Newman Lake Watershed Plan

Prepared by:
Newman Lake Watershed Plan Committee
Newman Lake Flood Control Zone District

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WASHINGTON STATE
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FOREWORD

In 1989 the Newman Lake Flood Control Zone District received a Referendum 39 Grant from the Washington State Department of Ecology to perform the Newman Lake Restoration Project Phase II. This watershed plan is one element of the Phase II project. The Department of Ecology grant funds 75% of the original $860,076 project, and local Flood Control Zone District assessments fund the remaining 25%. (The total project costs were revised later to include additional expenses associated with the aeration system.)

The information and recommendations in this plan were generated by the Newman Lake Watershed Plan Committee, a group of Newman Lake area residents and governmental agency representatives. Staff from the Spokane County Engineers Office, as administrator of the Flood Control Zone District, provided the necessary coordination and support for the committee.

The objective of this watershed plan is to evaluate water quality problems associated with watershed activities and to formulate means of correcting the problems. The goal is to reduce the nutrient loading to Newman Lake.

While the watershed plan is a fundamental step toward improving the lake's water quality, the most important part of the planning process is the start we have made toward building a coalition of citizens, timber industry representatives and governmental agencies interested in protecting the lake. We came to this project with differing opinions and for most of us, a little skepticism. In working together, however, most of us have learned that although we may not always agree, we can be assured that the farmers, ranchers, timber industry officials, governmental agency representatives and homeowners we have worked with on this plan are all committed to improving the quality of our lake. Our task now is to elicit such a commitment from our neighbors and from others who work and play in the watershed.

ACKNOWLEDGEMENTS

The two of us from the Spokane County Engineers Office who coordinated the production of this plan appreciate the enthusiasm, creative ideas and hard work of all these individuals. We learned from you and are grateful you took the time to make our community a better place to live.

Newman Lake area residents who produced this plan: Alvin Balcom, George Bolks, Paul Buckhorn, Lorne Burley, Wendy Burley, Edith Clark, Larry Guthrie, Warren Heylman, Bob Jones, Frank Knox, Bob Kolva, Bob Lindgren, Howard Platter, Bob Pool, Linda Pool, Walt Radmer, Carl Rantzow, Mary Riggs, Gary Siverson, Marvin Siverson, Bob Takai, Jane Takai, Patty Tyler, Bob Warner

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Water Research Center faculty and students who provided background information and technical assistance: Dr. William Funk, Dr. Barry Moore, Sharon Burkette, Steve Juul

Spokane County Health District, Appendix A: Dennis Kroll, Rick Manson, Pam Denton

Water Management of North Idaho, Appendix C: Allen Isaacson

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Jerry Nicholls and Brenda Sims, Office of the Spokane County Engineer

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I. SUMMARY OF FINDINGS AND RECOMMENDATIONS

The goal of the Newman Lake Restoration Project Phase II is the reduction of current and future nutrient levels in the lake. As an element of the restoration project, the Watershed Plan is intended to be a workable, long term approach to improving the water quality of Newman Lake. The plan was prepared by a committee of watershed landowners, farmers, ranchers, timber industry officials and representatives of several state and local government agencies.

The Newman Lake Watershed is mostly forested, and logging is expected to be a major activity in the area into the foreseeable future. Since much of the watershed has steep slopes, relatively little agriculture exists in the area except along the bottomlands of Thompson Creek. A few farms and ranches are scattered along the peat flats near the lake.

About 65% of the lake shoreline is developed for homes and summer cabins. The current year round population at the lake is estimated to be 545. Due to the lack of urban services such as public sewer and water systems around the lake, growth has been slow in the watershed over the last 20 or 30 years. Steep, rocky terrain and lack of reliable water supplies in portions of the area make extension of urban services very expensive. The beauty of the lake, its recreational value and development pressures in the nearby Spokane Valley mean the area always has the potential for growth, however.

The watershed plan committee considers the most serious water quality problems related to development in the watershed to be erosion from private roads, inadequate waste disposal and inadequate control of stormwater runoff. Major concerns associated with forestry are sedimentation from active roads, off-road vehicles and unauthorized use of roads. Agricultural concerns include inadequate stream and lake buffers, inappropriate use of agricultural fertilizers and excessive grazing.

To remedy these problems, the watershed plan committee outlined an action plan for 1991 and 1992. The watershed plan committee worked through 1991 and into 1992 on implementing the plan. In mid 1992 the primary responsibility for continuing implementation was transferred to the Newman Lake Property Owners Association. The continued support of landowners, farmers and ranchers, the timber industry and local and state agencies is essential to successful plan implementation. The action plan is summarized on pages 2 and 3 and the summary is followed by a progress report describing how the plan is being implemented.

ACTION PLAN SUMMARY

1991

Task	Responsible Agency
1. Write, publish, distribute information packet containing background information about water quality problems and common sense homeowner tips about improving the watershed.	Newman Lake Property Owners' Association (NLPOA) with county assistance
2. Meet with realtors association to tell them about packet; send fact sheet to realtors as new property listings occur.	NLPOA
3. Post signs in boating areas, off-road-vehicle use areas and access points to timber land explaining water quality concerns. Enlist the help of off-road vehicle clubs.	NLPOA with landowners assistance
4. Work with homeowners to resolve septic system problems.	Health District
5. Explore options for securing person to patrol watershed.	NLPOA
6. Review private road and erosion control regulations.	Watershed Plan Committee
7. Obtain information about development proposals in watershed and review such proposals.	NLPOA with county assistance
8. Create liaison committee to maintain ties among forestry, agriculture and development interests in watershed and to carry on watershed education and projects.	NLPOA and Watershed Plan Committee
9. Establish monitoring program and train volunteers.	NLPOA and Water Research Center (WRC)
10. Notify all farmers/ranchers in watershed about Soil Conservation Service assistance and the need to prepare conservation plans.	NLPOA
11. Encourage innovative ideas and demonstration projects on farms and ranches.	NLPOA and Soil Conservation Service (SCS)

12. Design study and seek student to inventory critical erosion hazard areas.	Watershed Plan Committee
13. Notify civic groups and schools of rehabilitation project needs.	NLPOA and Watershed Plan Committee
14. Review clearcutting practices.	Watershed Plan Committee with timber industry and Dept. of Natural Resources assistance

1992

Task	Responsible Agency
15. Hold a boater education day.	NLPOA with Marine Division of Sheriff's Department.
16. Sponsor off-road vehicle education day.	NLPOA with landowners and off-road vehicle clubs
17. Discuss feasibility of Adopt-A-Stream Program for Thompson Creek landowners and school district.	NLPOA with landowners and school district
18. Organize Newman Lake Clean Up Days.	NLPOA
19. Provide ongoing testing of septic systems.	Health District with NLPOA
20. Investigate need for ordinance requiring low flush toilets and water reduction techniques.	NLPOA
21. Provide support for farmers/ranchers with conservation plans who seek tax reductions.	SCS
22. Determine best means of encouraging cluster development.	NLPOA with County Planning Department
23. If problems with unauthorized use of forest roads is still occurring, ask for restrictions on road use during wet season.	NLPOA, County Road Department and landowners

Progress Report

Using the action plan as a "to do" list, we have accomplished most of the tasks. We are working on other tasks in the plan now, and we have accomplished a few other items that did not appear on the list. Activities we have completed include:

◆ produced "Naturally Newman," a brochure distributed to all owners of land in the watershed. The brochure gives tips on limiting impacts to water quality. All applicants for building permits in the watershed receive a copy of the brochure from the Spokane County Building Department. The brochure was also mailed along with a cover letter to all realtors selling properties in the watershed.

◆ produced "The Lake Book," a 40-page book giving in-depth information about how to protect the lake from our construction, landscaping, waste disposal, recreation and other activities.

◆ worked with Inland Empire Paper Company (IEP) and the Board of County Commissioners to have the road along Thompson Creek, the major tributary to the lake, closed during the wet season. Working with IEP, Spokane County will install signs this fall indicating that the road is closed December 15 to April 30 each year to prevent erosion and to protect water quality. IEP will install and maintain a gate to close the road.

◆ the Spokane County Health District has followed up on all the observed septic system failures. Most of the failures were gray water or drainage from sinks and laundry and bathing fixtures. By mid 1992, 5 of the 16 failures have been corrected. The Health District has sent compliance notices to the remaining 11 stating that the failures must be corrected prior to occupancy of the houses again.

◆ IEP has a security firm patrolling the company's timberlands in the Newman Lake watershed. The patrols will ask people using the watershed what activities they are engaged in and where they live. IEP will share this information with the watershed committee to enable the property owners association to follow up with water quality information for watershed users.

◆ the watershed committee reviewed private road and erosion control regulations in the county and recommended to the Board of County Commissioners that a task force comprised of representatives from all sensitive watersheds in the county be appointed to look at erosion problems. The task force would also address other issues of concerns to lakes groups, issues such as the use of dust palliatives.

◆ residents active in the watershed committee will carry on the work of the committee through the Newman Lake Property Owners Association. The association has a nucleus of energetic, knowledgeable and hard-working individuals who will continue to work toward improved water quality. The association secretary writes an interesting newsletter that keeps local residents informed of lake issues.

◆ the Water Research Center is training a group of residents to monitor lake water quality. An aeration system was installed in the lake in 1992. Because the oxygen content is an important factor in the lake clean up, the Flood Control Zone District is exploring the possibility of buying an oxygen probe for the volunteers to use.

◆ in 1991 the watershed committee held a farm field day. Representatives from Ecology, Wildlife, Soil Conservation Service, Conservation District, County Weed Board and a farm chemical company met with local ranchers and farmers to discuss farm practices and their effects on water quality. As a result of that field day and watershed committee meetings, two ranchers applied for and received free trees distributed by the Conservation District. The trees, mostly willows and red osier dogwoods, have been planted along a stretch of Thompson Creek and along a seasonal drainageway at the northeastern shore of the lake. Also the two ranchers have fenced their livestock away from the shoreline.

◆ an erosion hazard inventory was completed (see Appendix C). The watershed committee discussed recommendations from that study and asked the Board of County Commissioners to establish a task force to evaluate the need for erosion control regulations in sensitive watersheds as noted above.

◆ an energetic resident organized Newman Lake Clean Up Day in the spring of 1992. Those cleaning up along the roads in the watershed hauled over 2000 pounds of garbage to the transfer station.

◆ in the summer of 1991 the Health District held a septic system workshop for homeowners in the watershed. The participants learned how septic systems work, why they fail and how they need to be maintained. Spokane County staff enlisted several septic system pumping companies in offering coupons worth $10 off a septic system pumping for interested lake area residents.

II. BACKGROUND

Feasibility Study

The decline in water quality at Newman Lake has been apparent to lake area residents over the past fifteen to twenty years. Blue-green algal blooms in the early 80s indicated problems. In 1985 the Newman Lake Flood Control Zone District received a grant from the Washington Department of Ecology to assess the water quality of Newman Lake, to define the sources of nutrients causing over-enrichment of the lake and to evaluate options for improving water quality.

The Water Research Center (WRC) of Washington State University performed the study and produced a final report for the Newman Lake Restoration Feasibility Study, dated April 1988. Phosphorus level was one indicator of declining lake water quality discussed in the report (p.54.)

> *The relatively high total phosphorus values suggest late mesotrophic (medium enrichment) to moderate eutrophic (enriched) lake conditions. Phosphorus was being released from the bottom sediments in high quantities from mid-summer to fall. During this period it was rapidly taken up by undesirable algae (blue-green forms). The resulting moderately heavy algae growths (blooms) reduced light penetration, and after bloom conditions died. The bacteria consuming the dead algal cells utilized all or nearly all of the dissolved oxygen of the lower lake waters (hypolimnion). This process created obnoxious odors, unsightly masses of vegetation and decaying algae along the beaches.*

The feasibility study explored options for diverting, reducing, mitigating or eliminating excess nutrients in the lake. The options included: nutrient diversion and watershed management; dredging to remove sediment and organic matter from the lake; nutrient inactivation (using chemicals such as aluminum sulfate to reduce nutrients in the water); dilution/flushing; winter drawdown to control aquatic plants which are a nutrient source; hypolimnetic withdrawal (diverting nutrient-rich bottom waters from the lake to a stream); hypolimnetic aeration (adding oxygen to the bottom waters of the lake); and finally aquatic herbicides and mechanical harvesting and physical barriers to control lake vegetation. Page 90 of the feasibility study report notes:

> *. . . it is essential to initiate a comprehensive watershed management plan for the Newman Lake drainage basin. This plan must address logging, cattle grazing, wastewater disposal, recreation uses, plans for future development, water quality monitoring, and public awareness.*

At the urging of Newman Lake area residents and with WRC assistance, the Newman Lake Flood Control Zone District applied for, and received, a Referendum 39 grant from the Washington Department of Ecology for the Newman Lake Restoration Project Phase II. The original total project cost was $860,076, with 75% funding from the Department of Ecology. The remaining 25% funding is through Newman Lake Flood Control Zone District assessments on properties in the watershed benefiting from improvement in the lake's water quality. (The project cost was later revised to include additional expenses associated with the aeration system.) The Phase II Project includes these elements:

1. Project management
2. Application of aluminum sulfate to the lake
3. Installation of a hypolimnetic aeration system
4. Preparation of a watershed management plan
5. Septic system survey of lakefront properties
6. Water quality monitoring
7. Public involvement
8. Final report

The Phase II project's overall goal is the reduction of nutrient levels in the lake now and into the future. The feasibility study estimated the phosphorus loadings to the lake in 1986.

