

**SMOKE & IOSEGUN LAKES
MANAGEMENT PLAN**

HT
395
A32 I64
S666
1990
c.1

SMOKE AND IOSEGUN LAKES
MANAGEMENT PLAN

PREPARED BY: ALBERTA FOREST SERVICE

APPROVED BY: HONOURABLE LEROY FJORDBOTTEN
MINISTER OF FORESTRY, LANDS
AND WILDLIFE

DATE: JANUARY 30, 1990



TABLE OF CONTENTS

Section	Page
1. INTRODUCTION.....	1
2. HISTORY OF RECREATION IN THE STUDY AREA.....	7
3. RESOURCE SYNOPSIS AND BROAD RESOURCE MANAGEMENT OBJECTIVES AND GUIDELINES.....	8
4. ECOLOGICAL LAND CLASSIFICATION.....	9
5. ZONING FOR RECREATION DEVELOPMENT AND RESOURCE PROTECTION.....	10
6. SPECIAL CONSIDERATIONS FOR SOUR GAS.....	14
7. CARRYING CAPACITY.....	18
8. STRATEGY FOR RECREATION DEVELOPMENT.....	21
9. RECREATION DEVELOPMENT GUIDELINES.....	25
10. RESOURCE MANAGEMENT AND PROTECTION GUIDELINES.....	30
11. IMPLEMENTATION OF THE PLAN.....	34

LIST OF TABLES

Table	Page
1. Resource Synopsis and Broad Resource Management Guidelines and Objectives.....	8
2. Allowable and Discretionary Uses for Recreation Development and Resource Protection Zones.....	11
3. Smoke Lake Sour Gas Facilities and Energy Resources Conservation Board Set Back Guidelines.....	15

LIST OF REPORT FIGURES

Report Figure	Page
1. Iosegun and Smoke Lake Planning Areas.....	1a
2. Iosegun Lake Recreation Development and Resource Protection Zones.....	11a
3. Smoke Lake Recreation Development and Resource Protection Zones.....	11b
4. Smoke Lake Sour Gas Facilities and Energy Resources Conservation Board Setback Requirements.....	16

LIST OF APPENDICIES

Appendix	Page
1. Terms of Reference - Issues.....	i-iii
2. Ecological Land Classification for Smoke and Iosegun Lakes.....	17
3. Rationale for the 100 Metre Buffer.....	xxix
4. Energy Resources Conservation Board Level Classification of Sour Gas and Oil Wells Around Smoke Lake.....	xxxiii
5. Proposed Allocation of Recreation Units in Rejected Development Alternatives.....	xxxiv
6. Iosegun and Smoke Lakes Watershed Management Terrain Sensitivity Stratification.....	xxxv

1. INTRODUCTION

Both Smoke and Iosegun Lakes are well known as sport fisheries lakes and consequently over the years have become destination recreation lakes. Both lakes have some capability for increased recreational use and for residential use as they are located close to the Town of Fox Creek. Although a number of other lakes in the region have excellent fisheries potential as well, Iosegun and Smoke have the best potential for expanded development due to the close proximity to established travel corridors and population centers and the fisheries resource is able to withstand limited increased harvesting.

1.1 The Study Area

Both lakes are within 9 km of the Town of Fox Creek and Highway 43 which leads to the Alaska Highway. The lakes are located approximately 245 km northwest of the City of Edmonton. Whitecourt and Valleyview are 85 km and 90 km from Fox Creek respectively. The entire area is located in Improvement District 16.

For the purposes of this plan the study area for both lakes includes the entire shoreline, lake and approximately one mile of land surrounding the lake. The actual boundary is based on the township survey system. Figure 1 provides an illustration of the study area for both lakes.

1.2 Plan Purpose

The purpose of the plan as described in the August 29, 1988 approved Terms of Reference is to assess the capabilities and opportunities for commercial and public recreation use of Smoke and Iosegun Lakes, based on environmental, social and economic constraints. This plan will provide a framework for the orderly development of the recreation capability of the lakes and for the review of applications for development on both lakes.

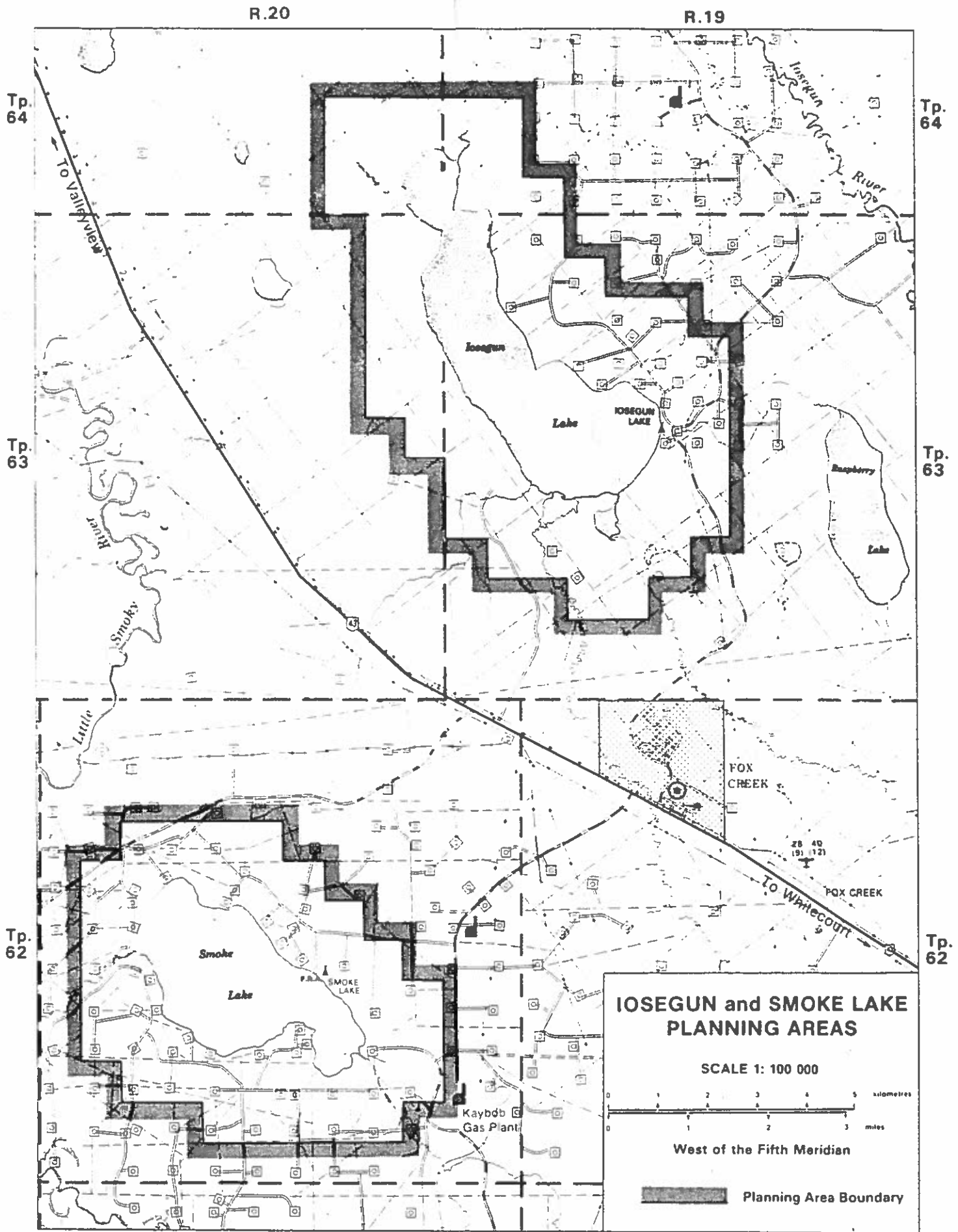


Figure 1: Iosegun and Smoke Lake Planning Areas

This plan will be used as the basis for the Area Structure Plan for the lakes to be prepared by Improvement District 16 (I.D.16).

1.3 Relationship to the Fox Creek/Knight Sub-Regional Integrated Resource Plan

The lake plan study areas are located in the planning area of the on-going Fox Creek/Knight Sub-Regional Integrated Resource Plan (I.R.P.) co-ordinated by the Resource Planning Branch, Public Lands Division. Normally the Sub-Regional I.R.P. would generally identify direction and the capability for recreational use expansion around any major lakes. It would then recommend that an implementation document (i.e. a lake management plan) be conducted to assess this capability and provide detailed direction for recreation development.

The Alberta Forest Service (A.F.S.), being the manager of lands in the Green Area of the province, maintains the management responsibility of the recreation resource in the Green Area. The A.F.S. had scheduled a lake plan to commence in 1989/90 due to the identified capability around both lakes. The initiation of the plan was advanced to July, 1988 in order that a lake plan be derived to provide guidelines for review of an application for a recreation development on Iosegun Lake.

Although the lake plan will be completed ahead of the I.R.P., the lake plan will provide clarification on the recreation capability and guidelines for recreation development for the I.R.P. Integration of the lake plan with the I.R.P. will be assured as the lake plan team membership and consultative team membership includes many of the same agencies which are included in the I.R.P. The respective agency objectives and guidelines are then common to both plans.

1.4 Lake Plan Team Membership

Although the A.F.S. is the manager of the recreation resource in the Green Area other government agencies were invited to join the planning team in order to ensure integration of their issues and objectives. It is the intent of the A.F.S. to ensure that recreation development proceeds in a manner

in which other resource agencies objectives are recognized and implemented where possible, and impacts of recreation development on other resource values are minimized. As well the Town of Fox Creek was invited to participate directly on the Team due to the potential of the Town to gain economic benefits from recreation development. Since the local municipal government (I.D. 16) is included in the review and approval process for development applications, the I.D. was also invited on the team.

Those agencies with direct interest in the recreational development of the lake were included on the planning team. Those include:

Alberta Forest Service	(Ted Flanders)
Fish and Wildlife	(Carl Hunt)
Town of Fox Creek	(Bruce Moltzan)
Improvement District #16	(Roy Brideau)
Public Lands	(Dom Ruggieri)

Those agencies with peripheral interest in the development of the lakes are consultative team members:

Transportation	(Don Tymchuk)
Forest Industry and Development	(Paul Short)
Recreation and Parks	(Gerry Tranter, Ken Zurfluh)
Environment	(Ted Dykstra)
Tourism	(Allan Koehler)
Culture and Multiculturalism	(Barry Newton)
Energy	(Kevin Williams)

The Energy Resources Conservation Board (E.R.C.B.) was also consulted on the sour gas situation around the two lakes.

1.5 The Lake Plan Terms of Reference:

One of the first functions of all team members and consultative members was to derive the Terms of Reference or the scope of the lake plan. Issues in the management of the two lakes were identified. From these issues, plan objectives were derived which indicated what the final plan is to achieve. The objectives of the plan are listed below while the management issues are provided in Appendix #1.

PLAN OBJECTIVES

1. To review concerns with regard to the water quality and quantity of both Smoke and Iosegun Lakes.
2. To determine how industrial operations, such as oil and gas development and timber harvesting, can be carried out in an environmentally sensitive manner and integrated with other uses of the lakes.
3. To determine how industrial operations can be integrated with other uses of the lakes.
4. To ensure conservation of the lake shorelines through appropriate development guidelines and standards to which all recreation/tourism developments must adhere to.
5. To assess the current supply of recreation facilities in relation to the demand for these facilities, and to assess the future demand for recreation developments at Smoke and Iosegun Lakes, in particular, the demand for cottage subdivisions.
6. To review public access requirements to both Smoke and Iosegun Lakes.
7. To evaluate the capability and the capacity of Smoke and Iosegun Lakes (including land and water) to support further recreational development within an integrated management framework.
8. To identify commercial, private and public recreation/tourism opportunities to meet present and future demand.
9. To identify the environmental, economic and social constraints/limitations to recreation/tourism development.
10. To determine how the impact of recreation developments on users of other resources may be minimized.

11. To identify required forest protection measures for the protection of additional recreational facilities.
12. To identify and protect historical and cultural resources on the lakes.
13. To assess fish populations and fishery production.
14. To identify and protect areas of ecological significance and critical wildlife/fisheries habitat.
15. To determine responsibility for providing and maintaining infrastructure required to support additional recreation developments.
16. To assess the problems associated with public traffic conflicting with industrial traffic on private roads.
17. To identify the standards, guidelines and requirements to which all recreational developments must adhere.
18. To determine the role of each government agency in implementing the final plan.
19. To identify implications of recreation/tourism development on the area and supporting infrastructure.
20. To provide a decision making framework to address public, private, commercial and non-profit recreation and tourism development.
21. To determine the danger of sour gas to public safety at recreation developments on the lakes and identify any required development guidelines.
22. To recognize that the timber resource in the plan area is fully committed to the forest industry when planning for additional recreation and resource developments.
23. To determine how the impact of natural resource developments on users

of other recreation resources may be minimized.

