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FUTURE FISHERIES IMPROVEMENT PROGRAM

REPORT TO 2001 LEGISLATURE
AND
FISH, WILDLIFE AND PARKS COMMISSION

*Montana Fish,
Wildlife & Parks*

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Prepared by:
Habitat Protection Bureau
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Cover photo: Aerial photograph of Big Spring Creek (near Lewistown) showing a newly constructed meandering channel on the Brewery Flats Fishing Access Site. The old channel (parallel to the road) was straightened when the railroad was built near the turn of the century. Stream length as a result of the project will increase from 2,600 to 3,950 feet.

MONTANA FISH, WILDLIFE AND PARKS
Fisheries Division

Future Fisheries Improvement Program
And
Bull Trout and Cutthroat Trout Enhancement Program
Summary 1995-2000

The Future Fisheries Improvement Program (HB 349) provides funds for: *"the long term enhancement of streams and stream banks, in stream flows, water leasing, lease or purchase of stored water, and other voluntary programs that deal with wild fish and aquatic habitats."* The Future Fisheries Improvement Program was supplemented in 1999 when the legislature enacted the Bull Trout and Cutthroat Trout Enhancement Program (HB 647) which *"provides for the enhancement of Montana bull trout and cutthroat trout populations through voluntary enhancement of spawning areas and other habitats for the natural reproduction of bull trout and cutthroat trout."*

This report summarizes project funding and status of all projects that have been approved since these programs began in 1995 and 1999, respectively. The report also includes a brief narrative description of all projects approved since the last reporting period. Results of project monitoring are summarized in Appendix A.

Review Panel: Panel members during this report period included: **Jim Stone**, representing the North Powell County Conservation District, Ovando; **Roy Gabel**, commercial rancher, Huntley; **Doug Parrott**, commercial rancher and irrigator, Roundup; **Paul Callahan**, Land and Water Consulting, Aquatic Habitat Consultants, Missoula; **Duane Phinney**, fishery biologist, St. Regis; **Robert Twiford**, licensed angler, Malta; **Earl Dorsey**, licensed angler, Helena; **Nick Morales**, student, Capital High School, Helena; **Senator Jack Wells**, Bozeman; **Representative Dan Fuchs**, Billings; **Dr. Steve Custer**, hydrologist, Montana State University, Bozeman; **Greg Watson**, Plum Creek Timber Company, Missoula; and **Gordon Stockstad** (ex-officio), Montana Department of Transportation. The review panel met four times since the last report -- January 99, July 1999, January 2000, and July 2000. Project proposal deadlines are January 1 and July 1 of each year.

Staffing: Mark Lere has been the Program Officer since November of 1997. Mark is responsible for reviewing project applications, visiting the sites of proposed projects, communicating department recommendations to the review panel, completing MEPA requirements, coordinating with consultants and contractors who design and perform restoration projects, developing project proposals, and working with landowners and other citizens who need help developing proposals.

Other program staff include Brad Shepard (0.5 FTE, biologist) who is responsible for project monitoring. Brad maintains a database to track restoration project monitoring conducted by

other biologists and conducts field monitoring of approximately 15 projects. His monitoring report is attached (Appendix A). Eric Reiland (0.5 FTE, biologist) is responsible for working with landowners to develop projects west of the Continental Divide. Eric is presently working in the upper Clark Fork and Rock Creek drainages. Lee Nelson (0.5 FTE, biologist from HB 647) is responsible for cutthroat restoration efforts in the Elkhorn Mountains. Glenn Phillips, Chief of the Habitat Protection Bureau, continues to be responsible for overall program administration.

Operating Budget: Operating expenses during FY-99, FY-00, and FY-01 are summarized in Table 1.

Table 1. Future Fisheries Improvement Program operating expenses July 1, 1998-October 31, 2000.

Expense category	FY-99	FY-00	FY-01
Salaries and Benefits	85,630	94,737	32,938
Operating Expenses			
Services	384	4,134	188
Supplies & Materials	5,513	2,182	1,462
Communications	1,077	1,153	353
Travel	12,179	9,508	5,591
Repair & Maintenance	392	299	266
Education and Training	1,130	690	65
Miscellaneous	980	989	380
Total	107,285	113,692	41,243

Anticipated Expenses: House Bill 349 requires Fish, Wildlife and Parks to report "anticipated expenses for the ensuing 10 years implementation of the program." During the first five years of the program, we have committed, on average, about \$0.7 million/yr to projects. There are approximately \$1.0 million of uncommitted dollars remaining in the program budget.

If \$350,000 (the average committed per funding cycle to date) is allocated to projects during the January 2001 funding cycle, there will be about \$650,000 in program dollars that will carry forward into the next biennium and which will be added to the \$2.01 million that is in the Governor's budget for the next biennium. Over the next ten years we anticipate continuing to spend approximately \$1.5 million per biennium or about \$7.5 million over the next ten years.

Projects and appropriations: To date the Future Fisheries Review Panel and Fish, Wildlife and Parks Commission have fully or partial funded 237 projects. Additionally, both the review panel and the commission approved funding for the Tongue River project. The 1995 legislature earmarked \$510,000 for projects to enhance fisheries in the Tongue River; an additional \$275,000 was appropriated towards this purpose by the 1999 legislature. These projects are to partially mitigate for fishery losses associated with the construction of Tongue River Dam. The Tongue River projects are administered by the state of Montana, the Northern Cheyenne Tribe, and the United States Bureau of Reclamation.

Legislative appropriations to the Future Fisheries program include: 95-\$2,270,000; 97-\$1,385,000; 99-1,470,000; Total-\$5,125,000. Additionally, the 1999 legislature appropriated \$750,000 from our general license account and \$500,000/yr (beginning in 2001) from the Resource Indemnity Trust Account to the Bull Trout and Cutthroat Trout Enhancement Program.

Table 2. Summary of projects approved, program dollars committed, and matching dollars committed during each funding cycle.

Funding Cycle	Projects Approved	Program \$ Committed	Matching \$ Committed
Winter 96	30	\$666,601	\$1,722,289
Summer 96	18	164,278	172,416
Tongue River (96&99)	1	785,000	115,000
Winter 97	27	435,807	767,052
Summer 97	18	266,617	1,677,408
Winter 98	23	320,520	712,300
Summer 98	26	483,397	410,187
Winter 99	20	360,860	571,981
Summer 99	30	379,114	937,735
Winter 00	30	285,847	1,049,606
Summer 00	14	206,298	200,847
Total	237	\$4,347,868	\$8,336,821

The process for securing the financial involvement of the Montana Department of Transportation in bull and cutthroat trout enhancement projects, as outlined in HB 647, is continuing to evolve. The Department of Transportation is a willing participant but projects must be located in areas where new roads are being constructed. Further, restoration projects must be scheduled concurrently with road construction. Several restoration projects are underway or are presently being planned including reaches of Camp Creek south of Hamilton, Kleinschmidt Creek near Ovando, and Therriault Creek near Eureka. We are also working toward mitigation agreements along transportation corridors where bull and cutthroat trout occur; mitigation funds will potentially be available for bull and cutthroat trout habitat restoration projects.

Table 3 summarizes the budget and status of projects that have been approved to date. Thirty of the approved projects are to improve fish habitat in lakes, reservoirs or ponds and the remaining projects are for habitat improvements in rivers and streams. Bull trout and cutthroat trout projects funded through HB 647 are highlighted in Table 3.

Table 3. Future Fisheries Improvement Program project funding and status (Program funds allocated and spent as of December 8, 2000). Projects highlighted in **bold** were funded under House Bill 647.

FFI#	PROJECT NUMBER, NAME & YEAR	APPLICANT	PROGRAM FUNDS COMMITTED (\$)	MATCHING FUNDS (\$)	TOTAL FUNDS COMMITTED (\$)	PROGRAM FUNDS SPENT (\$)	EXPECTED YEAR OF COMPLETION
	1996 WINTER FUNDING CYCLE						
001-96	1 Cress Spring Creek Fence	Landowner	\$5,328	\$12,172 ^{a,p}	\$17,500	\$5,328	Complete
002-96	2 Dunham Creek Fish Screen	FWP/Landowner	15,915	12,500 ^{a,r}	28,415	14,800	Complete
003-96	3 O'Brien Creek Restoration	FWP/Landowner	8,500	13,000 ^{a,l}	21,500	8,329	Complete
004-96	4 Gold Creek Pool Development	FWP/Landowner	25,652	29,000 ^{a,r}	54,652	25,652	Complete
005-96	5 Rock Creek Restoration	Consult/Landowner	12,450	9,758 ^a	22,208	12,450	Complete
006-96	6 Steel Creek Restoration	FWP/Landowner	10,000	19,325	29,325	9,415	Complete
007-96	7 Cottonwood Creek-Dreyer Diversion	FWP/Landowner	16,070	30,309 ^{a,r}	46,379	16,180	Complete
008-96	8 Meadow Creek Fence	USFS	2,000	2,000 ^a	4,000	0	Cancelled
011-96	9 Sweathouse Creek Enhancement	Landowners	13,305	1,500 ^a	14,805	9,609	Complete
013-96	10 Little Beaver Creek Riparian Fence	Landowner	1,966	1,200 ^a	3,166	2,125	Complete
014-96	11 Upper Big Hole River Flow Enhancement	USFWS/Landowner	20,000	45,000 ^{a,r}	65,000	20,001	Complete
016-96	12 Whites Gulch Riparian Fence & Revegetation	USFS	19,500	12,500 ^{a,s}	32,000	12,838	Complete
017-96	13 Deep Creek Channel Restoration	FWP/Landowners	65,000	280,000 ^{a,c,g}	345,000	70,000	Complete
018-96	14 Lake Francis Shoreline Stabilization	Cons. District	2,500	107,500 ^{a,c,l}	110,000	2,500	Complete
020-96	15 Dick Creek Restoration	USFWS/Landowner	6,800	0	6,800	6,520	Complete
021-96	16 Mol Heron Creek Flow Enhancement	Landowner	124,000	52,525 ^a	176,525	103,369	Complete
022-96	17 Fort Peck Breakwater - Spawning Reef	ACOE	12,500	920,000 ^{a,q}	932,500	12,000	Complete
024-96	18 Nelson Reservoir Spawning Vegetation	FWP	2,100	0	2,100	1,182	Complete
025-96	19 Nelson Reservoir Spawning Reef	FWP	5,750	1,000 ^a	6,750	5,817	Complete

FFI#	PROJECT NUMBER, NAME & YEAR	APPLICANT	PROGRAM FUNDS COMMITTED (\$)	MATCHING FUNDS (\$)	TOTAL FUNDS COMMITTED (\$)	PROGRAM FUNDS SPENT (\$)	EXPECTED YEAR OF COMPLETION
026-96	20 Fresno Reservoir Spawning Vegetation	FWP	2,400	0	2,400	863	Cancelled
027-96	21 Bear Paw Reservoir Spawning Enhancement	FWP	1,200	0	1,200	1,200	Complete
028-96	22 Stiemmons Pond Dam Removal	FWP	5,000	10,000 ^m	15,000	2,401	Complete
030-96	23 Big Hole River Channel Restoration	TU/Landowner	62,500	7,500 ^{a+b}	70,000	57,230	Complete
031-96	24 Ruby River Bank Stabilization	FWP/Landowner	16,340	7,000 ^{a+r}	23,340	16,340	Complete
032-96	25 Elk Creek Restoration	TU/Landowner	18,075	15,000 ^{a+r}	33,075	0	2002
033-96	26 Dry Creek Rehab. & N. Fork Blackfoot	TU/Landowner	76,250	2,000 ^a	78,250	74,343	Complete
036-96	27 Madison Spring Creek Rehabilitation	Consult/Landowner	15,000	17,000 ^a	32,000	15,000	Complete
037-96	28 Elk Creek Rehabilitation	USFWS/Landowner	8,000	23,000 ^{b+n+r}	31,000	8,000	Complete
038-96	29 Locke Creek flow enhancement	TU/Landowner	2,500	1,500 ^{a+p}	4,000	0	Cancelled
039-96	30 NCAT - Agrimet Flow enhancement	NCAT	90,000	90,000 ^k	180,000	90,000	Complete
	SUBTOTAL 1996 winter funding cycle		\$666,601.00	1,722,289.00	\$2,388,890.00	\$603,492.00	
	1996 SUMMER FUNDING CYCLE						
041-96	31 Prickly Pear Creek Fence & Bank Stabilization	Landowner	2,000	500 ^a	2,500	2,637	Complete
042-96	32 St. Regis River Channel Restoration	FWP/Landowner	27,500	26,500 ^{a+d}	54,000	26,622	Complete
043-96	33 Little Sheep Creek Channel Restoration	USFS	10,729	20,620 ^a	31,349	6,979	Complete
044-96	34 Cottonwood Creek	FWP	18,200	22,500 ^a	40,700	16,500	Complete
045-96	35 North Fork Fish Screens	FWP/Landowner	10,500	20,000 ^a	30,500	10,500	Complete
046-96	36 Blackfoot River Bank Stabilization	Consult/Landowner	1,500	6,350 ^a	7,850	1,500	Complete
047-96	37 Sun River Bank Stabilization	FWP/Landowner	10,800	19,200 ^a	30,000	0	Cancelled
048-96	38 Blanchard Creek Riparian Fence	DNRC	8,000	0	8,000	8,144	Complete
049-96	39 Elk Creek Assessment	Watershed group	7,300	1,000 ^a	8,300	8,745	Complete
050-96	40 Beaverhead, Van Camp & Rattlesnake Slough	Landowner	22,923	9,500 ^a	32,423	13,830	Complete

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051-96	41 Bitterroot River Fence	Landowner	5,625	3,244 ^a	8,869	2,892	Complete
052-96	42 Blanchard Creek Feedlot Removal	Landowner	9,143	10,742 ^a	19,885	0	Cancelled
053-96	43 Echo Lake Bass Rearing Habitat	Bassmasters	1,414	1,200 ^c	2,614	2,387	Complete
054-96	44 Magpie Creek Fish Passage	Landowner	5,000	5,000 ^a	10,000	5,000	Complete
055-96	45 Teton River Bank Stabilization	Cons. District	4,300	14,300 ^{a,c,d}	18,600	1,700	Complete
056-96	46 Canyon Creek Bank Stabilization	Landowner	2,500	2,116 ^f	4,616	2,500	Complete
057-96	47 Missouri River Bank Stabilization	Landowner	15,000	7,800 ^a	22,800	15,000	Complete
058-96	48 Meadow Creek Riparian Fence	USFS	1,844	1,844 ^s	3,688	0	Cancelled
	SUBTOTAL 1996 summer funding cycle		\$164,278.00	\$172,416.00	\$336,694.00	\$124,936.00	
	1997 WINTER FUNDING CYCLE						
001-97	1 Elk Creek Channel Restoration	Watershed group	55,800	84,500 ^{a,g}	140,300	55,796	Complete
002-97	2 Fisher River Channel Restoration	Cons. District	3,300	4,000 ^{e,h}	7,300	2,288	Complete
003-97	3 Stinger Creek Channel Restoration	Cons. Foundation	40,000	32,000 ^{a,k,r}	72,000	39,945	Complete
004-97	4 Middle Fork Rock Creek Riparian Fence	USFS	26,000	26,000 ^{a,s}	52,000	26,000	Complete
005-97	5 Clark Fork River Riparian Fence	Landowner	1,600	1,062 ^a	2,662	1,668	Complete
006-97	6 Grantier Spring Creek Channel Restoration	Landowner	2,260	5,060 ^a	7,320	2,260	Complete
007-97	7 Camp Creek Restoration	TU/Landowners	39,300	65,000 ^{a,u}	104,300	0	2001 (see 006-1999)
009-97	8 Chamberlain Creek Diversion	FWP/Landowner	10,442	18,178 ^r	28,620	10,442	Complete
010-97	9 O'Brien Creek Channel Restoration	FWP/Landowners	11,600	34,000 ^{a,m,r,s}	45,600	12,708	Complete
011-97	10 N. F. Blackfoot Hoxworth/Williams Fish Screen	FWP/Landowners	14,500	24,000 ^{a,p,r}	38,500	14,306	Complete
012-97	11 Monture Creek Fish Habitat Enhancement	FWP/Landowner	9,000	22,500 ^{a,p,r}	31,500	8,921	Complete
013-97	12 Salmon Creek & Dry Creek Habitat Restoration	FWP/Landowner	37,384	63,000 ^{a,k,p,r}	100,384	37,384	Complete
014-97	13 Mill Creek Channel Restoration	Consult/Landowner	38,246	32,000 ^a	70,246	0	Cancelled

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016-97	14 Stone Creek Channel Restoration	FWP/Landowner	8,910	5,700 ^{a,c,e}	14,610	8,909	Complete
017-97	15 Ruby River Channel Stabilization	FWP/Landowner	3,660	14,610 ^a	18,270	3,660	Complete
018-97	16 Mol Heron Creek Fish Screen – supplement	Landowner	21,000	0	21,000	46,000	Complete
020-97	17 Black Butte Creek Riparian Fence & Stabilization	USFS/Landowner	4,500	7,500 ^{a,c,e}	12,000	2,305	Complete
021-97	18 Missouri River Bank Stabilization	TU/Landowner	20,430	18,842 ^{a,d,e}	39,272	20,434	Complete
022-97	19 Sun River Bank Stabilization Survey	Consult/Landowner	6,000	6,000 ^a	12,000	5,044	Complete
023-97	20 Elk Creek Bank Stabilization	Consult/Landowner	11,000	27,700 ^{a,r}	38,700	11,000	Complete
024-97	21 Big Spring Creek Restoration	FWP	35,000	235,000 ^d	270,000	35,000	Complete
025-97	22 Dearborn River Channel Stabilization	Landowner	4,000	5,000 ^{a,r}	9,000	0	Cancelled
026-97	23 Townsend Ranch Streams Restoration	USFS/Landowner	10,000	28,500 ^{a,c,e}	38,500	9,148	Complete
027-97	24 Bynum Reservoir Spawning Habitat	WU	9,900	3,400 ^s	13,300	9,415	Complete
028-97	25 Hauser Reservoir Spawning Habitat	WU	4,400	500 ^s	4,900	4,400	Complete
029-97	26 Dearborn River Bank Stabilization	Landowner	3,800	2,000 ^a	5,800	0	Cancelled
031-97	27 Fresno Reservoir Spawning Habitat	FWP	3,775	1,000 ^s	4,775	3,735	Complete
	SUBTOTAL 1997 winter funding cycle		\$435,807.00	\$767,052.00	\$1,202,859.00	\$370,768.00	
	1997 SUMMER FUNDING CYCLE						
033-97	28 Yellowstone River Bank Stabilization	FWP/Landowner	20,000	20,000 ^a	40,000	20,000	Complete
034-97	29 Mud Creek Channel Restoration	Cons. Foundation	15,000	20,000 ^{a,c,e}	35,000	14,950	Complete
035-97	30 Bitterroot River Riparian Fencing	Landowner	991	991 ^a	1,982	0	Cancelled
036-97	31 Rock Creek Channel Restoration	USFS	20,000	625,000 ^s	645,000	8,100	Complete
037-97	32 Cottonwood Creek Culvert to Bridge Conversion	FWP/County	10,000	15,000 ^{d,r}	25,000	10,000	Complete
038-97	33 McCabe Creek Culvert to Bridge Conversion	FWP/County	13,000	12,000 ^{d,r}	25,000	13,000	Complete
039-97	34 Johnson Creek Culvert to Bridge Conversion	FWP/Landowners	4,000	6,500 ^{m,s}	10,500	4,000	Complete

