Pack River

Total Maximum Daily Load

Implementation Plan for Agriculture

Developed for the Idaho Department of Environmental Quality

Prepared by:
Idaho Association of Soil Conservation Districts

In Cooperation With:
Bonner Soil and Water Conservation District, the Idaho Soil Conservation Commission, and the USDA - Natural Resources Conservation Service

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Introduction

The Idaho Soil Conservation Commission (ISCC) is the designated management agency in Idaho for managing agricultural nonpoint source pollution and is therefore the lead in TMDL implementation activities on agricultural land. Although the ISCC does not have regulatory or licensing authority over water quality or pollution control, the mission of the ISCC is to provide support to Idaho's Soil and Water Conservation Districts for wise use and improvement of natural resources (RPU 2003). The ISCC offers technical assistance to landowners and operators and administers the Water Quality Program for Agriculture (WQPA), the Conservation Improvement Grants program, and the Resource Conservation and Rangeland Development Program (RCRDP) in cooperation with Soil and Water Conservation Districts.

The ISCC works with the Bonner Soil and Water Conservation District (BSWCD), the Idaho Association of Soil Conservation Districts (IASCD), and the Natural Resource Conservation Service (NRCS) in a partnership to reach common goals and successfully deliver conservation programs in Bonner County.

Other partners in the Pack River watershed include the Pack River Watershed Council (PRWC) and their Technical Advisory Committee (TAC). The Pack River Watershed Council formed as the result of two occurrences - the listing of bull trout as threatened under the federal Endangered Species Act and water quality concerns associated with bank erosion. The PRWC is made up of concerned citizens living in the Pack River watershed. Its mission is to "improve water quality and riparian habitat in the Pack River for people, fish and wildlife through education, collaboration, and cooperative/coordinated projects (PRTAC 2006)."

The PRWC worked with the Bonner conservation partnership and the Tri-State Water Quality Council to recruit the TAC to help develop a watershed management plan to protect the resources of the Pack River Watershed. The TAC membership consists of representatives from Native American tribes, agencies, and organizations with natural resource expertise, including the Bonner conservation partnership. The management plan was completed in 2006 and will incorporate this plan upon completion.

PURPOSE

The Lower Pack River TMDL Implementation Plan for Agriculture outlines an adaptive management approach for implementation of Resource Management Systems (RMS) and BMPs to meet the requirements of the Pack River TMDL. The goal of this plan is to complement other efforts in restoring and protecting beneficial uses for 1998 303(d) listed stream segments for which TMDLs have been developed.

GOALS AND OBJECTIVES

The goal of this plan is to provide a strategy for agriculture to assist and/or complement other watershed efforts in restoring and protecting beneficial uses for water quality impaired streams in the Lower Pack River watershed. These water quality impaired stream segments are identified in the Idaho Department of Environmental Quality (DEQ)

1998 303(d) list for the Pend Oreille subbasin. The *Clark Fork/Pend Oreille Sub-basin Assessment and Total Maximum Daily Loads* was originally developed in November 1999, with three revisions following the original document in April and November of 2000 and in March 2001. Stream segments in the Pack River watershed for which TMDLs have been developed are identified in Table 1.

Table 1: 1998 303(d) listed Stream Segments in the Pack River watershed with approved TMDLs (Steed 2007).

Stream	Description	POLLUTANT(S)
Caribou Creek	Tributary to Pack River	Sediment
Colburn Creek*	Tributary to Pack River	Sediment
Grouse Creek	Tributary to Pack River	Sediment
Jeru Creek*	Tributary to Pack River	
Lower Pack River	Sand Creek to Lake Pend Oreille	Sediment
North Fork Grouse Creek	Tributary to Grouse Creek	Sediment
Pack River*	Hellroaring Creek to Sand Creek	Sediment
Rapid Lightning Creek*	Tributary to Pack River	Sediment
Trout Creek*	Tributary to Pack River	Sediment

*These streams were included in the Lower Pack River TMDL.

This implementation plan will provide guidance to the Bonner Soil and Water Conservation District and agricultural producers in the Pack River watershed to identify BMPs necessary to meet the requirements of completed TMDLs on 303(d) listed streams for agricultural lands. The objectives of this plan include reducing the amount of sediment and associated nutrients entering the watershed from agricultural sources and increase riparian shading where feasible.

Agricultural pollutant reductions will be achieved by on-farm conservation planning with individual operators and application of Best Management Practices (BMPs) in agricultural critical areas. This plan recommends BMPs needed to meet TMDL targets and suggests alternatives for reducing surface and groundwater quality problems from agricultural related activities. Site specific BMPs will be developed and implemented onsite with individual landowners on a voluntary basis.

Although the existing TMDLs address sediment only, nutrients and temperature have been identified by IDEQ as contributing to water quality impairment, and TMDLs for these pollutants are under development. Table 2 below lists those segments within the Pack River drainage for which TMDLs are currently being developed.

Table 2: 2002 303(d) listed Stream Segments in the Pack River watershed with TMDLs under development (Steed 2007).

Stream	Description	POLLUTANT(S)
Colburn Creek	Tributary to Pack River	Phosphorus
Gold Creek	Tributary to Pack River	Temperature, Sediment
Grouse Creek	Tributary to Pack River	Temperature
Hellroaring Creek	Tributary to Upper Pack River	Temperature, Sediment
Jeru Creek	Tributary to Pack River	Temperature
N. Fork Grouse Creek	Tributary to Grouse Creek	Temperature
McCormick Creek	Tributary to Upper Pack River	Temperature
Rapid Lightning Creek	Tributary to Pack River	Temperature
Sand Creek	Tributary to Pack River	Phosphorus
Trout Creek	Tributary to Pack River	Phosphorus, Temperature
Lower Pack River	Sand Creek to Lake Pend Oreille	Phosphorus, Temperature
Pack River	Hellroaring Creek to Sand Creek	Phosphorus, Temperature
Upper Pack River	Headwaters to confluence with Hellroaring Creek	Phosphorus, Temperature, Sediment

This plan is intended to complement to the PRWC Pack River Watershed Management Plan (Management Plan) as well. The Management Plan incorporates all land uses as well as riparian- and habitat-specific concerns and provides strategies for education, on the ground improvements, program coordination, and monitoring for protection of natural resources in the Pack River watershed. Therefore, this plan integrates the above listed pollutants as well as habitat considerations into development of treatment priorities. Agricultural pollutant reductions will be achieved through the application of RMS and BMPs.

Efforts will be made to educate land users in the watershed on the effects of land use on water quality. This will encourage participation in implementation efforts, ensure long-term maintenance of BMPs, and increase awareness of water quality issues. Installed BMPs will be monitored for effectiveness and evaluated in terms of reducing pollutant loading and impacts on designated beneficial uses of the watershed.

Background

PROJECT SETTING

The Pack River watershed is located in Bonner and Boundary Counties in northern Idaho and is the second largest tributary to Lake Pend Oreille, encompassing approximately 185,433 acres (Figure 1). The Pack River originates from the Selkirk Mountains in Boundary County and flows south-southeast to Lake Pend Oreille in Bonner County, receiving significant flow from tributaries that flow southwest from the Cabinet mountains. See Figure 2 for the geology of the watershed. The elevation ranges from 7,550 in the Selkirk Mountains to 2,050 at the mouth of the Pack River, where it empties into Lake Pend Oreille. Coniferous forest dominates the watershed, with many wetland and meadow areas in the valleys.

