SECTION F
FISH HABITAT CONDITION
AND
AQUATIC SPECIES DISTRIBUTION

INTRODUCTION

The anadromous fish species inhabiting the Northern Russian River WAU are steelhead trout (*Oncorhynchus mykiss).* Other non-salmonid species include sculpin (*Cottus* spp.), three-spine stickleback (*Gasterosteus aculeatus),* California Roach (*Lavinia symmetricus),* and Sacramento Sucker (*Catostomus occidentalis)*. A fish habitat assessment was conducted in the Northern Russian River WAU to identify the current habitat conditions and quality of habitat for the three life stages of salmonids: spawning, summer rearing and over-wintering habitat.

Field surveys conducted to evaluate the quality and quantity of fish habitat in the Northern Russian River WAU include fish habitat typing and assessment, aquatic species distribution surveys, stream gravel permeability measurements and bulk gravel samples. The fish habitat assessment evaluates spawning, rearing and overwintering habitats based on targets derived from scientific literature (Bilby and Ward, 1989; Bisson et al., 1987; Bjornn and Reiser, 1994; CDFG, 1998; Montgomery et al., 1995; Washington Forest Practices Board, 1995) and professional judgment. The habitat data are combined into indices of habitat quality for the different life history stages.

Permeability samples were taken in one fish bearing reach, Ackerman Creek, to determine an index of spawning gravel quality. Permeability and gravel particle size distributions 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 intra-gravel water flow for their survival and development. Fine sediment within spawning gravel can impede intra-gravel 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.

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 electro-fishing or snorkeling surveys in the summer months to assess aquatic species distribution and composition in the Gualala River WAU. All organisms observed were identified to the lowest possible taxonomic level.

METHODS

Fish Habitat Assessment

The habitat inventory method used to evaluate the habitat condition of the Northern Russian River WAU was conducted during low flow conditions using methods modified from the

California Salmonid Stream Restoration Manual (Flosi et al., 1998). Stream segments were created based on stream gradient and channel confinement (see stream channel module). Fish habitat conditions were determined by sampling representative stream segments throughout the watershed. Factors that determined where the fish habitat assessment was evaluated include the presence of fish, accessibility and stream channel type (response, transport or source reach). Since high gradient streams were likely to be non-fish bearing, survey efforts were concentrated on low gradient reaches of the stream network.

A distance of 20-30 bankfull widths determined the survey length to ensure that approximately two meander bends of the stream channel were observed. Data collected during the fish habitat and stream channel surveys provided information on pool, riffle and flatwater frequency; pool spacing; spawning gravel quantity and quality; over-wintering substrate; shelter complexity; and large woody debris (LWD) frequency, condition and future recruitment.

The fish habitat observations were evaluated for quality of each salmonid life stage: spawning, summer rearing and over-wintering. Table F-1 displays the targets used for rating measured habitat parameters. These indices are based on scientific literature (Bilby and Ward, 1989; Bisson et al., 1987; Bjornn and Reiser, 1994; CDFG 1998; Montgomery et al., 1995; Washington Forest Practices Board, 1995) and professional judgment. Spawning habitat conditions are evaluated on the basis of gravel availability and quality (gravel sizes, subsurface fines, embeddedness), and are evaluated for preferred salmonid spawning areas located at the tail-outs of pools. Summer rearing habitat conditions for salmonids are evaluated on the size, depth and availability of pools and the complexity and quantity of cover (particularly large woody debris). Overwintering habitat is evaluated on the size, depth and availability of pools, the proportion of habitat units with cobble or boulder-dominated substrate and the quantity of cover.

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 numbers are in bold and the weights in parentheses.

Spawning Habitat

E (0.25) + **F** (0.25) + **G** (0.25) + **H** (0.25)

Summer Rearing Habitat

A (0.20) + **B** (0.15) + **C** (0.15) + **D** (0.15) + **F** (0.15) + **I** (0.20)

Overwintering Habitat

A (0.20) + **B** (0.15) + **C** (0.15) + **D** (0.10) + **I** (0.20) + **J** (0.20)

The overall score would be rated as follows:

