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McGrath Pond/Salmon Lake Watershed Nonpoint Source Pollution Survey

McGrath Pond/Salmon Lake Association

Maine Department of Environmental Protection

January 1999

Acknowledgments

The following people were instrumental in carrying out the tasks necessary to complete the project and deserve special recognition:

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Survey training was provided by Rebecca Manthey and George Lord, China Region Lakes Alliance.

Thanks to the McGrath Pond/Salmon Lake Association Board for it's support and to the Belgrade Regional Conservation Alliance and Belgrade Lakes Conservation Corps for their support and encouragement. Thanks to Alfred and Barbara Wheeler for their continued support of the lake association and all that it stands for.

Information provided in the Mousam Lake Watershed Nonpoint Source Pollution Survey (Mousam Lake Association, Maine DEP, JBR Consulting Hydrogeologist, York County Soil & Water Conservation District-November 1997) and Highland Lake Watershed Survey and Implementation Plan (Cumberland County Soil & Water Conservation District, Maine DEP, Highland Lake Watershed Steering Committee-June 1998) were drawn upon in preparing this report.

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1.0 INTRODUCTION

1.1Background

McGrath Pond has a surface area of 486 acres with a direct watershed of 3.78 square miles and Salmon Lake has a surface area of 667 acres with a direct watershed of 3.14 square miles. McGrath Pond flows via a short thoroughfare to Salmon Lake which flows to Great Pond and then onto Long Pond and Messalonskee Lake. McGrath Pond and Salmon Lake are both located in the Towns of Belgrade and Oakland.

During the spring and summer of 1998, a watershed survey was conducted by volunteers, Conservation Corp staff and Department of Environmental Protection staff. The purpose of the survey was to identify and document potential sources of nonpoint source (NPS) pollution- NPS pollution is defined as pollution that occurs during runoff events as a result of land use activities. The most significant pollutants to lakes and streams are phosphorus and sediment. Phosphorus is the limiting nutrient that regulates algal growth in lakes and can be carried to a waterbody either dissolved in the runoff or attached to sediment particles. Sediment can in addition directly alter or destroy aquatic habitat by smothering or filling in habitat. Because soil is a major source of phosphorus, watershed surveys focus on identifying sites where there is soil erosion and there is the likelihood that runoff from the site will reach a drainageway or waterbody.

McGrath Pond has average water quality for Maine lakes and actually shows improved water quality. Salmon Lake's water quality is of greater concern. Historically, it has algal blooms and was the focus of a restoration project in the mid-1980s'. Since then, water quality appears to be stable, but indicators of water quality (phosphorus and dissolved oxygen) are of concern. For further information, see Appendix A: Report- McGrath Pond/Salmon Lake Water Quality.

Both McGrath Pond and Salmon Lake are included on Maine's Nonpoint Source Priority List. One reason they are included is due to the degree of threat or impairment to water quality that exists due to Nonpoint Source Pollution. Because McGrath Pond and Salmon Lake are priority waterbodies, they were targeted for assistance for completing a watershed survey and development of a Management Plan. The Belgrade Regional Conservation Alliance has received a grant to develop a Management Plan. The plan includes completing a watershed survey for East Pond, North Pond and Great Pond and developing a Watershed Management Plan for the Great Pond watershed (includes Salmon Lake, McGrath Pond, North Pond, and East Pond).

1.2 Land Use

In 1987, Maine Department of Environmental Protection did a restoration project on Salmon Lake that focused on existing agricultural inputs. The Salmon Lake Restoration Project (1987) focused on existing agricultural inputs. Since then land use patterns have changed toward development being the predominant land use, including seasonal conversion and the conversion of farmland to residential development. Colby College students wrote an excellent report, " Land Use Patterns in Relation to Lake Water Quality in the Salmon Lake Watershed" (1994) that includes a very comprehensive assessment of

land uses, land use patterns, and trends. According to this report, about 70% of the lake's shoreline is developed and there are 140 residences on McGrath Pond and 193 residences on Salmon Lake. The number of non-shoreline residences in the watershed is 96 for McGrath Pond and 131 for Salmon Lake. There are three commercial children's camps, one campground and three commercial cottage rental businesses. Other land uses include an expanding lumber yard-mill, limited commercial business and limited agricultural uses.

2.0 OBJECTIVES

The project had four major objectives:

1. Identify, characterize, and prioritize sites in the watersheds, particularly soil erosion.
2. Raise public awareness throughout the watershed about stormwater runoff and soil erosion and it's effects on lake water quality.
3. Recommend strategies and conservation measures to mitigate soil erosion and identify possible funding sources to assist landowners in fixing problems.
4. Serve as a model for subsequent surveys in the Belgrade Lakes watershed.

3.0 METHODS

3.1 Background

As with other watershed surveys conducted in Maine, McGrath Pond/Salmon Lake's survey utilized trained volunteers to identify soil erosion sites within the watershed. The manual "Lake Watershed Surveys: How to conduct a NPS Phosphorus Survey," (Maine Department of Environmental Protection and Congress of Lake Associations, Revised 4/97) was utilized. Volunteers consisted of McGrath Pond/Salmon Lake Association members and Conservation Corp members.

On April 11, 1998, a team of 15 volunteers participated in a one day training session. The training included a classroom session covering lake ecology, nonpoint source pollution and identification and documentation of erosion sites. The second part of the training was a field training session to look at sites, discuss problems found and how to identify them.

The volunteers conducted their survey in groups of two or three during May and early June of 1998. Spring is the ideal time to identify erosion problems since runoff is high due to saturated soils, snowmelt, and spring rain and the absence of leaves and vegetation. It is more difficult to see erosion problems after spring leaf-out and also homeowners and road crews begin their annual maintenance that can temporarily mask evidence of problems.

During the summer and early fall of 1998, volunteer survey data verification and follow-up was conducted by Maine Department of Environmental Protection staff. The intent of the follow-up is to verify the sites identified by volunteers, identify any sites missed by the volunteers; and to talk with homeowners about soil erosion and phosphorus, what they can do on their property and distribute educational materials.

3.2 Sectors

For the purpose of this survey, the watershed was divided into seven survey sectors that were delineated on a topographical map (see Appendix B). Each sector included upland and shoreline area- the entire watershed was included.

Sector A: This sector is located in the Town of Oakland and includes the northeast portion of the McGrath Pond watershed. The northerly boundary is a line perpendicular to McGrath Pond Road, just west of Pleasant Point Campground and the southerly boundary includes up to Camproad T-4.

Sector B: This sector located in the Town of Oakland includes the northwest portion of the McGrath Pond Watershed, including Mutton Hill and Howland Hill. The southerly boundary is the Oakland-Belgrade town line on McGrath Pond Road and the northerly boundary bisects McGrath Pond Road, just west of Pleasant Point Campground.

Sector C: It is bounded on the north by the town line on the McGrath Pond Road and on the south by McGrath Pond Road. This sector is located in Belgrade and includes the southwest portion of McGrath Pond and the northwest corner of Salmon Lake (primarily Cold Brook drainage area).

Sector D: This sector is located in Oakland and is the northeast portion of McGrath Pond watershed. The northerly boundary includes up to Camproad T-3 and the southerly boundary bisects Town Farm Road, halfway between Camproads T-6 and T-7, to the watershed boundary of McGrath Pond and Salmon Lake.

Sector E: Located in the Town of Belgrade, this sector includes most of the western watershed portion of Salmon Lake. The boundary on the north is the McGrath Pond Road and the southerly boundary is a line perpendicular to Route 8, about halfway between Route 11 and the outlet, just north of Camproad S-7.

Sector F: This sector includes most of the portion of the Salmon Lake watershed in the Town of Oakland. The northerly boundary is a line perpendicular to Town Farm Road, about halfway between Camproads T-6 and T-7 and the southerly boundary is a line from the watershed boundary-town line intersection, north to the lake.

Sector G: The easterly boundary is a line from the watershed boundary-town line intersection, north to the lake and westerly boundary is a line perpendicular to Route 8, about halfway between Route 11 and the outlet, just north of Camproad S-7. It includes the southern end of the Salmon Lake watershed, located in the Belgrade and a small portion of Oakland.

3.3 Ranking of Sites

For each verified site, general recommendations were made for remediation or stabilization. In addition, each site was given a ranking based on technical level to install, impact, cost of remediation , and priority. The criteria used for the ranking is as follows:

Technical level to install

Low- Quick fix, low cost, landowner can usually do work, minimal training needed or contractor can do.

Medium- Moderate complexity fix, moderate cost, technical assistance necessary, need some equipment.

High- Complex fix, considerable cost, technical assistance and engineering necessary.

Impact

A relative impact (high, medium, low or none) is assigned to each site based on the size of the site, proximity and potential for direct flow. Sites that have direct flow to tributary or lake are assigned at least a medium level.

Cost

High (>$2500)
Medium ($500-$2500)
Low (<$500)
None ($0)

Priority

A priority rating of (high, medium, low or none) is assigned to each site. Cost, impact, and technical level to install are all taken into consideration.

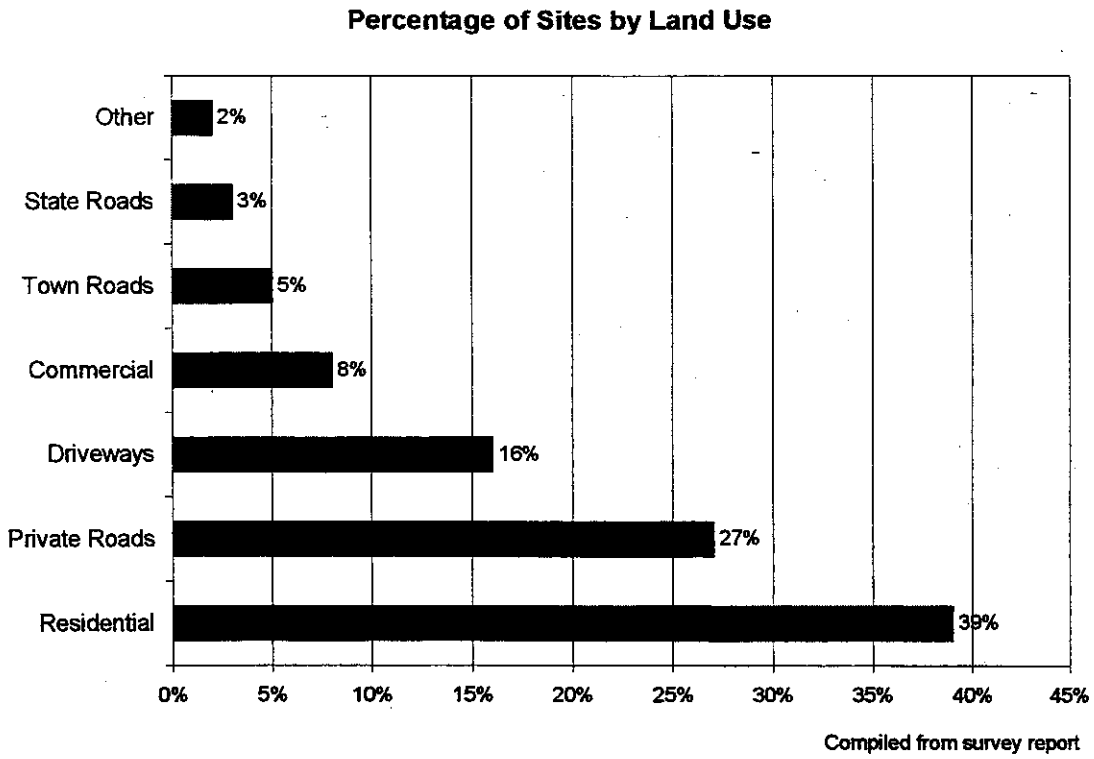
4.0 RESULTS

4.1 Site Identification

Volunteers identified 91 potential impact sites through the survey process. Of these, 70 were determined by DEP to have an impact on water quality and are documented in this report. The remaining 21 sites either did not have a significant impact on water quality or could not be located. During the follow-up, DEP staff documented an additional 61 sites bringing the total number of sites to 131 sites.

