Large Woody Material

REFERENCE CONDITION

The reference condition is considered to have had a higher incidence of instream Large Woody Material (LWM) due to available large seral vegetation habitat for recruitment, and the presumed lack of riparian harvest when compared to current conditions.

Salt Creek - 1937

Salt Creek mainstem was surveyed in 1937. Large Woody Material data collected for Salt Creek are not available in complete form (i.e. number of pieces and sizes per Reach and subsequent totals). The riparian area of Salt Creek was "heavily wooded with second growth conifers" and there was "no erosion in stream" (McIntosh et al. 1992). Only twice were instream large woody material mentioned in the 1937 survey, and both refer to LWM jams in the channel. At approximately 2.5 miles and 12.8 miles upstream from the mouth, a small and old log jam was observed and determined "passable [to fish] with difficulty" (McIntosh et al. 1992).

CURRENT CONDITION

Currently, large wood objective levels are below PACFISH & Willamette National Forest Plan - WNF objectives for the majority of stream surveyed in the Salt Creek Watershed (Table 3.6-3). The percent of streams in each subwatershed that meet the WNF forest plan large woody material objectives are shown in Table 3.6-4

Table 3.6-3. Streams within the Salt Creek watershed that meet PACFISH and/or WNF Forest Plan Objective Values for Large Woody Material.

Stream	Reach	Meet PACFISH Objectives	Meet WNF Forest Plan Objectives
McCredie Creek	2, 8	Yes	Yes
Warner Creek	2	Yes	No
T20f 45.3	1	Yes	Yes
T20f 46.3	1	Yes	Yes

Table 3.6-4. Percent of Streams Meeting WNF Forest Plan Objective Values (105 pieces/mile) for Large Woody Material

Subwatershed*	Total Stream Miles Surveyed	Percent of Streams That Meet PACFISH LWM Objective Values
20 1 (lower)	16.03	5.3
20 2 (middle)	30.3	1.5
20 3 (upper)	7.31	0

** Mainstem Salt Creek reaches were apportioned into their respective Subwatersheds.*

Mainstem Salt Creek - 1964

Woody material is available in varying sizes, locations and concentrations within the three subwatersheds of Salt Creek. A 1964 survey of the entire Salt Creek mainstem (from the mouth upstream to Gold Lake) reveals LWM in several sections of the stream. Within Reach 1 (0 - 5.0 miles) there were no LWM that created "obstructions to fish passage" (Hutchinson et al. 1966). In Reach 2 (5.0 -10.5 miles) data reveal "log and debris accumulations [that] altered the flow in some places and improved fish habitat by forming holes and pools [however] these accumulations have not obstructed fish passage" (Hutchinson et al. 1966). There is no mention of LWM jams or accumulations in Reach 3 (10.5 - 17.4 miles) and no obstructions to fish passage were noted. From miles 17.4 - 22.4 (Reach 4) data reveal eight log jams, three of which "are impassable at the current flow" (Hutchinson et al. 1966). Large woody material is not available until the final section (Reach 6) between 25.9 and 27.5 miles where 11 log jams were recorded, four impassable (Hutchinson et al. 1966). Stream cleanout following the 194 flood resulted in the removal of much of the LWM within and adjacent to the channel of Salt Creek.

Mainstem Salt Creek - 1990 and 1996

The valley segment types for lower Salt Creek (Reaches 1 - 4) dictate a situation where large woody material would be expected to be available in small debris jams and single pieces within a moderate slope bound valley. The upper reaches

(6 - 10) of the stream reflect a more varied geomorphology and gradient regime in relation to the potential LWM input and movement within the channel. Steeper gradient, reaches, such as those flowing through V-shaped valleys, would be expected to have less frequent, large debris jams. Other regions of upper Salt Creek display lower gradients and les constrainment where smaller accumulations and single pieces may be expected. The longitudinal profile for Salt Creek is shown in Figure 3.6-5.

All reaches of mainstem Salt Creek, including those in which large wood would be expected to be abundant, are below large woody material objective values (Figure 3.6-8). Large wood is most abundant in the upper reaches of Salt Creek, although current levels of wood are lower than the objectives and possibly historic values. No woody debris jams were observed on Salt Creek during stream surveys in 1990 and 1996.

It should be noted that the LWM now available (1997) in the lower and middle sections of the Salt Creek drainage may be quite different in number, complexity, frequency and placement from that observed during the 1990 stream survey. The reason for this shift in LWM is due to the addition of large woody material during restoration projects as well as the November 1996 flood events which rearranged many of the added structures and recruited new large woody material. Salt Creek from the mouth to the Eagle Creek railroad trestle was resurveyed during the 1997 field season to understand the effects of the 1996 flood events. Data analysis was not available in time for this watershed analysis.

Lower Salt Creek Subwatershed 20 1

Many of the streams surveyed in this section have little or no data available. Of those, McCredie and Warner Creeks have usable information.

McCredie Creek - 1992

Data collected from McCredie Creek in 1992 show five different valley segment types over the course of 1.33 miles. Assessing the expected abundance of LWM throughout this stream, one would expect to find both frequent and infrequent large jams and individual pieces, and abundant single pieces and occasional jams. Only 1 woody debris jam was observed during a 1992 stream survey. Calculated large LWM/mile for all eight reaches reveal two reaches where the number per mile exceeds both the PACFISH and WNF standards (Figure 3.6-9). All but one of the remaining reaches are within 50 percent of the standards.

Warner Creek - 1996

Data collected from Warner Creek in 1996 show two different valley segment types over the 1.9 miles. A longitudinal profile of Warner Creek is displayed in Figure 3.6-7. Warner Creek currently exceeds the PACFISH standard in Reach 2 but falls short in Reaches 1 and 3 (Figure 3.6-9). However, LWM numbers are within the 50 percent margin. Surveyors noted greater than 29 debris jams over the course of three Reaches.

Middle Salt Creek Subwatershed 20 2

Streams surveyed in this section with applicable data include tributaries T20f 45.3, T20f 46.3, T20w 11.8, Eagle Creek, Coyote Creek, South Fork Salt Creek, Fall Creek, and Diamond Creek.

T20f 45.3 - 1992

The valley segment type for tributary T20f 45.3 should reveal a LWM situation where small debris jams and single pieces are common. A 1992 survey reveals this tributary to Salt Creek exceeds both PACFISH and WNF standards (Figure 3.6-10). One debris jam was noted by surveyors.

T20f 46.3 - 1992

The valley segment type for tributary T20f 46.3 should reveal a LWM situation where infrequent large jams yet abundant small jams and single pieces are present. A 1992 survey reveals this tributary exceeds PACFISH and WNF in the first reach and falls short in the second reach (Figure 3.6-10). Data are not available for the other two reaches.

T20w 11.8 - 1992

The valley segment type for tributary T20w 11.8 should reveal a LWM situation where large jams are infrequent. A 1992 survey reveals this tributary falls well short of the two standards (Figure 3.6-10).

Eagle Creek - 1992

The valley segment types for Eagle Creek reveal a varied geomorphology and potential LWM arrangement. From these valley segment types one would expect to find abundant large jams on channel margins as well as infrequent large jams, small debris jams and single pieces, and frequent jams and single pieces creating pools. The LWM/mile data is suspect but Eagle Creek was resurveyed during the 1997 field season, but it was not yet available for inclusion in to the watershed analysis. Ten debris jams were noted by surveyors in Eagle Creek.

Coyote Creek - 1992

The valley segment codes for Coyote Creek reveal a situation where large jams are infrequent and beaver are important. A 1992 survey reveals this tributary falls well short of the two standards (Figure 3.6-10).

South Fork Salt Creek - 1996

The valley segment types for South Fork Salt Creek are varied and reveal an assortment of differing landforms and potential LWM placement and movement. A longitudinal profile of South Fork Salt Creek is displayed in Figure 3.6-6. A 1996 survey reveals that South Fork Salt Creek falls well short of the targeted PACFISH and WNF standards (Figure 3.6-8), however 125 debris jams were recorded in 1996. The 1964 South Fork Salt survey also noted four dense log jams between 0.9 and 2.9 miles.

Fall Creek - 1996

A 1996 survey of Fall Creek revealed that this stream fell short of the two standards (Figure 3.6-10). Seven debris jams were recorded by surveyors in 1996 for Fall Creek.

Diamond Creek - 1996

LWM data for Diamond from a 1996 stream survey showed that it also was below PACFISH and WNF standards (Figure 3.6-10).

Upper Salt Creek Subwatershed 20 3

The only stream surveyed in this subwatershed is Deer Creek.

Deer Creek – 1996

The valley segment types for Deer Creek are varied and reveal an assortment of differing landforms and potential LWM placement and movement. A 1996 stream survey shows that this stream is below PACFISH and WNF standards (3.10-10). Surveyors noted 6 debris jams.

