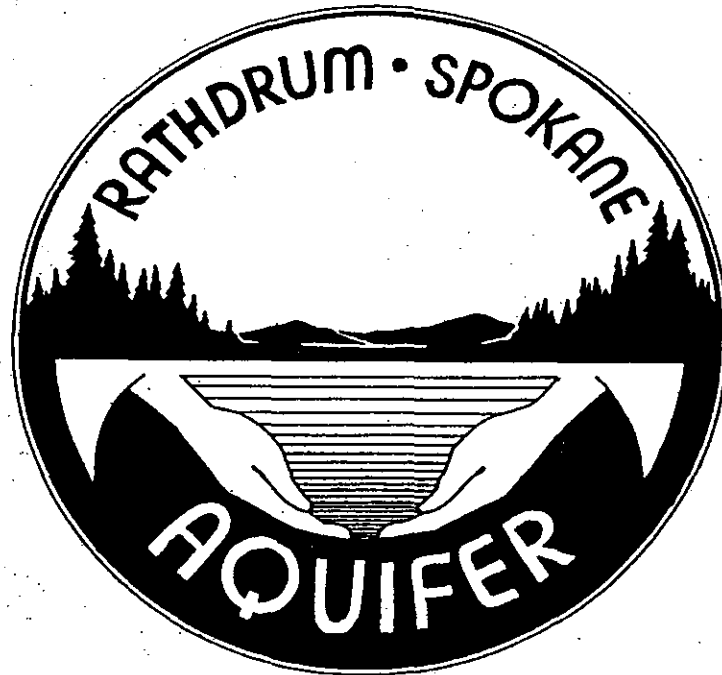


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HAYDEN LAKE WATERSHED MANAGEMENT PLAN



Panhandle Health District
Coeur d'Alene, Idaho
1994



HAYDEN LAKE WATERSHED MANAGEMENT PLAN

prepared by
Shireene Hale

and the

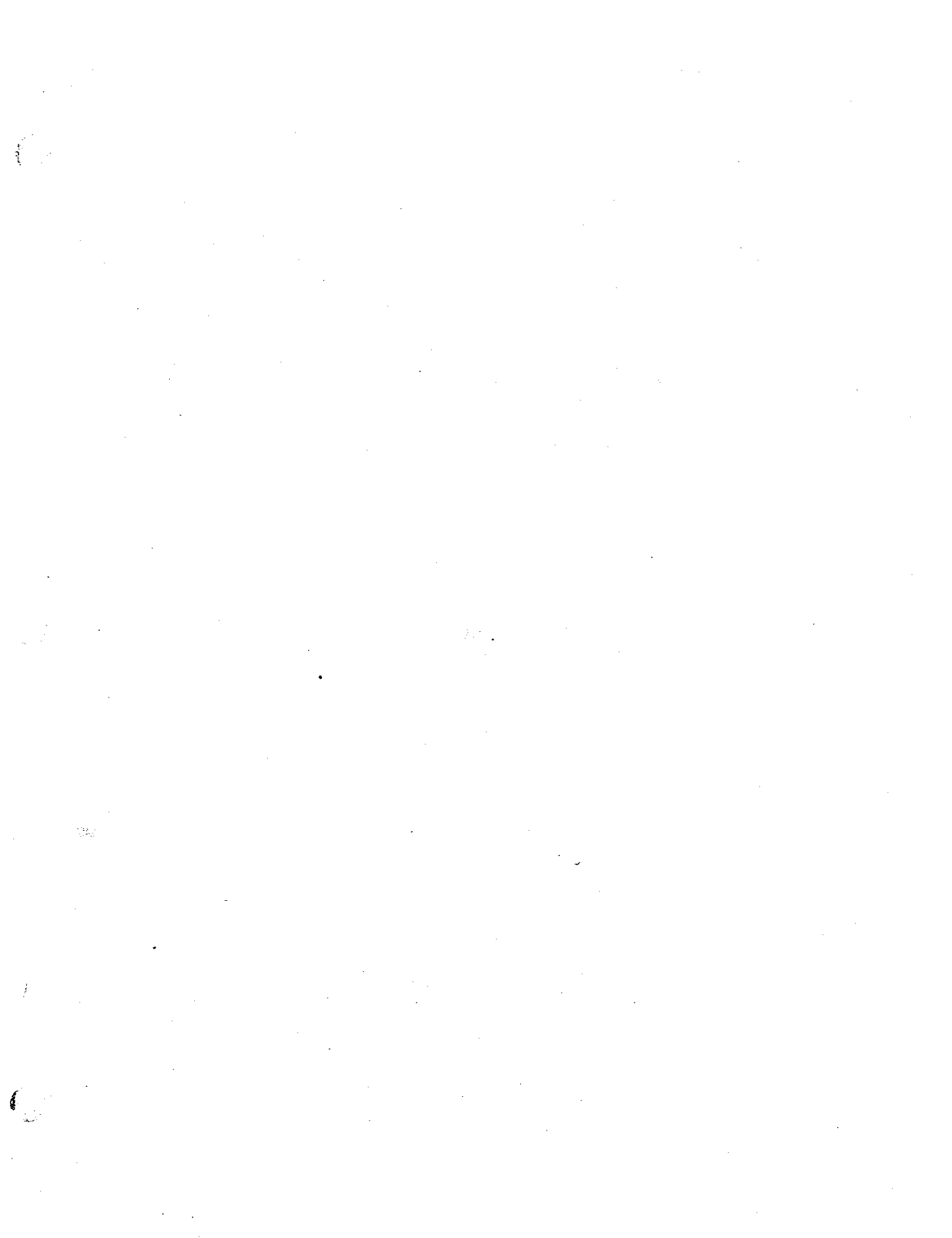
Hayden Lake Watershed Planning Committee

GIS analysis by **Randall Sounhein**

**Panhandle Health District
Coeur d'Alene, Idaho**

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Protection Agency and Idaho Dept. of Health and Welfare, Division of
Environmental Quality**

October 1994



Hayden Lake Watershed Planning Committee

Gene Abrams, Chairman, Kootenai County Board of Realtors

Ron Stone, Save Hayden Lake

Gerry House, Hayden Lake Recreational Water and Sewer District

Todd Walker, Hayden Area Homeowners Coalition

Bob McDonald, Commissioner, Kootenai

Deb Hamm, The Citizens Network For Responsible Growth

Ralph Kizer, Mayor, City of Hayden Lake

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Peggy Polichio, U.S. Forest Service, Fernat Ranger District

Chip Corsi, Idaho Dept. of Fish and Game

Pierre Bordenave, North Idaho Building Contractors Assn.

Jim McNall, Clean Lakes Coordinating Council/

Dave Brown, Soil Conservation Service

Bud Vanderbilt, Livestock Producer

Dave Atwood, Lakes Highway District/Kootenai Perspectives

Jim Colla, Idaho Dept. of Lands

Steve Meyer, Landowner

Nick Ormonde, Livestock Producer/ Aquaculturist

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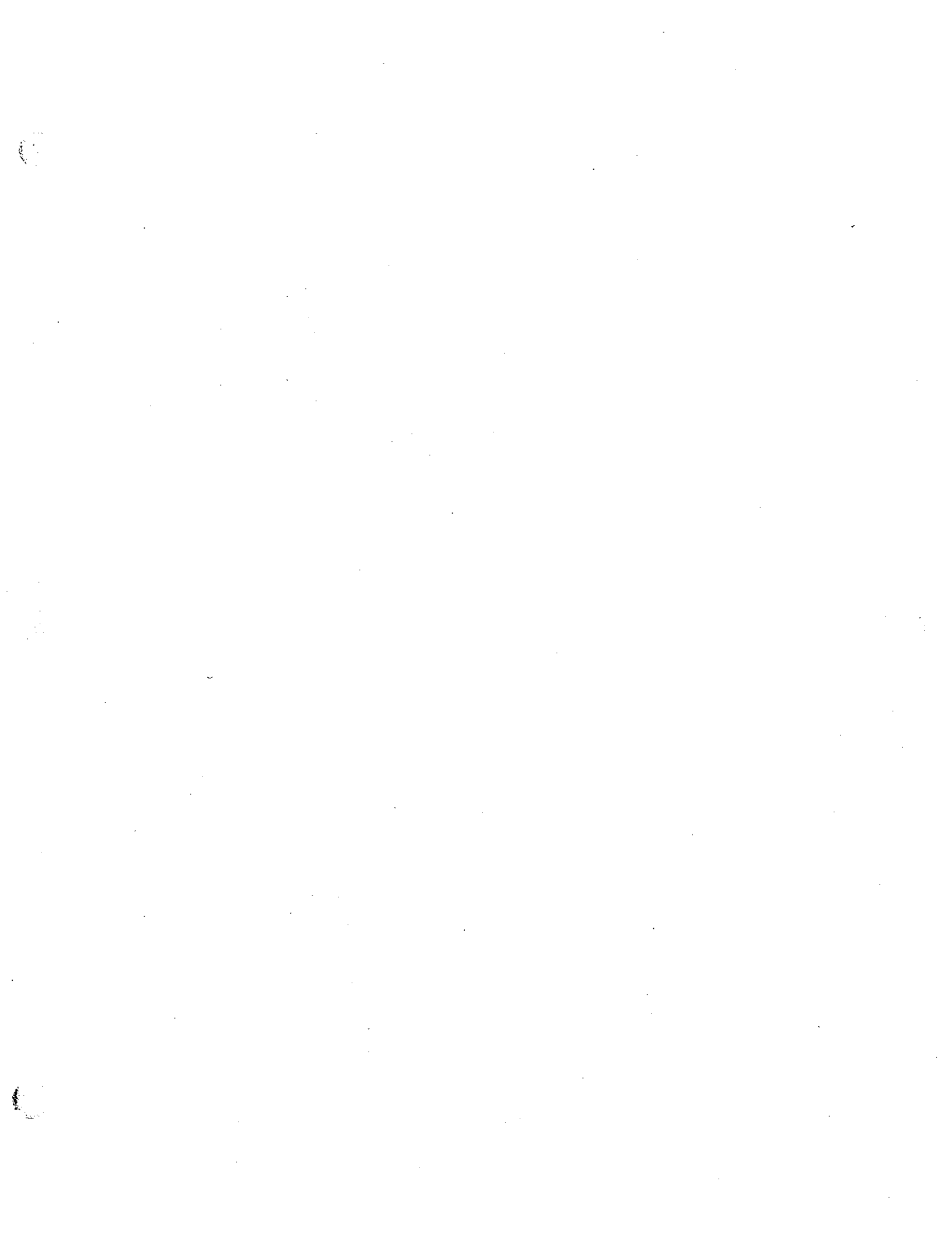


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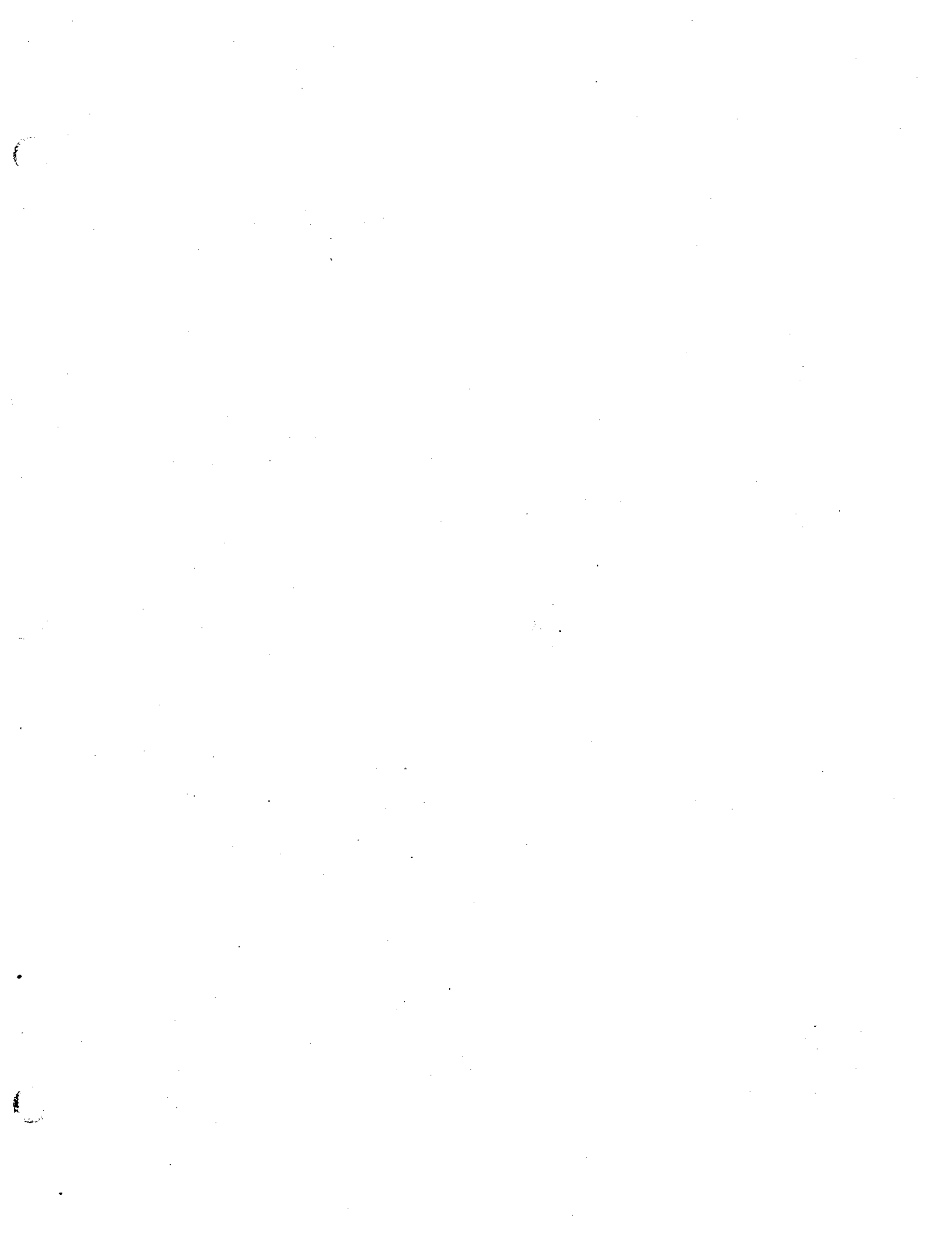
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EXECUTIVE SUMMARY

The 64 mi² Hayden Lake watershed is located in Kootenai County, Idaho. Much of the watershed is forested, with steep slopes and shallow, erodible soils. Most of the land is used for timber production, with some grazing and hay production. The lakeshore and lower watershed is undergoing rapid urbanization. There are approximately 1,100 - 1,300 cabins, homes and condominiums in the watershed, with 700-750 of these located on the lake shore. Approximately 572 residences, camps and businesses dispose of their sewage via septic systems. All but about 60 of these are located on or near the lake shore.

Hayden Lake itself has a surface area of 3,907 acres, and a maximum depth of 178 feet. Beneficial uses include domestic and agricultural water supply, cold water biota, primary and secondary contact recreation, and salmonid spawning. The lake is also designated a special resource water (DEQ, 1992). Approximately 66% of the residences on the lake shore use the lake for drinking water and the lake is a direct source of recharge to the EPA designated sole source Rathdrum Aquifer. This aquifer is the primary source of drinking water to 400,000 residents of northern Kootenai County and Spokane County.

In the past few years area residents have become concerned about a perceived decline in lake water quality. Water quality assessments conducted in 1985 and 1986 concluded that water quality was probably deteriorating at an accelerated rate due to sedimentation and nutrient enrichment from human activities in the watershed. Phosphorus was identified as the nutrient primarily responsible for increased growth of aquatic plants and algae ultimately responsible for deteriorating water quality. Sediment has also been identified as a contributing factor because it contains phosphorus, decreases the clarity of the water and causes lake shallowing. Phosphorus sources which have been identified include substandard septic systems, runoff from residential areas, erosion from substandard roads and construction sites, and erosion from timber harvest.

Because the lake is a direct source of recharge to the Rathdrum Aquifer, maintaining good lake water quality is important to maintaining good aquifer water quality. If the lake is allowed to become more eutrophic (or nutrient rich), it may cause aquifer nitrate levels to increase and it is likely that objectionable tastes and odors and other algae associated problems will affect both the lake and aquifer.

This plan was developed to provide long term protection of both of these valuable water resources. Water quality goals and management recommendations are presented in Chapter 4 of this document. This "action plan" was developed by a diverse, citizen/agency planning committee which considered available water quality data, consulted with numerous land management and water quality experts, and which evaluated and selected appropriate management strategies. This plan presents a comprehensive, proactive approach to improving and then maintaining the water quality of Hayden Lake and the adjacent Rathdrum Aquifer, without unnecessarily restricting development in the watershed. Implementation of the plan will occur primarily through existing public agencies, with some involvement from private organizations. This is a policy/ planning document, designed to provide guidance to the many individuals and organizations whose activities affect or are affected by the lake. Finally, this plan is intended to be a living document, and will be periodically reviewed and updated as new information becomes available.

INTRODUCTION

This management plan was prepared by Panhandle Health District and a broad based, citizen/agency planning committee, as part of the Rathdrum Aquifer Protection Program. The Rathdrum Aquifer is an EPA designated sole source aquifer which is the primary source of drinking water for 400,000 residents of Kootenai County, Idaho and Spokane County, Washington. Hayden Lake provides recharge to the Rathdrum Aquifer, and the entire watershed has been designated a Zone III Wellhead Protection Area in the Idaho Wellhead Protection Plan. According to this plan, Zone III Wellhead Protection Areas should be managed to prevent microbial and chemical contamination of drinking water wells. This plan applies to the City of Hayden Lake, the Hayden Lake Watershed (as defined by Idaho Dept. of Health and Welfare, Division of Environmental Quality (DEQ)), and to those areas which lie along the west lake shore. The watershed is illustrated in Figure 1-1.

This plan was developed to a) identify activities which are affecting lake and/or aquifer water quality, b) identify and evaluate alternatives which might minimize these impacts, and c) present recommendations in the form of an action plan, which will afford long term protection of both Hayden Lake and the Rathdrum Aquifer.

In preparing this document, the Planning Committee met and consulted with numerous land management and water quality experts. In addition, the Committee and staff reviewed, summarized and evaluated existing, technical information on Hayden Lake and similar watersheds. This data was developed primarily by public agencies and universities, and most if not all the published information has undergone peer review. Much of the information and research which was reviewed is summarized in Chapters 2 and 3 of this document; some is included in a companion document, entitled the *Lake Watershed Management Handbook* (Panhandle Health District, 1994). Studies which were reviewed are listed under "Literature Cited".

At the request of the Planning Committee, the Health District developed a rough estimate of phosphorus loading from residential stormwater, based on existing data on the Hayden Lake watershed and on export coefficients from similar watersheds; this estimate is by no means definitive, and should be verified with monitoring data.

The Health District also presented the Planning Committee with maps of existing septic systems, and with maps of soil and slope data, including erosion risk. Soil/slope and erosion risk data were derived from the Soil Conservation Service's Kootenai County Soil Survey. The procedure for mapping erosion risk was developed by Kootenai County, Panhandle Health District and the Soil Conservation Service, with review from soil scientists at the University of Idaho, Washington State University and a number of public agencies.

Though the Committee would have liked to have had a more comprehensive data base, they felt the information they did have was adequate for establishing water quality goals, and identifying manageable sources of sediment and nutrients. It was felt that changing the relative proportions of incoming nutrients, based on additional monitoring data, would not change the management and mitigation options available (though it may change implementation priorities). Much of the

phosphorus and sediment entering the lake cannot be controlled; thus this plan strives to manage the sources which can be controlled, while preventing additional contamination from new sources.

This plan presents a comprehensive, proactive approach to improving and then maintaining the water quality of Hayden Lake and the adjacent Rathdrum Aquifer, without unnecessarily restricting development. The plan is a policy document, composed of recommendations made by a diverse, well informed group of citizens; it is designed to provide guidance to, and be implemented by existing public agencies, with some involvement from private organizations. The plan is intended to be a "living document", which is periodically reviewed and updated as new information becomes available.

This plan is not a scientific study, or a regulation; any regulatory changes proposed as a result of this plan must go through established public notification, hearing and adoption processes. Many of the details of these regulations will be worked out at that time.

This plan advocates implementation of a management strategy now, while water quality is still good. As other communities have learned, lakes and aquifers are resources which are difficult, if not impossible to restore once water quality becomes unacceptable.

Chapter 1

METHODOLOGY

This chapter briefly explains the methods used to gather and analyze watershed data, to involve the public and to select management options for implementation.

GIS SYSTEM

A GIS (Geographic Information System) computer was used to store and analyze land use and natural resource data on Hayden Lake and its watershed. Watershed characteristics were identified on 7.5 minute (1:24,000) USGS maps; these points and polygons were then digitized (entered into the computer) along with available attribute data.

LAND USE SURVEY

Septic Systems

Information on septic systems was obtained from the Kootenai County Assessor's records, from a 1976 shoreline survey (PHD, 1977) and from a 1985 shoreline survey (PHD, 1986). Dwellings listed in the 1992 Assessors Roll, were located on County parcel maps. A dot was then placed in the same location on a 7.5 minute USGS map. Dots representing septic systems were then digitized and along with attribute data, were entered into the GIS system. It was assumed that each dwelling listed on the Assessors Roll, which is not served by municipal sewer, is served by a septic system. The only municipal sewer system in the area serves the Hayden Lake Recreational Water and Sewer District.

Septic system attribute data which was entered into the computer includes:

- a. County parcel number
- b. System type (public/private/commercial)
- c. Number of systems, connections or ER's on the parcel (one ER or equivalent residence is equal to 250 gallons of effluent per day - only sewage flows from Camp Mivoden were expressed in ER's)

NATURAL RESOURCES

Rainfall

Mean annual precipitation maps were provided by Dr. Myron Molnau, Idaho State Climatologist. These values were converted into rainfall intensity factors (R) using a conversion table provided by Kim Golden, U.S. Dept. of Agriculture, Soil Conservation Service. These R factor maps were then digitized.

Soils

Soils were digitized from maps provided by the Soil Conservation Service. Soil attribute data was obtained from the Kootenai County Soil Survey and includes the following for each soil type:

- a. maximum slope
- b. minimum slope
- c. maximum K (erodibility) factor
- d. minimum K factor
- d. minimum permeability in inches per hour
- f. least permeable hydrologic soil group
- g. minimum depth to water table
- h. minimum depth to bedrock
- i. minimum LS factor for 100 ft slope (based on minimum slope)
- j. maximum LS factor for 100 ft slope (based on maximum slope)

For several soils, the Soil Survey reports depth to water table as >6.0 feet; the computer would not accept the data in this format, and these values had to be entered as 6.0 feet. Likewise, depth to bedrock for several soils is listed as >40 and >60 inches, and these values were entered as 40 and 60 inches. This discrepancy should not be a problem, providing it is understood that depth to bedrock and depth to water table data represent minimum values.

Maps illustrating minimum slope, hydrologic group C and D (less permeable) soils, depth to bedrock, and depth to water table were prepared based on the soils map and corresponding attribute data. These maps present a general view of conditions in the watershed and though they are useful as a planning tool, they may not accurately depict site specific conditions.

As part of the soils analysis, a method of estimating erosion risk for land development was established and potential erosion risks were mapped. A derivation of the Universal Soil Loss Equation (USLE) was used to yield an Erosion Risk Index which was then divided into four categories (low, moderate, high and extreme risk). The breaks between risk categories were based on Kootenai County Planning Dept. officials experience with erosion problems in the County. These categories are similar to those developed in other communities. Appendix C contains an explanation of the procedure used to determine the Erosion Risk Index.

Using the GIS system, two erosion risk maps were prepared for the Hayden Lake watershed. One map is based on minimum slope and minimum K factor and the other is based on maximum

slope and maximum K factor. This was necessary because slope data was only available as a range, and because the K factor for each soil varies with depth. The two maps essentially present the best and worst case regarding erosion risk in this watershed.

Due to the nature of the research used to develop the USLE, these erosion risk maps are not suitable for predicting erosion from timber harvest. The USLE is based on studies of erosion losses from cultivated cropland. This situation is very different than that found in a forest where rain and snow melt are partially absorbed by vegetation, where trees, shrubs, grasses and organic debris protect the soil from the direct impact of raindrops, and where a well developed root system stabilizes slopes and stream corridors.

STORMWATER NUTRIENT LOAD

The stormwater phosphorus load to Hayden Lake was estimated using export coefficients. The developed portions of the watershed were divided into three categories based on housing density. Area 1 was medium density residential (average lot size per house assumed to be one acre or less) and includes most of the lake shore. Area two was low density residential (average lot size per house assumed to be at least two acres). Area three was rural residential with primarily large tracts of pasture, meadow and timber, interspersed with a few homes. The three areas proposed for inclusion in the stormwater calculations were then reviewed and boundaries were modified by the Planning Committee.

As part of this process, several limnologists and water quality experts were consulted regarding the proposed analysis procedure. There was consensus that the use of export coefficients was an acceptable method of obtaining a rough estimate of phosphorus loads from stormwater, pending additional monitoring data from this watershed. The phosphorus export estimate was then calculated by multiplying the acreage of each of the three areas by an export coefficient. Export coefficients from the literature were reviewed as a frame of reference, and coefficients felt to be appropriate for this watershed were selected. It should be noted, however, that these export coefficients, and thus the stormwater estimate, do not account for phosphorus and sediment being exported from construction sites and newly developed properties. Nutrient export from these areas is extremely variable and difficult to predict without site specific analysis. Because there are so many active construction sites, and newly developed properties in this watershed, it is likely that the stormwater estimate is less than what is actually occurring.

Figure 1-2 is a map of the three areas included in the stormwater calculations. Nutrient sources, including the Health District's stormwater estimate and Soltero's estimate of other phosphorus sources, are presented in Figure 2-9 (Soltero et. al., 1986). Following are acreages and export coefficients which were used in the stormwater calculations, as well as representative export coefficients from the literature.

Values used in stormwater calculations for the Hayden Lake Watershed:

2,556 acres medium density residential at 1 pound phosphorus per acre per year (area 1)

539 acres low density residential at .45 pounds phosphorus per acre per year (area 2)

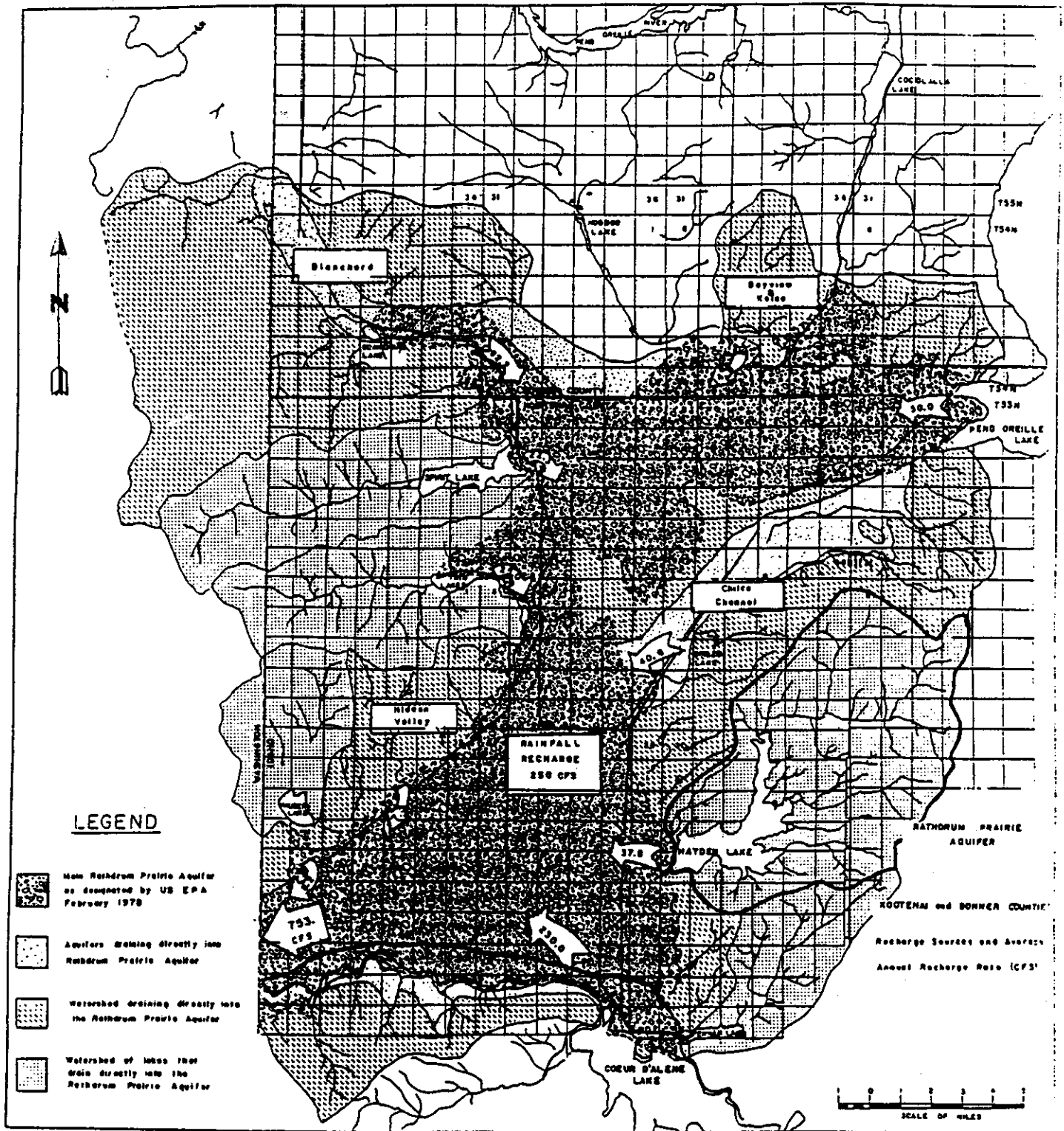
1,487 acres rural residential at .25 pounds per acre per year (area 3)

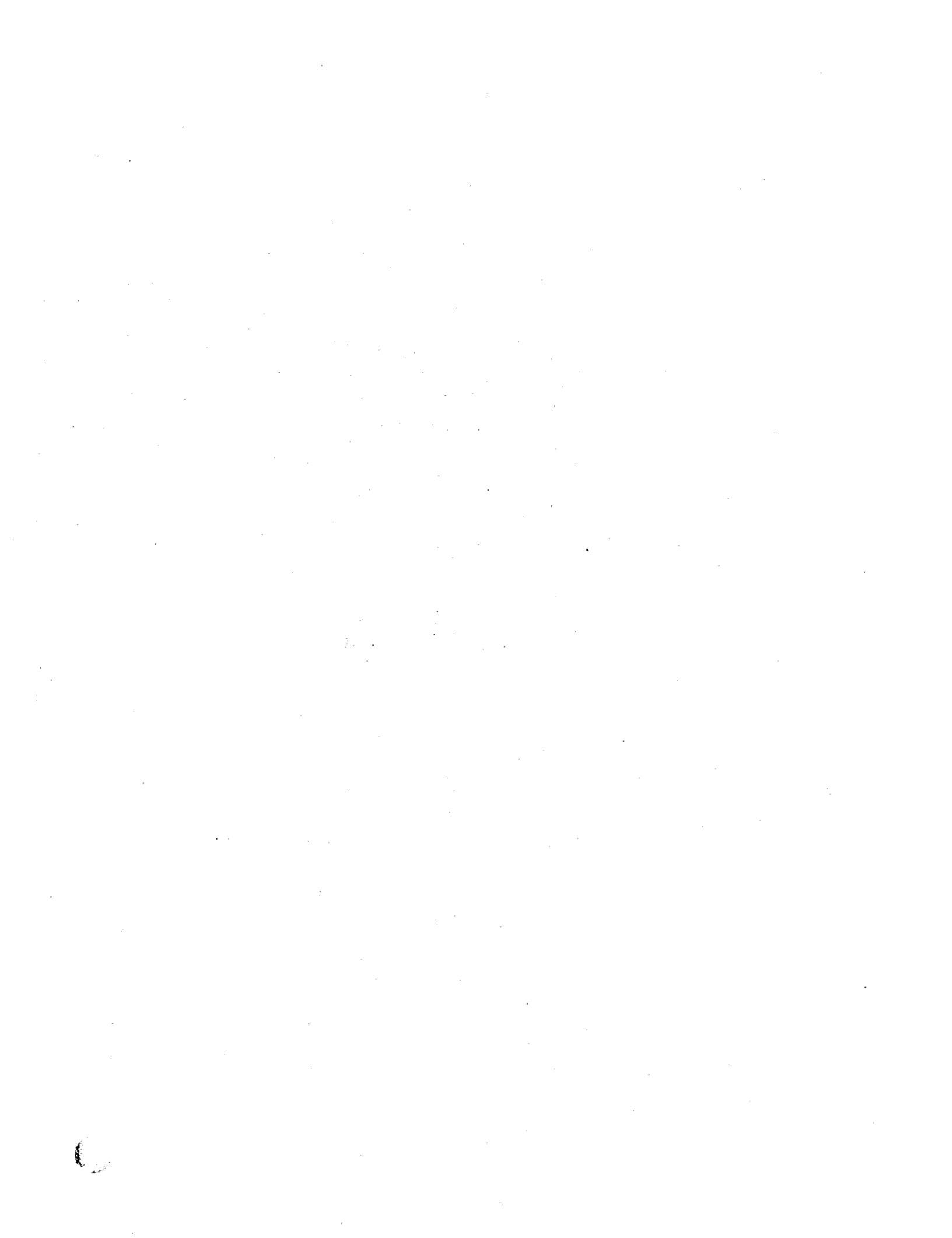
Literature coefficients which were reviewed:

- Total phosphorus export for Forest Service lands in this watershed ranges from .02 to .04 pounds per acre per year (see Table 2-7).
- Total phosphorus export for the Mokins Creek drainage is approximately .14 pounds per acre per year (see Table 2-7).
- The national average for runoff from residential areas with 30 " rainfall per year is .87 pounds total phosphorus per acre per year (EPA, 1983)
- In their study of Cocolalla Lake, Falter and Good estimated that stormwater from residential areas contributes .89 pounds total phosphorus per acre per year (Falter and Good, 1987).
- In his study of Spirit Lake, Bellatty estimated that stormwater from residential areas contributes .81 pounds per acre per year (Bellatty, 1987).
- A study of a residential area in Durham, North Carolina (\approx 1,070 acres, 37% impervious) found an export of 1.07 pounds of total phosphorus per acre per year (Bryan, 1970).
- A study of a residential area in Madison Wisconsin (\approx 124 acres, 27% impervious, 28 " precipitation per year) found an export of .98 pounds phosphorus per acre per year (Kluesener and Lee, 1974).
- Phosphorus export from hay fields and pasture typically ranges from .03 to .35 pounds per acre per year (EPA, 1974) (Most research relating to hay fields and pasture was conducted in Minnesota, Wisconsin and Ohio).

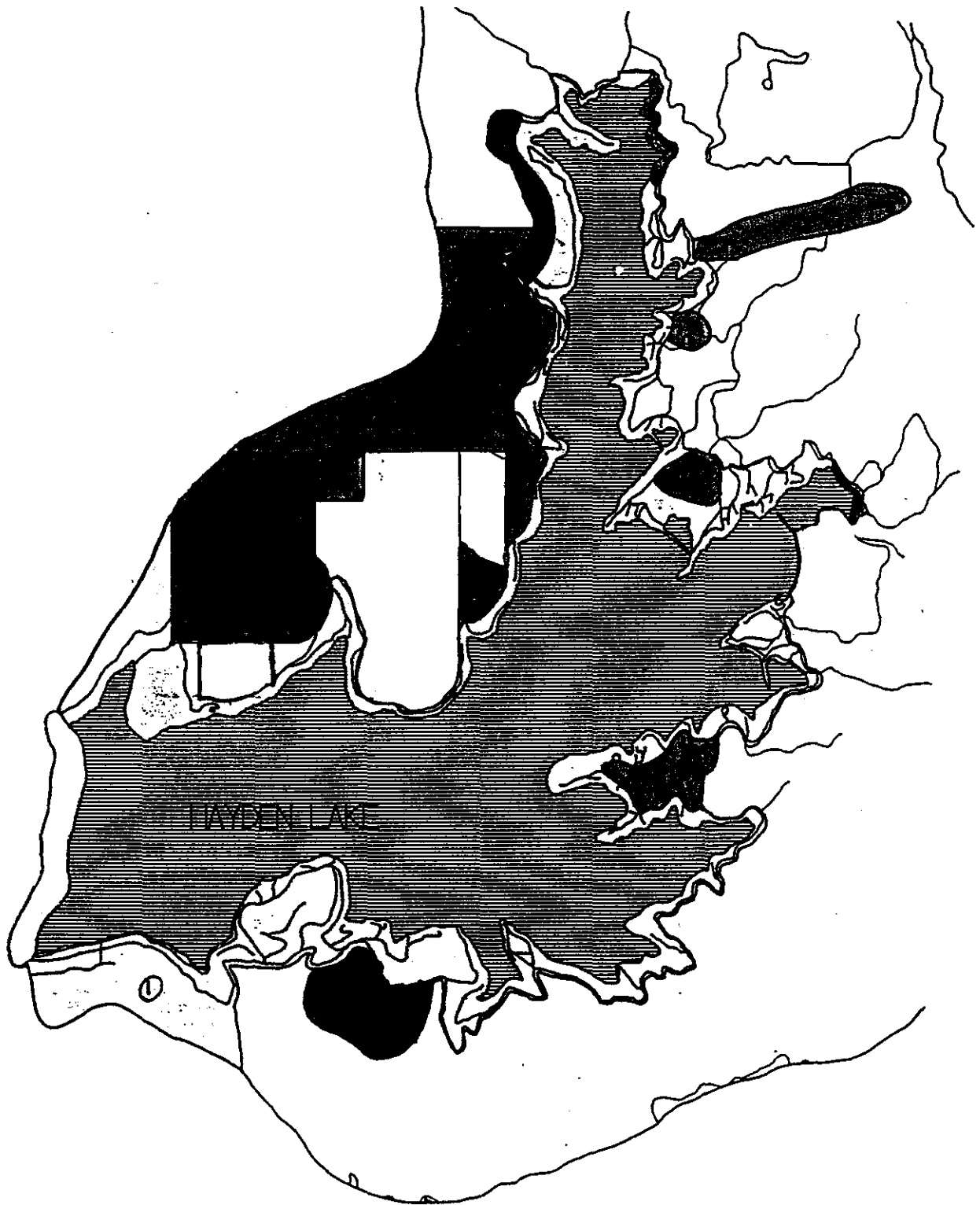
Figure 1-1

Watersheds Recharging the Rathdrum Aquifer (Painter, 1991)





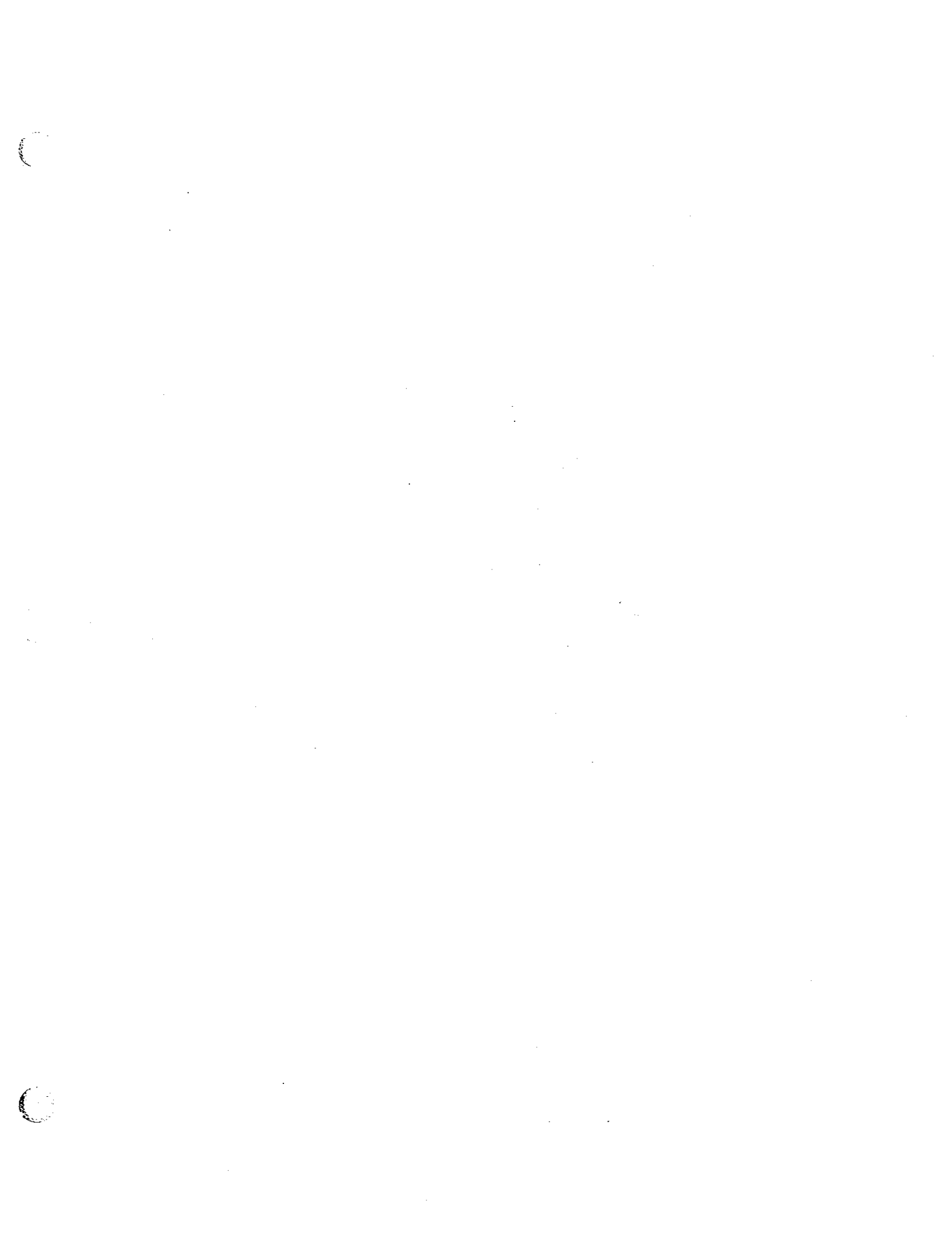
**FIGURE 1-2
STORMWATER EXPORT MAP**



□ 2,556 acres at 1 lb. total phosphorus per acre per year

▨ 539 acres at .45 lb. total phosphorus per acre per year

■ 1,487 acres at .25 lb. total phosphorus per acre per year



PUBLIC INVOLVEMENT/SELECTION OF MANAGEMENT OPTIONS

This plan was developed by a volunteer committee made up of both citizen and agency representatives. Groups which agreed to participate selected their own representatives, and these individuals identified watershed issues, selected water quality and fisheries goals, and evaluated and selected management options. The Committee met from September 1993 through October 1994.