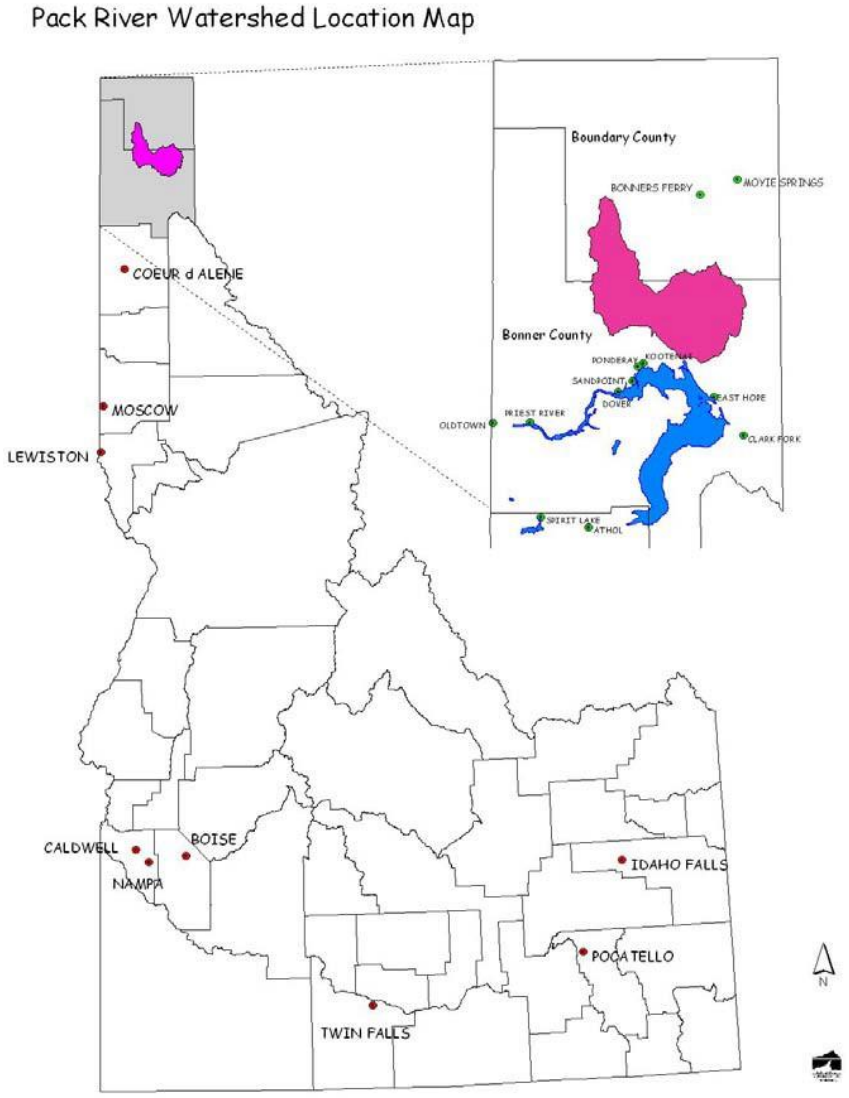

Figure 1. Pack River Watershed

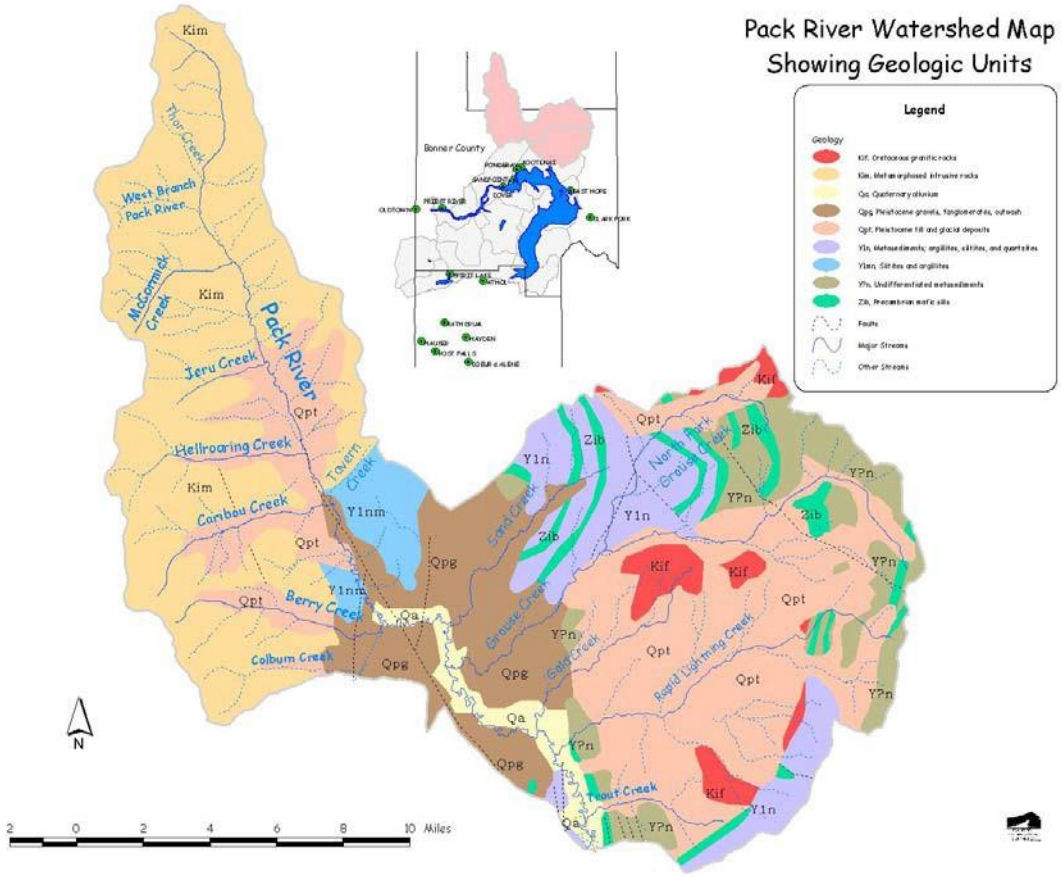

Figure 2. Geology of the Pack River Watershed

The higher gradient of the Upper Pack River (upstream from Colburn Creek) transports sand, silt, and other sediment from the Selkirks to the Lower Pack River.
The gradient of the river decreases in the lower portion, depositing sediment throughout this section of the watershed. As a result, this lower portion has high sinuosity (Golder 2003). The associated soils (Figure 3) in the watershed result in highly erodible banks in much of the drainage.

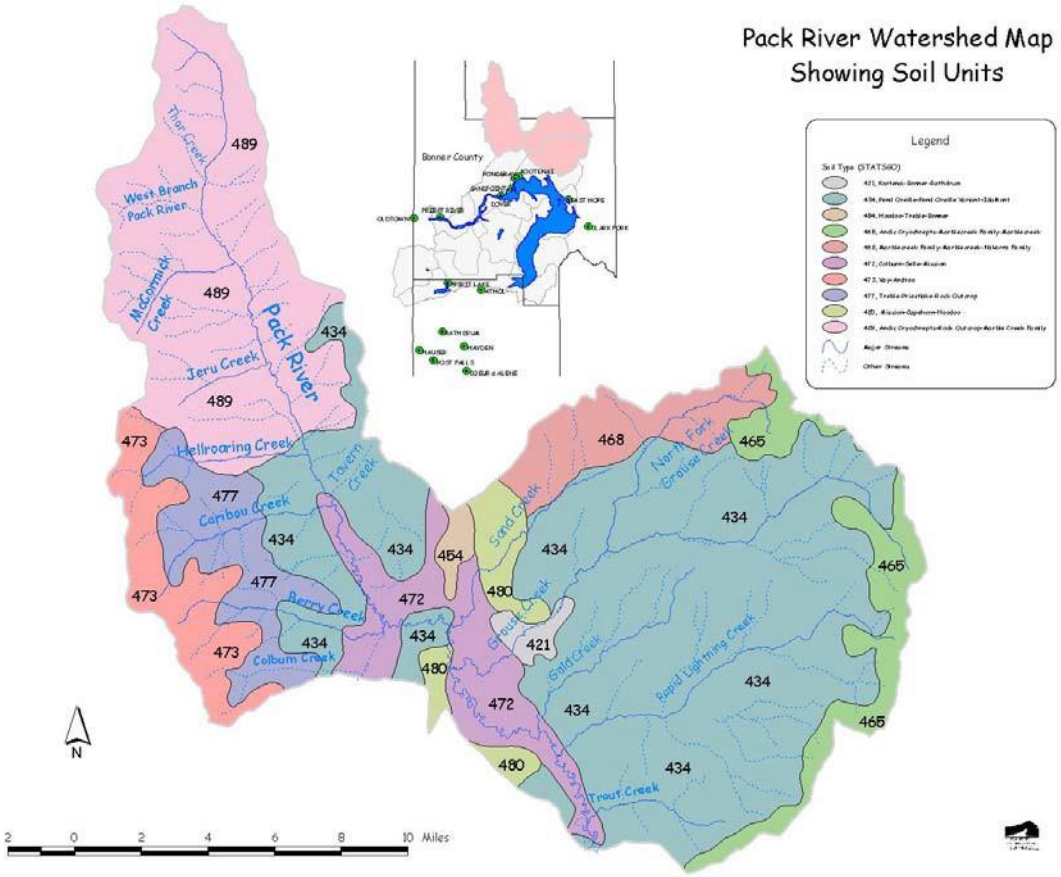

Figure 3. Soil Units in the Pack River Watershed

SUBWATERSHEDS

Subwatersheds in the Lower Pack River include Sand Creek, Grouse Creek, Gold Creek, Rapid Lightning Creek, and Trout Creek. The river valley is wide and flat in this lower portion, making it more suitable for agricultural uses. Sand, Grouse, and Gold Creeks, which flow southwest from the Cabinet Mountains, as well as the mainstem of the Lower Pack River, are higher priorities for this plan. These areas were identified as those with significant amounts of agricultural land use and inventory performed in these areas were used to formulate the recommendations for this plan.

