APPENDIX A - Introduction to the Roads Inventory Analysis and GIS Map Set

for
Study Area Roadway Inventory Analysis
and
Project Roadway Management Plan

Klamath Hydroelectric Project
(FERC No. 2082)

October 2004

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GIS Data Development and Linear Referencing

One of the components of the Inventory Analysis and Management Plan process was to develop location-based data that would allow for the identification of roadway segments and storage of attributes associated with roadway segments in an accompanying database. A Geographic Information System (GIS)-based technology was used to compile these data. Existing road data were provided by PacifiCorp (merge_blm_pcorp3_13.shp). These data were initially the most up-to-date information available at the start of the project. An analysis of this dataset determined that some attributes needed to be more fully populated and new attributes, related to the maintenance and ownership of certain roads or roadway segments, needed to be added to allow for the identification of segments or routes that would be useful to field staff during the license term.

The primary goal of this project was to develop a GIS dataset and map atlas that would provide a method for identifying roadway segments or routes, and provide additional supporting tabular information on these routes. This tabular information would need to consist of several key items used to define the responsibility and level of maintenance required by PacifiCorp for sections or road segments. To achieve this goal, project staff, using the base data provided, developed a method for generating unique for the purpose of creating a *linear-reference* that would address the needs of the project and provide PacifiCorp with a dynamic and robust roadway GIS dataset.

Linear Referencing

Road segments (or routes) are defined by the length of linear feature between two termini. Routes are identified in the tabular information of the GIS dataset through the use of the route identifier (Route id) item. The route id item is an 8 digit unique numerical value that allows for the identification of individual line segments or a group of line segments, for the purposes of creating a linear-referenced dataset. Once a dataset has been developed in this way it can be used to perform a number of tasks related to the linear nature of the data including queries, finding locations, measuring distances, or identify features. Linear referencing in its most basic form is a system by which locations along a line can be measured from a given location. Typically, location information is stored and represented using the Cartesian method of an X/Y location. Linear referencing allows for such a location to be represented using a measure of distance from a known location, such as a mile-marker along a highway. This allows for a more intuitive method for locating a particular point (or event) along a linear feature, like a mile marker along a road. "When data is linear referenced, multiple sets of attributes can be associated with any portion of an existing linear feature, independent of its beginning and end. These attributes can be displayed, queried, edited, and analyzed without affecting the underlying linear feature's geometry."[1] In a traditional line dataset, a line is required to be split each time there is a change in one of its attributes. If the dataset has a number of attributes (like ownership, maintenance level, pavement type, etc....), the line may be split into hundreds, if not thousands of tiny segments in order to properly attribute the line feature. Linear referencing allows for assigning a whole variety of changes in attributes along the measure of the line without the need of splitting it into numerous line segments. Point features can also be stored as part of a linear referenced dataset. These points are referred to as *events*. Events are occurrences such as, the start or end of a road feature, sign locations, gates, or other location-specific events along a road or line feature. Events can be a useful tool to performing analysis (like measuring distances between signs) or as a maintenance and monitoring tool (i.e. identifying potholes).

Another important feature of a linear-referenced dataset is the ability to assign a variety of measure units. Most GIS datasets are stored in either feet or meter units. With a linear referenced dataset, units can be converted to miles, kilometers, furlongs, or any other unit of measure that may be required. Once again, this modification does not require an entire redefining of the base information. Dynamic segmentation is another unique feature of storing data in a linear reference system. Dynamic segmentation allows a route to be divided into user defined segments for the purposes of measure. This can be a useful method for identifying and locating segments of a road route.

Roads Study Map Atlas

The map atlas generated as part of the Inventory Analysis and Management Plan is comprised of a 33-tile (sheet) map set formatted on an 11x17 tabloid paper size, with a map scale of 1"=.20 miles or 1:12,620 absolute scales. This map set was created to support information on the identification of roads provided in the report and tabular appendixes provided. Data provided by PacifiCorp, Ch2M Hill, BLM, as well as data generated by EDAW was used in the development of this map atlas. Some data modifications were required to support draft reviews of maps that resulted in the need to change data representation in graphic form or to support edits and comments supplied by PacifiCorp staff.

Roads data represented in the map atlas are symbolized using a road classification system developed by PacifiCorp and EDAW. This system is linked to an attribute field in the GIS data and classifies roads based on information provided by PacifiCorp.

The process of identifying roads is based on the linear reference system, whereby routes were identified based on a system of logical methods of travel along roadways and on field observations during site visits. These routes are defined as the linear features between their termini points. The map atlas contains annotation (labels) for both routes and termini and uses a numeric code to identify these features.

[1] Linear Referencing in ArcGIS, ESRI Press, 2002

As previously mentioned, routes were coded using an 8-digit numeric code. These codes are unique for each route and follow rules in their numbering convention (Table 1). The first two numbers were used to generally group roadway types. For example; Copco Road, a primary road, was coded with a 10 as its first two digits
.

Table 1. 8 Digit Numeric Codes for Roadway Annotation.

1st 2 digits	2nd 2 digits	last 4 digits		
General Road Type	Open Slots	Unique Route ID	Route_ID	General Road Type Description
10	00	0001	100000001	Primary Road
20	00	0002	200000002	Recreation-Based Roads
30	00	0003	300000003	Likely PacifiCorp Use Roads
50	00	0004	500000004	Potential PacifiCorp Use Roads
90	00	0005	900000005	Road in Study Area - Not Likely Used

The second two digits in the route-id number were left as open slots to provide for future coding needs or expansion of the general and unique value fields. The last four digits correspond to the unique route identifier for a given route. This unique number corresponds to all of the line features are included in that route. Using our Copco Road example, Copco Road from the study boundary to the intersection of Iron Gate Estates road (at termini 2729) has a route-id of 10000001, although Copco Road continues on, the Route-id changes to 100000002 (Map Tile 1). While it is still Copco Road, this new unique route identifier allows for new measures to be created from this location. The locations of these unique routes are determined by the termini points. The location of these changes in route identifiers were based on easy to locate features or intersections found along the roadway. The intent with this method of identification was to facilitate used of this data for locating specific locations from know features on the ground (see discussion above). This allows for a more intuitive use of the roads data by defining routes based on a specific point (termini) to the next specific point (termini). Copco Road changes in route-id again at the Overlook Point Recreation Area entrance road from 10000002 to 10000003 at termini 2679. This method of route identification is used for all roads in the study area and may also include some roads outside of the study area for continuity purposes. Line features not within the project study area or included for continuity have a route-id of "0." These features were retained for purposes of mapping efforts, and for the ability to assign routes to these features if needed.