Figure 3.6-5. Longitudinal Profile Salt Creek

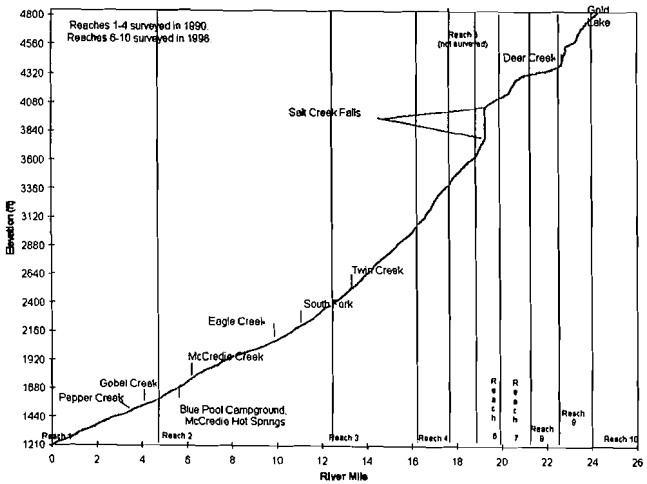


Figure 3.6-6. Longitudinal Profile South Fork Salt Creek

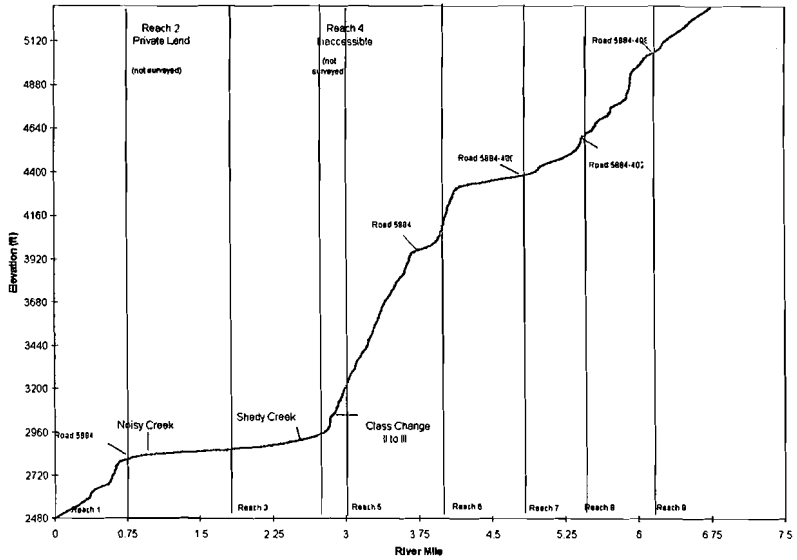


Figure 3.6-7. Longitudinal Profile Warner Creek

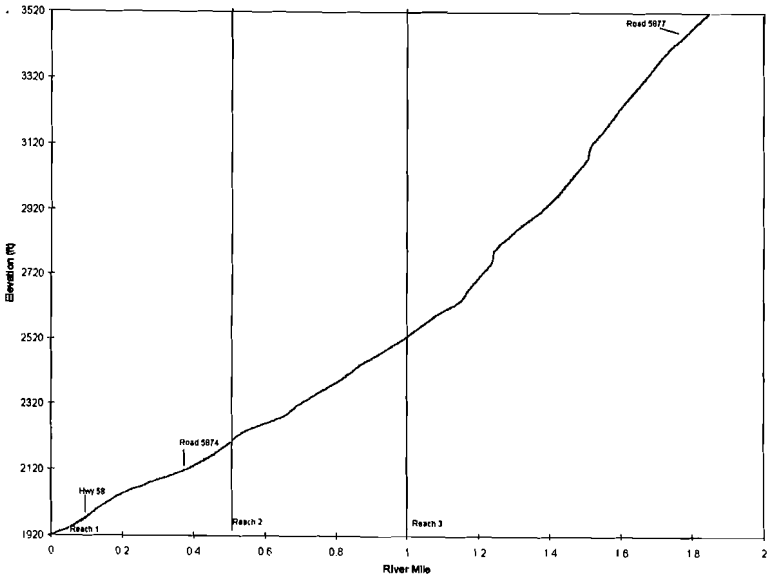


Figure 3.7A. Longitudinal Profile Eagle Creek

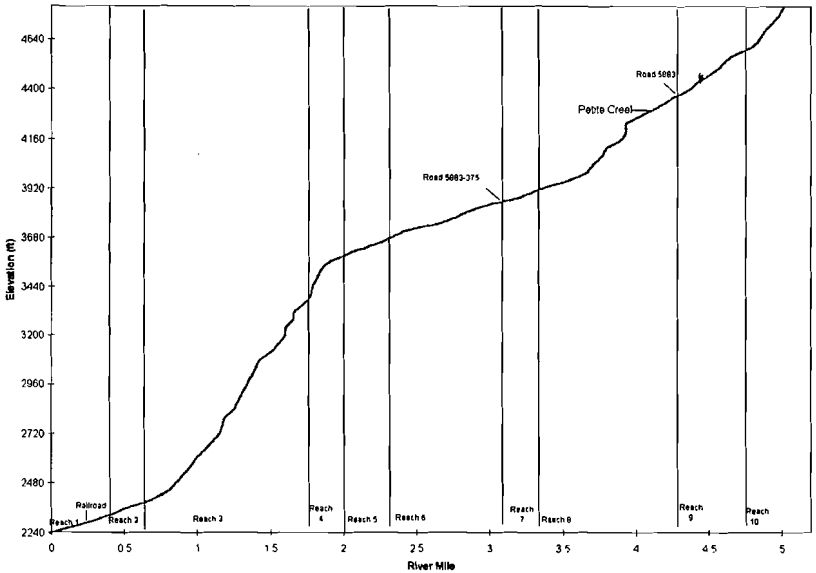


Figure 3.6-8. Salt Creek and South Fork Salt Creek - Medium + Large Woody Material

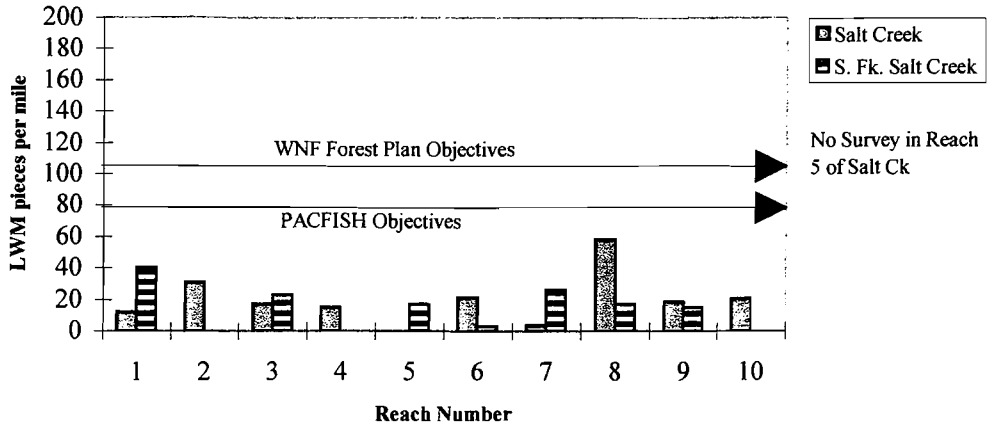


Figure 3.6-9. Streams in Subwatershed 20 1 - Medium + Large Woody Material

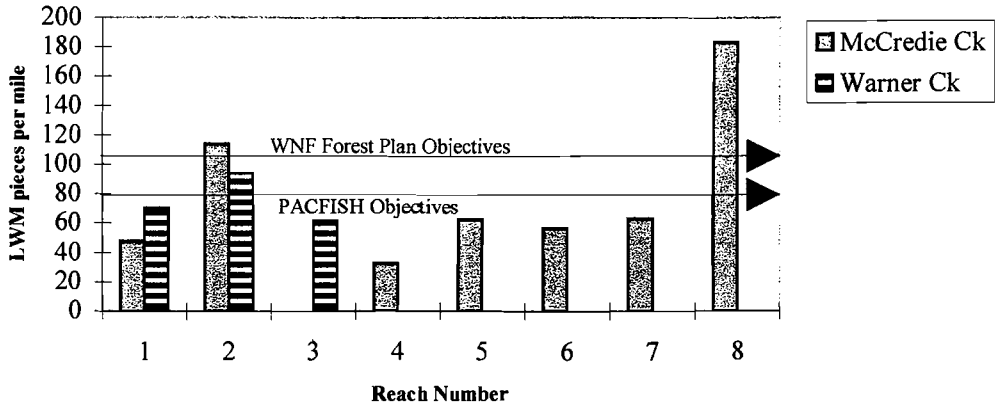
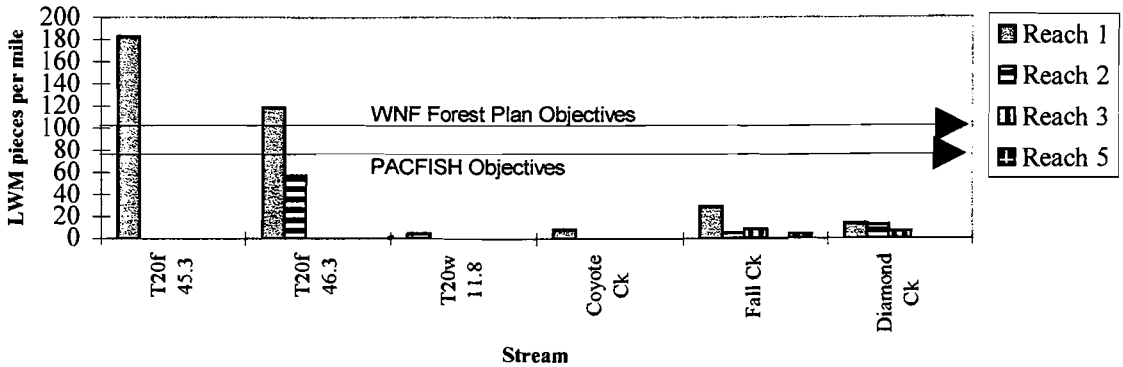


Figure 3.6-10. Streams in Subwatershed 20 2, Med + Large Woody Material



Adult Habitat (Large Pools)

REFERENCE CONDITION

Historically, large pools were probably more frequent due to the presence of large sized (channel spanning) woody debris which typically create plunge pools by a scouring action as well as enhancing gravel retention. Reference data is available from the 1937 mainstem Salt Creek survey where stations were delineated and measurements recorded. Pools were placed into size and depth categories (Table 3.6-5), the totals tallied as "resting pools," and percentages broken out in relation to size and depth per station interval as well as resting pools per mile (McIntosh et al. 1992). The resultant data show large pools per mile were greatest between stations C and D from Eagle Creek to South Fork Salt Creek, and stations E and F, 1.5 miles above railroad trestle to Salt Creek Falls; and least between stations D and E, South Fork Salt Creek to 1.5 miles above railroad trestle (Appendix H). The 1937 survey of Salt Creek resulted in two reaches meeting today's standards from the mouth of Salt Creek to the confluence with Eagle Creek. The lower reaches of Salt Creek, from the mouth to Salt Creek falls, contained many large and deep pools with numerous resting pools of all sizes" (McIntosh et al. 1992).

Table 3.6-5. 1937 Pool Classifications (From McIntosh et al. 1992)

Pool Type	Pool Depth (feet)	Pool Size (sq. yards)
S1	6	>50
S2	3-6	25-50
S3	< 3	<25
S4	> 6	25-60
S5	< 3	25-50
S6	Pocket Pools	

CURRENT CONDITION

Presently, there are no streams in the Salt Creek watershed which meet the PACFISH or WNF Forest Plan objectives for large pools using Region 6 stream inventory protocol. For those streams surveyed within the Salt Creek watershed, large pools are generally lacking in frequency.

Pools of varying size and complexity are available to some degree and were recorded by stream survey crews from 1964 to the present for the mainstem and several tributaries. Geomorphology, channel characteristics, and LWM all play important roles in the formation and maintenance of pool habitat. In lower, alluvial sections, LWM and channel scour around meandering bends are central to the formation of large, deep and long lateral scour pools often with long tails comprised of fine spawning materials. In middle reaches where gradient is often a bit higher, pools can be formed by plunging action or straight scouring of mid channel regions. Off channel pool habitat in the form of isolated pools and pockets is very important and acts as refugia for young of the year (YOY) salmonids in many systems. In the higher gradient regions where the valley form has a constrained channel, stair-step and pocket pools are common (though usually smaller) interspersed with some larger plunge pools.

Salt Creek - 1964, 1990, 1996

Presently, there are no reaches in the mainstem of Salt Creek which meet the PACFISH or WNF Forest Plan objectives for large pools using Region 6 stream inventory protocol.

Current pool data for mainstem Salt Creek are available from three different years (1964, 1990, 1996). The 1964 survey encompassed the entire stream length of 27.5 miles to Gold Lake. The 1990 survey covered the lower subwatersheds (Reaches 1-4) and terminated downstream of Salt Creek falls, a distance of 19.93 miles. In 1996, only the upper Subwatershed, above Salt Creek Falls (Reaches 6-10) was surveyed for a total of 5.3 miles. Pool and riffle habitat percentages for mainstem Salt Creek are displayed in Figure 3.6-11.

Table 3.6-6 compares the changes in large pool numbers between 1937 and 1990, for reaches below Salt Creek Falls, and Table 3.6-7 compares the changes in pools/mile between 1964 and 1996 for reaches above Salt Creek Falls Subwatersheds 20 1 and 20 2 lost considerable pool habitat when the 1990 survey is compared to the 1937 survey, both covering the same area. Table 3.6-7 reveals an increase in the frequency of pools/mile between 1964 and 1990 between

the falls and Deer Creek and a decrease between Deer Creek and Gold Lake. Differences in protocol between the years could have a considerable effect on identifying a large pool.

Table 3.6-6. Changes in the Number of Pools/Mile for Mainstem Salt Creek from 1937 to 1990 (Subwatersheds 20 1, 20 2)

1937 Survey*		1990 Survey**		% Difference from
Location	**pools/mile**	**pools/mile**	**Reaches**	**1937 to 1990**
Mouth to 2nd Salt Creek. Hwy bridge	15.3	2.7	1	-82.3
Eagle Creek to South Fork Salt Creek.	20.6	7.5	2	-63.6
1.5 mi. above trestle to the Falls	20	6.65	3 and 4	-66.8

** McIntosh et al. 1992*

*** Oakridge Ranger District stream surveys 1990*

(Note: location description was used rather than river miles for the mainstem Salt Creek comparisons.)