LAND USE

Land use in the Pack River watershed includes forestland, hay and pastureland, livestock feeding areas, wildlife habitat, residential development, and recreation.
The watershed is primarily forested in the upland areas. This area is used for recreation, timber harvest, wildlife habitat, and residential development. The forested areas give way to valleys in the lower subwatersheds and the mainstem of the river itself. These valleys are utilized for hay production, livestock grazing, residential development, wildlife habitat, and recreation. The Lower Pack River mainstem channel meanders significantly, with several oxbow areas and other wetland habitat present.

LAND OWNERSHIP

Land ownership in the Pack River watershed includes federal, state, and private entities. Figure 4 below depicts land use and management in the Pack River watershed. Table 3 accompanies this figure, showing land management and associated acreage for the Pack River watershed.

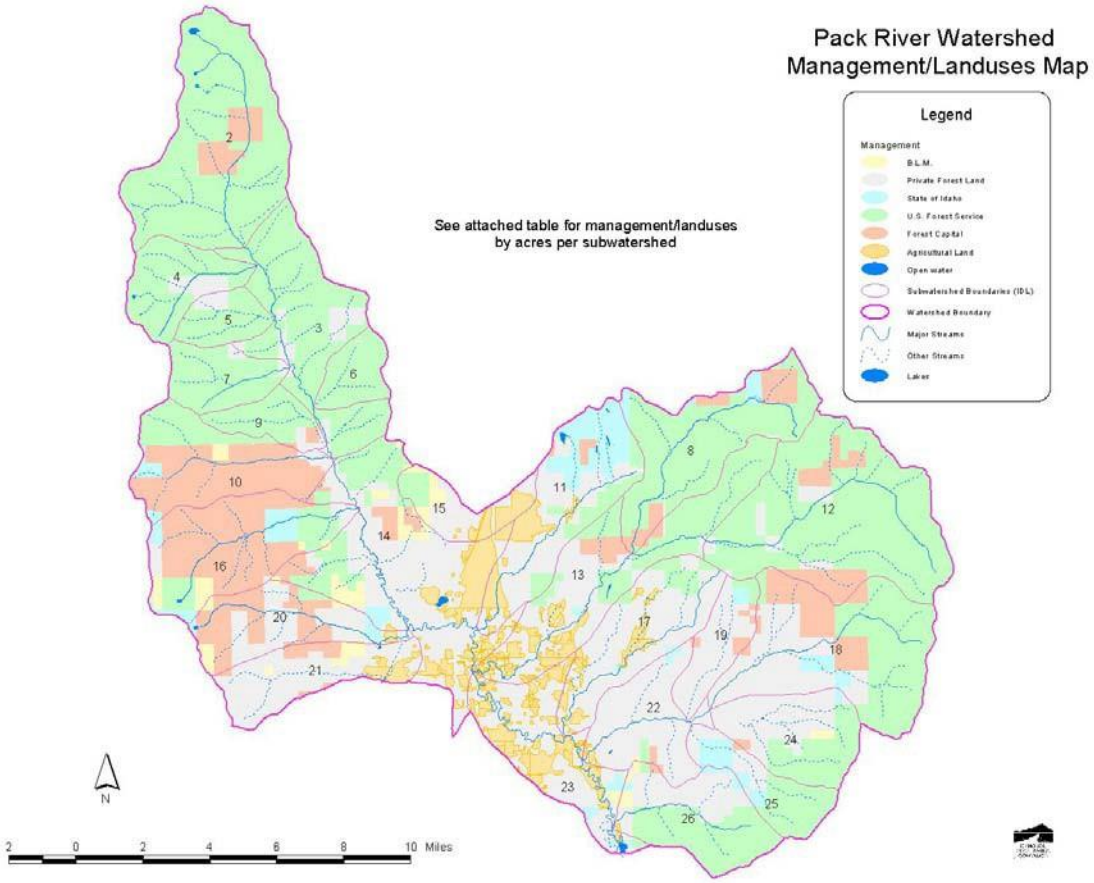

Figure 4. Pack River Watershed Land Use and Management by Subwatershed

Grazed forests are not delineated in this plan due to difficulty in assessing this land use. The United States Forest Service (USFS) and the Idaho Department of Lands (IDL) develop management plans for forested lands in their jurisdiction. IDL is the designated management agency for private forestland in Idaho. The conservation partnership is available to provide assistance to these agencies or private landowners in developing grazing plans in grazed forest areas upon request. Grazing in privately-owned forested areas where jurisdiction is unclear or overlapping will be addressed cooperatively between the conservation partnership and IDL.

Table 3. Land ownership in the Pack River watershed.

Pack River Land Uses by IDL Subwatershed									
			Forest						
#	Name	Total Acres	US Forest Service	Private Forest	Forest Capital	State of Idaho	BLM	Agriculture	Open Water
2	Pack River	14724	14724	0	0	0	0	0	46
3	Upper Pack River Sidewall	9690	8644	1046	0	0	0	0	0
4	McCormick Creek	4355	3735	571	0	18	0	0	8
5	Homestead Creek	2335	2026	307	0	0	0	0	0
6	Martin Creek	2314	2314	0	0	0	0	0	0
7	Jeru Creek	3556	3364	186	0	0	0	0	0
8	North Fork Grouse Creek	9582	7799	1010	258	496	0	0	0
9	Lindsey Creek	2404	2025	355	23	0	0	0	0
10	Hellroaring Creek	7762	1837	250	5130	359	154	0	0
11	Sand Creek	8882	1259	3950	184	2432	0	1035	17
12	Grouse Creek	16683	14526	521	1636	0	0	0	0
13	Lower Grouse Creek	10624	4920	3886	612	45	0	1198	0
14	Pack River	15670	2754	8567	894	239	945	2218	38
15	Unnamed	3044	524	1402	0	0	425	693	0
16	Caribou Creek	9168	1467	6078	0	1001	534	0	6
17	Gold Creek	7471	796	5859	0	67	0	749	0
18	Upper Rapid Lightning Creek	13006	5768	6766	0	473	0	0	0
19	Johnson Creek	3265	221	2889	0	156	0	0	0
20	Berry Creek	6089	168	5235	0	225	381	74	6
21	Colburn Creek	5520	0	4717	0	11	337	457	0
22	Lower Rapid Lightning Creek	5628	115	5327	0	100	23	63	0
23	Pack River	7384	66	4695	0	360	99	2164	0
24	Flume Creek	5946	2449	3305	0	66	126	0	0
25	Spring Creek	3687	1935	953	0	800	0	0	0
26	Trout Creek	6644	3737	2483	0	208	198	17	0
	Total for Watershed	185433	87173	70358	8737	7056	3222	8668	121
	Total for Lower Pack*	98802	41740	43064	3584	4420	1265	7444	55

*Highlighted subwatersheds included in Lower Pack River Totals.

ACCOMPLISHMENTS

The conservation partnership has been active in soil and water conservation and water quality issues since 1946. The partnership has developed individual conservation plans for local agricultural producers and has pursued funding sources to assist in implementing BMPs. The partnership has restored riparian areas, stabilized streambanks, coordinated with other agencies and individuals in educational activities, and made educational materials available to the public.

