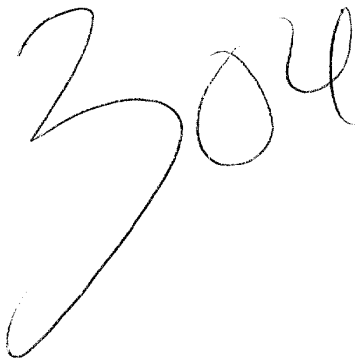
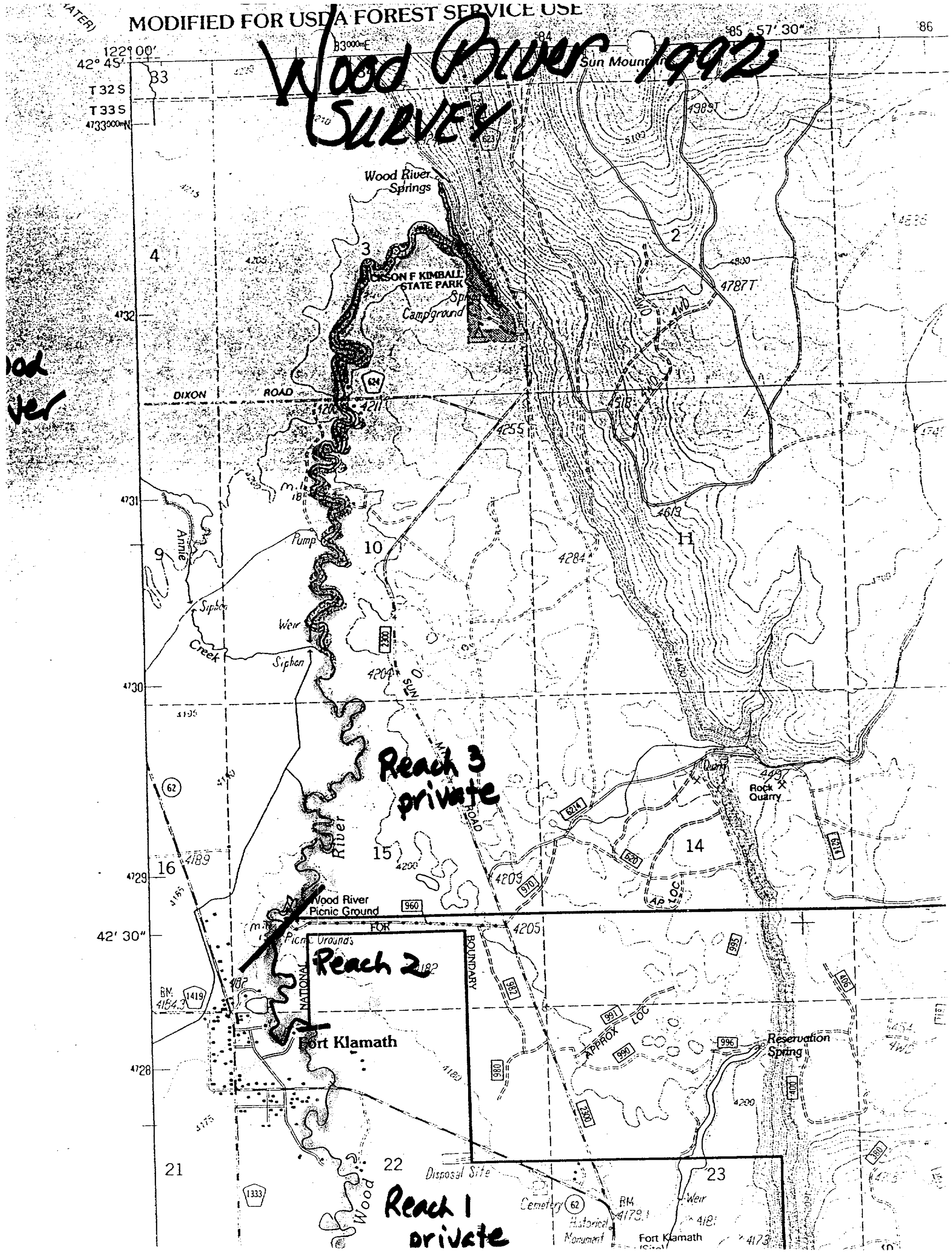
1-3-1993

