PART FOUR -- THE APPENDIX

APPENDIX 1

SOCIO-ECONOMIC DESCRIPTION OF THE ECONOMIC ASSESSMENT AREA

The economic assessment area to be considered in this description includes Idaho, Lewis, and Nezperce Counties. Most of the study area lies within Idaho County, but the use of the area extends outside the County. Timber harvested goes to other counties, and recreationists come from population centers outside Idaho County. This three-county area was selected for analysis because it is believed that most of the people who will be noticeably influenced by any selected allocation will live within this area.

Idaho County is the largest county in land area and is dominated by National Forest lands. In fact, this is the only county with National Forest within its boundaries. Lewis County is dominated by the Nezperce Indian Reservation, although the reservation extends into the other two counties as well.

Current population trend differ among the three counties. Idaho and Lewis Counties are similar in that their populations are small in number (12,929 and 3,486 respectively in 1975) (see table 1). Idaho County had an estimated 1975 population of 12,929, of which 1½ percent were Indians and another 1.3 percent were other non-whites (see table 2). Lewis County had less than a third as many people as Idaho County, estimated at 3,486 in 1975. About 2.4 percent were Indian and another .4 percent were other races. Both of these counties tend to be rural in character with the people being land-centered for their livelihoods. The most urban county in the assessment area is Nezperce County with a 1975 population of 30,555 or nearly twice the size of the other two counties combined. The Indian population here is highest in both numbers and percentage of the total, 2.9 percent in 1970. Other non-white races represented only .3 percent of the total. Lewiston is the largest town in Nezperce County and serves as a regional trade and service center for the surrounding area. In all three counties, the population level has remained about even since 1970. This contrasts with the previous declines in population in Idaho and Lewis Counties between 1960 and 1970 and the increase in Nezperce County population during the same period. This compares with a 14 percent increase in population in all of Idaho or over 100,000 people between 1970 and 1975.

For these changes to have occurred, Lewis and Idaho Counties had net outmigration of residents while Nezperce County experienced a small amount of net inmigration. Although projected population levels are shown in the accompanying tables, this projected rate of growth may not be realized. The projected population data all show increasing population between 1970 and 1975 while the estimated population actually declined in two of the three counties. Consequently, the projected population for the year 200 may be somewhat higher than will actually occur.

Another point of contrast is the distribution between males and females (see table 3). The number of males exceed the number of females until age 65 in the rural counties while females out number males in Nezperce County after age 20. The characteristics of Nezperce County are consistent with those of the State.

The people in this area earn varied amounts of income (see table 4). The income per capita ranged from $3,968 in 1975 for Idaho County residents to $5,731 per capita in the same year in Nezperce County. This compares with an average of $5,177 per capita for all of Idaho. Nezperce and Idaho Counties have income distributions fairly similar to other state residents, but Lewis County has a larger than average share of residents in the $10,000 per year and above range. This is partly due to the successful agricultural sector there. The rate of employed persons as a percent of population is fairly high, ranging from 38 percent to 46 percent. In fact, the per capita income ranks consistently with the percentage of people employed--the more people working, the higher the per capita income. Per capita incomes have not increased appreciably in real terms between 1970 and 1975 in Lewis and Idaho Counties. Increases in these counties barely exceeded the rate of inflation. The rate of increase in Nezperce County, however, exceeded that of the state and the county's per capita income was 11 percent higher than the state's in 1975. This rate of growth is uncommon with a stable population base.

The types of employment in the assessment area are consistent with the rural-urban breakdown depicted in the preceding data (see tables 5 and 6).

The 1974 employment and income data show higher proportions of both employment and income attributable to the economic base sectors such as agriculture, federal goverment, manufacturing, and construction, especially in Idaho and Lewis Counties. This characteristic is consistent with the more rural nature of these counties which have a less well developed economic interdependency than Nezperce County. Not only do the basic sectors dominate the economic makeup of the area, but the earnings per worker are noticeably higher in these sectors. This is reflected by the percentage of earnings of these sectors relative to the total being higher than the percentage of employment for the same sectors. For example, agriculture employed 10 percent of the workers in the three counties but accounted for 21 percent of the earnings. Conversely, the derivative sectors generally have lower than average earnings per worker. The woods products sector accounts for a large share of the manufacturing sector. In the three counties it ranged from about 47 percent of employment in Nezperce County to 82 and 94 percent in both Idaho and Lewis Counties, respectively. Consequently, wood products activity is a very important resource use. However, the relative importance of the resource based sectors of the economy (such as agriculture and wood processing) contribute to periodic unemployment as the seasons of harvest and processing levels are dependent on weather patterns and business cycles.

In addition, the large area of National Forest lands in Idaho County provide for a sizable distribution of National Forest funds to that county. This is the only county receiving these funds as there is no National Forest land in the other counties. The Nezperce National Forest contributes over half of these funds. The amount received in Idaho County in 1976 was $938,182 or 32 percent of its gross receipts. Due to transfers of funds from the County to local, independent taxing districts, the County retained a sum equaling 13 percent of its net receipts.

The provisions of the National Forest Management Act passed in 1976 will significantly increase National Forest Funds (in lieu of taxes). It has been estimated that Idaho County will receive $2,288,304 from this source in 1978 or a 144 percent increase over 1976. There will also be additional federal funds distributed based on this law. Consequently, the county may eventually receive a majority of its revenues from this source.

In 1972, Idaho County received for processing 178 million board feet of timber. Eighty one percent of that timber was cut in Idaho County and 16 percent in Clearwater County. Of the timber harvested in Idaho County, 65 percent was from National Forest lands in 1972 with another 24 percent from non-industrial private land.

During the 1969-1971 period, 84 percent of the timber harvested on the Nezperce Forest went to Idaho County and the balance went to Lewis County. In addition, 16 percent of the timber harvested on the Clearwater National Forest went to Idaho County.

Consequently, Idaho County is quite dependent on National Forest timber production, especially that of the Nezperce National Forest for its supply of wood fiber for processing.

TABLE 1 - POPULATION[1/]

Counties	April 1, 1970	July 1, 1975	1980	1990	2000
Idaho	12,891	12,929	14,653	18,658	21,832
Lewis	3,867	3,486	4,383	5,090	5,369
Nezperce	30,376	30,555	35,415	42,573	47,761
Total	47,134	46,970	54,451	66,321	74,962

1/ 1970, 75 pop. - "Idaho Planning Bulletin," Bur. of State Planning Vol VII, No. 3, June 1977. 1970 Employ. - REIS data. All other statistics - Population & Employ. Forecast - State of Idaho, Dept. of Water Resources, July 1976.

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TABLE 2 - 1970 POPULATION - RACE[1/]

	Total	White	Indian		Other Races	
			No.	Pct. of Tot.	No.	Pct. of Tot.
Idaho	12,891	12,553	196	1.5	162	1.3
Lewis	3,867	3,759	94	2.4	14	0.4
Nezperce	30,376	29,413	880	2.9	83	0.3
Total	47,134	45,725	1,170	2.5	259	0.5
State of Idaho	712,567	700,873	6,315	.9	5,379	.8

1/ 1970 Census of the Population, U.S. Dept. of Commerce

TABLE 3 - POPULATION - SEX & AGE[1/]

Counties	Age	1970 Male	1970 Female	1980 Male	1980 Female	2000 Male	2000 Female
Idaho	0-19	2,848	2,540	2,787	2,672	4,433	4,185
	20-64	3,145	3,068	3,865	3,691	5,701	5,524
	65+	618	672	763	870	839	1,151
	Total	6,611	6,280	7,415	7,233	10,973	10,860
Lewis	0-19	769	741	854	810	1,205	1,131
	20-64	975	931	1,100	1,099	1,276	1,270
	65+	235	216	251	271	198	289
	Total	1,979	1,888	2,205	2,180	2,679	2,690
Nezperce	0-19	6,032	5,848	6,576	6,271	8,833	8,345
	20-64	7,557	7,842	9,231	9,732	12,716	13,132
	65+	1,427	1,670	1,611	1,995	1,939	2,797
	Total	15,016	15,360	17,418	17,998	23,488	24,274
Total	0-19	9,649	9,129	10,217	9,753	14,471	13,661
	20-64	11,677	11,841	14,196	14,522	19,693	19,926
	65+	2,280	2,558	2,625	3,136	2,976	4,237
	Total	23,606	23,528	27,038	27,411	37,140	37,824
State of Idaho	0-19	148,163	142,210	183,257	174,483	287,165	269,538
	20-64	176,158	178,329	238,514	244,130	369,646	373,033
	65+	31,426	36,355	37,113	45,997	47,838	70,382
	Total	355,747	356,894	458,884	464,610	704,649	712,953

1/ Population & Employment Forecast - State of Idaho, Dept. of Water Resources, July 1976

TABLE 4 - 1970 FAMILY INCOME LEVELS[1/]

Location	$0-$3,999	$4,000-$9,999	$10,000-$24,999	$25,000+	Total No. Families
Idaho No. Families	538	1,512	1,018	92	3,160
Cum. Pct.	17.0	64.9	97.1	100.0	
Lewis No. Families	150	384	434	53	1,021
Cum. Pct.	14.7	52.3	94.8	100.0	
Nezperce No. Families	1,295	3,384	3,002	240	7,921
Cum. Pct.	16.3	59.0	96.9	100.0	
Total No. Families	1,983	5,280	4,454	385	12,102
Cum. Pct.	16.4	60.0	96.8	100.0	
State of Idaho	30,290	81,920	62,161	5,077	179,488
Cum. Pct.	16.9	62.6	97.2	100.0	

1/ 1970 Census of the Population, U.S. Dept. of Commerce

TABLE 5 - EMPLOYMENT [1]

	1970				1974			
	Idaho	Lewis	Nezperce	Total	Idaho	Lewis	Nezperce	Total
Total Employment	4,871	1,689	13,877	20,437	5,319	1,726	16,140	23,185
Proprietors	1,458	638	1,760	3,856	1,462	643	1,833	3,938
Farm	177	98	261	536	177	98	261	536
Prop.	876	348	581	1,805	838	333	556	1,727
Government	1,084	285	1,814	3,183	1,190	313	2,045	3,548
Federal	490	43	205	738	532	44	222	798
Manufacturing	927	238	3,335	4,500	1,078	183	3,621	4,882
Wood Products					1,017	150	1,697	2,864
Mining	D	-	D	D	D	-	D	D
Construction	98	15	308	421	124	37	854	1,015
Transport, Comm.	70	21	829	920	146	15	872	1,033
Trade	535	264	2,995	3,794	581	259	3,585	4,425
Finance, Insur.	81	36	372	489	96	54	480	630
Services	412	D85	2,102	2,599	427	112	2,471	3,010
Other	D	D	D	D	D	12	D	D
	D	D	D		D		D	

[1] 1970-74 REIS DATA

TABLE 6 - EMPLOYMENT

Counties	1970	1975	1980	1990	2000
Idaho	4,871	5,523	6,087	7,468	9,044
% increase		13	10	23	21
Lewis	1,689	1,841	1,923	2,113	2,303
% increase		9	4	10	9
Nezperce	13,877	15,774	17,271	20,537	23,795
% increase		14	9	19	16
Total	20,437	23,138	25,281	30,118	35,142
% increase		13	9	19	17

Population and Employment Forecast, State of Idaho, Dept. of Water Resources, July 1976

TABLE 7 EARNINGS M$[1]

	1970				1974			
	Idaho	Lewis	Nezperce	Total	Idaho	Lewis	Nezperce	Total
Total	28,430	11,446	95,249	135,125	43,901	24,676	156,812	225,389
Farm	5,093	5,226	7,880	18,199	9,681	16,701	21,232	47,614
Government	6,477	1,396	10,343	18,216	9,423	2,094	16,241	27,758
Federal	4,217	397	2,061	6,675	5,895	602	3,320	9,817
Manufacturing	7,419	1,757	29,806	38,982	12,152	1,986	43,317	57,455
Mining	D	-	D	D	D	-	D	D
Construction	1,759	124	3,979	5,862	2,555	402	13,626	16,583
Transport, Comm.	613	203	7,558	8,374	1,565	212	11,533	13,310
Trade	3,609	1,891	19,345	24,845	4,494	2,093	28,605	35,192
Finance, Insur.	679	217	2,932	3,828	843	358	4,144	5,345
Services	2,457	483	12,966	15,906	2,609	637	17,261	20,507
Other	D	149	D	-	D	193	D	-
		D=632						D=1625

1
1970-74 REIS DATA

Referring to Table 8, effects on earnings are very similar to those on employment due to the close correlation between these two factors. There would be slightly less effect, however, due to the marginal changes in income occurring among workers whose earnings rates are below average. The range of earnings changes are from a $948,000 increase to a $1,445,000 decrease compared to total 1974 earnings of $225,389,000, or considerably less than 1 percent. The change in the wood products sector ranges from a 2 percent increase to a 3 percent decrease.

The effect on earnings and employment of output changes of other resource uses is too small to be measurable when compared to the total number of jobs and amounts earned.

There would probably be no gain or loss in employment and less than a $10,000 change in earnings from these sources.

Population changes might occur in proportion to the employment at the rate of 2.5 to 3 persons per job. The amount of change would depend on the extent to which those workers gaining or losing jobs came from or remained in the existing labor pool. There might be a greater relative change in unemployment than population.

Turning to the financial portion of the economic analysis, it can be seen that each alternative by itself represents a viable investment opportunity. This can be seen from the positive net present worth values. When evaluating investment alternatives, however, it is necessary to compare higher cost options with the least cost option to determine if the investment of additional funds is prudent. This result is displayed in the marginal benefit/cost row. In this row is found the additional benefit returned per dollar of additional cost when compared to the least cost alternative (E-2) and discounted to the present at a 10 percent discount rate.

Alternative D, E-1, and W-1 all show that their additional costs are more than paid for, as their marginal benefit/cost ratios all exceed 1. The remainder of the alternatives all reflect less than sufficient additional benefits to cover higher costs because the ratios are below 1. For example, alternative B (option 1) returns only $.55 per dollar of additional cost when discounted at 10 percent. It would require an approximate doubling of timber values to raise this ratio to 1, or the point where added benefits equal added costs. Some alternatives would require as much as a threefold increase in timber values to achieve that relationship.

The recommended plan reduces the timber output by 2.8 MMBF, which would reduce wood products employment by about 12 workers and total employment by 20. * Earnings would decline $109,000 in the wood products sector

*Assuming no compensating actions occur.

and $186,000 in total. This would be a 1 percent change or less at all levels of consideration. The amount of potential wilderness foregone would be about 271,000 acres from that of Alternative F. Remember, Alternative E-2 is the alternative associated with the greatest negative economic effect described in the preceding discussion. The financial considerations indicate that this alternative would be implemented at a net cost to the Government over the life of the plan of about $6.1 million in today's dollars.

Consequently, the local economy, especially the wood products workers, is a beneficiary of the expenditure of public funds. There may also be some benefit derived by recreationists from an expanded transportation network as well as possibly some grazing permittees. Proponents of wilderness would lose the possibility of classification of 271,000 acres of National Forest for wilderness while retaining 253,564 acres proposed for study. Because the proposed alternative does not vary appreciably from the existing situation, there would be little change in the incidence of benefits and costs or income distribution.

In 1972, Idaho County received for processing 178 MMBF of timber from four counties. Eighty one percent came from Idaho County and 16 percent from Clearwater County. Of the timber harvested in Idaho County, 65 percent was from National Forest lands in 1972 with another 24 percent from non-industrial private land. Nearly all of the National Forest timber harvested was processed in Idaho County.*

During the 1969-1971 period, 84 percent of the timber harvested on the Nezperce Forest went to Idaho County and the balance went to Lewis County. In addition, 16 percent of the timber harvested on the Clearwater National Forest came to Idaho County.

Consequently, Idaho County is quite dependent on National Forest timber production, especially that of the Nezperce National Forest for its supply of wood fiber for processing.

*Data from "Timber Flow and Future Harvest" by William D. Koss, 1975. Unpublished M.S. Thesis, University of Idaho, College of Forestry, Wildlife and Range Sciences.

APPENDIX 1

TABLE 8

SOCIOECONOMIC IMPLICATIONS FOR EACH WILDERNESS ALTERNATIVE

Outputs	Alternative A		Alternative B				Alternative C		Alt. D	Alt. E	Alt. E	Alternative F	
	Run 1	Run 2	Run 1	Run 2	Run 3	Run 4	Run 1	Run 2	Run 1	Run 1	Run 2	Run 1 -Variation W-1	
Water Yield	940	949	938	946	972	948	938	970	927	918	911	956	924
Developed Recreat. (MVD)	.7	.7	.8	.8	.6	.8	.7	.5	.7	.8	.8	.7	.7
Dispersed Recreation	61	62	60	61	61	59	71	73	70	92	92	61	59
Values for above ($M)	1803	1826	1787	1810	1835	1783	1943	2002	1917	2220	2213	1819	1759
Revenues ($M)	716	603	794	621	1100	800	653	971	460	96	0	661	605
Payette Revenue ($M)	475	475	475	475	475	475	342	342	342	6	2	475	475
Total Revenue ($M)	2994	2904	3056	2906	3410	3058	2938	3315	2719	2322	2215	2955	2839
Total Cost ($M)	2067	1554	2045	1472	2751	2551	1965	2583	862	629	524	2112	856
Undiscounted net present worth ($M)	927	1350	1011	1434	659	507	973	732	1857	1693	1691	843	1983
Operation & maintenance cost ($M)	716	934	694	873	1000	1200	653	971	559	382	339	761	463
Capital Investment ($M)	1200	469	1200	448	1600	1200	1200	1500	201	114	52	1200	242
Payette Budget ($M)	151	151	151	151	151	151	112	112	112	133	133	151	151
Discounted Benefits($M)	26587	25788	27137	25805	30281	27155	26089	29437	24145	20619	19669	26240	25210
Discounted Costs ($M)	18355	13800	18160	13071	24429	22653	17449	22937	7655	5586	4653	18755	7601
Net present worth ($M)	8232	11988	8977	12734	5852	4502	8640	6500	16490	15033	15016	7485	17609
B/C Benefit/Cost ($M)	1.45	1.87	1.49	1.97	1.24	1.20	1.50	1.28	3.15	3.69	4.23	1.40	3.32
Diff. Benefits ($M)	6918	6119	7468	6136	10612	7486	6420	9768	4476	950	-	6571	5541
Diff. Costs ($M)	13702	9147	13507	8418	19776	18000	12796	18284	3002	933	-	14102	2948
Marg.Benefit/Cost($M)	.5	.67	.55	.73	.54	.42	.50	.53	1.49	1.02		.47	1.88
Change in Wood Prod.Emp.	7	56	97*	26	61	-13	-12	46	-35	-86	-94	23	-37
Change in Wood Prod. Income ($M)	62	507	881*	238	558	-121	-113	417	-320	-784	-850	207	-339
Change in Total Emp.#Jobs	12	95	165*	45	105	-23	-21	78	-60	-147	-159	39	-64
Change in Total Income ($M)	106	862	1498*	404	948	-206	-192	709	-544	-1333	-1445	351	-577
Timber (MMBM)	24.2	35.6	22.6	32.7	36.9	19.5	19.7	33.3	14.4	2.5	.8	27.9	13.9
Δ Timber (MMBM)	1.6	13.0	-	6.1	14.3	-3.1	-2.9	10.7	-8.2	-20.1	-21.8	5.3	-8.7

*These data reflect the present total contribution of the area to the local economy

Δ= Change in

Appendix 2

History of Gospel-Hump Study Area

Aboriginally the Gospel-Hump area was included in the area which the Nez Perce claimed as their territory. The study area was primarily used by the Lapwai and Kamiah bands as an area in which they hunted deer, elk, and bear (Chalfant 1974:116). They also used the trails in the area for access to the Salmon River. Numerous prehistoric archaeological sites have been located along the river.

In September of 1861 gold was discovered in the Florence Basin, an area immediately west of the study area. The subsequent boom fathered increased explorations in the adjacent areas, resulting in a report that rich mines had been discovered at the base of Buffalo Hump. The report was quickly shown to be false as "there was no placer gold and the gold-bearing ledges... were of a low grade and could not be profitably worked at that time" (Hawley 1920:107).

Years later two prospectors, Charles Robbins and Bert Rigley, discovered in August of 1898 an extensive quartz vein, which they promptly claimed as the Big Buffalo and Merrimac Mines. The discovery generated such enthusiasm that it is estimated that at least 5000 people had gone to the Hump area by June of 1899 (Bailey 1947:175, Elsensohn 1965:147). At the time of the initial discovery there was no road into the area. The first trail into the Hump left "from Florence, across Boulder Creek, around Umbrella Butte, then through Anchor Meadows, Long Meadows and Squaw Meadows to the Hump" (DeVeny 1974:21).

Later two wagon roads were constructed to facilitate the movement of supplies into the mining area. One road approached from the east, leaving "the Milner Trail at Adams, going over the hill to Slate Creek, along Slate Creek, through Anchor Meadows, up Beargrass Ridge, around Squaw Meadows, then to the Hump" (DeVeny 1974:21). This road was constructed in the fall of 1900. The other road, which came from the northeast, left Elk City and entered the Hump area by the way of Orogrande.

The influx of miners into the area encouraged the growth of the towns of Buffalo, Callendar, Concord, and Humptown (which included Frogstown). By the end of 1903 the initial boom was ending. Several of the bigger mines were closed and most of the miners had left the area. The principal reasons for the decline of the Robbins Mining District (as the Hump was officially known) were: (1) the expense of transport, (2) the severe winters which hampered mining operations, (3) the difficulty in extracting the gold from the ore, and (4) the expense of shaft mining (Beckwith 1928, Flagg 1913).