During June and July 1994, the draft management plan was circulated for public review; the Committee then revised the plan based on the comments received. Copies of the comments are included in Appendix F.

Though many agencies and private organizations were represented on the Planning Committee, it should be noted that their respective organizations may not support all the recommendations included in this plan.

The Hayden Lake Watershed Planning Committee was made up of the following organizations and individuals:

Gene Abrams, Chairman, Kootenai County Board of Realtors

Ron Stone, Save Hayden Lake

Gerry House, Hayden Lake Recreational Water and Sewer District

Todd Walker, Hayden Area Homeowners Coalition

Bob McDonald, Commissioner, Kootenai

Deb Hamm, The Citizens Network For Responsible Growth

Ralph Kizer, Mayor, City of Hayden Lake

Jack Skille, IDHW, Division of Environmental Quality

Peggy Polichio, U.S. Forest Service, Fernan Ranger District

Chip Corsi, Idaho Dept. of Fish and Game

Pierre Bordenave, North Idaho Building Contractors Assn.

Jim McNall, Clean Lakes Coordinating Council/

Dave Brown, Soil Conservation Service

Bud Vanderbilt, Livestock Producer

Dave Atwood, Lakes Highway District/Kootenai Perspectives

Jim Colla, Idaho Dept. of Lands

City of Hayden (invited)

Steve Meyer, Landowner

Nick Ormonde, Livestock Producer/ Aquaculturist

Buell Hollister, Kootenai Environmental Alliance

Richard Penn, Tobler Marina

In addition to the Planning Committee, several organizations and individuals were issued an open invitation to attend meetings and participate in discussions. These included the Idaho Forest Industries Association, the Hayden Lake Country Club, and Camp Mivoden.

Chapter 2

THE LAKE AND ITS WATERSHED

Lakes are complex ecosystems influenced by a variety of chemical, physical and biological factors including the size, depth and shape of the lake basin, climate, local geology, the amount of water entering the lake from its watershed, transparency of the water, the composition of bottom sediments, vegetative land cover, and the occurrence of sediment and nutrient producing activities in the watershed.

Lakes can be classified according to their biological productivity or trophic status. Biologically unproductive, or "oligotrophic" lakes are typically clear with low concentrations of algae and high concentrations of dissolved oxygen. Nutrients (such as phosphorus), organic material and sediment flowing into a lake cause it to become more biologically productive. Sediment deposited on the lake bottom causes it to become more shallow, and phosphorus attached to soil particles accelerates algae growth. The lake gradually becomes more cloudy, algae concentrations increase, oxygen in the deep parts of the lake decrease, aquatic plants become more abundant and objectionable odors from decaying organic material become apparent. The lake becomes "mesotrophic" and then "eutrophic". Finally, the lake becomes a marsh and then a meadow.

The trophic status of a lake is established based on several factors including the concentration of phosphorus in the water, clarity (measured with a black and white secchi disk), algal concentration (determined by measuring chlorophyll *a*, the main pigment in algal cells), the presence of blue-green algae, dissolved oxygen concentrations, and the number of prevalent submergent macrophyte (aquatic plant) species. Table 2-1 illustrates the relationship between lake characteristics and phosphorus concentrations.

Table 2-1
Relationship Between Lake Water Quality and Lake Water Phosphorus Concentration (Gilliom, 1983)

Lake Phosphorus Concentration (micrograms per liter)	Lake Characteristics
<p align="center">A (0-10)</p>	<p>Low algal productivity; high suitability for all recreational uses. Algal blooms are rare and water is extremely clear, with a Secchi-disk visibility that is usually 16 ft. or greater. Summer chlorophyll <i>a</i> concentrations generally average less than 3 $\mu\text{g/L}$.</p>
<p align="center">B (10-20)</p>	<p>Moderate algal productivity; generally compatible with all recreational uses. Algal blooms are occasional, but generally of low to moderate intensity. Oxygen depletion is common in bottom waters and cold-water fisheries may be endangered in some shallow lakes. In many lakes, however, fishery may be enhanced by increased productivity. Secchi-disk visibility is usually 10 to 16 ft.; chlorophyll <i>a</i> averages 2 to 6 $\mu\text{g/L}$ in most lakes.</p>
<p align="center">C (20-30)</p>	<p>Moderately high algal productivity; still compatible with most recreational uses, but algal blooms are more frequent and intense, and oxygen depletion is more serious. This can increase fisheries problems, though productivity may still be enhanced. Water clarity is reduced and Secchi-disk visibility is usually 7 to 13 ft. Chlorophyll <i>a</i> averages 4 to 10 $\mu\text{g/L}$.</p>
<p align="center">D (greater than 30)</p>	<p>High algal productivity; lake suitability for most recreational uses is often impaired by frequent and intense algal blooms which may form floating scums. The water often takes on a "pea soup" color and becomes extremely murky. Fish kills may be common, especially in shallow lakes. Secchi-disk visibility is generally less than 10 ft, and chlorophyll <i>a</i> concentration is usually greater than 10 $\mu\text{g/L}$.</p>

The public generally considers the water quality of eutrophic lakes to be unacceptable for recreation because of algae blooms, increased growth of submerged aquatic plants, objectionable tastes and odors, the murky appearance of the water and because algae "slime" tends to foul fishing lines and grow on boats and docks.

Long before water quality becomes unacceptable to recreationists, however, the water becomes undesirable as a source of drinking water. As algae concentrations increase people may experience problems with unpleasant tastes and odors. Water withdrawn from the hypolimnion (deep water) may contain hydrogen sulfide, reduced iron and manganese, and increased amounts of organic compounds. Water treatment becomes increasingly expensive as algae must be filtered from the water. Algae and algal metabolites can form carcinogenic compounds (called trihalomethanes) when chlorine is added to disinfect the water. In some cases ingestion of water containing algae causes allergic reactions. Toxic blue green algae blooms can also occur, presenting an additional hazard to those swimming in or drinking the water. Pets and livestock have been killed as a result of drinking water containing high concentrations of blue green algae at Black Lake in Northern Idaho, and Cascade Reservoir in Central Idaho.

Due to the problems associated with algae, in 1985 British Columbia adopted water quality standards for nutrients and algae. Because of the direct link between phosphorus and algae, their standard was based on phosphorus concentration. Their current standard for lakes used for drinking water is 10 μg total phosphorus per liter (mean for the entire water column), (Nordin, 1985). Lakes with an epilimnetic residence time greater than 6 months are measured at spring overturn; other lakes are measured through the growing season. This phosphorus concentration is reported to result in mean chlorophyll *a* concentrations of 2-2.5 $\mu\text{g}/\text{l}$.

Many of those who live around Hayden Lake use the lake as their source of drinking water. In previous years 85% of the residents surveyed had lake water systems (PHD, 1977). Though several lake systems have recently been replaced with wells, approximately 66% of the residents still use lake water for domestic purposes. Maintaining good water quality is essential if these residents are to avoid the expense associated with installing and operating complex water treatment and distribution systems.

Though the process of eutrophication occurs naturally, it is greatly accelerated by human activities in a watershed. A lake which would normally take 10,000 years to become eutrophic, might do so in 100 years or less. Figure 2-1 illustrates the eutrophication process. Table 2-2 presents limnological classification criteria for lakes and Table 2-3 compares the water quality and trophic status of several lakes in the region.

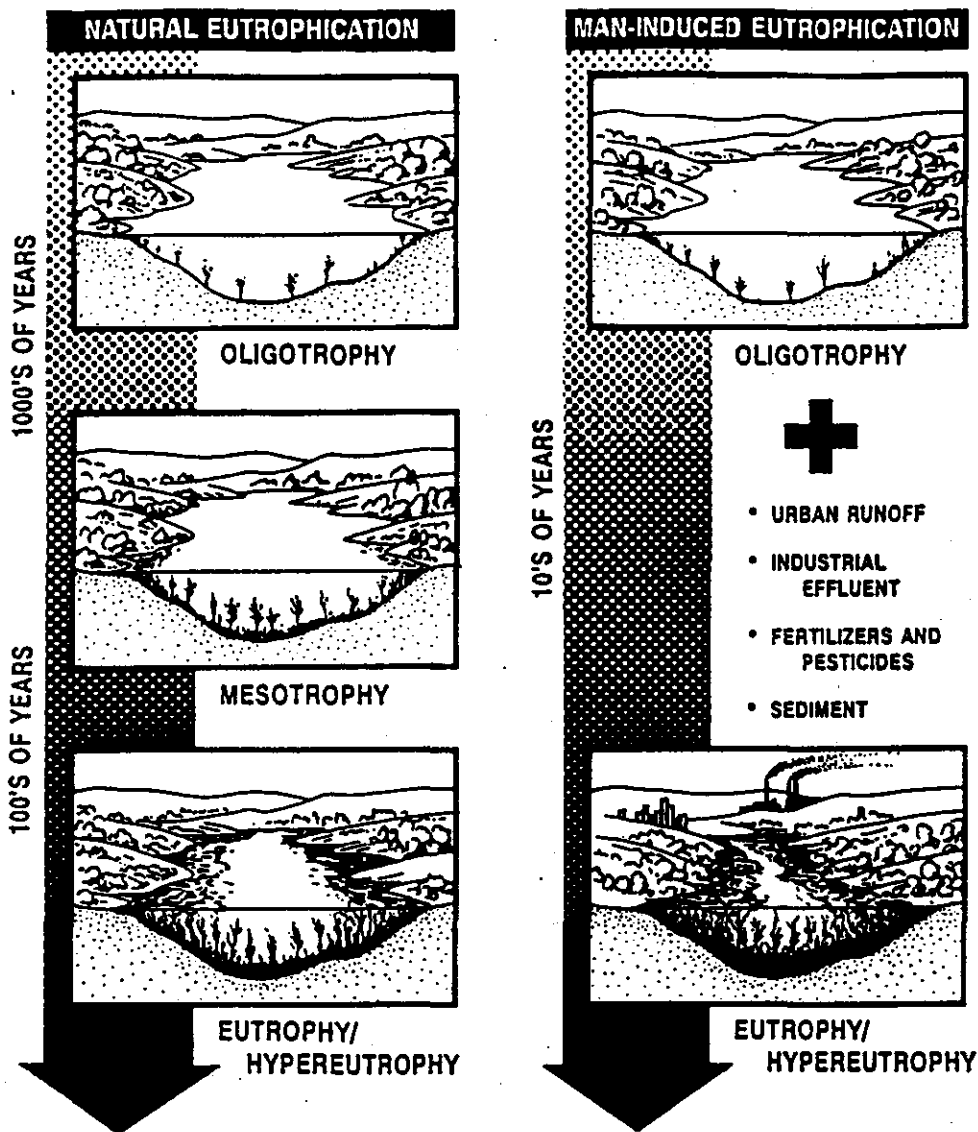


Figure 2-1

Lake Eutrophication Process

(left column) The progression of natural lake aging or eutrophication through nutrient-poor (oligotrophic) to nutrient-rich (eutrophic) sites. Hypereutrophy represents extreme productivity characterized by algal blooms or dense macrophyte populations (or both) plus a high level of sedimentation. The diagram depicts the natural process of gradual nutrient enrichment and basin filling over a long period of time (e.g. thousands of years).

(right column) Human induced or cultural eutrophication in which lake aging is greatly accelerated (e.g. tens of years) by increased inputs of nutrients and sediments into a lake, as a result of watershed disturbance by humans (EPA, 1990).

Table 2-2
Representative Values of Chlorophyll *a*, Secchi Disk
Transparency Depth and Total Phosphorus For Lake Classifications

Classification	Chlorophyll <i>a</i> (<i>ug/l</i>)	Secchi Depth (ft)	Total Phosphorus (<i>ug/l</i>)
From Jones and Lee (1982)			
Oligotrophic	<2.0	>15.1	<7.9
Oligo-mesotrophic	2.1-2.9	15.0-12.5	8-11
Mesotrophic	3.0-6.9	12.4-7.9	12-27
Meso-Eutrophic	7.0-9.9	7.8-5.9	28-39
Eutrophic	>10	<5.8	>40
Modified From Ryding and Rast (1989)			
Ultra-oligotrophic	<1.0	>19.7	<4.0
Oligotrophic	<2.5	>9.8	<10.0
Mesotrophic	2.5-8	10-5	10-35
Eutrophic	8-25	5-2	35-100
Hypereutrophic	>25	<2	>100
From OECD (1982)			
Oligotrophic	0.3-4.5	17.7-92.8	3.0-17.7
Mesotrophic	3.0-11	4.9-26.6	10.9-95.6
Eutrophic	2.7-38	2.6-23.0	16.2-386

**Table 2-3
Trophic Status and Water Quality Indices
of Northern Idaho Lakes (DEQ, 1993)**

Lake/ Trophic Status E=eutrophic ME=meso - eutrophic M=mesotrophic O=oligotrophic	Water Quality Parameter			
	Secchi Depth (ft)	Chlorophyll <i>a</i> ($\mu\text{g/l}$)	Total Phosphorus ($\mu\text{g/l}$)*	Hypolimnetic Dissolved Oxygen (mg/l)
Rose/ E	4.6	11.8	19. (1,300.)	1.6
Granite/ E	11.5	9.0	330. (970.)	.3
Round/ E	9.8	13.4	82. (380.)	.2
Hauser/ E	8.2	16.9	181. (170.)	.7
Cocolalla/ E	8.2	9.3	120. (220.)	.2
Upper Twin/ ME	9.8	7.0	170. (18.)	6.7
Kelso/ ME	11.5	6.1	40. (150.)	.3
Fernan/ M	10.8	3.8	20. (30.)	.8
Lower Twin/ M	16.4	2.7	150. (320)	.3
Upper Priest/O	16.4	2.7	5. (5)	4.3
Spirit/ O	17.1	1.7	60. (133)	4.0
Hayden/ O	25.6	1.9	12. (20)	8.8
Priest/ O	36.1	1.0	4/3.5 (5)	9.9

*The first figure is the average total phosphorus concentration in 1990, the figure in parenthesis is hypolimnetic total phosphorus.

HAYDEN LAKE

Hayden Lake is the second largest lake in Kootenai County, and is located five miles north of the City of Coeur d'Alene, on the eastern edge of the Rathdrum Prairie. The lake was probably formed by the damming of a secondary valley by glacial outwash (Conners, 1976). Twenty small and mostly seasonal streams empty into the lake, with the majority of the water originating in the forested mountains to the east. Hayden, Mokins and Yellowbanks Creek are the primary tributaries. Water from the lake flows via subsurface seepage to the Rathdrum Prairie Aquifer at a rate of approximately 38 cubic feet per second (Painter, 1991). The surface outlet flows only after the lake has filled to capacity from spring runoff and usually ceases in May. Spring overflow floods a meadow adjacent to the lake before percolating into the Aquifer. Irrigation and domestic water is also pumped from the lake.

The Hayden Lake watershed encompasses approximately 64 mi², 80% of which is forested. The elevation of this area ranges from 2,238 feet at Hayden Lake to 5,665 feet at South Chilco Mountain. Mean annual precipitation ranges from 25-50 inches per year. 25,824 acres, or 63% of the watershed is managed by the U.S. Forest Service.

The watershed has a diverse geomorphology. Parent materials include basalt in the northwestern portion of the watershed, and decomposing granite and metasedimentary bedrock in the eastern and southern portions of the watershed. Soils range from silty clay in the northern and southern watershed, to silty and sandy loam on the east side of the lake. The extreme western portion of the shoreline is adjacent to the Rathdrum Aquifer and soils consist of sands and gravels. Most soils are mixed with volcanic ash and loess. Slopes in the southern and eastern portions of the watershed are steep with shallow soils, while the northwestern watershed consists of gently rolling hills and deeper soils. The northwestern watershed was once covered with a lake, and much of the soil consists of relatively impermeable silts and clays which were deposited in the lake bed. This area, and the southern part of the watershed both have shallow, seasonal, laterally moving water tables which terminate in springs near the shoreline (PHD, 1986).

According to the Kootenai County Soil Survey, most soils in the watershed are highly to very highly erodible. Erosion risk maps illustrating erosion potential are presented in Figures 2-2 and 2-3. Two maps are used to present this data because two of the factors necessary for the calculations were only available in a range (K factors and slopes). One map is based on minimum values, the other on maximum values. In these maps low risk areas are depicted in red, moderate risk in dark gray, high risk in light gray, and extreme risk in green.

The surface area of Hayden Lake is 3,907 acres, with a mean depth of 93 feet and a maximum depth of 178 feet. The majority of the northern area of the lake was created in 1911 when the Hillyard Town Site Company built an earthen dam across the outlet and raised the lake level by 12 feet. The shallow northern end of the lake and most of the shallow bays contain dense submergent and emergent macrophyte (aquatic plants) growth. Morphometric data are presented in Table 2-4.

Hayden Lake is protected for several beneficial uses, including domestic and agricultural water supply, cold water biota, salmonid spawning, primary and secondary contact recreation, and as a Special Resource Water (DEQ, 1992).

Land uses include timber harvest, cattle grazing, hay production and residential development. The lake has two public access areas, one at the south end and one at the north end of the lake. A large swimming beach and picnic area is located adjacent to the southern public boat access at Honeysuckle Beach.

Much of the shoreline, as well as the hillsides in the western part of the watershed, are developed with approximately 1,100 -1,300 cabins, homes and condominiums. Approximately 700-750 of these residences are located on the lake shore (*See notation below). A golf course and country club, a corporate retreat, a marina and a summer camp are also located along the lake shore. Because of excellent access roads, and its close proximity to the City of Coeur d'Alene, the area is undergoing intense urbanization. Most of the lakefront is zoned "restricted residential", permitting up to five homes per acre.

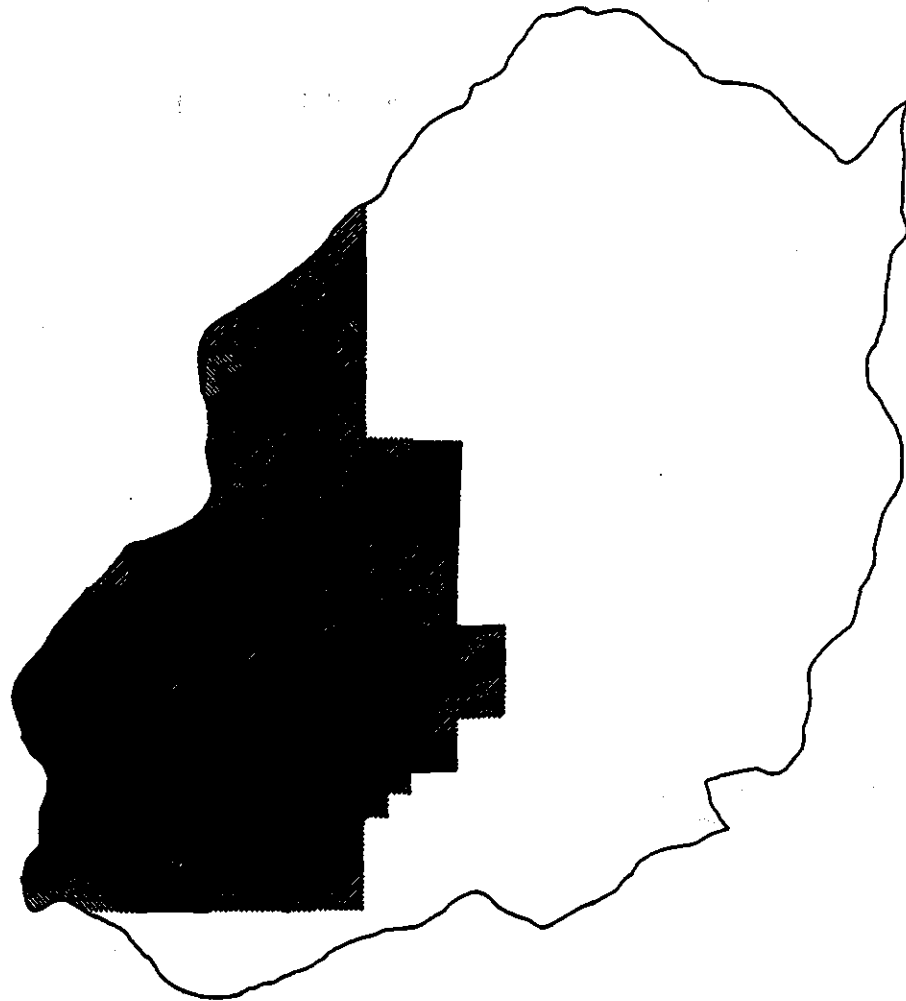
**Table 2-4
Morphometric Data for Hayden Lake, Idaho**

Maximum length	6.2 miles
Maximum width	1.8 miles
Maximum depth	178 feet
Mean depth	93 feet
Mean width	1.0 mile
Surface area	3,907 acres
Volume	3.62 x 10 ⁵ acre-feet
Shoreline length	27.0 miles

* These estimates assume that approximately half of the 1,220 homes connected to the Hayden Lake Recreational Water and Sewer District sewer are located in the Hayden Lake watershed, and that there are approximately 600 homes in the watershed on individual and small community sewage systems. In 1976 there were 627 residences located within ¼ mile of the lake. Between 1976 and 1985 an additional 66 lakefront residences were constructed (PHD, 1986). The number of lake front homes constructed since 1985 is not known.





EROSION RISK (MIN) FOR THE HAYDEN LAKE C.A.R.A.

Figure 2-2



Legend

EROSION CLASSIFICATION

-  LOW RISK
-  MODERATE RISK
-  HIGH RISK
-  EXTREME RISK

This analysis depicts an erosion risk map for the Hayden Lake C.A.R.A. for the year 1980 based on a minimum slope and erosion factors.

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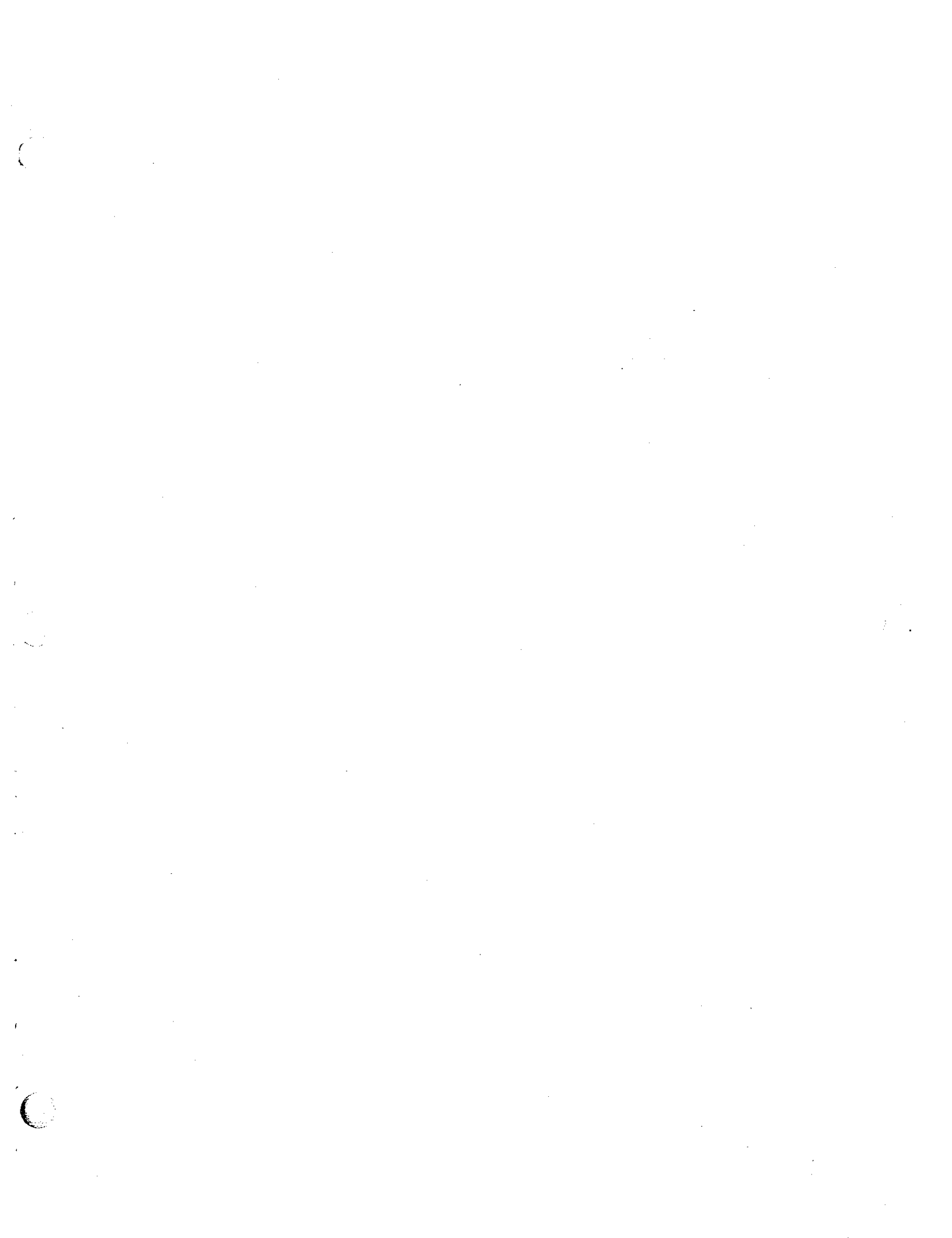
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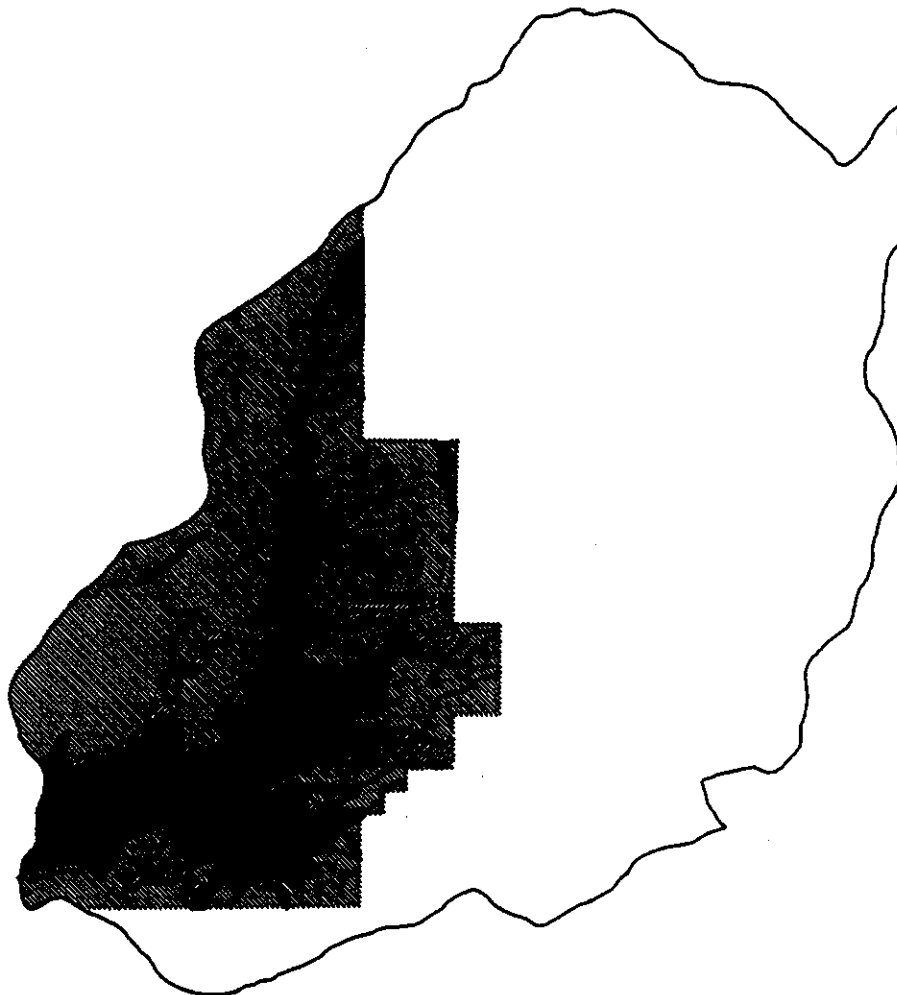
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EROSION RISK (MAX) FOR THE HAYDEN LAKE C.A.R.A.

Figure 2-3



Legend

EROSION CLASSIFICATION

-  LOW RISK
-  MODERATE RISK
-  HIGH RISK
-  EXTREME RISK

This analysis depicts the erosion risk index of the Hayden Lake C.A.R.A. based on the erosion risk index of the Hayden Lake C.A.R.A. This index is based on the erosion risk index of the Hayden Lake C.A.R.A. This index is based on the erosion risk index of the Hayden Lake C.A.R.A.

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NATIONAL BIOLOGICAL SERVICE

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Drinking Water/Sewage Disposal

Approximately 460-500 ($\approx 66\%$) of the lake shore residences still obtain their drinking water from Hayden Lake; this number was much higher, however several large lake water systems have recently converted to wells. Upgraded systems include the Hayden Lake Irrigation District, City of Hayden Lake and the Markhouse Water Association. Remaining public lake water systems include Hayden Lake Country Club, Dalton Irrigation District, Honeysuckle Hills Water Association, and Hayden Lake Irrigation District (irrigation water only).

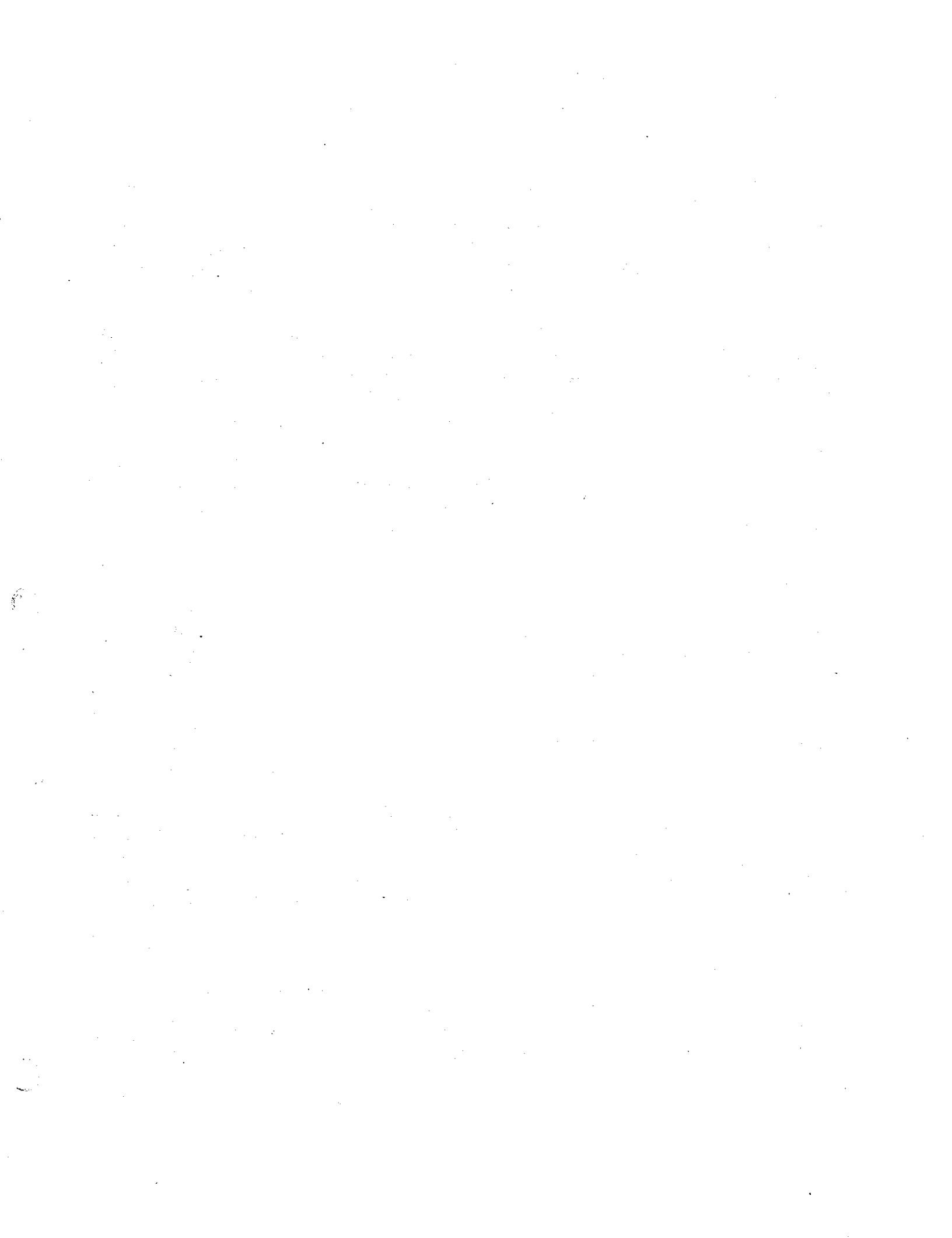
Throughout the Hayden Lake Watershed there are approximately 572 homes and cabins, a summer camp and a corporate retreat on private septic systems; all but about 60 of these are located on or near the lakeshore. Another 500 - 700 homes in the watershed are connected to the Hayden Lake Recreational Water and Sewer District. (The District has a total of 1,220 residences connected, however some of these are not in the watershed.)

Many of these remaining septic systems were probably installed 30-35 years ago and are likely substandard. In 1976 Panhandle Health District conducted a shoreline survey which identified 430 seasonal cabins and 197 permanent residences located within $\frac{1}{4}$ mile of the shoreline (PHD, 1977). The sewage disposal systems for 587 of these were evaluated. The majority of the residences surveyed (51%) used septic tanks with drywells, 21% used cesspools, and 17% used septic tanks and drainfields. Subsurface rock (basalt in the west, decomposed granite in the east) was identified on 59% of the lots. Average separation distances for the eleven areas surveyed ranged from 60 feet at O'Rourke Bay to Windy Bay, to 154 feet at Wrights Park. Average slopes ranged from 6° at Honeysuckle Beach to Hayden Lake Country Club, to 28° at Berven Bay to Cramps Bay.

A subsequent shoreline survey of septic systems located within 300 feet of the lake was conducted in 1985. This study indicated that between 1976 and 1985, 43 systems were renovated or repaired, 66 new systems were installed; 544 systems remained as they were in 1976 (PHD, 1986).

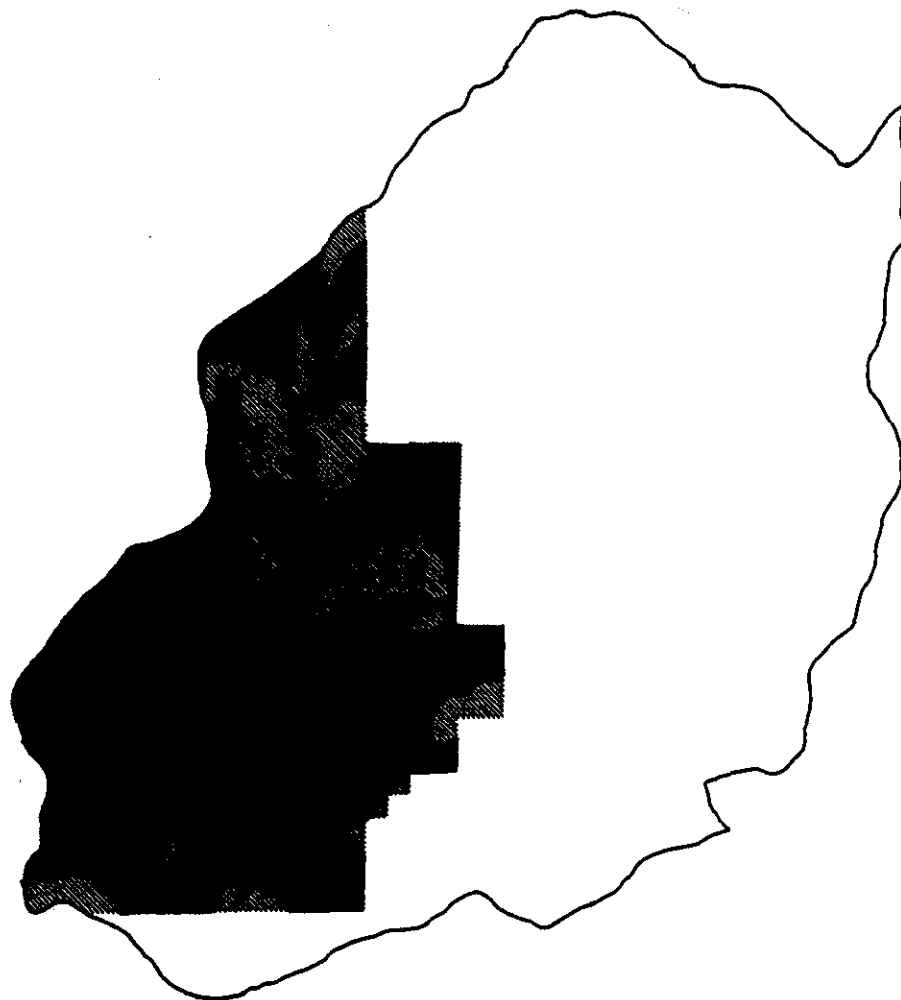
Due to steep slopes, shallow or impermeable soils, and high spring water tables, much of the watershed is unsuitable for septic system drainfields (a minimum of 60" of soil is needed for a standard drainfield). Maps illustrating minimum slope, hydrologic group C and D (poorly drained) soils, depth to bedrock, and depth to water table are included in Figures 2-4, 2-5, 2-6, and 2-7. Locations of septic systems are illustrated in Figure 2-8.

As previously mentioned, slope data was only available as a range, and the slope map presents the best possible situation; most slopes are greater than those depicted in the map. The slope map depicts minimum slopes $\leq 15\%$ in gray, 16-30% in red, and $\geq 31\%$ in green. The Hydrologic soil group map depicts group C soils in gray and group D soils in red. The depth to bedrock map depicts soil depths $\leq 41"$ in gray, 42-59" in red, and $\geq 60"$ in green. The depth to water table map depicts soil depths $\leq 41"$ in green, 42-59" in dark gray, and $\geq 60"$ in light gray.






SLOPE (MIN) FOR THE HAYDEN LAKE C.A.R.A.

Figure 2-4



Legend

SLOPE CLASSIFICATION

-  0 - 15%
-  16 - 30%
-  31% & ABOVE

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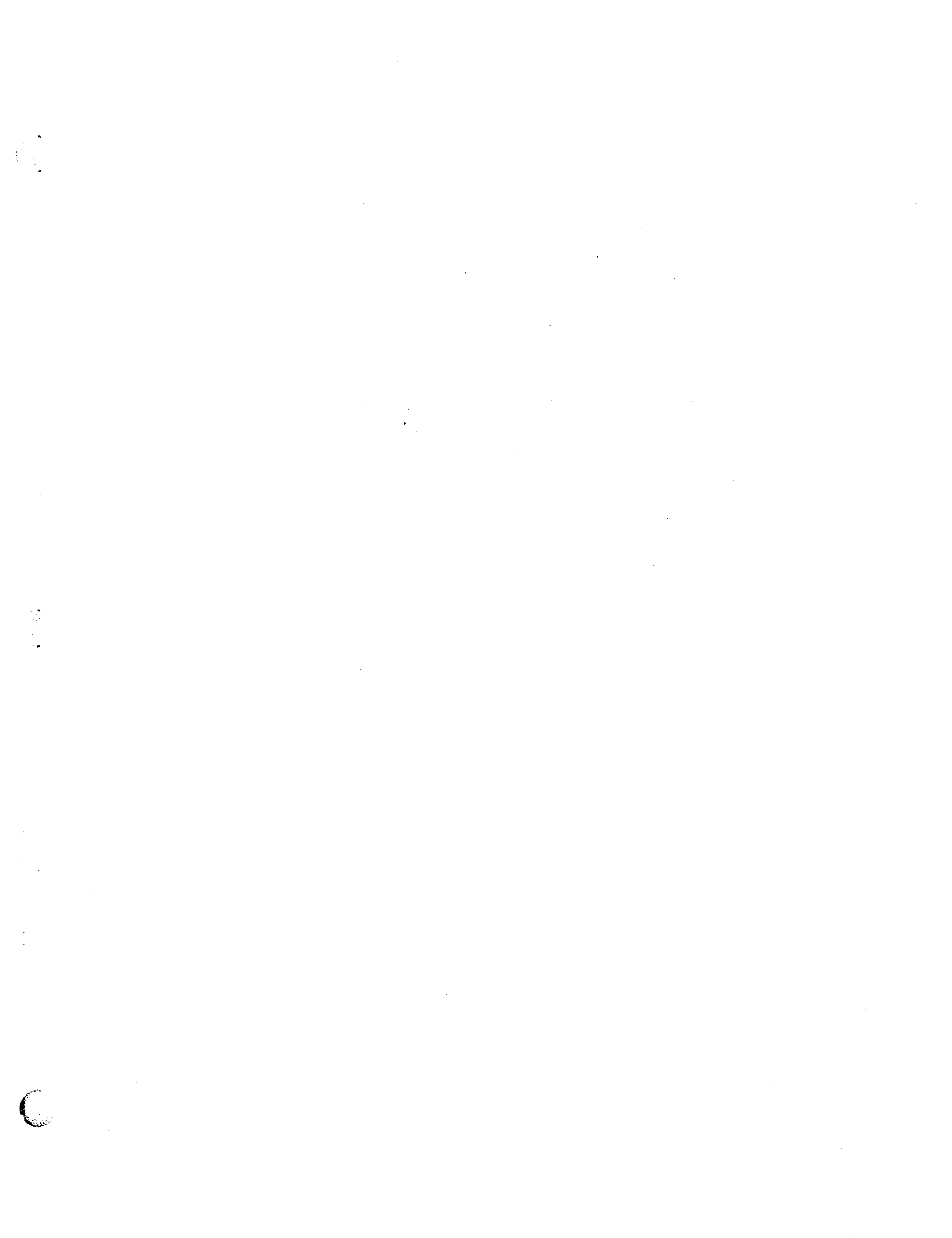


FOR MORE INFORMATION CONTACT

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HYDROLOGIC SOIL GROUPS IN THE HAYDEN LAKE C.A.R.A.