Routes are defined by the termini (see Appendix D & E) and were determined based on the likely "path" taken during a driving/access event. In the illustrated example below at Keno Recreation Area (Figure 1), Route 200000039 (Keno Recreation Access Rd.) is taken to its end termini (755) where it splits into two new routes (20000047 and 20000042). If 20000047 (highlighted in red) are taken to the left it runs to its end termini (796) at the Keno Dam. One thing to notice is that several spur roads (20000044 and 200000046) have their own termini on the 20000047 line but do not "split" the 20000047 into new route-id values. Another feature to be aware of are loops or circles in a route. In route 200000046, the route begins at termini 761 and loops around to join back up with itself at termini 774. This can be confusing when reading it on the map, but when observed, one should note that route 200000046 includes the loops section. Other loop effects to be aware of is when a loop begins and ends at the same termini, such as in 20000045. If reading tabular information and the To and From termini have the same ID value, it pertains to a route that forms a loop. A complete list of termini and their associated route IDs is provided in Table 2.

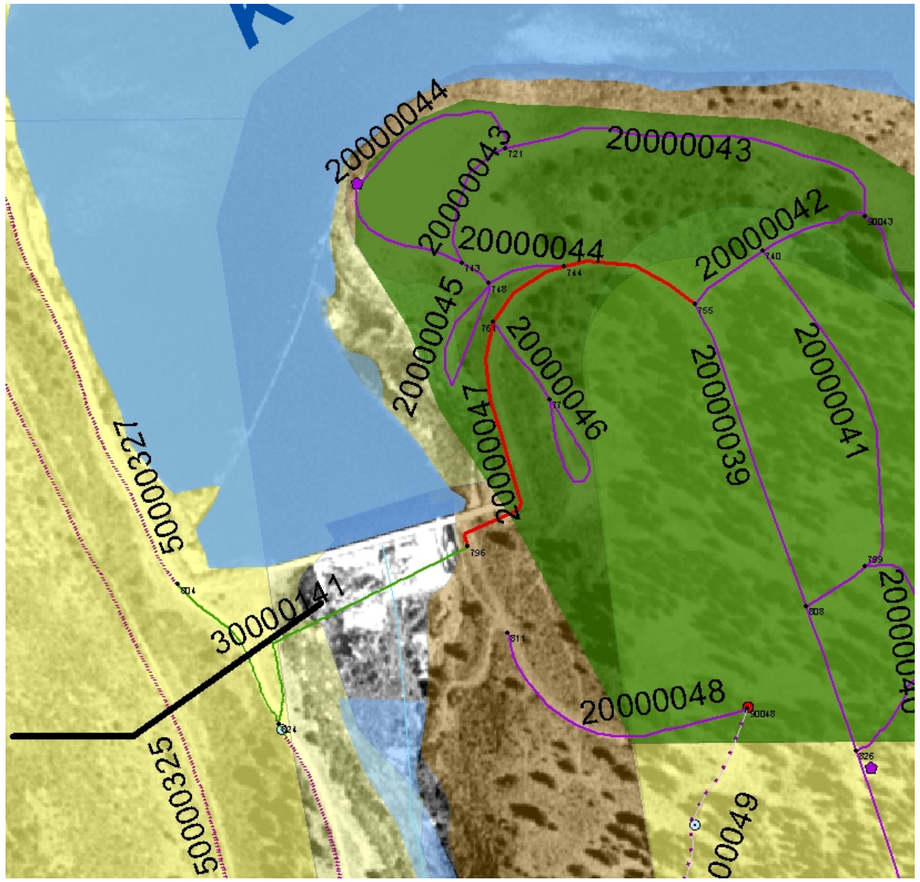


Figure 1. Road Annotation and Termini Example.

The challenge in reading a map of route events stems from determining where a route begins and ends. Termini points provide the necessary information for this, but it might not be visually intuitive to determine which termini corresponds to which route. Therefore, it is necessary to consult the route-id and termini values in the accompanying appendixes (D and E) in concert with the map atlas to correlate the relationship between the routes and their beginning and end points (termini).

Insert **Appendix A Table 2.xls**.

(Print xls spreadsheet **head to toe,** portrait, on 11x17)

Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
8	1	30000167						
9	1	20000054						
10	1	30000168						
22	1	30000166						
29	1	30000167						
35	1	30000166						
36	1	30000170						
58	1	30000170						
62	2	20000054	50000427					
65	1	30000174						
70	3	30000174	50000427	30000171				
77	1	50000418						
78	1	30000171						
267	1	50000390						
269	1	50000304						
270	1	50000305						
271	1	50000304						
272	1	50000306						
275	1	50000303						
276	1	50000305						
278	1	50000310						
279	1	50000169						
281	1	50000319						
284	1	50000321						
285	1	50000323						OATMAN LAKE RD
286	1	50000321						
288	1	50000317						
289	1	50000322						
292	1	50000318						
295	1	50000323						OATMAN LAKE RD
296	1	50000168						
297	1	50000322						
298	1	50000320						
303	1	50000320						
305	1	50000307						
307	1	50000285						
309	1	50000319						
312	1	50000315						
313	1	50000315						
316	1	50000309						
319	1	50000310						
320	3	50000294	50000290	50000306				
321	1	50000291						
323	1	50000309						
325	1	50000317						
326	1	50000307						
327	1	50000291						
328	1	50000308						
329	1	50000303						
332	1	50000290						
335	1	50009294						
337	1	50000298						
338	1	50000316						

Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
339	1	50000302						
341	1	50000308						
342	1	50000297						
343	1	50000299						
354	1	50000298						
357	1	50000299						
361	1	50000316						
362	1	50000314						
373	1	50000314						
375	1	50000301						
376	1	50000302						
378	1	50000311						
382	1	50000300						
384	1	50000289						
392	1	50000313						
394	1	50000311						
397	1	50009294						
400	1	50000173						
404	1	50000313						
407	1	50000300						
409	1	50000301						
410	1	50000312						
411	1	50000296						
416	1	50000297						
419	1	50000172						
420	1	50000295						
421	1	50000296						
422	1	50000312						
425	1	50000325						
428	1	50000295						
432	1	50000170						
434	1	50000288						
435	1	50000171						
442	1	30000134						
444	1	50000288						
446	1	50000286						
449	1	50000294						
451	1	50000275						
454	1	50000286						
458	1	30000136						
460	1	30000135						
462	1	30000135						
469	1	50000287						
471	1	30000136						
472	1	50000172						
479	3	30000133	20000038	30000134				
484	1	50000285						
485	1	30000133						
488	1	30000132						
490	1	30000132						
499	1	50000173						
500	1	50000284						
506	1	50000282						

Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
509	3	30000131	20000037	20000038				
513	1	50000174						
517	1	50000171						
523	1	50000281						
524	2	50000284	50000287					
525	1	30000131						
530	2	50000336	50000335					
533	1	50000331						
535	1	90000022						
536	1	50000333						
538	1	50000174						
539	1	50000283						
540	1	50000170						
541	1	50000169						
542	1	90000022						
543	1	50000168						
545	1	50000334						
546	1	50000283						
554	1	50000333						
561	1	30000121						
563	1	30000129						
566	1	30000129						
567	1	30000127						
569	1	50000334						
570	1	30000128						
571	1	30000128						
572	1	50009327						
577	1	50000179						
578	1	50000332						
579	1	30000126						
580	1	50000329						
581	1	50000176						
585	1	50000340						
586	1	50000339						
587	3	50000175	50000177	50000179				
588	2	50000325	50000329					
592	1	50000180						
593	1	50000331						
595	1	50000178						
597	1	30000130						
598	1	30000126						
601	1	50000335						
602	1	50000389						
603	1	50000180						
606	1	50000340						
609	1	50000341						
612	1	50000183						
623	1	50000018						
624	2	50000327	50009327					
635	1	50000018						
639	1	30000130						
642	1	50000332						
646	1	50000183						

Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
649	1	50000337						
651	1	50000389						
654	1	50000181						
659	1	30000125						
660	1	30000125						
663	1	50000182						
664	1	50000328						
665	1	50000342						
669	1	50000182						
676	1	50000176						
677	1	50000181						
687	1	50000331						
690	1	50000339						
693	1	50000343						
694	1	50000337						
695	1	20000037						
698	1	50000328						
699	1	30000122						
701	1	50000342						
705	1	50000278						
706	1	50000338						
707	1	30000127						
711	1	50000277						
713	1	50000338						
714	1	30000123						
715	1	30000122						
716	1	30000124						
718	1	30000124						
721	1	20000044						
723	1	30000123						
734	1	50000279						
736	1	50000280						
738	1	50000343						
740	1	20000041						
741	1	50000279						
742	1	50000276						
744	1	20000044						
748	1	20000045						CIRCULAR LOOP DRIVE
753	1	50000278						
754	1	50000280						
755	3	20000039	20000047	20000042				
756	1	50000275						
758	1	50000276						
760	1	50000281						
761	1	20000046						REC RD - INC. CIRCLE LOOP
766	1	20000042						
767	2	30000121	20000036					
769	1	50000277						
774	1	20000046						REC RD - INC. CIRCLE LOOP
776	1	20000036						PIONEER REC AREA - INC CIRCLE DR
778	1	50000184						
783	2	50000167	20000036					
784	2	50000178	30000140					

Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
790	4	11000008	12000002	12000001	50000166			
793	1	50000167						
796	2	30000141	20000047					
799	1	2000040						
801	1	50000185						
803	1	50000177						
804	2	30000141	50000327					
808	1	20000041						
810	1	50000184						
811	1	2000048						
813	1	20000053						PIONEER CROSSING REC AREA
814	1	50000341						
815	1	50000345						
824	1	50000326						OHV - INC. CIRCLE LOOP
826	1	2000040						
829	2	50000274	20000053					
831	1	50000388						
832	1	50000346						
833	1	50000346						
834	1	50000345						
835	1	30000139						
837	1	30000139						
840	1	50000344						
843	1	50000162						
846	1	50000347						
851	1	50000186						
858	1	50000186						
863	2	50000346	50000349					NO CONNECTION TO HWY 66
864	1	50000344						
866	1	20000049						
868	1	50000187						
870	3	30000140	30000138	30000137				
873	2	50000330	50000347					CONNECTOR ROAD TO HWY 66
874	1	50000166						
880	1	50000187						
882	1	12000003						
889	1	50000185						
890	1	50000352						
891	1	50000348						
892	2	50000163	50000162					
896	1	50000197						
897	1	50000196						
899	1	50000159						
900	1	50000198						
903	1	50000350						
904	2	50000197	50000198					
907	1	50000195						
913	1	50000201						
914	2	50000348	50000347					
916	1	50000352						
920	1	50000257						
921	1	30000137						
924	1	30000161						

Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
926	1	50000200						
928	1	50000189						CIRCULAR PULLOFF
931	1	50000188						
935	1	50000189						CIRCULAR PULLOFF
938	1	50000326						OHV - INC. CIRCLE LOOP
941	1	50000188						
942	1	50000195						
946	1	50000193						
948	1	50000256						
949	1	50000255						
950	1	50000163						
952	1	50000201						
953	1	50000161						
954	1	50000160						
956	1	50000356						
957	2	12000001	12000001					HWY 66 - SW SIDE OF BRIDGE
958	1	50000253						
961	1	50000353						
963	2	50000202	50000203					
967	1	50000204						
968	2	50000203	50000203					
969	1	50000355						
970	1	50000160						
971	1	50000253						
972	1	50000352						
973	1	50000192						
975	1	50000388						
976	1	50000387						
977	1	50000161						
982	1	50000204						
984	1	50000386						
985	1	50000257						
987	1	50000190						
988	1	50000194						
990	1	50000205						
991	1	50000255						
994	1	50000356						
995	1	50000202						
996	1	50000155						
997	1	50000256						
998	1	50000158						
1001	1	50000254						
1002	1	50000157						
1003	1	50000156						
1004	1	50000158						
1007	1	50000157						
1009	2	50000192	50000193					
1010	1	30000156						
1011	2	12000001	11000010					
1013	2	50000159	50000156					
1014	1	50000200						
1015	1	50000199						
1016	1	30000157						

Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
1017	1	50000191						
1018	1	50000274						
1019	1	50000196						
1021	1	50000154						
1023	1	50000355						
1024	1	50000155						
1028	1	50000350						
1029	1	50000386						
1032	1	30000162						
1033	1	50000154						
1034	1	50000194						
1035	1	50000353						
1036	1	50000190						
1041	1	50000365						
1043	1	50000366						
1044	1	50000387						
1045	1	50000153						
1048	2	30000160	30000161					
1049	1	50000366						
1051	1	50000254						
1053	1	20000039						
1054	1	90000023						
1056	1	30000162						
1057	1	90000024						
1058	1	50000369						
1059	1	30000160						
1060	1	20000035						TOPSY CAMPGROUND - INC. CIRCLE DRIVE
1061	1	20000035						TOPSY CAMPGROUND - INC. CIRCLE DRIVE
1064	1	5000370						
1065	1	5000370						
1069	1	50000191						
1071	1	90000024						
1072	1	90000023						
1073	1	30000158						
1074	1	30000158						
1077	1	50000368						
1082	1	50000367						
1084	1	30000157						
1085	1	50000367						
1086	1	50000153						
1087	1	50000352						
1090	3	30000156	30000164	30000144				
1092	1	30000163						
1094	1	30000163						
1095	1	90000020						
1096	1	50000369						
1099	1	30000154						
1101	1	30000117						
1104	2	30000154	30000152					
1106	3	30000155	30000156	30000116				
1107	1	30000153						
1109	1	30000153						
1111	1	30000148						

Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
1112	1	30000120						
1113	1	30000155						
1114	1	50000385						
1115	1	50000385						
1116	3	50000358	50000358	50000359				
1117	1	50000365						
1119	1	30000152						
1122	1	30000118						
1123	1	30000120						
1124	1	30000151						
1125	1	30000149						
1126	1	30000119						
1127	1	30000150						
1131	1	30000151						
1134	1	30000119						
1140	1	50000357						
1142	1	30000149						
1143	1	30000118						
1144	1	90000020						
1145	1	50000272						
1146	1	30000115						
1148	1	30000117						
1151	1	30000150						
1152	1	50000273						
1155	1	50000252						
1156	1	50000273						
1157	1	50000272						
1158	1	50000359						
1160	3	11000007	11000008	30000116				
1161	1	50000358						
1162	1	30000115						
1166	1	50000384						
1167	1	50000384						
1169	1	50000271						
1170	1	50000360						
1171	1	50000361						
1172	1	50000360						
1174	1	50000271						
1175	1	50000270						
1178	1	50000150						
1179	1	50000270						
1181	1	50000363						
1183	1	50000148						
1186	1	50000146						
1187	1	50000147						
1188	1	50000152						
1189	1	50000267						
1190	1	50000364						
1192	1	50000382						
1195	1	50000383						
1196	1	50000383						
1198	1	50000149						
1199	1	50000364						

Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
1200	1	50000266						
1201	1	50000147						
1203	1	50000266						
1204	1	50000148						
1205	1	50000362						
1207	1	50000362						
1208	1	50000149						
1209	1	50000150						
1210	1	50000267						
1211	1	50000363						
1219	1	50000264						
1223	1	50000263						
1226	1	50000268						
1228	1	50000265						
1231	1	50000263						
1235	1	50000269						
1237	1	50000269						
1238	1	50000268						
1239	1	50000372						
1240	1	50009262						
1241	1	50009262						
1242	1	50000262						
1247	1	50000258						
1249	1	50000252						
1250	1	50009252						
1253	1	50000146						
1254	2	50000372	50000371					
1255	1	50000373						
1258	1	50000260						
1259	1	50000361						
1264	1	50000262						
1265	1	50000261						
1266	1	50000261						
1267	1	50000371						
1270	2	50000259	50000260					
1271	1	50000373						
1272	1	50000259						
1275	1	50000258						
1278	1	30000148						
1279	1	50000382						
1281	1	50000381						
1282	1	50000381						
1283	1	30000147						
1286	1	30000146						
1287	1	30000145						
1288	3	30000142	30000143	30000144				
1289	1	20000051						
1292	1	20000052						
1295	1	50000381						
1296	1	20000052						
1297	1	50000374						
1298	1	30000145						
1299	1	30000146						

Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
1300	1	50000381						
1301	1	20000051						
1303	1	50000375						
1307	1	50000375						
1309	1	20000050						SPRING IS. BOAT LAUCH - INC. CIRCLE DRIVE
1312	3	30000142	50000251	20000050				
1313	1	30000147						
1314	1	50000374						
1318	3	50000380	50000380	50000381				
1321	1	50000377						
1324	1	50000376						
1325	1	50000380						
1327	1	50000378						
1328	1	50000378						
1332	1	50000379						
1333	1	50000377						
1335	1	50000376						
1343	1	50000381						
1359	1	50000250						
1363	1	50000235						
1372	1	50000250						
1373	1	50000248						
1378	1	50000249						
1379	1	50000249						
1380	1	30000091						
1381	1	30000113						
1382	1	30000112						
1389	1	50000248						
1395	1	50000236						
1399	1	50000247						
1400	1	50000247						
1403	1	30000112						
30000110	1	30000110						
1409	1	50000248						
1410	1	50000093						
30000110	1	30000110						
1418	1	30000111						
1424	1	30000109						
1426	1	30000071						
1428	1	90000013						
1429	1	30000109						
1433	1	90000013						
1439	1	50000246						
1440	1	50000246						
1441	1	50000094						
1442	1	50000094						
1447	3	50000093	30000070	30000071				
1450	1	30000104						
1451	1	30000108						
1452	1	30000108						
1453	1	50000092						
1455	1	50000219						
1456	1	50000089						

Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
1457	1	50000218						
1460	1	30000111						
1462	1	30000114						
1464	1	50000242						
1466	1	50000090						
1468	1	50000245						
1470	1	50000243						
1473	1	30000106						
1476	1	30000105						
1477	1	30000106						
1480	1	50009237						
1481	1	30000107						
1484	3	30000070	50000998	50000092				
1486	1	50000236						
1489	1	50000220						
1491	1	50000238						
1494	1	50000243						
1495	1	50000237						
1496	1	50000220						
1500	1	50000220						
1501	1	50000233						
1502	1	50000244						
1503	1	50009237						
1508	1	50000233						
1510	2	30000103	30000104					
1511	1	30000101						
1515	1	50000244						
1517	1	50000240						
1518	1	30000103						
1519	1	30000102						
1520	3	30000114	30000100	30000101				
1522	1	50000222						
1523	1	50000223						
1525	1	50000222						
1526	1	50000223						
1528	1	30000099						
1529	1	50000239						
1530	1	50000242						
1533	1	50000234						
90237	1	50000237						ENDS CIRCLE LOOP
1535	1	50000220						
1536	1	50000240						
1538	1	50000221						
1539	1	50000239						
1540	1	30000097						
1541	1	50000234						
1543	1	30000095						
1545	1	30000099						
1546	1	30000098						
1548	1	30000095						
1549	1	50000238						
1551	1	30000096						
1553	1	30000098						

Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
1554	1	30000100						
1555	1	30000097						
1558	1	50000224						
1561	1	50000235						INC. CIRCLE DRIVE
1562	1	50000221						
1563	1	30000096						
1564	1	50000230						
1567	1	50000218						
1568	1	50000228						
1570	1	50000219						
1572	1	30000092						
1573	1	30000094						
1574	1	30000094						
1575	1	30000093						
1567	1	50000143						
1577	1	50000228						
1579	1	30000092						
1580	3	11000006	11000007	30000091				
1575	1	30000093						
1582	1	50000232						
1583	1	50000226						
1584	1	50000232						
1585	1	50000229						
1586	1	50000226						
1587	1	50000095						
1589	1	50000229						
1591	1	50000231						
1592	1	50000095						
1594	1	50000130						
1596	1	50000216						
1597	1	50000142						
1598	1	50000225						
1599	1	50000217						
1601	1	50000090						
1602	3	50000218	50000214	50000215				
1604	1	50000225						
1605	1	50000227						
1607	1	50000096						
1613	1	50000231						
1616	1	50000140						
1617	1	50000230						
1618	1	50000142						
1619	1	50000130						
1622	1	50000142						
1624	1	50000140						
1625	1	50000216						
1626	1	50000088						
1627	1	50000131						
1630	1	50000096						
1631	1	50000129						
1632	1	50000138						
1634	1	50000141						
1636	1	50000089						

Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
1637	1	50000129						
1638	1	50000127						
1641	1	50000133						
1646	1	50000113						
1649	1	50000141						
1652	1	50000138						
1653	1	50000137						
1654	1	50000139						
1655	1	50000139						
1656	1	50000128						
1657	1	50000136						
1659	1	50000127						
1660	1	50000137						
1662	1	50000142						
1666	1	50000145						
1667	1	50000128						
1671	2	50000214	50000215					
1672	1	50000213						
1673	3	50000211	50000212	50000214				
1674	1	50000145						
1676	1	50000213						
1679	1	50000143						
1682	1	50000136						
1689	1	50000212						
1691	1	50000122						
1692	1	50000123						
1695	1	50000123						
1696	1	50000122						
1697	1	50000124						
1702	1	50000087						
1703	1	50000124						
1708	1	30000090						
1709	1	50000088						
1710	1	50000125						
1711	1	50000125						
1713	2	30000090	30000088					
1714	1	30000089						
1717	1	30000089						
1718	1	50000134						
1721	1	30000088						
1724	1	50000134						
1725	1	50000135						
1727	1	30000090						STATELINE TAKEOUT - INC. CIRCLE DR
1732	1	50000135						
1734	1	50000133						
1735	3	30000088	11000005	11000006				STATELINE TAKEOUT ACCESS RD
1737	1	30000068						
1741	2	50000996	30000067					
1744	3	30000066	30000067	30000068				
1747	1	50000114						
1752	3	30000063	30000064	30000068				
1758	1	50000087						
1760	3	30000062	30000063	50000997				

Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
1766	1	50000132						
1768	1	50000131						
1770	1	30000065						
1776	1	50000132						
1782	1	30000065						
1783	1	50000079						
1784	1	50000080						
1787	1	50000116						
1791	1	50000076						
1795	1	50000118						
1797	1	50000114						
1801	1	50000081						
1804	1	50000081						
1806	1	50000079						
1807	1	50000116						
1812	3	10000010	10000011	5000080				
1823	1	50000117						
1826	1	50000119						
1829	1	3000087						
1832	2	50000077	50000076					
1834	1	50000078						
1836	1	50000120						
1838	1	30000066						
1840	1	50000117						
1842	1	20000034						FISHING ACCESS #6 - TRAIL
1843	1	50000078						
1847	1	50000118						
1849	1	20000034						FISHING ACCESS #6 - TRAIL
1850	1	20000032						FISHING ACCESS #6 - TRAIL
1851	1	20000033						FISHING ACCESS #6 - PARKING
1854	1	20000033						FISHING ACCESS #6 - PARKING
1856	1	20000033						FISHING ACCESS #6 - PARKING
1857	1	50000120						
1861	1	50000121						
1864	1	50000118						
1865	1	20000032						FISHING ACCESS #6 - TRAIL
1866	1	50000121						
1872	1	30000053						
1875	1	50000097						
1876	1	30000054						
1879	1	50000097						
1882	1	90000019						
1883	1	50000075						
1887	1	30000054						
1889	1	50000082						
1890	1	50000083						
1892	1	50000082						
1894	1	50000075						
1902	1	50000085						
1904	1	30000056						
1907	1	30000057						
1908	1	50000085						
1909	1	30000058						

Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
1912	1	30000055						
1914	1	50000083						
1915	1	30000056						
1916	1	30000053						
1917	1	50000084						
1922	1	50000084						
1923	3	10000009	10000010	30000051				
1924	1	30000052						
1930	1	30000057						
1931	1	30000061						
1932	1	30000058						
1938	1	90000019						
1942	1	30000052						
1948	1	30000073						
1953	1	30000060						
1955	1	30000061						
1957	3	10000008	10000009	30000059				
1961	1	30000044						
1963	1	30000043						
1965	1	30000060						
1968	1	30000076						
1969	1	30000044						
1970	1	30000074						
1975	1	30000073						
1983	1	50000098						
1985	1	50000074						
1994	1	50000113						
1996	1	20000023						
2000	1	50000074						
2001	1	20000025						
2002	1	20000024						
2005	1	20000024						
2007	1	20000023						
2009	1	30000075						
2011	1	50000073						
2012	1	20000025						
2013	1	30000051						INCLUDES CIRCULAR DRIVE
2014	1	50000073						
2017	1	50000098						
2024	1	50000099						
2026	1	30000045						INCLUDES CIRCULAR DRIVE
2028	1	50000111						
2029	3	30000043	30000045	30000047				
2031	1	30000045						INCLUDES CIRCULAR DRIVE
2036	1	50000048						
2037	1	50000109						
2040	1	30000173						
2042	1	30000173						
2043	1	50000072						
2048	1	50000072						
2054	1	30000048						
2055	1	50000029				END	COPCO RD	
2056	1	30000049						