Forest Service activity in the Hump area began in 1897 with the establishment by President Grover Cleveland of the Bitter Root Forest Reserve, which included much of the area now within the Nezperce National Forest. Due to a conflict over the enforcement of Forest Reserve

restrictions, the miners requested that the Hump area be excluded from the reserve. On June 14, 1904 the Buffalo Hump reserve, which had an area of a township and a half (approximately fifty-four square miles) was eliminated from the Forest Reserve. However, it was returned to the Nezperce Forest on July 9, 1921 by President Warren G. Harding. Forest Service records show that the former Slate Creek Ranger District was also known as the Hump District. A separate Hump District with headquarters at Moores Station was active in 1928 and 1929 (Cochrell 1970:109). Today Moores Station is maintained as a guard station. Six lookouts have been built in the area since the 1920's.

On the eastern boundary of the study area lie the mining towns of Dixie and Orogrande. The first strikes in the Dixie area were made in 1862, which was concomitant with the first boom at Elk City and Florence. A second boom occurred in 1893 with the discovery of rich quartz veins in the area. A road was built to Dixie in 1925, increasing the mining activity near the town. Today Dixie remains a small but thriving town. Orogrande developed from strikes made in the 1890's and from its location on the eastern road to the Hump. Mining activity near the town continued until the 1940's. Today Orogrande is deserted, although the old Colgrove Hotel is still standing.

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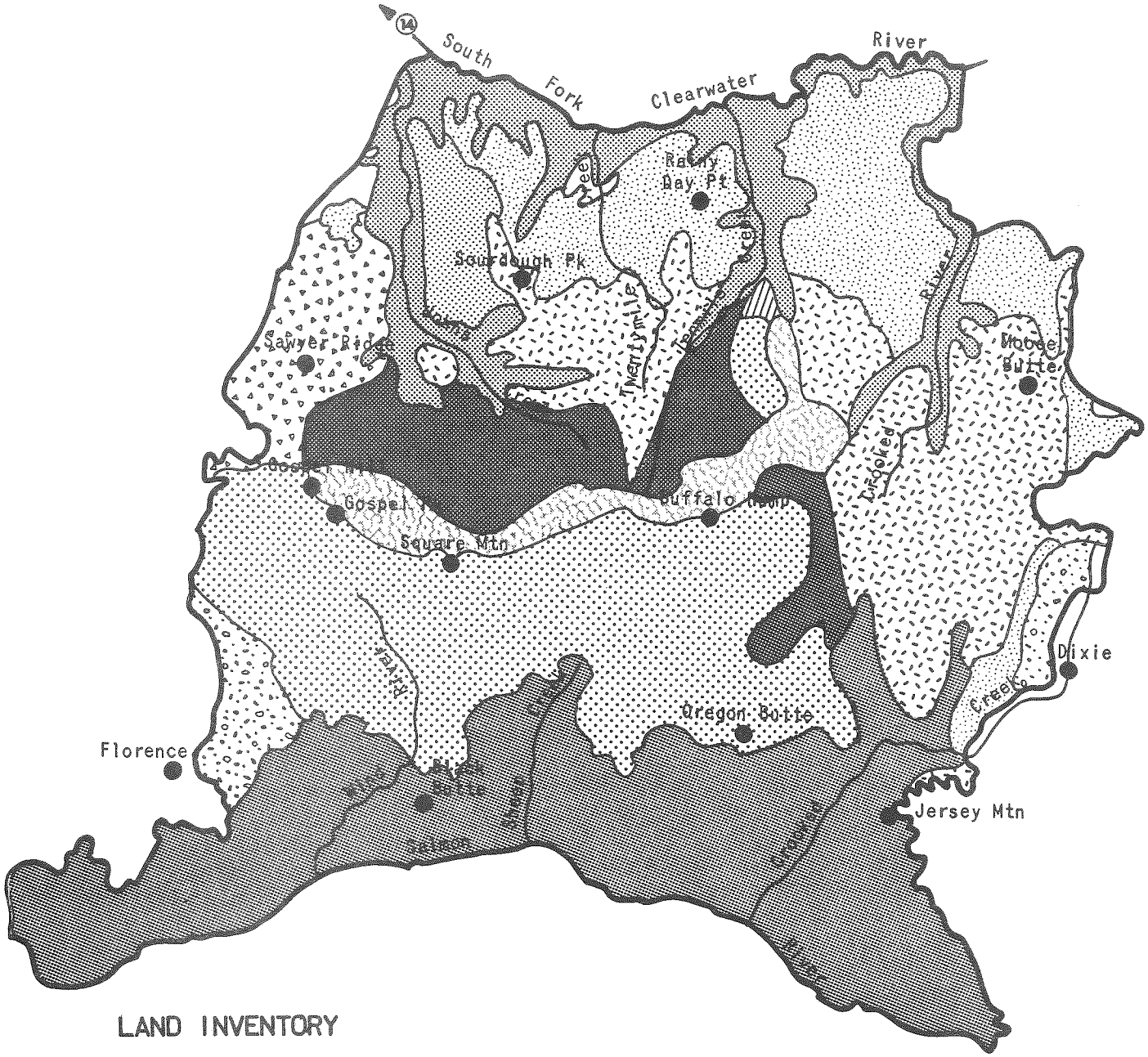
APPENDIX 3

Land Systems Inventory

Aerial photographic interpretation with no field verification of mapping units indicates that the steep Salmon River Breaks rise rapidly in elevation into a strongly glaciated area extending northward to an east-west line of north-facing cirques along Beargrass Ridge. These cirques form the heads of a number of glacial troughs running northward toward the South Fork of the Clearwater River. These troughs appear to dissipate into sharply incised stream channels bounded by steep pluvial breaklands which continue northward to the South Fork breaks. The less precipitous uplands above these breaks probably were overridden by ice during the Pleistocene, but appear to have had the time and climatic conditions necessary to develop reasonably productive soils. There is abundant evidence of glacial scouring and deposition within this upland area, and north of the South Fork, which seems to have been associated with the major glacial events. The ice cap seems to have extended further east over the ridges east of Lake Creek which also show evidence in their gentle, broadly convex landform of the effects of periglacial climates. These relatively gentle landscapes show signs of this glacial action in places where the ice apparently followed weaknesses in the bedrock, but are dominated by the broadly convex upper ridges often indicative of frost action. These landscapes are quite stable, but exist in cool, near alpine climates and plant growth is likely to be moderate at best. Where water relations become limiting under these conditions, plant production is rapidly decreased. The Florence Basin, a water worked, finely disected basin at about 6000 ft. elevation, borders the ice scoured area on the west. This area is underlain by compact granitic glacial till with volcanic ash influenced surface soils. This area is probably moderately productive only because the ashy material exists at the surface. The granitic material is often impermeable to water and plant roots.

Annual precipitation along the South Fork of the Clearwater River is a little less than 20 inches increasing southward to 40 inches or so at Beargrass Ridge, then decreasing again to 20 or 25 inches at the top of the Salmon River Breaks. Most of this moisture occurs during winter and early spring. Vegetative productivity on the south-facing Salmon River Breaks is limited by lack of soil moisture. This results in grassland vegetation with scattered or open canopied forest stands in those areas capable of supporting trees. The glaciated area is generally dominated by subalpine fir communities which tend to occur under conditions where vegetative production is limited by cold temperatures and short growing seasons. This is also true of the eastern margin of the area but forest coverage is better since soils tend to have finer textured surfaces and be more fertile.

The rolling uplands in the northern portion of the area seem to be moderately productive of vegetation and tree coverage tends to be dominated by grand fir or Douglas fir climax communities depending on soil moisture availability. Limitations to plant production in this area are probably related to combinations of soil fertility and water relations factors with some influence of colder climatic conditions at higher elevations.



LAND INVENTORY

NEZPERCE NATIONAL FOREST

GOSPEL HUMP STUDY AREA NORTH OF THE SALMON RIVER

20	40
22	45
30	45A
31	60
32	61
33	65

0 5

Scale of Miles

N

Land Systems Inventory

Mapping Unit Descriptions

The land inventory map of the Gospel-Hump area is made at a level of definition somewhere between the subsection and landtype association levels. For convenience, the mapping units will be called landtype associations. It is based solely on aerial photographic interpretation with little effective ground verification of mapping units. This ground truth is presently being established, but since it is not completed and the data is not analyzed, the information must be used with caution. Many of the inferences developed for the broad mapping units which follow would not be possible in the absence of information from the more detailed inventories presently underway.

There are 11 basic mapping units shown on the map. These units are identified by the symbol used on the map and the name of the land feature most representative of the unit as a whole. There are, in all cases, many inclusions of other things within each unit which may constitute up to 60% of the land area. The major components of the area shown are described in the unit descriptions which follow.

Mapping Unit 20 - Mid elevation (1050-1650 m). Pluvial landforms developed on batholith associated bedrock (Analysis Unit 13).

This mapping unit consists of landforms which have apparently been sculpted over long periods of time by running water. This has resulted in relatively low vertical relief (30-150 m ridge top to stream bottom) rolling landscapes. Most of these areas are found in the northern portion of the planning area immediately south of the South Fork of the Clearwater River. Rainfall ranges from 60 to 90 cm. annually. Dominant soils have a volcanic ash influenced surface 25 to 35 cm. deep over moderately weathered residual materials. Coherant bedrock probably occurs from two to four meters below the surface. Most areas are well drained and wet hollows occupy less than 1% of the total area. Vegetative habitat types represent the moist end of the range of conditions encountered in the Nezperce Habitat Type key. The grand fir climax series is dominant with Clintonia uniflora and Coptis occidentalis understories most common. Areas with more favorable moisture conditions may contain Assarum caudatum and Taxus brevifolia. Those which are drier are likely to exhibit Xerophylum tenax or Douglas fir-Physocarpus malvaceous habitat types. The distribution of these habitats is quite uniform over the landscape with one grading into the other as slope and aspect change.

The gentle terrain features, fertile soils, mild climate-mid elevation and habitat types indicating favorable moisture regimes suggest this mapping unit is quite productive, and given proper care to retain the surface, ashy mantles can produce renewable resources on a sustained basis throughout the foreseeable future. Sediment producing operations

can impair the integrity of surface soils and reduce productivity, but this can be prevented with minimal effort and costs. Compaction of the ashy surface reduces productivity and restriction of heavy equipment operations may be required when soils are near field moisture capacity. Favorable growing conditions make this an important unit on which wildlife values may be produced since good land productivity yields the quantity and quality environments and food sources for ungulates or any other habitat dependent wildlife species which occurs here. The poorly drained inclusions which occur in some areas appear to be important components of wildlife habitat and are trafficability problems. It would seem advisable to avoid these areas where possible during more intensive management operations.

Mapping Unit 22 - Mid to high elevation (1500-2000 m). Pluvial landforms developed primarily on glacially deposited granitic materials (Analysis Units 25B, 38, and 45B).

This mapping unit consists of gently rolling water worked landscapes of moderate vertical relief (30-150 m ridge top to stream bottom). These areas occur in the Florence Basin and near Dixie. Soils are often a 15-30 cm surface layer of volcanic ash influenced material over coarse grained glacially deposited granitic materials. This material often has the appearance of grus (or saprolite) and apparently has been compacted due to the weight of ice moving over it. The result is a massive impermeable material of fine gravel or smaller particle size which is highly erosive when exposed and left bare. This material is also infertile, making the relatively fertile surface mantles particularly important for plant growth. Poorly drained inclusions occupy about 10% of the landscape and contain Calamagrostis canadensis or Caltha biflora understories. Other vegetative habitat types are usually in the subalpine fir series with Xerophylum tenax understories occupying nearly 50% of the land area. The remaining 40% occurs on sheltered north aspects often supporting Menziesia feruginea. Grand fir may be the climax tree species near the lower elevation limit of the mapping unit.

Regardless of the climax habitat type, these landscapes often are dominated by lodgepole pine communities. This may be related to past fire history, but is also probably indicative of general fertility and water relations associated with relatively thin surface mantles over infertile and often impermeable subsoils. Gentle landforms make these areas relatively amenable to the use of most heavy equipment. The thin surface soil over materials which are not stable in running water suggests that care is required to keep sediment production down and retain land productivity. Compaction of ashy surfaces is not easily remedied since winter snowpacks generally prevent soils from freezing to significant depths. These landscapes provide some features favorable to wildlife habitat. Impermeable subsoils tend to result in poorly drained inclusions which produce variety, but general soil fertility and limitations in water availability probably limit quality forage production in quantity, thus lowering maximum sustainable animal populations.

Mapping Unit 30 - Mid elevation (1050-1550 m) colluvial and weakly frost churned landforms developed on batholith associated bedrock in moist habitats (Analysis Units 5, 6, 7, 8A, 9, 26A, 26B, 27, 28, & 45A).

This mapping unit occurs primarily in the northern portion of the area on uplands immediately south of the South Fork of the Clearwater River. It is a moderate relief landscape (100-300 m ridgetop to stream bottom) containing numerous streams which have cut sharply incised canyons in some places. The terrain that results is quite variable and may be gentle in some places, but quite steep in others. Drainage networks are less dendritic than in pluvial landscapes. Glacial scouring is obvious on ridge lines and sideslopes over 10 to 20% of the unit. Most features are probably glacial in origin, but this is less obvious in the warmer, relatively moist climates at mid-elevations than it is further south at higher elevations. Soil mantles are not as thick, but are generally more permeable to water, hence first order streams are farther apart and less well defined than those in pluvial landscapes. Soils usually have a volcanic ash influenced surface 25 to 40 cm thick over residual materials that are often skeletal (greater than 35% gravels and cobbles). Soil textures tend to be coarse loamy and quite fertile given good water relations. There are minor inclusions (10-15% of the unit) on moderately steep south aspects where tree regeneration is a problem due to high solar radiation loading. Inclusions of poorly drained areas occupy about 10% of the unit, lending variety to the landscape and increasing its desirability for wildlife habitat. Dominant habitat types are in the grand fir series with Asarum caudatum and Clintonia uniflora understories. Coptis occidentalis is a common inclusion and the Douglas fir - Physocarpus malvaceus habitat types occupy drier sites.

These landscapes are fertile and have favorable water relations for plant production. Restrictions to timber removal result from steep slopes and hydrologic limitations associated with removal of transpiring plant cover. Compaction of ashy surface soils is not a severe problem unless this material occurs as a discrete unmixed layer. It can be quite erosive, however, if left bare on steep slopes under this moist climatic regime. The favorable land productivity and variety landscape present in this mapping unit make it desirable wildlife habitat which can support large populations per unit area. The presence of Taxus brevifolia in the understory appears to be an important habitat component for some ungulate species.

Mapping Unit 31 - Mid elevation (1050-1550 m) colluvial and weakly frost churned landforms developed on batholith associated bedrock in moderately dry habitats (Analysis Unit 11).

This mapping unit occurs on the west facing slope of Blue Ridge which apparently was ice scoured during at least one of the major Pleistocene ice advances previous to Wisconsin time. This left a long broadly concave slope which exhibits moderate residual mantle weathering and moderately deep soils cut by low order streams running west from below the crest of the ridge. The faciting this causes results in habitats ranging from grand fir - Clintonia uniflora to Douglas fir - Calamagrostis rubescens. Soils on the moister sites tend to have a surface volcanic ash influenced layer over moderately weathered subsoils. Those on drier sites are generally developed almost entirely on coarse textured materials and while they are coarse loamy at the surface, subsoils are generally sandy and less able to retain water than those on moister sites. They are also probably less fertile since they lack the ashy surface and tree regeneration is likely to be a problem. Areas of poor drainage are not common or extensive, but do occur (<1% of total area) near the upper boundary of the unit which produces the variety favorable to some species of wildlife in this area.

This landscape is generally only moderately fertile and is reasonably vegetatively productive. Management for vegetative resources needs to deal with the variety of environmental conditions over relatively short distances, particularly the soil moisture limitations which probably occur over nearly 60% of the area. This is a result of solar radiation loadings on west and southwest facing slopes and the tendency of the drier sites to have coarser, less fertile surface soils. A band of micaceous bedrock crosses this unit and care should be exercised in engineering roads in this material. Wildlife species preferred in this area will generally be those which favor moderately dry habitats except in the upper portion of the unit where the variety provided by poorly drained areas may result in habitat characteristics which include a wider range of species.

Mapping Unit 33 - High elevation (above 1650 m) strongly frost churned landforms developed on batholith associated bedrock (Analysis Units 8B, 16, 17, 20, 21, 23, 25A & 29).

This mapping unit consists of broadly convex uplands indicative of an undulating, abraded till plane, with widely spaced weakly entrenched low order streams. Glacially scoured cirque basins and troughs occur as inclusions, but do not occupy more than 35% of the land area. Soils generally have a surface volcanic ash layer 25-35 cm thick over skeletal (over 35% gravel and cobbles) subsoils. Surface soils are coarse loamy and usually fertile. Ridge tops and southerly aspects tend to be droughty with sub-alpine fir - Xerophylum tenax habitat types. Northerly aspects with better water relations often support sub-alpine fir - Menziesia feruginea climax forests. Vegetative productivity is normally on the low side of moderate due primarily to cold climate limitations except in the lower elevation zone of the mapping unit where sub-alpine fir and grand fir -Clintonia uniflora habitats may be found. The delineation near Baking Powder Mountain appears to exhibit a higher proportion of these lower elevation characteristics than other areas mapped in this unit. Even here, however, vegetative production is being limited due to the effects of colder high elevation climates and trees do not grow as well and remain shorter throughout their life cycle. This particular area also contains several small cirques and troughs which add what appears to be critical variety to the landscape, making it important wildlife habitat. The delineation mapped in the Moose Butte area is probably a little less productive and nearer the mode for this mapping unit. It contains numerous poorly drained meadows (15% of unit) with Calamagrostis canadensis and Caltha biflora habitats which seem to be an important wildlife habitat component. About 60% of these areas occur in weakly expressed cirque bottoms and shallow valley trains.

These landscapes are moderately fertile and vegetative production is limited by cold climates compounded by water limitations associated with coarse textured soils and southerly exposures. Truly productive growing sites are limited and often spotty at the lower elevation extremes of the mapping unit and on northerly aspects. Spacial variability, an important habitat component for some wildlife species, is often limited, but does exist over broad areas. The wildlife populations seem to exist and are important, but probably do not attain the density of those in more productive areas and are probably not as easily managed through vegetative manipulation since seral stages in forest development do not produce as much nor as high quality forage as lower elevation areas. The large meadows southwest of Moose Butte are presently used for domestic livestock. Competition with elk may be occurring, but is not proven.

Mapping Unit 45 - Thick glacial till deposits (Analysis Unit 14A).

This mapping unit occurs primarily on 35-50% slopes on the west and north side of Sawyer Ridge where the ice moving northwest out of the Gospels deposited a till mantle thick enough that bedrock structure is not visible through it on aerial photographs. The actual depth of this till mantle is variable and some small scoured areas are visible on exposed ridges. The terrain contains many wet areas suggestive of perched water tables. A number of deeply cut draws are incised into this mantle. This suggests the presence of a fragipan in these soils and the single soil described in this area has a 40 cm ashy surface layer deposited over a fragipan. Estimations based on aerial photograph interpretation suggest that 60% of the area is composed of glacial till with fragipan formation, 20% is glacially abraded ridgetops, 15% is poorly drained enough to exclude tree cover and 5% at the lower end of the unit is small stream breaks. Drainages incised into the fragipans of the upper slopes of this unit lead straight into the stream break portion and deliver sediment and water produced higher on the slope rapidly into main drainages. Habitat types range from grand fir - Clintonia uniflora on low elevation well drained areas to subalpine fir - Clintonia uniflora or Menziesia ferruginea at higher elevations. Subalpine fir - Xerophylum tenax habitats occur on drier ridges. The wet areas tend to be dominated by Alnus sinuata communities.

Soils in this mapping unit would seem to be reasonably productive, but restrictions to water penetration and rooting due to the presence of a fragipan limits plant growth and is a cause of lack of wind firmness in mature trees. Perching of water by the impermeable fragipan is evident presently and harvest operations which increase soil water may result in overland flow erosion due to saturation of surface soils. Soil compaction which restricts permeability of the ashy surface above the fragipan can result in erosion of skid trails where water tends to concentrate and run off. Road cuts should be kept to a minimum if roads are to be built as these pans have a tendency to slake when exposed to alternating wet and dry conditions. This causes road cuts to retreat uphill, producing sediment which is carried into live drainages. The high incidence of surface moisture appears to provide favorable wildlife habitat for important ungulate species and surface soil productivity seems to favor both quantity and quality forage.

Mapping Unit 45A - Thin glacial till deposits (Analysis Units 19A, 19B, 32, 34, 36A & 36B).

This mapping unit occurs primarily in the glacially scoured area south of Beargrass Ridge. One other delineation exists just north of Wildhorse Lake which is a little more vegetatively productive, but is similar enough to be handled in the same mapping unit. This is a highly complex landscape which supported the center of what probably constituted an ice cap during the major ice advances of the Pleistocene. The result is a gently sloping ice scoured landscape dominated by glacial till deposits thin enough that bedrock structure is visible through the till mantle on aerial photographs of 1:60,000 or 1:15840 scale (55% of the unit). This landscape also includes scoured but weakly expressed cirque basins (5%), valley trains (10%), glacial trough walls (20%), and several well expressed cirques along higher ridges such as Oregon Butte and Quartzite Butte. An integral and important feature of this landscape is the occurrence of small poorly drained basins which apparently resulted from plucking action of the ice along weaknesses in the rock(5-10%). These basins have filled with alluvium since the ice retreat and now form a mosaic of poorly drained meadows supporting Caltha biflora, Calamagrostis canadensis and Streptopus amplexifolius habitat types. The better drained areas normally support subalpine fir - Xerophylum tenax and Luzula hitchcockii habitats. More exposed areas usually have Festuca sp. and/or Juncus perii dominated swards. Soils are thin, skeletal (greater than 35% gravels and cobbles) and coarse textured. Visually, the terrain is rugged and picturesque.