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040-97	35 Gilbert & Shanley Creeks Project Repair	FWP/Landowners	5,560	8,000 ^{err}	13,560	5,612	Complete
045-97	36 Mill Coulee Bank Stabilization	Consult/Landowner	13,603	33,000 ^{acc}	46,603	14,898	Complete
046-97	37 Sun River Channel Survey	Cons. Dist./Consult	5,000	0	5,000	5,500	Complete
047-97	38 Sun River Bank Stabilization	Consult/Landowner	11,963	13,034 ^{acc, err}	24,997	11,608	Complete
050-97	39 Canyon Creek Channel Restoration	NRCS/Landowner	12,000	17,000 ^{acc, err}	29,000	13,200	Complete
051-97	40 Boulder River Channel Stabilization	Consult/Landowner	10,000	65,438 ^a	75,438	10,000	Complete
052-97	41 Careless Creek Bank Stabilization	NRCS/Landowner	2,000	435,700 ^{a, b, acc}	437,700	995	Complete
053-97	42 Cottonwood Creek Migration Barrier	USFS	3,000	1,270 ^s	4,270	0	Superseded with 010-00
054-97	43 Union Creek Riparian Fence & Offsite Water	DNRC	10,500	29,250 ^h	39,750	0	Cancelled
055-97	44 Muskrat Creek Migration Barrier	FWP/USFS/BLM	10,000	25,225 ^{s, acc}	35,225	6,509	Complete
056-97	45 Yellowstone River Bank Stabilization	FWP/Landowner	100,000	350,000 ^a	450,000	100,000	Complete
			\$266,617.00	\$1,677,408.00	\$1,944,025.00	\$238,372.00	
001-98	1 Bear Paw Lake Shoreline Rearing Habitat	FWP	4,750	0	4,750	4,810	Complete
003-98	2 Beaverhead River Riparian Fencing	USFWS/Landowner	15,000	20,000 ^{err}	35,000	15,000	Complete
004-98	3 Big Creek Channel Restoration	Cons Dist./Consult	19,600	23,000 ^{acc, err}	42,600	19,600	Complete
006-98	4 Bynum Reservoir Spawning Habitat	WU	3,500	1,500 ⁱ	5,000	3,500	Complete
007-98	5 Canyon Ferry Reservoir Spawning Habitat	WU	1,000	7,000 ⁱ	8,000	1,100	Complete
009-98	6 Cottonwood Creek Barrier - supplement	USFS	6,000	6,000 ^s	12,000	0	Superseded with 010-00
010-98	7 Deep Creek Channel Restoration	FWP/Landowner	10,400	22,000 ^{err}	32,400	10,304	Complete
011-98	8 East Fork Bull River Bank Stabilization	FWP/Landowner	5,325	1,775 ^{acc, err}	7,100	5,728	Complete
012-98	9 Highwood Creek Bank Stabilization	Consult/Landowner	31,920	24,150 ^{acc, err}	56,070	24,000	Complete

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013-98	10 Hughes Creek Channel Restoration	USFS	5,000	125,000 ^{a,s}	130,000	5,000	Complete
014-98	11 Kleinschmidt Creek Channel Restoration	Consult/Landowner	25,500	10,000 ^a	35,500	0	2001
015-98	12 Mill Creek Channel Restoration	Consult/Landowner	30,000	60,500 ^{a,r}	90,500	0	2002
016-98	13 Missouri River Bank Stabilization	TU/Landowner	34,629	19,600 ^{a,b,p,r}	54,229	34,629	Complete
017-98	14 Mud Creek Channel Restoration	Cons. Foundation	20,000	24,000 ^{a,r,s,x}	44,000	0	Cancelled
018a-98	15 Spring Creek Murphy Diversion Fish Passage	FWP/Landowner	5,546	12,979 ^{a,r}	18,525	5,546	Complete
018b-98	16 North Fork Blackfoot River Haggert Diversion	FWP/Landowner	13,300	21,300 ^{a,r}	34,600	13,301	Complete
018c-98	17 North Fork Blackfoot River Weaver Diversion	FWP/Landowner	4,500	6,500 ^{a,r}	11,000	3,213	Complete
018d-98	18 Blackfoot River Bank Stabilization	FWP/Landowner	6,750	11,750 ^{a,r}	18,500	5,853	Complete
021-98	19 Ruby River Diversion Improvement	CD/Landowners	25,000	154,031 ^{a,s,x}	179,031	0	2002
022-98	20 Smith Pond Development	FWP/Landowner	30,000	65,000 ^{a,u}	95,000	0	Cancelled
023-98	21 South Fork Dupuyer Creek Habitat Enhancement	USFS	2,800	2,000 ^a	4,800	0	2002
024-98	22 Sweatouse Creek Bank Stabilization	Consult/Landowners	10,000	82,575 ^{a,r}	92,575	0	Cancelled
026-98	23 Spring Coulee Riparian Fence & Stabilization	Consult/Landowners	10,000	11,640 ^{a,n}	21,640	10,000	Complete
	SUBTOTAL 1998 winter funding cycle		\$320,520.00	\$712,300.00	\$1,032,820.00	\$161,584.00	
	1998 SUMMER FUNDING CYCLE						
027-98	24 Big Creek Flow Enhancement	Landowners	325,000	144,000 ^{a,r}	469,000	244,937	Complete
028-98	25 Bear Creek Channel Restoration	TU/Landowner	15,000	48,200 ^{a,b,m,o,r}	63,200	16,500	Complete
029-98	26 Blackfoot River Water Conservation	FWP/Landowner	3,050	9,175 ^{a,s,r}	12,225	1,560	Complete
030-98	27 Cottonwood & McCabe Cr. Bridges (supplement)	FWP/County	8,625	10,675 ^{b,p,r}	19,300	11,787	Complete
031-98	28 McCabe Creek Habitat Enhancement	FWP/Landowner	5,000	14,000 ^{b,p,r}	19,000	6,213	Complete
033-98	29 Nevada Creek Douglas & Helmville Fish Ladders	FWP/Landowner	3,000	5,400 ^{a,r}	8,400	3,000	Complete
034-98	30 Nevada Creek Quigley Fish Ladder	FWP/Landowner	2,980	12,980 ^{a,n,r}	15,960	211	2001

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035-98	31 Nevada Creek Fish Friendly Diversion & Fence	FWP/Landowner	2,590	15,370 ^{aa}	17,960	1,250	2001
036-98	32 Nevada Spring Creek Culvert to Bridge Conversion	FWP/Landowner	4,000	8,000 ^{ef}	12,000	4,400	Complete
037-98	33 Rock Creek Channel Restoration	TU/Landowner	27,660	35,540 ^{aa}	63,200	30,426	Complete
038-98	34 Shanley Creek Diversion & Riparian Fence	FWP/Landowner	2,800	6,800 ^{af}	9,600	2,307	Complete
039-98	35 Wasson Creek Fish Friendly Diversion	FWP/Landowner	1,250	2,400 ^{af}	3,650	272	Complete
042-98	36 Careless Creek Bridge & Riparian Fence	NRCS/Landowners	10,150	4,150 ^a	14,300	10,621	Complete
044-98	37 Cottonwood Creek Diversion	CD/Landowner	2,000	3,500 ^{af}	5,500	0	2001
045-98	38 Esp/Chamber Spring Creek Channel Restoration	CD/FWP/Owners	11,600	18,400 ^{af}	30,000	11,932	Complete
048-98	39 Prickly Pear Riparian Fence	Consult/Landowner	5,000	5,000 ^a	10,000	0	Cancelled
050-98	40 Red Lodge Creek Riparian Fence	NRCS/Landowner	4,050	1,350 ^{af}	5,400	0	Cancelled
051-98	41 Ross Fork Rock Creek Fish Ladder	USFS	2,000	4,000 ^f	6,000	1,891	Complete
052-98	42 Saddle Brook Pond Restoration	WU	12,000	3,340 ^{af}	15,340	13,218	Complete
053-98	43 Shields River & Elk Creek Riparian Fence	CD/Watershed Grp	20,000	41,537 ^{af}	61,537	24,405	Complete
054-98	44 Smith Creek Riparian Fence	Landowner	2,595	1,670 ^{af}	4,265	2,855	Complete
055-98	45 Spokane Creek Channel Restoration	USFWS/Landowner	4,000	5,100 ^{af}	9,100	4,000	Complete
056-98	46 Staubach Creek Fish Barrier	FWP	3,000	3,500 ^{af}	6,500	3,000	Complete
057-98	47 Sweetgrass Creek Riparian Fence	Landowner	2,500	2,500 ^a	5,000	2,500	Complete
059-98	48 Thompson Chain of Lakes Habitat Structures	Basismasters	1,060	1,600 ^c	2,660	0	2001
060-98	49 Tiber Reservoir Spawning Habitat	Sportsmen's Club	2,487	2,000 ^a	4,487	1,417	2002
		SUBTOTAL 1998 summer funding cycle	\$483,397.00	\$410,187.00	\$893,584.00	\$398,702.00	
		1999 WINTER FUNDING CYCLE					
001-99	1 Big Hole River Stock Water	CD/FWP	7,035	1,200 ^{af}	8,235	7,035	Complete
002-99	2 Big Hole River Stock Water	Landowner/FWP	10,000	4,300 ^{aa}	14,300	0	2001

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004-99	3 Butler Creek Fence and Stockwater	Landowner/FWP	2,906	1,300 ^a	4,206	2,881	Complete
005-99	4 Bynum Reservoir Spawning Habitat	WU	4,000	2,500 ^d	6,500	3,900	Complete
006-99	5 Camp Creek Channel Restoration	Consult/Landowner	12,000	54,950 ^{a,k}	66,950	23,887	Adds to 007-97
007-99	6 Coal Creek Riparian Fencing	DNRC	2,400	6,600	9,000	1,886	Complete
008-99	7 Cottonwood Creek Bank Stabilization	Landowner/CD	3,150	5,718 ^{a,g}	8,868	3,150	Complete
010-99	8 Douglas Creek Fish Passage	FWP	25,000	18,000 ^{a,r}	43,000	8,875	2001
012-99	9 Elk Creek (Scherrer) Channel Restoration	Landowner/FWS	5,000	11,500 ^{a,b,r}	16,500	5,000	Complete
013-99	10 Flatwillow Creek Bank Stabilization	Consult/Landowner	30,525	17,250 ^{a,k}	47,775	0	Cancelled
014-99	11 Horseshoe Lake Spawning Habitat	Basinmasters	1,000	1,150 ^a	2,150	0	2001
018-99	12 Prickly Pear Creek Bank Stabilization	Consult/Landowner	28,775	28,775 ^{a,r}	57,550	23,775	Complete
020-99	13 Rock Creek Water Salvage & Channel Restoration	Landowner/FWP	138,346	231,283 ^{a,k,n,r}	369,629	138,346	Complete
021-99	14 Ruby River Feedlot Relocation	Landowner/NRCS	18,100	60,000 ^{a,n,r}	78,100	11,000	2001
023-99	15 Smith River Stock Water	Landowner/CD	12,500	12,500 ^{a,n}	25,000	10,000	2001
024-99	16 Sun River Bank Stabilization	Consult/CD	13,712	21,500 ^{a,k}	35,212	13,032	Complete
025-99	17 Tenmile Creek Riparian Habitat	Watershed Group	4,501	1,000 ^a	5,501	4,401	Complete
026-99	18 Warren Creek Channel Restoration	USFWS	20,000	50,625 ^{a,n,r}	70,625	0	2001
027-99	19 S. Fork Willow Creek Riparian Fence	Landowner/FWP	7,000	34,630 ^{a,l}	41,630	7,200	Complete
028-99	20 Yellowstone River Huntley Fish Passage	Irrigation District	14,910	7,200 ^{a,k}	22,110	16,400	Complete
	SUBTOTAL 1999 winter funding cycle		\$360,860.00	\$571,981.00	\$932,841.00	\$280,768.00	
	1999 SUMMER FUNDING CYCLE						
030-99	21 Bad Canyon Creek Non-native Fish Removal	FWP	6,500	0	6,500	0	2001
031-99	22 Beaverhead/Poindexter Bank Stabilization	Landowner/FWP	3,117	8,112 ^{a,r,k}	11,229	3,117	Complete
033-99	23 Big Coulee Creek Fish Barrier	FWP	1,560	1,000 ^a	2,560	0	2001

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035-99	24 Canyon Ferry Reservoir Spawning Habitat	FWP	11,000	8,544 ^{aa}	19,544	10,310	Complete
036-99	25 Clark Fork River Riparian Fence and Bank Stabilization	Landowner/FWP	1,334	1,335 ^a	2,669	0	Cancelled
037-99	26 Cottonwood Creek Fish Barrier	FWP	9,550	1,600 ^a	11,150	5,623	2001
038-99	27 Cottonwood Creek Fish Ladder Repair	TU/FWP	4,000	7,000 ^{aa}	11,000	2,435	2001
039-99	28 Daisy Dean Creek Off-site Water and Fencing	CD/Watershed group	9,500	4,746 ^a	14,246	8,870	Complete
041-99	29 Elk Creek (Antz) Channel Restoration	Landowner/FWS	7,500	10,500 ^{aa,r}	18,000	6,570	Complete
042-99	30 Grave Cr Diversion Repair and Fish Screen	CD/FWP	38,000	121,050 ^{aa,r}	159,050	0	2001
044-99	31 Kleinschmidt/Rock Cr. Water Lease	TU	6,000	9,000 ^a	15,000	0	2001
045-99	32 Little Prickly Pear Cr. Fish Screen	FWP/Landowner	14,000	10,000 ^r	24,000	14,500	Complete
046-99	33 Little Prickly Pear Cr. Off-Site Water & Fence	FWP/Landowner	7,225	7,425 ^{a,r}	14,650	0	2001
047-99	34 Lost Creek Corral Relocation	Landowner/FWP	29,832	92,250 ^{aa,r}	122,082	16,091	2001
048-99	35 Middle Fork Rock Cr. Riparian Fence	USFS	5,500	5,900 ^a	11,400	0	2001
049-99	36 Monture Creek Habitat Restoration	TU/Landowner	5,000	10,000 ^{pr}	15,000	4,567	Complete
050-99	37 Ninemile Creek Bank Stabilization & Fencing	Landowner	5,000	14,325 ^a	19,325	0	2001
051-99	38 O-Brien Creek Grade Control Repair	FWP	2,400	1,300 ^{aa,r}	3,700	1,530	Complete
052-99	39 Pearson Creek Habitat Restoration	TU/Landowner	5,000	12,000 ^{aa,r}	17,000	4,875	Complete
053-99	40 Prospect Creek Channel Restoration	Watershed group	34,000	121,174 ^{a,g}	155,174	25,800	2001
054-99	41 Racetrack Creek Riparian Fence & Channel Restoration	Landowner/FWP	1,750	36,680 ^{aa}	38,430	1,750	Complete
057-99	42 Ronan Spring Cr. Channel Restoration	Community Found	10,000	2,500 ^a	12,500	10,000	Complete
058-99	43 Salmo Reservoir Lake Aeration	FWP	950	300 ^{a,d}	1,250	700	Complete
059-99	44 Shields River Bank Stabilization	CD	7,000	18,838 ^{a,b}	25,838	7,000	Complete
060-99	45 Shields River Bank Stabilization	CD	14,569	18,996 ^{a,b}	33,565	0	2001

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061-99	46 S. Fk. Smith River Off-Site Water & Fence	Landowner/CD	9,975	9,975 ^a	19,950	0	2001
063-99	47 Spring Creek Fish Barrier	FWP/Landowner	6,000	1,000 ^f	7,000	0	2001
064-99	48 Spring Creek Channel Restoration	Consul/Landowner	25,000	35,310 ^a	60,310	0	2001
066-99	49 Staubach Creek Native Fish Protection	FWP/Landowner	3,157	3,000 ^a	6,157	3,157	Complete
069-99	50 Trout Creek Channel Restoration	FWP	94,695	363,875 ^{a,g,h,i}	458,570	0	2001
	SUBTOTAL 1999 summer funding cycle		\$379,114.00	\$937,735.00	\$1,316,849.00	\$126,895.00	
	2000 WINTER FUNDING CYCLE						
002-00	1 Basin Creek Culvert Replacement	CT Foundation	3,900	1,950 ^{a,i}	5,850	0	2001
004-00	2 Upper Big Hole River Offstream Water	Big Hole Watershed	6,450	3,965 ⁱ	10,415	1,736	2001
005-00	3 Bitterroot River Riparian Fence	Landowner	4,336	4,546 ^a	8,882	3,734	Complete
007-00	4 Bynum Reservoir Spawning Habitat	Walleye Unlimited	3,160	3,000 ^f	6,160	2,896	Complete
008-00	5 Canyon Creek Riparian Fence	Landowner	1,485	1,650 ^a	3,135	1,081	Complete
009-00	6 Coltonwood Creek Channel Restoration	NRCS/Landowner	16,681	12,094 ^{a,g}	28,775	0	2001
010-00	7 Cottonwood Creek Fish Barrier	USFS	10,000	13,075 ^{a,i}	23,075	0	2001
011-00	8 Dry Creek Riparian Fencing	FWP/Landowner	6,000	3,897 ^a	9,897	0	2001
012-00	9 Dupuyer Creek Channel Restoration	USFWS/Landowner	9,800	14,200 ^{a,i}	24,000	9,802	Complete
013-00	10 East Fork Bull River Channel Restoration	Landowner	14,150	20,273 ^{a,i}	34,423	0	2001
014-00	11 Flatwillow Creek Riparian Fencing	Landowner	2,850	2,400 ^a	5,250	0	Cancelled
015-00	12 Flint Creek Off-site Water and Riparian Fencing	FWP/Landowner	16,500	47,920 ^{a,n}	64,420	12,600	2001
017-00	13 Lost Creek Headgate Repair & Channel Restoration	FWP/Landowner	31,860	163,020 ^{a,g,h,i}	194,880	0	2001
018-00	14 McCabe Creek Irrigation Efficiency	USFWS	15,084	85,000 ^{a,g,i}	100,084	0	2002
022-00	15 N. Burnt Fork Cr. Riparian Fencing	Landowner/Consul.	8,700	15,880 ^a	24,580	0	2001
023-00	16 Prickly Pear Creek Channel Restoration	FWP/Landowner	15,555	14,560 ^{a,g,i}	30,115	0	2001
024-00	17 Prospect Creek Channel Restoration	Watershed group	12,150	391,278 ^{a,i}	403,428	0	2001

