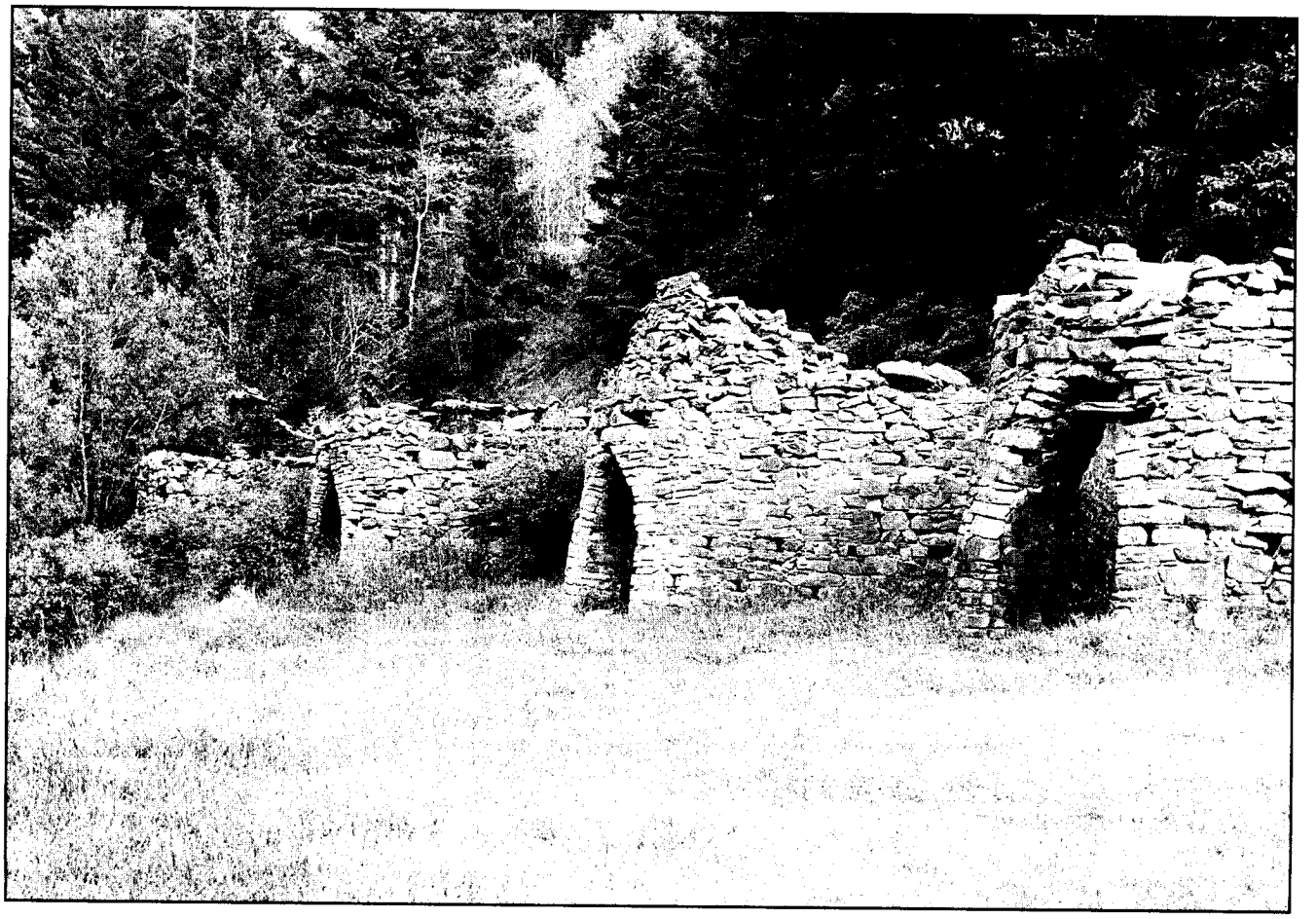
Appendices



Bayhorse Kilns

Appendix A: Cultural Resources

Item 1: Cultural Resources Special Areas

Birdie Peak - Preliminary work in the Birdie Peak area has identified archaeological values which may be significant to the Shoshone-Bannock Tribes, perhaps as a vision quest locale. The high peaks and ridges in the vicinity, the stunning viewsheds, and the type of features documented are all contributing factors in this assessment. The protection of the area is important as both an archaeological and traditional lifeway value.

Challis Archaeological Spring District - A total of 28 sites within the Challis Resource Area are listed on the National Register of Historic Places (NRHP) as part of the Challis Archaeological Spring District. These sites contain information on seasonal community patterns, areal settlement patterns, prehistoric chronologies, and climatic change through time (NRHP 1981). These sites appear to be associated with the persistence of a big game hunting strategy during prehistoric and into historic times. Butler (1978) refers to this as the Archaic Tradition, a regionally important concept that differs from previous hypotheses based on generally accepted Great Basin traditions. Collectively, these sites are of regional and national importance as a factor in defining and refining the archaeology of the Northern Rocky Mountain ecosystem.

Challis Bison Jump - The Challis Bison Jump is listed on the NRHP. Excavations in the early 1970s identified this site as a bison kill site, similar to the classic jumps prevalent in the Northern Plains cultural area and dating to late prehistoric times. The site is the only "jump" formally recorded in this region.

Lone Pine - Five sites located in the Lone Pine area are included as part of the NRHP listed Challis Archaeological Spring District. These sites contain cultural deposits predating 6700 B.P. based on the presence of apparently *in situ* remains significantly below Mazama ash. Test excavations identified over 45 "occupation" layers through time (Williams 1982). In addition, the Lone Pine sites can provide information on regional climatic sequences and changes and their relationship to settlement patterns and subsistence strategies through time. Finally, the presence of potential Paleoindian components in an "open" site situation such as the Lone Pine area is of regional and national significance, given the paucity of information on early man and the Paleoindian Period in North American archaeology.

Salmon River Corridor - Public lands along the Salmon River contain an abundance and apparent diversity of cultural resources. These sites have the potential to provide information on local settlement patterns, site function, and distribution within the Salmon River corridor. In addition, regional information on subsistence strategies, seasonal use, foraging patterns, resource procurement, chronology, and perhaps ethnicity can be obtained through additional work at these sites.

Appendix B: Economy and Society

Item 1: 1991 Employment in the Two-County Region, by County and Employment Sector[1]

Employment Sector	Custer County[3]		Lemhi County[4]		Two-County Region	
	FTE[5]	% of county	FTE[5]	% of county	FTE[5]	% of region
Agriculture	430	22.93	666	25.04	1,096	24.18
Mining	669	35.68	181	6.80	850	18.74
Timber[6]	18	0.96	296	11.13	314	6.92
Visitors	335	17.87	695	26.13	1,030	22.71
Linked to ROI[2]	71	3.79	157	5.90	228	5.03
State and Local Government	121	6.45	256	9.62	377	8.31
Federal Government	195	10.40	367	13.80	562	12.39
Other	36	1.92	42	1.58	78	1.72
Total	1,875	100.00	2,660	100.00	4,535	100.00

[1] Source: The Custer-Lemhi County Economic Model (CLEModel), pp. 9-12; in *A Social, Economic and Fiscal Analysis of Custer and Lemhi Counties, Idaho: A Model* (BLM 1994).

[2] "Linked to ROI" is defined as income in, and multiplier-generated by, industries servicing the spending of residents with outside incomes. "ROI" = "Resident's Outside Income" and is defined as a broad mix of incomes received by community residents from sources outside the communities. These include social security payments, public assistance, unemployment compensation, private retirement income, the receipt of dividend, interest, and rent payments, military (*e.g.*, national guard) income, and the income of out-commuters.

[3] Custer County figures are based on values for the Challis, Big Lost River, Stanley, and Pahsimeroi subregions shown in *Appendix B, Item 2*. The Pahsimeroi subregion includes the Patterson Division, which is in Lemhi County and has a population of 392.

[4] Lemhi County figures are based on values for the Salmon, Tendoy-Leadore, and North Fork subregions shown in *Appendix B, Item 2*.

[5] FTE - Full time equivalent (see *Glossary*).

[6] Baseline data for the timber sector are from 1991 and do not reflect closure of the Salmon Intermountain sawmill in 1995.

Appendix B: Economy and Society

Item 2: 1991 Employment in Custer and Lemhi Counties, by Subregion and Employment Sector[1]

Employment Sector	Custer County								Lemhi County					
	Challis Subregion		Big Lost River Subregion		Stanley Subregion		Pahsimeroi Subregion[3]		Salmon Subregion		Tendoy-Leadore Subregion		North Fork Subregion	
	FTE[4]	%	FTE[4]	%	FTE[4]	%	FTE[4]	%	FTE[4]	%	FTE[4]	%	FTE[4]	%
Agriculture	157	13.07	205	50.64	0	0.00	68	83.95	522	22.65	139	76.63	5	2.84
Mining	664	55.36	5	1.33	0	0.00	0	0.00	181	7.86	0	0.00	0	0.00
Timber[5]	12	1.00	6	1.54	0	0.00	0	0.00	293	12.74	0	0.00	3	1.70
Visitors	143	11.92	34	8.49	151	78.69	7	8.64	572	24.84	11	6.12	112	63.65
Linked to ROI[2]	32	2.65	36	8.80	1	0.58	2	2.47	150	6.51	3	1.55	4	2.27
State and Local Gov't	70	5.86	41	10.20	8	4.41	2	2.47	234	10.16	13	7.37	9	5.11
Federal Gov't	97	8.12	66	16.23	30	15.73	2	2.47	309	13.43	15	8.27	43	24.43
Other	24	2.02	11	2.77	1	0.59	0	0.00	42	1.81		0.06	0	0.00
Total	1,199	100.00	404	100.00	191	100.00	81	100.00	2,303	100.00	181	100.00	176	100.00

[1] Source: The Custer-Lemhi County Economic Model (CLEModel), pp. 9-12; in *A Social, Economic and Fiscal Analysis of Custer and Lemhi Counties, Idaho: A Model* (BLM 1994).

[2] "Linked to ROI" is defined as income in, and multiplier-generated by, industries servicing the spending of residents with outside incomes. "ROI" = "Resident's Outside Income" and is defined as a broad mix of incomes received by community residents from sources outside the communities. These include social security payments, public assistance, unemployment compensation, private retirement income, the receipt of dividend, interest, and rent payments, military (*e.g.,* national guard) income, and the income of out-commuters.

[3] The Pahsimeroi subregion includes the Patterson Division, which is in Lemhi County and has a population of 392.

[4] FTE - Full time equivalent (see *Glossary*).

[5] Baseline data for the timber sector are from 1991, and do not reflect closure of the Salmon Intermountain sawmill in 1995.

Appendix B: Economy and Society

Item 3: 1991 Earnings in the Two-County Region, by County and Employment Sector[1]

Employment Sector	Custer County Earnings[3]		Lemhi County Earnings[4]		Two-County Region Earnings	
	$1,000s	% of county	$1,000s	% of county	$1,000s	% of region
Agriculture	10,020	21.92	11,234	21.66	21,254	21.78
Mining	22,227	48.61	5,660	10.91	27,887	28.58
Timber[5]	602	1.32	7,941	15.31	8,543	8.75
Visitors	3,908	8.55	9,817	18.92	13,725	14.06
Linked to ROI[2]	1,714	3.75	3,673	7.08	5,390	5.52
State and Local Government	2,845	6.22	6,016	11.60	8,861	9.08
Federal Government	3,317	7.25	6,589	12.70	9,906	10.15
Other	1,088	2.38	944	1.82	2,032	2.08
Earnings Total	45,721	100.00	51,874	100.00	97,595	100.00

[1] Source: The Custer-Lemhi County Economic Model (CLEModel), pp. 9-12; in *A Social, Economic and Fiscal Analysis of Custer and Lemhi Counties, Idaho: A Model* (BLM 1994).

[2] "Linked to ROI" is defined as income in, and multiplier-generated by, industries servicing the spending of residents with outside incomes. "ROI" = "Resident's Outside Income" and is defined as a broad mix of incomes received by community residents from sources outside the communities. These include social security payments, public assistance, unemployment compensation, private retirement income, the receipt of dividend, interest, and rent payments, military (*e.g.*, national guard) income, and the income of out-commuters.

[3] Custer County figures are based on values for the Challis, Big Lost River, Stanley, and Pahsimeroi subregions shown in *Appendix B, Item 4*. The Pahsimeroi subregion includes the Patterson Division, which is in Lemhi County and has a population of 392.

[4] Lemhi County figures are based on values for the Salmon, Tendoy-Leadore, and North Fork subregions shown in *Appendix B, Item 4*.

[5] Baseline data for the timber sector are from 1991, and do not reflect closure of the Salmon Intermountain sawmill in 1995.

Appendix B: Economy and Society

Item 4: 1991 Earnings in Custer and Lemhi Counties, by Subregion and Employment Sector (in $1,000s and % of Subregion)[1]

Employment Sector	Custer County								Lemhi County					
	Challis Subregion		Big Lost River Subregion		Stanley Subregion		Pahsimeroi Subregion[3]		Salmon Subregion		Tendoy-Leadore Subregion		North Fork Subregion	
	$1,000s	%	$1,000s	%	$1,000s	%	$1,000s	%	$1,000s	%	$1,000s	%	$1,000s	%
Agriculture	3,194	9.99	4,003	49.79	0	0.00	2,823	96.51	7,126	15.78	4,089	85.40	19	0.99
Mining	22,001	68.78	226	2.81	0	0.00	0	0.00	5,660	12.53	0	0.00	0	0.00
Timber[4]	410	1.28	192	2.39	0	0.00	0	0.00	7,866	17.41	0	0.00	75	3.89
Visitors	1,587	4.96	303	3.76	2,002	72.32	16	0.54	8,886	19.67	93	1.94	838	43.65
Linked to ROI[2]	729	2.28	939	11.68	22	0.80	24	0.82	3,564	7.89	53	1.10	56	2.94
State and Local Gov't	1,644	5.14	965	12.00	197	7.12	39	1.32	5,495	12.17	305	6.38	216	11.26
Federal Gov't	1,656	5.18	1,140	14.18	497	17.94	24	0.81	5,635	12.48	245	5.12	709	36.95
Other	765	2.39	273	3.39	50	1.82	0	0.00	935	2.07	3	0.06	6	0.32
Earnings Total	31,986	100.00	8,041	100.00	2,768	100.00	2,926	100.00	45,167	100.00	4,788	100.00	1,919	100.00

[1] Source: The Custer-Lemhi County Economic Model (CLEModel), pp. 9-12; in *A Social, Economic and Fiscal Analysis of Custer and Lemhi Counties, Idaho: A Model* (BLM 1994).

[2] "Linked to ROI" is defined as income in, and multiplier-generated by, industries servicing the spending of residents with outside incomes. "ROI" = "Resident's Outside Income" and is defined as a broad mix of incomes received by community residents from sources outside the communities. These include social security payments, public assistance, unemployment compensation, private retirement income, the receipt of dividend, interest, and rent payments, military (*e.g.*, national guard) income, and the income of out-commuters.

[3] The Pahsimeroi subregion includes the Patterson Division, which is in Lemhi County and has a population of 392.

[4] Baseline data for the timber sector are from 1991, and do not reflect closure of the Salmon Intermountain sawmill in 1995.

Appendix B: Economy and Society

Item 5: 1991 Personal Income Analysis for the Two-County Region, by County and Subregion[1]

County/ Subregion	Earnings		Resident's Outside Income[2]		Total Personal Income	
	$1,000s	% County/ Subregion	$1,000s	% County/ Subregion	$1,000s	% Two-County Region
Custer County	45,721	81.38	10,464	18.62	56,185	45.26
Challis Subregion	31,986	90.89	3,207	9.11	35,193	28.35
Big Lost River Subregion	8,041	64.78	4,373	35.22	12,414	10.00
Stanley Subregion	2,768	81.91	611	18.09	3,379	2.72
Pahsimeroi Subregion[3]	2,926	56.28	2,273	43.72	5,199	4.19
Lemhi County	51,874	76.34	16,076	23.66	67,950	54.74
Salmon Subregion	45,167	77.25	13,298	22.75	58,465	47.10
Tendoy-Leadore Subregion	4,788	85.29	826	14.71	5,614	4.52
North Fork Subregion	1,919	49.57	1,952	50.43	3,871	3.12
Total Two-County Region	**97,595**	**78.62**	**26,540**	**21.18**	**124,135**	**100.00**

[1] Source: The Custer-Lemhi County Economic Model (CLEModel), pp. 9-12; in *A Social, Economic and Fiscal Analysis of Custer and Lemhi Counties, Idaho: A Model* (BLM 1994).

[2] Resident's Outside Income is defined as a broad mix of incomes received by community residents from sources outside the communities. These include social security payments, public assistance, unemployment compensation, private retirement income, the receipt of dividend, interest, and rent payments, military (*e.g.*, national guard) income, and the income of out-commuters.

[3] The Pahsimeroi subregion includes the Patterson Division, which is in Lemhi County and has a population of 392.

Appendix B: Economy and Society

Item 6: Economic Values of Fisheries Resources in the Challis RA

Resident trout stream fishing in the Challis Resource Area is considered very good by the Idaho Department of Fish and Game. Mackay Reservoir has a high quality trout and kokanee fishery which is locally very popular. Steelhead trout fishing from the Salmon River is very popular and has State-wide, if not nation-wide, recognition. The current value of sport fishing for resident species and steelhead trout in the Challis Resource Area is estimated at approximately $662,000 per year (see discussion below).

Historically, an estimated 10,000 angler days (see *Glossary*) were spent in the Challis Planning Unit in 1974 -- 1,739 days on anadromous fisheries and 8,261 days on resident fisheries (USDI, BLM 1977). (Note: The Challis Planning Unit comprised only **one** portion of the current Challis Resource Area.) Recent estimates provided by the Idaho Department of Fish and Game (June and August, 1995 - see Planning Record) indicate an annual average of approximately 17,900 angler days were spent in the Challis RA in 1993 and 1994 -- 6,977 angler days on anadromous species (steelhead trout) and 10,894 angler days on resident game species.

Each year, large amounts of money are spent by anglers on license fees, tackle, food, beverages, lodging, fuel, boating, guide services, camping, etc. These expenditures provide economic benefits on local, regional, and State-wide levels. However, exact dollar amounts spent directly or indirectly on recreational fishing in a particular area are difficult to estimate. The following discussions present some research findings related to current and historic fisheries economic benefits. Dollar values should be viewed as general trends.

Resident Fisheries Values

Historic Economic Benefit: In 1974 approximately 8,261 angler days were spent on resident fisheries in the Challis Planning Unit (USDA, BLM 1977). Gordon *et. al.* (1973) calculated the value of one trout angler day to be $10.60. Thus, in 1974 approximately $87,567 may have been spent on resident species sport fishing in the Challis Planning Unit, assuming a non-trout species (mountain whitefish, kokanee salmon) angler day had the same value as a trout angler day.

Current Economic Benefit: The 1997 estimated angler day value for cold water sport fishing species is $41.08 (Sorg, *et. al.* 1985, adjusted for inflation). Recent Idaho Department of Fish and Game estimates indicate about 10,894 angler days were spent on resident sport fishing in the Challis RA, including 10,000 angler days on the popular Mackay Reservoir. These angler days would have an approximate annual value of $447,526.

Anadromous Fisheries Values

Commercially, anadromous fish produced in the Columbia River system were worth an estimated $100 million annually to the Pacific Northwest (Tuttle 1978). Mallet and Bjornn (1970) estimated that Idaho spawning grounds account for 55 percent of the steelhead trout, 34 percent of the spring chinook salmon, and 41 percent of the summer chinook salmon in the entire Columbia River drainage. Historically, the Salmon River watershed produced about 50 percent of the steelhead trout and 98 percent of the chinook salmon harvest in Idaho (Mallet and Bjornn 1970). (For an additional economic analysis of the chinook salmon fishery in the area (based on Tuttle *et. al.* (1975)), please see the 1977 Challis Environmental Impact Statement.

At present, hatchery-produced steelhead trout are the only anadromous fish species which can be harvested in the Challis Resource Area. No sport fishing of chinook or sockeye salmon is permitted (because these species are listed as endangered under the Endangered Species Act), and any wild steelhead trout which are caught must be released. However, the economic value of the chinook salmon is still described, to indicate the possible economic value of that species if its population was restored.

Steelhead Trout:

Historic Economic Benefit: No attempt was made in the 1977 Challis EIS to evaluate the annual net value of steelhead trout. The Idaho Department of Fish and Game estimated 1,166 wild steelhead trout spawned each year in the Salmon River drainage above the Lemhi River confluence (1970-77 average). Ninety-seven percent of these fish moved above the Pahsimeroi River confluence into and above the Challis RA. Steelhead trout have had a slightly higher commercial value than salmon; thus, the annual value of these fish in the 1970s would probably have been at least $167,624 ($143.76 spawning fish value x 1,166 spawning steelhead).