Vegetative productivity in this mapping unit is low due to the cold climate and thin coarse textured soils. Plant growth is better in the gently north sloping moist area north of Wildhorse Lake which seems to be supporting a greater population of elk per unit of land area. The variability inherent in this mapping unit makes it favorable summer elk habitat but land productivity seems to limit population density. There is domestic grazing presently in the area near Gospel Peak. Forage production on these sites is probably quite low, however, and the value of the forage may be questionable when compared to the possible effects of overuse in fragile ecosystems. Generally, soils are stable and with proper trail and road placement, motorized vehicle use should not be damaging to the landscape nor excessively sediment producing. The recreation potential would seem to be quite high as the scenic values and ease of access are quite favorable.

Mapping Unit 40 - Ice scoured cirque basins (Analysis Units 22, 31, 33 & 35).

This mapping unit occurs primarily on an east west line just north of Beargrass Ridge curving north at its eastern end to include the area around Rainbow Lake. It consists of severely ice scoured cirque basins (70% of the unit) with 30 to 70% rock outcrops and thin soils. Five percent of the unit is ice scoured, frost affected uplands, and 20% consists of the upper ends of glacial troughs which extend north into the adjacent mapping unit. Ten to 20% of the troughs are composed of valley trains. Habitat types are in the subalpine fir series with forest crown canopy coverages generally less than 10%. Understories range from Caltha biflora in poorly drained areas, including filled lake bottoms, through Luzula hitchcockii to Xerophylum tenax and Festuca sp. on drier sites. A favored mountain goat forage species, Juncus perii, is common on dry sites in the subalpine fir-white bark pine habitat type complex.

Vegetative productivity is low in this mapping unit due to cold climates and thin coarse textured soils. There is little weathered rock in evidence as Wisconsin age ice scouring left little but hard granitic rock behind. Scenic and recreation values are high and the few roads which provide access are well used. The cirque bottoms and valley trains often contain grassy meadows valuable as wildlife habitat but productivity is limited and population densities are likely to be low.

Mapping Unit 60 - River and stream breaklands in moist habitats (Analysis Units 1, 2, 3, 4A, 4B, 10, 12, 15, & 24).

This mapping unit occurs in the northern portion of the area adjacent to the South Fork of the Clearwater River and its tributary streams. The landscape is steep (usually in excess of 60% slopes) and regolith materials have a tendency to move downslope into adjacent stream courses rapidly when disturbed. Soils often have a surface layer that is noticeably influenced by volcanic ash, but mixing with residual materials through colluvial processes occurs to such an extent that its effect on soil properties is diffused. This results in somewhat decreased fertility in comparison with soils with relatively intact ash caps on adjacent uplands. Control of land productivity rests on favorable water relations associated with lower solar radiation loading on northerly aspects and warmer climatic conditions at mid and low elevations (900-1550 m). Thin skeletal (greater than 35% gravels and cobbles) or fragmental (too few sand size or finer particles to fill interstices between rocks) soils often reduce climax forest crown canopy coverages in spite of otherwise favorable growing conditions and moist site habitat types. About 55% of this mapping unit conforms to this description. Fifteen percent has exposed bedrock and thin soils which severely limit management options and 30%, mostly along north-south running tributaries to the South Fork, are limited due to lack of available moisture. Vegetation is primarily in the grand fir series with understories ranging from Athyrium felix-femina on wetter sites through Asarum caudatum and Clintonia uniflora to Coptis occidentalis in drier areas. The droughty sites, particularly on west and southwest facing slopes, support Douglas fir - Physocarpus malvaceus and Calamagrostis rubescens habitat types.

Production of timber resources on this mapping unit is possible but extreme care is required in the harvesting operation. This probably dictates use of some type of aerial method combined with partial cutting to avoid surface disturbance since sediment and water delivery to live drainages is rapid on these steep slopes. There seems to be considerable wildlife use of many areas. This is particularly true of Taxus brevifolia dominated understories. This plant is not tolerant of high water stress so overstory integrity is probably important if this feature is to be maintained. The low elevation portion of these breaks loses its snow cover early and may provide some portion of a critical late winter forage component. Visually, the landscape is rugged and picturesque and its aesthetic value would seem to be high.

Mapping Unit 61 - River and stream breaklands in dry habitats (Analysis Units 39, 40, 41, 42, 43, & 44).

This mapping unit occurs in the southern portion of the area adjacent to the Salmon River and its tributary streams. The landscape is steep (usually in excess of 60% slopes) and regolith materials have a tendency to move downslope rapidly into adjacent stream courses when disturbed. Most soils are residual in that they are developed in local bedrock weathering products. Colluvial processes are continually moving soil downslope and most soils, as a result, are poorly developed and coarse textured. Many of the low elevation areas next to the Salmon have lithic (less than 50 cm to bedrock) soils and significant rock outcrops. These areas support Cercocarpus ledifolius communities. Other habitat types range from the ponderosa pine series through Douglas fir to the grand fir series, going dry to moist. Understory unions, in the same order, include: Agropyron spicatum, Festuca idahoensis, Calamagrostis rubescens, Symphoricarpos albus, Physocarpus malvaceus and Coptis occidentalis. The grand fir - Coptis occidentalis is restricted to higher ridge tops where soils may have a volcanic ash surface and to north facing facets within the steep breaks. Some 80% of this unit is steep dry (ponderosa pine and Douglas fir habitats) breaks with 14% in moister (grand fir habitats) ridge tops and north facing facets. The remaining 6% is composed of the lower end of glacial troughs extending down from the north with a few cirque basin inclusions.

Production of timber resources in this area is generally limited and exposed areas exhibit severe regeneration problems. The coarse textured soils are erosive on these steep slopes. Some of this mapping unit is presently being used for domestic grazing. Care is required, however, as the native bunchgrass range is easily forced into dysclimax vegetation by overgrazing or grazing during the wrong periods in the year. The climax understory grasses are the most desirable and productive native forage species on these sites. Substantial areas in this mapping unit are used by big game species as winter range and the Cercocarpus communities are used by big horn sheep year-round. These breaks are uniquely steep and rugged, making the visual resource values high. This is particularly true since the river itself is a major recreation area which is receiving continually increasing pressure.

Mapping Unit 65 - Glacial trough landforms (Analysis Units 14B, 18, 30 & 37).

This mapping unit is comprised primarily of steep vertically concave glacial troughs which exhibit the typically U-shaped valley features associated with glacial scouring. These troughs contain about 60% steep side walls, 20% valley trains including recessional morains, outwash and old lake bottoms, 10% broadly convex uplands that were probably ice scoured then subjected to frost action dueing ice recession, 5% glacial till on slopes in excess of 30%, and 5% ice scoured landscapes such as cirque headwalls. Soils are often thin. Most are skeletal (greater than 35% gravel and cobbles), and some are fragmental (not enough sand or finer materials to fill spaces between rocks). These soils are generally infertile and exist in climatic conditions cold enough to substantially reduce plant growth. Vegetation is predominantly in the subalpine fir series with Xerophylum tenax understories the most common. Menziesia feruginea may be expected on moister well drained sites with Luzula hitchcockii in higher elevation grassy areas. Poorly drained sites are usually a mosaic of Caltha biflora, Calamagrostis canadensis and Streptopus amplexifolius habitat types.

Vegetative productivity in this mapping unit is limited by cold climatic conditions and thin, coarse textured, relatively infertile soils. Forest stands, when destroyed, often regenerate as quickly as can be expected under these conditions, but tend to mature slowly due to poor growing conditions. Selected areas within this mapping unit seem to be valuable as wildlife habitat. This is particularly true of moist areas in trough and cirque bottoms where a wet-dry mosaic occurs which appears important. Some of the filled recessional and cirque lakes seem to be preferred moose habitat. Scenic values of this unit are high since the rugged precipitous terrain is well situated to be seen from high points of land and leaves one with a distinct feeling for the power of moving ice. Recreation values are probably high, but care needs to be taken in locating trails and roads to insure minimal damage to steep landscapes and high quality streams.

APPENDIX 4

HYDROLOGY AND WATERSHED

Sediment production for the landtype associations (LTA) used in the analysis of alternatives was derived from the literature. Table 1 contains the data used and is based on a table of values in Megahan (1974). These values were averaged and a standard deviation obtained ignoring the standard deviations in Megahan's table. One unpublished data point from the Horse Creek Experimental Watershed was also used. The LTA's were then arrayed from least to greatest sediment production hazard and a linear application of a range of values about the calculated mean was applied. Since Megahan estimated his sediment traps were only 80% efficient, the most hazardous LTA was placed two standard deviations above and the least hazardous one standard deviation below the calculated mean. Consultation with Dr. Megahan suggested that the values developed for logging and road construction may come closest to being representative of LTA 30. Some adjustment was made for more and less hazardous LTA's. This is reflected in the disturbance and roading factors in Table 1. Adjustments for area affected by roads and landings for various logging systems are presented in Table 2.

TABLE 1

BASE SEDIMENT PRODUCTION RATES FOR
VARIOUS LANDTYPE ASSOCIATIONS AND PRACTICES

	Sediment Production			
LT Association	Base Sediment Production Base Undisturbed* Cu.Yd./Ac/Year	Disturbance Factor**	Road Construction Factor***	Old Roads Factor
		Times base rate		
20	.016	1.2	400	50
22	.031	2	650	80
30	.039	2	800	100
31	.031	2	650	80
33	.023	1.2	500	60
40	.047	3	950	120
45	.031	2	650	80
45A	.023	1.2	500	60
60	.055	3	1100	140
61	.047	3	950	120
65	.047	3	950	120

*Undisturbed sediment production rate is from Megahan, W.F., 1974. (Table 1, page 76) with confirmation from unpublished data from Horse Creek experimental watershed.

**Disturbance - Based on Megahan's rate for felling and skidding of 1.6, we used two to be conservative, on landtype association (30) and adjusted upward on steeper landscapes (no supporting data base).

***Road construction rates based on Megahan's rate for roading applied to landtype association 30 and adjusted for other mapping units using the same ratio used for disturbance.

Estimated reliability is .40.

Sediment production due to logging in cu.yds./ac/year.
= (base rate)(disturbance factor)(1-% of area in roads)
+ (base rate)(road factor)(% of area in roads)

TABLE 2

AREA DISTURBED BY ROADS, SKID ROADS,
AND LANDING FOR VARIOUS LOGGING SYSTEMS

Logging System	Disturbance* % of Area
Jammer-group selection (Idaho)	25-30% = 0.3
High lead - Clearcut (Oregon)	9.8% = 0.098**
Tractor - Selection (Calif.)	8.4% = 0.084
Tractor - Selection (Idaho)	9.0% = 0.090**
Tractor - Group selection (Idaho)	7.7% = 0.077
Skyline - Clearcut (Oregon)	2.0% = 0.020
Helicopter - Clearcut (Oregon)	1.2% = 0.012

*Area in roads, skid roads and landings.
**Use same figure for high lead and tractor (conventional) logging (0.098).
From Rice, R.M., et al.

Assume: No tractor logging on slopes in excess of 40%.

Conventional logging assume 100% tractor.

Adjustment of base rate for old roads:

$$\text{new sediment rate} = \frac{(\text{base rate})(\text{Total acres} - \text{acres road}) + (\text{base rate})(\text{old road rate})(\text{acres road})}{\text{Total acres}}$$

Existing road = 8 acres/mi road
Existing trail = 0.75 acres/mi.

Sediment production for road disturbance
= (base rate)(construction factor)
Use same number for mining and trail construction.

Precommercial thinning, assume: roads used are from previous logging operations and sediment generated is still from that disturbance, hence no effect on sediment (no trees taken out).

Fish barrier removal, assume: sediment produced is already in the system and none is delivered. Evaluation of present sediment loads in stream channels would be required before action is taken.

Road resurfacing, assume: resurfacing material is rock, and will result in a reduction in sediment production of 10% below old road rate on old roads. This value results from personal communication with Rulon Gardner, research engineer at Forestry Sciences Lab., Bozeman, Montana, and article by H.W. Anderson, 1975.

Logging activity, assume that sediment production returns to base rate times four at the end of 20 years following a sharply right skewed normal distribution. Platts, W.S. and W.F. Megahan, 1975, (Fig. 6). The 20-year time period is not uniformly applied. It was expanded to 32 years on landforms having average slopes in excess of 60%, and to 16 years on landforms having slopes less than 40%.

August 31, 1977

Telephone conversation with Bill Platts, Res. Fisheries Biol. at Forestry Sciences Lab., Boise, Idaho:

Concerning instream sediment limits for fishery resource protection. Bill's base is research conducted in the South Fork of the Salmon.

Points made:

1. 15% increase in sediment 3.65 mm in the substrate or gravels and smaller should be the maximum allowed over natural rates. This is considering time and space relationships and should be the limit in small drainage basins.

2. 65% of total sediment is fines in Platt's work.

3. In major streams, 5% should be the maximum increase allowed. This helps avoid some time-space problems.

4. Time and space relationships (i.e., all of one drainage cut at one time or cutting lower in a large basin as sediment from previous activities moves into area of new activity) need to be considered in laying out sale program.

5. Bill cites problem of South Fork where a 600% increase in transported fines was a major disaster for the fishery and 50% increase presently is still causing major problems.

Dick Cline
Soil Scientist

September 12 phone conversation w/Bill Platts suggests that:

Increase in Delivered Sediment	Decrease in fish Population
5%	0%
15	10
50	25
100	50
600	100

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APPENDIX 5

WILDLIFE

Introduction

The Gospel-Hump Study Area, with its mosaic of landtypes, supports a wide array of wildlife species that provides esthetic enjoyment and/or hunting opportunity to the public.

Over 170 species of mammals, birds, reptiles and amphibians are characteristic of the area. This includes 57 species of mammals, 108 species of breeding birds, six species of reptiles, and eight species of amphibians. The habitats in which representative mammals and birds are found are indicated in Tables 1 and 2. Table 4 lists the representative reptiles and amphibians. Numerous invertebrates are also present on the area.

Wildlife Demand & Supply

Demand

Nationally, public demand for consumptive and nonconsumptive uses of wildlife is expected to increase (RPA 1975 Assessment, Idaho Comprehensive Fish & Wildlife Plan 1977). For example, midlevel projections of demand for outdoor recreation activities, partially dependent on the nonconsumptive uses of wildlife, show an upward trend from current levels. Photography, particularly, appears likely to double between 1975 and 2020. Projection of hunter demands from 1975 to 2020 shows a substantial increase in consumptive uses of wildlife (RPA 1975 Assessment).

Within Idaho, public awareness of nongame wildlife has also increased significantly in recent years. It is recognized by the Idaho Dept. of Fish & Game that more attention to nonconsumptive uses of wildlife is needed.

Statewide, demand for big and small game species is expected to increase under current and proposed management goals (IDF&G, Vol.I, Future Mgmt. Plans, Idaho Comprehensive Fish & Wildlife Plan 1977).

Supply

Nationally, it is difficult to determine whether the nonconsumptive wildlife supply meets or exceeds current or future demand. With an increase in consumptive use demands for hunter opportunities, the land base for hunting has diminished. This trend should continue in the future. Demands have been met in the past by increasing harvest rates within safe biological limits, but restrictions on further increases in many areas are now occurring (RPA 1975 Assessment).

Within Idaho, the Fish & Game Department sets a policy of maintaining all species of fish and game for their intrinsic and ecological values as well as for their direct benefits. One of the primary goals for

Idaho's big and small game program is to increase allowable harvest above the current levels while maintaining or increasing population levels (Table 6). (IDF&G, Vol. I, Future Mgmt. Plans, Idaho Comprehensive Fish & Wildlife Plan, 1977).

In review, more hunters are being crowded within a shrinking landbase. It is noted in the RPA 1975 Assessment and Idaho Comprehensive Fish & Wildlife Plan (1977) that the meeting of future demands for hunting (particularly big game) will fall increasingly on public lands. The Public Land Law Review Commission is quoted as follows: "Public lands fall far short of their potential for producing wildlife (both game and fish) and making it available for public use and enjoyment (RPA 1975 Assessment). It is also noted within the RPA Assessment that "further increases in big game hunting on these lands is unlikely in the absence of more intensive habitat management programs...."

Basic Wildlife Requirements

It is generally assumed that for most wildlife species, relative abundance is governed primarily by the quantity and quality of suitable habitat (Odum, 1965; Lyon, 1966; Thomas, 1975; Jener, 1975; Hall, 1974).

The large variety of wildlife species present within the Gospel-Hump Study Area reflects this habitat diversity. Wildlife is a product of the land and the future of wildlife populations is inseparable from actions which affect the quantity and quality of the habitat on that land. Historically, the major factor affecting the relative abundance of most wildlife species in northern Idaho was wildfire (Lyon, 1966; Buss and Dougherty, 1958).

Following the destruction of the forest canopy, forest sites go through several transitory (seral) stages, starting with grass and forbs, then shrubs, saplings, small trees, and then a mature forest (Thomas 1976). Nonforested sites are also affected to varying degrees. At any stage of vegetational development, some wildlife species will be favored over others (Table 3). A forest which contains a mosaic of diverse age forest stands ranging from early to mature development provides for the continued existence of all species.

Prior to 1920 in the Gospel-Hump Study Area, the ponderosa habitat probably burned with a frequency of 25 years or less. The cooler, more mesic forested sites burned only infrequently. Notably between 1872 and 1920, wildfires altered a significant portion of the Gospel-Hump habitats. Results of these fires was undoubtedly a significant decline in wildlife associated with mature forest, e.g., pileated woodpeckers (Hall 1974) and increases in species that used young, brushy forest, e.g., elk, deer (Norberg and Trout 1957).

With the coming of fire protection in the first half of this century, relatively few fires of any size have burned. These have been restricted

to the Salmon face. The consequence of fire control is an artifically induced trend toward climax vegetation over the entire Gospel-Hump Study Area. While this favors those species adapted to this condition, it also increases the likelihood of high-intensity stand destroying fires which could eliminate much of this habitat (Arno 1976).

Also contributing to change the past 100 years, perhaps to a significant degree, has been a period of intensive mining and heavy livestock grazing. The majority of the mining activity was prior to the turn of the century while livestock grazing (sheep) peaked about 1918. Human exploitation and disturbance has been considerably reduced over much of this area since then, but the effects of past activities on some wildlife species may still persist.

Representative Wildlife within the Gospel-Hump Study Area

Following is a review of the representative nongame and game wildlife species within the Gospel-Hump Study Area.

Non-Game Wildlife

Non-game wildlife includes approximately 50 species of mammals, 100 species of birds and 13 species of amphibians and reptiles (Tables 1, 2, 3, and 4). There are no known endangered or threatened wildlife species within the Study Area. The southwest corner of the planning unit along the Salmon River, however, borders an area where nesting peregrine falcon have been found (Hermans, Willard, 1977).

Undetermined status mammals that are characteristic of the Study Area are pine marten, fisher, and wolverine. Mammals designated as predators or furbearers by the Idaho Dept. of Fish & Game are recorded in Table 5.

Non-game species utilize all the various habitats available to them (Tables 1, 2, and 4). The current trend toward advanced forest succession as described in the past sections, favors those species that are largely arboreal, utilize old growth forests, or live primarily within extensive forest habitats (Tables 1, 3 and 4). Examples of such species are redtail chipmunk, goshawk and Pacific giant salamander.

Twenty-two species of mammals and 31 species of birds utilize cavities in snags for roosting and/or nesting (Tables 1 and 3). Maintenance of adequate snags is necessary to perpetuate these species on a unit of land. The majority of the birds and all the bats are insectivores and contribute to depressing insect epidemics, if not controlling them.

Woodpeckers are primarily excavators, providing cavities for species that lack this capability (Tables 1 and 3).

The majority of non-game species are adapted to early stages of forest succession, or a combination of successional stages. The greatest diversity of non-game breeding birds is found where a combination of growth forms from grass forbs to 100year-plus forest are intermixed (Table 3). Examples are the house finch, yellow bellied sapsucker, and western wood peewee. Advancing forest succession is not favoring these species within the Study Area. Other species such as the canyon wren have nesting requirements that are somewhat independent of vegetational succession. They are primarily a rock outcrop dwelling canyon species. These species would probably be mainly affected by fire or other natural disturbance.

Non-game species that are particularly susceptible to alterations of their habitat by man's activities are those wildlife heavily dependent on snags, forest stands older than 100 years, or a combination of these habitats (Tables 2 and 3).

Big Game

The characteristic big game species are elk, mule deer, whitetailed deer, Shiras moose, bighorn sheep, mountain goat, black bear, and mountain lion. Optimum habitat for elk, deer and black bear is a mix of seral and older forest growth providing in close proximity both adequate cover and forage. In central Idaho, moose exist seasonally where climax vegetation is predominant. Mountain lions are indirectly associated with seral vegetation while bighorn sheep and mountain goats are considered to be adapted to climax vegetation.

Elk, Mule Deer and White-Tailed Deer

Elk, mule deer and white-tailed deer winter ranges are delineated on the wildlife map (Fig. 1). These ranges are primarily associated with the steep breaklands that contain ponderosa and montane habitats.

Along the south edge of the Gospel-Hump, mule deer are the predominant wintering deer species. White-tailed deer increase in abundance within the northern drainages of the unit.

Approximately 700 elk and 500 mule deer were observed wintering along the Salmon River breaks (Hunting Unit 19) in 1975, compared to 1000 elk and approximately 950 mule deer in 1970. During an aerial survey of the South Fork of the Clearwater in 1974, approximately 170 elk were observed, but very few deer. Additional winter ranges are present west of the Gospel-Hump Study Area (Idaho Fish & Game Widlife Survey Reports). Many of these animals summer in and adjacent to the Gospel-Hump Study Area.