1.00 - 1.66 = Poor
1.67 - 2.33 = Fair
2.34 - 3.00 = Good

TableF-1. Fish Habitat Condition Indices for Measured Parameters

		Fish Habitat Quality		
Fish Habitat Parameter	**Feature**	**Poor**	**Fair**	**Good**
Percent Pool/Riffle/Flatwater (By length) **(A)**	Anadromous Salmonid Streams	<25% pools	25-50% pools	>50% pools
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 **(E)**	Pool Tail-outs Quantity	<1.5%	1.5-3%	>3%
Percent Embeddedness **(F)**	Pool Tail-outs	>50%	25-50%	<25%
Subsurface Fines (L-P watershed analysis manual) **(G)**	Pool Tail-outs	2.31-3.0	1.61-2.3	1.0-1.6
Gravel Quality Rating (L-P watershed analysis manual) **(H)**	Pool Tail-outs	2.31-3.0	1.61-2.3	1.0-1.6
Key LWD +Root wads / 328 ft. Of Stream **(I)**	Streams≤40 ft. BFW	<4.0	4.0-6.5	>6.6
	Streams ≥40 ft. BFW	<3.0	3.0-3.8	>3.9
Substrate for Over-wintering **(J)**	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

Permeability and Stream Bulk Gravel Samples

Steam gravel permeability and bulk gravel samples were collected on one stream monitoring segment of Ackerman Creek (UU1) in the Northern Russian River 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. Bulk stream gravel samples were taken with a 12-inch diameter sampler as described in Platts, Megahan and Minshall (1983).

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 differently than the standard protocol MRC utilizes. Many more observations were taken on Ackerman Creek than are normally taken. The permeability observations on Ackerman Creek were taken to assist with the development of the permeability protocol MRC currently uses.

The permeability measurements were taken in seven pool tail-out sections along the monitoring segment. At each pool tail-out sampled permeability measurements were taken at 12 sites within a 3 by 4 point grid of the tail-out.

A bulk gravel sample was taken in first 4 pool tail-outs of the segment. The gravel sample was taken directly over the permeability site that is closest to the thalweg of the channel. After the bulk gravel samples were collected the gravel is dried and sieved through 7 different size-class screens (50.8, 25.4, 12.5, 6.3, 4.75, 2.36, 0.85 mm). The weight of each gravel size class was determined for each of the bulk gravel samples using a commercial quality scale.

The mean 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 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. 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.

From the sieved bulk gravel samples the percent fine particles less than 0.85 mm sieve size class was determined. The survival index for steelhead trout was calculated from the bulk gravel samples using the method described in Tappel and Bjorn (1983). The steelhead index was used because it more closely approximates the fishery in the Northern Russian River WAU (steelhead trout).

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 electro-fishing or snorkeling. The effort put forth at each survey site is not sufficient to delineate the absence of a species

Prior to initiating surveys water quality is measured using a Horiba™ U-10 Water Quality Checker. Measurements taken are water temperature (°C), conductivity (micro-Siemens/cubic centimeter), 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.

The primary survey method is electro-fishing using a Smith-Root™ Model 12 (Smith-Root Inc., Vancouver, WA) backpack electro-fisher. One person operates the backpack electro-fisher while one or two other individuals use dip nets to capture the stunned species. The captured specimens are placed into a five-gallon bucket containing stream water. The aquatic species are enumerated, measured to fork length (fish) or snout-vent length (amphibians) and released back into the units from which they were captured. All vertebrate species are identified to the lowest possible taxonomic level.

Diving (snorkeling) is used to assess species presence when stream conditions are considered adequate or when elevated stream temperatures can adversely impact the health of the animals being electro-fished. 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. The diver(s) enters the survey unit from the downstream end and waits approximately one-minute before proceeding upstream to observe species. If the water velocity is too fast for divers to proceed upstream, the unit is surveyed by floating downstream. Dive slates are used to record data underwater. During the survey, salmonid species are enumerated by size class according to pre-determined size class categories (<70mm, 70–130mm, >130mm). All other vertebrate species observed during the field surveys are identified to the lowest possible taxonomic level.

RESULTS AND DISCUSSION

Fish Habitat Assessment

The following tables F-2 and F-3 summarize the 2000 fish habitat assessment. The habitat parameters used to evaluate individual stream segments can be found in Table F-2. Each parameter has two values reported: score and rating. The ‘score’ is the value assigned to the habitat characteristic from the field observations. The ‘rating’ is the corresponding quality value for calculation of weighted habitat indices (see Table F-1). The ratings were used to calculate habitat quality for each life history stage. A summary of the habitat ratings corresponding to each life history stage can be found in Table F-3.