4.2 Sites by Land Use

These 131 sites are further identified by land use. Over half (55%) of the sites are residential and driveway sites. Private roads comprise 27% of the sites and town and state roads together account for 8%. Commercial sites which include commercial camps and businesses account for 8% of the sites and the remaining 2% of the sites are other (agriculture, beach, and boat ramp). The following chart illustrates the breakdown of sites by land use.



The sector maps in Appendix C provide location maps for all of the sites by sector. Appendix D contains the summary tables for the sites and includes the following information: Sector and Site ID, Map ID Number, Land Use, Type of Problem, Length or Area (of site), Recommendations, Technical Level to Install, Impact, Cost and Priority. To use these tables, go to the table and locate a site; look at column 1 "Sector & Site ID". The first part of the Id refers to the sector and is either A through G or MA through MG (MA-MG refers to sites identified by Maine DEP). The second part of the Sector and Site ID is the sequential numbering of each site (some volunteers used numbers and some used the alphabet). The Map ID number is the identification given to each site for mapping purposes using the geographic information system.

The Map ID numbering system provides some basic information from just looking at the map. The first letter in the Map ID refers to the type of land use at the site:

A- Agriculture
B- Beach
BA- Boat Ramp
C- Commercial
D- Driveway
P- Private Road
R- Residential
S- State Road
T- Town Road

A summary of typical types of problems and remedies is provided below for each land use. Pictures of typical problems are also provided at the end of this section.

Agriculture (1 site)
The one surveyed site had a large area of bare soil (200' x 200') and bare fields. At the time that the follow-up was being done, it was not possible to determine if the site was a problem since it was not possible to tell where the runoff would be going and if it would reach any drainageway.
Remedies:

- Seed and mulch; use erosion controls
- Follow-up site in spring

Boat Ramp (1 site)
The one site was an unstable boat access on a private road with bare soil (50' x 50') and shoreline erosion.
Remedies:

- Stabilize and put in new surface material

Commercial (11 sites)
Commercial sites account for 8% of the problems and include a range of problems since sites include road and parking areas (3 sites), beach and boat access (4 sites), campsites (4 sites) and an unstable construction site. Typical lake dependent commercial uses involve heavy use areas for accessing the lake as well as for general foot and vehicle traffic.
Remedies:

- Stabilize beach and boat access
- Establish buffers
- Put in erosion controls (seed and/or mulch bare areas)
- Do not rake duff
- Redirect runoff
- Reshape roads and parking areas-build up and crown roads
- Riprap shoulder (parking area)

Driveways (21 sites)
Driveways account for 16% of the sites identified. About two thirds of the sites (13 sites) included moderate surface erosion. Other problems included moderate shoulder erosion (1 site), unstable culvert (1 site), bare soil (3 sites), areas needing re-vegetation due to runoff from drive or extensive drive-parking areas (3 sites), poor shaping (3 sites), poor surface material (1 site), ditch erosion (2 sites), and clogged culvert (1 site). On 4 sites, the driveway problems were a direct result of road runoff causing the problem. Almost half (9 sites) had direct flow to the lake or to a tributary.
Remedies:

- Install culvert inlet/outlet protection or new culvert
- Install turnouts, water bars, or broad-based ditch
- Vegetate areas or seed and mulch
- Put in new surface material
- Reshape driveway and parking areas
- Divert runoff or redirect runoff

Private Roads (36 sites)

Private roads account for a significant percentage (27%) of the sites identified. Two-thirds of the sites included either moderate surface erosion (18 sites) or slight surface erosion (6 sites). The second most common problem was poor shaping (lack of crowning to route water off the road) on 18 of the sites. Eleven of the sites had ditch problems; either slight (1 site), moderate (6 sites) or severe (2 sites) ditch erosion; poor ditching (1 site) or the ditch was exceeded (1 site). Culvert problems were present on 8 sites and problems included unstable culvert inlet/outlet (8 sites), clogged culvert (1 site), improperly installed culvert (1 site) and exposed culvert (1 site). Poor surface material was noted on 1 site and grader berms on 2 sites. Drainage problems occurred on 4 sites and problems were runoff from road across property, runoff from uphill affecting road, and road runoff causing pathway erosion. Almost two thirds of the sites (21 sites) have direct flow to a tributary or to the lake.

Remedies:

- Reshape and crown road, build up road
- Cut back ditch or reditch
- Remove grader berms
- Seed and mulch ditch or riprap/stabilize ditch
- Install culvert inlet/outlet protection, maintain culvert, or install new culvert
- Put in new surface material
- Enhance turnouts
- Install turnout, waterbar, cross culvert, or broad-based ditch
- Redirect flow to buffer; divert runoff

Residential (51 sites)

Residential sites account for the largest percentage of sites (39%). On 31 sites, there was a lack of buffer and 30 sites had bare soil. In most cases of the above, both lack of buffer and bare soil were present. Other problems included surface erosion (3 sites), undercut or shoreline erosion (4 sites), unstable beach or boat access (3 sites), unstable construction site (3 sites) and unstable footpath (2 sites). Runoff problems were a result of roof runoff (2 sites) and runoff from roads or driveways (4 sites).

Remedies:

- Establish buffer
- Seed and mulch
- Let natural vegetation establish or put in groundcover enhancement
- Limit access and limit driveway
- Do not rake duff
- Stabilize shoreline
- Put in turnout, waterbar or diversion; redirect runoff
- Put in erosion controls (construction sites)
- Mulch or stabilize traffic areas
- Put in crushed rock for roof runoff

State Roads (4 sites)
The four state road sites all have moderate ditch erosion and 2 of the sites have direct flow to a wetland.
Remedies:

- Seed and mulch ditch or riprap ditch
- Establish wetland vegetation in ditches

Town Roads (7 sites)
Town roads account for 5% of the identified sites. Six of the sites had moderate shoulder erosion and other problems include bare soil in ditch (1 site), winter sand (2 sites), unstable culvert inlet/outlet (1 site), grader berms (2 sites) and clogged culvert (1 site). Five sites have direct flow to a tributary.
Remedies:

- Remove winter sand and grader berms
- Stabilize culvert inlets and outlets
- Put in new culvert and stabilize

Photo1-lack of ditch

Photo 2- residential site

Photo 3- residential site

Photo 4- road surface erosion

Photo 5 - eroded dr ive

Photo 6- unstable culvert

Photo 7- road ditch

5.0 DISCUSSION

Major problems in the watershed are rather obvious. However, the numerous smaller problems that were observed can have a devastating impact on water quality over time. The assignment of high, medium, and low priority ratings for individual sites in Table 1 should be interpreted cautiously. Several sites in the watershed were rated "high priority" because of obvious direct impact to McGrath Pond/Salmon Lake's water quality. However, the impact on water quality from one high priority site may be less than the cumulative impact from numerous medium or low priority sites. All of the listed sites should be considered for remediation or stabilization.

The majority of sites did not represent any direct violation of either state law or local ordinance. However, a few sites had questionably violated Shoreland Zoning Ordinance.

In examining differences in problem sites between sectors, there does not appear to be any discernable differences. The number of each type of problem is generally similar between sectors and towns, taking into consideration that some land uses (state roads, commercial) are not present in every sector. The exception was sector A which had a greater number of residential problems (17 vs. average of 5 sites), likely due to greater shoreline development density. There may be differences in the types of problems due to differences in topography, date of development etc., but this was not clearly evident. New development seems to have just as many problems as older development and should be followed up to ensure that erosion controls are in place until the sites are stabilized.

Residential sites accounted for the greatest percentage of identified problems. Most of these problems are low technical level to install, low cost, and low to medium impact. However, almost half of the sites are medium priority since they are generally easy fixes and many have potential for direct flow to the lake. Two of the residential sites were assigned high impact and high priority, so the potential is there for significant effect.

Driveways account for a significant percentage of the problems (16%) and together with residential sites account for 55% of the problems. Similar to residential sites, most of the driveway sites are low technical level to install and low cost. About half of the sites are low impact and low priority and half are medium impact and medium priority. One driveway site is high impact and high priority. Again, these problems are generally easy fixes-problems the homeowners or a contractor can fix. The potential for effect to the lake is significant due to the potential for direct flow.

Private roads account for the second highest percentage of problems (27%). Two-thirds of the sites are low technical level to install and one third are medium technical level to install (technical assistance is necessary). About half of the sites are low impact, low cost and low priority and about half are medium impact, cost and priority- two sites are high impact and priority. The road problems include a variety of problems from surface erosion (due to poor material or lack of crowning), to ditching problems, drainage problems, and poor maintenance. Some excellent roads were also observed: good surface material on many roads, attempts to get runoff into buffers and good

maintenance. Further work in the watershed may want to include individual assessment of the problem roads.

Town and State roads together account for 8% of the problems. Most of the sites are low technical level to install, low impact, low cost and low priority. Problems include either maintenance problems (i.e. removal of winter sand-removal of grader berms) or ditch erosion (all of the State Road problems). In general the roads are in good shape and well maintained, however the documented sites should be addressed, particularly any significant ditch erosion.

Commercial sites also accounted for 8% of the identified problems. Most of the problems are low technical level to install and half of the sites are low impact, low cost, and low priority. About half are medium impact, medium cost, and medium priority-one site is high impact and priority. These represent a range of problems and a limited number of property owners, so that further work might include individual attention.

6.0 RECOMMENDATIONS

6.1 General Recommendations

Solving problems associated with soil erosion and runoff should occur at many levels (individuals, organizations, businesses, government, and schools) and in different time frames (short term, intermediate, long-term) in order to be effective. Everyone, including students, residents, business owners, and government officials has a part in maintaining a healthy watershed. Individuals can correct many small, uncomplicated, chronic sources of polluted runoff with little guidance and expense; while other, more complex, existing and future sources will require technical expertise, long term planning, and fundraising/budgeting.

Solutions include eliminating or reducing existing sources of soil erosion, implementing conservation and maintenance practices, education, and long term watershed planning. Each one of these approaches must be used throughout the watershed to ensure good water quality for McGrath Pond/Salmon Lake. Salmon Lake has experienced poor water quality including algal blooms and will continue to be in a vulnerable state. As the towns continue to grow, the need for long-term protection and implementation becomes more important.

