CLARK FORK - PEND OREILLE BASIN

WATER QUALITY STUDY

A SUMMARY OF FINDINGS AND A MANAGEMENT PLAN

Conducted Under

SECTION 525 OF
THE CLEAN WATER ACT OF 1987

January 1993

U.S. Environmental Protection Agency, Regions 8 and 10
State of Montana
State of Idaho
State of Washington

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Introduction and Acknowledgements

This document summarizes three years of water quality research in the Clark Fork-Pend Oreille Basin and provides a Management Plan for protection of the basin's water quality. All work was conducted pursuant to Section 525 of the 1987 amendments to the federal Clean Water Act as a cooperative effort among the states of Montana, Idaho, and Washington and with assistance from the U.S. Environmental Protection Agency. This report is a synthesis of the following three documents completed for the Clark Fork-Pend Oreille Basin Water Quality Study:

- A Rationale and Alternatives for Controlling Nutrients and Eutrophication Problems in the Clark Fork River Basin, by G. L. Ingman, Montana Department of Health and Environmental Sciences, Helena, 1992

- Phase I Diagnostic and Feasibility Analysis: A Strategy for Managing the Water Quality of Pend Oreille Lake, Bonner and Kootenai Counties, Idaho, 1988-1992, by B. Hoelscher, J. Skille, G. Rothrock, Idaho Department of Health and Welfare, Division of Environmental Quality, Boise, 1993.

- Pend Oreille River Management Plan, by R. Coots, Washington State Department of Ecology, Olympia, 1992.

State reports are available from each state's steering committee members.

This report is the fourth and final annual progress report for the Clark Fork-Pend Oreille Water Quality Study. The first, second, and third annual reports are available from any member of the Steering Committee.

Clark Fork-Pend Oreille Basin Water Quality Study Steering Committee

Gary Ingman Loren Bahls	Montana Department of Health and Environmental Sciences Water Quality Bureau Post Office Box 200901 Helena, MT 59620-0901	(406) 444-2406 FAX 444-1374
Brian Hoelscher Jack Skille	Idaho Department of Health and Welfare Idaho Division of Environmental Quality 2110 Ironwood Parkway Coeur d'Alene, ID 83814	(208) 667-3524 FAX 667-4869
Will Kendra Randy Coots	Washington Department of Ecology Watershed Assessments Section Post Office Box 47710 Olympia, WA 98504-7710	(206) 586-0803 FAX 586-5497
Judith Leckrone	U.S. EPA, Region 10 1200 Sixth Ave, WD-139 Seattle, WA 98101	(206) 553-6911 FAX 553-0165
William Roberts	U.S. EPA, Region 8 Montana Office 301 South Park Drawer 10096 Helena, MT 59626	(406) 449-5414 FAX 449-5434

The Steering Committee acknowledges the important contributions of previous Steering Committee members:

Mike Beckwith, U.S. Geological Survey, Idaho
Gwen Burr, Idaho Division of Environmental Quality
Mason Hewitt, EPA Environmental Monitoring Systems Laboratory, Las Vegas
Sally Marquis, EPA, Region 10, Seattle
Don Martin, EPA, Idaho Operations Office
Lee Shanklin, EPA, Region 8, Montana Office
Lynn Singleton, Washington Department of Ecology.

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Diana Boquist, U.S. Environmental Protection Agency
Bronwyn Echols, Technical Writer
David Haire, Confederated Salish and Kootenai Tribes of the Flathead Reservation
Glen Rothrock, Idaho Division of Environmental Quality
Christopher Moffett, U.S. Environmental Protection Agency
Peter Nielsen, Clark Fork-Pend Oreille Coalition
Connie Robinson, U.S. Environmental Protection Agency
Ed Tulloch, Idaho Division of Environmental Quality
Ruth Watkins, Clark Fork-Pend Oreille Coalition

Executive Summary

The Clark Fork-Pend Oreille Basin lies within western Montana, northern Idaho and northeastern Washington. The basin encompasses about 25,000 square miles and is the source of waters that enter and leave Pend Oreille Lake in Idaho. The Clark Fork River begins near Butte, Montana and drains an extensive area of western Montana before entering Pend Oreille Lake. The lake is the source of the Pend Oreille River in northeastern Washington which in turn drains into the Columbia River.

In response to concerns and complaints about the growing presence of algae and water weeds in the Clark Fork-Pend Oreille Basin, Congress mandated the United States Environmental Protection Agency (EPA) to conduct a comprehensive water quality study in the basin, and to report study findings and recommendations to Congress. This mandate appeared as Section 525 of the 1987 amendments to the federal Clean Water Act.[1] The main objectives of the study were to characterize water quality problems, identify sources and recommend actions for maintaining and enhancing water quality throughout the basin. This report and management plan are intended to meet the study and reporting requirements mandated in Section 525.

Regions 8 and 10 of the EPA had the primary federal responsibility for implementing the Clark Fork-Pend Oreille Basin Water Quality Study. The States of Montana, Idaho and Washington identified research objectives within their boundaries, conducted the research, wrote reports and recommended state-specific management

[1] Clean Water Act, 33 U.S.C. 1251, et seq., as amended by the Water Quality Act of 1987, P.L. 100-4, February 4, 1987.

actions that would meet the basin-wide study objectives. The Clark Fork-Pend Oreille Basin Water Quality Study Steering Committee, consisting of representatives from EPA and the three states, oversaw the study and reviewed and summarized the three state plans into this document, the Clark Fork-Pend Oreille Basin Water Quality Study: A Summary of Findings and a Management Plan.

The Steering Committee invited all interested persons and agencies to comment on individual state management plans and the basin-wide management plan. The Committee sponsored four public workshops in Deer Lodge and Missoula, Montana, Sandpoint, Idaho and Newport, Washington. The Committee also requested comments by mail from over five hundred individuals, agencies and other groups on the mailing list. (Responses to these public comments are included as Appendix C.)

Research Findings and Conclusions

The three-year Clark Fork-Pend Oreille Water Quality Study yielded the following major research findings and conclusions:

Clark Fork River

- Excessive levels of algae caused water use impairment in up to 250 miles of the Clark Fork River.

- About half of the soluble phosphorus derives from wastewater discharges, with the other half contributed by nonpoint sources in tributary watersheds. Three-fourths of the soluble nitrogen comes from tributaries, with the remaining quarter from wastewater discharges.

- The most critical point sources are the municipal wastewater treatment plants, particularly at Butte, Deer Lodge and Missoula. The Stone Container Corporation's Missoula Mill is a major source of industrial wastewater nutrient loading to the river, although the levels of nutrients in its effluent over the past six years have been reduced several fold.

- Phosphate detergent bans in several communities along the river have decreased the phosphorus content of the effluent of the municipal wastewater treatment plants.

- The largest nonpoint sources of nutrient loading to the Clark Fork River are the Flathead, Bitterroot, and Blackfoot rivers.

- A nonpoint source stream reach assessment found that of 99 basin streams with suspected problems, 65 percent have an impaired ability to support designated beneficial water uses.

Pend Oreille Lake

- Open lake water quality has not changed statistically since the mid-1950s.

- There is a high correlation between total phosphorous loading from nearshore and local tributaries and the degree of urban development.

- The greatest share (more than 90 percent) of water entering the lake comes from the Clark Fork River inflow, as does about 85 percent of the total loading of phosphorus, the nutrient that limits algae growth in the lake.

- Maintenance of open lake water quality is largely dependent on maintaining nutrient loadings from the Clark Fork River at or below their present levels.

- Pack River, followed by Sand Creek, are the tributaries discharging the highest phosphorus loads per unit of land area to the lake. Lightning Creek, Pack River, and Sand Creek have the highest nitrogen levels.

Pend Oreille River

- The mainstem Pend Oreille River has water quality that is generally good and in the oligo-mesotrophic range.

- The primary water quality concern on the Pend Oreille River is the proliferation of Eurasian watermilfoil, an invasive and adaptable plant.

- Roughly 75 percent of the external nitrogen and phosphorus loading to this reach of the river comes from the Newport wastewater treatment plant, Calispell Creek, and Trimble Creek.

- Several tributaries exceed standards for fecal coliform bacteria content.

! Nonpoint sources of pollutants in the Pend Oreille River basin that potentially affect the river are animal keeping practices, agriculture, on-site sewage disposal, stormwater and highway runoff, forest practices, land development, landfills, and gravel extraction.

Recommended Management Objectives, Actions and Priorities

Based on the research findings and conclusions, the Steering Committee of the Clark Fork-Pend Oreille Basin Water Quality Study recommends the following water quality management goals and objectives for the basin.

Goal: Restore and Protect Designated Beneficial Water Uses Basin-Wide.

Objectives:

! Control nuisance algae in the Clark Fork River by reducing nutrient concentrations.

! Protect Pend Oreille Lake water quality by maintaining or reducing current rates of nutrient loading from the Clark Fork River.

! Reduce nearshore eutrophication in Pend Oreille Lake by reducing nutrient loading from local sources.

! Improve Pend Oreille River water quality through macrophyte management and tributary nonpoint source controls.

Actions

Each state outlined numerous specific management actions to meet these basin-wide objectives. These recommended management actions were summarized into a an overall management plan for the entire basin. The recommended management actions include a spectrum of activities that ranges from mechanical harvesting of aquatic weeds, comprehensive public education programs, control of agricultural and residential nonpoint sources, revised permit limits on point sources, and developing and enforcing local zoning and stormwater ordinances. For each recommended action, the plan

identifies possible lead agencies, assigns a priority, estimates costs whenever possible, and identifies possible funding sources.

Priorities

The Steering Committee identified over 70 specific management actions. From these, the Committee has identified several actions to be the highest priority.

- Convene a Tri-State Implementation Council to implement the Management Plan recommendations.
- Establish a basin-wide phosphate detergent ban.
- Establish numeric nutrient loading targets for the Clark Fork River and Pend Oreille Lake.
- Develop and maintain programs to educate the public on their role in protecting and maintaining water quality.
- Control Eurasian watermilfoil by education, rotovation, and research into alternative methods.
- Install centralized sewer systems for developed areas on Pend Oreille Lake.
- Institute seasonal land application and other improvements at the Missoula municipal wastewater treatment facility.
- Enforce existing regulations and laws consistently and aggressively, in particular state anti-degradation statutes.
- Establish and maintain a water quality monitoring network to monitor effectiveness and trends and to better identify sources of pollutants.
- Develop and enforce stormwater control and erosion control plans and county ordinances.

Response to Citizens' Concerns: The Purpose and Organization of the Study

Purpose

The Clark Fork-Pend Oreille basin encompasses about 25,000 square miles of the intermountain Northwest in the states of Montana, Idaho, and Washington (Figure 1). The Clark Fork River, Pend Oreille Lake, and the Pend Oreille River are among the main bodies of water in the basin. The Clark Fork River has its headwaters near Butte, Montana, is fed by the Flathead, Bitterroot, and Blackfoot rivers and then flows into Pend Oreille Lake, Idaho's largest lake. Pend Oreille Lake is the source of the Pend Oreille River in northeastern Washington.

The Clark Fork-Pend Oreille Basin is characterized by highly valued recreational and economic resources and is the central focus of nearly every major urban, industrial and agricultural activity in the region. Vast resources of minerals, timber, fish, wildlife, water, rangeland and croplands support a variety of human uses, ranging from mining and agriculture to recreational fishing and boating.

In response to citizens' concerns about water quality in the basin, members of the three states' Congressional delegations added Section 525 to the Clean Water Act of 1987 which directed the U.S. Environmental Protection Agency (EPA) to conduct a comprehensive water quality study in the Clark Fork-Pend Oreille Basin. Congress, however, did not immediately appropriate the necessary funds for the study. Section 525 of the 1987 amendments to the Clean Water Act states:

STUDY OF POLLUTION IN LAKE PEND OREILLE, IDAHO.
The Administrator shall conduct a comprehensive study of the sources of pollution in Lake Pend Oreille, Idaho, and the Clark Fork River and its tributaries, Idaho, Montana, and Washington, for the purpose of identifying the sources of such pollution. In conducting such study, the Administrator shall consider existing studies, surveys, and test results concerning such pollution. The Administrator shall report to Congress the findings and recommendations concerning the study conducted under this section.

Concerns about environmental problems in the basin are longstanding. The two greatest concerns are pollution from heavy metals from past mining and smelting activities in the headwaters of the Clark Fork River and eutrophication problems caused by excessive nutrients. Eutrophication manifests itself in the Clark Fork River in Montana as abundant developments of nuisance attached algae that impair most designated uses of the river. In Pend Oreille Lake, increasing growths of algae and other water plants in nearshore areas and decreasing water clarity are the primary concerns. In Washington, the Pend Oreille River is choked with nearly continous growths of water plants that impede boat traffic and most other uses. Increasing population in the inland Northwest are likely to exacerbate these water quality problems in the near future.

In 1988, the Montana Governor's Office released the Clark Fork Basin Project Status Report and Action Plan. The Action Plan provided specific recommendations for addressing the nutrient problems in the basin and called for a coordinated program to investigate the sources and fate of nutrients in the Clark Fork-Pend Oreille Basin. Encouraged by Congress' action and prompted by the Governor's report, the citizen's group known as the Clark Fork-Pend Oreille Coalition (formerly the Clark Fork Coalition) successfully pushed for appropriation of funds to complete the comprehensive, basin-wide assessment authorized by Section 525.

Although the Montana Governor's Office report identified the mining-related heavy metals pollution in the headwaters area as the most acute problem in the basin, the Steering Committee decided to restrict the water quality studies to nutrient and eutrophication problems because they are the primary interstate water quality issue and are affecting the largest portion of the basin. In addition, investigations and remedial

activities on the metals contamination were already well underway through the federal Superfund Program.

This report, the Clark Fork-Pend Oreille Water Quality Study: A Summary of Findings and a Management Plan, summarizes the findings of three years of research conducted pusuant to Section 525. It also provides a management plan for the basin. This is the fourth and final report on the Clark Fork-Pend Oreille Water Quality Study.

Organization

Though Section 525 of the Clean Water Act directs EPA to conduct the study, the project was a joint effort of working teams from Montana, Idaho, Washington, Regions 8 and 10 of the EPA and from EPA's Environmental Monitoring Systems Laboratory at Las Vegas (EMSL-LV). EPA convened the Clark Fork-Pend Oreille Basin Water Quality Steering Committee to oversee the study. The Steering Committee comprises representatives from the two EPA regional offices and the agency from each state responsible for water quality management: the Water Quality Bureau of the Montana Department of Health and Environmental Sciences (MDHES), Idaho's Division of Environmental Quality (DEQ), and Washington's Department of Ecology (Ecology). The Steering Committee met regularly and communicated frequently to oversee progress and to coordinate the three states' research.

Each of the state agencies worked with other agencies and organizations within its state to carry out the research. In Montana, additional work was conducted by EMSL-LV, the Natural Resource Information System (NRIS) at the Montana State Library, the University of Montana, the U.S. Geological Survey, and several independent contractors.

In Idaho, DEQ managed a Clean Lakes Phase I Project for Pend Oreille Lake which was funded through an EPA Clean Lakes Program grant as well as by Section 525. The U.S. Geological Survey, EMSL-LV, the University of Idaho, the Idaho Department of Fish and Game, Eastern Washington University, the Bonner County

Planning and Development Department, and the Panhandle Health District also contributed research to the project. The DEQ project team also convened a Technical Advisory Committee to coordinate and integrate research elements and to review subcontractor results, and a Policy Advisory Committee representing agencies, industries, and interest groups with direct involvement in or concern for Pend Oreille Lake's water quality.

In Washington, the U.S. Army Corps of Engineers, the University of Idaho, and the Pend Oreille County Public Works Department contributed research.

To implement the Management Plan developed as a result of the Clark Fork-Pend Oreille Water Quality Study, EPA and the state agencies will have a guiding role in directing future research, coordinating management regulations, and continuing the interstate links forged through the project. Many other agencies and organizations will be active participants in the success of the management plans. Federal, tribal, state, and local units of government, each with oversight of part of the basin's water quality equation, will be working together for years to come to ensure clean water in the Clark Fork River, Pend Oreille Lake, and Pend Oreille River system. Citizens' groups have parts to play, also. The Clark Fork-Pend Oreille Coalition was instrumental in bringing about the Clark Fork-Pend Oreille Water Quality Study and will maintain active participation in basin water quality efforts. In Idaho, the Clean Lakes Coordinating Council will continue to work with the agencies responsible for the management of Pend Oreille Lake. The ultimate success of the Clark Fork-Pend Oreille Basin Management Plan will depend upon how well all of these agencies and organizations can frame common goals for water quality, agree upon the methods to be used in meeting these goals, and work together to take necessary actions to protect basin waters.

The State of the Basin

Clark Fork River

The Clark Fork River watershed is the largest subunit of the Clark Fork-Pend Oreille research area, comprising some 22,000 square miles, or nearly 90 percent of the Clark Fork-Pend Oreille Basin. A wide range of human activity, from urban centers to farming hamlets, is found within this region. Butte, at the Clark Fork River's headwaters is a city of some 34,000. Copper mining has been the city's major industry for decades. Missoula lies along the middle reaches of the river. It is home to about 34,000 people and the University of Montana. Both these cities are service and retail hubs for their regions. Between the hills that surround Butte and the mountains that begin to rise near Missoula lies the Deer Lodge Valley, a broad and fertile swale with numerous farms and ranches. Further downstream, the mountainous terrain between Missoula and the Idaho border is sparsely settled. Much of the western portion of the watershed is forested mountains, predominantly national forest. Part is wilderness and the remainder is managed for multiple uses, including logging and mineral extraction.

The economy of the region is predominantly natural resource based, with forestry, mining, and agriculture the major industries. In recent years, recreation and tourism have played an increasing role in the region's economy. In the valleys, the largest farms and ranches grow various short season crops, such as hay and winter wheat, as well as raise livestock. Vacation home development is occurring as the region increases in popularity as a recreational destination for skiing, fishing, hiking, and hunting. The cities and towns are more densely settled, but development and accompanying sprawl are progressing at a fairly restrained pace. The exception is the

booming Flathead Valley which is attracting a large population from outside the state.

These diverse land uses and economic activities in the Clark Fork River drainage area have led to an associated range of water quality problems. Apart from the heavy metals residual from mining wastes in the river's headwaters, the most pressing of these are the excessive nutrients that promote the growth of nuisance algae in the Clark Fork River. High concentrations of phosphorus and nitrogen have led to blooms of filamentous algae in the Clark Fork River above Missoula and heavy growths of slime, or diatom, algae below the city. Beside being unattractive, algae impair beneficial uses of the river water, such as irrigation and recreation. Dead and decaying algae form sludge that clouds the water and produces nuisance river foam. Algal respiration also depletes dissolved oxygen required for healthy and balanced populations of fish and other aquatic life. On the lower river, the primary concern is the discharge of nutrients to Pend Oreille Lake.

Pend Oreille Lake

The Pend Oreille Lake watershed is sparsely settled. Bonner County, which almost entirely contains the lake, has a population of about 26,000. Sandpoint, the county's largest city with about 5,200 residents, and the surrounding cities and rural areas along the north shore of the lake hold about half the county's population. In summer, an additional 5,000 people call the north shore their home. Bonner County is predicted to have continuing strong growth as a nonmetropolitan area. By the year 2010, the population may reach 35,000 -- an increase of nearly one-third.

Like the rest of the Clark Fork-Pend Oreille Basin, an array of land uses characterize the Pend Oreille Lake watershed. Much of the northern and eastern parts of the watershed are public lands comprise mountainous or hilly terrain deeply cut by streams and mostly forested. The broad, fertile valleys and river bottoms, predominately in the western part of the watershed, are mostly in private ownership. Near the lake and on its shore, private lands account for more than half of the

ownership. Timber is the region's primary natural resource industry. Until very recently, this and other natural resource based industries dominated the region's economy. However, jobs in services and retail trade are increasing as the region becomes more popular for second home development, tourism, and recreation. It is estimated that recreation and tourism contribute about $20 million annually to the local economy. Livestock grazing and short season crops, such as hay, wheat, oats, and barley, are important land uses in the valleys and on the lower slopes. Rarely are these operations very large.