Table 3.6-7. Changes in the Number of Pools/Mile for the Upper Mainstem of Salt Creek from 1964 to 1996 (Subwatershed 20 3)

1964 Survey*		1996 Survey**		% Difference from
Location	**pools/mile**	**pools/mile**	**Reaches**	1964 to 1996
Upstream of the Falls to upstream of Deer Creek	8	14.4	6,7,8,9	+44.4%
Upstream of Deer Creek to Gold Lake	<16	8.3	9,10	-50%

** Hutchinson 1966*

*** Oakridge Ranger District stream surveys 1996*

(Note: location description was used rather than river miles for the mainstem Salt Creek comparisons.)

Despite recording many pools, the 1964 large pool data would not meet any of today's standards (PACFISH or WNF). The 1990 stream survey covered the lower two subwatersheds below Salt Creek Falls (20 1, 20 2). Observed large pool/mile results for all 4 reaches are very low, and fall well short of the current standards (Appendix H). The 1996 survey was broken out into 5 reaches beginning upstream of Salt Creek falls and terminating near Gold Lake. None of the reaches meet the PACFISH or WNF standards. The reduced numbers of LWM may in part explain the low pool frequencies overall for both the years. Reach 8 of the 1996 survey displayed the greatest frequency of pools and had the highest LWM/mile (Figure 3.6-5). This trend is observed for nearly all the 1990 and 1996 surveyed reaches, except Reach 7 of the 1996 survey where the LWM was much reduced but the occurrence of pools was second highest. It should be noted that a distinct difference in protocol between the 1990 and 1996 surveys exists in reference to determining pool habitat. In 1990, surveyors did not classify a pool unless it was longer than wide thus potentially eliminating many plunge pools where frequently they are very wide but short. The 1996 protocol adjusts for this and classifies all channel spanning plunge pools as well as pools that are longer than they are wide.

Lower Salt Creek Subwatershed 20 1

Very little pool data exist for this subwatershed. Warner Creek was the only creek surveyed with this information available.

Warner Creek

A short but high gradient stream of only 1.9 miles in length, Warner Creek contains very few large pools in Reaches 1 & 2 (Figure 3.6-13) despite nearly meeting the PACFISH LWM standards (Reach 2 does exceed the standard) (Figure 3.6-9). A 1996 modified survey protocol was employed in Reach 3. In the modified survey the pools are classified in the same way as the Regional Level II protocol. The higher numbers are simply indicative of a step pool morphology. The high number of pools/mile in Reach 3 is due to the step pool morphology of this reach.

Middle Salt Creek Subwatershed 20 2

Streams containing pool data include Eagle Creek, South Fork Salt Creek, Fall and Diamond Creeks.

Eagle Creek - 1992

Eagle Creek contains very few large pools, none of which meet the two standards (Figure 3.6-12). The LWM data are suspect (either from computer software problems or errors in data entry) therefore it is difficult to speculate the effects c LWM on pool habitat.

South Fork Salt Creek - 1964, 1996

Data from 1964 in Reach 3 nearly meets both pool objectives. Region 6 protocol surveys in 1996 for reaches 1 and 3 show pools/mile well below the objectives (Figure 3.6-14). The final five reaches of the South Fork Salt Creek, surveyed with the modified protocol exceeded or come close to meeting objective values in Reaches 5, 6, 8 and 9. The high pool values in Reaches 5-9 are due to the seop pool morphology of these reaches.

Fall Creek - 1996

Fall Creek contains few large pools and with the high gradient it is presumed that many smaller step and pocket pools exist. Reach 5 is the only reach nearing objective values for large pools.

Diamond Creek - 1996

Diamond Creek falls below objective pool levels for all reaches.

Upper Salt Creek Subwatershed 20 3

Deer Creek - 1996

Deer Creek is the only stream surveyed in this section. Observed pool values are very low for Reach 1. Reach 3 met objective values for pools.

Rearing and Overwintering Habitat (Side Channels)

REFERENCE CONDITION

Reference data for rearing and overwintering habitat are generally lacking for Salt Creek. It is presumed that at the time of the 1937 survey, habitat conditions were sufficient to produce viable and sustainable runs of salmon and resident native trout populations (as well as non-salmonid species). Salt Creek most likely contained suitable off channel rearing and overwintering habitat in the form of side channels, tributary mouths, and isolated and alcove pools. LWM, intact riparian conditions and occasional bank undercutting further complemented habitat conditions.

CURRENT CONDITION

Within the Salt Creek watershed there is currently a reduced amount of large pool habitat, thus limiting the availability of adult overwintering habitat. In addition, the lack of side channel habitat and large wood for cover in many reaches of the Salt Creek watershed makes overwintering habitat a potentially limiting factor for juvenile salmonids. Quality habitat is essential for YOY rearing and YOY, juvenile and sub-adult overwintering. Suitable areas such as stream margins with ample vegetative cover and complex side channels (LWM and hydrology) are favorable conditions.

Side channel habitat is available in many of the surveyed streams within the Salt Creek basin. The percentage of available side channel habitat in Salt Creek and its larger tributaries is between 0.9 and 10%, relatively small overall when compared to the total area of each stream's habitat. Those streams with less than 3% available side channel habitat include upper Salt Creek (20 3), McCredie Creek (20 1), Coyote Creek (20 2), Deer Creek (20 3), Warner Creek (20 1), Diamond Creek (20 2), and Fall Creek (20 2).

Salt Creek - 1990, 1996

Within Salt Creek mainstem, side channel habitat is available in every reach. The lower reaches below the falls (1-4) contain more side channel area than the upper reaches above the falls (6-10), most likely due to the low gradient, wider floodplain and general landforms. Figure 3.6-15 displays the availability of side channel habitat as it compares to riffle and pool habitat. Off channel habitat such as isolated pools are not recorded for these surveys.

Lower Salt Creek Subwatershed 20 1

Warner Creek - 1996

Warner Creek is a high gradient stream with limited areas of side channel habitat (Figure 3.6-17). Pocket pools in boulder systems can act as a form of refugia for fishes during higher waters when side channels are lacking, and when coupled with stable LWM formations survival is enhanced.

McCredie Creek - 1992

McCredie Creek is lacking overall in side channel habitat except for Reach 4 where side channels comprised 14% of the habitat. A high degree of stream cover was noted (4 out of a possible 4), and streambanks are armored with bedrock and cobbles.

Middle Salt Creek Subwatershed 20 2

Eagle Creek - 1992

Eagle Creek contains several reaches where side channels are the dominant habitat characteristic (Reaches 1, 2, 4, 5 with 49.2%, 83.1%, 67.1%, and 10.8% respectively). The fish cover ratings were primarily 4's (out of 4) with turbulence being the dominant cover type. Bank armoring is a mixture of cobbles, small boulders and gravels.

South Fork Salt Creek - 1996

South Fork Salt Creek contained 4.2% side channels of the 2 surveyed reaches with the primary protocol (Figure 3.6-16). The remainder of the stream was surveyed with the modified protocol which does not record such habitat characteristics.

Fall Creek - 1996

Fall Creek is a high gradient stream ranging from 6 to 16 percent for reaches 1-5. Side channel habitat therefore was low for the stream (2.5%). Reaches 5 and 6 are within the Diamond Peak Wilderness.

Diamond Creek - 1996

Approximately 90 percent of Diamond Creek is within the Diamond Peak Wilderness. This stream is moderate to high in gradient ranging from 4 to 7 percent. Side channel habitat was low at 0.9%.

Figure3.6-11. Salt Creek Riffle/Pool Percentages

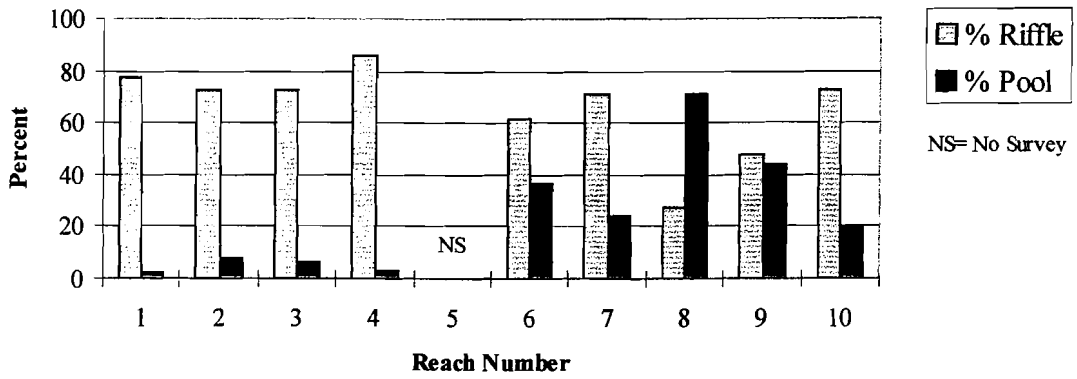


Figure 3.6-12. Eagle Creek (Subwatershed 20 2) Riffle/Pool Percentages

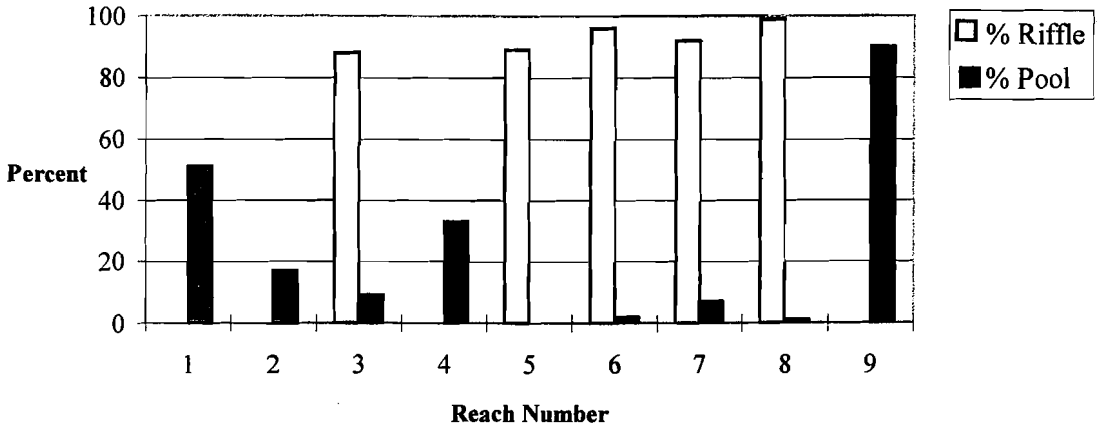


Figure 3.6-13. Warner Creek Riffle/Pool Percentages

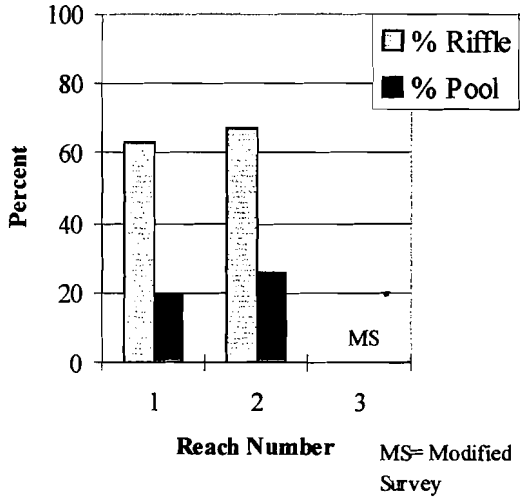
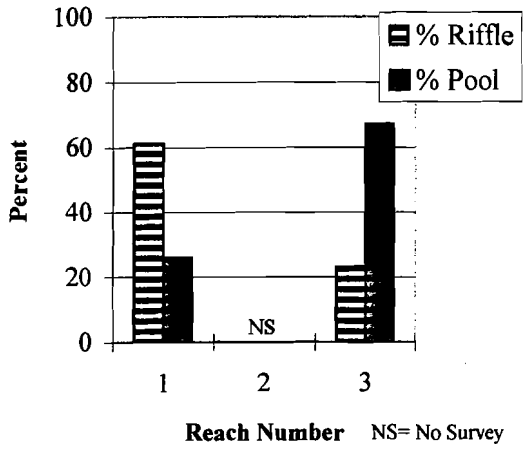


Figure 3.6-14. South Fork Salt Creek Riffle/Pool Percentages



Upper Salt Creek Subwatershed 20 3

Deer Creek - 1996

Deer Creek is a high gradient stream ranging from 6 to 10 percent. Side channel habitat accounted for 1 percent of the habitat in Reach 1 and 2 percent in Reach 2 (Figure 3.6-18).

