V. INTERPRETATION

V. A. Fish and Aquatic Habitat

Specific habitat parameters:

1. Water temperatures:

Spawning and rearing habitats have not yet been specifically delineated in the Wall Creek system, so, with the exception of lower Wall Creek (below the forest boundary), those portions of streams which are known to host adult Steelhead during the spawning season have been taken as spawning habitat for the purpose of this investigation. Wall Creek below the forest boundary is not believed to be steelhead spawning habitat and so has been treated as migration and rearing habitat. Waters in which only resident salmonids have been observed are designated as rearing habitat. These stream delineations correspond to the Class I & II streams in table one.

It may be important to note that Bull trout have been reported from the North Fork of the John Day River at the mouth of Wall Creek. It is conceivable that were water temperatures in Wall Creek cooler, it might be used by Bull Trout.

High stream temperature in Wall Creek and its tributaries is likely the factor most limiting for fish production. It may be that soil, geological and precipitation conditions in the Wall Creek system have always been such that summer flows have always been low. If so, late summer temperatures in these streams have probably always been relatively warm. On the other hand, it also seems clear that past livestock grazing, road construction, and logging have reduced stream side shade and increased the wetted width/depth ratios. Stream reaches with low flow, low shade and a high wetted width/depth ratio are especially vulnerable to temperature increases. Trapping of headwater springs in stock ponds may also have contributed to lowered late season stream flows which tend to increase water temperatures.

Presently, fencing along portions of some streams excludes cattle. This in conjunction with riparian planting, encourages vegetative recovery along these streams and over the long term should increase shade and help reduce water temperatures. However, cattle have access to and use the riparian zone along other parts of these streams and along many other streams. Fences which create livestock exclusion zones must be regularly maintained if they are to be effective. At least one exclosure in Wall Creek has been breached for most of the grazing season this year and cattle have been grazing inside it, setting back the recovery process.

Logging, roads and livestock grazing might also have altered timing and volumes of stream flows. This is impossible to substantiate because of lack of flow data, but if true, it would have most likely have produced higher early spring and lower late summer stream flows, tending to increase late summer water temperatures even more.

Water temperatures in many of the headwater springs in the Wall Creek system have been measured. They are consistently cool (mostly in the low 50's). However, the flow of many of them (estimates run as high as 1/3) are trapped as stock ponds. This has the effect of keeping the stream flows lower than they otherwise might be. In those cases in which some of the spring water escapes the stock pond and reaches the stream, it has been considerably warmed by detention time and greater surface area in the pond.

Bull Prairie Lake appears to have a similar warming effect to the waters of Wilson Creek. Wilson Creek water temperature was 64.6°F above Bull Prairie Lake and 75.8°F (7-day running avg. max) below the lake in the summer of 1994.

2. Width/depth ratios:

Twenty out of 48 stream reaches with data have bankfull width/depth ratios >ten. These reaches probably have less fish cover provided through undercutting than the other reaches. The upper reaches of many of the streams in the Wall Creek subwatersheds are in ash soils with very low consolidation. The Wall Creek drainage has a long history of easy access for livestock to the creeks. The generally high bankfull width/depth ratios are most probably related to this history.

3. Canopy cover:

Canopy cover in the Wall Creek streams does not seem as low as might have been expected from the extent of grazing and logging reported. It appears that in some cases, logging removed only high value ponderosa pine and larch, leaving most of the grand fir. Aerial photographs of the Wall Creek drainage show that the bottoms of many of the canyons hold considerably more trees than the uplands. In fact, the photographs give the impression that in some parts of the Wall Creek drainage, most of the trees that remain are in the canyon bottoms. Nevertheless, only 11 of 49 stream reaches have canopy cover that score as good. In other words, 37 reaches need improvement. The most immediate effect of low canopy cover is to expose stream waters to insolation, usually with a resultant temperature increase. The establishment of PACFISH specified RHCA's should help in the recovery of these areas, especially if livestock management can be adjusted to permit riparian vegetation recovery. It seems clear that continuation of past grazing practices in riparian areas will prevent attainment of RMO's. On the other hand, recent observation seems to indicate that the construction of livestock exclusion fences is already beginning to improve the vegetative condition of riparian zone in some areas.

More dense riparian vegetation that should result from a lessened impact of livestock will improve bank stability through plant root development and will tend to reduce stream temperatures through increased stream shade. Development of several canopy layers will produce the most effective stream shade.

4. Substrate quality:

Stream surveyors and report writers (Hoedads, Inc. 1993) seem to have been confused about protocol for gathering and interpreting cobble embeddedness data. This appears to have led to underestimates of cobble embeddedness for many, perhaps all of the streams surveyed in 1993. Incorporating the recorded dominant and subdominant particle size into the substrate evaluation procedure helps to correct for the methodology used to collect the cobble embeddedness data. As corrected, the data indicate that about half of all surveyed reaches in the Wall Creek watersheds contain poor quality substrate for either spawning or rearing or both. The specific problem is an overabundance of fine sediments in the stream beds.