Developed lands, primarily residential, are concentrated in a broad valley stretching north of Sandpoint. In this area, semi-rural residential development is gradually replacing agriculture. Almost half of all developable land in the watershed is located within one mile of the lake shore, indicating that the development pressure predicted by population growth figures will be concentrated fairly close to the lake.

Pend Oreille Lake is designated a Special Resource Water under Idaho's Water Quality Standards and Wastewater Treatment Requirements. No new point source discharges are allowed, nor may existing sources increase discharges of pollutants to the lake, a tributary, or an upstream segment if these discharges would compromise water quality necessary to designated uses of the special resource water. Pend Oreille Lake's designated uses are water supply, recreation, salmonid spawning, cold-water biota, wildlife habitat, and aesthetics.

Human activities in the basin have led to water quality concerns about Pend Oreille Lake. Paramount among these are excessive nutrients that promote the growth of slime (attached benthic algae) on shoreline rocks, structures, and boats. If left unmanaged, the algae eventually could impair of the lake's aesthetic qualities, recreational uses and domestic water supplies.

Pend Oreille River

The Pend Oreille River drains Pend Oreille Lake. Its basin lies mainly in Pend

Oreille County, a sparsely settled rural region in northeast Washington. The largest city, Newport, has fewer than 1600 residents. The next largest town, Ione, has about 500 residents. Local, state, and federal government jobs account for 43 percent of employment, with the remaining 57 percent split between retail, manufacturing, and service jobs.

Much of the river basin's land falls within the boundaries of the Kaniksu or Colville national forests. Two-thirds of the northern and central parts of the county are government owned; the southern portion is mostly privately owned. The basin's topography consists of river-bottom flatlands in a long and narrow trough between the Selkirk Mountains and Okanagan Highlands. Agriculture on the lowland plains includes grain crops, hay, pasture, and livestock. The area is largely forested with rough mountainous terrain. Private land ownership is concentrated on river and lake shorelines as strip development.

Milfoil is the mainstem Pend Oreille River's most serious problem. If left unchecked, this tenacious water weed could choke life from the river. In addition to restricting human recreational access to the river, existing data suggest milfoil may also be limiting to the fishery.

Previous Studies and Current Management Programs

The language of Section 525 of the Clean Water Act specifically directs the EPA to "... consider existing studies, surveys, and test results concerning such pollution" in the course of the study. Therefore, before discussing the Section 525 research, findings, and management recommendations, it is important to briefly describe previously conducted studies and current water quality management activities in the Clark Fork-Pend Oreille Basin. The management plan developed for the watershed under Section 525 takes into account and builds upon these efforts.

Clark Fork River

Other Studies

The Clark Fork River has been the subject of water quality concern for many years, primarily because of the residues of heavy metals left behind by the intensive mining around its headwaters. The Clark Fork River is probably the most thoroughly studied stream in the state. Research has ranged from examinations of water chemistry, hydrology, and contaminants to characterizations of the flora and fauna of the river and its tributaries. The effects of mining, logging, agriculture, sewage treatment plants and industrial discharges have also been explored. More recently, attention has turned to the high concentrations of nutrients in the upper and middle Clark Fork River.

A long-range comprehensive study of the Clark Fork Basin was inaugurated in 1984. Its final report, the Clark Fork Basin Project Status Report and Action Plan gathered fragmented information from the numerous studies of the Clark Fork River. It

reviewed the history of water and land uses in the basin, surveyed previous and current research directed at solving water quality problems, and made recommendations for future study and action. This report provided the framework for the Section 525 Clark Fork-Pend Oreille Water Quality Study.

Current Management Activities

A number of water management activities are already in place in the Clark Fork Basin. Management activities that include nutrient control measures include the Montana Pollutant Discharge Elimination System to control point source discharges of wastewater to protect stream quality; the state's Nondegradation Rules applying to new or increased sources of pollution; Montana's Nonpoint Source Pollution Control Program and the Flathead Basin Phosphorus Control Strategy. The communities of Missoula, Superior, and Alberton have adopted bans on phosphate-containing detergents, and the Stone Container Corporation kraft mill has steadily reduced the nutrient content of its wastewater discharge over the past six years.

In addition, the Salish and Kootenai Tribes have begun an aggressive water quality monitoring program on the Flathead Indian Reservation. The tribes have enacted a water quality ordinance for controlling point and nonpoint sources of pollution and are currently implementing the ordinance. The tribes also cooperated with the State of Montana on Flathead River Basin data collection and monitoring activities to determine nutrient sources in the Flathead Basin.

The upper Clark Fork River Basin has long suffered from the over-appropriation of water. The result has been serious stream dewatering problems during summer months which compromise all water uses. Low stream flows also aggravate the nutrient problem, especially in reaches below wastewater discharges, and promote the development of nuisance levels of algae. In 1991, the Montana Legislature passed legislation which placed a moratorium on most new surface water rights in the upper basin. It also created the Upper Clark Fork River Basin Steering Committee and

charged it with writing a management plan for waters of the upper basin. This plan must consider and balance all beneficial uses of water and develop recommendations to alleviate water shortages. The plan is scheduled for completion in December 1994.

A century of mining and smelting has left the Upper Clark Fork River and its tributaries severely polluted by toxic metals and other chemicals. EPA has listed four Superfund sites in the upper Clark Fork River basin on the National Priority List. Since 1982, EPA, MDHES, industries, and other agencies have worked together to investigate and prescribe clean-up procedures. Efforts conducted under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or Superfund) are being organized through the Clark Fork Superfund Master Plan.

Pend Oreille Lake

Other Studies

Pend Oreille Lake has also been the subject of considerable research since the mid-1980s. In 1984, researchers began monitoring the lake and the Clark Fork River to measure nutrients, sediments, and heavy metals. This was in response to the temporary discharge permit that allowed the Stone Container Corporation plant at Missoula to increase industrial wastewater outflows into the Clark Fork River. As a result of the sampling, researchers classified the lake as on the border between nutrient poor (oligotrophic) and moderately fertile (mesotrophic). Phosphorus was found to be the nutrient most often limiting to aquatic plants and algae, and some evidence indicated that heavy metals inhibited algal growth. In 1986, researchers first reported increased attached algae levels in shallow bays and nearshore waters.

Current Management Activities

The Idaho Division of Environmental Quality has provided technical and financial assistance for management of the lake's watershed. Particularly, the creation of several sewer districts around the lake has resulted in the planning and upgrading of

wastewater treatment systems. Bonner County's ban on phosphate detergents, the National Pollutant Discharge Elimination System which controls point source discharges of wastewater, the state's Antidegradation Policy applying to new or increased sources of point sources of pollution to Special Resource Waters, and nonpoint source programs designed to reduce pollution from forest practices and state road construction and maintenance are nutrient control measures that are already in place.

Pend Oreille River

Other Studies

Besides the Section 525 research, other Pend Oreille River projects include: 1) yearly studies of fisheries improvement opportunities conducted by the Upper Columbia United Tribes Fisheries Center at Eastern Washington University and funded by the Bonneville Power Administration; and 2) a two-year study by University of Idaho researchers of Box Canyon Reservoir's water quality, fish, wildlife and shoreline characteristics, and recreation and tourism opportunities. That study was completed with funding from the Pend Oreille County Public Utility District. The U.S. Army Corps of Engineers investigated water flow through river weed beds in an 1988 study, and is currently experimenting with the use of the aquatic herbicide trichlopyr for milfoil control. Additional water quality work on the river has focused on weed beds and rotovation in yearly evaluations of the Pend Oreille River Eurasian watermilfoil control program by consultants for the Pend Oreille County Public Works Department.

Current Management Activities

Since 1984, Pend Oreille County has tried several methods to control the spread of Eurasian watermilfoil, first through the application of the herbicide 2,4-D (the use of which is no longer allowed by EPA) and subsequently via the mechanical bottom tillage method known as rotovation, originally pioneered by the British Columbia Ministry of Environment for the Okanagan lakes. (Rotovation is the mechanical harvesting of

aquatic weeds.) The rotovator in use since 1988 was purchased by the county's Public Works Department under a joint funding arrangement with Ecology and the U.S. Army Corps of Engineers.

Scoping the Sources: Research Objectives

The primary research objective for the Clark Fork-Pend Oreille Water Quality Study was to evaluate the major interstate water quality issue: eutrophication problems caused by excessive quantities of nitrogen and phosphorus.

Two broad challenges were tackled by researchers during the three year study:

- Document water quality problems caused by pollution sources in the watershed; and
- Recommend actions for protecting and restoring water resources throughout the basin.

Each state team outlined research objectives specific to the water quality problems of its part of the basin while keeping in mind the basin-wide nature of the project. Each state then conducted studies to meet those objectives. Montana studied the Clark Fork River. Idaho completed a federal Clean Lakes Phase I study on Pend Oreille Lake in order to meet its commitment, and Washington focused its research on the Pend Oreille River. Following completion of the third year of research, each group wrote a management plan. The individual state plans were then forged into the Management Plan that is included in this document.

Clark Fork River

Research Objectives

The concerns of Montana researchers were two-fold: 1) abundant growths of attached algae in the Clark Fork River and their effects on beneficial water uses, and 2) nutrient loading to Pend Oreille Lake from the river. Specific research tasks were:

- Identify the sources of nutrients in Montana's portion of the watershed, develop a nutrient budget, and formulate a nutrient control strategy;
- Document the extent and severity of nuisance algae in the Clark Fork River, evaluate the role of instream nutrients in promoting algae growth, and determine what effect nutrient controls would have on the algae, fisheries, and riverine ecosystem; and
- Assimilate study results through use of a computerized Geographic Information System (GIS).

Research Conducted

Montana researchers intensively monitored the 350 miles of the Clark Fork River from its headwaters to the Idaho border, many of its tributaries, and most of the point source discharges of wastewater. This work provided data and information on the major sources of nutrients to the river. Section 525 research in Montana:

- Assessed the extent and severity of nuisance algae in the river and developed nutrient criteria for the control of algae growth;
- Determined instream nutrient concentrations from headwaters to Pend Oreille Lake, documented and ranked nutrient contributions from tributaries and wastewater discharges, and identified the sources that can be most readily controlled;
- Compiled data on the nonpoint sources and causes of water quality impairment within the tributary basins, along with information on the geographical distribution of problem streams; and
- Evaluated the potential negative effects of nutrient controls on fish production.

In addition to this research, EMSL-LV developed a GIS for the Blackfoot River watershed. (A GIS integrates data from many sources and may be used to analyze

how various topographic, climatic, geologic, biotic, and land use factors affect water quality.) The focus of the GIS work was nonpoint source pollution, particularly from silvicultural practices and livestock production. The Blackfoot River was selected as a demonstration project since it is a subbasin of the Clark Fork River, and had all nonpoint source modeling requirements. EMSL-LV worked directly with the Montana State Library and the Water Quality Bureau on remotely-sensed data acquisition, GIS database layering, and development of a user interface.

Concurrent with the Blackfoot River GIS project, the Natural Resource Information System at the Montana State Library developed a GIS system for the entire Clark Fork River watershed. The latter system was used extensively to help evaluate the Clark Fork-Pend Oreille Water Quality Study data and to display results. Both the Clark Fork River and the Blackfoot River GIS systems are housed at the Montana State Library where they will continue to be available for basin-wide water quality management and planning purposes. Plans are underway to increase the accessibility of the GIS systems to government and private institutions.

Pend Oreille Lake

Research Objectives

For Pend Oreille Lake, the major charges were to investigate citizens' concerns about increased growths of algae and the potential for lake eutrophication caused by nutrients from the Clark Fork River and rapid population growth and development in the immediate lake basin. Specific research objectives included:

- Assess current water quality and characterize the trophic status of the littoral, pelagic, and riverine zones of the lake;
- Identify and quantify nutrient inputs from natural, point, and nonpoint sources and prepare a mass balance nutrient budget for the lake;
- Conduct a land use inventory of the Idaho portion of the watershed;
- Develop a predictive computer model of the lake's response to nutrient

loads; and

- Formulate alternative water quality management strategies and select and initiate a comprehensive, long-term water quality management plan.

Research Conducted

The Idaho project team used several methods, including water quality monitoring in the lake and its tributaries and outflow, creating computer models, measuring organic productivity, and listing and mapping various land uses. Specific research accomplishments were:

- The U.S. Geological Survey (USGS) collected limnological and hydrological data from the lake and its tributaries and outflow to describe the lake's trophic status and develop nutrient and hydrological budgets for the lake.
- The USGS used an empirical nutrient load-lake response computer model to simulate how the open, deep area of the lake would respond to different rates of nutrient loading.
- University of Idaho researchers assessed nearshore water quality and algae production, and identified the types of phytoplankton found in the deeper waters of the lake.
- The Panhandle Health District inventoried all septic tanks close to the lake for use in the nutrient load-lake response computer model.
- The Bonner County Planning and Development Department and Eastern Washington University listed all current and anticipated land use practices in the Idaho portion of the watershed.
- The DEQ and Idaho Department of Fish and Game compiled all available knowledge on the lake's fishery, described its economic value, provided general information on heavy metal accumulation in fish tissue, and discussed the effects on fish populations of the proposed water quality

goals.

- EMSL-LV used satellite imagery to identify vegetative cover in the Idaho watershed and aerial photographs to map aquatic macrophytes and potential nonpoint nutrient sources.

Pend Oreille River

Research Objectives

The Pend Oreille River research centered around overall water quality and point and nonpoint pollution sources on the mainstem river and selected tributaries, in order to determine how to maintain the river's generally good water quality and to manage the worsening Eurasian watermilfoil (*Myriophyllum spicatum*) invasion.

Research Conducted

Sampling of water, aquatic plants, and fish as chemical and biological indicators was the primary research method in Washington during all three years of the project. Washington scientists addressed the question of the river's trophic status and its effect on aquatic plant and fish life. The researchers:

- Evaluated the general water quality of the mainstem river and determined pollutant loading from tributaries to Box Canyon Reservoir;
- Assessed fish communities and water quality within and outside weed beds; and
- Estimated primary productivity in the river mainstem and conducted further studies on the water quality and pollution sources of selected problem tributaries.

Researchers also conducted experiments with a variety of rotovation techniques and looked at several patterns of rotovation as methods for management and control of Eurasian watermilfoil.

Research Findings

Clark Fork River

The highest densities of attached algae in the upper Clark Fork River occur between Drummond and the Blackfoot River inflow, and in the middle river between Missoula and Harper Bridge. British Columbia, Canada, has proposed that undesirable changes occur in river communities when algal densities go above 100 milligrams of chlorophyll *a* per square meter, and that aesthetics and recreational uses are impaired at half this level. Upper river algal densities are four and eight times these criteria, respectively, while middle river algal densities are three and six times these criteria. Algal respiration causes dissolved oxygen levels in the river to fall below applicable state water quality standards in a number of reaches between the headwaters and the Flathead River confluence.

The nutrient source inventory project shows that about half of the soluble phosphorus (the form of the nutrient most readily available for use by plants and algae) derives from wastewater discharges, with the other half contributed by nonpoint sources in tributary watersheds. Three-fourths of the soluble nitrogen came from tributaries, with the remaining quarter from wastewater discharges.

A number of wastewater discharges, or point sources of potential pollutants, occur along the Clark Fork River. For the purposes of this study, with its focus on excessive nutrients, the most critical point sources are the municipal wastewater treatment plants, particularly at Butte, Deer Lodge, and Missoula. Nutrient loading from these plants correlates directly with reaches in the river at which nuisance algae problems are most prevalent. The Stone Container Corporation's Missoula Mill is a

major source of industrial wastewater nutrient loading to the river, although the levels of nutrients in its effluent over the past six years have been reduced several fold. Phosphate detergent bans in several communities along the river have decreased the phosphorus content of these cities' municipal wastewater treatment plant effluent.

Nonpoint sources of soluble nutrients were identified in a number of the tributary watersheds in the Clark Fork Basin. The largest nonpoint sources of nutrient loading to the Clark Fork River are the Flathead, Bitterroot, and Blackfoot rivers. Groundwater seepage from the Missoula area contributes up to half of the nitrogen in the lower Bitterroot River during summer. Three small tributaries to the lower Flathead River that flow through the Flathead Reservation provide a large share of the nutrients that river contributed to the Clark Fork River. Many other creeks have high nutrient concentrations in their waters but smaller nutrient discharges overall. Several tributaries whose waters are cleaner, as well as the major rivers with considerable water volume, have a diluting effect on the Clark Fork River's nutrient concentrations. During several years of drought in the late 1980s, smaller volumes of spring runoff and summer rains meant higher amounts of nutrients per unit of water, especially in reaches of the river below wastewater discharges. However, the early 1990s have seen lower overall nutrient concentrations as a result of more normal precipitation and the improved quality of municipal and industrial discharges. The nonpoint source stream reach assessment found that of 99 basin streams with suspected problems, 65 percent have an impaired ability to support designated beneficial water uses. The largest number of impaired streams are located in the upper Clark Fork River and Blackfoot River basins.

Pend Oreille Lake

Pend Oreille Lake comprises two different aquatic regimes in one water body. The pelagic region, generally in the central and southern portions of the lake, is deep, clear, and cold, and is classified as oligotrophic. Researchers have found that water quality in this region of the lake has not changed since the mid-1950s. The nearshore littoral zone, which accounts for about 11 percent of lake volume, is classified as meso-oligotrophic and is the primary location for water quality problems. University researchers consistently found the highest nearshore algae growth in areas adjacent to shorelines with significant residential development. Attached algae levels at the most productive site are one-third to one-half those that other Northwest researchers have reported as constituting nuisance conditions.

The greatest share (more than 90 percent) of water entering the lake comes from the Clark Fork River inflow, as does about 85 percent of the total loading of phosphorus, the nutrient that limits algae growth in the lake. Measurements of nutrient loads entering the lake and exiting via the Pend Oreille River show that, year to year, 55,000 kilograms of total phosphorus and about 750,000 kilograms of total nitrogen remain in the lake.

A nutrient load-lake response model has been used to aid in predicting the effect these and other nutrient levels could have on the lake. Computer simulations indicate that the trophic state of the lake's pelagic waters would be little changed by small to moderate alterations in how much nitrogen and phosphorus entered the lake. The smallest responses come from complete removal of phosphorus and nitrogen inputs from nearshore septic tanks and discharges from the Sandpoint and Priest River wastewater treatment plants. This is not surprising, since wastewater contributes only about 3 percent of the lake's nutrient budget, and since the treatment plants discharge into the Pend Oreille River downstream from Sandpoint and do not enter the lake. Although the research did not quantify the effect, removal of septic tank nutrient sources would probably improve nearshore water quality. Scientists found a correlation between

higher nearshore algae growth and areas with higher phosphorus loadings. The largest responses were produced by alterations in nutrients contributed by the Clark Fork River. Therefore, maintenance of open lake water quality is largely dependent upon maintaining nutrient discharges from the Clark Fork River at or below their present levels. Reductions in nutrient contributions from the river would probably result in corresponding reductions in nearshore nutrient concentrations. The exact correlation is unknown as the rate of water exchange between the open lake and nearshore waters was not quantified.

The lake's flora and biota are consistent with the trophic classification. Phytoplankton species in Pend Oreille Lake indicate conditions to be oligotrophic but tending toward mesotrophy. The ascendancy of green and blue-green algae blooms in recent years may be an early indicator of eutrophication. Eurasian watermilfoil is not currently present in Pend Oreille Lake, though it is abundant immediately downstream of Albeni Falls Dam in the Pend Oreille River. Winter drawdown may prevent its gaining a foothold in the lake.

The sport fishery, a valuable resource to the state and local economy, is characterized by the native fishes westslope cutthroat trout, bull trout and mountain whitefish, and by kokanee salmon and rainbow trout which have been introduced into the system. Due to reduced numbers, westslope cutthroat trout and bull trout are listed as state species of special concern and federal sensitive species. Generally, the lake's fish catch in recent years has been one-fifth to one-third of past levels of production, probably due to hydropower development on the rivers flowing into and out of the lake and to land use practices that have damaged tributaries. Restoration to past levels of production is compatible with the water quality goals set for the lake.