Table F-2 Summary of Fish Habitat Parameters, with Scores and Corresponding Ratings of the Northern Russian River Watershed Analysis Unit.

Segment	**A.** % Pool:Riffle: Flatwater by stream length		**B.** Pool Spacing		**C.** Shelter rating		**D.** % of all pools with residual depth >3 ft.		**E.** Spawning gravel quantity (%)		**F.**% Embed-dedness		**G.** Sub-surface fines		**H.** Gravel Quality		**I.** Key LWD + rootwads / 328 ft. with Debris Jams		**J.** % Over-wintering substrate	
	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating
UL1	67:33:0	3	3.8	2	81	2	7	1	>3	3	25-50	2	Fair	2	Fair	2	0	1	100	3
UU1	25:75:0	1	6.1	1	33	1	0	1	>3	3	>50	1	Fair	2	Fair	2	0	1	0	1
UU6	43:57:0	2	3.7	2	45	1	0	1	1.5-3	2	>50	1	Fair	2	Fair	2	0.5	1	25	2
UU10	66:34:0	3	5.8	2	58	1	0	1	>3	3	>50	1	Fair	2	Fair	2	1.2	1	78	3
UU12	59:41:0	3	3.6	2	47	1	16	1	1.5-3	2	>50	1	Fair	2	Fair	2	0.8	1	18	1
UU13	44:56:0	2	3.0	2	31	1	0	1	1.5-3	2	>50	1	Fair	2	Fair	2	1.0	1	16	1
UJ2	76:24:0	3	8.4	1	46	1	0	1	>3	3	25-50	2	Fair	2	Fair	2	0	1	0	1
UJ3	79:10:11	3	5.5	2	73	2	9	1	1.5-3	2	>50	1	Poor	1	Fair	2	8.9	3	0	1

Table F-3 Summary of Fish Habitat Ratings for Three Life History Stages.
Northern Russian River WAU.

Segment	Slope gradient class (percent)	Spawning habitat score	Spawning habitat rating	Rearing habitat score	Rearing habitat rating	Over-wintering habitat score	Over-wintering habitat rating
UL1	0-3	2.25	Fair	1.85	Fair	2.10	Fair
UU1	0-3	2.0	Fair	1.00	Poor	1.00	Poor
UU6	3-7	1.75	Fair	1.35	Poor	1.55	Poor
UU10	0-3	2.00	Fair	1.55	Poor	1.95	Fair
UU12	3-7	1.75	Fair	1.55	Poor	1.55	Poor
UU13	3-7	1.75	Fair	1.15	Poor	1.15	Poor
UJ2	0-3	2.25	Fair	1.55	Poor	1.40	Poor
UJ3	0-3	1.50	Poor	2.10	Fair	2.10	Fair

The Northern Russian River WAU is comprised of three planning watersheds, all of which were surveyed for fish habitat. The discussion of results is separated into the three planning watersheds. Each planning watershed contained 1 to 5 survey segments.

Lower Ackerman Creek
The segment surveyed (UL1) in the Lower Ackerman Creek planning watershed had slopes ranging from 0-3%. Steelhead were the only anadromous fish present in the survey segment. Spawning habitat was rated 'Fair' due to abundant spawning gravels, moderate levels of fine sediment and moderately embedded substrates. Summer rearing habitat was rated 'Fair' due to abundant pool habitat, moderate amounts of instream cover, but low levels of large woody debris. Over-wintering habitat was rated 'Fair' due to abundant pool habitat, high quantities of over-wintering substrate, but low levels of large woody debris and shallow pools. Poor pool depths suggest a need for large woody debris or other structures to promote scouring and pool development.

Upper Ackerman Creek
The segments surveyed in the Upper Ackerman Creek planning watershed had slopes ranging from 0-7%. Steelhead were present throughout the segments surveyed in the planning watershed. All of the segments rated 'Fair' for spawning habitat due to abundant spawning gravels, moderate levels of fine sediment, but highly embedded substrates. Summer rearing habitat was rated 'Poor' for all segments due to low levels of large woody debris, highly embedded substrates, poor pool depths and low amounts of instream cover. Segment UU10 rated 'Fair' for over-wintering habitat due to low levels of large woody debris, poor pool depths, low amounts of instream cover, but good amounts of over-wintering substrate. Segments UU1, UU6, UU12 and UU13 received 'Poor' over-wintering habitat ratings due to low levels of large woody debris, poor pool depths, low amounts of instream cover and low levels of over-wintering substrate. Poor pool depths suggest a need for large woody debris or other structures to provide instream cover and promote scouring and pool development.