The soils of the Wall Creek watersheds are composed largely of volcanic ash and when not protected by vegetation or soil surface litter are easily eroded. Livestock grazing, timber harvest and especially the roads associated with timber harvest all contribute to erosion and sedimentation problems. Stream survey report narratives for the Wall Creek system cite multiple instances of livestock congregating in the streams, breaking down stream banks, and retarding regrowth of riparian vegetation. They also report numerous instances of past timber harvests right down to the stream (stumps on the bank, or even in the creek) and roads closely paralleling the stream. Purser (1991) pointed out several instances of timber harvest, livestock grazing and roads causing erosion and sedimentation in the Wall Creek system. There seems little doubt that past management of the watershed has been responsible for soil erosion and stream sedimentation rates well above background for many years.

The existing road system is the almost certainly a major source of management produced fine sediment for Wall Creek system streams. Roads parallel streams within RHCA's for 39.5 miles (5.44% of total stream miles, Figures 3 & 4). Most of the riparian roads (21.45 miles) parallel class one and two streams. Overall for the Wall Creek watershed, roads within the RHCA accompanied nearly 21 percent of fish bearing streams. Subwatersheds 25b, 24e, 25c, 24c, and 24g stand out as being high in total riparian road density (calculated as miles of streams with roads in RHCA's/total miles of streams). Subwatersheds 24g, 24b and 24c have the highest riparian road density along class one and two streams. When all stream classes are included, subwatersheds 24e, 25b and 25c also stand out for high riparian road density. The above figures include only roads mapped in the GIS road layer.

Intensive livestock grazing also contributes to introduction of excessive fine sediment into the stream, primarily by removal of soil protecting vegetation and breaking down of stream banks. Stream survey reports cite multiple instances of such situations in the wall creek system.

5. Large woody debris:

Most forest management activities in the past have been of the type that tend to reduce the sources of large woody debris for streams. Logging in riparian areas removes trees that might have become in-stream wood, intensive grazing tends to prevent or retard regeneration of riparian trees, and riparian roads occupy land that might otherwise produce trees.

Currently, in the Wall Creek system, a majority of stream reaches meet the PACFISH RMO of 20 pieces of large wood per mile whether or not standing trees and snags are included in the tally. It is instructive to note that compared to west side standards, PACFISH RMO's for streams in the interior Columbia Basin are less stringent for woody debris frequency (20 pieces/mile, >12" diameter x 35' long *vs* 80 pieces/mile, >24" diameter x 35' long for the west side). Clearly, more than 20 pieces of large wood per mile would make for better aquatic habitat. It appears that PACFISH standards were adjusted simply to accommodate the realities of the less productive east side forests, not because of any less need for wood in the streams.

Data indicates that all but three of the subwatersheds (subwatersheds 24d, 24e, 24f) contain more than half of their RHCA's in a late/old or middle structural stage. Although this information source does not provide information about density of large trees (except that there are more than ten/acre), it implies that at least some large wood could be available to streams in the future. In any case, the forest in the Wall Creek watershed certainly seems capable of producing more than a mere 20 pieces of large woody debris per mile. Local, long-term goals of considerably more than 20 pieces of large wood per mile seem reasonable. In the context of Watershed analysis, PACFISH (page C-7) allows for adjustment of RMO's to fit local conditions.

6. Fish cover:

Sources of fish cover in mountain streams may include woody debris, low overhanging vegetation, undercut banks, interstitial spaces in cobble or larger substrate, water depth greater than three feet, aquatic vegetation or stream turbulence. Some management activities affect cover directly: Breaking down of stream banks via riparian livestock grazing eliminates bank undercutting. Livestock consumption of low overhanging vegetation eliminates that as a source of cover. Any management activity that causes sediment deposition in streams may fill instersticial spaces in the substrate, rendering it ineffective as cover. In years past, woody debris was sometimes removed from streams, which directly removed fish cover. Riparian timber harvest removes trees which would otherwise have eventually have become fish cover in the form of large woody debris. Riparian road construction, which often straightens and simplifies the channel usually eliminates overhanging vegetation, pools and undercut banks. Natural phenomena also affect fish cover. Very high stream flows may flush wood far downstream and in the process fill in pools or wash out the step/plunge producing structures, thereby eliminating pools, which if deep enough, would have served as cover. It is at least conceivable that the 1964 floods could have destroyed many pools in the Wall Creek system streams. The Forest service has built pools in many of the Wall Creek streams. However, even reaches with constructed pools may provide little cover for fish. In order to secure the best return on the investment in the pools it is important to ensure that other habitat factors are improved along with the pool depth and frequency. Measures such as including root wads in the pools, planting of shrubs and trees, and exclusion of livestock to improve shade and overhanging vegetation should be part any rehabilitation plan. In some areas, Wilson Creek for example, some such rehabilitation has already been implemented, but it will be many years before the full benefits are realized.

7. Pool habitat quality:

Historical data is insufficient for quantative comparisons with present habitat conditions in the Wall Creek system. Nevertheless, it is well established that intense livestock grazing, road building and removal of trees from the riparian zone will retard or defeat natural pool forming processes and result in a lowered pool frequency and less habitat diversity. Pool frequency in Wall Creek seems low to most specialists consulted, and the low pool frequency probably results from a combination of geologic and hydrologic conditions, natural phenomena (i.e., the 1964 floods) and past management activities (riparian harvest, road construction, and livestock grazing).