Current Economic Benefit: Recent IDFG data indicate anglers spent an average of 6,977 steelhead angler days on BLM river frontage in the RA during both the spring 1993 and 1994 steelhead trout seasons. The 1997 estimated value of one steelhead angler day is $30.73 (Donnelly, *et. al.* 1985, adjusted for inflation). Thus, the average annual value of steelhead trout sport fishing in the RA would be approximately $214,403.

An alternative method of calculation yields a similar result. Adjusting Tuttle *et. al.*'s 1974 spawning fish value for inflation since the 1970s (to $176.11) and assuming a continuing annual average of 1,166 spawning steelhead in the RA would mean the approximate annual value of steelhead trout fisheries in the Challis RA would be $205,344 in 1990s dollars.

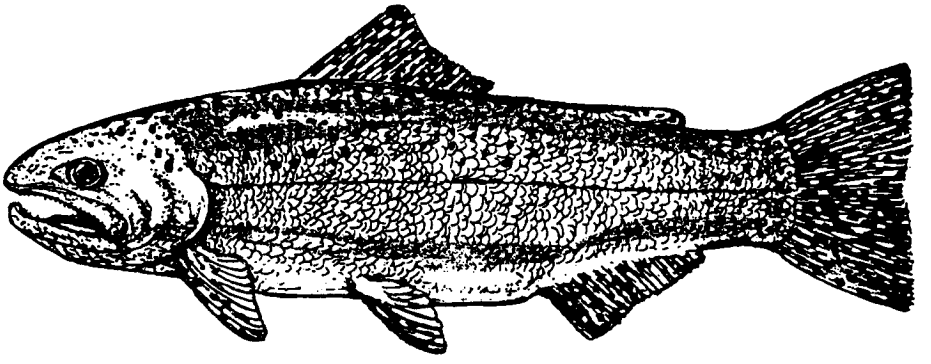
Chinook Salmon:

Historic Economic Benefit: Idaho Department of Fish and Game chinook salmon spawning surveys from the early 1970s indicated at least 180 summer chinook and 245 spring chinook redds could be attributed to the Challis RA each year. These counts probably approximated no more than half of the actual number of redds (Reingold, 1973), so about 850 redds were probably constructed annually. Bjornn (1975) found there were 1.3 males for each female spawner; thus, each redd represented 2.3 fish. Based on these data, an estimated annual run of 1,955 chinook salmon spawned in the East Fork Salmon River, Herd Creek, and main Salmon River above Challis Creek. (Other tributaries that produce chinook salmon (like the Pahsimeroi River) are not included in this estimate.) Tuttle *et. al.* (1975) calculated that each spawning salmon had a net annual value of $143.76. Thus, in the 1970s chinook salmon fisheries in the Resource Area would have been valued at approximately $281,051.

Current Economic Benefit: Redd counts for the entire Salmon River basin have diminished dramatically during the past two decades (see *Appendix C, Item 3*) and chinook salmon may no longer be harvested (except under Native American tribal treaty rights). Thus, the chinook salmon fishery no longer has any economic benefit to the local area. However, if Tuttle *et. al.*'s $143.76 value for spawning chinook salmon is adjusted for inflation since the 1970s, the estimated value of a spawning salmon would be $176.11. If chinook salmon populations could be restored to historic levels, 1,955 spawning chinook salmon would have an annual value of $344,295 in 1990s dollars.

Sockeye Salmon:

Sockeye salmon have insignificant economic value at this time, and this is not likely to change in the future.



Steelhead trout

Appendix B: Economy and Society

Item 7: Economic Values of Select Wildlife Species

Several wildlife species of the Challis Resource Area have economic importance on a local, and possibly regional, level. Based on the estimates of economic value described below, huntable wildlife species in the Challis Resource Area are valued at over $2,200,000 annually.

The following estimates of economic value for various wildlife species should be viewed as general trends. For further information on how these estimates were calculated, see the *Planning Record* for (a) the Idaho Department of Fish and Game's data on hunter days (see *Glossary*) spent in this general geographic area, (b) the BLM's calculations to estimate the portion of those days attributable to the Challis Resource Area, and (c) current Idaho BLM hunter day values.

Community businesses and outfitter/guide services in the Mackay, Challis, and Salmon, Idaho areas depend on elk hunting for a substantial portion of income. In 1997 an elk hunter day was valued at $56.55 (Sorg and Nelson 1986, adjusted for inflation). Average annual estimated elk hunter days in the Challis Resource Area for general and controlled hunts approximate 11,743 days. Thus, elk hunting in the Challis Resource Area is worth approximately $664,067 annually.

Community businesses and outfitter/guide services in Mackay and Challis, Idaho also depend on mule deer hunter expenditures for a portion of income. The 1997 estimated hunter day value for mule deer was $43.18 (Donnelly and Nelson 1986, adjusted for inflation). According to recent IDFG data, mule deer hunters spend an annual average of 25,269 hunter days on Challis Resource Area public lands. Thus, the value of mule deer in the RA would be approximately $1,091,115 annually.

Antelope hunting expenditures probably provide income for businesses in Challis and Mackay, Idaho. In 1993, hunters spent an estimated 2,881 hunter days hunting antelope in the Challis RA. In 1997 each antelope hunter day was worth $86.81 (Loomis, *et. al.* 1985, adjusted for inflation), for a total annual value of $250,100.

Bighorn sheep hunters spend an annual average of 277 hunter days hunting bighorn sheep in the Challis Resource Area, and bear or mountain lion hunters spent 189 hunter days hunting black bear or mountain lions (1993 and 1991 data). An "other big game" (*e.g.*, bighorn sheep, bear, mountain lion) hunter day was valued at $57.88 in 1997 (Sorg and Nelson 1987, adjusted for inflation). Thus, bighorn sheep, black bear, and mountain lion hunting in the Challis Resource Area has an approximate annual value of $26,972 (466 hunter days x $57.88). No data are available on the economic value of other furbearing wildlife species.

About 1,101 hunter days were spent hunting waterfowl in the Challis Resource Area in 1993. Each waterfowl hunter day had a value of $45.83 in 1997 (Sorg and Nelson March, 1987, adjusted for inflation), for a total economic value of approximately $50,459.

In the Challis Resource Area in 1993, about 2,528 hunter days were spent hunting various upland game and small game animals, including forest grouse, sage grouse, chukar, huns, pheasants, rabbits, and doves. An upland and small game hunter day was valued at $45.81 in 1997 (Young *et. al.* 1987, adjusted for inflation). Thus, upland and small game hunting in the RA has an approximate value of $115,808.

Appendix C: Fisheries

Item 1: Game Fish Species Distribution, by Drainage and Stream[1]

Drainage/Stream	Resident Species					Anadromous Species	
	Cutthroat Trout	Brook Trout	Bull Trout	Rainbow Trout	Mountain Whitefish	Chinook Salmon	Steelhead Trout
Salmon River[2]	x		x	x	x	x	x
Allison Creek	x						
McKim Creek	x		x	x			
Ellis Creek				x			
Cherry Creek				x			
Cow Creek	x		x	x			x
Pat Hughes Creek	x		x				
Little Hat Creek				x			
Morgan Creek	x	x	x	x	x	x	x
West Fork Morgan Creek	x	x	x	x			x
Challis Creek	x	x	x	x	x		x
Mill Creek	x	x	x	x			
Eddy Creek	x			x			
Darling Creek	x						
Garden Creek	x	x		x			
Buckskin Creek	x						
Bayhorse Creek	x	x	x	x			x
Lyon Creek	x						
Kinnikinic Creek	x	x		x			
Spud Creek	x						
Sullivan Creek	x						
Squaw Creek	x		x	x	x	x	x
Thompson Creek	x	x	x	x	x	x	x
Pat Hughes Creek		x					

Drainage/Stream	Resident Species					Anadromous Species	
	Cutthroat Trout	Brook Trout	Bull Trout	Rainbow Trout	Mountain Whitefish	Chinook Salmon	Steelhead Trout
Pahsimeroi River	x	x	x	x	x	x	x
Big Creek	x	x	x	x		x	x
Burnt Creek		x	x	x			
Big Gulch			x				
Ditch Creek			x				
Tater Creek			x				
Short Creek				x			
Morse Creek	x		x				
Lawson Creek				x			
Donkey Creek	x			x			
Falls Creek	x		x				
Goldburg Creek	x	x	x		x		
Little Morgan Creek	x		x	x			
Mahogany Creek			x				
Patterson Creek	x		x				x
Little Lost River		x	x	x			
Dry Creek	x	x					
Summit Creek		x		x			
East Fork Salmon River	x		x	x	x	x	x
Road Creek	x			x			
Horse Basin Creek	x						
Mosquito Creek	x						
Bear Creek	x			x			
Herd Creek	x		x	x	x	x	x
Lake Creek	x			x		x	x
Big Lake Creek				x	x	x	x
McDonald Creek				x			
Fox Creek			x				

Drainage/Stream	Resident Species					Anadromous Species	
	Cutthroat Trout	Brook Trout	Bull Trout	Rainbow Trout	Mountain Whitefish	Chinook Salmon	Steelhead Trout
Pine Creek			x				
Big Boulder Creek	x		x	x	x	x	x
Little Boulder Creek	x		x	x	x	x	x
Big Lost River		x		x			
Twin Bridges Creek				x			
Thousand Springs		x		x			
Mackay Reservoir[3]				x			

[1]This table lists the majority of game fish species distribution information for the Challis Resource Area, as of August 1998. Additional species presence may be confirmed in the future as additional information becomes available.
[2]Sockeye salmon also migrate in the main Salmon River.
[3]Kokanee salmon are also found in Mackay Reservoir.

Sources: Species distribution information for westslope cutthroat trout, brook trout, bull trout, rainbow trout, chinook salmon, and steelhead rainbow trout is from stream surveys conducted in the Challis RA in summer, 1994 and other recent presence/absence surveys conducted by BLM personnel. Information about mountain whitefish distribution is from Challis RA historic files.

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Appendix C: Fisheries

Item 2: Existing and Potential Spawning and Rearing Habitat Conditions of Surveyed Anadromous and Resident Fisheries Streams in the Challis RA

Stream	Spawning Habitat[1]			Rearing Habitat[1]		
	Existing	Potential	Limiting Factors	Existing	Potential	Limiting Factors
Salmon River	F/G	F/G	siltation	G	E	dewatering diversions
Allison Creek	F	F	gravels gradient	F	F/G	pool:riffle dewatering
McKim Creek	F	F	gravel gradient	F	F	pool:riffle dewatering
Morgan Creek	F/P	G	private land dewatering migration barrier	F	G	private land dewatering diversions
Challis Creek	G	E	dewatering	F	G	dewatering
Bayhorse Creek	P	F	dewatering gradient	P	F	dewatering pool:riffle
Squaw Creek	F/G	G/E	dewatering sediment	F	G	dewatering pool:riffle
Thompson Creek	F/G	G/E	sediment	F	G	pool:riffle
U. Pahsimeroi River	F/G	G	dewatering	F/G	E	dewatering
L. Pahsimeroi River	G/E	E	private land dewatering	G/E	E	private land dewatering
Big Creek - upper[2]	E	E	n/a	E	E	n/a
Big Creek - lower[2]	P	P	dewatering	P	P	dewatering
Burnt Creek	F/P	E	livestock	F/P	E	livestock
Goldburg Creek	G	E	private land	G	E	private land
Mahogany Creek	F	F	livestock elevation	F	F	livestock elevation
Little Morgan Cr. - upper[2]	G	G	n/a	G	G	n/a

Stream	Spawning Habitat[1]			Rearing Habitat[1]		
	Existing	**Potential**	**Limiting Factors**	**Existing**	**Potential**	**Limiting Factors**
Little Morgan Cr. - lower[2]	P	P	dewatering	P	P	dewatering
Patterson Cr. - upper[2]	G	G	old mine (inactive)	G	G	old mine (inactive)
Patterson Cr. - lower[2]	P	P	mining dewatering	P	P	mining dewatering
Summit Creek (Little Lost River)	G/E	E	State land livestock	G/E	E	State land livestock
East Fork Salmon River	F/G	E	sediment	G	E	private land pool quality
Herd Creek	F	E	sediment private land	G	E	sediment private land
Lake Creek	P	F	gravels gradient	F	F	gradient pool:riffle
Big Lake Creek	F	G	gradient	F	G	gradient pool:riffle
Big Boulder Cr.	P	F	gradient gravels	F	G	gradient pool:riffle
Little Boulder Cr.	P	F	gradient gravels	F	G	gradient pool:riffle
Road Creek	P	F	sediment channel condition	P	F	pool quality channel condition

Source: Challis Resource Area stream surveys; Summer, 1994.

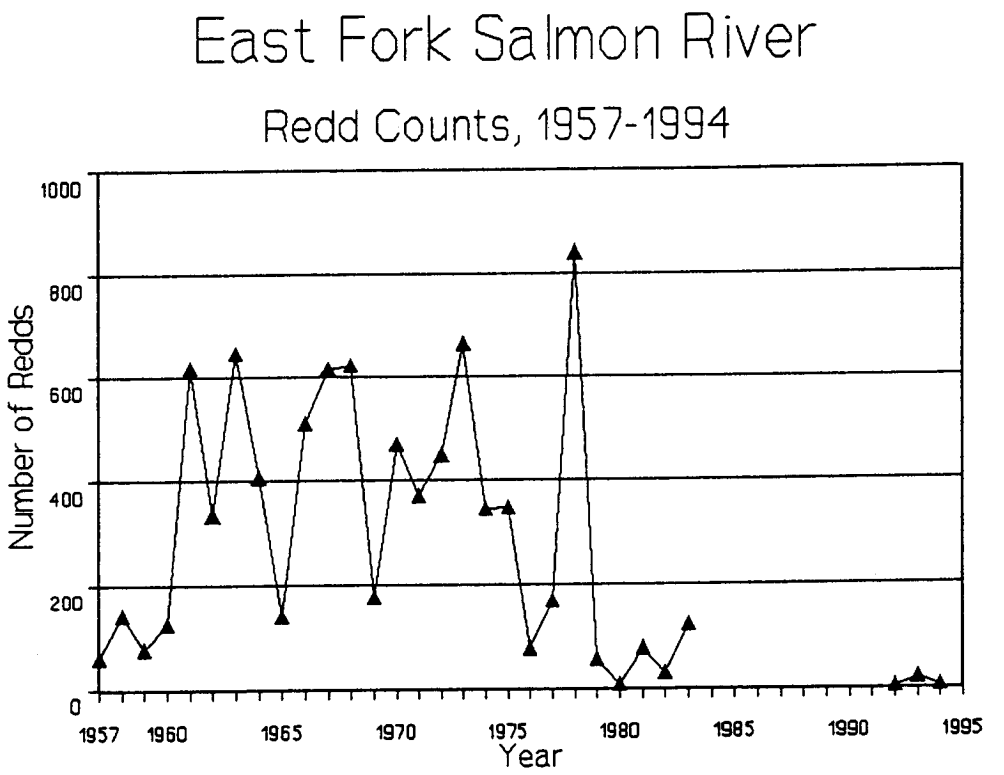
[1] E = Excellent; G = Good; F = Fair; P = Poor.

[2] The lower 11.0 miles of Big Creek, the lower 4.0 miles of Little Morgan Creek, and the middle 6.0 miles of Patterson Creek are limited by dewatering. "Upper" means that section of stream hydrologically connected to the perennial portion of the stream. "Lower" means that portion of the stream dewatered by diversion and (or) hydrologically connected to the Pahsimeroi River, with a dewatered center reach.

Appendix C: Fisheries

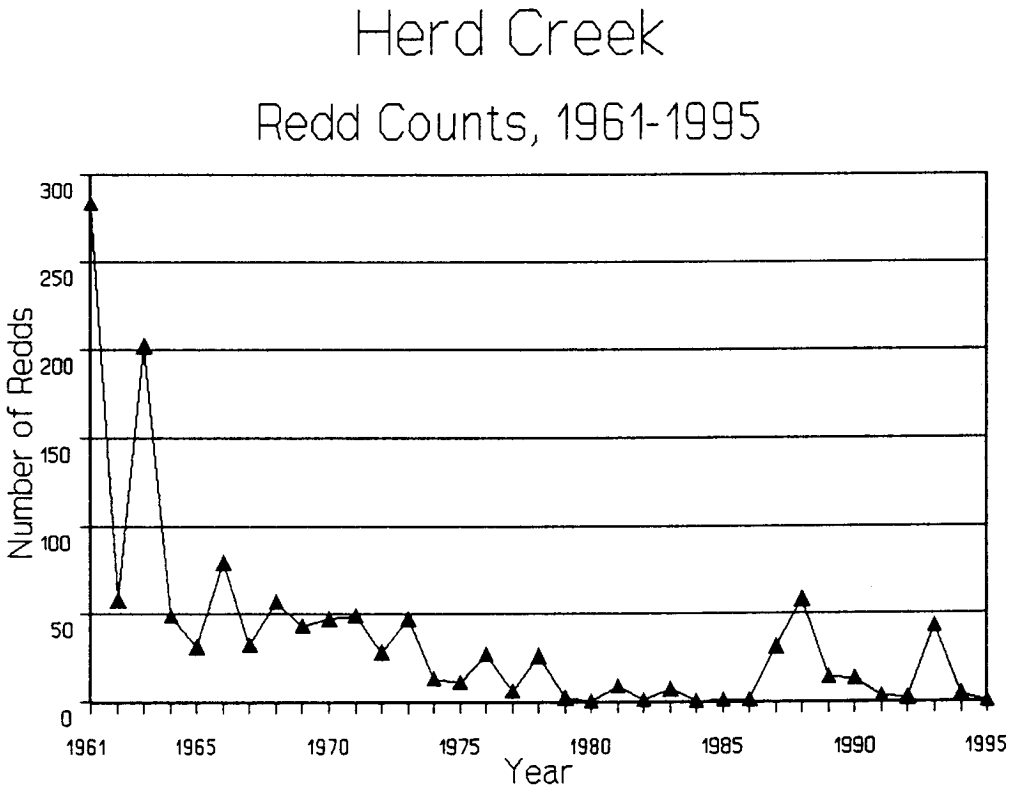
Item 3: Counts of Spring Chinook Salmon Redds

Annual survey counts of spring chinook salmon redds constructed in two important anadromous fisheries streams of the Challis Resource Area (the East Fork Salmon River and Herd Creek) indicate that the number of redds constructed each year has decreased substantially.



(**Note:** No counts were performed from 1984 to 1991. Only portions of the drainage were counted in 1992-1994.)

(**Sources:** Hall-Griswold and Cochnauer 1988; Saffel *et al* 1995.)



(**Sources:** Hall-Griswold and Cochnauer 1988; Richards and Cernera 1988, Richards *et al* 1989, Rowe *et al* 1989, and Rowe *et al* 1991 *in* Rowe *et al* 1994; Mike Rowe, personal communication 1996.)

Appendix C: Fisheries

Item 4: Stream Ownership and Condition Rating for Surveyed Portions of Fisheries Streams of the Challis RA (in miles)

Drainage/Stream	Private/State Ownership					BLM Public Lands					Surveyed Stream Totals
	Excellent	Good	Fair	Poor	Total	Excellent	Good	Fair	Poor	Total	
Salmon River	--	16.80	--	--	16.80	--	26.5	--	--	26.5	43.30
Allison Creek	--	--	0.40	1.00	1.40	--	--	1.35	--	1.35	2.75
McKim Creek	--	--	1.03	0.50	1.53	--	--	0.47	--	0.47	2.00
Morgan Creek	--	--	2.85	1.75	4.60	--	7.5	--	--	7.50	12.10
Challis Creek	--	3.0	4.75	0.25	8.0	--	--	0.5	--	0.5	8.5
Mill Creek	--	--	0.8	--	0.8	--	--	3.6	--	3.6	4.4
Garden Creek	Unknown				8.4	--	--	--	--	0.0	8.4
Birch Creek	--	--	0.6	--	0.6	--	--	--	2.0	2.0	2.6
Bayhorse Creek	.55	0.75	0.5	--	1.8	1.6	0.2	--	--	1.8	3.2
Lyon Creek	--	--	0.6	--	0.6	--	1.1	--	0.5	1.6	2.2
Kinnikinic Creek	--	--	1.0	--	1.0	—	2.5	1.3	--	3.8	4.8
Squaw Creek	--	1.6	2.0	--	3.6	0.2	0.9	0.8	--	1.9	5.5
Thompson Creek	--	--	0.3	--	0.3	.25	6.4	0.95	--	7.6	7.9

Drainage/Stream	Private/State Ownership					BLM Public Lands					Surveyed Stream Totals
	Excellent	Good	Fair	Poor	Total	Excellent	Good	Fair	Poor	Total	
Upper Pahsimeroi River	--	--	--	--	0.0	--	11.40	--	4.5	15.90	15.90
Lower Pahsimeroi River	Unknown				24.90	--	--	--	-	0.00	24.90
Big Creek	Unknown				4.40	0.60	0.32	--	6.43	7.35	11.75
Burnt Creek	--	--	0.20	3.40	3.60	--	2.85	3.00	2.30	8.15	11.75
Goldburg Creek	Unknown				11.63	--	0.70	0.67	--	1.37	13.00
Mahogany Creek	--	--	--	--	0.0	--	--	1.75	0.50	2.25	2.25
Little Morgan Creek	--	--	0.75	--	0.75	--	2.75	--	2.75	5.50	6.25
Patterson Creek	Unknown				9.24	0.33	--	1.4	3.78	5.51	14.75
Summit Creek (Little Lost River)	--	--	0.50	--	0.50	2.00	--	--	--	2.00	2.50
East Fork Salmon River	--	3.2	13.0	--	16.2	--	1.0	4.0	--	5.0	20.2
Herd Creek	--	1.6	2.0	--	3.6	--	2.6	1.2	--	3.8	7.4
Lake Creek	--	--	1.0	--	1.0	--	3.8	3.0	--	6.8	7.6
Road Creek	--	--	--	4.75	4.75	--	7.2	2.0	0.5	9.7	14.4
Big Lake Creek	--	2.2	--	--	2.2	--	1.2	--	--	1.2	3.4
Big Boulder Creek	0.1	0.2	--	--	0.3	0.9	0.3	--	--	1.2	1.5
Little Boulder Creek	0.3	--	--	--	0.3	1.8	--	--	--	1.8	2.1

Rating System: Adapted from a "Stream Habitat Evaluation" process developed by the Denver Service Center - BLM (Denver, Colorado) on one-quarter mile stream section surveys. Ratings are developed by assigning points from 1 to 4, with 4 being "excellent," to these factors: stream shade, streambank condition, streambank stability, stream channel stability, and siltation of streambed, summing the points, and applying the sum to this scale: 17+ = Excellent; 14-16 = Good; 10-13 = Fair; 5-9 = Poor.