Beyond the obvious benefits of maintaining good water quality, property values can be significantly reduced with changes in water quality. A 1996 University of Maine at Orono study found that a one meter decrease in water clarity of central Maine lakes can cause lake front property values to decrease in the range of $65 to $141 per foot of frontage. For a one meter increase in clarity, prices increased between $34 and $81 per foot of frontage. For example, a one meter decrease in clarity could decrease the value of a $80,000 property with 75 feet of frontage from $10,000 to $20,000.

Below are some examples of what can be done in the watershed. Other solutions are possible.

Individuals can install conservation practices that are inexpensive and can be done by hand such as:

- Planting a vegetative buffer
- Seeding and mulching areas of bare soil
- Diverting runoff away from driveway surfaces and parking areas into stable vegetative areas with water diversions (waterbars, open top culverts, broad-based dips

Individuals can also assist watershed management efforts by being involved in the lake association and by participating in development of the watershed management plan.

Road associations or individuals on private roads can work together by being educated about proper road construction and maintenance, enhancing existing road maintenance practices such as road shaping , stabilizing ditches and road shoulders, cleaning ditch turnouts, and using proper surface material.

Schools can become involved by teaching lake and stream ecology and by giving students a chance to perform community service through watershed projects either initiated by the school or by others. The Youth Conservation Corps educates the young people involved and provides inexpensive labor for fixing nonpoint source problems.

Municipal officials can include measures to protect the lake in ordinances, comprehensive plans, and in enforcement of ordinances; and participate in and support locally driven watershed projects, either through dollars, materials, equipment, labor or a combination of these. They can participate in local citizen watershed management awareness campaigns by helping to develop and distribute brochures, support workshops and help with media relations.

The public works department could obtain training for road crews. The Maine Department of Transportation (MDOT) Local Roads Center (287-2152) offers general low cost training in road construction in road construction, maintenance and the relationship between roads and water quality.

Staff at Maine DEP or Kennebec County Soil and Water Conservation District are available to help provide or facilitate workshops such as "how to plant a vegetated buffer", "how polluted runoff affects lake water quality", "how to construct and install an open top culvert".

The DEP's Division of Watershed Management has the Nonpoint Source Training Center that provides numerous training courses on an ongoing basis. The courses offered include training for contractors, engineers, and others on stormwater management, erosion control, and septic system installation. Other courses offered periodically include roadside and camproad erosion control and forestry best management practices.

The Maine Department of Environmental Protection administers the Nonpoint Source (NPS) Grants Program "to provide financial assistance for projects that prevent, control or abate water pollution by nonpoint sources. There are four categories of NPS grant projects:

- Watershed Survey Project: These projects assess a watershed for existing nonpoint source pollution problems and produce a report describing sites and general recommendations.
- Project to Develop a Watershed Management Plan: These projects produce a plan with specific goals, objectives and actions to achieve locally supported watershed management. They are more comprehensive than a survey report and include a component to obtain local input and support in it's development.
- Project to Implement a Watershed Management Plan: These projects are designed to implement the strategies contained within a watershed management plan.
- NPS Implementation Project: These are broad category projects for a wide variety of actions to address NPS pollution. Activities include technical assistance, education and outreach, and demonstration projects.

In 1998, the Belgrade Regional Conservation Alliance (BRCA) applied for and received approval for funding the development of a watershed management plan. The proposal includes completing watershed surveys for East Pond, North Pond and Great Pond and developing a management plan for these three lakes as well as McGrath Pond/Salmon Lake. The management plan will help develop the support for lake water quality protection and develop a comprehensive strategy. The Belgrade Regional Conservation Alliance should be looking ahead to apply for funding for implementation of the plan.

6.2 Specific Recommendations

Specific steps that the McGrath Pond/Salmon Lake Association and the BRCA can do include:

A. Develop vegetated buffer demonstration sites on each basin for low to medium priority residential sites where remedies could be installed by the landowner for low cost. Such remedies could include plantings, transplanting, mulching, seeding, or small regrading projects. Work with Kennebec County Soil and Water Conservation District (SWCD), Natural Resources Conservation Service (NRCS) and local nurseries to identify cost estimates for each site.

B. Work with a road association or landowners on a demonstration site on a camproad. Camproad problems are likely to require technical assistance- DEP staff, Kennebec County SWCD and NRCS are sources of technical assistance.

C. Coordinate a workshop or training for landowners on topics such as vegetated buffers or camproad maintenance. The above agencies may be able to assist.

D. Work closely with the Youth Conservation Corps regarding survey findings in order to direct them toward potential sites and types of problems to work on.

E. Support development of the Watershed Management Plan either through direct assistance with other watershed surveys or with development of the plan.

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Glossary

Best Management Practices: (BMPs) Techniques to reduce non-point source impacts from construction, agriculture, timber harvesting, marinas, and stormwater. Manuals describing these techniques have been developed by the State of Maine.

Buffer: An area of natural vegetation which has been left undisturbed or is replanted to mitigate the effects of land based operations on waterbodies.

Ditch Turnout: A Best Management Practice used to direct runoff in a ditch into a vegetated buffer. This shortens the distance that runoff travels in a ditch, thus reducing volume and speed of the water traveling in the ditch and preventing ditch erosion. A turnout prevents runoff in a ditch from reaching a stream or other water body by directing water into a vegetated buffer.

Diversion: A Best Management Practice used to intercept and direct surface runoff. Diversions are usually channels or depressions with a supporting ridge on the lower side, constructed across or at the bottom of a slope.

Erosion: Wearing away of rock or soil by the gradual detachment of soil or rock fragments by water, wind, ice or other mechanical or chemical forces. Human activities can greatly speed this detachment.

Mulch: A layer of hay or other materials covering the land surface that holds soil in place so that it does not erode. It aids in the establishment of vegetation by holding the soil in place, conserving moisture, and minimizing temperature fluctuations.

Phosphorus: An element found throughout the environment; it is a nutrient essential to all living organisms. Phosphorus binds to soil particles, is found in fertilizers, sewerage, and motor oil, and is found in high concentrations in stormwater runoff. The amount of phosphorus present in a lake determines the lake's production of algae. A very small change in phosphorus levels can dramatically increase algae growth.

Polluted Runoff: Runoff that has picked up contaminants or nutrients from the landscape (or air), as it flows over the surface of the land to a waterbody.

Sediment: Mineral and organic soil material that is transported in suspension by wind or flowing water, from its origin in another location.

Tributaries: Streams or rivers that flow to a larger body of water.

Vegetated Buffer: Areas of vegetation, left undisturbed or planted between a developed area and a waterbody that are used to capture pollutants form surface water and groundwater. Buffer vegetation can include trees, shrubs, bushes, and ground cover plants.

Waterbar: A diversion ditch and/or hump installed across a trail or road to divert runoff from the surface before the flow gains enough volume and velocity.

Watershed: The geographic region which water drains into a particular river, stream, or body of water. A watershed includes hills, lowlands, and the body of water into which the land drains. Watershed boundaries are defined by the ridges of land separating watersheds.

Appendix A

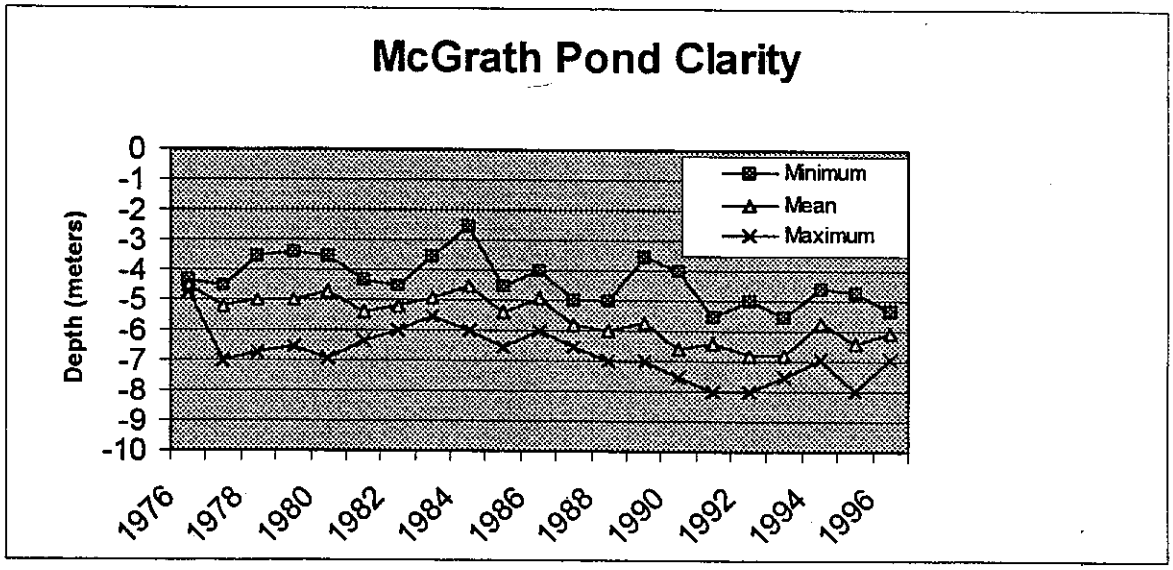
Report- McGrath Pond/Salmon Lake Water Quality

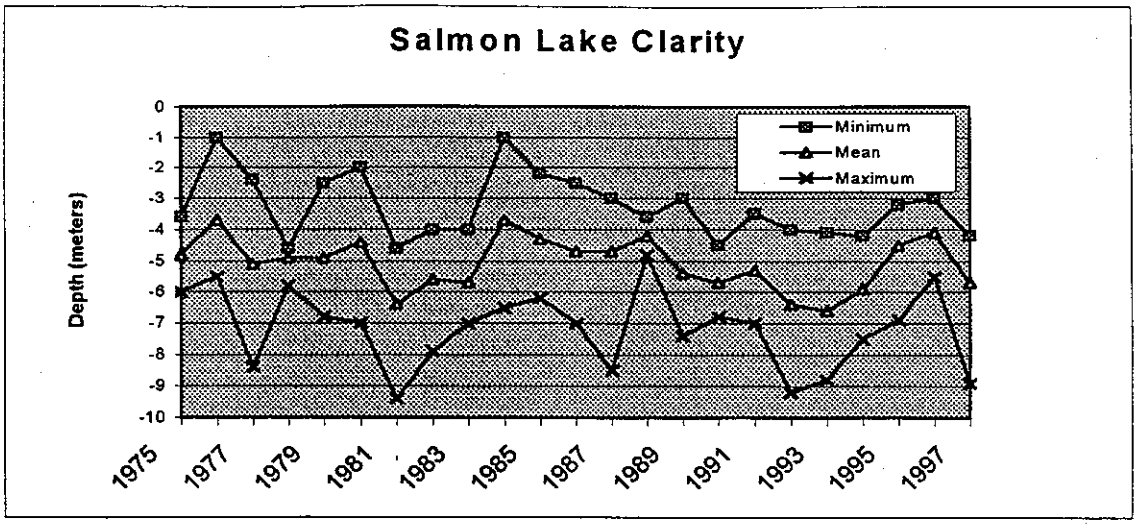
Salmon Lake and McGrath Pond
Water Quality

When the dam was installed on Salmon Lake ("Ellis Pond") the rising water level increased the connection between McGrath Pond and Salmon Lake. These lakes are significantly different in character. However, since McGrath Pond drains to Salmon Lake, its condition affects Salmon Lake, just as Salmon affects Great Pond downstream.