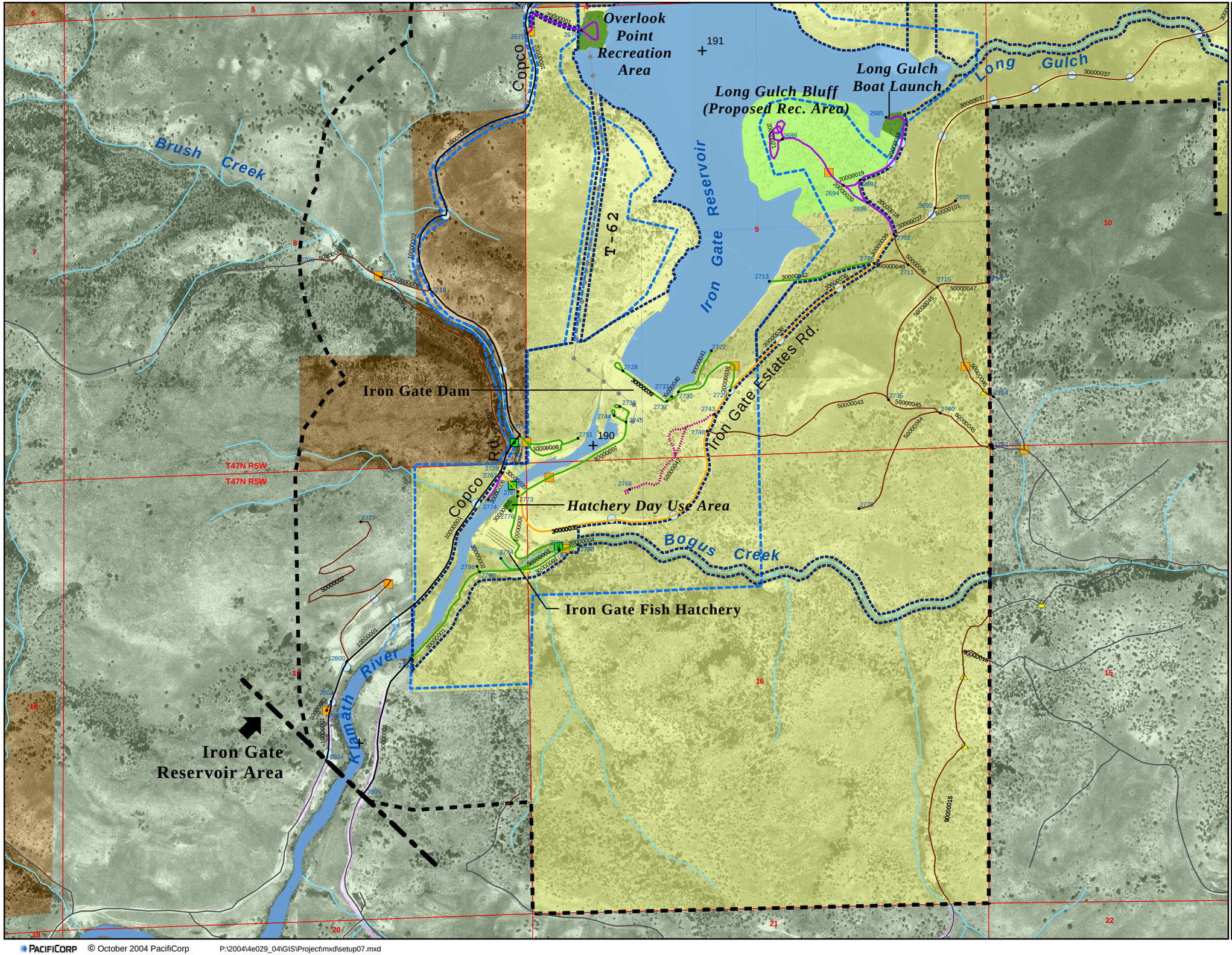
Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
2058	1	30000049						
2059	1	50000036						
2061	1	50000210						
2062	1	30000050						
2064	1	50000048						
2066	1	30000050						
2067	1	50000052						
2069	1	30000047						
2070	1	30000033						
2073	1	30000048						
2075	1	50000025						
2078	1	50000022				END	COPCO RD	
2079	1	30000030						
2080	1	50000071						
2084	1	30000032						
2089	1	50000052						
2091	1	50000100						
2093	1	30000018						
2095	1	30000032						
2096	1	50000068						
2097	1	50000100						
2099	1	50000030				END	COPCO RD	OHV - INCLUDES LOOP
2100	1	50000071						
2101	1	30000033						
2103	1	50000028				STBND	COPCO RD	
2104	1	30000019						
2106	1	50000021				STBND	COPCO RD	HORSESHOE RANCH RD
2107	1	30000019						
2109	1	50000035						
2110	1	50000099						
2113	1	30000018						
2115	1	50000053						
2116	1	20000014						JENNY CREEK
2120	1	50000067						
2122	1	30000017						
2123	1	90000025						
2125	1	50000034						
2126	1	50000049						
2131	1	90000025						
2135	1	50000030				COPCO RD	END	OHV - INCLUDES LOOP
2137	1	50000067						
2138	1	30000027						
2139	3	10000006	10000007	20000014		COPCO RD	VARIES	COPCO RD/JENNY CREEK
2144	1	50000035						
2146	1	30000026						
2147	1	50000023						
2150	1	30000022						
2156	1	30000027						
2158	1	50000024				50000023	END	
2160	1	30000031						COMM TOWER RD
2161	1	50000069						
2163	3	20000011	50000023	50000025		P FERC BND	COPCO RD	
2165	1	50000021				COPCO RD	STBND	HORSESHOE RANCH RD

Table 2. Termini and Associated Route IDs.

Termini Number	# of Routes at Termini	route_id_1	route_id_2	route_id_3	route_id_4	FROM_DESC	TO_DESC	COMMENT
2168	1	5000049						
2169	1	50000050						
2171	1	50000051						
2175	1	30000025						
2177	1	30000025						
2179	1	20000010						CAMP CREEK REC AREA
2185	1	50000027				END	50000028	
2186	1	30000016						
2189	1	50000069						
2190	1	50000024				END	50000023	
2193	1	20000031						FISHING ACCESS #5 - PARKING
2196	1	50000070						
2198	1	50000022				COPCO RD	END	
2199	1	50000029				COPCO RD	END	
2204	1					COPCO RD	COPCO RD	
2206	1	50000070						
2207	1	50000210						
2211	1					COPCO RD	COPCO RD	
2219	1	30000017						
2220	1	50000027				50000028	END	
2221	1	50000050						
2222	1	50000034						
2226	1	50000028				COPCO RD	STBND	
2228	1	20000022						MALLARD COVE - INCL. CIRCLE DR.
2229	1	50000065						OHV TRAILS - CONTAINS LOOPS
2230	1	20000031						FISHING ACCESS #5 - PARKING
2233	1	30000013						
2237	1	30000015						
2240	1	50000068						
2241	1	20000009						
2242	3	10000007	10000008	30000014				COPCO RD/COPCO VILLAGE RD
2244	1	20000016						
2245	1	30000013						
2246	1	30000015						
2248	1	50000211						
2251	1	20000022						MALLARD COVE - INCL. CIRCLE DR.
2252	1	20000017						
2253	1	30000016						
2257	1	20000010						CAMP CREEK REC AREA
2258	1	20000007						CAMP CREEK REC AREA
2263	1	20000009						
2267	1	20000017						
2268	1	30000028						INCLUDES CIRCULAR DRIVE
2269	4	30000024	30000026	30000028	30000029			
2271	3	11000004	11000005	30000083				
2274	1	50000066						
2276	1	30000023						
2281	4	10000005	10000006	20000006	20000011			COPCO RD/CAMP CREEK
2283	1	50000066						