24. To determine what significant wildlife viewing resources/opportunities exist in the study area and to identify how enhanced wildlife viewing and interpretation opportunities could be incorporated in lake management plan.

The Terms of Reference was approved by the Eastern Slopes Regional Resource Management Committee September 6, 1988 and then by the Deputy Minister, Forestry Lands and Wildlife September 21, 1988. The Councils of the Improvement District and Town also reviewed and approved the Terms of Reference.

1.6 Public Involvement

Public involvement in the plan took place by different means. At the request of the Town of Fox Creek a public meeting was held in Fox Creek on October 12, 1988. At the meeting the plan in general and a series of development alternatives (as outlined in the Alternatives Document) were presented to the public. The main items mentioned by the public related to the possible negative impact of increased recreation development on the fish populations in both lakes and the possible impact of the proposed 100 metre buffer on the economic viability of recreation developments on the lake. No objection to the proposed development alternative was put forth. However very little revision of the draft plan was required overall as a result of the public meeting.

Public input was also obtained by including the Improvement District and Town of Fox Creek on the planning team and through the public meeting held in conjunction with the sub-regional I.R.P.

2.0 HISTORY OF RECREATION IN THE STUDY AREA

There has been considerable interest in recreational development on Iosegun Lake in the last 30 years. During the late 1950's interest was initially shown for the development of a subdivision on the south-east side of Iosegun Lake. The proposed area was surveyed and staked out for a number of cottage site lots in 1959. The availability of lots for development in this area was advertised through Departmental Public Notice in the early 1960's. Some interest was generated by this Notice as some lake front lots were issued. However by 1969, most of the leases were surrendered due to lack of interest and poor road conditions.

The A.F.S. campground on Iosegun Lake was built in 1970 in Blocks 5,6,7, and 8 of the original survey. Meanwhile some interest was still shown by the public in obtaining cottage lots. As a result in 1979 the A.F.S. produced another document indicating possible sites for cottage development. The A.F.S. campground was upgraded for the first time in 1986.

The recreation history in Smoke Lake is much less eventful. No subdivisions were ever planned for. The only recreation development to date is the A.F.S. Smoke Lake campground on the north east shore which was built in 1968.

3.0 RESOURCE SYNOPSIS AND BROAD RESOURCE MANAGEMENT OBJECTIVES AND GUIDELINES

The synopsis for each resource provides a description of the current land use in the area and status of each resource. The broad resource objectives describe what is to be achieved for the resource and the broad guidelines generally indicate how the objectives will be achieved.

Table 1 provides the above information while Appendix maps 1 and 2 show the actual land dispositions and reservations at the time of plan development.

Detailed recreation development and resource management and protection guidelines are provided in Section 9 and 10 respectively.

TABLE I

RESOURCE SYNOPSIS AND BROAD RESOURCE MANAGEMENT
AND OBJECTIVES FOR THE RESOURCES FOUND
IN THE STUDY AREAS

Resource Synopsis	Broad Resource Management Objectives	Broad Resource Management Guidelines
<p>1. Fisheries</p> <p>Both lakes are noted as destination lakes for tourists because of the naturally occurring sport fishing species. These species include walleye, lake whitefish, tullibee, northern pike, yellow perch, burbot and some other minor species. Walleye and lake whitefish are the two major species. As such there are walleye spawning areas on both lakes which require protection to ensure population levels remain at desired levels.</p> <p>Sport fisheries and commercial fishing are two important uses of both lakes. Ice fishing is also a favorite winter pastime with the heavy demand on the current populations harvest rates are approaching current supply levels. This last factor is very significant in planning for</p>	<p>To maintain the indigenous walleye populations by natural reproduction as an effective method to provide recreation (at a catch rate of 0.25 fish/angler hour) and a moderate harvest (not to exceed 0.84 kg/ha/yr.)</p> <p>To protect critical walleye spawning habitat from adverse environmental impacts that might reduce the reproduction success of walleye, and where possible, to enhance spawning habitat to increase reproductive success.</p> <p>To minimize disturbance to other walleye habitat and provide optimal conditions for survival and growth of all life stages, including sources of food and cover.</p> <p>To maintain the whitefish (Smoke Lake) and whitefish/tullibee (Jasegun Lake) populations.</p>	<p>Prevent accelerated eutrophication caused by the addition of nutrients to the drainage.</p> <p>Protect the water from effluent of toxic material.</p> <p>Maintain undisturbed buffers of aquatic and terrestrial vegetation along inlet drainages and around the shoreline of the lakes.</p> <p>Limit road, pipeline and seismic line development adjacent to inlet streams.</p> <p>Road crossings of inlet creeks must be constructed to maintain migration of pike and walleye under variable flow conditions.</p>

additional recreation development.

at levels that will provide a recreational catch rate of at least 0.4 fish/angler hour, and a total annual harvest (recreational and commercial fishery combined) of 4.5 kg/hectare for each species.

To maintain the habitat required for the spawning, rearing and adult stages of whitefish and tullibee including a variety of areas with bottom substrates composed of sand, gravel or cobble.

To maintain the pike and perch populations at levels that will provide a catch rate of 0.8 fish/angler hour, and a maximum annual recreational harvest of 2.2 kg/hectare for each species.

To maintain pike and perch habitat for all life stages, recognizing the importance of potential pike spawning areas in inlet and outlet streams, and pike/perch spawning and rearing habitat provided by aquatic vegetation in the littoral areas of the lakes.

To maintain the aesthetic qualities of recreational angling including scenery, freedom from excessive noise and other disturbances, provide boating safety, prevent crowding, etc.

Increases in fishing pressure may require implementation of more restrictive fishing regulations to maintain harvests within acceptable limits.

Increased monitoring of fish populations and harvest rates will be required to provide information on which to base management decisions.

2. Grazing

No grazing dispositions currently exist in either lake study area. Capability for unimproved grazing is very low due to the dense forest canopy. The available forage is now utilized by wildlife.

Grazing is a prohibited use in the lake study area.

None required.

3. Infrastructure

Many roads and electrical distribution lines are located in the study area and vicinity to support the large presence of the petroleum and natural gas and timber (P&N.G.) industries in this region. All roads in both study areas are privately owned by Licence Of Occupation by either P & N.G. industry or timber industry. This presents a major constraint in developing the area for recreation.

To accommodate the infrastructure requirements associated with resource development while minimizing the impact on other resource values.

To encourage the centralization of services industries and other facilities.

To recognize the need for public transportation corridors as resource developments increase in the region.

Mineral exploration and development should be integrated at the operational level with existing and future land and resource developments, with an emphasis on co-ordinated and shared infrastructure routes (e.g. roads, pipelines, seismic lines).

Location of major infrastructure routes/corridors will be based on the most environmentally and economically efficient option and reviewed by all concerned referral agencies.

Significant commercial sales facilities will be directed to Fox Creek.

Transition of commercial road operation and maintenance should occur if the commercial road receives a significant amount of public use and fits into the long-term multi-purpose road system development plan.

4. Minerals

The presence of the petroleum and natural gas (P&N.G.) industry in the study area has been and will be longstanding in this region. Smoke Lake is located in the Kaybob South Oil and Gas Field and is characterized by a high level (17.02%) of hydrogen sulphide in gas wells. The Kaybob gas plant is located on the south east boundary of this study area. Iosegun

To provide for the development of sand, gravel, clay and marl.

To protect aggregate resources from sterilization.

To provide opportunities for continuing exploration, development and production of the area's petroleum and natural gas resources.

Mineral exploration and development will continue to be subject to the existing approval process, as well as the Coal Development Policy.

To prevent sterilization, reservation notations will be placed on all land containing known and significant (class 1 to 3) sand and gravel deposits.

Lake is located in the Kaybob Oil and Gas Field, however oil and gas wells in this area are "sweet" and contain very little or no hydrogen sulfide. Sub-surface mineral rights are totally allocated in both areas by P&N.G. leases. Many pipelines carry the oil and gas to processing plants.

No exploitable deposits of gravel are located in the study areas. Some sand ridges occur but again are not significant for resource extraction.

5. Recreation

Both lakes are known as destination fisheries lakes by local residents and tourists. In response to this recreation demand the Alberta Forest Service constructed one campground at each lake to provide basic camping facilities for sport fishermen and other campers. The Iosegun Lake campground was just upgraded in 1986 while Smoke Lake is now due for an upgrade to expand capacity. Total capacity in the two campgrounds is now 96 camping

To ensure public safety in relation to the sour gas field around Smoke Lake

To encourage the development and utilization of procedures and techniques that will minimize conflicts between mineral resource developments and other types of resource developments.

To ensure that all mineral exploration and development is planned in order to minimize and/or mitigate impacts on other land and resource values and uses.

To provide a wide range of suitable recreation activities on both lakes, within an integrated management framework.

To maintain public access to both lakes.

To maintain the opportunities for the potential expansion of existing public recreation facilities.

To allow for development of suitable private, commercial and non-profit recreation facilities and

Surface materials will be managed on a site-specific basis through existing referral systems. Gravel deposits will be developed and managed in such a manner as to maximize the recovery of the resource.

Private and commercial proposals for recreation/tourism facilities must demonstrate project feasibility and financial capability before developments area approved.

Random recreation will continue as a legitimate use within the plan area, subject to maintaining environmental quality.

units and 10 day use units. The campgrounds are used by a variety of campers, local, regional and international tourists. Some random camping by hunters occurs in and near the study areas as well. The area experiences considerable tourism as Highway #43 is the major route through the area.

Iosegun Lake campground also acts as the staging area for the A.F.S. Iosegun Lake Snowmobile Trails. Private recreation also occurs around the lake as a private church recreation lease is active on the west side of Smoke Lake. A lease for a Boy Scout camp and a miscellaneous permit for a private cottage are located on the east shore of Iosegun Lake.

activities within the capabilities of the study area.

To minimize the impact of resource developments on visually sensitive areas.

The first priority for prime recreation resources shall be public use.

Public recreation/tourism facility/service development will occur in response to an identified demand, and subject to budgets.

The appropriate mechanisms as detailed in Section 9 will be applied to protect environmentally sensitive areas having high recreation/tourism capability.

Current levels of service at existing facilities will be maintained subject to budget availability.

Forest landscape management guidelines will be applied on resource developments in visually sensitive areas.

A comprehensive set of guidelines for potential recreation developments at the lakes will be established.

6. Timber

The two lakes are located in the Green Area W2 Forest Management Unit in which both coniferous and deciduous species are managed under sustained yield management guidelines as established in the W2 Timber Management Plan of 1986. The coniferous and aspen Annual Allowable Cuts in this F/M Unit are totally committed.

All aspen north of Township 61 (which includes both lakes) is allocated to Alberta Newsprint Company Ltd. for their second line in their newsprint mill. Coniferous timber around Smoke Lake is committed under the Miscellaneous Timber Use program for local use and to Mostowich Lumber Co. of Fox Creek. Harvesting is on-going around Smoke Lake by the authority of active Timber Licences and permits. Some timber around Smoke Lake is tall and shallow rooted and thus is prone to blowdown. The timber around Iosegun Lake is younger and thus is more windfirm. No active timber dispositions occur around Iosegun Lake.

To maintain coniferous and deciduous timber supplies as close to current levels as possible to ensure timber developments remain viable.

To ensure a continuous supply of timber for local use.

To ensure full realization of the A.A.C. in the study area and utilization of salvage timber.

To increase the supply of timber through intensive forest management where justified from a timber standpoint and compatible with other resources.

To ensure the opportunity to manage all cutovers such that the resulting stand attains acceptable merchantable standard.

To maintain economic timber harvesting opportunities.

To protect silvicultural treatment investments.

Maintain the existing forest land base.

Identify and evaluate potential intensive forest management areas.

Encourage full wood utilization through integration of timber operations, utilization of currently non-commercial species, and improvement of utilization standards.

Reclamation of surface disturbances should consider reforestation wherever practical.

Apply appropriate harvesting techniques as specified by the Alberta Timber Harvest Planning and Operating Ground Rules.

Salvage of dead, damaged, diseased or endangered timber will occur.