Estimated Phosphorus Loadings — 1986

surface water	1200 lbs. per year	17%
ground water	1300 lbs. per year	19%
internal recycling (from bottom sediments)	4400 lbs. per year	64%
TOTAL	6900 lbs. per year	100%

The internal recycling of phosphorus already in the lake is the result of natural processes and a hundred years of unwise land use practices in the Newman Lake watershed. The approach of the Phase II Project is to attack both the internal cycling of nutrients and the external sources, i.e. the watershed activities contributing nutrients to the surface water and groundwater. The aluminum sulfate, applied in 1989, is a short-term means of reducing the internal recycling of nutrients in the lake, taking phosphorus from the water column and binding it to lake bottom sediments. The hypolimnetic aeration system, which began operating in 1992, is an intermediate step, a means of providing more oxygen to the lake's lower levels to reduce conditions under which phosphorus will be released from the sediments. The watershed plan, which includes the results of the septic system survey, is the long-term approach for reducing nonpoint sources of pollution to the lake. The plan is our best hope for improving the lake's water quality into the future.

The Process

Residents of the Newman Lake area worked hard to secure funding for the feasibility study and the restoration project. The Newman Lake Property Owners Association is a strong voice in community affairs, a voice strongly supporting improved lake water quality. Such public support is the key to producing and implementing a watershed management plan. Interested residents and major landowners in the watershed working with various governmental agencies can produce a reasonable, workable, long term approach to improving water quality.

A basic assumption of the watershed plan is that all land uses potentially contribute to the water quality problems of the lake and that all landowners in the watershed should be willing to do their part to help improve the water quality. While making this basic assumption, the committee writing this plan notes that the information collected to date does not provide definitive answers about specific land use activities currently impacting the quality of Newman Lake. Current practices and the practices recommended by this watershed plan should be monitored to determine changes in the lake's water quality.

The Spokane County Engineers Office administers the Newman Lake Flood Control Zone District, and two members of the Engineers staff were assigned to coordinate the lake restoration project and the watershed planning process. In April, 1989 the Engineers staff invited major landowners (those owning 20 acres or more in the watershed) and other residents who had expressed interest in being involved in the watershed planning process to an organization meeting. Agencies with regulations or responsibilities for activities in the watershed that might impact water quality were also invited. The agencies are the Spokane County Department of Planning, the WA Department of Natural Resources, the WA Department of Wildlife, the WA Department of Ecology and the USDA Soil Conservation Service and the Spokane County Conservation District. (The Spokane County Health District was responsible for a septic system survey, and the survey results are integrated into this watershed plan.)

The Newman Lake Watershed Plan Committee took shape at that organization session. In a series of meetings, the committee reviewed the background work of the WRC, and members explained their individual concerns. Agencies with regulations or programs in the watershed explained their efforts and how they relate to water quality.

The group took a bus tour of the watershed to see what is taking place and to hear perspectives of landowners and agency representatives. The watershed tour educated members about forestry regulations and practices that help protect water quality and about household practices that can affect water quality. The tour also gave us an opportunity to hear a major landowner's ideas for the future development of his property which is currently used for cattle grazing.

The committee then divided into subgroups: Agriculture, Forestry, Development. The subgroups collected and compiled the land use data in this plan. The subgroups also identified water quality related problems from their individual perspectives and recommended to the whole committee solutions to the problems. This plan contains the recommendations generally agreed upon by the whole committee.

Concerns

At the first meeting of the watershed plan committee the WRC staff explained the need for a watershed plan and provided background information to demonstrate that need. Residents expressed their concerns about the watershed plan. Some were unconvinced that their activities are part of the problem and others feared that the watershed plan and its possible recommendations would adversely affect their livelihoods. This is a summary of the initial concerns/ideas/suggestions of the group:

a) determine nutrient loading percentages (focus on resolving problems where we will get the greatest benefits; may need more monitoring to better define problem)

b) seek cost-effective solutions, funding for implementation measures, funding for water quality related projects

c) consider buffering the lake with vegetation strips

d) evaluate roads/culverts (look at erosion control methods for roads, consider road grades)

e) evaluate alternatives (non-chemical) for weed control and for farming activities

f) evaluate chemicals in septic systems (cleaning products/detergents)

g) determine what regulations are already in place and who is responsible for enforcement; determine whether there are enforcement problems

h) consider erosion problems caused by motorcycles, recreational vehicles, snowmobiles (public access for responsible public; access control system and enforcement)

i) evaluate threats to livelihoods from implementation measures

Another concern raised during the public review of the draft watershed plan is the changes occurring to the lake's shoreline. Construction of sandy beaches and bulkheads, waterfront dredging and removal of native shoreline vegetation, are activities that can impact the quality of the lake and the fishery resource.

III. THE WATERSHED

Location and Characteristics

The Newman Lake Watershed is located in eastern Spokane County. The lake's surface covers about 1200 acres. Roughly 18,500 acres of land to the east, north and west of the lake drain into it. Most of the land to the south of the lake (another 5,800 acres) drains away from the lake and into the drainage canal which serves as the outlet from the lake. Map 1 shows the total area draining to the lake and the outlet canal. References to the *"Newman Lake Watershed"* in this plan mean only the surface area draining to the lake.

In 1981 an outlet control structure was built at the lake to prevent flooding of lakefront properties, primarily the agricultural land on the north and south sides of the lake. The agricultural lands have rich peat soils which must be subirrigated to sustain crops. Together the outlet control structure and outlet canal help provide the balance of moisture and dryness needed for production of hay and cereal crops. The outlet canal drains to the Moab Sump, a 30-acre rock-filled sump that disposes of overflow waters from the lake by percolation to the Spokane/Rathdrum Aquifer. The Newman Lake Flood Control Zone District operates the outlet control structure and maintains the canal and sump.

The major tributary to the lake is Thompson Creek which enters the lake from the north. A few smaller creeks feed the lake during high runoff conditions. In most years Thompson Creek runs year round; the other tributaries are seasonal. The upper reaches of the watershed are steep and remote. *(For information about the geology, soils and vegetation in the watershed, refer to the Newman Lake Restoration Feasibility Study by the Water Research Center.)*

About 85% of the watershed is forested and roughly 7% is in agricultural production. The remainder of the watershed contains residential development along the lake's shoreline and along the county road circling the lake. A few homes are scattered in the hills overlooking the lake and up the drainages feeding into it.

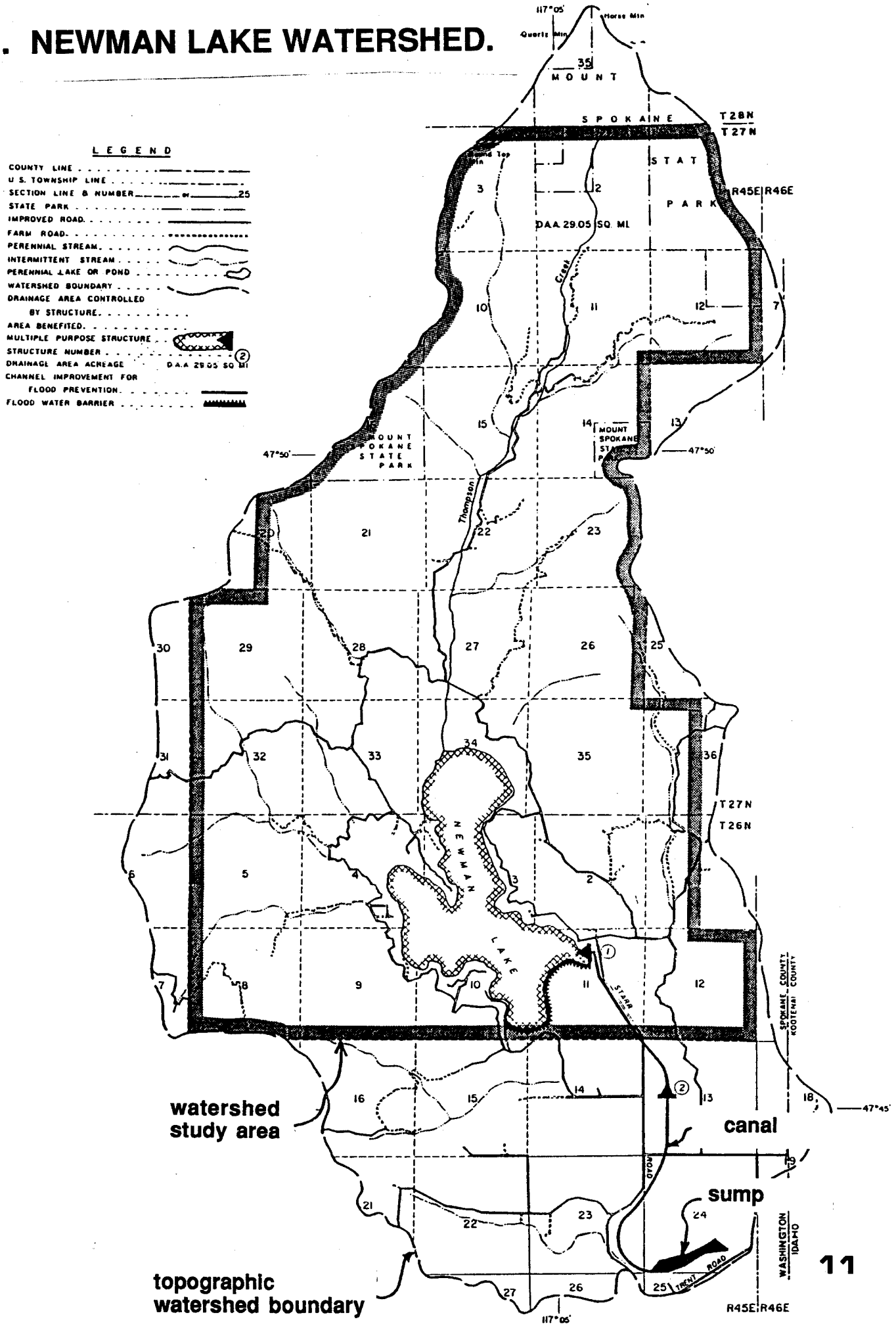
Land Uses and Trends

The Newman Lake Watershed has three basic land use types:

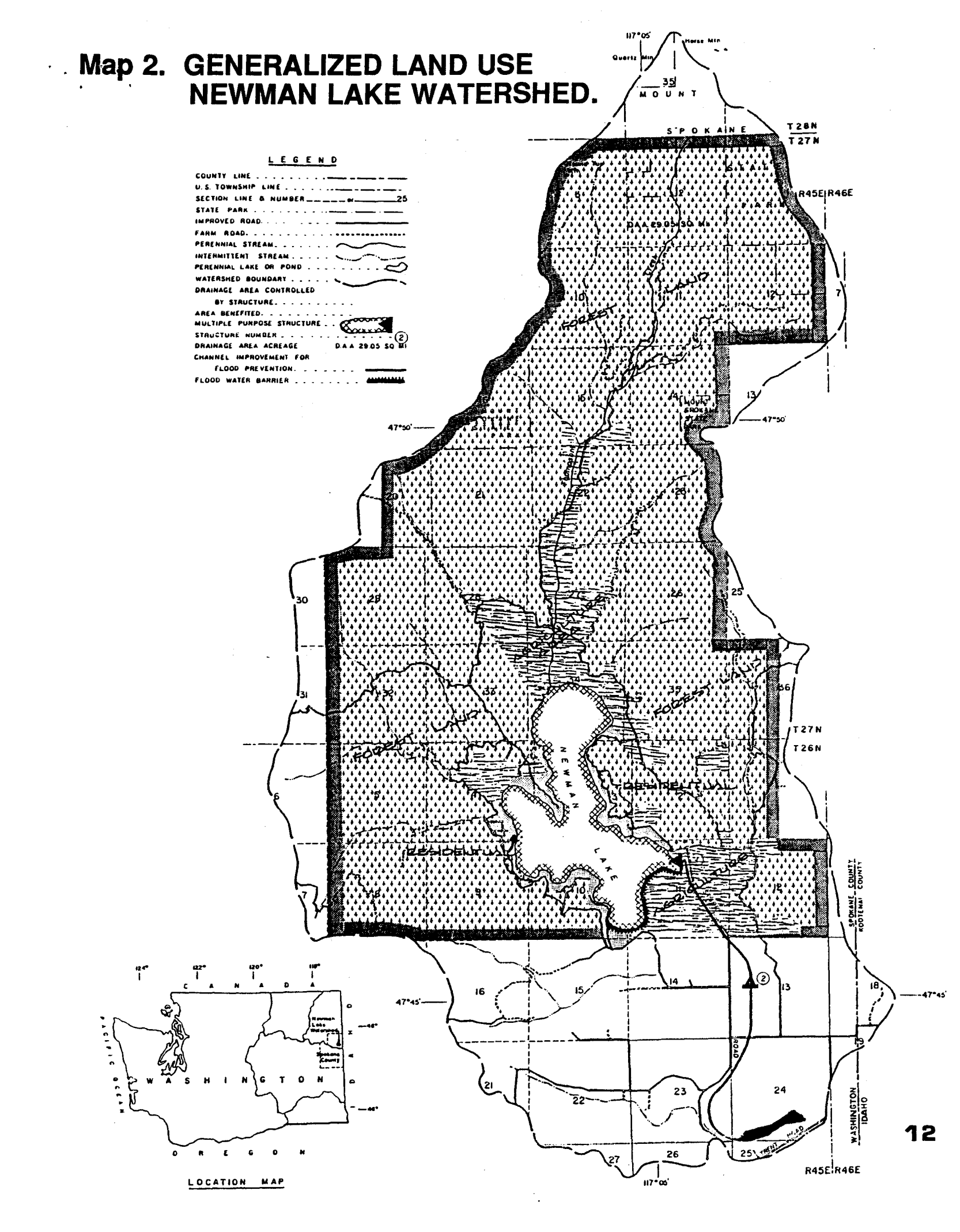
Land Use	Approximate Acreage	Percent
forest	15,725	85%
agriculture	1,295	7%
residential	1,480	8%
TOTAL WATERSHED	18,500	100%

Map 2 depicts the general land uses in the watershed.