Insert 17x11 inch color Map Set (33 maps).



Legend

- EXISTING FERC BOUNDARY
- PROPOSED FERC BOUNDARY/MANAGEMENT PLAN AREA
- STUDY AREA
- RESOURCE AREA BOUNDARY (8)
- TOWNSHIP/RANGE
- SECTION

ROAD TYPES & OTHER FEATURES

- ALL ROADS OUTSIDE STUDY AREA
- PROJECT MAINTAINED HYDRO ROAD (PMH)
- PROJECT MAINTAINED RECREATION ROAD (PMR)
- PROJECT T-LINE ROAD (PTL)
- JOINTLY MAINTAINED HYDRO ROAD (JMH)
- JOINTLY MAINTAINED RECREATION ROAD (JMR)
- NON-PROJECT T-LINE/DISTRIBUTION ROAD (NPT)
- BLM MAINTAINED RECREATION ROAD (BMR)
- OHV ROAD (OHV)
- PUBLIC ROAD (PUB)
- PRIVATE ROAD (PR)
- FOOT TRAIL (TRL)
- PROPOSED DECOMMISSIONED ROAD (DCM)
- UNAMED OR UNDEFINED ROAD (UNM)
- TRANSMISSION LINES
- STREAMS
- OR/CA STATE LINE
- OPEN WATER/HYDROLOGY
- RECREATION SITE
- PROPOSED RECREATION SITE
- RIVER MILE MARKERS
- TERMINI POINTS (ID Labels)
- ROAD SIGNS
- CULVERTS
- BRIDGES
- FORDS
- GATE, CABLE, OR BARRICADE
- ROAD CLOSURE

LAND OWNERSHIP

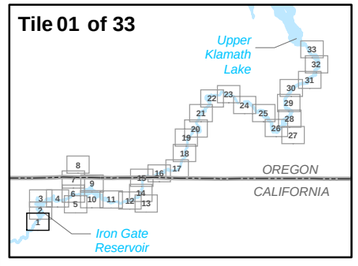
- PACIFICORP
- FEDERAL LANDS (BLM)
- STATE OF OREGON
- KLAMATH COUNTY
- CITY OF KLAMATH FALLS
- KLAMATH TRIBES HOUSING ATY.
- PRIVATE/OTHER

N

0 0.1 0.2 0.4 Miles

1 inch equals 0.20 miles

Tile 01 of 33



Klamath Hydroelectric Project

FERC Project No. 2082

Appendix A
Roads Inventory Analysis

IRON GATE DAM AREA

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Big Rock Dr.
Colstin Rd.
Mirror Cove Recreation Area
Iron Gate Reservoir
T-62
Gate
Reservoir
Linda Dr.
Mountain Ave.
Copco Rd.
Old Quarry Site
Shirley Ave.
Overlook Point Recreation Area
Long Gulch Bluff (Proposed Rec. Area)
Long Gulch Boat Launch
Long Gulch
Brush Creek
T48N R5W
T47N R5W
Lakeside Ln.
Iron Canyon Rd.
Fawn Rd.
Gate Rd.
Iron Gate Estates Rd
+193
+192
+191

Legend

- EXISTING FERC BOUNDARY
- PROPOSED FERC BOUNDARY/MANAGEMENT PLAN AREA
- STUDY AREA
- RESOURCE AREA BOUNDARY (8)
- TOWNSHIP/RANGE
- SECTION

ROAD TYPES & OTHER FEATURES

- ALL ROADS OUTSIDE STUDY AREA
- PROJECT MAINTAINED HYDRO ROAD (PMH)
- PROJECT MAINTAINED RECREATION ROAD (PMR)
- PROJECT T-LINE ROAD (PTL)
- JOINTLY MAINTAINED HYDRO ROAD (JMH)
- JOINTLY MAINTAINED RECREATION ROAD (JMR)
- NON-PROJECT T-LINE/DISTRIBUTION ROAD (NPT)
- BLM MAINTAINED RECREATION ROAD (BMR)
- OHV ROAD (OHV)
- PUBLIC ROAD (PUB)
- PRIVATE ROAD (PR)
- FOOT TRAIL (TRL)
- PROPOSED DECOMMISSIONED ROAD (DCM)
- UNAMED OR UNDEFINED ROAD (UNM)
- TRANSMISSION LINES
- STREAMS
- OR/CA STATE LINE
- OPEN WATER/HYDROLOGY
- RECREATION SITE
- PROPOSED RECREATION SITE
- RIVER MILE MARKERS
- TERMINI POINTS (ID Labels)
- ROAD SIGNS
- CULVERTS
- BRIDGES
- FORDS
- GATE, CABLE, OR BARRICADE
- ROAD CLOSURE

LAND OWNERSHIP

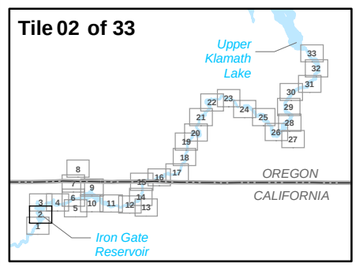
- PACIFICORP
- FEDERAL LANDS (BLM)
- STATE OF OREGON
- KLAMATH COUNTY
- CITY OF KLAMATH FALLS
- KLAMATH TRIBES HOUSING ATY.
- PRIVATE/OTHER