Six point sources discharge treated wastewater into Pend Oreille Lake. Five have National Pollutant Discharge Elimination System (NPDES) permits. Nutrient loadings from these sources represent less than three percent of the total load to the lake. Bonner County's recent ban on phosphate detergents may contribute to an

observed decline in phosphorus loads from the Sandpoint wastewater treatment facility. Scientists concluded that these discharges likely have minimal impact on the lake's pelagic water quality, and are more likely to affect nearshore areas and the Pend Oreille River.

Nonpoint sources in the Pend Oreille Lake watershed are the result of land uses activities that disturb or compact land, such as silviculture, agriculture, grazing, septic tanks, and urban runoff. Scientists estimating total phosphorus loading from nearshore and local tributaries found a high correlation between phosphorus loadings and the degree of urban development. Monitoring of tributaries flowing into and out of the lake allowed managers to estimate the amount of pollutants per unit of land area transported to the lake. Pack River, followed by Sand Creek, are the tributaries discharging the highest phosphorus loads per unit of land area to the lake. Lightning Creek, Pack River, and Sand Creek contribute the largest nitrogen loads. The Clark Fork River contributes the least amount of nutrients per unit of land area drained. However, since it provides most of the lake's water, the Clark Fork River contributes the lion's share of the nutrient load.

Pend Oreille River

The mainstem Pend Oreille River has water quality that is generally good and in the oligo-mesotrophic range, based on nitrogen and phosphorus concentrations, chlorophyll *a*, and Secchi disk transparency. Water and nutrient inputs from Washington tributaries account for less than 4 percent of the Pend Oreille River flow and nutrient load. Roughly 75 percent of the additional external nitrogen and phosphorus loading to this reach of the river comes from the Newport wastewater treatment plant, Calispell Creek, and Trimble Creek. Nitrogen appears to be the limiting nutrient to plant growth during the late winter, while phosphorus may be limiting during the rest of the year.

Department of Ecology surveys show no violations of state water quality

standards on the river, though several tributaries exceed standards for fecal coliform bacteria content. These tributaries are small enough that their effect on the main river's water quality is minimal at present because of high dilution ratios.

The primary water quality concern on the Pend Oreille River is the proliferation of Eurasian watermilfoil, an invasive and adaptable plant. Although the river appears to be dominated by milfoil, limited data suggest that other plants in the community, like pondweed, may be co-dominant. Milfoil's dense growth slows water velocities, so that nutrients and sediment precipitate out of the water column, thus promoting further macrophyte growth. Water column nutrients do not appear to be a factor in milfoil proliferation; phosphorus concentrations in the Pend Oreille River are well below the eutrophication threshold guideline of 25 micrograms per liter. However, water quality within the weed beds was found to be different from that of open water on the Pend Oreille River. Primary productivity in the river is fairly high, though fish numbers were quite low in the weed beds where sampling was done during the second year of the Clark Fork-Pend Oreille Water Quality Study. A GIS is assisting resource managers in tracking the expansion or upstream migration of macrophyte beds.

Nonpoint sources of pollutants in the Pend Oreille River basin that potentially affect the river are: animal keeping practices, agriculture, on-site sewage disposal, stormwater and highway runoff, forest practices, land development, landfills, and gravel extraction. The two permitted point sources, both within the Box Canyon Reservoir, are the Ponderay Newsprint Company plant at Usk (about 4.0 million gallons per day permitted) and the Newport wastewater treatment plant (permitted monthly average discharge limit of 0.5 million gallons per day).

Managing the Watershed: The Management Plan

Though the Clark Fork-Pend Oreille Basin Water Quality Study Steering Committee completes its assigned mission with the release and distribution of this document, all agencies represented on the Steering Committee are committed to working with other agencies, tribes, and interested groups to convene a Tri-State Implementation Council to implement the management actions outlined in the plan. Ideally, the Council would include representatives from federal, tribal, state and county agencies, along with citizens and special interest groups. Since most of the recommended actions must be implemented at the local level, the Steering Committee recommends that the local agencies, tribes and other locally-based interest groups and citizens have a large role in the Council. The Tri-State Implementation Council is discussed in more detail in the next chapter. The Steering Committee envisions that this Management Plan will serve as a guide to the Council.

Management Goals and Objectives

All management plans must begin with a stated goal. Therefore, the Committee recommends the following:

Restore and Protect Designated Beneficial Water Uses Basin-Wide.

Often, a management plan involves selection of a single preferred management alternative to achieve the desired water quality goals. The Clark Fork-Pend Oreille

Basin Water Quality Steering Committee decided that this approach would be inappropriate, since the research and input from experts and citizens established that numerous actions would need to be taken in order to reach the water quality goals. In particular, the Policy Advisory Committee for the Pend Oreille Lake Clean Lakes Project believes that any large, expensive project or use of expensive in-lake restoration techniques are inappropriate at this time. Thus the Management Plan for responsible management of the water quality of the Clark Fork-Pend Oreille Basin is cumulative.

Over 70 specific management actions are outlined in the management matrixes that follow. Many are relatively inexpensive and fairly easy to implement. Some rely on existing programs and authorities. For the most part, the Clark Fork-Pend Oreille Basin Water Quality Steering Committee recommendations rely on voluntary approaches to nutrient controls and pollution reduction in the Clark Fork-Pend Oreille Basin. However, the states would pursue the development of optional nutrient wasteload allocations so that mandatory controls could be implemented if voluntary measures fail to achieve the desired results.

The Steering Committee sees education as one of the most effective methods of reducing the amount of nutrients that enter the Clark Fork-Pend Oreille Basin. Informed watershed and lake users will be more conscious of how their activities affect the body of water they depend on and value, and will be more willing to modify these activities to meet water quality goals they understand. Enforceable regulations such as local zoning and planning ordinances, and rules governing sale and use of detergents and fertilizers, are other recommended tools for controlling watershed activities that generate pollutants.

It should be noted that there are also other existing authorities on which to rely to manage the water quality of the basin. The Clean Water Act provides states with the broad authority to survey, report on, and to correct water quality problems. In addition, individual state water quality statutes stipulate that their respective water quality agencies provide a comprehensive program for the prevention, abatement, and control

of water pollution. Furthermore, each state's surface water quality standards designate water use classifications for all surface waters in the state and establish standards for protecting, maintaining, and improving their quality and potability.

Clark Fork River: Management Objective

- ***Control nuisance algae in the Clark Fork River by reducing nutrient concentrations.***

The Steering Committee recommends that instream ambient nutrient concentrations be reduced in the Clark Fork River from its headwaters to the Flathead River confluence to achieve decreases in attached algae levels sufficient to eliminate associated water quality standards violations, and to restore all designated beneficial water uses. Furthermore, maintenance or reduction of current rates of nutrient discharge in the Clark Fork River at the Montana-Idaho border would provide reasonable protection against accelerated cultural eutrophication in Pend Oreille Lake.

Benefits that would derive from this management objective include: reductions in algae growth and lessening of algal impacts on cold-water biota, recreation, and irrigation; improved water clarity and aesthetics; lessened surface foam; increases in dissolved oxygen levels; and a reduced threat of eutrophication in Pend Oreille Lake.

Recommended Instream Conditions for the Clark Fork River

Many factors may promote or inhibit algae growth, however those other than nutrient levels may be very difficult to control. Hence, criteria for water quality focus on the nutrients that will achieve the desired improvements in Clark Fork River waters. Experiments showed that the levels of attached diatom algae in the middle Clark Fork River would be reduced with concentrations below 30 micrograms per liter for soluble phosphorus and 250 micrograms per liter for soluble nitrogen. The filamentous alga *Cladophora* dominating the upper Clark Fork River seemed able to thrive even when phosphorus was well below 30 micrograms per liter and nitrogen below 20 micrograms

per liter. Its ability to persist in low nutrient environments may mean that its abundance can only be controlled, but not eliminated.

While algal level decreases can be expected with nutrient concentrations below the figures given, target concentrations at which all beneficial uses would be protected throughout the river are not available. Regardless, it would be appropriate to set summer nutrient target levels at concentrations found in river reaches where algae are not a problem. These goals are 6 micrograms per liter or less for phosphorus and 30 micrograms per liter or less for nitrogen. While controls necessary to meet these restrictive levels may not be feasible everywhere on the river, even lesser reductions, or restoration of beneficial uses in fewer river miles, would constitute a worthy goal.

Nutrient reductions may affect other flora and biota as well as nuisance algae. However, a study designed to address this question concluded that proposed target nutrient levels would have a small impact on the Clark Fork River's trout fishery, a beneficial use and economic resource currently restricted by a number of other problems.

Pend Oreille Lake: Management Objectives

- ***Protect Pend Oreille Lake Water Quality by Maintaining or Reducing Current Rates of Nutrient Loading from the Clark Fork River.***
- ***Reduce nearshore eutrophication in Pend Oreille Lake by reducing nutrient loading from local sources.***

Desired water quality goals for Pend Oreille Lake are maintenance of lake water quality and reduction of the rate of nearshore eutrophication. These two management recommendations seek to protect and preserve the beneficial water uses of Pend Oreille Lake by controlling pollutants, particularly phosphorus, that enter the lake from natural, point, and nonpoint sources. Controlling nutrient pollution from local nutrient sources, as well as from the Clark Fork River, is expected to reduce the level of attached algae and prevent lake-wide eutrophication. If nutrients are not controlled,

algal growth can be expected to increase. Eventually increased levels of algae would impair the beneficial water uses of aesthetics, recreation, and domestic water supply.

Recommended Instream Conditions for Pend Oreille Lake

It was not possible to reach consensus on publicly acceptable levels of attached algae and therefore determine target nutrient concentrations for phosphorus in the lake. To resolve the issue, it was decided to set target nutrient levels at concentrations found at "undeveloped" sites. These target levels are two micrograms per liter for soluble phosphorus and five micrograms per liter for total phosphorus. Proposed target nutrient levels were determined to have a potentially small effect on the lake's fishery.

Pend Oreille River: Management Objective

- ***Improve Pend Oreille River water quality through macrophyte management and tributary nonpoint source controls.***

The primary problem afflicting the Pend Oreille River water quality is pervasive milfoil. Rotovation, as the most effective management tool, should continue in high use areas of the river. One rotovator is able to maintain about 200 acres of macrophyte beds. An additional rotovator should be purchased to double the amount of weed bed cleared. This additional machine could also be used to strip-rotovate milfoil beds in less used parts of the river to improve fish habitat, since strip rotovation provides a more diverse fishery habitat in weed beds. Since harvested aquatic plants could have beneficial uses, resource managers should investigate alternatives to disposing of the harvested weeds on the banks of the river (e.g. using harvested materials as fertilizer). Educating boat owners on how they can prevent the spread of milfoil is also crucial. Pend Oreille County could be the lead agency, with assistance from the county's Public Utility District, Ecology, and the U.S. Army Corps of Engineers.

Herbicide applications in high use areas may be feasible, though more research is needed on application rates in flowing waters. With possible approval of trichlopyr by

the EPA, local water quality managers may be able to experiment with herbicide control of milfoil, with projected state and federal technical and financial assistance. Biological agents, particularly aquatic insects and fungi, the subject of ongoing research, may also be an additional management method for the future.

The two major wastewater discharge sources, the Ponderay Newsprint Plant and the Newport sewage treatment plant, are adequately limited by NPDES permits. No additional conventional pollutant controls are recommended at present.

Since agricultural practices are likely a significant contributor of fecal coliform bacteria and nutrients levels in Pend Oreille River tributaries, implementation of best management practices (BMPs) would be the best way of improving water quality in these streams. Additional sampling, however, would be needed to better identify and prioritize problem areas and sources. The Pend Oreille Conservation District, as the responsible agency for BMP development and implementation related to agricultural water quality protection and management, could be the lead agency in conducting additional monitoring and follow-up on these nonpoint source problems. Education is crucial in this arena, since landowners who understand the deleterious effect of poor agricultural management practices on the common water resource are more likely to accept and implement BMPs.

Recommended Instream Conditions for Pend Oreille River

No special instream conditions are warranted for the mainstem Pend Oreille River since no obvious problems related to excessive nutrients occur. Attached algae communities do not approach nuisance levels, and free-floating algae indicates unpolluted waters in the main stem of the Pend Oreille River. Primary productivity of the main river was in the middle to upper range of the values reported in the scientific literature for larger rivers. In order to protect Box Canyon Reservoir from accelerated eutrophication, however, several tributaries that have elevated nutrient levels should meet a general guideline of less than 50 micrograms of phosphorus per liter.

Management Matrixes

The following matrixes outline the Steering Committee's recommended actions for protection and restoration of Clark Fork-Pend Oreille Basin water quality. The actions are organized according to the four management objectives for the basin.

- ***Control nuisance algae in the Clark Fork River by reducing nutrient concentrations.***

- ***Protect Pend Oreille Lake water quality by maintaining or reducing current rates of nutrient loading from the Clark Fork River.***

- ***Reduce nearshore eutrophication in Pend Oreille Lake by reducing nutrient loading from local sources.***

- ***Improve Pend Oreille River water quality through macrophyte management and tributary nonpoint source controls.***

A key to the abbreviations and the recommended funding sources in the matrixes can be found on page 52.

MANAGEMENT OBJECTIVE: Control Nuisance Algae in the Clark Fork River by Reducing Nutrient Concentrations.

POINT SOURCE CONTROLS

Management Action	Lead Agency	Priority	Cost (thousands)	Funding Source(s)
Implement seasonal land application and/or other improvements at the Missoula wastewater facility.	City of Missoula	High	600 (construction only)	4, 23
Implement seasonal land application of Deer Lodge municipal wastewater	City of Deer Lodge	High	405 (construction only)	4, 24
Adopt basin-wide phosphorus detergent bans	Municipalities, Counties	High	Low	1
Secure long-term protection for instream flows in the Clark Fork River	Upper Clark Fork Basin Steering Committee	High	Unknown	Unknown
Enforce an aggressive nondegradation policy with respect to nutrient sources	MDHES	High	_____	27
Establish numeric nutrient loading targets for the Clark Fork River and implement the TMDL wasteload allocation process if voluntary nutrient control measures are unsuccessful.	MDHES	High	50-500 (development of TMDL only)	1, 2, 27
Require nutrient monitoring as a condition of all wastewater discharge permits	MDHES	High	Low	29
Change nutrient limits for Stone Container Corp. to include surface and subsurface discharges	MDHES	High	_____	27, 29
Implement nutrient removal or alternative disposal methods for Butte municipal wastewater treatment facility	City of Butte	Medium	Unknown	4, 25, 26
Evaluate and implement additional measures to curb municipal and industrial wastewater nutrient discharges	Municipalities, Industries	Medium	Unknown	1, 28, 29
Organize wastewater discharge permits on a concurrent, five-year cycle	MDHES	Medium	_____	27

MANAGEMENT OBJECTIVE: Control Nuisance Algae in the Clark Fork River by Reducing Nutrient Concentrations.

NONPOINT SOURCE CONTROLS

Management Action	Lead Agency	Priority	Cost (thousands)	Funding Source(s)
Develop and implement a nonpoint source management plan specifically for the Clark Fork Basin	MDHES	High	1000	1, 3
Identify and control sources of nutrients in Mission and Crow creeks, Coleman Coulee, and the Little Bitterroot River	Confederated Salish and Kootenai Tribes	High	50 (Identification only)	1, 3, 27
Identify and control sources of nitrogen in the Dempsey, Lost, Mill, Willow and Racetrack creeks drainages.	MDHES	High	25 (identification only)	1, 3
Control groundwater sources of nitrogen loading to the Bitterroot River.	Missoula County, City of Missoula	High	Unknown	Unknown
Modify irrigation practices in the Gold Creek drainage to reduce phosphorus loading	Powell County, MDHES	Medium	Unknown	Unknown
Implement additional nonpoint source reclamation demonstration projects in the Clark Fork Basin	MDHES	Medium	Unknown	3
Identify nonpoint sources and causes of water quality impairment in the Blackfoot River drainage	MDHES, USFS, BLM, etc.	Medium	100	3
Implement the use of the Blackfoot Geographic Information System in nonpoint source pollution control	EPA, MDHES	Medium	50 - 100	1, 3
Implement the use of the Clark Fork Geographic Information System in nonpoint source pollution control	MDHES	Medium	50 - 100	1,3
Evaluate sources of nitrogen in Fish Creek, Trout	MDHES	Low	10	1

Creek and the Bull River				

MANAGEMENT OBJECTIVE: Protect Pend Oreille Lake Water Quality by Maintaining or Reducing Current Rates of Nutrient Loading from the Clark Fork River

POINT SOURCE CONTROLS

Management Action	Lead Agency	Priority	Cost (dollars)	Funding Source(s)
Require nutrient monitoring as a condition of all wastewater discharge permits	IDEQ, MDHES, EPA	High	1,000 annually per discharger	28, 29
Enforce an aggressive antidegradation policy with respect to nutrient sources	IDEQ, MDHES, EPA	High	N.A.	27
Establish numeric nutrient loading targets for Pend Oreille Lake and implement a nutrient allocation strategy if voluntary nutrient control measures are unsuccessful in protecting water quality	IDEQ, MDHES, EPA	High	40,000 (development only)	1, 2, 3

MANAGEMENT OBJECTIVE: Reduce Nearshore Eutrophication in Pend Oreille Lake by Reducing Nutrient Loading from Local Sources.

POINT SOURCE CONTROLS

Management Action	Lead Agency	Priority	Cost (dollars)	Funding Source(s)
Implement nutrient removal or alternative disposal methods for Kootenay-Ponderay municipal wastewater	IDEQ, Local Sewer District	High	30,000 (evaluation only)	8, 28
Require nutrient monitoring as a condition of all wastewater discharge permits	IDEQ, EPA	High	1,000 annually per discharger	28, 29
Enforce an aggressive antidegradation policy with respect to nutrient sources	IDEQ, EPA	High	N.A.	27
Establish numeric nutrient loading targets for Pend Oreille Lake and implement a nutrient allocation strategy for Pend Oreille Lake if voluntary nutrient control measures are unsuccessful in protecting water quality	IDEQ, MDHES, EPA	High	40,000 (development only)	1, 2, 3

NONPOINT SOURCE CONTROLS

Education

Management Action	Lead Agency	Priority	Cost (dollars)	Funding Source(s)
Prepare brochures to support recommended ordinances and provide a clearinghouse for information to interested and concerned lake and watershed users.	Clean Lakes Council, Tri-State Council	High	60,000 annually	1, 2, 5

MANAGEMENT OBJECTIVE: Reduce Nearshore Eutrophication in Pend Oreille Lake by Reducing Nutrient Loading from Local Sources (continued).

Septic Systems

Management Action	Lead Agency	Priority	Cost (dollars)	Funding Source(s)
Install centralized sewage treatment systems in developed areas	IDEQ, PHD, Local Sewer Districts	High	Cost dependent on site	1, 4, 8
Identify areas and zone for more dense development with centralized sewage treatment systems	Bonner County, PHD, SCS	High	Unknown (Low)	12
Periodic mandatory maintenance and operation inspections of septic systems	PHD, Local Sewer Districts	Medium	25,000 annually	13

Stormwater

Management Action	Lead Agency	Priority	Cost (dollars)	Funding Source(s)
Implement a county stormwater management plan	Bonner County, PHD, IDEQ	High	15,000 (development only)	1, 2, 3, 12

Fertilizer Use

Management Action	Lead Agency	Priority	Cost (dollars)	Funding Source(s)
Implement a county ordinance prohibiting the sale of phosphate lawn fertilizers	Bonner County, IDEQ	Medium	2,000 (development only)	1, 2, 12
Develop BMP's for methods and rates of application of fertilizers based on soil type and slope	Bonner County, SCS	Medium	10,000	1, 2, 3
Implement a county ordinance requiring fertilizer BMP's within a lake or stream protection zone	Bonner County	Medium	2,000 (development only)	2, 12

MANAGEMENT OBJECTIVE: Reduce Nearshore Eutrophication in Pend Oreille Lake by Reducing Nutrient Loading from Local Sources (continued).