Figure 2-5



Legend

HYDROLOGIC SOIL GROUPS

-  GROUP C
-  GROUP D

HYDROLOGIC SOIL GROUPS RECEIVED FROM THE U.S. GEOLOGICAL SURVEY, WASHINGTON, D.C. 20506. THIS MAP IS A REPRODUCTION OF A MAP PUBLISHED BY THE U.S. GEOLOGICAL SURVEY, WASHINGTON, D.C. 20506.

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1986

R. Scudler

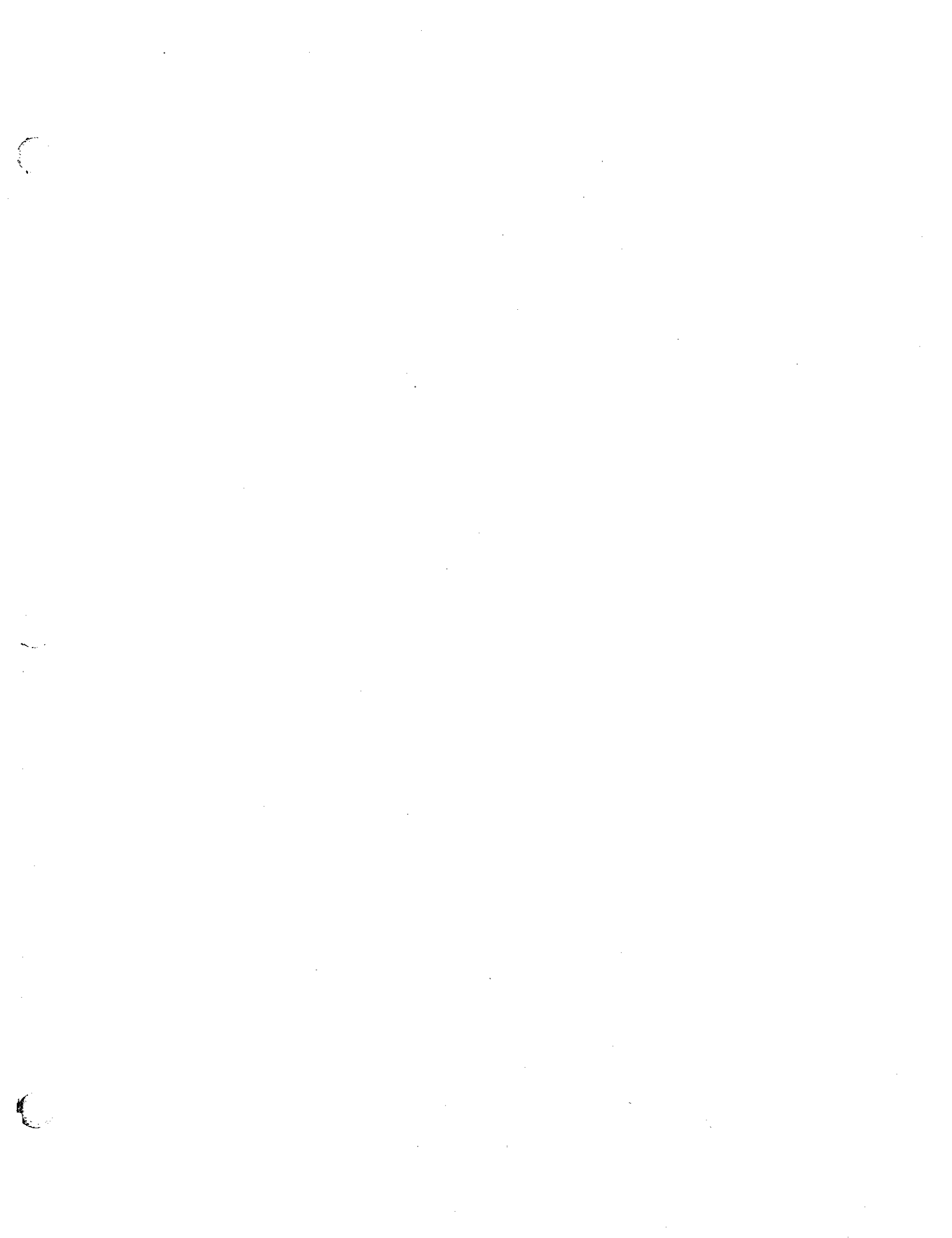


PARKLANDS HEALTH SERVICES

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MINIMUM DEPTH TO BEDROCK IN THE HAYDEN LAKE C.A.R.A.

Figure 2-6



Legend

BEDROCK DEPTH (INCHES)

-  0 - 41"
-  42 - 59"
-  ≥ 60"

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R. Swenlin



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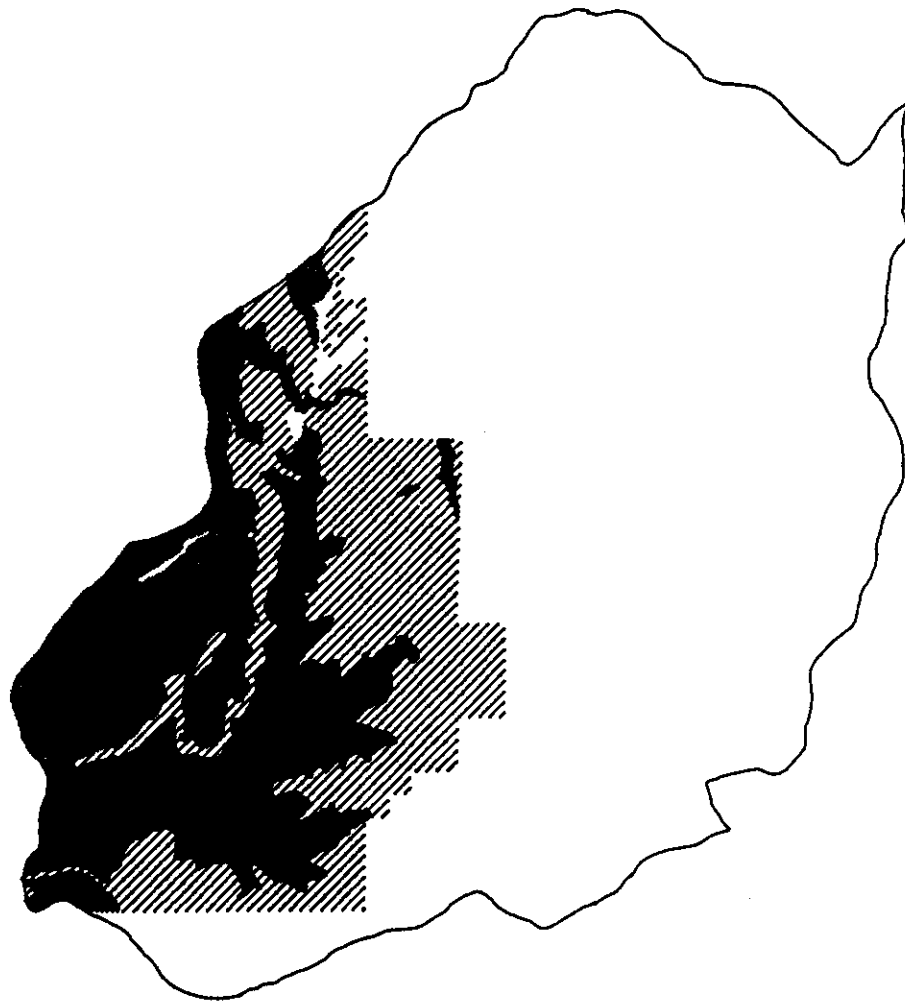
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MINIMUM WATER TABLE DEPTH FOR THE HAYDEN LAKE C.A.R.A.

Figure 2-7



Legend

DEPTH TO WATER TABLE (IN)

-  0-41'
-  41-80'
-  >80'

THE WATER TABLE DEPTH IS
FOR EACH COUNTY, 1950.

ALL GEOGRAPHIC DATA AND
STATISTICS ARE FROM THE
1950 CENSUS.

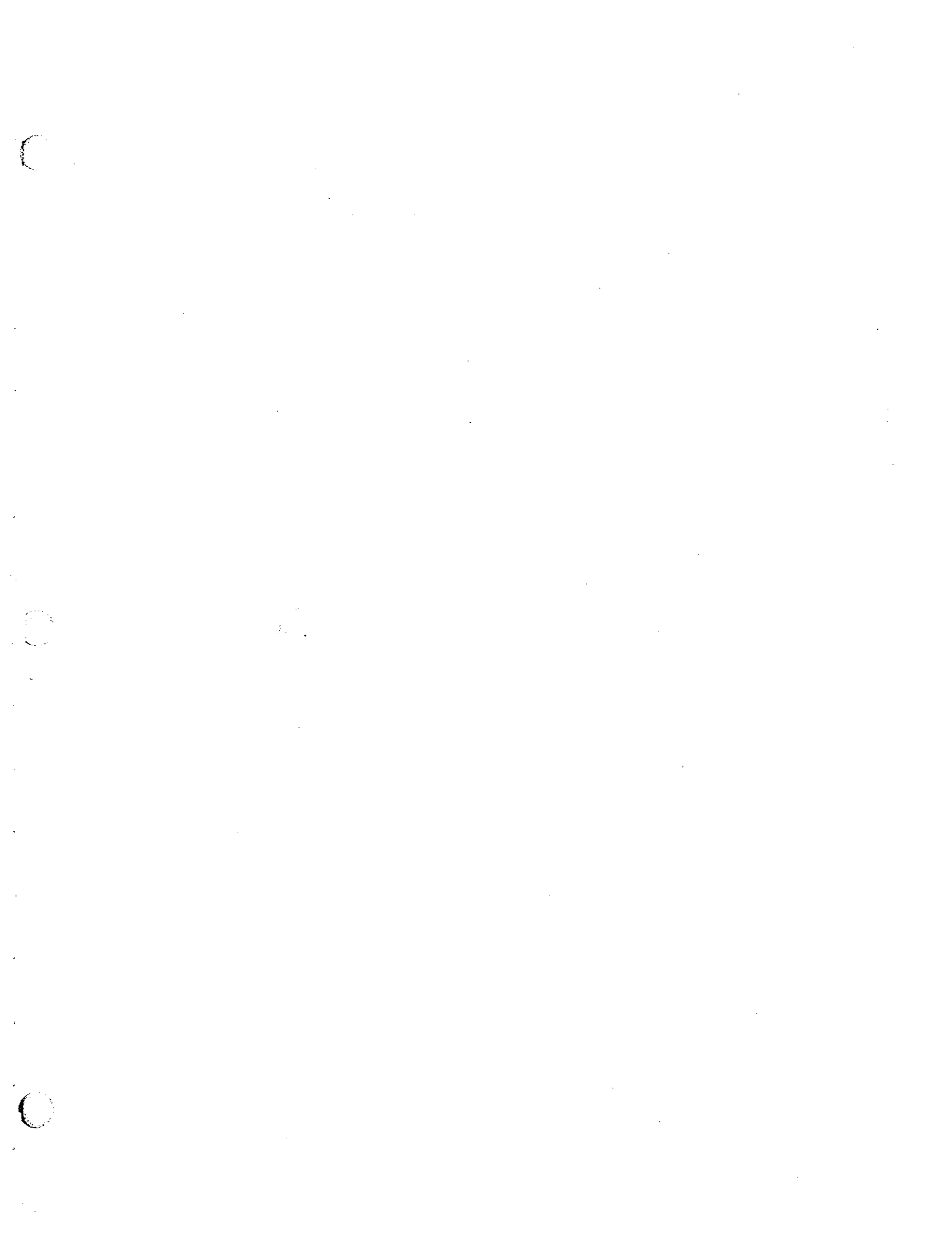
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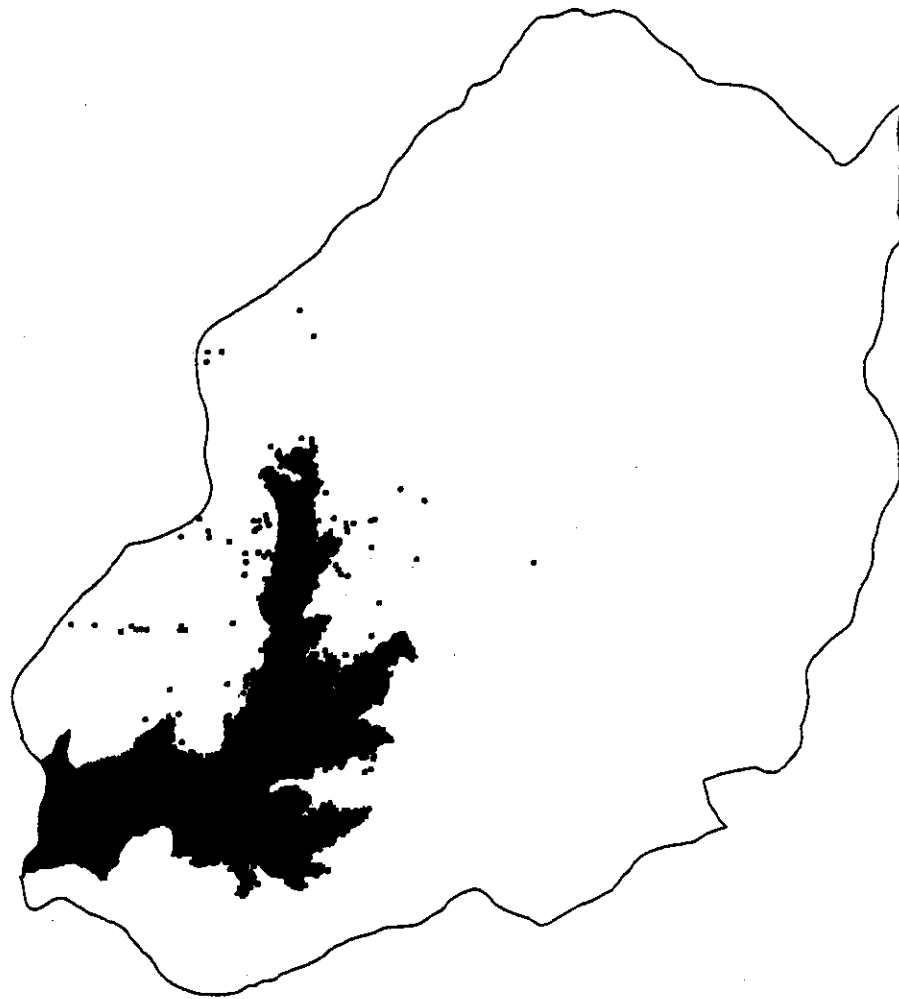
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SEPTICS SITES WITHIN THE HAYDEN C.A.R.A.

Figure 2-8



Legend

EXPLANATION OF SEPTICS

 SEPTIC SITES



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R. Scudder

1985



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PANHANDLE HEALTH DISTRICT



Water Quality

During the past twenty years, residents have become increasingly concerned about what is perceived to be deteriorating water quality in Hayden Lake. Residents believe the water isn't as clear as it used to be, that there is more algae growing on boats and docks, and that deposition of sediment is filling some bays; those who drink the water are also experiencing problems with objectional tastes and odors.

The first known water quality data for Hayden Lake was reported by Kemmerer et. al. in 1924 (Kemmerer, 1924). They found a distinct thermocline and a large, cool, hypolimnion with relatively high dissolved oxygen concentration to a depth of 50 meters. The Idaho Dept. of Fish and Game also conducted studies in 1948 and 1953. They found the lake to have good clarity with relatively high dissolved oxygen concentration even at lower depths with some oxygen depletion near the bottom (4.7 mg/l at 51 meters), (Vaughan, 1949; Mauser, 1958).

In 1972 the Idaho Dept. of Health and Welfare initiated a bacteriological water quality survey (Johann, 1974). High total coliform counts tended to be found in intensively used areas but seldom were any fecal coliform found.

In 1975 an algal growth potential study was performed by the U.S. Environmental Protection Agency as part of the National Eutrophication Survey (EPA, 1977). The report classified Hayden Lake as early mesotrophic. Two algal assays determined that phosphorus was probably the limiting nutrient for primary productivity (of algae), although, a calculated nitrogen to phosphorus ratio on July 23, 1975, suggested that nitrogen may periodically limit algal growth. This means that phosphorus is generally the nutrient in the shortest supply, and that the amount of algae which can grow is limited by the amount of phosphorus which is present in the lake. It has been estimated that adding one pound of phosphorus to a phosphorus limited lake can cause the growth of up to 500 pounds of algae (DEQ, 1987). Control of phosphorus inputs is thus critical to managing the water quality of Hayden Lake.

As previously mentioned, in 1976 Panhandle Health District conducted a shoreline survey with an update in 1985 (PHD, 1977; PHD, 1986). Results of these study are included in the Drinking Water/ Sewage section of this chapter.

In 1985 Soltero et.al. conducted a study of the lake (Soltero et.al., 1986). They found the water quality of the lake to be good, due in part to the volume and dilutive capacity of the lake basin, and because most of the watershed is forested, with low nutrient export per unit area of land. They found that the lake had good clarity, little conductivity and low nutrient concentrations. Temperature profiles revealed a well defined thermal stratification occurring in the mid-summer, resulting in a large, cool hypolimnion with some oxygen depletion occurring to a minimum concentration of 4.4 mg/l. The mean chlorophyll *a* concentration was also low (2.04 mg/m³), as was the calculated mean primary productivity (.202 g C/m²-day). The lake was classified as oligotrophic bordering on mesotrophy. As in previous studies, nutrient calculations showed phosphorous to be the major limiting factor for algal growth.

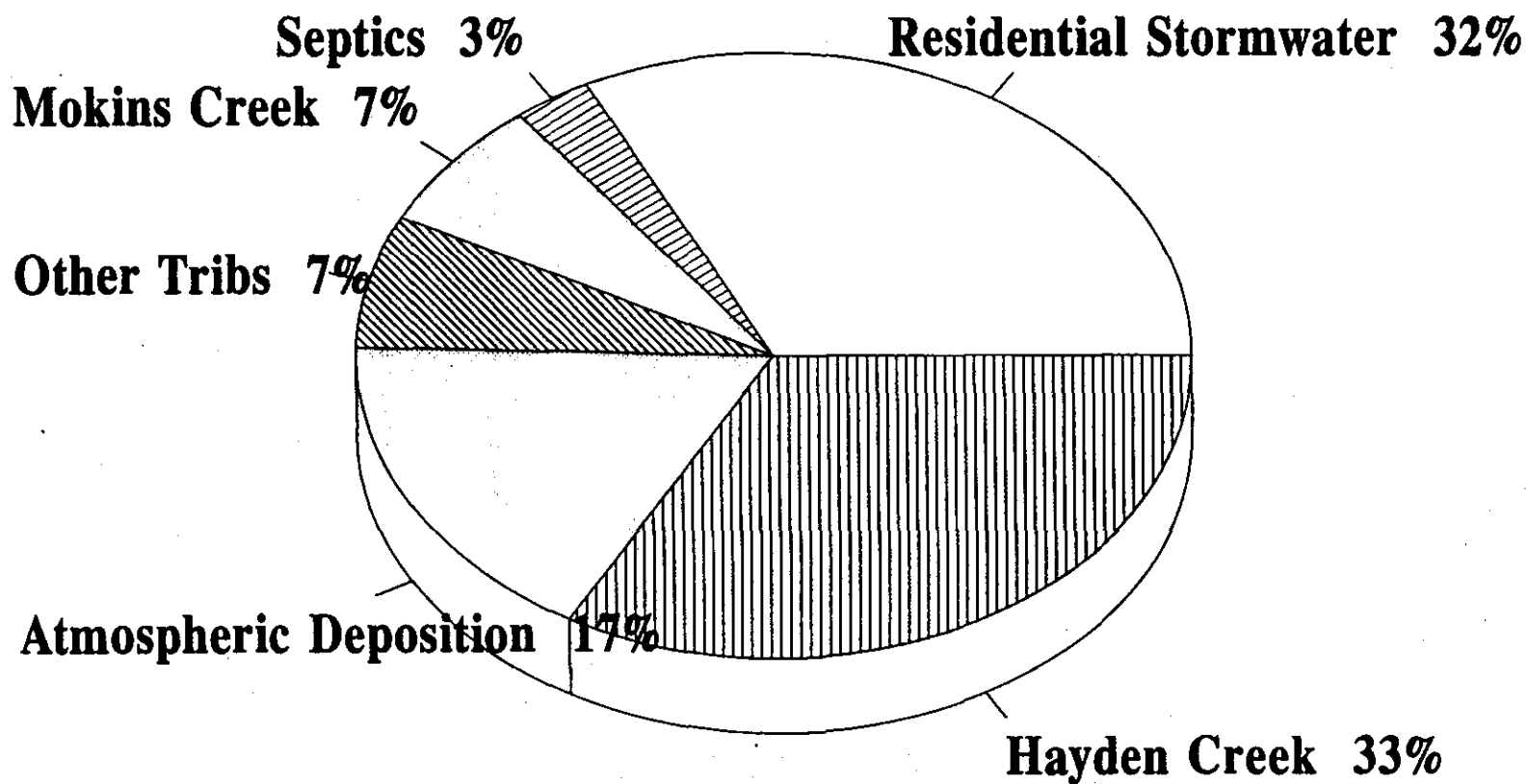
Sources of phosphorus which were identified are illustrated in Figure 2-9 and Table 2-5. These estimates include the residential stormwater estimate recently developed by Panhandle Health District. It should be noted that stormwater nutrient loads presented are a very rough estimate, based on available information. Additional monitoring of stormwater flows in this watershed is needed to more accurately quantify this source of phosphorus.

Table 2-5
Estimated Phosphorus Sources to Hayden Lake

<u>PHOSPHORUS SOURCE</u>	<u>METRIC TONS PER YEAR</u>
Hayden Creek	1.2
Mokins Creek	.24
Other Tributaries	.25
Atmosphere	.63
Septic Systems	.12
Residential Stormwater	1.17
Total	3.61

Figure 2-9

Phosphorus Sources to Hayden Lake



Though the water quality of Hayden Lake is still good, Soltero stated in his report that "Hayden Lake is susceptible to and probably experiencing accelerated eutrophication as a result of man's activities within the drainage basin. Preservation of Hayden Lake water quality will require that nutrients (phosphorus and nitrogen) which increase primary production (of aquatic plants) be minimized." At that time Soltero felt that the cumulative effect of continued harvest of approximately 300 acres of timber per year, posed the greatest threat to Hayden Lake water quality even with the use of best management practices. Watershed management strategies recommended in his report included:

- Establish a watershed zone which promotes well planned development and limits the density of development unless special sewage disposal and erosion prevention measures are taken.
- Create an interagency watershed committee that would review all potential activities in the watershed effecting the water quality of Hayden Lake. The committee would have representation from Hayden Lake homeowners, U.S. Forest Service, State Division of the Environment, State Dept. of Fish and Game, Panhandle Health District and any other individuals or agencies deemed appropriate.
- Develop and implement special timber harvest procedures (more strict than best management practices). These procedures should allow for the exclusion of certain areas from timber harvest if present lake quality is at risk.
- Maintain a monitoring program to identify any deterioration of water quality in the lake and its tributaries before a major problem develops.
- Promote educational programs to increase public knowledge and concern toward Hayden Lake and its environs with emphasis on the effects of human activities and water quality. Suggested protective measures that individual homeowners can implement are:
 - Update and inspect septic systems to maintain optimal effectiveness and minimize septic system effluent through water use conservation.
 - Design landscape to use as much native vegetation as possible. This will lessen maintenance and the need for extra watering and fertilizer, both of which can increase nutrient load to the lake.
 - Build road and parking surfaces to reduce erosion and runoff and remove organic debris (i.e. grass clippings, leaves) from the shoreline and parking surfaces so it will not be carried into the lake.
 - Restrict boat travel to established channels in weedy areas to minimize the cropping of aquatic plants, reducing nutrient input from decaying plant parts. Also, limit wake size near the shoreline by slowing boat speed, thus decreasing shoreline erosion and the resuspension of bottom sediments.

- Use aquatic wee harvesting methods that remove plants from the water as opposed to the use of herbicides which can be harmful to other biota and results in a residual of decaying vegetation in the water.

In 1986, DEQ conducted lake monitoring (DEQ, 1990) which verified Soltero's findings. They concluded that human activities in the watershed have already caused irreversible biochemical changes in the lake. They recommended a) conducting a watershed inventory to document the nature and extent of various land uses affecting water quality and delineate sensitive environments, b) monitoring water quality trends in the lake and its tributaries, c) developing a comprehensive lake watershed management plan, and d) designing an education program.

During 1985-87, and 1989, DEQ and the Forest Service monitored nutrient and sediment transport in the Hayden Creek watershed (Skille and Lider, 1988; Skille, 1994). This study verified Soltero's 1985 estimate of phosphorous loads from the North Fork, East Fork and Main Hayden Creeks. This study also indicated that phosphorus and sediment export from the Lancaster Creek drainage is greater than other subdrainages. The sources of phosphorus and sediment were not identified, but could include confined livestock and a small aquaculture operation located along the creek. Tables 2-6, 2-7 and 2-8 present data on total phosphorus concentrations, areal total phosphorus export, and mean nutrient, sediment, turbidity, and discharge values for several drainages in the watershed.

Table 2-6
Mean Annual Total Phosphorus Concentrations
Hayden Lake Watershed

YEAR /DATA SOURCE	MEAN ANNUAL PHOSPHORUS CONCENTRATION BY SUBDRAINAGE (micrograms per liter)					
	EAST FORK HAYDEN CR.	NORTH FORK HAYDEN CR.	NORTH AND EAST FORK (gaging st.)	LANCAS- TER CREEK	HAYDEN CREEK (mouth - incl. Stump and Lancaster creeks)	MOKINS CREEK
1985 (Soltero et.al., 1986)	-	-	-	-	13	20
1985 (Skille & Lider, 1988)	9	9	9	-	13	-
1986 (Skille & Lider, 1988)	8	7	8	-	16	-
1987 (Skille & Lider, 1988)	8	9	8	-	11	-
1989 (Skille, 1994)	-	-	15	61	18	-

Table 2-7
Estimated Areal Total Phosphorus Export Hayden Lake Watershed

YEAR/DATA SOURCE	AREAL PHOSPHORUS EXPORT BY SUBDRAINAGE (lbs. per acre per year)*				
	EAST FORK HAYDEN CR.	NORTH FORK HAYDEN CR.	NORTH AND EAST FORK (gaging st.)	HAYDEN CREEK (mouth - incl. Stump and Lancaster creeks)	MOKINS CREEK
1985 (Soltero et.al., 1986)	-	-	-	♣.15	.14
1985 (Skille and Lider, 1988)	.02	.03	.02	-	-
1986 (Skille and Lider, 1988)	.03	.03	.04	-	-
1987 (Skille and Lider, 1988)	.03	.07	.03	-	-

*Estimates were derived by dividing total phosphorus loads from referenced studies by the number of acres in each subdrainage. Estimated number of acres in each subdrainage is as follows:

East Fork Hayden Creek	8,308 acres
Mokins Creek	3,686 acres
North Fork Hayden Creek	5,429 acres
Stump Creek	1,723 acres
Lancaster Creek	2,650 acres
Hayden Creek - Total	18,110 acres

♣ This value is not representative of the Hayden Creek drainage; there appears to be a significant source of phosphorus entering Hayden Creek between the gaging station and the lake, most likely via Lancaster and/or Stump Creeks. Phosphorus export from the upper watershed is lower than this value (.02-.04 lbs./acre-yr) and that from the area containing the phosphorus source is much higher than this value.

Table 2-8
Mean Annual Nutrient and
Suspended Sediment Concentrations, Turbidity and Discharge
Hayden Creek Drainage
March-December 1989 (Skille, 1994)

WATER QUALITY PARAMETER (n=15)	Subdrainage		
	HAYDEN CREEK (gaging station)	LANCASTER CREEK (mouth)	HAYDEN CREEK (mouth)
Total Phosphorus (mg/l)	.015	.061	.018
Total Nitrogen (mg/l)	.193	.291	.163
Suspended Sediment (mg/l)	5.2	8.5	4.9
Turbidity (NTU)	2.2	9.3	2.6
Stream Discharge (CFS)	52.9	2.4	55.3*

*Estimated by combining Lancaster Creek and Hayden Creek USGS gage flows.

In 1990 and 1991 DEQ did additional monitoring as part of its Lake Water Quality Assessment (DEQ, 1993). This study concluded that the aesthetic and visual qualities of Hayden Lake are outstanding, but that deteriorating water quality is threatening the use of the lake for domestic water supply. The study found the north bay to be extremely eutrophic with extensive weed beds in July and August, which effectively eliminate boating activity. Lateral bays were found to vary from mesotrophic to oligotrophic. The south end of the lake is oligotrophic in most of the deep areas of the bays and main open water areas. Lakeshore development, intensive timber harvest and cattle grazing were identified as contributors of silt and nutrients making near-shore areas more eutrophic. The study predicted that if further deterioration continues, notable changes will include a significant loss in water clarity, a reduction of dissolved oxygen in the deep hypolimnetic waters, algal blooms along the shorelines and in the bays, and other characteristics associated with more eutrophic lakes.

Beginning in 1987 citizen volunteers began working with DEQ to monitor lake water quality monthly from May through October. Phosphorus, dissolved oxygen, chlorophyll *a* and secchi depth data from this program, as well as that from Soltero's 1985 and DEQ's 1986 study are summarized in Tables 2-9, 2-10, 2-11, and 2-12.

Water quality studies which have been conducted suggest that human activities in the watershed are accelerating eutrophication processes in Hayden Lake. If Hayden Lake becomes more eutrophic it is likely that algae related water quality problems will affect both the lake and the adjacent aquifer. In addition, increased nitrate levels in the lake water may make it less desirable as a source of groundwater recharge. Though it is unlikely that nitrate levels in the lake would exceed 2 mg/l, when combined with nitrate loading from down gradient septic systems, this may be enough of an increase to push some wells above the 10 mg/l maximum contaminant level. With 66% of the lakeshore residents relying on the lake as their source of drinking water, and with numerous wells located down gradient from the lake, maintaining good water quality is essential if this community is to avoid the expense associated with installing and operating complex water treatment and distribution systems.

Table 2-9
Total Phosphorus Concentration at Secchi Depth, North of Tobler Marina,
April - November (micrograms per liter)

Year	Month								
	April	May	June	July	Aug	Sept	Oct	Nov	Average/ Median
1985 Soltero et.al, 1986*	13 (40)	13 (40)	3 (10)	6 (20)	3 (10)	6 (20)	3 (10)	6 (20)	6.9 6
1986-DEQ, 90	4	-	4	5	-	11	-	-	6.0 4.5
1987-DEQ, 90	-	-	-	-	20	11 6	4	6	9.4 6
1988-DEQ, 89	-	12	-	9	6	-	3	-	7.5 7.5
1989-DEQ, 91	-	6	7	9	17	-	4	-	8.6 7
1990-DEQ, 93	-	6	10	11	2	-	8	-	7.4 8
1991-DEQ, 93	-	7	-	8	3	4	9	-	6.2 7
1992-DEQ, 94	-	-	8	20	-	-	-	-	14.0 14
1993-DEQ, 94	-	30	6	-	5	25	-	-	16.5 15.5
Nine Year Average									8.5
Nine Year Median									6

*Values in parenthesis are for Total PO_4^{3-} ; Total $PO_4^{3-} \times .326 =$ Total Phosphorus

Table 2-10
Chlorophyll *a* Concentration, North of Tobler Marina, April - November (micrograms per liter)

Year	Month								
	April	May	June	July	Aug	Sept	Oct	Nov	Ave
1985 Soltero et. al. 1986	2.83	2.37	2.59	1.15	1.69	2.32	1.6	2.24	2.1
1987 DEQ, 90	-	-	-	-	-	-	-	-	
1988 DEQ, 89	-		-			-		-	
1989 DEQ, 91	-	1.4	.9	1	.8	-	1.3	-	1.1
1990 DEQ, 93	-	2.1	2.6	1.1	1	-	1.8	-	1.7
1991 DEQ, 93	-	2	-	1.3	.7	1	1.4	-	1.3
Five Year Average									1.6
Five Year Median									1.4

Table 2-11
Dissolved Oxygen Concentration at Approximately 50 Meters,
North of Tobler Marina, April - November (milligrams per liter)

Year	Month								
	April	May	June	July	Aug	Sept	Oct	Nov	Ave
1985 Soltero et. al. 1986	10.4	9.9	8.6	8.8	6.6	4.6	4.4	4.5	7.2
1986 DEQ, 90	9.1 (45m)	-	4.6	4.7	-	5.3	-	-	5.9
1987 DEQ, 90	-	-	-	-	4.4	7.2 9.0	7.0 (45m)	-	6.9
1988 DEQ, 89	-	-	-	9.8	6.4	-	-	-	8.1
1989 DEQ 91	-	11.2	-	8.6	9.5	-	-	-	9.8
1990 DEQ, 93	-	8.0 (52m)	9.0 (54m)	8.5 (53m)	6.8 (52m)	-	11.0 (52m)	-	8.7
1991 DEQ, 93	-	10.0 (52m)	-	9.0 (52m)	9.0 (51m)	6.0 (51m)	9.0 (52m)	-	8.6
1992 DEQ, 94	-	-	-	6.5 (51m)	-	5.0 (52.5)	-	-	5.7
1993 DEQ, 94									
Eight Year Average									7.6
Eight Year Median									8.5

Table 2-12
Secchi Depth, North of Tobler Marina, April - November (meters)

Year	Month								
	April	May	June	July	Aug	Sept	Oct	Nov	Average/ Median
1985 Soltero et. al. 1986	6.4	5.9	6.9	8.0	7.2	9.2	7.9	7.1	7.3 7.2
1986 DEQ, 90	7.0	-	7.0	11.0	-	10.0	-	-	8.7 8.5
1987 DEQ, 90	-	-	-	-	16.0	11.5 10.0	10.0	9.0	11.3 10
1988 DEQ, 89	-	5.5	-	10.0	11.0	-	10.0	-	9.1 10
1989 DEQ, 91	-	6.0	5.5	11.5	8.5	-	6.2	-	7.5 6.2
1990 DEQ, 93	-	7.5	3.5	9.0	8.5	-	7.5	-	7.2 7.5
1991 DEQ, 93	-	7.0	-	8.5	9.5	9.5	6.0	-	8.1 8.5
1992 DEQ, 94	-	7.5	11.0	11.1	8.5	6.5	-	-	8.9 8.5
1993 DEQ, 94	-	-	7.0	-	-	5.0	-	-	6.0 6.0
Nine Year Average									8.3
Nine Year Median									8.0

Chapter 3

GOALS, ISSUES AND CONCERNS

GOALS

Early in the planning process, the Planning Committee established conceptual and numeric goals for Hayden Lake. The conceptual goals which were selected are to "improve drinking and swimming water quality, and the trout fishery in the lake". It is the intent of the Committee that nutrient loads be reduced to both improve water quality, and to increase the lake's capacity to assimilate natural, catastrophic inputs of phosphorus (such as ash from volcanic eruptions or increased sediment and phosphorus from a wildfire).

While selecting numeric goals for the plan, the Committee sought the advice of a several water quality experts, and considered a number of options including:

Option A: Ten year average secchi depth of 10 meters, ten year average total phosphorus of 7 micrograms per liter.

- This is a little better than existing conditions (i.e. clarity would be increased by approximately 5 ft.). Over the past nine years average secchi depth has been 8.3 m. and average total phosphorus in the euphotic zone has been 8.5 micrograms per liter.
- Advantages of using average values are a) they are easy to calculate and easy for the general public to understand, b) published trophic state classifications often use average values, making it easier to compare Hayden to other lakes, and c) limnology models often use average values, making it easier to use these models to predict lake responses to changes in nutrient loads.
- A disadvantage of using averages is that they can be skewed by unusually high or low readings; this becomes less of a problem however as the quantity of information increases.

Option B: Ten year median secchi depth of 9 meters, ten year median total phosphorus of 5 micrograms per liter.

- As with option A, this is a little better than existing conditions. Over the past nine years median secchi depth has been 8 meters and median total phosphorus has been 6 micrograms per liter.
- An advantage of using median values is that they are a better indicator of "central tendency", or the overall condition of the lake, because they are not skewed by unusually high or low values. The median total phosphorus value for Hayden is less than the average value for the past nine years because there have been several unusually high readings, which increased the average value.
- A disadvantage of using medians is that, due to the small number of lake samples collected during a year, the median value for a summer may not be very representative of the overall condition of the lake during that summer. This may make it more difficult to compare one year with another, or to compare one year with the established ten year goals.

Option C: Ten year geometric mean secchi depth of 9 meters, and geometric mean total phosphorus concentration of 6 micrograms per liter.

- As with the two previous options, these values are a little better than those for the past nine years. The geometric means for the past nine years are 8 meters for secchi depth and 7 micrograms per liter for total phosphorus.
- With small data sets, such as the four or five samples collected during a season, the geometric mean is better than the average or median as an indicator of central tendency. It is also better for data with a few very high values.
- A disadvantage is that the geometric mean is more difficult to calculate, and is more difficult for the general public to understand.

The committee selected, and then expanded upon Option A. The following numeric goals were established to represent the conceptual goals of the plan:

- Average Total Phosphorus at secchi depth will be 7 micrograms per liter
- Average secchi depth will be 10 meters
- Minimum dissolved oxygen will be 6 milligrams per liter or ninety percent of saturation, whichever is greater

Average Total Phosphorus will be the primary indicator of lake productivity and water quality. Averages will be based on ten years of data with a minimum of one sample per month during June, July, August and September of each year.

WASTEWATER

Existing Septic Systems

Many of the septic systems serving the residences and businesses along the lake shore were constructed prior to the 1971 regulations and are substandard. Regulations in effect from 1964 - 1971 allowed septic systems to be installed as close as 50 feet to streams and lakes. To adequately protect water quality, regulations adopted in 1971 required separation distances of 200-300 feet, depending on soil texture. Current regulations require separation distances of 100-300 feet to permanent and intermittent surface water, as well as specified separation distances between the system and groundwater. A 50-foot separation distance is required to temporary surface water flowing less than two months of the year.

In addition to being constructed too close to the water, many old septic systems utilized designs which have been shown to be inadequate for treating sewage. These include drywells and cesspools (a dry well without a septic tank).

Though many existing septic systems are substandard and a likely source of nitrogen, phosphorus, and bacteria to Hayden Lake, they may continue to "function" for many years (i.e. septic effluent will continue to percolate into the ground). Replacement of these systems is not required until sewage begins surfacing on the ground.

As discussed in the previous chapter, in 1976 and again in 1985 Panhandle Health District surveyed many of the septic systems located within 300 feet of Hayden Lake. The majority of the residences surveyed in 1976 used septic tanks with drywells (51%); 21% used cesspools, and 17% used septic tanks and drainfields.

Since 1985 the Hayden Lake Recreational Water and Sewer District actively sewered many homes along the western lake shore, as well as hillsides above the lake. In 1992 the Health District located and mapped remaining septic systems throughout the watershed; this survey identified 572 homes and cabins, a summer camp and a corporate retreat on private septic systems; all but about 60 of these were located on or near the lakeshore. Locations of septic

systems are illustrated in Figure 2-8.

Based on Soltero's 1985 study (Soltero et.al., 1986), phosphorus loading from septic systems probably represents less than 3% of the total load to the lake. This does, however, represent a phosphorus source which can be controlled.

Sewer

Hayden Lake Recreational Water and Sewer District now provides sewer service to many of the homes located along the western lakeshore and hillsides, including the Honeysuckle Hills subdivision south of the lake. Portions of this system are designed for effluent only, with each house providing a septic tank to remove solids. Individual homeowners are responsible for pumping and maintaining septic tanks and other system components which are on their property. The sewage treatment plant is located near the Hayden airport, over the Rathdrum Aquifer; treated effluent is disposed of a) in temporary drainfields, b) via land application, and c) into the Spokane River. The District has nearly completed sewerage of areas scheduled for connection to the regional treatment plant; they plan to explore the use of satellite sewage systems for replacing remaining septic systems along the lake shore.

Installation of sewers which replaced substandard septic systems has undoubtedly reduced nutrient loading from those systems. It appears, however, that stormwater runoff from new development made possible by the sewer, may actually contain more phosphorus than that which was previously entering the lake through the old septic systems. Installation of sewer may have indirectly increased sediment and nutrient loads to the lake. The Sewer District is however aware of this situation and is carefully weighing the potential costs and benefits of future projects, to ensure that sewers result in a net reduction of nutrients to the lake.

Future Sewage Disposal

The costs and benefits of various sewage treatment options were discussed by the Planning Committee. Approval of sewage disposal methods on the Rathdrum Aquifer and in the Spokane River will continue to be difficult. Using community septic systems may be an easier and less costly alternative, however the effect of nitrate on lake water quality is unknown. Using small, community land application systems may also be a feasible alternative.

The Planning Committee made the following recommendations:

- a. Replace existing, substandard septic systems.
- b. Determine access of undeveloped properties to publicly funded, community sewage systems on a case by case basis.

- c. Evaluate and select the type of sewage system (sewer, satellite community drainfield/community land application system) to be installed on a case by case basis. Factors which should be considered include:
- cost
 - risk to the Lake/Aquifer/Spokane River
 - political and legal obstacles
- d. Evaluate and prioritize septic systems based on the probable water quality impact to the lake, and on the predicted nutrient reduction and expected effects of erosion from the replacement system. Septic replacements which will result in the greatest nutrient reduction should be given the highest priority.