Map 1. NEWMAN LAKE WATERSHED.



Map 2. GENERALIZED LAND USE NEWMAN LAKE WATERSHED.



residential: About 65% of the Newman Lake shoreline is developed. The remaining 35% is mostly flat, marshy farmland. Of the developed shoreline, 90% is steep-sloped (greater than 20% grade). The watershed plan committee identified from aerial photographs and windshield surveys 550 residences in the watershed. About 40% of these (218) are occupied year-round; 60% (332) are occupied only seasonally. Some of the cabins are used several weekends a summer; others are rarely visited. Lakefront homes number 307. Most of the residences were built prior to 1940 and most of the lots along the shoreline are small by current Spokane County standards. The Health District Survey in 1989 - 90 found that shoreline residential densities varied by areas around the lake. Much of the development along the lake shoreline seems random as cabins were used for weekend retreats, added onto and placed haphazardly on their lots.

Area Around Lake	Units Per Acre
north	mostly undeveloped
east, Muzzy's to Cherokee Landing	4 to 5
south	mostly undeveloped
west, Honeymoon to Sutton Bay	6 to 7
west, north of Sutton Bay	1 to 3
peninsula	5 to 7

While a few new homes (39) have been constructed in the watershed within the last five years (1986-91), the only major residential development has been the conversion of 23 old church camp cabins into residences (4 year-round and 19 seasonal) in the Twin Cedars area on the west side of the lake. On the east side of the lake there is a boarding facility for boys where the residents keep exotic animals.

The current year round population at the lake is estimated to be 545 (using an estimate of 2.5 persons per household). Many residents are retired and living on fixed incomes. The lake's hey day seems to have been in the 1920s through 1950s; this was a time when the lake swarmed with people in the summertime. Kids swam in the lake and their parents fished, boated and visited with neighbors. As the landowners aged, their children grew up and moved from the Spokane area or became too busy to spend summers at the lake. As the older people passed on, they left the cabins to their children who seldom, if ever, come to the lake. Some of the cabins have been sold, but others have been left to deteriorate. Some residents feel the lake is poised for an influx of younger people.

Recent development has been mostly limited to a few new homes on view property high above the lake, a few mobile homes installed on large parcels (10+ acres) up the drainages to the lake and individual cabin renovation, most commonly occurring when properties change hands. In the last few years a few families have purchased dilapidated lake homes and remodeled them for year-round living. A few other families are expanding their living space by adding rooms or stories.

Remodeling and bringing the homes up to current standards is expensive. Because much of the lake's shoreline is rocky, finding good water is a problem. Installing an adequate septic system that can handle the modern demands of dishwashers, clothes washers and several bathrooms per household is also difficult. Any activity which would result in increased wastewater flow (adding bedrooms, adding wastewater fixtures, changing occupancy from part-time or seasonal to full-time, etc.) must meet regulations for new septic systems. The

requirements include density restrictions based on soil type and water source. Current regulations require a minimum lot size of one acre for placement of a new septic system. Many lots around Newman Lake are too small to meet this density requirement for lots using individual private wells or lake water. In the Twin Cedars area, a community drainfield is being developed to serve 23 residences.

As part of the restoration project, the Spokane County Health District surveyed septic systems of lakefront properties in 1989 - 90. *See Appendix A for the Health District's complete report.* A total of 308 waterfront properties were surveyed. The types of wastewater disposal systems found include privies; cesspools; septic tanks with drainfields, leachbeds or absorption pits; holding tanks; porta potties; incinerator toilets and drywells for disposing of gray water. The survey summarized the proximity to the lake of the waste disposal systems:

Distance From Lake	**% of Systems Surveyed**
less than 25 feet	13
21 to 100 feet	41
more than 100 feet	47

The Health District survey also gathered data about water supplies. The survey found that 50 properties have private wells or share a well with neighbors. A public water system installed in 1988 in the Honeymoon Bay area now serves 61 residences there. The remaining properties, 65 percent of those surveyed, obtain their water from the lake.

recreational: In the 1920s six resorts operated around the lake, but only two are currently in operation. Sutton's Resort has a few rental units and provides boat docking facilities. Cherokee Landing has a small store with boat rental, boating supplies including gasoline, a fishing dock and 2 or 3 camping sites. The only public access to the lake is a heavily-used Washington Department of Wildlife boat launching and parking area. A picnic area has also been developed on a portion of the Wildlife property. Mt. Spokane State Park encompasses a small portion of the extreme upper areas of the watershed.

roads: A paved county road circles Newman Lake, and a paved spur runs out onto the peninsula. A gravel county road runs a few miles along Thompson Creek and another gravel county road, Foothills Drive, crosses the western portion of the watershed. The county roads are narrow and wind across steep terrain. Private roads serve several small developments of 10-acre or larger parcels. Rough estimates from 1986 aerial photographs show about 43 miles of County roads in the watershed and perhaps 38 miles of private roads (not including logging roads).

development regulations and trends: Various state and local regulations affect development practices in the watershed. The most obvious regulations are those associated with land use planning. The Spokane County Comprehensive Plan shows only one designation for the Newman Lake Watershed: *rural.* The comprehensive plan is a guide for development, allowing about one residence for ten acres under the rural category. Zoning is the means of implementing the comprehensive plan. In January 1991 a new Zoning Code went

into effect. The Zoning Code provides consistency with the comprehensive plan. All land in the Newman Lake Watershed is designated *General Agricultural* (one house per ten acres.)

An Aquifer Sensitive Overlay Zone covers about three quarters of the lake shoreline and some surrounding land. Within the overlay area, the minimum area allowed for one residence is five acres. The State Shorelines Management Act regulates development within 200 feet of Newman Lake and its associated wetlands.

Some residents believe the watershed has, due to natural problems, very little potential for development. The lack of adequate water supplies is often cited as one of the most important limiting factors, but some locations around the lake have been reported to have good wells which could support higher density development. The terrain and geology make installation of private or public water and sewer systems very expensive. The roads are narrow and steep, and many commuters who work in Spokane do not relish driving the roads in winter.

An owner of a large block of land which is now in forest and agricultural use would like to develop a golf course at the northeast end of the lake. He believes the beauty of the area and the rolling topography are unique assets for a golf course, possibly a restaurant and a condominium development around the golf course.

forestry: Approximately 15,700 acres of the watershed is forested. The most common species of trees in the watershed (in descending order) are: Douglas Fir, Grand Fir, Ponderosa Pine, Larch, Lodgepole Pine, Cedar and Hemlock. These species account for about 99% of the trees logged in the watershed. Ninety percent or more of the trees are probably 80 to 100 years old -- fairly even-aged. (Even-aged means all the trees in a stand are approximately the same age because they originated from a "catastrophic" event such as fire, blowdown, insect infestation, clearcut.)

Holding over 3500 acres of timberland (1990 figure), Inland Empire Paper (IEP) is the largest landowner in the watershed. IEP generally cuts trees when they are 60 to 100 years old in this area. It is estimated that the watershed contains roughly 10,000 to 15,000 board feet per acre volume standing timber. Perhaps 6,000 board feet per acre is taken in partial cutting operations.

Logging has occurred in the watershed since 1884. At any time, there are generally 6 or 7 logging operations active in the watershed. Between 1984 and early 1989 IEP logged roughly 2400 acres. Most of the activity was partial cutting. About 180 acres were clearcut and planted. Only one clearcut is visible from the lake and that area was planted in spring, 1990.

From 1988 through August 1990 the Department of Natural Resources received 19 applications for logging in the watershed from companies other than IEP. The applications covered about 2780 acres.

To determine whether a stand of trees will be partial cut or clearcut, timber managers evaluate the stand for quality (age, vigor, and species mix) and look at the terrain. If the timber is of mixed ages, has no disease and has mixed species, it can generally be partial cut. In Eastern Washington partial cutting is preferred by most timber managers because that allows the stand to regenerate naturally. When areas are clearcut, the Forest Practices Act requires re-planting and a minimum survival rate of at least 150 trees per acre.

Topography affects the logging method and road construction techniques. If the terrain is steep, different logging systems must be used to protect the environment and to harvest the

timber efficiently. If the terrain is fairly flat or gently sloped, then a ground based system can be used: equipment goes in, harvests the trees and skids them out. Steep terrain usually means that a cable skidding method must be used; cables are attached to a tower and the logs are dragged out to a landing. Then trucks haul them to the mill. Cable skidding has light impact on the soil as the trees are partially raised above the ground. Ground based logging causes more disturbance to the forest floor and soil, but the disturbance can encourage natural regeneration to occur.

Generally, timber companies in Eastern Washington do not use fertilizers to improve growth rates of plantations. Herbicide use is regulated by the DNR. All stream crossings are flagged and no herbicides are sprayed in these areas. Herbicide application would generally be used only for controlling roadside vegetation. No aerial application of herbicides has been done in the forested areas of the watershed. For any proposed aerial herbicide application, a State Environmental Policy Act Checklist would be prepared and the spraying monitored by DNR personnel to ensure the herbicide does not reach a stream.

From the 1986 aerial photographs, we estimate there are about 93 miles of major logging roads in the watershed, some of which were built a long time ago. IEP would like to get rid of old logging roads on company land, and each year tries to rip and seed about 10 miles of old roads (in their overall holdings, including areas outside the Newman Lake watershed.)

forestry regulations and trends: Timber harvest is regulated by the 1974 Forest Practices Act. The Department of Natural Resources is responsible for implementing that act passed to address concerns about water quality, fisheries, air quality and public improvements. The act regulates road construction, harvest methods, chemical application and reforestation. Any logging that removes over 5,000 board feet (about one loaded log truck) for sale is regulated by the act. In 1987 the act was revised to include Timber, Fish and Wildlife provisions in response to concerns from various groups.

For water quality protection, the act regulates road construction in terms of location (minimize stream crossings, avoid slide areas), design (drainage, excavation/fill), water crossings (sized for stream, armored to prevent erosion) and maintenance (required, abandonment practices.) Regarding timber harvesting practices, the act requires skid trail stabilization, draining of landings, limiting operations on certain soils during high moisture conditions and riparian management zones. For chemical application, a buffer around streams is required.

Under state law, the forest practices regulations are the only ones which shall affect forest practices, except State Shorelines regulations. Local agencies cannot make regulations further restricting forest practices.

Logging is done in cycles. IEP has been logging in the Newman Lake watershed since 1984. In a few years the company will most likely leave the area and then return again in another 10 years or so. Logging fairly intensively in one area, then moving to other areas and finally returning to the original area maximizes the use of logging roads and provides other economies of operation. The company plans to continue timber harvesting in the watershed into the foreseeable future.

The Department of Natural Resources owns a section in the watershed that has not been logged yet, but it probably will be within the next 10 years. As a landowner DNR prepares a management plan and a SEPA Checklist for an area to be logged. Then the operator is told

how to harvest the trees. A different department within DNR regulates the logging just as it would for any private operation.