FFI#	PROJECT NUMBER, NAME & YEAR	APPLICANT	PROGRAM FUNDS COMMITTED (\$)	MATCHING FUNDS (\$)	TOTAL FUNDS COMMITTED (\$)	PROGRAM FUNDS SPENT (\$)	EXPECTED YEAR OF COMPLETION
025-00	18 Racetrack Creek Off-site water & Riparian Fencing	Landowner/FWP	4,500	13,300 ^{a,n,s}	17,800	0	2001
027-00	19 Ruby Creek Flow Enhancement	USFWS/Landowner	3,000	3,000 ^{a,r}	6,000	3,235	Complete
028-00	20 S.F. Musselshell River Fish Passage	NRCS	3,146	2,979 ^a	6,125	0	2001
029-00	21 S. Willow Creek Bank Stabilization & Riparian Fencing	Landowner	12,000	12,106 ^{a,n}	24,106	0	2001
030-00	22 Stillwater River Side Channel Restoration	Landowner	10,400	14,020 ^{a,n}	24,420	10,400	Complete
031-00	23 Sun River Channel Restoration	Consultant	5,000	73,025 ^{a,n,s}	78,025	0	2002
032-00	24 Sweathouse Creek Fish Screen	FWP/Landowner	3,000	3,000 ^a	6,000	0	2001
033-00	25 Tennille Creek Riparian Restoration	Watershed Group	3,549	3,536 ^{a,s}	7,085	3,549	Complete
034-00	26 Trail Creek Fish Ladder and Screen	Landowner	1,880	9,670 ^a	11,550	0	2001
035-00	27 Virginia Creek Channel Restoration	Landowner	2,875	2,875 ^a	5,750	0	Cancelled
036-00	28 Warren Creek Channel Restoration	FWP	35,000	88,541 ^{a,s}	123,541	31,885	Complete
037-00	29 West Fork Wilson Creek Fish Barrier	FWP	12,500	7,500 ^{a,s}	20,000	0	2001
038-00	30 Yellowstone River Riparian Restoration	Consultant	10,336	17,346 ^a	27,682	5,973	2002
	SUBTOTAL 2000 winter funding cycle		\$285,847.00	\$1,049,606.00	\$1,335,453.00	\$86,891.00	
	2000 SUMMER FUNDING CYCLE						
041-00	31 Big Creek Fish Screen	Landowner	57,500	14,700 ^a	72,200	0	2001
042-00	32 Bitterroot River Fish Screen	Ditch Company	42,000	50,000 ^{a,s}	92,000	0	2001
043-00	33 Butler Creek Fish Passage	FWP	6,400	480 ^a	6,880	0	2001
044-00	34 Canyon Ferry Perch Spawning Habitat	FWP	4,770	18,722 ^{a,s}	23,492	0	2001
045-00	35 Dempsey Creek Corral Relocation	Cons. District	11,608	13,580 ^{a,n,s}	25,188	0	2001
046-00	36 Kolb Spring Creek Channel Restoration & Fencing	FWP/Landowner	55,530	36,275 ^a	91,805	0	2001
049-00	37 Newlan Creek Riparian Fencing and Stockwater	Cons. District	1,290	10,760 ^a	12,050	0	Cancelled
051-00	38 O'Brien Creek Riparian Fencing	FWP	940	715 ^a	1,655	0	2001

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052-00	39 Poorman Creek Channel Restoration	Consultant	4,165	18,015 ^a	22,180	2,192	2001
053-00	40 Silver Butte Fisher Creek Bank Stabilization	NRCS	3,350	17,650 ^{a,b}	21,000	0	2001
056-00	41 Tongue River Riparian Fencing	FWP/Landowner	3,920	2,250 ^a	6,170	0	2001
057-00	42 Trout Creek Fish Ladder	FWP	4,100	4,100 ^m	8,200	0	2001
058-00	43 Wolf Creek Fish Passage	FWP	2,425	4,000 ^{m,k}	6,425	1,496	2001
059-00	44 Region 6 Pond Aeration	FWP	8,300	9,600 ^d	17,900	8,515	Complete
	SUBTOTAL 2000 summer funding cycle		\$206,298.00	\$200,847.00	\$407,145.00	\$12,203.00	

a Applicant/private landowner
 b Audubon
 c Bassmasters
 d BLM
 e Conservation Districts
 f Counties
 g DEQ 319 grant
 h DNRC
 i Federal Aid (USFWS)
 j Federation of Fly Fishers
 k Foundation grants
 l Milltown mitigation
 m MPC
 n NRCS
 o Timber companies
 p Trout Unlimited
 q US Corp of Engineers
 r USEFWS
 s USFS
 t Walleye Unlimited
 u MDOF
 v Confederated Salish/Kootenai Tribe
 x Other

Photo Illustration 1. Restoration of a side channel on the Stillwater River located near the town Absarokee. This abandoned side channel was restored to provide additional spawning and rearing habitat for rainbow trout and brown trout. Upper photo shows side channel during construction. Lower photo shows restored side channel following construction.

BEFORE
(Prior to 1998)
Photo by FWP

AFTER
8/28/00
12 cfs flow

Photo Illustration 2. Instream flow restoration in lower Big Creek, a tributary to the Yellowstone River located near the town of Emigrant. The program provided funding to allow landowners to convert to more efficient sprinkler irrigation, creating salvage water for two instream flow leases. This instream flow provides spawning and rearing habitat for Yellowstone cutthroat trout. Note large rock in channel of stream for photo reference.

Photo Illustration 3. Esp/Chamber Spring Creek, a tributary to the Yellowstone River located near the town of Big Timber, before (upper photo) and after (lower photo) restoration. Note the telephone pole for reference. The project involved channel reconstruction, riparian fencing, off-channel water development for livestock and replacement of a perched culvert. Yellowstone cutthroat trout have been introduced to promote future use as a spawning and rearing tributary.

Photo Illustration 4. Canyon Creek, located north of Helena, during (upper photo) and after (lower photo) channel restoration. This project involved channel re-construction and riparian fencing undertaken to improve habitat for resident rainbow trout, brown trout and brook trout.

Photo Illustration 5. (Top photo) Installation of a fish screen into a diversion on Little Prickly Pear Creek, a tributary to the Missouri River located north of Helena. Little Prickly Pear Creek is an important spawning tributary for migratory rainbow trout and brown trout from the Missouri River. **(Bottom photo)** Wind powered aerator installed on Salmo Reservoir located in Blaine County to prevent winter-kill of bass and bluegill.

Project Descriptions-1999

1. **Big Hole flow enhancement.** Big Hole River (Beaverhead County) near Wisdom suffers from seasonal dewatering. Diverted water is used primarily for stock watering. This reach of the river supports the last remaining population of fluvial arctic grayling in the lower 48 states. This project is part of a larger effort to provide off-stream watering and improve Big Hole River stream flows. Monies were used to construct a power line to the well site to operate the pumps. Ranchers have agreed to leave the diverted water in stream (20-30 cfs) in exchange for the development of the off-stream watering. **Completed.**
2. **Big Hole flow enhancement.** Big Hole River (Beaverhead County) near Wisdom suffers from seasonal dewatering. This project supplements project #1 above. Project dollars were used to develop two springs for off-stream watering of cattle. This is part of a larger project to increase Big Hole River stream flows. Ranchers have agreed to leave diverted water in stream (20-30 cfs) in exchange for the development of the off-stream watering.
3. **Butler Creek riparian enhancement.** Butler Creek (Missoula County) had become degraded over the years due to livestock trampling. Butler Creek supports a pure strain population of west slope cutthroat trout. This project involved riparian fencing to allow streamside areas to recover and off-stream water development. Approximately 500' of stream was treated. **Completed.**
4. **Bynum Reservoir spawning structures.** Bynum Reservoir (Teton County) supports a popular yellow perch fishery but numbers are limited due to a scarcity of spawning habitat and rearing cover. Several types of spawning structures were previously placed in the lake; scotch pines appeared to work best because of their dense network of branches. The project involved placing an additional 550 scotch pine structures in the lake. **Completed.**
5. **Camp Creek restoration.** Camp Creek (Ravalli County); a tributary to the East Fork of the Bitterroot River was channelized many years ago when the highway was constructed. The stream supports populations of cutthroat and brook trout. This project involves returning the stream to its historic channel and reconstructing the channel to simulate its natural stable form. Approximately two miles of stream will be reconstructed. Additionally, wetlands are being developed on adjoining lands. This project is being jointly funded between FWP and the Montana Department of Transportation.
6. **Coal Creek fencing.** Coal Creek (Ravalli County), a tributary to the West Fork of the Bitterroot River, supports populations of both bull and cutthroat trout. The stream was damaged by grazing. The project involved construction of approximately 1 mile of jackleg fence to exclude cattle from approximately 0.5 miles of stream. **Completed.**
7. **Cottonwood Creek bank stabilization.** Cottonwood Creek (Fergus County) supports both brown and brook trout populations. Previous grazing damaged the stream. However, the

applicant recently fenced the riparian area to exclude livestock. This project involved stabilizing approximately 200' of a high eroding bank using back sloping, rock veins, sod mats, willow clumps, and root wads. **Completed.**

8. **Douglas Creek fish passage.** Douglas Creek (Powell County), located on the Manley Ranch near Helmville, supports pure strain westslope cutthroat trout populations. Three irrigation reservoirs prevent movement of fish throughout the system. This project will establish fish passage throughout the system and improve population viability and recruitment.

9. **Elk Creek restoration.** Elk Creek (Lewis and Clark County) located near Augusta, supports a significant spawning run of brown and rainbow trout from the Sun River. This project on the Scherrer Ranch involved treating eroding banks using root wads and willow plantings and narrowing and deepening the channel; approximately 2,300' of stream was treated. **Completed.**

10. **Flat Willow Creek restoration.** The project was approved but the ranch changed hands and the funding request was subsequently withdrawn. **Withdrawn.**

11. **Horseshoe Lake boulder clusters.** Horseshoe Lake (Lake County) supports a popular fishery for smallmouth bass. However spawning and rearing habitat appears to be limited. This project will involve placement of boulder clusters to provide spawning and rearing habitat.

12. **Prickly Pear Creek restoration.** Prickly Pear Creek (Lewis and Clark County) near its confluence with Lake Helena supports brown and rainbow trout populations. The stream had become degraded over the years due to grazing and irrigation practices. The new owners are interested in improving the stream and also allow public fishing. The project included restoration of approximately 5,800' of stream using a variety of techniques including back sloping and revegetation, rootwad revetments, sod mats, rock vanes, channel shaping, and riparian fencing. **Completed.**

13. **Rock Creek flow enhancement and restoration.** Rock Creek (Powell County) is a tributary to the Clark Fork River near Garrison. Rock Creek has potential as a spawning stream for Clark Fork River fish but the lower 2.5 miles was historically dewatered due to irrigation. The dewatered reach also lacked habitat complexity. This project involved installation of a more efficient irrigation system and using the salvaged water for instream purposes (a minimum of 5 cfs). The project also included restoration of the lower 2.5 miles of stream and elimination of a migration barrier. **Completed.**

14. **Ruby River feed lot relocation.** The Ruby River (Madison County) is one of Montana's most popular trout streams. A feedlot located on the Sauerbier Ranch is located immediately next to the stream and has flooded several times in recent years due to upstream diking to protect the town of Alder. This project involves moving the feedlot away from the stream to prevent animal waste from being flushed into the Ruby.

15. Smith River and Thompson Creek fencing and off-stream watering. Smith River (Meagher County) and Thompson Creek located on the Brian Bodell Ranch are damaged due to grazing practices. This project involves riparian fencing and off-stream water development to improve the health of approximately 1.3 miles of Thompson Creek and 4.2 miles of the Smith. R

16. Sun River bank stabilization. Portions of the Sun River (Cascade County) between Fort Shaw and Sun River suffer from erosion due to adjacent land management practices. An inventory of this reach was completed two years ago to identify problem reaches in need of correction. This project involved treatment of two of these reaches (1,500' total) and included back sloping, root wads, and fencing to stabilize eroding banks. **Completed.**

17. Ten Mile Creek revegetation. Ten Mile Creek (Lewis and Clark County) has been degraded by roading and adjacent land management activities. This project involved planting willows, trees and shrubs along streamside areas to improve riparian condition. Approximately 3,500' of stream was treated. **Completed.**

18. Warren Creek restoration, fencing and fish passage. Warren Creek (Powell County) is a second order tributary to the Blackfoot River near Ovando. The stream supports cutthroat as well as brown and rainbow trout. The stream was historically channelized, woody vegetation removed, the stream routed through the corrals, and an irrigation diversion was installed that is a barrier to fish migration. This project includes complete restoration of 1.5 miles of stream, installation of 1.5 miles of riparian fencing, installation of a new diversion fitted with a fish ladder, and replacement of the old corral with an off-stream corral.

19. South Fork of Lower Willow Creek riparian fencing and revegetation. The South Fork of Lower Willow Creek (Granite County), which supports a pure strain population of cutthroat trout and bull trout, has been damaged over the years due to uncontrolled livestock grazing. This project involved installation of 4.6 miles of fencing, and development of a grazing management plan designed to protect the stream. Willows were planted in riparian areas to speed the recovery. **Completed.**

20. Huntley diversion fish passage. The Huntley Irrigation Diversion on the Yellowstone River near Huntley (Yellowstone County) has been a fish migration barrier for many years. This project involved installation of a rock fishway during a period when the dam was repaired for flood damage. Hopefully, the fishway will allow fish to migrate past the diversion structure. The Bureau of Reclamation is presently monitoring passage success. **Completed.**

21. Bad Canyon Creek rehabilitation (BT-CTT). Bad Canyon Creek (Stillwater County) is a tributary to the Stillwater River. The stream supports a native population of Yellowstone Cutthroat Trout as well as non-native brown trout that compete with the native cutthroat. The upper reach of the stream includes a waterfall that acts as a natural migration barrier for downstream fishes. The project involves only the reach of stream located above the waterfall. This project involves removing and safely holding the cutthroat, treating the stream with

antimycin to eliminate the brown trout, and returning the cutthroat to the stream. This project will allow the native cutthroat population to expand without competition from non-native fishes. The project is a joint effort between the BLM, USFS, and FWP.

22. Poindexter Slough protection. Poindexter Slough (Beaverhead County) is one of the few spring creeks in Montana that is in public ownership. The Slough supports one of the highest densities of brown trout in the state and provides important recruitment to the Beaverhead. This project involved installing a grade control to prevent the Beaverhead River from capturing the spring creek. If capture were to occur, about three miles of Poindexter Slough and several miles of the Beaverhead River would be negatively affected. **Completed.**

23. Big Coulee Creek barrier (BT-CTT). Big Coulee Creek (Choteau County) supports a remnant, pure population of west slope cutthroat trout. This projects involves creation of a migration barrier to protect the genetic integrity of this population and prevent invasion by non-native brook trout.. The project is located on the Lewis and Clark National Forest.

24. Canyon Ferry spawning structures. Canyon Ferry Reservoir (Lewis and Clark and Broadwater Counties) supports a popular fishery for yellow perch. Perch are also an important forage for walleye. Brush and christmas tree structures have been used in the past to try and enhance spawning and rearing habitat for yellow perch. This project expanded that effort. **Completed.**

25. Clark Fork fencing and revegetation. A 600 ft reach of the Clark Fork River near Clinton suffers severe bank erosion due to past grazing practices. This project would have included stabilizing the bank using soft techniques, revegetating with dogwood and willow clumps, trees and sprigs. The treated area would have been fenced and managed as a grazing exclosure. **Cancelled.**

26. Cottonwood Creek barrier (BT-CTT). Cottonwood Creek (Lewis and Clark County) on the Beartooth Game Range is a candidate site for re-establishing a pure population of westslope cutthroat trout. The upper six miles of stream presently supports a mixed population of cutthroat, brook, and rainbow trout. This project involves construction of a barrier that will isolate the upper six miles of stream. Once the barrier is in place, the competitors will be removed and the cutthroat population re-established.

27. Cottonwood Creek fish passage and grazing management (BT-CTT). Cottonwood Creek (Powell County) is a cutthroat stream in the Blackfoot River drainage. This project includes repair of a fish ladder, replacement of a culvert to enhance fish passage, and implementation of a grazing management plan along 0.6 miles of stream.

28. Daisy Dean Creek off stream watering and fencing (BT-CTT). Daisy Dean Creek (Park County) is a tributary to the Shields River near Wilsall. Daisy Dean Creek supports brown trout and Yellowstone Cutthroat. This project involved off-stream water development, fencing, and development of a grazing management plan. **Completed.**

29. Elk Creek restoration. Elk Creek (Lewis and Clark County) near Augusta has been the site of several stream restoration projects. This project involved restoration of 2,100 ft of stream on the Artz Ranch that had been damaged by grazing practices. Treatments included narrowing the channel, pool development, bank shaping, willow plantings, and placement of root wads and tree revetments. **Completed.**

30. Grave Creek diversion repair and fish screen (BT-CTT). Grave Creek (Lincoln County) supports runs of both bull trout and cutthroat trout from Libby Reservoir. An existing irrigation diversion captures migrating fish. This project includes installation of a fish screen on the diversion structure, removal of a log diversion dam and installation of a series of smaller rock weirs, and removal of bedload that has accumulated behind the diversion.

31. Rock Creek and Kleinschmidt Creek water lease. Rock and Kleinschmidt Creeks (Powell County) are spring fed tributaries that enter the North Fork of the Blackfoot River near Ovando and were historically used by bull trout. Both streams are subject to ongoing restoration efforts. This project involves leasing 15 cfs of salvaged water on the John Krutar property and will prevent upstream landowners from claiming the water for consumptive purposes; the lease would be for 10 years.

32. Little Prickly Pear Creek fish screen. Little Prickly Pear Creek (Lewis and Clark County) is an important spawning stream for Missouri River rainbow trout. Brown trout and whitefish are also present. An irrigation diversion (Sieben/Wirth) previously captured out-migrating adult and juvenile fish. This project involved installation of a fish screen on the diversion. **Completed.**

33. Little Prickly Pear Creek fence and stockwater. Little Prickly Pear Creek (Lewis and Clark County), on property recently acquired by the Oxbow Ranch, has been damaged by past grazing practices. This is an extremely important rainbow trout spawning stream for the Missouri River. This project involves installation of fencing and off-stream water development. Approximately 2 miles of stream will be protected.

34. Lost Creek Corral relocation. Lost Creek (Deer Lodge County) is a tributary to the Clark Fork River near Warm Springs. Portions of Lost Creek on the Ueland Ranch support nice populations of brown trout while others reaches have been heavily damaged by grazing. An effort is under way to try and restore the entire 6.1 mile reach of Lost Creek. This project (phase II of the restoration effort) includes relocation of a corral facility, offstream water development, and development of a riparian management plan.

35. Middle Fork Rock Creek riparian fence (BT-CTT). Middle Fork Rock Creek (Granite County) is a bull trout spawning stream that has been damaged by grazing. This project includes installation of 1.6 miles of fencing and two cattle guards. This project will eliminate cattle access to 12 miles of Copper Creek (a tributary to the Middle Fork) and 8 miles of the Middle Fork.

36. Monture Creek restoration (BT-CTT). Monture Creek (Powell County) provides spawning and rearing habitat for bull trout and westslope cutthroat trout. Poor grazing and riparian management have degraded the stream on the Heart-bar-Heart Ranch. This project involved restoring approximately 4,000 ft of stream using log veins, large woody debris and rootwads, and shrub plantings. A grazing management plan was developed to protect the stream. **Completed.**

37. Ninemile Creek restoration and fencing. Ninemile Creek (Missoula County) is a tributary to the Clark Fork River downstream of Missoula that supports a variety of trout species. The Creek on the Denim property has been damaged by previous grazing practices. This project involves riparian fencing to exclude livestock from 1.75 miles of stream and treatment of eroding banks using natural materials. The property is being placed in a conservation easement.