Spawning Habitat (Substrate)

REFERENCE CONDITION

In 1937, the lower reaches of Salt Creek, from the mouth to Salt Creek falls, contained "good spawning riffle is abundant with numerous resting pools of all sizes" (McIntosh et al. 1992). Spawning gravels were readily available from the mouth to the falls, occupying 58.9% of the substrate composition. The 1964 stream survey of South Fork Salt Creek noted that between river mile (RM) 0.9 and 2.9 miles (Reaches 1 and 2), excellent spawning areas for salmon and trout were available. "All of the spawning gravel is found in this section" (Hutchinson 1966). This segment of stream flows through private land.

CURRENT CONDITION

Classification of bottom substrates in stream surveys has been a subjective measurement, it has evolved from a two category (dominant/subdominant) system to a method in 1995 where percentages of sand/silt, gravels, cobbles, boulders and bedrock are recorded. More recently a quantitative method has been used (since 1995?) that predicts a median substrate particle size (Wolman 1954). Wolman substrate counts have been conducted on Salt Creek (Reaches 6-10), South Fork Salt Creek, Deer Creek, Diamond Creek, Fall Creek and Warner Creek (Appendix H).

Salt Creek - 1990, 1996

The lower sections of Salt Creek below the falls (20 1, 20 2) in 1990 contained cobbles as the dominant substrate and small boulders as subdominant. The upper reaches of Salt Creek above the falls (20 3) in 1996 contained predominantly gravel and cobble substrate. Reach 8 however, was predominantly sand (44 percent) (Figure 3.6-19).

Lower Salt Creek Subwatershed 20 1

Surveys conducted in 1964 for the following creeks found boulder as the dominant substrate and cobble or gravel as subdominant: Tumble, Sage, Pepper, Sugar, Gobel, Basin, Fin Roberts, and McCredie.

McCredie Creek - 1992

Cobble and small boulder substrate made up most of this stream, with gravel being subdominant in Reaches 5-8.

T20e 36.7, T20f 41.3, 41.5 and 43.3 - 1992

Sand was recorded as the dominant substrate and gravel subdominant for Reach 1 of all tributaries except T20f 43.3 which had a cobble and small boulder substrate.

Figure 3.6-15. Salt Creek Riffle/Pool/Side Lengths

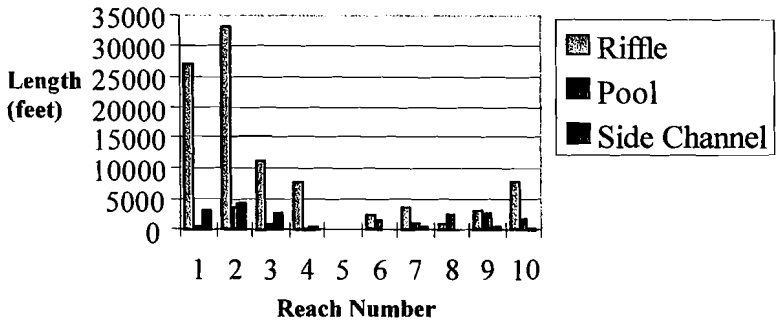


Figure 3.6-16. South Fork Salt Creek Riffle/Pool/Side Lengths

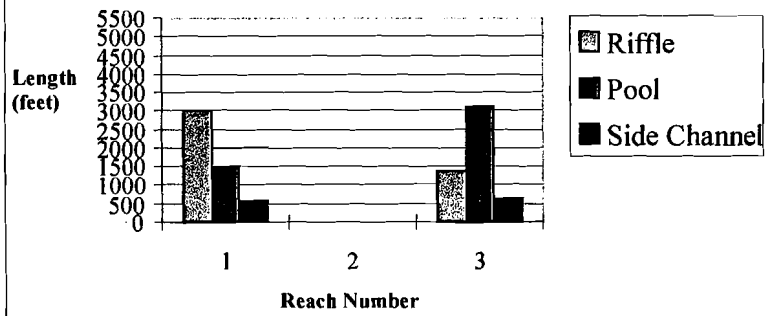


Figure 3.6-17. Warner Creek Riffle/Pool/Side Lengths

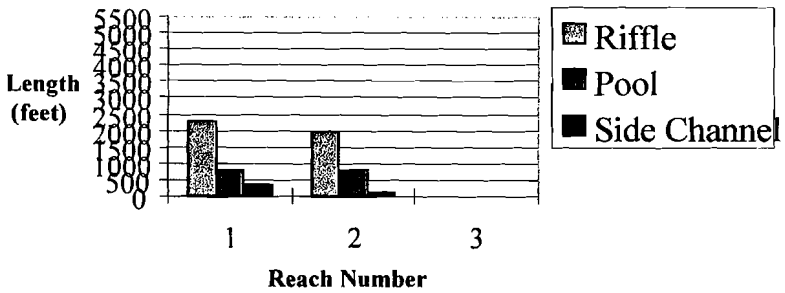
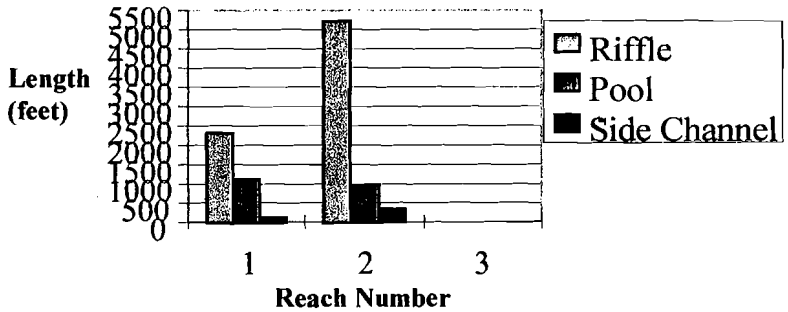


Figure 3.6-18. Deer Creek Riffle/Pool/Side Channel Lengths



Warner - 1964, 1996
The mouth of Warner Creek was surveyed in 1964 and found to have a dominant substrate of boulder with some gravel. The 1996 surveys showed an even distribution between gravel, cobble and boulder (Figure 3.6-22).

Middle Salt Creek Subwatershed 20 2

South Fork Salt Creek - 1964, 1996
In 1964, dominant substrate ranged from cobble/bedrock from the mouth to RM 0.9 (Reach 1), gravel from RM to 2.9 (Reach 2) and bedrock from RM 2.9 to 3.9 (Reach 3). Surveys in 1996 found that gravels and cobbles were the dominant and subdominant substrates respectively (Figure 3.6-20).

T20f 45.3, 46.3 and T20w 11.8 - 1992
Sand was the dominant substrate type followed by cobble for these streams during these surveys.

Eagle - 1964, 1992
Surveys in 1964 and 1992 found similar substrate types: cobble/boulder dominant, and gravel subdominant.

Coyote - 1964, 1992
A 1964 survey found boulder and cobble as the dominant substrate type and gravel as subdominant. A more recent survey in 1992 showed sand and gravel dominant and subdominant respectively in Reach 1, and cobble dominant, small boulder subdominant in Reach 2.

Fall - 1996
Reaches 1-2 were composed of cobble (dominant) and gravel (subdominant). Reach 3 was dominated by bedrock and an even percentage of boulder and cobble (Figure 3.6-20). Reach 4 was not surveyed. Reach 5 found bedrock as the dominant substrate followed by boulder. Reach 6 found sand as the dominant substrate with gravel subdominant. This reach was a low gradient wetland area. Approximately 70 percent of Reach 2 and all of Reaches 3-6 are within the Diamond Peak Wilderness.

Diamond - 1996
Gravel was the dominant substrate and cobble subdominant for most Reaches (Figure 3.6-20). Approximately 80 percent of Diamond Creek is within Diamond Peak Wilderness.

Upper Salt Creek Subwatershed 20 3

Deer- 1996
Cobble substrate was dominant for Reach 1 with bedrock dominant in Reach 2 (Figure 3.6-21).

Water Temperature
Stream temperatures in the mainstem of Salt Creek in subwatershed 20 3 are lower than downstream subwatersheds. Stream survey temperature data for tributaries to Salt Creek show cold water temperatures that are adequate for salmonids (Appendix C and pages 24-25 of this chapter).

Natural And Human Caused Migration Barriers
Salt Creek falls has been a migration barrier to salmonids since its formation. There are currently 21 known migration barriers (prior to November 1996 flood), 14 are due to culverts and 7 are natural (Figure 3.6-2).

On April 1993, culverts on state Highway 58 were inspected for fish passage. Seven culverts on six streams were identified as blocking fish passage. The following streams with problem culverts were identified: Sage Creek, Sugar Creek, Fin Roberts Creek, Warner Creek, McCredie Creek, two unnamed tributaries to Salt Creek (east and west of Eagle Creek), and Salt Creek near the pass of state Highway 58. Priorities for correcting culvert problems were given to Warner Creek, McCredie Creek and Salt Creek near the pass. These streams were chosen due to the amount of fish habitat that is located upstream of culverts.

Fish Habitat Restoration

There were 15 fisheries habitat restoration projects within Salt Creek between 1987 and 1995 (Table 3.6-8). The status of these structures since the flood in November 1996 is unknown. It is suspected that many have moved from thei original positions by the flood event. A survey during the 1997 field season will determine to what extent these structures were impacted by the 1996 flood event. This data was not yet available for inclusion in this watershed analysis.