Sources: Challis Unit Resource Analysis, Volume 2, Fisheries Section; and Summary of 1997 Field Inventory - updated to reflect monitoring and condition assessments from 1993 through 1997.

Appendix C: Fisheries

Item 5: Summary of Fisheries Habitat Condition in Drainages of the Challis RA

NOTE: This Appendix item summarizes detailed information contained in Appendix C: Fisheries, Items 2, 4, and 7.

Salmon River Drainage

The Salmon River has multi-state value, and has been classified as a "Class I" (*i.e.*, the highest fishery value) stream by the Idaho Department of Fish and Game. The Salmon River is the passageway for all anadromous fish in the region and is highly valued for sport fishing of resident fish species.

The fragmented ownership along the Salmon River in the Resource Area makes fisheries management and habitat improvement difficult. More than 62 miles of the Salmon River are within the Challis Resource Area. The BLM administers both banks along 20 miles and one bank along 14 miles; the remaining 28 miles are State or privately owned on both sides.

The majority of the water surface in the mainstem of the Salmon River can be characterized as riffle or deep run/pool habitat. Large pools in the Salmon River are extremely important holding areas for salmon and steelhead trout during migration. The bank stability of the mainstem Salmon River varies between the protected canyon areas and along many of the broader floodplain reaches, but is rated as fair to good overall. Lateral bank failures occur on both private and public lands along the mainstem Salmon River, due to naturally occurring events (*e.g.*, high spring flows) and limited woody vegetation along some streambanks.

The Salmon River is vital to the passage of thousands of adult steelhead trout and chinook salmon which spawn upstream of the Challis Resource Area. Young steelhead and salmon smolts also depend on the Salmon River for temporary rearing habitat as they outmigrate to the ocean. Some summer chinook salmon spawning occurs in the Salmon River in and around the confluence with the East Fork Salmon River, although annual redd counts by the Idaho Department of Fish and Game in the Salmon River between Thompson Creek (upper boundary of the Challis Resource Area) and the town of Challis, Idaho indicate this activity is limited (IDFG, personal communication - Jim Lukins, 1992). The water temperature of the Salmon River below the town of Challis can exceed 70 °F in the late summer as water conditions approach low flows.

Dewatering of streams for agricultural purposes is widespread in the tributaries of the main Salmon River. Allison, Challis, Morgan, Bayhorse, and Garden creeks may be completely dewatered during low water years. In low water years Squaw and Thompson creeks can also be sufficiently dewatered to prevent salmon from spawning. If water flows could be maintained during the entire year, all of these streams have the potential to accommodate spawning and rearing salmon.

The main Salmon River has a rather limited resident salmonid fishery consisting primarily of rainbow trout. Most of the rainbow trout are stocked and show good growth throughout the summer; however, population densities remain low. Westslope cutthroat trout and bull trout are also found in the main Salmon River in low numbers, although they are most often encountered in tributary streams. Bull trout can no longer be harvested as a sport fish. Mountain whitefish are also present in the Salmon River and are frequently sought after during the winter.

Stream surveys indicate many of the tributaries of the Salmon River in the Resource Area are in fair to good fishery habitat condition. Instream cover is fair to good, streambank and channel stability are good to fair, bank cover is good to fair, and the canopy cover (shading) is fair to good. Pool:riffle ratios on most streams are fair at approximately 30:70, with the exception of Morgan Creek (58:42). Pool quality is generally fair to poor, with most streams averaging 70 to 90% of their pool area in classes 4 or 5.

Pahsimeroi River Drainage

The Pahsimeroi River is the largest tributary to the Salmon River in the Challis Resource Area. The Pahsimeroi headwaters are on the east slope of the Lost River Range, which contains Mount Borah, the highest peak in Idaho. The main Pahsimeroi River is 40.8 miles long from its mouth to the Challis National Forest boundary. The lower 24.9 miles are privately owned and the upper 15.9 miles are administered by either the BLM or USFS. Typically, BLM and USFS stream surveys are confined to the upper reaches because of land ownership.

A small anadromous fish hatchery (owned by the Idaho Power Company and operated by the Idaho Department of Fish and Game) is located near the mouth of the Pahsimeroi River. Historically, the Pahsimeroi River was a prime spawning and rearing stream for natural steelhead trout and summer chinook salmon. Currently, all natural steelhead trout and summer chinook salmon are diverted into the hatchery and held for egg collection. The Pahsimeroi River is ideal for fish production because of the relatively constant flow of the lower Pahsimeroi River from numerous high quality springs along its lower reaches. However, the upper river and the upper one-third of private property dewaters in early summer.

Resident salmonids are present in adequate densities to provide a fair to good wild trout fishery throughout much of the upper drainage on public land. The lower Pahsimeroi River on private land supports a good resident rainbow trout fishery. The Idaho Department of Fish and Game manages the drainage as a wild trout fishery by natural reproduction, with harvest controlled under their general regulations (*i.e.*, except for a State-wide closure on bull trout, no special regulations for resident fish species are in place on the Pahsimeroi River).

The upper Pahsimeroi River drainage was surveyed in 1981 to determine the physical habitat availability and condition for salmonid production.

In general, the upper Pahsimeroi River on public land is in fair to good fishery condition. The pool:riffle ratio is very good, averaging 42:48. The pool quality is, however, rated as fair to good (good depth and size, but only fair bank and instream cover). Approximately 48% of the pools

were in classes 1, 2, or 3. Spawning gravels appear to be relatively abundant, and surface fines are at approximately 18 percent. Channel dewatering is probably the most limiting factor for salmonid production in the upper Pahsimeroi River. However, there is high potential to improve the available spawning habitat and instream flows through cooperative management throughout the drainage.

Few tributaries to the Pahsimeroi River have surface flows which reach the mainstem Pahsimeroi, due to irrigation diversions and the high natural permeability of the alluvial soils. The major tributaries with the potential for good yearlong flows are Little Morgan Creek, Morse Creek, Falls Creek, Patterson Creek, Big Creek, Goldburg Creek, the upper Pahsimeroi River, and Burnt Creek. The upper Pahsimeroi River and Burnt Creek are above the Pahsimeroi "sinks," and subsequently have limited access for anadromous fish (especially chinook salmon, which spawn in the summer during the height of the irrigation season). Thus, the potential for anadromous fish production in the upper tributaries is extremely limited at the present. However, all of these streams contain good populations of bull trout and (or) westslope cutthroat trout, which have been able to access the upper tributaries during higher flows.

In general, the surveyed tributaries of the Pahsimeroi River on public land are in fair habitat condition for resident salmonid species. The pool:riffle ratios average around 40:60, which is good for streams in this region. However, pool quality is relatively poor, with 80 to 90 percent in classes 4 or 5. Streambank and channel stability are generally good. However, all tributaries have isolated sections which have poor bank and channel stability, with extensive bank failures and associated channel sedimentation. Bank cover (especially woody vegetation) and instream cover are rated as fair. Spawning gravels are present in limited quantity and fair quality, with the exception of Big Creek and Patterson Creek, where surveys located little or no suitable substrate on public land. The presence of bull trout and westslope cutthroat trout in both of these drainages suggests that spawning gravels are present which were not identified during the survey. Although the existing spawning and rearing conditions on the upper Pahsimeroi River can only be rated as fair, the potential to develop good to excellent conditions through good management is high. The major limiting factor on all tributaries is low flow conditions because of agricultural diversions.

East Fork Salmon River Drainage

The East Fork Salmon River is critical for the recovery and enhancement of the anadromous fish stocks in the upper Salmon River. The East Fork Salmon River is classified as a "Class I" stream by the Idaho Department of Fish and Game. Historically, the East Fork drainage supported large runs of both chinook salmon and steelhead trout. Regional fishery biologists consider the East Fork to have excellent spawning potential, especially for chinook salmon. Only five miles of the 21 miles of the East Fork located within the Challis Resource Area are in public ownership. Five streams in the East Fork drainage have been identified as providing potential spawning and rearing habitat for anadromous fish: Herd, Big Boulder, Lake, Little Boulder, and Big Lake creeks. Herd Creek has the highest potential for salmonid production in the drainage.

Cobble embeddedness in the mainstem East Fork Salmon River and Herd Creek and Lake Creek generally is greater than 20%, while cobble embeddedness in Big Lake, Big Boulder, and Little Boulder creeks is generally less than 20% due to their higher gradients. Road Creek is the only exception, with embeddedness ratings well above 20%. Bank stability on the East Fork on public land is rated fair to good; however, bank stability is rated fair to poor on most private ground. Overall channel stability is rated as good, with good armoring and little channel shifting and braiding. Some rip-rap has been installed along the East Fork to help maintain the channel stability in highly erosive reaches. The bank and channel stability on the tributaries is generally quite good as the result of natural armoring by the large cobble/boulder substrate. The high gradient and heavy woody riparian vegetation help make the tributaries less susceptible to livestock damage. The three main exceptions are localized portions of Road Creek and Lake Creek and the private sections of Herd Creek, which have unstable banks and channels as the result of improper grazing management in the riparian zones.

No tributary streams of the East Fork Salmon River drainage are stocked with resident trout species by the Idaho Department of Fish and Game (IDFG). However, during the past 10 years, the IDFG has periodically stocked the East Fork Salmon River and Herd Creek with hatchery produced steelhead trout and occasionally chinook salmon. The Sawtooth Hatchery will be the primary source of spring chinook salmon in the future. In addition to releasing smolts to return as adults to the hatchery, the hatchery is being utilized as an outplanting facility to seed under-utilized habitats. The East Fork has been identified as a recipient for the release of 700,000 East Fork stock chinook smolts and 200,000 fingerlings from the Sawtooth Hatchery (BPA 1991).

The IDFG estimates that the East Fork drainage collectively contains about 95 miles of spawning and rearing habitat for anadromous fish (Petrosky and Holubetz, 1986). Spring chinook salmon spawn in the East Fork, Herd Creek, Big Boulder Creek, and Little Boulder Creek. Estimates suggest that about 30% of the redds in the East Fork drainage occur in Herd Creek. Summer chinook are generally "big river" fish; they spawn primarily in the 49 miles of the upper Salmon River above the East Fork and, to a lesser extent, in the lower portion of the East Fork. The East Fork and its tributaries are also important steelhead trout habitat. Steelhead trout spawning occurs in Herd Creek, Big Lake Creek, Big Boulder Creek, and Little Boulder Creek.

Cattle ranching is the main agricultural use along the East Fork Salmon River. Historically, mining was also an important use of the region. The Livingston Mine, currently inactive, was the largest mine in the drainage and is located at the head of Jim Creek, a tributary to Big Boulder Creek. Both cattle ranching and mining activities have introduced sediment into many stream channels, limiting fisheries habitat.

The mainstem East Fork Salmon River generally falls into the 20% embeddedness category, which is above the desired management goal of <20%. Approximately 70% of the available spawning gravel in Herd Creek falls into the fair category, with surface fines approaching 20%. Most of the tributaries have embeddedness ratings of less than 20%; but they have limited spawning potential due to high channel gradients and (or) gravels which are unavailable because of migration barriers.

Six streams in the East Fork Salmon River drainage have been identified as providing existing or potential spawning and rearing habitat for resident and anadromous salmonids: Road Creek, Herd Creek, Big Boulder Creek, Lake Creek, Little Boulder Creek, and Big Lake Creek. In general, the tributaries of the East Fork on public land appear to be in fair to good condition. Instream cover, canopy cover (shading), and low bank cover are generally rated as good, while bank and channel stability are rated as fair to good. The pool:riffle ratios are fair at approximately 30:70. Pool quality is also limited, with most pools falling into classes 4 and 5 due to a lack in overall pool size. However, pool size naturally decreases as stream gradient increases. Pool:riffle ratios and pool quality tend to limit the overall carrying capacity of the tributaries for rearing and overwintering salmonids.

Big Lost River Drainage

The Big Lost River Valley is one of the major structural intermountain basins of east central Idaho. It is located at the boundary between the northern portion of the Snake River Basin and the southern-most section of the Northern Rocky Mountains.

The mainstem Big Lost River is formed about 29 river miles upstream from Mackay Reservoir by the confluence of the East Fork of the Big Lost River and North Fork of the Big Lost River. There are approximately 180 miles of Big Lost River tributary streams within the Challis Resource Area. However, most streams are ephemeral or intermittent and provide little or no fishery value. The primary tributaries to the Big Lost River within the Resource Area are the East Fork of the Big Lost River, North Fork of the Big Lost River, and Thousand Springs Creek.

The Big Lost River has historically had streambank erosion problems; aquatic specialists in the region consider this to be the most critical factor in managing the drainage. During high flows, extensive movement of the streambed material occurs, causing major annual changes by in the channel configuration. Critical streambank erosion sites were identified by the Idaho Department of Health and Welfare in 1980. The area of greatest concern is mostly private land which extends along the 27-mile reach from the Bartlett Point Bridge to Mackay Reservoir. These critical streambank erosion sites are generally within the sagebrush-grass and riparian vegetation types. Various agencies and land owners have applied a variety of structural and non-structural treatments since 1980, with moderate success.

Streams in the Big Lost River drainage lose water very rapidly after they leave the mountains and flow across the alluvial fans in the valleys. On the Big Lost River the bed loss is so great that at medium to low flow, the entire surface flow in the mainstem disappears into the alluvium in the "Chilly Butte" area and is known locally as the "sinks." The primary fishery values of the river in the Resource Area lie in the upper reach, which runs 7 miles from the confluence of the East and North Forks and runs to the "sinks" area near Chilly Buttes.

The Big Lost River is a unique fishery because it has been isolated from other downstream drainages for hundreds of years. The fish population in the Big Lost River is comprised primarily of planted salmonids and native sculpins. Results of electrofishing carried out in the drainage by the IDFG indicate a fish population made up of rainbow trout, brook trout, mountain whitefish,

and sculpin. Bull trout have been found in the system, but no documented occurrence has occurred since 1976 when the IDFG found them in the Big Lost River below Arco, Idaho. Kokanee salmon are present in Mackay Reservoir and utilize the Big Lost River above the reservoir for spawning in the fall. Overall, the Big Lost River drainage is considered to be one of the better fisheries in eastern Idaho. The Big Lost River drainage is managed primarily as a wild trout fishery by natural reproduction with special regulations in place to limit the annual harvest and increase the number of larger fish in the population. Some fish stocking does occur in the upper drainages on National Forest land, but little or no stocking has taken place on the lower river in the Resource Area in the recent past. Recent surveys by the IDFG indicate the Big Lost River below Mackay Reservoir has an excellent population of trophy-sized (>18 inches) rainbow trout and a good population of large brook trout. Like other areas in Idaho, fishing pressure on the Big Lost River is steadily increasing.

The Big Lost River is beset by a number of problems impacting the fishery. Sections of streams in the upper watershed show damage by livestock grazing, which is aggravated by natural factors such as heavy surface runoff caused by rapid spring snowmelt and high intensity localized summer storm events. Riverbank erosion along the Big Lost River is the major problem contributing to water quality degradation and sedimentation of fisheries and macroinvertebrate habitat in the river and Mackay Reservoir. In some localized areas of the lower reach, winter icing contributes to bank and channel damage and, in some cases, winter fish kill. In the Chilly Sinks reach, the surface water sinks underground during the late summer leaving a dry channel, thus allowing only a transitory fish population during high flow periods.

Only two streams in the Big Lost River drainage within the Challis Resource Area presently have adequate habitat for good salmonid fishery production. These are the upper mainstem of the Big Lost River and Thousands Springs Creek. However, Burnt Creek and Grant Creek both have an adequate supply of year round flow to potentially maintain a small resident trout fishery if habitat conditions could be improved. Mackay Reservoir also provides a good put-and-take fishery for rainbow trout and kokanee salmon. It is known as one of the best ice fishing lakes in the region.

Of the first 6.5 miles of the Big Lost River below the Sawtooth National Forest boundary, 5.7 miles are on public land. The remainder of the Big Lost River through the Resource Area is privately owned, with the exception of approximately 2.7 miles of fragmented and scattered stream segments. These isolated parcels are difficult to effectively manage. Thus, management emphasis is focused on the resident trout fishery in the upper 5.7 miles.

The Thousand Springs Creek area is unique, being comprised of an extensive wetlands with a spring-fed stream. Approximately 2.65 miles of stream are on public land above the confluence with the Big Lost River, and more is being acquired through land exchanges and purchase. This stream currently contains a good population of rainbow trout and brook trout.

Nine minor tributary drainages feed the upper Big Lost River on public land: Deep Creek, Twin Bridges Creek, Lake Creek, Garden Creek, Bady Creek, Pinto Creek, Bartlett Creek, Rock Creek, and Talman Creek. During base flow conditions in the late summer, the surface flow at the mouth of these streams is reduced or completely dewatered. As the result of low flows and poor riparian

conditions due to adjacent land use activities, the fishery condition in these streams is poor. Although these streams have little fisheries potential, all contribute to sedimentation in the Big Lost River.

The upper portion of the Big Lost River is relatively straight with very little meandering. Most of the stream is shallow, fast-flowing riffle-type habitat with limited pool development. The few pools that are present are behind large boulders and the occasional debris jam. The pool:riffle ratio ranges from 10:90 to as high as 30:70 and appears to improve as the river moves downstream. Spawning habitat for resident trout is minimal in this section of river and is the most limiting factor for trout production in this section of river.

Overall, the existing fishery condition on this 5.7 miles of stream is rated as fair to good with a moderate to high fishery improvement potential. Recent surveys by the IDFG indicate a fair population of resident trout. However, the last several years of fishery data suggest that this section of river is not responding to the special management regulations in place, and further analysis is needed.

Thousand Springs Creek: Thousand Springs Creek originates from numerous small springs on private land and flows approximately 14 miles in a southeasterly direction, where it enters the Big Lost River approximately 7 miles above Mackay Reservoir. Approximately 2.65 miles of this stream are presently on public land. However, negotiations with the existing landowners are taking place to try and acquire more of this unique environment and place it under BLM management. The entire course of Thousand Springs Creek is a unique wetland unlike any other in the Challis and Lemhi Resource Areas.

There are essentially two separate fish populations in Thousands Springs. The stream flows above ground from the source downstream approximately 5 miles where it sinks and re-emerges a short distance downstream. The upper area has only rainbow trout. All of the known spawning habitat in the upper reach occurs on private land within 200 yards of the spring source, and 90% of all the fish occur in the first 1.0 mile of stream below the source. Thousand Springs Creek re-emerges approximately 4.5 miles above its confluence with the Big Lost River where it is locally known as Whiskey Springs. Suitable spawning habitat is available in the two miles of stream above the confluence with the Big Lost River. This lower section is a series of pools and riffles with a gravelly substrate, as opposed to the upper area which is heavily silted and shallow. The lower reach contains primarily brook trout and a few rainbow trout.

Mackay Reservoir: Mackay Dam was constructed in 1917 and its source of water is the Big Lost River. The reservoir has a surface area of 1,341 acres and a full capacity of 45,050 acre-feet. When filled to the spillway elevation, it has a maximum depth of 65 feet.