38. O'Brien Creek grade control. O'Brien Creek (Missoula County), a tributary to the Bitterroot River near Missoula supports a mixed trout population including westslope cutthroat trout. The stream has been the site of previous habitat restoration work. During the 1999 high water period, a headcut developed in the lower reaches. This project included installation of three log and rock vortex weirs to prevent further head cutting and planting of about 200 native shrubs in stream side areas. **Completed.**

39. Habitat improvements (BT-CTT). Pearson Creek (Powell County) is a tributary to the Blackfoot River and is an important spawning tributary for cutthroat trout. Riparian areas have been degraded under previous ownership due to poor land management practices. This project included riparian fencing to exclude livestock, development of off-stream watering, placement of woody debris to add channel diversity, planting of riparian shrubs and channel improvements at a stream crossing. Approximately 3000 ft of stream was treated. **Completed.**

40. Prospect Creek channel restoration (BT-CTT). Prospect Creek (Sanders County) is a tributary to the Clark Fork River near Heron. The stream has become degraded over the years due to construction of roads and pipelines and removal of riparian vegetation. The stream supports a mixed trout population including westslope cutthroat and bull trout. This project will treat approximately 3 miles of stream. The goal of the project is to recreate a stable bank full channel and functioning floodplain. Treatments will include intensive revegetation; bank stabilization using rootwads, rock, and native material revetments; floodplain grade controls and brush bars to limit sediment delivery to the channel; and channel shaping to restore the natural dimensions and facilitate sediment and bedload transport.

41. Racetrack Creek riparian fence. Racetrack Creek (Deer Lodge County) supports a mixed trout fishery that is dominated by brown trout. The reach of stream where this project was completed was damaged by previous grazing. A channel restoration project had already been completed and this project involved construction of 1.2 miles of riparian fencing to protect the restoration investment. **Completed.**

42. Ronan Spring Creek channel restoration. Ronan Spring Creek (Lake County) and tributaries have been the site of several previous stream restoration projects. This project restored an untreated reach that flows through the city park and an adjacent property that was degraded by a variety of land use activities. The project involved narrowing and deepening the stream and returning it to a single channel. **Completed.**

43. Salmo Reservoir aerator. Salmo Reservoir (Blaine County) is a small impoundment that used to support a wild bass/bluegill fishery. However, low oxygen levels in winter and subsequent winter kills have eliminated all but catfish from the reservoir. This project involved installing an aeration system that will allow winter survival and sustenance of a wild fishery. **Completed.**

44. Shields River bank stabilization. Shields River (Park County) supports a mixed trout fishery. Stream banks in the project area were overgrazed and eroding. Previous attempts by landowners to stabilize the banks added to the problem. This project involved treating selected locations along 1,830' of bank using rootwads and rock veins. A section of channel around an island was returned to a single channel, a grade control installed, and two irrigation diversions replaced. Measures were also taken to prevent Cole Creek from capturing the stream. **Completed.**

45. Shields River channel rehabilitation. Shields River (Park County) supports a mixed trout fishery, including Yellowstone cutthroat trout. Stream banks have been degraded by grazing practices and past attempts at stabilization. This project involves treating approximately 600' of stream banks using rootwads, tree revetments, and willow clumps. Also, portions of the channel will be realigned. Riparian fencing and off-stream water development will be used to protect the treated bank as well as an additional 0.75 miles of stream. Landowners on both sides of the stream are committed to changing management practices to protect the stream.

46. South Fork Smith – off site water and fence. The South Fork of the Smith River (Meagher County) supports a mixed trout fishery. The stream has become degraded over the years due to a variety of land use activities. This project involves installation of riparian fencing and development of off-stream watering. The riparian pasture will be managed to promote improved woody vegetation and riparian condition. Approximately 6,000 ft of stream will be treated.

47. Spring Creek fish barrier. Spring Creek (Madison County) on the John Malesich Ranch supports a pure strain population of westslope cutthroat trout. This project involves installation of a barrier to protect the genetic integrity of this population. The applicant has agreed to maintain the structure once it is installed.

48. Spring Creek restoration. Spring Creek (Lewis and Clark County) enters the upper Blackfoot River near Lincoln. The creek flows through a subdivided area and is degraded primarily from small impoundments built along the stream and replacement of riparian vegetation with lawns. Because of the above, the stream has become overly widened in some

reaches. This project involves restoring approximately 6,600 ft of channel using a variety of treatments including channel narrowing, bank construction, willow transplants, willow sprigging, willow facines, and placement of erosion control fabric and sod.

49. Staubach Creek native fish protection. Staubach Creek (Broadwater County) supports a population of pure strain westslope cutthroat trout. A migration barrier has already been installed on the creek to prevent invasion of rainbow trout and subsequent hybridization. This project involved repairing a leaking irrigation flume that carries Beaver Creek water over Staubach Creek. Beaver Creek supports a rainbow trout fishery and the leaking flume could have resulted in genetic contamination of the westslope fishery. **Completed.**

50. Trout Creek restoration. Trout Creek (Granite County) supports a brown trout fishery. The stream, as it flows through the MaClain, Yardley, and Dennis ranches is channelized and has been historically over grazed. The channelized reach, which is nearly two miles long, has severely down cut and suffers from lateral erosion. This project involves reconstructing the historic channel, stabilizing unchannelized reaches, revegetating stream banks and fencing and off-stream water development to facilitate grazing management, and moving a corral away from the stream . The entire project covers nearly 4 miles of stream. All three landowners allow public fishing.

Project Descriptions - 2000

1. **Basin Creek culvert replacement.** Basin Creek (Lincoln County) is a tributary to the Kootenai River located on the Kootenai National Forest. The stream supports a native population of red band trout – a species of special concern. The purpose of the project is to provide fish passage and to reduce sediment by replacing a culvert that is undersized and perched. The applicants intend to use this project as an example and incentive for the US Forest Service to replace similar culverts in the drainage.

2. **Upper Big Hole off-stream water.** The upper Big Hole River (Beaverhead County) supports the last remaining population of fluvial arctic grayling in the lower 48 states. Unfortunately, the upper Big Hole is dewatered during low flow years. This project supplements ongoing efforts to improve stream flow in the upper river by providing off-stream watering for cattle thereby reducing the need to divert water. This project involves several improvements to the existing watering system making it more workable.

3. **Bitterroot River riparian fence.** The Bitterroot River (Missoula County) south of Missoula is one of Montana's premier trout streams. This project will involve installation of 1.2 miles of riparian fencing to prevent impacts due to grazing. A grazing management plan is required.

4. **Bynum Reservoir spawning habitat.** Bynum Reservoir supports popular fisheries for yellow perch and walleye. Several different types of structures were installed during a previous project; these were monitored by divers to evaluate their suitability as spawning substrates for yellow perch. This project involved installation of additional Scotch pine spawning structures – Scotch pine were the most heavily used during previous installations. **Completed.**

5. **Canyon Creek riparian fence.** Canyon Creek (Lewis and Clark County) on the Grady Ranch was the site of a previous stream restoration project. This project involved construction of riparian fencing along approximately 0.5 miles of Canyon Creek (and a small tributary) to provide more controlled grazing management. **Completed.**

6. **Cottonwood Creek channel restoration.** Cottonwood Creek (Fergus County) is an important trout stream located about 8 miles southwest of Lewistown. A reach of Cottonwood Creek located on the Floyd Maxwell ranch is severely incised and suffers from steep, raw, eroding banks. This project involves creating 2,700 ft of newly restored channel and moving the stream to the new channel -- allowing it to regain access to its floodplain.

7. **Cottonwood Creek fish barrier.** Cottonwood Creek (Choteau County), located on the Lewis and Clark National Forest, supports a genetically pure population of westslope cutthroat trout. The project involves installation of a barrier to protect the genetic purity of the population.

8. Dry Creek riparian fencing. Dry Creek (Broadwater County) is an important spawning stream for rainbow trout from the Missouri River. This project involves installation of fencing on both sides of about 4,700 ft of stream. Grazing will be managed in streamside areas to promote regeneration of woody vegetation.

9. Dupuyer Creek channel restoration. Dupuyer Creek (Pondera County) supports a resident population of rainbow trout. This project included returning the stream to an old meander channel to increase stream length and improve fish habitat and bank stability. Treatments included root wads, bank shaping, and willow plantings; approximately 1800 ft of channel was restored. **Completed.**

10. East Fork Bull River channel restoration. East Fork of the Bull River (Sanders County) supports populations of both westslope cutthroat trout and bull trout. This project involves restoring approximately 1,200 ft of stream by returning a braided channel to a single thread channel that is capable of transporting sediment and conveying bankfull flows. Treatments include rootwad and log revetments, placement of large woody debris weirs, and revegetation of stream banks and the floodplain with native shrubs and tree seedlings.

11. Flatwillow Creek riparian fencing. Flatwillow Creek (Fergus County) supports a popular local fishery for brown and brook trout. The applicant proposed to fence 3,500 ft of stream to protect a reach that will be restored. However, the project was cancelled when ownership of the property changed. **Cancelled.**

12. Flint Creek off-site water and riparian fencing. Flint Creek (Granite County) supports a popular fishery for brown and rainbow trout. The applicant proposes to develop a riparian grazing management plan that includes fencing and off-stream water development. The project will improve riparian condition along approximately 3.1 miles of stream.

13. Lost Creek headgate repair and channel restoration. Lost Creek (Deer Lodge County), a tributary to the upper Clark Fork River, supports populations of both brown and rainbow trout. This project involves reconstructing an old irrigation diversion in a manner that will prevent the ditch from capturing the entire flow of the stream and restoring and protecting the old abandoned stream channel. Approximately 3.6 miles of stream will be restored.

14. McCabe irrigation efficiency. McCabe Creek (Powell County), a tributary to Monture Creek, supports a population of genetically pure westslope cutthroat trout. The stream suffers from seasonal dewatering due to a series of irrigation diversions; fish are also lost down the ditches. Additionally, one reach of the stream is channelized and has very little usable habitat. This project involves consolidating the diversions, installing a fish screen as well as a more efficient irrigation system that will allow salvaged water to be left instream. The channelized reach will be returned to its historic channel and woody debris will be added to improve channel diversity.

15. North Fork Burnt Creek riparian fencing. North Fork Burnt Creek (Ravalli County), a tributary to the Bitterroot River near the Lee Metcalf Wildlife Refuge, supports a mixed trout population. This project involves installing 7,400 ft of riparian fencing.

16. Prickly Pear channel restoration. Prickly Pear Creek (Lewis and Clark County) located in the Helena valley supports a mixed trout fishery. The reach that flows through the Burnam Ranch suffers from a variety of problems caused by adjacent land management practices. The owner is in the process of entering into a CRP agreement with the NRCS that will result in cattle being excluded from streamside areas for a minimum of 10 years to allow riparian areas to recover. This project will further the recovery and includes installation of riparian fencing and native material revetments, revegetation of selected areas with willow clumps, and re-alignment and narrowing of portions of the channel to facilitate sediment transport and improve fish habitat. Approximately 2,100 ft of stream will be treated.

17. Prospect Creek channel restoration. Prospect Creek (Sanders County) supports a mixed trout population that includes both bull and westslope cutthroat trout. The stream has become degraded from a variety of activities including road building, pipeline construction, and various land use activities that resulted in removal of riparian vegetation. Portions of the stream have already undergone restoration work. This project involves restoring selected reaches along an additional 11 miles of stream. Treatments will include channel shaping to establish a more favorable width/depth ratio, intensive revegetation of the floodplain, and native material revetments.

18. Racetrack Creek off-site water and riparian fence. Racetrack Creek (Powell County) is an important spawning stream for Clark Fork River brown trout. The stream in the project reach is degraded primarily due to grazing. This project involves riparian fencing, off-stream water development and revegetation along approximately 1.2 miles of stream.

19. Ruby Creek flow enhancement. Ruby Creek/North Fork Big Hole River (Beaverhead County) is a critical area for fluvial arctic grayling. There has been an ongoing effort to provide off-stream watering thereby eliminating the need to divert water for stock. This project was a continuation of this effort and involved installation of a well, pipeline, and two watering tanks. **Completed.**

20. South Fork Musselshell River fish passage. South Fork Musselshell River near Martinsdale supports a resident population of brown trout. This project involves modifying an existing irrigation diversion to allow fish passage. This will open up several miles of the upper South Fork to spawning.

21. South Fork Willow Creek bank stabilization and riparian fencing. South Fork Willow Creek near Harrison (Madison County) supports resident populations of

Brown, brook, and rainbow trout. This project involves backsloping, revegetation and installation of log veins, root wads, and riparian fencing to improve bank stability and promote recovery of woody vegetation. Car bodies and other trash will also be removed from streamside areas and off-stream water will be developed. Approximately 1.25 miles of stream would be treated.

22. Stillwater River side-channel restoration. Stillwater River (Stillwater County) supports a resident rainbow trout population. This project involved developing an abandoned side channel to serve as a spawning channel. Gated culverts were installed in an existing inlet channel plug to control flow. Pools were developed and gravel was added to riffles for spawning. **Completed.**

23. Sun River channel restoration. Sun River (Cascade County) supports resident populations of brown and rainbow trout. The stream in the area of an old gravel mining operation is extremely wide, shallow, and braided – very little fish habitat is present. This project will return the stream to a more natural and stable pattern and promote sediment transport. Banks will be stabilized using root wad revetments and rock veins and boulders will be used to establish a grade control. Additionally, the river will be diverted through a re-constructed side channel to regain additional channel length.

24. Sweathouse Creek fish screen. Sweathouse Creek (Ravalli County) on the Leslie Hinman property supports a resident population of brook trout. This project involves replacing an existing headgate with a turbulent fountain screen. This new system will prevent fish from being lost down the ditch.

25. Tenmile Creek riparian restoration. Tenmile Creek (Lewis and Clark County) supports a mixed resident trout population. The stream is degraded due to roading and adjacent land use practices. A local watershed group initiated a riparian revegetation project last year that was partially funded with Future Fisheries dollars. This project was a continuation of the riparian revegetation effort. **Completed.**

26. Trail Creek fish ladder and screen. Trail Creek (Missoula County) supports a mixed trout fishery that includes bull and cutthroat trout. A proposal to restore an old irrigation diversion will create a barrier to fish migration. This project involves installing a fish ladder and a non-mechanical screen on the irrigation diversion.

27. Virginia Creek channel restoration. Virginia Creek (Lewis and Clark County) supports a mixed resident trout population. Instream ponds and dams have degraded the stream as it flows through a series of private lots. This project would have involved removing a small concrete dam to drain a pond and reseeding and revegetating streamside areas. Approximately 270 ft of stream would have been treated. **Cancelled.**

28. Warren Creek channel restoration. Warren Creek (Powell County) supports a mixed trout assemblage including brown, rainbow, cutthroat, and bull trout. The stream is degraded due to previous channelization and grazing. This project involves restoring

9,200 ft of stream. Treatments include rebuilding and restoring stream length in the channelized reach, rebuilding the flood plain, back-sloping and revegetating vertical eroding banks, and placement of woody debris in the channel to improve fish habitat.

29. West Fork Wilson Creek fish barrier. West Fork Wilson Creek (Gallatin County), a tributary to the West Gallatin River, supports a genetically pure population of westslope cutthroat trout. An irrigation diversion in the lower reach of the stream has effectively prevented ingress of non-native species and subsequent hybridization. Unfortunately, the existing diversion is about to fail. This project involves replacing the existing barrier with a more permanent structure

30. Yellowstone River riparian demonstration. Banks of the Yellowstone River (Park County) south of Livingston have been treated with many miles of rip-rap and rock barbs in recent years because of the fear of property damage caused by flooding. The purpose of this project is to serve as a demonstration of softer, more natural methods of stabilizing banks using shrubs and trees. Approximately 0.6 miles of bank will be treated.

31. Big Creek fish screen. Big Creek (Ravalli County), a tributary to the Bitterroot River near Stevensville, supports a mixed assemblage of trout including spawning runs from the Bitterroot. The ditch presently traps migrating fish. The Big Creek Ditch Company is in the process of reconstructing the headgate and diversion. This project involves retrofitting the new diversion structure with a self-cleaning fish screen.

32. Bitterroot River fish screen. The Republic Canal which diverts water from the Bitterroot River near Hamilton (Ravalli County) entraps large numbers of fish from the Bitterroot each year. Sleeping Child Creek enters the river just upstream of the ditch diversion and is a spawning stream for the Bitterroot; juvenile fish entering the Bitterroot are likely lost down the ditch. This project involves installation of an overflow crest screen on the diversion to prevent fish from entering the ditch.

33. Butler Creek fish passage. Butler Creek (Missoula County) supports a genetically pure population of westslope cutthroat trout. Three structures (a rock sill, an undersized culvert, and an old irrigation diversion) presently obstruct fish passage and fragment habitat in Butler Creek. This project involves eliminating all three of these barriers.

34. Canyon Ferry perch spawning habitat structures. Canyon Ferry Reservoir (Broadwater and Lewis and Clark counties) supports a popular yellow perch fishery. The Helena Chapter of Walleye Unlimited and FWP have worked together to install yellow perch spawning and rearing structures constructed from Christmas trees; this project is an expansion of previous efforts.

35. Dempsey Creek corral relocation. Dempsey Creek (Powell County), a tributary to the Clark Fork River located south of Deer Lodge, supports genetically pure westslope cutthroat trout and brook trout. This project involves removing a streamside corral

and restoring riparian vegetation. Off-stream watering will also be developed. Approximately 1,200 ft of stream will benefit.

36. Kolb Spring Creek restoration and fencing. Kolb Spring Creek (Missoula County) which enters the Bitterroot River near Lola supports a mixed assemblage of trout and has great potential as a spawning and rearing stream. The creek has been channelized and has become entrenched over most of its length. This project involves reconstructing and restoring approximately 5,500 ft of stream.

37. Newlan Creek riparian fencing. Newlan Creek (Meagher County), which flows out of Newlan Creek Reservoir near White Sulphur Springs, supports a mixed trout population. The project area has minor impacts due to livestock grazing. This project would have involved riparian fencing. **Cancelled.**

38. O'Brien Creek riparian fencing. O'Brien Creek (Missoula County) supports a population of westslope cutthroat as well as other trout species. Bitterroot River fishes also use O'Brien Creek for spawning. Riparian areas in the project reach are degraded due to grazing and brush removal. This project involves installing riparian fencing along both sides of 400' of stream and complements other projects that have recently been completed.

39. Poorman Creek channel restoration. Poorman Creek (Lewis and Clark County), which enters the Blackfoot River near Lincoln, supports a mixed salmonid population that includes westslope cutthroat. The stream was historically placer mined and has been more recently manipulated by road building and landowners living along the creek. This project involves restoring approximately 700' of stream using a variety of treatments as well as replacing an undersized culvert with a bridge.