While pool frequency and depth are important components of high quality fish habitat, other habitat factors must also be of high quality in order to produce good fish habitat. Water temperatures in Wilson Creek do not meet PACFISH RMO's (see table 3) and in fact approach or surpass upper lethal limits for steelhead and rainbow trout. Higher pool frequencies cannot compensate for this.

Furthermore, some such constructed pools have trapped fish as stream flow decreased during the summer. In some pools these fish died as water further receded. Had these pools not been present, these fish might have moved down (or up) stream to reaches where flow persisted throughout the summer. Of course it is also possible that some could have been trapped between sections of dry channel and perished anyway.

Constructed pools in Wilson Creek may possess one redeeming virtue which could prove especially important during summer low flows, though. Temperature records from the deepest part of the pool and from water entering the pool indicate that water at the bottom of the pool can be notably cooler than water entering the pool. These pools are apparently intercepting some subsurface flow. So at least some of the pools may enhance fish survival by providing a small cool water refuge area during low, late summer stream flows. Whether constructed pools on balance enhance or decrease fish survival will depend upon the late summer flow characteristics of the stream, the location of the pool and other habitat factors such as cover over the stream and hiding cover within the pool.

However, previously mentioned data from ODFW for steelhead redd counts clearly indicate that numbers of anadromous fish have most definitely not increased dramatically. We are now halfway through the ten-year period of the Forest Plan and it is quite clear that the Forest is nowhere near to reaching the goal described on pages 4 - 7 and 4 - 8, at least not in the Wall Creek system.

Since both rainbow trout and steelhead are identified by the Forest Plan as indicator species, it must be concluded that condition for the other species using the aquatic habitat has not substantially improved either.

V. B. Historic and Current Condition Comparison

Existing and historic structural stage and species composition within the Wall Analysis Area were compared for four major subdrainages (Lower Wall, Upper Wall, Little Wall, and Skookum). This data (Tables 19-23) revealed the following conditions:

Lower Wall: This drainage is composed predominately of the warm grand fir PAG with a moderate component of ponderosa pine and a very small portion of cool grand fir and lodgepole PAG's. Overall, the structural component of this drainage is predominantly in the middle and late/old structure. Existing condition for the late/old, middle, and early structural stages are outside HRV, with late/old and early having less acres than historically and middle having more. An overall low priority for examination for silvicultural treatment exists in this drainage and indicates that species composition is generally appropriate for the plant association groups in this area. One exception is within the late/old structure where there are approximately 1,500 acres with a high priority rating. Recommend treatment of the late/old structure stands to enhance and promote the appropriate species mix for each PAG. Portions of the middle structure stands should be treated to promote continued growth toward the late/old structure and portions should be altered to promote the early structural stage.

Upper Wall: This drainage has the largest component of warm grand fir PAG in the analysis area, with moderate portions of ponderosa pine and cool grand fir PAG's. Both the middle and early structural stages are outside of HRV with the middle structure having considerably more acres than historically and the early structure having considerably less. Many of these stands are of high and moderate priority for treatment, especially in the late/old and middle structures. Recommend treatments that 1) alter the structure and/or 2) remove some components to improve species composition toward the desired seral species appropriate to each PAG while maintaining the existing structure. A preference toward the creation of some early structure is indicated.

Little Wall: The two PAG's in this drainage are warm grand fir and ponderosa pine. Overall, this drainage is outside HRV in every structural stage except early/mid. Late/old and early have less acres than historically, and middle and very early have more than historically. Again, many of these stands are of high or moderate priority for treatment with regards to species composition. Changing or promoting structure to the early and late/old stages would be preferred while also maintaining and enhancing components of the existing structure.

Skookum: The Skookum drainage is predominantly composed of warm grand fir with moderate components of lodgepole, cool grand fir, and ponderosa pine PAG's. The late/old, middle, and early structural stages are outside of HRV, with the middle structure being well beyond historic acres at over 15,800 acres. The late/old and early structures are well below the historical ranges. An overall high priority for examination for silvicultural treatment exists in this drainage indicating that species composition is generally of an inappropriate mix to reach the desired condition for theses stands. Recommend treatment of the late/old, middle, and early middle structural stands to enhance and promote the appropriate species mix for each PAG. Portions of the middle structure should also be treated to promote continued growth toward the late/old structure. The very early structure stands should be evaluated and enhanced to promote continued healthy regeneration.

Table 19. Comparison of Existing and Historical Acreages - Structural Stages by PAG and Examination Priorities for Silvicultural Treatment (Acres) - Lower Wall.

DCPAG	Acres
Lodgepole	17
Cool Grand Fir	68
Warm Grand Fir	7,302
Ponderosa Pine	1,174
Total of DCPAG's	8,561
Total FS Acres Lower Wall	11,721

Structural Stage	HRV (Acres)	Existing Condition Acres	Outside HRV	Examination Priorities for Treatment (Acres)		
				High	Moderate	Low
Late/Old	3405-5960	2,808	*	1,512	11	2,882
Middle	1288-2584	4,799	*	671	16	2,515
Early/Middle	429-868	766		207	0	559
Early	429-868	0	*	0	0	0
Very Early	85-439	187		N/A	N/A	N/A

Table 20. Comparison of Existing and Historic Acreages - Structural Stages by PAG and Examination Priorities for Silvicultural Treatment (Acres) - Upper Wall.

