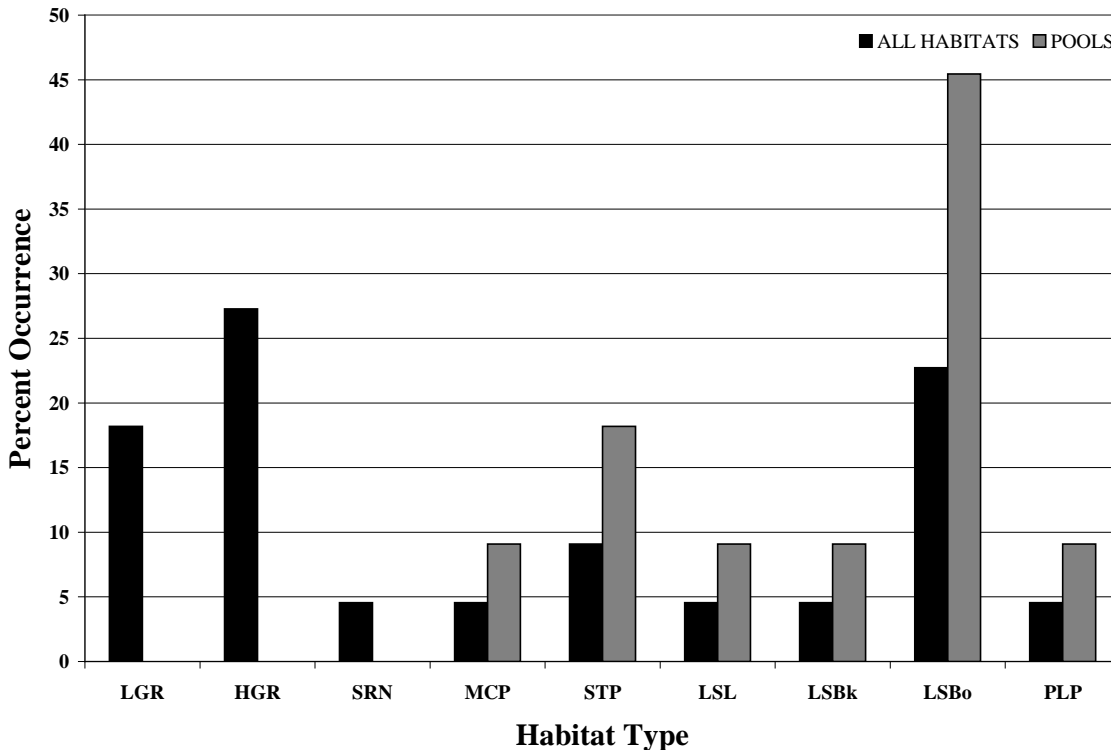


Figure F-17. Percent occurrence of habitat types surveyed in segment RJ12 within the Rockport Coastal Streams WAU, 2006.

Juan Creek (Segment RJ14)

The segment surveyed consisted of 38% pool, 62% riffle, and 0% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate and there was a high frequency of riffle habitat. The majority of pools were lateral scour pools formed by rootwads (27%, Figure F-18). Boulder was the dominant cover available to fish in pools in the segment (55%, Table F-3). The mean residual pool depth was 1.7 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was high (130), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.3 pieces per 328 feet) observed in the segment. However, 18% of pools in this segment were formed by LWD and there were also 24.3 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was large gravel and the embeddedness rating was moderate (25-50%).

Spawning Habitat

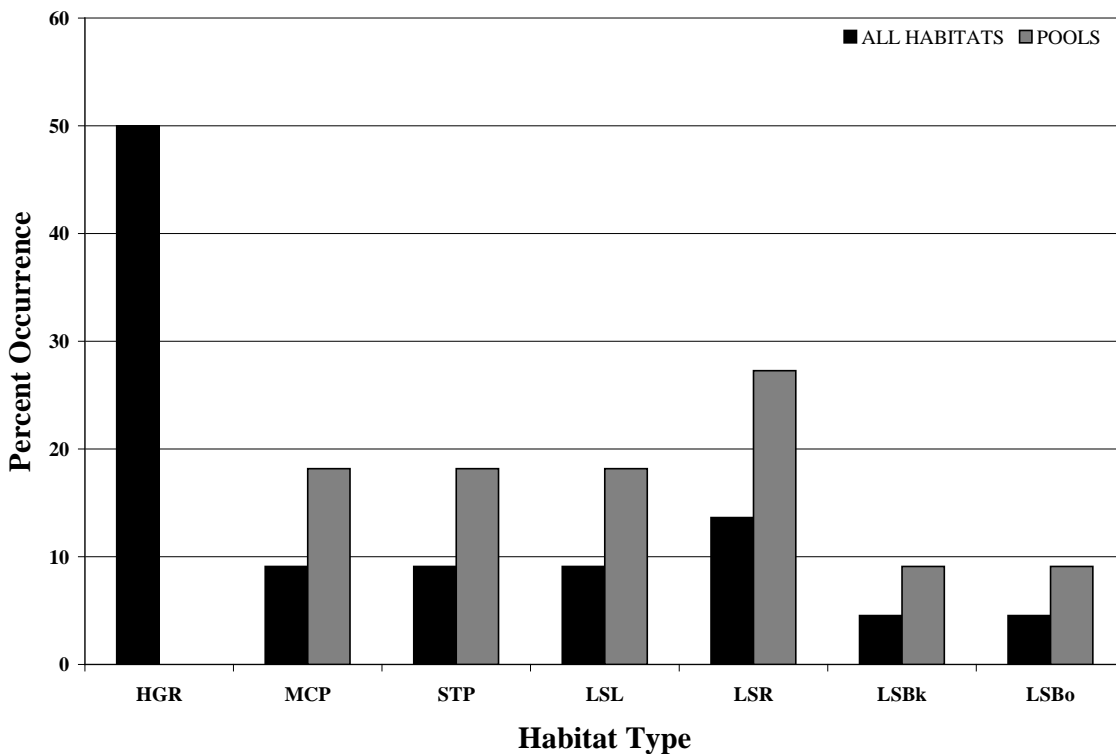
Spawning habitat in the segment appeared to be good due to a moderate percentage of spawnable gravels available to fish in tailouts (47% of tailout area), the dominant tailout substrate size (large gravel) was within the preferred range of salmonids, and the spawning gravels were slightly embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD and an absence of pools with residual depths ≥ 3 feet. However, there was a moderate frequency of pools and a high shelter rating.

Over-wintering Habitat

Over-wintering habitat in the segment was fair due to a high occurrence of over-wintering substrate, a high shelter rating, and a moderate frequency of pools. However, there was minimal amounts of key LWD, and an absence of side channels and pools with residual depths ≥ 3 feet.



Figure

F-18. Percent occurrence of habitat types surveyed in segment RJ14 within the Rockport Coastal Streams WAU, 2006.

Juan Creek (Segment RJ15)

The segment surveyed consisted of 25% pool, 75% riffle, and 0% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered low with a high frequency of riffle habitat. The majority of pools were lateral scour formed by logs (33%, Figure F-19). The dominant cover available to fish in pools in the segment was LWD (78%, Table F-3). The mean residual pool depth was 1.6 feet, with 11% of pools having residual depths ≥ 3 feet. The shelter rating was high (127), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.4 pieces per 328 feet) observed in the segment. However, 33% of pools were formed by LWD and there were 20.5 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was moderate (25-50%).

Spawning Habitat

Spawning habitat in the segment appeared to be fair due to a moderate percentage of spawnable gravels available to fish in tailouts (45% of tailout area) and the spawning gravels were slightly embedded.

However, the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD and a low occurrence of pools with residual depths ≥ 3 feet. However, there was a moderate frequency of pools and a high shelter rating.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to minimal amounts of key LWD, a low occurrence of pools with residual depths ≥ 3 feet, and an absence of side channels. However, there was a moderate occurrence of over-wintering substrate, a high shelter rating, and a moderate frequency of pools.

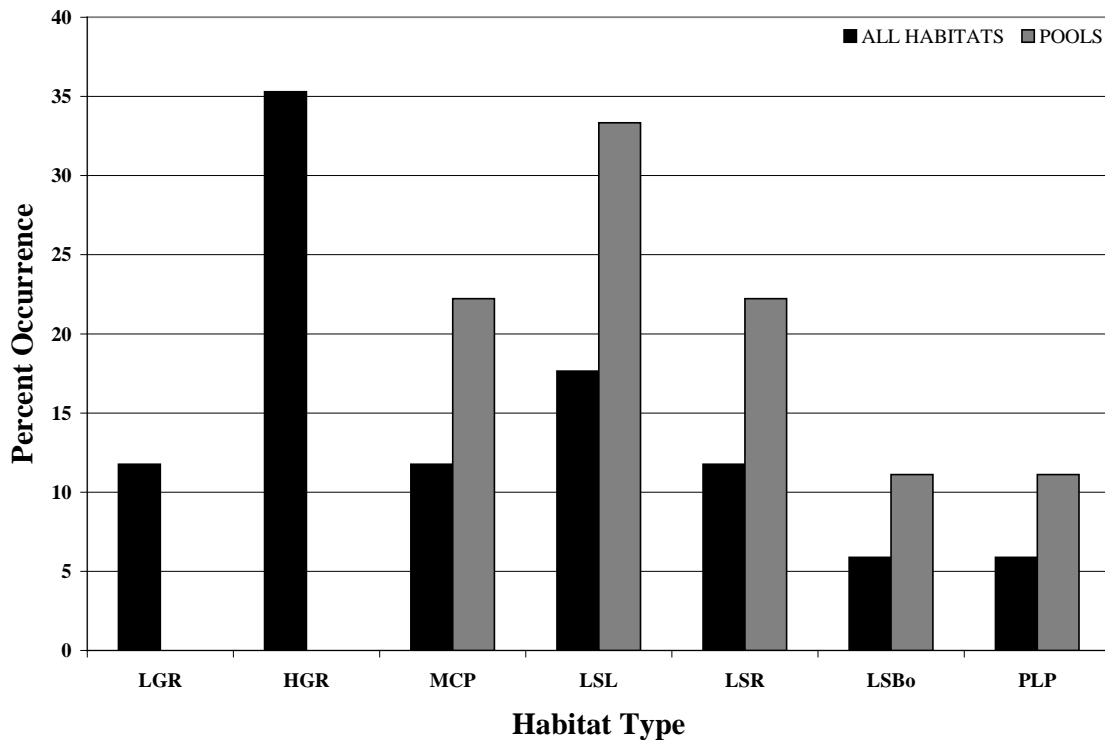


Figure F-19. Percent occurrence of habitat types surveyed in segment RJ15 within the Rockport Coastal Streams WAU, 2006.