Development and construction

Management Action	Lead Agency	Priority	Cost (dollars)	Funding Source(s)
Implement an county erosion control plan	Bonner County, IDEQ	High	15,000 (development only)	1, 2, 3, 12
Amend zoning ordinances to set residential density based on land and lake capabilities	Bonner County, SCS, IDEQ	High	Unknown (Low)	12
Amend zoning ordinances to restrict development in environmentally sensitive and unstable areas	Bonner County, SCS	Medium	Unknown (Low)	12
Increase set backs between development and watercourses	Bonner County, IDEQ	Medium	Unknown	12
Allow individuals and developers to design erosion control plans based on soil type and slope	Bonner County, IDEQ	Medium	30,000 annually	12, 13

Road construction

Management Action	Lead Agency	Priority	Cost (dollars)	Funding Source(s)
Implement road construction and maintenance BMP's specific to Pend Oreille Lake watershed and develop a Memorandum of Understanding with Bonner County Road Department	Bonner County, IDEQ	High	10,000 (development only)	1, 2, 3
Review travel corridor construction proposals within the Pend Oreille Lake watershed	IDEQ, ITD	High	N.A.	27

Agriculture

Management Action	Lead Agency	Priority	Cost (dollars)	Funding Source(s)
Identify and control sources of nutrients in Pack River and Sand Creek	IDEQ, SCD	High	30,000 (identification only)	1, 2, 7

MANAGEMENT OBJECTIVE: Reduce Nearshore Eutrophication in Pend Oreille Lake by Reducing Nutrient Loading from Local Sources (continued).

Forest practices

Management Action	Lead Agency	Priority	Cost (dollars)	Funding Source(s)
Implement a cooperative road management program with federal, state, and private landowners	IDL	High	Unknown	3
Increase personnel for enforcement of the Forest Practices Act and operator training	IDL	Medium	60,000 annually per new hire	Unknown
Encourage nomination of stream segments of concern to develop site specific BMP's		Medium	N.A.	6

Metals toxicity

Management Action	Lead Agency	Priority	Cost (dollars)	Funding Source(s)
Technically review proposed mining activities in the basin	IDEQ, IDL	High	N.A.	27
Implement a metals toxicity monitoring program	IDEQ	Medium	Unknown	Unknown
Complete a health risk assessment based on available literature	IDHW, PHD	Medium	30,000	Unknown

Motorized watercraft use

Management Action	Lead Agency	Priority	Cost (dollars)	Funding Source(s)
Require marinas to install pump-out stations	Bonner County	High	Unknown	13
Enforce the no sewage discharge standard	County Marine Division's	High	N.A.	Unknown
Implement a ban on phosphate detergents to clean watercraft	Bonner County, IDEQ	High	1,000 (development only)	1, 2, 12

MANAGEMENT OBJECTIVE: Reduce Nearshore Eutrophication in Pend Oreille Lake by Reducing Nutrient Loading from Local Sources (continued).

Shoreline Burning

Management Action	Lead Agency	Priority	Cost (dollars)	Funding Source(s)
Implement a county ordinance prohibiting shoreline burning	Bonner County, IDL	Medium	2,000 (development only)	1, 2, 12

Aquatic Macrophytes

Management Action	Lead Agency	Priority	Cost (dollars)	Funding Source(s)
Selective removal of aquatic plants by hand	Bonner County, Private	Low	100-1,500 for hand-held cutter	12, 13
Remove aquatic plants periodically using mechanical harvesting	Bonner County	Low	500-800 per acre biannually	12
Cover lake bottom with fabric barrier	Bonner County, private	Low	0.06-1.25 per sq. ft. with annual maintenance	12, 13

Environmentally sensitive or critical areas

Management Action	Lead Agency	Priority	Cost (dollars)	Funding Source(s)
Map environmentally sensitive areas with high water tables (wetlands)	COE, SCS	Medium	1,000	1, 12
Purchase or dedicate environmentally sensitive or critical areas		Low	Unknown	10, 11, 12, 13

MANAGEMENT OBJECTIVE: Improve Pend Oreille River Water Quality Through Macrophyte Management and Tributary Nonpoint Source Controls

Management Action	Lead Agency	Priority	Cost (thousands)	Funding Source(s)
Rotovation of milfoil in high use areas of the Pend Oreille River should continue, with additional emphasis on control of upstream pioneer colonies.	County, PUD	High	80K/year	1, 4, 16, 20
Purchase an additional rotovator to increase area coverage and enable alternative methods of harvesting, like strip rotovation.	County, PUD	High	135K	1, 4, 16, 18, 19, 20
Develop and maintain programs to educate the public on their role in preventing the migration of milfoil.	County, PUD, Ecology	High	10K/year	3, 4, 5, 16, 17, 18, 19
Resource managers should explore the possible use of harvested milfoil as a resource, in addition to herbicide application and biological agents as alternative milfoil controls.	County, PUD	Medium		1, 16, 18, 20
Tributaries exhibiting water quality problems from nonpoint sources should be referred to the Conservation District for additional sampling (if necessary), followed by BMP development and implementation.	Conservation District	High		3, 4, 17, 21
Grants secured by the Conservation District for BMP implementation should include post implementation monitoring to evaluate effectiveness of nonpoint source controls.	Conservation District	Medium		3, 4, 17, 21
As a general guideline, total phosphorus should not exceed 50 μg P/L in any tributary of the Pend Oreille River, nor 25 μg P/L within Box Canyon Reservoir.		Low		Unknown

MANAGEMENT OBJECTIVE: Improve Pend Oreille River Water Quality Through Macrophyte Management and Tributary Nonpoint Source Controls (continued).

Management Action	Lead Agency	Priority	Cost (thousands)	Funding Source(s)
Pend Oreille County should establish a local watershed management committee fashioned after the "nonpoint rule" (WAC 400-12).	County	High	40K	3, 4, 17, 19, 20
Pend Oreille County should form and manage a citizen monitoring program to gather current land use information in the Pend Oreille River Basin.	County	High	10K	3, 4, 17, 19
Ecology should maintain the Pend Oreille River at Newport as a core monitoring station and re-establish Metaline Falls as a rotating station to be sampled one year of every three.	Ecology	Medium	2K/year	1, 22
Pend Oreille River resource managers should utilize a GIS system for management of basin water resource data.	PUD, County	Medium	15K/year plus equipment	1, 19, 20

ABBREVIATIONS

BLM	U.S. Bureau of Land Management
COE	U.S. Corp of Engineers
EPA	U.S. Environmental Protection Agency
IDEQ	Idaho Division of Environmental Quality
IDHW	Idaho Department of Health and Welfare
IDL	Idaho Department of Lands
ITD	Idaho Transportation Department
MDHES	Montana Department Health and Environmental Sciences
N.A.	Not Applicable. Implementation is possible under current programs.
PHD	Panhandle Health District
SCD	Soil Conservation District
SCS	U.S. Soil Conservation Service
TMDL	Total Maximum Daily Load
USFS	U.S. Forest Service

FUNDING SOURCES *All funding sources are* ***possible funding sources.*** *No commitment for funding has been received from of any of the identified sources.*

1	Clean Water Act Section 525 Reauthorization
2	Clean Water Act Section 314 (Clean Lakes Program)
3	Clean Water Act Section 319 (Nonpoint Source Program)
4	State Revolving Fund
5	National Environmental Education Act
6	Idaho Antidegradation Policy
7	Agricultural Water Quality Management Program
8	Municipal Facilities Construction Grants Program
9	(Reserved)
10	Habitat Improvement Program (Idaho)
11	Forest Stewardship Program
12	Bonner County, Idaho
13	private landowner
14	(Reserved)
15	(Reserved)
16	Corps of Engineers Eurasian Watermilfoil Control Grants
17	Centennial Clean Water Fund (Washington)
18	Freshwater Weeds Account (Washington)
19	Pend Oreille County, Washington
20	Pend Oreille County Public Utility District, Washington
21	Pend Oreille Conservation District, Washington
22	State General Fund (Washington)
23	City of Missoula, Montana
24	City of Deer Lodge, Montana
25	City of Butte, Montana
26	Superfund Program
27	Clean Water Act Section 106 Funds
28	Municipalities
29	Industries/Dischargers

Taking the First Steps: Priorities for Action

Recognizing that it would be difficult to immediately implement all of the management actions outlined in the Management Matrixes, the Steering Committee has identified the following actions to be of the highest priority.

- ***Convene a Tri-State Implementation Council to implement the Management Plan recommendations.***

The Clark Fork-Pend Oreille Basin Water Quality Steering Committee is committed to working with the appropriate agencies and groups to convene a Tri-State Implementation Council to implement the management actions outlined in the plan. The Council should include representatives from federal, tribal, state and county agencies, along with citizens and special interest groups. The Council could also include representation from the suggested local watershed management committee in Pend Oreille County. (One of the management recommendations for improving Pend Oreille River water quality is the establishment of a local watershed committee fashioned after the Washington "nonpoint rule.") Since most of the recommended actions must be implemented at the local level, the Steering Committee recommends that the local agencies, tribes and other locally-based interest groups have a large role in the Council.

In particular, the Council should include or consult with all interested and affected Indian Tribes in the Clark Fork-Pend Oreille Basin and should ensure that the appropriate tribes be included in the planning and use of any funds allocated for water

quality monitoring of reservation waters as well as other activities that are necessary to implement the Clark Fork-Pend Oreille Basin Water Quality Management Plan.

There are several federally recognized Indian Tribes in the basin and many are developing resource management capabilities. Some have received federal "treatment-as-a-state" status under the federal Clean Water Act which makes them eligible to accept responsibility for developing and managing water quality programs. In addition, some of the Idaho and Washington tribes have formed the Upper Columbia United Tribes fishery research center with offices in Wellpinit, Washington, and on the campus of Eastern Washington University in Cheney.

Tribes likely to be most affected by this Management Plan are the Confederated Salish and Kootenai Tribes of the Flathead Indian Reservation in western Montana and the Kalispel Tribe in Washington. Several miles of the Kalispel Reservation are located directly on the banks of the Pend Oreille River. The Flathead River flows through the Flathead Reservation and contributes substantially to the nutrient loading in the lower Clark Fork River. Other tribes, such as the Spokane Tribe and the Colville Confederated Tribes in Washington and the Coeur d'Alene Tribe of Idaho, may not be directly affected by implementation of the plan but may have cultural interests or aboriginal territories in the Clark Fork-Pend Oreille Basin. The Council should be sure to keep these tribes apprised of its activities and decisions.

The Council would have various roles and responsibilities. These include, but may not be limited to, the following: building strong citizen, community and agency support for the plan; coordinating the activities of the various agencies implementing the plan; developing timetables; identifying funding; establishing budgets; securing agreements among agencies; establishing criteria for success; identifying or revising priority recommendations; communicating with appropriate groups as needed (e.g., the Upper Clark Fork Basin Steering Committee); and providing a forum for public input and support. The Council itself would not have any regulatory or enforcement authority beyond the authorities of the individual agencies represented on the Council.

! Establish a basin-wide phosphate detergent ban.

Studies by the University of Montana concluded that management of both nitrogen and phosphorus could reduce nuisance algal levels in the Clark Fork River and would be important in protecting reaches without current problems. Idaho researchers concluded that phosphorus is the primary nutrient controlling algal and plant growth in Pend Oreille Lake. In addition, the Montana Governor's Office in its 1988 Clark Fork Basin Project Status Report and Management Plan stated that "Regulatory agencies, industries, municipalities, and public interest groups should work to reduce all forms of nutrient loading to the Clark Fork Basin."

Phosphate in detergents is the source of much of the phosphorus discharged by municipal treatment plants, and approximately half of all soluble phosphorus loading to the Clark Fork River originates from wastewater discharges. Bans on the sale of high phosphate detergents are already in effect in Montana in the Flathead River Basin and in the communities of Missoula, Superior and Alberton. Bonner County, Idaho has also adopted a phosphate detergent ban. These actions have been highly successful in reducing phosphorus discharges to the Clark Fork River from the respective municipal wastewater treatment facilities. For example, the phosphate detergent ban that was implemented by the City of Missoula in May 1989 has resulted in greater than a 40 percent reduction in phosphorus loading to the Clark Fork River from the Missoula wastewater treatment plant. Concentrations of phosphorus in the river downstream from this facility have subsequently declined by a large margin. A modeling study conducted by the University of Montana predicted a reduction in algal standing crops in 110 miles of the Clark Fork River as a direct result of this action.

It seems clear that there have been very tangible water quality benefits associated with the elimination of the sale of phosphate detergents in Missoula. Therefore, the Steering Committee strongly recommends the adoption of similar bans in other basin communities. Adoption of bans at Butte and Deer Lodge, Montana, could

achieve a 10 percent reduction in soluble phosphorus loading to the upper Clark Fork River during summer. Adoption of bans at all remaining communities would have even greater cumulative effects and could reduce annual loading of soluble phosphorus to Pend Oreille Lake by five percent or more.

Low phosphate and phosphate free soap products are readily available to consumers and their effectiveness is not substantially different from high phosphate detergents.

! Establish numeric nutrient loading targets for the Clark Fork River and Pend Oreille Lake.

The Steering Committee has recommended the following targets for instream concentrations of phosphorus and nitrogen in order to attain the stated water quality objectives:

! Six micrograms per liter or less of soluble phosphorus and 30 micrograms per liter or less of soluble nitrogen in Clark Fork River.

! Two micrograms per liter of soluble phosphorus and five micrograms per liter of total phosphorus in Pend Oreille Lake.

! Fifty micrograms per liter of total phosphorus in several tributaries of the Pend Oreille River.

! No special instream conditions are warranted for the mainstem Pend Oreille River.

In order to meet these instream concentration targets of nutrients, it would be necessary to establish numeric loading targets for various reaches of the Clark Fork River and Pend Oreille Lake. Loads would then be allocated among the various sources contributing nutrients to those reaches. These numeric loading targets and the associated nutrient source allocations would not have to be regulatory but would provide voluntary reduction targets for the various point and nonpoint sources in the basin.

The Steering Committee recommends a voluntary approach to nutrient controls and pollution reduction in the Clark Fork-Pend Oreille Basin. However, Montana and Idaho would consider the application of mandatory wasteload allocations if voluntary measures fail to achieve the desired results.

- ***Develop and maintain programs to educate the public on their role in protecting and maintaining water quality.***

All three individual state plans as well as the overall Basin Management Plan put a high priority on public education. A comprehensive and well targeted public education program should have three main messages or components. First, inform watershed users how their activities directly affect the body of water that they depend on and value. The Steering Committee views this message as one of the most effective methods of reducing the amount of nutrients that enter the water. This component should include education about proper fertilizer and pesticide application, proper maintenance of septic tank systems, better agricultural and livestock management practices, and the benefits of low phosphate products.

Second, the public education program should clearly articulate water quality goals and benefits of improving and protecting water quality. Users and residents may be more willing to modify their activities to meet water quality goals that they understand. Third, the program should educate the public about the need for and benefits of any management action that is selected for implementation as a means of building public support for the action. For example, the public should be informed of the need for and benefits associated with stormwater and erosion control plans and how these plans would help to achieve the stated water quality goals.

Public education should begin before implementation, but it is particularly critical during implementation. Often nuisances are created and water uses are restricted while restoration is in progress. Examples would be shoreline stabilization, weed harvesting and stormwater improvements. People typically respond positively when they

understand what is occurring and why, and react negatively when they are uninformed.

- ***Control Eurasian watermilfoil by education, rotovation, and research into alternative methods.***

The primary problem afflicting Pend Oreille River water quality is pervasive milfoil. Rotovation, as the most effective management tool, should continue in high use areas of the river and an additional rotovator should be purchased to double the amount of weed beds cleared. Since harvested aquatic plants could have beneficial uses, resource managers should investigate alternatives to disposing of the harvested weeds on the banks of the river (e.g. using harvested materials as compost).

Local water quality managers may be able to experiment with herbicide control of milfoil, with projected state and federal technical and financial assistance. Biological agents, particularly aquatic insects and fungi, the subject of ongoing research, may also be an additional management method for the future.

To date, Eurasian watermilfoil is a problem only in the Pend Oreille River portion of the Clark Fork-Pend Oreille Basin. Milfoil is an invasive and adaptable plant that needs to be aggresively managed to prevent its spread into other parts of the basin. One of the primary means of spreading milfoil is by boaters. The milfoil is transported on the hulls of boats as boaters move from waterbody to waterbody. Therefore, educating boat owners on how they can help prevent the spread of milfoil is crucial.

- ***Install centralized sewer systems as part of development activities on Pend Oreille Lake.***

The Steering Committee recommends sewering in areas around Pend Oreille Lake that are experiencing development pressures. Prime high density development areas should be identified and zoned as such. Installation of centralized sewer systems in these high density development zones should be required before construction when the number of homes or commercial sites to be developed will exceed a specified

number of septic systems. The specified number should be based on soil type and slope. Existing septic systems in developed areas should be replaced with centralized sewer systems, but only when technically or economically feasible.

Sewering will soon be underway at Hope and East Hope, Idaho. The Steering Committee recommends that LaClede, Clark Fork and Trestle Creek be targeted as the next areas for installation of centralized sewer systems.

- ***Institute seasonal land application and other improvements at the Missoula municipal wastewater treatment facility.***

Utilization of treated municipal wastewater for agricultural irrigation is one potentially beneficial alternative for reducing the discharge of nutrients and other pollutants to surface waters. Most of the water quality problems associated with nuisance levels of algae in the Clark Fork River occur during the summer. During this period, the largest share of nutrients that feed the algae come from wastewater discharges.

If the entire volumes of municipal wastewater from the Deer Lodge and Missoula municipal wastewater treatment facilities were utilized for irrigation purposes during the months of July through September, summer nutrient loading to the upper and middle reaches of the Clark Fork River could decrease by as much as 30 and 70 percent, respectively. Nutrient concentrations in the reaches of the river below these discharges would decline by as much as 70 percent or more. Target levels would be achieved for phosphorus and nitrogen in the middle Clark Fork River and for phosphorus in the upper Clark Fork River. Lastly, annual reductions in soluble nutrient loading to Pend Oreille Lake of from 3-10 percent could be realized. Implementation of this alternative could reduce current summer algal levels in 200 or more miles of the Clark Fork River.

The City of Missoula has evaluated the opportunities for land application of its municipal wastewater. While a number of precautions are necessary, and legal issues relative to downstream water rights have not yet been explored, land application

appears to be a viable option. Sewer rate increases of 31 percent were projected in order to utilize land application, therefore strong support of this alternative by the citizens of Missoula would be necessary for implementation.

- ***Better enforcement of existing regulations and laws, in particular states' anti-degradation language.***

A nutrient control strategy for the Clark Fork-Pend Oreille Basin logically should consider and build upon the pollution control measures that are already in place. A number of programs, statutes, regulations, and planning efforts are in effect now or will be implemented in the near future. There are too many to list here and many are identified in the individual state plans, but some examples include the NPDES program for control of point source discharges; the Nonpoint Source Pollution Control Program which requires states to establish a framework for controlling nonpoint sources; Tribal Water Quality Programs which are developing comprehensive water quality management plans; Idaho's Nutrient Management Act; the Upper Clark Fork River Basin Management Plan; and Washington's Aquatic Plant Management Program.

A notable and important existing program is each state's Nondegradation Rules. The Nondegradation Rules are part of each state's water quality standards and apply to new or increased sources of pollution. The specific nondegradation language is different in each state's laws. Generally, however, nondegradation requirements state that if existing water quality is better than that which is necessary to support the designated uses of the waterbody as defined in the water quality standards, that level of water quality must be maintained. Montana, in particular, should enforce a consistent and aggressive policy of nondegradation, with respect to nutrient loading from new and enlarged point source discharges, because of the well-documented water quality problems in the Clark Fork River. It should be noted that MDHES has proposed legislative changes to the nondegradation statute in order to clarify its intent and ensure its consistent application.

One of the first steps that the Council should take to enforce existing authorities is to compile a list of all pertinent laws and the agencies responsible for their enforcement. From there, the issues and problems associated with their enforcement should be identified and this information distributed to all appropriate agencies.

- ***Establish and maintain a water quality monitoring network to monitor effectiveness and trends and to better identify sources of pollutants.***

Preliminary instream nutrient targets for the Clark Fork River, Pend Oreille Lake, and tributaries to the Pend Oreille River have been proposed in this report. A continuing basin-wide monitoring program to evaluate progress towards achievement of these target concentrations will be an essential component of a successful nutrient control strategy.