Most of the logging activity in the watershed for the next few years will be partial cuts. Because of the unpredictability of the timber market and the current controversy surrounding logging practices across the country, it is difficult to predict the future of the logging industry. This watershed plan assumes, however, that logging will continue to be a major activity in this area. *(Information about current forestry practices and regulations/trends was from personal communication with Dennis Parent, Inland Empire Paper and Walt Obermeyer, Department of Natural Resources.)*

agriculture: Although farming and ranching began in the watershed in the 1880s, it has declined in the last few years. Since much of the watershed has steep slopes, there is relatively little agriculture taking place except in the flats south of the lake. Inside the watershed about 60 acres of grass seed are grown. Perhaps 930 acres are in alfalfa/hay production and another 710 acres is farmed for oats. On the west side of the lake are two farms. One is primarily for growing grass seed and the other produces hay.

The northern end of the lake and the bottomlands along Thompson Creek sustain hay crops and about 100 head of cattle. Twenty to forty head of cattle graze at the lake's northeast edge and along a seasonal creek. The cattle have recently been moved to higher ground to allow grasses in the lower pasture to come back. The owner wants to keep the land near the lake grazed. He says the cattle fertilize the land and keep weeds from intruding into the area.

Another 15 to 20 head of cattle are kept up along Thompson Creek and the remainder are scattered elsewhere in the watershed. No dairies or commercial pig farms or sheep ranches exist in the watershed today.

Alfalfa is grown in the area northeast of the lake. Fertilizers are used. One farmer who used to farm 400 acres at the southern end of the lake, but now farms only 80, grows oats. He notes that peat soils are devoid of phosphates but high in nitrogen. Generally he applies about 50 to 60 pounds of phosphates per acre. Because phosphates tie up in the soil particles, the fertilizer must be placed next to the seed or the seed will not benefit.

The farmer uses herbicides for weed control and five or six years ago, he used a pesticide (parathion) to control aphids. He uses ground spraying, but not aerial spraying. There were reports of aerial spraying in 1989 and 1990, but most farmers do not consider aerial spraying in the watershed to be economical.

agriculture programs and trends: Few regulations beyond those typically applied to other land uses affect agricultural lands in the watershed. Regulations under the 1985 Food Security Act generally apply only to highly erodible land. The Soil Conservation Service can provide technical assistance to farmers interested in developing conservation plans for their farms. The Agricultural Stabilization Service can provide cost sharing for grass, strip cropping, managing cattle operations, minimum tillage programs and stream bank protection. All of these activities can lessen the impact of farming practices on water quality. The Resource Conservation and Development Program can help individual farmers develop plans. Farmers in the watershed say there used to be dairies in the area and perhaps as many as 500 or 600 head of cattle belonged to one operation. They all agree there is no money in dairies and cattle ranches today. Farming operations are declining due to economics, soil types and climate in the watershed. Most "farmland" is being held for future residential development. The future of agriculture in the watershed is uncertain. Several of the farmers

are reaching retirement age and only a few have children interested in maintaining the farms. There will probably be a transition to more hobby farms, large lots where a homeowner can keep a cow or perhaps a horse or two. This trend raises concerns about future impacts on water quality from the smaller farms.

Projections

Looking at the growth and changing land uses in the area over the years and at regulations in place, we can make projections for the future. The watershed plan committee looked at several options.

a) One approach is to assume that the County's Comprehensive Plan will remain constant into the future and that most of the development in the watershed will be in ten-acre parcels. If we assume the entire watershed is developed for residential purposes (which is unlikely due to the viability of the timber resource and current ownership patterns), then we could see another 1,730 houses in the watershed. (18,500 acres in watershed, minus 1,200- acre lake = 17,300 acres at 1 house per 10 acres = 1,730 houses) This number of units could house approximately 4,225 people, quite an addition to the population base in the watershed.

b) A more realistic scenario might involve the conversion of all the agricultural land and perhaps ten percent of the timber land to residential uses. We might also assume that some of the legally platted but vacant lots will be built upon. We estimate there are about 116 legally platted, vacant shoreline lots. Not all these lots can be built upon because some cannot meet minimum frontage requirements, have no access to a publicly maintained road, are unsuitable for septic systems and cannot meet other regulations. We might assume that half of the lots can be built upon (this estimate is probably high). Under this scenario, we would see 1,698 acres of agricultural land turned into 169 ten-acre parcels; 1,570 acres of timber land converted to 157 ten-acre parcels; and 55 smaller lots built upon. This adds up to 381 new units or 952 additional year-round residents in the watershed.

c) A third scenario was developed by members of the Development Subcommittee. The projection is based on three major assumptions:

- Spokane is and will remain in a growth pattern exceeding national averages for years to come.
- As area growth occurs, development pressures for desirable land such as that around Newman Lake may outweigh zoning restrictions.
- As people become accustomed to longer commutes, growth will occur and the existing transportation system will expand.

The projection assumes by the year 2020, 50% of existing seasonal homes will be converted to year round use, another 41 homes will be built on already platted (but currently vacant) lots along the shoreline, another 169 houses will be constructed on agricultural land and another 157 on what is currently timber land. This would mean a total of 822 new homes in the watershed and about 2,055 more people living in the area year round.

The projections from these three scenarios range from an additional 380 to 1730 units and from 950 to 4225 new residents. The construction of new homes, driveways and roads will remove vegetation, increase erosion potential and increase surface water runoff. The new residents will use the lake for recreation, and the residents, their pets and livestock will produce wastes requiring proper disposal. To accommodate growth while ensuring no further degradation of the lake's water quality will be a challenge.

IV. BENEFICIAL USES

Water Supply

Most lakefront properties use lake water in one way or another; most use it for irrigation. About sixty-five percent of lakefront properties use lake water for toilet fixture, sink and/or shower/bath. A small percentage uses lake water for drinking with a variety of filter processing methods employed.

Recreation

The most obvious beneficial use of the lake is recreational. The best data about the recreational use of the lake is contained in the feasibility study prepared by the WRC. That report states:

> *. . . During mid- and late-summer there may be between 15,000 and 30,000 tourist visitors to the Newman Lake. These people generally come from the nearby Spokane metropolitan area to enjoy fishing, boating, water-skiing, and other recreational opportunities offered by the lake. (p. 19)*

As noted above, recreational access to the lake is from private property, two resorts and one WA Department of Wildlife boat launch facility. For the past few summers a group of young people have performed on the lake as an acrobatic ski team.

The beauty and recreational value of the lake are the reasons most residents choose to live there.

Fishery

Newman Lake is shallow, with a maximum depth of 30 feet, and the lake is managed by the Washington Department of Wildlife primarily as a warm water fishery. The focus is on spiny-ray, mainly large-mouth bass. Annually the Department plants 15,000 to 20,000 German Brown Trout in the lake, but the plants will probably be reduced in future. The Department expects to continue managing the fishery as in the past, keeping tabs on the fish and their growth rates. *(Personal communication, Bob Peck, Washington Department of Wildlife, 12-20-89.)* While detailed, current information about fishing at the lake is unavailable, the feasibility study (p. 18) estimated that about 8,500 fishing days are spent at the lake annually.

Waterfowl

The WRC feasibility study (p. 19) noted that the lake "serves as a migratory stopover for about 5,500 waterfowl of various species, mostly pintail and mallard. . ." A fairly large population of geese also frequent the lake, and in the winter bald eagles can be spotted fishing. At least one osprey family and several great blue herons call the lake home part of the year.

V. WATER QUALITY PROBLEMS

The development, forestry and agriculture subcommittees described water quality problems from each of their perspectives. A few natural sources of nutrients (such as ducks, geese and wildlife) were mentioned, but the focus is on water quality problems associated with human activities. The watershed plan committee reviewed and discussed the problems and ranked the identified problems within each subcategory.

Development

The development subcommittee identified problems associated with development, household practices and recreational use of the lake. The subcommittee's list:

a. Poorly constructed private roads are erosion sources; sediment washes from roads and driveways carrying nutrients into streams and the lake.
b. Antiquated septic tanks/cesspools/drainfields are a concern.
c. Stormwater/spring runoff is not being correctly channeled or filtered before it reaches the lake.
d. Removing natural forest floor increases sediment loading to streams and the lake.
e. Off-road vehicles scar the landscape and increase erosion.
f. Overuse of fertilizer and water in the landscape/garden add to the lake's nutrient load.
g. Boats may be leaking gas and oil into the lake; gasoline spills into the lake when boats are filled.
h. Cleaning of fish in the water adds nutrients.
i. Litter from boaters/fishermen can contribute to water quality problems.
j. Household hazardous waste such as pesticides, cleaners, paint, etc. may not be disposed of properly.
k. Burning fires on the beach adds to nutrient load.

Although the watershed plan committee felt that septic systems are a major water quality concern, the Health District survey does not support this assumption as strongly as anticipated. The Health District report, Appendix A, states:

> *Of the 308 properties surveyed, only 16 actual sewage system failures could be identified. None of these failed systems involved raw toilet waste. They were graywater discharges from kitchen and lavatory sinks. (The toilet waste was being disposed of separately by means of a Porta-Potty, incinerator toilet, or privy.)*
>
> *Fourteen of these failures were identified without the use of dye since the discharge pipe and evidence of wash water and kitchen sink waste was readily evident at the end of the pipe. Additionally, the property owners were aware of the situation and indicated they knew they needed to correct it. The remaining two failing graywater systems were found using tracer dye.*
>
> *The Health District anticipated finding a considerably larger number of sewage system failures based on high density in the developed areas, shallow soils overlying bedrock, steep slopes, and what appeared to be a significant number of cabins located next to the lake. (page 3)*

The Health District report concluded that the reason more failures were not detected related to the seasonal occupancy of many lakefront homes and to the low number of wastewater fixtures (clothes washers, waterflush toilets, etc.) in the homes. The Water Research Center is continuing in-lake tests and groundwater movement monitoring to provide additional information about the potential impacts of septic systems on the lake.

Forestry

The forestry subcommittee addressed possible water quality concerns associated with timber practices. The subcommittee reviewed the WRC feasibility study, listened to comments in the initial watershed plan committee meetings, and noted what was observed during the field trip. The subcommittee studied the following list using the latest applicable published research and the best evaluation from their collective experience.

a. sedimentation from unauthorized off-road vehicle use
b. sedimentation from active roads
c. sedimentation from unauthorized use of roads
d. sedimentation from abandoned roads and roads constructed prior to the 1974 Forest Practices Act
e. pollution from garbage dumping
f. nutrient flow and sedimentation from timber harvest

Sedimentation from active roads had been an historical problem prior to the Forest Practices Act. Since that time actively used roads are required to have drainage structures which avoid sediment discharge into flowing water. Active roads for uses other than forestry activities are not subject to Forest Practices rules but may be subject to other agency regulation. Problems occurring from forest practice roads can be dealt with through the Department of Natural Resources; others need to be addressed through this watershed plan.

Perhaps the most troublesome activities in the forest come from unauthorized use of forest roads and forest lands by the public. Off-road vehicles, particularly motorcycles, damage the environment as they remove native vegetation and gouge trails down steep slopes that erode. Sediment carries nutrients down to the nearest water course and then into the lake. Sedimentation from unauthorized off-road vehicle use was observed in the Thompson Creek drainage during the field trip. Although it is a recognized problem, there is little regulation outside civil trespass law.

Another problem with public use of the forests is garbage dumping that occurs sporadically throughout the watershed. This illegal activity cannot be easily controlled. Leachate from the garbage may affect the water quality if in proximity to a stream.

Sedimentation from unauthorized road use, abandoned roads and roads constructed prior to the Forest Practices Act are related issues. The plan should address this, considering possibilities such as road closures, barriers and "putting roads to bed" by the removal of culverts and bridges. One landowner is in the process of ripping and seeding abandoned roads to reduce potential sedimentation and to return the land to forest production. Such action is costly and the plan should evaluate the benefits, then prioritize problem sites. The burden of such costs should be addressed also.

Nutrient flow and sedimentation from timber harvesting practices including clearcutting were discussed extensively on the field trip and in committee. Committee members asked whether current Forest Practices Regulations adequately address this issue. Observations from the field trip showed that water bars and riparian buffers provide catchment for

sedimentation but concerns were raised about non-visible pathways, such as groundwater flow. Some members of the committee reviewed the most recent scientific literature. *(See Appendix B for a copy of the original forestry subcommittee report and discussion of the studies reviewed.)* The forestry subcommittee felt that nutrient loading from current harvest sites has minimal adverse effects on the quality of water flowing into Newman Lake.

Agriculture

One of the results of agricultural activities in the lower Thompson Creek drainage over the last hundred years has been the changes in the physical characteristics of the stream and its riparian areas. Before development, this creek probably consisted of numerous meanders and surrounding wetlands with lush vegetation. This configuration slowed stream velocity and lengthened the time water was in the stream, causing sediments to filter out and nutrients to be absorbed by the vegetation. Beaver dams probably also enhanced this filtering effect.