Subalpine and montane forest habitats comprise the bulk of elk and deer transitional and summer range. In the mid-1970's, key portions of the summer ranges were surveyed by aerial and ground means. The results of these surveys are on file at the Nezperce Forest Supervisor's office.

Fire control has allowed an accelerated trend toward a mature forest and an increase in cover at the expense of nutritious forage. This appears particularly true of the winter ranges along the northern half of the Study Area.

Winter range is considered the primary controlling factor for elk and deer along the Clearwater drainages. It appears somewhat less important along the Salmon River face where forage is more abundant and the forest canopy more open.

Although summer ranges are not normally considered to be limiting, the quality and quantity of the forage does determine the condition of animals going into winter (fat reserves) and in early summer (protein for growth).

The potential exists to manage the Gospel-Hump for sustained elk and deer production above current levels. Under optimum habitat management (a mosaic of various age forest stands), a goal of 2500 to 3000 wintering elk is potentially possible. Under current management with fire control, a continued reduction in carrying capacity (forage quality and quantity) will be reflected in a dwindling game base.

Shiras Moose

Shiras moose are associated with the seral and mature stages of the montane and subalpine forest. They are believed to have increased in number in recent years. During the wildlife surveys in 1975 and 1977 by the U.S.F.S., it was discovered that Pacific yew receives heavy browsing by moose, particularly during the winter. Heavy use areas are located throughout the north portion of the Study Area. Areas of Pacific yew are displayed in Figure 1. In addition to yew, other types of winter ranges are known to exist within the Study Area. Current management probably benefits moose primarily by maintaining overstory cover and providing a maintenance diet in areas of deep snow. It is probably adverse from the standpoint of providing a declining amount of open forage-producing areas in early summer (high protein levels) and early winter as suggested for moose in Minnesota (Peek, 1976).

Optimum habitat management for moose would require a mosaic of various age forest stands that maintains the integrity of wintering sites (cover) and yet provides for adequate amounts of high quality forage producing areas.

Bighorn Sheep

Bighorn sheep reside yearlong along the Salmon River face between Sheep Creek and Mackay Bar (Figure 1). Historically, bighorn sheep were considerably more abundant than they are now. A minimum of 76 bighorn sheep were observed during the summer of 1976 (Lauer, 1976).

Bighorn sheep are adapted to habitats in which the predominant vegetation is composed of grasses. It appears that the decline of bighorn sheep populations in many areas has been closely correlated with a reduction in habitat quality deriving from fire protection and excessive grazing.

Prescribed burning, or permitting natural fires to burn are techniques which would help to reverse the adverse trend in range quality and quantity where trees are invading grasslands (Wishart, 1974). A thorough review of domestic livestock grazing practices (Lauer and Peek, 1976) on range utilized by bighorn sheep would also be a necessary undertaking.

Alteration of social organization or land use traditions by man's activities may also affect sheep ecology to a greater extent than for species primarily adapted to subclimax forage types (Geist, 1974).

Mountain Goat

Mountain goat are adapted to climax vegetation. The rocky, steep slope habitat along Johns Creek and Crooked Creek (Table 1, Figure 1) support small groups of goats. Some use is made of adjacent forested habitats. The population is probably in equilibrium with the habitat.

Black Bear and Mountain Lion

Black bear and mountain lion are present throughout the Study Area (Table 1). Little information is available on their status. They are directly and indirectly dependent, however, on the early stages of forest succession which are becoming limited in this area. It can be assumed they are at the carrying capacity of the habitat.

Small Game

The characteristic small game are blue, spruce, and ruffed grouse and chukars. Seasonally, grouse use a variety of habitats (Table 2). These requirements have been well documented. All three species require various stages of forest development at different seasons of the year. Fire or use of other means duplicating the effect of fire by providing for various age forest stands will benefit grouse.

Chukars are found primarily along the Salmon River Face adjacent to the river. This is a semi-arid area of rock outcropping, talus slopes and low vegetation. Little use is made of forested areas.

Conclusion

Considering the trend of vegetational succession within the Gospel-Hump, it appears the area is falling short of its potential to meet the future public demand for consumptive and nonconsumptive use of wildlife.

To help meet this demand and at the same time maintain representative populations of all wildlife species will require management procedures resulting in a mosaic of diverse age forest stands.

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TABLE 1.

THE MAMMALS CHARACTERISTIC OF THE HABITATS WITHIN THE GOSPEL-HUMP STUDY AREA 1/

(Species that utilize cavities in snags for denning or roosting are underlined)

Species	WILDLIFE HABITATS 2/ (1) Sub-Alpine Forest	(2) Montane Forest	(3) Ponderosa Pine Forest	(4) Rocky Steep Slopes/ Montane For.	(5) Rocky Steep Slope	(6) Riparian-Mt. Stream	(7) Mt. Shrub Forest Margin
1. Masked Shrew	x	x		x			
2. Vagrant Shrew			x	x	x	x	x
3. Dusky Shrew	x	x		x			x
4. Northern Water Shrew						x	
5. Little Brown Myotis (Bat) 3/							
6. Yuma Myotis (Bat)							
7. Long-eared Myotis (Bat)							
8. Fringed Myotis (Bat)							
9. Long-legged Myotis (Bat)							
10. California Myotis (Bat)							
11. Silver-Haired (Bat)							
12. Big Brown (Bat)							
13. Hoary Bat							
14. Western Big-eared Bat							
15. Black Bear	x	x	x	x		x	

	Species	(1) Sub-Alpine Forest	(2) Montane Forest	(3) Ponderosa Pine Forest	(4) Rocky Steep Slopes/ Montane For.	(5) Rocky Steep Slope	(6) Riparian Mt. Stream	(7) Mt. Shrub Forest Margin
16.	Raccoon	x	x		x		x	
17.	Marten 4/5/	x	x		x			
18.	Fisher 4/5/	x	x		x			
19.	Shortail Weasel			x	x	x	x	x
20.	Longtail Weasel	x	x	x	x	x	x	x
21.	Mink						x	
22.	River Otter						x	
23.	Wolverine	x	x	x	x		x	x
24.	Badger	x		x			x	x
25.	Spotted Skunk						x	
26.	Striped Skunk		x	x	x		x	
27.	Coyote		x	x	x	x	x	x
28.	Mountain Lion	x	x	x	x	x	x	
29.	Lynx	x	x	x	x		x	
30.	Bobcat	x	x	x	x	x	x	x
31.	Yellowbelly Marmot	x		x	x	x		x
32.	Hoary Marmot	x						
33.	Columbian Ground Squirrel	x	x	x	x			x

Species	(1) Sub-Alpine Forest	(2) Montane Forest	(3) Ponderosa Pine Forest	(4) Rocky Steep Slopes/ Montane For.	(5) Rocky Steep Slope	(6) Riparian Mt. Stream	(7) Mt. Shrub Forest Margin
34. Golden-mantled squirrel	x		x	x	x		x
35. Yellow Pine Chipmunk	x		x			x	x
36. Red-tailed Chipmunk 5/	x	x		x			
37. Red Squirrel 5/	x	x	x	x			
38. Northern Flying Squirrel 4/5/	x	x	x	x			
39. Northern Pocket Gopher	x	x	x	x			x
40. Beaver						x	
41. Deer Mouse	x	x	x	x	x	x	x
42. Bushy Tail Woodrat	x	x	x	x	x		
43. Boreal Redback Vole 5/							
44. Meadow Vole						x	
45. Mountain Vole						x	x
46. Longtail Vole	x		x			x	x
47. Richardson Vole	x					x	
48. Western Jumping Mouse	x					x	
49. Porcupine	x	x	x	x	x	x	x
50. Pika				x	x		

Species	(1) Sub-Alpine Forest	(2) Montane Forest	(3) Ponderosa Pine Forest	(4) Rocky Steep Slopes/ Montane For.	(5) Rocky Steep Slope	(6) Riparian Mt. Stream	(7) Mt. Shrub Forest Margin
51. Snowshoe Hare	x	x		x			
52. Elk	x	x	x	x		x	x
53. Mule Deer	x	x	x	x		x	x
54. Whitetail Deer	x	x	x	x		x	x
55. Moose	x	x		x		x	x
56. Mountain Goat	x			x	x		
57. Bighorn Sheep	x	x	x	x	x	x	

1/ This list has been adopted in part from the following references:

1. Burt, W.H. 1964, A field guide to the mammals, Houghton-Mifflin Co., Boston
2. Larrison, E.J. 1967. Guide to Idaho Mammals
3. Silousky, G.D. and C. Pinto, 1974.

2/ _____ Modified from Guide to Idaho Mammals

3/ Aerial - The open air between and above vegetation and land (includes all bats).

4/ Heavily dependent on snags.

5/ Species that are largely arboreal in habit and/or primarily live within the dark coniferous forest.

Table 2.

THE CHARACTERISTIC BREEDING BIRDS OF SEVEN HABITATS IN THE GOSPEL-HUMP STUDY AREA 1/

Species	WILDLIFE HABITAT (1) Sub-Alpine Forest	(2) Montane Forest	(3) Ponderosa Pine Forest	(4) Rocky, Steep Talus Slopes/ Montane For.	(5) Rocky Steep Talus Slope	(6) Riparian Mt. Stream	(7) Mt. Shrub Forest Margin
1. Gray Jay	x	x	x				
2. Steller's Jay	x	x	x	x			
3. Black-billed Magpie			x			x	x
4. Common Raven	x	x	x	x			
5. Clark's Nutcracker	x		x				
6. Black-Capped Chickadee		x	x	x		x	
7. Mountain Chickadee	x	x	x	x			
8. Chestnut-backed Chickadee		x		x			
9. White-breasted Nuthatch			x				
10. Red-breasted Nuthatch		x	x	x			
11. Pygmy Nuthatch			x				
12. Brown Creeper	x	x	x	x		x	

Species	(1) Sub-Alpine Forest	(2) Montane Forest	(3) Ponderosa Pine Forest	(4) Rocky, Steep Talus Slopes/ Montane For.	(5) Rocky Steep Talus Slope	(6) Riparian Mt. Stream	(7) Mt. Shrub Forest Margin
13. Water Ouzel (dipper)						x	
14. House wren			x			x	
15. Winter wren	x		x				
16. Canon wren				x	x		
17. Rock wren				x	x		
18. Catbird						x	
19. Robin		x	x			x	
20. Varied Thrush		x	x	x			
21. Hermit Thrush	x	x	x				
22. Swainson's Thrush		x	x	x		x	
23. Veery						x	x
24. Western Bluebird			x				x
25. Mountain Bluebird			x			x	x
26. Townsend's Solitaire	x	x	x				
27. Golden-crowned Kinglet		x	x	x			
28. Ruby-crowned Kinglet		x	x				
29. Cedar Waxwing						x	
30. Warbling Vireo		x	x			x	x

Species	Sub-Alpine Forest	Montane Forest	Ponderosa Pine Forest	Rocky, Steep Talus Slopes/ Montane For.	Rocky Steep Talus Slope	Riparian Mt. Stream	Mt. Shrub Forest Margin
31. Orange-crowned Warbler		x	x			x	
32. Yellow Warbler		x	x			x	x
33. Nashville Warbler			x				x
34. Audubon's Warbler	x	x	x	x			x
35. Townsend's Warbler	x	x	x	x			
36. MacGillivray's Warbler	x	x	x			x	
37. Yellowthroat						x	
38. Yellow-breasted Chat						x	x
39. Wilson's Warbler		x	x	x			x
40. American Redstart						x	
41. Bullock's Oriole						x	
42. Brewer's Blackbird						x	
43. Brown-headed Cowbird						x	
44. Western Tanager		x	x	x			
45. Black-headed Grosbeak		x	x			x	x
46. Lazuli Bunting			x			x	x
47. Evening Grosbeak		x	x				
48. Cassin Finch	x	x	x	x			
49. House Finch		x	x				

Species	(1) Sub-Alpine Forest	(2) Montane Forest	(3) Ponderosa Pine Forest	(4) Rocky, Steep Talus Slopes/ Montane For.	(5) Rocky Steep Talus Slope	(6) Riparian Mt. Stream	(7) Mt. Shrub Forest Margin
50. Pine Grosbeak	x	x	x	x			
51. Pine Siskin		x	x	x		x	
52. American Goldfinch		x	x				x
53. Red Crossbill		x	x	x			
54. Rufous-sided Towhee		x	x			x	x
55. Savannah Sparrow		x	x			x	
56. Oregon Junco	x	x	x	x		x	x
57. Chipping Sparrow							
58. Brewer's Sparrow		x					x
59. White-crowned Sparrow	x	x	x				
60. Fox Sparrow	x	x	x			x	x
61. Lincoln's Sparrow	x						
62. Song Sparrow	x	x	x			x	x
63. Screech Owl	x	x	x	x		x	
64. Flammulated Owl		x	x	x			
65. Great Horned Owl	x	x	x	x		x	x
66. Hawk Owl						x	

Species	(1) Sub-Alpine Forest	(2) Montane Forest	(3) Ponderosa Pine Forest	(4) Rocky, Steep Talus Slopes/ Montane For.	(5) Rocky Steep Talus Slope	(6) Riparian Mt. Stream	(Mt. Shrub Forest Margin
67. Pygmy Owl	x	x	x	x			
68. Great Gray Owl		x	x	x			
69. Long-eared Owl		x	x			x	
70. Saw-whet Owl	x	x	x	x			
71. Common Nighthawk		x	x				
72. Vaux's Swift	x	x	x	x			
73. Broad-tailed Hummingbird						x	
74. Rufous Hummingbird	x	x	x			x	x
75. Calliope Hummingbird							x
76. Belted King Fisher						x	
77. Red-Shafted Flicker	x	x	x			x	
78. Pileated Woodpecker		x	x	x			
79. Lewis Woodpecker	x						x
80. Yellow-bellied Sapsucker		x	x				
81. Williamson's Sapsucker	x		x				
82. Hairy Woodpecker	x	x	x	x			x
83. Downy Woodpecker		x	x			x	
84. White-headed Woodpecker			x				

Species	(1) Sub-Alpine Forest	(2) Montane Forest	(3) Ponderosa Pine Forest	(4) Rocky, Steep Talus Slopes/ Montane For.	(5) Rocky Steep Talus Slope	(6) Riparian Mt. Stream	(7) Mt. Shrub Forest Margin
85. Black-backed 3-Toed W.P.			x				
86. Northern 3-Toed Woodpecker	x	x	x				
87. Traill's Flycatcher		x	x			x	x
88. Hammond's Flycatcher		x	x	x			x
89. Dusky Flycatcher			x			x	x
90. Olive-sided Flycatcher	x	x	x	x			x
91. Western-wood Pewee		x	x	x		x	
92. Violet-green Swallow		x		x	x	x	x
93. Tree Swallow		x				x	x
94. Goshawk		x	x	x		x	
95. Sharp-Shinned Hawk		x	x			x	
96. Cooper Hawk	x	x	x	x		x	
97. Red-tailed Hawk			x	x			
98. Golden Eagle				x	x		
99. Bald Eagle 3/						x	

Species	(1) Sub-Alpine Forest	(2) Montane Forest	(3) Ponderosa Pine Forest	(4) Rocky, Steep Talus Slopes/ Montane For.	(5) Rocky Steep Talus Slope	(6) Riparian Mt. Stream	(7) Mt. Shrub Forest Margin
100. Pigeon Hawk		x					
101. Sparrow Hawk			x	x	x	x	
102. Blue Grouse	x	x	x	x			
103. Spruce Grouse	x	x	x				
104. Ruffed Grouse		x	x			x	
105 Chukar			x	x	x		
106 Turkey Vulture 3/		x		x			x

1/ This list represents those birds that have a high probability of nesting within the unit. It is not intended to be a complete listing of all birds or the habitats that they use. Distribution of some species is incompletely known. Use of a habitat may be restricted to a specific growth form (seral stage). Seasonal use of unit is made by some species that don't nest on the unit. Most of these have not been listed.

2/ Modified from Guide to Idaho Birds.

3/ Not believed to nest in unit.

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Table 3. BIRDS THAT ARE DEPENDENT ON SNAGS FOR CAVITIES AND/OR A SPECIFIC VEGETATION GROWTH FORM FOR NESTING

Species	Growth Form				
	Grass Forbs	Shrub Sapling	50-Year plus Forest including Mature Forest	Mature Forest 100-200 Yrs.Plus	Stream/ Rock/ Roots
1. Gray Jay			x		
2. Black-billed Magpie		x 2/			
3. Clark's Nutcracker			x		
4. Black-capped Chickadee 1/					
5. Mountain Chickadee					
6. Chestnut-backed Chickadee					
7. White-breasted Nuthatch			x		
8. Red-breasted Nuthatch			x		
9. Pygmy Nuthatch			x		
10. Brown Creeper			x		
11. Water Ouzel (Dipper)					x
12. House Wren			x		
13. Winter Wren					x
14. Canon Wren					x
15. Rock Wren					x
16. Catbird		x			
17. Western Bluebird					
18. Mountain Bluebird					
19. Townsend's Solitaire			x		
20. Starling					
21. Yellow Warbler		x			

	Species	Growth Form: Grass Forbs	Shrub Sapling	50-Year plus Forest including Mature Forest	Mature Forest 100-200 Yrs.Plus	Stream/ Rock/ Roots
22.	Audubon's Warbler		x			
23.	Townsend's Warbler			x		
24.	MacGillivray's Warbler		x			
25.	Yellowthroat		x			
26.	Wilson's Warbler		x			
27.	Western Tanager			x		
28.	Evening Grosbeak			x		
29.	Pine Siskin			x		
30.	American Goldfinch		x			
31.	Red Crossbill			x		
32.	Rufous-sided Towhee		x			
33.	Savannah Sparrow	x				
34.	Chipping Sparrow		x			
35.	Brewer's Sparrow		x			
36.	Fox Sparrow		x			
37.	Lincoln's Sparrow		x			
38.	Screech Owl					
39.	Flammulated Owl			x		
40.	Great Horned Owl					
41.	Hawk Owl			x		
42.	Pygmy Owl					
43.	Great Gray Owl			x		
44.	Saw-whet Owl					

	Species	Growth Form: Grass Forbs	Shrub Sapling	50-Year plus Forest including Mature Forest	Mature Forest 100-200 Yrs.Plus	Stream/ Rock/ Roots
45.	Common Nighthawk	x				
46.	Vaux's Swift				x	
47.	Broad-tailed Hummingbird		x			
48.	Belted Kingfisher					x
49.	Red-shafted Flicker			x		
50.	Pileated Woodpecker				x	
51.	Lewis Woodpecker					
52.	Yellow-bellied Sapsucker					
53.	Williamson's Sapsucker			x		
54.	Hairy Woodpecker			x		
55.	Downy Woodpecker			x		
56.	White-headed Woodpecker			x		
57.	Black-backed 3-toed W.P.			x		
58.	Northern three-towed W.P.			x		
59.	Traill's Flycatcher		x			
60.	Hammond's Flycatcher			x		
61.	Dusky Flycatcher		x	x		
62.	Olive-sided Flycatcher					
63.	Violet-green Swallow					
64.	Tree Swallow					
65.	Goshawk				x	

Species	Growth Form				
	Grass Forbs	Shrub Sapling	50-Year plus Forest including Mature Forest	Mature Forest 100-200 Yrs.Plus	Stream/ Rock/ Roots
66. Red-tailed Hawk			x		
67. Golden Eagle			x		
68. Sparrow Hawk			x		

1/ Thirty-one species dependent on holes for nest sites are underlined.

2/ x - Nests primarily in that growth form.

Table 4.

LISTING OF REPTILES AND AMPHIBIANS THAT ARE CHARACTERISTIC OF THE GOSPEL-HUMP STUDY AREA 1/

Species

(Amphibians)

1. Pacific Giant Salamander 2/ 3/
2. Blotched Tiger Salamander
3. Northern Long-Toed Salamander
4. Coeur d'Alene Salamander 2/3/
5. Tailed Frog
6. Western (Boreal) Toad
7. Pacific Tree Frog
8. Spotted Frog

(Reptiles)

1. Rocky Mt. Rubber Boa
2. Great Basin Garter Snake
3. Valley (Common) Garter Snake
4. Western Garter Snake
5. Western Skink
6. [illegible]

1/ This list is based in part on the following references. Actual distribution of some species is imperfectly known.

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2/ Species may occur in planning unit.