Apply special operating conditions to minimize and/or mitigate the loss of silvicultural treatment areas to other land uses.

Apply special operating conditions to minimize disturbances to critical wildlife habitat.

Identify appropriate areas for the supply of timber for local use.

Buffer management guidelines will be followed to minimize erosion associated with surface disturbances and vegetation removal, particularly in close proximity to watercourses.

Detailed watershed management guidelines will be incorporated in order to protect sensitive watersheds (i.e. headwater areas, poorly drained areas and highly erodible areas).

Existing watershed management guidelines and groundrules will be applied to land use and resource development activities.

Watershed monitoring may be done in order to determine the effects of land use operations on water yield and water

7. Watershed

Iosegun Lake is located in the Iosegun Plain Region and is characterized by very flat terrain and silty soils.

Erosion potential is therefore very

low around Iosegun Lake. Smoke Lake

is in the Fox Creek Benchland Region

and terrain is more rolling than around

Iosegun Lake. A Watershed Management

Terrain Stratification for both lakes,

based on the ecological land classification

designates areas where different development

conditions are necessary to minimize

erosion and maintain water quality.

Smoke and Iosegun lakes are classed as

hypereutrophic and the clarity of the

water of both is constantly poor.

Often algae blooms occur in

To manage land use activities to ensure the protection of the watershed with respect to water quality, quantity and timing.

To preserve the inherent productivity of the land through soil conservation practices (i.e. minimize soil erosion).

To ensure the utilization of an appropriate mix of reclamation techniques in recognition of the land's original resource capability, or enhancement thereof, and its intended land uses.

late summer making the lakes light green and aesthetically unappealing. These factors limit the desirability of the lakes for recreation development.

quality.

Developments will be located on environmentally stable sites, to ensure watershed protection and reflect lake management plan intents.

Site specific reclamation standards will be followed to minimize soil erosion and to ensure watershed protection and reflect lake management plan intents.

8. Wildlife

A wide range of wildlife species are located in the study area. The two lakes are important staging areas for migratory birds. There is an abundance of waterfowl including grebes, loons, goldeneye and bufflehead. A bald eagle's nest is located on Iosegun Lake. Black bear are predominant in the area and grizzly bears have been sighted. There is excellent moose habitat around both lakes and elk are found near Smoke Lake in the Little Smoky River valley. Fur bearers include muskrat, beaver and mink.

To maintain the numbers, distribution and diversity of regionally significant wildlife species and to increase numbers where projected demand (for both consumptive and non-consumptive uses) exceeds current populations.

Concentrate public access and facilities in order to minimize habitat loss and disturbance.

Avoid destruction of large reed beds.

Developments around known eagle and osprey nests will be minimized and if required should occur during freeze-up when the birds are absent.

Measures will be taken to minimize conflicts between humans and wildlife.

Moose are heavily hunted in this region by local and regional hunters. The area also has hunting seasons for deer, elk, black and grizzly bear, upland and migratory birds. Two Registered Trapping Areas (R.T.A.) surround Iosegun Lake (#312 and 459) and one R.T.A. (#1381) surrounds Smoke Lake.

Timber harvest techniques should maintain hiding cover and thermal cover for wildlife, and riparian habitat.

Access to motorized vehicles should be restricted where allowed by current policy and where it is effective and practical.

Implement snag management where possible for cavity nesting wildlife.

9. Archaeological Resource

So little is known regarding the resource base of these lakes that it is difficult to be precise in the delineation of specific areas of concern. The limited survey that has been completed on these lakes has identified significant sites along the immediate shoreline area, and in the areas bordering the inflow and outflow locales. In addition, it has been shown that Smoke Lake contains sites which are removed from the immediate shore areas and likely associated with former lake levels as marked by remnant beach ridge formations. None of these sites

To protect and/or preserve historical resources (archaeological, palaeontological, historical, and natural) as defined in the Historical Resources Act from potential or actual impact related to future resource developments.

Historical resource sites considered to be of provincial significance will be protected with the appropriate mechanism and preserved for future generations.

To manage historical resource sites for scientific, educational, and interpretive purposes.

are dated with the exception of those which correlate with the historic/contact period.

It is recommended that any of the well drained shoreline features of these lakes be considered to have high potential for the presence of historical resources and that upland areas surrounding the lakes be considered as having some potential for the discovery of additional resources. Until such time as additional background data are obtained on the distribution of sites around these lakes the assumption should be made that areas within the two planning blocks have potential for the discovery of historical resources. In some cases the resource potential is going to be high and it is likely that this will directly coincide with areas slated for recreational development. Thus all areas around the lake which are considered to have recreation potential can also be considered to have potential for impact to historical resources and should be reviewed to determine if resource impacts are

10. Forest Protection

Resources in the area are protected from wildfire by an established detection and suppression system.

Detection of fires is accomplished through a system of fire towers and fixed and rotary watch controls. There are many components to the suppression system. One of the four initial attack crews in Whitecourt Forest is usually stationed in the Fox Creek

District. A helitack crew (helicopter specialized equipment, and crew with rappelling capabilities) spends about 30 percent of the average fire season in the Fox Creek District. A staging camp is located at Fox Creek. Air tanker groups stationed in either Edson or Whitecourt are able to action fires in the Fox Creek District during periods of high fire hazard.

Additional helicopters and fixed wing aircraft are chartered as fire hazards rise.

No insect infestations currently occur in the area.

To protect the resources and values of forested areas from damage and destruction by wildfire.

To minimize the risk of wildfires occurring as a result of resource development, settlement and recreation.

To protect forested areas from damage and destruction by insects, disease and other agents.

To minimize any negative economic or social impacts resulting from forest disease or insect infestations.

Identify land and resource uses which could affect fire hazard or require specialized forest protection consideration.

Develop adequate fuel breaks, where necessary, to reduce fire hazard and risk (e.g. around public recreation areas and large continuous forest cover types).

Take immediate, cost effective and efficient action to control any infestation within and adjacent to the planning area.

Recommend proper stand modification to maintain the health of a managed forest stand or to prevent the building of pest problems.

11. Economic

The Town of Fox Creek is primarily a resource town with a population of 2,000 people. Fox Creek is located equidistant from Iosegun and Smoke Lakes with Iosegun Lake being ten kilometers north and Smoke Lake being ten kilometers south. Both of these lakes have been prominent recreational facilities for residents of Fox Creek and this region. They have been recognized in the most recent Fox Creek Recreation Master Plan as one of the significant recreational facilities in this area. The lakes have also been recognized by the town's Economic Development Committee as having economic benefits to residents and businesses in Fox Creek.

The town has taken positive steps to enhance its interest in the development of the lakes. The Alberta Forest Service was requested to upgrade the day use and camping areas at the lakes, a project which was completed several years ago. Also, both lakes have some type of weir structure which controls lake levels. Both of these projects involved

To ensure that implementation of this plan maximizes economic development opportunities that will benefit the Town of Fox Creek, being the adjacent service centre.

To provide recreation and housing alternatives (country residential) for the residents of Fox Creek.

The maximum number of commercial and public use alternatives for each of the lakes should be considered.

some form of encouragement from the town or town's people. The town has also been the lead agent towards encouraging further development of the lakes through the formulation of the Lake Management Plan.

It is a continuing concern of the Town that the lakes are managed to meet the needs of local and regional residents and such that a quality environment around and in the lake is maintained.

4. ECOLOGICAL LANDS CLASSIFICATION

As a basis for determining the capability for additional recreation development around the lakes an ecological land classification (E.L.C.) was conducted in the summer of 1988 by the Land Information Services Division.

Ecosections were described in which land units are homogeneous with respect to the parameters of surficial material, topography, slope, soil drainage, soil texture, soil type and vegetation character. Each ecosection was then evaluated with respect to its appropriateness to sustain different recreation facilities. These facilities include buildings without basements, septic tank absorption fields, serviced campgrounds and picnic areas. Limiting factors and degree of limitation for each development type on the ecosection are identified.

For both Smoke and Iosegun Lake the E.L.C. identified that the best areas available had at least moderate limitations for the construction of recreation facilities. The range of limitations varies from moderate to severe to areas having very severe limitations.

The most prevalent limiting factors to development on Iosegun Lake are poor soil drainage and flood hazard in low areas. Smoke Lake has these same limitations however excessive slopes are also a problem.

Although there is no exceptionally good land on which to construct recreation facilities the areas of moderate limitations still provide ample development opportunity.

Detailed tables of the E.L.C. classification and a map are provided in Appendix 2.

5. ZONING FOR RECREATION DEVELOPMENT AND RESOURCE PROTECTION

A system of zoning for recreation development and resource protection was adopted. Three zones are designated (as per Figures 2 and 3) in which recreation development may occur i.e. Zones A, B, and C. Zone A generally contains the best lands for development (as identified by the E.L.C.) with Zone C containing land with the least capability to support recreation development. Recreation development may occur in any of the three zones, however the prospective developer must be aware that to develop in Zones B and C special consideration must be given to overcome the limiting factors which exist in these areas. It is expected that developments will be more costly in these zones as a result.

Zones D and E are designated as resource protection zones and certain special natural resources and features of the lake.

For each zone a list of "Allowed Uses" and "Discretionary Uses" has been developed to assist the approval authorities to assess applications for development of recreation facilities. "Allowed Uses" are those developments that are considered appropriate within the context of the zone. "Discretionary Uses" are activities that may be appropriate in the zone depending upon factors such as the nature of the development, infrastructure requirements, adjacent land uses, etc. Approval of these "discretionary uses" rests with the development authorities. The proponent of a "discretionary" use must show how this use may be successfully integrated in the area along with "allowed" uses. The range of uses allowed in each zone is presented in Table 2.

5.1 Zone A

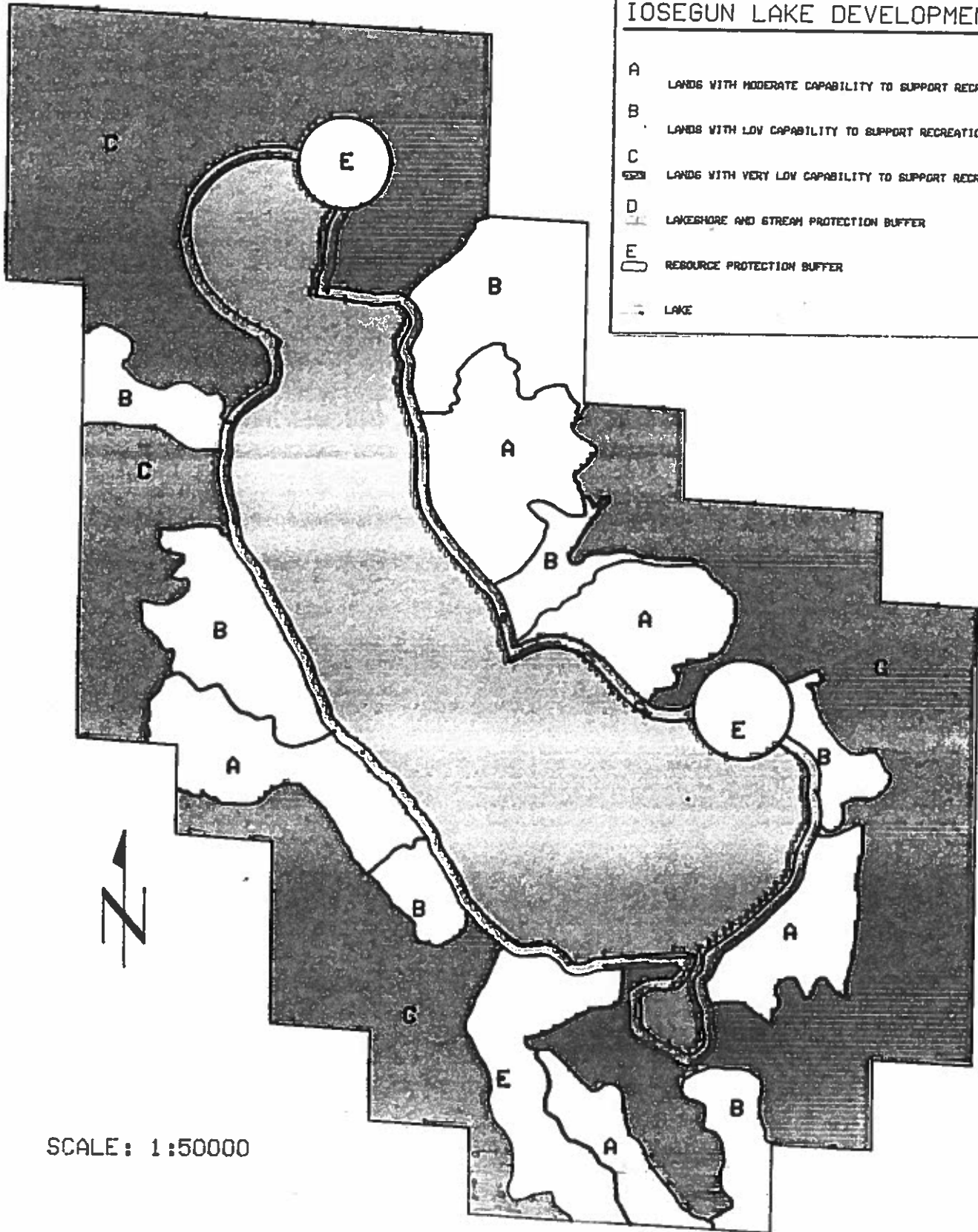
The lands included in this zone are the most favorable areas to support development of recreation facilities. Limitations to development are only moderate and are due primarily to poor soil drainage and steep slopes.