Ex. 281-US-424

Mike Mathews
Hydrologist, USDA


304


MODIFIED FOR USDA FOREST SERVICE USE
Wood River 1992
SURVEY
Sun Mountain
T 32 S
T 33 S
Wood River Springs
STATE PARK
Campground
DIXON ROAD
Pump
Weir
Siphon
Annie
Creek
Reach 3
private
River
Rock Quarry
Wood River
Picnic Ground
Picnic Grounds
Reach 2
NATIONAL
BOUNDARY
APPROX LOC
Fort Klamath
Reservation Spring
Disposal Site
Reach 1
private
Wood
Cemetery
Historical Monument
Fort Klamath

WOOD RIVER

On 6/8/92 Rob Vasquez, Dave Richter, Mike Mathews, and Ray Schoenemann surveyed the Wood River. Rob and Dave worked on the habitat survey while Ray and myself snorkled the reach for fish distribution. Upon completing the habitat survey Dave and Rob snorkled the lower half of the reach.

HABITAT SURVEY

Wood river is a low gradient, sinuous springfed system. Discharge varies little throughout the year. **Substrate** consists of gravel and sand and sand and gravel; substrate larger than gravel was rare. Substrate on both the stream bottom and banks are highly susceptible to erosion, streambed substrate redistributes constantly. **Habitat** consists largely of long glides with many scour pools along the banks and behind instream structures. Riffles constitute approximately 20% of the reach, these are few and lengthy(100-200') comprised of shallow gravels and gravel bars. Pool habitat developed from scouring and are quite deep(6-10') pools of this size are formed at the cutbank portion of the bend and behind large instream structures. **Cover** is abundant along the streambanks, which offers undercut, wood, and vegetation for refuge. Pool depth provides cover as well. Little cover exists in the middle two-thirds of the channel. **Hydrology** is very consistent under natural conditions, but varies greatly with diversion rates. Water temperature increases through the course of a day, gaining 7 degrees from morning to mid-afternoon(45-52).

FISH SURVEY

We started from the F.S upper boundary to the lower boundary, inspecting nearly all habitats. Later that day another crew re-snorkled the lower section. In both passings 3-6" fish sparsely distributed in the deep undercuts and brush bundles were observed. The exception was behind a log and rock weir; the 10' pool behind the weir held approximately 15 fish ranging in size from 12-24". Young of the year fish were observed in nearly all shallow slower moving water. About 80% of the fish identified were brown trout the remaining ~~was~~ were rainbow trout.

Mike Mathews
Mike Mathews

Hydrologist

Stream Name : WOOD RIVER 92
Year : '92

Comments
NONE.

Stream Name : WOOD RIVER 92
Year : '92

Reach No : 1

Comments

PRIVATE LAND. NOT SURVEYED.

Reach No : 2

Comments

RIVER FORMS FOREST SERVICE BOUNDARY AT PICNIC AREA.

Reach No : 3

Comments

PRIVATE LAND. NO SURVEY.

Stream Name : WOOD RIVER 92
Year : '92

Reach No : 2

NSO	HabType	Comments
4	P1	SILT LOCATED 90 DEGREES TO FLOW. BARRIER BLOCKING SMALL FLOW.
12	R2	SMALL POOL.
13	G4	EA SITE.
20	S4	GRAVEL ISLANDS NEAR FS.
21	G6	TURBULENCE AND WOOD PROVIDE COVER AT ~50 FT FROM END OF GLIDE.
22	R6	GAGE = .90
24	R7	SCOUR POOL IN RIFFLE. FOREST SERVICE BOUNDARY AT END OF FENCELINE.