Boat Wastewater

Wastewater from boats was discussed. Large boats with fresh water holding tanks are not constructed with greywater holding tanks, and thus greywater is disposed of in the lake. The Planning Committee recommended that existing regulations be expanded to prevent discharge of greywater.

STORMWATER

Nationwide, untreated stormwater from residential and commercial areas is being recognized as a significant source of sediment, nutrients, pesticides and petroleum contaminants. As part of this planning effort, the Health District developed a rough estimate of the stormwater phosphorus load to Hayden Lake. It appears that residential stormwater is contributing approximately 2,580 pounds of phosphorus per year, or about 32% of the total phosphorus load to the lake. If this estimate is accurate, stormwater would be second only to that from Hayden Creek which drains most of the watershed.

Kootenai County is however, aware of this situation. Commissioners recently adopted a stormwater and erosion control ordinance designed to reduce (though not eliminate) the effect of stormwater from new development. This ordinance requires that the first 1/2" of runoff from impervious areas be contained and treated using a grassed infiltration area or an "acceptable alternative". In addition, this ordinance requires that peak runoff flows be managed so that there is no increase in the peak rate of runoff for a 25 year storm, and so that components of the system, and adjacent land and improvements are not damaged. Stormwater systems meeting the requirements of this ordinance will treat approximately 85% of the stormwater flowing from impervious areas; the remaining 15% is a result of storms which exceed 1/2" of precipitation. Phosphorus removal efficiencies of stormwater systems range from 20-90%.

The Planning Committee invited Rand Wichman, Kootenai County's stormwater program coordinator, to report on the status of the County's stormwater program. At that time (fall 1993) he had 130-140 active building permits, and had conducted 20-25 final inspections since the ordinance was adopted (with mixed results). Most stormwater systems had been bonded due

to the weather. There were no properly installed stormwater treatment systems completed in the Hayden Lake watershed.

Contractors are generally using grassy swales for road and driveway runoff, with drip line trenches and sometimes drywells for roof runoff. On slopes, a flat pad is often excavated for the swale, leaving cut /fill slopes which must be stabilized (this is often included in the pad for the house). A modified swale was also being used in areas with impermeable soils. 18" of topsoil is placed over gravel with perforated pipe (like a septic system drainfield), which drains to daylight.

The Planning Committee was concerned that swales are only a temporary stormwater solution, because they eventually fill with fine sediment and quit draining properly. When this occurs the vegetation dies, they no longer remove stormwater contaminants, and standing water may become a hazard to young children. Though swales can be repaired by replacing the sod and upper soil layers, the County does not inspect existing systems to ensure they are functioning properly. Individual homeowners and homeowners associations are currently responsible for inspection, maintenance and reconstruction of stormwater treatment systems such as swales.

Concern was also expressed regarding the continued construction of homes and roads on steep slopes with silt and clay soils, particularly on the south side of the lake. The County may develop a hillside overlay zone in the new zoning ordinance, with special design requirements for hillsides. The 25 foot building to surface water set back was also discussed; the consensus of the Committee was that it is inadequate at preventing sediment laden runoff from entering the lake, and that a native vegetation buffer should be retained between the building site and the water. This would help remove sediment from runoff and provide better fish habitat along the shoreline.

AGRICULTURE

Livestock

Sediment and nutrient export from pasture and range land is generally quite low compared to that from crop land and residential areas. Properly managed livestock can also help control noxious weeds and can reduce the risk of fire, when they eat grass along roads. In some cases limited grazing of riparian areas can increase plant density and vigor, and improve seedling establishment. This improved vegetation is then more effective at slowing the velocity of incoming runoff, allowing sediment particles to settle out before they reach the water (Mosley, 1993).

Dave Brown of the Soil Conservation Service, and Jim Wilson, Kootenai County Extension Agent, presented information on livestock impacts to water quality. If livestock are too concentrated in riparian areas they begin eating the woody plants, such as willows (after they eat the grasses and forbes). This, combined with weight of the animals, destabilizes the stream bank; banks collapse and flatten out, and the creek becomes wider and more shallow. Nutrient loads from animal waste and sediment can also increase, particularly if there is short cropped grass along the stream, or if the soil has been compacted, making it less permeable. Animal wastes may then be washed from the land into the water. This is primarily a problem on small

hobby farms and in meadows and flood plains where livestock are kept in one area too long.

The greatest impact of livestock is to fish habitat in the stream. Water temperature may increase due to the decreased amount of shade over the stream. There may not be enough sediment flowing down the stream to affect other aspects of the ecosystem. Fecal coliform concentrations may also increase.

BMP's (best management practices) which can be used to minimize livestock impacts include rest/rotation grazing systems, placing salt away from streams, herding the livestock away from the water, fencing off riparian areas, and developing alternate water sources away from the stream (such as springs). The Extension Office is training volunteers to work with hobby farmers. Three of these volunteers are putting together a series of evening classes. The Extension Office also works with 4-H kids on good management practices.

There are two Forest Service livestock allotments in the drainage. Nick Ormonde is permitted 35 cow/calf pairs in the Hayden Creek drainage from June 1 - September 1. The first allotment in this drainage was in 1938. A 1988 riparian survey identified some damage to Hayden Creek (trails through the creek, undercutting, other channel degradation). The livestock seem to follow motorcycle trails. Nick places brush across trails he does not want the cattle to use, and uses salt to try and direct them away from the stream. There is some evidence that there may be less forage available due to growth of trees in the drainage.

Bud Vanderbilt is permitted 46 cow/calf pairs from May 1 - June 1 in the Nielson and Mokins creek drainages. The first allotment in this area was in 1940. Fences were installed in 1988 to limit livestock access to the lake. Bud mentioned that he is having trouble practicing rest/rotation grazing because he can't keep his fences and gates up. He also mentioned that herding livestock away from the water can be effective. No riparian surveys have been conducted in these drainages.

In addition to these two allotments, Joe Dobson's cattle occasionally wander into the Hayden Creek drainage.

The Planning Committee was concerned about hobby farms, primarily those with horses. Horses are often kept on small parcels of land, where they remove all the vegetation, compact the soil, and kill the trees (due to compacted soil and eating of the bark). Water then sheets off these areas, washing manure and soil into creeks and drainageways. One site has 8 horses on two acres, 200 feet from Hayden Lake.

Aquaculture

Fish rearing can also be a significant source of nutrients. In addition, it can impair native fish populations by increasing water temperature, dewatering streams, and introducing disease. Due to low average temperatures, commercial fish production is probably not viable in the Hayden Lake watershed however, fish rearing is becoming a popular hobby.

At this time, aquaculture operations are not regulated by DEQ if they use less than 5,000 pounds of fish food per month; operations using more than 5,000 pounds of food per month are required

to obtain an NPDES permit from EPA. The Idaho Dept. of Agriculture and Dept. of Fish and Game must both be notified of prospective operations and the Dept. of Fish and Game requires permits; they try to control disease and hybridization which could affect native fish populations. (This information was provided by Dr. Phil Mamer, Idaho Dept. of Agriculture, and Gary Fornshell, University of Idaho Extension Aquaculture Agent.)

Nutrients in aquaculture effluent originate primarily from uneaten food and waste products from the fish. The ingredients used in the food and its conversion rate both affect nutrient loads; food which is higher in fiber, with poorly balanced nutrients, generates higher waste loads than well balanced diets. Concentrations of contaminants also vary depending on the quality of source water, flow rate, facility design and operation, fish health, water temperature, and the size and density of fish (Collins, 1994).

There is a State Aquaculture Association, which is developing BMP's to minimize water quality impacts of aquaculture operations. At present the only economical methods of reducing nutrients are to reduce the amount of waste generated (through good feeding practices) or to use settling basins which contain the waste so it can periodically be removed.

Nick Ormonde has a small fish rearing operation on Lancaster Creek, which he discussed with the Planning Committee. The fish ponds he developed have a raceway to Lancaster Creek with a board he can use to shut off the flow from the Creek. He has a series of eight ponds, which were originally constructed to hold water for fire control. At the end of the ponds are four tanks with drains in the bottom. Sediment settles in these tanks, and the tanks are periodically drained and the sediment removed. He is in the process of building a hatchery, and is experimenting by rearing fish in small tanks.

The Planning Committee was concerned that there may be dissolved nutrients in the effluent which are not removed by settling of the solids. Though the water quality impact of Nick's current operation is probably minimal, the Committee felt aquaculture could become a significant source of nutrients if more people decide to raise fish.

CONSTRUCTION EROSION

Soil erosion from construction often has a major effect on surface water quality. Sediment smothers fish larvae and other aquatic life, fills in streambeds and lakes, increases drinking water treatment costs, and contains phosphorus which degrades lake water quality. It is not unusual to find sediment loading rates from construction sites which are 5-500 times higher than background levels (EPA, 1977).

Factors influencing soil erosion include the soil type, amount and type of vegetation, slope, length of disturbed area, climate, and season. Rain on snow events are a particular concern in this region.

To help address this problem, Kootenai County recently adopted a stormwater and erosion control ordinance which requires control of erosion during construction of subdivisions, commercial and industrial developments, public projects, and residential buildings which are

within 500 feet of surface water or on slopes exceeding 15%.

To help evaluate the effectiveness of the existing program, the Planning Committee viewed slides of construction sites along the south side of Hayden Lake. Rand Wichman, the County's Stormwater Program coordinator and Pierre Bordenave, the North Idaho Building Contractors representative, discussed potential problems which may be undermining the effectiveness of the County's erosion control program. Following are issues which were identified:

- a. **FIRST PRIORITY:** Erosion ordinance does not restrict construction on sites too steep/erodible for effective erosion control. The ordinance does not specify that there can be no transport of sediment off site.
- b. **SECOND PRIORITY:** The public and contractors are not informed regarding grading permit and erosion control requirements. County staff also need more training on evaluation of erosion control practices, and development of alternatives when BMP's are inadequate.
- c. **THIRD PRIORITY:** Setbacks to surface water (25 feet) are inadequate to prevent sediment from reaching the lake.
- d. **FOURTH PRIORITY:** The County needs more enforcement staff.
- e. **FOURTH PRIORITY:** Too much vegetation is being removed during and after construction.
- f. **FIFTH PRIORITY:** The timing and frequency of traditional building inspections is inadequate for identifying and correcting erosion problems in a timely manner. No erosion control inspections are conducted until the foundation is poured and inspections are sometimes too infrequent because inspections are not conducted unless building is occurring (erosion control inspections are conducted in conjunction with building inspections).
- g. Erosion control is not required for utilities.
- h. The Uniform Building Code on finished grades for cut/fill slopes may not be adequately enforced.
- i. Erosion control and grading ordinances are not being consistently administered. Conscientious contractors who are complying with the ordinance are economically penalized when others are not forced to comply.
- j. Some building sites which are affecting water quality are exempt from erosion control requirements (because they are less than 15% slope and greater than 500 feet from surface water).
- k. Buildings are sometimes not designed to be compatible with slopes - rather than

designing multilevel homes, contractors move tons of earth to form a flat pad for ranch style homes.

1. The applicability of the stormwater and erosion control requirement to roads built to access new, individual building sites is not clear: as a result, erosion control and stormwater management is often not required for private roads and driveways.

Another construction related problem which was identified involves the burning of construction debris in road side ditches and on the lake shore. Ashes rich in phosphorus then wash into drainage ways and eventually into the lakes.

As with most nonpoint source pollutants, lack of understanding contributes to this problem. Contractors, building officials and the general public sometimes don't recognize the connection between mud flowing off a construction site, and deteriorating lake and stream water quality. Even those who understand the problem may not be aware of BMP's which might be used to minimize erosion and sedimentation.

TIMBER LAND AND ASSOCIATED ROADS

Phosphorus and sediment export from forested watersheds is generally much lower than that from residential and agricultural areas. Pollutant loads vary depending on climate, type and age of trees, soil type and topography. Areas in this region below 4,000 foot elevation are also susceptible to erosion occurring during rain on snow events. Though timbered lands generally produce less phosphorus and sediment per acre than more intensive land uses, if they cover a large portion of the watershed their total contribution can be significant. Small changes in sediment and phosphorus export over a large area can result in large changes in the total contaminant load entering a water body.

Though generally quite low, sediment and phosphorus export are increased by timber harvest, construction and use of roads and skid trails, burning, and site preparation for reforestation, as well as by natural events such as wild fires and mass slope failures. Non silvicultural activities such as camping and recreational travel can also increase contaminant loads. The first year following a timber harvest, phosphorus loading increases from approximately .025 to .30-2.37 lb. per acre per year (Falter, Dec. 1987; Bellatty, 1987; USGS, 1994); sediment export increases from about .03 to 1.4 tons per acre per year (Bellatty, 1987). Both can return to background levels in approximately 2-6 years.

Developing an dirt road increases sediment export even more dramatically. If surface water is allowed to flow down roads and trails, its speed accelerates resulting in increased erosion. Even when roads are cross drained, water can be channelized by the ruts created when motorcycles and trucks use muddy roads. Road cuts may also intercept shallow ground water, compounding the problem. The quantity of sediment which reaches a stream channel varies based on a number of factors including the slope steepness, slope shape, drainage density, the vegetative community, and soil particle size. A new road exports approximately 105 tons per acre of exposed soil for the first year; if the road is cross drained, this decreases to a long term export

of 8-29 tons per acre per year (USDA Forest Service, 1981/ Megahan and Kidd, 1972). It is likely that sediment export from improperly drained roads is even higher.

In addition to sediment from roads and the land itself, sediment can also enter stream channels directly from erosion of the stream bank. Timber harvest, soil compaction, removal of topsoil and surface litter, and road construction all increase peak runoff and water yield, resulting in increased erosion. Removal of conifers from the riparian area of streams also makes stream channels less stable and more susceptible to erosion during spring runoff.

Another problem caused by excessive runoff and the removal of conifers from riparian areas, is increased bed load movement. In a natural state, large organic debris (LOD) such as logs fall into and across streams, reducing the velocity of the water, slowing runoff, and forming small pools for fish. When conifers along a stream are removed, this organic debris is no longer available and there is nothing to slow water velocities. Stream channels then become unstable, and the rocks which form the stream bed begin moving downstream, filling the pools necessary for fish survival.

Because of the potential water quality impacts of timber harvest and road construction, mandatory BMP's have been developed. These BMP's are required for any forest practice, and are designed to prevent or minimize effects on water quality. Timber harvest on State and private land is regulated by the Idaho Dept. of Lands (IDL), and Federal Land is managed by the U.S. Forest Service.

Jim Rickerd and Jim Colla with IDL presented information on the regulation of timber management activities on State and private land. Timber management on these lands is governed by the Idaho Forest Practices Act (FPA) and its associated regulations. Any time logs are sold commercially (to a mill), the operation is subject to the regulations and IDL must be notified before the forest practice is initiated. Mills will not accept logs unless they have a slash permit or "brush number" issued by IDL, to ensure that slash compliance is in place.

The FPA regulations are designed to protect water quality, minimize fire hazards, and maintain productive forests. Proper road construction and maintenance is a primary concern. The regulations are generally "descriptive" rather than "prescriptive", giving IDL a great deal of latitude to require additional measures when they are warranted. Bodies of water which are designated "stream segments of concern" are an exception, having specific requirements developed by "local working committees" (Hayden Lake and its tributaries are not designated stream segments of concern). Different requirements apply to Class I and Class II streams. (Class I streams are used for domestic water supply or are important for the spawning, rearing or migration of fish. Class II streams are headwater streams used by few, if any, fish). IDL does not evaluate road construction/timber harvest prescriptions.

Prior to a forest practice occurring, IDL tries to coordinate with other agencies when forest will be converted to other land uses. Land conversions to home sites can be a major water quality problem if temporary, low standard forest roads are put to bed in accordance with the FPA regulations, but are not upgraded to handle year round access traffic. If a land conversion is not accomplished within 3 years IDL can require reforestation of the area by the 5th year. Cross ditching is required before winter.

IDL is sensitive to the water quality impact of logging operations in lake watersheds. They try to get operators to pile and burn slash away from tributary streams to reduce the flush of phosphorus to the stream. They try to do a preoperational inspection before the start of each forest practice, and to do more inspections during the operation. Pre-op inspections are generally required on "stream segments of concern". There are currently 15-30 operations per year in the Hayden Lake Watershed.

IDL is examining options to effectively reduce water quality impacts caused by problem operators. Bonding, certification and civil fines have been discussed as way to achieve this goal. IDL can require bonding of non-resident operators and has explored applying bonding to those with a notice of violation. They also keep a list of people with notices of violation, and will not issue another slash permit until prior problems are fixed. IDL has also considered implementing a civil penalty system, however it may be difficult to collect fines which have been levied. Certification is not widely supported. Civil penalties and operators certification are administratively expensive.

In 1991 the Idaho Legislature required IDL to begin managing cumulative water quality effects of multiple timber harvests. A Cumulative Effect's Task Force was formed and has developed a draft screening process to evaluate effects based on sediment, nutrients, temperature, destabilized stream channels etc. If adopted, landowners in watersheds exhibiting signs of cumulative effects would be required to use additional BMP's or postpone logging for a few years. The Forest Service is already doing this on their land. The Cumulative Effects proposal will soon be available for public review and comment; it will be important that citizens support its adoption.

Jack Skille, of the Division of Environmental Quality, gave a brief overview of DEQ's role in the management of timber lands. DEQ periodically (every four years) evaluates the effectiveness of the BMP's. The last audit was conducted in 1992. During these audits the Forest Service, Dept. of Lands, Fish and Game, industry representatives, and landowners look at timber operations across the State and rate the effectiveness of BMP's. Generally the audits show that the BMP's work when applied properly. This information is presented to the Forest Practices Advisory Committee who reviews it and makes recommendations to the Board of Land Commissioners. DEQ also monitors site specific BMP's for designated stream segments of concern.

Recommended changes which were presented to the Advisory Committee in 1994 included:

- Adopt a definition of lakes.
- Require pre-operational inspections of lakefront operations.
- Increase the Class II stream protection zone to 30 feet.
- Change the definition of Class II streams from those containing "few if any fish" to those containing no fish.
- Develop a set of lake BMPs.
- Prohibit tractor skidding on slopes in excess of 45%.
- Require a 10' stream protection zone for wetlands.
- Keep slash piles out of the stream protection zone.

Other needs identified by the Planning Committee include:

- Retain some LOD next to Class II streams. Currently, there is no requirement that trees be left in the stream protection zone.
- Exclude mechanical equipment from stream protection zones.
- Apply special lake protection BMP's throughout lake watersheds.
- Develop setbacks for slash.

As with the Cumulative Effects proposal, it is important that citizens support needed rule changes.

Peggy Polichio and Ed Lider, with the Fernan Ranger District presented information on activities occurring on land managed by the Forest Service. Activities occurring on Federal land must, at a minimum, meet the requirements of the Idaho Forest Practices Act Regulations, and Idaho Water Quality Standards. In some cases, additional requirements are imposed under an array of Federal regulations.

The natural fire cycle in the Hayden Lake basin is believed to have been 20-40 years for ground fires, and 100-300 years for stand replacement fires. Most existing stands of timber are now 80-90 years old, with some old growth of 100+ years. About 4,500 acres (out of 25,000 acres) have been harvested, with 12% clear cut. Areas are generally burned following timber harvest, and there is a flush of nutrients following this burning. Road densities are about average compared to other drainages; 1-2 miles of main road per square mile, and 6 miles per square mile for all road types. The Forest Service places a high priority on maintaining roads and drainage systems, cleaning ditches and culverts, blading and maintaining the road prism. There are many roads (half the total - primarily jammer roads) which are no longer needed and could be removed. Some roads which are still needed could be reconstructed to reduce water quality impacts.

Hayden Creek shows some signs of instability and increased bedload movement. The stream would be better able to handle increased flows if there were more LOD in the stream channel and more large conifers in the riparian zone adjacent to the creek. Dispersed recreation and homelessness is a problem which may also be affecting water quality. Many people camp along Hayden Creek in the summer. They are permitted to use each camp site for up to 30 days, then must move to another site at least five miles away. Most of these people are new to the area, are looking for work, can't afford to rent a home, or are saving to buy a home. Sanitation is a major problem as these camp sites have no toilet facilities. Stump Creek is also being heavily impacted by people with four wheel drives and motorcycles.

There are some timber harvests planned on Federal land in the Hayden Lake watershed. Some of the stands need thinning and maintenance. There are no new roads planned. The Fernan Ranger District is currently pulling culverts and closing 50-100 miles of road each year. They will be drafting a new management plan beginning the fall of 1994 or spring of 1995. They plan

to do a comprehensive examination of the Hayden Lake system including an assessment of grazing impacts.

Ed Lider presented information on fish habitat surveys which have been conducted in Hayden Creek and other drainages. Most migration barriers in Hayden Creek have been corrected. Due to the geology of the eastern part of the watershed, fine sediment does not appear to be a problem on Forest Service land. Fish live in pools in the tributaries until they are approximately 3 years old, then migrate to the lake. They return to the tributaries to spawn in April and May when they are 5-6 years old. Fish require different kinds of habitat. Riffles are important for food production and are the dominant type of habitat. Fish spend most of their time in pools. Woody debris (logs etc.) are important in forming pools for fish, and in reducing stream velocities. In areas which have been logged the amount of pools and pocket water (small pools) decline. In unstable stream channels, pools tend to fill with sediment and rock, making fish survival more difficult. Maintaining pools is critical to maintaining fish populations.

Reaches 4 and 6 in the East Fork of Hayden Creek have depressed pool habitat. Residual pool volumes for both C and B type channels (in both the East and North Forks) are less than they should be but both seem to be recovering. (Type C channels are wide, with a large flood plain. Type B channels have steeper sides, with less flood plain.) The North Fork has a greater number of pools, but many were artificially created with gabions which are now falling apart. The North Fork has about twice the trout density of the East Fork. Fish densities in both tributaries are, however, an order of magnitude (10 times) higher than that in the Cd'A and other drainages. This may be due to less logging in this watershed. Both stream channels need to be stabilized by replanting the riparian zone with conifers, and by adding LOD. Several figures illustrating the results of the fish surveys are included in Appendix D.

PUBLIC AND PRIVATE RESIDENTIAL ROADS

Public and private roads not associated with timber harvest are a significant source of sediment and nutrients. In addition to erosion of the road surface, sediment export can be accelerated by repair and maintenance activities. The Planning Committee was particularly concerned about the poor condition of private dirt and gravel roads, the lack of soil stabilization following the cleaning and repair of road side ditches and culverts, the cumulative effect of multiple roads in geologically unstable areas, and wide road widths required by counties and highway districts. Wider roads result in more impervious area and greater quantities of runoff. In general, road ordinances and standards are based on safety and maintenance considerations and are not designed to reduce water quality impacts.

Poorly constructed and inadequately maintained private roads undoubtedly contribute a great deal of sediment to Hayden Lake and its tributaries. Some of these roads were originally constructed as temporary roads to access timber, and are constructed of dirt, on steep slopes, with little or no provision for drainage. Road ditching is often not present or if present the ditches have filled with sediment. Road cuts and fills often exceed recommended slopes, and soil is often left exposed for long periods of time. Long stretches of steep roads are not cross ditched, causing water velocities to increase unchecked. Many private roads and driveways have significant gullies which form each winter and spring.

Mark Soderling, Road Supervisor for Lakes Highway District, presented information on the administrative structure and responsibilities of the Highway District. The District has jurisdiction over all secondary roads not maintained by the State and cities. The District is governed by an elected board of directors. Road maintenance is their primary responsibility; they do very little construction. If new roads are to be maintained by the District, they must meet District road construction standards. Homeowners associations are often responsible for maintaining public roads which do not meet Highway District standards.

The Highway District works closely with the Idaho Dept. of Fish and Game and Dept of Lands when construction is occurring in a stream. The District does not oil its roads; their emphasis is on paving. The District uses very little salt. They use it only during heavy snow storms. They are experimenting with liquid deicer. When utilities are installed in the road right of way, the District requires the use of hydroseeding and straw bales to reduce erosion.

Current Highway District construction standards require 32 feet from shoulder to shoulder and 28 feet of paved surface. Grades must be ½-6%, with slope length less than ¼ mile. The Highway Districts recently adopted a variance procedure permitting the Districts to consider alternate construction standards. This could be used to approve designs which will reduce road related impacts to water quality, such as narrower, steeper roads, with fewer cuts and fills.

Rand Wichman, Stormwater Program Coordinator and Planner with Kootenai County, presented information on the County's responsibilities with regard to roads. They are responsible for approving construction of private roads in new subdivisions, as well as new roads and driveways serving individual parcels. They recently adopted an ordinance which requires that roads serving five or more parcels meet highway district standards, and other roads meet uniform fire code. An all weather surface (generally gravel) is required and the grade must be less than 12% within 150 feet of the structure. Prior to this ordinance there were no construction requirements for private roads and driveways, and developers were not required to meet highway district standards if a homeowners association was to be responsible for maintenance.

Kreg Beck, Hazardous Materials Compliance Officer with DEQ, presented information on the use of road oil for dust control. It is likely that the use of used oil will soon be prohibited by the State due to hazardous waste products contained in the oil. Clean oil generally does not cause a surface water quality problem if applied properly (not too close to streams, grade road first, don't apply too heavily etc.). Magnesium chloride and lignosulfonate are also effective for dust control.

The following road related issues were identified by the Planning Committee:

- a. **FIRST PRIORITY:** Highway District and County road ordinances do not address water quality impacts and unstable areas (e.g. road widths, steep slopes with extensive cuts and fills).
- b. **SECOND PRIORITY:** The cumulative effect of new roads and development is not being considered before new roads are approved.
- c. **THIRD PRIORITY:** Erosion, due to poor construction and maintenance, is not

being controlled on private roads.

- d. **FOURTH PRIORITY:** Road maintenance practices do not consider water quality.
- e. Forest roads, originally intended for temporary access to timber, are being used access residences.
- f. Stormwater treatment is needed for existing roads (it is currently channelized and flows into roadside ditches and into the lake).

MISCELLANEOUS

Motorized Watercraft

The use of motorized watercraft (boats, jet skis) on lakes and their tributaries can effect water quality by adding nutrients and sediment to the water body. In addition to being a source of wastewater, the motors of boats and jet skis can stir up lake sediments, and their wakes can increase lake and stream bank erosion.

Erosion of the shoreline due to increased wave action from boats and jet skis was discussed by the Planning Committee. This does appear to be a problem particularly on the south side of the lake, because it isn't as rocky and because water skiers prefer the calmer water. This problem seems to be exacerbated by removal of shoreline rocks and vegetation. Peak usage of the lake is during the weekends and evenings. It was felt that the County does not consistently enforce their no wake requirements.

Agitation of sediments in shallow areas was also discussed. This does not seem to be a problem because people prefer to stay out of the "weeds". Some residents on the north end of the lake are considering harvesting some of these macrophytes. It was not known if permits are required for harvesting. Concern was expressed that the corporate retreat at Gem Shores may dredge their sand bar and lagoon, so it is navigable. They have a permit from Dept. of Lands. Concern was also expressed about people modifying docks and the shoreline without obtaining required permits.

Clean Water Act and Water Quality Standards

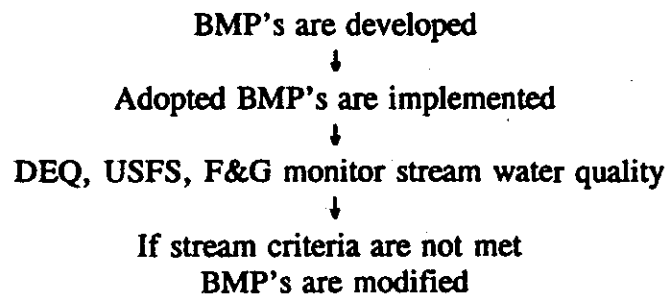
Jack Skille of DEQ presented information on the Federal Clean Water Act (CWA) and the *Idaho Water Quality Standards and Wastewater Treatment Requirements*. The CWA contains both laws and funding programs, and DEQ is the agency primarily responsible for implementing the Act in Idaho, through the Water Quality Standards. The Standards designate beneficial uses for larger water bodies in the State, include beneficial use criteria, specify wastewater treatment requirements, and address pollutants which might be entering the water.

Enforcement of the Standards is based on DEQ's ability to identify impairment of beneficial uses. Monitoring is time consuming, and it is often difficult to identify impairment even if it is occurring. If monitoring does not indicate that beneficial uses are impaired, nothing can be

done to prevent contaminants from flowing into the water. Even if it can be shown that a beneficial use is impaired, correction of the problem is not always mandatory. If approved BMP's are already being used or if the landowner has demonstrated a "knowledgeable and reasonable effort to minimize water quality impacts", additional actions are suggested but not required. When used, enforcement options include preparation of a compliance schedule or administrative or civil proceedings including injunctive relief.

Sediment is the most common pollutant. The Standards currently have no numeric criteria for sediment; sediment entering a stream or lake cannot impair a beneficial use, which as previously mentioned is very difficult to prove. Also, if several activities are contributing sediment, and a beneficial use is impaired, it is difficult to force those responsible to change their practices because none of the operations are solely responsible for the problem. It is difficult to use the existing Standards to manage cumulative water quality effects of land use activities. Numeric sediment criteria proposed by DEQ are currently going through the public hearing process and will soon be considered by the Board of Health and Welfare. The Planning Committee submitted written comments on the standards which are included in Appendix E.

Idaho evaluates and upgrades its mandatory BMP's through a Feedback Loop process which is outlined below:



Aesthetic Issues

The Planning Committee identified several aesthetic issues. Noise from drag boats and jet skis appears to be a problem for many people. Newer jet skis are designed to be quieter, however, many areas are banning them due to noise. Management options could be either voluntary or mandatory, and might include a) limiting the times and number of hours jet skis are on the lake, b) limiting their use to certain areas of the lake, and c) limiting noise levels.

Commercial activities occurring in residential areas is also a concern. A resort serving up to 150 people per day was recently developed in a residential area at Gem Shores, and a commercial dock is proposed in another residential area on the lake shore. Existing County land use ordinances appear to adequately address these kinds of problems.

Preservation of the natural setting of the shoreline is an emerging issue. Management options which might be considered include:

- a) Developing viewshed building and development design standards. Standards could address building size and materials, vegetation removal and planting, and minimization of lighting.
- b) Developing a vegetation/ tree ordinance limiting removal of existing trees. Options include requiring permits for removal of more than 10% of existing trees, or for removal of trees greater than a given caliper. Standards could also be developed specifying conditions under which trees are allowed or not allowed to be cut, pruned, or topped.
- c) Developing building bulk restrictions to protect view corridors. Variable side yard setbacks relative to the size of the building could be considered, where greater building bulk would require larger setbacks, to provide view corridors. Overall height limits could also be considered.

Because these issues are not directly related to water quality, the Planning Committee chose not to include them in their recommended management actions in Chapter 4.

Other Issues

The impact of swimmers using Honeysuckle Beach was a concern. The primary water quality impact may be inadequate restroom facilities. There is also a problem with inadequate parking for boats and cars.

Gas and oil contaminants were discussed. Due to the design of venting systems, most boat gas tanks tend to overflow when they are filled. The amount of gas spilled at Tobler marina during a day is however, minimal. Exhaust from two cycle engines also contains petroleum products. Oil leaking from seals may be a problem. Concern was expressed regarding people filling gas tanks from 5 gallon cans, and barges filling their tanks from trucks parked along the dike road. M & M Docks and TPM both do this. Petroleum contaminants do not seem to be affecting fish and wildlife; much of the spilled gasoline probably volatilizes. This does not appear to be an important issue on Hayden Lake.

Residential fuel storage tanks on the shoreline were a concern. There are no regulations which restrict residential tanks under 1,100 gallons, and replacement is only required upon visible evidence of leakage.

Burning of driftwood and dock debris on the beach was discussed. This is a common way to clean up in the spring. Old docks are often disposed of by simply cutting them loose and allowing them to break up on the north shore. If left on the beach and in the water, large wooden debris makes good fish and wildlife habitat.

The use of Thompson's Waterseal and Penta to preserve docks was discussed. Since the decking lasts much longer than the supporting structure, preserving the wood with these types of products is unnecessary. The Planning Committee felt education on this issue in needed.

Educational ideas were presented and included public service announcements, distribution of

pamphlets at area businesses, and publication of newspaper articles. The Clean Lakes Council and Clark Fork Coalition developed and printed lake pamphlets for Hayden and the other major lakes in the area; it was suggested that the pamphlets be reprinted, possibly for North Idaho Lakes. The Health District has been distributing these at the County Licensing Dept. (where boat licenses are purchased), but the supply has been depleted.

Atmospheric deposition of dust and nutrients was discussed. This accounts for 17 - 26% of the total phosphorus load to the lake. This material probably comes as dust from Eastern Washington and the Palouse, smoke from slash and grass burning, and roads in the watershed. In the spring paved roads are often cleaned without water, which stirs up a great deal of dust (enough that cars must turn on their lights). Lakes Highway District may be contracting this work out. Concern was also expressed regarding erosion control procedures (silt fence, timing of projects, revegetation of cuts and fills) used by Lakes Highway District.

Water level and usage were discussed. The water quality effect of water withdrawal by Dalton, Avondale and Hayden Lake Irrigation Districts is not known.

Chapter 4

GOALS AND ACTION PLAN

HAYDEN LAKE WATERSHED MANAGEMENT PLAN OCTOBER 1994

This chapter summarizes the recommendations of the Hayden Lake Watershed Planning Committee in the form of an "action plan". This plan presents a comprehensive, proactive approach to improving and then maintaining the water quality of Hayden Lake and the adjacent Rathdrum Aquifer, without unnecessarily restricting development in the watershed. The plan advocates implementation of a management strategy now, while water quality is still good, in order to avoid remediation costs which will be incurred if water quality becomes unacceptable. This policy/ planning document is designed to provide guidance to the many individuals and organizations whose activities affect or are affected by the lake. Finally, this plan is intended to be a living document, and will be periodically reviewed and updated as new information becomes available.

This plan applies to the City of Hayden Lake, the Hayden Lake watershed, and to those areas which lie along the west lake shore. This plan includes water quality and fisheries goals, as well as prioritized management recommendations selected to achieve these goals. For each recommended action, the plan lists lead agencies and organizations which should be involved in implementation. Explanatory notes follow each table of recommendations.

This plan has no regulatory authority. Though some of the recommendations pertain to development and/ or modification of regulations, any regulatory changes proposed as a result of this plan must go through established public notification, hearing and adoption processes. Many of the details of these regulations will be worked out at that time.

While this plan is based on several water quality studies, it is not in and of itself a definitive study. Pertinent water quality data and information on management alternatives is summarized in previous chapters, and in a companion document, the *Lake Watershed Management Handbook* (Panhandle Health District, 1994). While water quality data on this watershed is somewhat limited, the Committee felt the information they did have was adequate for establishing goals, and identifying sources of and management strategies for sediment and nutrients. It was felt that changing the relative proportions of incoming nutrients, based on additional monitoring data, will not change the management options available. Much of the phosphorus and sediment entering the lake cannot be controlled; this plan strives to manage the sources which can be controlled, while preventing additional contamination from new sources.

GOALS

The goals of the Hayden Lake Watershed Management Plan are to improve drinking and swimming water quality, and the trout fishery in the lake. The following numeric goals are established to represent these conceptual goals:

- Average Total Phosphorus at secchi depth will be 7 micrograms per liter
- Average secchi depth will be 10 meters
- Minimum dissolved oxygen will be 6 milligrams per liter or ninety percent of saturation, whichever is greater

Average Total Phosphorus will be the primary indicator of lake productivity and water quality. Averages will be based on ten years of data with a minimum of one sample per month during June, July, August and September of each year.

HAYDEN LAKE WATERSHED ACTION PLAN OCTOBER 1994

The following tables outline the actions which are recommended to improve the trout fishery and water quality of Hayden Lake. Each action is followed by a "lead group" designation and an "action level" rating. Lead group acronyms are defined at the end of these tables. Action levels are defined as:

- 1 = Immediate Action Needed 2 = Action Needed Following Implementation of Action Level 1 Items
3 = Action Needed - Not As Imperative As Levels 1 and 2

Wastewater		
Goal: Reduce phosphorus and other contaminant loading from existing septic systems; prevent increased contaminant loading from future development.		
Management Actions	Action Level	Lead Groups
1. Replace existing, substandard septic systems. Evaluate and prioritize septics based on the probable water quality impact to the lake, and on the predicted nutrient reduction and expected effects of erosion from the replacement system. Septic replacements which will result in the greatest nutrient reduction should be given the highest priority.	1	HLRWSD PHD
2. Encourage the use of satellite community sewage systems in the watershed rather than large, centralized systems on the Rathdrum Aquifer.	1	HLRWSD
3. Adopt a regulation requiring that there be no net increase in contaminant loading (phosphorus, nitrate, bacteria, viruses etc.) to the lake as a result of sewage system installation and subsequent development.	1	PHD HLRWSD
4. Review sewage system design standards to ensure they are adequate to prevent system failure.	2	DEQ, PHD HLRWSD
5. Review sewage system inspection procedures to ensure they are adequate to ensure proper installation; establish local plumbing inspection program if necessary.	2	KC, PHD State of Idaho HLRWSD

6. Recommend that the HLRWSD upgrade effluent portions of their sewage system to include disposal of solids.	2	HLRWSD
7. Request that the HLRWSD pursue septic tank/pump inspection and maintenance authority from homeowners.	3	HLRWSD
8. Adopt more effective regulations for controlling greywater from boats.	3	PHD, DEQ
9. Develop and implement management alternatives to address the sanitation problems along the lakeshore.	2	KC, F&G, PHD

Notes:

Item 2 - Due to the difficulty of gaining approval for sewage systems discharging into the Spokane River or Rathdrum Aquifer, and concerns regarding the effect of large, centralized sewer system failures on lake water quality, it is recommended that future sewage systems consist of satellite systems located in the watershed rather than on the Aquifer. Satellite systems should be designed to be compatible with the hydrogeologic characteristics of the area in which they are installed; both community land application and septic/drainfield systems should be considered. It is also recommended that these satellite systems be maintained and operated by the Hayden Lake Recreational Water and Sewer District (HLRWSD), and that the issue of sewage system access to undeveloped properties be resolved neighborhood by neighborhood.

Item 3 - Protecting lake water quality should be the primary consideration in selecting future sewage system designs. The total cost of proposed systems should also be considered, including the life expectancy of the system, maintenance costs, costs associated with potential system failure (e.g. sewage contaminates a portion of the lake), and capital costs. It is recommended that a "no net increase" regulation be adopted by Panhandle Health District, in conjunction with a "sewage management agreement" with the Sewer District. Pursuant to this agreement, the Sewer District would not install new satellite sewage systems unless the Health District provides an evaluation stating that there will be no net increase in contaminant loading to the lake. The risk of system failure, treatment efficiency of the proposed system, and stormwater/development impacts would all be considered in these evaluations.

Item 4 - This item is to address the possible inadequacy of existing design standards at preventing sewage system failures (pressure line leaks, pump failures etc.), resulting in sewage and/or nutrients entering the lake via overland or subsurface flow.

Item 5 - This item is to address the possible inadequacy of inspections of sewer lines between the house and septic tank (State plumbing inspector's responsibility) and pressure lines between the septic tank and private drainfields (Health District and/or design

engineer's responsibility).

Items 6 and 7 - These items are to address the deteriorating condition of existing HLRWSD pressure effluent systems, and the inability of the Sewer District to maintain components of the system which are on private property. The method of obtaining maintenance authority needs to be researched; it may be necessary to develop contracts or easements with property owners. It is recommended that homeowners be given the first opportunity to meet inspection/ maintenance requirements; HLRWSD should inspect and perform needed maintenance only when a homeowner fails to have it done within a specified period of time.

Item 9 - This item is to address sanitation problems along the lakeshore, created by boaters who use the vegetation on lakefront properties, rather than public restroom facilities.

Stormwater and Erosion From Future Development

Goal: Minimize quantity of runoff and associated contaminants entering Hayden Lake.

Management Actions	Action Level	Lead Group(s)
<p>1. Restrict grading and development on sites too steep and/or erodible for effective erosion control.</p> <ul style="list-style-type: none"> a. Adopt performance based, hillside grading and development standards which are objective, scientifically based and which are consistent with the goals and intent of this plan. b. Develop tiered site evaluation system based on erosion risk (e.g.as erosion risk increases require more detailed site evaluation). c. Clearly identify areas with high erosion risk; evaluate soils and their erodibility during the subdivision platting process. 	1	KC DEQ
<p>2. Increase contractors, building officials, and the general public's awareness of erosion/sedimentation/burning impacts, management options, and regulatory requirements.</p>	1	KC
<p>3. Modify subdivision, zoning, grading and stormwater ordinances to increase surface water set backs in conjunction with native vegetation buffers as follows:</p> <ul style="list-style-type: none"> - Existing, platted lots: 75' (horizontal) zone of native vegetation next to the lake and its tributaries and wetlands; permit buffers to be reduced to as little as 30' providing the additional phosphorus and sediment export is mitigated. - New lots/subdivisions: Minimum 75' (horizontal) zone of native vegetation next to the lake and its tributaries and wetlands. 	1	KC, DEQ, F&G
<p>4. Minimize removal of vegetation during construction; establish clearing limitations before, during, and after construction.</p>	1	KC
<p>5. Remove exemptions from Kootenai County's stormwater/erosion control ordinance; develop erosion control standards for installation of utilities.</p>		KC

<p>6. Improve enforcement of Kootenai County's erosion control and stormwater ordinance.</p> <ul style="list-style-type: none"> a. Evaluate efficiency of present inspection/enforcement methods. b. Provide adequate staff to conduct on site inspections before and during excavation activities and following storm events, and to enforce the provisions of the stormwater ordinance. c. Establish plan review/permit fees adequate to hire needed staff for inspection/enforcement. d. Establish substantial fines for property owners/excavators who violate stormwater/erosion control/grading ordinances. e. Require bonds or other forms of financial surety adequate to cover the cost of repairing failed stormwater/erosion control systems, and mitigating potential damage. 	2	KC
<p>7. Work with landowners to voluntarily reduce development of sensitive, high impact sites (steep, erodible, near water).</p> <ul style="list-style-type: none"> a. Transfer development rights from high impact sites to less sensitive areas. b. Purchase development rights in sensitive, high impact areas. c. Eliminate tax inequities which encourage development of sensitive sites (i.e., higher taxes for undeveloped properties not in timber production). d. Decrease building density near water and on steep slopes. e. Develop a regional land trust to assist with conservation of sensitive areas. 	2	Land Trust, KC, SHL
<p>8. Adopt additional erosion control and stormwater treatment requirements for the Hayden Lake Watershed including no net increase in phosphorus regulations for stormwater from new development.</p>	2	KC PHD
<p>9. Implement seasonal grading restrictions for erosion prone sites.</p>	2	KC
<p>10. Enforce long-term maintenance of vegetative buffers and stormwater treatment systems.</p>	2	KC

Notes:

Explanatory Note: The stormwater management program which is recommended would have two primary components, a) a no net increase in phosphorus requirement for new development, and b) a minimum, native vegetation buffer requirement for all undeveloped properties located along the lakeshore and the tributaries in the Hayden Lake watershed. It is recommended that the buffer be considered as part of the stormwater treatment system, and that the treatment obtained in the buffer be considered as a "credit" in phosphorus export calculations. For example, if a development will increase phosphorus export to the lake by 1 pound per year, and the vegetative buffer will remove 1 pound of phosphorus per year, no other stormwater treatment would be required.