Presently all three states have some fixed station monitoring sites in the basin. MDHES has maintained a network of fixed monitoring stations throughout the Clark Fork River drainage since 1985. Idaho DEQ has contracted with the USGS to continue monitoring tributaries and outflows of Pend Oreille Lake. Washington maintains a routine monitoring station on the Pend Oreille River at Newport. As long as funding remains available, all three states plan to continue these programs in order to provide the needed information to assess trends in nutrient concentrations and loads throughout various areas of the basin and to evaluate overall progress toward water quality goals.

However, these programs will need to be expanded, or separate programs initiated, to monitor the successful implementation and effectiveness of individual management actions basin-wide. Anytime an implementation project is funded and initiated, a portion of the project budget should be set aside for water quality monitoring before and after implementation to evaluate the project's effectiveness. In addition, citizen volunteer monitoring programs should be initiated or modified as appropriate to collect information that would be useful to assess long term trends or to provide information that is not available elsewhere. For example, information on current land

use in Pend Oreille County is needed. Available information is over 20 years old. Detailed land use information would be a significant contribution to the refinement of the watershed management plan.

Finally, the Steering Committee recommends that a larger Clark Fork-Pend Oreille Basin GIS System be developed and maintained by an appropriate agency or group of agencies.

- ***Develop and enforce stormwater control and erosion control plans and county ordinances.***

Due to increased population and development around Pend Oreille Lake, the Steering Committee recommends that the Tri-State Council work with Bonner County to incorporate stormwater and erosion control plans during the current updating of the county's comprehensive plan. The recently completed Kootenai County erosion control plan could be used as a model and revised as appropriate for Bonner County.

Appendix A: Glossary

algae Small aquatic plants lacking stems, roots, or leaves which occur as single cells, colonies, or filaments.

algal bloom Rapid, even explosive growth of **algae** on the surface of lakes, streams, or ponds; stimulated by **nutrient** enrichment.

beneficial use Any of the various uses which may be made of the water, including, but not limited to, domestic water supplies, industrial and agricultural water supplies, recreation in and on the water, wildlife habitat, and aesthetics. Any use may not lower the ambient **water quality.**

benthic The bottom of lakes, streams or ponds.

best management practices Accepted methods for controlling nonpoint source pollution; may include one or more conservation practices.

chlorophyll *a* The dominant green, photosynthetic pigment in plants; a measure of aquatic plant production.

coliform bacteria A group of bacteria found in the colons of animals and humans, but also in natural soil and water where organic content is high. The presence of coliform bacteria in water is an indicator of possible **pollution** by fecal material.

cultural eutrophication An accelerated rate of lake aging induced by human sources of **nutrients, sediment,** and organic matter.

discharge In the simplest form, discharge means outflow of water. The use of this term is not restricted as to course or location and it can be used to describe the flow of water from a pipe or from a drainage basin. Other words related to discharge are runoff, **flow,** and yield.

dissolved oxygen Molecular oxygen freely available in water and necessary for the respiration of aquatic life and the oxidation of organic materials.

drainage area The land area contributing runoff to a stream or other **body of** water, and generally defined in terms of acres, square miles, or square kilometers.

effluent The **sewage** or industrial liquid waste which is released into natural waters **by** sewage treatment plants, industry, or septic tanks.

erosion The wearing away of the landscape by water, wind, ice, or gravity to smaller particles, usually **sediment.**

eutrophic Literally, "nutrient rich." Generally refers to a fertile, productive body of water. Contrasts with **oligotrophic.**

eutrophication The natural process **by** which lakes and ponds **become** enriched with dissolved **nutrients,** resulting in increased growth **of algae** and other microscopic plants and reduced **water clarity.**

flow The rate of water discharged past a point expressed in water volume per unit time.

littoral zone That portion of a lake or pond extending from the shoreline lakeward to the greatest depth occupied **by** rooted aquatic plants.

load The amount of substance, usually **nutrients** or **sediment,** discharged past a point; expressed in weight per unit time.

mesotrophic Literally, "moderate nutrients." Generally refers to **a** moderately fertile body of water.

nitrogen An essential **nutrient** for aquatic organisms, comprising 80% of the earth's atmosphere.

nonpoint source pollution Pollution discharged over a wide land area, not from one specific location.

nutrient loading The addition of **nutrients,** usually **nitrogen** or **phosphorus,** to a water body (often expressed as g/m^2 of lake surface area per year) . The majority of nutrient loading in a lake usually comes from its tributaries.

nutrients Elements or compounds essential to life, including but not limited to oxygen, carbon, **nitrogen,** and **phosphorus.**

oligotrophic Literally, "nutrient poor." Generally refers to an infertile, unproductive body of water. Contrasts with **eutrophic.**

pelagic zone The open area of a lake from the **littoral zone** to the center of the lake.

Phosphorus An essential **nutrient** for aquatic organisms derived from weathered rock and human sources.

phytoplankton Usually microscopic aquatic plants (sometimes consisting of only a cell).

point source pollution Pollutants discharged from any identifiable point, including pipes, ditches, channels, sewers, tunnels, and containers of various types.

pollution Any alteration in the character or quality of the environment which renders it unfit or less suited for **beneficial uses.**

primary production The synthesis of organic compounds by green plants in the presence of elements (e.g. **nitrogen, phosphorus)** and light energy.

secchi depth The mean depth at which a black and white disk 20 centimeters in diameter is no longer visible from the water surface; a measure of water transparency.

sediment Fragmented organic and inorganic material derived from the weathering of soil, alluvial, and rock materials removed by **erosion** and transported by water, wind, ice, and gravity.

sewage The water-carried human and animal waste from residences, buildings, industrial establishments, or other places, together with groundwater infiltration and surface water.

stormwater runoff Surface water runoff, usually associated with urban development, which carries both natural and human-caused **pollutants.** Stormwater runoff can be conveyed to lakes, ponds, and streams either through **point** or **nonpoint sources.**

trophic status Referring to the nourishment status of a water body, e.g. **oligotrophic, eutrophic.**

wastewater Treated or untreated **sewage,** industrial waste, or agricultural waste with such water as is present. Sometimes referred to as **effluent.**

water clarity The ability of water to transmit light; often reported as **secchi depth.**

water quality standard Legally mandated and enforceable maximum contaminant levels of chemical, physical, and biological parameters for water. These parameters are established for water used by municipalities, industries, agriculture, and recreation.

water quality A term used to describe the chemical, physical, and biological characteristics of water with respect to its suitability for a **beneficial use.**

watershed An area of land that contributes surface runoff to a given point in a drainage system.

wetlands Lands where water saturation of the soil for at least part of the year is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the surrounding environment. Other common names for wetlands are sloughs, ponds, swamps, marshes, and riparian areas.

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Appendix C: Response to Public Comments

INTRODUCTION

This appendix contains public comments received on the draft Clark Fork-Pend Oreille Basin Water Quality Study: A Summary of Findings and a Management Plan. The 30-day public comment period ended August 3, 1992. Public meetings were held in Deer Lodge (July 13), Missoula (July 14), Sandpoint (July 15), and Newport (July 16), to hear comments and concerns. Those meetings were tape recorded and the comments received are summarized (paraphrased) below. In addition, a notice that the draft plan was available for review was sent to over 500 persons. Responses to written comments follow the responses to comments at the public meetings. Responses from the Clark Fork-Pend Oreille Water Quality Study Steering Committee are provided in bold.

PUBLIC WORKSHOPS

Deer Lodge, Montana, July 13, 1992

Registered Attendees

Peter Chapin	Butte, Montana
Tom Neihart	Deer Lodge, Montana
Ivan Wallgren	Deer Lodge, Montana
Pat Hansen	Avon, Montana
Dick Hafer	Anaconda, Montana
Ron Kelley	Deer Lodge, Montana
Pat McDonald	Philipsburg, Montana
Dick Pederson	Helena, Montana
Wayne Hadley	Deer Lodge, Montana
Errol Hammond	Deer Lodge, Montana
Frances B. Helton	Deer Lodge, Montana
Sally Spear	Anaconda, Montana

Comments and Responses

! The end of July does not allow enough time to comment on the draft management plan.

The public comment period could not be extended beyond August 3, 1992 due to the publication deadline for the final draft report.

! Agriculture, mining, and timber interests should have been represented on the Steering Committee.

EPA had a mandate from Congress to conduct a water quality assessment of the Clark Fork-Pend Oreille Basin with emphasis to be placed on nutrients and eutrophication issues. Scientists and managers on the three-state steering committee directed the scientific studies. Now that we have completed the investigations and identified pollution sources, we are soliciting input from all interested parties with regard to management alternatives. We are recommending that implementation of the selected alternatives be directed by a Tri-State Council which will include representatives of all potentially affected parties.

! Agriculture is the economic mainstay of the upper Clark Fork Basin. I am not convinced agricultural activities are a significant source of nutrient pollution in the basin, especially when tributaries with similar land use have different nutrient levels. We should look more closely to pinpoint the sources of nutrients in tributary drainages.

Approximately 75 percent of the soluble nitrogen loading to the Clark Fork River originated from various nonpoint sources. The relative contribution from agricultural activities was not determined. Recommended management actions include the identification and control of nutrient sources in specific tributary watersheds, regardless of the land uses that may be responsible.

! Clark Fork River streambanks should be stabilized so they don't erode into the river.

Eroding streambanks can be a significant source of phosphorus loading to streams. The Superfund Program has placed a high priority on stabilizing streambanks and tailings areas in the upper Clark Fork Basin to control metals inputs. These actions will also serve to reduce nutrient inputs to the river.

! Will the cost-effectiveness of the management alternatives be considered?

Costs versus potential benefits of the various management alternatives was considered in the assignment of priority ratings. It will continue to be an important factor in the implementation process.

! Would aeration at the Deer Lodge sewage lagoon improve the quality of the discharge to the Clark Fork River?

The lagoon is currently aerated. The design capacity of the system currently exceeds the population served and treatment efficiency is high. A problem is that streamflows in the Clark Fork River in this area are small during summer when the nuisance algae are most prevalent and dilution rates for the wastewater are relatively low.

! Aren't nutrient loads to the upper Clark Fork River from tributaries fairly small during the

summer? It appears that the Butte and Deer Lodge municipal wastewater discharges account for the majority of nutrient loading to the upper Clark Fork River during the summer.

Nutrient loads from upper Clark Fork River tributaries are individually rather small during the summer, despite elevated nutrient concentrations in many of them. Many of the tributaries are heavily utilized for irrigation and the total volume of water which reaches the Clark Fork during summer is limited. However, tributary sources are collectively important, accounting for perhaps 60 percent of the soluble nutrient loading to the upper Clark Fork during the summer when algae problems are most severe. The remaining 40 percent originates from municipal wastewater discharges, with 80 percent of the total coming from the Deer Lodge sewage lagoon.

! Is nitrogen or phosphorus, or both, limiting to the growth potential of the filamentous green alga Cladophora in the upper Clark Fork River? What is the role of high spring streamflows on the development of nuisance levels of filamentous algae in the upper Clark Fork?

Based on an examination of instream nitrogen to phosphorus ratios, it would appear that nitrogen is most often the limiting nutrient with respect to algal growth potential in the upper Clark Fork River (above the Blackfoot River confluence) during the summer. However, both nitrogen and phosphorus concentrations are currently high enough in much of this reach of the river to support nuisance growths of algae. Control of both nitrogen and phosphorus sources is warranted.

Periodic channel-scouring streamflows would be expected to provide some benefit from the standpoint of controlling nuisance algal growths in the Clark Fork River. This is especially true for diatom (slime) algae. However, experience has shown that the basal holdfasts (or point of attachment to the stream bottom) of Cladophora are capable of withstanding normal spring runoff water velocities and associated scouring with no apparent detrimental effects. Filamentous algae "blooms" in the upper Clark Fork have occurred in recent years immediately following the subsidence of "normal" spring runoff conditions. Scouring flows of a magnitude sufficiently high to actually tumble stream bottom rocks would probably destroy Cladophora holdfasts and reduce the potential for algal blooms for several months.

! Why did Anaconda and Opportunity not appear as nutrient sources in the findings of the Section 525 assessment?

Anaconda's municipal wastewater is treated in a lagoon system and stored in holding ponds for seasonal irrigation usage. There is no direct discharge to the Clark Fork River or any of its tributaries.

Opportunity has no central sewage treatment facility and residences are on

individual septic systems. The area has very shallow groundwater levels and serious problems with the operation of septic systems. Surfacing sewage is a common problem and a recognized health hazard. Some of the groundwater enters the Mill and Willow creeks bypass channel around the Warm Springs treatment ponds. Elevated nitrogen levels in the Mill-Willow Bypass are believed to originate from septic systems in the Opportunity area. This was discussed in several of Montana's Section 525 annual reports. A sewage collection and treatment system for Opportunity is badly needed.

! The steering committee has recommended that Deer Lodge sewage effluent be seasonally land-applied at an initial construction cost of $405,000. Is there a time limit within which the city must do this?

The steering committee developed the various management alternatives from the standpoint of which actions would achieve the greatest instream improvements in water quality. They are recommendations only, recognizing it may well be impractical for communities such as Deer Lodge to bear the cost of implementing major actions such as land application. The proposed Tri-State Council will be responsible for coordinating implementation of the plan, developing a timetable, and securing funding for high priority alternatives. Even with adequate funding, the successful implementation of the plan will require strong citizen, community and agency support.

Missoula, Montana, July 14, 1992

Registered Attendees

Wendy Moore	Lolo, Montana
Barry L. Dutton	Missoula, Montana
Jon Schulman	Missoula, Montana
Peter Nielson	Missoula, Montana
David Haire	Pablo, Montana
Murray Carpenter	Missoula, Montana
Gail Miller	Missoula, Montana
Lorraine Gills	Philipsburg, Montana
J. F. Schombel	Missoula, Montana
Steve Schombel	Missoula, Montana
Patti Hansen	Gold Creek, Montana
C. B. Pearson	Missoula, Montana
Stu Levit	Missoula, Montana
Les Billingten	Missoula, Montana

John Donahue	Missoula, Montana
Terry & C. McLaughlen	Missoula, Montana
Anne Stewart	Missoula, Montana
Ross Miller	Missoula, Montana
John McDonald	Philipsburg, Montana
Esther J. McDonald	Philipsburg, Montana
Mike Snavely	Missoula, Montana
Hal Ort	Missoula, Montana
Earl Reinsel	Missoula, Montana
Mark Sanz	Missoula, Montana
Liz Colantuono	Missoula, Montana
Seth Makepeace	Pablo, Montana
Ron Broker	Missoula, Montana
Linda Lee	Missoula, Montana

Comments and Responses

! What is the source of nonpoint pollutants in Clark Fork tributaries?

Numerous land use activities occur in the Clark Fork Basin and all have the potential to cause nonpoint source pollution. An assessment of nonpoint sources was conducted in 99 Clark Fork Basin tributary drainages as part of the Clark Fork-Pend Oreille Basin Water Quality Study. It was learned that grazing, road development, mining, logging and irrigation were the dominant land uses in tributary drainages rated as having impaired water quality. More information on the Clark Fork Basin nonpoint source assessment is available in Montana's draft management plan.

! Do you think streambank erosion is a significant concern from the standpoint of nonpoint source pollution?

Yes. Eroding streambanks have a direct negative effect on downstream water quality and beneficial water uses. Suspended sediment and turbidity levels may be increased. Stream channels may become wider and shallower, thereby affecting water temperature and fish habitat. Concentrations of nutrients, especially total phosphorus, may increase. In the upper Clark Fork, eroding streambanks contribute heavy metals to the river because of the abundance of streamside mine tailings deposits.

! What is the source of phosphorus in Gold Creek?

Gold Creek drains the geologically phosphorus-rich Phosphoria formation and Cabbage Patch Tertiary lake beds. Much of Gold Creek's phosphorus load is believed to come from these natural sources, although irrigation practices may

contribute to their influence. This was the subject of a 1991 University of Montana M.S. thesis by Jennifer Carey.

! Have you studied the contribution of irrigation return flows to late season instream flows in the Clark Fork?

No. It was a recommendation of the interstate steering committee to preserve adequate streamflows in the Clark Fork. Our rationale was that any improvements in the quality of wastewater discharges can quickly be reversed if dilutional streamflows are not maintained. The Upper Clark Fork Basin Steering Committee is currently developing a water management plan and has expressed an interest in exploring your question. There may be some benefit to late season streamflows in certain reaches of the river and in various tributaries resulting from land application of water (irrigation) during earlier months.

! Isn't the algae problem in the river related to a prolonged drought and/or a lack of scouring streamflows?

The nuisance algae problem in the Clark Fork River is a common occurrence dating back at least to the early 1970's, or about the time that improved treatment of mine discharges in the headwaters reduced copper levels in the river. Copper is highly toxic to algae and some suspect that the former high copper concentrations prevented the algae from reaching nuisance proportions. The recent drought years have undoubtedly made the algae problem worse by increasing water temperatures and nutrient concentrations and decreasing the frequency of scouring.

! There is a need to better coordinate local planning processes and subdivision review with watershed protection efforts such as the Section 525 project.

The proposed Tri-State Council will include representatives from all levels of government within the basin, as well as citizen's groups. This should improve coordination and communication between entities in the Clark Fork-Pend Oreille Basin. In addition, the Clark Fork-Pend Oreille Basin Water Quality Study has documented surface water problems in the Missoula area resulting from subdivisions. The Montana Department of Health will be meeting with local officials there to
formulate a new policy for future development proposals where surface waters may be impacted.

! There is a problem with developers finding loopholes in the subdivision regulations. I have heard that 90 percent of the rural lots in the Missoula area are developed without ever going through the subdivision review process.

Subdivisions in Montana, defined as lots less than 20 acres in size, are regulated under two acts. The Subdivision and Platting Act empowers the county commissions and planning boards to review subdivisions for planning matters (impacts on services, taxation, natural environment, wildlife, public health and safety...). The Sanitation in Subdivisions Act requires that the State or contracted authority review subdivisions for adequate sanitary facilities (water, wastewater, solid waste and storm drainage).

There are exemptions available from each act. It is very common for land owners in rural areas to divide off a single parcel for sale and exempt the division from planning review. This exemption can be claimed once each 12 month period for a given parcel of land. Such lots are, however, subject to sanitary review.

Attempts have been made in the past to change the legislation and will most likely be proposed for the next legislative session as well.

! Action levels for nitrate in groundwater are being developed for the Missoula aquifer. Can we develop nutrient action levels for surface waters?

Nutrient criteria for surface waters must be developed on a site-specific basis, if the criteria are to be meaningful. This is essentially what we have done for the Clark Fork River and Pend Oreille Lake through the Clark Fork-Pend Oreille Basin Water Quality project. The response to the next question provides further explanation.

! We need to adopt firm, enforceable standards for nutrients in the Clark Fork River rather than goals and develop a plan to meet those levels instream.

The Clark Fork-Pend Oreille Basin Water Quality project was successful in determining nutrient concentrations for the Clark Fork below which algal densities can be controlled. These are called "saturation" concentrations. Unfortunately, we cannot at this time establish a defensible lower limit for nutrients where we can be assured that all beneficial water uses will be protected all of the time. In the absence of these standards, we have proposed nutrient concentration target levels for the river. These numbers are 6 micrograms per liter (μg/l) for soluble Phosphorus and 30 μg/l for soluble Nitrogen and are comparable to nutrient concentrations found in reaches of the Clark Fork that normally do not sustain nuisance growths of algae or experience the related dissolved oxygen and aesthetics problems. The proposed management actions have been developed to help achieve these target levels instream. As stream modeling exercises and other work can be carried out, we anticipate that more definitive nutrient standards will be developed and enforced.

! Can the Montana Department of Health, under the broad authority of the federal Clean

Water Act, develop administrative rules to ban the sale of phosphate detergents throughout the Clark Fork Basin? This approach would be superior to having to pass numerous local ordinances.

The Clean Water Act provides broad authority to survey, report on, and to correct water quality problems. The Montana Water Quality Act is patterned after the Clean Water Act but gives the state of Montana broader and stronger authority than the federal legislation. The Department will examine its administrative rule-making authority under the Act with regard to phosphate detergent bans as a means of controlling a recognized pollution problem in the Clark Fork Basin.

! Montana has a law against land application of treated wastewater within floodplains. There may be opportunities for a variance from the law in situations where the alternative is a direct discharge to the river. We need to take a critical look at Missoula's land application feasibility study and come up with a practical alternative.