TABLE 2
POSSIBLE USES FOR RECREATION DEVELOPMENT AND RESOURCE PROTECTION ZONES


Use Type	Recreation Development Zones			Resource Protection Zones	
	A	B	C	D	E
Possible	<ul style="list-style-type: none"> - cottage subdivisions - overnight camps and day use/public recreation trails - walking trails 	<ul style="list-style-type: none"> - back country lodge - day use/public recreation trails - institutional camps - walking trails 	<ul style="list-style-type: none"> - none 	<ul style="list-style-type: none"> - no intensive recreation developments allowed 	<ul style="list-style-type: none"> - none
Discretionary	<ul style="list-style-type: none"> - country residential - back country lodge - institutional camps - minor commercial operations - industrial camps - horse trails - snowmobile and A.T.V. trails - commercial trail ride base camps - x-country ski trails - other uses considered suitable - natural resource exploration extrac-tion and development activities 	<ul style="list-style-type: none"> - cottage subdivision - overnight campground - country residential - minor commercial operations - industrial camps - horse trails - snowmobile and A.T.V. trails - commercial trail ride base camps - x-country ski trails - other uses considered suitable - natural resource exploration, extraction and development and development 	<ul style="list-style-type: none"> - all uses Zones A and B are discretionary in Zone C. 	<ul style="list-style-type: none"> - only the following are allowed with strict conditions of operation applied - day use facilities - light commercial operations only where in conjunction with developments beyond the 100-m buffer - boat launches - natural resource exploration, extrac-tion as per Section 10 of this plan (See page 12 for further development restrictions) 	<ul style="list-style-type: none"> - recreation activities of a very extensive nature allowed only i.e., hiking trails

IOSEGUN LAKE DEVELOPMENT ZONES

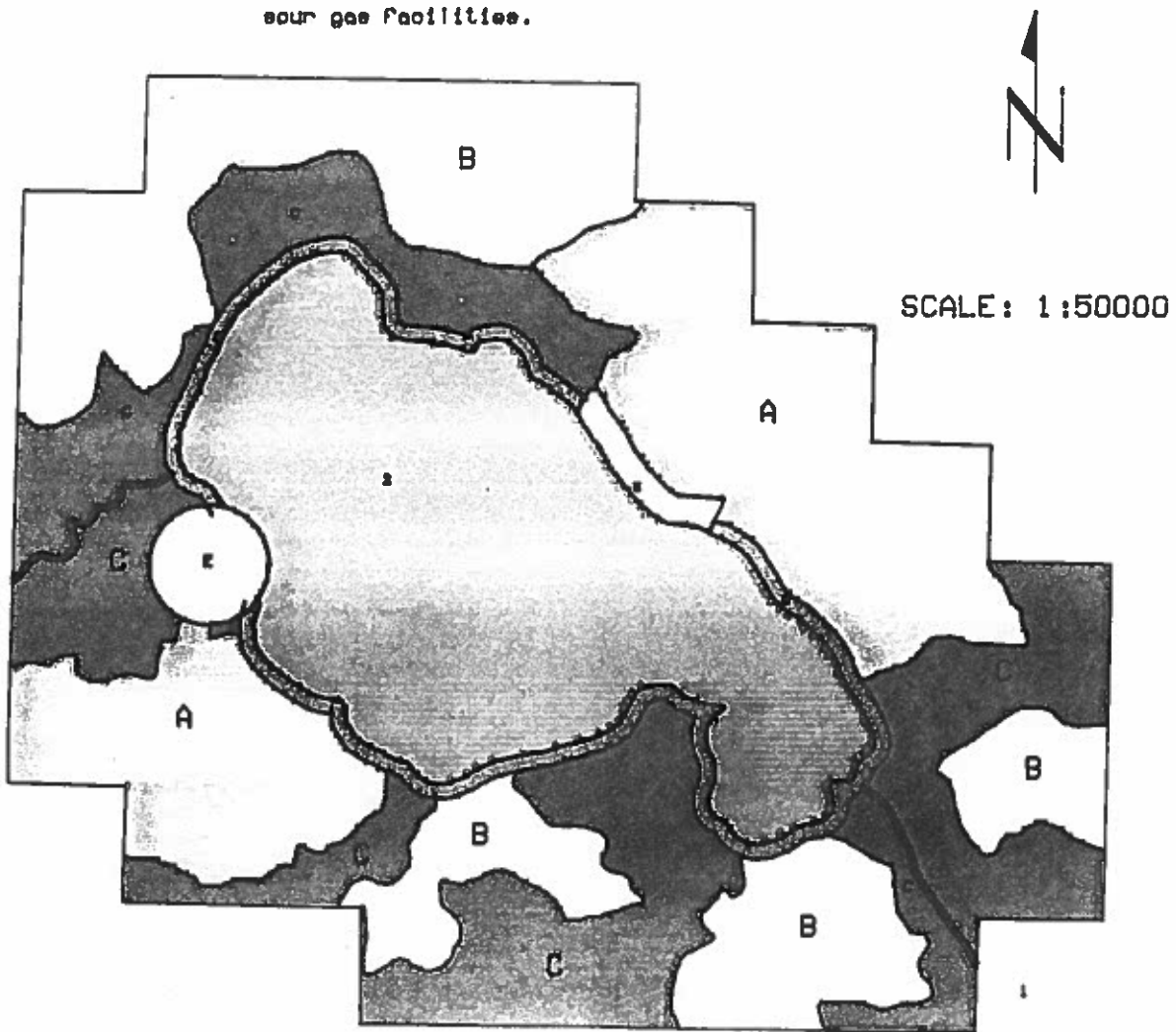
- A LANDS WITH MODERATE CAPABILITY TO SUPPORT RECREATION DEVELOPMENT
- B LANDS WITH LOW CAPABILITY TO SUPPORT RECREATION DEVELOPMENT
- C LANDS WITH VERY LOW CAPABILITY TO SUPPORT RECREATION DEVELOPMENT
- D LAKE SHORE AND STREAM PROTECTION BUFFER
- E RESOURCE PROTECTION BUFFER
- LAKE



SCALE: 1:50000

SMOKE LAKE DEVELOPMENT ZONES	
A	LANDS WITH MODERATE CAPABILITY TO SUPPORT RECREATION DEVELOPMENT
B	LANDS WITH LOW CAPABILITY TO SUPPORT RECREATION DEVELOPMENT
C	LANDS WITH VERY LOW CAPABILITY TO SUPPORT RECREATION DEVELOPMENT
D	LAKESHORE AND STREAM PROTECTION BUFFER
E	RESOURCE PROTECTION BUFFER
	LAKE

Refer to Section 6.0 for special development restrictions on Smoke Lake due to the presence of sour gas facilities.



5.2 Zone B

These lands generally have severe limitations for development of recreation facilities, due to very poor soil drainage. Recreation facilities can be developed on these sites, however there may be requirements for major modifications to the soil, special designs or intensive maintenance. These improvements may be difficult and costly. Development proposals must address the particular concerns that arise because of development limitations.

5.3 Zone C

The lands included in this zone are identified as having very severe limitations to development, primarily because of extremely poor soil drainage. The soils in these areas may not be suitable for development purposes and special techniques or measures may be required if development is pursued.

5.4 Zone D

This zone is identified as a buffer area around the lake shore and along the inlet and outlet streams to both lakes. The lake shore buffer extends a minimum of 100 metres from the lake shore; the stream side buffer is a minimum of 30 metres wide along each side of watercourses as identified on Phase 3 1:15,000 scale Forest Cover Type Maps.

The Crown will retain ownership of the buffer but will not develop facilities in the buffer area adjacent to cottage development. To ensure that the Crown's buffer management is acceptable to commercial development, a letter of joint agreement may be signed with the developer. As well, any activities permitted by the lake management plan and proposed by the developer will be described in this agreement.

Rationale for the 100 metre shoreline buffer is provided in Appendix 3.

5.5 Zone E

The areas within this zone are set aside as buffer areas around critical fish and wildlife habitat, and around historic and cultural sites on the lakes. The size of the buffer is variable depending upon the nature of the site. Developments within this zone will be restricted to recreation activities of a very low impact nature, such as hiking trails. Resource development activities will operate under strict guidelines. All applications to develop facilities in this zone will be referred to the appropriate agencies for review.

5.6 Resource Infrastructure Corridor

The main Licence of Occupation road leading to the north of the Town of Fox Creek and past the south east end of Iosegun Lake is paralleled by at least two major pipelines. This area is designated as a resource infrastructure corridor in which future major pipelines and other infrastructure will be directed in order to preserve the integrity of prime recreation development between this corridor and the south east end of the lake.

5.7 Designation of Public Recreation Use Areas

In order to ensure the availability of large areas of prime recreation capability areas for public use, one area on each lake is designated as "public use" area. On Iosegun Lake it is the Zone A in which the current AFS campground is located. This area is currently reserved by disposition reservation (DRS). The DRS will require amendment as it now overlaps the resource infrastructure corridor mentioned in 7.6. On Smoke Lake the public use area consists of the area held under DRS reservation, already established for Smoke Lake AFS campground.

6.0 SPECIAL CONSIDERATIONS FOR SOUR GAS

The petroleum and natural gas industry has been active for a number of years in the region. Consequently a large number of oil and gas wells (some of which contain moderate levels of H_2S), pipelines and processing plants occur in the area.

A concern was expressed at the initiation of the plan, regarding further recreation development in the vicinity of the sour gas wells around the north east part of Smoke Lake. Discussions with the Energy Resources Conservation Board (ERCB), confirmed there is a conflict with developing the north east part of the lake at this time due to several sour gas wells and the pipeline which delivers sour gas to the Amoco Kaybob gas processing plant.

E.R.C.B. Interim Directives ID 81-3 and 87-2 provide for minimum setback distances from facilities (wells, pipelines and processing plants) which contain significant levels of H_2S . These guidelines apply to larger public recreation development or concentrated residential development as proposed for Smoke Lake. Although, according to the E.R.C.B.'s Interim Directive smaller buffers could be considered for the area if lesser density developments were allowed. Since this plan indicates that concentrated developments are only allowed, the E.R.C.B. guidelines are then adopted as absolute buffer requirements. It is acknowledged that this is a conservative approach and that this strategy extends beyond the E.R.C.B.'s recommendations. Minimum development buffers are then:

TABLE 3
SMOKE LAKE SOUR GAS FACILITIES AND ERCB GUIDELINES

Facility	ERCB Classification	Minimum Distance to Concentrated Public Facility Developments (i.e. development buffer)
-Kaybob gas plant	4	1.5 km
-sour gas pipeline NE shore	3	1.5 km
-gas wells (NE shore)	2 & 3*	500m and 1.5 km
-sour oil wells (S shore)	1	100m

*Appendix 3 provides a listing of sour gas wells by E.R.C.B. level

With various non-development buffers required for the above gas and oil facilities, essentially no recreation development will be allowed along the north east shore of Smoke Lake until the hydrogen sulphide content of the wells decreases substantially or the gas wells become inactive. Nevertheless Smoke Lake is zoned for development in the event that development may occur in the future.

Wells around Iosegun are "sweet" i.e. contain very little or no sour gas and thus development is not restricted.