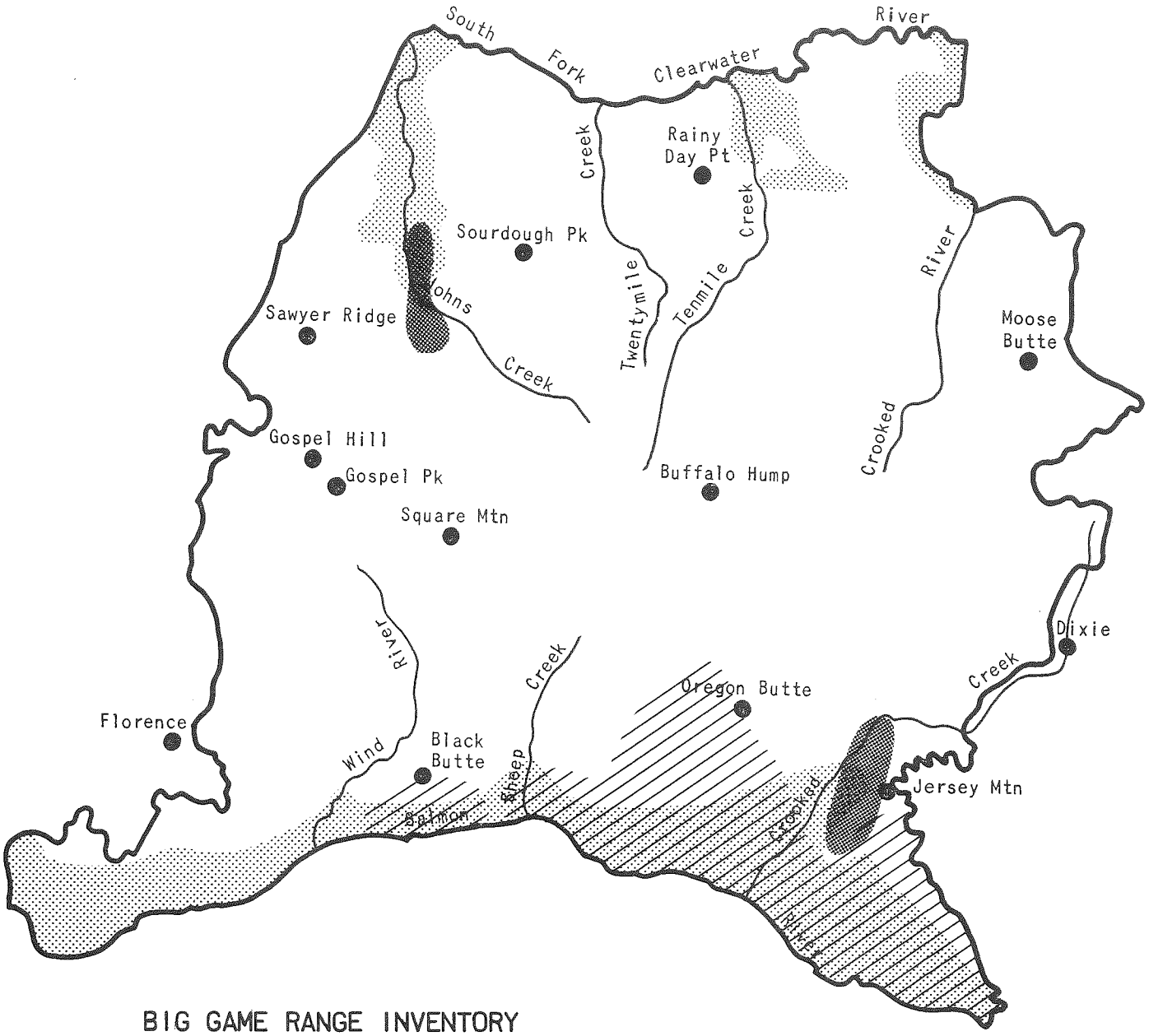
3/ Preferred habitat is forest older than 100 years. Silovsky and Pinto (1974).

APPENDIX 5

TABLE 5

MAMMALS, DESIGNATED PREDATORS OR FURBEARERS

Predators	Furbearers
Coyote	Beaver
Skunk	Muskrat
Weasel	Mink
	Marten
	Otter
	Fisher
	Bobcat
	Lynx
	Redfox
	Raccoon



BIG GAME RANGE INVENTORY

NEZPERCE NATIONAL FOREST
GOSPEL HUMP STUDY AREA NORTH OF THE SALMON RIVER

Deer and Elk Winter Range

Mountain Sheep Range (Lauer)

Mountain Goat Range

0 5
Scale of Miles

N

APPENDIX 6

Fisheries Resource

The RPA assessment for 1975 indicates fishing is one of America's most popular and fastest growing outdoor recreation activities. There are roughly twice as many fishermen as hunters (U.S. Forest Service, 1976). Data from the four quinquennial National Surveys of Fishing and Hunting (1955-1970) reveal that long-term annual rate of freshwater angling growth (3.18%) has averaged nearly twice population growth, while salt water anglers increased even faster (5.0% annually) (Stroud, 1977). In 1970, 21 percent of the Nation's population were categorized as "substantial" anglers. This represented an increase of 60 percent over 1955. In 1970, about 29 million people fished in fresh water and over 9 million did at least some of their fishing in salt water. And, in 1970, anadromous fish accounted for about 4 percent of the total recreational catch by salt water sport fishermen. Last, an increasing average consumption of fish by Americans indicates that the domestic market for fish is expanding faster than population growth, and it appears that the total domestic demand for fish is increasing more rapidly than domestic supply (U.S. Forest Service, 1976).

Idaho is known nationally for its anadromous fisheries resource. Idaho produces approximately 39 percent of the spring chinook salmon, 45 percent of the summer chinook salmon and 55 percent of the summer steelhead trout that enter the Columbia River (Mallet, 1974). There are 27,930 acres of anadromous fish habitat in Idaho (op.cit.) and 6 percent (1655 acres) of that habitat is within the Gospel-Hump planning unit.

The Idaho anadromous fisheries resource in recent years has been at the crossroads. Of the 5,687 miles of habitat once available, 2,329 miles of habitat has been lost (op.cit.). This is a 41 percent reduction in habitat. Downstream problems associated with the lower Snake River and Columbia River dams seriously threatened Idaho's anadromous fishery. However, recent intense efforts to enhance the chances of the downstream migrants, the improvement of fish passage over the dams, and the resolving of the nitrogen supersaturation problem have brightened the Idaho anadromous fishery picture considerably.

The Lewiston Dam, built in 1927, destroyed the historic chinook salmon run in the Clearwater River drainage (Murphy & Metsker, 1962). Further, anadromous fish were restricted to utilization of the lower 20 miles of the South Fork Clearwater River drainage when high water in 1949 destroyed the fishway over the Washington Water Power Co. dam (Mallet, 1974). This dam remained a total fish passage barrier until it was removed in 1963. The result was destruction of the historic run of steelhead trout upstream from th dam. In 1962, the Idaho Department of Fish & Game began an intense effort to reintroduce a chinook salmon fishery in the Clearwater River drainage and to reintroduce the steelhead trout fishery in the upper South Fork Clearwater River drainage (op.cit.). This reintroduction program has met some success. Numbers of chinook observed passing the Lewiston Dam up to the time of its removal were increasing, and both chinook and steelhead have established themselves in limited numbers throughout the South Fork Clearwater drainage (op.cit.).

The anadromous fisheries spawning habitat in the South Fork Clearwater River drainage has more potential than the present level of utilization. Based on information from the Murphy & Metsker report (1962), within the Gospel-Hump planning unit there is potentially from 41,860 square yards to 55,810 square yards of gravel suitable for chinook salmon spawning and 31,625 square yards to 42,170 square yards of gravel suitable for steelhead trout spawning. A spawning pair of spring chinook salmon requires 16 square yards of gravel, and a spawning pair of steelhead trout requires 15 square yards of gravel to spawn. Thus, the spawning habitat in the South Fork Clearwater River drainage portion of the Gospel-Hump planning unit has the annual potential to provide spawning habitat for 2615 to 3490 spawning pairs of spring chinook salmon and to provide spawning habitat for 2110 to 2810 spawning pairs of steelhead trout.

The anadromous fisheries spawning gravel potential for that area of the Gospel-Hump planning unit that is within the Salmon River drainage is from 1725 square yards to 2300 square yards for summer chinook salmon, and from 4275 square yards to 5700 square yards for steelhead trout. It would provide annual potential spawning habitat for 72 to 96 spawning pair of summer chinook salmon, which require 24 square yards of gravel to spawn; and would provide annual potential spawning habitat for 285 to 380 spawning pair of steelhead trout.

Based on the potential anadromous fish spawning gravel, the Gospel-Hump planning unit can potentially support a yearly run of between 5375 and 7170 chinook salmon and a yearly run of between 4790 and 6380 steelhead trout.

In a report on the economic values of the anadromous fishery for the Columbia River drainage, it was suggested that each adult fish that returns to spawn represents the following net economic value of fish harvested: $143.76 for spring chinook and $149.24 for summer steelhead (Tuttle, 1975). Thus, the potential annual economic value in the Gospel-Hump planning unit for chinook salmon is from $773,000 to $1,031,000, and for steelhead trout from $715,000 to $952,000.

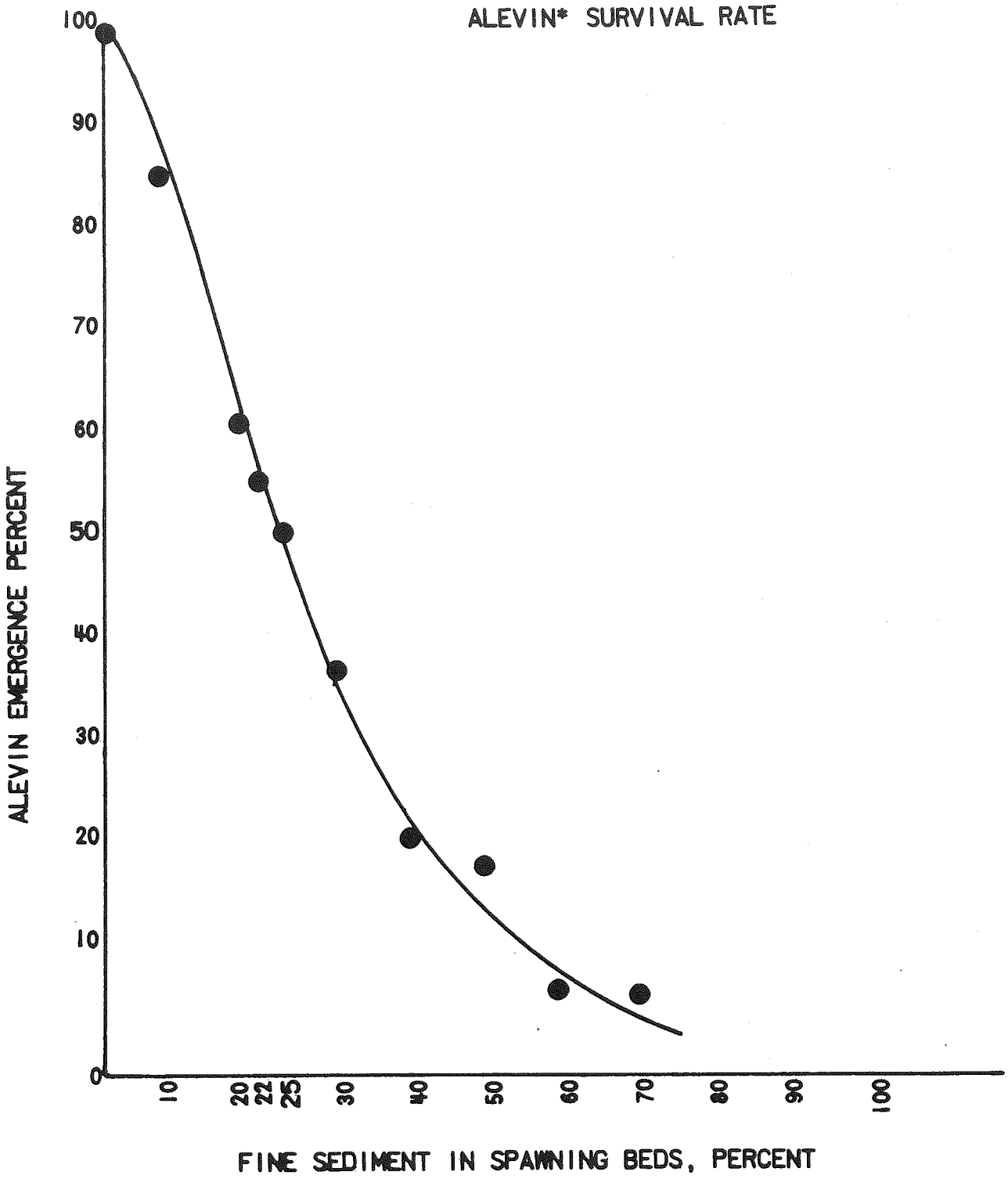
The Gospel-Hump Planning Unit selection criterion for anadromous fish was to select an alternative that produced the lowest sediment increases possible while achieving other planning goals. The alternative selected was one in which the percent total sediment increase over natural was 50%. The impact from a 50% increase in total sediment over natural (150%) on the anadromous fisheries resource in the planning unit will be a 25% potential population reduction (Platts, 1977, personal communication).

The Forest made a decision to monitor total sediment entering a stream and to monitor potential changes in the anadromous fish populations. The method to monitor total sediment is fairly simple. However, monitoring potential fish population changes is more difficult.

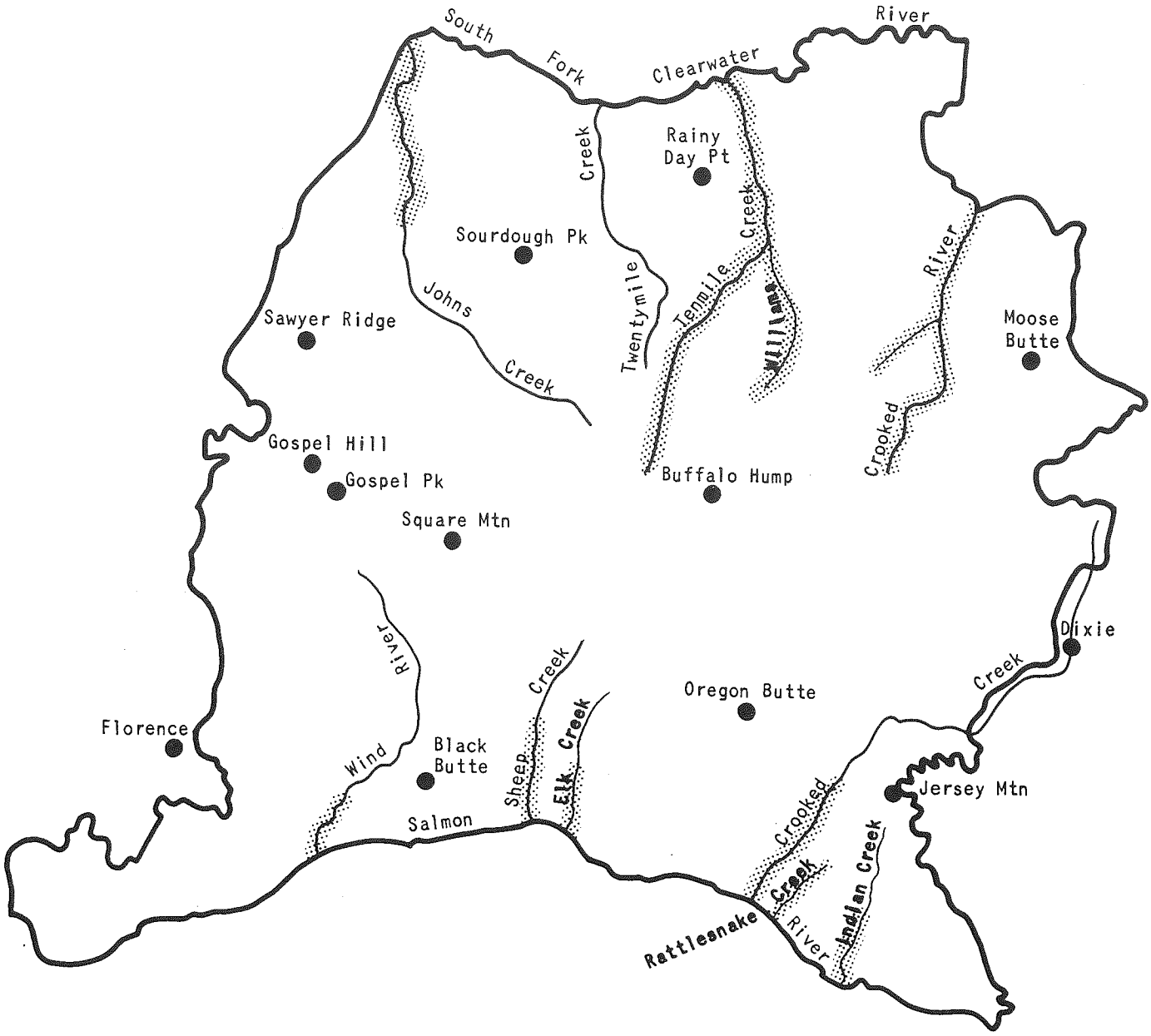
The recommendation was to measure the potential population at emergence from the spawning gravel (Bjorn, 1977, personal communication) and (Chrostowski, 1977, personal communication) indicate that alevin (newly hatched salmon or steelhead) emergence is the most critical link in the life cycle of salmon and steelhead and is the best population indicator. Platts (1977, personal communication) feels the most critical link in the life cycle is between emergence and smoltification (the physical change juvenile salmon and steelhead go through just prior to migrating to the ocean) but there is little documentation on the relationship of sediment on rearing success. However, there is strong documentation displaying an inverse relationship between alevin emergence success and the percent of fine sediments (material lesss than 6.33 mm in size) in spawning gravels (Chrostowski, 1976; Phillips, 1975; Koski, 1972; Hall, 1969; Bjorn, 1973) (Figure 1).

From this inverse relationship, we can ascertain potential population changes by measuring the percent fine sediment in the spawning gravel. For example: if one female spawns 5000 eggs and the percent fine sediment is 18% the emergent success will be 75% or 3750 alevin and if one female spawns 5000 eggs at the same spot next year and the percent fine sediment is 25%, the emergent success will be 50% or 2500 alevin. A 33% population reduction results.

Chrostowski and Everest (1977, Personal Communication) suggest at least 50% alevin emergence success is necessary in order to maintain a viable chinook salmon and steelhead population in a drainage. The recommendation was to maintain the percent fine sediment (material less than 6.33 mm in size) at a level where the alevin emergence success would be 50% or higher. The decision was in streams containing 150 square yards or more of anadromous fish spawning gravel that the maximum acceptable percent fine sediment in the spawning gravel would be 18%. The management direction will be if that point is reached there will be a cessation of land disturbing activities. At 18% fine sediment in the spawning gravel the alevin emergent success should approximate 75%.



*ALEVIN - NEWLY HATCHED SALMONOID



ANADROMOUS FISHERIES SPAWNING STREAMS

NEZPERCE NATIONAL FOREST

Anadromous Fisheries Habitat

0 5

Scale of Miles

N

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APPENDIX 7

TIMBER

1. Tree Species & Timber Description - Ten conifer species and two hardwood species grow in the Gospel-Hump roadless area. They are:

Common Name	Scientific Name
Grand fir	Abies grandis
Subalpine fir	Abies lasiocarpa
Western larch	Larix occidentalis
Engelmann spruce	Picea engelmannii
Whitebark pine	Pinus albicaulis
Lodgepole pine	Pinus contorta
Limber pine	Pinus flexilis
Ponderosa pine	Pinus ponderosa
Douglas fir	Pseudotsuga menziesii
Pacific yew	Taxus brevifolia
Cottonwood	Populus spp.
Aspen	Populus tremuloides

The entire Forest was PI (photo interpretation) typed in 1973. A list of the types and their descriptions follows. The aerial photos and maps are on file in the Nezperce Forest Supervisor's office and are available for review.

There are no elevational (climatic) limits to commercial forest land, only edaphic (soil) limits. Where adequate soil exists, the land is moderately - to well-stocked and is growing more than 20 cubic feet per acre per year. The high, rocky areas, such as Buffalo Hump, are non-forest or non-commercial forest because of edaphic limitations.

The Salmon River Breaks are predominantly PP and DF. The xeric south and west exposures have stocking limitations, induced by high solar radiation loadings. Only thick barked PP and DF are capable of surviving the frequent fires and droughty conditions there. Regeneration on the Breaks is limited to the fortuitous combination of a good seed year and several successive wet summers. Much of the Breaks is non-forest or non-commercial forest.

The old-growth timber on the Breaks (250-350 yrs.) is very large -- 24"-40" DBH. Timber type maps compiled for the 1964 timber management plan are on file in the Supervisor's office in Grangeville.

TIMBER TYPE
AERIAL PHOTO CLASSIFICATION
NEZPERCE NATIONAL FOREST 1973

REFERENCE MATERIAL - See Land Classification page 25; PI Definition of Commercial Forest Land, page 26; and Noncommercial Forest Land, pages 29-30. These have been included in the Blue Section because of the logical tie-in with the layout of the field sample.

Definition of a Stand - A stand is a homogeneous unit 5 acres or more in size, with characteristics which separate it from surrounding areas. Sometimes the differences are so definite it is easy to determine the stand boundary. More often the boundary is rather indefinite, and where the line should be drawn is subject to interpretation only. There will also be situations where adjacent stands may logically have the same PI code, but obvious differences justify separating them. Although the term "stand" implies tree growth present, we are regarding stands as areas in the same sense as the other areas we delineate, such as the nonstocked, noncommercial, and nonforest.

I. Stand height greater than 40 feet

A. Coarse texture - usually indicates mature or overmature sawtimber

11-- Well stocked
12-- Med. stocked
13-- Poorly stocked

B. Fine texture - small sawtimber or pole stands. These are not easily separated as to maturity, and may be either mature or immature, depending on site, etc.

14-- Well stocked or overstocked
15-- Med. stocked
16-- Poorly stocked

C. Two-storied - At least 15-20 feet height difference between overstory and understory.

Unmanageable Two-Story Stands

Overstory well or medium stocked - classify as under A or B above.

Manageable or Potentially Manageable
Two-Story Stands

(Overstory generally poorly stocked but no more than medium stocking.)

17-- Understory - well and medium stocked
18-- Understory poorly stocked. Understory with at least 100 trees per acre.

D. Cutover - areas with obvious evidence of man's recent cutting activities, such as cutting area boundaries, characteristic roading systems, etc.

Cutover - Coarse texture

19-- Well or medium stocking
20-- Poor stocking

Cutover - Fine texture

21-- Well or medium stocking
22-- Poor stocking

Cutover - Two-Storied

23-- Residual overstory with a well or medium stocked understory.
24-- Residual overstory with poorly stocked understory

II. Stand Height less than 40 feet

A. Coarse texture

25-- Well and medium stocked
26-- Poorly stocked

B. Fine texture

27-- Well stocked - immature stands less than pole size, usually, but may also be stagnated.
28-- Medium stocked
29-- Poorly stocked
30-- Apparently nonstocked (refers to trees) - due to natural conditions such as fire, but not due to logging.