Funding sources utilized by the conservation partnership in the Pack River watershed have included NRCS's Environmental Quality Incentives Program (EQIP), the ISCC's Water Quality Program for Agriculture (WQPA), US Fish and Wildlife Service Partners Program, Avista Foundation, and Idaho's Clean Water Act Section 319 Nonpoint Source Grant Program.

From 1998 to 2007, conservation plans were developed for 989 acres in the Lower Pack River watershed. Of these, 584 acres are located within the Lower Pack River mainstem watershed, 290 lie within the Rapid Lightning Creek drainage, 84 in the Grouse Creek drainage, and 31 acres in the Sand Creek watershed. Specific BMPs from these plans, as well as other BMPs initiated through the conservation partnership, that have been completed to date are shown in Table 4 below.

Table 4. Completed agricultural BMPs in the Lower Pack River drainage by subwatershed.

Subwatershed	BMP	Amount	Units	Cost	Project/Program
Pack River Mainstem	Streambank/Channel Stabilization	3,915	Feet	[redacted]	[redacted]
Grouse Creek	Pasture & Hayland Planting	28.6	Acres	[redacted]	[redacted]
	Pasture & Hayland Planting	2.5	Acres	[redacted]	[redacted]
	Conservation Cover	6.9	Acres	[redacted]	[redacted]
TOTAL:				[redacted]	

The stabilized channel and bank was accomplished using a combination of bioengineering, such as tree revetments, root wads, and vegetation, as well as rock barbs and armoring. In addition, one problematic road culvert was replaced using an arch and a series of weirs to enhance fish habitat and migration. The result is a reduction in sediment and associated nutrient delivery as well as increased fish and invertebrate habitat. The pasture and hay planting and conservation cover (perennial vegetative cover) enhance soil infiltration, help keep noxious weeds species under control, and reduce sheet and rill erosion.

Other BMPs not yet installed but included in existing conservation plans are listed in Table 8 under Recommended BMPs and Estimated Costs.

Water Quality Problems

BENEFICIAL USE STATUS

Idaho water quality standards require that beneficial uses of all water bodies be protected. Beneficial uses can include existing uses, designated uses, and presumed existing uses. Designated uses are uses officially recognized by the state. In cases where designated uses have not been established by the state for a given water body, DEQ has established the presumed existing uses of supporting cold water aquatic life and either primary or

secondary contact recreation. Beneficial uses for water bodies on the 1998 303(d) list in the Pack River watershed are listed below in Table 5.

Table 5. Beneficial uses for 1998 303(d) listed stream segments in the Lower Pack River watershed (IDEQ 2001).

Water Body	Boundaries	Beneficial Uses	Support Status
Caribou Creek	Tributary to Upper Pack	CWAL, SS	Not Full Support
Grouse Creek	Tributary to Middle Pack River	CWAL, SS	Not Full Support
North Fork Grouse Creek	Tributary to Grouse Creek	Existing-AWS, DWS, CWAL, SS PCR, SCR	Not Full Support
Pack River	From Highway 95 to mouth	Designated—DWS, AWS, CWAL, SS, PCR, SCR	Not Full Support

Beneficial Uses Key: DWS = Domestic Water Supply; AWS = Agricultural Water Supply; IWS = Industral Water Supply; CWAL = cold water aquatic life; SS = salmonid spawning; PCR = primary contact recreation; SCR = secondary contact recreation; SRW = special resource water.

POLLUTANTS

Past land use in the Pack River has removed much of the roughness from the upper portions of the watershed, increasing the erosive forces of the river in the lower portion of the watershed. Large woody debris and other obstacles were historically removed from the channel to facilitate log transport. In addition, vegetative removal has further increased bank erosion throughout much of the drainage (Golder 2003).

Current and historic land use in the Pack River watershed has increased sediment input to the system and decreased riparian shading. Agricultural activities contribute sediment to waterbodies through runoff and erosion. Sheet and rill erosion from pasture and hayland contribute to the sediment load in waterbodies. Agricultural activities that encroach upon the riparian zone and direct livestock impact to streambanks and riparian vegetation additionally reduce the filtering and shading capacity of the riparian zone and increase streambank erosion.

The *Clark Fork/Pend Oreille Sub-basin assessment and Total Maximum Daily Loads* analysis concluded that Caribou Creek, Grouse Creek, North Fork Grouse Creek, and the Pack River are impaired due to excess sediment. No agricultural land use was identified in the TMDL document within the Caribou Creek or North Fork Grouse Creek watersheds (IDEQ 2001). Table 6 below summarizes load reductions calculated for agricultural lands from existing TMDLs for the Pack River watershed.

Grouse Creek

Sediment transport in Grouse Creek is estimated to exceed natural background levels by 2 ½ times. Historic logging in the watershed altered the sediment transport and flow

patterns of the channel, increasing the movement of the channel back and forth across the valley bottom and accelerating streambank erosion. The approved TMDL for Grouse Creek calls for a sediment load reduction of 1555.9 tons per year (IDEQ 2001).

Based upon on-the-ground land use inventory and related ArcView GIS coverage developed by the ISCC in conjunction with IDL and USFS in 2003 and 2004 (see Figure 4), there are 1,198 acres of hay and pasture land in Lower Grouse Creek and none in either Grouse Creek or North Fork Grouse Greek (see Table 3 above). Given the estimated watershed area of 23,926 acres used to develop the Grouse Creek mainstem TMDL (including both Grouse and Lower Grouse Creeks), agricultural lands make up 5% of the Grouse Creek watershed. Thus, the reduction target for agricultural lands in the Grouse Creek watershed is 5% of 1,555.9 tons, or 77.8 tons per year. The total acreage from the TMDL – as opposed to the total acreage from the GIS coverage - is used here to calculate the percentage agricultural land load reduction. This approach results in a more conservative estimate of 5% versus 4% of the total load reduction. This compensates for the fact that private roads, which may or may not be associated with hay and pasture lands, are not broken out separately in the TMDL.

Pack River

The Pack River was determined to be impaired by sediment and nutrients. TMDLs were completed in 2001, but the nutrient TMDL was not approved by the United States Environmental Protection Agency (PRTAC 2006). The existing TMDL addresses sediment in the Lower Pack River. Phosphorus and temperature TMDLs are in progress for the Pack River watershed, and a sediment TMDL is under development for portions of the upper watershed.

The approved TMDL for the Lower Pack River calls for a sediment load reduction of 45,465.6 tons per year (IDEQ 2001). The load calculations included loading estimates from the entire watershed, including tributaries. Based on an estimated acreage of agricultural lands of 8,668 acres in the watershed from Table 4 above, agricultural land use makes up approximately 5% of the Pack River watershed. Therefore, 5% of the load reduction called for in the TMDL, or 2,273.3 tons per year, is the target load reduction for agricultural lands. This includes the 77.8 tons/year reduction target for Grouse Creek.

Table 6. 1998 303(d) listed stream segments: identified pollutants and required reductions.

Water Body	303(d) Listed Pollutants	Load Reduction Target for Ag Lands	Agricultural Concerns
Caribou Creek	Sediment	0	No Agricultural Activity
Grouse Creek	Sediment	77.8 tons/year	Pasture Condition, Encroachment on Riparian Zone
North Fork Grouse Creek	Sediment	0	No Agricultural Activity
Lower Pack River Mainstem	Sediment, Nutrients	2,273.3 tons/year	Pasture Condition, Encroachment on Riparian Zone

A nutrient TMDL as well as a TMDL implementation plan has been developed for Lake Pend Oreille. Given that the Pack River is the second largest inflow to the lake, this implementation plan is expected to complement water quality improvement efforts in the Lake Pend Oreille watershed.

WATER QUALITY MONITORING

The PRWC performed volunteer water quality monitoring in the mainstem of the Pack River from 1999 to 2005 through IDEQ's Citizen Monitoring Program. Monitoring has included dissolved oxygen, coliform, pH, temperature, phosphorus, nitrates, turbidity, and total solids. A spreadsheet of the data collected by the PRWC is included as Appendix A.

The IDEQ performed monitoring in the Pack River watershed in 2006, including nutrients, shade and temperature, and, in the lower delta portion, dissolved oxygen. This information has been compiled and additional TMDLs for the waters within the Pack River watershed are currently under development for sediment, phosphorus, and temperature.