Wastewater disposal systems discharging treated wastewater onto lands located within a designated floodplain are allowable as long as the land is not within the designated floodway and the disposal systems meet standards and/or laws set by the Montana Department of Health. Pollutants cannot be discharged to floodwaters and the systems for disposing of the wastes must be able to withstand damage caused by flood conditions. The systems could only operate under prescribed operating conditions.

! If a TMDL wasteload allocation process is implemented in the Clark Fork Basin, communities with phosphate detergent bans already in place should receive extra allocation credits.

A TMDL would be based on allowable pollutant loadings to a given reach of the river. The allowable load would then be apportioned among all point and nonpoint source contributors to that reach of river. The current degree of wastewater treatment, including source controls such as phosphorus detergent bans, would be a major consideration in the allocation process.

! Why was the correction of nonpoint sources of nutrients in upper Clark Fork tributaries listed as a medium rather than a high priority action item?

Nutrient loads from upper Clark Fork tributaries are individually rather small but collectively important. Together they provide about 60 percent of the soluble nutrient loading to the upper Clark Fork during the summer when algae problems are most severe. The anticipated cost of nonpoint source controls in many miles of tributary streams versus the benefits was a factor in the priority rating. Considering the cumulative impact of these nutrient sources on water uses in the upper river,

this alternative has been elevated to a high priority rating in the final plan.

! You didn't mention the possibility of funding the various management alternatives through a variety of sources. Perhaps we should seek implementation money through a reauthorization of Section 525 of the Clean Water Act, especially for the more expensive alternatives such as land application of the Missoula municipal wastewater.

A number of potential funding sources were identified for the proposed management alternatives, including Section 525 of the Clean Water Act. The steering committee recognizes that successful implementation of the management plan will depend upon meeting the challenge of securing adequate funding. We remain open to any funding suggestions.

! What is the timetable for the proposed revisions to Montana's Nondegradation Statute and how will that relate to the proposed alternatives outlined here tonight?

The Montana Department of Health is optimistic that revisions to the current nondegradation rules can be finalized by early in 1993. Anticipated changes that may be relevant to nutrient controls in the Clark Fork Basin include reduced limits for nitrate in groundwater and new standards for groundwater that discharges to surface waters. In particular, the proposed changes may help to control groundwater sources of nitrogen loading to the Bitterroot River.

! There have been a lot of questions tonight but not many comments. I'd like to offer my three point plan for the Clark Fork River. First, we need to continue and expand monitoring programs on the river to document successes and to prove the validity of our actions. Second, we need to do things to get results. We know enough about the river to implement actions now. The public wants to see things happen. Taking action does a lot to build public support for your programs. Lastly, we need to continue to study the system through basin-wide and region-wide modeling of surface and groundwater resources as well as through special smaller scale studies.

The steering committee fully concurs with your suggestions.

! What is the City of Missoula's position on land application of its municipal wastewater as proposed in the draft management plan? The land which has been identified as suitable for wastewater application has increasing subdivision potential. The City should pursue a lease or purchase of this property while they still can because costs can be expected to increase.

Joe Aldegarie, Missoula's Director of Public Works, has indicated that the city council is environmentally concerned and will give serious consideration to alternatives that could lesson the impact of the city's municipal wastewater on the

Clark Fork River. However, cost is a consideration. A 38 percent sewer rate increase is projected for land application of nine million gallons per day of wastewater for six months of the year. Some of the suitable land which may be available for land application is already being subdivided. These lots are selling at high prices and it may be hard to convince adjacent landowners to sell or enter into long-term lease agreements with the city. There is no money in the city's Fiscal Year 1993 budget to purchase or lease land. At the current time, the city has contracted with a private engineering firm to evaluate alternative nutrient removal technologies and associated costs. No decision on land application will be made until after this study is completed.

! Have you looked at the potential effects of nutrient reductions on fisheries resources in the Clark Fork River?

Yes. This area of concern was addressed in a project-related report entitled "Potential Effects of Nutrient Control Measures in the Clark Fork Basin on Resident Fisheries" (Knudson, 1992). The report concluded there was a low probability of reduced fish production associated with the proposed management actions.

! Unless there is going to be tertiary treatment or land application, I don't see the sense of requiring sewage collection and central treatment of Missoula subdivision wastewater over septic tanks. There isn't a significant reduction in nutrients in conventional treatment plants is there?

It is true that the conventional secondary sewage treatment process does not markedly affect nutrient concentrations. However, point source discharges are easier to treat, control and monitor than diffuse, nonpoint sources such as seepage from septic tanks. Additionally, septic tanks are a major contributor to the increasing nitrate levels in Missoula's sole source groundwater aquifer. When coupled with the proposed disposal alternatives for the Missoula wastewater treatment facility, sewering of Missoula's rural subdivision areas makes a lot of sense.

! Is the Department looking at revising the current 10 mg/l nitrate standard for surface waters? The current standard is not doing a very good job of protecting beneficial uses in the Clark Fork River.

The 10 mg/l nitrate standard is a health-based standard for drinking water supplies (and for streams with designated drinking water supply usage) and will remain as such. A universal surface water standard to protect against the growth-stimulating effect of nitrogen has not been quantified because it must be developed on a site-specific basis. This problem was discussed at length in Montana's Clark Fork Basin nutrient management plan.

Sandpoint, Idaho, July 15, 1992

Registered Attendees

R. Hawkins	Sandpoint, Idaho
Ken Heffner	Sandpoint, Idaho
Charlton Mills	Sandpoint, Idaho
Doug Worman	Sandpoint, Idaho
Dennis Clark	Sandpoint, Idaho
Bayview Chamber of Commerce	Bayview, Idaho
E. H. Robbins	Sagle, Idaho
Al Bricker	Sandpoint, Idaho
Ed Bittner	Sandpoint, Idaho
Kevin M. Laughlin	Sandpoint, Idaho
Tom & Nancy Renk	Sandpoint, Idaho
Daily Bee	Sandpoint, Idaho
Liz Sedler	Sandpoint, Idaho
Jim Hahn	Sagle, Idaho,
Bill Middleton	Hope, Idah
Jerry Palmer	Sandpoint, Idaho
Lloyd Pierce	Bayview, Idaho
Robert Tate	Sandpoint, Idaho
Harold Riese	Sandpoint, Idaho
Gene Brown	Sandpoint, Idaho
Joel Petty	Sandpoint, Idaho
Pam Auman	Sandpoint, Idaho
Juanita Whitson	Sagle, Idaho
James D. Thomas	Bayview, Idaho
Kathie Hasselstrom	Coeur D'Alene, Idaho
Norman Bonner	Ponderay, Idaho
Jean Gerth	Sandpoint, Idaho
David Sawyer	Sandpoint, Idaho
Scott Engstrom	Sagle, Idaho

Comments and Responses

! When will the final Idaho plan be available?

Draft Pend Oreille Lake project reports are now being reviewed internally. The final reports will be available late this fall. They will consist of three volumes; an

executive summary, a management plan, and a collection of contractor reports. The public can receive a copy of the executive summary and management plan by signing the "Request for Copy" sheet circulating this evening or by contacting our office. Due to publication expenses, copies of the contractor reports will be on display at local libraries or can be obtained at printing costs. This should be about $16.00.

! Is there any more detail in the Idaho management plan?

Yes, our management plan will give the rationale behind the recommendations for controlling nutrients in Pend Oreille Lake. It will also elaborate on contractor findings.

! How was the Idaho plan put together?

The formulation of management recommendations began nearly two years ago when the Policy Advisory Committee identified priority issues and set management goals for both open and near shore lake conditions. Then DEQ reviewed other state management plans, Citizens Clean Lakes Council options, and drew upon their experience in lakes management to develop a list of management options relating to the priority issues. These options were then presented to the PAC who selected the preferred recommendations.

! What is the status of the lake drawdown option?

The PAC decided to include the lake drawdown option for future consideration in the event Eurasian water milfoil ever got established in Pend Oreille Lake. This is why it does not appear in the management plan as an action item. Dr. Falter's work indicates that the current drawdown may be preventing Eurasian water milfoil from becoming established in Pend Oreille Lake.

! Does lake drawdown and its flushing action increase the flow of nutrients through the system, thereby reducing eutrophication?

That type of information was not collected as part of the Pend Oreille Lake Project. However, I would say no. Study of the vertical and horizontal distribution of the Clark Fork River inflow revealed different patterns. In 1989, the turbid river-water plume was routed into the northern part of the lake while in 1990 the turbid water extended throughout the lake. Irrespective of the different distributions, net retention of total phosphorus and total nitrogen in Pend Oreille Lake was about equal in both years.

! Is it possible to monitor for toxic metals, especially in the lower river and the lake's near

shore, before ASARCO builds its Rock Creek Project?

We have quite a bit of baseline information on the Clark Fork River. The Montana Water Quality Bureau has been monitoring metals below Thompson Falls Dam, at Noxon Bridge, and below Cabinet Gorge Dam from 15 to 17 times a year since September 1985. We are also concerned about possible metals problems from the ASARCO mine, so to establish a baseline, we started monitoring Rock Creek about three years ago.

! Is it possible metals from the upper river could are getting into the lake?

As far as heavy metals getting to the lake from the upper river, studies have shown metals being contained by the Milltown Dam. Cabinet Gorge and Noxon reservoirs have also been studied. Metals enrichment was found but at much lower levels than at Milltown. There may be some metals enrichment in the lake, but it is probably very insignificant. Most of the metals in the system are moving with sediments. They are not in solution and, therefore, would probably be very hard to detect in the lake.

! A friend told me there is a hole in the Noxon Dam.

I work at Noxon Dam, and I can tell you there are no holes in the dam.

! Regarding your map that shows developable land, I live in one of those areas and I would call it developed. What criteria was used for "developable?"

Eastern Washington University-Department of Urban and Regional Planning inventoried land uses in the watershed. For the purpose of their inventories, developable lands were parcels less than 10 acres which had no structures and were privately owned. Unfortunately, the map does not provide the resolution to which the data was interpreted and only general categorization of land development is possible.

! Regarding some of the options proposed, a lot of these are already on the books as laws with state agencies, but they aren't enforced. Unless enforcement is a priority, regulations and ordinances will not work.

The Steering Committee fully concurs.

! I understand that EPA Region 10 had to do some battling with headquarters to get the money that had been appropriated by Congress. Has an accounting been done to verify that all the money came through to Region 10?

No retrospective account audit has been done of the project, however, all money appropriated by Congress for this study was received by the EPA Regions.

! The Draft Environmental Impact Statement will be coming out soon from the Idaho Department of Transportation on the Highway 95 Sandpoint by-pass. If the by-pass goes along the creek, it will cause a tremendous amount of sedimentation and erosion into the creek and lake. Has DEQ had any input into the Draft EIS, and are you concerned about the overall effect of this project on Pend Oreille Lake?

Yes, we are concerned about the effects of the by-pass on Pend Oreille Lake water quality and have prepared two responses for consideration in formulating alternatives in the Draft EIS. Of course, our primary concern is the protection of water quality especially with the heightened public awareness generated by this project. One recommendation was to upgrade existing roadways whenever possible to minimize compacting and exposing new soils. We suggested a plan which addresses measures to control erosion during all phases of construction and offered to review this plan on the ground during construction. Other water quality concerns included alteration of groundwater flow and maintaining public drinking water supplies, the destruction of wetlands and aquatic habitat, and leakage from stored fuel. Your concern over the accidental release of toxic substances is real. However, an emergency response action plan already exists. This plan provides a structure for response to emergency situations. We will comment when the Draft EIS is available for review.

! I am disappointed in the turnout tonight. We have 35,000 people in this county. Where are they? I believe there is a need to have a clearinghouse for information from studies that have been done and other environmental information. I feel that the agencies' right hand doesn't know what the left hand is doing. This is a frustration for the public.

Comment noted.

! I am concerned about mining adits and the contamination of groundwater. Mining adits around the lake need to be reclaimed. No one is willing to take care of this problem. Who is responsible?

I understand your frustration. A local water quality task force has looked at past mining activities near Lakeview to identify the extent of the problem and brainstorm on what can be done. Who is responsible does not seem to be as big a question as where do we find the money to fix the problem. Both of these questions are compounded when we are talking about activities that occurred nearly a hundred years ago. Idaho Department of Lands is the regulatory agency for all major surface mining activities and DEQ for mining activities using cyanidation for recovery of precious metals. I believe DEQ also regulates subsurface mining activities.

Ultimately, however, it is the landowner who would shoulder the costs of reclamation.

! What about Garfield Bay? Will mining problems be solved there before logging can take place? I am concerned about how this will be done.

I agree there needs to be better coordination with regulators on mixed-ownership and mixed-use areas. The problem is there are so many different programs. We are aware of the problem, but also must prioritize it in light of the other issues concerning water quality in the Pend Oreille Lake watershed.

! I am disturbed by impacts of heavy equipment in areas around eagles' nests. Near our home, it drove eagles away. Now we only have one nest in the area.

We do not work with the agencies that deal with wildlife habitat. The US Fish and Wildlife Service would be the agency to contact.

! Is EPA the coordinating body for all the other agencies working on habitat, water quality, endangered species, etc.?

While we are not mandated by Congress to play this role, we are doing more of it. At Lake Roosevelt and several other major watersheds, we are taking on more of a leadership role; working on interagency coordination.

! Who do we contact when we have a concern about a particular local project? Where do we get answers to the problems, such as one I am concerned with on local shoreline development?

There are a couple publications which identify who to call for a particular problem or concern. These are Idaho Lake Management Guide and The Citizens Guide to Idaho Water Policy. Local shoreline development is regulated by state and county rules. If there are water quality issues involved, this is when federal and state standards would come into play.

! Regarding sewer systems as an option in plan, it states these would be done where feasible, Have criteria been developed to determine what is "feasible?"

No, this would be determined on a case by case basis.

! When and why was there a decision made not to monitor mining pollution during the lake study?

Idaho residents have for some time been more concerned about increased growth

of algae on the rocks and the potential for lake eutrophication than mining pollution. Also, a report from the Montana Governor's office in 1988 recommended a nutrient study of the watershed. Metals were not looked at in Montana because of the extensive Superfund Project already underway. In addition, Montana has a monitoring program in place and our last station is actually below the Cabinet Gorge Dam in Idaho. In Idaho, the Technical Advisory Committee decided early in the study that sediment testing for metals would be too expensive given the budget, so this was dropped from the project's scope of work. Finally, nutrients are considered the primary <u>interstate</u> water quality problem.

! U.S. Geological Survey figures from 1984 and 1988 show toxic levels of heavy metals in fish flesh.

I believe the data you are referring to indicate that cadmium was consistently above chronic and acute toxicity criteria for freshwater aquatic life, and on occasion copper and zinc exceeded EPA criteria. The researcher recommended further investigations be made. So as part of the Pend Oreille Lake Project, a preliminary investigation of metals concentrations in fish collected from the lower river and lake was conducted. It showed that levels were below recommended action limits, but that the data base should be expanded. The Policy Advisory Committee acted upon this recommendation and has included a metals toxicity monitoring program and health risk assessment action items in the plan. No commitment for funding to complete these tasks has been received. Cooper and zinc, that have caused fish kill problems in the upper river and are of high concern, are not toxic to humans. These metals do not bioaccumulate; they do not build up in the food chain.

! Regarding development around the lake, how much of the load is coming from septic systems?

Wastewater contributes about 3% of the total phosphorus and 1% of the total nitrogen to the lake annually. This includes septic-tank and Sandpoint and Priest River wastewater treatment facilities effluent.

! Is there any way of knowing how much of this affects the near shore?

There is no easy way to separate wastewater effects lake-wide from effects near shore. Even though the computer model indicated that 100% wastewater removal would have little or no effect on lake water quality, common sense tells us since septic-tank effluent are coming in at the near shore level they are likely to effect the near shore area. The reason computer modeling showed little effect from wastewater removal was because it represents a small percentage of the annual lake load and is discharged into the Pend Oreille River.

! How does the goal of 5 parts per billion (ppb) of phosphorus near shore compare with existing phosphorus levels in open water?

The average total phosphorus concentration in the upper water column was 7 ppb and ranged from 3 to 13 ppb.

! Is not a goal of 5 ppb of phosphorus too minimal to detect?

The mean concentration of phosphorus in the near shore areas where the public is perceiving a problem is 8 ppb, so there is a small window that accounts for nuisance algal growth. Therefore, we do need to be very precise. The laboratory detection limit for total phosphorus is 2 ppb.

! Have there been any studies done on contributions from road dust to water quality and also road oiling?

I am sure there have been, but I am not familiar with any. Data collected for this study indicates that about 5% of the annual phosphorus load to the lake comes from the atmosphere. Since phosphorus is adsorbed to soil particles, I would suspect that fugitive dust from roads contributes to the annual phosphorus load, especially when the road is near a lake or stream. Falter did some studies on outboard engines and contributions of nutrients from exhaust, and I suspect you probably get more contributions of phosphorus from road dust than you do from oil. Oiling does control dirt and, therefore, nutrients but probably causes other problems.

! About half of Bottle Bay Sewer District is sewered. The other half just conducted a survey and 50% of them did not want to add on to the system. It would only cost them $35 a month, but they think their septic tanks are working since they got permitted by Panhandle Health.

Comment noted.

! When folks change to other positions within the agency, is there some level of continuity and coordination with new people?

Yes, we keep extensive computer files and there is coordination for transfer of information.

! The By-pass is going to be a lot more important than DEQ thinks. DEQ needs to come up to speed on this issue.

This would make a good recommendation as an option in the plan: that DEQ work closely with ITD on water quality concerns of by-pass alternatives.

! Regarding work being done in the lake watershed by Bio/West for the Forest Service, are they sampling sediments for heavy metals?

No, they are only sampling for sediment amounts.

! I am with the National Park Service, Coulee Dam Recreation Area, and I have been impressed by your getting together and taking a basin-wide approach with the three states. We have come a long way, and I really appreciate all the input from the citizens. I represent one and a half million visitors who come to our recreation area. This evening I have also received a little geographic lesson: Pend Oreille is part of the Coulee Dam system.

Comment noted.

! Have we ever tried to get Canada involved in this project?

No, not in this project, but the basin-wide approach is getting more and more common. Canada has been involved in the Lake Roosevelt project that John was just referring to, and there is also a Kootenai River Network that I am involved in that includes the province of British Columbia, state agencies in Idaho and Montana, federal agencies, the Lower Kootenay Band, Kootenai Tribe of Idaho, and various environmental groups. Their focus is watershed management in the Kootenai River Basin. We have also had some cooperation with the mining interests.

! Is there a phone number for calling someone with all of these concerns?

The public comment form has the phone numbers and addresses of contacts in each state. They can help you sort out which agency you should be dealing with when you have a problem. Earlier we mentioned two publications that identify what each state agency is responsible for; Idaho Lake Management Guide and The Citizens Guide to Idaho Water Policy.

! Five minute presentation given by Harold Riese. He is concerned about drug labs in the watershed and their impact on water quality from pollutants.

Comment noted.

Newport, Washington, July 16

Registered Attendees

Dick L. Arkills	Newport, Washington
Bill Kelley	Cheney, Washington
Pam Tunnell	Newport, Washington
Ken Rux	Newport, Washington
Lori Blau	Usk, Washington
Dorothy Sandvig	Newport, Washington
Linda Lee	Usk, Washington
Rick Donaldson	Coeur D' Alene, Idaho
Do Hopp	Newport, Washington
Clarence Soliday	Usk, Washington
Harold Dilling	Cusick, Washington
John W. Miller	Spokane, Washington
John Krogh	Newport, washington

Comments and Responses

! How much of the Pend Oreille River study was performed by the Washington State Department of Ecology?

All of the Ecology studies presented at the public workshop were performed by Ecology. Some assistance from other associated groups was used on sub-projects like popnetting and electrofishing. Additionally, we used information from other studies done in the past. We also utilized aquatic plant surveys performed by a consultant for the Pend Oreille County Public Works Department for our GIS demonstration project contained in Ecology's Draft Pend Oreille River Management Plan.

! How can the Pend Oreille County Conservation District obtain funding to perform monitoring etc. identified in the draft plan?