Table 3.6-8. Fish Habitat Restoration Projects on Salt Creek, 1987 to 1995

Project Name	Year	Start Location	Num. of Structures	Num. of LWM
Swamp Creek Culvert	1987	T22S, R5E, S21	N/A	N/A
Log Bridge	1987	T22S, R5E, S26	N/A	N/A
Wicopee Bridge	1987	T21S, R4E, S36	22	4
MP 46 - Salt Creek Side Channel	1988	T22S, R5E, S6	6	20
Elk Salvage # 1	1989	T22S, R5E, S8	11	12
Blue Pool	1990	T21S, R4E, S35	6	8
Sage	1990	T21S, R4E, S28	N/A	N/A
Wicopee	1990	T22S, R5E, S6	10	8
Squaw Butte I	1991	T21S, R4E, S20	7	5
Squaw Butte II	1992	T21S, R4E, S20	9	12
Salt Creek Section 6	1993	T22S, R5E, S6	N/A	N/A
Tumbler # 1	1993	T21S, R4E, S19	10	34
Tumbler # 2	1994	T21S, R4E, S19	12	13
Elk Salvage # 2	1994	T21S, R4E, S36	86	125
Tumbler # 3	1995	T21S, R4E, S19	61	132
		Total	**240**	**373**

Figure 3.6-19. Wetted Channel Substrate Percentage for Salt Creek

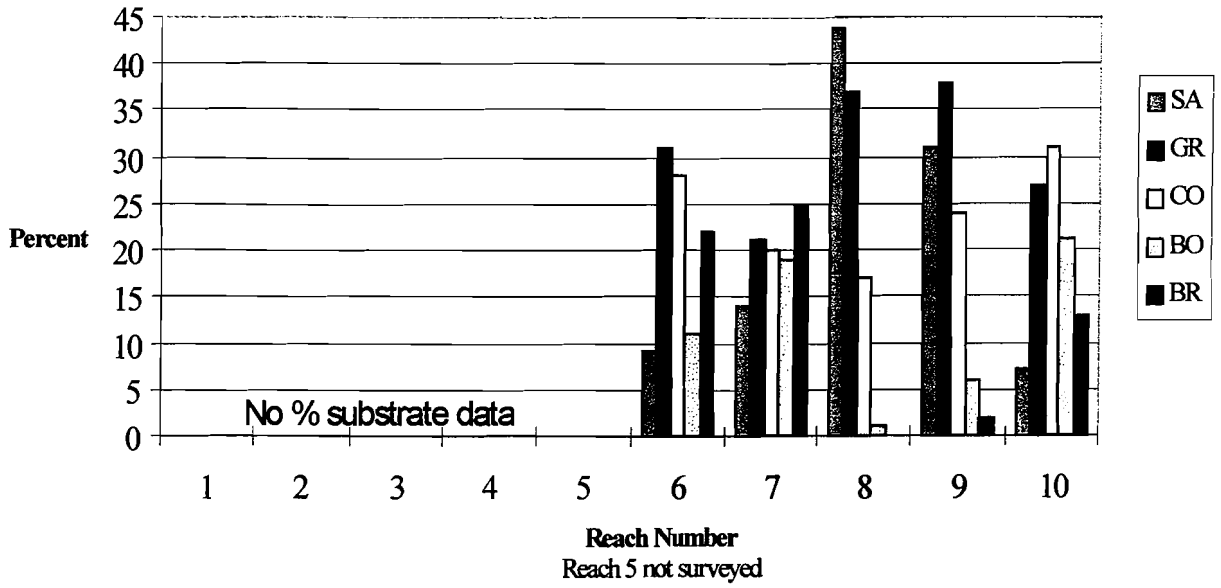


Figure 3.6-20. Wetted Channel Substrate Percentage for Streams in Subwatershed 20 2

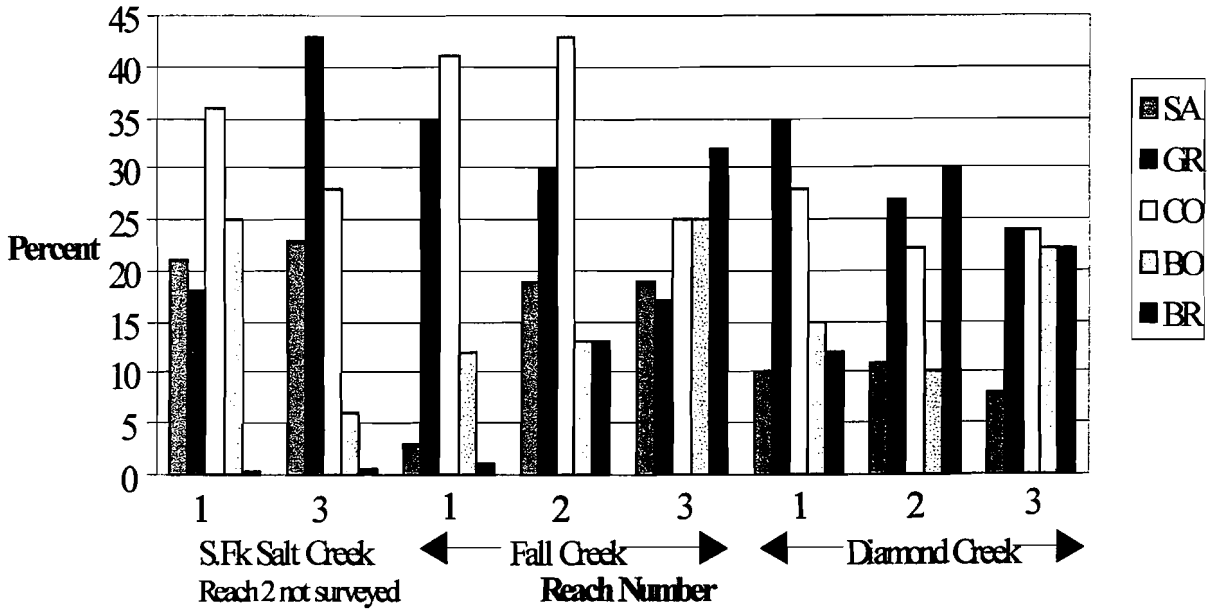


Figure 3.6-21. Wetted Channel Substrate Percentage for Subwatershed 20 3

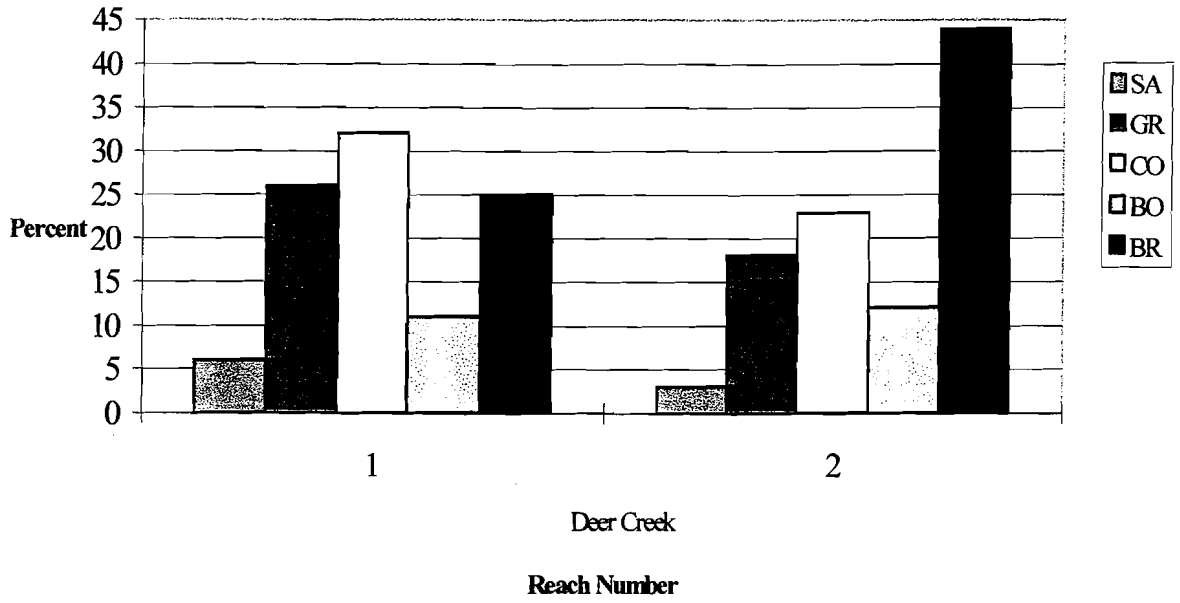
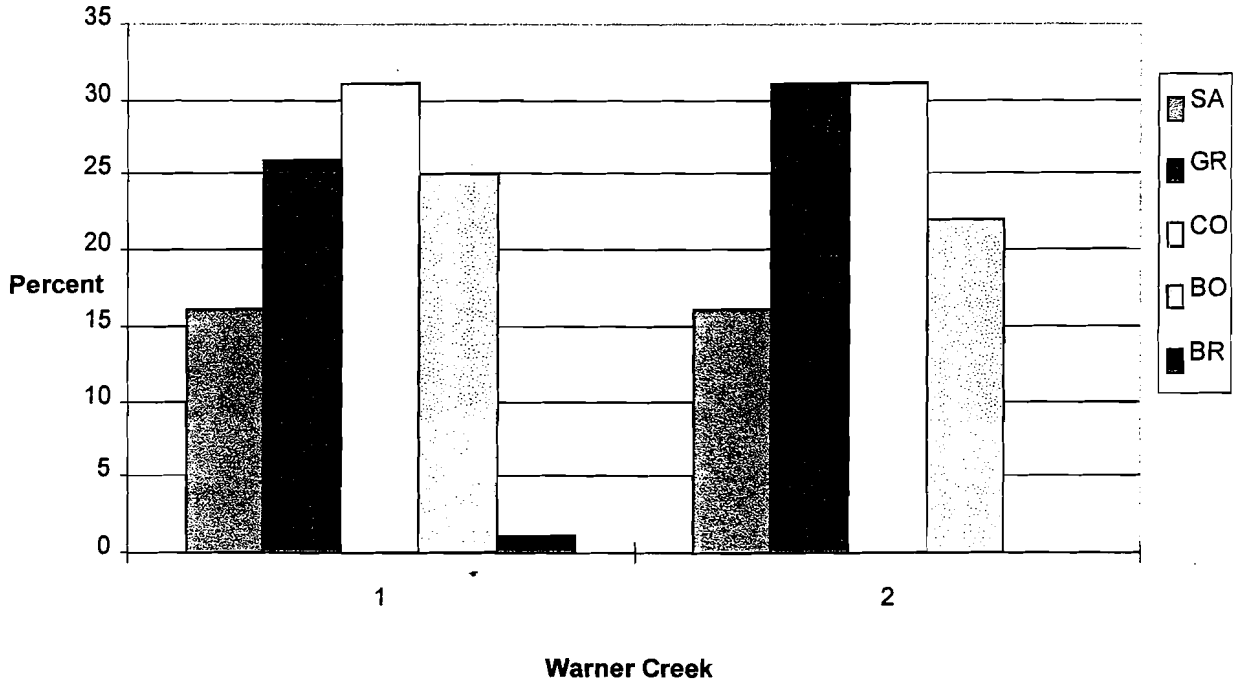


Figure 3.6-22. Wetted Channel Substrate Percentage for Subwatershed 20 1



NON-SALMONID SPECIES

REFERENCE CONDITION

Historical references and data do not exist for non-salmonid species but it is assumed that native species existing today existed historically in the Salt Creek Watershed.

CURRENT CONDITION

Non-salmonid species exist within Salt Creek watershed. Three genera of fish have been observed either visually, or via electroshocking since 1964. Salt Creek mainstem contains sculpins (*Cottus spp.*) in the lower reaches of the system (Reaches 1 & 2 of 20 1), lamprey (*Lampetra spp.*) in Reach 1 (20 1), and speckled dace (*Rhinicthys osculus*) in the lower reaches (Appendix H). Others streams containing non-salmonids include Eagle Creek (Reach 1 of 20 2) and South Fork Salt Creek (Reaches 1 & 2 of 20 2). Both Eagle Creek and South Fork Salt Creek contained only cottids. Other non-salmonid species in the Salt Creek watershed include largescale suckers (*Catostomus spp*), squawfish (*Ptychocheilus spp*), and redsided shiners (*Richardsonius balteatus*).

NON-NATIVE SALMONID SPECIES

REFERENCE CONDITION

Non-native salmonid species did not exist in the watershed prior to European habitation.

CURRENT CONDITION

It is unknown when non-native species were introduced into the watershed. Currently the only known non-native salmonid species occurring in the Salt Creek watershed is brook trout.