Jack Smith Creek
The segments surveyed (UJ2 and UJ3) in the Jack Smith Creek planning watershed had slopes ranging from 0-3%. Steelhead were present in both segments surveyed. Segment UJ2 received a 'Fair' spawning habitat rating due to abundant spawning gravels and moderately embedded substrate. Segment UJ3 rated 'Poor' for spawning habitat due to highly embedded substrates and high levels of fine sediment. Summer rearing habitat was rated 'Fair' for segment UJ3 due to abundant pool habitat, high levels of large woody debris, but poor pool depths and highly embedded substrate. Segment UJ2 received a 'Poor' summer rearing rating due to low levels of large woody debris, poor pool depths and poor amounts of instream cover. Over-wintering habitat was rated 'Fair' for segment UJ3 due to abundant pool habitat, high levels of large woody debris, but poor pool depths and low quantities of over-wintering substrate. Segment UJ2 received 'Poor' over-wintering ratings due to low levels of large woody debris, poor pool depths, low amounts of instream cover and low quantities of over-wintering substrate.

Permeability and Bulk Gravel Samples

Results from permeability and percent fine particles <0.85 mm for the stream monitoring segment UU1, Ackerman Creek, are presented in Table F-4. 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 observation for the Ackerman Creek stream monitoring segment is in the marginal category. A mean observation, as presented for the segments, provides an index of the segment's condition, however, even with the marginal mean observation permeability observations range 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.

The results from the percent of particles <0.85 mm were encouraging. However, the observations are bordering on a level of concern. Generally, the survival indices predicted by the bulk gravel samples were not too bad, however there is room of improvement; these observations are something that will have to be watched over time.

Table F-4. Permeability and Percent Fine Sediment <0.85 mm and Associated Survival Indices for Long Term Monitoring Segments of the Big River WAU, 2000.

Segment ID	Stream Name	Geometric Mean Permeability for Segment (cm/hr)	Standard Error Permeability (cm/hr)	Range of Permeability Observations (cm/hr)	Survival Index (Taggart/ McCuddin)	Tappel/Bjorn Steelhead Survival Index	Percent Particles <0.85 mm
UU1	Ackerman Creek	3453	509	52-26,650	39%	30-72%	8-13%

Aquatic Species Distribution

Data from six years of fish distribution surveys are located in the appendix. Map F-1 illustrates the distribution of steelhead trout and other non-salmonid fish species (California roach, sculpin, and stickleback) in the Northern Russian River WAU.

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Northern Russian River WAU Fish Habitat Assessment

Appendix F

Table A85. Summary of results for aquatic species surveys within the Russian River watershed, Mendocino Co., California. Refer to Maps 17-18.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
JACK SMITH CREEK	77-01	8/4/1995	PRESENT	PRESENT	PRESENT			PGS
JACK SMITH CREEK	77-01	8/2/1996	PRESENT	PRESENT	PRESENT			CRY PGS RSN YLF
JACK SMITH CREEK	77-01	8/10/2000	5	5				PGS RSN
JACK SMITH CREEK	77-01	10/10/2001	5	1				PGS YLF
JACK SMITH CREEK	77-01	9/25/2002	11	2	1			PGS
JACK SMITH CREEK	77-02	8/4/1995	PRESENT	PRESENT	PRESENT			CRY PGS
JACK SMITH CREEK	77-02	8/2/1996	PRESENT	PRESENT	PRESENT			PGS YLF
JACK SMITH CREEK	77-02	8/10/2000	2	3	1			PGS
JACK SMITH CREEK	77-02	10/10/2001	2	1				PGS
JACK SMITH CREEK	77-02	9/25/2002	1	1	2			
JACK SMITH CREEK	77-03	8/4/1995	PRESENT					PGS
JACK SMITH CREEK	77-03	8/2/1996	PRESENT	PRESENT				PGS YLF
JACK SMITH CREEK	77-03	8/10/2000	2	5				PGS
JACK SMITH CREEK	77-03	10/10/2001	3	1				
JACK SMITH CREEK	77-03	9/25/2002	3	3				PGS