The stream has been drastically altered as wetlands were drained and fields were prevented from flooding. The lower Thompson Creek channel appears to have been straightened, allowing stream water to enter the lake much faster with less chance for nutrient and sediment loss. Soil exposed to erosion from annual plowing adds to the nutrient loading. Some filtering of nutrients and sediments may occur in the cross-drain ditches that are allowed to remain vegetated.

The study by the WRC identified these problems from agricultural activities:

- **a.** Excessive grazing, removing vegetation cover that helps trap sediments and excrement before they reach streams or the lake.
- **b.** Erosion along streams, caused by agricultural practices.
- **c.** Fecal matter deposited in streams.

Other concerns listed by the Agricultural subcommittee were:

- **d.** Fertilizer use.
- **e.** Lack of buffers along streams and lake shoreline.
- **f.** Herbicide spraying in ditches by County.

Priorities

The watershed plan committee reviewed the reports from each subcommittee and added other problems to each list that the group felt could be contributing to water quality problems in the lake. The group ranked within each category the problems where attention should be focused. Page 23 shows the results of the ranking procedure.

The committee ranked the most serious problems in the development category as erosion from private roads, inadequate waste disposal and stormwater runoff. Although the preliminary results of the Health District septic system survey identified few septic systems that discharge directly to the lake, some residents still feel there is a problem.

The major committee concerns associated with forestry are sedimentation from active roads, off-road vehicles and unauthorized use of roads. In the agricultural category, inadequate stream and lake buffers was ranked as the number one priority. Agricultural fertilizers and excessive grazing were other concerns.

Watershed Problems as Ranked By Watershed Plan Committee

DEVELOPMENT ACTIVITY	# of "votes" by rank 1st	2nd	3rd	TOTAL POINTS*
erosion (private roads)	11	3	4	43
waste disposal	9	5	1	38
runoff	6	9	2	38
clearing trees	6	4	2	28
off-road vehicles	3	3	7	22
building/remodeling	3	4	2	19
over fertilizing lawns	2	4	3	17
boating/fishing	0	4	7	15
hazardous waste	0	1	6	8
wildlife	2	0	0	6
beach fires	0	1	2	4

FORESTRY ACTIVITY	# of "votes" by rank 1st	2nd	3rd	TOTAL POINTS*
sedimentation (off-rd. vehicles)	5	10	0	35
sedimentation (active roads)	11	1	0	35
unauthorized road use	3	7	3	26
sedimentation from pre'74 roads	4	4	6	26
inadequate stream buffers	5	1	2	19
clearcutting	5	1	2	19
garbage dumping	2	0	6	12
skid trails	0	3	4	10
burning	0	1	5	7
nutrients from timber cutting	1	0	2	5

AGRICULTURAL ACTIVITY	# of "votes" by rank 1st	2nd	3rd	TOTAL POINTS*
inadequate stream/lake buffers	14	2	3	49
ag. fertilizers	2	9	3	27
excessive grazing	2	6	8	26
wetlands degradation	5	1	6	23
erosion along streams	3	3	4	19
herbicides (ditches)	2	5	2	18
fecal matter in streams	4	1	4	18
ag. pesticides	0	4	2	10
aerial spraying	1	1	1	6
peat soils	1	0	1	4
geese/waterfowl	0	2	0	4

*Total points were calculated by giving a value of 3 points to a first place ranking, 2 points to a second and 1 point to a third place ranking.

VI. RECOMMENDATIONS -- AN ACTION PLAN

Newman Lake area residents are action-oriented. We want to see improvements in the lake's water quality. Each subcommittee of the watershed plan committee studied the problems associated with the individual land uses and recommended means of solving those problems. The whole committee discussed and generally agreed to the recommendations listed here in 1990. Implementation of these recommendations is tied to a timeline, and each group or agency responsible for implementation is identified.

Development

Public education is the key to reducing impacts from current household and landscaping activities in the watershed and reducing impacts from the future development we expect. Individual property owners within the watershed need to understand how they impact the lake and what they can do to alleviate that impact.

1991: The focus in 1991 will be on educating property owners about water quality problems and what they can do to improve the situation and on establishing within the Newman Lake Property Owners Association (NLPOA) subcommittees to carry on the work outlined by this watershed plan.

The NLPOA will prepare and distribute an information packet containing background information about water quality problems and a common sense homeowner's manual with "Dos" and "Don'ts" for improving the watershed. The packet will include:

- homeowner hints (phosphate use, beach fires, hazardous waste disposal, toxic cleaner alternatives, how to dispose of household and landscaping wastes, telephone numbers to call for assistance, etc.) The committee has already received permission from the Chesapeake Bay Foundation to use information developed by that organization.
- water conservation techniques;
- septic system maintenance information;
- landscape/gardening hints (landscaping with native plants, fertilizer and pesticide use, landscaping to prevent erosion,);
- stormwater runoff and erosion control information (best management practices for filtering stormwater and for preventing erosion; reference to the Department of Ecology's "Construction Erosion Control" publication) ;
- driveway and private road building and maintenance tips, with emphasis on driveways or roads crossing or near streams;
- fishing and boating information (waste disposal, milfoil education, regulations about gasoline filling for boats);
- Best Management Practices for streams and wildlife protection (how to prevent pollution and protect natural areas);
- alternatives to county roadside spraying that can be implemented by individual homeowners; and
- agencies, regulations and permits needed for shorelands development or construction.

The NLPOA will hand-deliver the information packet to all households around the lake. The County Building Department will distribute the packet to contractors and builders working in the Newman Lake watershed on new homes and on remodelings or conversions of summer to year-round homes. The NLPOA will meet with local realtors to let them know the packet is

available and to encourage them to pass the information along to prospective purchasers of property in the watershed. When Newman Lake properties are listed on the market, the NLPOA will send the realtor a fact sheet reminding her/him of the information packet and the efforts of local residents to protect the lake. The information packet will be the cornerstone for the NLPOA's ongoing education effort.

Recreational visitors to the lake must also be educated as to what they can do to maintain water quality. Visitors need to know they play an important role in protecting the fishery and waters they come to enjoy. The NLPOA or other organizations will post informational signs at the following locations:

- at the boat launch, urging visitors to limit waste disposal from boats, to refrain from cleaning fish in the water and along the shores and to prevent the spread of milfoil and purple loosestrife.
- in off-road vehicle areas, pointing out erosion damage and its detrimental impact on the watershed. In severe cases, there may be a need for gates, concrete barriers, or regulation enforcement in dealing with those not reachable through education.
- in off-road dump areas, regarding illegal garbage dumping. As the cost of legal dumping increases, illegal dumping will become a bigger problem, especially along Thompson Creek. Department of Ecology stencils reading "Dump No Waste, Drains to Lake" will be used. "Woods Watch" signs could be posted giving the telephone numbers of private landowners to contact if dumping is occurring on their properties.

Compliance with these guidelines by homeowners and recreational visitors would, for the most part, be voluntary but will increase if we in the watershed adopt a "concerned neighbors" attitude. Homeowners will be educated as to what activities are harmful to the lake and encouraged to report such practices to the proper authorities (a list of agencies and telephone numbers will be included in the information packet). Before long, Newman Lake will become known as an ecologically conscious area whose inhabitants are aware of what is going on around them and are willing to work with one another to protect the environment.

As explained below, recently Inland Empire Paper has contracted with a private security firm for surveillance of their forestry lands. In 1991 the NLPOA will explore means of securing a person to patrol the watershed to identify activities affecting water quality and to talk with residents and to contact the appropriate authorities when necessary. One option is to follow the lead of IEP and hire a private security agency for the patrol.

Preparing, printing and distributing the information packet and preparing and posting the signs will require funding. We propose to use one-half of the funds available for implementation of the watershed plan under the Referendum 39 grant as seed money for the packet and signs. To secure the additional funding required, the NLPOA will form a fund-raising committee to approach both public agencies and private industry for donations and/or services. Profits from the manufacture of "We're Saving Newman Lake" T-shirts and bumper stickers could also be used.

In 1991 the Health District will continue working with homeowners whose septic systems are failing to ensure problems are corrected. Future problem septic systems will be dealt with individually, or, for area failures, through construction of small community systems. Spokane County Health has indicated a willingness to work with people on a case-by-case basis for adequate solutions. Perhaps septic systems could be tested periodically so that homeowners converting from seasonal to year-round occupancy could make sure their systems are operating properly and not adding pollution to the lake.

The Watershed Plan Committee will review current ordinances concerning private roads, to evaluate their effectiveness in preventing erosion and protecting existing vegetation. The committee will discuss the possible need for new regulations to protect Newman Lake's Watershed as a unique and special area. As noted previously, in 1991 the majority of the Newman Lake Watershed will be zoned "rural" allowing one home per ten acres. Further restrictions may be needed in some areas to protect the wetlands and stream corridors in the watershed. Close contact with the Planning Department will help as individual developments come up for review. The NLPOA needs to be placed on a county list for notification of any upcoming area development proposals.

Newman Lake property owners have already contacted County Planning seeking an update of the shorelines program for the Newman Lake area. Wetlands are of special water quality value and must be identified and protected to provide future wildlife habitats and to provide filtering of pollutants.

The NLPOA will continually work to obtain information about projects proposed for the lake area that might impact water quality. A concern raised during committee meetings was the current procedure for permitting the application of herbicides to lakes in Washington. The watershed plan committee feels that we should be informed and allowed to comment whenever an application for herbicide treatment of Newman Lake is being considered by the Department of Ecology.

In 1991 we will set up the means of seeing that the recommendations of this watershed plan continue to be implemented after the lake restoration project is completed. The NLPOA will organize a watershed committee within its organization to continue to work on watershed education and projects. In addition, the watershed plan committee will work with the NLPOA to establish an ongoing liaison committee to maintain ties with those involved in forestry and agriculture in the watershed and to continue discussion of any future problems that may occur. At least one meeting a year to review progress will be needed.

Finally, in 1991 the watershed committee will ask the WRC to establish a monitoring station and to train volunteers for future water quality monitoring by the NLPOA when the lake restoration project is completed. Results of the monitoring will be reported to the Newman Lake Flood Control Zone District.

1992: The activities required in 1992 will depend to some degree on the progress made in 1991, but other projects we recommend the NLPOA consider include:

1. Work with the marine division of the Sheriff's Department to hold a boater education day in the spring.
2. With the cooperation of landowners and off-road vehicle clubs, sponsor an off-road vehicle education day.
3. Discuss the feasibility of an Adopt-A-Stream Program's being set up by Thompson Creek landowners and the East Valley School District.
4. Organize Newman Lake Clean Up Days in the spring and fall to pick up refuse.
5. Work with Spokane County Health District to set up a program providing ongoing testing of existing septic systems to identify and deal with problems quickly.
6. Evaluate the need for an ordinance requiring low flush toilets and water reduction shower heads in all new buildings and remodels.

SEWAGE SYSTEM SURVEY

FOR

NEWMAN LAKE WATERSHED

Spokane County Health District

Dennis Kroll
Director, Environmental Health

Rick Manson
University of Washington Student

Pam Denton
Eastern Washington University Student

Fall 1990

Appendix A.

I. PURPOSES OF ON-SITE SEWAGE SYSTEM SURVEY

- provide to Newman Lake Flood Control Zone District a survey of the present status of on-site systems on the Newman Lake waterfront as required by the Newman Lake Restoration Project

- determine the extent of water quality problems attributable to improperly operating sewage systems on lakefront properties

- develop recommendations for improving and maintaining on-site systems within the Newman Lake Watershed

Summary

Three hundred and eight separate waterfront properties were surveyed. Of this number, 16 on-site sewage systems were found to be operating improperly. In 14 of the 16 failing systems, direct discharge of graywater was readily apparent from sink waste line pipes discharging directly onto the ground surface. The other two failing systems were found by evidence of the colored fluorescein tracer dye that had been placed into a plumbing fixture.

A total of 78 water samples were taken to test for the concentration of fecal coliform bacteria in the lake water. Of these sampling locations, 74 were preselected based on the probability of finding lake contamination resulting from failing on-site sewage systems within 100 feet of the lake. Three of the 78 samples were taken at different locations near the center of the lake. These samples showed zero fecal coliform contamination. One of the 78 lake water samples was obtained along the undeveloped shoreline in the NE 1/4, Section 34, Township 27, Range 45. This sample showed the highest fecal coliform count we encountered, 330/100ml. Since the area of this sample had been used as pasture land, the source of fecal contamination can likely be attributed to cattle.

Another lake water sample was taken along a shoreline area 250 feet south of the public boat launch. This sample showed the second highest fecal coliform bacterial count at 230/100ml.

Another 3 of the 74 sample locations where failing septic systems were suspect revealed fecal coliform concentrations of 110/100 ml, 140/100ml and 94/100ml.. These three sampling locations were within a 400 foot shoreline area near Shadow Bay on the west side of the lake.

When the properties along the Shadow Bay shoreline were dye checked in August, 1989, there was no evidence of surface discharge from any existing on-site systems. These same properties were vacant when the Health District representative attempted to recheck the on-site systems during the high groundwater table season in the spring of 1990.