Brook trout have colonized several streams in the upper Salt Creek watershed by moving downstream via lake outlets. Brook trout are native to eastern North America and currently occur in Upper Salt above the falls, Fall and Diamond Creeks (Subwatershed 20 2), and Deer Creek (Subwatershed 20 3). They also occur in 16 lakes (Table 3.6-10) due to stocking which has occurred since the early 1900's.

In 1964 cutthroat in Salt Creek were the only fish sighted throughout the Upper Salt Creek subwatershed (20 3) and the upper portion of the Middle Salt Creek subwatershed (20 2). By 1980 brook trout and rainbow were the only species observed. However, sampling techniques differed for the two sample years. Visual observances were employed for the 1964 survey whereas electroshocking was used in 1980.

AQUATIC MACROINVERTEBRATES

REFERENCE CONDITION

No information exists about historic macroinvertebrate populations but it can be assumed that native species existed in the Salt Creek watershed.

CURRENT CONDITION

Macroinvertebrate surveys were conducted on nine streams within the Salt Creek watershed from July to September 1995. No sensitive species were located during these surveys (Table 3.6-9). Information gathered on macroinvertebrates will be useful as baseline surveys, but few conclusions can be drawn at this time.

Table 3.6-9. Federal Status of Aquatic Macroinvertebrates within Willamette National Forest

Common Name	Species	WNF status	Federal Candidate Category
Beer's false penny beetle	*Acneus beeri*	D	2
Mt. Hood Primitive Caddisfly	*Eobrachycentrus gelidae*	D	2
Tombstone Prairie Caddisfly	*Farula reaperi*	D	2
Ft. Dick Limnephilus Caddisfly	*Limnephilus atersus*	D	2
Tombstone Prairie Caddisfly	*Oligophlebodes mosthento*	D	2
One-spot Caddisfly	*Rhyacophila unipunctata*	D	2

LAKES, WETLANDS, AND PONDS

REFERENCE CONDITION

Prior to European habitation, lakes that were not connected to streams did not contain fish populations. Many of the larger lakes within the watershed have been stocked with native and non-native fish since the early 1900's.

CURRENT CONDITION

There are 16 named lakes within the watershed, most stocked with resident salmonids (Table 3.6-10). A history of lake stocking can be found in Appendix I. Lakes are stocked because most introduced fish populations do not naturally reproduce in a lake environment. In addition, the shallow lakes will freeze over in the winter and cause mortality (winterkill).

Table 3.6-10. Physical and Biological Information on Lakes within the Salt Creek Watershed

Lake Name	Elevation (feet)	Acreage	Depth (feet)	Fish Species
Abernathy, Lower	4950	2	8	BT, RB, CT, BR
Abernathy, Upper	4960	16	20	BT
Betty, Lower	5440	9	17	RB
Betty	5500	40	28	RB
Birthday	6100	3	11	BT
Boo Boo	5400	3	18	CT
Gold	4800	104	25	BT*, RB*
Horsefly	5450	7	13	RB, BT
Howkum	?	?	?	CT
Island, Lower	6400	7	16	BT, CT
Island, Upper	6450	9	19	BT, RB
Jo Ann	6000	12	22	BT, CT
Le May	4500	5	12	BT, RB
Little Gold	4815	3	4	BR*
Lopez	5000	6	4	BT*
Lorin	6000	10	17	BT, CT, RB
Lucas	5500	15	27	BT, CT, RB
Marilyn, Lower	4950	22	18	BT
Marilyn, Upper	5000	23	25	BT
Verde	6100	2	12	BT, CT
Vivian	5500	24	15	BT

* = *natural production*

HUMAN USES

PRE-HISTORIC

REFERENCE CONDITION

Native American inhabitants of the Salt Creek watershed are believed to have had their winter dwellings in the Oakridge area, perhaps in the lower portions of the watershed. The upper watershed was used on a seasonal basis for hunting, fishing, huckleberry gathering, and other social and economic activities.

HISTORIC

REFERENCE CONDITION

Euro-American subsistence and recreational activities, mainly hunting and fishing, occurred on a limited basis from the 1840s until the 1920s. During this same period, commercial hunting and trapping for meat, furs, and bounties targeted a wide variety of species, including elk, deer, cougar, bear, wolf, bobcats, coyotes, mink, beaver and fisher.

The Oregon Central Military Wagon Road started in 1864, provided early access to Salt Creek and the Willamette Pass. Rigdon Meadows was an important camping site.

SCENIC VALUES

CURRENT CONDITION

Management to preserve or retain visual quality has resulted in fairly natural appearing views along Salt Creek and State Highway 58. Under the Willamette National Forest Plan this stream and highway corridor is allocated 11f, Scenic with retention in the foreground. Most of the upper watershed, including the road corridor to Waldo Lake, is allocated to dispersed recreation with scenic values preserved or retained.

Much of the remainder of the Salt Creek stream viewshed is managed for partially retained or modified scenic values in combination with scheduled timber harvest. Here forest visitors see a landscape mosaic of various stand ages as the result of timber harvest. Union Pacific Railroad is an Amtrak passenger route where railroad travelers also see this mosaic of various stand ages.

Since 10% of the watershed is in Late-Successional Reserve allocations, this situation will change over time as previously harvested areas develop into late-successional forest. However, forest harvest will still affect views in many areas of the watershed, particularly those areas allocated to intensive timber management (13% of the watershed).

Currently, the most popular scenic areas are Salt Creek Falls and the Willamette Pass area lakes and trails.

RECREATIONAL RESOURCES

REFERENCE CONDITION

Early recreational developments and attractions in this area include McCredie Springs and Salt Creek Falls. McCredie Springs, originally called Winino Springs, was developed as a resort around 1914.

Modern recreational use began with improved road access for automobiles to McCredie Springs before 1920 and then east across the mountains. The Southern Pacific Railroad was completed over Willamette Pass in 1925 and the Willamette Highway (Oregon 58) was completed in 1940. The area's trail system had little use, except for administrative purposes, until Civilian Conservation Corps trail improvements of the 1930s.

Skiing started in the Willamette Pass with construction of the railway and became even more popular with completion of the Willamette Highway. By 1941 skiers had a rope tow and warming hut at the present site of Willamette Pass Ski Area. Snowmobile and cross-country ski trail development started in the 1970s.

CURRENT CONDITION

Nearly two-thirds of the watershed (65.5 percent) is allocated to some form of recreation or scenic management (Table 3.7-1). An additional 11 percent is allocated to wilderness, wildlife habitat, special interest, and research natural areas. Old-growth groves and late successional reserves make up another 10 percent of the watershed.

The lower two-thirds of Salt Creek watershed is generally quite accessible by motor vehicle except for a few small restricted or closed areas. A considerable part of the upper watershed has motor vehicle restrictions or closures in the form of nonmotorized dispersed recreation areas and designated wilderness. The upper watershed includes part of the Diamond Peak Wilderness.

Table 3.7-1. Land Use Allocations

	Allocation	Acres	Percent of total
10a	Dispersed Recreation - Roaded Natural	337.7	0.5
10b	Dispersed Recreation - Semiprimitive Motorized	1054.6	1.5
10e	Dispersed Recreation - Semiprimitive Nonmotorized	14294.1	19.9
10f	Dispersed Recreation - Lakeside Setting	224.9	0.3
12a	Developed Recreation - FS Site	81.8	0.1
12b	Developed Recreation - Special Use Permits	1223.4	1.7
	Recreation subtotal	***17216.5***	***24.0***
11a	Scenic - Modification Middleground	10520.7	14.7
11c	Scenic - Partial Retention Middleground	11893.1	16.6
11e	Scenic - Retention Middleground	300.6	0.4
11f	Scenic - Retention Foreground	7045.6	9.8
	Scenic subtotal	***29760***	***41.5***
1	Wilderness	4920.8	6.8
9d	Wildlife Habitat - Special Areas	611.3	0.9
5a	Special Interest Areas	1862.4	2.6
4	Research Natural Areas	414.8	0.6
	Late Successional Reserves	3745.8	5.2
	Late Successional Reserves - 100 acre	3277.1	4.6
7	Old-growth Groves	496.1	0.7
14a	General Forest - Intensive Timber Management	9290.1	12.9
	Private Land	175.1	0.2
	Other subtotal	***24793.5***	***34.5***
	Overall Total	**71770**	**100.0**

Developed and Dispersed Camping

There are about 300,000 visits each year to developed recreational sites in the Salt Creek watershed (Tables 3.7-2 and 3.7-3). Except for an apparent increase in visits to Salt Creek Falls, use of developed recreational sites had remained relatively stable over the past three years. About 20,000 of these visits were for purposes of camping at two developed sites.

Table 3.7-2. Recreational Use of Developed Sites

Activities by developed site	1994		1995		1996	
	Occasions	RVDs	Occasions	RVDs	Occasions	RVDs
Gold Lake Campground						
All camping	8,313	8,050	8,800	7,925	12,805	10,880
Picnicking	1,574	472	1,511	453	1,735	521
Viewing scenery	320	43	307	41	355	47
Nordic skiing	1,020	349	1,167	399	585	200
Boat launching	2,300	226	2,300	226	2,180	218
Blue Pool Campground						
All camping	12,870	12,354	15,340	12,730	7,250	6,652
Picnicking	3,000	900	2,400	720	2,400	720
Viewing scenery	27,812	3,708	22,250	2,967	22,250	2,967
Fishing	775	278	620	222	450	150
Salt Creek Falls						
Viewing scenery	143,325	19,110	146,732	19,564	151,880	20,251
Fishing	350	125	351	126	370	133
Nordic skiing	595	203	595	203	400	137
Viewing exhibits	140,400	45,630	143,208	9,547	151,888	10,126
Hiking and walking	11,700	3,510	11,934	3,879	12,630	4,105
Gold Lake Sno-Park						
Viewing scenery	2,875	383	32,775	4,370	400	53
Snow play	510	383	581	136	300	70
Trailhead activities	20,080	6,860	22,890	7,820	11,000	1,100
Waldo Lake Sno-Park						
Viewing scenery	572	76	650	86	450	60
Trailhead activities	1,145	122	1,335	135	1,500	150
Willamette Pass Ski Area						
Downhill skiing	76,050	31,055	86,793	35,440	45,886	18,737
Nordic skiing	9,128	3,115	10,403	3,554	5,201	1,777
Snow play	1,445	337	1,647	384	825	193
Viewing exhibits	11,700	780	11,700	780	9,000	600

Table 3.7-3. Total Visitors at Developed Sites

	1994	1995	1996
Gold Lake Campground	13,525	11,294	12,988
Blue Pool	27,810	32,700	30,000
Salt Creek Falls	40,400	146,730	155,535
Gold Lake Sno-Park	21,000	24,302	12,395
Waldo Lake Sno-Park	3,500	3,914	1,920
Willamette Pass Ski Area	92,900	98,793	60,910
Totals	**199,135**	**317,733**	**273,748**

There are 62 identified dispersed recreation sites in the watershed: 28 of these are on roads, 23 are non-road sites, and 11 are wilderness sites (Figure 3.7-1). Half of these dispersed sites are on or near high elevation lakes and most of the rest are in the State Highway 58 corridor. The majority are used for camping, especially during the summer fishing season and the fall deer and elk hunting seasons. Dispersed camping can degrade water quality and riparian or littoral habitat, particularly around high lakes.

Trail System

There are a total of 60.5 miles of summer recreation trails in Salt Creek Watershed (Table 3.7-4 and Figure 3.7-2). There are 15 trails ranging in length from 0.5 to 22 miles. Most of the trails and trail visits are in the upper part of the

watershed. Concentrated use occurs on the short 0.5 mile trail at Salt Creek Falls but there were about 9,000 visits on the other trails in 1996. About 2,650 of these visits were on trails associated with high lakes. There are 102 miles of marked winter recreation trails, all in the upper watershed.