Juan Creek (Segment RJ16)

The segment surveyed consisted of 29% pool, 71% riffle, and 0% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle habitat. There was an equal proportion of lateral scour pools formed by boulders to step pools (33%, Figure F-20). The dominant cover available to fish in pools in the segment was LWD (50%, Table F-3). The mean residual pool depth was 1.7 feet, with 11% of pools having residual depths ≥ 3 feet. The shelter rating was high (135), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.4 pieces per 328 feet) observed in the segment. However, 11% of pools were formed by LWD and there were 30.1 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was large gravel and the embeddedness rating was high (>50%).

Spawning Habitat

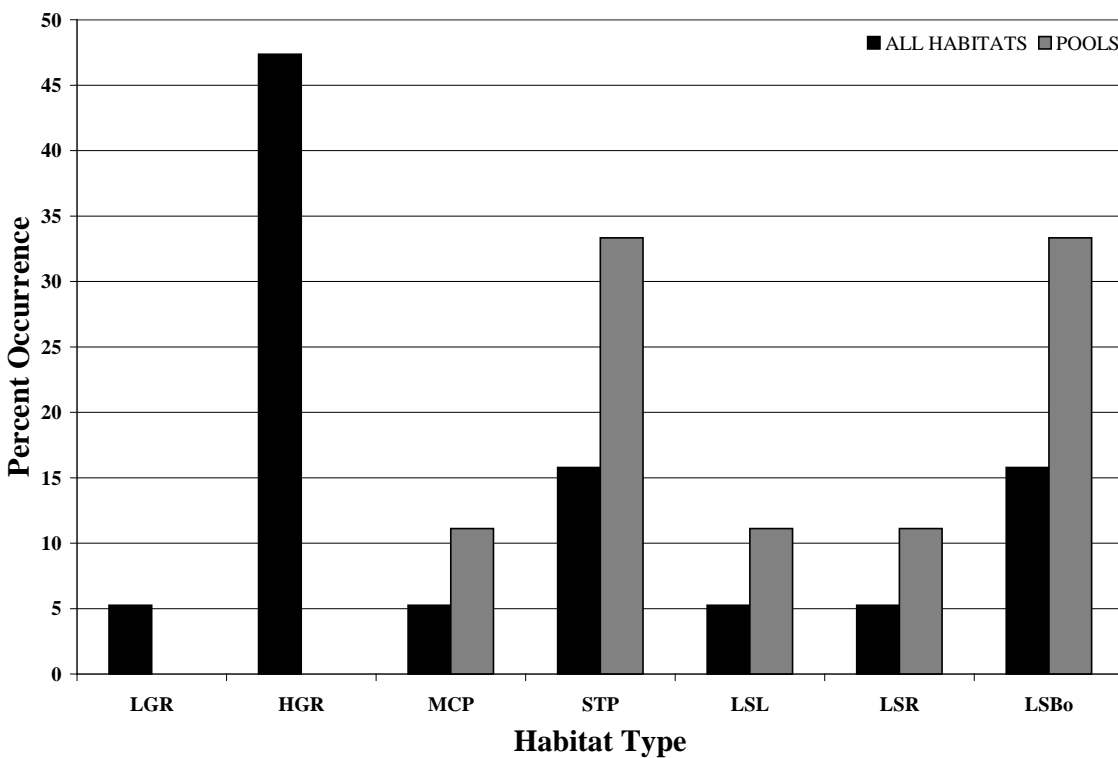
Spawning habitat in the segment was fair due to a moderate percentage of spawnable gravels available to fish in tailouts (42% of tailout area) and the dominant tailout substrate size (large gravel) was within the preferred range of salmonids. However, the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD and a low occurrence of pools with residual depths ≥ 3 feet. However, there was a moderate frequency of pools and a high shelter rating.

Over-wintering Habitat

Over-wintering habitat in the segment was fair due to a high occurrence of over-wintering substrate, a high shelter rating, and a moderate frequency of pools. However, there was a minimal amount of key LWD, a low occurrence of pools with residual depths ≥ 3 feet, and an absence of side channels.



Figure

F-20. Percent occurrence of habitat types surveyed in segment RJ16 within the Rockport Coastal Streams WAU, 2006.

Unnamed Right Bank Tributary to Juan Creek (Segment RJ19)

The segment surveyed consisted of 20% pool, 80% riffle, and 0% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered low with a high frequency of riffle habitat. The majority of pools were plunge pools (50%, Figure F-21). The dominant cover available to fish in pools in the segment was boulder (50%, Table F-3). The mean residual pool depth was 1.7 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was high (159), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (1.1 pieces per 328 feet) observed in the segment. However, 10% of pools were formed by LWD and there were 29.9 pieces of functional LWD

per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment appeared to be fair due to a moderate percentage of spawnable gravels available to fish in tailouts (27% of tailout area). However, the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD, a low frequency of pools, and a low occurrence of pools with residual depths ≥ 3 feet. However, there was a high shelter rating.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to minimal amounts of key LWD, a low occurrence of pools with residual depths ≥ 3 feet, a low frequency of pools, and an absence of side channels. However, there was a moderate occurrence of over-wintering substrate and a high shelter rating.

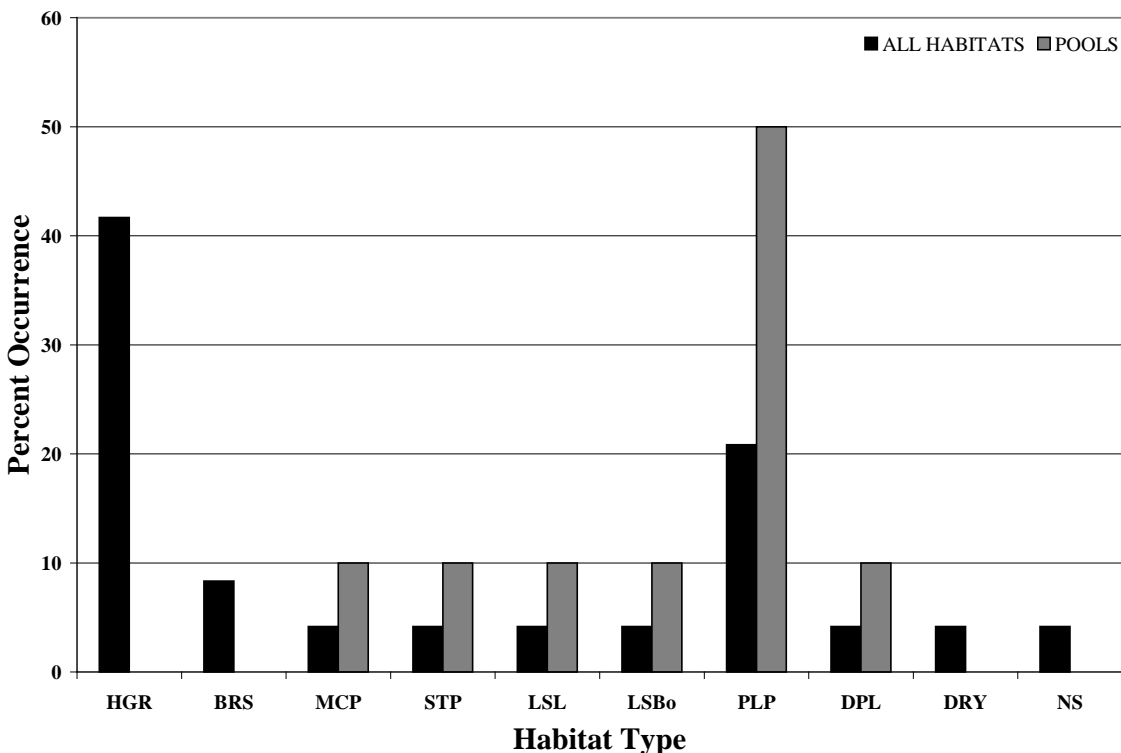


Figure F-21. Percent occurrence of habitat types surveyed in segment RJ19 within the Rockport Coastal Streams WAU, 2006.

Little Juan Creek (Segment RJ22)

The segment surveyed consisted of 27% pool, 64% riffle, and 9% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle habitat. The majority of pools were lateral scour pools formed by logs (44%, Figure F-22). The dominant cover available to fish in pools in the segment was LWD (50%, Table F-3). The mean residual pool depth was

1.1 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was moderate (116), mainly due to an availability of cover. There were minimal amounts of key LWD (0.3 pieces per 328 feet) observed in the segment. However, 44% of pools in this segment were formed by LWD and there were also 12.7 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high ($>50\%$).

Spawning Habitat

Spawning habitat in the segment appeared to be fair due to a moderate percentage of spawnable gravels available to fish in tailouts (32% of tailout area). However, the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to a minimal amount of key LWD and an absence of pools with residual depths ≥ 3 feet. However, there was a moderate frequency of pools and a moderate shelter rating.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to an absence of pools with residual depths ≥ 3 feet, a minimal amount of key LWD, and an absence of over-wintering substrate and side channels. However, there was a moderate shelter rating and a moderate frequency of pools.