The remaining 70 lake water samples showed fecal coliform levels of fewer than 50/100ml. The mean was 18/100ml with a median of 2/100ml indicating that wastewater high in fecal coliform bacteria was not contaminating the lake. The most probably source of fecal coliform in the lake water was from waterfowl, domestic pets and the various wildlife species that inhabit the area.

Fecal coliform bacteria is a good contamination indicator; however, the numbers of fecal coliform colonies found in the lake water samples near the developed areas are not necessarily indicative of failing on-site systems. Before fecal coliform contamination can be

attributed to a human source, the number of colonies must be near 1600/100ml. In the areas where septic systems were being used, only 50 to 230 colonies per 100 ml were found.

II. METHODOLOGY

Survey procedure

A survey of on-site sewage disposal systems was conducted to determine the amount of wastewater that could be generated on each property, the method(s) being used to dispose of the sewage and the proximity of the disposal systems to the lake.

A survey form was developed (see appendix A-1) and mailed to each property owner. Rick Manson, a University of Washington summer student, conducted the survey for the Health District during the summer of 1989. Manson made appointments with individual property owners, performed dye tests on the sewage systems and assisted the property owners in completing the survey forms.

The questions on the survey form included the number and type of wastewater fixtures, occupancy status of the structure (seasonal versus year-round), type of sewage system(s), system location(s) relative to the lake, maintenance status, drinking water source, and information on neighbor's water source and sewage system if known. A Findings of Field Survey Form (attachment A-2) was developed to record results of the dye testing, record lake water sampling locations and lab results and to plot as-built drawings of existing sewage systems as described by the property owner.

Assessor's maps

Section maps obtained from the Spokane County Assessor's Office were used to locate individual lots by parcel number, plot informations obtained from the survey forms and to compare the information.

Tracer dye

A large molecule tracer dye was placed into various water flush fixtures (sinks, toilets.) (Only one fixture was dyed if the property owner said that all wastewater fixtures were connected to one sewage system.) Various colors of dye were used to differentiate one wastewater source from another in the event the dye surfaced on the ground or was evident in the lake. The tracer dye is formulated to trace various sources of sewage flow for both public and private sewage systems. Thus, the dye does not damage sewage systems nor is it hazardous to an aquatic environment.

The amount of dye placed into the wastewater fixtures varied from 100-500ml followed by 10-15 gallons of water to sufficiently purge the sewage system. Prior to installing the dye, the Health District verified with the property owner that the structure had been occupied 24-48 hours prior to the test.

Following placement of the dye into the wastewater fixtures, the area of the sewage system was examined carefully for the presence of the dye as well as other failure indications such as lush green vegetation and spongy or marshy soils. In most instances, properties were rechecked within 24 hours after initial dye installation. Those properties whose sewage systems were within 25 feet of the lake were rechecked in 4-6 hours after dye introduction.

Fecal coliform sampling

Water samples were collected in 125ml sterile sample containers provided by the Health District laboratory. Samples were collected on Monday of each week and delivered to the laboratory within 4 hours and analyzed for fecal coliform bacteria according to the required laboratory protocol. After a 96 hour two-step incubation process, the fecal coliform counts were conducted using standard methods.

Fecal coliform/fecal streptococcus ratio

During the initial survey in 1989, there were areas where dye checks revealed no sewage system failures, but fecal coliform bacteria counts in the lake water were elevated. Also, three general locations of the sewage systems were in areas where spring season high groundwater tables could mix with the sewage systems. These systems were scheduled for a second dye check in the spring of 1990.

Lake water samples were also taken again for fecal coliform analysis. The laboratory procedure, however, included another step to determine the ratio of fecal coliform to fecal streptococcus to identify possible sources of the bacteria. These bacteria are typically found in the intestinal tract of all warm blooded animals and humans. They can be characterized as being of human or animal origin based on the ratio of fecal coliform to fecal streptococcus (FC/FS.) Human FC/FS is 4.4, cow FC/FS is 0.2 and duck FC/FS is 0.6. Therefore, a ratio greater than 4.1 indicates pollution form a human source. Ratios less than 0.7 suggest pollution from a nonhuman source. Rations between 0.7 and 4.4 are indicative of mixed human and animal sources.

Out of the 26 water samples taken, 18 revealed ratios less than 0.7; the remaining 8 had ratios between 0.7 and 4.0. In order for a human source to be suspected, the fecal streptococcus must be 400/100ml. None of the samples taken approached this amount.

III. RESULTS AND DISCUSSION

Of the 308 properties surveyed, only 16 actual sewage system failures were identified. None of these failed systems involved raw toilet waste. They were graywater discharges from kitchen and lavatory sinks. (The toilet waste was being disposed of separately by means of a Porta-Potty, incinerator toilet or privy.)

Fourteen of these failures were identified without the use of dye since the discharge pipe and evidence of wash water and kitchen sink waste was readily evident at the end of the pipe. Additionally, the property owners were aware of the situation and indicated they knew they needed to correct it. The remaining two failing graywater systems were identified using tracer dye.

The Health District anticipated finding a considerably larger number of sewage system failures based on high density in the developed areas, shallow soils overlying bedrock, steep slopes and what appeared to be a significant number of cabins located next to the lake.

The land use and density characteristics in the areas surrounding the lake:

- East side of the lake between Muzzy's and Cherokee Landing density - 4.5 cabins per acre (Hoyts Subdivision - 5 cabins/acre; Hood's Subdivision - 4 cabins/acre.)

- Northeast side of the lake, north of Muzzy's to the peninsula - virtually undeveloped. Mostly marshland and pasture for cattle.

- Southeast and south end of the lake - undeveloped portions are marshland. Most of the south end is farmland.

- West side, north of Sutton Bay - 1-3 cabins/acre.

- Honeymoon and Sutton Bay areas - 6-7 cabins/acre.

- Peninsula area at north end of lake - 5-7 cabins/acre in developed area.

According to the Spokane County Soil Survey published by the USDA Soil Conservation Service, the soils in the developed areas are the Moscow and Spokane soil series. These soils, according to the USDA Soil Engineering Interpretation, are rated "severe" for drainfield systems, primarily due to slopes ranging from 30%-70%, bedrock at depths less than 30 inches and 20%-50% exposed bedrock.

According to the Health District survey, the location of the sewage systems relative to the lake are:

- 13% of all systems surveyed are less than 25 feet from the lake

- 41% of all system surveyed are from 21 feet to 100 feet from the lake

- 47% of the sewage systems are over 100 feet from the lake.

Factors contributing to not finding more sewage system failures are:

1. water source:

• 65% of all systems surveyed obtain water from the lake; many of the users of lake water do not filter or disinfect so the drinking water they use is bottled water or water from their homes elsewhere.

• Most of the properties which use lake water have not developed their property for occupancy on a year-round basis. Typically, the only wastewater fixtures on these properties consist of a toilet, bathroom sink and kitchen sink. Some have a shower for bathing purposes, but many do not have bathing facilities. None of these properties had laundry facilities.

2. occupancy status

• Only 27%-31% of the properties surveyed were being occupied on a full-time/permanent basis.

- In the Honeymoon Bay area, 51% of the properties were occupied only on weekends, holidays and vacations (less than 30 days per year.) In this same area, 22% of properties were occupied on a seasonal basis or 90-120 days per year.

- In the Muzzy to South Hampton area located on the east side of the lake, the weekend/holiday occupancy rate was 29% with 40% occupying on a seasonal basis (see Attachment A-3.)

3. wastewater fixtures

   - Only 1/3 of all properties surveyed had automatic clothes washers.

   - 60%-63% of all properties surveyed had:
     1 - waterflush toilet
     1 - kitchen sink
     1 - lavatory sink in the bathroom

   - 14%-17% of all properties surveyed had Porta-Potties, incinerator toilets (operated by propane or electricity) or used a privy. The graywater was discharged to either a drywell or a rock sump (see Attachment A-3).

IV. CONCLUSIONS AND RECOMMENDATIONS

In the Newman Lake area, there area a variety of sewage disposal arrangements consisting of septic tanks and drainfields, drywells, cesspools and gravel sumps. Most of these systems are located on steep terrain in shallow soils overlying bedrock. Many of these systems are shared by cabins on separate properties beyond the ownership and control of at least one of the user properties. The occasional, infrequent use of the cabins connected to these sewage systems is the primary reason there is not more evidence of sewage system failures.

For most of these systems, any increase in sewage volume such as the addition of a second bedroom, another lavatory sink or adding a shower or jacuzzi may be all that is needed to cause the existing sewage system to fail. Without any changes in the cabins or additional plumbing fixtures, just more people using the cabin at one time or a longer period of use could cause present sewage systems to fail.

What long-term options could be considered for the present sewage disposal problem?

- Construct a public sewer system to serve all Newman Lake properties. The disadvantage to this is the excessive cost of sewer construction. Assessments to individual property owners may exceed present property values. There is no evidence the public benefit would be offset by the cost.

- Cluster of properties within defined areas may consider developing community sewage systems. (This is currently being done at the Twin Cedars development on the west side of Newman Lake.) This option would allow individual properties to be improved and enlarged without restrictions on the increasing daily wastewater flow.

What restrictions currently exist for property owners desiring to upgrade their present sewage system?

- Provided there will be no increase in the present daily wastewaters flow volume, any on-site sewage system may be replaced/upgraded.

Examples of increased wastewater flow include:

- adding bedrooms.
- adding wastewater fixtures. This includes the conversion of privies and incinerator toilets to waterflush toilets.
- changing occupancy from part time and seasonal to full time.

Any property proposing an increase in flow volume must meet regulation requirements for initial construction. This includes density restrictions based on soil type and method of water source. Most properties cannot meet current regulation requirements since a minimum of one acre land area is needed for each dwelling unit. This is based on the water source being an individual private well or use of lake water.

Essentially all Newman Lake area property owners who currently use their properties on an intermittent seasonal basis will continue to be restricted to such use of their properties until a public sewer or community sewer system becomes available.

APPENDICES

A-1. Survey Form

A-2. Findings of Field Survey Form.

A-3. Facilities Summary.

NEWMAN LAKE SURVEY FORM

PROPERTY IDENTIFICATION: SUBDIVISION NAME_____
LOT_____BLOCK_____ PARCEL#_____
STREET ADDRESS_____

CURRENT PROPERTY OWNER_____
OWNER'S MAILING ADDRESS_____PHONE_____
OCCUPANT_____
OCCUPANT'S MAILING ADDRESS_____PHONE_____

APPROXIMATE YEAR ORIGINAL STRUCTURE WAS BUILT_____
HAS STRUCTURE BEEN REBUILT/REMODELED? [ ]yes [ ]no IF YES, APPROX. YEAR_____
NATURE OF REMODELING:
__INTERIOR - EXPLAIN_____
__EXTERIOR - EXPLAIN_____
__BOTH - EXPLAIN_____
__APPROXIMATE SQUARE FOOTAGE ADDED_____

EXISTING PLUMBING FIXTURES:
KITCHEN SINK [ ]yes [ ]no
BATHROOMS [ ]one [ ]two [ ]three [ ]none
[ ]SHOWER [ ]tub [ ]combo shower/tub TOTAL #_____
BATHROOM WASH BASIN [ ]yes [ ]no TOTAL #_____
TOILET(S) TOTAL #_____
LAUNDRY WASHING MACHINE [ ]yes [ ]no LAUNDRY UTILITY SINK [ ]yes [ ]no
SPA/POOL/JACUZZI [ ]yes [ ]no IF YES, WHICH:_____
SPRINKLER SYSTEM [ ]yes [ ]no

OCCUPANCY STATUS:
PERMANENT PART-TIME* [ ]yes [ ]no
WEEKENDS AND VACATION ONLY: [ ]yes [ ]no
APPROXIMATE # OF DAYS PER YEAR: [ ]less than 8 days
[ ]8-24 days [ ]25-36 days [ ]more

BEDROOMS (# OF):_____

SEWAGE SYSTEM:
PRIVY: [ ]yes [ ]no [ ]do not know [ ]sealed [ ]unsealed vault
SEPTIC TANK: [ ]yes [ ]no [ ]do not know
CESSPOOL: [ ]yes [ ]no [ ]do not know
DRAINFIELD: [ ]yes [ ]no [ ]do not know
HOLDING TANK [ ]yes [ ]no [ ]do not know
OTHER TYPE SEWAGE SYSTEM (SPECIFY):_____

DO YOU KNOW THE LOCATION OF YOUR SEWAGE SYSTEM? [ ]yes [ ]no
HAVE YOU NEEDED TO REPAIR THE SEWAGE SYSTEM? [ ]yes [ ]no WHEN?_____
HAVE YOU HAD THE SEWAGE SYSTEM PUMPED? [ ]yes [ ]no WHEN?_____
HOW OFTEN HAS THE SYSTEM BEEN PUMPED?_____

HOW FAR IS YOUR SEWAGE SYSTEM FROM THE LAKE? [ ]less than 50 feet
[ ]50-100 feet
[ ]over 100 feet
[ ]do not know

*DEFINITION: Occupancy on a continuous basis in late spring, summer, and early fall; vacant during winter months.