Item 1 - This set of actions address the issue of development of sites which are too steep and/or erodible for effective erosion control. This was identified as the most important stormwater/erosion issue. It is recommended that performance standards be consistent with the goals and intent of this plan, and that new development not be permitted to increase nutrient and sediment loads to the lake. It is recommended that no variances to performance standards be permitted.

Item 2 - As part of these educational efforts, information will be provided on agencies and individuals who handle questions and complaints from the public.

Item 3 - This action is recommended to reduce the effect of development activities on water quality and quantity, fish habitat, and streambank/ lakeshore stability. Vegetative buffers will serve several purposes, including:

a)A "last line of defense" for removing phosphorus and sediment from stormwater flowing toward the lake. Studies and existing regulations reviewed by the Planning Committee suggest that a 75 foot wooded or meadow buffer, with undisturbed ground cover, on a 15% slope, will remove up to half the sediment and phosphorus flowing through it (providing the stormwater is not concentrated or channelized and enters the buffer as sheet flow). Much of the information which was considered by the Planning Committee is summarized in *The Lake Watershed Management Handbook*, (PHD, 1994).

b)A means of maintaining stable hydrologic conditions in the tributaries, by providing adequate large organic debris to slow water velocities.

c)A means of maintaining stable lakeshores and streambanks, by preserving deep rooted conifers. Conifers provide support and stability needed to minimize erosion resulting from wave action, spring runoff and intense storm events.

d)A means of maintaining shade, lakeshore/ streambank vegetation, and large woody debris needed by trout, and

e)A means of maintaining the natural setting of the lakeshore and its tributaries.

75 feet was selected, in part, because it is compatible with what is required of forest landowners under the Forest Practices Act Regulations (for water bodies with fish or domestic water supplies). Though this buffer is intended to be a "no disturbance zone", with a dense mixture of conifers and ground cover, it is recommended that property owners be permitted to trim brush and remove a limited number of trees to allow for a view of the lake, and to minimize fire danger. It is also recognized that in some cases, existing native vegetation may not be as effective as it could be at meeting the objectives listed above (for example a stand of ponderosa pine with exposed soil and little ground cover). It is recommended that regulations which are developed be flexible enough to permit planting of additional native vegetation which will better meet the objectives of the buffer requirement.

Item 4 - Retaining vegetation is an easy, inexpensive and effective method of minimizing erosion of construction sites. Vegetation protects the soil from the impact of raindrops, roots hold the soil in place, and organic debris slows runoff velocities allowing sediment to settle out.

Item 5 - It is recommended that stormwater management and erosion control requirements be expanded to apply to all building and grading sites in the watershed, without exception (the existing ordinance does not apply to building sites more than 500 feet from surface water, with a slope less than 15%). Though sediment and runoff from exempted sites reaches the lake more slowly than that from steeper, closer sites, it still reaches the lake and affects water quality. The Committee suggested that a blanket permit be developed for utilities installation; if utilities are installed in compliance with this general permit, the County would only require notification of utility installation.

Item 6 - 6.b: It is recommended that stormwater/erosion control staff be dedicated to the program, and that they not have other duties (e.g. building inspections). It was felt that the timing of building and erosion control inspections are not compatible, and that the stormwater/ erosion control program could be more effectively implemented with staff whose time is dedicated solely to that program. 6.e: The Planning Committee did not make a recommendation on the application of bonding requirements; they discussed both bonding of all excavators, and bonding of just those with a track record of noncompliance. The Committee felt that the pro's and con's of the various options should be considered, and that a bonding system be developed which will adequately protect water quality, but not unnecessarily burden contractors. Of particular concern were projects with only a 30 foot vegetative buffer adjacent to the water.

Item 7 - This item is targeted toward sites upon which construction should not be prohibited, but which have a high potential to effect water quality. This includes areas with a high erosion risk, and those near streams, wetlands, and the lake. Items 7.a.-b. pertain to voluntary solutions initiated by willing landowners. 7.a. Transferring development rights may not be possible unless the County adopts ordinances permitting it. 7.b. Purchase of development rights can be accomplished now; no regulatory changes are needed; a conservation easement is simply placed on the property. 7.c. Some communities encourage the conservation of land by reducing taxes for properties with conservation easements (because the property cannot be developed it is worth less, and the landowner pays less tax. 7.d. Decreasing density would be most effective at minimizing water quality impacts if overall density were decreased, with homes clustered to minimize road length. For example, instead of developing eight one acre lots, eight lots could be developed on two acres, with six acres retained, preferably downslope, in native vegetation. One option might be to reduce densities based on proximity to surface water and/or erosion risk.

Item 8 - It is the intent of the Planning Committee that compliance with "no net increase" regulations be achieved through a combination of on site stormwater treatment and, if pollutants cannot be contained on site, off site mitigation. Potential phosphorus mitigation opportunities include removal of unneeded roads, reconstruction of substandard roads, replacement of substandard septic systems, stabilization of eroding cuts and fills, and restoration of riparian buffers along the lake and its tributaries. It is the intent of the Committee that "no net increase" requirements apply only to runoff from new development, and that phosphorus inputs from natural events not affect development activities in the watershed.

Item 10 - It is strongly recommended that effective methods of ensuring the maintenance of buffers and stormwater systems be developed. Maintenance of buffers and stormwater systems is critical if they are to remain effective at removing pollutants and providing good fish habitat. Options might include placing a lien on the property if necessary.

Stormwater From Existing Development (excluding roads)

Goal: Minimize quantity of runoff and associated contaminants entering Hayden Lake.

Management Actions	Action Level	Lead Group(s)
1. Encourage homeowners to reduce stormwater flows and sediment/ phosphorus export by converting lawns to native vegetation. <ul style="list-style-type: none"> a. Recognize with T-shirts, certificates, etc. b. Develop cost share program. c. Develop tax incentives. 	2	SHL, PHD, CLCC
2. Educate homeowners on stormwater (and general lake) impacts and management options, so they recognize problems when they see them. <ul style="list-style-type: none"> a. Exhibit at Home and Garden Show(s) (e.g. info on drip line trenches, level spreaders, "lake friendly" no P fertilizer, slow release fertilizer, frequency of fertilization, seeding of cuts/ fills/ cleaned ditches/ defoliated areas, burning on beaches and in ditches etc.). b. Distribute flyers and/or door hangers. c. Contact local nurseries and garden stores regarding distribution of information. d. Ask landscapers to provide information. e. Mail info to watershed residents. f. Provide info to new residents, through title companies. g. Provide information to lakefront homeowners, schools and Lakes Highway District. h. Use media to inform the public about stormwater issues and options. g. Distribute bumper stickers (school fund raiser?). 	1	SHL, PHD, CLCC
3. Recognize contractors who do a good job controlling erosion and managing stormwater.	1	NICBA
4. Explore "Coors Clean Water 2,000" and other outside funding sources.	2	SHL, PHD, CLCC
5. Explore IGA tree program as a source of trees for revegetation.	3	SHL, PHD, CLCC

Runoff From Public and Private Roads and Driveways (excluding logging roads)

Goal:- Reduce the quantity of runoff, sediment and phosphorus being exported from roads in the watershed.

Management Actions	Action Level	Lead Groups
<p>1. Expand Highway District and County road ordinances, policies and procedures to address water quality and slope stability concerns.</p> <p>a. Evaluate cumulative water quality effects of new roads and associated development prior to subdivision/road approval (slope stability, erosion, stormwater runoff etc.)</p> <p>b. Modify road maintenance procedures to reduce water quality impact (e.g. control dust on unpaved roads and parking areas, clean paved roads with water to reduce dust, time projects to avoid rainy seasons, provide erosion control and revegetation during cleaning of ditches, replacement of culverts etc.).</p>	1	LHD, KC
<p>2. Improve construction and maintenance of private roads and driveways, to minimize their effect on water quality.</p> <p>a. Inventory location and condition of private roads.</p> <p>b. Develop incentives for improving private roads.</p> <p>c. Develop construction and maintenance guidelines for private roads and driveways.</p>	3	KC
<p>3. Identify and correct stormwater problems with existing roads, to reduce their effect on water quality.</p> <p>a. Develop no net increase in phosphorus regulations in conjunction with a mitigation program for existing private, Highway District and Forest Service roads.</p> <p>b. Retrofit existing roads with stormwater treatment systems.</p> <p>c. Retrofit existing drainage structures which are not accessible to fish.</p>	1	KC, SHL, LHD, PHD, F&G
<p>4. Meet with road oilers on using alternatives to oil.</p>	1	DEQ, LHD
<p>5. Discontinue conversion of temporary, forest roads to year round, residential use without upgrading the construction of the road to make it adequate for residential traffic.</p>	1	KC, IDL

6. Develop penalties for landowners and excavators who do not comply with construction/ erosion/ stormwater ordinances (significant enough to make compliance less costly than noncompliance).	2	KC (Pros. Attn.'s Office)
7. Modify County and Highway District standards to require that drainage structures in fish bearing streams be accessible to fish.	1	LHD, KC
8. Provide excavators, the public and road maintenance personnel with information on road construction and maintenance.	1	LHD, KC

Notes:

Item 1 - Lakes Highway District currently requires a stormwater control plan, and their new road standards address slope concerns. Dust control is a particular concern near Honeysuckle Beach.

Item 3.a. - Mitigation actions could include removing roads which are no longer needed, repairing or surfacing existing roads, or paying public agencies such as the Highway District, Dept. of Lands, or Forest Service to make road improvements. 3b. and 3c. Retrofitting of existing roads with stormwater treatment systems and drainage structures accessible to fish could occur in conjunction with road reconstruction and/or resurfacing. Stormwater treatment systems which could be considered include adding culverts and directing runoff into swales, dense vegetation, or retention/detention ponds.

Runoff From Timber Land (USFS, State and privately owned)

Goal: Minimize sediment and phosphorus export from lands used for timber production.

Management Actions	Action Level	Lead Groups
1. Talk to recreational clubs regarding water quality impacts of four wheel drives and motorcycles.	1	USFS
2. Develop standards to protect water quality from recreational impacts.	1	USFS
3. Remove unneeded roads and reconstruct substandard logging roads, to reduce their effect on water quality.	1	USFS, IDL, KC, PHD
4. Develop and implement a plan to maintain, and if necessary, improve the stability of stream channels on private, state and federal land which has been over harvested.	1	USFS, IDL
5. Participate in County, City, State and USFS planning efforts to ensure that other plans are consistent with or more stringent than this plan.	1	KC, USFS, IDL, CHL, PHD
6. Distribute forest management information and studies.	2	USFS, IDL, IFIA
7. Encourage landowners to maintain land in timber production by preventing neighboring property values from affecting the value of timber land (e.g. through conservation easements).	2	KC, Land Trust
8. Support adoption of the proposed Cumulative Effects regulations, including additional BMP's or harvest restrictions in watersheds where streams and water quality are impaired by the cumulative effects of timber harvest.	1	IDL, DEQ, KEA, ICL, SHL, PHD

<p>9. Improve the Forest Practices Act Regulations to make them more effective at protecting lake water quality:</p> <ul style="list-style-type: none"> - Adopt proposed Cumulative Effects regulations. - Require that slash be kept out of the stream protection zone. - Increase the number of large conifers retained in the stream protection zone of Class I streams, to provide larger organic debris. - Require that some conifers be retained in the stream protection zone of Class II streams to provide LOD. - Increase the Class II stream protection zone to 30 '. - Bond operators. - Require pre-operational inspections of lakefront operations. - Develop BMP's for lake watersheds. - Prohibit tractor skidding on slopes in excess of 45%. - Require a 30' stream protection zone for wetlands. 		IDL, DEQ, SHL, KEA, ICL
<p>10. Support IDL hiring of one additional, full time staff position to monitor and inspect timber harvest and road building activities.</p>	2	IDL, SHL, ICL, KEA, PHD
<p>11. Eliminate property tax inequities for preserving trees (i.e. higher taxes for those who conserve trees).</p>	1	KC, Land Trust
<p>12. Develop an enforcement mechanism to ensure that property tax breaks for land in timber production are contingent upon compliance with a harvest management plan and the Forest Practices Act regulations.</p>	1	KC
<p>14. Manage timber to minimize potential water quality impacts of wildfire, while maintaining other resource attributes such as wildlife habitat.</p>	n/a	USFS, IDL

Notes:

Item 2 - These standards could include a)restricting camping along tributaries of Hayden Lake, b)reducing the 30 day camping limit, c)developing designated, maintained camping areas, and d)developing stream setbacks for camps.

Item 7 - In general, sediment and phosphorus export is much lower for timber land than for residential areas.

Item 8 - The Cumulative Effects regulations will soon be available for public review and comment.

Agriculture

Goal: Prevent increases in sediment and nutrient loading from grazing and aquaculture activities.

Management Actions	Action Level	Lead Groups
1. Encourage the continued use of good livestock management BMP's (best management practices).	2	SCS, SCD
2. Identify hobby farms which are impacting water quality; provide them with information on livestock management BMP's.	3	KCE, SCS, SCD
3. Establish recommended animal densities, to minimize their effect on water quality.	3	SCS, KCE
4. Retain native vegetation buffers along the lake, creeks and drainageways, to help remove sediment and pollutants, maintain bank stability, and provide good fish habitat.	2	
5. Use incentives to encourage the use of BMP's and conservation plans.	3	SCS, SCD
6. Inform the public on the potential water quality impacts of aquaculture operations, and about aquaculture permitting processes through the Fish and Game Dept. and Dept. of Agriculture.	3	F&G, IDA

Notes:

Item 2 - Hobby farms might be identified using County plat maps, or by surveying the area by air. Information outreach could include providing BMP handbooks at local feed stores, and working with 4-H kids.

Item 6 - Potential water quality impacts include dewatering of streams, elevation of water temperature, and spread of disease to native fish populations.

Miscellaneous		
Management Actions	Action Level	Lead Groups
1. Expand the scope of the anti degradation agreement and requirements to address all land uses equally (residential and commercial development, agriculture, mining, timber).	2	SHL, KEA, ICL
2. Improve State Water Quality Standards to make them easier to enforce and more effective at protecting water quality and beneficial uses; adopt minimum BMP's for agriculture and construction activities and adopt local and/or State sediment standards for Hayden Lake and its tributaries.	1	DEQ, KEA, ICL, SHL, PHD
3. Maintain the existing citizens volunteer monitoring program, and support additional monitoring in the watershed to: -Evaluate the effectiveness of actions implemented pursuant to this plan, -Identify water quality trends, -Verify nutrient loading estimates developed by Soltero et. al. and Panhandle Health District, -Quantify sediment and nutrient export from a variety of commercial and residential developments, on varying slopes and soils, and -Identify sources of nutrients entering Hayden Creek between the gaging station and the lake.	1	DEQ, CLCC, SHL
4. Discourage the use of wood sealants and preservatives on the decking of docks.	2	SHL
5. Assess the adequacy of restroom and parking facilities for Honeysuckle Beach.	2	CH
6. Take annual air photos of the shoreline to identify illegal shoreline modifications.	3	
7. Request that Dept. of Lands require permits for removal of docks which are replaced.	3	IDL
8. Request that the Cities of Hayden and Hayden Lake sponsor an annual clean up day for small debris on the beach (to reduce the amount of burning which occurs).	2	CH, CHL

<p>9. Provide information and education on water quality issues including</p> <p>a) Educate boaters and jet skiers about</p> <ul style="list-style-type: none"> -staying away from shore and shallow areas, -the location of public restroom facilities on the lakeshore. <p>b) Educate residents about</p> <ul style="list-style-type: none"> -the value of retaining and/or replacing native vegetation and rocks along the shoreline, -permitting requirements for building docks, modifying the shoreline and dredging or filling the lake bed, -the adverse effects of burning near the lake and its tributaries, the benefits of using of fire pans for small beach fires -the fish and wildlife benefits associated with retaining large woody debris on the beach, -the benefits of using phosphorus free cleaning products. <p>c) Provide informational signs at the entrances to the watershed.</p> <p>d) Develop a phone directory of the various agencies involved in watershed management, including a brief description of their respective responsibilities.</p> <p>e) Provide lot by lot consultation on stormwater management alternatives.</p>	1	CLCC, SHL, PHD, DEQ
<p>10. Nominate Hayden Lake as an Outstanding Resource Water and/or Stream Segment of Concern.</p>	1	SHL, PHD, HOHC
<p>11. Explore funding options to support plan implementation including:</p> <ul style="list-style-type: none"> a. Formation of a County stormwater utility. b. Adoption of a surcharge on septic system permits issued in the watershed. c. A County sponsored bond levy (possibly in connection with the existing Hayden Lake Watershed District). 		
<p>12. Discourage the use of chemicals for cleaning boats.</p>	3	SHL, CLCC
<p>13. Develop setbacks and installation standards for residential petroleum storage tanks.</p>		PHD, KC, DEQ

Notes:

Item 3 - This includes monitoring through DEQ, the U.S. Forest Service, Idaho Dept. of Fish and Game, as well as the Citizens Volunteer Monitoring Program.

Item 4 - Use of these products is unnecessary if the wood is pretreated; the base of the dock needs to be replaced long before the decking deteriorates.

Item 7 - This is to reduce the number of old docks which are disposed of by simply cutting them loose. This contributes to the quantity of woody debris which ends up on beaches, and which is often disposed of by burning.

Abbreviations:

KEA	Kootenai Environmental Alliance
CHL	City of Hayden Lake
KC	Kootenai County
SHL	Save Hayden Lake
DEQ	Division of Environmental Quality
IDL	Idaho Dept. of Lands
HOHC	Hayden Area Homeowners Coalition
SCS	Soil Conservation Service
HLRWSD	Hayden Lake Recreational Water and Sewer District

ICL	Idaho Conservation League
PHD	Panhandle Health District
CH	City of Hayden
LHD	Lakes Highway District
NICBA	North Idaho Building Contractors Assn.
F&G	Idaho Dept. of Fish and Game
USFS	U.S. Forest Service
ITD	Idaho Transportation Dept.

Plan Implementation

Implementation of this plan is to be achieved through existing agencies, organizations and processes. As previously mentioned, this plan has no regulatory authority; recommended regulatory changes will be pursued through existing agencies, using their respective notification, hearing and adoption processes. Many of the details of these regulations and ordinances will be worked out at that time. Panhandle Health District will implement actions wholly within its jurisdiction, and will assist other agencies and organizations to implement actions within their jurisdiction. If jurisdictions overlap, and other organizations are unwilling to implement actions outlined in this plan, the Health District will pursue implementation through its Environmental Health Code. The Planning Committee will actively support agencies involved in implementing this management plan.

All sectors of the community will be encouraged to support and assist with implementation. Private organizations which may wish to be involved include the Hayden Lake Watershed District, the Clean Lakes Coordinating Council, the North Idaho Building Contractors Association, the Kootenai County Board of Realtors, the Hayden Area Homeowners Association, the Chamber of Commerce, the Citizens Network for Responsible Growth, Kootenai Perspectives, Kootenai Environmental Alliance, the Idaho Conservation League, and Save Hayden Lake.

Following completion of this plan, the Hayden Lake Watershed Planning Committee will meet every six months to assess the progress of the plan, review new information, and modify the plan as needed. Between meetings the Health District will provide the Committee and interested citizens with periodic, written progress updates.

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APPENDIX A

GLOSSARY

Acid neutralizing capacity (ANC): the equivalent capacity of a solution to neutralize strong acids. The components of ANC include weak bases (carbonate species, dissociated organic acids, alumino-hydroxides, borates, and silicates) and strong bases (primarily, OH). In the National Surface Water Survey, as well as in most other recent studies of acid-base chemistry of surface waters, ANC was measured by the Gran titration procedure.

Acidic deposition: transfer of acids and acidifying compounds from the atmosphere to terrestrial and aquatic environments via rain, snow, sleet, hail, cloud droplets, particles, and gas exchange.

Adsorption: The adhesion of one substance to the surface of another; clays, for example, can absorb phosphorus and organic molecules.

Aerobic: Describes life or processes that require the presence of molecular oxygen.

Algae: Small aquatic plants that occur as single cells, colonies, or filaments.

Allochthonous: Materials (e.g., organic matter and sediment) that enter a lake from atmosphere or drainage basin (see autochthonous).

Anaerobic: Describes processes that occur in the absence of molecular oxygen.

Anoxia: A condition of no oxygen in the water. Often occurs near the bottom of fertile stratified lakes in the summer and under ice in late winter.

Autochthonous: Materials produced within a lake; e.g., autochthonous organic matter from plankton versus allochthonous organic matter from terrestrial vegetation.

Bathymetric map: A map showing the bottom contours and depth of a lake; can be used to calculate lake volume.

BMP: Best management practice - a method of minimizing nonpoint source pollutants.

Benthos: Macroscopic (seen without aid of a microscope) organisms living in and on the bottom sediments of lakes and streams. Originally, the term meant the lake bottom, but it is now applied almost uniformly to the animals associated with the substrate.

Biochemical oxygen demand (BOD): The rate of oxygen consumption by organisms during the decomposition (= respiration) of organic matter, expressed as grams oxygen per cubic meter of water per hour.

Biomass: The weight of biological matter. Standing crop is the amount of biomass (e.g., fish or algae) in a body of water at a given time; Often measured in terms of grams per square meter of surface.

Biota: All plant and animal species occurring in a specified area.

Chemical oxygen demand (COD): Nonbiological uptake of molecular oxygen by organic and inorganic compounds in water.

Chlorophyll: A green pigment in algae and other green plants that is essential for the conversion of sunlight, carbon dioxide, and water to sugar. Sugar is then converted to starch, proteins, fats, and other organic molecules.

Chlorophyll *a*: A type of chlorophyll present in all type of algae, sometimes in direct proportion to the biomass of algae.

Cluster development: Placement of housing and other buildings of a development in groups to provide larger areas of open space.

Consumers: Animals that cannot produce their own food through photosynthesis and must consume plants or animals for energy (see producers).

DEQ: Idaho Dept. of Health and Welfare, Division of Environmental Quality.

Decomposition: The transformation of organic molecules (e.g., sugar) to inorganic molecules (e.g., carbon dioxide and water) through biological and non-biological processes.

Delphi: A technique that solicits potential solutions to a problem situation from a group of experts and then asks the experts to rank the full list of alternatives.

Density flows: A flow of water of one density (determined by temperature or salinity) over or under water of another density (e.g., flow of cold river water under warm reservoir surface water).

Detritus: Nonliving dissolved and particulate organic materials from the metabolic activities and deaths of terrestrial and aquatic organisms.

Drainage basin: Land area from which water flows into a stream or lake (see watershed).

Drainage lakes: Lakes having a defined surface inlet and outlet.

Ecology: Scientific study of relationships between organisms and their environment; also defined as the study of the structure and function of nature.

Ecosystem: A system of interrelated organisms and their physical-chemical environmental. In this Manual, the ecosystem is usually defined to include the lake and its watershed.

Effluent: Liquid wastes from sewage treatment, septic systems, or industrial sources that are released to a surface water.

Environment: Collectively, the surrounding conditions, influences, and living and inert matter that affect a particular organism or biological community.

Epilimnion: Collectively, the surrounding conditions, influences, and living and inert matter that affect a particular organism or biological community.

Epilimnion: Uppermost, warmest, well-mixed layer of a lake during summertime thermal stratification. The epilimnion extends from the surface to the thermocline.

Erosion: Breakdown and movement of land surface, which is often intensified by human disturbances.

Eutrophic: From Greek for "well-nourished," describes a lake of high photosynthetic activity and low transparency.

Eutrophication: The process of physical, chemical, and biological changes associated with nutrient, organic matter, and silt enrichment and sedimentation of a lake or reservoir. If the process is accelerated by man-made influences, it is termed cultural eutrophication.

Fall overturn: The autumn mixing, top to bottom, of lake water caused by cooling and wind-derived energy.

Fecal coliform test: Most common test for the presence of fecal material from warm-blooded animals. Fecal coliforms are measured because of convenience; they are not necessarily harmful but indicate the potential presence of other disease-causing organisms.

Floodplain: Land adjacent to lakes or rivers that is covered as water levels rise and overflow the normal water channels.

Flushing rate: The rate at which water enters and leaves a lake relative to lake volume, usually expressed as time needed to replace the lake volume with inflowing water.

Flux: The rate at which a measurable amount of a material flows past a designated point given amount of time.

Food chain: The general progression of feeding levels from primary producers, to herbivores, to planktivores, to the larger predators.

Food web: The complex of feeding interactions existing among the lake's organisms.

Forage fish: Fish, including a variety of panfish and minnows, that are prey for game fish.

Groundwater: Water found beneath the soil's surface; saturates the stratum at which it is located; often connected to lakes.

Hard water: Water with relatively high levels of dissolved minerals such as calcium, iron, and magnesium.

Hydrographic map: A map showing the location of areas or objects within a lake.

Hydrologic cycle: The circular flow or cycling of water from the atmosphere to the earth (precipitation) and back to the atmosphere (evaporation and plant transpiration). Runoff, surface water, groundwater, and water infiltrated in soils are all part of the hydrologic cycle.

Hypolimnion: Lower, cooler layer of a lake during summertime thermal stratification.

IDL: Idaho Dept. of Lands.

Influent: A tributary stream.

Internal nutrient cycling: Transformation of nutrients such as nitrogen or phosphorus from biological to inorganic forms through decomposition, occurring within the lake itself.

Isothermal: The same temperature throughout the lake.

Lake: A considerable inland body of standing water, either naturally formed or manmade.

Lake district: A special purpose unit of government with authority to manage a lake(s) and with financial powers to raise funds through mill levy, user charge, special assessment, bonding, and borrowing. May or may not have police power to inspect septic systems, regulate surface water use, or zone land.

Lake management: The practice of keeping lake quality in a state such that attainable uses can be achieved.

Lake protection: The act of preventing degradation or deterioration of attainable lake uses.

Lake restoration: The act of bringing a lake back to its attainable uses.

Lentic: Relating to standing water (versus lotic, running water).

Limnology: Scientific study of fresh water, especially the history, geology, biology, physics, and chemistry of lakes. Also termed freshwater ecology.

Littoral zone: That portion of a waterbody extending from the shoreline lakeward to the greatest depth occupied by rooted plants.

Loading: The total amount of material (sediment, nutrients, oxygen-demanding material) brought into the lake by inflowing streams, runoff, direct discharge through pipes, groundwater, the air, and other sources over a specific period of time (often annually).

Macroinvertebrates: Aquatic insects, worms, clams, snails, and other animals visible without aid of a microscope, that may be associated with or live on substrates such as sediments and macrophytes. They supply a major portion of fish diets and consume detritus and algae.

Macrophytes: Rooted and floating aquatic plants, commonly referred to as waterweeds. These plants may flower and bear seed. Some forms, such as duckweed and coontail (*Ceratophyllum*), are free-floating forms without roots in the sediment.

Mandatory property owners association: Organization of property owners in a subdivision or developments with membership and annual fee required by covenants on the property deed. Association will often enforce deed restrictions on members' property and may have common facilities such as bathhouse, clubhouse, golf course, etc.

Marginal zone: Area where land and water meet at the perimeter of a lake. Includes plant species, insects, and animals that thrive in this narrow, specialized ecological system.

Metalimnion: Layer of rapid temperature and density change in a thermally stratified lake. Resistance to mixing is high in the region.

Morphometry: Relating to a lake's physical structure (e.g., depth, shoreline length).

Nekton: Large aquatic and marine organisms whose mobility is not determined by water movement—for example, fish and amphibians.

Nominal group process: A process of soliciting concerns/issues/ideas from members of a group and ranking the resulting list to ascertain group priorities. Designed to neutralize dominant personalities.

Nutrient: An element or chemical essential to life, such as carbon, oxygen, nitrogen, and phosphorus.

Nutrient budget: Quantitative assessment of nutrients (e.g., nitrogen or phosphorus) moving into, being retained in, and moving out of an ecosystem; commonly constructed for phosphorus because of its tendency to control lake trophic state.

Nutrient cycling: The flow of nutrients from one component of an ecosystem to another, as when macrophytes die and release nutrients that become available to algae (organic to inorganic phase and return).

Oligotrophic: "Poorly nourished," from the Greek. Describes a lake of low plant productivity and high transparency.

Ooze: Lake bottom accumulation of inorganic sediments and the partially decomposed remains of algae, weeds, fish, and aquatic insects. Sometimes called muck; see sediment.

Ordinary high water mark: Physical demarcation line, indicating the highest point that water level reaches and maintains for some time. Line is visible on rocks, or shoreline, and by the location of certain types of vegetation.

Organic matter: Molecules manufactured by plants and animals and containing linked carbon atoms and elements such as hydrogen, oxygen, nitrogen, sulfur, and phosphorus.

Pathogen: A microorganism capable of producing disease. They are of great concern to human health relative to drinking water and swimming beaches.

Pelagic zone: This is the open area of a lake, from the edge of the littoral zone to the center of the lake.

Perched: A condition where the lake water is isolated from the groundwater table by impermeable material such as clay.

Ph: A measure of the concentration of hydrogen ions of a substance which ranges from very acid ($\text{Ph} = 1$) to very alkaline ($\text{Ph} = 14$). $\text{Ph} 7$ is neutral and most lake waters range between 6 and 9. Ph values less than 6 are considered acidic, and most life forms can not survive at Ph of 4.0 or lower.

Photic zone: The lighted region of a lake where photosynthesis takes place. extends down to a depth where plant growth and respiration are balanced by the amount of light available.

Phytoplankton: Microscopic algae and microbes that float freely in open water of lakes and oceans.

Plankton: Planktonic algae float freely in the open water. Filamentous algae form long threads and are often seen as mats on the surface in shallow areas of the lake.

Primary productivity: The rate at which algae and macrophytes fix or convert light, water, and carbon dioxide to sugar in plant cells. Commonly measured as milligrams of carbon per square meter per hour.

Producers: Green plants that manufacture their own food through photosynthesis.

Profundal zone: Mass of lake water and sediment occurring on the lake bottom below the depth of light penetration.

Reservoir: A manmade lake where water is collected and kept in quantity for a variety of uses, including flood control, water supply, recreation and hydroelectric power.

Residence time: Commonly called the hydraulic residence time-the amount of time required to completely replace the lake's current volume of water with an equal volume of "new" water.

Respiration: Process by which organic matter is oxidized by organisms, including plants,

animals, and bacteria. The process releases energy, carbon dioxide, and water.

Secchi depth: A measure of transparency of water obtained by lowering a black and white, or all white, disk (Secchi disk, 20 cm in diameter) into water until it is no longer visible. Measured in units of meters or feet.

Sediment: Bottom material in a lake that has been deposited after the formation of a lake basin. It originates from remains of aquatic organisms, chemical precipitation of dissolved minerals, and erosion of surrounding lands (see ooze).

Seepage lakes: Lakes having either an inlet or outlet (but not both) and generally obtaining their water from groundwater and rain or snow.

Soil retention capacity: The ability of a given soil type to absorb substances such as phosphorus, thus retarding their movement to the water.

Stratification: Layering of water caused by differences in water density. Thermal stratification is typical of most deep lakes during summer. Chemical stratification can also occur.

Swimmers itch: A rash caused by penetrations into the skin of the immature stage (cercaria) of a flatworm (not easily controlled due to complex life cycle). A shower or alcohol rubdown should minimize penetration.

Thermal stratification: Lake stratification caused by temperature-created differences in water density.

Thermocline: A horizontal plane across a lake at the depth of the most rapid vertical change in temperature and density on a stratified lake. See metalimnion.

Topographic map: A map showing the elevation of the landscape at contours of 2, 5, 10, or 230 feet. Can be used to delineate the watershed.

Trophic state: The degree of eutrophication of a lake. Transparency, chlorophyll *a* levels, phosphorus concentrations, amount of macrophytes, and quantity of dissolved oxygen in the hypolimnion can be used to assess state.

Voluntary lake property owners association: Organization of property owners in an area around a lake that members join at their option.

Water column: Water in the lake between the interface with the atmosphere at the surface and the interface with the sediment layer at the bottom. Idea derives from vertical series of measurements (oxygen, temperature, phosphorus) used to characterize lake water.

Water table: The upper surface of groundwater; below this point, the soil is saturated with water.

Watershed: A drainage area or basin in which all land and water areas drain or flow toward a central collector such as a stream, river, or lake at a lower elevation.

Zooplankton: Microscopic animals that float freely in lake water, graze on detritus particles, bacteria, and algae, and may be consumed by fish.

APPENDIX B
Comparison of Phosphorus Export From Residential Stormwater and Septic Systems

Shireene Hale
Panhandle Health District
Coeur d'Alene, Idaho

<i>Septic Systems</i>		
<i>Estimated Annual Total Phosphorus Export Per Residence</i>		
Cocolalla Lake (permanent residences)		1.7 lb TP/house-yr ^{1*}
Spirit Lake (primarily seasonal residences)		.71 lb TP/house-yr ^{2*}
Hayden Lake (444 seasonal/209 permanent residences)		.40 lb TP/house-yr ^{4*}
<i>Stormwater</i>		
	<i>Estimated Annual Total Phosphorus Export (Without Treatment)</i>	<i>Estimated Total Phosphorus Export With 60% Removal From First Half Inch of Runoff+</i>
Cocolalla Lake	.89 lb TP/acre-yr ^{1*}	.44 lb TP/acre-yr
Spirit Lake	.81 lb TP/acre-yr ^{2*}	.40 lb TP/acre-yr
National Average For Areas with 30" Rainfall	.87 lb TP/acre-yr ³	.43 lb TP/acre-yr

Background total phosphorus export for this area ranges from .01-.09 lb/acre-yr.

*These values are based on export coefficients from the literature, rather than monitoring data from specified watersheds.

+None of these estimates include phosphorus loading from erosion occurring during construction. These estimates are based on the assumption that grassed infiltration areas will generally not be used in the Hayden Lake watershed (due to shallow or impermeable soils, steep slopes, high water tables, etc). The maximum treatment efficiency of most alternatives is approximately 60%. It is also assumed that 15% of the stormwater flow will occur after there has been a half inch of runoff and that this will receive no treatment. This estimate is based on information provided by Kit Craine of the State Climatologist's Office. Ms. Craine reviewed

rainfall data for Coeur d'Alene for the past 80 years and found that daily rainfall exceeds $\frac{1}{2}$ " an average of 11.16 times, and 1" an average of 1.74 times each year. Assuming that 1.25" of precipitation falls on the two days each year when precipitation exceeds 1", approximately 1.5" would not be treated by stormwater systems (.75" from each storm). Assuming that .75" of precipitation falls on the remaining 9 days when precipitations exceeds $\frac{1}{2}$ ", 2.25" would not be treated by stormwater systems (.25" from each of the 9 days). This equals a total of 3.75" of untreated stormwater runoff, or 15% of the 25" of precipitation Coeur d'Alene normally receives each year.

Literature Cited

1. Falter, C.M. and J.C. Good. 1987. *Cocolalla Lake Phosphorus Loading and Trophic Status Assessment*. College of Forestry, Wildlife and Range Sciences, University of Idaho, Moscow, Idaho. 124pp.
2. Bellatty, J.M. 1987. *Land Use Activities Contributing to the Cultural Eutrophication of Spirit Lake, Idaho*. Masters Thesis. University of Idaho, Moscow, Idaho. 178pp.
3. EPA, 1983. *Results of the Nationwide Urban Runoff Program, Volume I, Final Report*. U.S. Environmental Protection Agency, Water Planning Division, Washington D.C.
4. Soltero, R.A., K.R. Merrill, M.R., Cather, and L.M., Appel, *Water Quality Assessment of Hayden Lake Idaho*. Eastern Washington University, Cheney, Wa. 92pp.

APPENDIX C

Method Used to Predict Erosion Risk

(R) (K) (LS) = erosion risk index (ERI)

K = soil erodibility factor (from Table 16 of the Kootenai County Soil Survey).

LS = slope length gradient factor for this area (see attached Table 2-1 submitted by Dr. Don McCool, Washington State University). In calculating the ERI, slope was rounded to the closest value available on the LS table. If the slope was halfway between two values, the high value was used.

R = rainfall intensity factor for this area (varies with mean annual precipitation - See Table 2-2)

$$R = [-71.97 + 10.31 (p)] - 0.1881 p^2$$

(p = precipitation in inches per year)

ERI = 0-15 low risk - erosion can be easily controlled with dequate planning and implementation of erosion control BMP's.

ERI = > 15-25 moderate risk - erosion can be controlled however adequate planning and close supervision of erosion control BMPs is needed.

ERI = > 25-58 high risk - erosion control will be difficult. Adequate planning and close supervision of erosion control BMPs is needed. Construction activities should be scheduled to avoid rainy seasons.

ERI = > 58 extreme risk - soil disturbing activities should be avoided.

Example

For a site with a slope of 20% and slope length of 100 feet (LS=1.88), mean annual precipitation of 26 in/yr (R=70), and soil K factor of .10, the erosion risk index would equal 13.16

$$\begin{array}{l} (R) \quad (K) \quad (LS) = \text{erosion risk index} \\ (70) \quad (.10) \quad (1.88) = 13.16 \end{array}$$

Table C-1
Values for Topographic Factor, LS, for Thawing Soils Where Most of the Erosion is Caused By Surface Flow

Horizontal Slope Length in Feet

Slope %	15	25	50	75	100	150	200	250	300	400	600	800	1000
0.2	0.02	0.03	0.04	0.05	0.06	0.07	0.09	0.10	0.10	0.12	0.15	0.17	0.19
0.5	0.04	0.05	0.07	0.09	0.10	0.12	0.14	0.16	0.17	0.20	0.25	0.28	0.31
1.0	0.06	0.08	0.11	0.14	0.16	0.20	0.23	0.26	0.28	0.32	0.40	0.46	0.51
2.0	0.11	0.14	0.20	0.25	0.29	0.35	0.41	0.46	0.50	0.58	0.71	0.82	0.91
3.0	0.16	0.21	0.29	0.36	0.42	0.51	0.59	0.66	0.72	0.83	1.02	1.17	1.31
4.0	0.21	0.27	0.38	0.47	0.54	0.66	0.77	0.86	0.94	1.08	1.33	1.53	1.71
5.0	0.26	0.33	0.47	0.58	0.67	0.82	0.94	1.06	1.16	1.34	1.64	1.89	2.11
6.0	0.31	0.40	0.56	0.69	0.79	0.97	1.12	1.26	1.38	1.59	1.95	2.25	2.51
8.0	0.41	0.52	0.74	0.91	1.05	1.28	1.48	1.65	1.81	2.09	2.56	2.96	3.31
10.0	0.48	0.62	0.88	1.08	1.25	1.53	1.77	1.98	2.16	2.50	3.06	3.54	3.95
12.0	0.54	0.70	0.98	1.21	1.39	1.71	1.97	2.20	2.41	2.78	3.41	3.94	4.40
14.0	0.59	0.76	1.08	1.32	1.53	1.87	2.16	2.41	2.64	3.05	3.74	4.31	4.82
16.0	0.64	0.82	1.17	1.43	1.65	2.02	2.33	2.61	2.86	3.30	4.04	4.67	5.22
20.0	0.73	0.94	1.33	1.63	1.88	2.30	2.66	2.97	3.25	3.76	4.60	5.31	5.94
25.0	0.83	1.07	1.51	1.85	2.13	2.61	3.02	3.37	3.69	4.27	5.23	6.03	6.75
30.0	0.91	1.18	1.67	2.05	2.36	2.89	3.34	3.73	4.09	4.72	5.78	6.68	7.47
40.0	1.07	1.38	1.95	2.39	2.75	3.37	3.90	4.36	4.77	5.51	6.75	7.79	8.71
50.0	1.19	1.54	2.18	2.67	3.08	3.77	4.35	4.87	5.33	6.16	7.54	8.71	9.74
60.0	1.30	1.67	2.37	2.90	3.35	4.10	4.74	5.30	5.80	6.70	8.20	9.47	10.59

Excerpt from RUSLE (Revised Universal Soil Loss Equation) Handbook, provided by Dr. Don McCool, Research Agricultural Engineer, USDA-ARS; Land Management/Water Conservation Research Unit, Washington State University.

Table C-2
Universal Soil Loss Equation R Factors
for Pacific Northwest Rainfall and Snowmelt Conditions

Based on the Polynomial Fit of Annual R to Annual Precipitation
 $R = -71.97 + 10.31 P - 0.1881 p^2$

Average Annual Precipitation (Inches)	Rounded R. Factor
10 or less	13
11	20
12	26
13	31
14	36
15	41
16	46
17	50
18	54
19	57
20	60
21	63
22	65
23	67
24	68
25	69
26	70
27	70
28	70
29	70
29	70
30	70

Developed by Dr. Don McCool, ARS, Pullman, Washington, from research in the Palouse, Pendleton, Oregon and southeast Idaho. (Technical Guide Section I-C, 5CS - Idaho, Oct. 1986.)