AGRICULTURAL WATER QUALITY INVENTORY AND EVALUATION

Agricultural activities in the Lower Pack River watershed consist of seasonal livestock operations – primarily cow-calf operations - hay production, pasture land, and some animal feeding operations. Field inventories conducted in 2006 and 2007 on private agricultural lands included stream channel/riparian assessments and pasture condition evaluations.

In order to identify critical areas for treatment, stream assessments were performed along agricultural areas in the Sand, Gold, and Grouse Creek drainages as well as the mainstem of the Lower Pack River. Streams and riparian zones were assessed using the NRCS's Stream Visual Assessment Protocol. Pasture conditions were assessed using the NRCS Guide to Pasture Condition Scoring.

Riparian

Stream Visual Assessment Protocol (SVAP), an NRCS protocol for assessing the condition of a stream segment, was performed on private agricultural lands along stream segments of Sand Creek, Gold Creek, Grouse Creek, and the Lower Pack River mainstem in July 2006 (NRCS 1998). The stream reaches assessed are shown in Figure 5. The assessment areas were selected based on TMDL loading calculations, land ownership, and access permission. Assessments were completed by interdisciplinary teams consisting of representatives from ISCC, IASCD, and IDEQ.

Assessments included observations of channel conditions, hydrologic alterations, riparian zones/canopy cover, streambank stability, water clarity, nutrient enrichment, barriers to fish movement, instream fish and invertebrate habitat, pools, and manure presence. Overall stream condition ratings were obtained by combining scores from these categories. Stream segments were assigned a rating of excellent, good, fair, or poor, based on the overall score. Channel measurements, photo points, eroding banks, and riparian species were also recorded. During assessments, the teams noted any observed problems and developed general recommendations to address these, where feasible.

These recommendations for agricultural reaches from these assessments were utilized to develop this plan.

A total of 11 reaches were assessed, totaling approximately nine miles of stream length. Ratings for all reaches are summarized in Table 7. The Stream Visual Assessment Protocol and field form can be viewed online at http://www.nrcs.usda.gov/technical/ECS/aquatic/svapfnl.pdf.

Table 7. 2005 Stream Assessment Summary.

Rating	Length of Stream in Feet
Excellent	1,898
Good	11,100
Fair	13,305
Poor	21,123

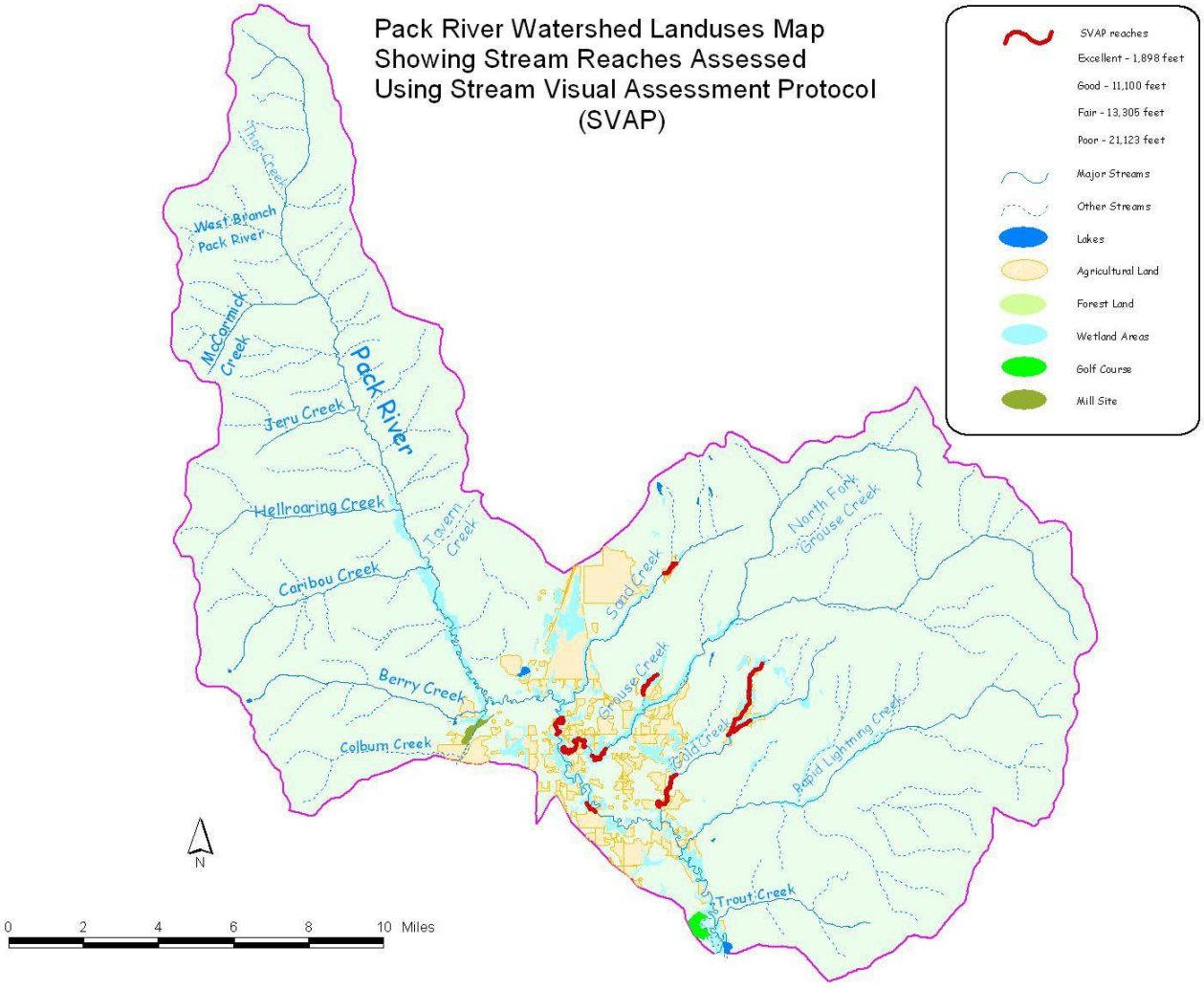

Figure 5. Stream Reaches Assessed in the Pack River Watershed, July 2006.

Unstable, eroding streambanks as well as poor riparian zone conditions were commonly observed in inventoried areas. Many observed problems were associated with disturbance or removal of riparian vegetation, insufficient riparian buffer width, and lack of woody vegetation in the riparian area. Unrestricted livestock access to the riparian area and other direct vegetative removal was commonly observed during stream assessments. Many of the degraded riparian areas were infested with invasive plants such as tansy and spotted knapweed. Summaries of the agricultural reaches will be delivered to land managers by the Bonner conservation partnership and recommendations discussed. Individual conservation plans will be developed based on these recommendations, where the land managers have an interest.

Pasture

All pastures in the watershed that could be viewed from public roads were visually inventoried for condition. In addition, these visual inventories were supplemented with completion of on-the-ground Pasture Condition Scoresheets, following NRCS guidelines for scoring (NRCS 2001). The pasture condition inventory was completed in late summer and early fall 2007, at the end of the grazing season. Only pastures that are not used for hay production were assessed. It was assumed that areas cut for hay are generally productive.

Pastures were assigned a score ranging from 1-5, with 1 being the worst condition (major effort required to rehabilitate) and 5 the best (no changes needed). All areas that received a score of 1 or 2 are considered critical areas for treatment. Indicators scored include *percent desirable plants, percent plant cover, plant diversity, plant residue, plant vigor, percent legumes, uniformity of grazing use, livestock concentration areas, soil compaction,* and *erosion.* The Pasture Condition Scoresheet can be viewed at ftp://ftp-fc.sc.egov.usda.gov/GLTI/technical/publications/pasture-score-sheet.pdf.

THREATENED AND ENDANGERED SPECIES

Section 7 of the Endangered Species Act of 1973 (ESA) requires federal agencies to determine how to use their authorities to further the purpose of the ESA to aid in recovering listed species and address existing and potential conservation issues. Section 7 (a)(2) further states that agencies shall consult with the U.S. Fish and Wildlife Service or NOAA Fisheries to ensure that any action they authorize, fund, or carry out "is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of (designated critical habitat)." As a federal agency, the NRCS is required to follow this mandate for all projects implemented with federal funding. NRCS policy, as outlined in their General Manual, also includes provisions to consider State species of concern in their conservation activities (190-GM, Amend. 8, December 2003).