In the back of Ecology's Draft Pend Oreille River Management Plan is a section on funding sources. This section describes specifics of federal, state, and local monies available. Reauthorization of Section 525 of the Clean Water Act is a high priority for funding. Our goal is to get monies to locals for implementation of the management plan.

! Washington and Idaho seem to be lax on their inspections of septic tanks and sewers. Up and down the river there are developments in areas where the soil is a problem for septics, and there are also areas where people don't even have septics but are dumping their sewage directly into the river.

Septic systems are under the authority of county health agencies. If you know of direct dumping of sewage, failed or failing septic systems, or other like potential

impacts to the river, you are encouraged to contact the Northeast Tri-County Health District in Washington or the Panhandle Health District in Idaho.

! I live in Pend Oreille County and about 10 years ago I was told I had 30 days to do something about my septic or else I'd get fined; within 3 months we had a sewage lagoon that met their standards. So if you make the penalties stiff enough, it seems you can force the issue and make people clean up their sewage in a hurry.

As previously stated, individual sewage disposal systems are under the jurisdiction of the local Health Districts. However, this suggestion does have merit and should be presented to the local Board of Health for consideration.

! What did you have in mind for the local "Watershed Management Committee"?

The Committee would be made up of diverse interests in the watershed who would meet frequently to decide on priorities for work that is needed. The group would seek grant money to fund and oversee water quality improvement projects. The Watershed Management Committee would be a good candidate for representation on the proposed Tri-State Council.

! Does the presence of Box Canyon Dam increase the milfoil problem?

When a river is impounded current velocities are lowered. This results in an increased rate of sedimentation. Nutrients carried with the sediments settle out and are a source of food for aquatic plants. The dam also increases shallow areas where you would expect nuisance plant growth. It is probably true that the impoundment enhances the habitat for aquatic plants in general.

! The use of a rotovator to stir up the milfoil is a poor approach. The milfoil needs to be removed, but there is a better way. There is a machine now available that harvests the stems and leaves much like a hay field is harvested. The biomass is removed to the shore for disposal. The rotovator system stirs up the roots, sets them adrift to grow in new places. The machine I refer to does not do that. It is in wide spread use in California and has proven its value. The use of a rotovator should be excluded from your plan, however harvest of the milfoil plant should still be included.

Rotovation is a 3 step process. First debris is removed from the bottom area to be rotovated. Then the bulk of the biomass is removed by a cutter bar, probably much like the harvester referred to. The third step is bottom tillage. Bottom tillage is done by a tiller head like rototillers for gardens, except that it is used underwater and on a larger scale. The tilled roots and stem debris float to the surface for collection and bank disposal, as does the plant material from the second step. The same machine performs all three steps. A different detachable head is placed on the hydraulic

boom for each step. If rotovation is ever determined to be undesirable, the ability to harvest is always there. One problem with just harvesting is that it does nothing to inhibit regrowth. Rotovation sets back regrowth of milfoil, giving other opportunistic plant species an opportunity to colonize first. One may not need to come back to rotovate for 2 or 3 years.

! I wonder if we should look into ways of harvesting milfoil for use as fertilizer or animal feed? We use it at our home as a fertilizer. In Japan they use it as animal feed. There may be some uses for milfoil that would be beneficial.

The idea merits further investigation and has been incorporated into the basin management plan.

! Regarding the statement in the management plan about freezing of milfoil, I have a pond with milfoil and for five years it's frozen over in the winter and the milfoil keeps coming back. I'll volunteer my pond as a test site.

Ecology appreciates the offer of the pond as a test site and will keep this idea in mind for any future work done on the Pend Oreille River.

! If your going to look at management control options for milfoil, you're going to have to go in there and manually harvest it. If you don't remove it before you put water back over it, you haven't gained a thing. Also, if you operate the river under a FERC license, you'd have to go through a lot of procedure to lower the river in order to control milfoil. Why do you make recommendations for milfoil control options that you haven't researched further?

We are offering options that have been used elsewhere. There is not a lot of background on milfoil control alternatives for the Pend Oreille River. It may be that multiple approaches are needed to most effectively manage milfoil.

! Milfoil that is rotovated must be piled up away from the shoreline area so it doesn't wash back into the river.

This is a good suggestion. The management plan has been modified to reflect the need for resource managers to investigate alternatives to bank disposal of harvested plant materials.

! I strongly oppose a winter drawdown of the Pend Oreille River. This idea does have some merit concerning a reduction in the milfoil community, but it also has the potential to seriously impact the fishery. The Box Canyon Reservoir is generally a shallow reservoir and therefore the milfoil plants are able to grow and thrive in a large percentage of the reservoir. In order to really impact the milfoil community a severe drawdown would be required. A drawdown of this nature would completely dewater the littoral areas,

concentrating most of the fish in the main channel of the river. As fish are not very active during the cold winter months, it is likely that a good percentage of the fish would simply be flushed from the system.

It appears potential impacts from drawdown of the reservoir far outweigh possible benefits. Based on the number of persons concerned about the negative impacts from drawdown, and a general lack of support, the final management plan will remove the recommendation to explore drawdown as a management option.

! There was a drawdown a few years back, and warm weather baked the milfoil; it did slow its growth for awhile.

When drawdown of the reservoir was first investigated as a possible management alternative, winter was assumed to be the season with the least potential impacts. Summer was not considered because of the problems that would be created during peak periods of recreation and tourism. It may be that desiccation rather than freezing is a better method of milfoil management. Yet it is also likely that summer drawdown would be even less well received than winter drawdown.

! I strongly recommend that rotovation of Eurasian watermilfoil in the Pend Oreille River should include rotovating rows or paths through the dense beds. This would enhance habitat for largemouth bass, as it would allow access to the small perch which hide in the weed beds. Most of the bass captured during our studies were associated with weed beds. According to Prince and Maughan (1979) prey (yellow perch) that are attracted to structure become concentrated in vegetation, thereby increasing encounter rates with, and vulnerability to, foragers (bass) that reside there. Open spaces or "trails" through the dense macrophyte beds would be advantageous to predators (bass) as they would provide more area for ambushes.

This is a good suggestion and consistent with recommendations already in the management plan. The ability to strip rotovate is contingent on local resource managers acquiring an additional rotovator or utilizing other management options. At present, the rotovator now used is only able to maintain high use areas of the river (*i.e.* swimming beaches, boat launches etc.). With two rotovators, one machine could maintain the high use areas while the other could be used for fishery habitat enhancement.

! Shouldn't Washington seek funding through reauthorization of Section 525 or other means to study biological agents for milfoil control?

We advocate staying abreast of current research on milfoil control methods and evaluating it's applicability to the Pend Oreille River. At the present time, we do not intend to pursue a site-specific study of biological controls for the Pend Oreille

River.

! We encourage research on biological control methods; we do not support the use of herbicides.

Biological controls may be many years away from use. Alternatives that have worked elsewhere need to be looked at for applicability to the Pend Oreille River. Ecology is not endorsing use of herbicides, but rather suggesting an alternative that should be evaluated by local resource managers if and when it becomes available.

! Regarding the Newport wastewater treatment plant and the Ponderay Newsprint Company, are they always in compliance with their wastewater discharge permits?

Compliance reports indicate there has not been a problem complying with NPDES permit limits. Occasional exceedances of permit limits can happen to even the most sophisticated treatment systems. The Newport wastewater treatment plant and Ponderay Newsprint Company discharge about 0.5 millions gallons per day (mgd) and 4 mgd, respectively, which allows for ample dilution by the river, which has an average annual flow of about 16,500 mgd.

! Please explain the units for attached algae in your presentation and give the source of the guideline quoted.

One slide in Washington's presentation noted units for periphyton concentrations in the Pend Oreille River in parts per billion (ppb). This was in error and should have read in mg/M^2. The recommended guideline comes from a report entitled Nuisance biomass levels of periphytic algae in streams, contained in Hydrobiologia 157:161-168, 1988, by Welch, E.B., J.M. Jacoby, R.R. Horner, and M.R. Seeley.

! Were dissolved oxygen (DO) measurements made over a 24 hour period, and have the lowest DO's of the summer been getting steadily higher?

The DO measurements referred to were for determination of primary productivity and are based on 24 hour measurements. The methods and the data set used for determination of primary productivity are described in Ecology's third annual report of the Section 525 study entitled Pend Oreille River Primary Productivity And Water Quality Of Selected Tributaries by Coots, R. and R. Willms, 1991. The DO was measured specifically for determination of primary productivity and was only collected during two weeks of the summer. From this limited data set, we are unable to evaluate if the lowest DO's of the summer have been getting steadily higher.

! You indicated that most measures of water quality at the Newport station have gotten better. Do you have long term flow and channel depth data? If so, have river flows and

channel depths in the Pend Oreille River been getting lower, and if so, what are the causes and correctives - since this would encourage macrophytes.

We have long term river discharge data, but do not have data concerning channel depth and current velocity. A trend analysis of river discharge indicated a significant decrease has occurred over the past 15 years. While this decrease in discharge likely improved conditions for aquatic plant growth, the decrease probably resulted from circumstances beyond our control - *i.e.* natural changes in climate and run-off.

! Perhaps efforts to restore channel flows and some judicious dredging would have less negative impacts and longer term benefits than herbicides and drawdown to freeze macrophytes.

Restoring channel flow would require integrated water resources coordination throughout the Pend Oreille Lake/River system. Dams would be potentially impacted because by allowing more water to spill, less electricity would be produced. This would likely be confronted with strong opposition by power generating and fisheries interests. Restoring channel flows would impact water levels of Pend Oreille Lake and Box Canyon Reservoir if dam gates are lowered, specifically by dewatering some littoral areas and fishery habitat. Dredging does have merit, although it would be a drastic change in direction requiring a substantial capital investment initially, besides being more labor intensive. Dredge materials would need to be transported and disposed of properly. Locally, habitat for native plants would be lessened. Dredging below the optimal growth depth of milfoil (about 3.5 meters) is possible, but would create deep pockets of water nearshore.

! I strongly support a water quality monitoring network. The Kalispel Tribe will be monitoring water quality in waters on and adjacent to their Reservation. A network with this type of information would be very beneficial to the Tribe and the whole community of the Pend Oreille River.

The development of a water quality monitoring network should be a product of the proposed local Watershed Management Committee and the Tri-State Council. This information would be essential to any group wanting to manage a waterbody or determine priorities for restoration on a basinwide approach. The Kalispel Tribe should be represented on the Watershed Management Committee and possibly the Tri-State Council also. This is indeed an opportune time for coordination of efforts within the basin.

! The newspaper article published in the Newport Miner officially announcing the public workshops points the finger at livestock and stated 87% of the fecal coliform in the Pend Oreille River came from Skookum Creek.

The article was somewhat inaccurate in referencing Ecology's third year report, which stated five tributaries were studied for fecal coliform in the summer of 1990. Of those five tributaries, Skookum Creek accounted for 87% of the load. There was evidence of livestock directly accessing the creek. Ecology was not aware of the newspaper article prior to the public workshop. In fact Ecology has sent a letter to the editor of the Newport Miner, which was subsequently published, stating Ecology's position that the article was misleading with its emphasis on "Domestic animals adding to river pollution" instead of the most significant problem we identified, namely proliferation of Eurasian watermilfoil. The newspaper article and Ecology's letter are contained in the Appendices of this management plan. (See Appendix D, July, 1992.)

! What is the maximum level for fecal coliform in surface waters of Washington State?

The maximum allowable fecal coliform bacteria in Class A surface waters is 100 colonies per 100 milliliters (about 2 cup) of water.

! Your third year report indicates 1200 colonies per 100 milliliters were found at SK5, a site on Skookum Creek. Did you determine how much of that comes from livestock?

No; livestock were identified as one possible source. Field observations, noted at the time of sampling, identified livestock having direct access to Skookum Creek with evidence of shore erosion. While it appeared from visual observations that livestock were responsible for the high counts, other sources potentially impacting Skookum Creek include wildlife and domestic wastes.

! Skookum Creek has been impacted by beavers for many years. Your samples from SK5 were taken right on top of a known beaver pond. Doesn't this impact your sampling?

All samples taken for the survey were collected from flowing water. Samples from the Skookum Creek site (SK5) were collected at a culvert crossing under Skookum Creek Road. Wildlife are one potential source of bacterial contamination to surface waters. Further sampling would be needed to determine the relative contribution from beavers at this site.

! How do you account for some of the low bacterial readings from Skookum Creek?

Nonpoint source pollution tends to be highly variable in the environment. The low bacterial counts at some sites are likely a result of dilution from higher quality inflowing water as it moves down the system and natural die-off of bacteria. Other potential bacteria inhibitors include sensitivity to light, temperature, and toxic chemicals.

! Regarding Skookum Creek, the third year report states the fecal pollution problem "appears to be related to animal keeping practices".

As stated earlier, we are not certain of the source of the fecal contamination. Field observations taken at the time of sampling noted evidence of livestock directly accessing the stream. Further sampling would be necessary to determine specific sources. The management plan has been revised to indicate the need for additional sampling.

! The newspaper article is very upsetting to local cattlemen because we've been working hard to keep our cattle out of the stream and we're not happy about being blamed for the pollution.

Ecology apologizes for any inconveniences resulting from the report and the newspaper article. It was not the intent of the study to point the finger at anyone. The focus was to better define sub-basin water quality based on sampling results found in 1988. Ecology supports all efforts to keep animal wastes out of streams. Any efforts over the last 2 years by cattlemen to better manage their animals would not be recognized in this report because the survey the newspaper article referred to was conducted during the summer of 1990.

! I've been working on a committee and we've got a dairy discharge permit plan coming out; we're trying to work on our problems. You've done a lot of damage by putting blame on us.

As mentioned earlier, Ecology has written a letter to the editor of the Newport Miner in hopes of clarifying information which may have been misrepresented in the newspaper article advertising the public workshop.

! I'd like to propose that after the field season, you agency folks and your committee, and the Idaho people, come over to Skookum Creek. We'd like to show you around the creek and discuss our livestock management practices.

Thank you for the invitation; if the committee is able, we'd like to take you up on the offer.

! I strongly support management of animal keeping practices and fencing of the riparian zones in tributaries to the Pend Oreille River. The Kalispel Tribe is currently applying for grant money to fund construction of some riparian fences. I have also been working with the Pend Oreille Conservation District to educate private landowners of the importance of animal keeping practices and proper fencing.

Part of the management plan identifies the need for development and implementation of best management practices (BMPs). The formation of a local Watershed Management Committee would provide better oversight of plan implementation. The Kalispel Tribe and the Pend Oreille Conservation District would be good candidates for representation on the Watershed Management Committee.

WRITTEN COMMENTS

The following individuals, agencies or groups identified themselves in their written comments to the Steering Committee. The Committee also received comments from four unidentified sources.

Dick Arkillis, P.E., Director
Hydro Operations and Power Supply, Public Utility District #1
Pend Oreille County, Newport, WA

Becky Ashe, Fisheries Biologist
UCUT Fisheries Center, Eastern Washington University, Cheney, WA

Edward C. Bittner, U.S. Permanent Representative to the U.N.
Environment Program 1985-86. Sandpoint, ID.

CDR James A. Blake (Ret), Sandpoint, ID

Stephanie Fries, Hope, Idaho

George Hetherington, Butte, MT

Earle A. Hussell, Trout Creek, MT

Hobart G. Jenkins, President
Bayview Chamber of Commerce, Bayview, ID

Shawn Keogh, Timber Information
Greater Sandpoint Chamber of Commerce

Robert G. Klatt, Sagle, ID

Gary J. Kuiper, Superintendent
Coulee Dam National Recreation Area, Coulee Dam, WA

Bill Middleton, Hope, Idaho

Michael T. Pablo, Chairman, Tribal Council
Confederated Salish and Kootenai Tribes of the Flathead Nation
Pablo, MT.

Steve Schombel, Trout Unlimited
Westslope Chapter, Missoula, MT

Richard Sedlak, Technical Director
The Soap and Detergent Association, New York, NY

Robert M. Tate P.E., Coeur d'Alene, ID

Ruth Watkins, Pend Oreille Director
Clark Fork-Pend Oreille Coalition, Sandpoint, ID.

Vicki Watson, University of Montana, Missoula

Bruce Zander, Monitoring and Standards Section
U.S. EPA, Region VIII, Denver, CO

Comments and Responses

! Page 8 of the draft plan implies that the Total Maximum Daily Load (TMDL) wasteload allocation process has already been implemented for control of nutrient sources in the Clark Fork-Pend Oreille Basin.

The process described in the report is very much a TMDL process in that instream or inlake nutrient targets are established and alternative controls are developed with the instream targets in mind. However, a regulatory wasteload allocation process for nutrient sources has not yet been implemented in the basin, but remains an option. The final management plan has been changed to clarify this.

! The discussion of water quality criteria for attached algae on page 18 should be reworded for clarity.

The suggested changes have been incorporated in the final draft.

! The matrix of Clark Fork River nutrient point source control alternatives omits the highest priority action--seasonal land application of the Missoula sewage effluent.

This alternative was inadvertently deleted during editing of the draft management plan. It has been replaced in the final plan.

! Securing long-term protection for instream flows in the Clark Fork River should be the highest priority management alternative, followed by seasonal land application of Missoula wastewater.

The steering committee ranked both alternatives as high priority items. Relative placement in the matrix of alternatives within a priority category (high, medium, low) was not intended to suggest a preference for one over another.

! Implementation of nutrient removal for the Butte municipal wastewater should be a medium or low priority action.

It is true that most of Butte's nutrient load is removed in the Warm Springs Treatment Ponds on Silver Bow Creek prior to reaching the Clark Fork. It is also likely that this nutrient loading improves the metals treatment efficiency of the ponds and that reductions in nutrients could increase metals loading to the Clark Fork. However, concentrations of nutrients and ammonia in Silver Bow Creek between the Butte wastewater discharge and the ponds are so high that beneficial water uses will continue to be impaired even if all metals sources are controlled. The Montana draft management plan recommends a cautious approach and the examination of alternatives for reducing nutrients in Silver Bow Creek while maintaining metal treatment efficiency in the ponds. Given the moderate importance of the Butte wastewater as a source of nutrient loading to the Clark Fork River, this alternative has been changed from a high to a medium priority item.

! The Butte municipal wastewater should be seasonally land applied to enhance revegetation efforts in Superfund reclamation sites along Silver Bow Creek.

This suggestion may be a practical alternative and is consistent with our proposal to "implement nutrient removal or alternative disposal methods for Butte municipal wastewater." However, the effect of summer land application on streamflows in Silver Bow Creek and on downstream water rights would have to be carefully examined.

! Controlling groundwater sources of nitrogen loading to the Bitterroot River should be a high priority rather than a medium priority item.

The steering committee has reconsidered their priority rating for this alternative and has changed it to a high priority item. The high cost of implementing this alternative, the magnitude of the project, and the incremental benefits to be expected were considerations in the former rating. However, when the importance of protecting Missoula's municipal groundwater supply from contamination is considered in addition to the existing impacts to surface water quality, a high priority rating is easily justified.

! The alternative to organize wastewater discharge permits on a concurrent, five-year cycle would facilitate basin-wide planning for nutrients but could decrease the level of

review for some permit-specific issues (e.g. toxics).

If this alternative is adopted, provisions would be included to insure that each permit received at least as rigorous a review as under the current permit by permit approach. It is not anticipated that all permits would be organized to expire on the same day, but perhaps only in the same year. This approach should facilitate basin-wide permit reviews and planning for all issues.

! There are a number of planned subdivisions immediately adjacent to the lower Clark Fork River in Sanders County, Montana. Each lot will have an individual septic system and drainfield. Will this concentration of septic tanks adversely affect water quality and do we have adequate existing information to detect future degradation in this area?

The location of septic systems and drainfields in relation to surface and groundwater is a criteria in the review of all subdivisions. Septic system distance parameters have been established for seasonal high groundwater, surface waters, and hundred-year floodplains. Additionally, any proposed subdivision of ten lots or larger utilizing on-site sewage disposal requires that a nitrate sensitivity analysis be preformed. All of these measures are intended to protect designated uses of surface and groundwaters from degradation. The Administrative Rules of Montana that deal specifically with these issues are under current departmental review and will probably be modified to afford increased protection to water resources.