40. Silver Butte/Fisher Creek bank stabilization. Silver Butte/Fisher River (Lincoln County) supports cutthroat trout and some bull trout. The stream is unstable in the project area due to past grazing and land use. This project involves stabilizing the bank using rock vanes, J-hook weirs, and rootwads. Riparian fencing will also be installed.

41. Tongue River riparian fencing. The Tongue River (Rosebud County) is one of the most important streams in southeastern Montana. In the project area, the stream supports sauger, channel catfish, walleye, and smallmouth bass. Streambanks in the project area have been damaged by previous grazing practices. This project involves construction of two miles of riparian fencing and installation of two water gaps. Streamside areas will be managed to promote recovery of woody riparian vegetation.

42. Trout Creek fish ladder. Trout Creek (Lewis and Clark County) flows into Hauser Reservoir east of York. The stream supports a mixed salmonid population that includes spawning trout and salmon from Hauser Reservoir. An irrigation diversion located about 2 miles upstream from York is presently a barrier to fish migration. This project involves retrofitting the diversion with a Denil fish ladder that will open up about 6.8 miles of stream for spawning.

43. Wolf Creek fish passage. Wolf Creek (Lewis and Clark County) enters Little Prickly Pear Creek near the town of Wolf Creek. Little Prickly Pear and its tributaries support the most important spawning run of trout from the blue ribbon reach of the Missouri located below Holter Dam. A diversion on Wolf Creek is presently a barrier to fish migration. Nearly 300 rainbow trout spawners were found pooled up below the dam during spring 2000. This project involves creating a series of step-pools below the diversion that will allow migrating fish to move upstream.

44. Northeast Montana pond aeration. Fishing ponds in North-central Montana commonly winterkill due to oxygen depletion. Many of these ponds are capable of maintaining self-sustaining fisheries, primarily bass and yellow perch, were it not for the oxygen problem. This project involved installation of wind powered aeration pumps on 8 ponds to maintain oxygen levels over the winter and allow naturally reproducing fish populations to sustain themselves. **Completed.**

Appendix A

Future Fisheries Improvement Program Monitoring Report – 2000

by

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Introduction

This report summarizes the results of monitoring conducted from 1998 to 2000 to evaluate the effectiveness of selected habitat restoration projects funded through the Future Fisheries Improvement Program (FFI). Monitoring was conducted to help answer the question; "Did the funded project improve target fish populations?" Monitoring is essential to understand what types of projects provide benefits to fish populations and which do not. It is important to consider that stream flows statewide were nearly normal during 1999, but were near record low flows during 2000. The data in this report need to be viewed in this context and it was interesting to note that while fish abundance indices for some FFI projects declined during 2000, these indices increased or remained stable in 2000 despite these extremely low base flows. These data suggest that for some streams extremely low flows can be partially mitigated by improved habitat or that efforts to mitigate low flow impacts by increasing flows through FFI efforts may be, at least, partially successful.

This report presents data collected for 53 projects. Shepard (1998) reported on fish resource assessments for FFI Projects that had been completed through 1998. This report only summaries information for projects where fish information was collected during the time period 1998 through 2000. These data, as well as conclusions, are considered preliminary because it often takes five years or more for fish populations to fully respond to habitat improvement treatments (Hunt 1976) and some of these data have not yet been fully analyzed. Of the 53 projects evaluated in this report, baseline data is reported for 24 (45%), preliminary results were inconclusive for 7 (13%), and preliminary data indicate fish populations are improving at 22 (42%) projects. This report is organized first by the river basin where each project is located and then by the project name.

Beaverhead River Drainage

Stone Creek Rehabilitation

WATER NAME: Stone Creek – Beaverhead River

DATE PROVIDED BY: Dick Oswald and Brad Shepard, FWP

DETAILED REPORT CITATION: Oswald (2000)

MFWP CODE: RRA-54-1994 and FFI-16-1997

The Left Fork of Stone Creek from the Barretts Minerals, Inc. talc mine downstream (about 1.6 miles) was reclaimed from 1995 through 1997. Barretts Minerals moved most of an existing road that had been located along the entire length of the stream away from the stream channel. Other reclamation included rebuilding the stream channel, banks, and floodplain in several areas, adding pools, and controlling sediment delivery to the stream channel by construction catch basins and re-vegetating the riparian area. Populations of westslope cutthroat trout responded relatively quickly to this restoration project within the East Fork and that response was documented in the last report (Shepard 1998). Most recent monitoring focused on the expansion of the westslope cutthroat trout population from the restored Left Fork area down into main Stone Creek. Sampling soon after completion of the restoration of the Left Fork found that westslope cutthroat had begun expanding their distribution from the Left and Middle forks down

into the mainstem Stone Creek in 1998. Sampling on the mainstem found about 30 westslope cutthroat trout per 1,000 feet in 1986, 3 in 1994, none in 1995, immediately prior to the restoration done in the Left Fork from 1995 to 1997, and then went up to 200 per 1,000 feet in 1998, following restoration activities. Five sample sections in the mainstem from the junction of the Left and Middle forks downstream 3.5 miles were sampled in 1995 and 1999. Sampling in 1995 found no fish in any of the sections. In 1999 westslope cutthroat trout were found in all five sample sections and their abundance was relatively high in four of the five sections (71 to 82 fish per 1,000 feet of stream length). A section located about 2.8 miles downstream only supported about 17 per 1,000 feet; however, the habitat in this portion of the mainstem was severely degraded, apparently due to excessive sediment loads. **Channel restoration completed in the Left Fork not only dramatically increased the population of westslope cutthroat trout in this stream, but led to a dramatic expansion of this population at least 3.5 miles down the drainage.**

Big Hole River Drainage

Deep Creek Channel Restoration

WATER NAME: Deep Creek – Big Hole River

DATE PROVIDED BY: Jim Magee, FWP

DETAILED REPORT CITATION: FWP files, Dillon

FWP CODE: FFI-10-1998

A long meander loop in Deep Creek was cut off by high flows. The FFI project, completed during June of 1998, reconnected and restored the channel in this meander loop. In October 1998 and 1999 single electrofishing passes were conducted in two 1,000 feet-long sample sections in Deep Creek. One was located within the project area (Treatment) and another was located in an untreated section upstream from the project area (Control). In 1999 sampling equipment broke down while working the Control Section, consequently, no data were collected. Catches of most fish species were similar between the Treatment and Control sections in October 1998 (Figure 1). More ling and brook trout, but fewer rainbow trout, were captured in the Treatment Section in 1999 than in 1998. Fall sampling may not be representative of summer use of these sections due to fall spawning migration from the Big Hole River, or movements of non-spawners to prey on the eggs. Further sampling will be needed to determine the fish capacity of the Treatment Section. **Baseline data has been obtained, but no conclusions can yet be reached on this project.**

Figure 1. Relative abundance (catch in a single electrofishing pass per 1,000 feet of channel) of grayling, brown trout, rainbow trout, brook trout, ling, mountain whitefish, and suckers in restored (Treatment: T) and Control (Untreated: C) sections of Deep Creek in 1998 and 1999.

Bitterroot River Drainage

Camp Creek Channel Restoration

WATER NAME: Camp Creek – Bitterroot River

DATE PROVIDED BY: Chris Clancy, FWP

DETAILED REPORT CITATION: Clancy (in prep.)

MFWP CODE: FFI-06-1999

Mark-recapture electrofishing estimates were done for brook and westslope cutthroat trout on August 5, 1999 in a 1000-foot long section of Camp Creek located about 3.2 miles above its mouth. The section was immediately downstream of a bridge crossing near the north end of Section 34 (T01N;R19W; Section 27). This section is in the portion of the creek that was channelized in the past and is slated for restoration, probably in 2001. The data collected in 1999 represents pre-project information. In 1999 this section supported an estimated 31 brook trout (SD: 3.8) 4.0 to 9.0 inches in length and 379 (SD: 25.8) westslope cutthroat trout 3.0 to 14.0

inches long. In addition to these species, 2 bull trout, 1 brown trout, 7 westslope cutthroat rainbow trout hybrids, and 6 longnose suckers were also captured; however, no estimates were made for these species. **These data represent baseline data that will allow for future evaluation of this FFI project.**

Blackfoot River Drainage

Cooperative private and public fisheries restoration efforts, of which FFI program has been one component, have been implemented within Blackfoot River drainage throughout the 1990's. Cooperators include FWP, US Fish and Wildlife Service, US Bureau of Land Management, US Natural Resource Conservation Service, Montana Department of Transportation, Montana Department of Natural Resources and Conservation, North Powell Conservation District, Big Blackfoot Chapter of Trout Unlimited, private landowners, Chutney Foundation, National Fish and Wildlife Foundation, Montana Power Company, and Plum Creek Timber Company. Fish evaluations for specific FFI projects often could not be separated from other cooperative projects conducted during the same time and in the same drainages as FFI projects. Consequently, the following evaluations should be viewed as assessments for the total effort, rather than just FFI projects.

Bear Creek Channel Reconstruction

WATER NAME: Bear Creek – Blackfoot River

DATE PROVIDED BY: Ron Pierce, FWP

DETAILED REPORT CITATION: Pierce et al. (1997); Pierce and Schmetterling (1999);
Pierce and Podner (2000); Pierce et al. (in prep.)

MFWP CODE: FFI-28-1998

Restoration activities in Bear Creek began in 1995 using funds other than FFI funds. In 1998 FFI funds helped reconstruct 1,870 feet of channel and restore habitat in an additional 2,000 feet of Bear Creek that had been degraded from channelization and improper logging and grazing practices in the riparian area. This FFI project was part of a larger basin-wide collaborative effort that included improving grazing practices, fixing under-sized culvert barriers, increasing irrigation efficiencies, and removal of a winter livestock feed lot. In 1998 and 1999, habitat evaluations and fish population monitoring was completed for the Bear Creek Channel Reconstruction Project. Habitat data found that the 1,870-foot segment of restored channel contained 62 pools, a total wetted area of 1,163 square feet, and 184 pieces of woody debris. These data will be used to document persistence of constructed habitats through time by repeating these habitat surveys over time. Two fish survey sections were sampled to assess the habitat project in lower Bear Creek. Depletion estimates conducted in the restored section found that trout over 4.0 inches increased in abundance from 126 trout per 1,000 feet of stream to 177 trout from 1998 to 1999; however, these increases were not significant (Figure 2). Westslope cutthroat trout were not captured in this section in 1998, but were found in 1999. In 2000 the first bull trout ever observed in Bear Creek was found in lower Bear Creek. **The relative abundance of fish and presence of native fish appear to have initially increased following restoration activities within the Bear Creek drainage. Baseline data on fish abundance and habitat condition have been collected in the restored channel reach.**

Figure 2. Estimated populations and 95% confidence intervals (vertical lines; 95% CI) of all species combined (cross-hatched bars) 4.0 inches and longer per 1,000 feet of stream length and species composition (westslope cutthroat - WCT, rainbow, brown, brook, and bull trout) in Bear Creek at stream miles 1.1 and 1.5 from 1998, prior to channel restoration, through 2000.

Blanchard Creek Fish Passage, Riparian Fencing, and Feedlot Removal

WATER NAME: Blanchard Creek –Clearwater River

DATE PROVIDED BY: Ron Pierce, FWP

DETAILED REPORT CITATION: Peters (1990); Pierce et al. (1997); Pierce and Schmetterling (1999); Pierce and Podner (2000); Pierce et al. (in prep.)

MFWP CODE: RRA-45-94, FFI-48-96, and FFI-52-96

Blanchard Creek, a small tributary to the Clearwater River, was historically de-watered for about a mile above its mouth by irrigation water withdrawals. Fish passage over two irrigation diversions and the crossing under Highway 200 was very poor and probably negatively impacted the fishery in the lower reaches of the tributary. A water lease has been in effect since 1993; however, the water right holder began passing more flow down the lower stream channel in

1991. Two diversion structures were modified in 1993 by adding fish ladders. The culvert under Highway 200 was also modified by the Montana DOT to facilitate fish passage. In addition, Plum Creek Timber Company and the DNRC improved management of livestock grazing within riparian areas. Blanchard Creek supports both rainbow trout, primarily in its lower reaches, and cutthroat trout, primarily in its upper reaches. Fish populations in lower Blanchard Creek in the area of the diversions and water lease (stream mile 0.1) have been monitored from 1990 to 1999. Brown and westslope cutthroat trout began inhabiting this sample section in 1992, following increases in flows through this section. Although their densities appeared to be highly variable between years, densities of young (< 4.0 inches) rainbow trout increased with increases in stream flows after 1991 with the highest estimated densities occurring during 1998 and remaining high in 1999 (Figure 3). Densities of rainbow trout dropped slightly in 2000; however, drought conditions resulted in extremely low base flows during 2000. Rainbow trout over 4.0 inches in length initially increased to densities over 200 per 1,000 feet, then declined slightly and stabilized at densities between 100-200 per 1,000 feet. **Young rainbow trout have become more abundant in the treatment area following treatment.**

Figure 3. Estimated population of rainbow trout < 4.0 inches and 4.0 inches and longer at Stream Mile 0.1 in Blanchard Creek from 1990 to 1999 standardized to estimated number per 1,000 feet of stream length. Vertical bars represent 95% confidence intervals (95% CI).

Chamberlain Creek Fish Passage and Irrigation Diversion

WATER NAME: Chamberlain Creek – Blackfoot River

DATE PROVIDED BY: Ron Pierce, FWP

DETAILED REPORT CITATION: Pierce et al. (1997); Schmetterling (1998; 2000); Pierce et al. (in prep.)

MFWP CODE: FFI-09-97

The upper reaches of Chamberlain Creek support relatively high densities of cutthroat trout. However, aquatic habitat in the lower portion of Chamberlain Creek (below Stream Mile 3.0) was severely altered by channelization, de-watering, and poor management practices, including livestock grazing in riparian areas and increased sediment delivery to the stream channel related to road drainage problems. Consequently, densities of westslope cutthroat trout in this portion of Chamberlain Creek were severely depressed. Fish passage between Chamberlain Creek and the Blackfoot River was also inhibited by irrigation diversions. Since 1990, Chamberlain Creek has been the focus of a comprehensive fishery restoration effort. Road drainage problems have been fixed. Livestock management has been improved, especially around riparian areas. Water flows have been improved through leasing agreements. Consolidating several ditches and installing a fish ladder on the diversion that delivers water to these ditches made irrigation delivery more efficient. Chamberlain Creek supports a significant migration of Blackfoot River fluvial cutthroat trout with reproduction occurring in mid to upper stream reaches.

From 1989 to 2000 relative abundance of fish was assessed at mile 0.1. A comparison of electrofishing catches indicated a substantial increase in catch of fish following restoration activities and dramatic increases in abundance of westslope cutthroat trout (Figure 4). Juvenile

Figure 4. Relative abundance (catch in a single electrofishing pass per 1,000 feet of stream length) of westslope cutthroat (WCT), rainbow (RB), and brown trout in a sample section located at stream mile 0.1 in Chamberlain Creek from 1989 to 2000. It should be noted that 1989 data was collected in a portion of stream that had been recently modified by a bulldozer.

bull trout have been consistently captured in the lower 4.0 miles of Chamberlain Creek from 1997 to 2000, while sampling for a six-year period prior to 1997 captured none. These were the first bull trout recorded in Chamberlain Creek in 18 years of sampling. In a radio telemetry study where spawning westslope cutthroat trout were tagged in the Blackfoot River during 1997 and 1998 and tracked, more radio tagged cutthroat trout moved into Chamberlain Creek to spawn than any other Blackfoot River tributary. A few adult westslope cutthroat trout moved more than 30 miles to spawn in Chamberlain Creek. Sixty-eight westslope cutthroat redds (spawning sites) were observed in a two mile section of Chamberlain Creek during a 1998 redd survey. Several spawning adult cutthroat trout were located in pools created during restoration efforts. These adults apparently used these pools as holding sites prior to spawning. One tagged fish spawned in the bottom end (tail-out) of one of these constructed pools. **Results suggest that rehabilitation work has led to increased spawning use of Chamberlain Creek by adult westslope cutthroat trout from the Blackfoot River; increased catches of rearing westslope cutthroat trout in the lower creek; and may have improved conditions in the lower creek so that bull trout can once again use this stream for rearing, and perhaps spawning.**

Cottonwood Creek Fish Friendly Diversion, Dryer Diversion Lining, and Fish Screen Improvement

WATER NAME: Cottonwood Creek – Blackfoot River

DATE PROVIDED BY: Ron Pierce, FWP

DETAILED REPORT CITATION: Pierce and Podner (2000); Pierce et al. (in prep.)

MFWP CODE: RRA-56-94, FFI-07-96, and FFI-44-96

To help conserve native aquatic species in Cottonwood Creek several projects were undertaken. Fish ladders were installed on two major diversions, and two irrigation canal intakes were screened. A total 8,000 feet of irrigation canal was lined with an impermeable fabric to prevent water loss. An estimated 8,663 acre-feet of water salvaged by lining the ditch was annually leased for instream flow purposes. Associated with these projects were efforts to improve riparian livestock management and negotiate conservation easements in the middle reaches of Cottonwood Creek. Stream flow is being monitored as part of the lease effort, but is not reported here. Past fish populations monitoring found that the previously de-watered portion of the stream now support bull, westslope cutthroat, and brook trout, as well as, sculpins and tailed frogs (Shepard 1998; Pierce et al. 1999). Pierce and Podner (2000) conducted fish habitat assessments in the previously de-watered reach and a reference reach located upstream in 1999. They found that the upstream reference reach contained four times the amount of woody debris in the channel as the previously de-watered reach (42 versus 10 pieces per 1,000 feet of channel). Bankfull channel widths were much wider in the previously de-watered reach than in the reference reach (24.3 versus 19.4 feet for pools and 26.9 versus 19.0 feet for riffles). The relative abundance of westslope cutthroat trout in a sample section located at mile 12.0 has tripled from 1997 to 2000 (Figure 5). Prior to 1997 this segment of channel had no flow during the low water period of late summer to early fall, as a result this section supported no fish prior to 1997. Brook trout have increased slightly and bull trout have occasionally been captured in this same section (Figure 5). An equipment problem in 1999 lowered capture efficiencies, consequently the 1999 data was not included. **The previously de-watered portion of Cottonwood Creek now supports bull, brook, and westslope cutthroat trout along with sculpins and tailed frogs. Abundance of westslope cutthroat trout in this portion of the**

creek appears to be increasing. Woody debris in this previously de-watered reach is less common than an upstream reference reach and will probably take a number of years before this previously de-watered reach recovers its potential habitat complexity in the form of woody debris and channel features such as pools.

Figure 5. Relative abundance (catch in a single electrofishing pass per 1,000 feet of stream channel) for westslope cutthroat (WCT), bull, and brook trout 4.0 inches and longer in a sample section of Cottonwood Creek located at stream mile 12.0 from 1997 to 2000.