The reservoir is stocked with rainbow trout and kokanee salmon and provides a good put-and-take fishery. It also has the reputation of being one of the best ice fishing lakes in the region. The Big Lost River, Warm Spring Creek, and Parsons Creek are vital to these fish as spawning and nursery areas.

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Appendix C: Fisheries

Item 6: Anadromous and Resident Fish Life Histories and Habitat Requirements

Anadromous Fish Species

The general life history for all anadromous species in the upper Salmon River is similar (see *Table C-1*). Young fish are spawned in the tributaries and reared in their natal waters for 1 to 3 years before migrating back to the Pacific Ocean in April and May. After maturing for 1 to 3 years in the ocean, the adults swim up to 850 miles to return to their natal streams to spawn and complete their life cycle.

Chinook salmon in the upper Salmon River are considered "spring" or "summer" stocks depending on the time they leave the ocean and enter the Columbia River. Spring chinook destined for the upper Salmon River enter the Columbia River during March through May, arrive in the Challis area in June and July, and spawn in August to September. Historically, the runs were comprised of exceptionally large 4 and 5 year old fish (Bjornn *et. al.* 1960). The eggs incubate in the gravel until December, with fry emerging in February and March. Juvenile rearing extends until the spring (March and April) of the second year when the fish are about 4 to 5 inches long (BPA 1991). Summer chinook enter the Columbia River in late May, June, and early July, arrive in the mainstem Salmon River and lower East Fork Salmon River in mid-July to August, and spawn in September and early October. Spring chinook tend to spawn in smaller tributaries and the East Fork Salmon River, while summer chinook tend to spawn entirely in the mainstem Salmon River, the East Fork Salmon River, and the Pahsimeroi River.

Steelhead rainbow trout of the upper Salmon River and its tributaries are termed "summer" steelhead because they enter the Columbia River in June through August. Arrival in the Challis area is not until the following spring, after the fish have overwintered lower in the main Salmon River, usually near the town of North Fork, Idaho. Steelhead spawning occurs in April and May. Fry emerge from redds in early July and rear the rest of the summer in their natal streams. When water temperatures cool in September and October, the young fish either overwinter in their natal streams, if adequate habitat is available, or migrate downstream to the Salmon River to overwinter. The following spring many of the fry will smolt and migrate to the ocean. Those that have not sufficiently matured will migrate back up a tributary and spend another year before migrating to the ocean. Approximately 80% of the Salmon River steelhead rainbow trout will remain in the ocean for one year, while the remaining 20% will spend two years in the ocean before returning to the Salmon River to spawn.

Sockeye salmon migrate through the Resource Area in mid-July and August and spawn in Redfish Lake in September and October. The smolts are reared in Redfish Lake after hatching and outmigrate two years later, moving down the Salmon River to the ocean during high spring flows (April through May).

Table C-1: Anadromous Fish Species Life Histories and Habitat Requirements

Life Cycle/Habitat	Spring Chinook	Summer Chinook	Steelhead Trout	Sockeye Salmon
adult fish age at maturity (years)	mostly 4 and 5 some 3	3 to 5	mostly 4 and 5	mostly 4 and 5
time in ocean (years)	1 to 3	1 to 3	1 to 2	1 to 3
return migration to Upper Salmon River	June to July	mid-July to August	Oct. to May	mid-July to August
spawning	August to early September	September to early October	April to mid-June	August to September*
preferred size of spawning gravels (inches)	3 to 6	3 to 6	1/2 to 4	n/a*
redd size	16 square yards	16 square yards	6.5 square yards	n/a*
egg incubation, hatching, and emergence	August to March	September to April	April to mid-July	n/a*
young fish rearing - time in fresh water (years)	1	1	mostly 2 some 1 and 3	1 or 2
out-migration to ocean	majority in April and May	majority in April and May	majority in April and May	most in May
food habits	Young chinook and steelhead eat mostly aquatic macroinvertebrates and terrestrial insects.			Young sockeye live only in Redfish Lake (outside the Challis Resource Area) and feed on plankton.

Sources: Bell 1973; Bjornn, *et. al.* 1968; Bruner 1951; Orcutt, *et. al.* 1968; White and Cochnauer 1975; and Parkhurst 1950.

*Sockeye salmon migrate through waters within the Challis Resource Area boundary, but do not spawn or rear young fish in RA waters.

Resident Fish Species

The waters of the upper Salmon River and its tributaries are used by several economically important resident fish species for movement, spawning and rearing. All phases of these species' life histories are spent in these waters, as opposed to anadromous fish which migrate to the ocean for a part of their lives. Bull trout, westslope cutthroat trout, and rainbow trout are discussed further in this section. *Table C-2* describes the general life histories and habitat requirements for rainbow trout, westslope cutthroat trout, brook trout, bull trout, and mountain whitefish.

Bull trout are found throughout the Salmon River drainage, as well as portions of the Big Lost River and Little Lost River drainages. However, although bull trout may be present in these river systems, their distribution is highly disjunct, primarily as a result of diversions or other artificial obstructions which adversely affect distribution and abundance. Bull trout populations are generally only present in upper stream reaches of tributaries of the Salmon River (see *Appendix C, Item 1: Game Fish Species Distribution*). Bull trout spawn in the fall in spring areas or areas of clean gravel and cold water. Eggs incubate through the fall, and fry and juvenile rearing occurs in natal streams. Adults move from stream to stream, if possible, in their search for spawning and rearing areas. Where these fish occur, the streams are used for spawning, rearing, and migration. Important habitat requirements for these fish, as defined in the *State of Idaho Bull Trout Conservation Plan* (Batt 1996), include good bank and channel stability, unsedimented substrate, good cover, temperatures below 59 °F, and uninterrupted migration corridors. If any of these factors are compromised, then the ability of this species to survive in its habitat is adversely affected.

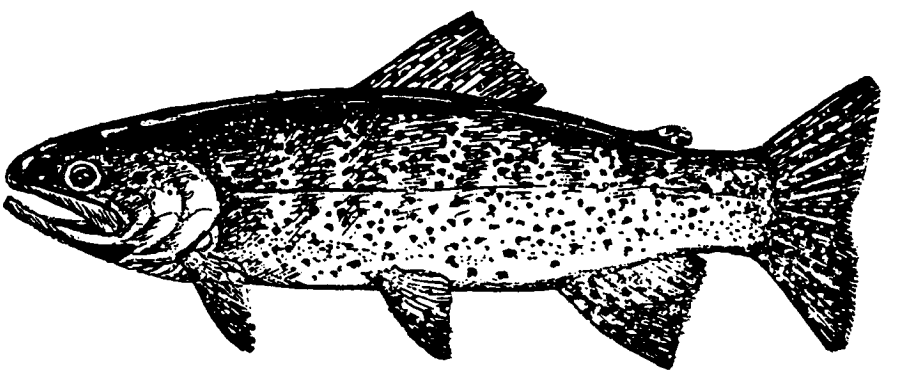
Westslope cutthroat trout are found throughout the Salmon River drainage, either naturally or as hatchery plants, and are sought after as sport fish. Cutthroat trout populations are highly disjunct, for the same reasons bull trout populations are disjunct; the two species are often found concurrently within the same stream. Westslope cutthroat trout habitat requirements are approximately the same as for the bull trout, although they do not need extremely cold and high quality waters to survive. Cutthroat trout spawn in the spring, in clean gravel areas and during spring high flows, with incubation occurring over the summer months. Rearing of emergent fry occurs in the natal stream with adults moving less than bull trout, although some movement does occur between systems.

Rainbow trout follow a similar pattern as cutthroat trout, although they do not require as high quality habitat as bull trout or cutthroat trout. They appear able to withstand higher temperatures and sediment loads. Rainbow trout spawn in the spring, in clean gravel areas and during spring high flows, with incubation occurring over the summer months. Fry emerge from redds in early July and rear the rest of the summer in their natal streams. When water temperatures cool in September and October, the young fish either overwinter in the natal streams, if adequate habitat is available, or migrate downstream to the Salmon River to overwinter. They will move back into tributary streams as conditions permit. Many steelhead rainbow trout (see "Anadromous Fish Species" above) will remain in the Salmon River drainage as resident fish and live out their lives without migration to the sea.

Table C-2: Resident Fish Species Life Histories and Habitat Requirements

Life Cycle/Habitat	Rainbow Trout	Westslope Cutthroat Trout	Brook Trout	Bull Trout	Mountain Whitefish
Spawning	April to June	May to June	Sept. to Nov.	Sept. to October	October to January
Egg Incubation, Hatching, and Emergence	April to July	May to July	Sept. to April	Sept. to April	October to early May
Age at Maturity	3 to 4 years	3 to 4 years	3 to 4 years	4 to 6 years	3 to 4 years
Preferred Size of Spawning Gravels	1/4 to 1-1/2 inches				Whitefish broadcast spawn over gravel and cobble bottoms.
Food Habits	All trout fry initially feed on zooplankton and very small aquatic macroinvertebrates. Their diet gradually changes to progressively larger insects, aquatic macroinvertebrates, and crustaceans. As they grow larger, rainbow and cutthroat trout consume some small fish. Bull trout become very predaceous on small fish and anadromous fish eggs during spawning.				Whitefish are bottom feeders, eating primarily aquatic macroinvertebrates. They will also take small terrestrial insects on the surface and occasionally even a small fish.

Sources: Bell 1973; Bjornn, *et. al.* 1968; Bruner 1951; Orcutt, *et. al.* 1968; and White and Cochnauer 1975.



Westslope cutthroat trout

Appendix C: Fisheries

Item 7: Stream Characteristics of Surveyed Fisheries Streams of the Challis RA

Stream	% Gradient	Average Width (feet)	Average Riffle Depth (inches)	Average Pool Depth (inches)	Pool: Riffle Ratio	Pool Quality		Spawning Gravels (sq. yds.)		Surface Fines (1995-1996 data)	Shade[1]	Low Bank Cover[1]	Stream-bank Stability[1]	Channel Stability[1]	In-stream Cover[1]
						Classes 1, 2, 3	Classes 4, 5	Good	Marginal						
Salmon River	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Allison Cr.	7.4	6	6	9.5	15:85	8%	92%	0	64.5	>20%	F	G/F	F	G/F	G/F
McKim Cr.	6.8	11	9	18.0	36:64	23%	77%	45.0	19.0	>20%	F	G/F	G	G/F	G
Morgan Cr.	2.2	15	6	20.0	58:42	38%	62%	60.0	217.0	15.4%	F/P	G/F	E	G	G/F
Challis Cr.	1.5	17	8	--	20:80	--	--	1,444	11,435	--	F/G	G/F	F	G/F	--
Bayhorse Cr.	5.0	13	10	--	36:64	--	--	384	688	5.1%	G	G	G/E	G	--
Squaw Cr.	1.5	24	10	--	33:67	--	--	3,244	10,435	13.9%	F/G	F/G	G/F	G/F	--
Thompson Cr.	2.2	19	10	--	20:80			1,244	3,168	14.8%	G	G	F	F	--
L. Pahsimeroi R.	0.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--
U. Pahsimeroi R.	2.0	18.3	15	24.0	42:48	48%	52%	0.0	80.0	18.3%	F/P	G/F	F/P	G/F	G/F
Big Cr.	2.4	17	9	14	37:63	15%	85%	0.0	0.0	<20%	G/F	G/F	G/F[3]	E/G	G/F
Burnt Cr.	1.9	6	5	13.0	44:56	9%	91%	48	57	27.7%	P	F/P	F/G	F/P	P
Goldburg Cr.	1.5	12.9	10	18.4	37:63	100%	0%	10.3	0.0	>20%	F	E/G	G/F	F	F
Mahogany Cr.	3.7	6	5	14.0	56:44	15%	85%	18.5	27.8	>20%	F/P	F	F	F	F
L. Morgan Cr.	5.0	13	9	15.0	40:60	13%	87%	73.0	19.0	>20%	G	G	G/F[3]	G	G
Patterson Cr.	1.7	18	10	16.0	50:50	12%	88%	0.0	0.0	<20%	F	G	G	E/G	G/F
Summit Cr. - (Little Lost R.)	0.5	14.8	10	2.2	50:50	100%	0%	--	abundant	<20%	E	E	E	E	E

Stream	% Gradient	Average Width (feet)	Average Riffle Depth (inches)	Average Pool Depth (inches)	Pool: Riffle Ratio	Pool Quality		Spawning Gravels (sq. yds.)		Surface Fines (1995-1996 data)	Shade[1]	Low Bank Cover[1]	Stream-bank Stability[1]	Channel Stability[1]	In-stream Cover[1]
						Classes 1, 2, 3	Classes 4, 5	Good	Marginal						
East Fork Salmon River	--	--	--	--	--	--	--	--	--	>20%	<20%	G	F/G	G	G
Herd Cr.	1.2	19	14[a]	6[b]	26:74	--	--	9,117	20,888	17.8%	33%	G[2]	F/G[2]	G/F[2]	G[2]
Lake Cr.	4.2	7	6[a]	3[b]	28:72	--	--	65	435	30.2%	80%	G	G	G	G
Big Lake Cr.	4.7	7	9[a]	2.5[b]	20:80	--	--	1,075	1,368	<20%	78%	G	G	G	G
Big Boulder Cr.	4.5	16	13[a]	5[b]	28:72	--	--	20	126	<20%	68%	G	G	G	G
Little Boulder Cr.	5.0	19	14[a]	3.5[b]	32:68	--	--	29	281	<20%	85%	G	G	G	G
Road Cr.	--	--	--	--	--	--	--	0	unk.	36.2%	<20%	F	G	F/P	F/P

Sources: Challis Unit Resource Analysis, Volume 2, Fisheries Section; Summer, 1994 stream surveys of the Challis RA; and Summary of 1997 Field Inventory - updated to reflect monitoring and condition assessments from 1993 through 1997.

[1] E = Excellent; G = Good; F = Fair; P = Poor

[2] bank stability, channel stability, bank cover, and instream cover are all fair to poor on private land. Along Herd Creek, streambank stability is good on public lands and fair on private lands

[3] Streambank stability along Big Creek and Little Morgan Creek in the Upper Pahsimeroi River is good in the upper section and fair in the lower section.

[a] column data are average depth (inches)

[b] column data are maximum pool depth (feet)

Appendix C: Fisheries

Item 8: Irrigation Diversion Structures

Within the Challis Resource Area there are at least 21 screened and 43 unscreened water diversion structures for agricultural purposes on anadromous and resident fisheries streams. These diversions are in direct conflict with Resource Area fishery management goals and objectives for the following reasons: (a) many are unscreened, allowing fish to be diverted into ditches and canals where they eventually perish; (b) many diversions completely dewater sections of a stream for several weeks or months out of the year, making anadromous fish migration in and out of some streams impossible and providing only a transitory fish population in these sections; (c) reduced flows below diversions reduce available fish habitat, degrade other habitat features, and increase water temperature above optimal levels; and (d) the numerous screened diversions can significantly slow down the migration of anadromous smolts, reducing their chance of successfully reaching the ocean.

The BLM is presently coordinating with the Idaho Department of Fish and Game, Bonneville Power Administration, and National Marine Fisheries Service to delineate all diversions on BLM public lands and to prioritize a construction program for screening all unscreened diversions and replacing existing screens that are in poor condition or otherwise inoperable. The BLM needs to coordinate with the Idaho Department of Water Resources in a program to gate all diversions so that only the legal water right is diverted, retaining adequate instream flows for fish and wildlife values. Instream flow rights need to be filed for on all important fishery streams in the Resource Area.

Many irrigation diversions are present along the mainstem Salmon River and nearly all of its tributaries in the Challis Resource Area. *Table C-3* lists the number of known diversions on important fishery streams and rivers on BLM public lands in the Challis Resource Area, and their relative impact on the flow at the stream's mouth. (**Note:** Streams not listed have no known diversions on Challis RA public lands. Diversions located on private and U.S. Forest Service lands are not identified in *Table C-3*, although those diversions create the same negative effects on fish and aquatic habitat discussed in this section.) The location of these structures and the relative amount each diverts are presently being researched. During years of extremely low flows, many diversion structures extend across the entire Salmon River, although none prevent anadromous fish migration on the river.

Dewatering of streams for agricultural purposes is widespread in the tributaries of the mainstem Salmon River. The irrigation demand is at its peak when stream flows are at their lowest. This situation generally eliminates fish migration into and out of most tributaries, while the reduced flows decrease the overall carrying capacity and associated salmonid production in most of these tributaries and the main Salmon River. Several stream sections on public land are totally dewatered for irrigation, eliminating all fish and aquatic life for several months out of the year. Other streams also have the potential to be completely dewatered, depending on the annual precipitation and surface water available in a given year.

Water diversions have six negative impacts on fish: (1) loss of water results in a direct loss of habitat; (2) low flows degrade essential habitat features for all aquatic life; (3) water flow reductions cause increases in water temperature; (4) fish (especially outmigrating steelhead trout and chinook salmon smolts) are killed when stranded in irrigation ditches and fields as the result of unscreened diversions; (5) diversion structures and/or dewatering retard or prevent upstream migration of anadromous fish; and (6) the numerous screened diversions can significantly slow down the outmigration of anadromous smolts, reducing their chance of successfully completing the journey.

Table C-3: Irrigation Diversion Structures on Challis RA Public Lands

Drainage/Stream	# Screened	#Unscreened	Status at Mouth
Salmon River	11	3	n/a
Bayhorse Creek	0	2	reduced flow
Challis Creek	0	1	reduced flow
Eddy Creek	0	1	dry
Cow Creek	0	2	reduced flow
Lyon Creek	0	2	reduced flow
McKim Creek	0	1	reduced flow
Morgan Creek	0	2	dry
Squaw Creek	0	1	reduced flow
Pahsimeroi River	n/a/	n/a	n/a
Little Morgan Creek	0	1	dry
Tater Creek	0	1	dry
Morse Creek	0	2	dry
Falls Creek	0	2	dry
Patterson Creek	0	3	dry
Big Creek	0	2	dry
Ditch Creek	0	1	dry
Goldburg Creek	0	unknown	reduced flow
Big Gulch Creek	0	unknown	reduced flow
Donkey Creek	0	1	dry
Upper Pahsimeroi River	0	1	dry
Mahogany Creek	0	1	reduced flow
Sulphur Creek	0	1	dry
Trail Creek	0	1	dry
Lawson Creek	0	1	dry
East Fork Salmon River	6	2	reduced flow
McDonald Creek	0	1	dry
Fox Creek	0	1	dry
Herd Creek	1	0	reduced flow
Big Boulder Creek	2	0	reduced flow
Little Boulder Creek	0	1	reduced flow
Big Lake Creek	1	1	reduced flow
Road Creek	0	4	reduced flow

Appendix D: Land Tenure and Access

Item 1: Withdrawal Status of Campgrounds and Recreation Sites*

Site Description	Site Location		Acreage
Mackay Reservoir	T. 7N.,R.23E.;	Sec. 1: SWSW	40.00
		Sec. 2: SESE	40.00
Black Daisy Recreation Site[1]	T. 7N.,R.23E.;	Sec.11: SESE	40.00
Pinto Creek Rec. Site (Garden Creek)	T. 8N.,R.21E.;	Sec.30: Lot 2	51.69
Upper East Fork Campground (Little Boulder Creek)	T. 9N.,R.17E.;	Sec.22: SESW	40.00
		Sec.27: NWSW	40.00
		Sec.28: SWSE	40.00
Fox Creek Campground[1]	T. 9N.,R.18E.;	Sec. 3: Lot 3	39.39
		Lot 4	39.00
Lake Creek Picnic Site	T. 9N.,R.19E.;	Sec.23: SESE	40.00
Ziegler's Hole Recreation Site[1]	T.10N.,R.18E.;	Sec.24: SESW	40.00
Jimmy Smith Lake Campground	T.10N.,R.18R.;	Sec.30: Lot 4	38.19
Clayton Ranger Station Campground[1]	T.11N.,R.17E.;	Sec.29: Lot 11	37.30
		Sec.30: Lot 10	37.10
East Fork Recreation Site	T.11N.,R.18E.;	Sec.22: Lot 5	29.39
Birch Creek Recreation Site[1]	T.11N.,R.18E.;	Sec.22: Lot 8	38.43
Spud Creek Rec. Site[1]	T.11N.,R.18E.;	Sec.22: Lot 11	25.89
		Sec.27: Lot 1	33.65
		Lot 2	0.92
		Sec.28: Lot 2	45.26
		Lot 3	44.05
Summit Creek Rec. Site	T.11N.,R.25E.;	Sec.22: NENE	40.00
		Sec.23: NWNW	40.00
Bayhorse Creek Rec. Site	T.12N.,R.18E.;	Sec. 2: S2SESE	20.00
		Sec.11: N2NENE	20.00

(continued)

Site Description	Site Location		Acreage
Deadman Hole Recreation Site	T.12N.,R.19E.;	Sec.19: Lot 7	28.42
		Sec.30: Lot 1	32.30
		Lot 2	34.75
		Lot 3	41.38
Wood Creek Recreation Site (Dugway)	T.12N.,R.19E.;	Sec. 6: Lot 13	26.14
Double Springs Recreation Site[1]	T.12N.,R.23E.;	Sec.31: Lot 4	34.47
Round Valley Rec. Site (Challis Bridge)	T.13N.,R.19E.;	Sec.10: Lot 6	15.31
		Lot 7	33.80
Morgan Creek Recreation Site	T.16N.,R.19E.;	Sec.33: Lot 2	35.10
Mike Ellis Bridge Recreation Site[1]	T.16N.,R.20E.;	Sec.34: Lot 3	12.10
		Lot 4	24.80
		Lot 7	44.75
		Sec.35: Lot 1	23.15
Cow Creek Recreation Site[1]	T.16N.,R.21E.;	Sec. 8: Lot 4	41.71
		Lot 5	46.80
Cronk's Canyon Recreation Site[1]	T.16N.,R.21E.;	Sec. 8: Lot 8	52.00
		Sec.17: Lot 1	23.52
		Total	1,450.76

* Includes lands segregated from Homestead Entry, Desert Land Entry, Indian Allotment, Public Sale, and the General Mining Laws.