Impacts to T&E species and species of concern in the Pack River watershed will be taken into account in TMDL project implementation. If a proposed action is determined to be within close proximity to habitat used by a Threatened or Endangered (T&E) species or the known location of a T&E species, consultation will be initiated with the appropriate agency. Consultation involves describing the proposed project, assessing potential impacts, describing mitigation efforts for the project, and determining the effect of the

project on the species of concern. The consultation process results in development of reasonable alternatives, and helps to minimize impacts of conservation practices to critical habitat.

The Idaho Department of Fish and Game Conservation Data Center, 2002 Threatened and Endangered Species GIS database is available as a tool in conservation planning. The database contains documented locations for terrestrial species. This can help identify known locations of T&E species and identify critical habitat types that may harbor T&E species. Conservation planners can reference habitat requirements to help landusers determine the potential benefits and impacts of their project implementation. These discussions remain confidential between the landuser and planners.

Bull trout, listed as threatened under the Federal Endangered Species Act, utilize the Grouse Creek drainage for spawning and rearing (IDEQ 2001). The Pack River mainstem serves as a migratory corridor for bull trout to move between Lake Pend Oreille and spawning areas in the Upper Pack River watershed and tributaries. The Bull Trout Problem Assessment identifies the Pack River mainstem as spawning and rearing habitat as well as a migratory corridor. The Problem Assessment also identifies lower Grouse Creek as a migratory corridor and the upper Grouse Creek watershed as spawning and rearing habitat (PBTAT 1998).

Agricultural conservation planning will be coordinated with other species recovery and protection efforts in the watershed to improve bull trout habitat and address any potential impacts from BMP implementation. Improvements in water quality, achieved from BMPs installed on agricultural lands, are not expected to adversely affect these listed species and should improve or enhance their habitat. Any BMP implementation that will affect T&E species or habitat will follow Endangered Species Act (ESA) consultation requirements.

ANIMAL FEEDING OPERATIONS AND DAIRIES

There are no dairies in the Pack River watershed, and 7 known commercial livestock operations in the Lower Pack River watershed. No confined areas were observed with direct runoff to surface water. Concerns associated with these operations are related to pastures and degraded riparian zones. These concerns will be addressed through improvements made in these two treatment units.

Implementation Priority

Data from inventory and evaluations, as well as identified bull trout habitat areas, were used to identify critical agricultural areas affecting water quality and set priorities for treatment.

CRITICAL AREAS

Agricultural areas that have the potential to contribute excess pollutants to waterways are defined as critical areas for BMP implementation. Critical areas prioritized for this plan were identified during field observations in 2006 and 2007. Critical areas were identified based on proximity to surface water, pasture condition scores, and SVAP scores. These areas are shown below in Figure 6.

Lower Portion of Pack River Watershed, East of Highway 95
Bonner and Boundary Counties, Idaho
Map Showing Critical Treatment Areas

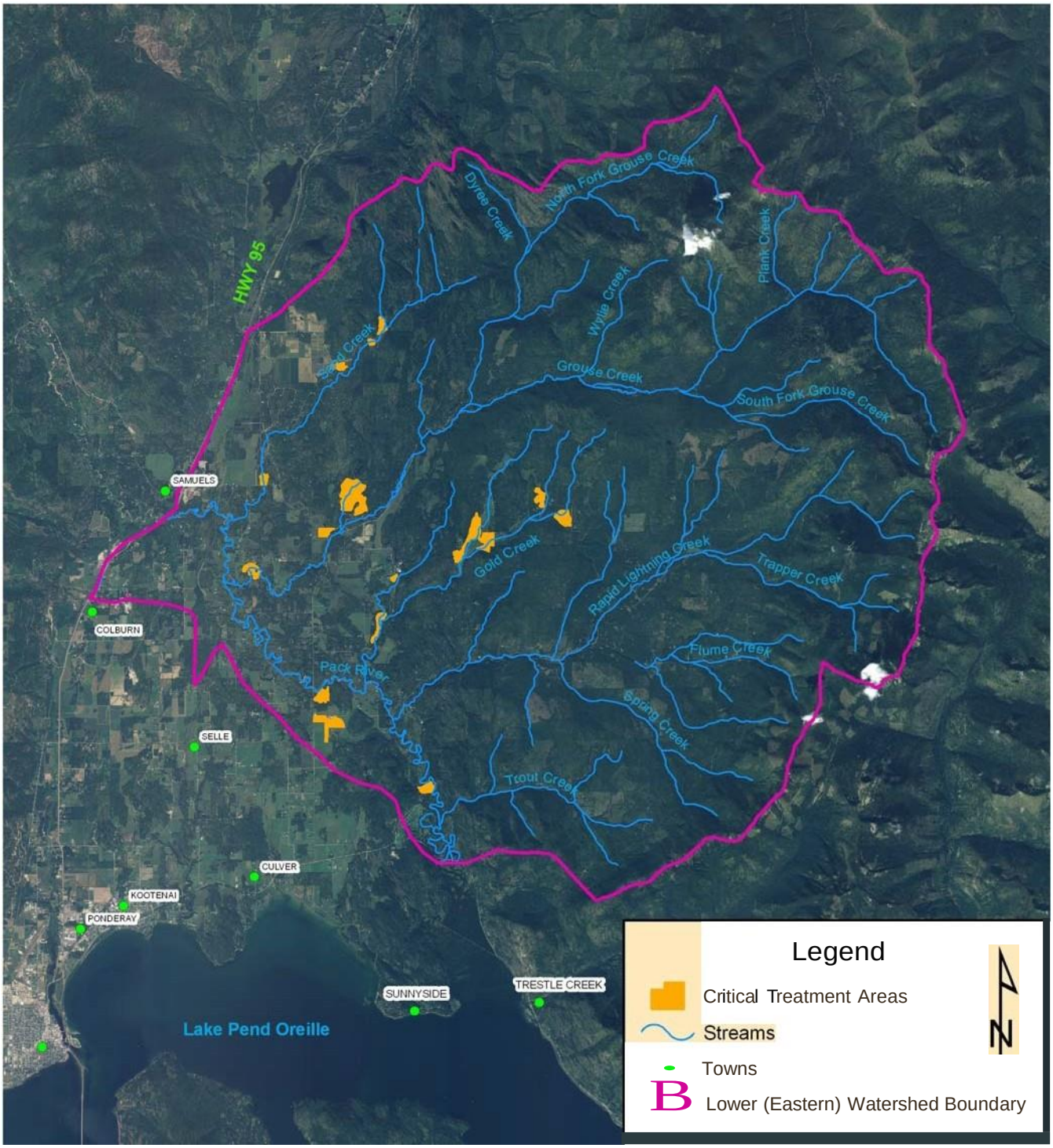

Figure 6. Agriculture Critical Areas in the Lower Pack River Watershed.

Agricultural critical areas are prioritized for treatment based on their location relative to the Pack River and its tributaries and the potential for pollutant transport and delivery to its water. Primary areas of concern are degraded riparian areas and excessively eroding streambanks, overgrazed pastures, and agricultural areas that encroach upon riparian areas. Approximately 34,428 linear feet of streambank/riparian areas and 596 acres of pasture/hayland have been identified as critical areas for treatment in the Pack River watershed.

RECOMMENDED PRIORITIES FOR BMP IMPLEMENTATION

Practices already included in individual conservation plans (mentioned previously under Accomplishments) are top priority for implementation. These are listed below in Table 8. These are the BMPs that are currently scheduled for installation between 2007 and 2010. The cost estimates are based on the approved cost list for the associated program from the year each plan was developed.

The Bonner SWCD's 5 year plan identifies water quality as one of the top priorities for Bonner County. Based on the existing TMDLs for 303(d) listed segments, the presence of agricultural lands, and identified bull trout habitat, Grouse Creek and the Lower Pack River mainstem are next in priority for TMDL implementation (see Threatened and Endangered Species section above). Sand Creek and Gold Creek are included in this area due to their proximity in the watershed. These two tributaries have inventoried agricultural lands and drain directly to the Lower Pack River mainstem.

Table 8. Planned Agricultural BMPs in the Lower Pack River Drainage by subwatershed.