Gilbert Creek Irrigation Diversion Screen and Fish Passage

WATER NAME: Gilbert Creek – Blackfoot River

DATE PROVIDED BY: Ron Pierce, FWP

DETAILED REPORT CITATION: Pierce et al. (1997)

MFWP CODE: FFI-40-1997

Channel restoration was done for about 2.9 miles from its mouth upstream in 1996. Prior to the project, relative fish abundance estimated at mile 2.0, within the project, by a single electrofishing pass found only rainbow and brown trout (Figure 6). Following construction of this project, total fish abundance increased dramatically and westslope cutthroat begin making up an increasing proportion of the catch. Bull trout have also been occasionally observed in the monitoring section following construction of the project. **Fish abundance increased dramatically following completion of this project.**

Figure 6. Relative abundance (catch in a single electrofishing pass per 1,000 feet of stream channel) for westslope cutthroat (WCT), bull, rainbow (RB), brown, and brook trout 4.0 inches and longer in a sample section of Gilbert Creek located at stream mile 2.0 from 1995 to 2000.

Gold Creek Pool Development

WATER NAME: Gold Creek – Blackfoot River

DATE PROVIDED BY: Ron Pierce, FWP

DETAILED REPORT CITATION: Pierce et al. (1997); Schmetterling and Pierce (1999); Swanberg (1996); Swanberg (1997); Pierce and Podner (2000); Schmetterling (2000)

MFWP CODE: FFI-04-96

Timber harvest of riparian conifers and the removal of large instream wood had reduced the diversity of stream habitat in the lower three miles of Gold Creek. Prior to restoration, pool habitats comprised less than 1% of the stream's area in this segment of Gold Creek. In 1996, a habitat restoration project that focused on pool construction and maintenance using large woody debris was completed. Three types of monitoring have been undertaken for the Gold Creek Project: 1) monitoring of the habitat structures, 2) electrofishing, and 3) radio tracking of fluvial cutthroat and bull trout. Eight months after the project was completed an estimated 50-year flood event passed through the project area and monitoring indicated that most of the restoration work survived this event (Schmetterling and Pierce 1999; Shepard 1998). Maximum depths of

constructed pool habitats have been monitored from 1996 to 1999 and while maximum pool depths initially decreased following the filling of pools with sediments during the 1997 flood event, maximum pool depths either stabilized or increased slightly following 1997. Swanberg (1996 and 1997) and Schmetterling (2000) found that fluvial adult bull and westslope cutthroat trout from the Blackfoot River use the restored area of Gold Creek seasonally during their spawning migrations. Annual fish abundance survey results from 1996 to 2000 have shown an increase in fish abundance although westslope cutthroat trout declined slightly from 1998 to 2000 and brown trout declined from 1996 to 1998 before increasing dramatically in 1999 (Figure 7). **Preliminary data suggest that habitat structures in confined channel types remain in place following flood events better than structures placed in laterally extended types of channels and treated areas in lower Gold Creek support more fish following treatment than prior to treatment. Adult bull and westslope cutthroat trout from the Blackfoot River are using Gold Creek seasonally as a thermal refuge and for spawning.**

Figure 7. Relative abundance (catch in a single electrofishing pass per 1,000 feet of stream length) of westslope cutthroat (WCT), bull, rainbow (RB), and brown trout in a sample section located at mile 1.9 in Gold Creek from 1996 to 2000.

Kleinschmidt Creek Channel Restoration, Phase II

WATER NAME: Kleinschmidt Creek – Blackfoot River

DATE PROVIDED BY: Ron Pierce, FWP

DETAILED REPORT CITATION: Pierce (1991); Pierce et al. (1997); Pierce and Schmetterling (1999); Pierce and Podner (2000)

MFWP CODE: FFI-14-1998

Kleinschmidt Creek, a spring creek to the North Fork Blackfoot River, has been severely degraded by past channel straightening and improper livestock grazing. Whirling disease is present in this stream. Approximately 2,500 feet of channel have been restored through a previous channel restoration project. Phase II will restore the remaining 5,300 feet of channel in the near future. Four types of monitoring are included in this project: 1) pre- and post project habitat surveys, 2) fishery response to habitat restoration, and 3) temperature studies, and 4) pre- and post-project whirling disease evaluations (sentinel fish cage studies plus macroinvertebrate including *Tubifex tubifex* sampling). Fish population survey, thermograph, and whirling disease results are reported. Fish abundance surveys were done in 1998 and 1999 at two locations (stream mile 0.5 and 0.8) and in 1999 at another reference location at mile 1.1. The survey at mile 0.5 was located in the degraded section of channel slated for restoration in 2000. The survey at mile 0.8 was completed in a section of channel restored in 1997 and the survey at mile 1.1 is a control section. Fish abundance of age 1 and older brook and brown trout increased from 1998 to 2000 in both of the lower two sections; however, increases were higher for restored portion of the channel (Figure 8). Brook trout were more abundant than brown trout in the mile

Figure 8. Relative abundance (catch in a single electrofishing pass per 1,000 feet of stream channel) for young-of-the-year (YOY) and age 1 and older (1+) brown and brook trout in a sample section of Kleinschmidt Creek located at stream mile 0.8 from 1998 to 2000.

1.1 Section and the first bull trout documented within the Kleinschmidt drainage in recent years was also found in this upper section. Water temperatures during the summer of 1999 warmed 2-

3 degrees F from the restored segment at mile 0.8 down to the untreated degraded section below mile 0.5. Whirling disease was assessed using fish in sentinel cages placed in lower Kleinschmidt Creek in 1998 and 1999 and increased from a 2.8 to a 3.6 infection grade from 1998 to 1999. Most of the sentinel fish in 1999 suffered from grade 3 and grade 4 infection levels that could potentially cause population impacts (Vincent 1999). **Preliminary data indicated that fish abundance in the portion of Kleinschmidt Creek increased in response to a channel restoration treatment compared to a lower untreated section. Water temperatures appear to warm through the untreated, degraded section in the lower stream that is slated for restoration. Whirling disease will likely impact those fish species susceptible to it in the stream, and the lack of rainbow trout in the stream is interesting and may result from a synergistic effect of both disease and poor quality habitat.**

McCabe Creek Barrier Removal, Debris Placement, Culvert Replacement

WATER NAME: McCabe Creek – Blackfoot River

DATE PROVIDED BY: Ron Pierce, FWP

DETAILED REPORT CITATION: Pierce and Podner (2000)

MFWP CODE: FFI-38-97; FFI-31-1998

McCabe Creek has had a long history of channel alteration and improper land management activities that have adversely impacted fish populations including poorly designed road crossing and irrigation diversions, improper riparian grazing practices, and physical channel alterations. In 1999 a major restoration project was undertaken in McCabe Creek to: 1) consolidate four separate irrigation ditches into a single pipeline and screen the intake; 2) convert from flood to sprinkler irrigation to increase water efficiency; 3) place woody debris in the channel and plant shrubs along 0.5 mile of stream channel; 4) alter riparian livestock grazing practices to be more compatible for protecting riparian habitats; and 5) replace a poorly designed culvert at a county road crossing. In 1999 fish population survey sites were established at stream mile 2.3, below the lowermost irrigation diversion in an area that had been de-watered and damaged from improper livestock grazing, and at mile 3.2, above most management impacts where stream and riparian habitat was in relatively good condition. In late 1999, an irrigation ditch was screened near mile 3.2 and base streamflows approximately doubled due to increased irrigation efficiency. The relative catch of westslope cutthroat trout in a single electrofishing pass was much lower at mile 2.3 than at mile 3.2 in 1999, prior to project construction (Figure 9). Following construction, abundance of brook trout increased at mile 2.3. No brook trout were captured at mile 3.2, while 5 per 1,000 feet were captured at mile 2.3. **Baseline fish abundance data has been collected to evaluate FFI projects in McCabe Creek and these data indicate that degraded portions of the stream slated for restoration had much lower abundance of westslope cutthroat trout than portions of the stream in relatively good condition and westslope cutthroat trout abundance increased in 2000 following restoration activities, in spite of drought conditions.**

Figure 9. Relative abundance (catch in one electrofishing pass per 1,000 feet of stream channel) of westslope cutthroat (WCT) and brook trout estimated in two sample sections of McCabe Creek in 1999 and 2000.

Monture Creek Stream Restoration

WATER NAME: Monture Creek – Blackfoot River

DATE PROVIDED BY: Ron Pierce, FWP

DETAILED REPORT CITATION: Pierce et al. (1997); Pierce and Schmetterling (1999);
Pierce and Podner (2000)

MFWP CODE: FFI-12-1997; FFI-49-1999

Monture Creek, a large tributary to the middle Blackfoot River, is an important spawning stream used by fluvial bull and cutthroat trout inhabiting the lower Blackfoot River. From 1991 to 1998, improvements have been made in riparian livestock management along 9.3 miles (about 80%) of the mainstem of Monture Creek. In 1997 a cooperative stream restoration project placed large woody debris in two sections of stream, totaling 17,606 feet of channel. Extensive restoration work and improved riparian livestock management have been done in many of the tributaries to Monture Creek. In addition, fishing regulation changes that went into effect in 1990 have led to increases in bull trout. Three types of information were collected to monitor these projects: 1) woody debris frequency; 2) bull trout redd counts; and 3) estimating abundance of juvenile bull trout in five long-term sample sites. Woody debris frequency surveys were reported in Shepard (1998). Redd (spawning site) counts have shown that bull trout are responding to habitat restoration measures in Monture Creek. Numbers of bull trout redds

steadily increased from 1989 to 1997 and then leveled off slightly before rising again in 1999 and 2000 (Figure 10).

The relative abundance of juvenile bull trout has also increased dramatically from 1989 to 2000 in five sections throughout Monture Creek from its mouth upstream 12 miles. The total catch (summed over several sections) per 1,000 feet has increased from 7 to 66 juveniles from 1989 to 1998 before dropping slightly to 41 per 1,000 feet in 2000. The lower numbers observed in 2000 were probably related to drought effects. Increased spawning and juvenile bull trout in Monture and other Blackfoot River tributaries, most notably the North Fork, have led to increased abundance of sub-adult and adult bull trout in the main Blackfoot River (Pierce et al. in prep.). **Preliminary data suggest that bull trout use of Monture Creek is increasing. While the exact cause of this increase is not yet proven, the restoration of the lower creek has probably contributed to this increase.**

Figure 10. Counts of bull trout redds (spawning sites) in Monture Creek from 1989 to 2000.

Pearson Creek Woody Debris Placement

WATER NAME: Pearson Creek– Blackfoot River

DATE PROVIDED BY: Ron Pierce, FWP

DETAILED REPORT CITATION: Pierce and Podner (2000); Schmetterling (2000)

MFWP CODE: FFI-52-1999

Pearson Creek is a small second order tributary to Chamberlain Creek that has had a history of channel alterations, irrigation de-watering, and improper land management impacts along its lower 2 miles. Between 1999 and 2000 instream habitat restoration, fencing of the riparian area along with off-channel water developments, and shrub plantings along the streambanks were completed. Single electrofishing passes were conducted at stream mile 1.1 in 1999, prior to restoration work, and in 2000, following restoration work. Relative catches of westslope cutthroat trout young-of-the-year were similar between the two years (277 versus 260 per 1,000 feet of stream in 1999 and 2000, respectively), but abundance of age 1 and older westslope cutthroat trout increased dramatically between 1999 and 2000 (42 versus 277). **Abundance of age 1 and older westslope cutthroat increased immediately following restoration work; however, it is too early to attribute this increase solely to the FFI project.**

Rock Creek Restoration, Dry Creek Restoration, and Rock Creek Restoration, Burmit Project

WATER NAME: Rock Creek – Blackfoot River

DATE PROVIDED BY: Ron Pierce, FWP

DETAILED REPORT CITATION: Peters (1990), Pierce (1991), Pierce et al. (1997), Pierce and Schmetterling (1999), Koopal (1998); Pierce and Podner (2000)

MFWP CODE: FFI-05-1996, FFI-33-1996, and FFI-18-1998

Rock Creek, an 8.2 mile tributary to the lower North Fork of the Blackfoot River, has been the focus of extensive restoration efforts, with projects completed on 5.5 miles of stream. In 1999 monitoring focused on the evaluating the newly restored 2,507 feet of channel. Monitoring done from 1998 to 2000 included: 1) habitat surveys, 2) temperature monitoring, and 3) fish population monitoring at two locations. Habitat surveys were completed in both 1998 and 1999 for the newly restored channel and found that this segment of channel had increased in length 167% (from 2,507 to 4,193 feet) and wetted widths had decreased from 22.5 feet to 8.5 feet. In addition, the amount of instream woody debris increased from none to 92 pieces per 1,000 feet of channel. Fish abundance data suggested that abundance of both young-of-the-year and age 1 and older brook and brown trout at mile 1.7 declined from 1998 to 1999, before increasing dramatically in 2000 (Figure 11). **Preliminary data suggest that habitat restoration in Rock Creek has increased woody debris frequencies, increased channel length by 167%, and decreased channel width; however, it will probably take a few years before fish abundance responds.**

Figure 11. Relative abundance (catch in one electrofishing pass per 1,000 feet of stream length) of young-of-the-year (top) and age 1 and older (bottom) rainbow, brown, and brook trout in two sections (mile 0.7 and 1.7) of Rock Creek from 1990 to 2000.

Boulder River Drainage

Muskrat Creek Migration Barrier

WATER NAME: Muskrat Creek – Boulder River

DATE PROVIDED BY: Brad Shepard and Ron Spoon, FWP

DETAILED REPORT CITATION: Shepard and Spoon (in prep.)

MFWP CODE: FFI-56-1997

Muskrat Creek supports a genetically pure population of westslope cutthroat trout. FWP, in cooperation with USDI Bureau of Land Management and the USDA Forest Service, have been recovering the existing population of westslope cutthroat trout in Muskrat Creek. This effort has involved: 1) construction of a barrier near the Forest boundary (about stream mile 6.5); 2) capturing westslope cutthroat trout from the portion of creek between this constructed barrier and a natural barrier located at approximately stream mile 8.0 (above which the stream was fishless) and moving captured westslope cutthroat trout above this natural barrier; and 3) capturing brook trout between the constructed and natural barrier and moving them below the constructed barrier. FFI funds were used in construction of the permanent barrier to upstream fish movement near the Forest Service boundary to prevent brook trout from moving upstream into the portion of the creek occupied by westslope cutthroat trout. From 1997 to 2000 brook trout from the lower portion of the creek (permanent constructed barrier to the natural barrier) were moved down below the constructed barrier. In 1997 we moved 48 westslope cutthroat trout above the natural barrier and almost 1,900 brook trout below the constructed barrier. In 1998 we moved another 99 westslope cutthroat trout above the natural barrier and transported almost 1,500 brook trout below the constructed barrier. In 1999 and 2000 we did not move any additional westslope cutthroat trout upstream, but did move 1,000 and 976 brook trout, respectively, below the constructed barrier. Those brook trout transported below the constructed barrier from 1998 to 2000 had their adipose fin removed so we could assess whether they were able to migrate back upstream over the constructed barrier. Unfortunately, in 1998 and 1999 we held brook trout that had been adipose clipped in a holding pen near the mouth of Nursery Creek (above the constructed barrier) prior to transporting them below the constructed barrier. We are reasonably sure that a few of these adipose fin-clipped brook trout, especially those under 100 mm, escaped from this holding pen. In addition, we know of at least one adipose fin-clipped adult brook trout that was accidentally released back into Muskrat Creek in 1999 immediately after it was clipped. To date, we have recaptured one adipose fin-clipped brook trout above the constructed barrier in 1999 (7.0 inches in length) and three in 2000 (lengths of 4.6, 7.1, and 7.4 inches). Sampling below the constructed barrier in 1999 and 2000 found many adipose fin-clipped brook trout present below the barrier. At this point, we believe that no brook trout have successfully moved upstream past the constructed barrier due to the very small number of recaptures we have seen above the barrier and the probability that some fin-clipped fish escaped into the stream above the barrier when processed. **Initial observations at the constructed fish barrier and recapture rates above the constructed barrier indicate that brook trout cannot pass over the barrier; however, we will need to totally remove brook trout from above the barrier before we can ascertain with certainty that the barrier is effective.**

Clark's Fork River Drainage

East Fork Bull River Bank Stabilization and Channel Restoration

WATER NAME: East Fork Bull River – Clark Fork River

DATE PROVIDED BY: Laura Katzman and Pat Saffel, FWP

DETAILED REPORT CITATION: Katzman and Saffel (2001)

MFWP CODE: FFI-11-1998

Channel restoration and bank stabilization are planned for a section of the East Fork of the Bull River on Robert Stein's property. Fish population estimates were done in two sections during 2000, a portion of the channel within the proposed restoration area (Treatment) and upstream of the proposed restoration area (Control). The proposed Treatment area supported westslope cutthroat, brown, brook, and bull trout, as well as mountain whitefish and sculpin. Only two small bull trout were captured, so an estimate was not computed for them. The Control Section supported westslope cutthroat trout, bull trout, and sculpin. The Control Section supported significantly higher populations of westslope cutthroat and bull trout than did the Treatment Section (Figure 12). In addition to population estimates, weirs and traps were operated just downstream of the Stein property during the spring and fall of 2000 to monitor use of the portion of the East Fork above these traps by spawning trout. Data from these traps have not yet been summarized. **Baseline data consisting of fish population estimates and fish trap catches have been collected prior to FFI activities.**

Figure 12. Number of westslope cutthroat (WCT), brown, brook, and bull trout estimated per 1,000 feet of channel length (standard deviations shown by vertical lines) in the proposed FFI project area (Treatment) and a control area upstream during 2000.

Elk Creek Channel Restoration

WATER NAME: Elk Creek – Clark Fork River

DATE PROVIDED BY: Pat Saffel, FWP

DETAILED REPORT CITATION: Saffel (2001)

MFWP CODE: FFI-49-1996

The lower portion of Elk Creek, a tributary to the Clark Fork River near Heron, Montana, was rehabilitated in late 1997. Rehabilitation consisted of bank stabilization and channel reconstruction. The stream supports populations of brook and westslope cutthroat trout. The objective was to increase numbers of trout, especially westslope cutthroat trout. Monitoring of fish populations found that trout populations went up dramatically in the two upper restoration sections (BS2 and New 2; Figure 13) following restoration activities in 1997. Population increases in the lower two restoration sections were more modest and it appeared that trout may have moved between the lower bank stabilization section (BS1) and lower channel restoration section (New 1) in 2000 (Figure 13). It was clear that fish populations in all sections appeared to increase more, and more consistently, than populations in the Control Section. **Preliminary data suggests that this FFI project has increased fish populations in the treatment areas.**

Figure 13. Number of trout (westslope cutthroat and brook trout combined) estimated for five sections of Elk Creek in 1997 (pre-project) and from 1998 to 2000 (post-project). Estimates were made in two bank stabilization treatment sections (BS1 and BS2), two sections where the channel was reconstructed (New 1 and New 2), and one control section in a Wilderness Area (Control).