Table 3.7-4. Summer Recreation, Trail Mileage, and Use

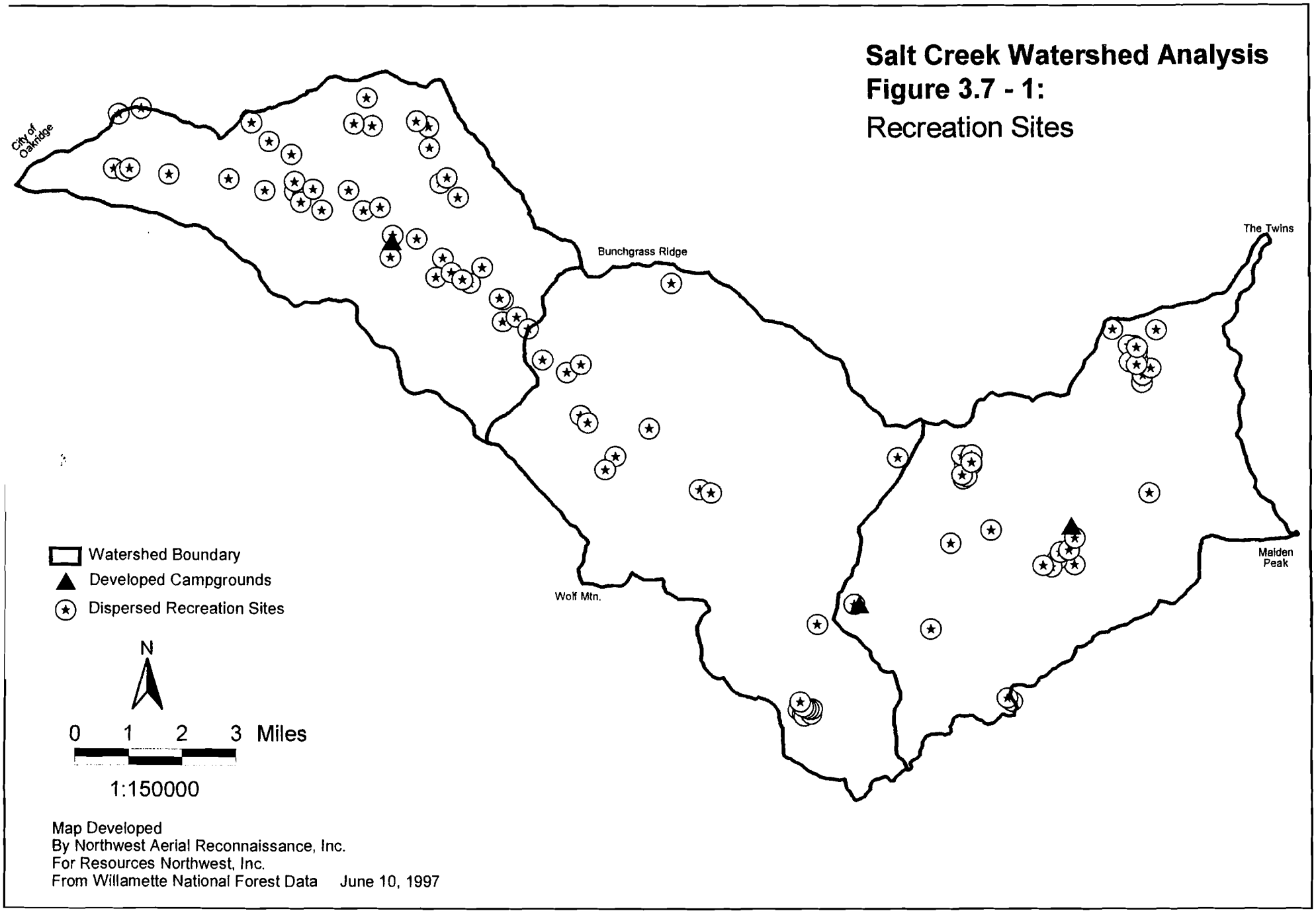
Trail	Type of use*	Miles in watershed	Estimated visits, 1996
2000 Pacific Crest National Scenic Trail	N/H	1.5	1,000
3554 Aubrey Mountain	N/H/B	1.5	30
3559 Eugene to Crest	N/H/B	22.0	--
3586 South Waldo	W/N/H/B	1.5	200
3598 Diamond Creek Falls	N/B	2.5	6,000
3662 Vivian Lake	W/H	7.0	700
3665 Devils Garden	N/H/B	1.1	20
3672 Deer Creek	W/N/H	1.7	30
3673 Salt Creek Falls	N	0.5	140,400
3674 Fuji Mountain	N/H/B	5.6	500
3677 Gold Lake	N/H/B	3.8	500
3681 Maiden Peak	N/H/B	5.8	200
3682 Mount Ray	W/N/H/B	2.5	450
3686 Verdun	N/H/B	2.5	60
3689 Marilyn Lakes	N/H/B	1.0	300
Totals		60.5	150,390

* *N = Non-Wilderness hiking* *W = Wilderness hiking*
B = Mountain bike *H = Horse*

Swimming and Boating

Several high lakes are used for swimming, e.g., Betty, Island, Midnight, and Marilyn lakes. Gold Lake is used for boating (no motors allowed) and the dock is wheelchair accessible.

The mainstem of Salt Creek is used for white water kayaking and rafting however, use is infrequent due to the high skill level required and numerous hazards.


Salt Creek Watershed Analysis
Figure 3.7 - 1:
Recreation Sites
City of Oakridge
Bunchgrass Ridge
The Twins
Wolf Mtn.
Malden Peak
Watershed Boundary
Developed Campgrounds
Dispersed Recreation Sites
N
0 1 2 3 Miles
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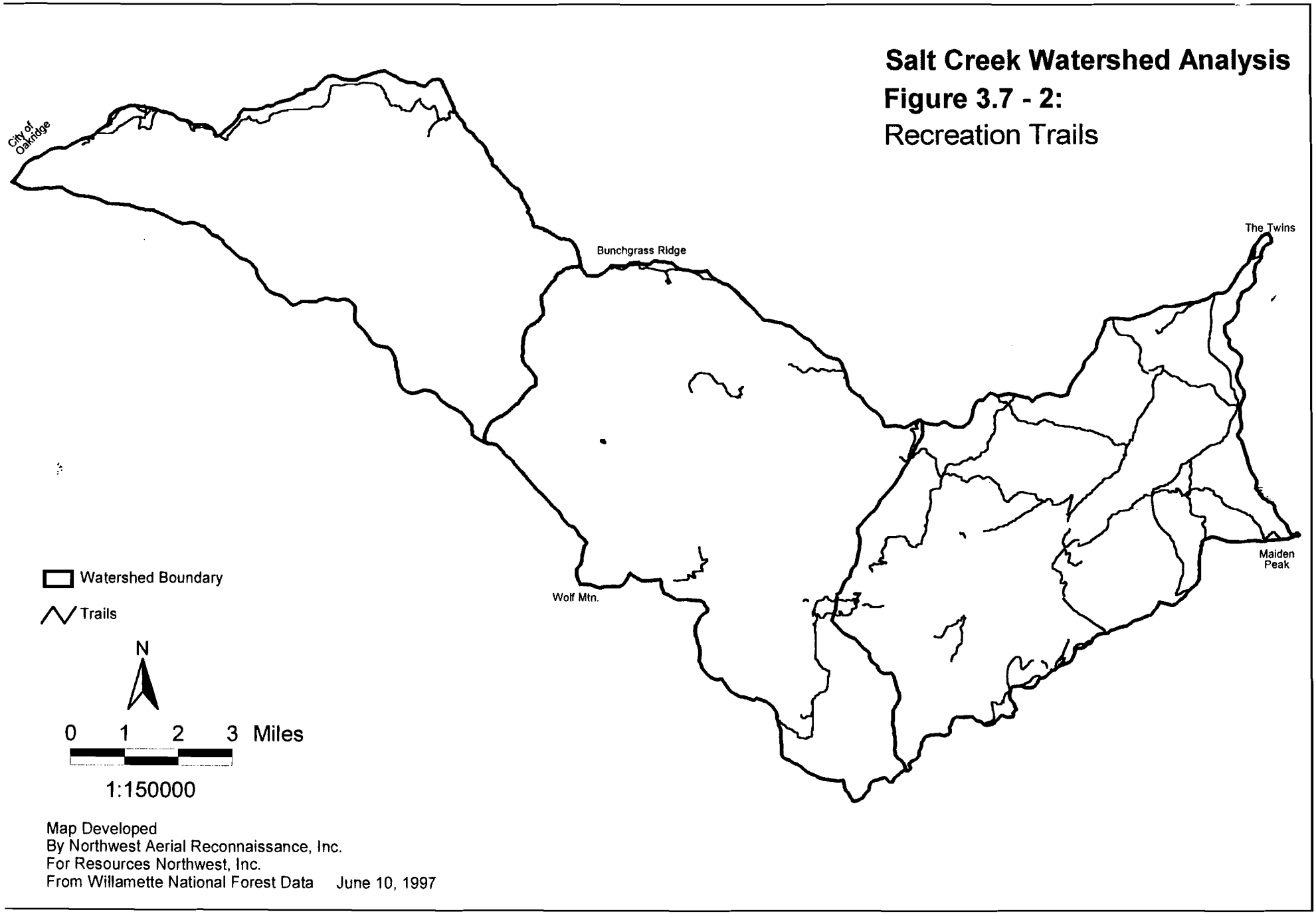
Map Developed
By Northwest Aerial Reconnaissance, Inc.
For Resources Northwest, Inc.
From Willamette National Forest Data June 10, 1997


Salt Creek Watershed Analysis
Figure 3.7 - 2:
Recreation Trails
City of Oakridge
Bunchgrass Ridge
The Twins
Maiden Peak
Wolf Mtn.
Watershed Boundary
Trails
N
0 1 2 3 Miles
1:150000
Map Developed
By Northwest Aerial Reconnaissance, Inc.
For Resources Northwest, Inc.
From Willamette National Forest Data June 10, 1997

Hunting and Fishing

This is a popular elk hunting area and this recreational use is increasing. Considerable elk hunting takes place in the Squaw Butte area of the lower watershed and the Shady Gap area of the upper watershed. There is a special elk hunt with road closure in the Eagle Creek area.

The upper watershed is popular for deer hunting during the High Cascades buck season and the archery season, particularly in areas around Gold Lake and upper Salt Creek. There are also some mountain quail hunting opportunities and activities.

Most of the angling is for rainbow trout in Salt Creek and for rainbow trout and brook trout in the high lakes. There is also some fishing for native cutthroat trout. Catchable rainbow trout are stocked in Salt Creek and rainbow trout, cutthroat trout and brook trout have been planted in many of the high lakes. Gold Lake has a self-sustaining population of rainbow trout and brook trout. Some ice fishing occurs at Marilyn Lakes.

Winter Recreation

Besides the Willamette Pass Ski Area (a special use permit development) there are 102 miles of winter recreation trails, three snoparks, five shelters and one proposed shelter near Lower Island Lake, all in the upper watershed (Table 3.7-5). There were over 124,100 estimated winter recreation visit occasions in 1994; about two-thirds of these were downhill skiers, one-quarter were nordic skiers, and the remainder were for snowmobiling and snow play. Winter recreation use varies from year to year depending on weather and snow conditions. Overall, there has been about a three to five percent increase per year.