*Stream Name : WOOD RIVER 92
Year : '92

**Reach No : 1

1 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35

**Reach No : 2

1 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
1 R1	120.0	45.0	2.3		GR	GR	0	1	0	2	U	T	45	950																				
2 S1	75.0	16.0	1.1		GR																													
3 S2	55.0	7.0	1.7		SA																													
4 P1	60.0	60.0	10.0	1.4	GR	SA	2	1	0	4	D	W			125.0	2.8	N	SA	SA	1	SS	HA	HW	SS	HW	HW			52.0	55.0	10.0	1.4	R06F20A
5 P2	50.0	40.0	7.0	2.3	SA	GR	5	0	0	2	D	W																						
6 G1	95.0	53.0	3.5		GR	GR	4	2	0	2	U	W																						
7 P3	190.0	45.0	10.0	1.5	GR	SA	3	5	0	3	D	U																						
8 G2	60.0	45.0	1.8		GR	SA	1	2	0	2	U	T					N	SA	GR	2	GF	GF	GF	SS	HW	HW			65.0	49.0	1.8		R06F20A
9 P4	70.0	40.0	5.0	1.3	GR	SA	4	1	1	2	W	D																						
10 G3	140.0	50.0	2.5		GR	GR	2	1	0	2	H	H																						
11 S3	135.0	32.0	4.5		SA																													
12 R2	90.0	50.0	2.2		GR	GR	3	8	0	2	D	W					N	SA	SA	1	GF	GF	GF	SS	HW	GF			97.0	54.0	2.2		R06F20A
13 G4	460.0	40.0	4.0		SA	GR	2	5	0	1	U	D																						
14 R3	160.0	45.0	1.5		GR	GR	3	2	0	1	H	U																						
15 G5	250.0	45.0	4.0		GR	SA	1	1	0	1	D	W																						
16 P5	90.0	40.0	6.0	1.3	SA	SA	1	0	0	2	D	U			53.0	3.1	N	SA	SA	1	GF	GF	HW	GF	GF	HW	52	1240	120.0	47.0	6.0	1.3	R06F20A
17 R4	50.0	35.0	2.1		GR	SA	2	0	0	2	D	W																						
18 P6	75.0	25.0	6.0	1.4	GR	SA	5	2	0	3	D	W																						
19 R5	285.0	60.0	4.0		GR	SA	4	0	0	1	T	T																						
20 S4	130.0	5.0	.2		SA								52	1300																				
21 G6	230.0	40.0	6.0		GR	SA	3	0	0	2	U	D	47	950			N	SA	SA	1	GF	GF	HW	GF	GF	HW			273.0	44.0	6.0		R06F20A
22 R6	160.0	50.0	2.4		GR	SA	5	0	0	2	W	T					N	GR	SA	1	SS	HA	GF	GF	GF	HW			178.0	43.0	2.4		R06F20A
23 P7	115.0	35.0	6.0	1.9	SA	GR	4	0	0	2	D	U			52.0	3.9	N	SA	SA	1	SS	HA	GF	SS	HW	GF	49	1115	140.0	47.0	6.0	1.9	R06F20A
24 R7	115.0	43.0	3.2		GR	SA	5	1	0	2	D	W																						

**Reach No : 3

1 2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35

Stream Name : WOOD RIVER 92
Year : '92

Reach	Mile From	Mile To	Zone Width	Floodplain Vegetation, Zone 1 GF	SS	SP	ST	LT	MT	GF* D	GF* S	SS* D	SS* S	SP* D	SP* S	ST* D	ST* S	LT* D	LT* S	MT* D	MT* S
2	13.1	13.9	20	57%	43%					GF	GF HW	HA	GF								

*If more than one entry is listed per reach, there were an equal number of each.