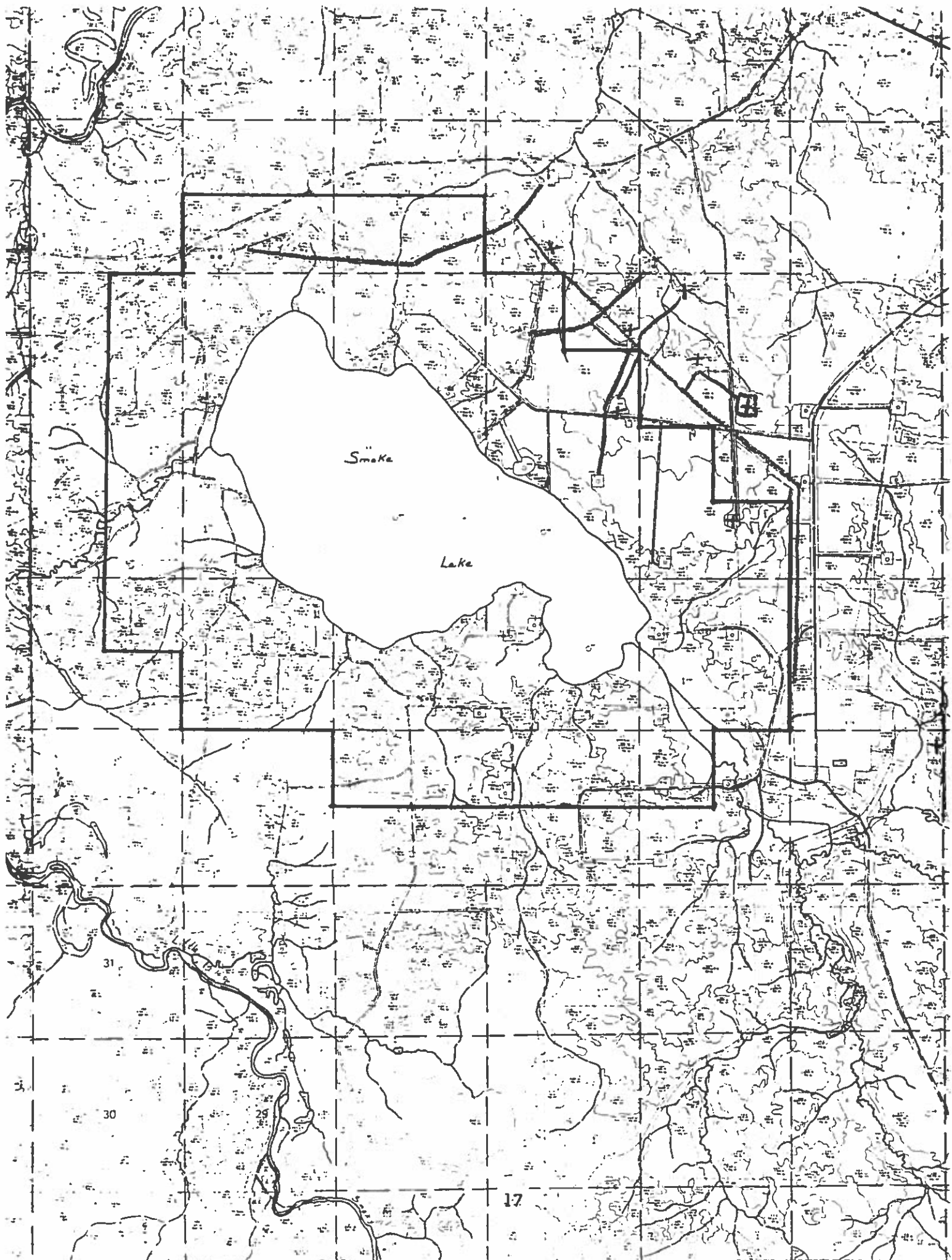
As well if development does occur on the south west shore of Smoke Lake in amongst the sour oil wells, there are nuisance odours which should be assessed by the developer with respect to its impact on the marketability of any recreation development.

Figure 4 details the location of sour gas facilities and the development buffer on Smoke Lake.

FIGURE 4
 SMOKE LAKE SOUR GAS FACILITIES AND ENERGY
 RESOURCES CONSERVATION BOARD SET BACK
 REQUIREMENTS

	<u>ERCB LEVEL</u>	<u>SYMBOL</u>
Sour Gas Well	3	+
	2	+
	1	+
Sour Oil Well	1	□
Sour Gas Pipeline	3	—
Development buffer		

All remaining wells in the study area are "sweet" i.e. contain no H₂S



Smoke

Lake

31

30

17

7.0 CARRYING CAPACITY

The amount of recreational development that may occur on land around the lakes is in part limited to the capacity of the lakes to carry boats for recreational use. For safety and logistical reasons there is a maximum number of boats that the lake may carry at any one time. Carrying capacity (based on guidelines developed by the Ontario Ministry of Natural Resources) should also take into account (a) the net usable area of the lake: in other words, the shallow parts of the lake are assumed not usable for most of the boating purposes; (b) an estimate of how many boats each cottage/day use/camping and/or commercial lodge unit will use and (c) what proportion of these boats will be on the lake and shoreline at the heaviest use periods.

In this conceptual framework, the boat carrying capacity of the lake determines the maximum recreation development potential on the adjoining lake shore. Unlimited recreation development will then not create a hazard from the standpoint of boating on the lake.

For the application of this formula, available information was used including local knowledge knowing that currently the main use is fishing from boats. Also it is acknowledged that future use patterns may change to include a wider variety of boat uses such as water-skiing, which may conflict with fishing use. However, this conceptual framework provides an opportunity to obtain the type of data needed to improve carrying capacity estimates in the future.

Assumptions in deriving the allowable carrying capacity are as follows:

- each boat needs at least 4 hectares (10 acres) of usable water surface.
- each cottage, campground unit or unit in a commercial lodge will have 1 boat on average for its use.
- at heaviest use periods, 75% of the boats located at each lake will actually be on the lake. (i.e. of 4 boats - 3 will be on the lake with only 1 on shore).

Carrying capacities for the two lakes are as follows:

Smoke Lake - Total gross area = 9.6 km²

- Net useable area = 772 hectares (84.7% of gross area)
(delete areas less than 2 metres in depth)

- Maximum boat capacity = $\frac{772 \text{ hectares}}{4 \text{ hectares/boat}} = 193$

- Maximum boats and therefore recreational units developable around the lake

= $\frac{193}{0.75} = 257$ recreational units

Iosegun Lake - Total gross area = 13.4 km²

- Net useable area = 854 hectares (68.8% of gross area)
(Where water depth exceeds 5 feet)

- Maximum boat capacity = $\frac{854}{4} = 214$
4 hectares/boat

- Maximum boats and therefore recreational units developed around the lake = $\frac{214}{0.75} = 285$ units

0.75

A recreational unit is equivalent to one cottage, a campground unit, day-use unit or bedroom unit in a commercial lodge/motel.

The net carrying capacity (recreational units) available on the 2 lakes are as follows:

	<u>Maximum Carrying capacity (rec. units)</u>	<u>Currently Allotted</u>	<u>Net Available for Allocation</u>
Iosegun	285	71*	214
Smoke	257	51**	206

* AFS campground - 61; Private cottages - 2; Boy Scouts - 8

**AFS campground - 45; Private Recreation Lease - 6

The carrying capacities calculated for each lake became limiting factors for recreation development on both lakes. There is ample space on lands with only moderately severe limitations (i.e. the best available) on both lakes to sustain the stated carrying capacity. The shallow shoreline and south bay on Smoke Lake and north bay on Iosegun Lake result in large deductions from the total area of the lakes.

8.0 STRATEGY FOR RECREATION DEVELOPMENT

Although a maximum recreation development level for the lakes is designated based on boating carrying capacity factors there are other factors which may indicate that less recreation development than maximum allowable should be attempted. The maximum allowable development may maximize economic objectives. However, a trade off with natural resource development and resource protection, environmental, wilderness and social factors may indicate that less development is more desirable.

Three development alternatives for both lakes with different levels of recreation development were devised and tested against other factors. The alternatives included:

8.1 Alternative #1: Minimal Development

This allows the use of only 25% of the net available recreation units on each lake or about 50 units each. These units would be used exclusively to expand the current A.F.S. campgrounds on each lake with no provision for development of private (i.e. non-profit, commercial and private recreation developments) developments.

This alternative ensures continued public access to all portions of the lake. With little additional recreation development on the lakes the potential for impacts on lake water quality and fish and wildlife resources are minimized, as are concerns about conflicts between various recreation user groups. Conflicts between recreation users and resource development and extraction activities are also minimized.

However this alternative allows no opportunities for development of non-profit, commercial or private recreation facilities on the lakes. Fewer economic benefits will accrue to the Town of Fox Creek.

8.2 Alternative #2 - Intermediate Level of Development

This involves the use of 50% of the net available recreation units on each lake. i.e. 107 on Iosegun Lake and 103 on Smoke Lake. Again 50 units on each lake would be used for A.F.S. campground expansion. In addition some development of private recreation facilities would be allowed.

This alternative recognizes that there may be a demand for recreation types other than public recreation facilities, and it provides an opportunity to develop a wide range of these facilities. This alternative also provides great flexibility: further development may be permitted in the future, if demand for additional facilities is warranted, and if the impacts of development on the lakes are shown to be sustainable.

Selecting this alternative will increase the angling pressure on the walleye populations, and may result in stricter regulations to control the walleye harvest. As angling pressure increases there may be perceived conflicts between the recreational and commercial fisheries. Greater numbers of people using the lakes may result in conflicts and safety concerns, for example between water skiers and fishermen. Further development and greater numbers of people around the lakes may cause loss of wildlife habitat, and there is potential for impacts on lake water quality, because of siltation, erosion and nutrient loading. Impacts with recreationists and resource extraction industries would become greater.

8.3 Alternative #3 - Maximum Level of Development

This allows maximum development of carrying capacity on both lakes as stated in section 9. Again 50 units on each lake would be used to expand the A.F.S. campgrounds. The majority would be available for private development.

This alternative provides the maximum opportunity for economic and recreational development at both lakes, as the widest range of recreation uses are permitted. For the Improvement District, this alternative allows for the greatest potential tax base, and provides potential economic opportunities for the Town of Fox Creek.

This alternative encourages the highest number of people and developments on the lake and thus also the highest potential for causing problems. It will place the greatest pressure on the lake walleye populations. There may be conflicts between various recreation users and between recreation users and resource extraction and development activities. There is a higher possibility for loss of wildlife habitat, and the potential for impacts on lake water quality are increased.

8.4 Chosen Alternative for Development

Alternative #2 - Intermediate Level of Development was selected for implementation. Little objection to this preferred alternative was put forth at the public meeting. Although there is much more developable land around both lakes than what is required to accommodate the maximum carrying capacity, it was deemed important that development proceed at a controlled, intermediate pace. This will allow Fox Creek residents, resource industries and government agencies to determine how lake development will impact their quality of life, the industrial activities in the area and the quality of the environment.

Alternative 2 provides a level of private recreation development on a scale which is indicated as reasonable to expect according to the Nichols Applied Management Report. Also, there is the possibility of allowing more recreation development on the lake at a later date if this intermediate level of development is successfully integrated with the community, industry in the area and environmental impacts are minimal.

Allocation of the existing and future development units is outlined below.

	Existing Allocation		Proposed Allocation		Total Allocation		
	AFS	Private	AFS	Private	AFS	Private	Total
	Iosegun	61	10	50	57	111	67
Smoke	45	6	50	53	95	59	154

AFS - Alberta Forest Service

Private - defined as non-profit, commercial and private recreation developments.

The types of developments that are suitable are indicated in Table 2.

Appendix 4 provides details on the allocation of recreational units in the rejected alternatives.

9.0 RECREATION DEVELOPMENT GUIDELINES

As development zones and a recommended level of recreation use are proposed for recreation use on the lake, guidelines are necessary to ensure the orderly development of recreation facilities around the lakes. This is not an exhaustive list of guidelines and it is not meant to preclude processing individual development applications through the normal government referral process. However, the guidelines provide the prospective developer with guidance on how different levels of government and the public want recreational development to occur in this area. All municipal planning regulations will apply to the review and approval of development proposals. This plan does not affect current development. However, any further development must conform to the provisions of the plan. If any changes in current use are required, these changes could be implemented at the time of disposition renewal.

9.1 Sale of Crown Land for Recreation Development

Where a developer or individual demonstrates that sale of public land is necessary for the viability of the proposal, then sale of the land may be considered. The applicant must prove financial capability. In cases where sale of crown land is approved in principle, a lease with option to purchase may be one possible type of disposition. This type of disposition will be subject to all standard requirements governing leases with option to purchase as specified by the Department.