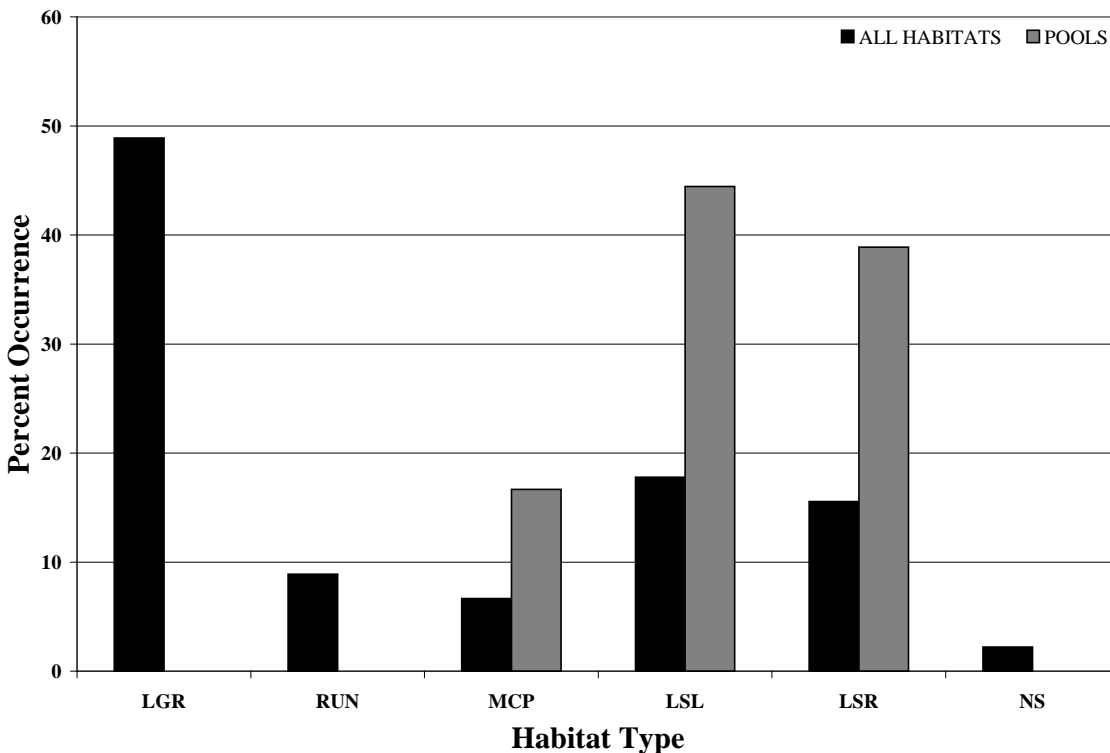


Figure F-22. Percent occurrence of habitat types surveyed in segment RJ22 within the Rockport Coastal Streams WAU, 2006.

Little Juan Creek (Segment RJ23)

The segment surveyed consisted of 32% pool, 61% riffle, and 8% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle habitat. The majority of pools were lateral scour pools formed by logs (57%, Figure F-23). The dominant cover available to fish in pools in the segment was LWD (71%, Table F-3). The mean residual pool depth was 1.4 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was high (129), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.5 pieces per 328 feet) observed in the segment. However, 57% of pools were formed by LWD and there were 29.8 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment appeared to be fair due to a moderate percentage of spawnable gravels available to fish in tailouts (35% of tailout area). However, the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD and an absence of pools with residual depths ≥ 3 feet. However, there was a moderate frequency of pools and a high shelter rating.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to minimal amounts of key LWD, an absence of pools with residual depths ≥ 3 feet, and an absence of side channels and over-wintering substrate. However, there was a moderate frequency of pools and a high shelter rating.

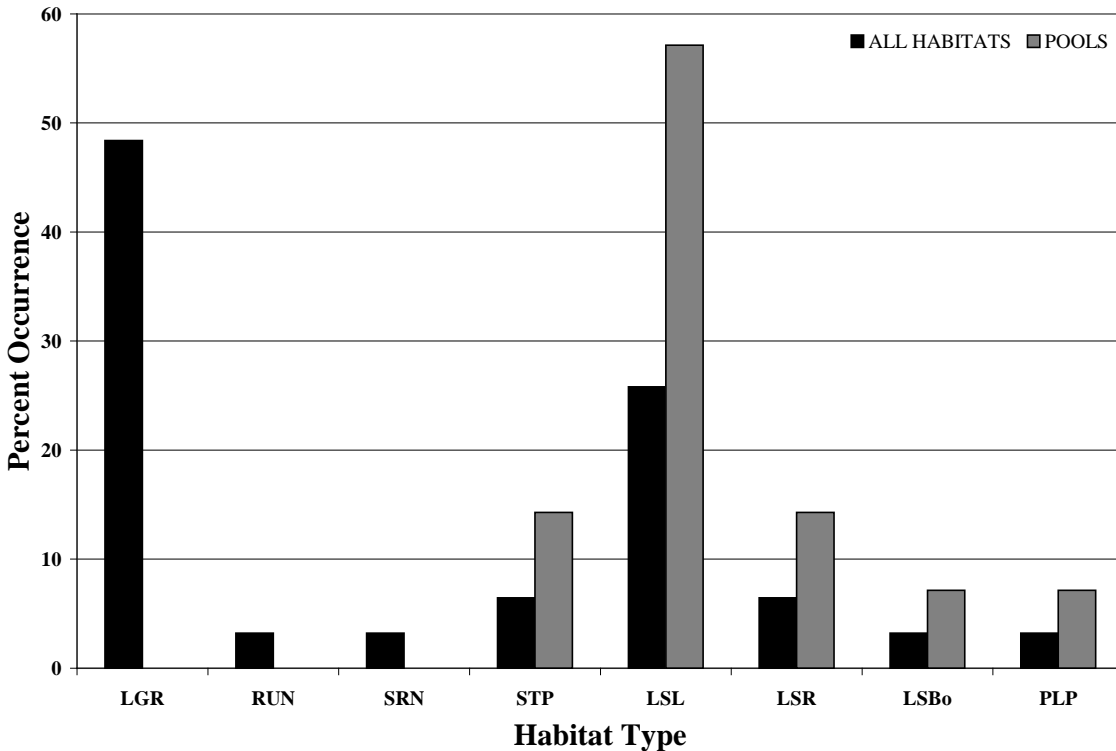


Figure F-23. Percent occurrence of habitat types surveyed in segment RJ23 within the Rockport Coastal Streams WAU, 2006.

Little Juan Creek (Segment RJ26)

The segment surveyed consisted of 47% pool, 42% riffle, and 10% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a moderate frequency of riffle habitat. The majority of pools were lateral scour formed by logs (40%, Figure F-24). The dominant cover available to fish in pools in the segment was LWD (73%, Table F-3). The mean residual pool depth was 1.6 feet, with 10% of pools having residual depths ≥ 3 feet. The shelter rating was high (153), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.9 pieces per 328 feet) observed in the segment. However, 40% of pools were formed by LWD and there were 38.6 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high ($>50\%$).

Spawning Habitat

Spawning habitat in the segment was poor due to a low percentage of spawnable gravels available to fish in tailouts (21% of tailout area), the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids, and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was fair due to a moderate frequency of pools and a high shelter rating. However, there was a minimal amount of key LWD and a low occurrence of pools with residual depths ≥ 3 feet.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to minimal amounts of key LWD, a low occurrence of pools with residual depths ≥ 3 feet, and an absence of side channels and over-wintering substrate. However, there was a high shelter rating and a moderate frequency of pools.

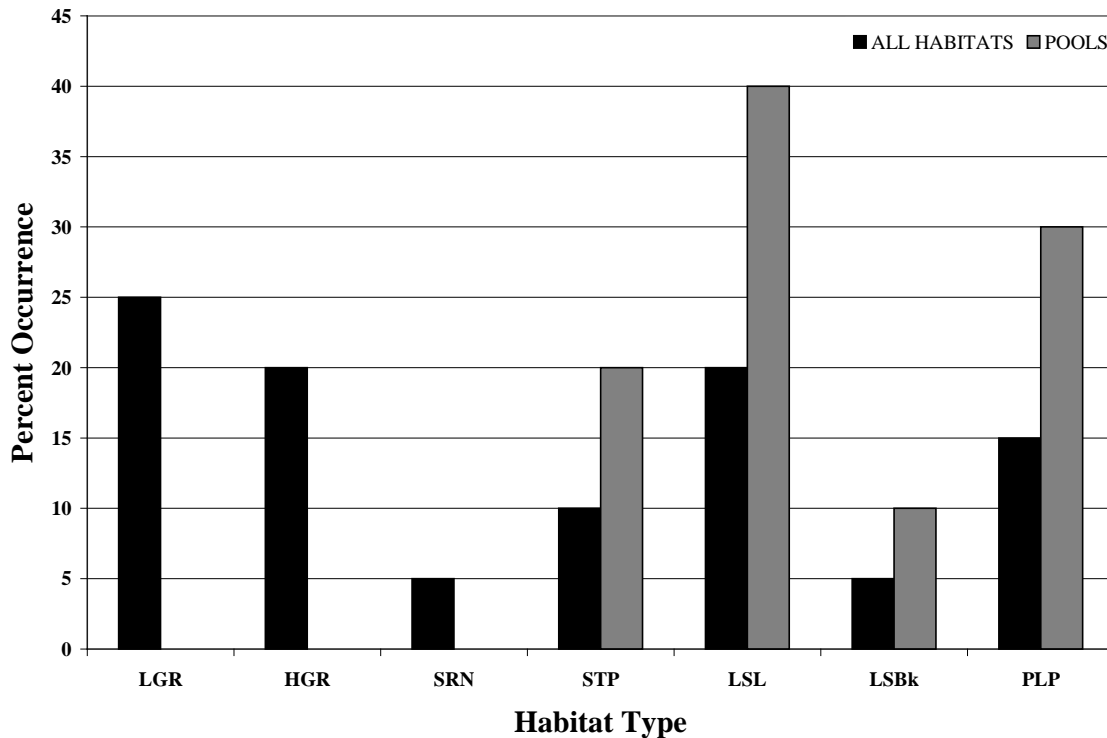


Figure F-24. Percent occurrence of habitat types surveyed in segment RJ26 within the Rockport Coastal Streams WAU, 2006.