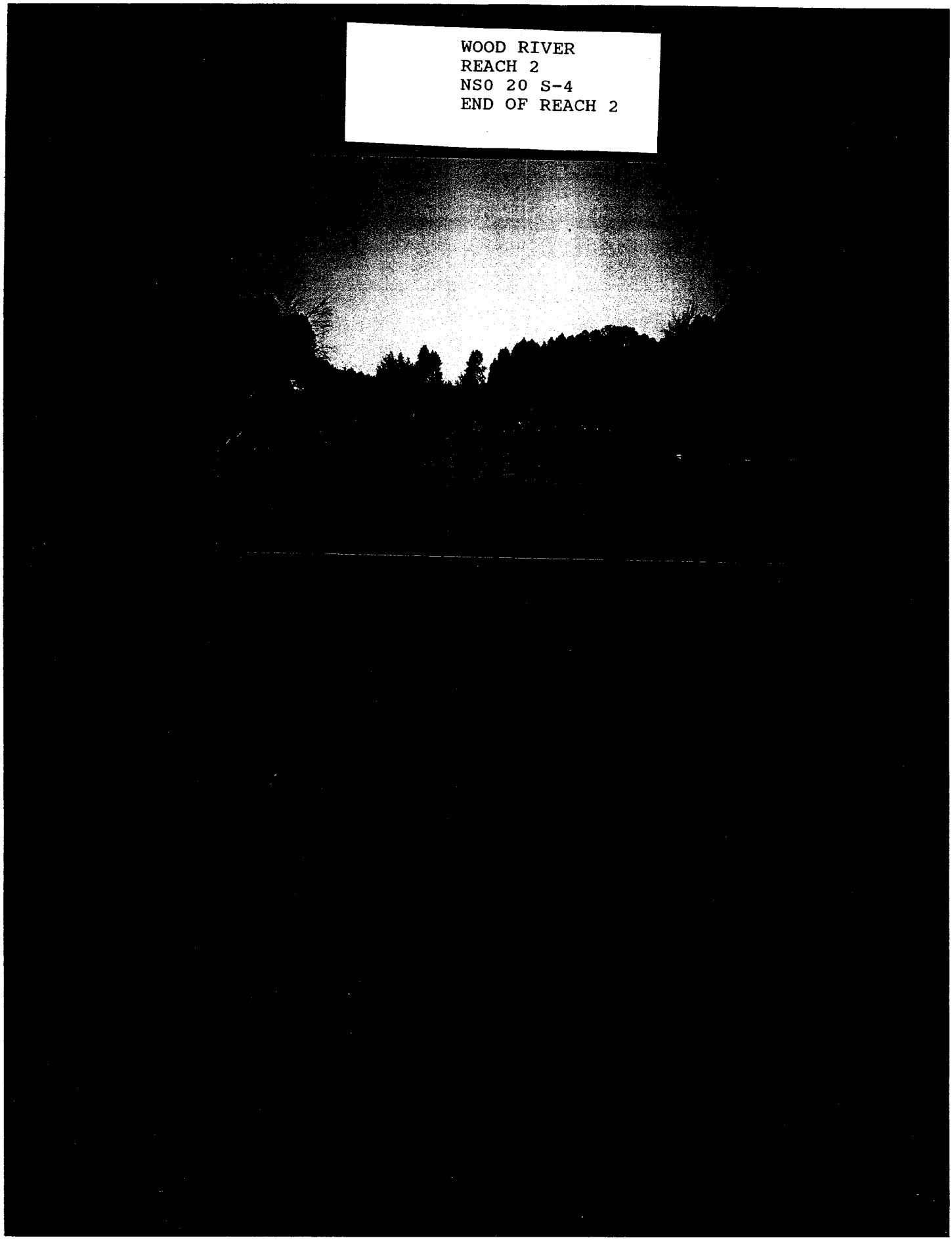
Stream Name : WOOD RIVER 92
Year : '92

Reach	Mile From	Mile To	Zone Floodplain Vegetation, Zone 2 Width	GF	SS	SP	ST	LT	MT	GF* D	GF* S	SS* D	SS* S	SP* D	SP* S	ST* D	ST* S	LT* D	LT* S	MT* D	MT* S
2	13.1	13.9	80	43%	57%					GF	HW	HW	GF HW								

*If more than one entry listed per reach, there were an equal number of each.
If report is blank, no data was found for this stream in Floodplain 2.