Prospect Creek Channel Restoration

WATER NAME: Prospect Creek – Clark's Fork River

DATE PROVIDED BY: Laura Katzman and Pat Saffel, FWP

DETAILED REPORT CITATION: Katzman and Saffel (2001)

MFWP CODE: FFI-53-1999; FFI-24-2000

Redd count surveys were conducted in the fall of 1999 and 2000 from the upstream end of the canyon below Clear Creek to Coyote Gulch. In 1999 40 redds were observed and in 2000 30 redds were observed in this portion of the creek. Each year about half of the redds were thought to have been constructed by brown trout and half by brook trout based on size of redds. In 1999 about 18% of the redds were located in the portion of restored channel and this restored portion of channel made up about 20% of the total survey section. In 2000 about 17% of the redds were located in the restored channel area, but during this year the restored channel made up about 25% of the surveyed area. Redd count and distribution data has not indicated a response by spawning fish to selectively use the restored portions of Prospect Creek immediately after restoration. However, it may take some time before adequate cover for spawning fish develops; streambed materials are sorted by high spring flows to provide good spawning gravels; and for spawning fish to shift their spawning to these areas. A rotary screw trap operated just upstream of the confluence of Dry Creek from March 9 to October 20, 2000 and a weir was operated just downstream of the confluence of Dry Creek from August 8 to November 26, 2000. Data from these traps have not yet been summarized, but will provide information on spawning fish moving into and out of Prospect Creek and juvenile trout emigrations from the stream. Trapping and redd count information from subsequent years will allow for evaluation of the effects of channel restoration on fish reproduction and recruitment to the system. Populations of fish were monitored in four sections of Prospect Creek in 1999 and 2000. The lowermost section (mile 11.0) had no flow during either year. Estimates in the other three sections illustrated that bull trout populations declined slightly at mile 15, were the same at mile 17 and increased at mile 18.5, while populations of westslope cutthroat trout declined at mile 15, increased slightly at mile 17, and declined slightly at mile 18.5 (Figure 14). **Information collected currently suggests that spawning fish have not yet responded to channel restoration in Prospect Creek; however, it is probably too soon after restoration to reach any conclusions.**

Rock Creek (Garrison) Instream Flow and Habitat Improvement Project Channel

WATER NAME: Rock Creek – Clark's Fork River

DATE PROVIDED BY: Eric Reiland, FWP

DETAILED REPORT CITATION: Reiland (in prep.)

MFWP CODE: FFI-20-1999

The Rock Creek Instream Flow and Habitat Improvement Project converted the Garrison Ranch's flood irrigated pastures to sprinkler irrigation and all salvaged water was donated for instream flow (5-27 cfs). The lower 1.75 miles of Rock Creek had been annually dewatered for the past 35 years. The project also restored four meanders using bank stabilization and channel reconstruction techniques to create 46 new pools and 16 areas with overhead cover. The purpose of the channel restoration and instream flow water lease was to provide spawning opportunities for trout from the Clark Fork River and improve habitat for resident salmonids.

Figure 14. Numbers of bull (BT) and westslope cutthroat trout (WCT) estimated per 1,000 feet of stream length by stream mile in 1999 and 2000. The FFI channel restoration projects were located at mile 17.

Fish evaluations for this project include redd counts and electrofishing population estimates. During the fall of 2000, brown trout redds were counted for a 2.5 mile reach of Rock Creek affected by the project. Redd surveys were made three times during the fall at intervals of at least one week. These surveys identified 4 definite redds, 9 probable redds and 4 test digs. Electrofishing estimates will be conducted during the summer 2001 field season. **Baseline redd counts have been conducted and fish population estimates are planned to evaluate this project.**

Jefferson River Drainage

Hell's Canyon Creek Irrigation Modification

WATER NAME: Hell's Canyon Creek – Jefferson River

DATE PROVIDED BY: Ron Spoon, FWP

DETAILED REPORT CITATION: No report available (FWP files, Townsend, MT)

MFWP CODE: RRA-38-93

Improvements to an irrigation withdrawal system in Hell's Canyon Creek during 1997 have eliminated the loss of juvenile trout down an irrigation ditch on lower Hell's Canyon Creek. A screen by-pass of the irrigation diversion allows juvenile rainbow and brown trout to move downstream and into the Jefferson River. In addition, flows in Hell's Canyon Creek below the irrigation diversion remained above 5 cfs in 1999 and above 1 cfs during 2000 (above the required minimum of 0.25 cfs). Without flow augmentation negotiated as part of this project Hell's Canyon Creek would have gone dry below the irrigation diversion in 2000. **This project has eliminated loss of juvenile trout to an irrigation ditch and provides flows that allow these juvenile trout to emigrate from Hell's Canyon Creek into the Jefferson River.**

South Willow Creek Bank Stabilization

WATER NAME: South Willow Creek – Jefferson River

DATE PROVIDED BY: Brad Shepard, FWP

DETAILED REPORT CITATION: Shepard (2000a)

MFWP CODE: FFI-29-2000

FFI funds are proposed for stabilizing stream banks and to build a fence that excludes the riparian area from livestock grazing along a portion of South Fork Willow Creek within the Maichel's property near Harrison, Montana. Mark-recapture population estimates were conducted using a mobile electrode system in a 2,460 feet-long Control Section above the Maichel's property and in a 1,540 feet-long FFI Section within the Maichel's property on June 22, 2000. These estimates were conducted prior to any restoration work and represent pre-treatment conditions.

The upper Control Section supported an estimated 652 (SD: 42; plus 2 mortalities that were 4.0 to 4.9 inches) brown trout and 91 (SD: 15) rainbow trout 3.0 inches and longer. Prior to bank stabilization treatments the lower FFI Section supported an estimated 521 (SD: 59; plus 13 mortalities that were 4.0 to 4.9 inches) brown trout and 278 (SD: 90; plus seven mortalities that were 3.0 to 3.9 inches) rainbow trout 3.0 inches and longer. It should be noted that fish less than 5.0 inches in length (fish age 1 and younger) dominated the populations, particularly for the lower treatment section (Figure 15). For fish 6 inches and longer the estimates were 258 and 310 for brown trout in the lower FFI and upper Control sections, respectively, and 39 for rainbow trout in both sections. When these estimates were standardized to number of fish 6.0 inches and longer per 1,000 feet of stream length the lower FFI Section supported more fish per stream length for both species than the upper Control Section (Figure 16).

Length frequency histograms illustrated that both sections supported rainbow trout up to about 12 inches and brown trout up to about 17 inches (Figure 15). Length frequencies of captured fish were similar between sections. **Baseline fish population data have been collected prior to the construction of the FFI project in South Willow Creek. These data found that fish populations were slightly higher in the proposed treatment portion of South Willow Creek than in an upstream control portion that is not scheduled to be treated.**

Figure 15. Length frequency histograms for brown trout (left) and rainbow trout (right) captured in an upper Control Section (top) and lower FFI Section (bottom) of South Willow Creek in 2000.

Figure 16. Estimated number and standard deviations (vertical lines) of brown trout (left) and rainbow trout (right) 6.0 inches and longer in both a section where FFI funds will be spent on bank stabilization (FFI Section) and in an upper Control Section of South Willow Creek during 2000.

Judith River Drainage

Big Springs Creek Brewery Flats Channel Restoration

WATER NAME: Big Spring Creek – Judith River

DATE PROVIDED BY: Anne Tews, FWP

DETAILED REPORT CITATION: Liknes et al. (In prep.)

FWP CODE: FFI-24-1997

Big Spring Creek in the Brewery Flats area consisted primarily of a straight, rock-lined channel with high velocities due to channelization. FFI funds were used to restore a more natural meandering channel-type by lengthening this section of channel. Mark recapture data for trout populations were collected in August or September from 1995 to 2000 from three sections of Big Spring Creek. Sites included the Burleigh (5860 feet) and Brewery Flats (3704 feet) sections above Lewistown, and the 4394-foot Carroll Trail (Tresch) section below town. In 2000, a 3740-foot section was electrofished at Carroll Trail. Historical population data was also analyzed from 1967, 1968 and 1982. The Tresch and Burleigh sections have a somewhat natural meander pattern and are considered control sections for this project. After sampling in September 2000, 2500 feet of the Brewery Flats Section was re-routed into a restored channel. Habitat information has been collected, but has not been summarized, from the old straightened channel.

Estimates of small (6 to 10 inches) rainbow trout were typically lowest in the Burleigh section (Figure 17). Estimates of larger (10 inches and longer) trout per mile from the Brewery Flats and Burleigh sections were similar with overlapping confidence intervals. Below town (Tresch), estimates were consistently higher for both brown and rainbow trout than in either section above town. For example, from 1995 to 2000, estimates for larger rainbow trout (10 inches and longer) fluctuated from 874 to 2453 per mile below town at the Carroll Trail section, but were only 207 to 622 per mile in the Burleigh section and 218 to 756 per mile at the Brewery Flats section. In 2000 record high numbers of trout, approximately 3231 trout 10 inches and longer (3222 pounds) per mile, were found in the Carroll Trail section. This compares with point estimates of 726 (703 pounds) and 1039 (756 pounds) per mile for the Burleigh and Brewery Flats section, respectively. The FFI project for Brewery Flats increased channel length and this increased channel length will probably result in higher overall populations of fish in this segment of stream, even if fish densities (number of fish per acre or mile) stay the same as in the old channelized portion of channel. It is anticipated that fish densities will also increase in this channel segment due to improved habitat conditions. Presently the average size for age 2 and older rainbow trout appears to be smaller (almost an inch shorter for average length) in the restoration section than in the other two sections. **Baseline data have been collected to evaluate the FFI project for the Brewery Flats channel restoration.**

Figure 17. Estimated number and 95% confidence intervals (vertical lines) of rainbow trout 10 inches and longer per mile in three sections of Big Springs Creek from 1967 to 2000.

Cottonwood Creek Channel Restoration

WATER NAME: Cottonwood Creek – Judith River

DATE PROVIDED BY: Brad Shepard, FWP

DETAILED REPORT CITATION: Shepard (2000b)

MFWP CODE: FFI-9-2000

On July 10 and 11, 2000, prior to construction of a channel restoration project on Floyd Maxwell's property funded by Future the Fisheries Improvement program, a depletion fish population estimate was made in two sample sections in Cottonwood Creek (a tributary to the Judith River near Lewistown, Montana) within Floyd Maxwell's property. Sampling was conducted in a 1,150-foot-long section of Cottonwood Creek within the proposed restoration area (FFI Section) and another 1,150-foot-long control (Control Section) above the restoration section, starting at the upper fenceline and continuing downstream past the shooting range on the Maxwell Ranch. Depletion fish population estimates were made for fish 3.0 to 5.99 inches, 6.0 to 11.99 inches, and 12.0 inches and longer.

The FFI Section supported primarily brook trout, while white suckers, sculpins and longnose dace were also observed, but not estimated. A four-pass depletion estimate for this 1,150-foot long section resulted in estimates of 36 (SD: 1.1) brook trout 3.0 to 5.99 inches, 47 (SD: 2.4) brook trout 6.0 to 11.99 inches, and 2 (SD: 0.6) brook trout 12.0 inches and longer prior to any channel restoration. The Control Section also supported primarily brook trout; however, while

sculpins were commonly observed, white suckers and longnose dace were less abundant than in the FFI Section. A three-pass estimate for the 1,150-foot long upstream Control Section resulted in estimates of 60 (SD: 13.9) brook trout 3.0 to 5.99 inches, 93 (SD: 4.2) brook trout 6.0 to 11.99 inches, and 2 (SD: 0.4) brook trout 12.0 inches and longer. Numerous young-of-the-year brook trout less than 3.0 inches were observed, but not estimated in both sections. When estimates of fish 3.0 inches and longer were standardized to the number per 1,000 feet of stream length, it was obvious that the Control Section supported significantly higher populations of brook trout than the proposed FFI restoration section (Figure 18). Most captured brook trout from both sections were 4 to 10 inches; however, more longer (>6.0 inches) brook trout were captured in the Control Section than in the FFI Section, but both sections supported brook trout over 12 inches (Figure 19). **Baseline fish population data have been collected prior to the construction of the FFI project in Cottonwood Creek. These data found that fish populations were higher in the control portion than in the proposed treatment portion of Cottonwood Creek.**

Figure 18. Estimated numbers (standard deviations shown as vertical capped lines) of brook trout (standardized to number per 1,000 feet of stream channel) 6.0 inches and longer in a FFI habitat restoration section and Control section of Cottonwood Creek in 2000.

Figure 19. Length frequencies for brook trout captured in the FFI Section (cross hatch bars) and a Control Section (grid bars) of Cottonwood Creek in 2000.

Missouri River Drainage

Canyon Ferry Yellow Perch Habitat Enhancement

WATER NAME: Canyon Ferry Reservoir – Missouri River

DATE PROVIDED BY: Dave Yerk, FWP

DETAILED REPORT CITATION: Yerk (In prep.)

MFWP CODE: FFI-35-1998

Monitoring was initiated in 2000 to evaluate the use of Christmas trees placed in Canyon Ferry Reservoir to enhance yellow perch spawning and rearing habitat in the reservoir. An underwater camera was used to visually inspect trees for deposition of perch skeins and to monitor use of trees by juvenile fishes later in the summer. Additionally, two clusters of ‘sentry’ trees were placed at the Silos where turbid water conditions precluded the effective use of the camera. Marked with buoys, these trees could be pulled to the surface and inspected for egg skeins. The Silos site ‘sentry’ trees were checked weekly following their deployment in early April. No eggs were observed on these trees until May 9 (11.0 C), when 8 skeins were observed on one of the structures. Eggs were never observed on trees deployed at the White Earth and Hellgate sites. Trees placed at these sites sunk to the bottom within about a month of deployment. Because the White Earth and Hellgate sites were located in bays where little wave activity washed over the trees, silt and periphyton may have accumulated rapidly on branches and needles causing them to sink. The trees at the Silos site remained relatively clean and stood upright through August. Juvenile fish were not documented using the structures at any of the sites for rearing habitat. Because the reservoir is at full-pool in July and August, the trees are likely too deep to provide

rearing habitat. Beach seine sampling completed in late August did not show any notable changes in age-0 perch production from previous years. However, we are still evaluating the validity of this methodology for providing a baseline of age-0 yellow perch production. Based on this year's observations, efforts in spring 2001 will be directed at increasing the number of structures placed in the south end of the reservoir (Silos site). Trees placed in the reservoir at other sites will be deployed in the main reservoir and not in bays. Efforts to monitor use of the structures by spawning perch will continue with the placement of 'sentry' trees and the use of the underwater camera. **Perch may use placed underwater trees for spawning, but extensive use of these trees by spawning perch was not yet documented. No documentation is yet available that shows these trees are being used by juvenile fish.**

Highwood Creek Channel Rehabilitation

WATER NAME: Highwood Creek – Missouri River

DATE PROVIDED BY: Brad Shepard, FWP

DETAILED REPORT CITATION: Shepard (2000c)

MFWP CODE: FFI-12-1998

Baseline fish population sampling conducted in 1997 and 1998 was reported in Shepard (1998). Between July 1998 and June 30, 1999 the FFI bank stabilization and channel restoration project on John McGowan's was completed. On June 30, 1999 a mark-recapture estimate made 656-foot Control section located above the FFI treated section estimated 114 brown trout (SD: 13.7) and 52 brook trout 5.0 inches and longer (SD: 4.6) occupied this section. No reliable estimate could be made for rainbow trout in the Control section. The 863-foot long FFI restoration section supported an estimated 217 brown trout (SD: 9.6), 67 brook trout (SD: 4.7), and 39 rainbow trout 5.0 inches and longer (SD: 5.5). During the summer of 1999 Highwood Creek was badly dewatered and the "Control" section was reported to have gone totally dry, while the "FFI" section retained some flow due to the presence of several springs near the upper end of this section (personal communication, George Liknes, Montana FWP, Great Falls and John McGowan, Highwood). On July 12, 2000 the FFI section supported an estimated 228 (SD: 2.9) brown trout, 24 (SD: 5.8) rainbow trout, and 22 (SD: 0.5) brook trout 6.0 inches and longer, while the Control section supported an estimated 16 (SD: 0.9) brown trout, one (all fish captured on first pass) rainbow trout, and 16 (SD: 0.6) brook trout 6.0 inches and longer. Prior to 2000 sampling we removed a beaver dam within the Treatment section that had created a beaver pond that inundated about 100 feet of the channel. The impact of the dewatering of the Control section in 1999 on the fish populations was obvious from the low numbers of fish found in this section in 2000.

When estimates were standardized to number of fish 6.0 inches and longer per 1,000 feet of stream channel it was apparent that numbers of brown trout increased from 1997 to 2000; rainbow increased from 1997 to 1999, but declined slightly in 2000; and brook trout have steadily declined since 1998 within the FFI treated portion of channel (Figure 20). Brown trout numbers have remained higher in the FFI treated portion than the Control portion; however, dewatering of the Control portion in 1999 influenced these results. It appears that the FFI habitat restoration enhanced brown trout; however, brook trout numbers have declined. Brook trout declines were probably related to increased competition with a larger population of brown trout that were increasing because of habitat restoration. The dewatering that occurred in 1999 within

the Control section makes it difficult to attribute increases within the FFI treated section solely to habitat restoration. The differential impact of dewatering on these two sections will confuse efforts to evaluate the habitat restoration project.

Figure 20. Numbers (standard deviations shown as vertical capped lines) of brown trout, rainbow trout, and brook trout (standardized to number per 1,000 feet of stream channel) 6.0 inches and longer estimated for a FFI habitat restoration section and Control section of Highwood Creek from 1997 to 2000.

In an effort to understand how these two sections might be utilized for spawning and early rearing the relative catches (number caught on first electrofishing pass) of fish less than 6.0 inches per 1,000 feet of stream were plotted for 1999 and 2000, the years fish less than 6.0 inches were captured (Figure 21). It appears that rainbow trout are not using this portion of the stream for spawning, as almost no young rainbow trout were captured. It was interesting to see the dramatic increase in relative catches of both brown and brook trout within the FFI treated section from 1999 to 2000, in spite of the extremely low water experienced in 1999. This type of increase was also seen in the Control section for brook trout, but not for brown trout. It may be that the decline in brook trout 6.0 inches and longer might be a temporary situation and with the good reproduction that appears to have occurred in 2000, more larger brook trout will inhabit the FFI section in the future.

A few large brown trout were captured in both sections during each sampling event (Figure 22). Numerous young-of-the-year brook and brown trout were captured during 1999 and 2000 in each section (Figure 22). **Preliminary information suggests that the FFI channel restoration in Highwood Creek has resulted in higher standing crops of trout; however, the de-watering that occurred in 1999 has complicated interpretation of these results.**

Figure 21. Relative catch (number of fish captured on the first electrofishing pass per 1,000 feet of channel length) for brown, rainbow, and brook trout less than 6.0 inches long in a FFI habitat restoration section and Control section of Highwood Creek in 1999 and 2000.

Figure 22. Length frequencies for brown trout (left), brook trout (middle), and rainbow trout (right) captured in the FFI project area (cross hatch bars) and a control area (grid bars) of Highwood Creek in 1999 (top) and 2000 (bottom).