Subwatershed	BMP	Amount Planned	Units	Cost	Project/Program
	Streambank Stabilization	1,300	Feet	[redacted]	[redacted]
	Grade Stabilization Structure	1	Number	[redacted]	[redacted]
	Pasture & Hayland Planting	40.9	Acres	[redacted]	[redacted]
	Tree & Shrub Establishment	6.4	Acres	[redacted]	[redacted]
	Fence	10,150	Feet	[redacted]	[redacted]
	Prescribed Grazing*	405	Acres	[redacted]	[redacted]
	Forest Stand Improvement	22.5	Acres	[redacted]	[redacted]
	Noxious Weed Management (non-cropland)	11	Acres	[redacted]	[redacted]
Rapid Lightning Creek	Stream Crossing	1	Number	[redacted]	[redacted]
	Pasture & Hayland Planting	20.3	Acres	[redacted]	[redacted]
	Tree & Shrub Establishment	41	Acres	[redacted]	[redacted]
	Critical Area Planting	1	Acre	[redacted]	[redacted]
	Forest Stand Improvement	31	Acres	[redacted]	[redacted]
	Forest Slash Treatment	9	Acres	[redacted]	[redacted]
	Noxious Weed Management (non-cropland)	20.3	Acres	[redacted]	[redacted]
Grouse Creek	Streambank Stabilization	550	Feet	[redacted]	[redacted]
	Pasture & Hayland Planting	5.9	Acres	[redacted]	[redacted]
	Fence	750	Feet	[redacted]	[redacted]
	Prescribed Grazing*	80.6	Acres	[redacted]	[redacted]
	Noxious Weed Management (non-cropland)	16	Acres	[redacted]	[redacted]
Sand Creek	Fence	3,600	Feet	[redacted]	[redacted]
TOTAL:				[redacted]	

*Cost associated with prescribed grazing is only assigned to acres that are pure pasture, without hay or timber production. Therefore, implementation cost only reflects prescribed grazing on pastures while total acreage reflects prescribed grazing planned for pastures, hay aftermath, and grazed forests.

Treatment

TREATMENT UNITS (TU)

The following Treatment Units (TUs) describe critical areas in the Pack River watershed with similar land uses, soils, productivity, resource concerns, and treatment needs. These TUs not only provide a method for delineating and describing land use, but are also used to evaluate land use impacts to water quality and in the formulation of alternatives for solving water quality problems. BMPs to improve water quality are suggested for each treatment unit.

Treatment Units for the Pack River watershed include Riparian Areas and Pasture/Hayland. These TUs are described below. Seven livestock feeding operations (operations that involve providing livestock with supplemental feed in addition to grazed vegetation) were identified during stream assessment activities. Recommended BMPs included in Treatment Units 1 and 2 apply to concerns in these areas.

Agricultural BMPs are voluntary in nature and, therefore, rely on operator participation. The BMPs proposed in this plan to address the resource concerns are based on inventory. Since inventory was not performed on every acre of private agricultural land, actual implementation may vary as site-specific plans are developed with agricultural operators. Implementation in the form of education, outreach, inventory, planning, and BMP installation is ongoing. Resources will continue to be directed at the Pack River watershed with added emphasis.

Treatment Unit #1 - Riparian Areas
The riparian resources of the Pack River watershed vary from pasture and hayland vegetation to mixed woody and herbaceous riparian zones extending down from adjacent agricultural, residential, and forested areas. There are approximately 60 acres within this treatment unit, which consists of riparian zones impacted by agricultural areas. The acreage was calculated using the total length of Fair or Poor inventoried reaches (34,428 feet) and a 75-foot wide buffer. The buffer width was calculated based on twice the weighted averages of bankful channel widths of Fair and Poor SVAP reaches (1 bankful channel width on each side of inventoried reaches with a rating of Fair or Poor).

Riparian areas in the Pack River watershed are unstable from lack of woody vegetation and perennial grasses. Riparian area degradation has occurred as a result of livestock overgrazing, direct vegetative removal for facilitation of farming and ranching operations, and, in some cases, issues associated with upstream activities. Bare, exposed soil and unstable banks resulting from the lack of vegetation can contribute sediment to waterways through erosion and sediment delivery to water. Lack of vegetation also inhibits a stream's ability to filter excess pollutants flowing into the water body from surface runoff and reduces effective shade on the stream. Poorly functioning riparian zones can contribute to degraded habitat and increased water temperatures.

Varying levels of treatment are recommended for riparian areas, based on the level of impact observed during stream assessments. Combinations of riparian exclusion fence; riparian vegetation; livestock water gaps, hardened crossings, or offsite watering facilities

will help restore the functioning condition of riparian areas. In locations where more severe riparian degradation and streambank erosion is occurring, streambank shaping, stabilization, and bioengineering can be applied to restore the condition of the streambanks and riparian vegetation.

Treatment Unit #2 – Pasture/Hayland
There are approximately 596 acres of pasture and hayland in this treatment unit. The majority of the hay and pasture soils in this treatment unit are silt loam and somewhat poorly to poorly drained. Soils in the valleys generally present wetness limitations for cutting and grazing seasons. Areas on terraces are generally better drained, but use is restricted by depth and risk of compaction (SCS 1982).

In cases where overgrazing occurs, soil compaction can increase surface runoff versus infiltration. In addition, overgrazing can leave inadequate vegetative cover on the land surface, reducing the ability of the land to hold soil in place. Surface runoff not only has the potential to carry sediment into stream channels, but increased runoff, as opposed to infiltration, can also increase peak flows and associated stream channel erosion. These issues are especially significant where pastures are adjacent to riparian areas and are exacerbated by noxious weed infestations.

BMPs recommended for Pastures are intended to aid in maintaining pasture productivity by minimizing weed infestation and localized pressure from livestock. Riparian area treatment was summarized in Treatment Unit #1 above. The BMPs for Treatment Unit # 2 are in addition to riparian treatment where pastures are adjacent to surface water.

RECOMMENDED BMPS AND ESTIMATED COSTS

The BMPs recommended for this implementation plan, in addition to those already scheduled, are broken down by treatment unit. Table 9 below shows these BMPs and associated costs by treatment unit. Costs are based on the NRCS 2008 Environmental Quality Incentive Program approved cost list.

Table 9. Recommended BMPs and estimated costs by treatment unit.

Treatment Unit 1 – Riparian Areas		
Recommended BMPs	Amount	Estimated Costs
Fence	28,374 feet	$49,087
Riparian Forest Buffer	35 acres	$39,375
Riparian Herbaceous Cover	7 acres	$1,575
Livestock Watering Facility (Trough/Tank)	14 each	$15,750
Pipeline (for livestock water)	5,600 feet	$11,760
Streambank Stabilization	1,670 feet	$14,200
Pest Management	7 acres	$105
	subtotal	$131,852
Treatment Unit 2 – Pasture and Hayland		
Recommended BMPs	Amount	Estimated Costs
Prescribed Grazing	596 acres	$2,980
Pasture and Hayland Planting	596 acres	$59,600
Fence	10,000	$17,300
Livestock Watering Facility (Trough/Tank)	10 each	$11,250
Pipeline (for livestock water)	4,000	$8,400
Pest Management	596 acres	$8,940
	subtotal	$108,470
TOTAL:	total cost	$240,322

The estimated cost for implementation, including scheduled BMPs in existing conservation plans (Table 8) as well as all recommended BMPs for critical areas (Table 9), totals $399,880.