9.2 Road Use

The fact that all roads outside of the Town of Fox Creek are owned by industry in the area through Licence of Occupation creates an impediment to recreation development in the vicinity of the two lakes. Industry will only build

and maintain roads in the area to their standard of use. As well it is foreseen that if a developer obtains a road use agreement with industry to use its roads, that eventually public pressure in the subdivision may be applied to the Improvement District (I.D.) and Alberta Transportation and Utilities (A.T. & U.) to assume ownership. The I.D. and A.T. & U. are very reluctant to assume ownership of additional roads at this time due to limited budgets. Also providing access to recreation developments is a low priority in comparison with other uses for the I.D. and A.T. & U.

The Nichol's report (Iosegun and Smoke Lake Management Plan: Commercial Market Analysis - Final Report, Nichol's Applied Management, October, 1988 submitted to the Town of Fox Creek) suggests that it is not feasible for a developer to include access road costs in the development. The use of industrial roads appears then to be a necessity through road use agreements with the industrial road owner. The developer may be required to assume some road maintenance costs to repair damage caused by recreational users. Therefore the first areas to be developed for recreation will probably be those which are located closest to the best grade of industrial road.

The developer will be required to indicate in the application how it is intended to access the proposed development. If use of industrial roads is indicated, a road use agreement with the road owner must be produced prior to approval of the application.

9.3 Guidelines Regarding Individual Residential Units

Scattered, isolated, individual units will be discouraged and development should be concentrated in as few areas as possible to maximize the use of the land and minimize impact on resource extractive industries, wildlife and the lake shore. Individuals should join together to design and propose cottage or country residential subdivisions.

For individual or association development proposals, an outline plan for the entire area is required. This will indicate how other development in the immediate area will occur. The proposed subdivision should accommodate a minimum of 12 cottages/residences. Public access to the lake, roads, park

reserves and availability of water and power should be detailed in the outline plan. Soil tests must be provided to determine the most appropriate type of footings for cottages and road construction parameters.

Cluster configurations for cottage and country residential lots are preferred. No sale of lake front lots is permitted and linear shoreline cottage development is not allowed. All cottages and residential developments must be constructed on an internal subdivision road system and may not be constructed on an LOC Road.

Where public access is required to the lake shore there may be a community boat launch and mooring facility designed into the proposal. Individual Licences of Occupation shall not be allowed in that general area for additional boat docks. Unlicensed structures will be removed under the authority of the Public Lands Act.

9.4 Recreation Development Parameters

9.4.1 Cottage and Country Residential

Cottage and country residential units differ in relation to size of lot allowed for each. It is assumed that cottages are based more on water facilities and therefore the amount of area used in cottage developments should be minimized. As well country residential developments will be restricted to beyond 300 metres of the shoreline of the two lakes. Cottage developments are allowed beyond the 100 metre shoreline buffer.

- cottage lot sizes may range from 0.5 to 2.0 acres
- The Improvement District Land Use Order now allows country residential lots to range from 7 to 10 acres. However to minimize the size of the area used and impacts on resource extractive industries, a range of 2 acres to 5 acres for country residential lots will be used for this plan.

Lot size may vary within the range based on demonstrated need.

The minimum building (cottage) size for a recreational development shall

be 500 square feet, and for a country residence shall be 800 square feet.

Developments must be of at least minimum standards according to the Alberta Building Code, and gas, electrical wiring and plumbing must be approved by Alberta Labour.

Required set backs for cottages shall be:

- a. along the internal road - 25 feet from the property line
- b. side yard setback - 10% of lot width to a minimum of 10 feet
- c. rear yard setback - 25 feet.

Refer to the Improvement District 16 Land Use Order for required setbacks for other developments.

Sewage must be stored in holding tanks and disposed of in an approved sewage lagoon. Septic fields are not permissible.

9.4.2 Commercial Sales Developments in the Study Area

Commercial sales developments shall be limited to uses associated with recreational developments, such as boat rentals, campground and marina supplies, and may include confectionery stores providing minor retail sales of a maximum floor area of 500 square feet.

9.4.3 Infrastructure for the Development

The developer will be responsible for providing the infrastructure required to service any proposed recreational development including power and roads.

Roads shall be of an all weather condition to a standard satisfactory to Alberta Transportation. Recommended internal roadway widths should be a minimum 7 metre top. All approaches shall be built to Transportation standards.

9.4.4 Steps in Applying for a Recreation Development

Applications are submitted to Alberta Forestry, Lands and Wildlife. This department provides approval if warranted, however applications are referred to the Improvement District for the purpose of issuing the development permit. The Improvement District will change the zoning of the land around both lakes automatically to reflect the intense recreation designation with the adoption of this plan.

The following steps with the Improvement District must be followed by developers wishing to develop a recreational subdivision:

1. Information required in this application includes proposed development plan showing lots, roads and buffers, and other information as required by the municipality.
2. Subdivision approval.
3. Development permit.

Upon subdivision, required reserves will be 10% of the total area to be subdivided. This area can be in the form of a Municipal Reserve, cash-in-lieu (based on market value of the land), or deferred to the balance of the quarter section.

It is strongly recommended that the developer consult with the Environmental Assessment Division of Alberta Environment upon applying for a development permit to obtain information on the natural characteristics of the lake.

When plans or applications for development of the area are proceeding the E.R.C.B. should be contacted for determination of the location of energy facilities, sour gas levels and appropriate setbacks. The energy industry is very dynamic and therefore there may be changes in these factors by the time development is imminent.

10.0 DETAILED RESOURCE MANAGEMENT AND PROTECTION GUIDELINES

Resource management and protection guidelines are necessary to integrate intensive recreation development in an area which has long been used for resource extraction. Also, there are natural features which require special protection. These guidelines do not supercede but are complementary to established policies and guidelines. They are intended to assist field staff in the review and approval of resources exploration and development applications.

10.1 Fisheries

On the north east shore of Smoke Lake the critical walleye spawning habitat shall be protected by a 200 metre land buffer. Recreation developments are prohibited. Resource development proposals for oil and gas exploration and development and timber extraction may occur subject to approval by a habitat biologist. Land use activities shall be conducted in a manner which prevents siltation of the spawning area.

A 200 metre buffer on each side of Fox Creek and its associated tributary on Iosegun Lake protects another important walleye spawning area. Again all recreation developments are prohibited and resource extraction and development proposals are subject to approval by a habitat biologist. Crossings will be directed away from this area and any unavoidable crossings will require complete stream habitat restoration.

All stream crossings should be constructed and reclaimed within a strict time frame that will protect spring spawners, (i.e. no operations between April 1 and July 15). Any disturbed soils or vegetation must be reclaimed within one growing season.

Destruction of shoreline emergent and submergent vegetation shall be minimized for recreation development in order to preserve fish and waterfowl habitat. This will be accomplished by limiting the size of beach and/or dock development associated with private and commercial facilities. Where clearing is approved only mechanical means (and not herbicides) shall be employed as directed by a habitat biologist.

10.2 Grazing

Unimproved and improved grazing are prohibited uses within the study areas due to the very low capability for grazing in the area and the potential for conflicts between grazing and recreational developments. Forage grasses in the area are totally committed to wildlife production.

10.3 Minerals

Standard operating conditions will apply to oil and gas exploration and development occurring in the study areas. However hand cut lines should be used in the buffer areas. Once development for recreation occurs Petroleum and Natural Gas applications must take in account the development and will be subject to ERCB development regulations.

Sand and gravel extraction will not be permitted within the buffer areas (Zone D and E). Applications for other areas will be reviewed on their own merits.

10.4 Timber

Timber harvesting operations will be conducted in a manner which preserves the aesthetics of the area in recognition of its recreation potential and to minimize the siltation of the lake and hence important fish spawning habitat. The Alberta Timber Harvest Planning and Operating Ground Rules shall apply in timber operations around the lakes.

However, special considerations are required in the study area in recognition of the aesthetics and unique timber types in the area. The 3-pass (or 3-cut) system and small and irregular shaped cut blocks will be used to preserve aesthetics and where the timber is determined to be windfirm. As well roadside buffers may be used and the 100 metre lakeshore buffer will be left natural where the timber is windfirm.

Where it is recognized that timber in proposed buffers is not windfirm some form of buffer management will be employed with the objectives of assuring human and property safety and establishing a windfirm and aesthetic buffer as soon as possible.

10.5 Watershed

Recreation development design and construction and resource exploration and development must occur in a manner which minimizes the potential for soil erosion and water siltation. To identify the potential for soil erosion in the study area, a Watershed Management Terrain Stratification was conducted by the Alberta Forest Service. The terrain stratification is based on an interpretation of information provided in the Ecological Land Classification Ecosystem Map. The product is a map (appended to this plan) for each lake that assigns Low, Moderate and High sensitivity ratings to ecosystems.

The ratings are determined by the criteria of slope, material stability, watershed area characteristics and presence of organics. Appendix 5 provides the detailed system plus the ranking of each ecosystem.

Proposals for recreation developments and resource extraction must be aware of the ratings for each ecosystem and adopt necessary procedures to minimize erosion.

LOW rated areas normally require normal operating groundrules, guidelines and conditions.

MODERATE rated areas generally require further ground investigation because of potential problem areas. Specific operational limitations/restrictions may be required.

HIGH rated areas require ground investigation, detailed planning and definite limitations/restrictions regarding: type and intensity of development, season of operation, type of equipment, etc.

10.6 WILDLIFE

A 200 metre "sphere of interest" buffer shall be maintained around the bald eagle nest on Iosegun lake. Within this buffer only very extensive developments shall be allowed (such as walking trails) subject to approval and conditions of habitat biologist.

A 100 metre radius buffer (in which vegetation will be left unaltered) shall be maintained around mineral licks. Harvest planning should try to incorporate mineral licks in permanent reserves.

Snag management will be applied subject to Occupational Health and Safety Regulations.

Rollback will be applied to access routes where it is deemed practical and effective in order to minimize harrassment of wildlife.

Trapping is a legitimate activity within the planning area.

Trappers must be notified in writing of any proposal for development of recreation facilities, including a map and a development schedule.

10.7 Archaeological Resource

Resource uses in the planning area involving land surface disturbance may require Historical Resources Impact Assessments prior to development occurring, as outlined under Section 33(2) of the Historical Resources Act.

The Archaeological Survey of Alberta, Resource Management Section will participate in the land use referral process, to review proposed development projects within 400 metres of the lake shore.

Protective notations should be established and maintained to properly protect important sites.

10.8 Forest Protection

All proposed development will require a fire control plan which should address:

Road system - It should include good access for inhabitants and emergency fire equipment (including no dead end roads).

Water availability - Reliable water sources that are accessible to water trucks should be identified.

Forest fuels - A minimum of 10 metres of mostly cleared area shall occur around buildings for fire breaks. Other fuel modification for fire protection may be required.

Solid waste disposal - Garbage shall not be burned on site. All garbage may be temporarily stored in bear-proof containers but must be taken to an approved landfill site.

Fire permits other than for cooking and heating are required in the Forest Protection Area during the fire season.

11.0 IMPLEMENTATION OF THE PLAN

The Alberta Forest Service will be the prime agency in the implementation of this lake management plan. Nevertheless several other government agencies are involved in the referral and approval of recreation developments and resource exploration and development applications.

The entire plan study area will be placed under a consultative notation held by the Alberta Forest Service. The notation will refer to the Lake Management Plan for specific direction in approving applications.

AFS recreational surveys on the two lakes should include measurement of parameters used in calculating carrying capacity in order to verify and refine the assumptions used in this plan. The first revision of this management plan should include this improved data.

REFERENCES

APPENDIX SECTION

APPENDIX 1

TERMS OF REFERENCE - ISSUES

A listing of management issues included in the approved Terms of Reference are as follows:

ISSUES:

1. Increases in industrial and recreational activity may impact air quality and water quality/quantity. These impacts may result in conflicts between users.
2. There are concerns about environmental protection in the plan area, relating to increasing industrial and resource development and future recreation developments. Of particular concern is conservation and protection of the lake shoreline and other areas of high recreation, environmental or aesthetic values.
3. Site locations of lake shore developments should consider the natural full supply levels of the lakes.
4. Present recreation sites are receiving over-use on long weekends.
5. There is a need to ensure that public access to the lakes will be maintained.
6. There is a perceived demand for private and commercial recreation facilities (eg. cottage subdivisions).
7. There are concerns as to the viability of private and commercial recreation facilities, related to the site (site capability, water suitability, etc.) and related to the market for cottage lots.