WOOD RIVER
REACH 2
NSO 10 G-3
ISLAND WITH SIDECHANNEL

WOOD RIVER
REACH 2
NSO 12 R-2
DOWNSTREAM OF RIFFLE


WOOD RIVER
REACH 2
NSO 20 S-4
END OF REACH 2

STREAM IDENTIFICATION FORM

R6-2500/2600-10

Page: 1 of __

Date: __/__/__ YY/Mmm/DD

A. State 41 B. County 035 C. Forest 20 D. District 02

E. Stream Name: Wood River

F. Watershed Code 18, 01, 02, 03 NFS 03, J; __, __, __, __, __

G. USGS Quad: Ft. Klamath

H. Survey Date: ____/_____/____ Year/ Month /Day

I. Name: _____

---

1. Watershed Area 56128 Acres (Hectares) (from USGS near Ft. Klamath)
2. Stream Order 2
3. Stream Class 1
4. Fish Species __, __, __, __, __, __, __, __

   Data Source: _____

5. Flow Data:

   Data Source: _____

6. Water Quality Data:

   Data Source: _____

7. Macroinvertebrate Data:

   Data Source: _____

8. Previous Surveys:

   Data Source: _____

9. Historical Land Use Data:

   Data Source: _____

10. Coordination: _____

11. Comments: _____

F IL REACH IDENTIFICATION FORM B2 (FIELD) Page 1 of ___
R6-2500/2600-21

A. State 41 B. County 035 C. Forest 20 D. District 02
E. Stream Name: Wood River
F. Watershed Code 18. 01. 02. 03 NFS 03 J; ___. ___. ___. ___
G. USGS Quad: Ft. Klamath
H. Survey Date: ____/____/____
Year/ Month /Day
I. Name: _____

---

1. Reach # 1 2. NSO ____ to ____
3. Flow _____
4. Channel Entrenchment D__ M__ S__
* 5. River Mile 0.0 to 13.1
* 6. Sinuosity value _____
7. Average Channel Gradient _____
* 8. Valley Length _____
9. Valley Form _____
10. Valley Width Class 1__ 2__ 3__ 4__
11. Stream Canopy Closure 1__ 2__ 3__ 4__
12. Dominant/Subdominant a.)___ b.)___
Substrate
13. Inner Riparian Zone Width _____
14. Comments private — no survey

15. Observer: _____
Recorder: _____
16. Date: __/__/__
YY/MM/DD

---

1. Reach # 3 2. NSO ____ to ____
3. Flow _____
4. Channel Entrenchment D__ M__ S__
* 5. River Mile 13.9 to 18.8
* 6. Sinuosity value _____
7. Average Channel Gradient _____
* 8. Valley Length _____
9. Valley Form _____
10. Valley Width Class 1__ 2__ 3__ 4__
11. Stream Canopy Closure 1__ 2__ 3__ 4__
12. Dominant/Subdominant a.)___ b.)___
Substrate
13. Inner Riparian Zone Width _____
14. Comments private — no survey

15. Observer: _____
Recorder: _____
16. Date: __/__/__
YY/MM/DD

---

1. Reach # 2 2. NSO 1 to 24
3. Flow 89.7 cfs
4. Channel Entrenchment D__ M__ S__
* 5. River Mile 13.6 to 13.9
* 6. Sinuosity value 2.6
7. Average Channel Gradient 0.3%
* 8. Valley Length 0.3 mi
9. Valley Form 10
10. Valley Width Class 1__ 2__ 3__ 4X
11. Stream Canopy Closure 1X 2__ 3__ 4__
12. Dominant/Subdominant a.) GR b.) SA
Substrate
13. Inner Riparian Zone Width 20'
14. Comments
River forms FS boundary at picnic area

15. Observer: D RICHTER
Recorder: R VASQUEZ
16. Date: 92/06/08
YY/MM/DD

---

1. Reach # ___ 2. NSO ____ to ____
3. Flow _____
4. Channel Entrenchment D__ M__ S__
*5. River Mile ____ to ____
*6. Sinuosity value _____
7. Average Channel Gradient _____
*8. Valley Length _____
9. Valley Form _____
10. Valley Width Class 1__ 2__ 3__ 4__
11. Stream Canopy Closure 1__ 2__ 3__ 4__
12. Dominant/Subdominant a.)___ b.)___
Substrate
13. Inner Riparian Zone Width _____
14. Comments _____