DCPAG	Acres
Lodgepole	0
Cool Grand Fir	2,767
Warm Grand Fir	18,065
Ponderosa Pine	4,867
Total of DCPAG's	25,699
Total FS Acres Upper Wall	30,019

Structural Stage	HRV (Acres)	Existing Condition Acres	Outside HRV	Examination Priorities for Treatment (Acres)		
				High	Moderate	Low
Late/Old	9726-17160	11,357		4,802	1,303	5,251
Middle	3993-8264	11,876	*	5,743	310	5,823
Early/Middle	1284-2847	1,351		527	11	416
Early	1284-2847	32	*	1	0	31
Very Early	230-1699	1,083		N/A	N/A	N/A

Table 21. Comparison of Existing and Historic Acreages - Structural Stages by PAG and Examination Priorities for Silvicultural Treatment (Acres) - Little Wall.

DCPAG	Acres
Lodgepole	0
Cool Grand Fir	0
Warm Grand Fir	9,956
Ponderosa Pine	1,335
Total of DCPAG's	11,291
Total FS Acres Little Wall	19,757

Structural Stage	HRV (Acres)	Existing Condition Acres	Outside HRV	Examination Priorities for Treatment (Acres)		
				High	Moderate	Low
Late/Old	4516-7904	2,875	*	1,223	0	1,652
Middle	1693-3388	6,664	*	2,984	0	3,680
Early/Middle	565-1130	1,074		528	0	546
Early	565-1130	67	*	0	0	67
Very Early	113-565	611	*	N/A	N/A	N/A

Table 22. Comparison of Existing and Historic Acreages - Structural Stages by PAG and Examination Priorities for Silvicultural Treatment (Acres) - Skookum.

DCPAG	Acres
Lodgepole	1,854
Cool Grand Fir	4,907
Warm Grand Fir	15,520
Ponderosa Pine	2,796
Total of DCPAG's	25,077
Total FS Acres Skookum	33,696

Structural Stage	HRV (Acres)	Existing Condition Acres	Outside HRV	Examination Priorities for Treatment (Acres)		
				High	Moderate	Low
Late/Old	8307-14784	5,359	*	2,536	1,404	1,419
Middle	4099-8691	15,819	*	11,089	2,057	2,674
Early/Middle	1346-3555	1,697		1,436	17	245
Early	1346-3277	213	*	111	6	95
Very Early	202-1990	1,854		N/A	N/A	N/A

Table 23. Comparison of Landscape Structure - 1937 and Existing

Structure	1937		Existing		Difference (Acres)
	Acres (FS)	%	Acres (FS)	%	
Late/Old	71,508	75	23,519	25	-47,989
Middle	6,733	7	42,754	45	+36,021
Early/Middle	0	0	8,863	9	+8,863
Early	0	0	882	1	+882
Very Early	1,221	1	7,815	8	+6,594
Forested No Structure	3,115	4	0	0	-3,115
Other	12,616	13	11,360	12	-1,256

V. C. Integration Process

For the purpose of integrating and comparing resource conditions across the 15 subwatershed landscape of the Wall Analysis Area, a "Resource Attribute Integration Matrix" was developed (Table 24a, b, c). The objective was to develop a means of tracking and comparing various resource attributes and conditions by major analysis issue in order to identify and prioritize ecosystem restoration recommendations. This matrix was developed from the following process (logic track):

1. Identification of measurable criteria, i.e., "resource attribute," that could be analyzed in order to answer key questions regarding current conditions.

2. Second, the analysis team used an integrated approach to subjectively determine the "importance" of each resource attribute relative to and within each of the three major issues. i.e., for the Forest Sustainability issue, fire hazard was given a relative importance of 3 = High, compared to Noxious Weeds which was rated of moderate (2) importance.

3. Analysis of available information was then used to define a "condition rating" of each subwatershed by each resource attribute.

4. The number of high importance resource attributes and poor condition subwatersheds were then summarized for initial identification of the highest priority by subwatersheds for identifying specific restoration recommendations.

5. Some resource attributes do not lend themselves well to assessment of conditions on a subwatershed scale, for example, stream temperature. Another consideration was identification of subwatersheds and resource attributes that were of high concern to maintain or protect relatively good conditions. Examples include high elevation, wet meadow areas that hold for late summer release cool water, thus having a positive effect on downstream water temperatures. Yet another example is protection from roading or timber harvest of relatively good condition riparian and wildlife habitat "refugia" areas. These considerations were applied in development of the subwatershed specific integrated restoration recommendations (see Section VI.).