8. Increasing recreation use raises the possibility of increased forest fire hazard.
9. Important historical and cultural resources on the lakes may be impacted by further resource and recreation development.
10. Increased recreational use of these lakes may negatively impact fish and wildlife populations.
11. Increased demand for angling opportunities may conflict with commercial fisheries on both lakes.
12. Walleye spawning areas are critical and increased recreation use may negatively impact walleye populations.
13. Increased recreation use may cause conflicts between fisheries resource users and other recreational resource users.
14. There is concern about who will be responsible (ie. government agencies or the developer) for providing and maintaining the infrastructure that will be required to support recreational developments on the lakes.
15. There is a need for recreational developments to meet standards, guidelines and requirements of the various agencies on the planning team, eg. design and construction standards of roads, need for dispositions, property setback and lot size standards, etc.
16. There is concern that expanded development opportunities on Iosegun and Smoke Lakes may result in increased pressure for public land use and purchases.

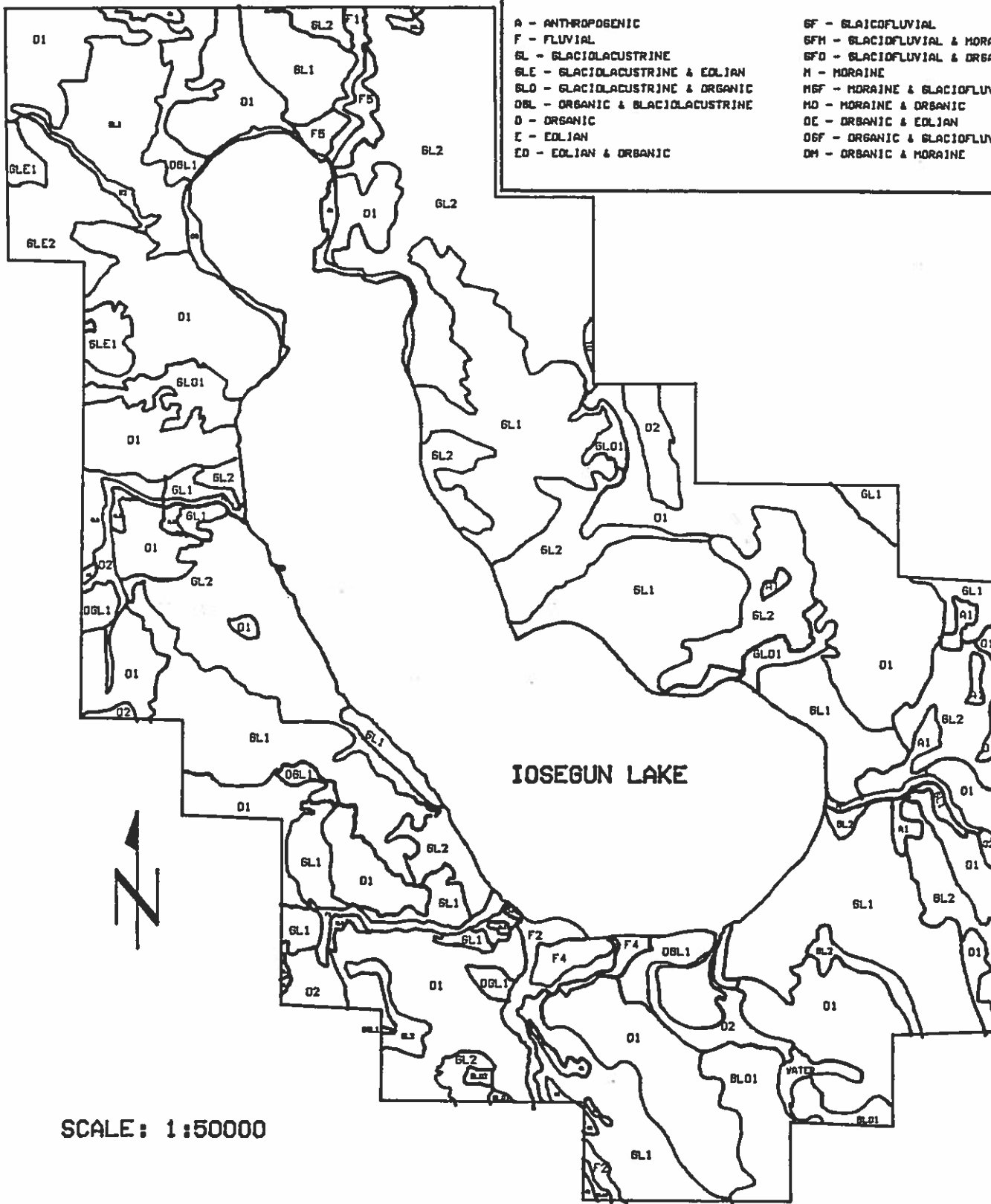
17. At the implementation stage of the plan the roles of the various government agencies need to be clarified, i.e. responsibility for administration, enforcement, monitoring, etc.
18. Demographic characteristics of the region are changing, primarily due to industrial development and expansion.
19. There is concern about danger of sour gas to public safety at future recreation developments.
20. Timber resources in the Forest Management Unit in which these two lakes are situated are fully committed to the forest industry.
21. The oil and gas industry is very active in this area and this industry wishes to continue exploration in the area.

APPENDIX 2

ECOLOGICAL LAND CLASSIFICATION
FOR SMOKE AND IOSEGUN LAKES

ECOSECTION CODES

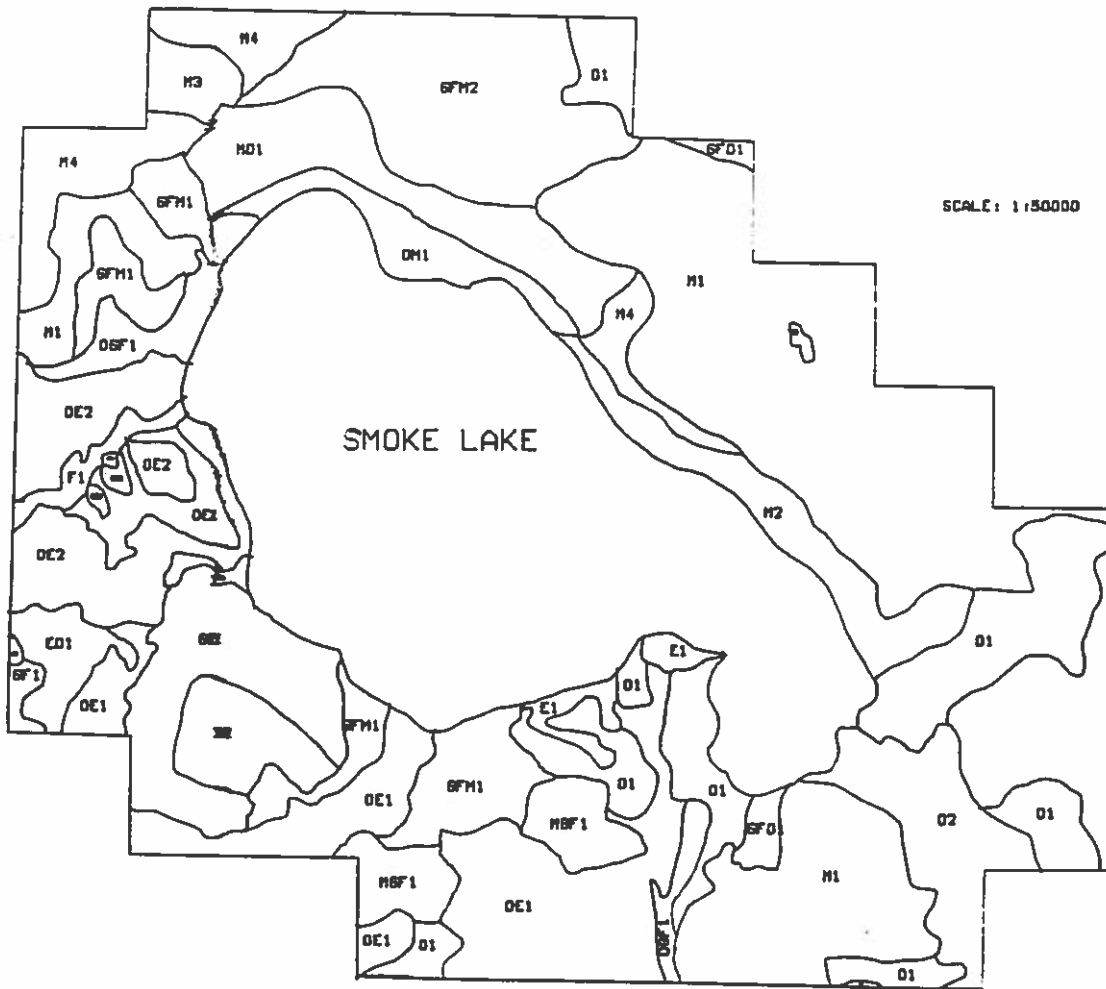
- | | |
|----------------------------------|--------------------------------|
| A - ANTHROPOGENIC | GF - GLACIOFLUVIAL |
| F - FLUVIAL | GFH - GLACIOFLUVIAL & MORAINIC |
| GL - GLACIOLACUSTRINE | GF0 - GLACIOFLUVIAL & ORGANIC |
| GLE - GLACIOLACUSTRINE & EDJIAN | M - MORAINIC |
| GL0 - GLACIOLACUSTRINE & ORGANIC | MF - MORAINIC & GLACIOFLUVIAL |
| OBL - ORGANIC & GLACIOLACUSTRINE | MO - MORAINIC & ORGANIC |
| O - ORGANIC | OE - ORGANIC & EDJIAN |
| E - EDJIAN | OF - ORGANIC & GLACIOFLUVIAL |
| EO - EDJIAN & ORGANIC | OM - ORGANIC & MORAINIC |



SCALE: 1:50000

ECOSECTION CODES

A - ANTHROPOGENIC	BF - GLACIOFLUVIAL
F - FLUVIAL	BFM - GLACIOFLUVIAL & MORaine
BL - GLACIOLACUSTRINE	BF0 - GLACIOFLUVIAL & ORGANIC
BLE - GLACIOLACUSTRINE & EDLIAN	M - MORaine
BL0 - GLACIOLACUSTRINE & ORGANIC	MBF - MORaine & GLACIOFLUVIAL
OL - ORGANIC & GLACIOLACUSTRINE	MO - MORaine & ORGANIC
X - ORGANIC	OE - ORGANIC & EDLIAN
E - EDLIAN	OF - ORGANIC & GLACIOFLUVIAL
EO - EDLIAN & ORGANIC	OM - ORGANIC & MORaine



IOSEGUN LAKESHORE

Biophysical Parameters								
Ecosystem/ Ecosite	Vegetation	Landform and Surficial Materials	Soils	Slope (%)	Drainage	Surface Texture	Subsurface Texture	Permeability
ANTHROPOGENIC								
A1	Variable, non-forested.	Disturbed areas because of oil and gas activities.	Variable	0- 5	Imperfectly to poorly	Silt loam to loam	Silty clay to clay	Slow
FLUVIAL								
F1	Small stands of closed deciduous and mixedwood forest with areas of willow shrubland and sedge meadows.	Medium to coarse textured fluvial channel deposits; level to undulating floodplain and short valley slopes of Outlet Creek.	Gleyed Cumulic Regosol; Orthic Regosol; Rego Gleysol	0-45	Imperfectly to moderately well	Silt loam to loamy sand	Silt loam to silty clay	Moderate to slow
F2	Willow shrubland with small stands of closed deciduous and mixedwood forest and sedge meadows.	Undulating medium to coarse textured fluvial channel deposits on floodplain of inlet creeks in southern part of lake; occasional short, steep valley slopes.	Rego Gleysols; Gleyed Cumulic Regosols	0- 9	Poorly to imperfectly	Silt loam to loamy sand	Silt loam to silty clay	Slow
F3	Willow shrubland and sedge wetland with occasional small stands of deciduous forest.	Undulating medium to coarse textured fluvial channel deposits and narrow floodplain of small inlet stream flowing from Raspberry Lake and short inlet stream on west shore of Iosegun Lake.	Rego Gleysols; Gleyed Cumulic Regosols	0- 9	Poorly to imperfectly	Silt loam to loamy sand	Silt loam to silty clay	Slow

TOSEGUN LAKE SHORE

Key to Limitation Factors (indicated in brackets under Landscape Evaluations)

- B - Shallow bedrock
- F - Flood hazard
- H - Potential frost action
- P - Low permeability
- R - Rockiness
- S - High shrink-swell potential
- T - Topography
- W - Poor soil drainage
- X - Excessive soil permeability