Volunteers have participated in the Volunteer Monitoring Program almost continuously for two decades and thus we have some of the best data in the state for these lakes. Both Salmon and McGrath had somewhat poorer water quality in the decade after the mid-1970's than is seen today. Salmon Lake had several years with nuisance algae growth ("blooms"), although McGrath Pond only approached that level once. During that time, there was a limited project to restore water quality on these lakes that included some work to reduce "non-point" phosphorus sources. However, no comprehensive watershed survey work was done.

Since monitoring began in the mid 1970's, water clarity has improved in both lakes, particularly in McGrath where a statistically significant improving trend has been evident. Salmon Lake's improvement has been much more modest, and the year to year variability is great enough that we cannot call it a true trend.





Yearly peaks in algae growth, usually in August, along with other data indicate that Salmon Lake still grows a lot of algae.

Salmon Lake has a lot of water with low dissolved oxygen concentrations by mid-summer. Oxygen is lost in the deep water due to the decay of algae which are produced near the surface and settle to the bottom. In many years, more than 50 % of the entire lake volume (everything deeper than 25 feet) has less than 5 ppm oxygen conditions, the minimum needed for stress-free trout and salmon habitat. Oxygen concentrations get to as little as 1-2 ppm in much of the deep water. This causes the sediment to release significant amounts of phosphorus in the lake as summer progresses ("internal recycling"). Deep water phosphorus samples have been as high as 60-120 parts per billion ("ppb"). This means that there is a large amount of phosphorus which is affecting the lake and which is nearly impossible to control. At around 14 ppb in summer, Salmon Lake surface water continues to have phosphorus levels 3-4 ppb higher than McGrath Pond. This makes it very susceptible to periods of high algae growth and very sensitive to additional nutrient pollution. This makes protecting the lake from phosphorus in runoff even more important.

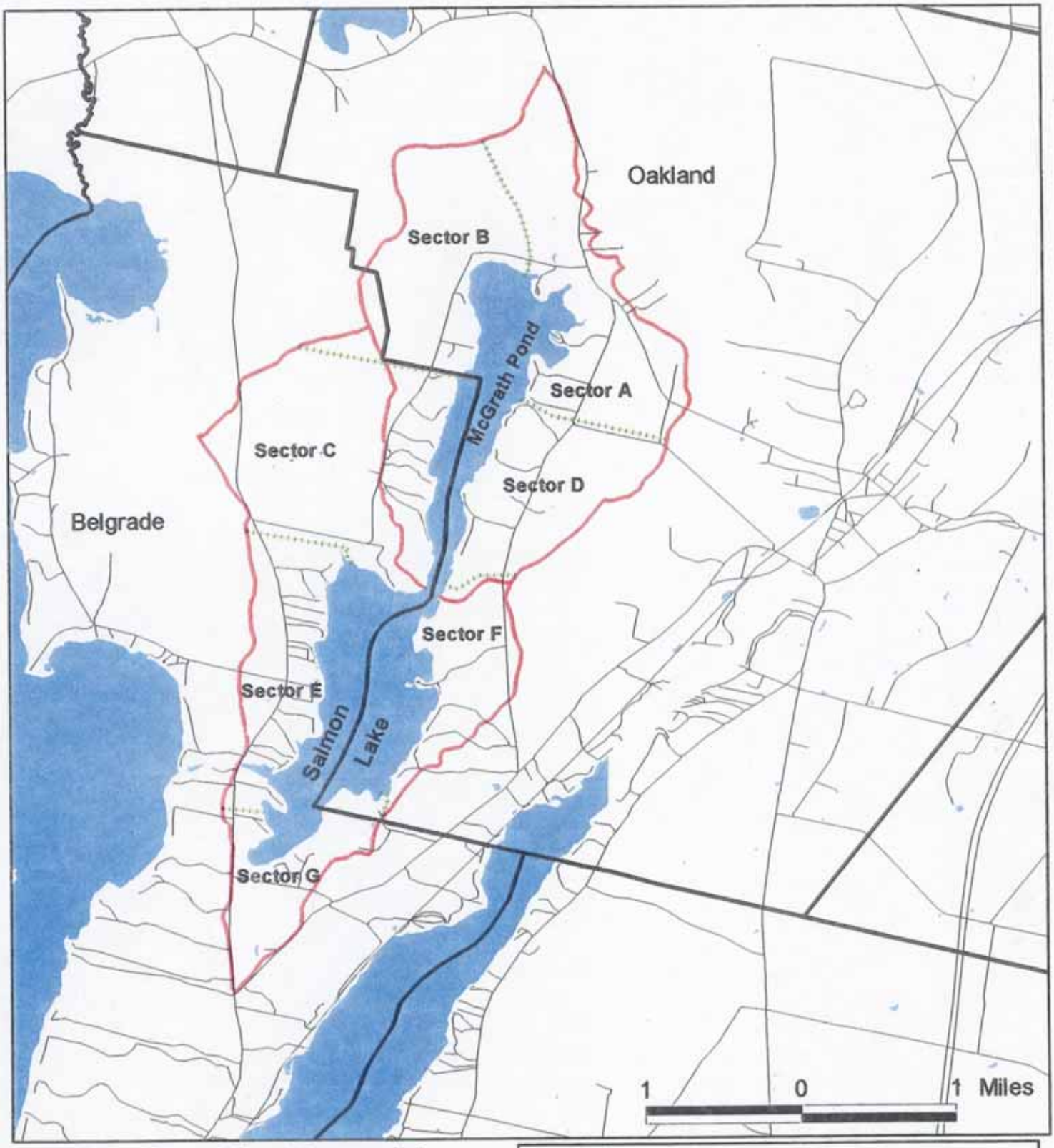
Results from 1998 sampling by volunteer monitors Lakin and Couture

Late season water clarity was high in McGrath Pond and ranged around 19-22 feet. Salmon Lake showed definite signs of algae, with readings around 9-12 feet in August and in late September around 8 feet. The monitor noticed algae particles floating thoughout August, and this was replaced by finer particles and more cloudy appearance later in the season. Oxygen loss in Salmon Lake was considerable. By late August, all the water below 25 feet had essentially no oxygen left, a condition which persisted until late September. McGrath Pond is too shallow to stratify and did not develop low oxygen conditions.

The better water clarity in recent years is good news, but is not cause for complacency. Despite the apparent gains we have made, a return to algae blooms can easily happen, especially in the case of Salmon Lake. The low oxygen conditions and high phosphorus in Salmon Lake call for extra attention in managing the watersheds of both lakes for the future.