* Species Abbreviations; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; BUFO=Western Toad; CDS=Clouded Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; LAM=Pacific Lamprey; NAL=Northern Alligator Lizard; NEW=Newt (Unidentified Species); NWP=Western Pond Turtle; PBL=Pacific Brook Lamprey; PGS=Pacific Giant Salamander; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RCH=California Roach; RLF=Red Legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Olympic Tailed Frog; WAGS=Western Aquatic Garter Snake; YLF=Yellow Legged Frog.

* Blank spaces indicate that no organisms were observed.

*Click here to view physical data.
*Click on a Site ID to view map.

Table A86. Summary of results for aquatic species surveys within the Russian River watershed, Mendocino Co., California. Refer to Maps 17-18.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
ACKERMAN CREEK	83-01	7/20/1995	PRESENT	PRESENT				CRY RCH RSN
ACKERMAN CREEK	83-01	7/12/1996	PRESENT	PRESENT				CRY PGS RCH
ACKERMAN CREEK	83-01	8/11/2000	2	2				RCH
ACKERMAN CREEK	83-01	8/27/2001	1	2				CRY PGS RCH YLF
ACKERMAN CREEK	83-02	7/20/1995	PRESENT	PRESENT				RCH YLF
ACKERMAN CREEK	83-02	7/10/1996	PRESENT	PRESENT	PRESENT			RCH YLF
ACKERMAN CREEK	83-02	8/24/2001						CNT RCH
ALDER CREEK	83-03	7/20/1995	PRESENT					PGS RCH RSN YLF
ALDER CREEK	83-03	7/10/1996	PRESENT	PRESENT				RCH YLF
ALDER CREEK	83-03	8/11/2000	12	4	3			RCH
ALDER CREEK	83-03	8/24/2001	4	1				RCH
ALDER CREEK	83-03	8/26/2002	5	2				PGS RCH
ALDER CREEK	83-04	7/20/1995	PRESENT					RCH RSN YLF
ALDER CREEK	83-04	7/10/1996	PRESENT	PRESENT				PGS RCH RSN YLF
ALDER CREEK	83-04	8/11/2000	11		1			

* Species Abbreviations; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; BUFO=Western Toad; CDS=Clouded Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; LAM=Pacific Lamprey; NAL=Northern Alligator Lizard; NEW=Newt (Unidentified Species); NWP=Western Pond Turtle; PBL=Pacific Brook Lamprey; PGS=Pacific Giant Salamander; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RCH=California Roach; RLF=Red Legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Olympic Tailed Frog; WAGS=Western Aquatic Garter Snake; YLF=Yellow Legged Frog.

* Blank spaces indicate that no organisms were observed.

*Click here to view physical data.
*Click on a Site ID to view map.

Table A87. Summary of results for aquatic species surveys within the Russian River watershed, Mendocino Co., California. Refer to Maps 17-18.

STREAM NAME	SITE ID	DATE	STH <70 MM	STH 70-130 MM	STH >130 MM	COH <70 MM	COH 70-130 MM	OTHER SPECIES
ALDER CREEK	83-06	8/24/2001	9	2				CNT YLF
ALDER CREEK	83-06	9/25/2002	4	3				CNT YLF WAGS
ACKERMAN CREEK	83-05	7/19/1995	PRESENT	PRESENT				NEW PGS RCH RSN
ACKERMAN CREEK	83-05	7/10/1996	PRESENT	PRESENT	PRESENT			RSN STB YLF
ACKERMAN CREEK	83-05	8/11/2000	2					RCH
ACKERMAN CREEK	83-05	8/24/2001	3	1				RCH
ACKERMAN CREEK	83-05	8/26/2002	2	1	1			PGS YLF