[1] Recreation site is not developed at present.

Appendix E: Legislation

Item 1: Expanded Description of Legislation Relevant to the Challis RMP

American Antiquities Act of 1906 (P.L. 59-209; 34 Stat. 225; 16 U.S.C. 432, 433). Chronologically and philosophically the basis legislation for the protection and preservation of cultural properties (archaeological and historic, without regard to minimum age) on Federal lands. It provides for permits to authorize scholarly use of properties, for misdemeanor-level penalties to control unauthorized use, and for Presidential designation of outstanding properties as national monuments for long-term preservation.

American Indian Religious Freedom Act of 1978 (P.L. 95-341; 92 Stat. 469; 42 U.S.C. 1996). The Act resolves that is shall be the policy of the United States to protect and preserve for the American Indian, Eskimo, Aleut, and Native Hawaiian the inherent right of freedom to believe, express, and exercise their traditional religions, including but not limited to access to religious sites, use and possession of sacred objects, and freedom to worship through ceremonials and traditional rites.

Archeological and Historic Preservation Act of 1974 (P.L. 93-291; 88 Stat. 174; 16 U.S.C. 470). Amends the Reservoir Salvage Act of 1960 and expands the National Historic Preservation Act of 1966 by authorizing agency funds for survey of archaeological sites and the recovery of significant archaeological materials caused by any alteration of terrain from any Federal action.

Archeological Resources Protection Act of 1979 (P.L. 96-95; 93 Stat. 721; 16 U.S.C. 470aa *et seq.*) as amended. Act provides for felony-level penalties, more severe than those of the American Antiquities Act of 1906, for the unauthorized or attempted unauthorized excavation, removal, damage, alteration, or defacement of any archaeological resource more than 100 years of age, found on public lands or Indian lands. The Act also prohibits the sale, purchase, exchange, transportation, receipt, or offering of any archaeological resource obtained from public lands or Indian lands in violation of any Federal law.

Clean Water Act of 1977. Provides for protection, restoration, or improvement of water quality, including riparian/wetland areas.

Emergency Wetland Resources Act of 1986. Promotes the conservation of riparian/wetland areas by intensifying cooperative efforts among state, private, and Federal interests.

Endangered Species Act of 1973. A Federal law requiring all Federal departments and agencies to conserve species listed by the Secretary of the Interior or Secretary of Commerce as threatened or endangered, to ensure that the continued existence of listed species is not jeopardized and that designated critical habitat of listed species is not destroyed or adversely modified. Requires consultation with the U.S. Fish and Wildlife Service or National Marine Fisheries Service if it is determined that any BLM action may affect a listed species or its habitat.

Executive Order 11593 ("Protection and Enhancement of the Cultural Environment," 36 F.R. 8921, May 13, 1971). This order directs Federal agencies to inventory cultural properties under their jurisdiction, to nominate to the National Register of Historic Places all Federally owned properties that meet the criteria, to use due caution until the inventory and nomination processes are completed, and to assure that Federal plans and programs contribute to the preservation and enhancement of non-Federally owned properties.

Executive Order 11987 of May 1977 (Exotic Organisms). Directs Federal agencies, to the extent permitted by law, to restrict the introduction and/or importation and funding of exotic species into natural ecosystems on the lands they administer. It also encourages state and local governments and private citizens to prevent introduction of exotic species.

Executive Order 11988 of May 1977 (Floodplain Management). A Federal executive order, signed by the President, directing Federal agencies to evaluate the potential effects of their actions on floodplains and to ensure that their planning programs and budget requests take flood hazards and floodplain management into account. Requires Federal agencies to take actions to reduce the risk of floodplain loss, minimize the impacts of floods, and restore and preserve the natural and beneficial values of floodplains.

Executive Order 11989 of May 1977 (Off-road Vehicle Use). A Federal executive order, signed by the President, directing Federal agencies to close areas to off-road vehicle use whenever it is determined that use of ORVs is causing or will cause considerable adverse impact on soil, vegetation, wildlife, wildlife habitat, or certain other resources on public lands.

Executive Order 11990 of May 1977 (Protection of Wetlands). A Federal executive order, signed by the President, directing Federal agencies to minimize the destruction, loss, and degradation of wetlands, and to preserve and enhance the beneficial values of wetlands.

Executive Order 12088 of 1978 (Federal Compliance with Pollution Control Standards). Requires Federal compliance with pollution control laws.

Executive Order 12372 (Intergovernmental Review of Federal Programs). Requires Federal agencies to provide an opportunity for review of Federal programs and activities by other appropriate affected levels of government.

Executive Order 13007 of May 1996 (Indian Sacred Sites) - Directs Federal agencies with responsibility for managing Federal lands to (1) accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and (2) avoid adversely affecting the physical integrity of such sacred sites.

Federal Land Policy and Management Act of 1976 (FLPMA) (P.L. 94-579). A Federal law that establishes public land policy and establishes guidelines for its administration, to provide for the management, protection, development, and enhancement of the public lands. Requires that public lands be managed in a manner that will protect the quality of ecological, environmental, and water resource values, among others, including riparian/wetland areas. Regarding fish and

wildlife resources, FLPMA directs that the public lands be managed in a manner that will provide food and habitat for fish and wildlife. FLPMA identifies "fish and wildlife development and utilization" as a principal land use and authorizes designation of ACECs to protect and prevent damage to fish and wildlife and other resources. Section 201(a) provides for the preparation and maintenance of an inventory of public land resources on a continuing basis. Section 401(b)(1) authorizes the use of Range Betterment Funds for the protection, maintenance, rehabilitation, improvement, and management of wildlife habitat.

Federal Regulations: 43 CFR 3809. Locatable mineral development on BLM-managed public lands is subject to the 43 CFR 3809 regulations which are authorized by the Federal Land Policy and Management Act of 1976. Three thresholds of development are recognized: casual use, Notice level, and Plan of Operations level. Casual use level operations include activities which cause no, or minimal, surface disturbances, such as claim staking, work with hand tools, and some underground work. Operations in excess of casual use are required to file a "Notice" to the BLM at least 15 days prior to the start of operations. The BLM does not approve or disapprove a properly submitted Notice, but merely reviews the Notice and informs the miner how to avoid "unnecessary or undue degradation" to public lands and resources. Mining operations which require Plans of Operation instead of Notices are: surface disturbance in excess of five acres, non-casual use operations in special category areas (wild and scenic river corridors, areas designated "closed" to off-road vehicle use, designated wilderness areas administered by the BLM, and ACECs), and non-complying miners operating under a Notice. The filing of a Plan of Operations requires that an environmental assessment be prepared by the BLM prior to the start of mining. Mitigation measures and reclamation bonding are often required as part of the approval of the Plan. All operations are required to prevent unnecessary or undue degradation to the public lands and resources and to abide by all applicable Federal, State, and local laws and regulations.

Fish and Wildlife Coordination Act of 1958. Requires that wildlife conservation be coordinated within water-resource development programs, that possible damage to fish and wildlife resources from work planned in navigable waters and drainages be assessed, and that measures be adopted to prevent such losses or damages. Provides for development and improvement of wildlife and fisheries resources.

Food Security Act of 1986. Provides incentives for riparian/wetland protection and restoration on farmlands.

General Mining Law of 1872. All metallic minerals, such as gold, silver, copper, and certain non-metallic minerals, such as gypsum, talc, and bentonite, on open unappropriated Federal lands, can be obtained by locating and perfecting mining claims under the General Mining Law of 1872, as amended. The location of mining claims, exploration and extraction of locatable minerals, and issuance of mineral patents on open public land is not a discretionary action of the BLM. Federal Regulations at 43 CFR parts 3700 and 3800 were issued to implement this act.

Geothermal Steam Act of 1970. This act authorized the leasing of geothermal resources and associated byproducts on public lands through competitive and noncompetitive leasing systems. This law is implemented by Federal Regulations promulgated at 43 CFR 3200. Leasing of geothermal resources is a discretionary action by the Department of the Interior, and such leases may be subject to any mitigation measures deemed necessary.

Historic Sites Act of 1935 (P.L. 74-292; 49 Stat. 666; 16 U.S.C. 461). Declares national policy to identify and preserve "historic sites, buildings, objects and antiquities" of national significance, providing a foundation for the National Register of Historic Places.

Land and Water Conservation Fund Act of 1964. Establishes a fund to preserve, develop, and assure access to outdoor recreation resources.

Materials Act of 1947. This law authorized discretionary disposal from public land and Federal mineral estate of certain common variety minerals such as sand and gravel, stone, clay, pumice, and volcanic cinders by sale. These mineral materials are sold at fair market value. Free use of these minerals can be permitted for non-commercial use by government and non-profit agencies. Federal Regulations found at 43 CFR 3600 further define this act.

Mineral Leasing Act of 1920. This law removed deposits of coal, oil and gas, sodium, phosphate, and oil shale from disposal under the General Mining Law of 1872 and made such deposits subject to a leasing system. Leasing of minerals under this act is discretionary and the Secretary of the Interior is given broad discretion in granting leases and permits. Federal Regulations at 43 CFR 3100 regulate oil and gas leasing. Regulations at 43 CFR 3500 give specifics for the management of solid leasable minerals other than coal or oil shale.

National Environmental Policy Act (NEPA) of 1969. A Federal act to declare a national policy which will a) encourage productive and enjoyable harmony between man and his environment; b) promote efforts to prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity; c) enrich the understanding of ecological systems and natural resources important to the nation; and d) establish a Council on Environmental Quality.

National Historic Preservation Act of 1966 (P.L. 89-665; 80 Stat. 915; 16 U.S.C. 470), as amended). Extends the policy in the Historic Sites Act to include state and local as well as national significance, expands the National Register of Historic Places, and establishes the Advisory Council on Historic Preservation, State Historic Preservation Officers, and a preservation grants-in-aid program. Directs all Federal agencies to take into account effects of their undertakings (actions and authorizations) on properties included in or eligible for the National Register of Historic Places.

Native American Graves and Repatriation Act of 1990 (P.L. 101-601; 104 Stat. 3048; 25 U.S.C. 3001). Directs Federal agencies and museums on the disposition, inventory, and repatriation of Native American human remains, associated funerary objects, and other cultural items.

Non-commercial Rock Collection. Federal Regulations at 43 CFR 8365.1-5(b)(2) allow for the free collection of reasonable amounts of "rock." Rock includes, but is not limited to, sand, gravel. cobbles, boulders, volcanic cinders, pumice, pumicite, and decomposed granite. This collection may be for personal and non-commercial use only. Collection may be made by hand or with hand tools only. Collectors are required to avoid unnecessary or undue degradation to public lands and associated resources, as defined by 43 CFR 3600.0-5(k).

Public Rangelands Improvement Act (PRIA) of 1978. A Federal law directing improvement of rangeland conditions in accordance with land use planning under FLPMA. PRIA directs development and maintenance of an inventory of range conditions and trends as part of FLPMA's inventory process and provides for establishment of Experimental Stewardship Program areas. PRIA also provides funding for rangeland improvements, which includes providing habitat for wildlife. PRIA requires consultation with State wildlife agencies and other individuals having scientific expertise and special knowledge of wildlife management.

Recreation and Public Purposes Act (R&PP Act). A Federal act authorizing the Secretary of Interior to lease or convey public lands for recreational and other public purposes under specified conditions of states or their political subdivisions, and to non-profit corporations and their associations.

Sikes Act of 1960. Authorizes preparation and implementation of joint BLM-State wildlife agency habitat management plans (HMPs).

Sikes Act of 1974. Provides for the conservation, restoration, and management of species and their habitats in cooperation with state wildlife agencies, including establishment of a hunting and fishing stamp program, with revenues to be spent upon lands on which fees are collected.

Taylor Grazing Act of 1934. A Federal law requiring the Secretary of the Interior to protect, administer, regulate, and improve grazing districts created in accordance with the Act; to regulate the use of grazing districts; to preserve the land and its resources from destruction or unnecessary injury; to provide for the orderly use, improvement, and development of the range; and to provide for cooperation with local stockmen associations, state land officials, and state agencies. Directs the Secretary of the Interior to stop injury to the public lands (including riparian/wetland areas) by preventing overgrazing and soil deterioration.

Water Quality Act of 1987. Establishes a program to manage nonpoint source pollution.

Wild and Scenic Rivers Act of 1968 (PL 90-542, as amended). Directs that selected rivers of the nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geological, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations. Resources or values identified as "Outstandingly Remarkable" shall be protected on eligible, suitable, and designated Wild and Scenic River segments.

Wild Free-Roaming Horse and Burro Act of 1971 (PL 92-195). A Federal law providing protection, management, and control of wild free-roaming horses and burros on public lands. This act requires that (1) management activities for wild horses be carried out in consultation with State wildlife agencies in order to protect the natural ecological balance of all wildlife species; and (2) any adjustments in forage allocations take into consideration the needs of all wildlife species.

Appendix F: Livestock Grazing

Item 1: Allotment Summary

Allotment	Class[1]	AUMs[2]	Acres[3]	Category[4]	Season of Use[5]	AMP Date[6]	# Permittees
Allison Cr.	C	532	12,227	M	May 01-Oct 21	11/09/84	4
Hat Cr.	C	1,214	20,374	I	May 10-Oct 28*	10/03/84	2
Morgan Cr.	CH	2,395	48,164	I	May 01-Jan 30*	03/01/72	10
Lawson Cr.	C	1,481	25,278	M	May 01-Oct 16*	11/08/84	5
Lit. Morgan	C	350	6,256	M	May 01-Dec 15*		1
Highway	H	74	1,389	M	May 16-Oct 31		2
Eddy Creek	CH	93	1,866	M	May 01-Nov 15*		1
Trail Cr.	C	277	5,327	M	May 01-Oct 20*		2
Spud Cr.	C	227	6,302	I	May 08-Jul 15	06/02/88	1
Falls Cr.	CH	545	13,485	I	May 01-Nov 15		3
Hamilton	C	60	321	I	May 11-Jul 10	10/18/88	1
Mahogany Cr.	C	113	1,957	M	May 10-Jul 31	02/15/85	1
Patterson Cr.	C	120	1,730	I	May 01-Jun 06	09/23/86	1
Grouse Cr.	CS	2,218	35,564	I	Apr 26-Jan 15		3
Meadow Cr.	C	240	2,809	M	May 27-Jun 26	01/29/85	1
Countyline	C	496	9,751	I	May 05-Jun 15	09/23/86	1
Mill Cr.	CH	155	3,308	M	May 01-Nov 15		1
Big Cr.	CH	396	3,752	I	May 01-Oct 31		1
L. Goldburg	C	196	4,960	I	May 16-Jun 15		1
Bear Cr.	CS	1,301	11,111	M	May 16-Nov 30	06/22/89	2
Pines/Elkhorn	CSH	1,840	19,787	I	May 16-Nov 15		4
Goldburg	CS	517	15,868	M	May 16-Aug 15		2
Donkey Hills	C	1,328	17,442	I	May 16-Oct 31		1
U. Pahsimeroi	C	2,867	23,273	I	Jun 16-Nov 30		1
Rock Cr.	C	162	1,470	M	Jun 01-Oct 15	03/27/87	1
Burnt Cr.	C	858	4,884	I	Jun 16-Sep 30		1
Dry Cr.	C	2,024	14,565	I	Jun 16-Sep 30		2
Summit Cr.	C	1,920	20,218	I	May 21-Oct 31		1
Round Valley	C	290	7,490	M	May 05-Sep 15	06/17/81	3
Garden Cr.	CH	631	22,720	M	May 15-Oct 14	04/24/81	2
Warm Springs[7]	C	4,295	60,173	I	May 01-Jan 15	05/22/81	1
Squaw Cr.	C	264	7,044	M	May 21-Oct 15*	12/03/81	1
Eastfork	C	288	14,761	I	May 21-Jun 10	02/19/82	2
Bayhorse	C	156	9,305	I	May 15-Jul 15	04/21/81	1
Bald Mountain	CH	446	15,951	M	May 10-Oct 15	04/21/81	2
Bradshaw Bas.	C	475	7,493	M	May 16-Jul 15	04/21/81	4
Bradbury Flat	C	414	15,705	I	May 16-Sep 27	12/01/82	3
Mountain Sprgs [7]	C	8,375	81,600	I	May 11-Oct 15	01/15/82	1
Road Cr.	C	259	7,730	M	May 16-Aug 28	05/20/81	2
Herd Cr.	C	1,035	21,502	I	Jun 16-Oct 31	02/26/75	2
Stanley B. Tr.	C	42	160	C	May 29-Nov 01*	Unsigned	2
Challis Cr.	C	139	4,079	M	May 25-Jun 14	04/21/81	2
Lime Cr.	C	140	2,440	C	May 15-Oct 15	04/14/80	1
Pennal Gulch	C	94	3,573	I	May 15-Sep 12	01/12/81	1
Spud Cr.	C	236	8,856	M	May 10-Jul 12	04/21/81	1
Thompson Cr.	C	43	5,595	I	May 25-Aug 15	12/19/80	1

Allotment	Class[1]	AUMs[2]	Acres[3]	Category[4]	Season of Use[5]	AMP Date[6]	# Permittees
Pine Cr.	C	153	4,523	M	May 23-Jun 30	09/27/82	1
Sullivan Cr.	CH	57	2,866	C	May 11-Oct 15*	04/21/81	1
French Cr.	C	28	988	C	Jun 01-Aug 15	01/22/82	1
Split Hoof	C	187	8415	M	May 16-Jun 15	09/04/81	1
Arentson Gulch	C	448	6,131	M	May 20-Sep 25	07/09/86	1
Dickey	C	570	5,333	M	May 18-Sep 30	01/27/87	2
Whiskey Spr.	C	280	5,539	I	May 10-Jul 09	03/20/72	1
Mackay	CH	1,497	17,191	I	May 01-Dec 15	08/30/84	6
Asay	C	108	819	C	May 11-Jul 25		1
Woodbury	C	30	80	C	Nov 01-Nov 30		1
Copper Basin	C	1,255	21,259	M	May 15-Oct 26*		9
Boone Creek	CH	714	9,826	I	May 15-Oct 26		5
Wildhorse	CH	2,096	24,642	I	May 07-Oct 10*	10/19/84	8
Sage Creek	C	1,023	5,996	I	May 16-Sep 30		3
Thousand Spr. [7]	C	881	5,670	I	May 01-Dec 25*	10/01/85	1
Willow Creek	C	121	1,439	C	Jun 11-Jul 10		1
Totals		**51,069**	**750,332**				

[1] C=Cattle, H=Horses, S=Sheep.
[2] Active preference in AUMs as of 1991, when the Challis RMP was started.
[3] Acres of BLM public land within the allotment boundary.
[4] Categories: M = maintain, I = improve, C = custodial (see *Glossary* definition: allotment categorization).
[5] Earliest date on allotment to latest date livestock are permitted.
[6] Date AMP was approved by the BLM (for allotments with an AMP).
[7] Data for the Warm Springs, Mountain Springs (San Felipe) and Thousand Springs allotments were updated to reflect a new Ecological Site Inventory completed during the 1994 field season.

* Split season; livestock are not on the allotment for the entire time shown.