Table 3.7-5. Winter Recreation, Trail Mileage, and Use

Type of trail	Miles	1994 Occasions
Marked nordic ski trails	89.0	30,350
Groomed nordic ski trails (Willamette Pass Ski Area)	7.0	
Marked snowmobile trails	6.0	7,280

Proposed Recreation Developments

In 1993 the Forest completed a winter recreation plan for the Willamette Pass area. This plan addressed needs for additional or improved trails, shelters, snoparks, and snow play areas. The Waldo Sno-Park would relocated to flatter ground just .2 mile northwest of the Waldo Lake Road/Highway 58 junction. The new facility would provide additional parking, vault toilets and a safe place to snowplay. Possible effects resulting from implementing this plan include improved sanitation and safety, increased user conflicts, impacts to riparian reserves, and some possible increases in wildlife disturbance.

The Forest also prepared a 1985 Environmental Impact Statement to address a proposed Willamette Pass Ski Area expansion. The selected alternative has not been fully implemented. Facilities still not implemented include two new triple chair lifts, a summit lodge, and a one-mile access road.

McCredie Springs, currently a dispersed recreation area, had an estimated 21,600 visitors in 1996.

COMMERCIAL RESOURCES

REFERENCE CONDITION

Early settlers had free use of forest timber for firewood, fencing, buildings, mining, and other domestic purposes. This free use continued under early Forest Reserve provisions although there were also provisions for timber sales (Organic Administration Act of 1897).

The lower end of the watershed is rather steep and inaccessible. Little or no timber harvesting occurred until the 1940s, except for partial cutting along the railroad right-of-way in the 1920s for firewood and bridge and tunnel timbers. During World War II and the post-war years clearcutting became standard practice. The first commercial sales were probably in the Heather area.

Special forest products have long been gathered for traditional native American and folk use, as well as commercial use. This area has also been a source of firewood for settlers and residents of nearby communities, as well as the Eugene-Springfield metropolitan area.

CURRENT CONDITION

Timber

Peak levels of timber harvest occurred in the 1980's. Previous harvest in the lower two-thirds of this watershed was generally well-dispersed. Roads were constructed to all harvest areas now classified as LSR's. As trees mature in these harvest areas, access may be needed for commercial thinning to promote and enhance LSR values. Existing roads would provide this access if retained, with no maintenance necessary on many until they are needed.

There has been little timber harvest activity in the upper Salt Creek watershed. Much of it is currently allocated to wilderness or recreation areas.

Firewood

Since the 1970s, demand for firewood has gone down due to more efficient wood stoves and pellet stoves, availability of natural gas in the Eugene-Springfield area, reduced timber harvests, and air pollution issues. Over 90 percent of these permittees are residents of the Oakridge and Westfir community. Salt Creek provides a relatively small portion of the total firewood gathered on this part of the Forest. Of the 120 firewood permits issued by the District in 1996, only 9 were for the Salt Creek watershed.

Changes in land allocation and harvest intensity have drastically reduced firewood availability in recent years. With the reduction in timber harvest and an increase in relative utilization of harvested trees, firewood availability has been reduced by two-thirds in this area. Now most firewood permits are issued for individual trees which still meets the local community need. From November 1996 to September 1997 there were 146 permits issued on the Oakridge Ranger District with 21 (14%) being issued for the Salt Creek drainage. Most of those permits issued served the local community of Oakridge and Westfir.

SPECIAL FOREST PRODUCTS

REFERENCE CONDITION

Special Forest Products have long been gathered for traditional native American and folk use.

CURRENT CONDITION

Many miscellaneous non-convertible special forest products found in the watershed are the basis for frequent personal and commercial use requests by local and non-local collectors. There is a growing interest in special forest products as a source of alternative income. These products will continue to be an important part of future forest resource use.

A 1993 Forest-wide programmatic environmental assessment on special forest products provides the framework for decisions on the collection of these products (Willamette National Forest special forest products environmental assessment, 1994). Willamette Forest Plan Amendment 23 allows commercial collection on all lands open to commercial timber harvest.

The Forest has not formally inventoried species having economic potential as special forest products. Information is limited on specific locations, quantities, qualities, and accessibility for these species. Several plant communities in the watershed contain products of marketable quality as ornamental cuttings, transplants, boughs, and florist greenery. The following is a list of those products identified in the watershed that may occur in quantities sufficient for commercial collection, while remaining abundant enough to maintain plant populations as prescribed in the Forest's special forest products standards and guidelines:

- mushrooms
- florist greens (salal, sword fern, dwarf Oregon grape, beargrass, scotch broom)
- landscape transplants (vine maple, rhododendron, manzanita, etc.)
- Christmas trees
- huckleberries

- nuts
- ornamental cuttings/crafts (willow, vine maple, ceanothus, madrone, chinquapin, Pacific yew)
- boughs (fir, western red cedar, incense cedar)
- pitchwood
- cones
- conks
- botanicals (prince's-pine, wild ginger, wildflowers, etc.)

Lichens are not currently made available for commercial collection on Oakridge Ranger District. "Vine maple moss" (a collective term for several species of moss) has been harvested on the district — several thousand pounds were sold in the 1980s.

Beargrass, fir boughs, and matsutake mushrooms have elevational relationships, at least with regards to their relative value and availability. This relationship is shown in Figure 3.7-3.

Because of easy access via State Highway 58, the Salt Creek watershed has had a number of special forest products harvested. This is especially the case for personal use Christmas tree harvest in the Pinto Mountain and Abernathy areas. Also, there were two recent commercial bough sales near Pinto Mountain; several more of these are planned for 1997.

CULTURAL RESOURCES

REFERENCE CONDITION

Salt Creek watershed has been visited by people for perhaps 10,000 years. At the time of European exploration (1820 1840) at least three tribes are thought to have used the watershed: The Molala and Kalapuya on the Willamette Valley side seasonally visited the watershed and the Klamath on the Central Oregon side made trading trips through the watershed.

CURRENT CONDITION

Archeologists have recorded over 80 sites representing seasonal and temporary campsites in the Salt Creek watershed. Native Americans established routes that later became the Salt Creek and Bunchgrass trail systems.

Historic sites and features found in the watershed include:

- six lookouts (1920 1966)
- Cottonwood Ranger Station on Bunchgrass Trail (1920's)
- Beamer Ranch homestead site (a current inholding)
- campgrounds established in the 1930's as Blue Pool, Salt Creek Falls, and Diamond Creek (the first two still exist as developed campgrounds)
- McCredie Springs resort (ca. 1914)
- Willamette Pass Ski Area (1930's)
- several railroad section stations and sidings (1920's)

AIR QUALITY

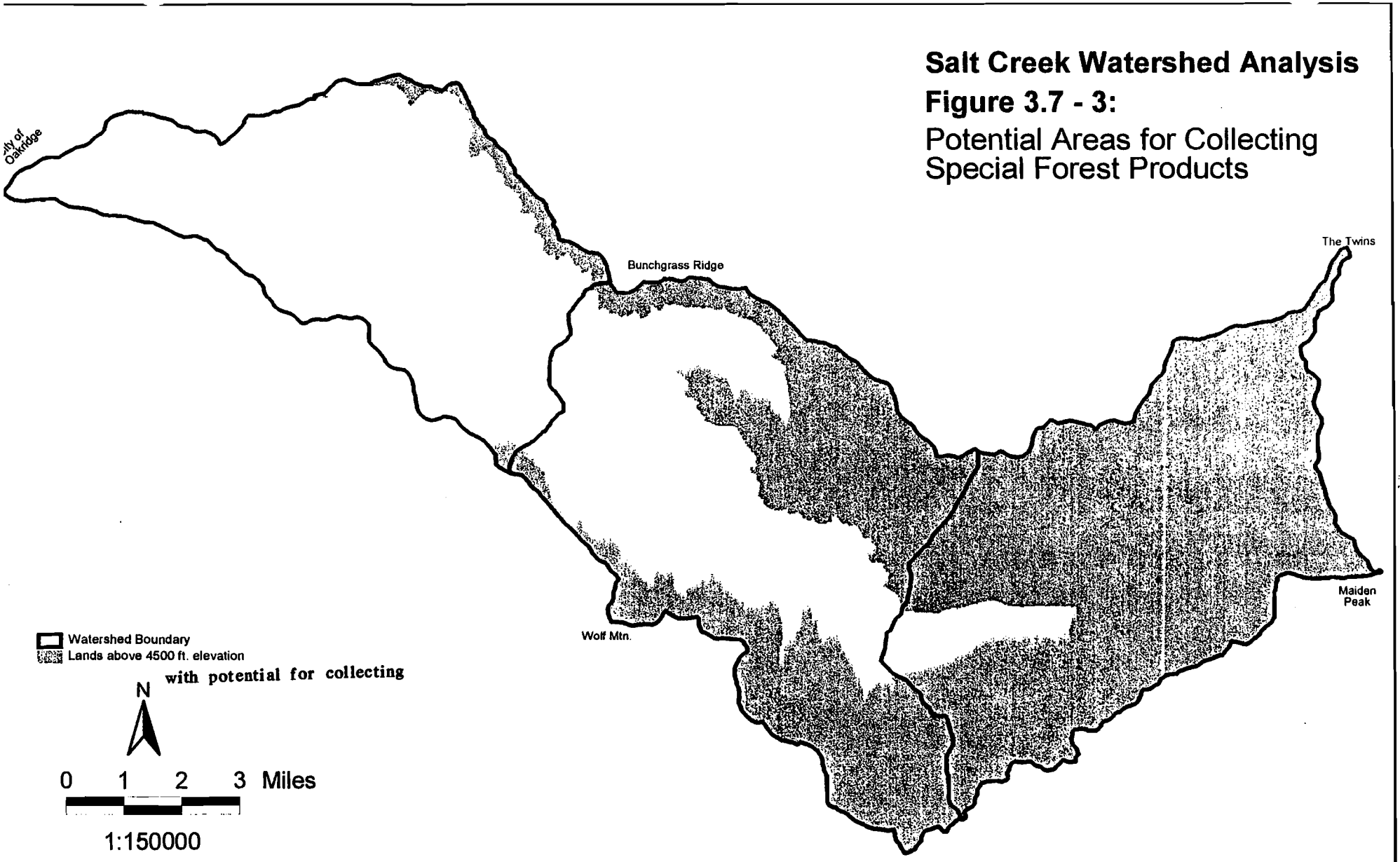
REFERENCE CONDITION

Prior to forest management, air quality was pristine during late fall, winter, and spring. Since fires were not suppressed (and may have even been deliberately initiated by aboriginal inhabitants), air quality could often be quite degraded when wildfires burned during summer and early fall. These fires could burn for months as quickly moving or smoldering fires. Visibility was often very limited due to the large numbers of these fires, according to early observers.

A recently completed assessment compares presettlement smoke emissions and acres burned annually to current smoke emissions from wildfire and prescribed fire (A first approximation of ecosystem health on National Forest System lands, Pacific Northwest Region, June 1993). For western Oregon, this assessment estimates that historic particulate emissions from forest fires were more than double current estimates of PM10 emissions from wildfires and prescribed fires.

CURRENT CONDITION

The Northwest Forest Plan states that, under selected Alternative 9, PM10 emissions would drop to 26 percent of 1985 92 levels in this climatic province (Chapters 3&4, page 96). This emissions estimate was converted to a TSP (Total Suspended Particulate) emissions estimate and compared with Oregon's TSP baseline. The projected drop surpasses the state of Oregon goal of 50 percent reduction of these emissions by year 2000. It will allow for fire use and prescribed burning will not compromise achievement of emission reduction goals.



Map Developed
By Northwest Aerial Reconnaissance, Inc.
For Resources Northwest, Inc.
From Willamette National Forest Data June 10, 1997