APPENDIX D

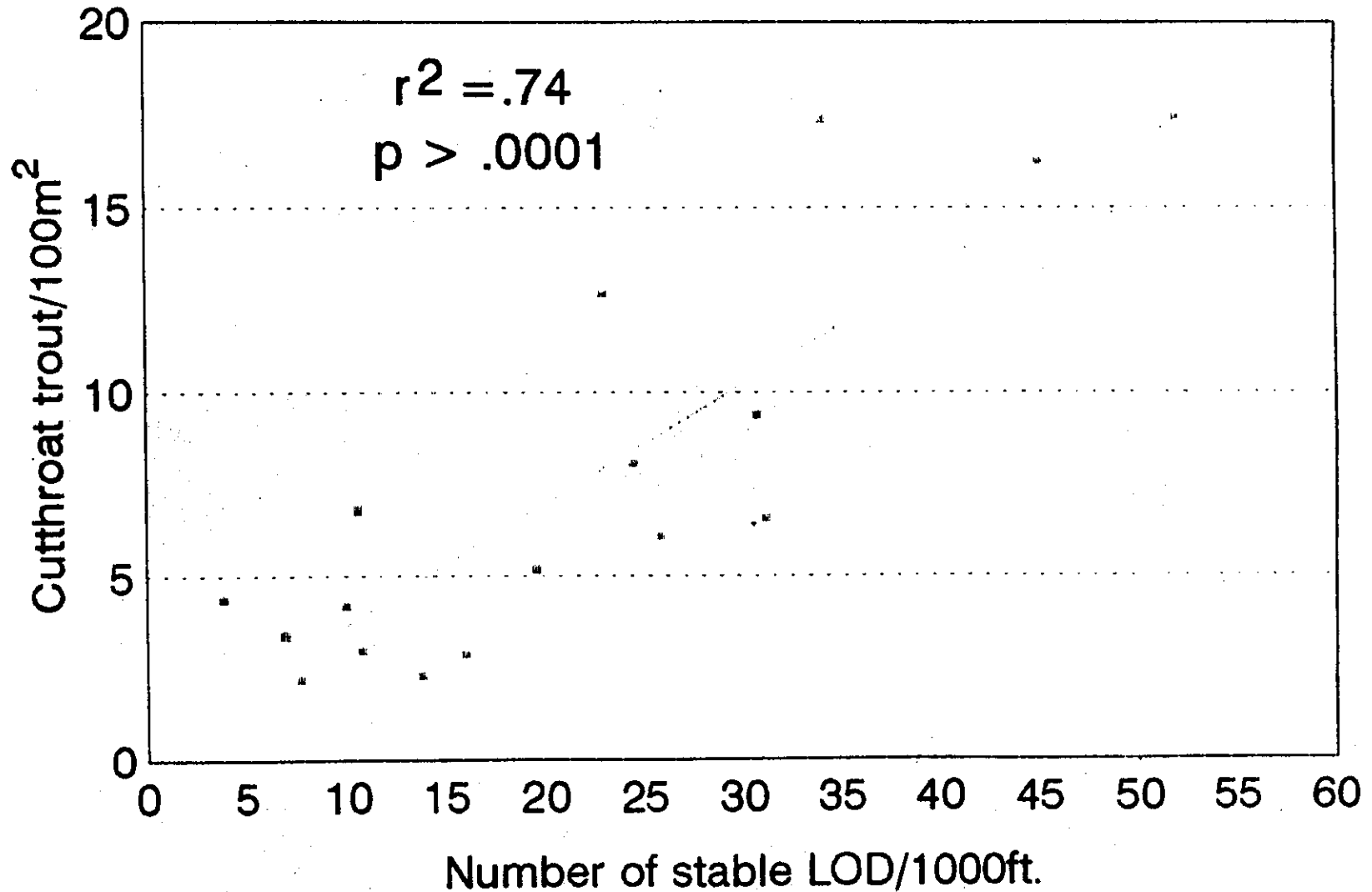
USFS Fish Habitat Survey Data for Hayden Creek Drainage

2

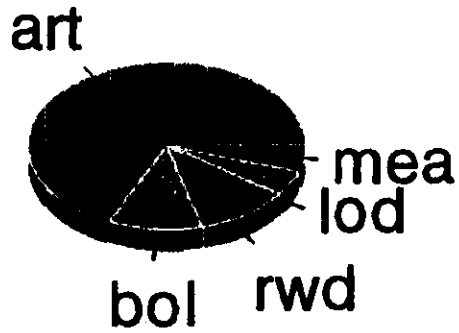
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Relation of fish densities to LOD

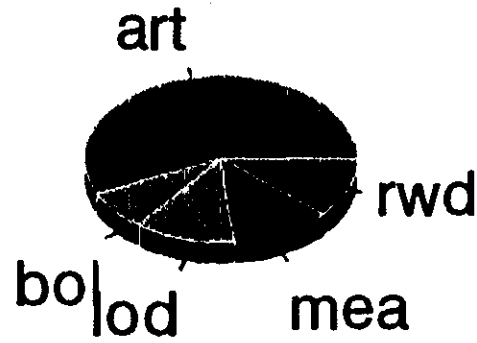
Cougar Gulch drainage



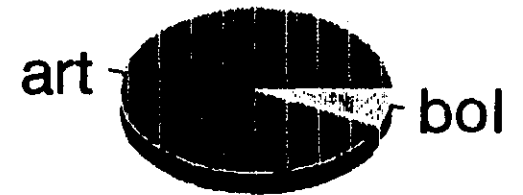
N.F. Hayden Creek pool creators



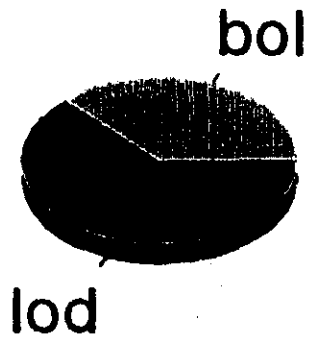
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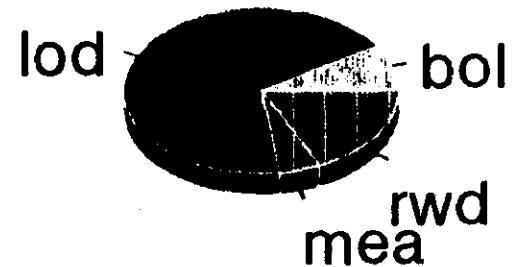
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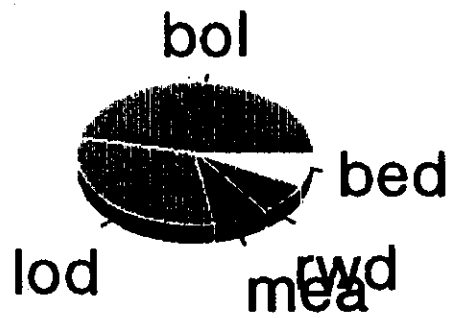


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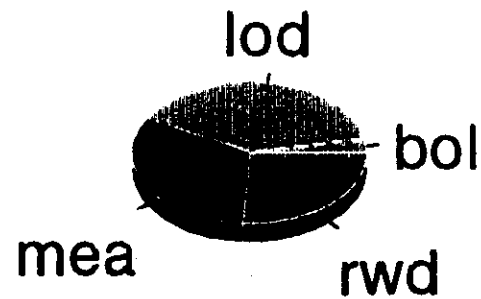


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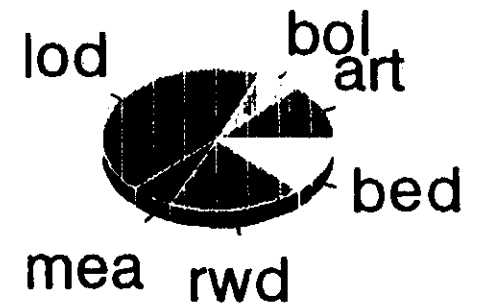
E.F. Hayden Creek pool creators



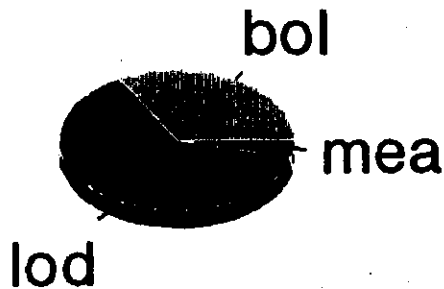
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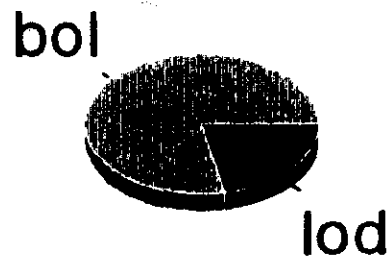
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reach 3



reach 4



reach 5

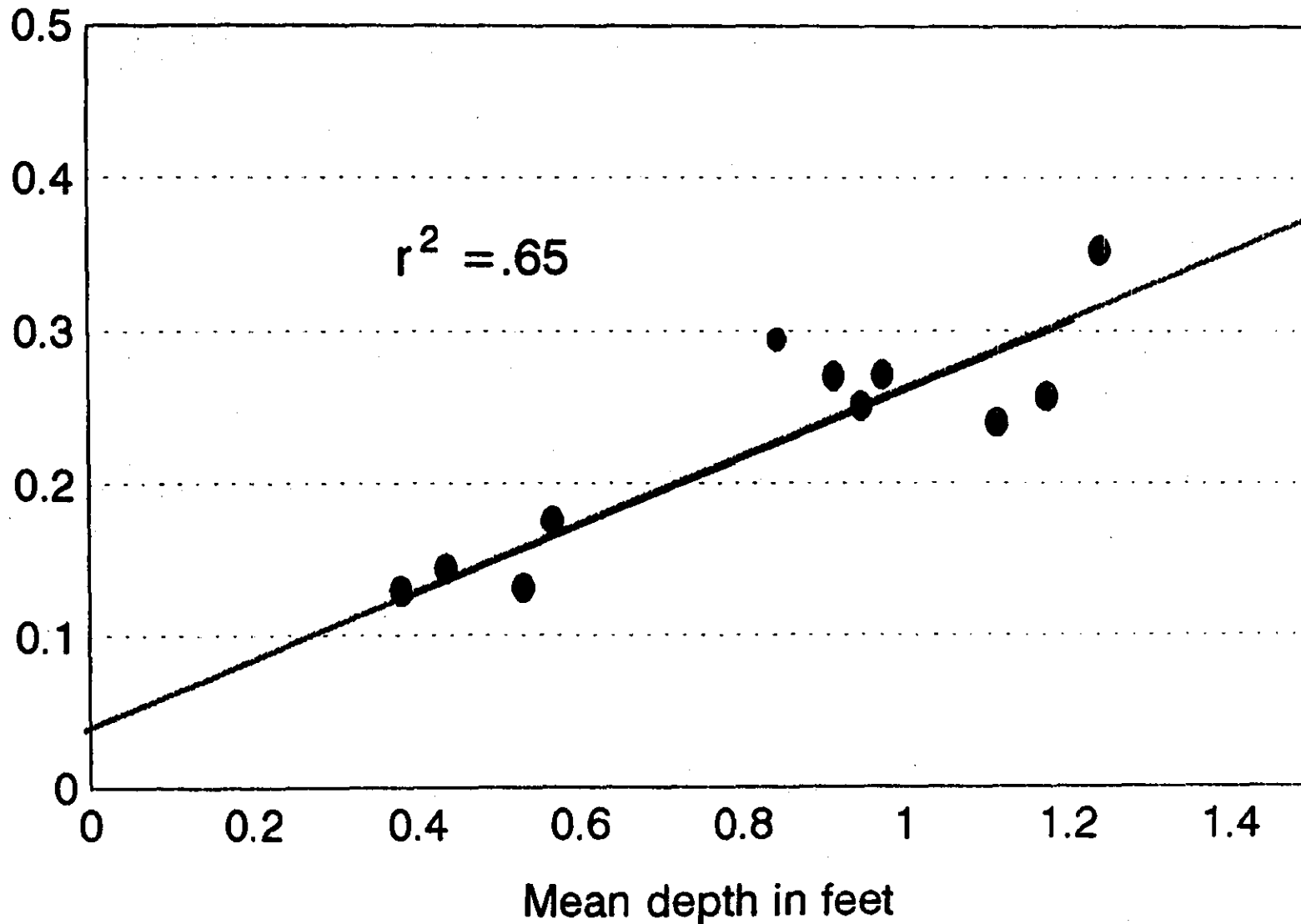


reach 6

Trout Density vs. Mean Depth

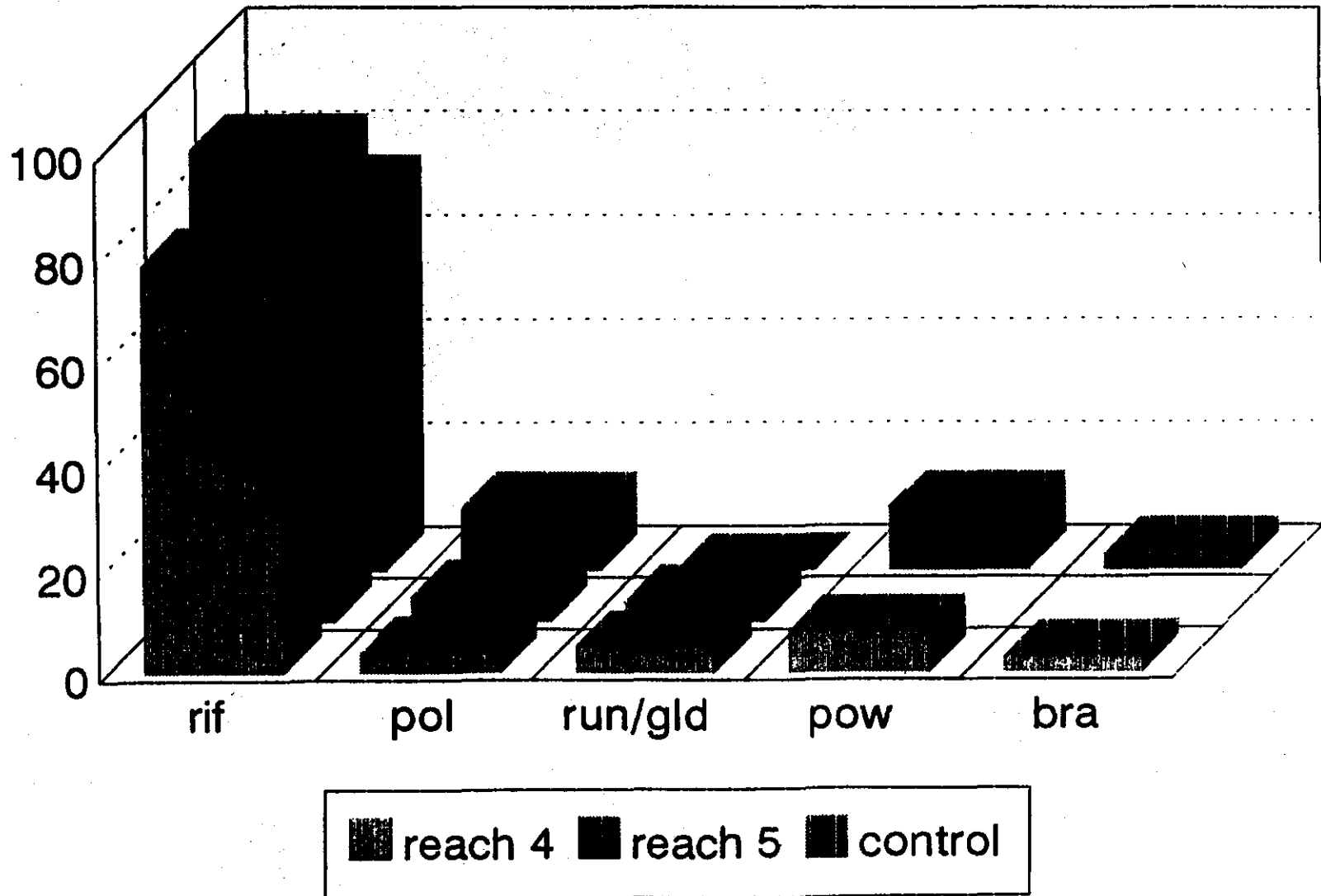
Coeur d'Alene Drainage by Habitat Type

Fish per Square meter



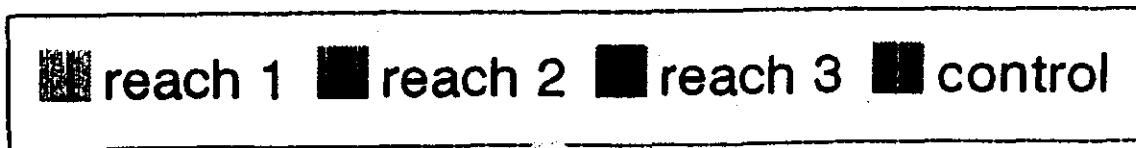
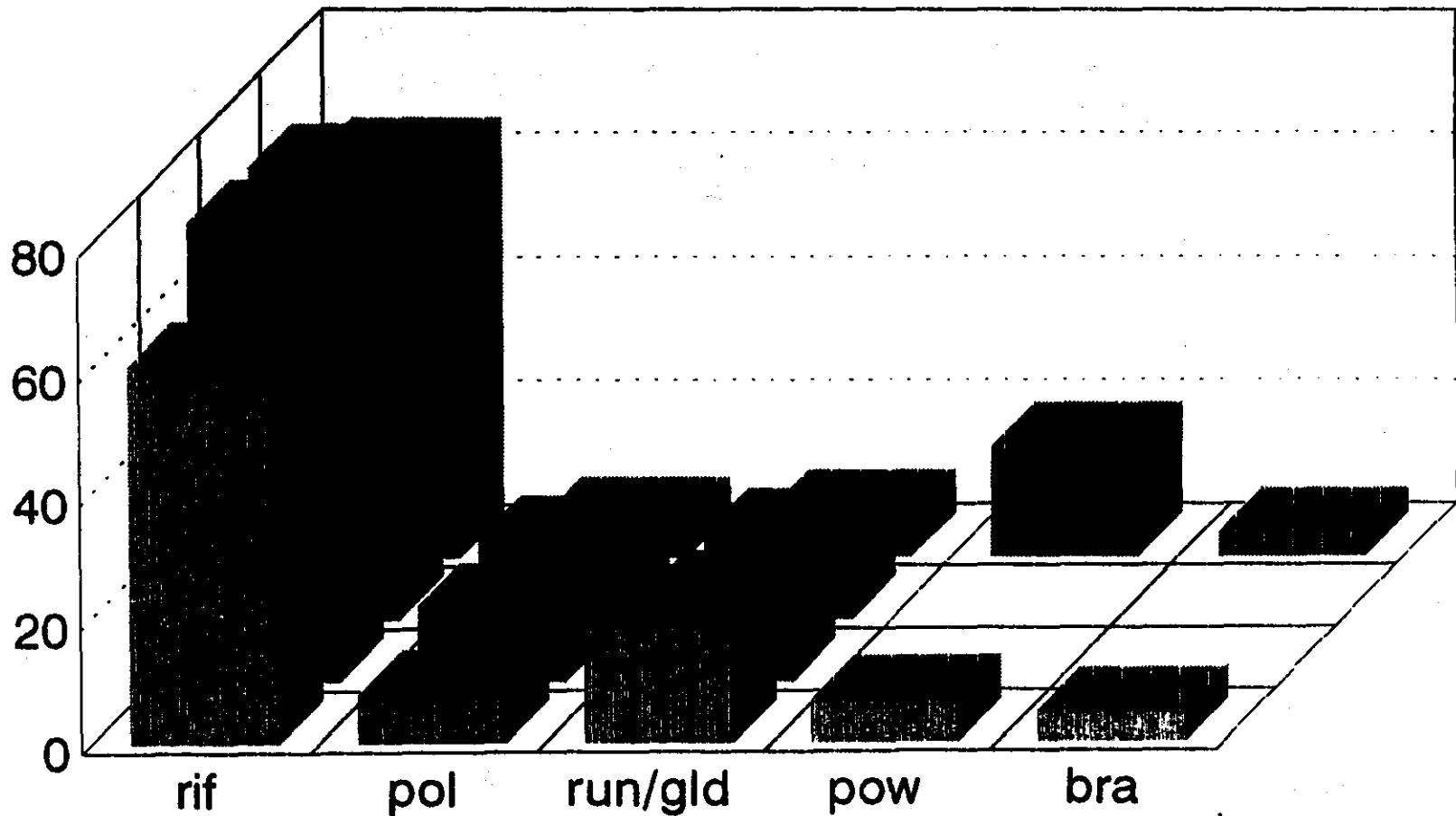
● Riffles/Runs ● Pools

N.F. Hayden Creek habitat composition, "B" type channels



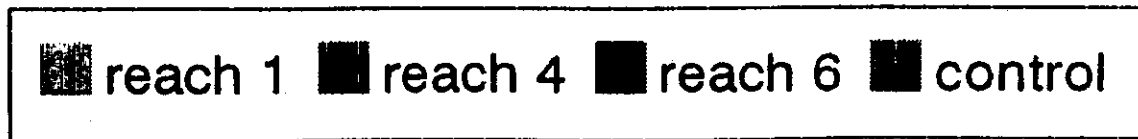
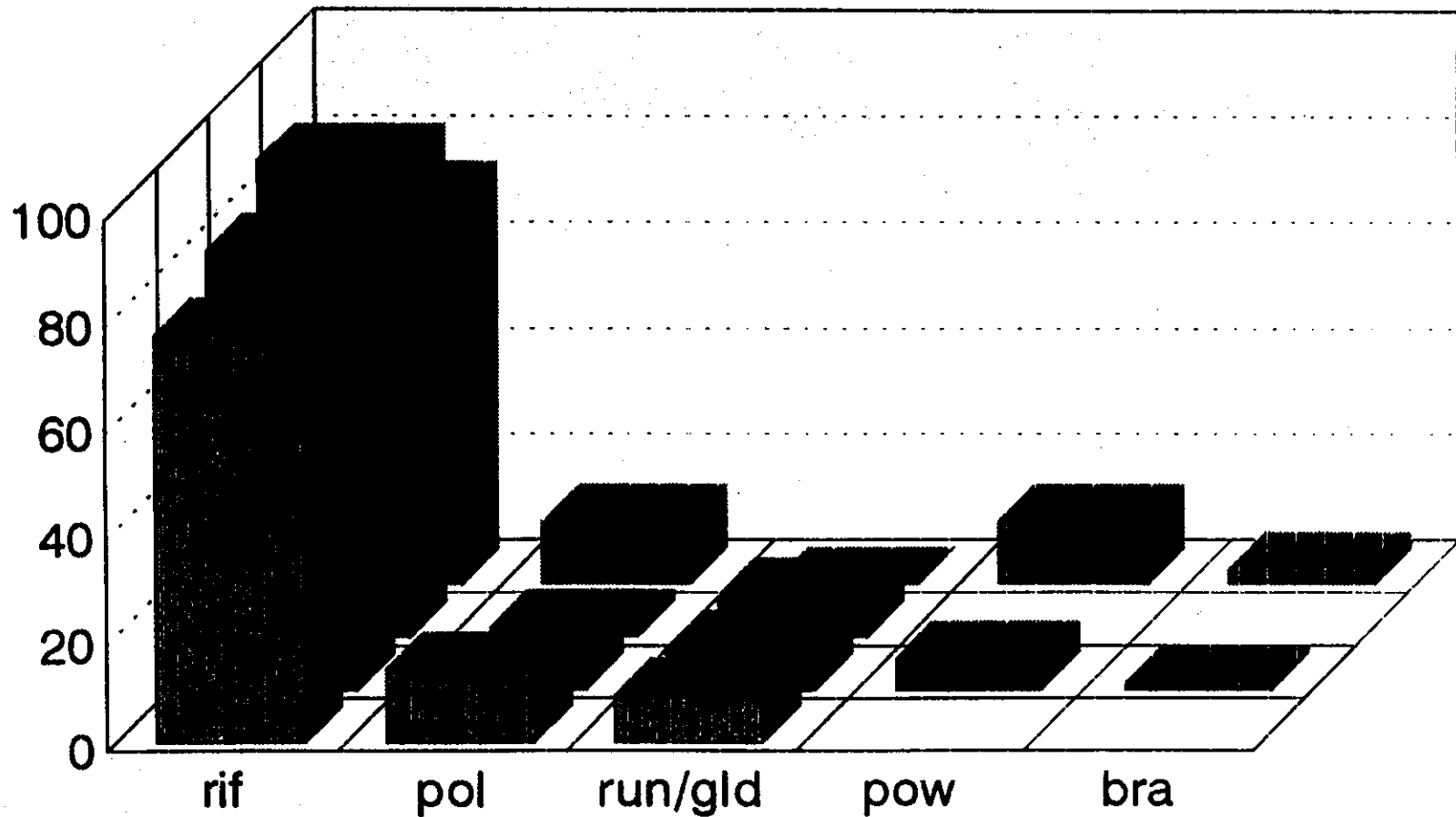
N.F. Hayden Creek

habitat composition, "C" type channels



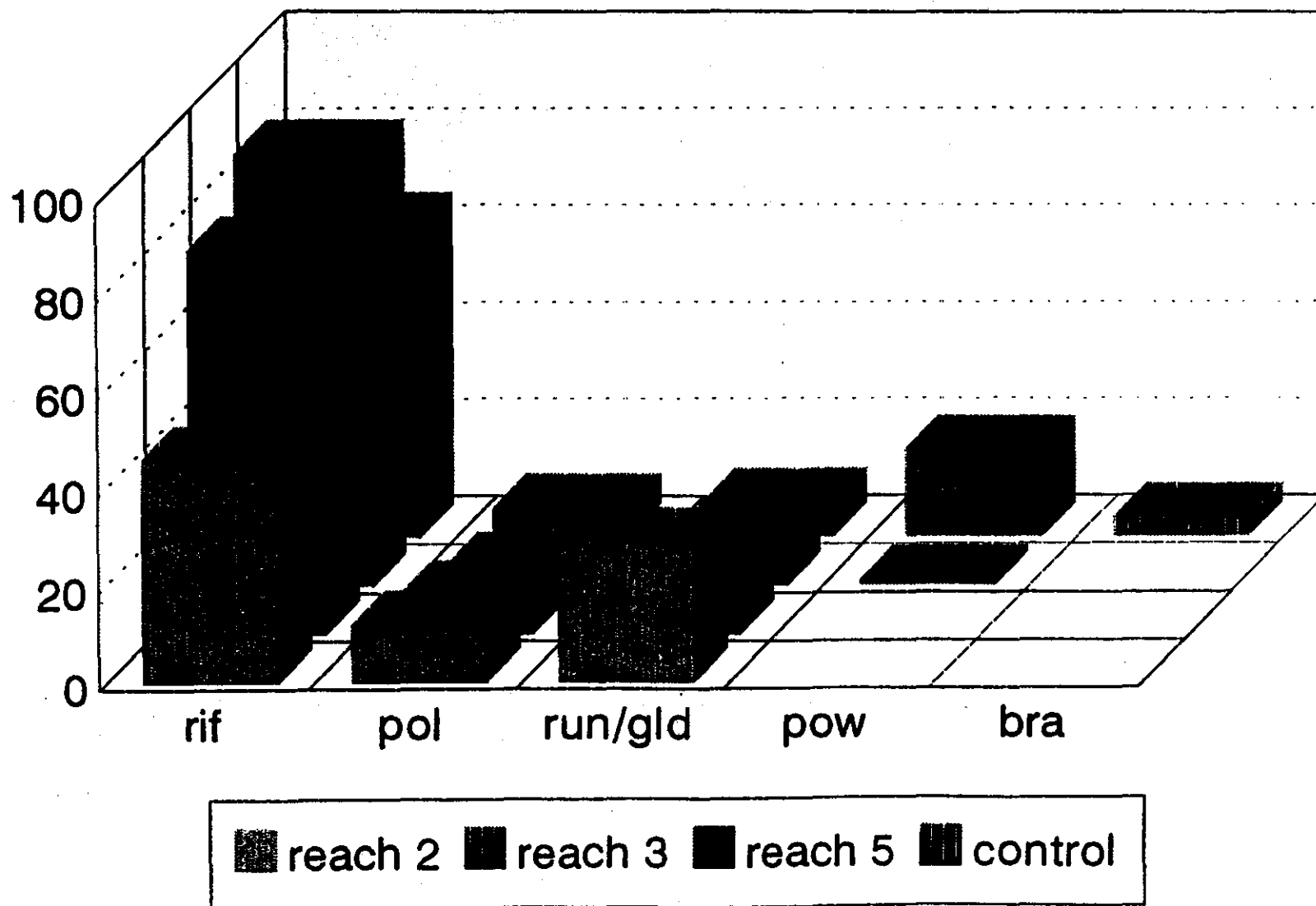
E.F. Hayden Creek

habitat composition, "B" type channels



E.F. Hayden Creek

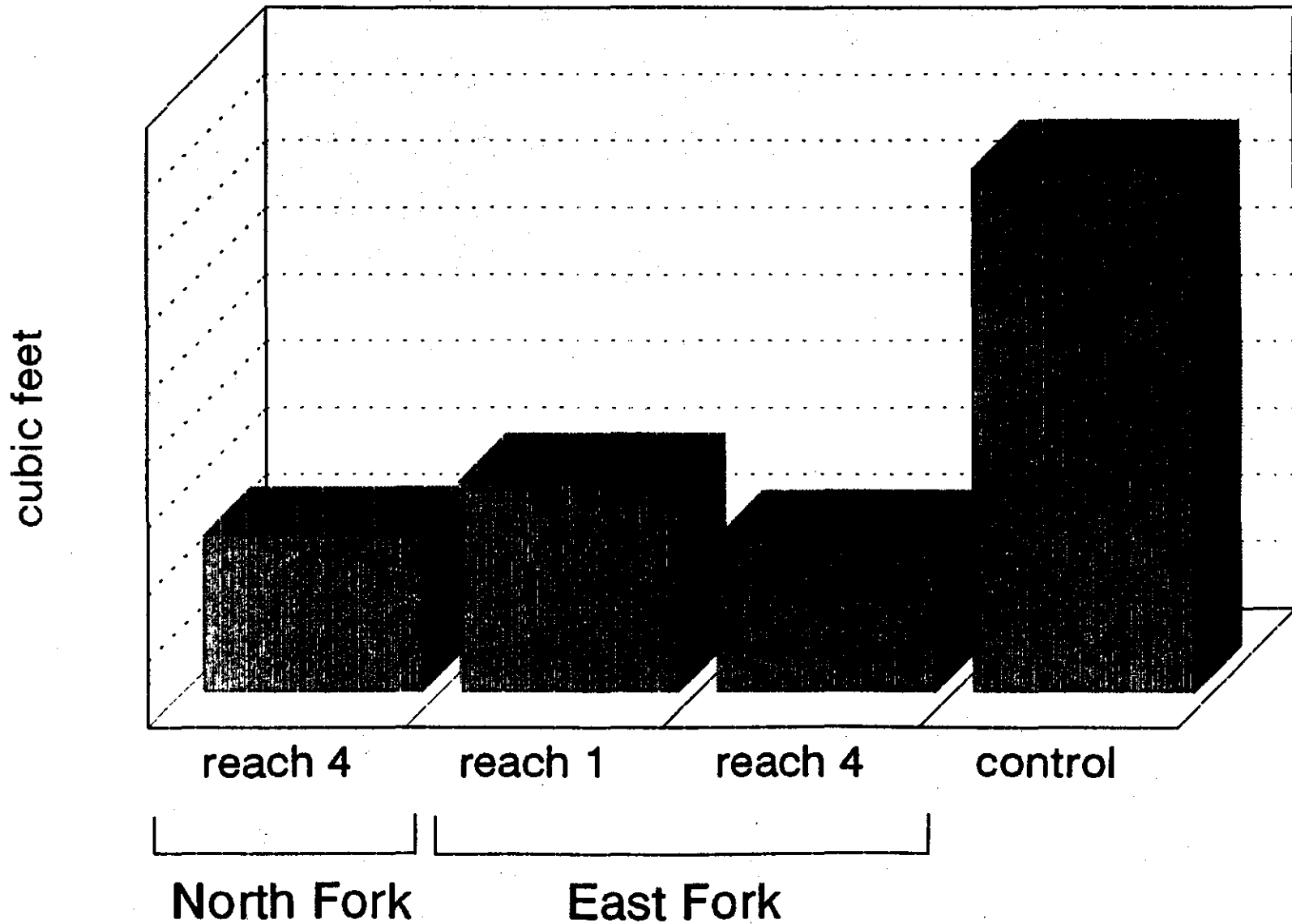
habitat composition, "C" type channels



Hayden Creek Watershed

Residual pool volumes

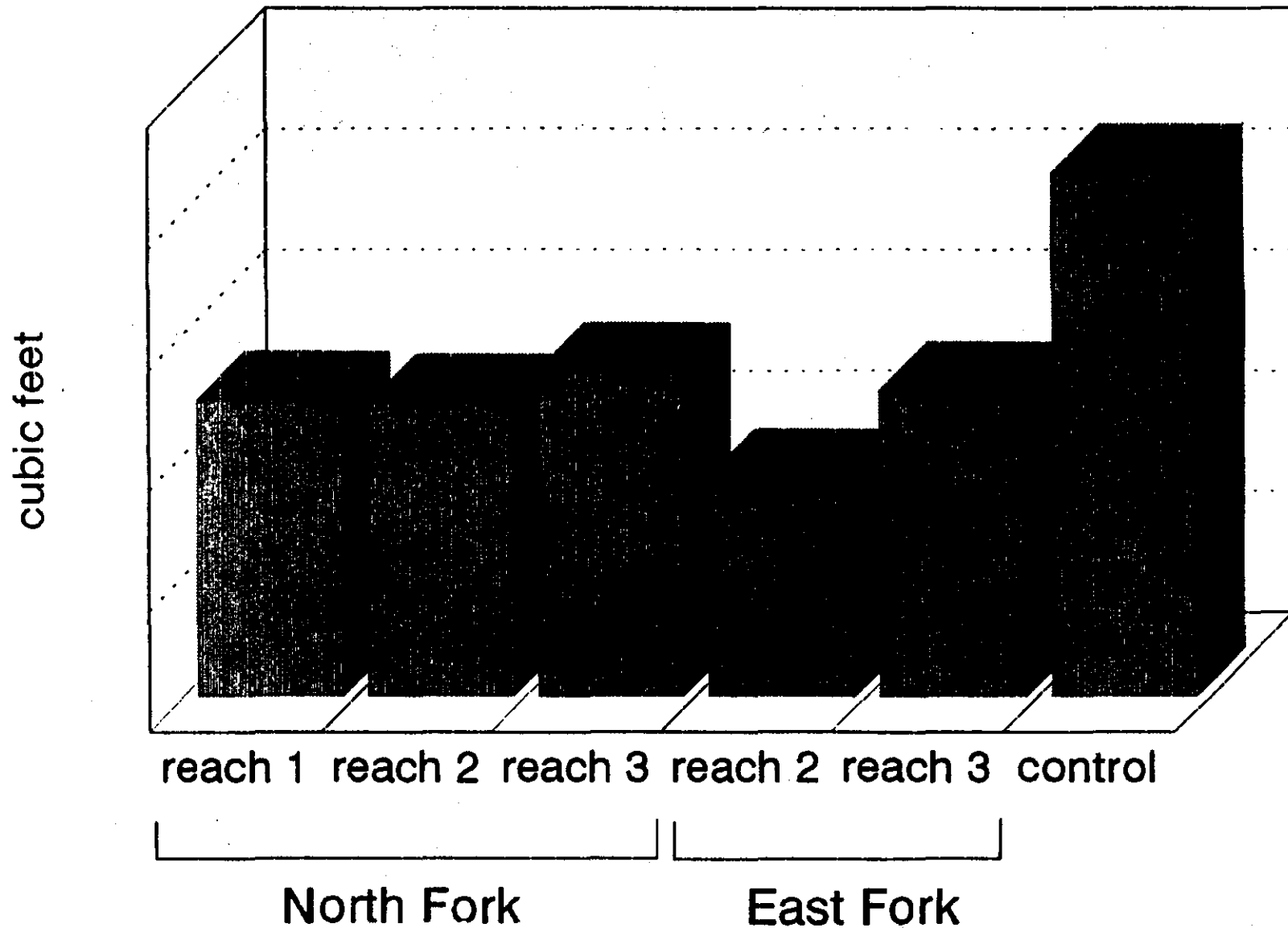
"B" type channels



Hayden Creek Watershed

Residual pool volumes

"C" type channels



APPENDIX E

Letter of Support for Numeric Sediment Standards

Hayden Lake Watershed Planning Committee
c/o Gene Abrams, Chairman
P.O. Box 2377
Coeur d'Alene, Idaho 83814
(208) 762-3200

March 7, 1994

Karen L. Gustafson
Administrative Procedures Coordinator
450 West State Street, 10th Floor
Boise, Idaho 83720

Dear Ms. Gustafson:

On behalf of the Hayden Lake Watershed Planning Committee, I would like to encourage the Board of Health and Welfare to adopt the Clean Lakes Coordinating Council's recommendations for sediment and turbidity water quality standards in lake watersheds. The proposed changes would be included in the *Idaho Water Quality Standards and Wastewater Treatment Requirements*, which were published in the February 2, *Idaho Administrative Bulletin*; a hearing is scheduled for March 22.

Hayden Lake is a high quality, recreational lake located in Kootenai County, just north of the city of Coeur d'Alene. It is an important economic and cultural resource for this community, and for the State of Idaho. There are over 1,300 lakefront homes on this lake, as well as many homes located in the nearby cities of Hayden and Hayden Lake, and in adjacent subdivisions in unincorporated areas. 85% of the lakefront residents (over 1,100 families) rely on the lake as their only source of drinking water. In addition, Hayden Lake provides recharge to the Rathdrum Prairie Aquifer, which supplies drinking water to approximately 400,000 residents of Kootenai County and the City of Spokane.

The Hayden Lake Watershed Planning Committee is developing a watershed management plan to maintain, and if possible improve the trout fishery, as well as the swimming and drinking water quality of Hayden Lake. The planning committee is made up of citizens and agency staff representing 22 different organizations. The Hayden Lake Watershed is undergoing rapid urbanization, and the lake is being heavily impacted by sediment laden runoff. Adoption of effective sediment standards is an action which has been given high priority in the draft management plan.

Though we support the sediment and turbidity criteria proposed by DEQ, we believe the broader application endorsed by the Clean Lakes Council will better protect the water quality of Hayden and other recreational lakes. Sediment and turbidity standards which apply throughout lake watersheds are needed to minimize the quantity of sediment entering lakes and help prevent further deterioration of water quality.

Attached is a copy of the Clean Lakes Council's recommendations, which we support, as well as a list of our planning committee members. As you can see, we represent a cross section of many different interests. Thank you for your consideration in this matter.

Sincerely,

Gene Abrams, Chairman
Hayden Lake Watershed Planning Committee

Hayden Lake Watershed Planning Committee

Ron Stone, Save Hayden Lake

Gerry House, Hayden Lake Recreational Water and Sewer District

Todd Walker, Hayden Area Homeowners Coalition

Bob MacDonald, Commissioner, Kootenai County

Deb Hamm, The Citizens Network For Responsible Growth

Ralph Kizer, Mayor, City of Hayden Lake

Gene Abrams, Kootenai County Board of Realtors

Jack Skille, IDHW, Division of Environmental Quality

Peggy Polichio, U.S. Forest Service, Fernan Ranger District

Chip Corsi, Idaho Dept. of Fish and Game

Pierre Bordenave, North Idaho Building Contractors Assn.

Jim McNall, Clean Lakes Coordinating Council/ Kootenai Perspectives

Dave Brown, Soil Conservation Service

Sandy Gates, Northwest Water Watch

Bud Vanderbilt, Livestock Producer/Land Owner

Dave Atwood, Lakes Highway District

Jim Colla, Idaho Dept. of Lands

Dick Panabaker, Mayor, City of Hayden

Steve Meyer, Citizen Representative/Landowner

Nick Ormonde, Livestock Producer/Aquaculturist

Buell Hollister, Kootenai Environmental Alliance

Shireene Hale, Panhandle Health District

February 15, 1994

Karen L. Gustafson
Administrative Procedures Coordinator
450 West State Street, 10th Floor
Boise, Idaho 83720

Dear Ms. Gustafson:

The Clean Lakes Coordinating Council would like to encourage the Board of Health and Welfare to adopt the sediment/turbidity standards proposed for the *Water Quality Standards and Wastewater Treatment Requirements*, as published in the February 2 *Idaho Administrative Bulletin*. These Standards were developed by DEQ staff and an interdisciplinary team of experts, and are needed to help minimize the impact of sediment on surface water quality and fisheries, and to gage the effectiveness of Best Management Practices. We do, however have a few recommendations which we believe will improve the Standards, and better protect our lakes and lake drinking water systems.

1. We suggest that the proposed turbidity standard for domestic surface water supplies (measured at the intake) be expanded to include as many lake and lake tributary systems as possible. The proposed standard applies to only 30 water bodies statewide, consisting of streams with small public water supplies (25-500 users). It excludes lake systems as well as systems used by either individuals or large public water systems. Priest, Pend Oreille, Spirit, Hayden, and Coeur d'Alene Lakes have several small, public water supplies, as well as many private systems, and all were excluded from the turbidity standards.

There are many water bodies, in addition to the 30 proposed in the Standards, which are important sources of drinking water for Idaho residents. Of particular concern are those systems located on streams, or in lakes near streams, where activities in the drainage could result in high turbidity levels at the water intake. Recent surveys conducted by the Panhandle Health District found that 85% of the people living on Spirit and Hayden Lakes rely on the lakes as their sole source of drinking water; there are no public water supplies available to these people. Many of these water sources are of high clarity, requiring minimal treatment. Without turbidity standards, it will be very difficult for DEQ to protect these water supplies from the effects of land disturbing activities in their watersheds.