C. Cutover

31-- Well and medium stocked residual after cutting
32-- Poorly stocked residual
33-- Apparently nonstocked after cutting

III. Other

40. Noncommercial forest
60. Nonforest
92. Water (noncensus)

2. Volumes & Acres - The estimate of standing volume is based on the 1973 inventory done for the timber management plan. There is approximately 2,900 MMBF of net merchantable volume on the regulatable commercial forest land (CFL). The following table shows the acres and volumes by analysis unit. The standard error of estimation of volume for the Forest is 6.1%. It's probably considerably higher for each analysis unit and can, with effort, be calculated for each.

Analysis Unit	CFL Acres	Total Acres	Volume(MMBF)
1	4658	5750	52.2
2	1620	2580	23.9
3	5850	6010	87.2
4A	3206	3931	47.8
4B	1842	1842	27.5
5	14335	15938	213.7
6	2290	2870	34.1
7	3804	4710	56.3
8A	9683	12965	143.3
8B	1193	2900	17.7
9	5690	5760	84.2
10	2020	2935	29.9
11	7666	8277	113.5
12	3580	4065	53.0
13	2131	2400	31.5
14A	9775	11490	144.7
14B	11950	23225	167.3
15	4650	5645	65.1
16	535	985	7.5
17	3750	8255	52.1
18	4180	9505	62.3
19A	2200	2225	32.8
19B	2300	2345	34.3
20	3050	3070	45.4
21	1820	3125	27.1
22	850	2140	12.7
23	2721	6805	40.5
24	1550	1595	23.1
25A	5660	5285	84.3
25B	3703	3745	55.2
25C	2578	8945	38.4
26A	4280	4280	63.8
26B	1875	1875	27.9
26C	205	205	3.1
27	2243	5325	33.4
28	2017	2590	22.8
29	6431	16145	72.0
30	3490	5580	39.1
31	0	2485	0
32	1236	14735	13.8
33	0	2035	0
34	4820	26195	54.2
35	120	8750	1.3

36A	2225	11655	28.1
36B	2260	17715	28.5
37	2442	4415	27.4
38	5213	6235	66.2
39A	20127	24545	255.6
39B	3009	3855	38.0
40	5766	6360	73.0
41	5498	8575	67.4
42	10565	19490	118.3
43	1571	23475	17.6
44	9840	15835	111.2

3. Habitat Type & Site Index - Most mesic sites below 5500' MSL are of grand fir series. Above that elevation, the habitat types are usually of the subalpine fir series. There are large stands of dense Pacific yew on the north exposures in Wing Creek, Rainy Day Creek, Otter Creek, Huddleson Creek and Six-Mile Creek. Lighter, scattered yew understory occurs in parts of Trout and Swift Creeks. H.T. is GF/Asarum caudatum and/or GF-Clun in these areas.

Xeric sites on the riverbreaks are often of the ponderosa pine series, with the slightly more moist sites being of the Douglas fir series. Elsewhere in the roadless area, xeric sites are Douglas fir if at low elevation. A complete h.t. map is attached with a more detailed description.

Site index varies from 15 (50-year base) for subalpine fir at high elevation to 100+ for ponderosa pine occurring serally on grand fir-clintonia habitat types. The "average" site index for DF on the predominant grand fir series is approximately 65-75.

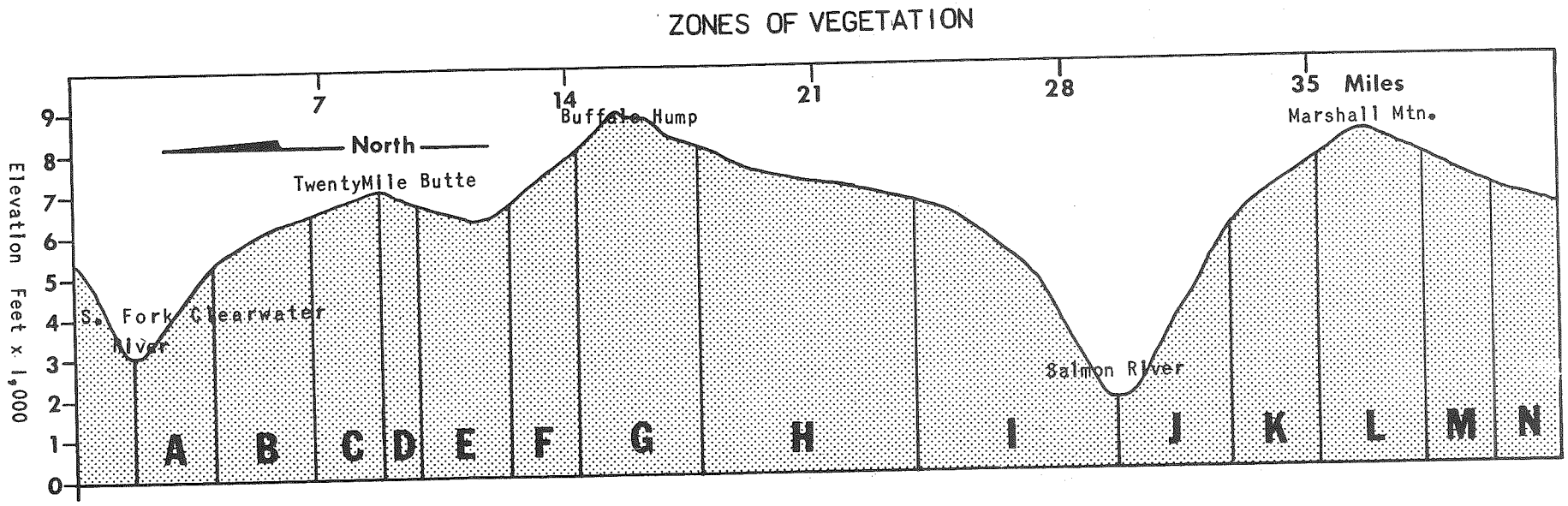
NEZPERCE NATIONAL FOREST

HABITAT TYPES BY

ELEVATION: MOISTURE ORDINATION

		Exposure			
	Area*	320°-70°	70°-120°	120°-270°	270°-320°
I	Xeric	PP-Syal	PP-Agsp	PP-Agsp	PP-Feid
	Mesic	DF-Phma	PP-Feid	PP-Feid	PP-Syal
	Hydric	DF-Phma	DF-Phma	DF-Phma	DF-Syal
H	Xeric	GF-Xete	DF-Syal	DF-Caru	GF-Xete
	Mesic	GF-Cooc	GF-Cooc	DF-Phma	GF-Libo
	Hydric	GF-Cooc	GF-Clun	DF-Phma	GF-Clun
G	Xeric	AF-Xete	AF-Xete	AF-Xete	AF-Xete
	Mesic	AF-Mefe	AF-Clun	AF-Cooc	AF-Mefe
	Hydric	AF-Cabi	AF-Caca	AF-Caca	AF-Caca
F	Xeric	AF-Luhi	AF-Caca	AF-Xete	AF-Caca
	Mesic	AF-Clun	AF-Cooc	AF-Xete	AF-Cooc
	Hydric	AF-Cabi	AF-Clun	AF-Cooc	AF-Clun
E	Xeric	GF-Xete	GF-Xete	GF-Xete	GF-Xete
	Mesic	GF-Clun	GF-Clun	GF-Cooc	GF-Clun
	Hydric	GF-Atfife	GF-Asca	GF-Clun	GF-Asca
D	Xeric	AF-Luhi	AF-Caca	AF-Xete	AF-Caca
	Mesic	AF-Mefe	AF-Clun	AF-Cooc	AF-Clun
	Hydric	AF-Cabi	AF-Mefe	AF-Stam	AF-Mefe
C	Xeric	AF-Xete	AF-Xete	AF-Xete	AF-Xete
	Mesic	AF-Mefe	AF-Clun	AF-Cooc	AF-Clun
	Hydric	AF-Cabi	AF-Cabi	AF-Cabi	AF-Cabi
B	Xeric	DF-Vaca	DF-Syal	DF-Caru	DF-Syal
	Mesic	GF-Clun	GF-Cooc	GF-Clun	GF-Cooc
	Hydric	GF-Asca	GF-Asca	GF-Clun	GF-Asca
A	Xeric	DF-Phma	DF-Syal	DF-Caru	DF-Syal
	Mesic	GF-Clun	GF-Clun	GF-Cooc	GF-Clun
	Hydric	GF-Atfi	GF-Atfi	GF-Asca	GF-Atfi

* These areas refer to the schematic cross-section displayed.


ZONES OF VEGETATION
7
14
21
28
35 Miles
North
Buffalo Hump
Marshall Mtn.
TwentyMile Butte
S. Fork Clearwater River
Salmon River
Elevation Feet x 1,000
0
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
G
H
I
J
K
L
M
N

PAYETTE NATIONAL FOREST

J	Xeric Mesic DF-Phma	PP-Phma DF-Phma	PP-Agsp PP-Phma	PP-Syal DF-Phma	PP-Agsp PP-Syal	
K	Xeric Mesic Hydric	AF-Mefe	AF-Cooc	AF-Clun	AF-Cooc	
L	Xeric Hydric	AF-Luhi AF-Cabi	WBP-AF AF-Cabi	AF-Luhi	WBP-AFMesic	AF-Mefe
M	Xeric Mesic Hydric	AF-Mefe	AF-Cooc	AF-Clun	AF-Cooc	
N	Seric Mesic Hydric	DF-Caru GF-Clun GF-Clun	DF-Caru GF-Cooc GF-	DF-Caru GF-Clun GF-	DF-Caru GF-Cooc GF-	

DEFINITIONS AND ABBREVIATIONS

HABITAT TYPES

Tree Species

Overstory Components

1. DF - Douglas fir
2. PP - Ponderosa pine
3. GF - Grand fir
4. AF - Subalpine fir

Understory Components

1. Syal - snowberry (Symphoricarpos albus)
2. Phma - ninebark (Physocarpus malvaceus)
3. Xete - beargrass (Xerophyllum tenax)
4. Cooc - Western gold thread (Coptis occidentalis)
5. Mefe - menziesia (Menziesia ferruginea)
6. Cabi - marshmarigold (Caltha biflora)
7. Caca - bluejoint (Calamagrostis canadensis)
8. Luhi - woodrush (Luzula hitchcockii)
9. Clun - queencub beadlily (Clintonia uniflora)
10. Vaca - dwarf huckleberry (Vaccinium caespitosum)
11. Asca - wild ginger (Asarum caudatum)
12. Feid - Idaho fescue (Festuca idahoensis)
13. Libo - twinflower (Linnaea borealis)
14. Atfi - lady fern (Athyrium filix - femina)
15. Stam - twisted stalk (Streptopus amplexifolius)

4. Yields - The RAM program used the timber and volume classes which were developed for the timber management plan, except for the BGM* activity. A separate timber class (BGM-Card 5) and volume class* were set up to recognize that activity's peculiar management scheme and yields.

*Card 7 - Volume, Class #16; Non-intensive Harvest Cuts --Column 7F. Regeneration Alternative 2.

The acres of conventional logging (CL) were distributed among the Standard timber classes in RAM. The acres of skyline (SL) and aerial logging (AL) were distributed among the Marginal classes. Distribution was on a proportional area basis as explained below.

A RAM "timber class" is a group of stands on which the same type of management (silvicultural system) is to be practiced. The acreage of each class was originally computer-calculated for the timber management plan. Timber Class #1, for instance, specifies a two-cut shelterwood system and contains 7½% of the Forest's Standard acreage. Timber class #2 contains 3% of the Standard acreage. Thus, 7½% and 3% of any standard acres which are added to the problem would be added to timber classes #1 and #2, respectively. The remaining 35 standard timber classes are similarly allotted their respective percentages of any added standard acreage.

The calculated potential yield of the entire Gospel-Hump roadless area is 56.6 MMBF. The areas and yields for each of the land use classes are shown below:

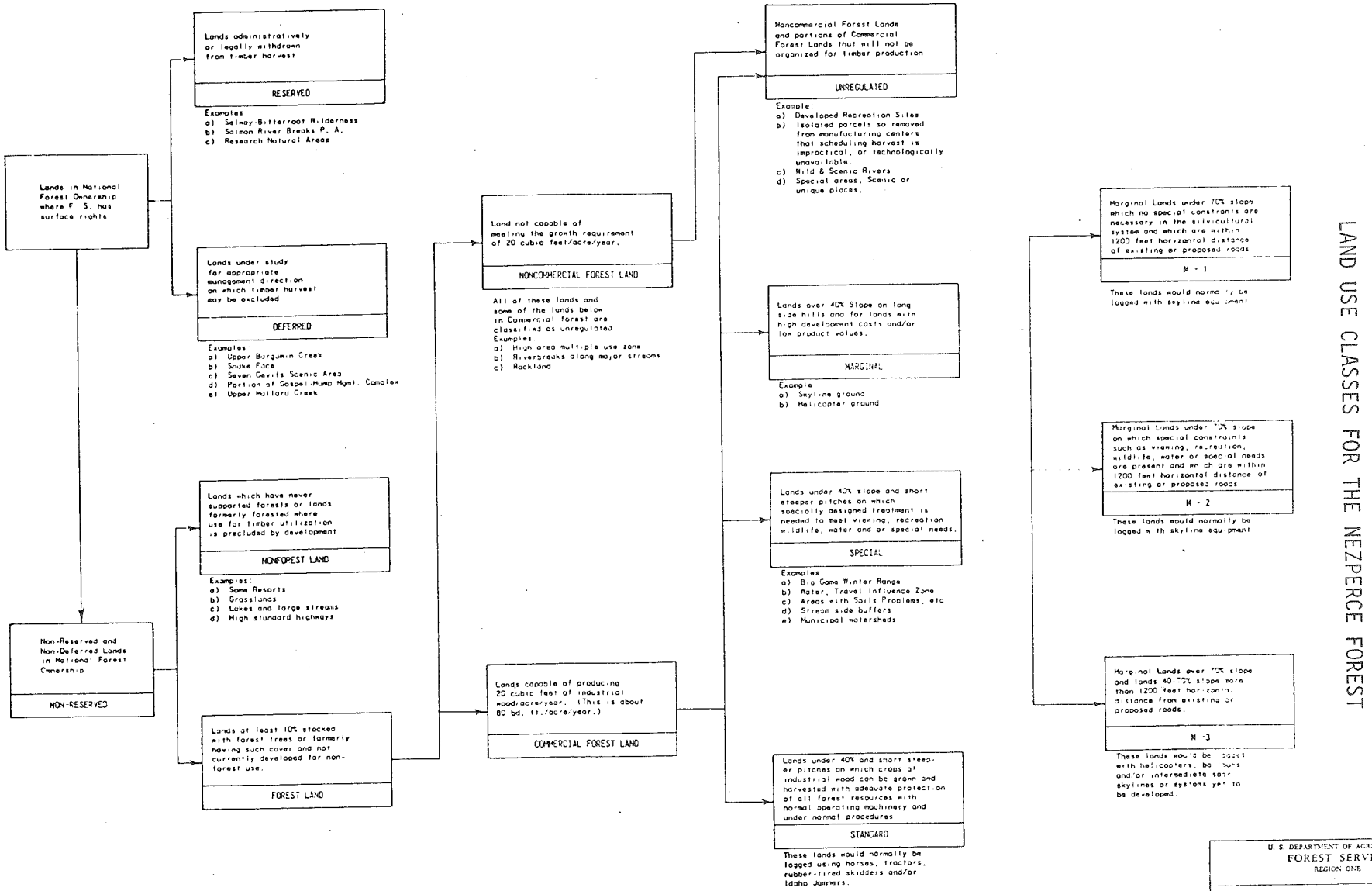
	Standard	Special	Marginal	Total
Periphery				
Area (acres)	64,815	10,950	80,560	145,325
Yield	12.9	2.2	15.9	31.0
Wilderness Portion				
Area	8,870	2,105	116,325	127,300
Yield	1.8	.4	23.4*	25.6
Totals				
Area	73,685	13,055	196,885	283,625
Yield	14.7	2.6	39.3	56.6

*10.6 MMBF of this is from the inaccessible Sheep Creek, Wind River and lower Crooked Creek areas.

5. Growth - The average gross MAI (cf) for the regulatable CFL is 337 bf/acre. Old-growth grand fir stands' PAI 0. The PAI for two-story stands is 337 bf, with 274 bf and 63 bf occurring on the understory and overstory respectively. The PAI for most immature stands is 342-405 bf. The PAI for single-story old-growth stands -- other than grand fir -- is 67 bf/acre.

*BGM refers to timber harvested as part of a big game habitat manipulation, and volumes are shown as a one-time harvest with no subsequent growth.

LAND USE CLASSES FOR THE NEZPERCE FOREST



U. S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
REGION ONE

STRATIFICATION SYSTEM FOR TIMBER MANAGEMENT PLANS

	By	Date	REVISIONS
DESIGNED			
DRAWN			
CHECKED			
SUBMITTED		Date	Sheet Of
APPROVED		Date	

6. Insects and Disease - There are no significant outbreaks of insect or disease infesta ions on the Gospel-Hump planning unit, but the entire area is recovering from a serious spruce budworm infestation which culminated in 1975. A pine butterfly infestation killed many mature ponderosa pine on the Salmon face in 1974. Many stands are overmature, and as such, very susceptible to future epidemics or infestations.

7. Costs & Revenues

A. Conventional Logging (CL)

1. Revenue - The "advertised value" (line 43, Form 2400-17) averages $15/MBF. With a Growth Rate of *149 bf/ac/yr, the revenue is $2.24.

* = Example

2. O&M Costs - Sale preparation and administration, and post-sale costs are $343/acre. The annual cost per acre if $3.43 ($343 ÷ 100-yr. rotation).

B. Skyline Logging (SL)

1. Revenue - The advertised value averages $-15/MBF. *149 bf/ac/yr @ $-15/MBF = $-2.24/acre.

* = Example

2. O&M Costs - Costs are the same as for conventional logging ($3.43/acre/yr).

C. Aerial Logging (AL)

1. Revenue - Yarding costs are so high as to place helicopter sales in deficit. The advertised value is, therefore, base rate, or approximately $2/MBF.

$2/MBF x .149 MBF/ac/yr = $.298/acre/year

2. O&M Costs - Sale preparation and administration costs and post-sale costs total $369/acre. Dividing by 100-yr. rotation = $3.69/ac/yr.

D. Roads

1. Revenue - The average specified road value (line 30, Form 2400-17) is $35/MBF. The *149 bf/ac/yr. TBF value converts this to a $5.22/ac/yr. revenue.

* = Example

E. O&M Cost/Acre

	Preparation	Admin.	Post-Sale	Total
Aerial logging (AL)	$ 29	$ 70	$ 270	$369/acre
Skyline logging (SL)	29	44	270	343/acre
Conventional logging (CL)	29	44	270	343/acre

APPENDIX 8

GRAZING ALLOTMENTS BY DISTRICT

The following breakdown shows the grazing allotments within the Gospel-Hump Study Area by Ranger District. The "% in area" is the portion of the allotment within the Study Area boundary. It can be assumed that stocking is also proportionate.

RANGE

A) Breakdown of Grazing Allotments - Number of Livestock

1) Salmon River District

a) Allison Creek Allotment - 20% in area
   1) 1100 sheep - 12/1 - 2/29 - 3300 AM's sheep
   2) 775 sheep - 4/1 - 6/15 - 1938 AM's sheep

b) Anchor Meadows - 100% in area
   1) 900 sheep - 6/21 - 9/20 - 2700 AM's sheep
   2) 7 horses - 6/21 - 9/20 - 21 AM's horses

c) Butte-Gospel - 70% in area
   1) 164 cattle - 7/1 - 10/10 - 410 AM's cattle

d) Dome-Hill - 100% in area
   1) 100 cattle - 6/6 - 9/30 - 400 AM's cattle

e) Florence Allotment - 35% in area
   1) 321 cows - 6/15 - 10/15 - 1284 AM's cows

f) Hanover Allotment - 100% in area
   1) 87 cows - 7/1 - 9/30 - 261 AM's cows
   2) 6 horses - 7/1 - 9/30 - 18 AM's horses

2) Clearwater District

a) Hungry Ridge - 55% in area
   1) 200 cattle - 6/1 - 9/30 - 800 AM's cows

b) Blue Ridge - 100% in area
   1) 25 cows - 5/20 - 10/15 - 125 AM's cows

3) Elk City District

a) Ten-Twenty Mile Allotment
   1) 75 cows - 6/15 - 10/1 - 263 AM's cows

4) Red River District

a) Big Creek Allotment
   1) 20 cows - 7/1 - 9/1 - 40 AM's cows
   2) 75 cows - 7/1 - 9/20 - 188 AM's cows

b) Bull Creek
   1) 300 sheep - 6/21 - 9/21 - 900 AM's sheep

c) Cove Creek
   1) 20 horses - 6/15 - 9/15 - 60 AM's horses

d) Little Mallard
   1) 20 horses - 7/1 - 9/15 - 75% of time = 38 AM's horses

e) Moose Butte
   1) 40 cows - 6/1 - 7/15 - 60 AM's cattle

B) Production was estimated by District Personnel or roughly calculated. Approximate percentages of Mountain Meadow (2000 lbs/acre), open conifer Forest (550 lbs/acre) and dense conifer Forest (250 lbs/acre) were calculated by percent in each unit. These were combined to derive overall forage production in each unit.

C) Endangered and threatened plants were supplied by District Personnel, from the grazing management folders or from the reference book - "Endangered and Threatened Plants of Idaho," by Henderson, Johnson, Packard and Steele.