15. Observer: _____
Recorder: _____
16. Date: __/__/__
YY/MM/DD

*These values determined back in office

Page: 1 of ____
Date: 92/06/8 (YY MM DD)

RIPARIAN IDENTIFICATION FORM C
R6 2500-22/2600-22

A. State 41 B. County 035 C. Forest 20 D. District 03 E. Stream Name: WOOD RIVER
F. Watershed Code 18.01.02.03 NFS ___.___.___.___.___.___.___ G. USGS Quad: ____
H. Survey Date: 92/06/08 (Year/Month/Day)
I. Reach Number: 2 J. (Sampling frequency: Pool 4 ; Riffle 4 ; Glide 4)
(* Indicates information to be gathered at the Nth unit only)

Observer D RICHTER
Recorder R VASQUEZ

1. Nat. Seq. Ord. #	2. Hab. Type & Num. P,R,G, S,P,D,T	3. Hab. Length ft.	4. Hab. Width ft.	5. Max. Depth 0.1ft	6. Depth @Pool Tail Crest 0.1ft	7. Substrate Dom. SA,GR, CO,SB, LB,BR	8. Substrate S-dom. SA,GR, CO,SB, LB,BR	9. # Piece LWD .B Brush	10. # Piece LWD S Small	11. # Piece LWD L Larg	12. Total Cover 1=0,5 20,40 code 1-4	13. Total Cover Dom. U,S,D H,W,T A	14. Total Cover S-dom U,S,D H,W,T A	**15** Bank full Width ft.	**16** Bank full Depth ft.	**17** Embeddednes >35% Y/orN	**18** Bank Substrat SA,GR, CO,SB LB,BR Dom.	**19** Bank Substrat SA,GR CO,SB LB,BR S-dom	**20** Bank Grnd Cover 1-4	**21** Floodplain 1 Vegetation class a.	Dom. b.	Sdom c.	**24** Floodplain 2 Vegetation class a.	**25** Dom. b.	**26** Sdom c.	+++27+++ Water Temp. (3X/day) °F or °C (circle one) Degree	Time	34 Comments
1	R1	120	45	2.3		GR	GR	0	1	0	2	U	T														45F	9:50	
2	S1	75	16	1.1		GR	SA	1	1	0	2	U	T																
3	S2	55	7	1.7		SA	GR	0	0	0	2	U	T																
—	MP1	52	55	10.0	1.4	—	—	—	—	—	—	—	—	125	2.8	N	SA	SA	1	SS	HA	HW	SS	HW	HW				SA LOCATED AT 90° FLOW BARRIER — LOCK IN SMALL FLOW
4	P1	60	60	10.0	1.4	GR	SA	2	1	0	4	D	W																
5	P2	50	40	7.0	2.3	SA	GR	5	0	0	2	D	W																
6	G1	95	53	3.5		GR	GR	4	2	0	2	U	W																
7	P3	190	45	10.0	1.5	GR	SA	3	5	0	3	D	U																
8	G2	60	45	1.8	1.2	GR	SA	1	2	0	2	U	T																
—	MG2	65	49	1.8	—	—	—	—	—	—	—	—	—			N	SA	GR	2	GF	GF	GF	SS	HW	HW				
9	P4	70	40	5.0	1.3	GR	SA	4	1	1	2	W	D																
10	G3	140	50	2.5		GR	GR	2	1	0	2	H	H																
11	S3	135	32	4.5		SA	A	7	7	1	3	W	D																
12	R2	90	50	2.2		GR	GR	3	8	0	2	D	W																
—	MR2	97	54	2.2	—	—	—	—	—	—	—	—	—			N	SA	SA	1	GF	GF	GF	SS	HW	GF				SMALL POOL
13	G4	460	40	4.0		SA	GR	2	5	0	1	U	D																XEA SITE
14	R3	160	45	1.5		GR	GR	3	2	0	1	H	U																
15	G5	250	45	4.0		GR	SA	1	1	0	1	D	W																
16	P5	90	40	6.0	1.3	SA	SA	1	0	0	2	D	U																
	MP5	120	47	6.0	1.3	—	—	—	—	—	—	—	—	53	3.1	N	SA	SA	1	GF	GF	HW	GF	GF	HW	52°F	12:40	
17																													