V. D. Resource Attribute Matrix

TABLE 24a WALL ANALYSIS AREA RESOURCE ATTRIBUTE INTEGRATION MATRIX 09/14/95

FISH/WATER

WALL WATERSHED			H2O	Logs/	Pools/	Fish	Residual	Substrate	Deep	Canopy	Width/	RHCA	Rd Density	Chanl	Upland	SWS Score	# of High	Importance X
SWS	SWS #	SWS NAME	Temp	Mile	Mile	Cover	Pool Dpth	score	Pools	Cover	Depth	Roads	Mi./Sq. Mi	Entrch.	Havest	Ratg x Cndt	Scores	Condition
Importance			3	3	3	3	3	3	2	2	1	3	2	2	3			3 * 3
Lower Wall	23C	Fern	3	x	x	x	x	x	x	x	x	x	x	x	x	9	1	1
	24A	Lower Big Wall	3	3	3	3	3	2	3	2	3	1	1	3	1	78	8	5
	24G	Indian	3	2	3	2	3	2	3	2	1	3	3	3	3	86	8	5
Upper Wall	24B	Mid. Big Wall	3	3	3	2	3	3	3	2	2	3	3	3	3	93	10	7
	24C	Upper Big Wall	3	2	3	3	3	3	3	2	2	3	3	3	3	93	10	7
	24D	Porter	3	2	3	3	2	3	3	3	2	2	3	2	3	87	8	5
	24E	Upper Wilson	3	2	2	2	1	3	3	2	2	3	2	2	2	74	4	3
	24F	Lower Wilson	3	2	2	2	2	2	3	3	3	3	3	1	3	80	7	3
Little Wall	25A	Lower Little Wall	3	2	3	2	3	2	3	3	3	3	2	2	2	83	7	4
	25B	Upper Little Wall	3	2	3	3	3	1	2	3	2	3	3	2	3	85	8	6
	25C	Bacon	3	2	3	2	3	1	3	2	1	3	3	3	2	80	7	4
Skookum	26A	Lower Skookum	3	2	3	2	3	2	3	2	3	1	1	3	1	72	6	3
	26B	Bear	3	3	3	2	3	2	3	2	1	2	3	3	2	83	7	4
	26C	Alder/Upr. Skook	3	2	3	2	3	3	3	2	1	2	2	3	2	81	6	4
	26D	Swale	3	2	3	2	3	3	3	2	1	3	2	3	2	84	7	5
	26F	Hog	3	1	3	3	3	3	3	2	2	2	2	2	3	83	7	6

Factor Importance - Weight of parameter relative to issue and other parameters.
1 = Low
2 = Moderate
3 = High

Condition Rating
1 = Good Condition
2 = Useable (but not good)
3 = Poor Condition
X = No Data

Highest Concern?
Lowest Concern?
Note: Summaries at left (cols. q,r,s)
do not compensate for missing data.

Data not available, condition estimated from observations

TABLE 24b

WALL ANALYSIS AREA RESOURCE ATTRIBUTE INTEGRATION MATRIX

09/29/95

VEGETATION SUSTAINABILITY

WALL WATERSHED			Spp Composi[tion]	Struct Stage	SBW	I&D	Nox.	Juniper	Fire	Deeper	Steep Slopes	P.Ms Wst	Tot. Pot. Det.	Road Dens.	Only 1 Tmbr	Range	SWS Score	# of High	Importance
SWS	SWS #	SWS NAME	Departure	Depart fr HRV	Damage	Risk	Weeds	Encroach.	Hazard	Ash	>=30%	Hmn. Act.	Soil Condtns.	Total	Sale	Condition	Ratg x Cndtn	Scores	x Condition
Importance			3	3	2	2	2	3	3	3	2	2	3	2	2	2			3 * 3
Lower Wall	23C	Fern	X	X	X		2	1	1	X	2	X	X	X	X	X	14	0	0
	24A	Lower Big Wall	2	2	1	3	3	3	2	2	2	2	1	1	1	2	66	3	1
	24G	Indian	1	3	1	3	2	2	1	1	1	1	2	2	3	2	60	3	1
Upper Wall	24B	Mid. Big Wall	2	2	1	3	2	2	3	2	2	1	1	2	3	2	68	3	1
	24C	Upper Big Wall	2	1	1	3	2	2	2	1	1	1	1	2	3	2	57	2	0
	24D	Porter	3	1	1	3	2	2	1	1	1	1	2	2	2	2	58	2	1
	24E	Upper Wilson	2	1	1	3	3	1	2	1	1	1	2	2	3	2	59	3	0
	24F	Lower Wilson	2	2	1	2	3	3	1	2	2	1	2	2	3	3	70	4	1
Little Wall	25A	Lower Little Wall	1	2	1	2	2	3	1	2	2	1	1	1	2	2	56	1	1
	25B	Upper Little Wall	2	3	1	1	2	3	2	2	1	1	3	2	1	3	69	4	3
	25C	Bacon	3	3	0	3	2	3	1	2	1	1	2	2	3	3	72	6	3
Skookum	26A	Lower Skookum	3	2	1	1	2	3	2	2	2	1	1	1	1	2	61	2	2
	26B	Bear	3	3	1	2	2	2	2	2	1	1	1	2	2	3	67	3	2
	26C	Alder/Upr. Skook[um]	3	3	3	3	2	1	3	1	1	2	1	2	2	3	72	6	3
	26D	Swale	3	3	2	3	2	1	3	2	1	1	1	2	2	3	71	5	3
	26F	Hog	3	3	1	3	2	3	2	2	1	1	2	2	1	2	71	4	3