It appears that private and large public water supplies were excluded from the proposed Standards due

to the difficulty associated with establishing background turbidity levels in large watersheds. This should not, however, preclude the adoption of standards for lakes, small watersheds and subdrainages of large watersheds. Rather than limit the application of sediment standards to a handful of the water bodies actually used for domestic water supply, we suggest you simply exclude the portions of rivers which are a problem. If this is not acceptable, we would suggest that the standards be expanded to include all Northern Idaho lakes and their tributaries.

2. To minimize the quantity of sediment entering recreational lakes, and prevent further declines in water quality and fisheries, we suggest that the proposed cold water biota turbidity standard be applied to all tributaries of lakes and reservoirs used or designated for a) primary contact recreation, b) domestic water supply or c) cold water biota. This requirement could be included separately, in all three sections of the Standards.

There is a clear consensus that existing water quality and beneficial uses of recreational lakes should be maintained or improved. To achieve this goal, it is imperative that sediment loading from nonpoint sources (construction, residential stormwater, agriculture, silviculture, mining etc.) be minimized.

In addition to causing lakes to become more shallow, and decreasing the clarity of the water, phosphorus attached to sediment particles fuels the growth of both attached and free floating algae. As algae concentrations increase, objectionable tastes and odors and the presence of algae inhibit the public's ability to swim and ski in the water, as well as their ability to drink the water. People may develop allergic reactions after swimming in or drinking water with high concentrations of algae. Algal metabolites can form carcinogenic compounds called trihalomethanes when chlorine is added to disinfect drinking water. High concentrations of algae can also deplete dissolved oxygen levels in the hypolimnion (deep water) of lakes, making the water uninhabitable for fish and releasing undesirable levels of hydrogen sulfide, soluble iron and manganese compounds, and organic carbon. Finally, some species of blue green algae can produce potentially lethal toxins, such as that responsible for the deaths of pets and livestock drinking from Black Lake in Northern Idaho, and Cascade Reservoir in Central Idaho.

A factor which must be considered, is that eutrophication of lake ecosystems sometimes cannot be reversed by simply controlling pollution sources. Once water quality is poor enough to impair beneficial uses, improving water quality may not be possible or may require the use of costly, technical fixes such as aerators, alum treatments, macrophyte harvest, dredging and ground water diversion. Communities nationwide are spending millions trying to regain acceptable lake water quality.

If we are to maintain current water quality and prevent costly lake rehabilitation, the water resource as a whole must be protected. Without sediment standards for all recreational lake tributaries there is no way to *prevent* degradation of water quality; DEQ can't do anything until a beneficial use is impaired. As a result, lake water quality is deteriorating. DEQ's recently completed *Idaho Lake Water Quality Assessment Report* states that primary contact recreation (swimming, water skiing etc.) is threatened for Lower Twin, Hauser, Cocolalla, Round, and Rose Lakes, and is impaired for Winchester Lake. Cold water biota (e.g. trout and other salmonids) beneficial uses are threatened for Lower Twin, Kelso, Upper Twin, Cocolalla, Hauser, Round, and Waha Lakes and Soldier's Meadow Reservoir; the cold water biota use for Granite Lake and Winchester Lakes is impaired. This report also states that domestic water supply is threatened for Hayden, Spirit, Upper and Lower Twin, Fernan, Kelso, Cocolalla, and Hauser Lakes, and is impaired for Winchester Lake (DEQ, 1993). We cannot continue

to permit lake degradation until beneficial uses are impaired and water quality is unacceptable.

Though the proposed sediment standard for cold water biota would already apply to some lake tributaries, it would not apply to the many intermittent and temporary streams in lake basins. These can also be significant sources of sediment. Unless sediment standards are adopted, and sediment loading is minimized, the water quality and cold water fishery of lakes will continue to deteriorate until they are no longer acceptable for swimming and other beneficial uses. This is in direct conflict with the Antidegradation Policy.

We suggest that the "cold water biota" sediment standard be applied throughout lake watersheds. This will help minimize sediment loading to all lake tributaries, without creating a third sediment/ turbidity standard (in addition to those proposed for cold water biota and domestic drinking water). With regard to lake water quality, there is no optimum sediment standard. The lower the sediment loads are, the better water quality will be.

3. In addition to the turbidity standards proposed for cold water biota, consider adding a cobble imbeddedness criterion (possibly based on an Interstitial Space Index), and criteria for residual pool volumes in streams. Both are important indicators of the condition of salmonid habitat and of the effects of land use activities.
4. Modify all statements to make it clear that these standards apply to existing as well as officially designated beneficial uses.
5. Consider deleting the last sentence of Section 16.01.02.200.05. which exempts suspended sediment produced as a result of nonpoint source activities, from the requirement that "surface waters of the State shall be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated or existing beneficial uses."

Attached are examples of how our suggestions could be incorporated into the Water Quality Standards. If you or the Board have questions or need further clarification on our concerns, we will be happy to discuss them with you. Thank you for the opportunity to comment on these proposed rule changes.

Sincerely,

Mr. Mike Faber, Chairman
Clean Lakes Coordinating Council

CLEAN LAKES COORDINATING COUNCIL
COMMENTS AND RECOMMENDATIONS
on the
WATER QUALITY STANDARDS
AND WASTEWATER TREATMENT REQUIREMENTS

1. Consider modifying section 16.01.02.200.05. (previously 04.) as follows:

General Surface Water Quality Criteria. Floating, Suspended, or Submerged Matter

Surface waters of the State shall be free from floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated or existing uses. ~~This matter does not include suspended sediment produced as a result of nonpoint source activities.~~

2. Adopt a sediment/ turbidity standard for recreational lakes, reservoirs and their tributaries in section 16.01.02.250.01. For example:

Surface Water Quality Criteria For Use Classifications. Recreation

d. Turbidity of waters entering lakes and reservoirs, and entering tributaries of lakes and reservoirs, designated or used for primary contact recreation, shall not exceed:

- i. Background turbidity by more than 50 NTU instantaneously, or more than 25 NTU for more than ten consecutive days.** (This is the same as the proposed cold water biota standard).

3. Modify and adopt proposed sediment/ turbidity standard for waters designated for or used by Cold Water Biota (Section 16.01.02.250.02.c.) as follows:

Surface Water Quality Criteria For Use Classifications. Aquatic Life.

c. Cold water biota: water designated for or used by cold water biota are to exhibit the following characteristics:

- iv. Turbidity, below any applicable mixing zone set by the Department, shall not exceed background turbidity by more than 50 NTU instantaneously or more than 25 NTU for more than ten consecutive days.**

- v. Turbidity of waters entering lakes and reservoirs, and entering tributaries of lakes and reservoirs, designated for or used by cold water biota, shall not exceed background turbidity by more than 50 NTU instantaneously or more than 25 NTU for more than ten consecutive days.**

4. Modify and adopt proposed intragravel dissolved oxygen standard for waters designated or used for Salmonid Spawning (Section 16.01.02.250.02.d.i.) as follows:

Surface Water Quality Criteria For Use Classifications. Aquatic Life.

d. **Salmonid Spawning.** Waters designated or used for salmonid spawning are to exhibit the following characteristics during the spawning and incubation periods for the particular species inhabiting those waters:

i. **Dissolved Oxygen**

a. **Intragravel Dissolved Oxygen.**

i. **One day minimum of not less than 5.0 mg/l.**

ii. **Seven day average mean of not less than 6.0 mg/l.**

b. **Water Column Dissolved Oxygen.**

i. **One day minimum of not less than 6.0 mg/l or 90% of saturation, which ever is greater.**

5. **Modify and adopt section 16.01.02.250.03.a. as follows:**

Water Supplies. Domestic.

a. **Domestic:** waters designated or used for domestic water supplies are to exhibit the following characteristics:

~~iii. **Small public water supplies (Surface Water):**~~

~~(a) **The following Table identifies waters, including their watersheds above the public water supply intake (except where noted), which are designated as small public water supplies:**~~

~~**Table. DESIGNATED SMALL PUBLIC WATER SUPPLIES**~~

~~(b) **For those surface water identified in Section 250.03.a.iii.(a) turbidity as measured at the public water intake shall not be:**~~

~~(i) **Increased by more than 5 NTU above natural background at comparable stream discharge when background turbidity is 50 NTU or less.**~~

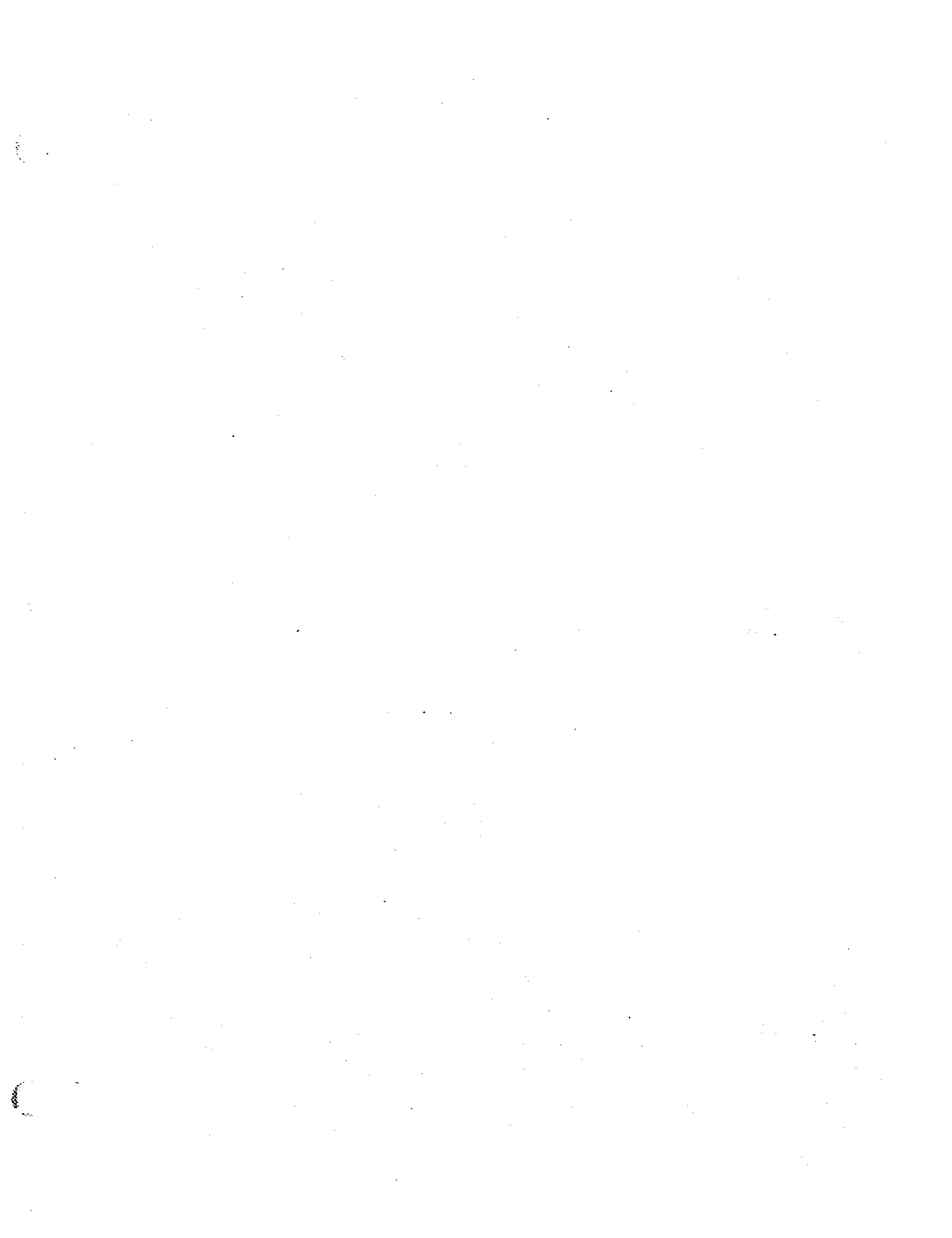
~~(ii) **Increased by more than ten percent (10%) above natural background at comparable stream discharge, not to exceed 25 NTU when background turbidity is greater than 50 NTU.**~~

~~iii. **Except for those waters identified in Section 250.03.a.v., turbidity as measured at the water intake shall not be:**~~

~~(a) **Increased by more than 5 NTU above natural background at comparable stream discharge when background turbidity is 50 NTU or less.**~~

- (b) Increased by more than ten percent (10%) above natural background at comparable stream discharge, not to exceed 25 NTU when background turbidity is greater than 50 NTU.
- iv. Turbidity of waters entering lakes and reservoirs, and entering tributaries of lakes and reservoirs, designated or used for domestic water, shall not exceed background turbidity by more than 50 NTU instantaneously or more than 25 NTU for more than ten consecutive days. (This is the same as the proposed cold water biota standard).
- v. The following table identifies waters which are exempt from the requirements of Section 250.03.a.iii.(a) and (b), due to unique geographical constraints which limit the Department's ability to establish appropriate background turbidity values.

**TABLE - WATERS EXEMPT FROM DOMESTIC
WATER SUPPLY TURBIDITY STANDARDS**



APPENDIX F

Comments Received on Draft Management Plan

July 18, 1994

Shirleen Hale
Hayden Lake Watershed Planning Committee

RECEIVED

JUL 21 1994

PANHANDLE
HEALTH

Dear Committee Members:

On behalf of all of us who drink the water from the Rathdrum Aquifer here in Spokane, from all of us who brush our teeth and swim in the Hayden Lake water and from our neighbors at the Lake who drink the water, thank you. You have done a lot of work in our behalf. For all those nights (days) when you attended meetings and researched and read and argued to produce this document, we are grateful.

Below are my comments on your thoughtful document.

p#63 Wastewater Management Actions Item Nos. 1 and 2

We have a "working" septic tank with dry well built in the '60's. We have had a gentleman from Panhandle Health walk our lots to try to find a suitable site to bring us into closer compliance. We'd like to be a better neighbor to the Lake, but he couldn't find a suitable site. The one available lot that would work is priced at \$60,000. A satellite community sewage system is also not an option. Any suggestions? What should we do if it ever fails? We want to be good stewards but would also like to help our children through college...

Item No. 3

Figure 2-9 shows Residential Stormwater as contributing 32% of the phosphorous sources. Even though the chart on the following page (*Stormwater and Erosion from Future Development Management Actions*) addresses this issue, I think this should be the #1 Management Action. Your work states that the damage from new construction allowed by sewer is even worse than the damage done from existing older septic systems, so No. 3 should be first on this list. (Am I right in thinking that it is more important that I don't ever build a garage than I do replace the existing "working" septic tank system?)

pp#65-66 Stormwater and Erosion from Future Development

This is very impressive and hard to swallow but it does seem to offer great promise for keeping the Lake healthy. I would encourage you to adopt these measures. We will all have to compromise our desires for lakeside conveniences for the greater good of clean water and a clean aquifer.

p#67 Stormwater from Existing development (excluding roads)

More information would be very helpful. I wonder... "*should I be using oil-based paints?*" After reading this I now know I shouldn't consider sealing the dock deck.

pp#71-72 Runoff from Timber Land

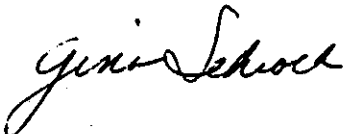
I am particularly impressed with items 9 thru 14. We have a neighbor who wasn't required to get a logging permit because he said he would only be taking out a few thousand board feet to check out possible home sites. He took out 40,000+ and left slash everywhere and logged right next to Class II streams. Erosion was everywhere. I think you should be able to put a lien on property, assess huge fines, etc. This kind of blatant misuse of the land under our stewardship should not be tolerated.

pp#74-75 Miscellaneous

On larger lakes in the area people can successfully "cove out" in their sailboats, etc. because they have holding tanks. This year I have seen people "coving out" but they jump onshore and run up into the woods to take care of their bathroom needs. Two years ago, in another low-water year like this one, some boaters set up camp below the high water line. (Property owners only own down to the high water line.) There were a couple of places where camps (aluminum chairs and other equipment) remained on site all summer. But these folks also run into the woods, above the high water mark, with their toilet paper in hand. As the density in the area increases, I fear this practice will also increase. Could you please address this issue!

Thank you again for your concern for the water quality and for taking even more time to read these comments

Sincerely,



Gina Schrock

Gina and Larry Schrock
(Windy Bay, Hayden Lake)
1027 E. 26th Ave
Spokane, Wa., 99203

July 9, 1994


JUL 12 1994

To: Shireene Hale, Panhandle Health District
Hayden Lake Watershed Planning Committee

**PANHANDLE
HEALTH**

Subject: Draft Hayden Lake Watershed Management Plan

From: Marilyn Montgomery



My husband and I moved to Idaho from Atlanta, Georgia, seven years ago. We were thrilled to acquire 26 acres of land overlooking beautiful Hayden Lake. From our home on the southeastern side of the lake we look out over a panoramic view--forests of cedar, tamarack, hemlock, and fir, the lake itself, and the mountains beyond--from two sides of our house. It's a colorful and constantly changing picture, and we never tire of looking at the magnificent scenery around us.

And yet as I drive through our neighborhood, and walk my dog along the roads, I am frequently amazed to see what is allowed to happen to the land around this lake. Most people choose to live here because of the natural setting. But all too often I see lots being cleared in the most insensitive and brutal manner that one can imagine. Big machines come and rip out all the trees, tear off the topsoil, and gouge out the earth to make a flat uninteresting place for a house. People who care about our quality of life object to these projects, but nobody seems to be able to do anything to prevent them.

So I was very glad to see the newspaper article last Sunday about a plan being drafted to safeguard Hayden Lake and prevent these environmental tragedies from ever taking place. I have read the plan, and I wish to commend the effort, and add a few suggestions of my own.

First, I see four major areas of need: **Public Education, Legislation, Enforcement, and Funding for Improvements.**

Public Education: Information materials should be developed and distributed to homeowners and renters around the lake and its drainage area, as well as to builders, boaters, woodcutters, landscapers, and other users such as RV drivers and campers. The existing report is excellent, and comprehensive, but is too technical to be distributed to the general public. For example, on page 13 the expression "epilimnetic residence time ← greater than 6 months" is used. Does this mean "people living around the lake most of the year?" I had to read for half an hour in order to figure out that phosphorus comes mainly ← from fertilizer, and that that is the reason why we should use natural vegetation around the lake (as opposed to lawns, I suppose, though that is never stated).

An example of clear and understandable language is in the first paragraph of page 27. Incidentally, the erosion problem was obvious to me, but I didn't know about the fertilizer problem until I read this report.

So I think someone needs to produce a document that is persuasive and easy to read, to be sent to all the people who need to understand the issues. In addition, a videotape or slide show should be made available for presentations to groups such as school groups, civic groups, professional organizations, etc. These public information materials should be written by someone who knows how to communicate with the public.

When addressing the people of Hayden Lake and its surrounding areas, we should stress the following points:

- 1) the beauty of Hayden Lake
- 2) purity and quality of drinking water
- 3) recreation
- 4) pocketbook issues
 - b) risk of declining property values
 - c) future clean-up costs.

Legislation: I am no legislator, but I rarely miss an opportunity to vote, and I would be glad to vote for an environmental law for the benefit of Hayden Lake and all of our lakes and rivers.

Enforcement of Standards: I would like to see a plan that takes place in stages. First, inform everyone who needs to be informed about the steps that are going to be taken. Second, notify transgressors that they are out of line and need to take steps to correct a problem by a certain date. Third, if the problem is not corrected, a disciplinary action should follow.

There should be an established procedure for emergency action. Within the last month, for example, a lot right on the south edge of Hayden Lake was cleared down to bare dirt in about two days. At this point, I still have no idea if there was anything I could have done about it, even though I wondered if there was some possible action. I think we need to be sensitive to people who make their living from building, but don't builders have licenses? Some of these licenses should probably be taken away.

Regarding the actions recommended in the report, I can only say yes, yes, yes, to the following: page 66, 6.f, g, and h. (Citizens block watches and fines against excavators who create erosion into the lake). Page 66, 7 and 8. Page 68, 1, 2, 3, 4, and 5. Page 69, 1, 2, 3, 4, 5, and 6. These are all good plans of action.

Funding for Improvements: There is a genuine need to do something about the terrible roads in this area. What about a Local Improvement District? We are tired of seeing our property taxes go up and up without any improvements being made in the Hayden Lake Area. Half-Mile Lane is a steep, rutted unpaved road that actually aims toward the lake and is getting worse every year. Much of Upper Hayden Lake Road is unpaved and used more heavily each year as more homes are built. Clarkview becomes almost impassible at times every year. Let's get these roads paved!

Once again, this report and the effort involved are commendable. Now let's take the next steps: **Inform and educate the public.** Thousands of people are interested in keeping Hayden Lake beautiful and pure, and would take steps if they knew what to do. **Legislate some standards. Find some funds for improvement. Notify and warn violators. Take disciplinary actions if all else fails.**

July 29, 1994

Ms. Shireene Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, ID 83814

Dear Ms. Hale:

I have concerns about the Draft Hayden Lake Watershed Management Plan. I own property on Hayden Lake, and I believe that the Plan will adversely impact my ability to utilize my property and will negatively affect the value of the property.

I am associated with the natural resource industry, and I am familiar with the development of the antidegradation agreement and the implementation of best management practices for nonpoint source water and sediment control in natural resource utilization. I further support the development and implementation of necessary and achievable water quality standards which allow the utilization of natural resources while providing a level of protection for Idaho waters which the legislature deems appropriate. I believe that the Plan is overreaching in its goals and in the means of achieving those goals.

We must recognize that the utilization of our natural environment results in a decision to accept an alteration to that environment. For example, some of the shallow areas of Hayden Lake are due to the construction of a dam in 1911; a decision was made to construct the dam, and I doubt that the community today would recommend removing the dam to return the lake to its earlier form. We have also elected to conduct timber management and agricultural activities in northern Idaho and the watershed; I would not recommend discontinuing those activities. And, for the past nearly one hundred years, we have accepted the development of private dwellings in the Hayden Lake watershed and particularly near the lake. Such activities are the basis for the quality of life that we have enjoyed in the area.

With increasing pressure on our natural resources, we need to be more concerned with the impacts we have on those resources. Thus, the U.S. Congress and the State of Idaho have responded with various environmental laws. I support the laws, but will continue to work with the political process to change those I believe are unnecessary or overly restrictive. I therefore appreciate the opportunity to comment. However, since it appears that the document was prepared outside the process authorized by the State of Idaho (i.e., the Clean Lakes Coordinating Council), I am concerned about whether or not the "citizen/agency committee" will be following the administrative procedures outlined by the State. I am aware of the activities of the CLCC, and apparently the Hayden Lake Plan has not been a part of their agenda, at least recently. I do note that the Hayden Lake Plan was prepared by Panhandle Health, who also provides

support to the CLCC. I further note in the Plan Implementation section that the "Clean Lakes Coordinating Council and the Idaho Conservation League will also be invited to participate in supporting implementation of this Plan." I simply do not understand why the Plan was prepared outside the purview of the CLCC, and why the ICL is specifically identified since most of the land adjacent to the lake is privately owned. The tone of the Plan certainly leads to speculation about a hidden agenda of some of the preparers of the Plan.

My technical concerns with the plan stem from the fact that the plan seems to be prepared with limited site specific data and with no basis for development of many of the recommendations. Specifically, "The stormwater phosphorous load to Hayden Lake was estimated using export coefficients from the literature." The Plan estimates that 32% of the phosphorous load is from residential stormwater (Figure 2-9). The recommendations for management action (p. 65) indicate that a 75 foot (horizontal) set back, plus any additional buffer someone decides is needed, is necessary to reduce the phosphorous loading. The phosphorus quantity is estimated, and there is no scientific basis given for the determination of the set back proposed in the Plan. It appears that it is simply speculation on someone's part. By developing an ordinance or regulation based on conjecture is wholly inappropriate and not responsible to landowners in the area nor the taxpayers who apparently have unknowingly supported the preparation of the document. More appropriately, the method by which a sediment or phosphorous standard is achieved should be left to the landowner. There are many means for achieving the results, in addition to the set back, and likely many more will be developed in the future.

The Plan also discusses the concern about erosion from steep slopes, which are common around the lake, and recommends that development be restricted on some sites. Again, the Plan is being heavy-handed. The County "recently adopted a stormwater and erosion control ordinance which requires control of erosion during construction..." (p. 46). I suggest that there are requirements already in place requiring erosion to be addressed, at least during construction. If erosion control is required beyond what the existing ordinance requires, the standards to be met should be specified and the landowner have the option of the methodology by which they are achieved. Unilateral restrictions on utilization of property because it is the easy way to regulate is wholly inappropriate.

There are numerous statements through the Plan which indicate more regulation of activities is required, but further reading reveals that there are ordinances on the books which are not presently being enforced. It would seem that if an ordinance is not working, it would be appropriate to first evaluate whether the law needs to be modified or some other action taken to achieve compliance, then see what the results are before passing new laws or ordinances. Apparently there is a shortage of staff for enforcement; passing more ordinances in a region that is already bearing a heavy tax burden would not resolve problems. Perhaps new ways to provide compliance with existing ordinances and laws should be pursued instead.

There are several other action plans (recommendations) which I would like to identify and comment on individually. The action plans show a focus on attempting to limit growth,

rather than providing protection of the watershed and the lake:

"Adopt a regulation requiring that there be no net increase in contaminant loading (phosphorus, nitrate, bacteria, viruses, etc.) to the lake as a result of sewage system installation and subsequent development." (p. 64) -- This action plan effectively limits growth because it essentially requires someone else to reduce loading to the watershed in order to allow another to develop his land. If there is a problem with a specific septic system, or with fertilization of yards, or with hobby farms, those issues should be addressed under current regulations and ordinances. Since loading is only estimated grossly from literature unrelated to the watershed, rather than from actual watershed data, it is unreasonable and inappropriate to recommend such a drastic step as no further development. Incidentally, there is no data in the Plan which shows the present baseline for viruses from septic systems, and very limited data on bacteria (which shows no problem), so how can a net increase be measured?

"Adopt additional erosion control and stormwater treatment requirements for the Hayden Lake Watershed including no net increase in phosphorus regulations for stormwater from new development." (p. 66) -- Same comment as above. In addition, I recall that the water of the lake belongs to the State. It also is my understanding that it is the province of the DEQ to propose and the legislature approve water quality standards for the lake, not Kootenai County or the Panhandle Health District.

"Restrict development on sites too steep and/or erodible for effective erosion control." (p. 65) -- The note for this Action Plan indicates that building permits would be denied for lots which in someone's opinion are too steep or the soils too erodible for effective erosion control. Having worked in the natural resource industry, I understand that there are very few sites which would fall into this category, assuming there is a wide range of erosion control activities available to the site development architect. The focus is misdirected in any event; the direction should be towards the compliance with water standards which are set by the state rather than prohibiting a specific activity which has not been shown to cause a problem.

"Enforce long-term maintenance of vegetative buffers and other stormwater treatment systems." (p. 66) -- As has been discussed earlier, the vegetative buffer proposals have not been shown to be appropriate. Further, there are other means to control stormwater and nutrient loading other than vegetative buffers. The note which further explains this item indicates that it may be appropriate to place a lien on the property "if necessary" to enforce compliance. This is a very dangerous intrusion into the area of private property rights, and should have a full public disclosure before considering it, recognizing that the result would likely be significant litigation costs to the county if it were adopted.

"Improve State Water Quality Standards to make them easier to enforce and more effective at protecting water quality and beneficial uses..." (p. 74) -- State water quality

standards are the responsibility and authority of the DEQ; the Kootenai Environmental Alliance, the Idaho Conservation League, the Save Hayden Lake, and the Panhandle Health District would have the opportunity to comment on the regulations in the administrative procedures process the same as everyone else in the State.

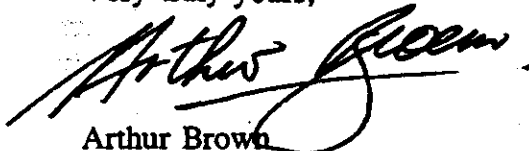
"Nominate Hayden Lake as an Outstanding Resource Water and/or Stream Segment of Concern." (p. 74) -- The document indicates that Hayden Lake is in reasonable good condition. To nominate it as a stream segment of concern is simply corrupting the process which was established to identify stream segments in the state where there is a significant problem. Otherwise, the listing is of little meaning. Further, the Outstanding Resource Water designation was set up to recognize the significant waters of the State. As suggested here, the process is being used for political means instead. The Henry's Fork had not been nominated the last time I looked, and it is recognized as a truly outstanding stream. Only where there has been an orchestrated effort to restrict development have streams been nominated, as suggested in the Plan.

"Develop shoreline/viewshed building and development design standards, addressing building size and materials, vegetation removal and planting, and minimization of lighting." (p. 75) -- These proposals are for aesthetic reasons only, and have no business in this "Watershed Management Plan". The attempt is for some individuals to restrict the rights of others on private property. This is a taking issue which will result in significant litigation expense for the county. Such proposals need thorough public review. But the question is, what is an undesirable view? Who makes the decision? And, the regulations will need to be uniform throughout the county, not just the shore of Hayden Lake.

Thank you for the opportunity to comment on the Plan. I only have been able to conduct a quick review and believe that hearings on the Plan and opportunity for further public input should be given. As you can see from my comments, I believe that the Plan makes significant intrusion into private property rights with no clear need to do so. As I'm sure you know, the U.S. Supreme Court has made it clear in its recent rulings on "takings" that governments can not summarily devalue private property without reimbursement to the owner.

I believe that a large number of people will share my concerns if they have the opportunity to review the Plan. At a minimum, you should extend the comment period at least 90 days prior to taking action on this very important matter.

Very truly yours,



Arthur Brown
P.O. Box 1290
Hayden, ID 83835



A Pioneer Company
PIONEER TITLE COMPANY
OF KOOTENAI COUNTY
100 Wallace Avenue, Coeur d'Alene, ID 83814
208/664-8254; 208/664-9479 (FAX)

***** FAX COVER SHEET *****
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Date: 8/1/94

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TO... RE: _____

Name: Shireene Hale

Company: Panhandle Health Dist.

Fax Number: 664-8736

FROM...

Name: Dirk Scott

Department: Manager

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North Idaho Building Contractors Association

2915 E. Seelice Way • Post Falls, Idaho 83854 • (208) 773-2021 • FAX (208) 773-0245

August 1, 1994

Shireene Hale
Panhandle Health District 1
2195 Ironwood Court
Coeur d'Alene, ID 83814

Dear Shireene:

The North Idaho Building Contractors Association (NIBCA) applauds the efforts of the Panhandle Health District on the Draft Hayden Lake Management Plan. One of the primary goals of the NIBCA has been to promote quality growth in North Idaho. Quality growth most certainly includes maintaining high water standards in precious lakes. However, quality growth also includes stable economic growth. It is imperative that North Idaho's robust economy be maintained.

While we would have preferred to have a greater length of time to be able to discuss, at length, the proposed Hayden Lake Water Shed Management Plan with the rest of our general membership and at subsequent committee meetings, we have been able to formulate some of our thoughts.

We wish to go on record as stating that we, as all citizens, are very interested in maintaining, and even improving, the water quality in Idaho, more specifically, Hayden Lake. Water quality is something that affects us all and needs to be protected. We share with you the same responsibility, incumbent upon all citizens, to protect same.

We do give our congratulations on all the hard effort that has gone into the preparation of this document. We do, however, have some questions concerning the statistical data and some questions concerning whether this is a complete and exhaustive study on the subject. It would assist us greatly if we could find out if this was based upon a grant, how much the funding of the grant was for, and what the purpose of the grant was.

STAFF

Anne Blodgett
EXECUTIVE
OFFICER

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Shireene Hale
August 1, 1994
Page 2

While there were many different sites given within the purview of the document, we respectfully do question whether this is a scientific study or not. In fact, it is our feeling that it is not. We look at this more as a research document, as opposed to a formalized study, which is a very important distinction in the sense that, if it were a scientific study, the results could be conclusive.

While the goal of clean water is something that we all hold dear, we believe that a no net increase of phosphorous materials is not a reachable goal, nor a realistic one. For example, it is difficult to always ascertain where the phosphorous materials which produce contaminants have originated from. We believe that if the study were done, there would have been a dramatic increase in phosphorous materials at the time of the Mount St. Helen's volcanic eruption in 1981. This example shows that, if the goal was to have a no-net increase, that something beyond developers' control, beyond the state's control, beyond the federal government's control, happened. It was an event which no one could foresee, an event which is unpreventable. We are concerned that these unpreventable events, these unforeseen circumstances would, at that time, trigger a moratorium if this document and/or regulations were passed into law and if the no-net increase is the goal and guideline.

Furthermore, just like there are life cycles in human beings, animals, and plants, there are also life cycles in lakes. All lakes have a certain degree of aging, and while we would like to slow down the aging process, it is impossible to stop. All things age and eventually die, and in this case, through eutrophication. Furthermore, this research document states that the phosphorous buildup is only a recent event, being in the later 1980's and early 1990's. That is not factual. I have personally observed phosphorous contamination and phosphate buildups which were visibly observable as early as 1980.

On page seven of the document, and I quote, "The storm water phosphorous load to Hayden Lake was estimated using export coefficients from the literature. The developed portions of the water shed were divided into three categories, based on housing density." It further states, in the document, later on, that you are unsure as to how many houses have been built through the 1980's, which tells me that you are unsure of exactly how many houses exist on Hayden Lake at this current time, or at any other point and time in history. In fact, the estimate was between 1,100 and 1,300 houses. That is a 200-point spread, which is a rather large spread and shows a lack of documentation.

Shireene Hale
August 1, 1994
Page 3

We would like to specifically start with our discussion concerning the 75-foot natural setback which is being proposed. On page 65, under paragraph three, it states, "Increased surface water setbacks, in conjunction with native vegetation buffers, require a minimum 75-foot horizontal zone of undisturbed vegetation next to the lake and its tributaries, plus any additional buffer needed to ensure that there is no net increase in phosphorous loading from the development." First of all, on that issue, we would like to say that a 75-foot setback is onerous if the lot is only 75 feet deep, to start with. This, in effect, would put a moratorium on any building on that lot and would, in essence, be a taking, without compensation, of that piece of property by this piece of proposed legislation.

We do not have a problem with the 75-foot setback if the lot is large enough to accommodate building and/or other types of activity which would be normal for a lot owner. The only exception we would have is if trees or any other type of natural vegetation cannot be disturbed within that 75-foot setback, that it may still render the lot unbuildable even if the lot, for example, were 600 feet deep due to the fact that there may be total visual obstruction of the lake. That would need to be stressed as an exception to the rule. Furthermore, we find it very unpalatable that, in the rest of that comment it says, "...plus any additional buffer needed..." which would, in essence, leave an open policing power which could essentially decimate private property rights.

We believe the more appropriate thing to do would be to provide some type of standard of mitigation which would allow construction. This mitigation would need to be tied to the sponsor being able to provide to you what the proposed mitigation is for your approval. This approval would need to not be unreasonably withheld, and the burden of proof would be upon Panhandle Health District or DEQ to state that the mitigation is inadequate and why, backing that up with hardcore data.

Further, on page 65, paragraph five, where it states, "Remove exemptions from Kootenai County's Erosion Control Ordinance, utilities, individual building sites...." We would ask you to strike that entire paragraph as being, again, too restrictive, violating private property rights, and an illegal taking without compensation.

On page 66, paragraph six, sub-paragraph "F," I quote, "Organized citizen block watch-type program to inspect construction sites." We believe that this is totally inappropriate, the first point being that citizens are not qualified or competent to inspect

Shireene Hale
August 1, 1994
Page 4

construction sites. Secondly, citizens are without authority to go onto, to encroach, or to inspect construction sites. Thirdly, we would not want our government participating in or organizing citizens against particular construction sites. We believe that this would be the encouragement.

Furthermore, on page 66, in that same paragraph six, we are finding that it states there that you will provide staff dedicated to erosion control, provide adequate staff to conduct on-site inspections, and provide enforcement staff. We believe that this is a further expansion of the bureaucracy which we believe would be both costly and unwarranted. We believe that the current staff of Panhandle Health District should be sufficient at this point in time to carry out these edicts. To have further policing powers at the expense of taxpayers is not reasonable, in light of current budget constraints throughout state, county, and local governments.

Page 69, paragraph three, sub-paragraph "A" - retrofit existing roads with storm water treatment systems. We would ask that you either delete that or be more specific and define storm water treatment systems. This, again, could be too restrictive. We are unable to tell because there are no specifics given in this particular case.

We believe, furthermore, on page 66, paragraph nine, it should be deleted where it states, "Implement seasonal building restrictions for sensitive high-impact sites." Again, not defined: seasonal building restrictions, high-impact sites.

Page 67, item 1.A, "To directly prohibit construction in inappropriate areas, erosion risk needs to somehow be predicted before a building permit is issued and before the site is disturbed." We are concerned with, again, that this would elicit a building moratorium without studies being done, without documentation, without being able to have a methodology to predict site disturbance (as in your own statement, it says, "somehow be predicted"). Again, to directly prohibit construction without some type of due process system, we believe, again, is onerous.

While we believe something needs to be done about the phosphorous loading in Hayden Lake, we feel that the idea is not to estrangulate private property rights. We also believe that we need to work together to accomplish this goal and task. Some of the things which have not been mentioned, that are very easily done, is to ban the sale of phosphorous-containing soaps, dishwashing detergents, and different types of detergents within

Shireene Hale
August 1, 1994
Page 5

Kootenai County. It has already been done in the City of Coeur d'Alene. Furthermore, we say that there has been no analysis on the Mount St. Helen's volcanic eruption in 1981, which was certainly a factor.

We do think that many of the concepts are sound and are correct. For example, on page 66, paragraph seven, "...work with landowners to voluntarily reduce development of sensitive, high-impact sites, steep, erodable, near water." We definitely agree with this statement, but, again, it needs some definition. It needs some clarity to it, it lacks scope and authority. We see, also, in sub-paragraph "B" of paragraph seven, "...purchase development rights in sensitive high-impact areas." Again, this is not a violation of taking in this case; this is the right way to do it -- to purchase those development rights yourself, rather than inhibit and take those from the property owners.

Furthermore, these satellite sewer systems in the water shed. Those, again, are good and viable ideas which we would be in full support of. We do not believe that this document is not a good document, but we believe that there are things here that need to be further studied, defined, and discussed.

As an organization, we further find objectionable the list of people who, you say, helped author this document. You have listed Pierre Bordinave, as a representative of the North Idaho Building Contractors Association. Pierre is not even a member of our organization and is saying things and speaking without board authority. In fact, we absolutely demand that his name be removed from the document as being a representative of the North Idaho Building Contractors Association, and we take exception to that. In fact, we ask that this document be replaced as our comments. We are not in support of this document, as it currently stands and ask that there be further hearings and further revisions.

We would further ask that, when evaluating a building site for building permit purposes, in light of this document, that the burden of proof be placed upon Panhandle Health District to prove that the particular construction will, in fact, cause phosphate loading; will, in fact, cause damage and utrification to Hayden Lake; that that burden of proof is upon the state, through scientific study and through full scientific evaluation. The burden of proof is not upon the sponsor, and we would state that that be specifically placed in this document. It would be unfair to stop building sites, to stop builders, to alienate property rights, and to alienate people, based upon supposition and guesswork.

Shireene Hale
August 1, 1994
Page 6

Concerning going through and replacing septic tanks, we would like to pose a question: If construction and cell disturbance causes phosphate loading, erosion, and substandard water qualities, then certainly going in and disturbing septic sites, which are deficient already -- would that not also cause further erosion, phosphate loading? We would like some further clarification on how you would go about this. While we think the theory is sound, the actual practicality of it has some serious problems, and we would ask that you address that.

In conclusion, we would like to state that we wish to have further input into this process. We believe that more work needs to be done, we believe that some actual scientific studies need to be accomplished -- some new ones, not some old ones in 1977 and 1985, which were inconclusive.

Furthermore, we do believe that there needs to be an actual representative of a truly diverse cross-section of this society in giving input into this process. We believe, further, that you should look at the Lake Erie model. Lake Erie was almost virtually a dead sea and has since come back to be one of the most vibrant and vital fisheries within the United States. Nearly none of the procedures and policies which brought Lake Erie back are being proposed here. While we believe that the cause is just, and the theories are sound, we would again ask you to take more time to look into this document and to allow all of us more time in the process to give more cogent comments. We thank you for allowing our input.

Sincerely,



Dirk Scott, Co-Chair
Governmental Affairs Committee



John Lasher, Co-Chair
Governmental Affairs Committee

DS/JL:pc



United States Department of the Interior RECEIVED

U.S. GEOLOGICAL SURVEY
Water Resources Division
1500 Highway #2
Room 336, Federal Building
Sandpoint, Idaho 83864

JUL 20 1994
PANHANDLE HEALTH DISTRICT 1

July 19, 1994

Shireene Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene ID 83814

Dear Shireene:

I have reviewed the draft Hayden Lake Management Plan. I think you, PHD, and the citizen's committee have done an excellent job, and that the document will serve as a useful framework for managing Hayden Lake water quality. I urge you to continue your efforts for other area lakes, and I continue to offer my assistance where appropriate.

I have only one substantive comment, regarding the statement that I support the use of average values in formulating the goal statement for Hayden Lake. As you recall, on several occasions we discussed the merits of using the mean, median, or geometric mean of the 8-9 years of data available for Hayden Lake. In general, for small data sets having a relatively wide range of values, the median may better reflect so-called "average" conditions.

While I have not performed the calculations, I suspect the mean of the values taken over the entire time period will not differ significantly from their median. More importantly, whether the mean or the median is used as the basis for the goal statement, little difference in the limnological "outcome" will result. This ambivalent line of thinking probably resulted in the statement on p. 61 that I support the use of the mean while the other "experts" support the use of the median.

The pro and con arguments for using either the mean or median are well presented. I see no need in the report for the statements of support for the two statistics attributed to specific individuals. I am quite uncomfortable over the prospect that such statements may be construed (for whatever reason or purpose) as "the USGS said... but DEQ said...". Therefore, I suggest you remove all three statements attributed directly to individuals from the report, and I specifically request you remove the one attributed to me.