Little Juan Creek (Segment RJ27)

The segment surveyed consisted of 21% pool, 71% riffle, and 8% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered low with a high frequency of riffle habitat. The majority of pools were lateral scour pools formed by logs (75%, Figure F-25). The dominant cover available to fish in pools in the segment was LWD (100%, Table F-3). The mean residual pool depth was 1.2 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was high (133), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.3 pieces per 328 feet) observed in the segment. However, 75% of pools were formed by LWD and there were 30.7 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment was poor due to a low percentage of spawnable gravels available to fish in tailouts (15% of tailout area), the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids, and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD, a low frequency of pools, and an absence of pools with residual depths ≥ 3 feet. However, there was a high shelter rating.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to a minimal amount of key LWD, a low frequency of pools, an absence of pools with residual depths ≥ 3 feet, and an absence of side channels and over-wintering substrate. However, there was high shelter rating.

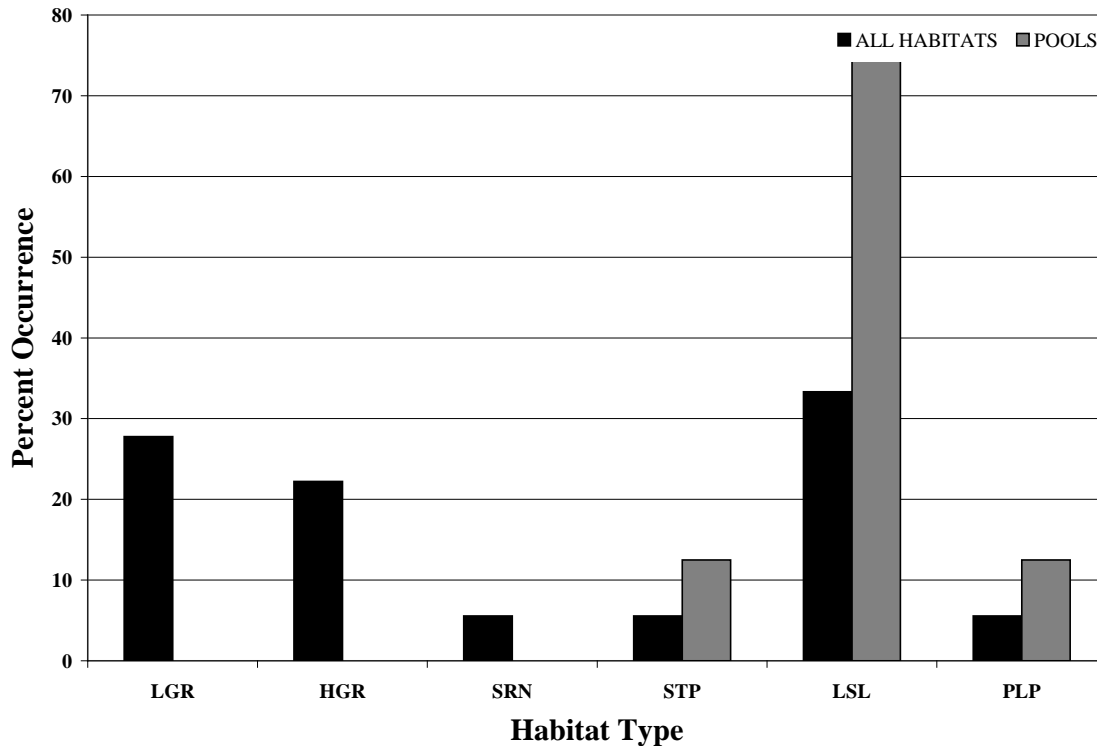


Figure F-25. Percent occurrence of habitat types surveyed in segment RJ27 within the Rockport Coastal Streams WAU, 2006.

Little Juan Creek (Segment RJ28)

The segment surveyed consisted of 9% pool, 91% riffle, and 0% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered low with a high frequency of riffle habitat. The majority of pools were mid channel pools (40%, Figure F-26). The dominant cover available to fish in pools in the segment was SWD (40%, Table F-3). The mean residual pool depth was 0.9 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was moderate (84), mainly due to an availability of cover. There were minimal amounts of key LWD (0.2 pieces per 328 feet) observed in the segment. However, 20% of pools were formed by LWD and there were 22.8 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment was poor due to a low percentage of spawnable gravels available to fish in tailouts (20% of tailout area), the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids, and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD, a low frequency of pools, and an absence of pools with residual depths ≥ 3 feet. However, there was a moderate shelter rating.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to a minimal amount of key LWD, a low frequency of pools, an absence of pools with residual depths ≥ 3 feet, and an absence of side channels and over-wintering substrate. However, there was a moderate shelter rating.

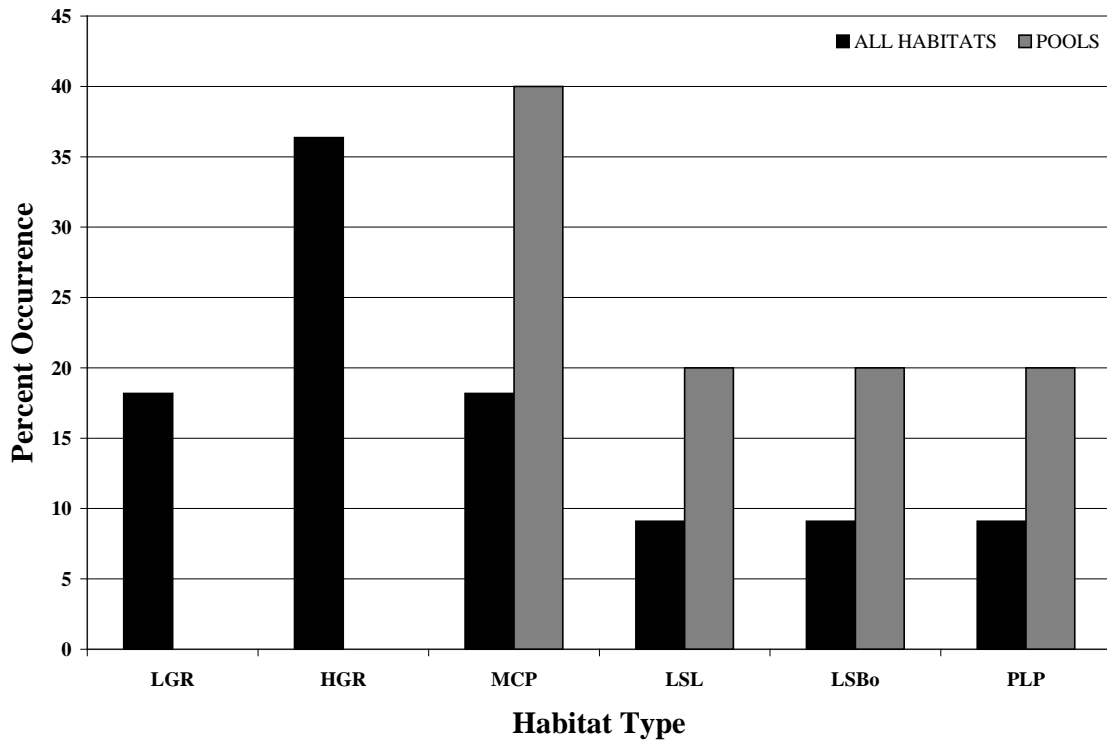


Figure F-26. Percent occurrence of habitat types surveyed in segment RJ28 within the Rockport Coastal Streams WAU, 2006.

Howard Creek Planning Watershed***Howard Creek (Segment RW01)***

The segment surveyed consisted of 47% pool, 43% riffle, and 9% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a moderate frequency of riffle habitat. The majority of pools were lateral scour formed by logs (64%, Figure F-27). The dominant cover available to fish in pools in the segment was LWD (71%, Table F-3). The mean residual pool depth was 1.9 feet, with 21% of pools having residual depths ≥ 3 feet. The shelter rating was high (154), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.2 pieces per 328 feet) observed in the segment. However, 64% of pools were formed by LWD and there were 16.3 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was large gravel and the embeddedness rating was high ($>50\%$).

Spawning Habitat

Spawning habitat in the segment was good due to a high percentage of spawnable gravels available to fish in tailouts (60% of tailout area) and the dominant tailout substrate size (large gravel) was within the preferred range of salmonids. However, the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was fair due to a moderate frequency of pools and a high shelter rating. However, there was a minimal amount of key LWD and a low occurrence of pools with residual depths ≥ 3 feet.

Over-wintering Habitat

Over-wintering habitat in the segment was fair due to a high frequency of side channels, a high shelter rating, and a moderate frequency of pools. However, there was a minimal amount of key LWD, a low occurrence of pools with residual depths ≥ 3 feet, and minimal over-wintering substrate.

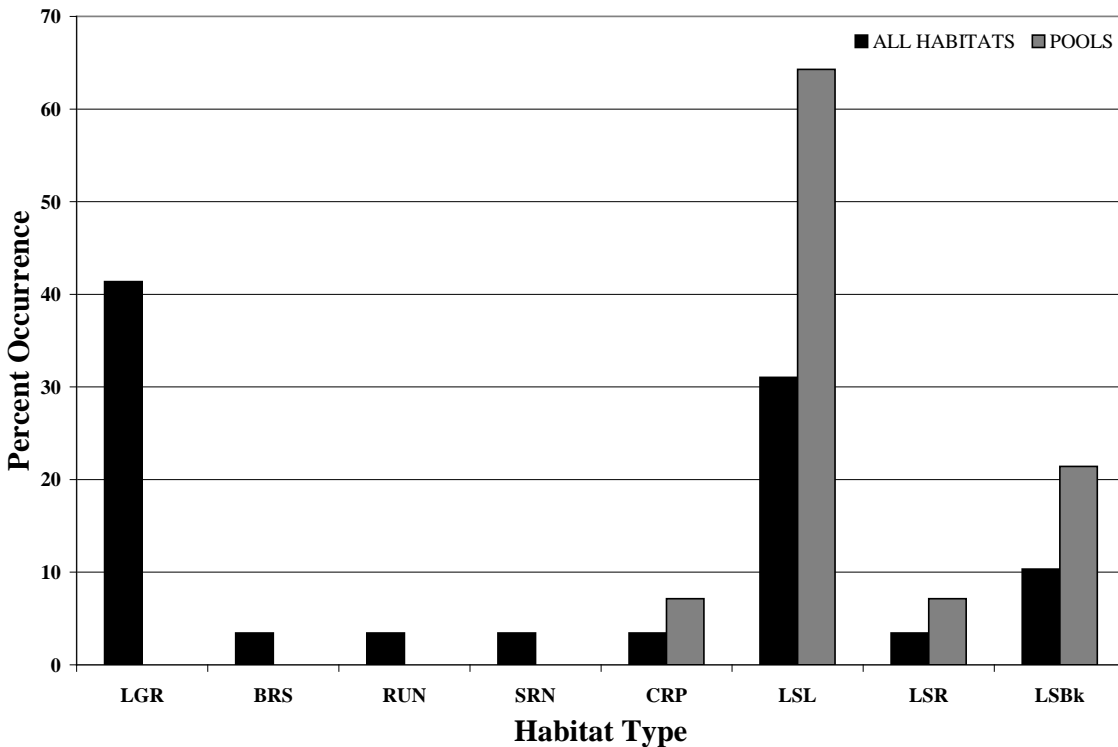


Figure F-27. Percent occurrence of habitat types surveyed in segment RW01 within the Rockport Coastal Streams WAU, 2006.