Magpie Creek Fish Passage

WATER NAME: Magpie Creek – Canyon Ferry Reservoir - Missouri River

DATE PROVIDED BY: Ron Spoon, FWP

DETAILED REPORT CITATION: Shepard (1998); (FWP files, Townsend, MT)

MFWP CODE: FFI-54-96

Spawning site (redd) surveys conducted in Magpie Creek in 1997 and 1998 indicated that the FFI project that modified a culvert by inserting a fish ladder allowed rainbow trout from Canyon Ferry Reservoir to ascend Magpie Creek through the culvert to spawn (Shepard 1998). In 2000 beaver dams located in the lower 2 miles of Magpie Creek and extremely low spring flows and low reservoir levels in Canyon Ferry Reservoir led to no rainbow trout being observed in the vicinity of the culvert and no redds were observed above the culvert. **Preliminary data found that rainbow trout spawners from Canyon Ferry Reservoir were ascending Magpie Creek to spawn above the culvert retrofitted with a fish ladder; however, low flows and beaver activity in 2000 resulted in no spawning use of Magpie Creek above the culvert.**

Missouri River Bank Stabilization – Range and Below Craig

WATER NAME: Missouri River

DATE PROVIDED BY: Brad Shepard, FWP

DETAILED REPORT CITATION: Shepard (2000d)

MFWP CODE: RRA-73-1995, FFI-21-1997 and FFI-16-1998

We attempted to quantify the relative effects of several bank stabilization projects completed on the Missouri River by assessing the relative catch of fish along various river banks at night using jet boat electrofishing and by conducting controlled angling sampling along various stream bank sections during both 1998 and 1999. We assessed six different areas: barbs installed along Range's property (Barb); an old riprapped bank above the Craig Bridge (Riprap); a natural eroded bank near an irrigation pivot below the Craig Bridge (Natural Er); old barbs installed on Sterling's property (Old Barb); debris and channel stabilization along Judeman's property near the I-15 bridge (Debris); and a slightly eroded natural bank along Lehman's property below the I-15 bridge (Natural; Figure 23).

During 1998 total catches of rainbow trout per 1,000 feet of bank were similar in all six areas, however, catches of smaller rainbow were higher along the Riprap and Debris banks (Figure 23). Catches of brown trout varied widely in 1998 with no apparent trend between treated and untreated areas with the Riprap and lower Natural bank having the higher catch rates (Figure 23). The lowest catch rates for brown trout in 1998 were seen along the upper natural eroded bank

Figure 23. Catch rates (number per 1,000 feet of river bank) for rainbow and brown trout less than 6 inches and 6 inches and longer along six river bank sections along the Missouri River near Craig, Montana.

(Natural Er). In 1999 we captured rainbow trout at higher frequencies along the upper Barb and Riprap banks than any of the lower banks (Figure 23). We did not see a similar higher catch of smaller rainbow trout along the Riprap or Debris banks compared to other banks as we had observed in 1998. Catch rates for brown trout in 1999 were very similar to catch rates in 1998, except we caught more brown trout along the Debris bank in 1999 than in 1998. Catch rates in 1999 indicated that all stabilized banks had higher catches than the upper naturally eroded bank, but were not generally higher than the lower slightly eroded natural bank.

We were unable to document any differences between banks in our angling survey; however, this survey consisted of a single float down each bank in 1998 and two floats down each bank in 1999. In 1998 we caught no fish along any of the treated banks and only had six strikes, catching one rainbow and two mountain whitefish in the entire survey. During angling floats in 1999 we captured several fish along each bank, but no trend was evident.

It appears that trout abundance along stabilized banks may have been somewhat higher than along a highly eroded bank, but not higher than along a slightly eroded bank. Angling did not appear to be a reasonable tool to sample differences in relative fish abundance along different types of banks at the very low level of effort we expended. Angling might provide reasonable data at a much higher level of effort. We wanted to assess angling success along different types of banks because one rationale used by the project proponents for creating structure along riverbanks was for improving angling success. Annual variability in night shocking catch rates might cloud any conclusions that could be made from catch per effort sampling between bank types. We suggest either conducting a much more intensive study on the effects of bank stabilization techniques on fish; assuming that annual variability is minor and use catch per effort to compare banks; or discontinue attempts to evaluate bank stabilization techniques on fish abundance in large rivers. If the second option above is selected, we recommend conducting catch per effort sampling during the same time period each year to minimize potential seasonal variation. We further recommend that several years pre- and post-project completion will probably be needed to account for some level of annual variation. **We could not conclude that these bank stabilization projects have led to higher populations or abundance of fish. The data suggest that brown trout were more abundant along the riprap bank than other bank types; however, the natural bank had the next higher abundance of brown trout.**

Missouri River Big Springs Spawning Channel

WATER NAME: Missouri River above Townsend

DATE PROVIDED BY: Ron Spoon, FWP

DETAILED REPORT CITATION: No report available (FWP files, Townsend, MT)

MFWP CODE: RRA-21-92

A spawning channel was constructed at Big Springs along the Missouri River in 1994 to increase spawning habitat for brown and rainbow trout inhabiting the Missouri River and Canyon Ferry Reservoir. Redd (spawning site) counts were made during the fall (to count brown trout redds) and spring (to count rainbow trout redds) from 1994 to 1998. No count was made during the spring of 1996 and counts of rainbow trout redds made during the springs of 1997 and 1998 were not complete counts due to turbid water making redd observation extremely difficult. In 1998, no counts of brown trout redds were made after November 19, so the count for brown trout in

1998 was an incomplete count. Both brown and rainbow trout were using the new spawning channel immediately following its construction (Table 1). The number of brown trout redds declined somewhat after 1995; however, this area has been used as a source for taking brown trout eggs as part of the Toston Mitigation Project and that may explain the reduced number of redds. More brown trout redds were observed in 1999 than in any other year. No significant changes in the constructed spawning channel have been observed since its construction in 1994. **The data indicate both brown and rainbow used this spawning channel immediately after its construction. The number of observed redds has declined in recent years and the reason for this decline is undetermined at this time.**

Table 1. Number of brown and rainbow trout redds observed in the Big Springs spawning channel of the Missouri River from 1994 to 1999.

Year	Season (dates of surveys)	Number of Redds	
		Browns	Rainbows
1993	Fall (10/14 – 1/19)	44	-
1994	Fall (10/25 – 12/23)	44	-
1995	Spring (2/16 – 5/8)	-	103 ^{a/}
	Fall (11/6 – 12/20)	43	-
1996	Spring (4/10)	-	15 ^{b/}
	Fall (10/26 – 12/18)	51	-
1997	Spring (4/2)	-	16 ^{c/}
	Fall (11/3 – 12/16)	18	-
1998	Spring (3/17 – 4/15)	-	57 ^{c/}
	Fall (10/28 – 11/19)	13 ^{c/}	-
1999	Spring (3/23 - 5/18)	-	30
	Fall (10/26 – 12/6)	57	-

^{a/} Represents the minimum number due to sampling problems.

^{b/} Only a single survey was completed.

^{c/} Incomplete counts due to turbidity limiting visibility or because surveys were not done through the spawning season.

White's Gulch Rehabilitation and Barrier

WATER NAME: White's Creek – Canyon Ferry Reservoir - Missouri River

DATE PROVIDED BY: Brad Shepard and Ron Spoon, FWP

DETAILED REPORT CITATION: Shepard and Spoon (in prep.)

MFWP CODE: RRA-74-1995 and FFI-16-1996

White's Creek in White's Gulch supports a genetically pure population of westslope cutthroat trout. The RRA and FFI projects in White's Gulch were part of a large cooperative effort to reclaim White's Gulch from past mining impacts and conserve the existing population of westslope cutthroat trout. In 1993 we began removing brook trout from a portion of White's Creek above the area most heavily impacted by past placer and dredge mining (Above Project area). In 1994 and 1995 the dredge and placer-mined portion of the White's Gulch valley and

the stream channel were rehabilitated (Project area). A permanent fish barrier was placed about 1,000 feet below this rehabilitated segment of stream in 1995 (portion of the stream from this barrier up to the Project area termed Below Project area). From 1995 through 1998 fish surveys and brook trout removals were conducted from this permanent fish barrier up through the rehabilitated portion of the channel. Fish sampling was conducted in three major areas of the stream from 1993 through 2000. Catch of trout per 1,000 feet in each of these areas showed that brook trout abundance declined significantly until only four brook trout were captured above the constructed barrier during 2000 (Figure 24). Removal of brook trout and the restoration of the stream channel have resulted in much higher catches of westslope cutthroat trout after 1995 (Figure 24). **Observations and nearly total removal of brook trout from above this constructed barrier indicate that brook trout cannot pass over the barrier. Habitat restoration in the portion of White's Creek impacted from past mining activities has dramatically increased the relative catch of westslope cutthroat trout in this portion of the creek.**

Figure 24. Relative catch (number of fish captured on the first electrofishing pass per 1,000 feet of channel length) for westslope cutthroat and brook trout 3.0 inches and longer in three areas of White's Gulch from 1993 to 2000.

Musselshell River

South Fork Musselshell Irrigation Diversion Fish Passage

WATER NAME: South Fork Musselshell River – Musselshell River

DATE PROVIDED BY: Brad Shepard and Anne Tews, FWP

DETAILED REPORT CITATION: Shepard and Tews (2000)

MFWP CODE: FFI-28-2000

The Montana Department of Natural Resources and Conservation applied to provide fish passage upstream over the Martinsdale Diversion dam on the South Fork of the Musselshell River that presently does not allow easy fish passage. Prior to modification of this irrigation diversion to provide fish passage, a survey was conducted on October 17, 2000 to evaluate brown trout spawning and movement above and below this diversion. A spawning site (redd) count was done from the State Highway 294 bridge, near Martinsdale, upriver about 0.8 mile (includes about 0.55 mile from the diversion to the highway and about 0.25 mile above the diversion).

On October 17, 2000 very little water was flowing down the South Fork Musselshell below the Martinsdale Diversion. No water was flowing over the diversion and the channel was intermittent for about 0.2 miles below the diversion. Groundwater valley flow re-charged the channel to create surface flow about 0.2 miles below the diversion, but flows were visually estimated to be less than 2 cfs. Flows above the diversion were at least 10 cfs.

A total of three redds were observed below the diversion and two redds were seen above the diversion. A total of six adult brown trout were observed below the diversion and three were seen above the diversion. Two large redds were seen at the head of the diversion canal, just below the diversion headgate. Spawning habitat above the diversion was under-utilized. A large, well-maintained beaver dam blocked the entire channel about 0.25 miles above the diversion. Below the diversion lots of good deep pool habitats were seen and several beaver dams may partially block upstream movement of fish, especially at low flows.

A total of 22 brown trout were captured in 840 feet of channel. These brown trout averaged 14.1 inches long (range: 7.1-20.9) and 1.10 pounds (range: 0.2-2.0). Of these 17 were tagged with number Floy tags to assess movement. Eight of the captured brown trout were identified as females and six were identified as males that had either just recently spawned or were ready to spawn. Water flows during summer and fall 2000 were some of the lowest on record. Fall flows at Martinsdale Diversion must be adequate to fully water both the fish passage structure and the river channel below the diversion to effectively pass fish. **Baseline data have been collected to evaluate whether a proposed fish passage facility at the Martinsdale Diversion allows brown trout to move above the diversion and results in additional spawning above the diversion.**

Sun River Drainage

Spring Coulee Bank Stabilization

WATER NAME: Spring Coulee Creek – Sun River

DATE PROVIDED BY: Brad Shepard, FWP

DETAILED REPORT CITATION: Shepard (2000e)

MFWP CODE: FFI-26-1998

A single electrofishing pass was made in Spring Coulee Creek on Mark Lee's property on July 1, 1998, prior to completion of the FFI bank stabilization project, and results from that effort were reported in Shepard (1998). The FFI bank stabilization project was completed within the lower section (New Treated) from the fall of 1998 through the early summer of 1999. On June 24, 1999 we were able to conduct a mark-recapture estimate in the same three sections (Control, Old Treated, and New Treated) that were sampled previously. However, the lower section (New Treatment) was about 1,900 feet longer than the 1,150 feet sampled in 1997. High turbid stream flows during the mark run limited our capture efficiencies. We clipped different fins as marks between the three sections to test for movement between sections. A mark-recapture estimate was made across all three sections and then portioned within each section by the proportion of total fish marked by species. Estimates were made for rainbow, brown, and brook trout.

In 1999 relative catches (number captured per 1,000 feet) were higher in all sections than observed in 1998; however, the much higher catches in the Old and New Treatment sections during 1999 could be attributed to better sampling efficiencies related to cooler water temperatures (Figure 25). Brook trout were only captured in the lower section in 1998, but were captured in all sections during 1999. Mark-recapture population estimates made using the modified Peterson estimator in 1999 estimated that the entire 5,550-foot long sample section supported 60 (SD: 8.0) brown trout 8.0 to 28.9 inches long, 84 (SD: 11.5) rainbow trout 11.0 to 23.9 inches long, and 35 (SD: 10.7) brook trout 6.0 to 13.9 inches long. When these estimates were apportioned between the three sample sections based on proportion of fish marked in each section, it was apparent that the New Treatment Section had the highest estimated number of trout (Figure 26). Since population estimates were done immediately following the FFI bank stabilization in the New Treatment section, these estimates should be regarded as pre-treatment estimates for this section. Six of the 15 recaptured brown trout and two of 15 recaptured rainbow trout were recaptured in a different sub-section than where they were tagged, indicating that movement, particularly by brown trout, occurred between sub-sections in between the mark and recapture events. Half the fish moved upstream (3 browns and 1 rainbow) and half moved downstream (3 browns and 1 rainbow). Many of the rainbow and brown trout within this portion of Spring Coulee Creek were over 18 inches with some over 24 inches (Figure 27). Rainbow trout averaged 14 to 20 inches, brook trout averaged 8 to 10 inches, and brown trout averaged 17 to 25 inches in length.

Figure 25. Relative catches (number captured in first pass per 1,000 feet) of rainbow, brown and brook trout in three sections of Spring Coulee Creek in 1998 and 1999. Note that in 1998 warm water temperatures limited catch efficiencies in the Old and New Treatment sections.

During July 2000 we observed that livestock exclusion fences had been constructed along the entire length of stream on Mr. Lee's property including a few water gaps and a ford.

In conclusion, this portion of Spring Coulee Creek supports relative low populations of very large trout. It appears that recruitment of rainbow trout from within this area of Spring Coulee Creek is very limited based on length frequency information (Figure 26). It is possible that large trout move into this portion of the creek from downstream areas during the summer, but more detailed movement data would need to be collected to confirm this speculation. These data will serve as reasonable baseline data for evaluating the FFI funded bank stabilization project. **The 1998 data provide baseline data on fish in Spring Coulee Creek and indicate relative abundance's were similar between untreated and treated sections and that this stream supports some large rainbow and brown trout.**

Figure 26. Estimated number of brown trout (8 inches and longer), rainbow trout (11 inches and longer) and brook trout (6 inches and longer) per 1,000 feet of stream length in three sections of Spring Coulee Creek within Marc Lee's property during June 1999.

Figure 27. Length frequencies for brook (solid bars), brown (cross-hatched bars), and rainbow (stippled bars) trout in three sections of Spring Coulee Creek sampled in July 1998 (top) and June 1999 (bottom).

Sun River Inventory and Design - Simms to Fort Shaw; Bank Stabilization

WATER NAME: Sun River – Missouri River

DATE PROVIDED BY: Brad Shepard, Bill Hill, George Liknes and Steve Leathe, FWP

DETAILED REPORT CITATION: Hill et al. (in prep.)

MFWP CODE: FFI-22-1997, FFI-46-1997, FFI-47-1997, FFI-24-1999, FFI-31-2000

A pilot study was done in 1997 to determine the effort needed to estimate fish populations in several sections of the Sun River (Shepard 1998). In 2000 mark-recapture population estimates were done for the Sun River below the towns of Augusta and Sun River. These sampling efforts obtained relatively poor quality population estimates; however, these data consistently suggest that the Sun River supports relatively low population densities of rainbow and brown trout and that population levels appear to decrease in a down river direction. In addition, the Sun River supports some relatively large brown trout. It is believed that the principal factor limiting trout populations are low summer river flows. **Preliminary data indicate that fish densities are relatively low in the Sun River, trout abundance decreases in a down river direction, the river supports some large brown trout, and low summer flows are likely limiting trout populations at the present time.**

Yellowstone River Drainage

Big Creek Irrigation Efficiency

WATER NAME: Big Creek – Yellowstone River

DATE PROVIDED BY: Leanne Roulson, Garcia and Associates

DETAILED REPORT CITATION: Roulson (2000)

MFWP CODE: FFI-27-1998

A water lease linked to improving irrigation efficiency in the lower Big Creek drainage was initiated in 1999. This lease provides water to lower Big Creek to improve the success of spawning trout, primarily Yellowstone cutthroat trout (YCT), from the Yellowstone River in lower Big Creek. Fry trapping to monitor this lease began in Big Creek in 1999. About 3,500 YCT fry were captured in 1999 during 35 days of trapping while over 11,000 fry were trapped in 2000 during 44 days of trapping (Figure 28). Compared to other tributaries that contribute YCT fry to the Yellowstone River, Big Creek produced a relatively high total catch and catch per day of YCT fry in 2000 (Figure 28). **It is obvious that Big Creek has a high potential for producing Yellowstone cutthroat trout to the Yellowstone River and the augmented flows during 2000, a drought year, resulted in relatively high numbers of fry moving down into the river.**

Figure 28. Total number (top) and catch per trap day (bottom) of Yellowstone cutthroat trout fry captured in fry traps while emigrating from Mill, Big, Cedar, and Mol Heron creeks from 1996 to 2000.

Mol Heron Creek Flow Enhancement and Fish Screen

WATER NAME: Mol Heron Creek – Yellowstone River

DATE PROVIDED BY: Leanne Roulson, Garcia and Associates

DETAILED REPORT CITATION: Roulson (2000)

MFWP CODE: FFI-21-1996 and FFI-18-1997

A water lease and modification of an irrigation diversion in lower Mol Heron Creek drainage was initiated in 1998. This lease provides water to lower Mol Heron Creek and the irrigation diversion was modified to provide upstream passage to fish to improve the success of spawning trout, primarily Yellowstone cutthroat trout (YCT), from the Yellowstone River in lower Mol Heron Creek. Fry trapping to monitor this lease began in 1996. From about 1,100 to 4,100 YCT fry have been annually captured from 1996 to 2000 during from 10 to 35 days of trapping (Figure 28). **Mol Heron Creek has the potential to provide some recruitment of Yellowstone cutthroat trout to the Yellowstone River; however, the number of fry emigrating during 2000 was less than 1999.**

Stillwater River Channel Restoration

WATER NAME: Stillwater River – Yellowstone River

DATE PROVIDED BY: Brad Shepard and Mike Poore, FWP

DETAILED REPORT CITATION: None

MFWP CODE: FFI-30-2000

A 775-foot long side channel of the Stillwater River that had been cut off from the main channel for years was reconnected and restored during the summer of 2000 to provide spawning habitat to fish, primarily rainbow trout, from the Stillwater River. Prior to implementation of this project, no water flowed in this channel. Immediately following construction, the channel was surveyed on October 19, 2000 to check for evidence of brown trout spawning. There was no evidence of spawning and no brown trout were observed; however, this result was expected since the channel had been so recently restored. The newly restored channel contained plenty of suitable spawning substrate with adequate water depth and velocity for spawning. There was evidence of recent beaver activity in the channel. The landowners said that they had been removing a dam that beaver were trying to construct near the mouth. **No spawning could have occurred in this channel prior to its restoration. This channel will need to be surveyed periodically to document whether trout use this channel for spawning and, if so, the number of redds constructed in the channel.**

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