WATER SOURCE:

	DRINKING	BATHING	LAUNDRY	IRRIGATION
WELL				
SPRING				
LAKE				
PUBLIC SYSTEM				

DO YOU KNOW WHERE ADJACENT PROPERTY SEWAGE SYSTEMS ARE LOCATED? [ ]yes [ ]no

COMMENTS:

DIAGRAM PROPERTY IMPROVEMENTS BELOW. SHOW APPROXIMATE PROPERTY DIMENSIONS AND LOCATIONS OF ANY/ALL BUILDINGS, WATER SOURCES, SEWAGE SYSTEMS, AND UTILITY LINES (PIPING). SHOW "NORTH" ARROW.

If the residence is occupied throughout the summer months, please give day(s) of the week and times during the day when you will be available for a survey.

If you will only be at property during certain vacation period(s), please give dates between July 15 through September 15, 1989.

If you will not be at Newman Lake property during the summer, please give phone number and where you can be reached to make an appointment to do survey.

NAME OF PERSON COMPLETING THIS FORM_____

NEWMAN LAKE FIELD SURVEY

ADDRESS OF FIELD SURVEY:_____PARCEL:_____

DATE OF FIELD SURVEY:_____

FINDINGS OF FIELD SURVEY

EXISTING SEWAGE DISPOSAL SYSTEM WAS DYED? [ ]yes [ ]no If no, why not:

BRIEF PLOT PLAN SHOWING LOT, STRUCTURE, SEWAGE DISPOSAL SYSTEM, AND WATER SUPPLY; DISTANCE OF SEWAGE SYSTEM FROM LAKE (NOTE GREATER THAN/LESS THAN 100 FEET):

RESULTS OF DYE TRACE:

FOLLOWUP DYE TEST RECOMMENDED? [ ]yes [ ]no If yes, when_____

OTHER EVIDENCE OF SUSPECT FAILURE WHEN DYE IS NOT PRESENT:

[ ] 1. Marshy, saturated soils and lush vegetation.

[ ] 2. Sewage system within 25 feet of lake and system is at or below lake level.

[ ] 3. Fecal coliform bacteria: greater than 2 per 100 ml. _____ (Water samples taken from lake where sewage system is suspect of being within 25 feet of lake.)

REFERRAL TO LIQUID WASTE STAFF? [ ]yes Date:_____
[ ]no - not necessary

OCCUPANCY:

OTHER TESTING PERFORMED AT THIS SITE:

NEWMAN LAKE SURVEY

	Sec 9&10–Twn 26–Rng 45 Honeymoon Bay Area Sutton Bay Area Sutton Bay Resort	Sec 15–Twn 26–Rng45 Sec 11–Twn 26–Rng45 Cherokee Schaefer Tracts S. End Outlet	Sec 2–Twn 26–Rng 45 Sec 4–Twn 26–Rng 45 Sec 34–Twn 27–Rng 45 Twin Cedars Muzzalls S. Hampton	Sec 3–Twn 26–Rng 45 Hampton Area Wood Addn. Hoods Park Area
Total # Prop. Surveyed	110 Sutton Bay Resort 11 RV Sites + Cabins 2 Restrooms	10	35 Not including Twin Cedars on Community Sewer	153
# System Failures	2	0	2	
# Cabins With 1–Toilet 1–Sink 1–Bathing	15 Toilets – Porta Potties, Privys, Incin. Sinks & Bath – Drywells & Sumps		6	
# Cabins With 1–Toilet 2–Sinks 1–Bathing Bath or Shower	69 Only 75% of these had bathing facilities	6 All had bathing facilities	21 All had bathing facilities	
# Cabins With 2–Toilets 2–Plus Sinks 2–Bathing or Jacuzzi	26 Includes multiple cabins using one sewage system	4	8	
# Cabins With Laundry Facilities	35	7	12	
# Seasonal Weekends & Vacations (Fewer 36 days/yr)	56	1	10	
# Seasonal Summer Home (90–120 days)	24	2	14	
# Permanent Full–Time Residences	30	7	11	
Type of Sewage System: Septic Tank/Drainfield	41	9	20	
Septic Tank/Leachbed	2	1	1	
Septic Tank/Absorp Pit	4			
Septic Tank/Unknown	16			
Cesspools	4		4	
Drywells (Graywater)	11			
Holding Tank	12		3	
Privys-Yes	20		3	
Share Common System				

0721E/bls

NEWMAN LAKE SURVEY FORM

SECTION 3, TOWNSHIP 26, RANGE 45
HAMPTON – WOODS ADDITION – HOODS PARK

Total # Prop. Surveyed	93*
# System Failures	2
# Cabins With: 1–Toilet (Privy, Porta Potty, Incinolet) 1–Sink	17
# Cabins With: 1–Toilet (Privy, Porta Potty, Incinolet) 1–Sink 1–Bathing Facility	7
# Cabins With: 1–Toilet 2–Sinks 1–Bathing Facility	48
# Cabins With: 2–Toilets 2–Plus Sinks 2–Bathing Facility, Jacuzzi	18
Cabins with Laundry	34
# Cabins Occupied on Seasonal Basis or Weekends < 36 days/year	57
# Cabins Occupied on Seasonal Basis or Summer Hours (90–120 Days)	2
# Cabins – Permanent/Full–Time	34
Type of Sewage Systems: Septic Tank/Drainfield	40
Septic Tank/Leachbed	1
Septic Tank/Absorp Pit	0
Septic Tank/Unknown	16
Cesspools	10
Drywells	5
Holding Tank	8
Privies	32

*One property had a septic tank but no buildings. Two properties had buildings but no plumbing or water.

0721E/bls

FORESTRY SUBCOMMITTEE REPORT

FOR

NEWMAN LAKE WATERSHED

Dennis Parent
Inland Empire Paper Company

Walt Obermeyer
WA Department of Natural Resources

1990

Appendix B.

NEWMAN LAKE WATERSHED PLAN
FORESTRY SUBCOMMITTEE REPORT

This subcommittee has been working to determine what effects forestry practices within the watershed have on the water quality of the lake. Over 80% of the watershed is forest land and the committee wants to find what are current water quality problems and how they compare with other use problems within the watershed.

A list of possible water quality problems has been developed utilizing the feasibility study, comments in the initial meetings and observations during the field trip. The subcommittee has studied the following list using the latest applicable published research and the best evaluation from their collective experience.

1) sedimentation from active roads
2) sedimentation from unauthorized off road vehicle use
3) nutrient flow and sedimentation from timber harvest
4) pollution from garbage dumping
5) sedimentation from unauthorized use of roads
6) sedimentation from abandoned roads and roads constructed prior to the 1974 Forest Practices Act

1) Sedimentation from active roads had been an historical problem prior to the Forest Practices Act. Since that time actively used roads are required to have drainage structures which avoid sediment discharge into flowing water. Active roads for uses other than forestry activities are not subject to Forest Practices rules but may be subject to other agency regulation. Problems occurring from forest practices roads can be dealt with through the Department of Natural Resources; others may need to be addressed through the watershed plan.

2) Sedimentation from unauthorized off road vehicle use was observed during the field trip. Although it is a recognized problem, there is little regulation outside civil trespass law. The plan should attempt to address possible solutions.

3) Nutrient flow and sedimentation from timber harvest was discussed extensively on the field trip and in committee. Concerns have been raised whether current Forest Practices regulations adequately address this issue. Observations from the field trip showed that water bars and riparian buffers visibly provided catchment for sedimentation, but concerns were raised about non-visible pathways, such as groundwater flow.

Some members of the committee reviewed the most recent scientific literature. A study in the Eastern Cascades completed in 1988 showed no statistical difference in nutrient production between clearcut and undisturbed watersheds. A 1975 study in Northern Idaho showed increases of bicarbonate, sulfate, calcium and magnesium. Nitrate showed increased levels onsite but dropped when sampled downstream. The nitrate level found in the downstream samples was less than that found in the precipitation falling on the headwaters. Phosphorus was not sample in this study. The study was conducted on streams adjacent to several clearcuts had been burned.

Earlier studies have shown increased nutrient loading following clearcut and burn operations, but these were done without streamside buffers and do not reflect the effects of these features required now by state regulations. Considering all this information leads toward the

implication that nutrient loading from current harvest sites has minimal adverse effects on the quality of water flowing into Newman Lake.

4) Unauthorized garbage dumping occurs sporadically throughout the forested watershed. It is an illegal activity not easily controlled. Leachate from the garbage may affect the water quality if in the proximity of the stream. The plan should address this issue.

5 and 6) Sedimentation from unauthorized road use, abandoned roads and roads constructed prior to the Forest Practices Act are related issues. The plan should address this considering possibilities such as road closures, barriers and "putting roads to bed" by removal of culverts and bridges. One landowner is in the process of ripping and seeding abandoned roads to reduce potential sedimentation and return the land to forest production. Such action is costly and the plan should evaluate the benefits and then prioritize problem sites. The burden of such costs should be addressed also.

It is important to keep perspective of the effects of forest land uses on water quality. The State of Maryland recognized forest land as the least polluting land use. A study in that state showed sediment production as follows:

Forest land	50 tons per square mile per year
Urban and suburban	50 - 100 tons per square mile per year
Agriculture	1000 - 5000 tons per square mile per year
Cleared for construction	25000 - 50000 tons per square mile per year

(from American Forests, July - August, 1988)

Newman Lake Watershed users should be aware of this scale of effect the various land use practices have on water quality. The watershed plan should embody Best Management Practices for all users proportional to the effect those users have on water quality.

Literature cited:

Fredricksen, R. L. Comparative Chemical Water Quality - Natural and Disturbed Streams Following Logging and Slash Burning.

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Ebenreck, S. 1988. Measuring the Values of Trees. American Forests, July/August 1988.

EROSION HAZARD INVENTORY

FOR

NEWMAN LAKE WATERSHED

Allen Isaacson
Hydrologist

Water Management of
North Idaho

September 1991

Appendix C.

TABLE OF CONTENTS

FOREWORD

The object of the erosion hazard inventory is to pinpoint the sources of sediment within the Newman Lake Watershed and suggest possible remedial actions. This report is written to tie in with the Newman Lake Watershed Plan, original draft September, 1990. This contract was completed as a part of the contract with the Newman Lake Flood Control Zone District and Water Management of North Idaho, Allen Isaacson, Hydrologist. This contract was approved by Resolution 91-0816 passed by the Board of County Commissioners of Spokane County, Washington on June 18, 1991.

I. INTRODUCTION

An agreement was entered with Newman Lake Flood Control Zone District to provide an erosion hazard inventory of the Newman lake Watershed. This was to be completed by doing stream inventories, using maps and using the Pfankuch method as prescribed by the U.S. Forest Service. A survey of the roads was also completed with photographs of problem areas keyed to a base map.

II. THE WATERSHED

There is a good physical description of the watershed in the Newman Lake Watershed Plan. The same material is not presented here unless it pertains to specific hydrologic situations. The watershed will be characterized by four parameters: physical setting, soils, geology and climatic conditions, as these are the main constituents that the produce the sediment loading to the lake.

Physical Setting

Newman Lake Watershed is located in Eastern Spokane County adjacent to the Idaho border. Newman Lake is about 1,200 acres with a drainage basin of approximately 18,500 acres. The watershed faces to the south and is open in that direction with the lake at the bottom of the drainage. The elevation ranges from 2,131 feet at the lake to 5,110 feet at Horse Mountain. The major tributary and only perennial stream is Thompson Creek. This creek flows from north to south in an elongated pattern. There are a few other streams that run flood flows and snow melt runoff or mostly first or second order drainage that are dry during the summer and fall months.

The watershed is approximately 9 miles long and 3 to 4 miles wide. Rain and snow storms will funnel up this drainage to drop precipitation from the south-southwest. An elongated drainage is usually fairly flashy, especially when oriented north to south. This means the physical setting contributes to high quick runoff patterns from storms and from spring snow melt because of the large area open to the direct sun's radiation due to the south aspect.

Geology

The base geology is very old precambrian rocks that have been metamorphosed to develop the (PC/N) Newman Lake gneiss and (PC/bg) Newman Lake banded gneiss. These are probably metamorphosed granitic formations or possible extensions of the Belt series. There are some intrusion silts of (Tqmf) fine grained quartz monzonite. These are highly weathered and eroded landscapes with a high erosional rate when disturbed and high natural contributors of sediment.

Below approximately the 2,750 foot elevations, there are more recent quaternary deposits. These are (Qlb) lake bed deposits from when Newman Lake was larger due to glacial action such as the formation of the Spokane aquifer by the flooding from lake Missoula. Glacial kame terraces deposits backed up a much larger lake. These old lake beds are fine sands, silts and clay deposits. Where streams cut through this geology it is highly erosive.