APPENDIX 8

SOURCES

Grazing Management on Red River District EAR

Clearwater District Grazing Management Program EAR

Elk City District Grazing Management Program EAR

Grazing Management on Salmon River District EAR

Bruce Dreher - Salmon River District

Vern Fleisher - Elk City District

Jo Moltzen - Red River District

Joe Bednorz - Clearwater District

Carol Smith - Supervisor's Office, Grangeville

"Endangered and Threatened Plants of Idaho" by Henderson, Johnson, Packard and Steele

APPENDIX 9

MINERALS AND GEOLOGY REPORT
FOR THE
GOSPEL HUMP PLANNING UNIT

NEZPERCE NATIONAL FOREST
GRANGEVILLE, IDAHO

MINERALS

INTRODUCTION

The Gospel-Hump Planning Unit lies on the southwest flank of the Idaho Batholith. The area is composed predominantly of pre-cambrian aged meta-sedimentary rocks and mesozoic-aged granitic intrusives (Hyndman and Williams 1977). Within the boundaries of this area are the Buffalo Hump Mining District which produced from 1898 to 1915, and the Ten Mile, Orogrande, Dixie, Florence and Simpson Mining Districts (figure 1) that started with placer mining in the 1860's to be followed by limited lode mining.

The following is a brief description of the history, the geology and mineralization, the developments of interest and the current status followed by summations of the mineral potential and future.

BUFFALO HUMP MINING DISTRICT

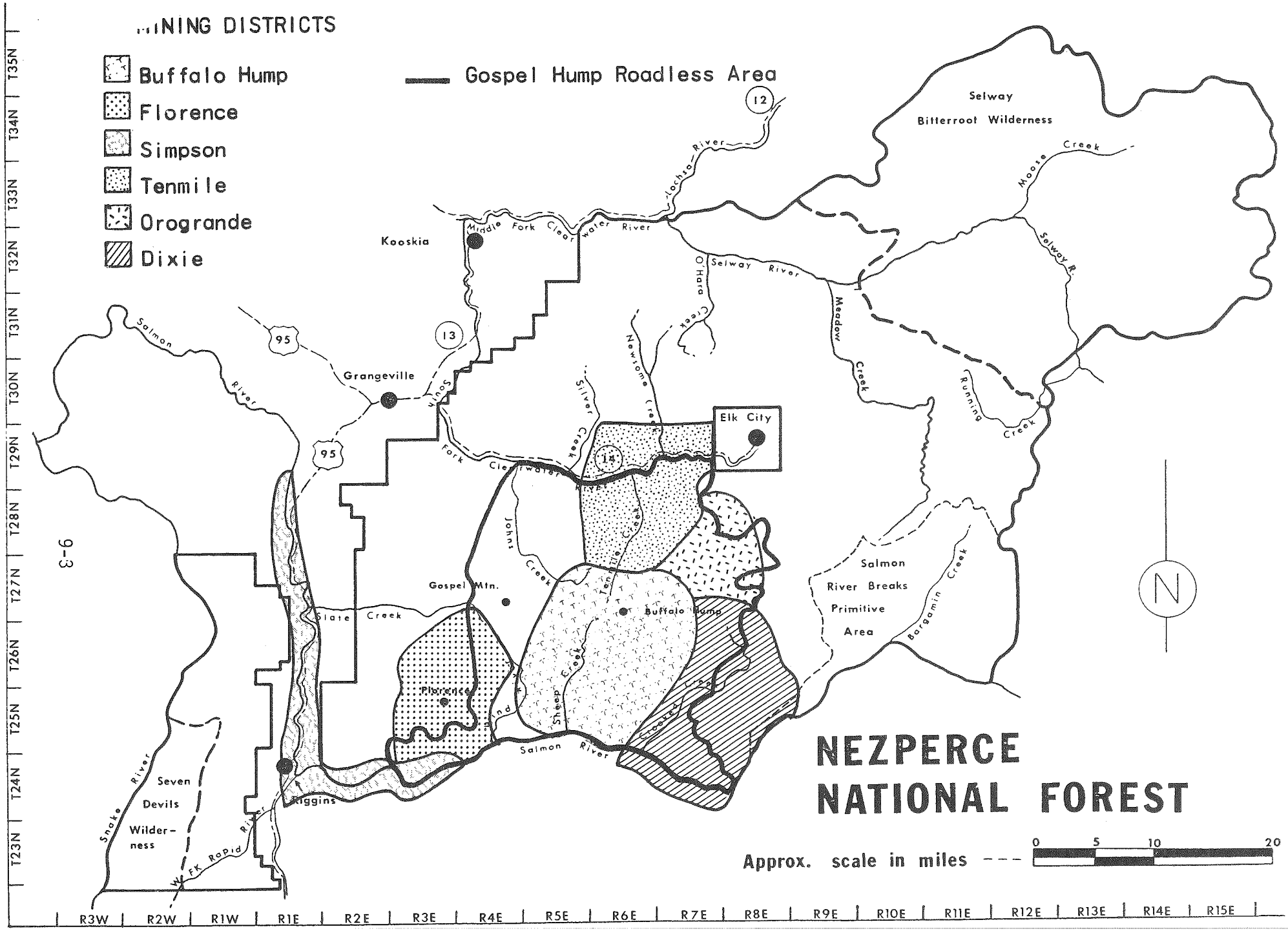
HISTORY

This mining district was formed in 1899, the year after a ledge named the Big Buffalo vein started producing precious metals. State of Idaho Mine Inspector M. H. Jacobs (1902) stated the area "occupies a commanding position upon the map of north central Idaho, being an empire in extent and possessing a vast as yet undeveloped mineral territory." Three towns, Concord, Humptown and Callender, sprung up as exploration and development lead to many producing mines until 1915. Thereafter, only a few sporadic ventures continued. The Concord Mine, closed by Presidential decree in 1942, ended mineral production in this district. The value of minerals produced between 1898 and 1950 has been calculated at $995,505 (Shenon and Full, 1957).

GEOLOGY AND MINERALIZATION

The geology of the area is complex and many ideas have been expressed on the origin of the area and vein systems. The Hump area is considered a resultant of igneous intrusives that intruded the country rock and subjected the area to metamorphic events (Reid, 1959). Shenon and Reed (1934) suggest the area to be a large anticlinal structure into which the granites intruded. The mineralized veins occupy a crestal position in this proposed anticline (figure 2). The veins and mineralization are genetically related to the intrusive rocks. Crandall (1977) has mapped granite, schist and quartzites units and studied the vein systems through the area.

The vein system is composed of 20 named veins and several unnamed occurrences. They trend north-south and dip generally to the east at 60 degrees or more. Two east-west vein systems have been noted; one that crops out west of Concord Hill and trends eastward south of the Mother Lode shaft (Shenon and Reed, 1934) and a similar set at the southern end of the district (Thomson and Ballard, 1924).


MINING DISTRICTS
Buffalo Hump
Florence
Simpson
Tenmile
Orogrande
Dixie
Gospel Hump Roadless Area
Selway Bitterroot Wilderness
Kooskia
Middle Fork Clearwater River
Lochsa River
Moose Creek
Selway River
O'Hara Creek
Meadow Creek
Running Creek
Selway R
Salmon River
Grangeville
South Fork Clearwater River
Silver Creek
Newsome Creek
Elk City
Johns Creek
Tenmile Creek
Gospel Mtn.
Slate Creek
Buffalo Hump
Florence
Sheep Creek
Crooked Fork
Salmon River
Salmon River Breaks Primitive Area
Bargamin Creek
Higgins
Seven Devils Wilderness
Snake River
W Fk Rapid River
12
95
13
14
N
NEZPERCE NATIONAL FOREST
Approx. scale in miles
0 5 10 20
T35N T34N T33N T32N T31N T30N T29N T28N T27N T26N T25N T24N T23N
R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E R10E R11E R12E R13E R14E R15E

The vein composition is mainly quartz and sulfide minerals. Sulfide compounds of silver, iron, copper, zinc, molybdenum, lead and antimony exist as does native gold (Shenon and Reed, 1934). The majority of gold occurs in solid solution with iron-sulfide (pyrite) and to a lesser degree with lead-sulfide (galena) in ore shoots that are large and consistent (Thomson and Ballard, 1924). Jellum (1909) noted, "the mineralization of the veins is no more pockety nor uneven than that which characterizes the productive gold deposits in all parts of the world."

The veins extend along six general lines of strike which extend for miles, while actual exposures range from a few inches to 2500 feet. Vein continuity is sometimes questionable as they are subject to splitting and resplitting into a maze of stringers (horsetailing). This fact can play havoc with subsurface control. Widths vary from inches to greater than 60 feet. Depths are unknown, but the Jumbo Mine was developed to the 800 foot level. Several others including the Concord, Big Buffalo and Cracker Jack were developed to the 300 foot level. Jellum (1909) states, "In no instance has the deepest development shown any thinning out of the vein to resolve itself into a mass of remifying stringers." The idea that the veins remain constant or increase in thickness rather than pinch out or split with depth suggests highly favorable mineralized conditions. Remer (1977 Per. Comm.), owner of the Concord Mine, confirms that all indications were favorable for increasing development at depth at the time in the 1930's "with all haste".

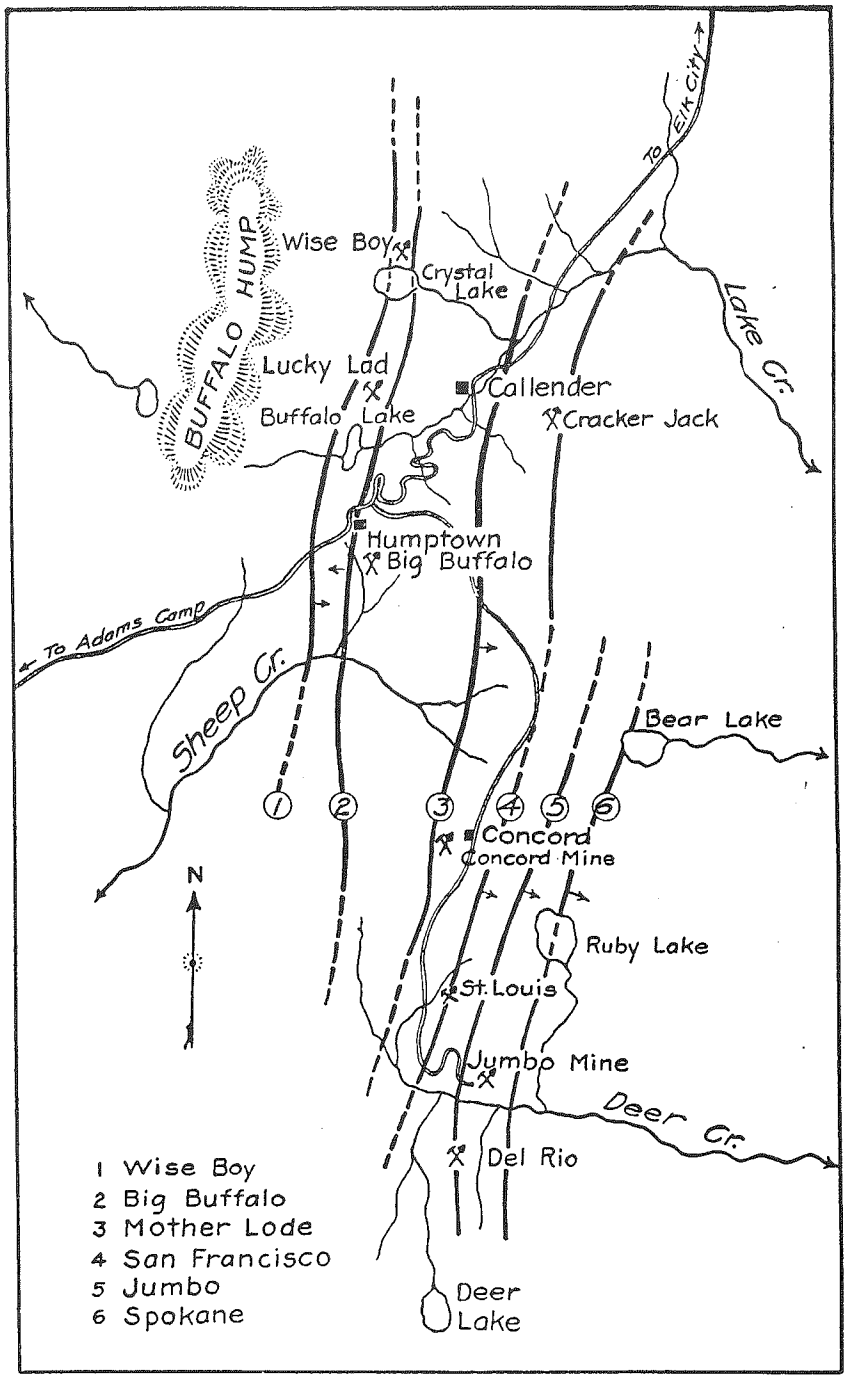
The vein history is complex but it is considered to be the last stage of the geologic development because they cut all the rocks present. The mineralization is located in the intrusive quartz monzonite and the metasedimentary country rock and the adjoining contact area. Very little oxidation has taken place as fresh sulfide minerals can be found in shallow prospect holes (Thomson and Ballard, 1924).

Lindgren (1904) stated, "a number of placer claims have been located in the vicinity but owing to the extensive glaciation it is probable that most of these will be disappointing in yield."

DEVELOPMENT

M. H. Jacobs (1901), State of Idaho Mine Inspector, estimated there were 1100 claims in the district at that time, but only a handful produced sizeable amounts of mineral. To date, 1576.506 acres of mineralized land has been patented within the Buffalo Hump Mining District. In addition approximately 100 unpatented claims are on record.

The Big Buffalo claim was the first discovery of the district in 1898. It produced from 1899 to 1903 at twenty dollar gold, $250,000 (Shenon and Reed, 1934) to $300,000 (Jellum, 1909). Shafts were sunk to the 300 foot level and considerable ground was stoped. Shenon and Reed (1934) estimate their values to represent only 3/4 of the true mineralization mined as recovery was as low as 57% at times. On the surface, the vein exposed is 8 to 10 feet wide; on the 300 foot level, it attains a width of 60 feet yielding good specimen ore.



SKETCH MAP OF BUFFALO HUMP DISTRICT SHOWING VEIN SYSTEM

The Jumbo property was considered the best developed within the district. The mine was active from 1902 to 1915 and consisted of four tunnels and 3600 feet of underground workings (Jellum, 1909). Bell (1903), State of Idaho Mine Inspector, reported 150,000 tons of ore delineated in 1903, while Shenon and Reed (1934) gave the total gold produced as 18,129.43 ounces and valued as $375,770.

The Cracker Jack Mine, located east of the town of Callender was developed to the 330 foot level. Production records for the years 1902 - 1910 show 3,401.86 ounces of gold valued at $70,316 was produced from 8131 tons of crude ore (Shenon and Reed, 1934). The vein does not exceed a foot in width on the surface, but at the 330 foot level, it attains a breadth of 60 feet (Thomson and Ballard, 1924).

The Concord Mine ranks with the Jumbo Mine in development. A four compartment shaft was sunk with stations at the 77, 177, and 277 foot levels from which three drifts and 25 crosscuts totaling 1590 feet were developed. Assays (Shenon and Reed, 1934) indicate values of $15 to $26 per ton. The vein width varies between 20 and 46 feet (Thomson and Ballard, 1924).

Other prospects include the Lucky Lad, one half mile north of Hump Lake on a vein averaging 26 feet in width. A structure still stands on this property. The Wise Boy property on the northern end of the district consisted of two tunnels, but the vein was lost with depth. The Atlas property is located one mile south of the Big Buffalo Mine on a 40 foot wide vein. Development included a 125 foot shaft and 700 foot tunnel. The ore was not considered of economical grade. The Del Rio (Venture) is considered a possible extention of the Jumbo on the south side of Jumbo Canyon. Development consisted of a 1000 foot tunnel driven in on the vein. Production continued until 1933. The St. Louis Mine, located north of the Jumbo Mine, consisted of an adit and shaft from which three levels were driven. At the 160 foot level the ore averaged $18 per ton (Jellum, 1909).

CURRENT STATUS

There are no producing mines in the district at this time. Access, weather, economics, political sensitivity, and a land status problem are the principle reasons for the lack of production at this time.

TEN MILE MINING DISTRICT

HISTORY

The Ten Mile Mining District lies between Elk City and Buffalo Hump Mountain. Gold was discovered in the 1860's in placer deposits along the South Fork of the Clearwater River and its major tributaries. Lode mining followed at a later date to include such mines as the New York and Center Star. Mining generally ceased in the 1930's but continues today through the portable suction dredges found on the South Fork. Shenon and Full (1957) have calculated the value of minerals produced in this district at $3,016,078.

GEOLOGY AND MINERALIZATION

Bedrock in the area consists of gneiss and quartzite of the Belt Series which are intruded by granodiorite and quartz monzonite of the Idaho Batholith. The ore deposits are in quartz veins that fill fractures in the bedrock compartments. Various forms of sulfides including iron, copper, lead, zinc, and arsenic along with native gold occur within the vein deposits.

DEVELOPMENT

There is a total of 287.899 acres of patented land within this district and approximately 200 unpatented mining claims. Lode mining was the more prominent of the two types south of the river.

The Pioneer Placer is located on a divide between Santiam Creek and the South Fork. The area consists of high-level and gulch gravel bars. Values obtained were varied, but the gold was not consistent within the gravel above the bedrock. Portions of both benches still remain (Shenon and Reed, 1934).

The Center Star Mine lies about six miles east of Golden and is accessible by fording the South Fork and utilizing the road constructed in 1932. The principle development was through the Weiss Tunnel which included 1500 feet of drift and crosscut and an additional 300 feet on the lower level. Two other tunnels, the Murphy and the Potato, accessed the area higher topographically. The mineralization is various forms of sulfides in the vein quartz and silicified wall rock, a quartz-biotite gneiss. Thomson and Ballard (1924) took samples of covellite, chalcopyrite and pyrite which showed excellent gold and silver values.

The Coeur d'Alene mine is located in the headwaters of Santiam Creek. Two east and west quartz veins encase a 70 foot dike intrusion through the granite bedrock (Thomson and Ballard 1924). The mine, first located in 1898, is developed by two tunnels which allow the lower vein to be produced. The ore is massive white quartz with various sulfide minerals (Thomson and Ballard, 1924).

The Gilt Edge Mine lies at the head of Buckhorn Creek and is developed by a 110 foot shaft and 200 feet of drift. Approximately 65% recovery was possible due to iron oxide coatings of the bluish-grey quartz vein material (Shenon and Reed, 1934).

The Wonder and Buckhorn Mines are located on Buckhorn Creek. The typical quartz veins run east-west and blend into the enclosing dike rock. The Wonder carries values of $16 to $17 per ton (Shenon and Reed, 1934).

CURRENT STATUS

There is no commercial production, placer or lode, in this mining district at this time. Portable suction dredges worked in a recreational manner can be found along the South Fork from time to time.

OROGRANDE MINING DISTRICT

HISTORY

This mining district, located southeast of Elk City was strictly lode mining in the 1890's. The two largest producers were the Gnome Mine until 1902 and the Orogrande-Frisco Mine until 1932 (Shenon and Reed, 1934). The value of minerals produced in this area between 1867 and 1950 was calculated at $1,129,568 (Shenon and Full, 1957).

GEOLOGY AND MINERALIZATION

Country rock is composed of granitics of the Idaho Batholith and schists of the Belt Series (Shenon and Reed, 1934). There are two types of ore deposits: gold-pyrite disseminated in silicified shear zones in the schist and quartz veins and stringers with sulfides in the granitic rocks. The large low grade "dike or reef deposits", disseminated ore deposits, are typical of this area. This district has produced the largest tonnage of gold ore in Idaho County (Lorain, 1938).

DEVELOPMENT

Patents were acquired on 434.76 acres of mineralized lands and approximately 200 unpatented claims are located in the district.

The Orogrande-Frisco Pit, a glory hole 250 feet in diameter by 100 feet deep, is an example of a low grade disseminated deposit. At $20.66 ounce gold, the ore averaged $1.40 per ton. Total production was 2,530.40 ounces of gold, 170 ounces of silver and 1,089 pounds of copper (Shenon and Reed, 1934). Mineral production was achieved utilizing a 20 stamp mill and a cyanide plant. The pit was a forerunner of today's open pit mining method.

The Gnome Mine, 3 miles north of Orogrande on the Crooked River, is an example of the quartz and sulfide vein mining. The quartz vein, in thin bedded quartzite wall rock, contains pyrite, galena and chalcopyrite minerals along with free gold. The ore was said to average $25 per ton. Development consisted of one adit 575 in length with one short crosscut.

Mineral production is being conducted in the old Una, Sungold, Five Mile and Umatilla Mine area, now called the Golden Eagle - Eagle complex. Mining conducted in the 1930's concerned itself with the free gold and oxide ores that were readily concentrated by that day's knowledge. Sulfide mineralization left untouched is the subject of the current mining venture. The vein system is a structure complex of east-west quartz veins that are intersected by a less prominent north-south group of quartz veins. The veins or dikes are mainly quartz or quartzite varieties with inclusions of porphyry or pegmatites. Swisher (pers. comm.) indicates that on three lode claims, approximately four million tons of ore exist with a value of 231 million dollars (based on $145/ounce gold).

Other mines in the area, all vein type, include the Diamond Hitch, Double Diamond Hitch, Penman Hill, Petsite and Homestake Mines. All contained quartz veins with sulfide mineralization and free gold.

CURRENT STATUS

Production is being conducted on a small scale basis in the Eagle drift located in the Umatilla drainage. Tonnage is limited in order to determine the most economic means of mining and milling the sulfide ores (Swisher, Per. Comm.).

DIXIE MINING DISTRICT

HISTORY

The Dixie District is known for placer and lode mining. Placer mining started in 1861 with various production figures quoted. Thomson and Ballard (1924) noted $1,500,000 but Lorain and Metzger (1938) say probably less than a million dollars. Lode mining commenced in 1891 and has produced $50,000 of minerals (Ross, 1941). (Shenon and Full, 1957) calculated the value of mineral production between 1867 and 1950 to be $416,807.