Howard Creek (Segment RW03)

The segment surveyed consisted of 32% pool, 51% riffle, and 17% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle habitat. The majority of pools were lateral scour formed by logs (80%, Figure F-28). The dominant cover available to fish in pools in the segment was LWD (80%, Table F-3). The mean residual pool depth was 1.8 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was high (159), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.2 pieces per 328 feet) observed in the segment. However, 80% of pools were formed by LWD and there were 22.5 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was moderate (25-50%).

Spawning Habitat

Spawning habitat in the segment appeared to be fair due to a high percentage of spawnable gravels available to fish in tailouts (60% of tailout area) and the spawning gravels were slightly embedded. However, the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD and an absence of pools with residual depths ≥ 3 feet. However, there was a high shelter rating and a moderate frequency of pools.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to minimal amounts of key LWD, an absence of pools with residual depths ≥ 3 feet, and an absence of side channels. However, there was moderate amount of over-wintering substrate, a moderate frequency of pools, and a high shelter rating.

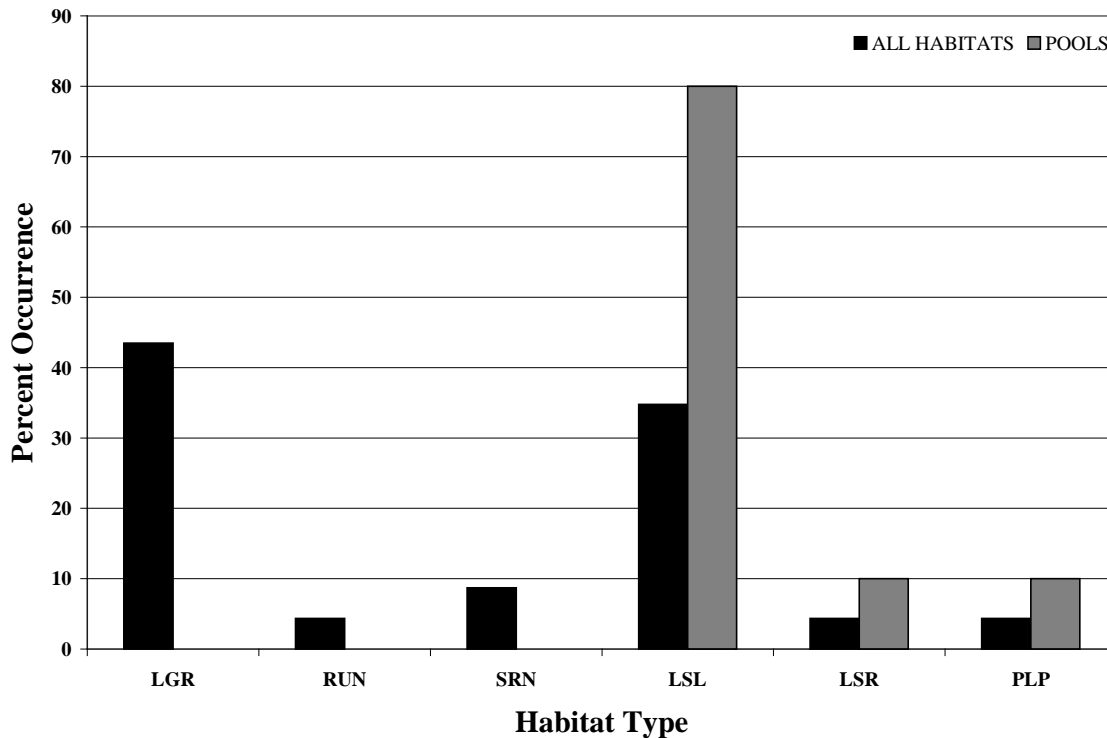


Figure F-28. Percent occurrence of habitat types surveyed in segment RW03 within the Rockport Coastal Streams WAU, 2006.

Howard Creek (Segment RW05)

The segment surveyed consisted of 27% pool, 73% riffle, and 0% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a high frequency of riffle habitat. There was an equal proportion of lateral scour pools formed by logs as to lateral scour pools formed by rootwads (33%, Figure F-29). The dominant cover available to fish in pools in the segment was LWD (67%, Table F-3). The mean residual pool depth was 1.4 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was high (166), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.5 pieces per 328 feet) observed in the segment. However, 33% of pools were formed by LWD and there were 33.3 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment appeared to be fair due to a high percentage of spawnable gravels available to fish in tailouts (54% of tailout area). However, the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD and an absence of pools with residual depths ≥ 3 feet. However, there was a high shelter rating and a moderate frequency of pools.

Over-wintering Habitat

Over-wintering habitat in the segment was fair due to a high amount of over-wintering substrate, a moderate frequency of pools, and a high shelter rating. However, there was a minimal amount of key LWD, an absence of pools with residual depths ≥ 3 feet, and an absence of side channels.

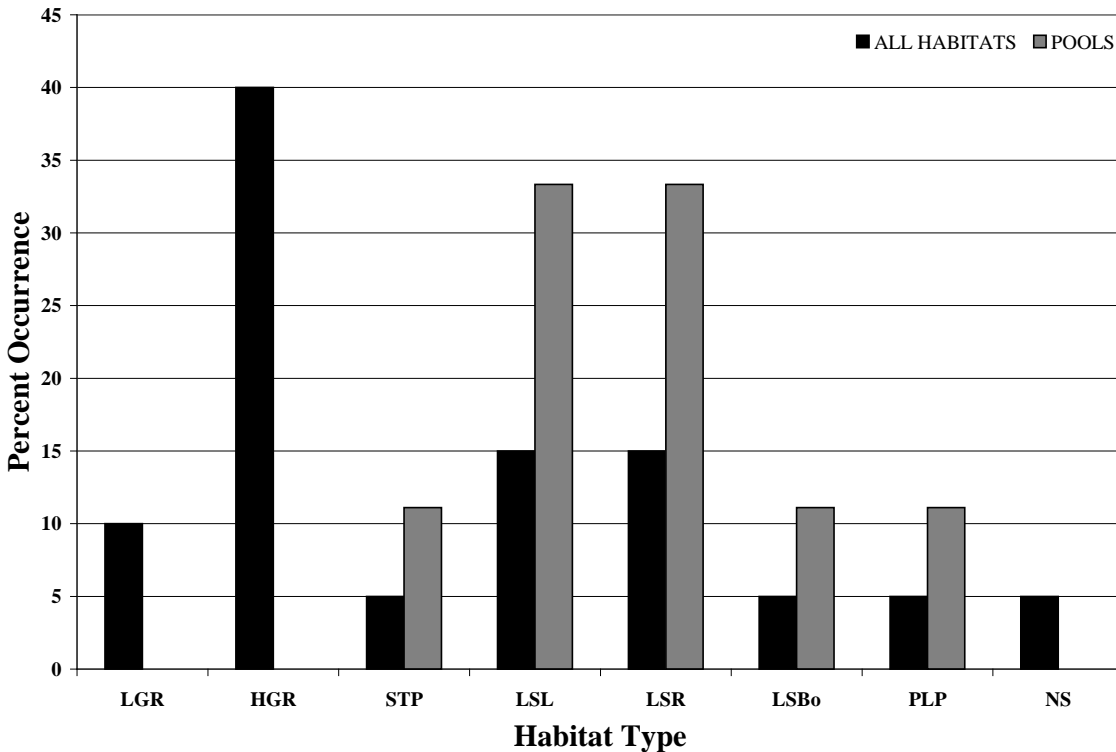


Figure F-29. Percent occurrence of habitat types surveyed in segment RW05 within the Rockport Coastal Streams WAU, 2006.

Howard Creek (Segment RW07)

The segment surveyed consisted of 10% pool, 90% riffle, and 0% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered low with a high frequency of riffle habitat. There was an equal proportion of lateral scour pools formed by logs as to lateral scour pools formed by boulder (43%, Figure F-30). The dominant cover available to fish in pools in the segment was boulder (57%, Table F-3). The mean residual pool depth was 1.4 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was high (143), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.3 pieces per 328 feet) observed in the segment. However, 43% of pools were formed by LWD and there were 20.3 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment appeared to be fair due to a moderate percentage of spawnable gravels available to fish in tailouts (27% of tailout area). However, the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD, a low frequency of pools, and an absence of pools with residual depths ≥ 3 feet. However, there was a high shelter rating.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to minimal amounts of key LWD, a low frequency of pools, an absence of pools with residual depths ≥ 3 feet, and an absence of side channels. However, there was a moderate amount of over-wintering substrate and a high shelter rating.