FloodP.veg codes= GF,SS,SP,ST,LT,MT
Shrubland ht.=1(0-2') 2(2-5) 3(5-10) 4(>10')
Conifer Codes = CA,CC,CD,CE CF,CH,CJ,CL,CM,CP,CQ,CR,CS,CT,CW,CY,CX
Hardwood Codes= HA,HB,HC,HD,HE,HL,HM,HO,HQ,HT,HV,HW,HX

Pool start #		Riffle start #		Glide start #	
1	___	2	___	2	___
5	___	6	___	6	___
9	___	10	___	10	___
13	___	14	___	14	___
17	___	18	___	18	___
21	___	___	___	22	___
24	___	___	___	26	___
29	___	___	___	30	___
32	___	___	___	___	___
36	___	___	___	___	___

Date: ___/___/___ YY MM DD

RIPARIAN IDENTIFICATION FORM C
R6 2500-22/2600-22

A. State _____ B. County _____ C. Forest _____ D. District _____ E. Stream Name: _____

F. Watershed Code ___,___,___,___ HFS ___,___:___,___,___,___,___,___ G. USGS Quad: _____

H. Survey Date: ____/____/____ Year/ Month /Day

I. Reach Number: _____ J. (Sampling frequency: Pool ____; Riffle ____; Glide ____)

(* Indicates information to be gathered at the Nth unit only)

3200 ft · L 5280 m

1. Nat. Seq. Ord. #	2. Hab. Type & Num. P,R,G, S,F,D,T	3. Hab. Length ft.	4. Hab. Width ft.	5. Max. Depth 0.1ft	6. Depth @Pool Tail Crest 0.1ft	7. Substrate Dom. SA,GR, CO,SB, LB,BR	8. Substrate S-dom. SA,GR, CO,SB, LB,BR	9. # Piece LWD .B Brush	10. # Piece LWD S Small	11. # Piece LWD L Larg	12. Total Cover %0,5 20,40 code 1-4	13. Total Cover Dom. U,S,D H,W,T A	14. Total Cover S-dom U,S,D H,W,T A	**15** Bank full Width ft.	**16** Bank full Depth ft.	**17** Embeddedness >35% Y/orN	**18** Bank Substrat SA,GR, CO,SB LB,BR Dom.	**19** Bank Substrat SA,GR CO,SB LB,BR S-dom	*20** Bank Grnd Cover 1-4	**21** Floodplain 1 Vegetation class a.	**22** Floodplain 1 Vegetation Dom. b.	**23** Floodplain 1 Vegetation Sdom c.	**24** Floodplain 2 Vegetation class a.	**25** Floodplain 2 Vegetation Dom. b.	**26** Floodplain 2 Vegetation Sdom c.	+27+ Water Temp. (3X/day) ⊕ or °C (circle one) Degree	Time	34 Comments
17	R4	50	35	2.1		GR	SA	2	0	0	2	D	W																
18	P6	75	25	6.0	1.4	GR	SA	5	2	0	3	D	W																
19	R5	285	60	4.0		GR	GA	4	0	0	1	T	T																SMALL L
20	S4	130	5	.2		SA	SA	3	0	0	1	A	W														52°F	1300	GRAVEL BANDS NEAR FS. U/S
21	G6	230	40	6.0		GR	SA	3	0	0	2	U	D														47F	0950	6-9-92
	MG6	273	44	6.0												N	SA	SA	1	GF	GF	HW	GF	GF	HW			TW≈50ft end
22	R6	160	50	2.4		GA	SA	5	0	0	2	W	T																
	MR6	178	43	2.4												N	GR	SA	1	SS	GF	HA	GF	GF	HW			GAGE=0.90.
23	P7	115	35	6.0	1.9	SA	GR	4	0	0	2	D	U																
	MP7	140	47	6.0	1.9									52	3.9	N	SA	SA	1	SS	GF	HA	SS	HW	GF	49°F	1115	
24	R9	115	43	3.2		GR	SA	5	1	0	2	D	W																SC POOL IN RIFF FR B. END FORECU