Sincerely,

Mike A. Beckwith, Biologist

JUN 6 1994

M E M O R A N D U M

PANHANDLE
HEALTH

DATE: June 3, 1994
TO: Shireene
FROM: Ron Stone
RE: Hayden Draft Plan

replaces letter of June 2

I'm still hearing reports about the quality of the Hayden Lake Plan (take a bow).

A couple things have come up since our last meeting:

1. I discovered several instances of underground fuel storage tanks at residences near the shoreline. In two cases they are gasoline tanks, and the other is a heating oil tank. There are no regulations which restrict such installations. The DEQ rules state that non-commercial tanks must be less than 1,100 gallons, and that replacement is required only upon visible evidence of leakage. I think we should address the conditions where by petroleum storage tanks are permitted within the watershed. I would propose that they be prohibited within a prescribed horizontal distance to the surface water body, and that all tanks be above ground, with containment.
2. One of the dock building contractors recently submitted an application for a commercial dock. In this particular instance, the location is in a residential area. This raises several issues regarding commercial uses. This commercial activity involves fuel handling, noise, construction debris, and large wakes. The most appropriate location for this kind of activity should be evaluated. The Tobler Marina, which has fuel containment training and equipment, has offered to make space available. The issue of current non-conforming use could also be addressed.
3. Another new situation of non-conforming commercial use has appeared in Gem Shores. A full service resort began operation this season within a residential zone, with overnight accommodations and a daytime capacity up to 150 people on a septic field designed for one single family residence. Aside from the local nuisance issues and the water quality issues of intense use, this instances again raises the issue of designating appropriate commercial areas and the conditions under which they are permitted to operate.

The other issue is one we have discussed before. The Plan is vehicle through which a group of interest citizens with varied background and expertise can express their concerns and ideas regarding the lake. Such an opportunity may come about once in 10 or 15 years. I think that general aesthetic considerations are appropriate.

The members of Save Hayden Lake are most concerned about the preservation of the natural setting, as it seems does the majority of the general public. We have already addressed some

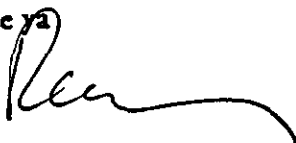
of these concerns by way of vegetative buffers and no soil disturbance zones. Additional measures which have been incorporated into other shoreline jurisdictions are:

1. shoreline/viewshed building and development design standards. Such standards could address building size and materials, vegetation removal and planting, lighting (minimization of), etc.
2. vegetation/tree ordinance. Typically ordinances require permits for removal of more than 10% of existing trees, or for removal of trees greater than a given caliper. Provides conditions under which trees are allowed or not allowed to be cut, pruned, or topped.
3. building bulk restrictions. Usually described in the zoning ordinance, this provision stipulates variable side yard set backs relative to the size of the building. The greater the proposed building bulk, the greater the set back. In effect, at a prescribed bulk height and width, say the equivalent of a 2,500 sf 2 story house, any increase in that size would be penalized by increasing side yard setback requirements and consequently narrower buildings. This effectively limits buildings to about 3,000 sf on 100' lots, and protects view corridors. Essential to this approach are overall height limits, which are not currently prescribed in the county zoning ordinance.

Concerns have also been expressed about jet skis (primarily noise level and frequency) and about the excessive illumination taking place within the watershed.

Also, I'm going to take the summer off starting Tuesday, and I'd be willing to prepare the Outstanding Resource application. Let me know.

See ya

A handwritten signature in black ink, appearing to be 'Ken', written in a cursive style.

RECEIVED

Dear Ms. Hale,

August 11 1994

I would like to express my gratitude for taking the time to answer my questions when we spoke last week. My wife and I had been very concerned about the proposed changes on Hayden Lake. In particular, the increased setback from the water edge (from 25ft. to 75ft.). This would have rendered our property unbuildable. It is reassuring to know that these changes will not affect properties such as ours that have been previously platted for building. It is also comforting to know that it is not your intention to transform buildable into unbuildable sites.

We are staunch environmentalists, and want to do everything possible to help preserve the water quality of Hayden Lake. We plan for our future home to be as environmentally friendly as possible.

Please keep us informed of any changes that would affect the building of our home on English Point. So that you do not incur any expenses, please call us collect. Our home phone number is 206-820-6826 and my wife's work number is 206-320-2616.

Sincerely,


Brian Nibler



IDAHO FISH & GAME

PANHANDLE REGION
2750 Kathleen Avenue
Coeur d'Alene, Idaho 83814

Phone (208) 769-1414 • Fax (208) 769-1418

Cecil D. Andrus / Governor
Jerry M. Conley / Director

August 15, 1994

RECEIVED
AUG 18 1994
PANHANDLE
HEALTH

Ms. Shireene Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, ID 83814

Dear Shireene:

REFERENCE: DRAFT HAYDEN LAKE MANAGEMENT PLAN

We have reviewed the Draft Hayden Lake Management Plan and believe it will serve as a valuable guide for directing management activities which could affect water quality on the lake. Hopefully, high priority items can be accomplished in the near future.

We have two minor recommendations for the final, which are as follows:

1. P. 68 #4. add "...or other outside funding source" after the word program. There are numerous foundations from which grant monies can be obtained, Coors 2000 is but one.
2. P. 74 #4. Consider changing the word "wooden" to "woody" to conform with common terminology.

We commend yours and the committee's efforts at putting this plan together.

Sincerely,

David W. Ortmann
Regional Supervisor

DWO:CEC:kh

C: Natural Resource Policy Bureau



RECEIVED

July 22, 1994

JUL 21 1994

PANHANDLE
HEALTH

Shireen Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, Idaho 83814

Subject: Draft Hayden Lake Management Plan,
hereafter the "Plan"

Dear Ms. Hale:

As property owners on the north side of Hayden Lake near Sportsman's Access, we write to commend the Hayden Lake Watershed Planning Committee's commitment of time and personal energy in preparing a plan which addresses objectives with which we strongly concur. We purchased our property because of the quality of the lake. A mere two summers of ownership has allowed us to see how problems are exacerbated when the lake level is down because of low winter precipitation. We are among those property owners you mention in your document who contemplate aquatic weed harvesting to enhance the aesthetics and recreational use of their location.

Our enthusiasm for the Plan, however, is clouded by strong objection to one particular proposal. So that we may be absolutely clear, a minimum 75' (horizontal) zone of undisturbed vegetation next to the lake, as identified on page 65 of the Plan, will preclude our building a home on our site.

The Beverly Park area, platted sometime in the 1960's, can best be described as eleven long narrow lots. Lake frontage on the most narrow lot is just under 36 feet. Although our lot has 50' of frontage, due to the irregular shape of the lot it is less than 45' wide. Our lot extends approximately 250 feet uphill from the lake front property line. This narrowness constrains the design of any home we can build here. In addition, ingress/egress easements platted or granted by previous owners prevent our building on the upper portion of the lot.

Aware that runoff from excavation sites is a significant source of pollution, we endeavored to design a house which would require minimum excavation. We are in the intermediate stages of working with an architect to design a home within constraints of the lot. At 24.5' by 40', our proposed home is hardly a large one. Yet a 75' setback requirement would make it impossible to fit the home on our lot. As our architect stated, a 75' setback would make this site unbuildable.

A case-by-case variance procedure must be a part of the Plan. Prior to purchasing the lot, we realized existing easements and setbacks as well as the topography severely limited our ability to build on the lot; only after ensuring the feasibility of building

did we buy the lot. While we intend to provide a 50' setback from the lake, strict adherence to a 75' requirement would prevent our building a home on the property and would significantly devalue the property as well as the nearly \$20,000 spent to date in preparation.

We strongly support the public education envisioned in the Plan and would like to make a suggestion. From a layman's view, there is presently a confusing overlap of public entity regulations and responsibility. An example is on page 53 of the Plan where it states that the Lakes Highway District has jurisdiction over all secondary roads not maintained by the State and cities. Yet under the Stormwater Ordinance, Kootenai County is responsible for approving construction of all new roads and driveways serving individual parcels. Which entity then provides a permit for ingress-egress changes or improvements? And if both must give approval, does one agency "educate" the property owner that additional approval is necessary elsewhere? Simply stated, multijurisdictional regulations must be streamlined to make it easier for a responsible property owner to determine and comply with the law.

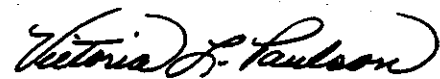
Finally, we suggest monitoring water quality at the northern end of the lake as well as at other sites to provide a more comprehensive picture of the management/quality relationship over the long term. Much of the data in the document reflects the oligotrophic qualities of Tobler's Marina on the south end of the lake. Yet the document describes the difference in lake characteristics depending on lake location. Monitoring lake quality at various sites will provide a picture of how effective management techniques are when actually applied.

We thank you for the opportunity to comment on the draft Plan. Furthermore, we look forward to working with you to establish a management plan that will protect and enhance this outstanding resource while, at the same time, allow us the benefit of property ownership.

Sincerely,



Ronald P. Ringel



Victoria L. Paulson



1250 Ironwood Drive, Suite 336 • Coeur d'Alene, Idaho 83814 • (208) 667-3400 • Fax (208) 664-6741

Steven C. Wetzel
Robert J. Fasnacht
Dana L. Rayborn Wetzel
Scott L. Poorman

July 22, 1994

Shireene Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, ID 83814

Re: Draft Hayden Lake Watershed Management Plan

Dear Ms. Hale:

Our firm has been retained by Mr. and Mrs. Sam Thoen, Mr. and Mrs. Jeff Lugar, Mr. and Mrs. John Beutler, Mr. and Mrs. James Sabala, Mr. and Mrs. Chick Weaver, Mr. and Mrs. William Fisher. These individuals are owners of Hayden Lake frontage lots. Each has become extremely concerned about the Draft Hayden Lake Watershed Management Plan ("Plan").

After careful review of the above referenced document and the Lake Watershed Handbook dated April, 1994, our firm must share our clients concern. On numerous lots the suggested regulation would completely eliminate all rights to build any residence. This appears to be a regulatory taking without due compensation as required by the United States Constitution. See Lucas v. South Carolina Coastal Council. However even more troublesome is that this taking appears to be supported by questionable assumptions.

For example, the equivalent residence (ER) number of 250 gallons of fluid, per day assumes over four (4) persons per household are using an average per capita of domestic water of 220 liters per day or 57 gallons per day¹. With the number of vacation homes, part-year residences, and residences with fewer than four (4) persons per household, this ER number is not reasonable. A more accurate number could easily be calculated using per capita domestic water use numbers and actual population numbers for the watershed.

¹Metcalf and Eddy, Inc. (1979), *Waste Water Engineering: Treatment, Disposal, Reuse*, 2nd Addition, revised by G. Tchobanoglous, McGraw Hill Book Co., New York.

¹Salvato, J.A., (1982), *Environmental Engineering and Sanitation*, 3rd Addition, Wiley Interscience Publishers, New York.

Another assumption made in estimating erosion risk was the use of six (6) feet as the minimum depth to water table for soil survey reports showing a depth to water table as greater than six (6) feet. Similarly the use of forty (40) and sixty (60) inches as the actual depth to bedrock for depths listed as greater than forty (40) and sixty (60) inches respectively. These kind of assumptions can greatly skew erosion estimates and estimated phosphorus loading.

At page 7 the draft plan reports "the storm water phosphorous load to Hayden Lake was estimated using export coefficients from the literature." Reviewed export coefficients listed on page 8 seem to have no relation to the export coefficients actually used. For example, the 1983 E.P.A. study of national average for runoff from residential areas list thirty (30) inches of rainfall per year estimated an export coefficient of .87. The 1987 study by Bellatty estimated an export coefficient in the Spirit Lake area of .81. No explanation is given and none is apparent why an export coefficient of one was used for the medium density residential area (Area 1). No information is provided on the percentage of impervious area within the acreage of each area. The export coefficients chosen for areas two and three also seem to have no rational basis in the literature reviewed. One could not help but wonder why an export coefficient of .25 was chosen for Area 3 when the forest service lands generate .02 to .04 pounds of total phosphorus per acre, per year.

With regard to rainfall within the drainage, no calculation of the effects of evapotranspiration appears to have been made.

Based upon these and many other unproven assumptions, the plan concludes that phosphorus contributions to Hayden Lake were estimated to total 3.61 metric tons per year (Table 2-5 at page 28). Of this total, residential storm water was estimated to contribute 1.17 metric tons per year a 32% of total contribution. While these questionable figures explain how phosphorus is carried to Hayden Lake, these figures neither explain nor identify the actual source or sources of this phosphorus. The plan should address the following questions:

1. Where does all this phosphorus come from?
2. Have any measurements been taken to confirm these empirical estimates?
3. Are there natural sources of phosphorus within the watershed?
4. Who or what is dumping 1.2 metric tons of phosphorus per year into

Hayden Creek?

5. What is the major phosphorus source within residential storm water and is the more cost effective ways to deal with the source?

In the goals and action plan section, no fewer than 26 new restrictions, ordinances, regulations and penalties are suggested to implement the recommendations of this plan. All of these suggested actions are subject to the new Idaho Regulatory Takings Act, Idaho Code Title 67 Chapter 80. Under that act the Attorney General will establish by October 1, 1994, a process for evaluating the taking issue in relation to proposed regulatory or administrative actions. All state agencies are required to follow these guidelines. Failure to evaluate this plan under the new Attorney General guidelines could result in protracted and expensive litigation. With suggested measurement actions such as a "no net increase" regulation and a 75 foot minimum set back from the lake and its tributaries, it appears that the ultimate goal of this plan is to eliminate any new development within the Hayden Lake Watershed and no homes on lake frontage lots. This action appears to be a regulatory taking and the basis for substantial compensation to our clients.

Since even our cursory review of the plan demonstrates questionable assumptions, we believe that it is imperative that the plan be reviewed carefully by other experts in the field. We would therefore request that an extension of time be granted for further comment so that experts will have an adequate opportunity to adequately review what has been proposed. We would also request that certain public records be made available to our office for our experts review. In particular we would request the following:

1. Copies of any grant requests made to the E.P.A. and the E.P.A. response.
2. A complete list of all data sets entered into the G.I.S. computer to calculate values reported in the plan.
3. The basis for the estimates which were used to make the determination that 32% of the phosphorus sources to Hayden Lake are caused by residential storm water.
4. All public documents which delineate the actual sources of phosphorus in Hayden Creek.
5. All public documents that delineate the source of phosphorus in

Shireene Hale
July 22, 1994
Page 4

residential storm water other than fertilizer and soap products in residential neighborhoods.

Please respond to this is request for public information consistent with the requirements of Idaho Code Section 9-339. We would request the opportunity to review the documents before copying. Please advise Scott Poorman in our office when the records can be reviewed.

Our clients are also concerned with the water quality of Hayden Lake and desire to assist to protect the environmental quality of the lake. However, they are not willing to have their property rights eliminated without due compensation and without substantial proof that there is a need to eliminate those property rights.

Our firm and our clients are concerned that the report is putting less emphasis on elimination of environmental degradation than on elimination of housing on Hayden Lake. There is no proof shown in the report that housing on the lake cannot be environmentally safe. We strenuously disagree with blanket conclusions which appear to be dwellings.

Sincerely,



STEVEN C. WETZEL

SLP/rm

cc: Mr. and Mrs. Anne Thoen
Mr. and Mrs. Jeff Lugar
Mr. and Mrs. John Beutler
Mr. and Mrs. James Sabala
Mr. and Mrs. Chick Weaver
Mr. and Mrs. William Fisher



1250 Ironwood Drive, Suite 336 • Coeur d'Alene, Idaho 83814 • (208) 667-3400 • Fax (208) 664-6741

RECEIVED

AUG 1 1994

July 28, 1994

PANHANDLE HEALTH

Steven C. Wetzel
Robert J. Fasnacht
Dana L. Rayborn Wetzel
Scott L. Poorman

Shireene Hale
Ken Lustig
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, ID 83814

Re: Draft Hayden Lake Watershed Management Plan

Dear Shireene and Ken:

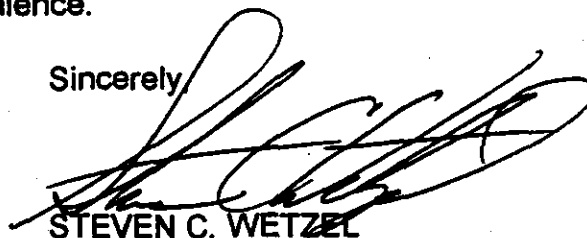
Our clients and our firm appreciate that you have extended the period of time for public comment on the Draft Hayden Lake Watershed Management Plan. However, an extension to August 1, 1994, is simply not sufficient time for full review. We know that at this time, there are three (3) environmental engineers reviewing the draft, but their reports cannot be completed by August 1st.

Given the fact that this process has been going on since 1993, it appears that additional time for public comment is appropriate. Our clients desire to review the raw data, which is the basis for the empirical studies of the Plan. Our office has not received that data as of this date. We requested that information in our prior correspondence and are awaiting your telephone call so we can have an opportunity to review the information in detail. Once we have the information, then it will be possible to complete an independent review of the empirical studies. Therefore, it seems only fair and appropriate that a public agency grant sufficient time for adequate review.

We would therefore respectfully request that an extension of public comment be made until November 1, 1995. This will give adequate time to review thoroughly and to offer constructive comment.

Please advise at your earliest convenience.

Sincerely,



STEVEN C. WETZEL

SCW/dmc



1250 Ironwood Drive, Suite 336 • Coeur d'Alene, Idaho 83814 • (208) 667-3400 • Fax (208) 664-6741

Steven C. Wetzel
Robert J. Fasnacht
Dana L. Rayborn Wetzel
Scott L. Poorman

September 7, 1994

Hayden Lake Management Plan Committee
c/o Shireene Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, ID 83814

Re: Draft Hayden Lake Watershed Plan

Dear Committee Members:

As you are aware, a substantial number of lake shore owners on Hayden Lake have become concerned about the effect of a proposed Draft Hayden Lake Watershed Management Plan considered by your committee. There is a very real concern that implementation of the Hayden Lake Management Plan as drafted may lead to a halt of all residential construction on the shores of Hayden Lake and yet not really improve the water quality of the lake.

Given this concern, our law firm was contacted by a group of land owners. In discussing the situation with several of your committee members and with the staff of Panhandle Health, we believe that cooperation between our efforts would be most beneficial for the community and the lake. We therefore request an extension of time for comment on the Plan in order to formulate a constructive and cooperative supplementation to the Draft Hayden Lake Watershed Management Plan.

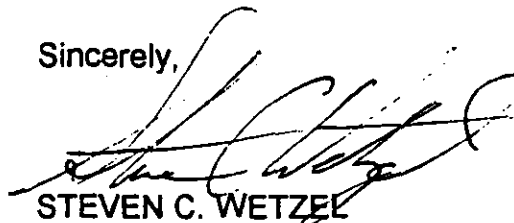
We appreciate your time spent on this project and do not intend to use the additional time to simply criticize the work that has been completed. Instead, we believe that this can be the first step in the education of the shoreline property owners and will allow experts to prepare alternatives which this committee may want to consider before finalizing the Plan.

In order to prepare a thoughtful supplementation, we have contacted Michael Faulters from the University of Idaho. He is a recognized expert in this area and was cited in the proposed Plan for his work done on phosphorus loading on Cocolalla Lake. We have also requested the assistance of several other environmental specialists and anticipate a considerable amount of volunteer work in order to complete the proposed supplementation. We would respectfully request that you allow a 120 day extension consistent with the terms of the attached schedule for an opportunity to create

Hayden Lake Management Plan Committee
September 7, 1994
Page 2

cooperation and a better management Plan consistent with your intent and the intent of the lake shore owners. We also want to thank you for the opportunity to address the Committee and present our concerns at the hearing on September 7, 1994.

Sincerely,



STEVEN C. WETZEL

SCW/rm
Enc.

f:\fisher\hale2.ttr

SCHEDULE

- | | |
|-----------------------------|--|
| September 12 - September 23 | Organize the questions to be reviewed by Michael Faulter and collect all sums necessary to pay for the work to be completed. |
| September 26 - October 10 | Organize citizen group to assist expert's analysis |
| October 10 - October 24 | Michael Faulter to complete the review of the Plan and make suggestions as far as alternatives for improvement to the water quality of Hayden Lake. |
| October 24 - November 7 | Meetings of interested property owners and other community leaders to review the findings by Michael Faulter and completion of literature review for drafting. |
| November 7 - December 2 | Initial drafting of supplementation to Plan and expert review. |
| December 5 - January 2 | Subsequent drafting and preparation of implementation suggestions. |
| January 4 | Present supplementation of Hayden Lake Watershed Management Plan to citizen/agency committee |

William and Candace Fisher
2500 Harrison
Coeur d'Alene, ID 83814

Sept. 7, 1994

Shireene Hale
Panhandle Heath Dept.
2195 Ironwood Court
Coeur d'Alene, ID. 83814

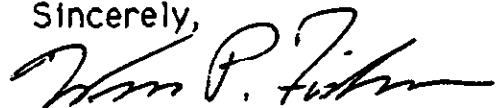
Dear Committee Members:

This letter is in reference to the propose draft Hayden Lake Management Plan. We have owned a plotted lot at Point Hayden on Hayden Lake for many years.

We request an 120 day extension to the comment period on this plan. This time will allow us to have Mike Falter of the University of Idaho, review the plan and the scientific data in it . He will then make constructive comment on it and suggest alternatives. Mr. Falter's data is already used in the Plan (see page * B-2 of Appendix B).

Please allow us this need extension. We must make sure any plan adopted is the right plan to protect the Hayden Lake for future generations.

Sincerely,



Wm. P. Fisher

C. R. Weaver
2999 Ponderosa Lane
Hayden Lake, ID 83835

September 5, 1994

Shireene Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, ID 83814

Dear Ms. Hale:

I am writing in regard to the "Draft Hayden Lake Management Plan," dated June, 1994. I understand that you are permitting additional public comment, and this consideration is greatly appreciated.

As a Hayden Lake homeowner, I applaud the extensive work done by the Planning Committee and the Health District. Maintenance of water quality is essential, and we should all work to achieve this objective.

Nevertheless, I have a number of concerns about the Draft Plan. Some of these concerns were expressed in Steve Wetzel's July 22nd letter to you and again in your meeting with him last week.

The purpose of this letter is two fold: (1) to ask that all of the background information requested in Steve's July letter be provided to his associate, Scott Poorman; and (2) to provide additional comments as a property owner.

As for purpose (1) above, I think it is very important that the assumptions, specific data and procedures relied on by the Planning Committee receive careful review by independent experts. As you remember, Steve's letter raised important questions about major assumptions such as estimates of stormwater run off and "equivalent residence" gallons of fluid per day.

Purpose (2) has to do with a most likely -- in fact, an inevitable result of the Management Plan as now proposed. The inevitable result will be no more residential building on Hayden Lake. The Management Actions detailed on pages 65 and 66 of the Draft Plan are a classic outline of a "no growth" policy. Specifically --

(a.) "Adopt additional erosion control and stormwater treatment requirements for the Hayden Lake Watershed including no net increase in phosphorus regulations for stormwater from new development."

"No net increase" are the definitive words in any "no growth" regulation.

- (b.) "Restrict development on sites too steep and/or erodible for effective erosion control."
- (c.) "Require a minimum 75 feet (horizontal) zone of undisturbed vegetation next to the lake..."
- (d.) "Remove exemptions from Kootenai County's erosion control ordinance (utilities, individual building sites)."
- (e.) "Organize a citizen 'block watch' type program to inspect construction sites."

This is an open invitation to "not-in-my-backyard" types to issue unfounded complaints that will result in litigation costs to the property owner, the County -- and therefore to all of us as taxpayers.

The rights of property owners are at great risk if this Plan is approved as currently drafted. People who acquired lots years ago and who have been saving for a long time to build their Hayden Lake home will be stuck with unsaleable property and broken dreams. Others who have acquired lots for investment purposes using hard earned, after tax savings will see their investment wiped out.

The Planning Committee and the Health District have a duty to protect the rights of these property owners. Surely, an effective plan that is less restrictive can be developed. A proper Lake Management Plan will protect both the quality of Hayden Lake water and the individuals' Constitutional property rights.

Thank you for your review of these comments. Please pass this letter on to all Planning Committee members.

Sincerely,



CC: Gene Abrams
Steve Wetzel

Donna L. Weaver
2999 Ponderosa Lane
Hayden Lake, ID 83835

September 5, 1994

TO: Shireene Hale
Panhandle Health District

SUBJECT: DRAFT -- HAYDEN LAKE WATERSHED MANAGEMENT PLAN

First, I'd like to thank the citizen/agency committee for the time and effort they have put in on development of this draft Plan. The Plan puts forth lofty goals -- identification of watershed issues, selection of water quality and fisheries goals, and evaluation and selection of management options for recommendation to the Health District.

Nevertheless, I fear that bottom line, this draft Plan is a "slow or stop growth" proposal for Hayden Lake. So what if it is, you may ask. My answer is that such well-meaning initiatives inevitably lead to attempted public "takings" of private property without just compensation. This in turn leads to a waste of taxpayer money on long and costly litigation when instead our hard earned dollars could go to solving the problems through positive action.

Eventually, I believe that if approved and put into effect, this Plan will inevitably mean that some owners of duly platted lots with paid up sewer connections will find that they are prohibited from building the home they've saved up for and dreamed of because some bureaucrat decides their property is too steep. Near term, we can expect a rush to "panic development" as owners of unplatted property rush to realize their property value before the window of opportunity closes. For those who have not seen panic development, consider yourselves forewarned -- it isn't pretty.

The report makes it sound as if Hayden Lake is the sole source of the aquifer providing drinking water to some 400,000 people on the Prairie. In fact, according to the report's Figure 1-1 on page 4, "Watersheds Recharging the Rathdrum Aquifer," it appears that the 37.8 cubic feet per second seepage from Hayden Lake to the Rathdrum Aquifer amounts to only some 5% of the total Aquifer recharge total of 753 cubic feet per second. This compares to 230 feet per second seepage from Lake Coeur d'Alene, 30% of the total, and recharge from annual rainfall of 250 cubic feet per second, amounting to 33% of the total.

How much of the aquifer is used for drinking water and how much for agriculture? What percentage of the pollutants in the aquifer come from Hayden Lake's 5% recharge, how much comes from the septic tanks of the 400,000 people living on top of the aquifer, and how much comes from agricultural chemicals? How do these sources of pollution compare to stormwater runoff from the few homesites left available to people around Hayden Lake? Indeed, per the report, all of the pollution from stormwater runoff from all of the homes now on the Hayden Lake Watershed does not even equal the amount of nutrients dumped into the lake annually by the agricultural runoff into Hayden Creek. How on earth can a few more homes on Hayden Lake even begin to have any significant, even measurable impact on the Rathdrum Aquifer? This defies all common sense.

This does not mean that I am not concerned for the residents of the 480 or so lake shore houses that still drink Hayden Lake water. On the other hand, these are for the most part the same residences that dispose of their sewage in septic tanks, many of which are "too close to the Lake, are 30-35 years old, and are likely substandard," according to your report. Before we start stripping property rights from our fellow taxpayers, let's make every effort to reduce pollution through preventative measures. These would include: a new Water & Sewer District to serve those homeowners who still drink Lake water and use septic tanks; extensive, house-by-house educational effort on proper planting/land management; lot-by-lot consulting on prevention of pollution during and after development; and, finding some way to treat water flowing into the Lake from the biggest source of pollution -- Hayden Creek .

Thank you for your consideration of my comments. I trust this memo will be distributed to all members of the Plan Committee and Panhandle Health District.

Donna Weaver

CC: Gene Abrams
Steve Wetzel



William R. Robinette, CCIM, CRS—President

September 7, 1994

Ms. Shireene Hale
PANHANDLE HEALTH DISTRICT
2195 Ironwood Ct.
Coeur d'Alene, Idaho 83814

Re: Hayden Lake Watershed Management Plan

I have had an opportunity to review the above referenced document. I appreciate the opportunity to voice my concerns and am sorry I will not be able to personally attend the meeting of September 7, 1994.

As a Real Estate Broker very active in the Hayden Lake market for the past 20 years, no one is more concerned with the quality of the Hayden Lake Watershed. My concern is both personal and from a business standpoint. From a business standpoint, if the water quality deteriorates, my business will be impacted negatively. From a personal standpoint, I own property on the water that will become unbuildable, and therefore worthless, if this draft passes and ultimately becomes law.

I also have many friends, clients and business associates who have purchased property around the lake with the intention of someday constructing their dream home, whether it be a modest summer cottage or a year around home. Believe me, most of these folks have worked for and are continuing to work extra hard to make this dream become a reality.

I am concerned with a number of issues in the draft, many of which were addressed in Steve Wetzels' letter dated July 22, 1994. Specifically, my major concerns are, but not limited to, the 75' setback, sites that are "too steep" for proper erosion control and the citizens involvement of construction sites. The 75' setback makes many sites unbuildable, the topography around Hayden Lake is naturally steep and the citizens (environmentalists) involvement would turn out to be nothing more that stall and delay tactics designed to ultimately stop all construction.

Please reconsider these recommendations.

Very sincerely yours,



William R. Robinette
SELECT PROPERTIES COMPANY

ARCHITECTS WEST

Architecture, Planning
Interior Design &
Landscape Architecture



July 29, 1994

R E C E I V E D

Shireene Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, ID 83814

AUG 2 1994

**PANHANDLE
HEALTH**

Re: Hayden Lake Watershed Management Plan

Dear Ms. Hale:

Once again it appears that a 'management plan' for private property has been developed with very little time given for public testimony. While this plan was developed with a cross section of Hayden Lake residents, during an eight to nine month time period, I feel that one week is not enough to analyze the scientific data and recommendations.

I would like to see the review period extended for ninety days to analyze the information contained in the report. Water quality is an important issue in this area. However, implementing standards without total analysis of the findings could be detrimental to the economic future of Kootenai County.

Sincerely,

ARCHITECTS WEST



James M. Patano

August 2, 1994

Ken Lustig
Shirlene Hale

Re - New 75' set back on waterfront.

Waterfront lots should have sedimentary & mitigation plans for each site. A 75 foot set back is a taking without compensation!

Sincerely,



Sharon Culbreth



July 29, 1994

Ms. Shireene Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, Idaho 83814

Dear Ms. Hale:

On Thursday, July 21, we were notified that Panhandle Health District had prepared a Draft Hayden Lake Watershed Management Plan and that the comment period would close on Monday, August 1. We normally watch carefully for this type of document, but for some reason were not aware of its existence.

After obtaining a copy early this week, we did have time to give it a quick review. Although we have not had time for a thorough review, we did enough work to realize that it is a far-reaching and important public policy document that contains numerous findings relying on questionable or unclear scientific data.

In speaking with a number of others in the community, we have found that very few people were aware that this type of far-reaching process was under way. The types of public policy decisions suggested in the draft should not be proposed or implemented without thorough and careful scientific peer review and comment from the public at large. Indeed, this document could serve as the model for a new level of regulations governing the entire basin. For these reasons, we urge that you extend the comment period at least an additional 90 days and that you work to involve a much broader representation of the community in the decision-making process.

Sincerely,

A handwritten signature in black ink, appearing to read "W. Bill Booth". The signature is stylized and cursive.

W. Bill Booth, Vice President -
Investor and Public Affairs

WBB/slw

WASHINGTON WATER POWER
1735 N. 15th Street
Coeur d'Alene, ID 83814

FAX TRANSMITTAL

TO:

NAME: SHIREENE HALE

COMPANY: PANHANDLE HEALTH DISTRICT

TELEPHONE #:

FAX #: 664-8736

FROM:

NAME: PAUL ANDERSON

TELEPHONE#: 208-769-1320 or EXT. 1320

FAX #: 208-769-1381

DATE SENT: 7/29/94

NUMBER OF PAGES (INCLUDING COVER): 1

COMMENTS/INSTRUCTIONS TO RECIPIENT:

THANK YOU FOR THE DRAFT COPY OF THE HAYDEN LAKE WATER QUALITY MANAGEMENT PLAN AND THE 10 DAY EXTENSION OF COMMENT PERIOD.

WE WOULD VERY MUCH LIKE TO MAKE EDUCATED COMMENT TO THE PLAN, BUT WOULD NEED ADDITIONAL TIME TO TO STUDY THE RECOMMENDATIONS; THEREFORE I RESPECTFULLY REQUEST A 90 DAY EXTENSION TO THE COMMENT PERIOD.

THANK YOU FOR CONSIDERING THIS REQUEST.

IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL SENDER.

net-it™ brand fax transmittal memo 7871		# of pages > 1
Shireene Hale		From: Charlie Polts
		To:
		Phone #: 687-2525
687-8736		Fax #

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TWIN LAKES
VILLAGE



"Resort Living Year-Round"

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JUL 29 1994

PANHANDLE
HEALTH

July 29, 1994

Shireene Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, ID 83814

Dear Shireene,

Thank you for sending us a copy of the Panhandle Health District's management plan for Hayden Lake. In reviewing this plan, it is my opinion that more time is needed to examine this data. Therefore, I am requesting a 90 day extension to evaluate this plan.

Sincerely,

Charles R. Polts, Jr.
President, Twin Lake Investments

CRP/lar

carpet center

July 29, 1994

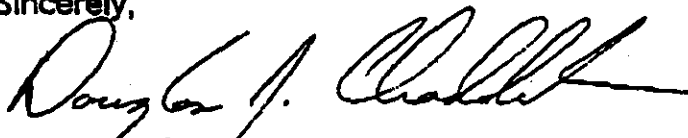
Ms. Shireene Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, ID 83814

Dear Ms. Hale:

I would like to request that you extend, for a period of 90 days, the time for public comment on the management plan for Hayden Lake. As it has taken two years to develop the plan, I think it is reasonable to grant the extension.

Thank you in advance for your consideration in this matter.

Sincerely,



Douglas J. Chadderdon
President

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206 Indiana Ave., Suite 208 • Coeur d'Alene, ID 83814 • (208) 664-6588 • FAX (208) 667-0291

August 1, 1994

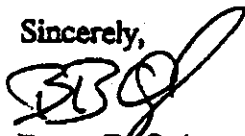
Shireene Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, ID 83814
FAX 664-8736

RE: Stormwater Management Plan - Hayden Lake

Ms. Hale:

I understand that public comment concerning the stormwater management plan has been extended to today. I have not heard a whisper of any possible public comment being allowed. I watch the papers and such for this sort of thing and find it hard to believe I missed an announcement. As a property owner around Hayden Lake, I am very concerned with what is in the plan and would like more time to research it, and the impact upon the lake. I am asking you to extend the period allowed for public comment. 90 days would be suffice, as I understand there are other experts in the field currently looking into the plan also, and I am sure they could use more time. Thank you for your time and consideration.

Sincerely,



Bryan B. Ogle
Vice-president



Coeur d'Alene Mines
CORPORATION

Kevin L. Packard
Director of Taxes

July 29, 1994

R E C E I V E D

Telefaxed to (208) 664-8736
Ms. Shireene Hale
Panhandle Health District I
Environmental Health Division
2195 Ironwood Court
Coeur d'Alene, Idaho 83814

AUG 1 1994

**PANHANDLE
HEALTH**

Dear Ms. Hale:

This letter is written to request your office to extend the public comment period on the Draft Hayden Lake Management Plan (the Plan) to October 31, 1994.

The Plan was not made available for public comment until after July 4th, thereby, giving the public very little time to read and comment on a comprehensive and detailed document that took over two years to develop. Furthermore, many individuals affected by the Plan have yet to be informed of the Plan's existence and so have been denied the opportunity to offer their comments. Accordingly, we consider it only fair that the public comment period be extended so that proper notice and comments can be given.

Please inform me of your decision as soon as possible. I can be reached at (208) 667-3511 during normal business hours.

Very truly yours,

Kevin L. Packard

cc: Pat Raffee, Fax (208) 777-8354

505 Front Avenue/P.O. Box 1
Coeur d'Alene, Idaho 83816-0316
(208) 667-3511
FAX (208) 765-0324

FIRST AMERICAN TITLE COMPANY
1044 NORTHWEST BLVD.
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AUG 1 1994

PANHANDLE
HEALTH

VIA FACSIMILE
664-8736

TO: Shireene Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, ID 83814

RE: Hayden Lake Management Plan

Due to the fact that the public has not had adequate time to study the Health District's proposed management plan, I respectfully request that you extend the time for public comment an additional 90 days.

Please call me at the above number if you wish to discuss this.

Thank you in advance.

Sincerely,



Cathy L. Kendrick
President

ATLAS BUILDING CENTER

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Shireene Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, ID 83814

August 1, 1994

Dear Ms. Hale

My company recently received a copy of the management plan for Hayden Lake. We would like to study and comment on this document, but have been unable to do so in the short time that we have had the plan. We would like to request a 90-day extension of time for public comment.

We recognize that Panhandle Health District and many others have put a lot of time and effort into developing the Hayden Lake management plan, and we hope that you will also allow us time to study the plan and be able to make intelligent comments. Your consideration is appreciated.

Sincerely,



Tom Richards

R E C E I V E D

AUG 1 1994

**PANHANDLE
HEALTH**

ARCHITECTS WEST

Architecture, Planning
Interior Design &
Landscape Architecture



July 29, 1994

Shireene Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, ID 83814

Re: Hayden Lake Watershed Management Plan

Dear Ms. Hale:

Once again it appears that a 'management plan' for private property has been developed with very little time given for public testimony. While this plan was developed with a cross section of Hayden Lake residents, during an eight to nine month time period, I feel that one week is not enough to analyze the scientific data and recommendations.

I would like to see the review period extended for ninety days to analyze the information contained in the report. Water quality is an important issue in this area. However, implementing standards without total analysis of the findings could be detrimental to the economic future of Kootenai County.

Sincerely,

ARCHITECTS WEST

James M. Patano

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AUG 1 1994

**PANHANDLE
HEALTH**

**CENTRAL PRE-MIX CONCRETE CO.**

2500 W. SELTICE WAY • P.O. BOX 757
COEUR D'ALENE, IDAHO 83814 • (208) 664-2111

August 1, 1994

**Ms. Shireene Hale
Panhandle Health District
2195 Ironwood Ct.
Coeur d'Alene, ID. 83814**

Fax #: 664-8736

RE: Hayden Lake Management Plan

Dear Ms. Hale:

This letter is to request a 90 extension for public comment on the Panhandle Health District's "Hayden Lake Management Plan". Insufficient notice of your meeting makes this request reasonable. Several people are now studying the plan, but more time is needed to allow responsible feed back at your hearings.

Very truly yours,

CENTRAL PRE-MIX CONCRETE CO. INC.


**Dan J. Malcolm,
Branch Manager**

RECEIVED

AUG 1 1994

**PANHANDLE
HEALTH**

W. W. NIXON

Attorney at Law
409 Coeur d'Alene Avenue
Post office Box 1560
Coeur d'Alene, Idaho 83816-1560

Telephone: (208) 667-4655
FAX: (208) 765-4702

July 29, 1994

RECEIVED

JUL 29 1994

PANHANDLE
HEALTH

VIA FACSIMILE #664-8736

SHIREENE HALE
PANHANDLE HEALTH DISTRICT
2195 IRONWOOD COURT
COEUR D'ALENE, ID 83814

Dear Ms. Hale:

Thank you for sending Panhandle Health District Management Plan for Hayden Lake so promptly; however, I am not able to review and provide input without a minimum of 60 days. A 120-day extension to comment would be more realistic as I am sure it merits serious review to adequately protect property owners and planned future users.

Too often after those in place are secure in their use, the process is to eliminate anyone else. I am more inclined toward truly objective standards that protect property owners' interests, since the private property owners bears the heavy tax burden.

A 120-day extension for comment beyond August 1 is requested.

Yours very truly,


W. W. Nixon

WWN/mlb



Coeur d'Alene Mines
CORPORATION

Dennis E. Wheeler
Chairman, President and
Chief Executive Officer

R E C E I V E D

July 29, 1994

JUL 29 1994

TELECOPIED TO 664-8736

**PANHANDLE
HEALTH**

Ms. Shireen Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, ID 83814

Dear Ms. Hale:

In following the progress of the Panhandle Health District's management plan for Hayden Lake, I am discovering that there is insufficient time to adequately prepare a response by Monday, August 1, 1994. This letter is to request that you consider a 90-day extension to accommodate not only myself but a number of others who have indicated an interest in participating but cannot because the schedule simply does not permit it.

Thank you for your attention.

Yours very truly,

Dennis E. Wheeler

DEW:ct

Harris • Dean Insurance

JULY 29, 1994

PANHANDLE HEALTH DISTRICT
2195 IRONWOOD COURT
COEUR D'ALENE ID 83814

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PANHANDLE
HEALTH

ATTN: Shireene Hale

RE: Hayden Lake Watershed Management Plan

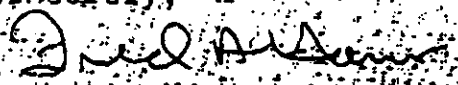
Dear Ms. Hale:

Thank you for sending a copy of the management Plan.

Due to the technical nature of the report, your one week term period for public comment is not adequate. It appears the report took almost two years to compile.

Please grant a 90 or 120 day extension of time for further public comment.

Sincerely,



FRED A. HARRIS



703 Lakeside Avenue • P.O. Box 430 • Coeur d'Alene, Idaho 83814-0430 • (208) 667-9406 FAX (208) 664-6707

8/1/94

Shireen Hale
Panhandle Health District
2195 Ironwood Court
Coeur d'Alene, ID 83814

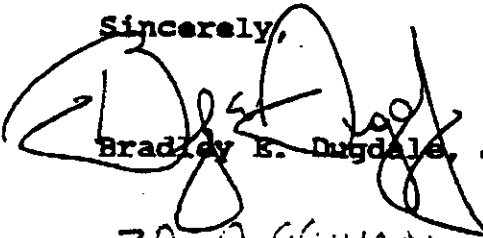
Dear Shireen:

As a Hayden Lake property owner, I was surprised by the Hayden Lake Management Plan. I was not informed or asked to participate in its creation.

It is my recommendation that a letter be sent to all Hayden Lake property owners to solicit input and extend to public comment period for 90 days.

I will want to remodel our cabin in the future and do not understand how the plan effects my property.

Sincerely,


Bradley B. Dugdale, Jr.
2020 CONLY ON DT.
CDA