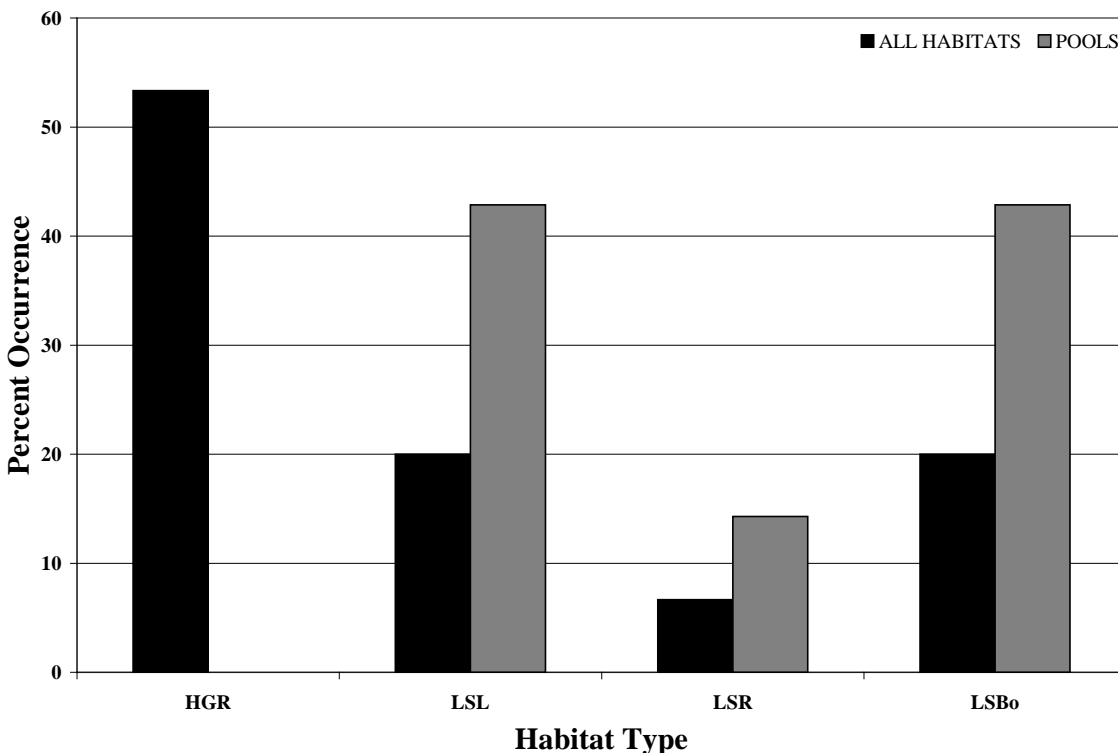


Figure F-30. Percent occurrence of habitat types surveyed in segment RW07 within the Rockport Coastal Streams WAU, 2006.

Rock Creek (Segment RW10)

The segment surveyed consisted of 43% pool, 50% riffle, and 17% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered moderate with a moderate frequency of riffle habitat. The majority of pools were lateral scour formed by logs (58%, Figure F-31). The dominant cover available to fish in pools in the segment was LWD (74%, Table F-3). The mean residual pool depth was 1.3 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was high (142), mainly due to good cover complexity and availability. There were minimal amounts of key LWD (0.7 pieces per 328 feet) observed in the segment. However, 58% of pools were formed by LWD and there were 26.4 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was large gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment was good due to a high percentage of spawnable gravels available to fish in tailouts (59% of tailout area) and the dominant tailout substrate size (large gravel) was within the preferred range of salmonids. However, the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was fair due to a high shelter rating and a moderate frequency of pools. However, there was a minimal amount of key LWD and an absence of pools with residual depths ≥ 3 feet.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to minimal over-wintering substrate, a minimal amount of key LWD, an absence of pools with residual depths ≥ 3 feet, and an absence of side channels. However, there was a high shelter rating and a moderate frequency of pools.

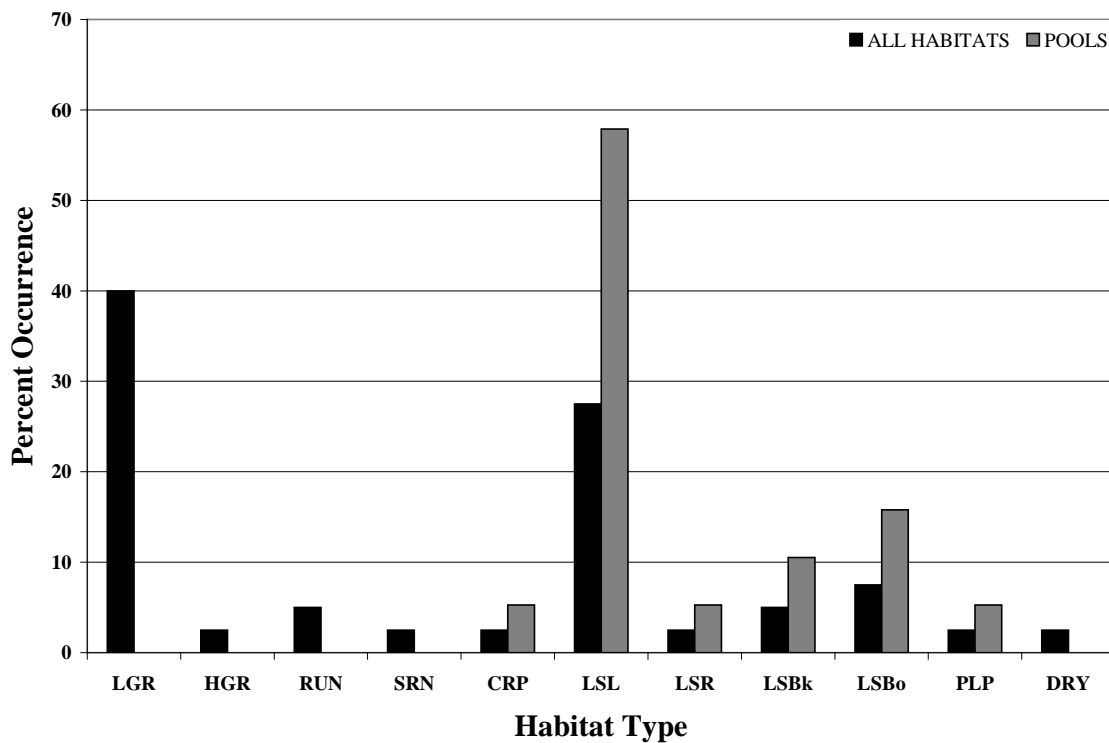


Figure F-31. Percent occurrence of habitat types surveyed in segment RW10 within the Rockport Coastal Streams WAU, 2006.

Rock Creek (Segment RW11)

The segment surveyed consisted of 12% pool, 82% riffle, and 6% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered low with a high frequency of riffle habitat. The majority of pools were lateral scour formed by logs (56%, Figure F-32). The dominant cover available to fish in pools in the segment was LWD (44%, Table F-3). The mean residual pool depth was 1.4 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was moderate (113), mainly due to an availability of cover. There were minimal amounts of key LWD (0.7 pieces per 328 feet) observed in the segment. However, 56% of pools were formed by LWD and there were 24.6 pieces of functional LWD

per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment was poor due to a low percentage of spawnable gravels available to fish in tailouts (14% of tailout area), the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids, and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD, a low frequency of pools, and an absence of pools with residual depths ≥ 3 feet. However, there was a moderate shelter rating.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to a minimal amount of key LWD, a low frequency of pools, minimal over-wintering substrate, an absence of pools with residual depths ≥ 3 feet, and absence of side channels. However, there was a moderate shelter rating.

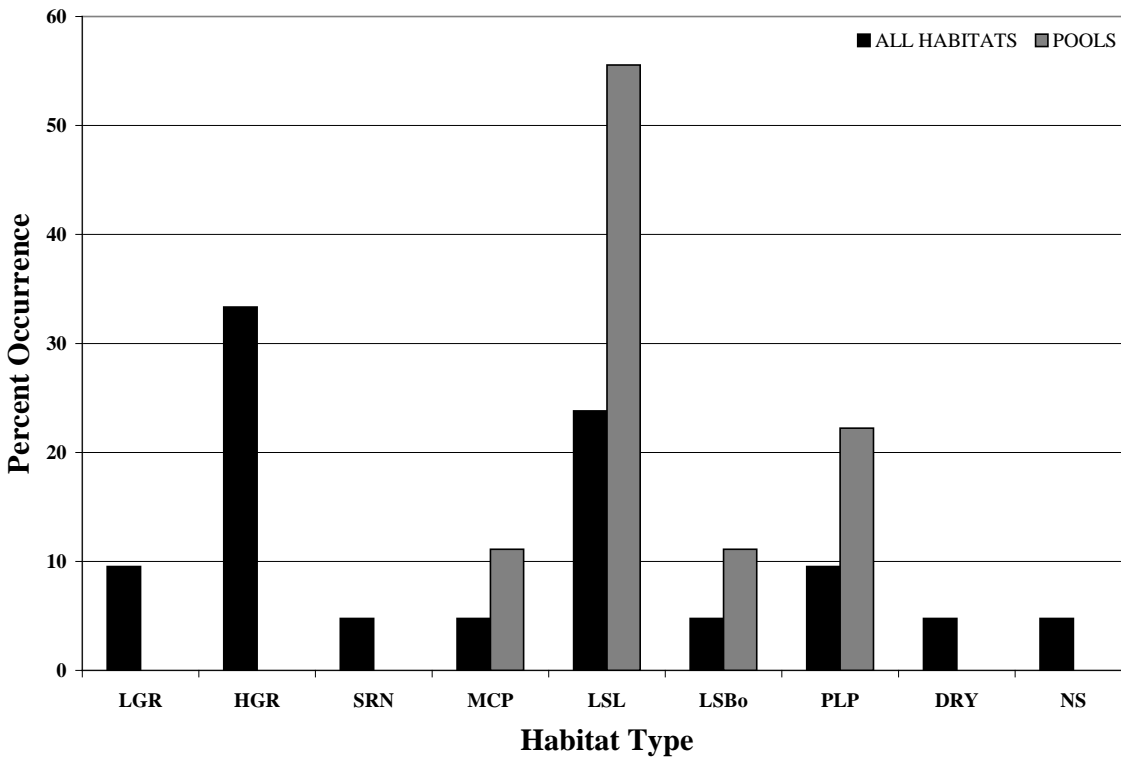


Figure F-32. Percent occurrence of habitat types surveyed in segment RW11 within the Rockport Coastal Streams WAU, 2006.