* Species Abbreviations; AMM=Pacific Lamprey Larvae; BLF=Bullfrog; BKS=Black Salamander; BUFO=Western Toad; CDS=Clouded Salamander; CHK=Chinook Salmon; CNT=California Newt; COH=Coho Salmon; CR=Coast Range Sculpin; CRY=Crayfish; LAM=Pacific Lamprey; NAL=Northern Alligator Lizard; NEW=Newt (Unidentified Species); NWP=Western Pond Turtle; PBL=Pacific Brook Lamprey; PGS=Pacific Giant Salamander; PR=Prickly Sculpin; PTF=Pacific Tree Frog; RCH=California Roach; RLF=Red Legged Frog; RSN=Rough Skinned Newt; SCP=Sculpin (Unidentified Species); SKR=Sacramento Sucker; STB=Stickleback; STH=Steelhead Trout; TLF=Olympic Tailed Frog; WAGS=Western Aquatic Garter Snake; YLF=Yellow Legged Frog.

* Blank spaces indicate that no organisms were observed.

*Click here to view physical data.
*Click on a Site ID to view map.

Table B85. Summary of site parameters within the Russian River watershed, Mendocino Co., California. Refer to Maps 17-18.

Stream Name	SITE ID	DATE	METHOD e=electrofish d=dive v=visual	EFFORT (minutes)	DISTANCE SAMPLED (feet)	POOL:RIFFLE: FLATWATER SAMPLED (%)	VISIBILITY*	FLOW*	DO (mg/l)	TEMP (°C)	pH
JACK SMITH CREEK	77-01	8/4/1995	E	8			3	1		17.5	
JACK SMITH CREEK	77-01	8/2/1996	E				3	2		18.5	
JACK SMITH CREEK	77-01	8/10/2000	E	4	134	57:43:0	3	1	8.7	15	6.3
JACK SMITH CREEK	77-01	10/10/2001	E	2	102	29:45:25	3	1	9	12.1	6.8
JACK SMITH CREEK	77-01	9/25/2002	E	4	83	51:10:40	3	1	7.6	13.5	6.7
JACK SMITH CREEK	77-02	8/4/1995	E				3	1		15.5	
JACK SMITH CREEK	77-02	8/2/1996	E	5			3	2		15.5	
JACK SMITH CREEK	77-02	8/10/2000	E	3	93	84:16:0	3	1	8.4	14	7
JACK SMITH CREEK	77-02	10/10/2001	E	2	97	57:43:0	3	1	7.3	10.6	7.0
JACK SMITH CREEK	77-02	9/25/2002	E	2	81	56:44:0	3	1	9.9	12.2	6.9
JACK SMITH CREEK	77-03	8/4/1995	E	3			3	1		16	
JACK SMITH CREEK	77-03	8/2/1996	E	4			3	1		15.5	
JACK SMITH CREEK	77-03	8/10/2000	E		92	53:47:0	3	1	6.2	13	6.7
JACK SMITH CREEK	77-03	10/10/2001	E	2	92	40:60:0	3	1	7.4	10.5	7.1
JACK SMITH CREEK	77-03	9/25/2002	E	1	89	53:47:0	3	1	7.9	12.8	6.7

*Visibility: 1=<1 ft. 2=1-5 ft. 3=>5 ft.

*Flow: 0=Intermittent 1=<1 CFS 2=1-5 CFS 3=>5 CFS

*Blank spaces indicate that no data was collected.

*Click here to view biological data.
*Click on a Site ID to view map.

Table B86. Summary of site parameters within the Russian River watershed, Mendocino Co., California. Refer to Maps 17-18.

Stream Name	SITE ID	DATE	METHOD e=electrofish d=dive v=visual	EFFORT (minutes)	DISTANCE SAMPLED (feet)	POOL:RIFFLE: FLATWATER SAMPLED (%)	VISIBILITY*	FLOW*	DO (mg/l)	TEMP (°C)	pH
ACKERMAN CREEK	83-01	7/20/1995	E	6			3	2		23	
ACKERMAN CREEK	83-01	7/12/1996	E	14			3	2		18.5	
ACKERMAN CREEK	83-01	8/11/2000	E	4	139	78:22:0	3	1	7.6	15	7.6
ACKERMAN CREEK	83-01	8/27/2001	E	2	101	81:0:19	3	0	3.9	17.1	7.1
ACKERMAN CREEK	83-02	7/20/1995	E	2			3	1		23.5	
ACKERMAN CREEK	83-02	7/10/1996	E	7			3	2		22	
ACKERMAN CREEK	83-02	8/24/2001	E	1	67	100:0:0	3	1	3.23	19.8	7.1
ALDER CREEK	83-03	7/20/1995	E	5			3	1		22.5	
ALDER CREEK	83-03	7/10/1996	E	6			3	1		22	
ALDER CREEK	83-03	8/11/2000	E	2	171	59:41:0	3	1	7	16	7.6
ALDER CREEK	83-03	8/24/2001	E	1	53	100:0:0	3	1	2.6	17.3	6.9
ALDER CREEK	83-03	8/26/2002	E		110	100:0:0	3	1	4.99	15.9	6.4
ALDER CREEK	83-04	7/20/1995	E	2			3	1		21.5	
ALDER CREEK	83-04	7/10/1996	E	5			3	1		23	
ALDER CREEK	83-04	8/11/2000	E	3	106	45:55:0	3	1	7.9	17	7.9