N

0 0.1 0.2 0.4 Miles

1 inch equals 0.20 miles

Tile 02 of 33



Klamath Hydroelectric Project

FERC Project No. 2082

Appendix A
Roads Inventory Analysis

CENTRAL IRON GATE RESERVOIR AREA

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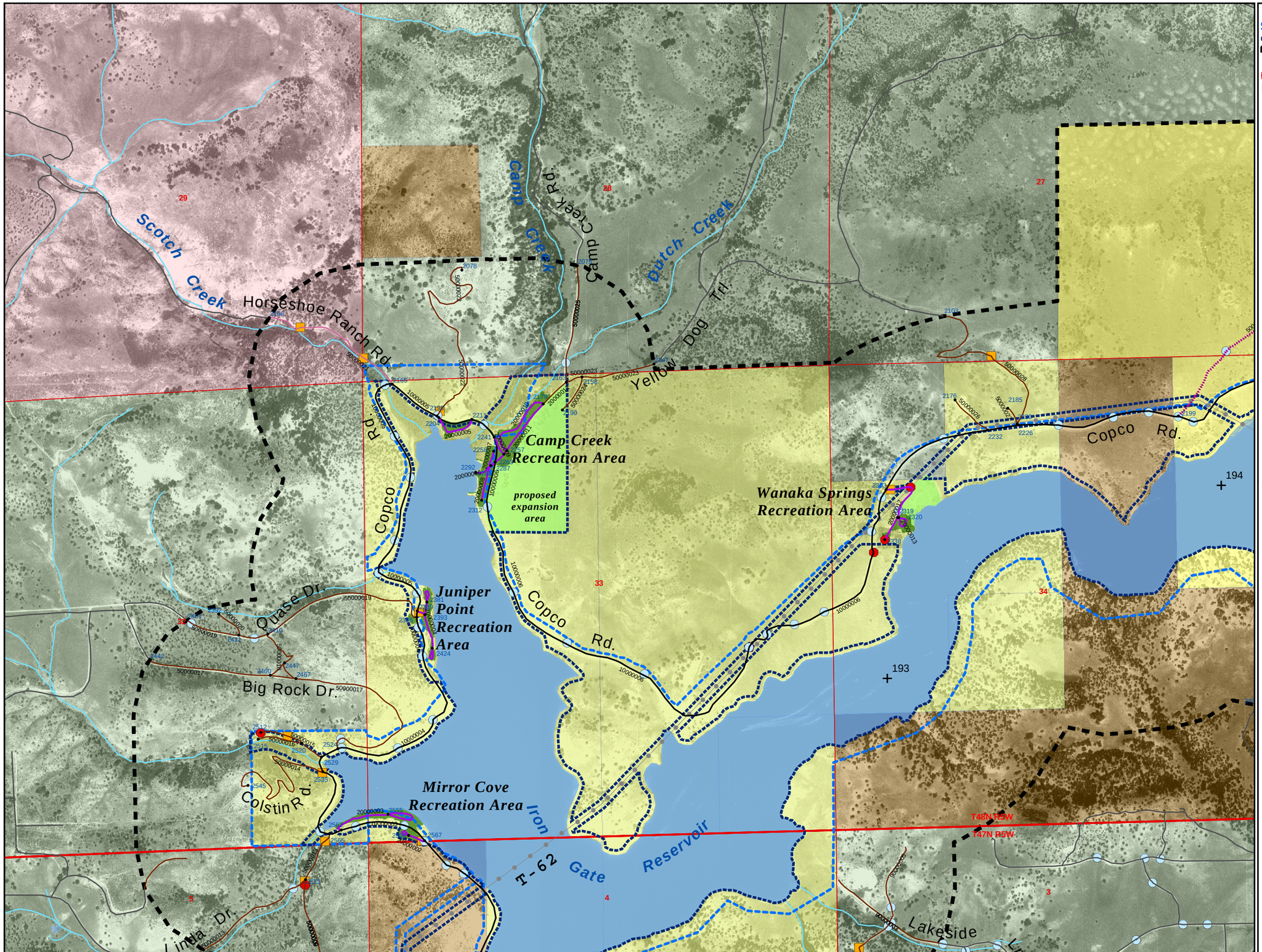


Legend

- EXISTING FERC BOUNDARY
- PROPOSED FERC BOUNDARY/MANAGEMENT PLAN AREA
- STUDY AREA
- RESOURCE AREA BOUNDARY (8)
- TOWNSHIP/RANGE
- SECTION

ROAD TYPES & OTHER FEATURES

- ALL ROADS OUTSIDE STUDY AREA
- PROJECT MAINTAINED HYDRO ROAD (PMH)
- PROJECT MAINTAINED RECREATION ROAD (PMR)
- PROJECT T-LINE ROAD (PTL)
- JOINTLY MAINTAINED HYDRO ROAD (JMH)
- JOINTLY MAINTAINED RECREATION ROAD (JMR)
- NON-PROJECT T-LINE/DISTRIBUTION ROAD (NPT)
- BLM MAINTAINED RECREATION ROAD (BMR)
- OHV ROAD (OHV)
- PUBLIC ROAD (PUB)
- PRIVATE ROAD (PR)
- FOOT TRAIL (TRL)
- PROPOSED DECOMMISSIONED ROAD (DCM)
- UNAMED OR UNDEFINED ROAD (UNM)
- TRANSMISSION LINES
- STREAMS
- OR/CA STATE LINE
- OPEN WATER/HYDROLOGY
- RECREATION SITE
- PROPOSED RECREATION SITE
- RIVER MILE MARKERS
- TERMINI POINTS (ID Labels)
- ROAD SIGNS
- CULVERTS
- BRIDGES
- FORDS
- GATE, CABLE, OR BARRICADE
- ROAD CLOSURE

LAND OWNERSHIP

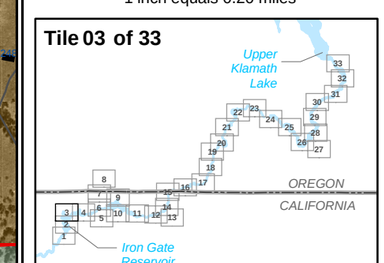
- PACIFICORP
- FEDERAL LANDS (BLM)
- STATE OF OREGON
- KLAMATH COUNTY
- CITY OF KLAMATH FALLS
- KLAMATH TRIBES HOUSING ATY.
- PRIVATE/OTHER

N

0 0.1 0.2 0.4 Miles

1 inch equals 0.20 miles

Tile 03 of 33



Klamath Hydroelectric Project

FERC Project No. 2082

Appendix A
Roads Inventory Analysis

NORTH IRON GATE RESERVOIR AREA

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