Factor Importance - Weight of parameter relative to w/n issues and other parameters
1 = Low
2 = Moderate
3 = High

Condition Rating
1 = Good Condition
2 = Useable (but not good)
3 = Poor Condition
X = No Data

TABLE 24c WALL ANALYSIS AREA RESOURCE ATTRIBUTE INTEGRATION MATRIX 09/14/95

TERRESTRIAL BIODIVERSITY

WALL WATERSHED			Old Growth	Elk	Unique	TES	TES	Floristic	Plant Spp.	SWS Score	Total High	Importance
SWS	SWS #	SWS NAME	Quant/Qual.	Use	Habitat	Animal	Plants	Rich	of Concern	Ratg x Condition	Scores	x Condition
Importance			3	2	2	3	3	2	3	3		3x3
Lower Wall	23C	Fern	x	x	x	x	2	1	x	8	0	0
	24A	Lower Big Wall	3	2	2	2	3	2	3	45	3	3
	24G	Indian	2	2	3	1	3	2	2	38	2	1
Upper Wall	24B	Mid. Big Wall	1	2	1	2	2	2	2	31	0	0
	24C	Upper Big Wall	1	2	2	1	1	3	1	26	1	0
	24D	Porter	2	2	2	1	1	2	1	27	0	0
	24E	Upper Wilson	2	3	2	1	2	3	1	34	2	0
	24F	Lower Wilson	3	3	2	1	3	2	3	35	3	2
Little Wall	25A	Lower Little Wall	3	3	1	1	2	1	1	31	2	1
	25B	Upper Little Wall	3	3	2	2	1	1	1	33	2	1
	25C	Bacon	3	3	1	1	2	3	2	38	3	1
Skookum	26A	Lower Skookum	3	3	2	1	2	3	3	43	4	2
	26B	Bear	3	2	2	2	1	1	1	31	1	1
	26C	Alder/Upr. Skookum	3	3	2	2	1	2	1	35	2	1
	26D	Swale	2	3	2	2	1	2	2	35	1	0
	26F	Hog	3	2	1	2	1	1	1	29	1	1

Factor Importance - Weight of parameter relative to w n issues and other parameters
1 = Low
2 = Moderate
3 = High

Condition Rating
1 Good Condition
2 = Useable (but not good)
3 = Poor Condition
X = No Data

V. E. Old Growth/RHCA Network

Network Development Process

Background:

The Federal Guide for Watershed Analysis includes guidance for the delineation and management of old growth and riparian habitat "reserves". PACFISH includes general standards for protection of aquatic/riparian resources in eastern Oregon. Conservation of old growth and riparian habitats was addressed at the "landscape" scale for the entire Wall drainage, including all 15 subwatersheds. At this scale, we sought to integrate amended Forest Plan, including the intent of the 5/95 timber sale screens and 3/95 PACFISH Forest Plan Amendments, and Regional direction with current understanding of ecosystem function and the habitat needs of riparian and old growth-associated animals and plants. The rationale and process used to develop a proposed old growth/riparian habitat network in the Wall drainage are outlined below for a complete discussion of this topic, see Section VII. W.

Network Goal and Objectives:

The goal of this process was to develop a network of habitats that could contribute both now and in the future to the long-term viability of old growth and riparian habitats and the local populations of species dependent on those habitats. These species in turn contribute to the continued function of the forest ecosystem, and to the overall biological diversity of aquatic and terrestrial communities. The boundaries of the individual units within the network are viewed as permeable, both spatially and temporally, recognizing that old growth plant and animal communities have and will shift over time and space. The network should reflect and encompass this dynamic process.

The objective of this effort was to identify, map, and draft management proposals for a combined network of Riparian Habitat Conservation Areas (RHCAs) and old growth forest habitats. The ultimate products of this exercise include spatially-displayed management opportunity areas within the network blocks, along with suggested management strategies. Restoration needs are prioritized, and in some cases area-specific management prescriptions are offered.

The large blocks of habitat and relatively wide connective corridors delineated in this proposal were intended to begin to move the drainage back towards historic proportions of structural stages and plant association groups. Moreover, by delineating large blocks, more options are retained for active management that can speed the development of old growth structure in "capable" areas. Larger blocks lend themselves to more of a landscape approach, and allow managers to move away from "managing at the minimum" for single species: a concept that has proven ineffective and inordinately expensive.

Based on the 1937 map, approximately 75 percent of the Wall drainage was covered with mature or old growth forests after the turn of the century. The proposed network includes approximately 46,890 acres (including riparian connective corridors), or 61 percent of the approximately 76,018 **currently forested** acres in the drainage (NOTE: the approximately 7,815 acres of "very early" structural stage in the watershed were not included in calculations of "currently forested" acres, since they do not function as forested habitats). Only about 15,000 acres (31%) of the proposed network acres are currently in the late/old structural stage. A breakdown of acres by structural stage for the proposed network is found in Table 25.