*Visibility: 1=<1 ft. 2=1-5 ft. 3=>5 ft.

*Flow: 0=Intermittent 1=<1 CFS 2=1-5 CFS 3=>5 CFS

*Blank spaces indicate that no data was collected.

*Click here to view biological data.
*Click on a Site ID to view map.

Table B87. Summary of site parameters within the Russian River watershed, Mendocino Co., California. Refer to Maps 17-18.

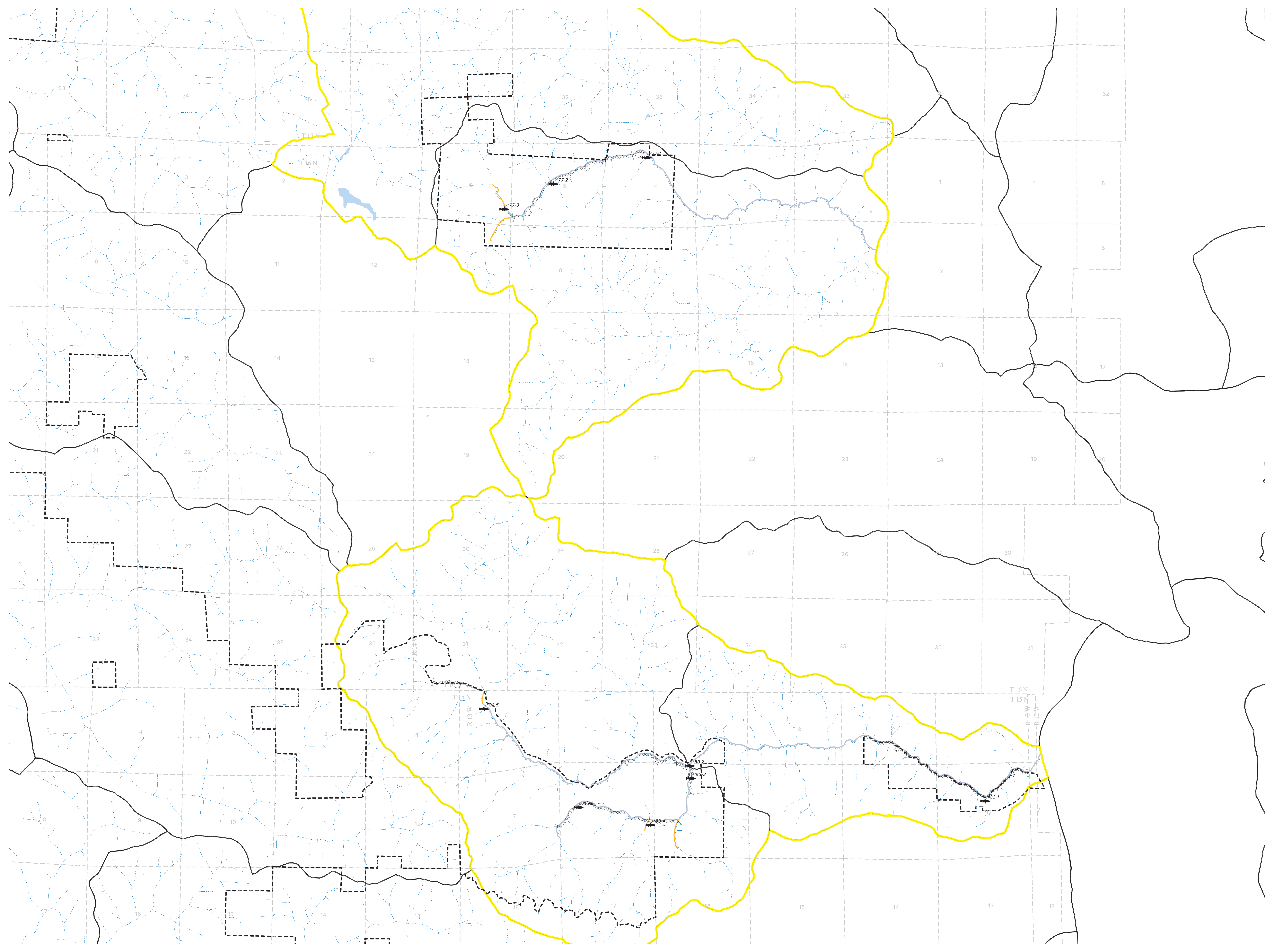
Stream Name	SITE ID	DATE	METHOD e=electrofish d=dive v=visual	EFFORT (minutes)	DISTANCE SAMPLED (feet)	POOL:RIFFLE: FLATWATER SAMPLED (%)	VISIBILITY*	FLOW*	DO (mg/l)	TEMP (°C)	pH
ALDER CREEK	83-06	8/24/2001	E	2	106	43:57:0	3	1	7.14	16.6	6.7
ALDER CREEK	83-06	9/25/2002	E	4	87	52:48:0	3	1	10.2	21.8	7.9
ACKERMAN CREEK	83-05	7/19/1995	E	3			2	1		23	
ACKERMAN CREEK	83-05	7/10/1996	E	9			3	1		24.5	
ACKERMAN CREEK	83-05	8/11/2000	D		104	73:27:0	3	1	9.2	19	7.9
ACKERMAN CREEK	83-05	8/24/2001	E	1	61	100:0:0	3	0	3.42	18.6	6.8
ACKERMAN CREEK	83-05	8/26/2002	E		97	78:22:0	3	1	8.88	19.1	6.5