Appendix B

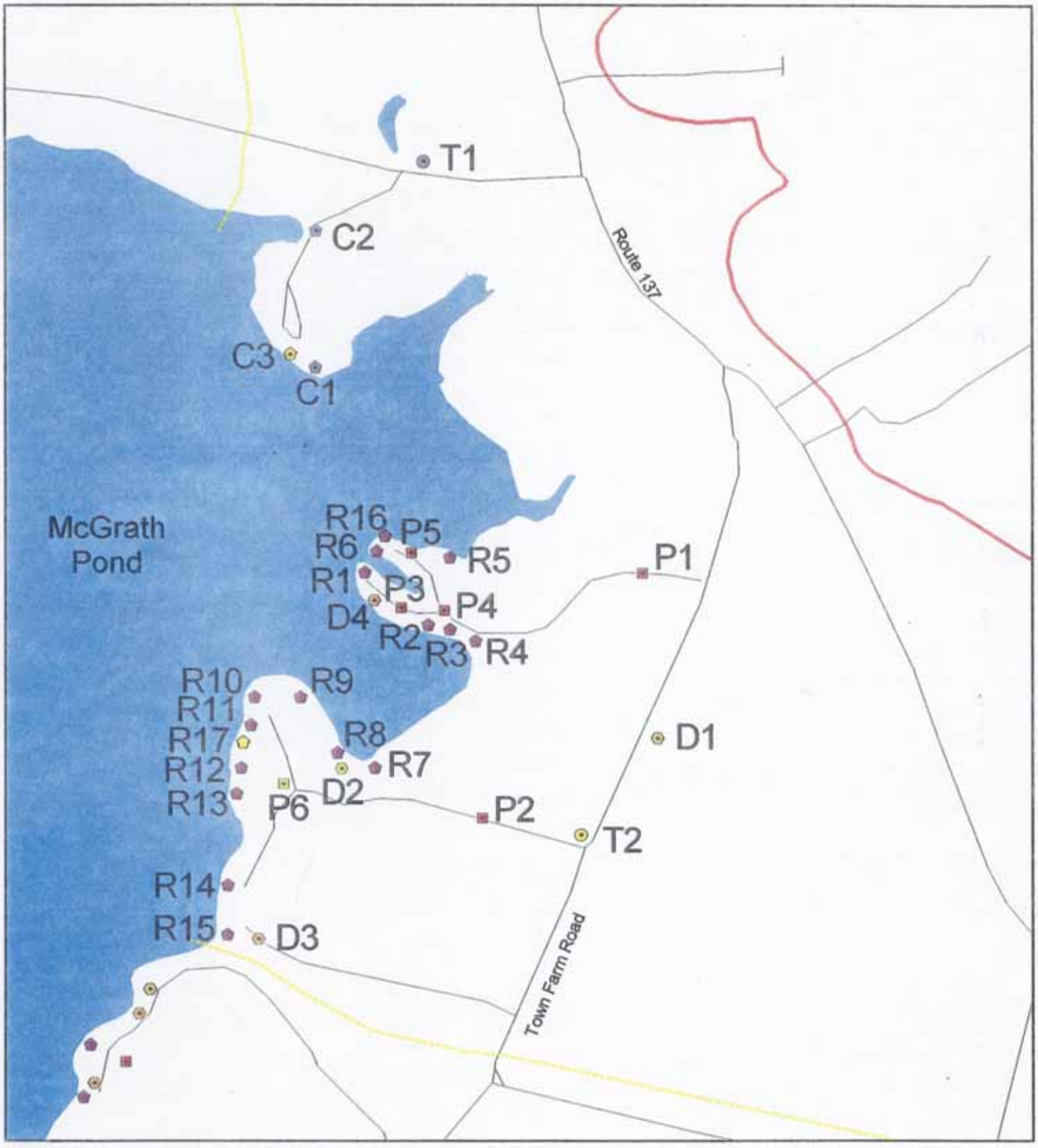
Map- Watershed with Survey Sectors



McGrath Pond/ Salmon Lake Watershed with Survey Sectors

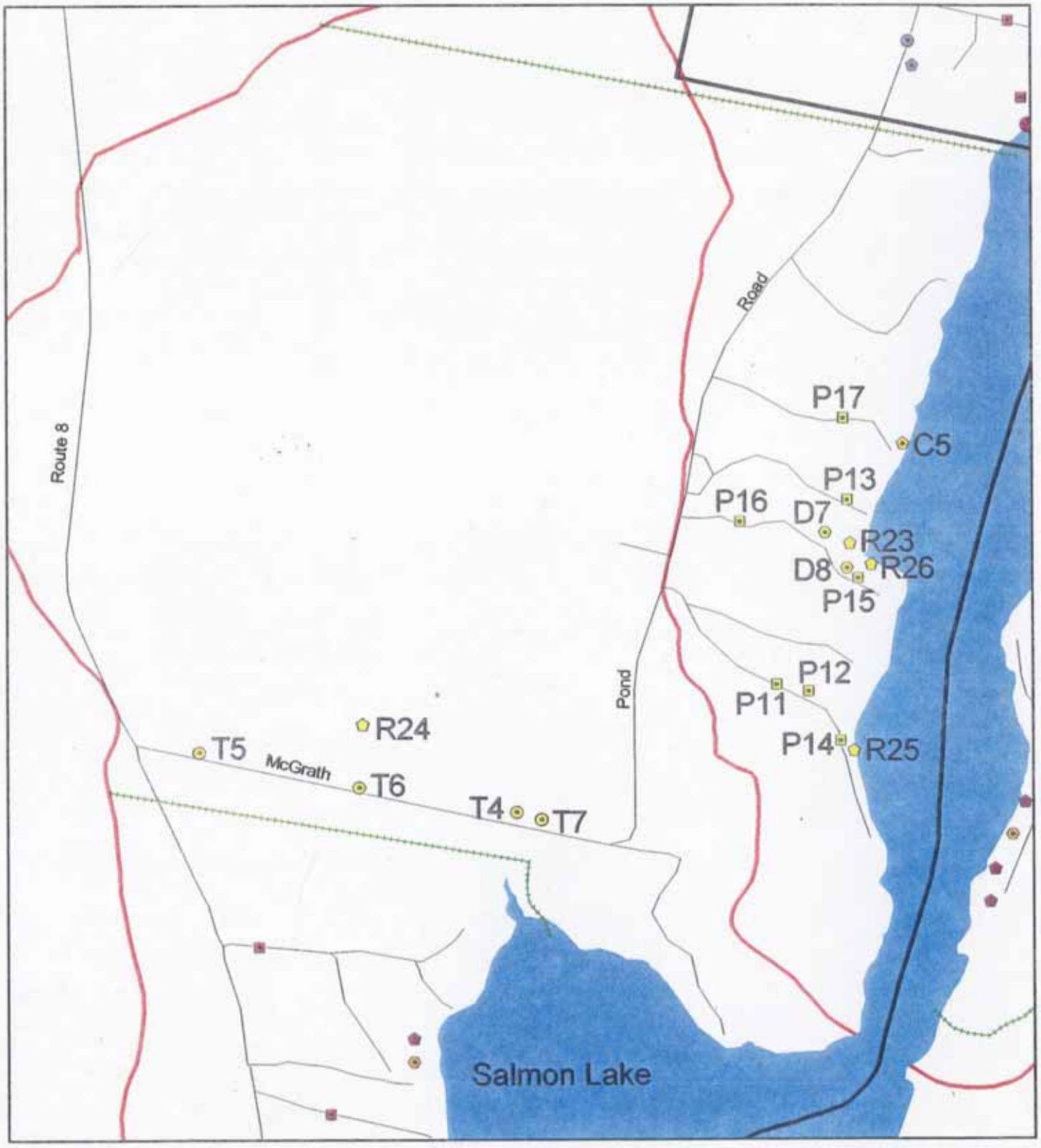
Appendix C

Maps- Sector Maps with Site Locations



Sector A Sites

Sector B Sites

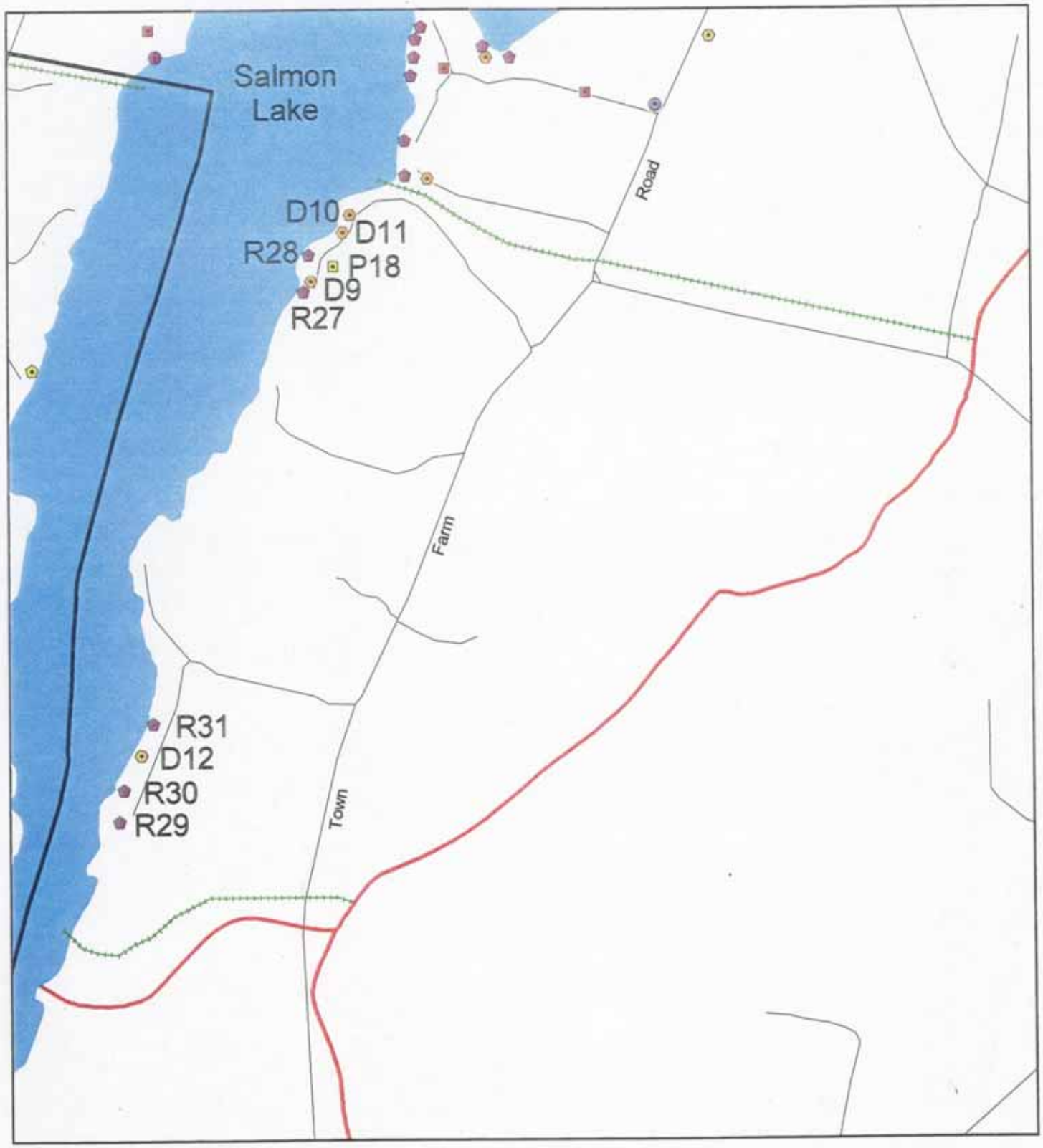


0.1 0 0.1 0.2 Miles

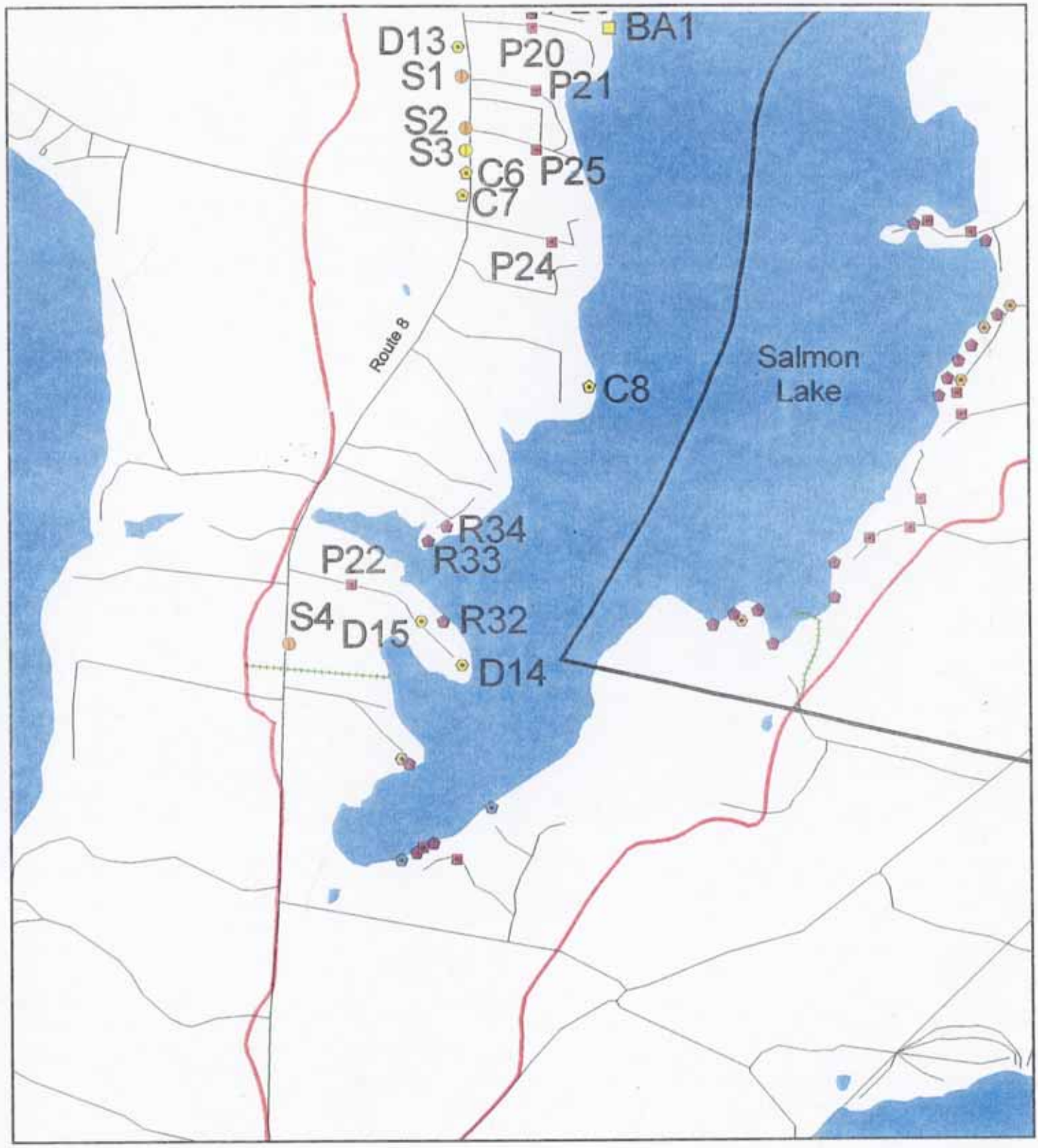
Sector C Sites

Watershed Boundary
Road
Sector Boundary
Lake
Town Lines
N

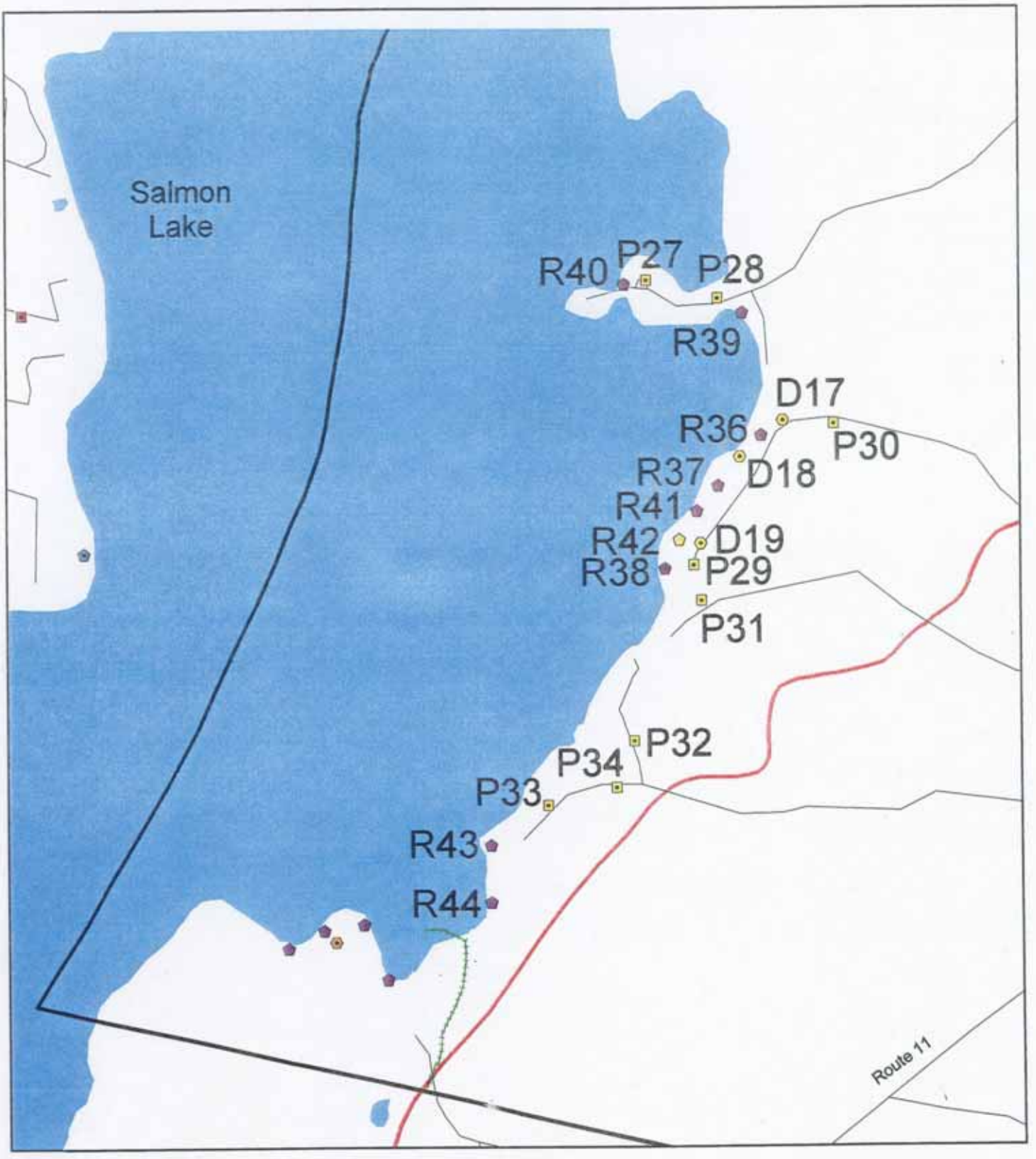
State Road
Town Road
Private Road
Driveway
Residential
Boat Access
Beach
Commercial
Agriculture



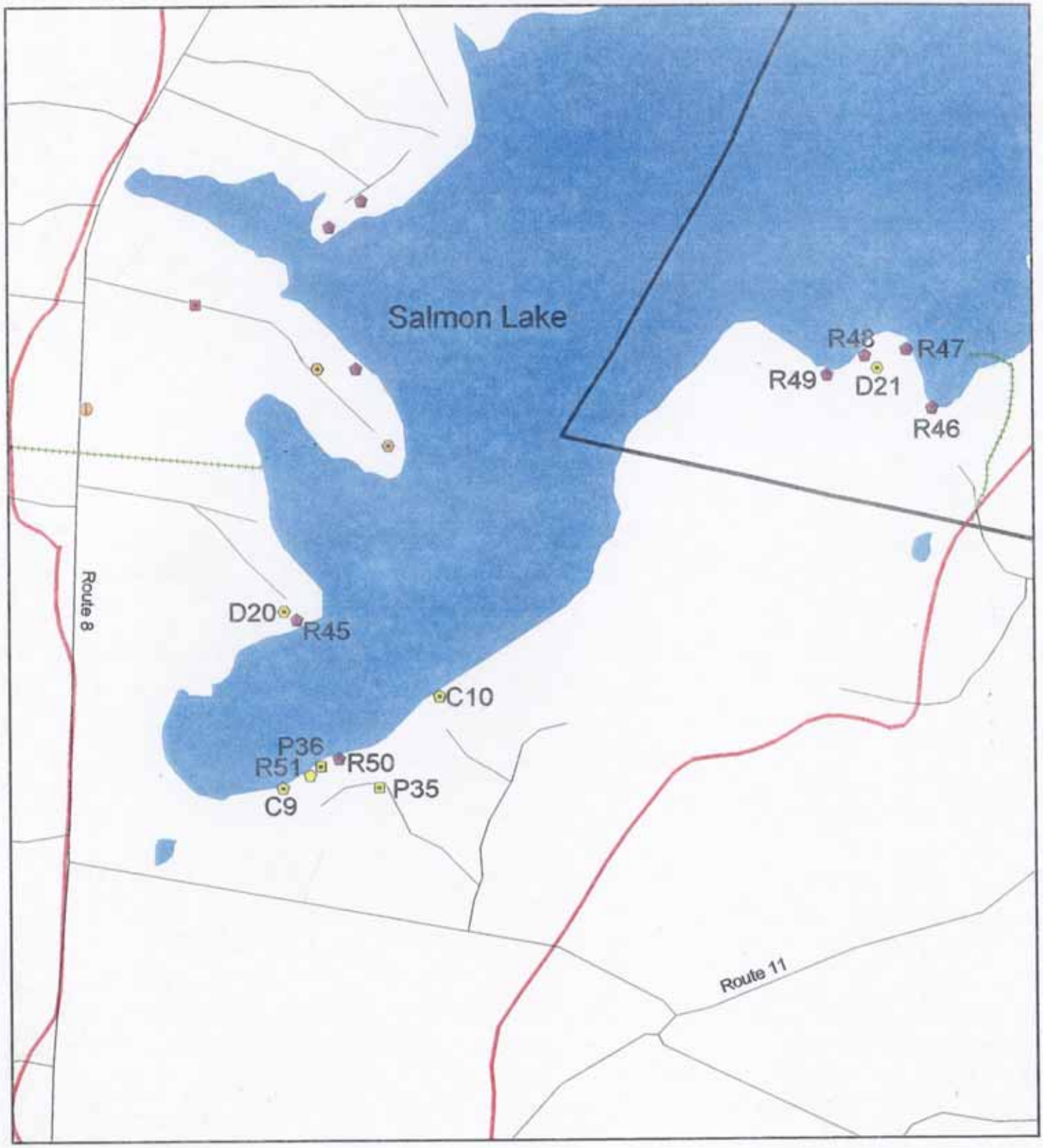
Sector D Sites



Sector E Sites



Sector F Sites



Sector G Sites

Appendix D

Table- McGrath Pond/Salmon Lake Watershed Sites

McGrath-Salmon Watershed Sites

SECTOR & SITE ID	MAP ID NUMBER	LAND USE	TYPE OF PROBLEM	LENGTH OR AREA	RECOMMENDATIONS	TECHNICAL LEVEL TO INSTALL	IMPACT	COST	PRIORITY
B-H	A1	Agriculture	Bare soil, bare fields	200' x 200'	Erosion controls, seed & mulch, follow-up in spring	Low	Low	Medium	Low
E-3	BA-1	Boat ramp	Unstable boat access	10' x 50'	Stabilize, new surface material	Low	Low	Low	Low