WALL ANALYSIS AREA — OLD GROWTH NETWORK

FIGURE 2

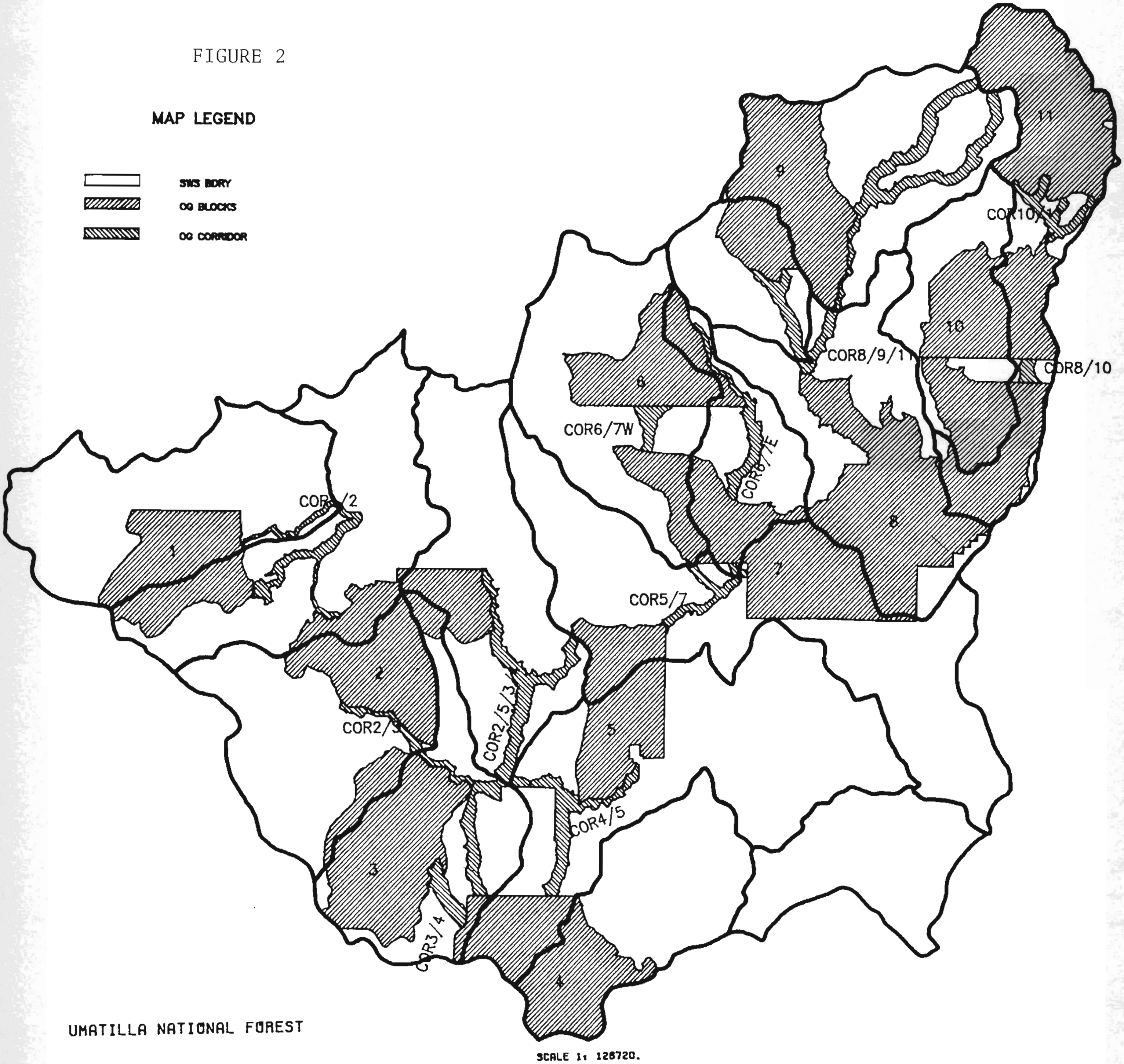

Table 25. Old Growth/Riparian Network Composition

Block No.	Total Acres	L/O Ac. (%)	M Ac. (%)	E-M Ac. (%)	E Ac. (%)	VE Ac. (%)
01	2,783	1,801 (65)	491 (18)	144 (5)	17 (.6)	330 (12)
02	4,105	1,765 (43)	1,988 (48)	135 (3)	0	216 (5)
03	3,866	1,990 (51)	1,664 (43)	91 (2)	0	121 (3)
04	3,482	1,535 (44)	1,688 (48)	173 (5)	0	86 (2)
05	2,518	994 (39)	1,147 (46)	251 (10)	0	126 (5)
06	2,412	171 (7)	1,035 (43)	256 (11)	2 (.1)	951 (39)
07	4,292	1,511 (35)	913 (21)	1,294 (30)	236 (5)	347 (8)
08	6,972	1,100 (16)	2,801 (40)	1,673 (24)	95 (1)	1,303 (19)
09	3,965	1,747 (44)	1,950 (49)	57 (1)	8 (.2)	203 (5)
10	2,585	167 (6)	1,446 (56)	506 (16)	12 (.5)	455 (18)
11	3,805	1,358 (36)	1,644 (43)	57 (1)	121 (3)	625 (16)

Old growth and RHCA "layers" resulting from the above processes were overlaid in GIS to arrive at a combined old growth/riparian network.