Appendix F: Livestock Grazing

Item 2: Range Condition Summary by Allotment

Allotment Name	No.	Categ.[1]	Acres	Poor[2]	Fair[2]	Good[2]	Excel.[2]	Unclass.[2]
Allison Creek	4409	M	12,227	2,893	2,996	6,076	262	0
Hat Creek	4410	I	20,374	7,063	5,767	5,865	0	1,679
Morgan Creek	4411	I	48,164	7,548	23,210	12,795	794	3,817
Lawson Creek	4412	M	25,278	3,806	11,104	9,444	0	924
Little Morgan Creek	4413	M	6,256	0	3,064	2,044	284	864
Highway	4414	M	1,389	0	1,389	0	0	0
Eddy Creek	4415	M	1,866	936	624	0	0	306
Trail Creek	4501	M	5,327	81	1,437	2,381	1,377	51
Spud Creek	4502	I	6,302	53	3,392	1,625	356	876
Falls Creek	4503	I	13,485	5,831	6,466	1,188	0	0
Hamilton	4504	I	321	321	0	0	0	0
Mahogany Creek	4505	M	1,957	0	915	1,042	0	0
Patterson Creek	4506	I	1,730	1,134	79	346	0	171
Grouse Creek	4507	I	35,564	7,923	7,793	18,326	254	1,268
Meadow Creek	4508	M	2,809	292	939	1,408	0	170
County Line	4509	I	9,751	9,751	0	0	0	0
Mill Creek	4510	M	3,308	331	408	1,679	0	890
Big Creek	4511	I	3,752	348	1,505	1,613	0	286
Lower Goldburg	4512	I	4,960	2,117	2,843	0	0	0
Bear Creek	4513	M	11,111	3,501	3,773	2,569	0	1,268
Pines/Elkhorn	4514	I	19,787	1,506	9,987	6,627	95	1,572
Goldburg	4515	M	15,868	2,328	2,120	10,704	0	716
Donkey Hills	4516	I	17,442	6,898	5,471	4,277	0	796
Upper Pahsimeroi	4517	I	23,273	4,181	7,084	11,774	0	234
Rock Creek	4518	M	1,470	0	712	555	203	0
Burnt Creek	4519	I	4,884	110	2,882	989	707	196
Dry Creek	4520	I	14,565	771	4,529	7,375	1,094	796
Summit Creek	4521	I	20,218	0	8,699	6,587	0	4,932
Round Valley	5601	M	7,490	1,972	831	3,754	0	933
Garden Creek	5602	M	22,720	5,996	15,615	1,109	0	0
Warm Springs[3]	5603	I	60,173	14,637	37,448	5,800	0	2,288
Squaw Creek	5604	M	7,044	2,651	1,036	760	0	2,597
East Fork	5605	I	14,761	4,854	7,437	61	0	2,409
Bayhorse	5606	I	9,305	2,827	6,114	364	0	0
Bald Mountain	5607	M	15,951	4,557	4,484	927	0	5,983
Bradshaw Basin	5608	M	7,493	1,413	2,078	271	0	3,731
Bradbury Flat	5609	I	15,705	1,833	6,694	5,301	0	1,877
Mountain Springs[3]	5610	I	81,600	0	4,017	49,050	22,239	6,294
Road Creek	5611	M	7,730	165	1,395	0	0	6,170
Herd Creek	5612	I	21,502	2,138	6,637	7,744	0	4,983
Stanley Basin Trail	5613	C	160	0	0	0	0	160
Challis Creek	5615	M	4,079	1,176	2,903	0	0	0
Lime Creek	5616	C	2,440	370	1,474	596	0	0
Pennal Gulch	5617	I	3,573	0	1,308	1,842	0	423
Spud Creek	5618	M	8,856	2,797	3,568	307	0	2,184

Allotment Name	No.	Categ.[1]	Acres	Poor[2]	Fair[2]	Good[2]	Excel.[2]	Unclass.[2]
Thompson Creek	5619	I	5,595	785	2,119	276	0	2,415
Pine Creek	5621	M	4,523	74	3,337	548	0	564
Sullivan Creek	5622	C	2,866	218	862	202	0	1,584
French Creek	5623	C	988	108	119	0	0	761
Split Hoof	5624	M	8,415	2,759	5,153	0	0	503
Arentson Gulch	5701	M	6,131	0	74	6,057	0	0
Dickey	5702	M	5,333	0	1,502	3,831	0	0
Whiskey Springs	5703	I	5,539	342	2,847	2,350	0	0
Mackay	5704	I	17,191	195	10,885	6,111	0	0
Asay	5705	C	819	0	535	284	0	0
Woodbury	5706	C	80	0	80	0	0	0
Copper Basin	5707	M	21,259	307	4,412	16,540	0	0
Boone Creek	5708	I	9,826	92	4,723	5,011	0	0
Wildhorse	5709	I	24,642	3,089	9,277	12,276	0	0
Sage Creek	5710	I	5,996	0	822	5,174	0	0
Thousand Springs[3]	5712	I	5,670	417	1,600	3,653	0	0
Willow Creek	5713	C	1,439	0	433	1,006	0	0
Other Areas								
Cronk's Canyon	4411a	n/a	1,511	0	213	248	550	500
Morgan Cr BHS Past.	4411b	n/a	3,642	845	2,506	0	0	291
Dry Cr I.F. District	4520	n/a	820	0	795	0	0	25
E/P Unlicensed Use	4599	n/a	1,488	10	68	883	0	527
Mackay Unallot. Areas	5798	n/a	2,543	0	0	0	0	2,543
Malm Gulch Area	5699	n/a	10,340	2,206	2,128	4,110	0	1,896
Bruno Creek	5620	n/a	2,378	77	536	494	0	1,271
Sand Hollow	5698	n/a	5,476	0	0	0	0	5,476
All Other Areas	9999	n/a	12,377	0	0	0	0	12,377
E/P BLM-USFS Admin.	4599	n/a	1,660	0	25	1632	0	3
	Total Acres		**792,567**	**128,633**	**277,278**	**265,861**	**28,215**	**92,580**
	Percent of RA		**100**	**16.2**	**35.0**	**33.5**	**3.6**	**11.7**

[1] Categories: M = maintain, I = improve, C = custodial (see *Glossary* definition: allotment categorization).

[2] Sources: Ecological status inventories of the Challis Planning Unit (1977), the Ellis-Pahsimeroi Planning Unit (1979), and the Mackay Planning Unit (1981).

[3] Data for the Mountain Springs (San Felipe), Warm Springs, and Thousand Springs allotments were updated to reflect a new Ecological Site Inventory completed during the 1994 field season.

Appendix G: Minerals

Item 1: Locatable and Saleable Minerals Site Descriptions and Locations

NOTE: See *Map 30: Locatable Minerals Land Classification* and *Map 37: Saleable Minerals Land Classification* for the location of specific mine sites, mining districts, and pit sites.

Locatable Minerals

P-1 The Ima Mine is located near the town of Patterson and within the only organized mining district (Blue Wing) in the Pahsimeroi Planning Unit. Tungsten was mined from the Ima Mine and associated properties, with minor amounts of molybdenum, silver, copper, and lead. Between 1863 and 1988 production from the Blue Wing Mining District was $21.9 million (USDI Bureau of Mines 1988). The mine has been inoperative since 1958.

P-2 Barite has been extracted from a small open pit mine approximately 8 miles north of the town of Challis. The mine has been inoperative since 1980.

P-3 Opaline material has been extracted from small trenches approximately 12 miles north of the town of Challis. The Blue Opal claims consist of two lode claims, one of which has not had assessment work recorded since 1981.

P-4 The Ellis uranium properties are located near the town of Ellis. Many exploratory holes have been drilled in the past (1973-1981), but no development has occurred. Assessment work has not been recorded on most of the claims since 1982.

C-1 The Thompson Creek area is in the extreme western end of the Challis Planning Unit, north of the Salmon River. It includes lands in the upper Thompson and Bruno Creek drainages. Tungsten has been produced in the past and molybdenum is currently being produced. The Cyprus Thompson Creek Molybdenum Mine is the active property in the area. The Twin Apex Mine adjacent to the Cyprus Thompson Creek Mine produced small quantities of lead and silver in the early 1900s, but has been inoperative for many years. The Tungsten Jim Mine, also a small producer of tungsten, has been inoperative since the 1960s.

C-2 The Kinnikinic area includes all mines and properties in the Kinnikinic drainage and the Clayton area. Commodities produced in the past include lead, silver, and zinc, with byproduct copper and cadmium. At the present time all properties in the area are inoperative. The Clayton Silver Mine was the most recent to close (in the early 1980s).

C-3 The Garden Creek and Bayhorse Creek area properties are in the northern portion of the Bayhorse Mining District. The Garden Creek and Bayhorse (Pacific) mines contain reserves of fluorite, with additional values in silver and lead at the Pacific property. Originally (1870-1890) this area was actively prospected for its silver and lead deposits,

with several active mines recording substantial production. In the extreme southern part of the area, the old Riverview Mine and the Turtle Mine produced lead, silver, copper, and a little gold. Currently, there are no active mines.

C-4 The Squaw Creek area contains reserves of lead and silver. Past producers include the Red Bird Mine, the South Butte Mine, and the Saturday Mountain Group. The South Butte Mine and the Saturday Mountain Group have been inoperative since the 1920s. The Red Bird Mine has run intermittently since 1878, with the most recent shutdown in 1976.

C-5 Several prospects are located on Poverty Flat and near the heads of the forks of Lyon and Sink creeks. The major property in this area is the old Silver Bell Mine. It was discovered in 1879 and worked until about 1897. Copper, silver, and lead were produced. Two less important producers were the Mammoth Mine (two miles east of the Silver Bell) and the Henie Hinie Mine (two miles southeast of the Silver Bell). They have been inoperative since the early 1900s.

C-6 Deposits of travertine rock occur in three areas of the Challis Planning Unit. The largest deposit is on the west side of Bradbury Flat and is of chemical grade. Two smaller deposits occur near the mouth of the East Fork of the Salmon River area.

C-7 Nineteen lode claims make up this prospect. Two backhoe trenches on this property expose barite crystals. The property is currently claimed; however, no production other than sampling has occurred.

M-1 Prospect holes dot the countryside in this area. Five abandoned tunnels are located on BLM lands in this area. The tunnels are driven in tactite, showing mineralization in jasperoid bodies. In the early days it appears there were numerous prospectors seeking a mine as prosperous as the nearby Empire Mine, which lies to the southwest on Forest Service lands. Of the five tunnels, the Cossack Tunnel is the only tunnel about which any specific information can be found. The Cossack Tunnel represents an early attempt to cut the downward extensions of the Empire Mine ore shoots. Examination of the dump indicates no significant mineralized rock. Dumps at other tunnels in the area exhibit some mineralization. At one time copper, gold, silver, and tungsten were produced on Forest Service lands that lie adjacent to the southwest.

M-2 Discovery trenches are a common site in this area. Several irregular, small bodies of magnetite crop out in dacite, and float is scattered over the area. The largest body exposed on the surface does not exceed 150 square feet. The prospect may consist of heterogeneously dispersed pods of massive magnetite. No development has taken place on the property.

M-3 The Bartlett Point area was explored from 1988 to 1990 by two separate companies in consecutive years. Test borings were completed by both companies. No active development of the property has been proposed.

M-4 The Lehman Butte area was explored from 1988-1990 by two separate companies in consecutive years. Test boring and sampling trenches were completed by both companies. No development active of the property has been proposed.

Saleable Minerals

PS-1 The West Fork Morgan Creek Community Borrow Pit is located along the Morgan Creek Road near its intersection with the West Fork of Morgan Creek Road approximately 6 miles from State Route 93 South. The site consists of a colluvial slope of a gravelly sandy clay. The material is suitable for common borrow and as surfacing on secondary roads. Public access is excellent on an improved gravel roadway, and the quantity is adequate (based on historical use) for the foreseeable future.

PS-2 The Morgan Creek Community Rip-Rap Pits are located along Morgan Creek Road commencing 3.5 miles from the intersection of Morgan Creek Road and State Route 93 South to a point 5 miles from the intersection. The 5 sites consist of talus slopes of blocky quartzite with rock size ranging from 6 inches to 3 feet. This material is suitable for armoring stream banks. Public access is excellent on an improved gravel roadway, and the quantity is adequate (based on historical use) for the foreseeable future.

PS-3 The Burstead Lane Community Sand and Gravel Pit is located near the mouth of the Pahsimeroi Valley at the intersection of Burstead Lane and the West Side Pahsimeroi Valley Road. The site consists of a river terrace deposit of gravels with intermittent pockets of silty sands. This material is suitable for surfacing secondary roads and common borrow. Public access is excellent on an improved gravel roadway, and the quantity is adequate (based on historical use) for the foreseeable future.

PS-4 The California Ditch Community Borrow Pit is located in the upper portion of the Pahsimeroi Valley approximately 3/4-mile west of Hatch Lane and 1/4-mile southeast of the California Ditch. The site consists of a colluvium deposit of gravelly clay. This material is suitable for lining ponds and ditches and for the surfacing of secondary gravel roads. Public access is excellent on an improved gravel roadway, and the quantity is adequate (based on historical use) for the foreseeable future.

PS-5 The Goldburg Creek Community Gravel Pit is located in the upper portion of the Pahsimeroi Valley near the intersection of Hatch Lane and the West Side Pahsimeroi Valley Road. The site consists of a large stream alluvium deposit of gravel with some sand and silt. This material is suitable as common borrow and for aggregate purposes. Public access is excellent on an improved gravel roadway, and the quantity is adequate (based on historical use) for the foreseeable future.

CS-1 The Challis Creek Community Borrow Pit is located in the northwest portion of Round Valley. The site consists of a talus slope where andesite of the Challis Volcanics weathers to small (1" x 3") tabloid fragments. This material is suitable for use in surfacing gravel roads. Public access is good on an improved gravel roadway, and the

quantity is adequate (based on historical use) for the foreseeable future.

CS-2 The Bradbury Flat Community Topsoil Pit is located in the northern portion of Bradbury Flat approximately nine miles south of the town of Challis. The site consists of a lens of silty sandy loam that is a portion of a large alluvial fan. This material is suitable for many landscaping applications. Public access is excellent on an improved gravel roadway, and the quantity is adequate (based on historical use) for the foreseeable future.

CS-3 The Spar Canyon Community Rip-Rap Pit is located approximately 3/4-mile northeast of the intersection of the Spar Canyon Road and the East Fork Salmon River Valley Road. The site consists of a talus slope where andesite of the Challis Volcanics weathers to large blocky fragments. This material is suitable for armoring stream banks. Public access is excellent on an improved gravel roadway, and the quantity is adequate (based on historical use) for the foreseeable future.

MS-1 The Lake Creek Community Rip-Rap Pit is located in the southwestern portion of the Thousand Springs Valley. The site consists of a talus slope where basaltic lava of the Challis Volcanics weathers to large blocky fragments. This material is suitable for armoring stream banks. Public access is excellent on an improved gravel roadway, and the quantity is adequate (based on historical use) for the foreseeable future.

MS-2 The Lake Creek Community Shale Pit is located in the southwestern portion of the Thousand Springs Valley. The site consists of a talus slope where basaltic lava of the Challis Volcanics weathers to small tabloid fragments. This material is suitable for use in surfacing gravel roads. Public access is excellent on an improved gravel roadway, and the quantity is adequate (based on historical use) for the foreseeable future.

MS-3 The Pinto Creek Community Shale Pit is located in the southwestern portion of the Thousand Springs Valley. The site consists of a talus slope where argillite of the Copper Basin Formation has been sheared into small irregular flat pieces. This material is suitable for use in surfacing gravel roads. Public access is excellent on an improved gravel roadway, and the quantity is adequate (based on historical use) for the foreseeable future.

MS-4 The Bartlett Point Road Community Topsoil Pit is located in the southwestern portion of the Thousand Springs Valley. The site consists of a swale area containing sandy loam material. This material is suitable for many landscaping applications. Public access is excellent on an improved gravel roadway, and the quantity is somewhat limited.

MS-5 The Chilly Buttes Community Sand and Gravel Pit is located in the central portion of the Thousand Springs Valley. The site consists of a large river terrace deposit of sand and gravel. This material is suitable for common borrow and the production of aggregates. Public access is excellent on an improved gravel roadway, and the quantity is adequate (based on historical use) for the foreseeable future.

Appendix H: Paleontological Resources

Item 1: Paleontology Areas of Special Note

Broken Wagon Locality - Fissure fill material from this locality has produced bone including a partial *Microtis* (vole) skull. It appears this locality could be a productive site for vertebrate paleontological remains.

Challis Creek - Faunal materials collected from this locality represent a variety of identified vertebrate families or species, including the following:

Osteichthyes (bony fish, probably minnow vertebrae)
Aves (bird)
Ochotona princeps (pika)
Sylvilagus (cottontail)
Marmota flaviventris (yellow bellied marmot)
Spermophilus sp. (ground squirrel)
Thomomys sp. (gopher)
Microtis (vole)
Neotoma sp. (packrat)
cf. *Vulpes vulpes* (red fox)
Ovis canadensis (mountain sheep).

Malm Gulch - Malm Gulch is the only area within the Challis Resource Area which is managed specifically for paleontological resources. The Malm Gulch area is designated as an ACEC; petrified forest fossil remains which are of significant paleontological value are a major component requiring special management and recognition in the ACEC. During early studies it was reported that "nearly all the tree trunks preserved are large, and some of them are giants far outranking any now growing in the region..." (Ross 1937). At least six successive levels of forests are present, as demonstrated by stumps of sequoia trees still in growth position (standing). The forest levels are distributed through a sequence of volcanic ash layers 175 feet thick. Each forest level represents a period between eruptions that was long enough for trees to grow to as much as ten feet in diameter before being destroyed by falling volcanic ash. There are also known leaf fossils in the area which are of Middle Oligocene volcanic ash. The presence of these ancient, standing petrified sequoia trunks in the Challis Resource Area indicates that a demonstrably wetter climate (with considerable precipitation) once occurred in the area.

Poison Springs Locality - Poison Springs is the location of a previously recorded archaeological site with an abundance of faunal material. In July, 1988 the site was visited by a group of Idaho State University paleontologists to ascertain its significance as a vertebrate paleontological locale. Results of this visit are unavailable at present.

Appendix I: Vegetation

Item 1: Riparian Species Known or Thought to Occur in the Challis Resource Area

This list is based on collections housed in the Salmon BLM Herbarium, literature review, and professional judgement of Dr. Caryl Elzinga, Challis RA botanist from 1990 to 1993. Nomenclature follows Hitchcock and Cronquist (1973), except graminoids.