Rock Creek (Segment RW14)

The segment surveyed consisted of 11% pool, 79% riffle, and 10% flatwater by stream length (Table F-5). The frequency of pools in the segment was considered low with a high frequency of riffle habitat. The majority of pools were lateral scour formed by logs (38%, Figure F-33). The dominant cover available to fish in pools in the segment was LWD (50%, Table F-3). The mean residual pool depth was 0.9 feet, with 0% of pools having residual depths ≥ 3 feet. The shelter rating was high (123), mainly due to good cover

complexity and availability. There were minimal amounts of key LWD (0.8 pieces per 328 feet) observed in the segment. However, 38% of pools were formed by LWD and there were 20.8 pieces of functional LWD per 328 feet surveyed. The dominant tailout substrate was small gravel and the embeddedness rating was high (>50%).

Spawning Habitat

Spawning habitat in the segment appeared to be fair due to a moderate percentage of spawnable gravels available to fish in tailouts (28% of tailout area). However, the dominant tailout substrate size (small gravel) is slightly smaller than the preferred range of salmonids and the spawning gravels were embedded.

Summer Rearing Habitat

Summer rearing habitat in the segment was poor due to minimal amounts of key LWD, a low frequency of pools, and an absence of pools with residual depths ≥ 3 feet. However, there was a high shelter rating.

Over-wintering Habitat

Over-wintering habitat in the segment was poor due to a minimal amount of key LWD, a low frequency of pools, minimal over-wintering substrate, an absence of pools with residual depths ≥ 3 feet, and absence of side channels. However, there was a high shelter rating.

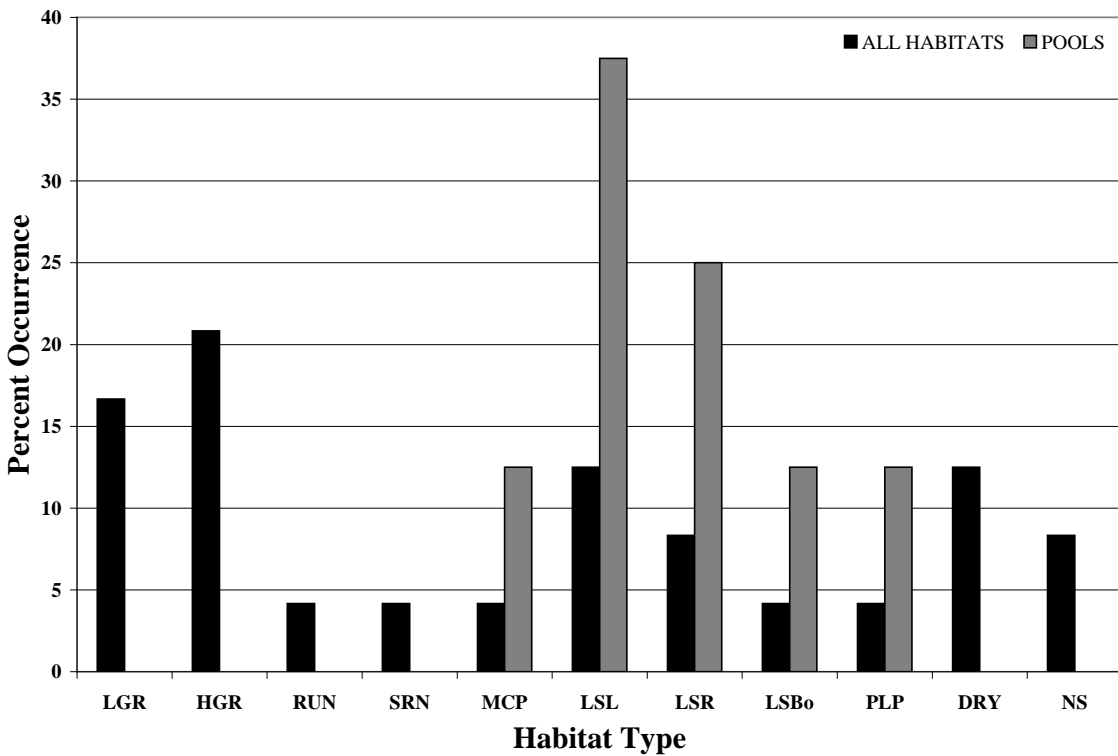


Figure F-33. Percent occurrence of habitat types surveyed in segment RW14 within the Rockport Coastal Streams WAU, 2006.

Permeability Samples

Results from permeability and percent fine particles <0.85 mm for the long term stream monitoring segment RJ02 in Juan Creek is presented in Table F-7. MRC used the following criteria for evaluating permeability: 0-3000 cm/hr is deficient, 3000-10,000 cm/hr is marginal, and >10,000 cm/hr is on target. The geometric mean permeability observations for both stream monitoring segments are in the marginal category. A mean observation, as presented for the segments, provides an index of the segment's condition, however, observations ranged from deficient to on target. This suggests that though the mean observations are low, and of concern, there are some areas of good quality spawning gravels within the segments sampled.

Table F-7. Permeability and associated survival indices for Long Term Monitoring Segments of the Rockport Coastal Streams WAU, 2006.

Segment ID	Stream Name	Geometric Mean Permeability for Segment (cm/hr)	Standard Error Permeability (cm/hr)	Range of Permeability Observations (cm/hr)	Permeability Survival Index (Taggart/McCuddin)
RJ02	Juan Creek	4,840	1,453	1,470 - 30,119	44%

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APPENDIX F

Table A27. Summary of results for fish distribution surveys within the Hardy Creek watershed, Mendocino Co., California. Refer to Map 5.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
HARDY CREEK	47-18	7/20/1994	15	5				CGS
HARDY CREEK	47-18	8/1/1995	PRESENT	PRESENT	PRESENT			CGS SCP
HARDY CREEK	47-18	8/8/1996	PRESENT	PRESENT	PRESENT			CGS SKR
HARDY CREEK	47-18	6/22/2000	5	4	1			CR
HARDY CREEK	47-18	9/11/2001	2	2	1			CR CGS
HARDY CREEK	47-18	8/2/2002	9	6	1			CGS
HARDY CREEK	47-18	10/13/2006	20	21	1	1	1	CR CGS
HARDY CREEK	47-18	10/2/2007	32	56	4			
HARDY CREEK	47-18	9/10/2008	33	18	1			SCP
HARDY CREEK	47-18	6/30/2010	29	33	1			CGS SCP
SF HARDY CREEK	47-19	7/20/1994	7	3				CGS
SF HARDY CREEK	47-19	7/11/1995	PRESENT	PRESENT	PRESENT			CGS
SF HARDY CREEK	47-19	8/8/1996	PRESENT	PRESENT	PRESENT			CGS
SF HARDY CREEK	47-19	6/22/2000		4	2			CGS TLF
SF HARDY CREEK	47-19	9/4/2001	2	5	1			CGS

* Species Abbreviations; ALL=Alligator Lizard; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; CGS=Coastal/California Giant Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; GTR=Garter Snake; LAM=Pacific Lamprey; NEW=Newt (Unidentified Species); NWP=Northwestern Pond Turtle; PBL=Pacific Brook Lamprey; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RBN= Red Bellied Newt; RCH=California Roach; RLF=Red-legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Coastal Tailed Frog; WDS=Wandering Salamander; WTD=Western Toad; YLF=Yellow-legged Frog.

* Blank spaces indicate that no organisms were observed.

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Table A28. Summary of results for fish distribution surveys within the Hardy Creek watershed, Mendocino Co., California. Refer to Map 5.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
SF HARDY CREEK	47-19	8/8/2002	6		1			CGS
HARDY CREEK	47-20	7/20/1994	23	10				
HARDY CREEK	47-20	7/11/1995	PRESENT	PRESENT	PRESENT			CGS
HARDY CREEK	47-20	8/8/1996	PRESENT	PRESENT				CGS
HARDY CREEK	47-20	6/22/2000	1	7	1			CGS
HARDY CREEK	47-20	9/4/2001	4	2	1			CGS
HARDY CREEK	47-20	8/8/2002	10	3				CGS
NF HARDY CREEK	47-21	7/20/1994						CGS
NF HARDY CREEK	47-21	7/11/1995						CGS
NF HARDY CREEK	47-21	8/8/1996						CGS
NF HARDY CREEK	47-21	6/22/2000		8	1			CGS
NF HARDY CREEK	47-21	9/4/2001	1					CGS
NF HARDY CREEK	47-21	8/14/2002	4	2				CGS
NF HARDY CREEK	47-34	9/4/2001	1	1				CGS
NF HARDY CREEK	47-34	8/8/2002	1		1			CGS

* Species Abbreviations; ALL=Alligator Lizard; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; CGS=Coastal/California Giant Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; GTR=Garter Snake; LAM=Pacific Lamprey; NEW=Newt (Unidentified Species); NWP=Northwestern Pond Turtle; PBL=Pacific Brook Lamprey; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RBN= Red Bellied Newt; RCH=California Roach; RLF=Red-legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Coastal Tailed Frog; WDS=Wandering Salamander; WTD=Western Toad; YLF=Yellow-legged Frog.

* Blank spaces indicate that no organisms were observed.