FloodP.veg codes= GF,SS,SP,ST,LT,MT
Shrubland ht.=1(0-2') 2(2-5) 3(5-10) 4(>10')

Conifer Codes = CA,CC,CD,CE CF,CH,CJ,CL,CM,CP,CQ,CR,CS,CT,CW,CY,CX
Hardwood Codes= HA,HB,HC,HD,HE,HL,HM,HO,HQ,HT,HV,HW,HX

Pool start # ____ ____

Riffle start # ____ ____

Glide start # ____ ____

COMMENTS FORM C3 (FIELD)
R6-2500/2600-25

Date: 92/ 6/ 8
YY/Mmm/DD

A. State 41 B. County 035 C. Forest 20 D. District 02
E. Stream Name: Wood
F. Watershed Code 18, 01, 02, 03 NFS 03, 5; ____, ____, ____, ____
G. USGS Quad: ____
H. Survey Date: 6 / 8 / 92
Year/ Month /Day

Reach #	NSO #	Habitat Type and Number	Comment
2	3		DIVERSION BEHIND TRAILOR PARK ON PRIVATE LAND
2	4-5		WEIR MAN MADE ROCK
2	10		#17 ROLL 38 ISLAND, SIDECHANNEL
2	12		#18 ROLL 38 DOWNSTREAM AT RIFFLE
2	20		#19 ROLL 38 GRAVEL ISLAND END OF REACH

DISCHARGE FORM Q

Stream Name Wood River Gage .86 @ 1215 Date 6-9-92 Page 1 of 1
Meter (type & number) Pygmy 03 Swoffer (number) 3950
Spin Test (seconds): Before 60+ After 60+ All measurements at 45 seconds
Instrument Person D. Richter Recorder RVasquez
Wx Clear 76°F Start 1215 End H2o 51°F

Comment: Flow Taken @ 35 ft upstream from gage.

Dist. from left stake	Width of subset	Depth of water	Area of subset	Meter revolutions	Velocity	Discharge (cfs)
LEW = .6	.75	1.11	.833	ø	ø	ø
2.1	1.50	1.12	1.68	5	.137	.230
3.6	1.50	.5	.750	38	.853	.639
5.1	1.50	.4	.600	40	.896	.537
6.6	1.50	.57	.855	56	1.244	1.063
8.1	1.50	.65	.975	53	1.179	1.149
9.6	1.50	.72	1.08	61	1.352	1.460
11.1	1.50	.80	1.20	70	1.548	1.857
12.6	1.50	.87	1.305	77	1.700	2.216
14.1	1.50	.87	1.305	88	1.939	2.530
15.6	1.50	.94	1.41	102	2.243	3.162
17.1	1.50	1.12	1.68	103	2.264	3.804
18.6	1.50	1.35	2.025	113	2.481	5.024
20.1	1.50	1.50	2.250	107	2.351	5.289
21.6	1.50	~~2.02~~ 1.50	2.250	113	2.481	5.582
23.1	1.50	1.53	2.295	~~89~~ 117	2.264	5.196
24.6	1.50	1.60	2.40	~~122~~ 96	2.395	5.748
26.1	1.50	1.59	2.385	~~129~~ 107	2.590	6.177
27.6	1.50	1.49	2.235	119	2.612	5.837
29.1	1.50	1.49	2.235	122	2.677	5.983
30.6	1.50	1.42	2.130	120	2.633	5.608
32.1	1.50	1.43	2.145	102	2.243	4.811
33.6	1.50	1.49	2.235	103	2.264	5.060
35.1	1.50	1.73	2.595	~~97~~ 48	1.591	4.128
36.6	1.50	1.75	2.625	~~90~~ 61	1.656	4.347
38.1	1.50	1.49	2.235	34	.766	1.712
39.6	1.50	1.47	2.205	12	.289	.637
41.1	1.20	.25	.300	ø	ø	ø
REW = 42.0	.45	ø				
41.4 ✓	41.4 ✓		X = 49.22			89.7