V. F. Analysis/Data Limitations

V. F. 1. Aquatic Habitat

Limitations due to quality and availability of information:

It would probably be most useful in this sort of report to identify subwatersheds or stream reaches which are in best (or worst) condition and then to correlate this situation directly to past management practices and/or to natural conditions or events.

Unfortunately, data at this level of specificity has not been available within the allotted time frame for these watersheds. Apparently livestock use of the watersheds cannot be readily broken down by subwatersheds or stream reaches. Timber harvest records prior to 1987 are not sufficiently specific about harvest prescription or geographic location to permit such correlations, either.

Therefore, wherever there is degraded aquatic habitat in conjunction with a history of heavy grazing and timber harvest, the weight of evidence will indicate management responsibility. The burden of proof to the contrary lies with the defense of past levels or styles of grazing, road building, or timber harvest. Lacking evidence to the contrary we must assume, for the present, that where degraded aquatic conditions are found in the Wall Creek watersheds, they must be, in large part, a result of past management activities.

Information management:

1. Development of a mechanism to assure updating stream class and fish distribution information

The quality of an analysis and the effectiveness of management depends very largely upon the quality and accessibility of information to analysts and managers. During the process of this analysis, information in MOSS/GIS on stream class and fish distribution was found to disagree with information received from the Heppner district. Inconsistencies in data from different sources lead to confusion and loss of time in the analysis process and may result in less than best management.

The MOSS/GIS information is probably old and ought to be updated to reflect new knowledge. There does not seem to be any consistent mechanism to ensure that regular, frequent updating happens. Accomplishment of Riparian Management Objectives (and probably most other management objectives) would be furthered over the long run by development of a mechanism to ensure such updating on a regular basis.

2. Linking SMART to MOSS/GIS

It would be very useful for this type of analysis, and probably for management as well, to have the SMART database linked to MOSS/GIS. This would allow procurement of a large amount of geographically specific information from one source. Protocol for making this link is established. There seem to have been some difficulties in implementing the process. Higher prioritization of the task and better communication between Heppner District personnel and MOSS/GIS personnel at the Umatilla NF Supervisor's Office could probably solve this problem.

3. Data quality control

As reported earlier in this document, the quality of some of the stream survey data (Hoedads, 1993) seems suspect because of misunderstanding on the part of the data gatherers of the concept of cobble embeddedness. It is critical for any scientific investigation that the original data be gathered by knowledgeable persons using techniques and instruments appropriate to the task and which are representative of methodology accepted by the scientific community. If the original data is flawed, the entire analysis will be in question (the old garbage in -- garbage out concept). Selection of field data collectors must ensure qualifications for the specific task. Qualifications for gathering biologic or hydrologic data include several years of college including classwork in upper division science classes with field laboratories. For Hankin and Reeves type stream surveys, additional training in the specific techniques is critical as is quality control monitoring of surveyors during the data gathering process.

V. F. 2. Forest Vegetation

Photo interpreted EVG data layer was the only information available at the time of this analysis. Incorporation of stand exam information into the EVG layer in a timely manner would portray a more accurate picture of existing condition.

Initially, it was intended that we accomplish a comparison between the EVG data layer and the PMR data layer. Due to time constraints, we were unable to meet this intention. From an ecologist perspective, there is reason for professional skeptisim regarding the PMR data layer and we are hesitant to utilize it until ground truthing of the data has been accomplished. It is also difficult to work with this data layer because the objectives under and for which it was derived are different from those of this analysis. Direct correlation of the specific "classes" (species groups, structural classes, canopy closures, etc.) is difficult due to these differences.

It is recommended that the warm ABGR plant association group be broken into two groups, warm ABGR and PSME. This would offer a more detailed look at the differences between the two PAG's and provide a better analysis for those using this information on the ground.

It is also recommended that the species composition for the ponderosa pine PAG be changed from 90 percent to 80 percent canopy closure of pine and larch. We believe this will give a more accurate picture of what is actually on the ground

V. F. 3. Terrestrial Biodiversity

The lack of quantitative population data, both historic and current, for any terrestrial species except mule deer and elk placed a significant limitation on the terrestrial biodiversity analysis.

Further, incomplete data on current status of forest vegetation (i.e., timber harvest prescription back only to 1987 and Existing Forest Vegetation information from 1988 photo interpretation) resulted in assumptions regarding data quality that causes concern. The primary concern is that habitat analysis for old growth associated species and development of the old growth/riparian network was based on the mapped vegetation for old growth and middle structural stage forest. Given that the old growth definition used and structural stage data queries were based on a minimum of 10 large trees per acre in the PIPO and Warm ABGR Plant Association Groups, no analysis of old growth quality was feasible. From review of aerial photography, it is evident that many of the areas mapped as late/old structure have had one or more harvest entries and are actually very open, sparse stands that approach the minimum definition of old growth habitat.