B-A	B1	Beach-commercial	Bare soil, direct flow to lake, shoreline erosion	50' x 50'	Vegetate, seed & mulch	Low	Low	Low	Medium
MA-9	C1	Commercial	Unstable beach access, direct flow to lake	15' x 40'	Stabilize path, seed & mulch	Low	Medium	Low	Medium
MA-10	C2	Commercial-road	Mod. surface erosion, direct flow to lake	150'	Build up & crown road, divert runoff	Low	Medium	Medium	Medium
MA-11	C3	Commercial-campsites	Lack of buffer, bare soil	6-10' x 10'	Establish buffer, seed & mulch	Low	Low	Low	Low
MB-2	C4	Commercial Parking	Mod. surface erosion, bare soil	150' x 30'	Reshape, waterbar	Medium	Low	Medium	Low
C-7	C5	Commercial	Lack of buffer, direct flow to lake, slight surface erosion (boat access)	20' x 25' (access)	Establish buffer, stabilize boat access	Low	Low	Low	Low
E-10B	C6	Commercial	Unst. construction site, plugged culvert, direct flow to ditch	100' x 200' & 10' x 20' (eroded)	Erosion controls, stabilize, redirect drainage if possible	Medium	Medium	Medium	Medium
E-10C	C7	Commercial	Mod. shoulder erosion-next to ditch, runoff from parking area may be contributing	5' x 30'	Riprap, stabilize	Low	Low	Low	Low
ME-54	C8	Commercial	Bare soil, direct flow to lake, unst. beach access		Erosion controls, mulch, limit beach access	Low	Medium	Low	Medium