*Visibility: 1=<1 ft. 2=1-5 ft. 3=>5 ft.

*Flow: 0=Intermittent 1=<1 CFS 2=1-5 CFS 3=>5 CFS

*Blank spaces indicate that no data was collected.

*Click here to view biological data.
*Click on a Site ID to view map.



Northern Russian River Watershed Analysis Unit

Map F-1 Salmonid Distribution

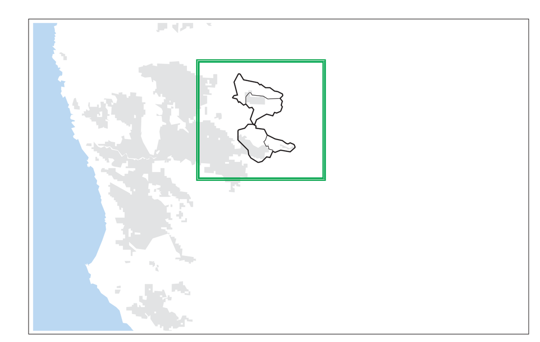
This map illustrates the documented and potential distribution of steelhead trout in the Northern Russian WAU. Documented distribution is based on distribution surveys conducted by MRC in 2000-2002 and the previous landowner Louisiana-Pacific Corporation in 1994-1996. Documented distribution only shows presence of fish up to the observation site. Potential distribution represents an interpretation of where steelhead trout potentially use. The potential distribution is only interpreted for the larger watercourses and cannot be considered complete. The potential distribution is our interpretation at this point in time for larger streams; it is highly likely the actual potential distribution is larger.

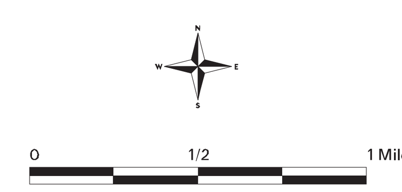
Salmonid Distribution
- Steelhead Distribution
- Potential Steelhead Distribution
- Habitat Survey Segments
- Fish Distribution Sampling Locations

Barriers to Adult Salmonid Upstream Migration
- Gradient
- Waterfall
- Culvert

- MRC Ownership
- Planning Watershed Boundary
- Northern Russian River Watershed Analysis Unit Boundary

Flow Class
- Class I
- Class II
- Class III





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