Funding

Financial and technical assistance for installation of BMPs is needed to ensure success of this implementation plan. The Bonner Soil and Water Conservation District will actively pursue multiple potential funding sources to implement water quality improvements on private agricultural and grazing lands. Many of these programs can be used in combination with each other to implement BMPs.
These sources include (but are not limited to):

Avista Utilities – Local natural resource improvement project funding is available through the Clark Fork Settlement Agreement. This was part of the Clark Fork River Project relicensing, and is intended to mitigate for impacts of continued operation of Noxon Rapids and Cabinet Gorge Dams in the watershed. Source: www.avistautilities.com/resources/hydro/clarkfork/default.asp

CWA 319 –These are Environmental Protection Agency funds allocated to the Nez Perce Tribe and the State of Idaho. The Idaho Department of Environmental Quality (DEQ) administers the Clean Water Act §319 Non-point Source Management Program for areas outside the Nez Perce Reservation. Funds focus on projects to improve water quality and are usually related to the TMDL process. The Nez Perce tribe has CWA 319 funds available for projects on Tribal lands on a competitive basis. Source: DEQ http://www.deq.idaho.gov/water/prog_issues/surface_water/nonpoint.cfm#management

Conservation Improvement Grants – These grants are administered by the ISCC. Source: ISCC http://www.scc.state.id.us/programs.htm

Conservation Reserve Program (CRP) –The CRP is a land retirement program for blocks of land or strips of land that protect the soil and water resources, such as buffers and grassed waterways. Source: NRCS http://www.nrcs.usda.gov/programs/crp/

Conservation Security Program (CSP) –CSP is a voluntary program that rewards the Nation's premier farm and ranch land conservationists who meet the highest standards of conservation environmental management. Source: NRCS http://www.nrcs.usda.gov

Conservation Technical Assistance (CTA) –The CTA provides free technical assistance to help farmers and ranchers identify and solve natural resource problems on their farms and ranches. This might come as advice and counsel, through the design and implementation of a practice or treatment, or as part of an active conservation plan. Source: local Conservation District and NRCS: http://www.nrcs.usda.gov/programs/cta/

Environmental Quality Incentives Program (EQIP): EQIP offers cost-share and incentive payments and technical help to assist eligible participants in installing or implementing structural and management practices on eligible agricultural land. Source: NRCS http://www.nrcs.usda.gov/programs/eqip/

Habitat Improvement Program (HIP) – This is an Idaho Department of Fish and Game program to provide technical and financial assistance to private landowners and public land managers who want to enhance upland game bird and waterfowl habitat. Funds are available for cost sharing on habitat projects in partnership with private landowners, non-profit organizations, and state and federal agencies. Source: IDFG http://fishandgame.idaho.gov/cms/wildlife/hip/default.cfm

Partners for Fish and Wildlife Program in Idaho – This is a U.S. Fish and Wildlife program providing funds for the restoration of degraded riparian areas along streams, and shallow wetland restoration. Source: USFWS http://www.fws.gov/partners/pdfs/ID-needs.pdf

Resource Conservation and Rangeland Development Program (RCRDP) –The RCRDP is a loan program administered by the ISCC for implementation of agricultural and rangeland best management practices or loans to purchase equipment to increase conservation. Source: ISCC http://www.scc.state.id.us/programs.htm

State Revolving Loan Funds (**SRF) –**These funds are administered through the ISCC. Source: ISCC http://www.scc.state.id.us/programs.htm

Water Quality Program for Agriculture (WQPA) –The WQPA is administered by the Idaho Soil Conservation Commission (ISCC). This program is also coordinated with the TMDL process. Source: ISCC http://www.scc.state.id.us/programs.htm

Wetlands Reserve Program (WRP) –The WRP is a voluntary program offering landowners the opportunity to protect, restore, and enhance wetlands on their property. Easements and restoration payments are offered as part of the program. Source: NRCS http://www.nrcs.usda.gov/programs/wrp/

Wildlife Habitat Incentives Program (WHIP) –WHIP is a voluntary program for people who want to develop and improve wildlife habitat primarily on private land. Cost-share payments for construction or re-establishment of wetlands may be included. Source: NRCS http://www.nrcs.usda.gov/programs/whip/

Outreach

Conservation partners in the Pack River watershed will use their combined resources to provide information about BMPs to improve water quality to agricultural landowners and operators. Newspaper articles, Bonner SWCD and PRWC newsletters, watershed and project tours, landowner meetings and one-on-one personal contact may be used as outreach tools. Outreach efforts will be coordinated with the Lake Pend Oreille Nearshore Committee, and existing Pend Oreille Lake*A*Syst materials will be utilized in educational efforts.

Outreach efforts will:
provide information about the TMDL process,
supply water quality monitoring results,
accelerate the development of conservation plans and program participation,
distribute progress reports,
enhance technology transfer related to BMP implementation,
increase public understanding of agriculture's contribution to conserve and enhance natural resources,
improve public appreciation of agriculture's commitment to meeting the TMDL challenge, and
identify and encourage the use of BMPs for recreation activities.

Applications for technical and financial assistance will be solicited with emphasis in the Pack River watershed, through cooperation of all conservation partners. As assistance is requested from this area, high priority will be given to these and other applicants in areas critical to TMDL implementation. Assistance requests resulting in field visits allow direct contact with land managers and observation of the land. One-on-one time will be utilized to dispense information on water quality, BMPs, and available resources. Treatments applicable to the needs of the Pack River watershed will be the focus of discussions with landowners in the vicinity.

Monitoring and Evaluation

FIELD LEVEL

At the field level, annual status reviews will be conducted to insure that the contracts are on schedule and that BMPs are being installed according to standards and specifications. BMP effectiveness monitoring will be conducted on installed projects to determine installation adequacy, operation consistency and maintenance, and the relative effectiveness of implemented BMPs in reducing water quality impacts. This monitoring will also measure the effectiveness of BMPs in controlling agricultural nonpoint-source pollution. These BMP effectiveness evaluations will be conducted according to the protocols outlined in the Agriculture Pollution Abatement Plan and the ISCC Field Guide for Evaluating BMP Effectiveness.

Stream Visual Assessment Protocol (SVAP) is used to assess aquatic habitat, stream bank erosion, and lateral recession rates. The Idaho OnePlan's CAFO/AFO Assessment Worksheet is used to evaluate livestock waste, feeding, storage, and application areas. The Water Quality Indicators Guide is utilized to assess nitrogen, phosphorus, sediment, and bacteria contamination from agricultural land.

WATERSHED LEVEL

At the watershed level, there are many governmental and private groups involved with water quality monitoring. The Idaho Department of Environmental Quality uses the Beneficial Use Reconnaissance Protocol (BURP) to collect and measure key water quality variables that aid in determining the beneficial use support status of Idaho's water bodies. The determination will tell if a water body is in compliance with water quality standards and criteria. In addition, IDEQ will be conducting five-year TMDL reviews.

Annual reviews for funded projects will be conducted to insure the project is kept on schedule. With many projects being implemented across the state, ISCC developed a software program to track the costs and other details of each BMP installed. This program can show what has been installed by project, by watershed level, by sub-basin level, and by state level. These project and program reviews will insure that TMDL implementation remains on schedule and on target. Monitoring BMPs and projects will be the key to a successful application of the adaptive watershed planning and implementation process.

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APPENDIX A – PACK RIVER WATERSHED COUNCIL CITIZEN MONITORING DATA

Pack River Citizen Monitoring Data

Monitoring Sites - Delta - 1 Northside Bridge - 2 Colburn Bridge - 3 Upper Pack - 4

	1999				2000				2001			
	1	2	3	4	1	2	3	4	1	2	3	4
DO	11	10	11	12	8	8	8	9	4.6	9	6.3	11.7
Fecal Coli	<1/100	26/100	23/100	4/100	9	15	27	2	25	5	0	0
Total Coli									1200	1300	1200	230
E. coli									3	3	6	4
ph Temp C	7	6.5	7.5	7	7.5	7	7.5	7	6.8	7.5	7.5	7.25
Total phos	11C	6C	7C	6C	9C	8C	8C	7C	9	5	6	5
Nitrate	0.015	0.014	0.014	0.009	0.011	0.012	0.014	0.008	0.012	0.018	0.023	0.004
Turbidity	<.010	0.012	<.010	<.010	<.010	<.010	<.010	<.010	<.010	<.010	<.010	<.010
Total solid					17.5	3	3	0.33	7.5	0.5	2.5	5.1
					55.33	5	42	4.33	118.7	74.6	65.5	9.3

	2002				2004				2005			
	1	2	3	4	1	2	3	4	1	2	3	4
DO	20	22	21	21	9	15	10	16	12	12	11	10
Fecal Coli	4/100	2/100	2/100	1/100								
Total Coli					2400	1400	1400	390	260	260	310	75
E. coli					39	23	20	25	5	2	7	2
ph Temp C	8	7.5	7.5	6.5	7	7	7	6.5	7.3	5.8	6.8	6.7
Total phos		1C	.5C		10	9	9	8	9.5	10	9	8
Nitrate					0.008	0.009	0.009	0.005	0.01	0.012	0.009	0.004
Turbidity					<.020	<.020	<.020	<.020	0.02	0.06	0.009	0.004
Total solid	10	10	5		.98?	.89?	.97?	.25?				
	169	121	137	16.6								