Upstream in the stream bottoms the valleys are made up of (Q2c) alluvium and colluvium stream and hillwash deposits. This material is also highly erosive unless glacial boulders give some protection.
The geology from ridgetop to the lake is made up of components that are all erosive naturally and respond to disturbances with accelerated sediment productions.

Soils

The soils information if from the Spokane County Soil Survey, 1968. These soils are predominantly of either the Moscow series on 30-55 percent slopes (MmD) or the Spokane Complex 30-70 percent (SsE) and Spokane loam 30-55 percent slope (SpD). These soils formed under conifers in weathered granite, gneiss or schist and are mixed in the upper layers with loess and volcanic ash. This ties the soils with the geology previously described. The soils of the Moscow series have rapid surface runoff and are a severe erosion hazard. This soil is described under Woodlot 2.

The Spokane soils are described under Woodlot 6. The erosion hazard is low on these soils in the undisturbed areas under timber canopy, but may be severe in logged or burned areas. I did not witness problems in logged areas except on the roads as discussed later.

The soils in the Newman Lake Watershed naturally are erosive and produce high volumes of sediment if disturbed. The management of roads with vegetation, closure gates, timing of use, water bars and culverts is very important on these soils.

Climate

The climate ranges from fairly dry at low elevation ridges to wet at higher elevations with deep soils. A common problem in mountain watersheds with a predominant area below the 4,000 foot elevation is rain-on-snow events. Research on the impact of rain-on-snow events on watersheds was started on the coast by Christner and Harr in a paper a few years ago. The same situation occurs in the Eastern Washington-North Idaho area and was shown in unpublished U.S. Forest Service papers (Bengeyfield and Isaacson.)

Below 4,000 feet damage occurs due to winter rain and warming events on tope of a snowpack. Quick melting and flooding occur carrying increased volumes of sediments. This is due to the viscosity (can carry more), due to cold temperature, the high volume of water and the slurry action that helps move larger sized material. The elevation, shape of the drainage, geology and soils, along with the occurrence of 3-5 rain-on-snow events a year work together to cause high natural sediment rates. A watershed with a high density of forest roads and logged areas contributes to the intensity and volume of runoff from each rain-on-snow event. This single natural phenomenon probably carries more sediment to the lake than any other parameter discussed.

III. FIELD INVENTORIES

Stream Inventories

The streams within the drainage basin were inventoried using the methodology developed by Dale Pfankuch and widely used in the United States. A blank copy of the rating form and the directions are in Appendix C-1. A copy of all the rating forms for the reaches are provided in Appendix C-2.

A map was provided with the streams to survey. All were walked and surveyed the full length by foot. Those streams not rated were observed and determined to either not have a defined channel or an intermittent channel where they went subsurface and are not transporting sediment to the lake.

The streams rated are Thompson Creek and its major tributaries and two unnamed streams on the southwest side of the lake. The stream stability related to the geology, soils and man's impact on the natural system.

The highest ratings (lowest stability) are located in the agricultural ground and grazed areas from the mouth of the stream upstream. These correspond to the peat, lake bed, silts and alluvium geologies discussed earlier. The banks are very fine grained material with little or no rock for stability (see picture in Appendix C-3.) Man has attempted to straighten the stream channel and put it where he thinks it ought to be, but nature doesn't work that way. The stream will continue to move and meander, causing bank cutting and lateral migration of the channel until the stream is back in equilibrium. Contributing also to the instability of the lower sections of the stream is the flattening of the stream slope or gradient. The stream carried sediment down steep gradient reaches from the tributary stream until reaching the valley bottom. Here the velocity drops, causing the stream to drop its load of sediment. It is easier for the stream to cut a new channel in the fine grained banks than to pick up the material it deposited. The newly eroded bank material ends up in the lake. This unstable or poor rating (over 114) characterizes the bottom 3.6 miles of stream. (See Appendix C-2 for field notes and the rating forms for each stream reach.) At approximately 2.3 miles upstream there is a series of structures that are trapping sediment. These could be cleaned out with a backhoe and used as sediment traps. The deflectors have caused heavy channel bank cutting into banks 6 foot and higher. This is a major source of sediment to the lake. Brush planting or cuttings and fencing to keep livestock off stream banks would help stabilize this bottom 2.3 miles of stream.

As the survey works upstream, there is an increase in rock in the bed and banks giving more stability in reach 4, at approximately 3 miles from the lake. There are two old log bridges that need to be replaced.

Reach 5, at 3.6 miles upstream, contains more boulders and rock with a high-fair rating of 83. This is a stable stretch of stream for 0.4 miles.

Reach 6 from 4 miles to 4.41 miles upstream is a lower rating due to erosion of roads and sediment bars in the stream at the upper point. About one-third of the road has been eroded away, and a log bridge is collapsing into the stream channel.

The stream becomes progressively more stable as it becomes smaller and less impacted. Reach 7 has a rating of 94 for 0.9 miles. Reach 8 has a rating of 68 for 0.75 miles and reach 9 has a rating of 42 for 3.3 miles.
The next tributary rated was one going toward Round Top Mountain. It is 1.6 miles long in the bottom reach with a score of 72, or good stability. The second reach is rated 97 for 1.2 miles. The lowered rating is due to road impacts adjacent to the stream and sediment from road gullies coming directly into the stream. The road culvert here has a hole and needs repair. (See field notes.)

The next tributary has its beginning as Hysing Springs. This tributary, like the others, is broken into two reaches due to changes in the stream gradient. This area has been logged and at least 6 log culverts are still on the stream causing some problems. The roads are well vegetated and stable but culverts will continue to be a problem. There is a lot of bank cutting and sediment introduced into the system from this tributary. This is rated at 105 for 1.6 miles and 76 for 2.22 miles.

The next tributary rated was the stream toward Ragged Mountain. This stream was also divided into two reaches. The first section rated 91 and the second 70. The main problem here is a road crossing and roads that need to be closed.

The next stream surveyed is an unnamed stream that comes into the lake north of Shadow Bay. This stream is very stable above the west side road. Below West Newman Lake Road is a different story. The paved road is collecting water that flows onto the hill slope and into the creek. The stream is very unstable or in poor conditions, rated at 115. This section of stream is wide and shallow when it flows with a lot of overbank flooding.

The next stream surveyed is the unnamed stream that enters the lake at Honeymoon Bay. There are many problems that are road related and have affected the stream. There is a high density of roads, with roads up each side of the stream above West Newman Lake Road. There is a driveway that is steep and concentrating flow to where it has cut down the hill slope with a gully formed that is 2-3 feet deep. This wash crosses another road and goes directly into the stream channel. This all occurs within 500 feet of West Newman Lake Road. The road also accumulates runoff and funnels it into the stream. Remedial work would help at this location.

The streams reflect the roading and geology, with the lower ratings where there has been less activity and the higher rating in fine grained sediments where the channel has been modified and the brush and tree species removed by man.

Road Inventory

This watershed had many roads in poor condition due to the erosive nature of the geology and use by recreationists during times of the year that rutting and erosion take place. Roads should be closed and revegetated at least with grass as soon as they are not used for logging. Then they should only be used when frozen or when very dry. Vehicles should be kept off them the rest of the year. This is an erosive watershed; a tire track one year can be a gully the next, or within a few years, enhancing the erosion potential. Culverts should be pulled, or maintained, even on old abandoned roads. This will correct much of the problem on forest roads.

Close to the lake, driveways should be designed to move water onto vegetation, not tot he main road and then downslope to the nearest stream via the road ditch. A lot of sediment

enters the lake from the road collection system of driveways and main county road ditches such as along West Newman Lake Road.

Specific sites are listed below that were observed. With work, some sediment problems can be corrected. A thorough road inventory was outside the scope of this contract, although most of the roads were driven or walked. A complete sediment study would inventory all the roads and assess ratings mile by mile much like the stream survey. This could be accomplished with a future small contract. The following are the top 5 road problems with the watershed:

1. **Thompson Creek road crossing.** SW 1/4 section 11. Old log culvert is collapsing, road fill is caving in, abandoned road is not ditched or cross-drained so runoff flows down it into the creek at this point also.

2. **Thompson Creek road crossing.** NW 1/4 section 14. Several road and motorcycle trails converge at this point; there is also a ford of the creek. None of the roads or trails are ditched or cross-drained to stop the flow of sediment laden runoff from entering the creek here in large quantities. Just 200 feet downstream from here "Hysing Springs" enters and there is a gullied jeep road contributing sediment as well.

3. **Hysing Springs Creek.** N 1/2 section 14, SE 1.4 section 11, S 1/2 section 12. Roads built using log culverts which are now creating constrictions of the stream flow. Cutting through road fill is going on as logs rot and collapse. There were no fewer than six such sites. Roads are well revegetated, however, and not passable without cutting and reconstruction.

4. **Honeymoon Bay Road.** S 1/2 section 10 above West Newman Lake Road. Driveways and old roads along the creek need to be repaired by cross-ditching, use of straw bales and moving water onto vegetation.

5. **The miles and miles of forest roads** that need vegetation and closure management to shape up for non-use and then closed to the public except for very restrictive use periods. An alternative is surfacing on these geologic formations. This is prohibitively expensive unless the public helps foot the bill.

Current Sediment Reduction Practices

There are many positive things happening within this watershed to help slow down the filling of the lake with sediment. On the forested portion there has been rock placed on sections of road that need stabilization due to wet conditions. This stabilization helps with erosion and makes the road usable during wet times of the years. There has been seasonal closures of the roads to prevent rutting and channeling of water down the road surface. There is annual road maintenance to improve the use of the road and to clean ditches. This helps with controlling erosion. Along with the road management, the timber cutting practices have been lightly placed on the land. The selection methods of harvest have not opened large areas to clearcutting and the problems associated with control burning.

On the lower elevations there have been attempts to control sediment and stream erosion by the use of planned menders, use of structures and the use of rock riprap on the areas of accelerated bank cutting along Thompson Creek. Along this same reach of the creek, the vegetation is coming back with riparian species due to fencing to keep the animals from browsing. This will do a lot to stabilize the stream as the brush continues to fill in the banks

in the future. Similar stabilization work is needed along the lower reaches where Thompson Creek has been channelized.

IV. CONCLUSION AND RECOMMENDATIONS

The geology and soil section of this report were presented to show that under natural conditions this watershed is a high sediment producer. When we combine man's activities with the weather, there is going to be sediment produced because of the erosive nature of all of the watershed. Along with the geology, most of this drainage is located in rain-on-snow prone areas below 4,000 feet and the drainage is oriented to the south. All these factors link for a high sedimentation rate into a relatively shallow lake lacking the storage capacity to handle this without eventually filling in.

Winter storms in the rain-on-snow areas are the major producers of quick flash flood and sediment movement. Most of the sediment that reaches the lake is transported in this fashion. The more open area (agricultural, clearcuts, etc.) the higher the impact of each winter storm. There are systems developed to assess the impact and limit watershed activity timing to protect stream channels (Isaacson, 1986) (Kappesser, 1991.)

The main problems in this drainage are road management and agricultural land management in Thompson Creek along with lakefront property owners' management of their lands. This study documents problems and suggests remedial actions for those recognized in the Newman Lake Watershed Plan. The stream survey and road inventory give evidence supporting the listing from the previous assessments of the watershed.

The major producers of sediment in order of magnitude from this survey are listed below with possible remedial actions:

Agricultural lands where the streams have been straightened and vegetation has been removed from the banks:

- fence
- revegetate with brush species
- let meander patterns form or develop
- riprap with rock main problem areas
- remove cement structures or manage by cleaning out

Forest roads that have not been properly put to bed or are disturbed by woodcutters and recreationists:

- close roads after logging use
- pull or maintain culverts
- rip and seed to get vegetative cover along with hydromulch during construction of fill and cut slopes
- user filter windows near stream crossings
- revegetate quickly all disturbed areas with seed or hydromulch
- surface main use roads that are not closed

Construction sites around lake, private driveways and yards:

- prevent water from collecting and entering road ditches and streams

- use construction standards for sediment control of construction sites.
- educate each homeowner on preventing sediment and pollution from their activities

Logging operations:

- seed all skid roads and waterbar before first runoff season
- look at orientation, size and type of cutting to eliminate accelerated problems from rain-on-snow
- operate on fragile soils only when frozen or dry; use time of operations as an effective tool
- only tractor log below 30-35 percent slopes and cable on steeper slopes

This is only a listing to be used where practical. Common sense will dictate when and where each practice should be used. We can control land use contributions of sediments, but there will still be high levels of natural erosion in this sensitive watershed.

APPENDICES

C-1. Stream Reach Inventory and Channel Stability Evaluation

C-2. Completed Stream Inventory Forms

C-3. Photographs

C-4 Kappesser -- Rain-On-Snow Procedure

C-5 Literature Cited

C-6 Map

All appendices and the original erosion hazard inventory are on file at the Washington State Department of Ecology in Olympia and at the Spokane County Engineers Office in Spokane.