McGrath-Salmon Watershed Sites

SECTOR & SITE ID	MAP ID NUMBER	LAND USE	TYPE OF PROBLEM	LENGTH OR AREA	RECOMMENDATIONS	TECHNICAL LEVEL TO INSTALL	IMPACT	COST	PRIORITY
G-3	C9	Commercial	Bare soil (footpaths)		Erosion controls	Low	Low	Low	Low
MG-45	C10	Commercial	Mod. surface erosion, bare soil, direct flow to lake, raking duff, roof runoff	100' x 20'	Divert runoff, mulch, erosion controls, do not rake	Low	High	Medium	High
A-11	D1	Driveway	Mod. shoulder erosion, unstable culvert i/o, direct flow to trib.	40' x 3'	I/O protection, extend riprap	Low	Low	Low	Medium
A-15	D2	Driveway	Moderate surface erosion, direct flow to lake, steep slope		Turnout for drive., eliminate steep drive	Low	Medium	Low	Medium
A-25	D3	Driveway	Mod. ditch erosion, direct flow to lake, direct flow to trib.	250'	Turnout, water bar, vegetate	Low	Medium	Low	Medium
MA-12	D4	Driveway	Mod. surface erosion, bare soil, direct flow to lake, slopes to lake	Parking -3 camps	Vegetate some areas, new surface material	Medium	Medium	Medium	Medium
B-E2	D5	Driveway	Poor shaping	120' x 60'	Vegetate, seed & mulch (silt fence in place)	Low	Low	Low	Low
MB-8	D6	Driveway	Mod. surface erosion, poor shaping, direct flow to trib.	100'	Build up road, new surface material, reshape	Low	Medium	Low	Medium
C-5	D7	Driveway	Poor surface material	200' x 20'	New surface material, turnout	Low	Medium	Low	Medium
MC-26	D8	Driveway	Mod. surface erosion	100'	Turnout	Low	Medium	Low	Medium

McGrath-Salmon Watershed Sites

SECTOR & SITE ID	MAP ID NUMBER	LAND USE	TYPE OF PROBLEM	LENGTH OR AREA	RECOMMENDATIONS	TECHNICAL LEVEL TO INSTALL	IMPACT	COST	PRIORITY
D-1	D9	Driveway	Mod. surface erosion, road runoff	15' x 50'	New surface material, reshape, divert runoff	Low	Low	Low	Medium
D-4	D10	Driveway	Mod. surface erosion, clogged culvert, runoff from road eroding drive	20' x 30'	Maintenance, new culvert, reshape, seed & mulch some areas	Low	Medium	Low	Medium
D-5	D11	Driveway	Mod. surface erosion, runoff from road	15' x 25'	Divert runoff from road	Low	Low	Low	Low-Medium
D-8	D12	Driveway	Mod. surface erosion, runoff from road	15' x 30'	New surface material, reshape, redirect runoff	Low	Low	Low	Low
E-6	D13	Driveway	Mod. surface erosion, poor shaping, direct flow to ditch	30' x 10'	Reshape, waterbar, broad based ditch	Low	Low	Low	Low
ME-50	D14	Driveway	Mod. surface erosion, bare soil, direct flow to lake	100' x 10'	Waterbar-diversion, broad based ditch, seed & mulch	Low	Low	Low	Low
ME-51	D15	Driveway	Mod. surface erosion, direct flow to lake	80' x 15'	Waterbar-diversion, broad based ditch	Low	Low	Low	Low
ME-57	D16	Driveway	Unstable, direct flow to lake	12' x 350'	Turnout, stabilize	Medium	High	Medium	High
F-1	D17	Driveway	Light surface erosion	10' x 40'	Waterbar-diversion	Low	Medium	Low	Medium
MF-30	D18	Driveway	Runoff from driveway, bare soil next to drive.	15' x 60'	Vegetate, waterbar-diversion, seed & mulch	Low	Low	Low	Low
MF-32	D19	Driveway	Slight surface erosion		Turnout, waterbar-diversion	Low	Medium	Low	Medium

McGrath-Salmon Watershed Sites

SECTOR & SITE ID	MAP ID NUMBER	LAND USE	TYPE OF PROBLEM	LENGTH OR AREA	RECOMMENDATIONS	TECHNICAL LEVEL TO INSTALL	IMPACT	COST	PRIORITY
G-1	D20	Driveway	Eroded ditch		Seed & mulch ditch	Low	Low	Low	Low
MG-43	D21	Driveway	Mod. surface erosion	150' x 12'	Reshape, waterbar	Low	Medium	Low	Low
A-4	P1	Private Road	Mod. surface erosion, mod. shoulder erosion, poor shaping	700'	Reshape-crown road, I/O protection, cut back ditch, remove grader berm	Low	None-to woods	Low	Low
A-13	P2	Private Road	Unstable culvert i/o, mod. ditch erosion	1000'	Seed & mulch, cut back ditch, culvert i/o protection	Low	None-into woods	Low	Low
MA-12	P3	Private road	Mod. surface erosion, direct flow to lake, slopes to lake	50'	Build up road, new surface material, reshape	Medium	Medium	Medium	Medium
MA-13	P4	Private road	Mod. surface erosion, poor shaping, direct flow to lake	150'	New surface material, reshape	Medium	Medium	Medium	Medium
MA-15	P5	Private road	Mod. surface erosion, poor shaping, poor surface material	200'	Build up road, new surface material	Low	Low	Low	Low
MA-18	P6	Private road	Mod. surface erosion, poor shaping, direct flow to lake	10' x 150'	Build up road & reshape, turnout	Low	Medium	Low	Medium
B-C	P7	Private road	Unstable culvert i/o, clogged culvert		Maintenance, new culvert	Medium	Low	Low	Low
B-D	P8	Private Road	Mod. surface erosion, poor shaping	400' x 10'	Reditch, build up road, reshape, turnout, waterbar	Medium	Low	Medium	Low
MB-4	P9	Private Road	Slight ditch erosion, poor shaping (road not crowned), direct flow to trib	100' x 10'	Crown road, redirect flow to buffer, recheck stability	Low	Low-Medium	Low	Low

McGrath-Salmon Watershed Sites

SECTOR & SITE ID	MAP ID NUMBER	LAND USE	TYPE OF PROBLEM	LENGTH OR AREA	RECOMMENDATIONS	TECHNICAL LEVEL TO INSTALL	IMPACT	COST	PRIORITY
MB-6	P10	Private Road	Poor shaping, direct flow to trib., slight surface erosion (tar breaking up), sediment from above	10' x 200'	Turnout, repave, follow-up source of sediment	Medium	Medium	Medium	Medium
C-1	P11	Private Road	Old-exposed culverts (2), unstable i/o		New culverts, maintenance	Low	Low	Low	Low
C-2	P12	Private Road	Mod. surface erosion, mod. ditch erosion, poor shaping, direct flow to trib. (lower part of road)	2000'	New surface material, reshape	Low	Medium	Medium	Medium
C-6	P13	Private Road	Mod. surface erosion, severe ditch erosion, poor shaping, direct flow to lake	400' & 250'	Reditch & stabilize, new surface material, turnout	Medium	High	Medium	High
MC-25	P14	Private Road	Moderate ditch erosion	100'	Seed & mulch, cut back & stop mowing ditch, divert uphill runoff	Medium	Medium	Low	Medium
MC-27	P15	Private Road	Poor shaping, direct flow to trib., grader berm	400'	Reshape, reditch-clean out ditch, vegetate	Low	Medium	Low	Medium
MC-28	P16	Private Road	Mod. surface erosion, poor shaping, poor ditching	1500'	Reditch, new surface material, reshape, turnout	Low	Low	Medium	Low
MC-29	P17	Private Road	Mod. surface erosion, mod. & severe ditch erosion	500'	Maintenance, reshape, turnout, stabilize ditch	Low	Low	Medium	Low
D-2	P18	Private Road	Mod. ditch erosion, unstable culvert i/o, direct flow to lake, improperly installed culvert		Vegetate, new or more-larger culvert(s), reshape, i/o protection	Medium	Medium	Medium	Medium
E-2	P19	Private Road	Mod. surface erosion, poor shaping, direct flow to trib.	300'-400'	Reshape, turnout, cross culvert to turn out	Low	Medium	Medium	Medium

McGrath-Salmon Watershed Sites

SECTOR & SITE ID	MAP ID NUMBER	LAND USE	TYPE OF PROBLEM	LENGTH OR AREA	RECOMMENDATIONS	TECHNICAL LEVEL TO INSTALL	IMPACT	COST	PRIORITY
E-5	P20	Private Road	Mod. surface erosion, poor shaping, direct flow to trib.	600'	Plunge pool w/ maintenance, turnout, seed & mulch ditch, regrade	High	High	Medium	High
E-9	P21	Private Road	Mod. surface erosion, poor shaping, direct flow to stream	400'-500'	Build up road, reshape, turnout	Medium	Medium	Medium	Medium
E-11	P22	Private Road	Unstable culvert i/o		Riprap culvert	Low	Low	Low	Low
ME-49	P23	Private Road	Slight surface erosion, unstable culvert i/o, direct flow to trib.	300'-400'	Reshape, turnout, i/o protection	Low	Medium	Medium	Medium
ME-55	P24	Private Road	Mod. ditch erosion, ditch capability exceeded, direct flow to lake	300'	Reditch, reshape, turnout, seed & mulch or riprap ditch	Medium	Medium	Medium	Medium
ME-56	P25	Private Road	Mod. surface erosion, direct flow to lake	300'	Reshape, waterbar-diversion, remove grader berm	Low	Medium	Medium	Medium
ME-58	P26	Private Road	Mod. ditch erosion, direct flow to trib., grader berm, winter sand	300'	Turnout, remove grader berms, clean out ditch	Low	Medium	Low	Medium
F-7	P27	Private Road	Slight surface erosion	75' x 15'	Reshape, waterbar-diversion	Low	Low	Low	Low
F-8	P28	Private Road	Light surface erosion, poor shaping, direct flow to lake	1700'	Build up road, reshape, waterbar-diversion, establish buffer	Low	Low	Medium	Low
MF-33	P29	Private Road	Slight surface erosion, direct flow to trib.	15' x 150'	Vegetate, turnout, waterbar-diversion	Low	Low	Low	Low

McGrath-Salmon Watershed Sites

SECTOR & SITE ID	MAP ID NUMBER	LAND USE	TYPE OF PROBLEM	LENGTH OR AREA	RECOMMENDATIONS	TECHNICAL LEVEL TO INSTALL	IMPACT	COST	PRIORITY
MF-34	P30	Private Road	Mod. surface erosion, poor shaping, direct flow to lake, runoff from road across property	200' x 15'	Build up road, reshape, turnout, waterbar-diversion	Medium	Medium	Medium	Medium
MF-35	P31	Private Road	Eroded footpath between roads, runoff from road & uphill	30' x 3'	Turnout, waterbar-diversion	Low	Medium	Low	Medium
MF-36	P32	Private Road	Poor shaping, direct flow to trib.	100'	Maintenance, build up road, turnout, diversion, broad based ditch	Low	Medium	Low	Medium
MF-37	P33	Private Road	Mod. surface erosion, poor shaping, direct flow to lake, runoff from uphill	50'	Build up road, clean out ditch, divert runoff to buffer	Medium	Medium	Low	Medium
MF-38	P34	Private Road	Slight surface erosion, poor shaping	500'	Enhance turnouts, broad based ditch	Low	Low	Low	Low
MG-46	P35	Private Road	Mod. surface erosion	200'	Reshape, turnout, waterbar-diversion	Low	Medium	Low	Medium
MG-48	P36	Private Road	Mod. surface erosion, direct flow to lake	75' x 20'	Reshape, diversion	Low	Medium	Low	Medium
A-1A	R1	Residential	Lack of Buffer, bare soil, direct flow to lake, roof runoff	40' x 30'	Establish buffer, seed and mulch	Low	Medium	Low	Medium
A-5	R2	Residential	Lack of buffer, bare soil, direct flow to lake	20' x 40'	Establish buffer, vegetate	Low	Medium	Low	Medium
A-6	R3	Residential	Lack of buffer, bare soil	10' x 30' & 5' x 15'	Establish buffer, do not rake, limit access	Low	Low	Low	Low