SPECIES	FAMILY	SPECIES	FAMILY
Acer glabrum	Aceraceae	*Cornus stolonifera*	Cornaceae
Cicuta bulbifera	Apiaceae	*Cardamine pensylvanica*	Cruciferae
Cicuta douglasii	Apiaceae	*Descurainia richardsonii*	Cruciferae
Sium suave	Apiaceae	*Rorippa nasturtium-aquaticum*	Cruciferae
Apocynum cannabinum	Apocynaceae	*Thlaspi arvense*	Cruciferae
Bidens cernua	Asteraceae	*Juniperus scopularum*	Cupressaceae
Alnus incana	Betulaceae	*Carex mertensii*	Cyperaceae
Betula glandulosa	Betulaceae	*Carex lanuginosa*	Cyperaceae
Mertensia ciliata	Boraginaceae	*Carex canescens*	Cyperaceae
Myosotis laxa	Boraginaceae	*Carex simulata*	Cyperaceae
Barbarea orthocerus	Brassicaceae	*Carex leporina*	Cyperaceae
Lonicera ciliosa	Caprifoliaceae	*Carex aquatilis*	Cyperaceae
Cerastium vulgatum	Caryophyllaceae	*Carex scirpoidea*	Cyperaceae
Chenopodium fremontii	Chenopodiaceae	*Carex lenticularis*	Cyperaceae
Chenopodium rubrum	Chenopodiaceae	*Carex praegracilis*	Cyperaceae
Chenopodium gluacum	Chenopodiaceae	*Carex lasiocarpa*	Cyperaceae
Kochia scoparia	Chenopodiaceae	*Carex rostrata*	Cyperaceae
Salicornia rubra	Chenopodiaceae	*Carex disperma*	Cyperaceae
Achillea millefolia	Compositae	*Carex microptera*	Cyperaceae
Antennaria rosea	Compositae	*Carex nebraskensis*	Cyperaceae
Arnica cordifolia	Compositae	*Carex aurea*	Cyperaceae
Artemisia douglasiana	Compositae	*Eleocharis palustris*	Cyperaceae
Aster foliaceus	Compositae	*Kobresia simpliciuscula*	Cyperaceae
Aster hesperinus	Compositae	*Scirpus americanus*	Cyperaceae
Centaurea maculosa	Compositae	*Scirpus microcarpus*	Cyperaceae
Cirsium arvense	Compositae	*Scirpus fluviatilis*	Cyperaceae
Cirsium undulatum	Compositae	*Scirpus validus*	Cyperaceae
Matricaria chamomilla	Compositae	*Scirpus acutas*	Cyperaceae
Senecio debilis	Compositae	*Equisetum hymenale*	Equisetaceae
Senecio integerrimus	Compositae	*Equisetum palustre*	Equisetaceae
Senecio triangularis	Compositae	*Equisetum variegatum*	Equisetaceae
Senecio hydrophilus	Compositae	*Equisetum fluviatile*	Equisetaceae
Sisyrinchium angustifolium	Compositae	*Equisetum laevigatum*	Equisetaceae
Solidago canadensis	Compositae	*Pyrola asarifolia*	Ericaceae
Sonchus uliginosus	Compositae	*Astragalus diversifolius*	Fabaceae
Tancetum vulgare	Compositae	*Glycyrrhiza lepidota*	Fabaceae
Tragopogon dubious	Compositae	*Medicago lupulina*	Fabaceae
Chrysanthemum leucanthemum	Compositae	*Melilotus alba*	Fabaceae

SPECIES	FAMILY
Melilotus officinalis	Fabaceae
Trifolium repens	Fabaceae
Vicia sativa	Fabaceae
Corydalis aurea	Fumariaceae
Frasera speciosa	Gentianaceae
Geranium viscosissimum	Geraniaceae
Ribes hudsononianum	Grossulariaceae
Ribes cereum	Grossulariaceae
Ribes aureum	Grossulariaceae
Hippuris vulgaris	Hippuridaceae
Philadelphus lewisii	Hydrangeaceae
Phacelia franklinii	Hydrophyllaceae
Hypericum formosum var. *scouleri*	Hypericaceae
Iris missouriensis	Iridaceae
Juncus nodosus	Juncaceae
Juncus bufonius	Juncaceae
Juncus effusus	Juncaceae
Juncus acuminatus	Juncaceae
Juncus ensifolius var. *montanus*	Juncaceae
Juncus balticus	Juncaceae
Juncus ensifolius	Juncaceae
Juncus longistylis	Juncaceae
Juncus torreyi	Juncaceae
Triglochin maritimum	Juncaginaceae
Triglochin palustre	Juncaginaceae
Agastache urticifolia	Labiatae
Lycopus americana	Lamiaceae
Mentha arvense	Lamiaceae
Mentha spicata	Lamiaceae
Astragalas leptaleus	Leguminosae
Lupinus argenteus	Leguminosae
Oxytropis deflexa	Leguminosae
Thermopsis montana	Leguminosae
Utricularia vulgaris	Lentibulariaceae
Allium brevistylum	Liliaceae
Streptopus amplexifloius	Liliaceae
Streptopus roseus	Liliaceae
Zigadenus elegans	Liliaceae
Linum perenne	Linaceae
Lythrum salicaria	Lythraceae
Epilobium watsonii	Onagraceae
Equisetum arvense	Onagraceae
Corallorhiza mertensiana	Orchidaceae
Habenaria hyperborea	Orchidaceae
Plantago eriopoda	Plantaginaceae
Plantago major	Plantaginaceae
Agropyron repens	Poaceae
Agropyron smithii	Poaceae
Agropyron spicatum	Poaceae
Agropyron inerme	Poaceae
Agropyron desertorum	Poaceae
Agrostis scagra	Poaceae
Agrostsis exarata	Poaceae
Agrostsis alba var. *palustris*	Poaceae
Alopecuris aequalis	Poaceae
Beckmannia syzigachne	Poaceae
Bromus vulagris	Poaceae
Bromus inermis	Poaceae
Calamagrostis neglecta	Poaceae
Calamagrostis canadensis	Poaceae
Catabrosa aquatica	Poaceae
Dactylis glomerata	Poaceae
Deschampsia caespitosa	Poaceae
Deschampsia danthonioides	Poaceae
Echinochloa crusgalli	Poaceae
Elymus cinereus	Poaceae
Festuca rubra	Poaceae
Festuca scabrella	Poaceae
Festuca octoflora	Poaceae
Glyceria grandis	Poaceae
Glyceria borealis	Poaceae
Glyceria occidentalis	Poaceae
Glyceria striata	Poaceae
Glyceria elata	Poaceae
Glyceria paucifolia	Poaceae
Hordeum jubatum	Poaceae
Hordeum brachyantherum	Poaceae
Leersia oryzoides	Poaceae
Muhlenbergia richardsonis	Poaceae
Muhlendbergia asperifolia	Poaceae
Phalaris arundinaceae	Poaceae
Phleum pratense	Poaceae
Phragmites communis	Poaceae
Phyleum alpinum	Poaceae
Poa juncifolia	Poaceae
Poa compressa	Poaceae
Poa pratense	Poaceae
Poa pulustris	Poaceae
Polypogon monspeliensis	Poaceae
Puccinellia distans	Poaceae
Puccinellia pauciflora	Poaceae
Puccinellia lemoni	Poaceae
Spartina gracilis	Poaceae
Phlox kelseyi	Polemoniaceae
Phlox diffusa	Polemoniaceae
Polemonium occidentale	Polemoniaceae
Polygonum bistortes	Polygonaceae
Polygonum agrotisiti	Polygonaceae

SPECIES	FAMILY
Polygonum hydropiper	Polygonaceae
Polygonum lapathifolium	Polygonaceae
Polygonum ramosissimum	Polygonaceae
Polygonum amphigium	Polygonaceae
Polygonum californicum	Polygonaceae
Polygonum amphimbium	Polygonaceae
Polygonum sawatchense	Polygonaceae
Polygonum monspeliensis	Polygonaceae
Polygonum californicum	Polygonaceae
Rumex crispus	Polygonaceae
Rumex paucifolius	Polygonaceae
Rumex occidentalis	Polygonaceae
Rumex paucifolius	Polygonaceae
Sagittaria cuneata	Polygonaceae
Androsace filiformis	Primulaceae
Dodecathon pauciflorum	Primulaceae
Glaux maritima	Primulaceae
Glaux maritimum	Primulaceae
Primula alkalina	Primulaceae
Caltha leptosepala	Rannunculaceae
Actaea rubra	Ranunculaceae
Anemone multifida	Ranunculaceae
Aquilegia formosa	Ranunculaceae
Clematis columbiana	Ranunculaceae
Ranunculus urticifolia	Ranunculaceae
Ranunculus hyperboreus	Ranunculaceae
Ranunculus aquatilis	Ranunculaceae
Ranunculus macouni	Ranunculaceae
Ranunculus scleratus	Ranunculaceae
Ranunculus pennsylvanicus	Ranunculaceae
Ranunculus cymbalaria	Ranunculaceae
Thalictrum occidentale	Ranunculaceae
Amelanchaier alnifolia	Rosaceae
Fragaria virginiana	Rosaceae
Geum macrophyllum	Rosaceae
Geum triflorum	Rosaceae
Geum macrophyllum	Rosaceae
Physocarpus malvaceus	Rosaceae
Potentilla glandulosa	Rosaceae
Potentilla fruiticosa	Rosaceae
Potentilla anserina	Rosaceae
Potentilla gracilis	Rosaceae
Potentilla palustris	Rosaceae
Prunus virginia	Rosaceae
Rosa woodsii	Rosaceae
Rosa woodsii v. *ultramontana*	Rosaceae
Rubus idaeus	Rosaceae
Sorbus scopulina	Rosaceae
Spiraea betulifolia	Rosaceae
Galium aparine	Rubiaceae
Galium triflorum	Rubiaceae

SPECIES	FAMILY
Salix exigua ssp. *exigua*	Salicaceae
Populus trichocarpa	Salicaceae
Salix bebbiana	Salicaceae
Salix exigua ssp *melanopsis*	Salicaceae
Salix boothii	Salicaceae
Salix wolfii	Salicaceae
Salix lasiandra	Salicaceae
Salix lasiandra var. *caudata*	Salicaceae
Salix geyeraniana	Salicaceae
Salix planifolia	Salicaceae
Salix lutea	Salicaceae
Parnassia parviflora	Saxifragaceae
Castilleja minuata	Scrophulariaceae
Mimulus guttatus	Scrophulariaceae
Mimulus lewisii	Scrophulariaceae
Phacelia sericea	Scrophulariaceae
Veronica americana	Scrophulariaceae
Veronica serpyllifolia	Scrophulariaceae
Veronica anagallis-aquatica	Scrophulariaceae
Solanum dulcamara	Solanaceae
Sparganium simplex	Sparganiaceae
Sparganium emersum	Sparganiaceae
Typha angustifolia	Typhaceae
Typha latifolia	Typhaceae
Osmorhiza occidentalis	Umbelliferae
Ozmorhiza chilensis	Umbelliferae
Urtica dioica	Urticaceae
Valeriana edulis	Valerianaceae
Viola palustris	Violaceae

Appendix I: Vegetation

Item 2: Habitat Areas Associated with the Alkaline Primrose and Wavy Leaf Thelypody

Calcareous Wetland Species

The alkaline primrose (*Primula alcalina*) has been extensively inventoried by the BLM, Conservation Data Center, and academic botanists. Only three locations of this special status species are known world-wide. Two locations are in the Lemhi Resource Area (which adjoins the Challis Resource Area) and one is in the Challis Resource Area (the Summit Creek ACEC/RNA). All three sites are unusual due to their hydrology, chemistry, and species associates. Each site occurs in the headwaters of spring-fed alkaline streams where flow is relatively constant throughout the year and scouring flood events are rare. The substrate is calcareous clays, and conditions are somewhat fen-like (normally covered with water). The specific habitat requirements of this species facilitates effective inventory, and botanists are relatively certain that nearly all habitat areas have been intensively examined. Because of a checkered land ownership pattern, the Thousand Springs complex is the only potential area of alkaline primrose populations that has not been intensively examined. Areas of potential primrose habitat within the Thousand Springs complex have, however, been examined, with no successful location of this species.

Three other sensitive species occur at the Summit Creek site: *Lomatogonium rotatum* (marsh felwort), *Astragalus diversifolius* (meadow milkvetch), and *Salix candida* (hoary willow). Two other sensitive species, *Astragalus leptaleus* (park milkvetch) and *Carex livida* (livid sedge) were recently located at one of the other alkaline primrose sites in the Lemhi Resource Area, and thus may occur at the Summit Creek site as well. Any of these sensitive species may also occur at Thousand Springs; the inventory is incomplete.

Challis Volcanic Species

Four species often occur together on steep erosive slopes of Challis volcanic weatherings: *Thelypodium repandum* (wavy leaf thelypody), *Astraglus amblytropis* (Challis milkvetch), *Astragalus aquilonius* (Lemhi milkvetch), and *Malacothrix torreyi* (Torrey's malacothrix).

T. repandum and *A. amblytropis* occur only on steep erosive Challis volcanic substrate, and are Challis endemics. Distribution for these two species is the East Fork Salmon River and its tributaries (especially Road Creek, Herd Creek, and Spar Canyon) and along the Salmon River to Ellis. *Astragalus amblytropis* also occurs in the Hat Creek and McKim Creek area, and there is potential for *T. repandum* to occur there as well.

M. torreyi and *A. aquilonius* often occur with the two Challis endemics, but their distribution extends beyond the Challis area. *Malacothrix torreyi* is also found on bentonite substrate in the Lemhi area. *Astragalus aquilonius* is found at the southern end of the Lost River and Lemhi ranges on limestone gravely slopes, as well as in a few drainages near the town of Leadore, Idaho, where the plant was first discovered (hence the common name of Lemhi milkvetch). Within the Challis area, *Astragalus aquilonius* is also found on more gentle slopes, as well as the steep erosive slopes containing the two Challis endemics. The center of distribution of *Astragalus aquilonius* is the Bradbury Flat/Round Valley area, where the plant becomes a regular, although uncommon, member of the range flora.

Appendix J: Water Resources

Item 1: Beneficial Use Classifications for Drainage Segments

Beneficial use classifications for streams in the Big Lost River, Little Lost River, East Fork Salmon River, Pahsimeroi River, and Main Salmon River drainages are shown below. In addition to the classifications listed below, Bruno Creek in the Main Salmon River is identified by the BLM as an "industrial water supply" beneficial use. No streams in the above drainages are classified as an "outstanding resource waters" beneficial use. Listed beneficial uses were either identified by the BLM (shown with an "X") or published in the Idaho Department of Health and Welfare, Division of Environmental Quality, Title 01, Chapter 02, "Water Quality Standards and Wastewater Treatment Requirements," February 1998.

Drainage Big Lost River

BENEFICIAL USE CLASSIFICATION

SEGMENT	PRIMARY CONTACT RECREATION	SECONDARY CONTACT RECREATION	COLD WATER BIOTA	SALMONID SPAWNING	AGRICULTURAL WATER SUPPLY	DOMESTIC WATER SUPPLY	WILDLIFE HABITAT	AESTHETICS AND HUMAN HEALTH	SPECIAL RESOURCE WATERS
ROCK CREEK		X	X		X		X	X	
LONE CEDAR CREEK			X		X		X	X	
MAHOGANY CREEK		X	X	X	X		X	X	
FRANKLIN CANYON			X		X		X	X	
NAVARRE			X	X	X		X	X	
LEHMAN CREEK			X	X	X		X	X	
BOONE CREEK			X		X		X	X	
GARDEN CREEK		X	X		X		X	X	
GRANT		X	X		X		X	X	
BIG LOST*	D	D	D	D	D	D	D	D	D
CORRAL CREEK		X	X		X		X	X	
SAGE CREEK		X	X		X		X	X	
BRADSHAW CREEK		X	X		X		X	X	
N. FORK SAGE CREEK		X	X		X		X	X	
JONES CREEK			X		X		X	X	
UPPER CEDAR CREEK		X	X		X		X	X	
DEEP CREEK			X		X		X	X	
TWIN BRIDGES CREEK*	X	X	X	X			X	X	
MACKAY RESERVOIR	X	X	X	X	X		X	X	
THOUS. SPRINGS CR.		X	X	X	X		X	X	

* Water Quality Limited Segment as of May 15, 1998 (Draft DEQ Section 303(d) list)
X Beneficial Use Identified by the BLM during 1991 field surveys
D Beneficial Use Designated by the Division of Environmental Quality

Drainage Little Lost River

BENEFICIAL USE CLASSIFICATION

SEGMENT	PRIMARY CONTACT RECREATION	SECONDARY CONTACT RECREATION	COLD WATER BIOTA	SALMONID SPAWNING	AGRICULTURAL WATER SUPPLY	DOMESTIC WATER SUPPLY	WILDLIFE HABITAT	AESTHETICS AND HUMAN HEALTH	SPECIAL RESOURCE WATERS
SUMMIT CREEK *		X	X	X	X		X	X	
DRY CREEK		X	X	X	X		X	X	

Drainage East Fork Salmon River

BENEFICIAL USE CLASSIFICATION

SEGMENT	PRIMARY CONTACT RECREATION	SECONDARY CONTACT RECREATION	COLD WATER BIOTA	SALMONID SPAWNING	AGRICULTURAL WATER SUPPLY	DOMESTIC WATER SUPPLY	WILDLIFE HABITAT	AESTHETICS AND HUMAN HEALTH	SPECIAL RESOURCE WATERS
EAST FK. SALMON	D	D	D	D	D	D	D	D	D
HORSE BASIN			X	X	X		X	X	
BEAR CREEK			X	X	X		X	X	
ROAD CREEK*			X	X	X		X	X	
MOSQUITO CREEK			X	X	X		X	X	
HERD CREEK	X	X	X	X	X		X	X	
LAKE CREEK		X	X	X	X		X	X	
MCDONALD CREEK			X	X	X		X	X	
FOX CREEK			X		X		X	X	
PINE CREEK			X	X	X		X	X	
BAKER CREEK			X		X		X	X	
WICKIUP CREEK		X	X	X	X		X	X	
LITTLE BOULDER CR.		X	X	X	X		X	X	
BIG BOULDER CREEK	X	X	X	X	X		X	X	
BLUETT CREEK			X		X		X	X	
BIG LAKE CREEK		X	X	X	X		X	X	
JIMMY SMITH CREEK		X	X	X	X		X	X	
CORRAL CREEK			X	X	X		X	X	
MARCO CREEK					X		X	X	

* Water Quality Limited Segment as of May 15, 1998 (Draft DEQ Section 303(d) list)
X Beneficial Use Identified by the BLM during 1991 field surveys
D Beneficial Use Designated by the Division of Environmental Quality

Drainage Pahsimeroi River

BENEFICIAL USE CLASSIFICATION

SEGMENT	PRIMARY CONTACT RECREATION	SECONDARY CONTACT RECREATION	COLD WATER BIOTA	SALMONID SPAWNING	AGRICULTURAL WATER SUPPLY	DOMESTIC WATER SUPPLY	WILDLIFE HABITAT	AESTHETICS AND HUMAN HEALTH	SPECIAL RESOURCE WATERS
LITTLE MORGAN CREEK		X	X	X	X		X	X	
PATTERSON CREEK*	X	X	X	X	X		X	X	
MILL CREEK			X		X		X	X	
STINKING CREEK			X		X		X	X	
BIG CREEK*	X	X	X	X	X		X	X	
LONG CREEK		X	X	X	X		X	X	
BABY CREEK			X		X		X	X	
SHORT CREEK		X	X	X	X		X	X	
SQUAW CREEK			X		X		X	X	
DONKEY CREEK		X	X	X	X		X	X	
GOLDBURG CREEK		X	X	X	X		X	X	
BURNT CREEK		X	X	X	X		X	X	
ELKHORN CREEK			X		X		X	X	
PAHSIMEROI RIVER*	D	D	D	D	D	D	D	D	D
DOUBLE SPRING			X	X	X		X	X	
MEADOW CREEK			X		X		X	X	
ELBOW CREEK			X		X		X	X	
SULPHUR CREEK			X		X		X	X	
TRAIL CREEK			X		X		X	X	
LAWSON CREEK			X		X		X	X	
MORSE CREEK*	X	X	X	X	X		X	X	

* Water Quality Limited Segment as of May 15, 1998 (Draft DEQ Section 303(d) list)
X Beneficial Use Identified by the BLM during 1991 field surveys
D Beneficial Use Designated by the Division of Environmental Quality

Drainage Main Salmon River (page 1 of 2)

BENEFICIAL USE CLASSIFICATION

SEGMENT	PRIMARY CONTACT RECREATION	SECONDARY CONTACT RECREATION	COLD WATER BIOTA	SALMONID SPAWNING	AGRICULTURAL WATER SUPPLY	DOMESTIC WATER SUPPLY	WILDLIFE HABITAT	AESTHETICS AND HUMAN HEALTH	SPECIAL RESOURCE WATERS
MAIN SALMON RIVER*	D	D	D	D	D	D	D	D	D
MCKIM		X	X	X	X		X	X	
ALLISON CREEK			X		X		X	X	
COW CREEK		X	X	X	X		X	X	
SHEP CREEK			X		X		X	X	
DRY			X	X	X		X	X	
CAMP CREEK			X		X		X	X	
BROKEN WAGON			X		X		X	X	
LONE PINE			X	X	X		X	X	
WARM SPRINGS CR.*	X	X	X	X	X		X	X	
SPUD CREEK			X		X		X	X	
SULLIVAN CREEK			X		X		X	X	
FRENCH CREEK			X		X		X	X	
THOMPSON CREEK		D	D	D	D		D	D	
BRUNO CREEK			X	X	X		X	X	
SQUAW CREEK		D	D	D	D		D	D	
KINNIKINIC CREEK*			X	X	X		X	X	
BIRCH CREEK			X		X		X	X	
SINK CREEK			X	X	X		X	X	
LYON CREEK			X	X	X		X	X	
RATTLESNAKE CREEK			X		X		X	X	
BAYHORSE CREEK			X	X	X		X	X	
CENTENNIAL FLAT			X		X		X	X	

* Water Quality Limited Segment as of May 15, 1998 (Draft DEQ Section 303(d) list)
X Beneficial Use Identified by the BLM during 1991 field surveys
D Beneficial Use Designated by the Division of Environmental Quality

Drainage Main Salmon River (continued - page 2 of 2)

BENEFICIAL USE CLASSIFICATION

SEGMENT	PRIMARY CONTACT RECREATION	SECONDARY CONTACT RECREATION	COLD WATER BIOTA	SALMONID SPAWNING	AGRICULTURAL WATER SUPPLY	DOMESTIC WATER SUPPLY	WILDLIFE HABITAT	AESTHETICS AND HUMAN HEALTH	SPECIAL RESOURCE WATERS
GARDEN CREEK*	X	X	X	X	X	X	X	X	
MILL CREEK			X	X	X		X	X	
JEFF'S CREEK			X		X		X	X	
CHALLIS CREEK*	X	X	X	X	X		X	X	
DARLING CREEK			X	X	X		X	X	
MORGAN CREEK		X	X	X	X		X	X	
W.FK. MORGAN C.		X	X	X	X		X	X	
BLUE CREEK			X		X		X	X	
BLOCK CREEK			X		X		X	X	
SAGE CREEK			X		X		X	X	
ELLIS CREEK			X		X		X	X	
LITTLE HAT CREEK			X	X	X		X	X	
BIG HAT CREEK		X	X	X	X		X	X	
PARK CREEK			X	X	X		X	X	

* Water Quality Limited Segment as of May 15, 1998 (Draft DEQ Section 303(d) list)
X Beneficial Use Identified by the BLM during 1991 field surveys
D Beneficial Use Designated by the Division of Environmental Quality

Appendix J: Water Resources

Item 2: Surface Water Quality Condition and Trend

Water quality in the Challis Resource Area is adversely affected by land use activities occurring in the Resource Area, because land use activities generally disturb the protective soil cover, vegetation, or hydrologic processes to some extent. Most activities are relatively localized, short term, or controllable, and, with properly applied restrictions, usually do not pose a widespread threat to water quality. On a landscape scale, livestock grazing is the most water quality-impairing land use activity occurring in the Resource Area.