GEOLOGY AND MINERALIZATION

The geology consists of granitic type rocks from the Idaho Batholith and schists, gneisses and quartzites of the Belt Series. Lodes consist of simple quartz veins with pyrites and gold and small amounts of sulfide minerals. The vein systems trend N 45^{0} W and Dip 60^{0} - 85^{0} northeast (Thomson and Ballard, 1924).

The placer deposits are of two varieties, residual and reconcentrated (Reed, 1939). The residual placers are located in the immediate vicinity of the mineral bearing veins. The reconcentrated are located downstream in areas conducive to mineral collection, generally flat stream beds or meadow areas.

DEVELOPMENT

There are 220.244 acres of patented land and approximately 200 unpatented claims.

The residual and reconcentrated placer deposits can be found in the majority of the Crooked Creek drainage and its tributaries. Some creeks of particular importance include Olive Creek, Fourth of July Creek, Hundred Dollar Gulch, Big Creek and Crooked Creek. The gold size and shape is entirely dependent upon the source and distance traveled.

The War Eagle Mine was located on Fritz Creek west of Jersey Mountain in 1898. The mine is within the granite batholith, possibly 2000 feet below the roof where the Jumbo Mine is located (Thomson and Ballard, 1924). The vein consists of quartz, carbonate minerals and the principle group of sulfide minerals. Three adits with 1500 feet of development were constructed to mine the Blue Bell and Boyce ore shoots and several smaller apparently associated ore shoots, (Shenon and Reed, 1934). The Boyce ore shoot is said to average $57.25 per ton (Shenon and Reed, 1934).

The Robinson Dike Mine, located 2 1/2 miles south of Dixie, was discovered in 1904. The N 35° E trending mineralized zone is located in a silicified granite. The ore exposed in an open pit across width of 80 feet assayed between $2 and $5 per ton (Lorain, 1938).

Some other mines, particularly gold, that are of interest include the Surprise Mine (Painter Bar), Gold Master, L and L, 64, Hematite, North Star and Tonopah.

CURRENT STATUS

There is no current production at this time.

FLORENCE MINING DISTRICT

HISTORY

The Florence area is located 11 airline miles northeast of Riggins. Gold was found in the 1860's in gulch and stream bed placers. It is estimated that $15 to $30 million dollars was mined in the 1860's (Lindgren, 1900) while through 1959, one million ounces of gold were produced (Koschmann and Bergendahl, 1968). Shenon and Full (1957) valued the minerals produced at $1,969,271. The majority of the well known Florence area lies outside the contiguous roadless area.

GEOLOGY AND MINERALIZATION

The geology is a quartz monzonite, a granitic intrusive of the Idaho Batholith, which has been intruded by quartz veins carrying gold and pyrite with minor amounts of arsenopyrite (Lorain and Metzger, 1938). The lode or vein deposits are sheets up to 50 feet in thickness of alternating layers of granitic materials and quartz veinlets (Reed, 1939).

The lode deposits are the source of the placers. Three types of placer, weathered bedrock, older gravel deposits, and younger sediment deposits, can be found in the Florence Basin (Reed, 1939). Gold grains found within the veins are coarse and irregular shaped prior to erosional transportation, but become well rounded and flattened pieces when finally deposited in placer gravels.

DEVELOPMENT

There are 19.972 acres of patented lands within the contiguous roadless area and approximately 300 unpatented claims at the present time.

There are three lode mines, Bullion, Big Three and Yakima, that trend east and dip to the south. Koehler (1977, Pers. Comm.) suspects they are or may be on the same vein system. The Bullion is 5 feet thick while the Yakima is 2 feet thick (Reed, 1939).

There are no placers within the contiguous roadless area.

CURRENT STATUS

The Bullion produced silver ore which was hauled to the Grangeville rail head during the summer of 1976. Tonnages and values were not made available. Reports indicate they did not operate in 1977.

SIMPSON MINING DISTRICT

HISTORY

This district encompasses an area of the Salmon River 10 miles upstream from Riggins downstream to the White Bird area. Production in placer deposits occurred during the 1860's. Koschmann and Bergendahl (1968) estimated that $575,000 was produced between 1903 and 1959 or 9,578 ounces of gold.

GEOLOGY AND MINERALIZATION

Lorain and Metzger (1938) indicate that all production came from bench and stream gravel placers. The bench gravels may extend up the banks several hundred feet above the present day channel, while the stream gravels occupy bars along the existing stream channels.

DEVELOPMENT

There are no areas of major interest within this mining district that falls within the contiguous roadless area. There are no patented lands in this area while approximately 100 unpatented claims do exist.

CURRENT STATUS

There is no production at this time.

OTHER AREAS

There is a large acreage of land that lies from the South Fork of the Clearwater to the Buffalo Hump Mining District on the east and the Florence Mining District on the west. There are no records available of any production within this area. Mineral occurences may occur, but have not been found at this time.

MINERAL POTENTIAL

The Buffalo Hump, Ten Mile, Orogrande, Dixie and Florence Districts have shown excellent mineral production throughout history. Mineral needs, economics, land status, politics, and weather have and will play a large role in whether people or industry will pursue exploration and development.

The Buffalo Hump area certainly exhibits potential. Chevillon (1977, Per. Comm.) indicates there may be a copper-molybdenum complex that could be the basis for the vein systems. Literature that indicates vein widths of several feet on the surface and breadths of sixty feet at a depth of three hundred feet are positive indicators of the mineral potential at depth. The horsetailing effect may indicate large, low grade porphyry type sulfide systems in this mining district.

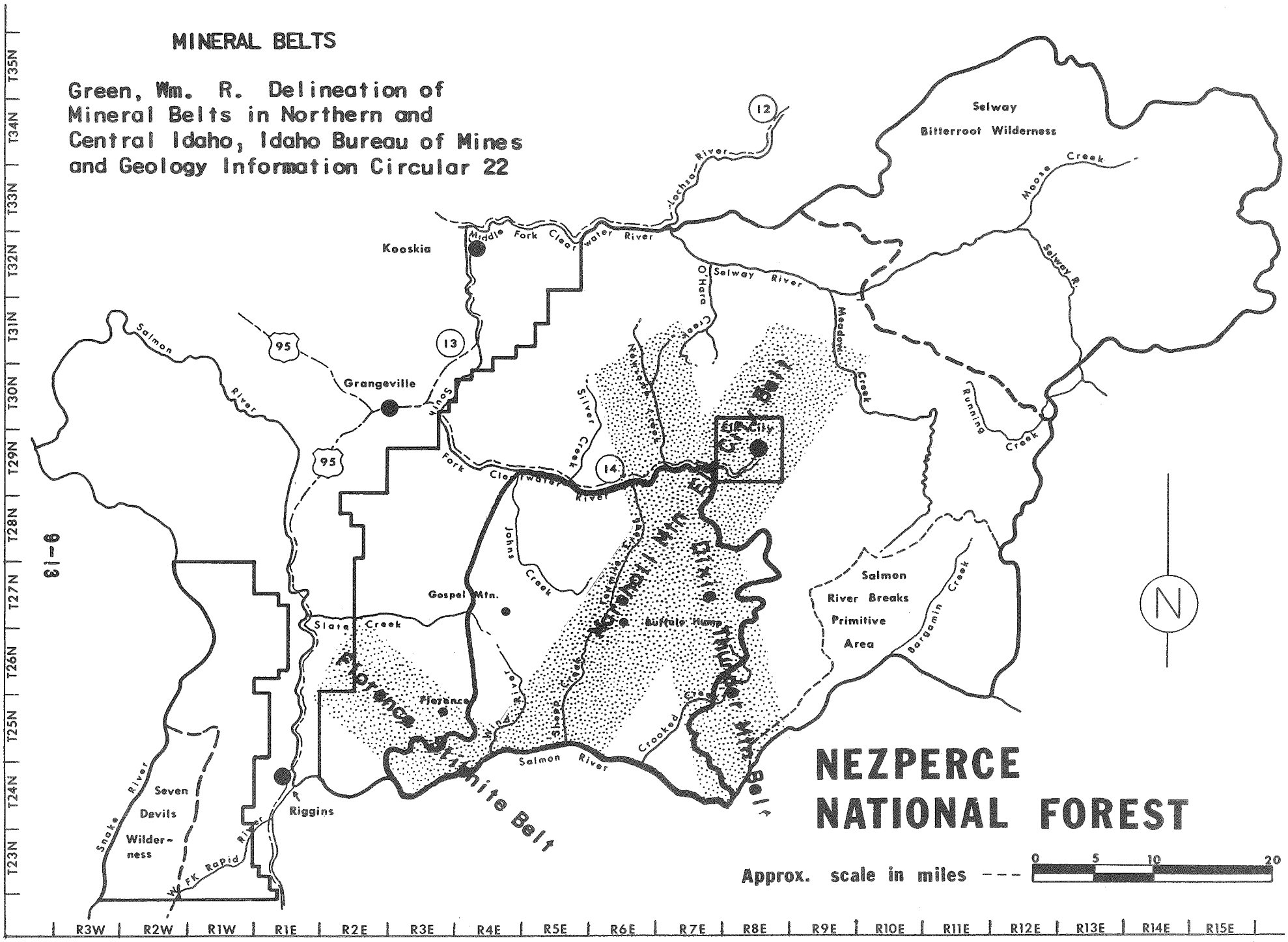
The other districts show indicators of mineral resources that have been left untapped. The shear zones of the Orogrande District and the placer sources of the Florence Districts are good examples.

Green (1972, figure 3) delineated mineral belts in Central Idaho. These belts, based on mineral occurences, traverse the contiguous roadless area and indicate, other than actual occurences, areas of speculative and hypothetical mineral reserves. Mineral occurences outside these belts were few in number indicating good mineral potential may be found within the limits of each belt. The Marshall Mountain - Elk City Belt crosses northeast to southwest across the contiguous roadless area and contains the Buffalo Hump Mining District.

Samples were taken during the 1977 field season from dumps of various mines located in the Buffalo Hump Mining District. They were taken in an attempt to obtain an overall picture of all the material in each dump (mineralized rock and waste). These values should be representative of each area sampled. Assays were conducted for gold, silver, copper, lead and zinc with values computed using todays current prices. Locations are shown on figure 4 and the assay results and values in table 1. The potential for mineral resources is indicated by the results of these samples.

MINERAL FUTURE

The U.S. Bureau of Mines (Millie 1977) indicates that the U.S. imported $4.7 billion dollars of mineral raw materials and processed materials (exclusive of energy) from January to May 1977. In this figure is 70% of the annual gold consumption and 47% of the annual silver consumption. Future work will be dependent on the ability to import foreign reserves which can be cut off or depleted at any time. Technology will develop new alloys from lesser known minerals and new uses for the commonly known minerals. Exploration and development must increase accordingly to meet these demands. The Gospel-Hump Planning Unit area is a potential source for these raw materials we import and for the demands of todays society. Exploration for new reserves start in areas of favorable geology, structure and mineral occurrences, usually old mining districts.


MINERAL BELTS
Green, Wm. R. Delineation of Mineral Belts in Northern and Central Idaho, Idaho Bureau of Mines and Geology Information Circular 22
Selway Bitterroot Wilderness
Kooskia
Middle Fork Clearwater River
Selway River
Grangeville
Salmon River
South Fork Clearwater River
Silver Creek
Newsome Creek
Elk City
Meadow Creek
Running Creek
Gospel Mtn.
Slate Creek
Florence
Florence Mineral Belt
Buffalo Hump
Elk City Mineral Belt
Salmon River Breaks Primitive Area
Bargamin Creek
Crooked Creek
Riggins
Seven Devils Wilderness
Snake River
W Fk Rapid River
White Bird Mineral Belt
NEZPERCE NATIONAL FOREST
Approx. scale in miles
0 5 10 20
N
T35N T34N T33N T32N T31N T30N T29N T28N T27N T26N T25N T24N T23N
R3W R2W R1W R1E R2E R3E R4E R5E R6E R7E R8E R9E R10E R11E R12E R13E R14E R15E

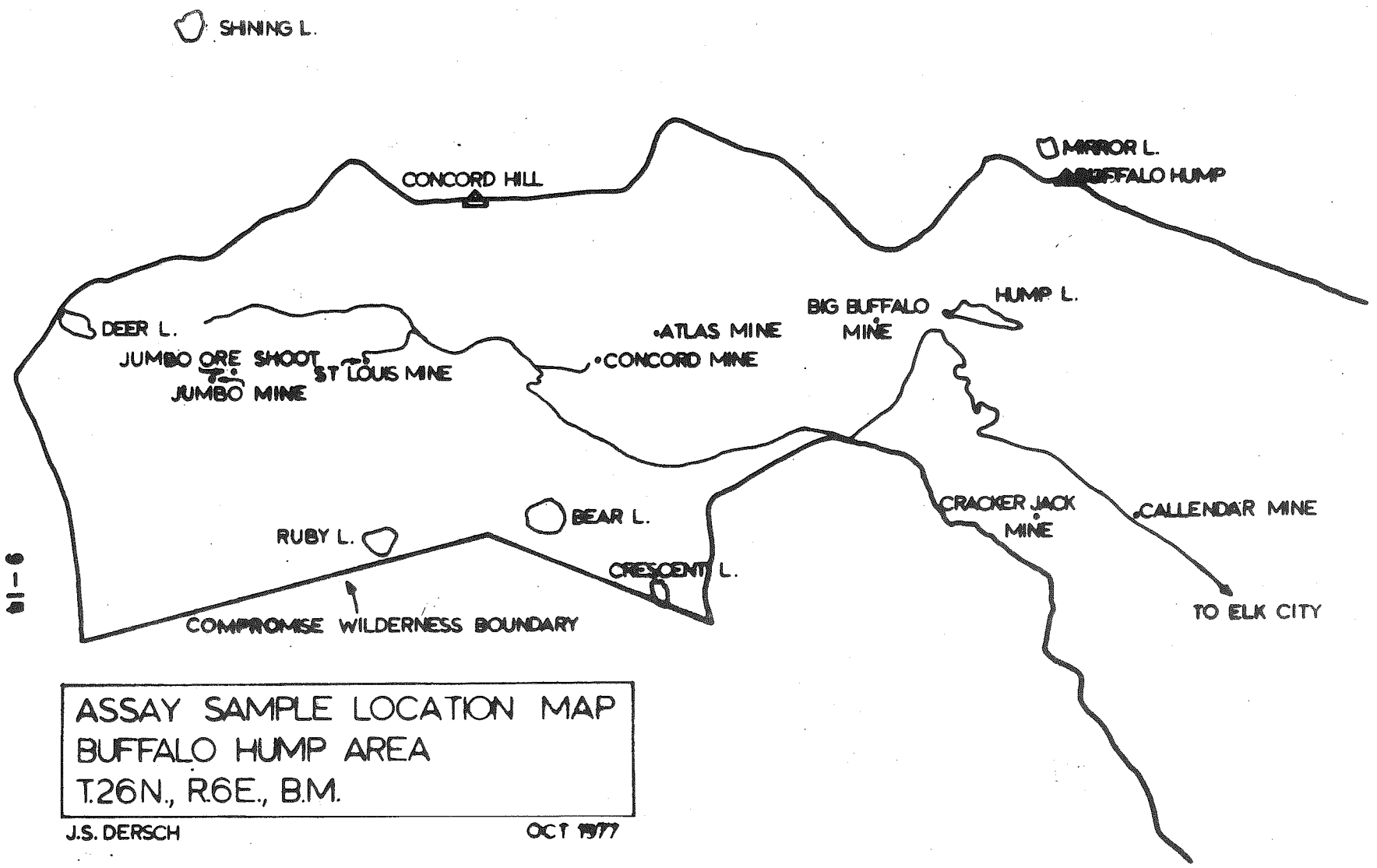

SHINING L.
CONCORD HILL
MIRROR L.
BUFFALO HUMP
DEER L.
JUMBO ORE SHOOT
JUMBO MINE
ST LOUIS MINE
ATLAS MINE
CONCORD MINE
BIG BUFFALO MINE
HUMP L.
BEAR L.
RUBY L.
CRESCENT L.
CRACKER JACK MINE
CALLENDAR MINE
TO ELK CITY
COMPROMISE WILDERNESS BOUNDARY
ASSAY SAMPLE LOCATION MAP
BUFFALO HUMP AREA
T.26N., R.6E., B.M.
J.S. DERSCH
OCT 1977

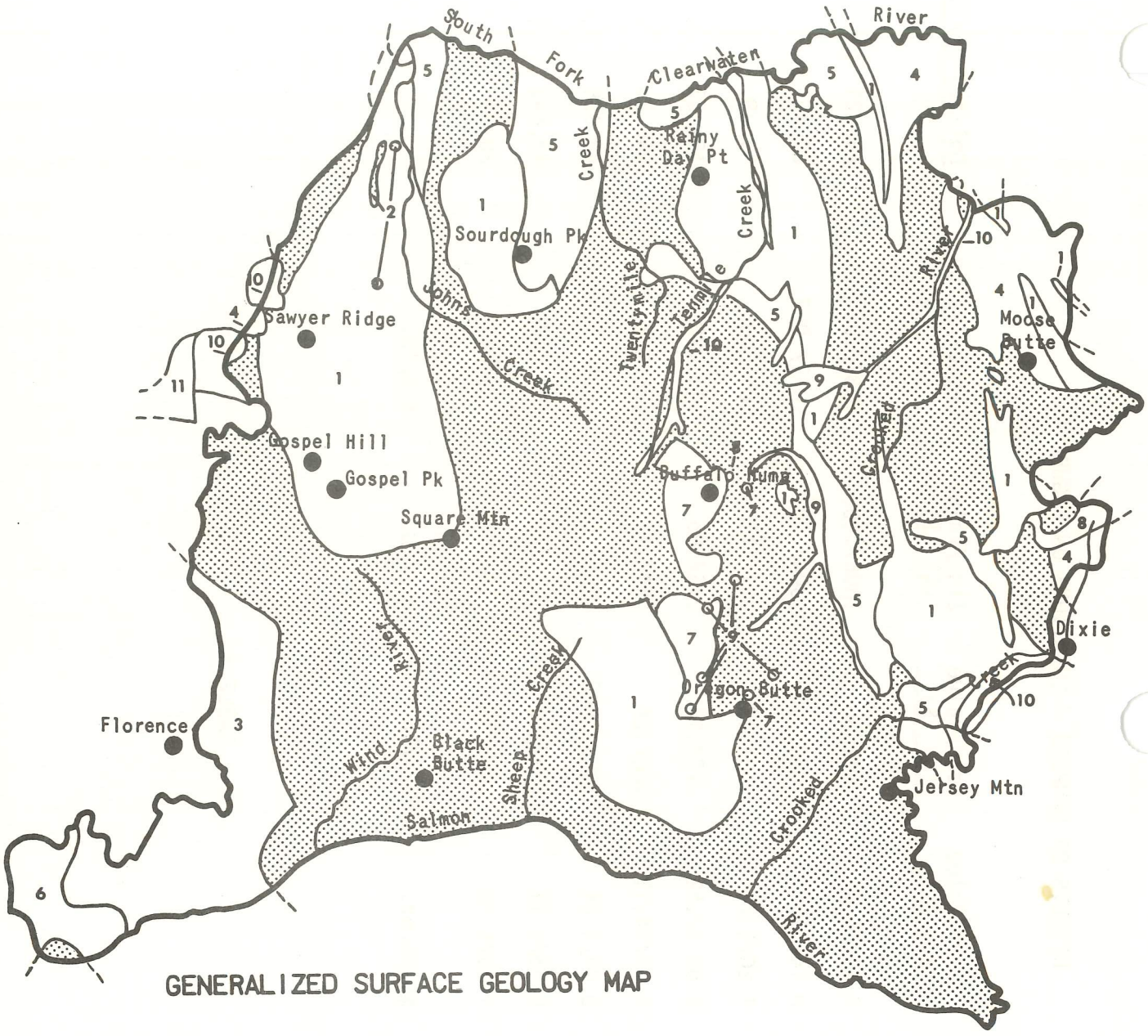
FIGURE 4

RESULTS OF SAMPLES - LOCATIONS ON FIGURE 4

Place	Gold/Value (oz.) ($)	Silver/Value (oz.) ($)	Lead/Value (%) ($)	Zinc/Value (%) ($)	Copper/Value (%) ($)	Dollars Per Ton
Jumbo Mine	0.06/10.04	3.13/15.46	.94/.30	.006/.002	.037/.02	25.822
Jumbo Ore Shoot	0.16/26.76	0.14/.69	.028/.009	.004/.001	.011/.007	27.467
St. Louis Mine	0.26/43.49	1.26/6.22	.40/.13	.37/.11	.05/.03	49.98
Big Buffalo Mine	0.62/103.70	9.62/47.52	.17/.05	.16/.05	.41/.25	151.57
Concord Mine	2.52/421.47	4.88/24.11	.80/.26	.54/.17	.36/.22	446.23
Cracker Jack Mine	0.26/43.49	0.94/4.64	.006/.002	.004/.001	.003/.002	48.135
Callender Mine	0.28/46.83	0.56/2.77	.097/.03	.028/.009	.01/.006	49.645
Atlas Mine	0.08/13.38	1.40/6.92	.55/.18	.18/.06	.29/.17	20.71
Prices*	$167.25/oz.	$4.94/oz.	32¢/lb.	31¢/lb.	60¢/lb.	

*Western Mining News 11 NOV 77

TABLE 1



GENERALIZED SURFACE GEOLOGY MAP

1	Quartzite
	Quartz monzonite-granodiorite
3	Quartz diorite
4	Biotite gneiss
5	High grade metamorphic schists and gneisses
6	Pre-belt metamorphies
7	Meta sedimentary rock
8	Shallow granitic intrusives
9	Morainal materials
10	Alluvial sediments
11	Basalt

N

0 5

Scale of Miles