The Montana Water Quality Bureau maintains a series of long-term water quality monitoring stations throughout the entire length of the Clark Fork River. Information from this program will continue to be available to evaluate water quality trends as influenced by development activities in the lower river basin.

! The Section 525 assessment indicated the majority of nitrogen loading to the Clark Fork River originated from nonpoint sources. The primary method of control for nonpoint source pollution is the application of best management practices, or BMP's. It seems obvious that current BMP's are not working and that changes are in order, especially with regard to cattle grazing in riparian areas. We need to get the cows out of the bottoms and reestablish native riparian vegetation which will aid to narrow and deepen tributary channels and reduce nutrient, hydrologic and fishery impacts.

The Montana Water Quality Bureau, under it's Nonpoint Source Pollution Control Program, is facilitating a process to examine, refine and/or completely revise as needed the BMPs for grazing to ensure that the recommended BMPs are protecting water quality. A technical committee of agency representatives and private landowners has been established with the ultimate goal of adopting one set of BMPs for all lands in Montana.

! Will regulations for control of nutrient sources in the Clark Fork-Pend Oreille Basin be mandatory or voluntary and what agency will have oversight responsibility? Implementation of mandatory BMP's should be strongly considered.

The State of Montana is proposing to adopt a voluntary approach to nutrient source controls in the Clark Fork River Basin. Should this approach fail to achieve the desired results, as indicated by a continuing monitoring program, a mandatory approach will become necessary. The U.S. EPA and the Montana Department of Health and Environmental Sciences, Water Quality Bureau will have primary oversight responsibility for nutrient controls in the Montana portion of the basin. However, the proposed Tri-State Council will be charged with directing the implementation of the various nutrient control alternatives.

Mandatory BMPs are a subject of much current debate, and one that is beyond the scope of this management plan.

! The Westslope Chapter of Trout Unlimited supports the recommended nutrient control alternatives presented in the draft Clark Fork-Pend Oreille Basin Water Quality Management Plan. Two items of particular interest are the basin-wide phosphate detergent ban and sewage treatment plant improvements. Please keep us informed of continuing developments.

The Westslope Chapter of Trout Unlimited has been added to the Clark Fork-Pend Oreille Basin Water Quality Study mailing list for receipt of the final management plan, meeting notices, and any other mailings. The Westslope Chapter may be a good candidate for representation on the proposed Tri-State Management Council.

! The plan should state clearly and unequivocally what nutrient concentration targets should be for reducing algae in the Clark Fork River. The plan suggests 6 μg/l for soluble phosphorus and 30 μg/l for soluble nitrogen. Based on the saturation levels identified by Dr. Vicki Watson and researchers in British Columbia, the plan should clearly state that in no case should phosphorus ever be over 30 μg/l or nitrogen over 250 μg/l in the river below Missoula. For the upper river, where we're dealing with filamentations algae, the targets should be closer to 6 μg/l for phosphorus and 30 μg/l for nitrogen.

Proposed nutrient target levels in the draft plan are based on ambient summer concentrations in reaches of the Clark Fork that normally do not support nuisance developments of attached algae. The research conducted by Dr. Watson for the Clark Fork-Pend Oreille Basin Water Quality assessment succeeded in establishing "saturation" nutrient concentrations for diatom algae

in the Clark Fork River. These values are 30 μg/l for P and 250 μg/l for N and reflect concentrations above which increased algal growth would not be expected with incremental increases in nutrient concentrations. These values are not practical target levels because they are in excess of current ambient concentrations found throughout much of the Clark Fork and because these concentrations are capable of supporting the maximum achievable standing crops of diatom algae. For algae control to be realized, target levels must be appreciably less than the saturation concentrations.

Nutrient criteria which would protect all beneficial water uses in the Clark Fork Basin and eliminate nuisance algae and related problems such as dissolved oxygen depletion are unavailable at this time. The Montana Department of Health has requested the assistance of a contractor to EPA Region VIII to help us conduct the necessary modeling studies to establish more definitive nutrient criteria for various reaches of the Clark Fork. In the interim, the proposed nutrient target levels of 6 μg/l for P and 30 μg/l for N have been adopted as instream goals in the final management plan.

! A basin-wide phosphate detergent ban should be a high priority action item. The methods for carrying out such a ban should be examined by the states. The proposed Tri-State Management Council should consider taking a lead role in some type of tri-state rule-making.

The states will examine their legislative and administrative rule-making authority under the Clean Water Act and their respective state water quality statutes with regard to phosphate detergent bans in the Clark Fork-Pend Oreille Basin. Guidance in this area will be provided by the Tri-State Council.

! Mandatory nutrient loading allocations for point source dischargers and nonpoint sources should only be developed if voluntary nutrient control measures fail to control nutrient-related water quality problems in the basin.

The states favor a voluntary approach to nutrient controls and pollution reduction. Most of the recommended nutrient control alternatives in the management plan are voluntary in nature. However, Montana and Idaho will pursue the development of optional nutrient wasteload allocations so that mandatory controls can be implemented if voluntary measures fail to achieve the desired results.

! The agencies should develop a timetable and conditions criteria under which nutrient allocations would be executed.

The development of a monitoring program, timetable, and criteria to evaluate the

success of nutrient control measures will be the responsibility of the Tri-State Council.

! The high priority action item calling for seasonal land application of the Missoula municipal wastewater should be reworded to read "Institute improvements at the Missoula municipal wastewater treatment facility." This would allow for other methods of pollution reduction at the plant should seasonal land application prove unfeasible. Possibilities include combinations of land application with other options such as denitrification technology or alternative disposal sites such as gravel pits and constructed wetlands.

This alternative was intended to mean any effluent disposal method other than direct discharge to the Clark Fork River, including rapid infiltration, irrigation usage, discharges to wetlands, etc. Other measures for improving wastewater treatment and effluent quality are recommended under the alternative to "Evaluate and implement additional measures to curb municipal and industrial wastewater nutrient discharges." We have changed the first alternative to read "Implement seasonal land application and/or other improvements at the Missoula municipal wastewater treatment facility" to clarify our intent.

! Continued monitoring is a priority and must be designed to tie directly to the priority actions being taken to reduce pollution. A specific plan is needed to show how monitoring will influence the implementation process.

The Tri-State Council should place a high priority on designing and implementing a basin-wide water quality trends monitoring network to evaluate the overall success of the monitoring plan. This plan should build upon the monitoring programs that are already in place. Additionally, a more focused implementation and effectiveness monitoring program will need to be put in place to insure that management alternatives are implemented and that they are working. The Council should develop and utilize monitoring feedback loops to guide the implementation process.

! The Clark Fork-Pend Oreille Coalition recommends that the list of eight highest priority action items in the three-state management plan be expanded to include:

1) specific changes in the wastewater discharge permit for the Stone Container Corporation kraft mill west of Missoula;

2) additional sewer hookups in unsewered portions of the Missoula Valley;

3) further analysis of opportunities for land application/alternative disposal methods at the Deer Lodge municipal wastewater treatment plant; and

4) identifying and controlling nonpoint sources of pollution in upper Clark Fork tributary drainages.

Each of these recommendations was included as a high priority management action in the draft management plan. The "highest priority" short list was intended to serve as a starting point in the implementation process and included only the very highest priorities from each of the three states. The possibility of limited implementation funding was a consideration in the development of the list of highest priorities, as was anticipated costs versus benefits throughout the basin.

Some of the comments relating to the Stone Container Corporation wastewater discharge permit were not addressed in this management plan. They have been forwarded to the Permits Section Supervisor of the Montana Water Quality Bureau and will be addressed in the forthcoming permit review for this facility. Stone's current permit expires on September 30, 1992.

! There are no scientific references contained in the draft management plan which support the conclusions regarding water quality conditions and the potential effects of management options.

A bibliography containing all pertinent scientific reports was included in the draft management plan. Summaries of all the various project-related studies are included in the individual state management plans. All of the supporting study reports were available at the public meetings or upon request from the steering committee. The three-state management plan was directed at the general public and was not intended to have a scientific format.

! The Soap and Detergent Association opposes the proposed basin-wide phosphate detergent ban on the following grounds: 1) There is no evidence that the elimination of phosphorus from the affected products would result in any water quality improvement in the river basin; 2) phosphate detergent bans are ineffective in improving water quality; and 3) phosphate reductions of 20 percent or greater are required before any measurable change in water quality can occur.

Approximately half of all soluble phosphorus loading to the Clark Fork River originates from wastewater discharges. The phosphate detergent ban which was implemented by the City of Missoula in May 1989 has resulted in a greater than 40 percent reduction in phosphorus loading to the Clark Fork River from the Missoula wastewater treatment plant. Concentrations of phosphorus in the river downstream from this facility have subsequently declined by a large margin. A modeling study conducted by the University of Montana predicted a reduction in

algal standing crops in 110 miles of the Clark Fork as a direct result of this action. It seems clear that there have been very tangible water quality benefits associated with the elimination of the sale of phosphate detergents in Missoula. The steering committee will continue to encourage the adoption of similar bans in other basin communities.

! Nitrogen rather than phosphorus is the primary nutrient controlling algal growth in the Clark Fork River.

Studies by the University of Montana suggested that nitrogen limitation, phosphorus limitation or a balance between the two existed for significant periods of time in almost all reaches of the Clark Fork River. It was concluded that management of both N and P could reduce nuisance algal levels and would be important in protecting reaches without current problems. Furthermore, Idaho researchers have concluded that Pend Oreille Lake is primarily phosphorus-limited. As such, efforts to control phosphorus sources in the Clark Fork River basin will have a direct benefit to Pend Oreille Lake. The Montana Governor's Office, in its 1988 Clark Fork Basin Project Status Report and Action Plan, stated that "Regulatory agencies, industries, municipalities, and public interest groups should work to reduce all forms of nutrient loading to the Clark Fork Basin."

! The potential adverse impacts on fisheries that may result from nutrient controls in the Clark Fork Basin have been overlooked.

This area of concern was addressed in a project-related report entitled "Potential Effects of Nutrient Control Measures in the Clark Fork Basin on Resident Fisheries" (Knudson, 1992). The report concluded there was a low probability of reduced fish production associated with the proposed management actions.

! ... A water quality management plan that does not consider the impact of this planned highway (Sandpoint Bypass) construction is meaningless. The environmental impact from nutrient loading is minor compared to the adverse impact of construction of a bypass across the lake and along Sand Creek.

We admire your commitment to the protection of water quality in Pend Oreille Lake and agree that an action item in Idaho's plan should identify coordination with Idaho Department of Transportation on water quality concerns of the bypass alternatives. However, we regret that you feel our management plan is meaningless. The Clark Fork-Pend Oreille Basin Water Quality Study Steering Committee realized from the beginning that water quality throughout the basin is threatened by a wide range of human activity. Given the budget, however, we had to focus our priorities. In response to the Montana Governors's office report and Idaho resident's concern over increased algal growth on shoreline rocks, the

Committee decided to focus on the source and fate of nutrients in the basin. It is the opinion of the Committee that nutrient loading has a major effect on attainment of beneficial uses in the basin. The plan recommends actions which when implemented will abate nutrients throughout the basin.

! ... I am concerned about the lowering of Pend Oreille Lake and the impact on spawning and pollution....

Hydropower development on the inlet and outlet of Pend Oreille Lake is likely the single most important contributor to the decline in sport fish numbers. Idaho Department of Fish and Game speculates that a change in operation policy of Albeni Falls Dam forced kokanee to spawn in sub-optimum conditions. Recently, a petition was initiated to circumvent this problem and allow greater access to the lake during fall months. Lake level management is a very complicated procedure. It must maximize the benefits from all water uses.

Lower water levels in Pend Oreille Lake would likely have minimal effects on pollution. The Clark Fork River mostly influences lake dynamics. Irrespective of how the river inflow is distributed throughout the lake, net retention of nutrients remains about the same.

! I feel the priority for a stormwater management plan should be increased. Current stormwater discharges into the near shore area would exceed most wastewater treatment plant yearly annual discharges....(EPA) requirements (for permitting stormwater) should be passed to the communities that border the lake.

EPA is currently instituting National Pollutant Discharge Elimination System permits for stormwater discharges from communities over 100,000 in population. This requirement does not strictly adhere to those communities but can be implemented in any community. The need for a County stormwater management plan and accompanying ordinances and enforcement measures to ensure compliance has been realized. This action item has been identified in the tri-state management plan to be of the highest priority and will be one of the first steps taken to reduce nutrients in the basin.

! ... For the past six years, I have been trying to get the Clean Water Coalition to take action on locally generated pollutants (*e.g.* crank case oil, gasoline) that have been dumped into the lake.... I can not get anyone to do anything about it. I would like your comments on what action would be appropriate when things like this occur.

Idaho's Water Quality Standards and Wastewater Treatment Requirements state that in the case of an unauthorized release of hazardous materials or petroleum products to state waters or to land such that there is a likelihood that it will enter

state waters, the responsible persons in charge must stop continuing spills, contain the material, notify DEQ, and collect, remove and dispose of the material in a manner approved by DEQ. The appropriate action would be to notify DEQ.

! ... The report states that "Recreation and tourism are at present mainstays of the local economy." While to some extent that may be true, and certainly both segments of the economy are growing, the timber industry continues to play a strong role in our economy.... If this report is to go out to the public and elected officials, it should be as accurate as possible.

Thank you for bringing this discrepancy to our attention. We strive to be as accurate as possible and will research this further. Our information, as cited in the report, is over a decade old and indicated a decline in employment related to the natural resources and a strong increase in service and retail trade jobs. We did not intend to imply that timber industry was not an important component of the local economy but that recreation, tourism, and second home development are growing and will continue to grow.

! The activity that offers much benefit to the beneficial uses of ground and surface water is the construction of wastewater treatment plants--especially those using land application of the treated effluent.... My personal philosophy is not that Government should throw money at every concept that might come along. In our case, however, the area is increasingly intensively utilized by people who do not live in the area. It makes sense to me that it is a legitimate expenditure of public funds to help us who are residents to assure that the lake and drinking water of the area remain pure.... the need is still here because many people are moving into the non-urban areas unserved by sewers....

Your support of our management action to install centralized sewage treatment systems in developed areas is appreciated. As you probably are aware, this is also a priority for action in the tri-state management plan. When the development of management actions began, the Policy Advisory Committee overwhelmingly supported controlling septic systems to reduce water quality impacts. Federal assistance to help reduce the cost incurred by private citizens will continue to be a important factor. This assistance will have to be evaluated at the time a project is proposed.

! ... One instance of the challenge facing the Tri-State Management Council is to coordinate the law enforcement efforts of the many agencies involved. Making a list of existing pertinent laws, the agencies and persons responsible for the enforcement of each, and problems in the enforcement of each could be a useful first step. Such a list distributed to all agencies could expedite enforcement....

We would like to thank you for your support of a Tri-State Management Council. The specifics you mentioned were also voiced early in the process by the Policy Advisory Committee. There is some information in the Idaho plan which identifies agency authorities. Also, two documents exist which provide more information. These are the Idaho Lake Management Guide and The Citizens Guide to Idaho Water Policy. Compilation of existing information would be the first step of the Council in coordinating enforcement efforts.

! ... We have great concern that parameters for nutrients could become statutory limits in Lake Pend Oreille. We believe the 5 parts per billion of phosphorus is an unrealistic and arbitrary figure that can not be achieved in the developed bays of the lake. If that figure is allowed to become a ceiling it would preclude development in the few areas that are privately owned.

You are correct that 5 ppb total phosphorus near shore was arbitrarily selected. However, the Policy Advisory Committee did not feel it was unrealistic. Target concentrations at which algal growths would not be considered a nuisance were not available. Therefore, this concentration was selected because it represented the total phosphorus concentration in near shore areas which were the desired future condition of the Committee. It should be clarified that 5 ppb is only a target to gauge the attainment of a management goal: to reduce the rate of near shore eutrophication. It is in no way meant to be a statutory limit.

! We likewise fear that dependence upon sewers will permit excessive development of both riparian and upland areas which will contribute to a nutrient runoff that will cause those areas to exceed the 5 ppb limit....

You are also correct in assuming that increases in urban runoff are often associated with centralized sewage systems. This is because the areas are typically developed to a higher level. This is why we have identified the need for stormwater and erosion control management plans. Like centralized sewage systems, stormwater and erosion control management plans are also tri-state priority actions.

! ... The use of a rotovator to stir up the milfoil is a poor approach. The milfoil needs to be removed, but there is a better way....

Presently, no Eurasian water milfoil exists in Pend Oreille Lake and no large scale aquatic weed control project is recommended. The management actions were in response to the Policy Advisory Committee's concern regarding weed growth in high use areas and near private boat docks. Even though mechanical harvesting is recommended, rotovation is not identified as the preferred alternative.

! ... The nutrient levels in Lake Pend Oreille are very low and that does not support a significant increase in fish populations. With increased fishing pressure, the lake simply can not produce the number of fish that recreation demands would like to have.... Some balance must be sought between the zero algae proponents and the fishing proponents....

The trophic status of the pelagic zone of Pend Oreille Lake has not changed statistically since the early 1950s. During that period sport fish harvests were three to five times current harvest levels. Contrary to your statement, nutrient levels in Pend Oreille Lake do allow increases in fish populations and water quality management goals are supportive of fishery management goals, restoration to past levels of production.

! ... Clark Fork River loading must be controlled because it has the potential to degrade a stream and drinking water. Whereas the lake does not face that kind of pressure, nor is it likely to do so. We do not believe that nutrient load levels set as low as proposed are necessary in the lake and that these levels will preclude future development of private property....

Pend Oreille Lake does have the potential to decline in water quality. The Clark Fork River contributes the vast majority of inflow into the lake and as such maintenance of open lake water quality is largely dependent upon maintenance or reductions in nutrient concentrations in the Clark Fork River. You are correct in that modeling of open water responses to nutrient loading were relatively insensitive to small to moderate changes in Clark Fork River nutrient loads. However, researchers have shown an ascendancy of green and blue-green algae in the open water. Researchers feel that this could be an indication of increased pelagic productivity.

! ... Of course, we can not support growth that permits excessive discharges into the lake and we support your call for sewer systems in the denser areas....

Comment noted.

! ... We believe that some fill in the lake between 2051 and 2062 MSL for the development of boat basins is acceptable and is probably desirable in order to provide the necessary pump out stations for boaters. The demand for boat slips is growing by leaps and bounds and some accommodation for this recreational potential must be included in your plan....

We agree that recreational use of the lake is increasing. Our management recommendation to require pumpout stations is directed toward this expectation. Hopefully, an indirect result of implementing this action would be compliance

with the no sewage discharge standard; another management action. As for your request to include some provision in the plan for the increased demand for boat slips and docks, the plan is directed toward controlling nutrient sources. We feel the county comprehensive plan would be a better forum.

! ... The Coalition agrees that education is a key element to the management plan, but we would like to see specific targets set for any education efforts.... the Coalition believes that the education program should be reinforced with ordinances and strong enforcement....

As originally proposed, numerous management actions had educational components. For example, the Policy Advisory Committee felt it important to educate the lake and watershed users as to the need for stormwater and erosion control plans, the effects of shoreline burning, and about proper lawn fertilizer application rates and methods. These educational components were combined into an educational program. This program is intended to provide the information necessary to support recommended ordinances and to provide a clearinghouse for information to interested and concerned lake and watershed residents.

! ... We support centralized sewer systems around Pend Oreille Lake. In fact, because sewering of communities around the lake is occurring, this recommendation is already a priority action. Once the proposed system at Hope and East Hope is underway, the Coalition sees the sewering of Laclede, Clark Fork, and Trestle Creek as the next targets....

! ... a top priority should be the instigation of strong erosion and stormwater control plans and accompanying ordinances and enforcement measures to ensure compliance....

Both of these recommendations were included as a priority action in the tri-state management plan. The "highest priority" short list was intended to serve as a starting point in the implementation process and included only the very highest priorities from each of the three states. The possibility of limited implementation funding was a consideration in the development of the list, as was anticipated costs versus benefits throughout the basin.

Appendix D: Selected News Features and Articles

Articles from Montana, Idaho and Washington newspapers, 1986 to 1992

Articles from Currents, published by the Clark Fork-Pend Oreille Coalition, 1989 to 1992