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Table A29. Summary of results for fish distribution surveys within the Hardy Creek watershed, Mendocino Co., California. Refer to Map 5.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
NF HARDY CREEK	47-40	8/8/2002						CGS
TRIB TO HARDY CREEK #1	47-22	8/8/1996		PRESENT				CGS
TRIB TO HARDY CREEK #1	47-22	6/22/2000	2					CGS
TRIB TO HARDY CREEK #1	47-22	9/11/2001	1	2				CGS
TRIB TO HARDY CREEK #1	47-22	8/2/2002	1					CGS

* Species Abbreviations; ALL=Alligator Lizard; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; CGS=Coastal/California Giant Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; GTR=Garter Snake; LAM=Pacific Lamprey; NEW=Newt (Unidentified Species); NWP=Northwestern Pond Turtle; PBL=Pacific Brook Lamprey; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RBN= Red Bellied Newt; RCH=California Roach; RLF=Red-legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Coastal Tailed Frog; WDS=Wandering Salamander; WTD=Western Toad; YLF=Yellow-legged Frog.

* Blank spaces indicate that no organisms were observed.

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Table A30. Summary of results for fish distribution surveys within the Juan Creek watershed, Mendocino Co., California. Refer to Map 5.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
LITTLE JUAN CREEK	47-23	7/15/1994	2	6				CR CGS PR
LITTLE JUAN CREEK	47-23	7/11/1995	PRESENT	PRESENT				CGS SCP
LITTLE JUAN CREEK	47-23	8/9/1996	PRESENT	PRESENT	PRESENT			CGS SCP
LITTLE JUAN CREEK	47-23	6/22/2000	18	5				CR
LITTLE JUAN CREEK	47-23	9/6/2001	5	1				CGS
LITTLE JUAN CREEK	47-23	8/2/2002	2	2				CR CGS
LITTLE JUAN CREEK	47-24	8/8/1996	PRESENT	PRESENT	PRESENT			
LITTLE JUAN CREEK	47-24	6/23/2000	17	5	2			CGS
LITTLE JUAN CREEK	47-25	8/9/1996						CGS
LITTLE JUAN CREEK	47-25	6/23/2000	4	5	2			CGS TLF
LITTLE JUAN CREEK	47-25	10/8/2001						CGS
LITTLE JUAN CREEK	47-25	8/7/2002	3	5				CGS
LITTLE JUAN CREEK	47-41	8/7/2002						CGS
JUAN CREEK	47-26	7/14/1994	8	5				CR
JUAN CREEK	47-26	7/11/1995	PRESENT	PRESENT	PRESENT			SCP

* Species Abbreviations; ALL=Alligator Lizard; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; CGS=Coastal/California Giant Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; GTR=Garter Snake; LAM=Pacific Lamprey; NEW=Newt (Unidentified Species); NWP=Northwestern Pond Turtle; PBL=Pacific Brook Lamprey; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RBN= Red Bellied Newt; RCH=California Roach; RLF=Red-legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Coastal Tailed Frog; WDS=Wandering Salamander; WTD=Western Toad; YLF=Yellow-legged Frog.

* Blank spaces indicate that no organisms were observed.

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Table A31. Summary of results for fish distribution surveys within the Juan Creek watershed, Mendocino Co., California. Refer to Map 5.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
JUAN CREEK	47-26	8/9/1996	PRESENT	PRESENT	PRESENT			CGS SCP
JUAN CREEK	47-26	6/20/2000	12	7	1			CR
JUAN CREEK	47-26	9/6/2001	6	3				CR PR
JUAN CREEK	47-26	8/2/2002	4	3				CR PR
JUAN CREEK	47-26	9/14/2005	13	9	2			CR PR STB
JUAN CREEK	47-26	10/16/2006	8	23	11			CR PR STB
JUAN CREEK	47-26	7/24/2007	42	43	6			CR PR STB
JUAN CREEK	47-26	9/24/2008	48	40	7			SCP STB
JUAN CREEK	47-26	7/28/2010	40	8	5			SCP
JUAN CREEK	47-27	8/11/1994	13	9	2			CGS
JUAN CREEK	47-27	7/11/1995	PRESENT	PRESENT	PRESENT			CGS
JUAN CREEK	47-27	8/9/1996	PRESENT	PRESENT	PRESENT			CGS
JUAN CREEK	47-27	6/22/2000	11	6	1			CGS
JUAN CREEK	47-28	8/9/1996	PRESENT	PRESENT	PRESENT			CGS
JUAN CREEK	47-28	6/22/2000	16	15	2			CGS TLF

* Species Abbreviations; ALL=Alligator Lizard; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; CGS=Coastal/California Giant Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; GTR=Garter Snake; LAM=Pacific Lamprey; NEW=Newt (Unidentified Species); NWP=Northwestern Pond Turtle; PBL=Pacific Brook Lamprey; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RBN= Red Bellied Newt; RCH=California Roach; RLF=Red-legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Coastal Tailed Frog; WDS=Wandering Salamander; WTD=Western Toad; YLF=Yellow-legged Frog.

* Blank spaces indicate that no organisms were observed.

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Table A32. Summary of results for fish distribution surveys within the Juan Creek watershed, Mendocino Co., California. Refer to Map 5.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
JUAN CREEK	47-28	9/6/2001	8	3				CGS
JUAN CREEK	47-28	8/7/2002			1			CGS
JUAN CREEK	47-29	8/11/1994						CGS
JUAN CREEK	47-29	7/11/1995						CGS
JUAN CREEK	47-29	8/9/1996						CGS
JUAN CREEK	47-29	6/22/2000						CGS RSN
JUAN CREEK	47-29	9/6/2001						CGS
JUAN CREEK	47-29	8/7/2002						CGS

* Species Abbreviations; ALL=Alligator Lizard; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; CGS=Coastal/California Giant Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; GTR=Garter Snake; LAM=Pacific Lamprey; NEW=Newt (Unidentified Species); NWP=Northwestern Pond Turtle; PBL=Pacific Brook Lamprey; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RBN= Red Bellied Newt; RCH=California Roach; RLF=Red-legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Coastal Tailed Frog; WDS=Wandering Salamander; WTD=Western Toad; YLF=Yellow-legged Frog.

* Blank spaces indicate that no organisms were observed.

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Table A33. Summary of results for fish distribution surveys within the Howard Creek watershed, Mendocino Co., California. Refer to Map 5.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
HOWARD CREEK	47-30	8/11/1994	26	16	1			CGS
HOWARD CREEK	47-30	7/11/1995	PRESENT	PRESENT				CGS SCP
HOWARD CREEK	47-30	8/9/1996	PRESENT	PRESENT	PRESENT			CGS SCP
HOWARD CREEK	47-30	6/26/2000	14	14	7			CGS
HOWARD CREEK	47-30	7/5/2001	10	2	1			CGS
HOWARD CREEK	47-30	8/14/2002		5				CR CGS
ROCK CREEK	47-31	8/11/1994	21	14	3			CGS
ROCK CREEK	47-31	7/11/1995	PRESENT	PRESENT				CGS TLF
ROCK CREEK	47-31	8/9/1996	PRESENT	PRESENT	PRESENT			CGS SCP
ROCK CREEK	47-31	6/26/2000	25	7	1			CGS
ROCK CREEK	47-31	7/5/2001	9	3				CGS
ROCK CREEK	47-31	8/14/2002	2	3				CGS
HOWARD CREEK	47-32	8/11/1994	2	3	1			CGS
HOWARD CREEK	47-32	7/11/1995	PRESENT	PRESENT	PRESENT			CGS
HOWARD CREEK	47-32	8/9/1996	PRESENT	PRESENT	PRESENT			CGS

* Species Abbreviations; ALL=Alligator Lizard; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; CGS=Coastal/California Giant Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; GTR=Garter Snake; LAM=Pacific Lamprey; NEW=Newt (Unidentified Species); NWP=Northwestern Pond Turtle; PBL=Pacific Brook Lamprey; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RBN= Red Bellied Newt; RCH=California Roach; RLF=Red-legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Coastal Tailed Frog; WDS=Wandering Salamander; WTD=Western Toad; YLF=Yellow-legged Frog.

* Blank spaces indicate that no organisms were observed.

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Table A34. Summary of results for fish distribution surveys within the Howard Creek watershed, Mendocino Co., California. Refer to Map 5.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
HOWARD CREEK	47-32	6/26/2000	22					CGS
HOWARD CREEK	47-32	7/5/2001	2	3				CGS
HOWARD CREEK	47-32	8/14/2002	1	2				CGS
HOWARD CREEK	47-33	8/9/1996						CGS
HOWARD CREEK	47-33	6/26/2000						CGS TLF
HOWARD CREEK	47-33	10/8/2001	2	1				CGS
HOWARD CREEK	47-42	10/16/2006	53	41	5			CR CGS PR
HOWARD CREEK	47-42	7/24/2007	63	49	5			CR CGS PR
HOWARD CREEK	47-42	9/24/2008	50	34	6			SCP
HOWARD CREEK	47-42	7/28/2010	14	26	3			CGS SCP

* Species Abbreviations; ALL=Alligator Lizard; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; CGS=Coastal/California Giant Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; GTR=Garter Snake; LAM=Pacific Lamprey; NEW=Newt (Unidentified Species); NWP=Northwestern Pond Turtle; PBL=Pacific Brook Lamprey; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RBN= Red Bellied Newt; RCH=California Roach; RLF=Red-legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Coastal Tailed Frog; WDS=Wandering Salamander; WTD=Western Toad; YLF=Yellow-legged Frog.

* Blank spaces indicate that no organisms were observed.

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**Rockport Coastal Streams
Watershed Analysis
Unit**

**Map F-1
Salmonid Distribution**

This map illustrates the documented and potential distribution of steelhead trout and coho salmon in the Rockport Coastal Streams WAU. Documented distribution is based on distribution surveys conducted by MRC through 2006. Documented distribution only shows presence of fish up to the observation site. Potential distribution represents our interpretation, at this point in time, for larger streams where coho salmon or steelhead trout could occur. Since the potential distribution is assessed only for larger watercourses, it cannot be considered complete, and it is highly likely the actual potential distribution is larger.

Salmonid Distribution

	Presence	Potential
Coho		
Steelhead		

**Barriers to Adult Salmonid
Upstream Migration**

- Gradient
- Waterfall
- Fish Distribution Sampling Locations
- MRC Ownership
- Planning Watershed Boundary
- Elk Creek Watershed Analysis Unit Boundary

Flow Class

- Class I
- Class II
- Class III