McGrath-Salmon Watershed Sites

SECTOR & SITE ID	MAP ID NUMBER	LAND USE	TYPE OF PROBLEM	LENGTH OR AREA	RECOMMENDATIONS	TECHNICAL LEVEL TO INSTALL	IMPACT	COST	PRIORITY
A-7	R4	Residential	Lack of buffer, bare soil, direct flow to lake	30' x 30'	Establish buffer, seed & mulch	Low	Medium	Low	Medium
A-8	R5	Residential	Mod. surface erosion, lack of buffer, direct flow to lake, driveway to lake	15' x 25'	Establish buffer, vegetate, limit drive.	Low	Medium	Low	Medium
A-9	R6	Residential	Mod. surface erosion, lack of buffer, direct flow to lake, driveway to lake	15' x 25'	Establish buffer, vegetate, limit driveway	Low	Medium	Low	Medium
A-14	R7	Residential	Lack of buffer, bare soil	25' x 20'	Establish buffer, seed & mulch	Low	Low	Low	Medium
A-15	R8	Residential	Lack of buffer, bare soil, direct flow to lake	50' x 75'	Establish buffer, seed & mulch	Low	Medium	Low	Medium
A-16	R9	Residential	Lack of buffer	20' x 25'	Establish buffer	Low	Low	Low	Low
A-18	R10	Residential	Lack of buffer, bare soil, direct flow to lake	30' x 50'	Establish buffer, seed & mulch	Low	Medium	Low	Medium
A-19	R11	Residential	Undercut shoreline (boat access)	10' x 2'	Stabilize	Low	Low	Low	Low
A-20	R12	Residential	Lack of buffer, bare soil, direct flow to lake, runoff from road &drive	50' x 100'	Establish buffer, turnout, fix runoff problem	Low	Medium	Low	Medium
A-21	R13	Residential	Lack of buffer, bare soil	10' x 15'	Establish buffer, seed & mulch	Low	Low	Low	Medium
A-23	R14	Residential	Lack of buffer, bare soil, direct flow to lake	15' x 30'	Establish buffer, vegetate	Low	Low	Low	Medium

McGrath-Salmon Watershed Sites

SECTOR & SITE ID	MAP ID NUMBER	LAND USE	TYPE OF PROBLEM	LENGTH OR AREA	RECOMMENDATIONS	TECHNICAL LEVEL TO INSTALL	IMPACT	COST	PRIORITY
A-24	R15	Residential	Lack of buffer, bare soil, direct flow to lake, driveway runoff	20' x 20'	Establish buffer, vegetate, turnout, seed & mulch	Low	Medium	Low	Medium
MA-14	R16	Residential	Lack of buffer, bare soil	All camps on road	Establish buffer, groundcover enhancement	Low	Low	Low	Low
MA-17	R17	Residential	Lack of buffer, bare soil	30' x 100'	Establish buffer	Low	Low	Low	Low
B-E2	R18	Residential	Bare soil	150' x 15'	Reshape, waterbar	Low	Low	Low	Low
B-E3	R19	Residential	Drainage pipe, direct flow to lake	3' x 15'	Stabilize ditch, crushed rock	Low	Low-None	Low	Low
B-J	R20	Residential	Lack of buffer along stream turned into lawn (potential to be unstable)	200'	Establish buffer, i/o stabilization	Low	Low	Low	Low
MB-5	R21	Residential	Lack of buffer- several camps	300' x 100'	Establish buffer	Low	Low	Low	Low
MB-7	R22	Residential	Lack of buffer -several houses	400' x 100'	Establish buffer	Low	Low	Low-Medium	Low
C-5	R23	Residential	Lack of buffer, bare soil, shoreline erosion, unstable beach access	20' x 20' & 25'(shore)	Establish buffer,seed & mulch, stabilize shore	Low	Medium	Low	Medium
MC-22	R24	Residential	Slight surface erosion, bare soil, unst. construction site, direct flow to trib. (potential)	100' x 150'	Erosion controls, seed & mulch	Low	Low	Low	Low

McGrath-Salmon Watershed Sites

SECTOR & SITE ID	MAP ID NUMBER	LAND USE	TYPE OF PROBLEM	LENGTH OR AREA	RECOMMENDATIONS	TECHNICAL LEVEL TO INSTALL	IMPACT	COST	PRIORITY
MC-24	R25	Residential	Lack of buffer on 3 camps		Establish buffer	Low	Low	Low	Low
MC-26	R26	Residential	Lack of buffer, direct flow to lake, unst. beach access	40'(shore) & 60' x 75'	Riprap shore, establish buffer	Low	Medium	Low	Medium
D-1	R27	Residential	Unstable footpath	3' x 20'	Mulch footpath	Low	Low	Low	Medium
D-3	R28	Residential	Bare soil	30' x 30'	Vegetate, seed & mulch	Low	Low	Low	Medium
D-6	R29	Residential	Lack of buffer, slight surface erosion, bare soil	10' x 15' (bare)	Establish buffer, seed & mulch	Low	Low	Low	Medium
D-7	R30	Residential	Bare soil	25' x 25'	Seed & mulch, do not rake, let natural vegetation grow	Low	Low	Low	Medium
D-9	R31	Residential	Lack of buffer	3-4 lots	Establish buffer	Low	Low	Low	Low
ME-51	R32	Residential	Bare soil		Seed & mulch	Low	Low	Low	Low
ME-52	R33	Residential	Bare soil, direct flow to lake	25' x 50'	Seed & mulch, do not rake, let natural vegetation establish	Low	Low	Low	Low
ME-53	R34	Residential	Bare soil	25' x 25'	Seed & mulch, do not rake	Low	Low	Low	Low
ME-57	R35	Residential	Unst. construction site, direct flow to lake	200' x 25'	Erosion controls,seed & mulch, establish buffer, address runoff	Medium	High	Medium	High

McGrath-Salmon Watershed Sites

SECTOR & SITE ID	MAP ID NUMBER	LAND USE	TYPE OF PROBLEM	LENGTH OR AREA	RECOMMENDATIONS	TECHNICAL LEVEL TO INSTALL	IMPACT	COST	PRIORITY
F-1	R36	Residential	Eroded boat access, bare soil, direct flow to lake	15' x 20'	Establish buffer, leave undisturbed	Low	Medium	Low	Low
F-2	R37	Residential	Lack of buffer, bare soil, direct flow to lake, runoff from driveway	75' x 20'	Establish buffer, turnout, waterbar-diversion, seed & mulch	Low	Medium	Low	Medium
F-3	R38	Residential	Unstable footpath	70' x 10'	Use larger size gravel	Low	Low	Low	Low
F-5	R39	Residential	Slight shoreline erosion	36'	Establish buffer	Low	Low	Low	Low
F-6	R40	Residential	Slight shoreline erosion	10'	Establish buffer, riprap	Low	Low	Low	Low
MF-31	R41	Residential	Lack of buffer	200'	Establish buffer	Low	Low	Low	Low
MF-32	R42	Residential	Bare soil, direct flow to lake, runoff from driveway	40' x 20'	Divert runoff, seed & mulch	Low	Medium	Low	Medium
MF-39	R43	Residential	Bare soil, direct flow to lake, channelized roof runoff	20' x 20'	Divert driveway runoff, crushed rock for roof runoff	Low	Medium	Low	Medium
MF-40	R44	Residential	Lack of Buffer	100' x 75'	Establish buffer	Low	Low	Low	Low
G-1	R45	Residential	Lack of buffer	75' x 75'	Establish buffer	Low	Low	Low	Low
MG-41	R46	Residential	Bare soil, unst. construction site	40' x 10'	Erosion controls, seed & mulch	Low	High	Low	High

McGrath-Salmon Watershed Sites

SECTOR & SITE ID	MAP ID NUMBER	LAND USE	TYPE OF PROBLEM	LENGTH OR AREA	RECOMMENDATIONS	TECHNICAL LEVEL TO INSTALL	IMPACT	COST	PRIORITY
MG-42	R47	Residential	Lack of buffer	50' x 75'	Establish buffer	Low	Low	Low	Low
MG-43	R48	Residential	Lack of buffer (no understory-raking),bare soil-eroded channel	80' x 80' & 50' x 2'	Establish buffer, stop raking	Low	Medium	Low	Low
MG-44	R49	Residential	Bare soil-path eroded	3' x 50' & 10' x 10'	Stabilize	Low	Low	Low	Low
MG-47	R50	Residential	Lack of buffer	50' x 75'	Establish buffer, vegetate	Low	Low	Low	Low
MG-48	R51	Residential	Bare soil, direct flow to lake		Seed & mulch, divert runoff from road	Low	Medium	Low	Medium
E-7	S1	State Road	Mod. ditch erosion, subsurface drainage from fields	200'	Riprap bottom of ditch, wetland vegetation in ditch	Low	Low	Medium	Low
E-10A	S2	State Road	Mod. ditch erosion, direct flow to wetland	200'	Seed & mulch ditch	Low	Low	Low	Medium
E-10D	S3	State Road	Mod. ditch erosion, direct flow to wetland	250'	Seed & mulch	Low	Low	Low	Medium
E-13	S4	State Road	Mod. ditch erosion, bare soil in ditch	200'	Improve soil, use wetland vegetation	Low	Low	Medium	Low
A-2	T1	Town Road	Moderate shoulder erosion, direct flow to trib., winter sand	25'	Maintenance	Low	Low	Low	Low
A-12	T2	Town Road	Mod. shoulder erosion, direct flow to trib.	5' x 15'	Vegetate, new surface material, build up shoulder	Low	Low	Low	Low

McGrath-Salmon Watershed Sites

SECTOR & SITE ID	MAP ID NUMBER	LAND USE	TYPE OF PROBLEM	LENGTH OR AREA	RECOMMENDATIONS	TECHNICAL LEVEL TO INSTALL	IMPACT	COST	PRIORITY
MB-1	T3	Town Road	Mod. shoulder erosion, winter sand	300'	Maintenance	Low	Low	Low	Low
C-1A	T4	Town Road	Mod. shoulder erosion, unstable culvert i/o, direct flow to trib.	50'	Maintenance (road sand), new culvert?, stabilize i/o, maintenance	Low	Medium	Low	Medium
MC-20	T5	Town Road	Mod. shoulder erosion, direct flow to trib., grader berms	50'	Maintenance, remove grader berms	Low	Low	Low	Low
MC-21	T6	Town Road	Mod. shoulder erosion, direct flow to trib., berms along side of road	50'	Maintenance, remove sand	Low	Low	Low	Low
MC-23	T7	Town Road	Clogged culvert, water running around culvert	25'	New culvert, stabilize	Low	Medium	Low	Medium