In-depth monitoring of water quality indicators and an assessment of their relationship to livestock grazing was conducted in 1993. A variety of parameters have been monitored that either directly or indirectly indicate the status for support of beneficial uses and water quality condition and trend. A summary of the on-going monitoring, analysis, and conclusions of current water quality conditions and trends is presented below for each principal drainage basin within the Resource Area (see *Map 25: Geography and Principal Drainage Basins*).

Main Salmon River:

The BLM currently monitors water quality on seven tributaries that drain into the Main Salmon River. These include Cow Creek, Little Hat Creek, Morgan Creek, West Fork of Morgan Creek, Bayhorse Creek, Squaw Creek, and Thompson Creek. Only water temperature has been monitored in the West Fork of Morgan Creek.

Temperature data indicate that during years of adequate snowpack and rainfall, Bayhorse, West Fork of Morgan and Cow creeks all meet temperature standards (USDA Forest Service and USDI-BLM, February 1995) for chinook salmon migration (<64 °F) and spawning (<60 °F) requirements. Thompson and Little Hat creeks meet the chinook salmon migration standard and come close to meeting chinook salmon spawning requirements, while Squaw and Morgan creeks have been exceeding all standards (USDI - BLM, National Marine Fisheries Service Annual Monitoring Report, 1996). Critical bull trout temperatures, indicated as a 24 hour average, for rearing (53.6 °F, June through August) and spawning (48 °F, after September 15) (IDAPA 16, 1998) can only be assessed through a review of the available daily maximum and daily minimum temperatures. The Hobo thermographs are being re-programmed to provide daily averages from multiple daily readings over a 24-hour time period. Rearing temperatures are generally not being met, while spawning temperatures are being met after September 15. Exceptions are Cow Creek, Bayhorse Creek, and the upper reaches of Little Hat Creek where both standards are being met.

Over the past five years of monitoring, trends indicate that Bayhorse, West Fork of Morgan and Cow creeks are in stable condition. Little Hat Creek has shown some decline. Thompson, Squaw and Morgan creeks show slight improvement, as the number of days exceeding standards have decreased. There are several contributing factors such as roads, private land ownership and land use practices along the Squaw and Morgan Creek drainage that are negatively impacting water

quality, but are outside the scope of BLM management.

Sedimentation in the Main Salmon River drainage has been periodically monitored through R1/R4 stream habitat surveys between 1995 and 1997. Six of the seven streams have slight to moderate sediment levels, most of which fall within the desired standard of ≤ 20% (NCASI, Technical Bulletin No. 428, 1984). Sedimentation in Little Hat Creek is well above desired levels, partially due to beaver dams throughout the system. However, it is believed that this stream is not a major contributor of sediment to the Salmon River due to its location high in the watershed.

Biological monitoring assessing aquatic macroinvertebrate populations is considered to be an effective indicator of past water quality trends and current conditions. Interpretation of the health and integrity of the aquatic ecosystem is based on a number of biotic indices and life history characteristics of individual taxa, physical habitat and water chemistry data. Macroinvertebrate community structure and species composition in Cow and Bayhorse creeks indicate good water quality. Squaw and Thompson Creek are fair, with an upward trend in macroinvertebrate quality. Little Hat and Morgan creeks have remained in poor condition, although the percentage of pollution-tolerant species has decreased since 1993 in Morgan Creek and overall data in Little Hat shows improvement, but still is not meeting desired standards (USDI-BLM, National Marine Fisheries Service Annual Monitoring Report, 1996).

Water chemistry sampling is performed to coincide with macroinvertebrate samples. All streams sampled within the Main Salmon River watershed had dissolved oxygen and pH levels within the desired criteria (Vinson 1992) to support cold water biota.

Coliform levels were initially sampled in 1979 and indicate that the majority of tributaries, in addition to the seven the BLM regularly monitors, generally were within State standards for primary (500 coliforms/100 ml at any time) and secondary (200 coliforms/100 ml in more than 10% of samples over a 30 day period) contact recreation (Vinson 1992). At this time, specific trends are unknown since repeated sampling has not been conducted.

East Fork Salmon River:

The BLM currently monitors water quality on ten tributaries that drain into the East Fork Salmon River. These include Big Boulder Creek, Little Boulder Creek, Big Lake Creek, Bear Creek, Horse Basin Creek, Herd Creek, Lake Creek, Pine Creek, Mosquito Creek and Road Creek. Only water temperature has been monitored at Big Boulder Creek, Big Lake Creek and Little Boulder Creek.

Temperature data indicates that during years of adequate snowpack and rainfall, Herd and Lake creeks meet temperature standards (USDA Forest Service and USDI-BLM, February 1995) for chinook salmon migration (<64 °F) and come close to meeting chinook salmon spawning (<60 °F) requirements. Bear and Mosquito creeks meet the chinook salmon migration standard but do not meet spawning requirements. Road Creek and Horse Basin Creek have not been meeting standards on a regular basis and Big Lake Creek did not meet them in 1997. Four streams (Herd, Lake, Bear, and Mosquito) have been displaying fairly good instream water temperatures throughout the summer, while the others show potential for improvement (USDI-BLM, National

Marine Fisheries Service Annual Monitoring Reports, 1994-1996). Critical bull trout temperatures, indicated as a 24-hour average, for rearing (53.6 °F, June through August) and spawning (48 °F, after September 15) (IDAPA 16, 1998) can only be assessed through a review of the available daily maximum and daily minimum temperatures. The Hobo thermographs are being re-programmed to provide daily averages from multiple daily readings over a 24-hour time period. The Road Creek drainage which includes Road, Bear, Mosquito, and Horse Basin creeks, does not contain bull trout and is not considered bull trout habitat. Bull trout rearing standards are generally not being met in Herd or Lake creeks, but spawning standards are being met. Big Lake Creek generally does not meet spawning standards until early October.

Sedimentation has been periodically monitored through R1/R4 stream habitat surveys between 1995 and 1997. The majority of the surveyed streams in the watershed depict evidence of increased sediment levels, most of which do not fall within the desired standard of $\leq$ 20% (NCASI, Technical Bulletin No. 428, 1984). Only one stream (Herd Creek) met this guideline. Within the Road Creek drainage, most streams have sediment levels that are slightly elevated above the desired standard, particularly in Road Creek.

Biological monitoring assessing aquatic macroinvertebrate populations is considered to be an effective indicator of past water quality trends and current conditions. Interpretation of the health and integrity of the aquatic ecosystem is based on a number of biotic indices and life history characteristics of individual taxa, physical habitat and water chemistry data. Very few desired standards are being met at the various sampled sites within the Road Creek drainage. However, the data are showing improvement over time. Although no standards were met in Lake Creek, several indices were very close and the overall indication is that quality is improving. Herd Creek has remained relatively stable, meeting some, but not all, macroinvertebrate indices, with variations probably due to climatic changes (USDI-BLM, National Marine Fisheries Service Annual Monitoring Report, 1996).

Water chemistry sampling is performed to coincide with macroinvertebrate samples. All streams sampled within the East Fork Salmon River watershed had dissolved oxygen and pH levels within the desired criteria (Vinson 1992) to support cold water biota.

There is no available information on coliform levels in the East Fork Salmon River drainage.

Pahsimeroi River:

The BLM currently monitors water quality on the Pahsimeroi River and eleven tributaries of the Pahsimeroi River. These include Burnt Creek, Big Creek, Donkey Creek, Falls Creek, Little Morgan Creek, Long Creek, Mahogany Creek, Mill Creek, Morse Creek, Patterson Creek, Short Creek and the Upper Pahsimeroi River. Monitoring on several of these streams was recently implemented in 1997, and only water temperature has been monitored in Mill, Falls, Little Morgan, Short, Long, and Morse creeks. Temperature data indicate that during years of adequate snowpack and rainfall, the Upper Pahsimeroi River, Little Morgan Creek and Mahogany Creek meet temperature standards (USDA Forest Service and USDI-BLM, February 1995) for chinook salmon migration (<64 °F) and spawning (<60 °F) requirements. Burnt Creek meets the chinook

salmon migration standard and comes close to meeting spawning requirements (USDA Forest Service and USDI-BLM, Pahsimeroi River Watershed Biological Assessment, 1997). Most streams are in good condition, with Burnt Creek and the Upper Pahsimeroi River demonstrating slightly lower temperatures and less fluctuation during the summer months. Critical bull trout temperatures, indicated as a 24-hour average, for rearing (53.6 °F, June through August) and spawning (48 °F, after September 15) (IDAPA 16, 1998) can only be assessed through a review of the available daily maximum and daily minimum temperatures. The Hobo thermographs are being reprogrammed to provide daily averages from multiple daily readings over a 24-hour time period. The bull trout streams, consisting of Burnt, Little Morgan, Morse, Falls, Patterson, Big, Ditch, Mahogany, Tater, and Big Gulch creeks and the Pahsimeroi River, are generally meeting all bull trout temperature standards. The exceptions are lower Burnt Creek and Little Morgan creeks, which meet only the spawning standard, and the lower Pahsimeroi River which meets the spawning standard later than desired (in early October).

Sedimentation has been periodically monitored through R1/R4 stream habitat surveys between 1995 and 1997. Of the four streams surveyed, one (Donkey Creek) stream displayed slightly elevated sediment levels, one (Burnt Creek) was borderline with the desired standard of $\leq$20% (NCASI, Technical Bulletin No. 428, 1984) and two streams (Mahogany Creek and Upper Pahsimeroi River) met the criteria. It is believed that only slight amounts of suspended sediment reach the Pahsimeroi River from the other tributaries (USDA Forest Service and USDI-BLM, Pahsimeroi River Watershed Biological Assessment, 1997).

Biological monitoring assessing aquatic macroinvertebrate populations is considered to be an effective indicator of past water quality trends and current conditions. Interpretation of the health and integrity of the aquatic ecosystem is based on a number of biotic indices and life history characteristics of individual taxa, physical habitat and water chemistry data. Macroinvertebrate community structure and species composition in Mahogany Creek indicates good water quality. Burnt Creek data indicate that the stream is in fair to poor condition, with a declining trend in macroinvertebrate quality. Macroinvertebrate data on the remaining creeks sampled in 1997 (Big Creek, Donkey Creek, and the Upper Pahsimeroi River) have not yet been analyzed.

Water chemistry sampling is performed to coincide with macroinvertebrate samples. All streams sampled within the Pahsimeroi watershed had dissolved oxygen and pH levels within the desired criteria (Vinson 1992) to support cold water biota.

Coliform levels were initially sampled in 1979 and indicate that the majority of streams, in addition to the twelve the BLM regularly monitors, are within State standards for primary (500 coliforms/100 ml at any time) and secondary (200 coliforms/100 ml in more than 10% of samples over a 30 day period) contact recreation (Vinson 1992). At this time, specific trends are unknown, since repeated sampling has not been conducted.

Big Lost River:

At this time the BLM has little information about the Big Lost River Watershed, as no monitoring is conducted. It is believed that most streams meet temperature and pH requirements for cold

water biota. The Big Lost River system is not considered anadromous or bull trout habitat. Through observation and professional judgement, the majority of streams appear to fall into a functional-at-risk category (see **Volume 1**, *Attachment 1: Riparian-Wetland Area Function Classification*, pp. 101-102). Extrapolating from these conclusions, overall water quality would seem to be in fair condition with the potential for improvement.

Little Lost River:

The BLM currently has limited information about this watershed, since monitoring occurs on only two streams. The Little Lost River system is not considered anadromous habitat. Critical bull trout temperatures, indicated as a 24-hour average, for rearing (53.6 °F, June through August) and spawning (48 °F, after September 15) (IDAPA 16, 1998) can only be assessed through a review of the available daily maximum and daily minimum temperatures. The Hobo thermographs are being re-programmed to provide daily averages from multiple daily readings over a 24-hour time period. Temperature has been monitored on Summit Creek since 1993 and intermittently on Dry Creek since 1994. Temperatures are slightly elevated in Summit Creek and very close to meeting desired standards for cold water biota in Dry Creek (USDI-BLM, National Marine Fisheries Service Annual Monitoring Report, 1997).

Coliform levels were initially sampled in 1979 at several locations along Summit Creek and were within State standards for primary (500 coliforms/100 ml at any time) and secondary (200 coliforms/100 ml in more than 10% of samples over a 30 day period) contact recreation (Vinson 1992).

Appendix K: Wild Horses and Burros

Item 1: Relative Percent Density of Discerned Contents from Wild Horse Fecal Samples

Tentative Identification	Spring	Summer	Fall	Winter	
Grasses and Grasslike Plants					
Western wheatgrass (*Agropyron smithii*)	0.31	0.50	0.00	0.57	
Bluebunch wheatgrass (*Agropyron spicatum*)	52.87	39.63	77.90	43.20	
Brome (*Bromus*)	0.00	0.20	0.00	0.00	
Reedgrass (*Calamagrostis*)	0.62	1.00	0.35	0.11	
Sedge (*Carex*)	1.74	1.93	2.45	0.46	
Wildrye (*Elymus*)	0.00	1.11	0.00	0.00	
Idaho fescue (*Festuca idahoensis*)	5.22	18.72	0.21	1.16	
Junegrass (*Keoleria cristata*)	3.18	10.09	0.94	5.86	
Indian ricegrass (*Oryzopsis hymenoides*)	2.20	2.77	0.14	1.16	
Bluegrass (*Poa*)	5.10	5.29	0.87	3.70	
Squirreltail (*Sitanion*)	0.51	1.61	0.00	1.63	
Dropseed (*Sporobolus*)	0.51	0.40	0.14	0.23	
Needlegrass (*Stipa*)	0.62	5.75	0.21	0.69	
Unknown sedge	0.10	1.61	0.14	0.00	
Unknown grass	0.00	0.10	0.00	0.81	
Total	72.98%	90.71%	83.36%	59.58%	77%
Forbs					
Milkvetch (*Astragalus*)	0.00	0.30	0.07	0.57	
Buckwheat (*Eriogonum*)	0.00	2.45	0.07	4.20	
Lupine (*Lupinus*)	0.31	1.10	1.84	0.93	
Phlox (*Phlox*)	22.95	2.45	8.01	19.58	
Mullein (*Verbascum*)	0.00	0.10	0.00	0.00	
Unknown forb	0.00	0.00.	0.00	0.11	
Total	23.26%	5.40%	9.99%	25.39%	16%
Shrubs					
Sagebrush (*Artemisia*)	0.00	0.50	0.36	10.08	
Saltbush (*Atriplex*)		0.20	0.00	0.07	0.46
Rabbitbrush (*Chrysothamnus*)	0.00	0.00	0.07	0.00	
Winterfat (*Eurotia lanata*)	3.85	3.08	1.46	3.70	
Prickly phlox (*Leptodactylon pungens*)	0.00	0.00	4.55	0.11	
Total	4.05%	3.59%	6.51%	14.35%	7%
					100%

Source: Hansen, Richard M., *Report of Microhistological Estimates of Ruminant Food Habits of Deer, Elk, Horses, Cattle and Antelope in the Challis Planning Unit.* Special Report, 1975.

Appendix L: Resource Studies

Item 1: Summary of Studies of the Challis Resource Area

This appendix item summarizes most of the past and present resource studies, inventories, surveys and research activities conducted within the Challis Resource Area. Major headings include: Upland Habitat, Riparian Habitat, Aquatic Habitat/Fisheries, Forest Resources, Cultural Resources, Wildlife, Climate, and Miscellaneous References. This summary of studies is in *addition* to the list of References contained in the PRMP/FEIS, Volume 2. Except for the studies listed under "Cultural Resources", the studies mentioned in this appendix item are available for review at the Challis Resource Area office in Salmon, Idaho.

Upland Habitat

* 145 upland nested frequency plots, permanently located on 45 allotments.
* 107 3' x 3' photo plots located on 39 allotments.
* Two established vigor studies on one allotment, utilizing fenced exclosures as comparative controls.
* Yearly utilization transects and utilization pattern mapping.
* Wild horse dietary studies (**Note:** The results of these studies are summarized in *Appendix K, Item 1*).
* Annual (since 1972) wild horse counts through aerial surveys.
* Site-specific and landscape inventories of special status plant species. (**Note:** The general distribution of special status plant species is presented on *Map 38.*)
* Site-specific inventories of noxious weed populations. (**Note:** The general distribution of known noxious weeds infestations is shown on *Map 28.*)
* Rangeland inventories, as listed below:

Year	Type	Purpose	# Allotments	# Acres	Planning Unit
1977	ESI(mod) [1]	Range Condition	22	331,163	Challis
1979	SVIM [2]	Range Condition	27	342,559	Ellis-Pahsimeroi
1981	SVIM [2]	Range Condition	12	118,845	Mackay
1994	ESI [1]	Ecological-Seral	1	79,298	Challis
1995	ESI [1]	Ecological-Seral	2	81,675	Challis

[1] Ecological Site Inventory
[2] Soil-Vegetative Inventory Method

Riparian Habitat

* 50 permanent study sites on 26 perennial creeks within 24 allotments.
* Permanently stacked photo points on an additional 7 perennial creeks.
* Additional photo series established on Road Creek (1987), Sage Creek (1988), North Fork Sage Creek (1988), Horse Basin Creek (1988), Little Anderson Ranch (1980), Corral Creek (1988), and Burnt Creek (1984), each with multiple permanent photo points.
* Summit Creek Exclosure Stream Study, established in 1975.
* Riparian vegetation/hydrologic inventory on 128 miles of perennial streams in 1994-1995.
* Bursik, R.J. 1994. *Field survey of plant communities at Thousand Springs/Chilly Slough, Custer County, Idaho.* Unpublished report prepared for The Nature Conservancy, Ketchum, Idaho. 20 pp.

Aquatic Habitat/Fisheries

* 38 permanent study sites on 20 perennial streams located on 15 allotments.
* Fish distribution surveys performed on 45 streams since 1994. (**Note:** Fish distribution data are summarized in Appendix C, Item 1).
* Fish habitat condition inventories have been performed on 21 perennial streams.
* End-of-Year Report to National Marine Fisheries Service for Endangered Species Act Section 7 Consultation Compliance. Annual reports from 1993 to present.
* Aquatic benthic macroinvertebrate monitoring reports from USDI - BLM Aquatic Ecosystem Laboratory, Fisheries and Wildlife Department, Utah State University, Logan, Utah. Annual reports from 1993 to present.
* Water temperature profiles for streams located in the Challis Resource Area. Annual summaries since 1995.

Forest Resources

* Timber Production Capability Classification (TPCC) inventory of 1984, and 1996 updates with maps and field forms.
* Yield and allowable sale quantity (ASQ) calculation databases (Lotus software).

Cultural Resources (**Note:** This information is not available for public review.)

* Broadscale Class II inventory performed as a random sample encompassing the entire Challis Resource Area, 1976-1979.
* Site-specific Class III inventories; ongoing as needed.
* Miscellaneous site-specific archaeological excavations.

Wildlife

* Barnes, Larry J. 1994. *The Birds of Chilly Slough, Idaho.* A report completed for The Nature Conservancy, Ketchum, Idaho. November 1994. 65 pp.
* Levine, Ed. 1992. *Peregrine habitat evaluation/Mackay area.* Memorandum to Alan Thomas from the Nongame and Endangered Wildlife Program of the Idaho Dept. of Fish and Game, Boise, Idaho.
* BLM, Challis Resource Area. *Small mammals of the Thousand Springs Marsh.* Unpublished small mammal trapping data. 1978.
* Small mammal trapping data.
* Nongame bird transects. 1988, 1989, 1990.
* Big game browse form class measurements. 1977-1980.
* Winter elk utilization data - bluebunch wheatgrass, Willow Creek Summit elk winter range. 1992.
* Big game winter range maps.
* Big game pellet group transect data.
* Bighorn sheep vegetative trend studies.
* Sage grouse lek monitoring data - 1970-1997.
* 1977 Raptor Cliff Nest Site Inventory.
* Big Game Winter Range Surveys, 1989, 1992, 1994, 1996. Idaho Department of Fish and Game. Older survey data also available.

Climate

* 31 precipitation gauges scattered throughout the Resource Area are maintained and read quarterly each year to determine annual and growing season precipitation.
* Three National Oceanographic Aeronautics Administration (NOAA) climate stations (Challis, Chilly, Mackay Ranger Station) are utilized for regional climate data.
* One RAWS (Remote Area Weather Station) site is monitored and utilized for precipitation, temperature, and wind data.

Miscellaneous References

* Custer/Lemhi Soil Survey, Natural Resources Conservation Service (in publication).
* Ecological Site Guides, Major Land Resource Areas (MLRA) B-12, Natural Resources Conservation Service, 1983.