Ecosystem/Ecosite	Biophysical Parameters (continued)										Landscape Evaluations			
	Depth to (cm)		Bedrock	Impermeable Layer	Water Table	Surface Rockiness Class	Surface Stoniness Class	Shrink-Swell Potential	Potential Frost Action	Flood Hazard	Buildings without Basements	Septic Tank Absorption Fields	Serviced Campgrounds	Picnic Areas
A1	>180	>180	>180	Variable	0	1	High	High	None	N/A	N/A	N/A	N/A	
F1	>180	>180	>180	80-120	0	0	High	High	Frequent	Very Severe (F, W)	Very Severe (F, W)	Severe (F, W)	Severe (F, W)	
F2	>180	>180	>180	< 50	0	0	High	High	Frequent	Very Severe (F, W)	Very Severe (F, W)	Severe (F, W)	Severe (W, F)	
F3	>180	>180	>180	< 50	0	0	High	High	Frequent	Very Severe (F, W)	Very Severe (F, W)	Severe (F, W)	Severe (W, F)	

IOSEGIN LAKESHORE

Biophysical Parameters								
Ecoregion/ Ecosite	Vegetation	Landform and Surficial Materials	Soils	Slope (%)	Drainage	Surface Texture	Subsurface Texture	Permeability
F4	Closed deciduous and mixedwood forest with small areas of willow shrubland.	Undulating to level coarse fluvial overbank deposits adjacent to larger inlet stream channel in southern part of Iosegin Lake.	Gleyed Humic Regosol; Orthic Humic Gleysol	0-3	Imperfectly to poorly	Sandy loam	Sand	Rapid
F5	Closed deciduous and mixedwood forest with patches of willow shrubland.	Level medium textured fluvial veneers over fine textured glaciolacustrine deposits adjacent to head of Outlet Creek.	Orthic Humic Gleysol	0-3	Poorly	Silt loam	Sandy clay loam	Moderate
GLACIOLACUSTRINE								
GL1	Closed mature deciduous and mixedwood forest; mature white birch stands common.	Undulating to level, fine textured glaciolacustrine deposits; inclusions of glaciolacustrine veneers over moraine in southeast part of project area.	Gleyed Gray Luvisols; Gleyed Solonchic Gray Luvisols; Orthic Luvic Gleysols; Orthic Humic Gleysols	0-5	Imperfectly to poorly	Silt loam to loam	Silty clay to clay	Slow
GL2	Closed mature deciduous and mixedwood forest; inclusions of willow shrubland and sedge meadows.	Level to undulating, fine textured glaciolacustrine deposits with inclusions of shallow organic deposits over glaciolacustrine material.	Orthic Humic Gleysols; Orthic Luvic Gleysols; Gleyed Gray Luvisols	0-5	Poorly to imperfectly	Silt loam to loam	Silty clay to clay	Slow

IOSEGUN LAKESHORE

Key to Limitation Factors (Indicated in brackets under Landscape Evaluations)

- B - Shallow bedrock
- F - Flood hazard
- H - Potential frost action
- P - Low permeability
- R - Rockiness
- S - High shrink-swell potential
- T - Topography
- W - Poor soil drainage
- X - Excessive soil permeability

Ecosystem/ Ecosite	Biophysical Parameters (continued)							Landscape Evaluations						
	Depth to (cm)		Bedrock	Impermeable Layer	Water Table	Surface Rockiness Class	Surface Stoniness Class	Shrink-Swell Potential	Potential Frost Action	Flood Hazard	Buildings without Basements	Septic Tank Absorption Fields	Serviced Campgrounds	Picnic Areas
	Bedrock	Impermeable Layer												
FA	>180	>180	>180	50-80	0	0	Moderate	Moderate	Occasional	Severe (F, W)	Severe (M, F)	Severe (M, F)	Moderate (M, F)	
F5	>180	>180	>180	< 50	0	0	Moderate	Moderate	Occasional	Severe (F, W)	Very Severe (M, F)	Severe (M, F)	Severe (M, F)	
GL1	>180	>180	>180	>120	0	1	High	High	None	Moderate (M)	Severe (M)	Moderate (M)	Moderate (M)	
GL2	>180	>180	>180	< 50	0	1	High	High	None	Severe (M)	Very Severe (M)	Severe (M)	Severe (M)	

IOSEGUN LAKESHORE

Biophysical Parameters								
Ecosystem/ Ecosite	Vegetation	Landform and Surficial Materials	Soils	Slope (%)	Drainage	Surface Texture	Subsurface Texture	Permeability
GLACIOLAUSTRINE AND BOLLIAN								
GLE1	Closed deciduous, coniferous and mixedwood forest.	Undulating fine textured glaciolaustrine deposits with inclusions of thin coarse eolian veneers over glaciolaustrine sediments.	Gleyed Gray and Brunisolic Gray Luvisols; Orthic Luvic Gleysols; Orthic Humic Gleysol	0-5	Imperfectly to poorly	Silt loam to loam; sand to loamy sand	Silty clay to clay	Slow
GLE2	Closed deciduous and mixedwood forest; inclusions of willow shrubland and sedge meadows.	Undulating to level fine textured glaciolaustrine deposits with inclusions of thin coarse eolian veneers over glaciolaustrine sediments.	Orthic Humic Gleysols; Orthic Luvic Gleysols; Gleyed Gray Luvisols	0-5	Poorly to imperfectly	Silt loam to loam; sand to loamy sand	Silty clay to clay	Slow
GLACIOLAUSTRINE AND ORGANIC								
GLU1	Closed deciduous and mixedwood forest; willow shrubland; black spruce-tamarack fens.	Complex of undulating to level fine textured glaciolaustrine deposits and shallow organic veneers over glaciolaustrine deposits.	Orthic Humic Gleysols; peaty Orthic Gleysols; Terric Mesisols	0-5	Poorly to very poorly	Silty loam to loam and mesic organics	Silty clay to clay	Slow

IOSEGUN LAKESHORE

Key to Limitation Factors (indicated in brackets under Landscape Evaluations)

- B - Shallow bedrock
- F - Flood hazard
- H - Potential frost action
- P - Low permeability
- R - Rockiness
- S - High shrink-swell potential
- T - Topography (steep slopes)
- W - Poor soil drainage
- X - Excessive soil permeability

Ecosystem/Ecosite	Biophysical Parameters (continued)						Landscape Evaluations							
	Depth to (cm)		Bedrock	Impermeable Layer	Water Table	Surface Rockiness Class	Surface Stoniness Class	Shrink-Swell Potential	Potential Frost Action	Flood Hazard	Buildings without Basements	Septic Tank Absorption Fields	Serviced Campgrounds	Picnic Areas
	Bedrock	Impermeable Layer												
GLE1	>180	>180	>120	0	1	High	High	High	None	None	Moderate (W)	Severe (W)	Moderate (W)	Moderate (W)
GLE2	>180	>180	<50	0	High	High	High	None	None	None	Severe (W)	Very Severe (W)	Severe (W)	Severe (W)
GLE1	>180	>180	25-50	0	1	High	High	High	None	None	Severe (W)	Very Severe (W)	Severe (W)	Severe (W)

IOSEGUN LAKESHORE

Biophysical Parameters								
Ecosystem/ Ecosite	Vegetation	Landform and Surficial Materials	Soils	Slope (%)	Drainage	Surface Texture	Subsurface Texture	Permeability
ORGANIC AND GLACIOLAUSTRINE								
UGL1	Willow shrubland; black spruce-tamarack fens; closed deciduous and mixedwood forest.	Complex of level to undulating, shallow organic veneers over fine textured glaciolaustrine deposits and fine textured glaciolaustrine deposits.	Terric Mesisols; peaty Urthic Gleysols; Orthic Humic Gleysols	0-3	Very poorly to poorly	Mesic organics and silty loam to loam	Silty clay to clay	Slow
ORGANIC								
01	Black spruce-tamarack fen; willow shrubland.	Level to depressional deep organic deposits to organic veneers and blankets over fine textured glaciolaustrine deposits.	Typic Mesisols; Terric Mesisols; occasional Urthic Humic Gleysols; peaty Urthic Gleysols	0-3	Very poorly	Mesic	Silty clay to clay	Slow
02	Willow shrubland; sedge wetland; tamarack fen.	Level deep organic deposit.	Typic Fibrisol	0-0.5	Very poorly	Fibric organics	Mesic to fibric organics	Slow
03	Emergent and floating aquatic vegetation.	Floating organic mats along periphery of lake and small ponds and open water.	Non-soil	0	Very poorly	Fibric	N/A	N/A

IOSEGUN LAKESHORE

Key to Limitation Factors (indicated in brackets under Landscape Evaluations)

- B - Shallow bedrock
- F - Flood hazard
- H - Potential frost action
- P - Low permeability
- R - Rockiness
- S - High shrink-swell potential
- T - Topography (steep slopes)
- W - Poor soil drainage
- X - Excessive soil permeability

Ecosystem/ Ecotope	Biophysical Parameters (continued)										Landscape Evaluations			
	Depth to (cm)		Bedrock	Impermeable Layer	Water Table	Surface Rockiness Class	Surface Stoniness Class	Shrink-Swell Potential	Potential Frost Action	Flood Hazard	Buildings without Basements	Septic Tank Absorption Fields	Serviced Campgrounds	Picnic Areas
	Bedrock	Impermeable Layer												
	>180	>180	>180	>180	>180	>180	>180	>180	>180	>180	>180	>180	>180	
<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25		
UGL1	>180	>180	>180	>180	>180	0	1	High	High	None	Very Severe (W)	Very Severe (W)	Very Severe (W)	
01	>180	>180	>180	>180	>180	0	0	N/A	N/A	None	Very Severe (W)	Very Severe (W)	Very Severe (W)	
02	>180	>180	>180	>180	>180	0	0	N/A	N/A	None	Very Severe (W)	Very Severe (W)	Very Severe (W)	
03	>180	>180	>180	>180	>180	0	0	N/A	N/A	Frequent	Very Severe (W, F)	Very Severe (W, F)	Very Severe (W, F)	

SHOKE LAKESHORE

Biophysical Parameters								
Ecosystem/ Ecosite	Vegetation	Landform and Surficial Materials	Soils	Slope (%)	Drainage	Surface Texture	Subsurface Texture	Permeability
EDULM E1	Closed deciduous forest with small areas of coniferous forest.	Subdued ridges of eolian sand deposits with inclusions of organic veneers over eolian sand.	Gleyed Eluviated Dystric Brunisols; Orthic Humic Gleysols; Orthic Luvic Gleysols	0-30	Imperfectly to poorly	Sand (occasional mesic organics)	Sand	Rapid
EDULM AND ORGANIC ED1	Closed deciduous and coniferous forest and open pine stands.	Gently rolling to hummocky eolian sand deposits with scattered organic veneers in depressions.	Eluviated Dystric Brunisols; peaty Orthic Gleysols; Orthic Luvic Gleysols	3-30	Well to poorly	Sand and mesic organics	Sand	Rapid
FLUVIAL F1	Willow shrubland with occasional small stands of mixedwood and deciduous forest.	Unfolding coarse to medium textured fluvial channel deposits on floodplain and terraces of outlet creek; includes short, steep valley slopes.	Gleyed Cumulic Regosols; Rego Gleysols	3-9 (16-30 on short slopes)	Imperfectly to poorly	Loamy sand to sand	Cobbly silty clay to cobbly silt loam	Moderate

SMOKE LAKESHORE

Key to Limitation Factors (indicated in brackets under Landscape Evaluations)

- B - Shallow bedrock
- F - Flood hazard
- H - Potential frost action
- P - Low permeability
- R - Rockiness
- S - High shrink-swell potential
- T - Topography (steep slopes)
- W - Poor soil drainage
- X - Excessive soil permeability
- Y - Sandy surface soil texture

Ecosystem/Ecosite	Biophysical Parameters (continued)										Landscape Evaluations			
	Depth to (cm)		Bedrock	Impervious Layer	Water Table	Surface Rockiness Class	Surface Stoniness Class	Shrink-Swell Potential	Potential Frost Action	Flood Hazard	Buildings without Basements	Septic Tank Absorption Fields	Serviced Campgrounds	Picnic Areas
	Bedrock	Impervious Layer												
E1	>180	>180	>180	>180	110-120	0	0	Low	Low	None	Moderate (M, T)	Severe (M, X)	Moderate (X, T, Y)	Moderate (M, T, Y)
E01	>180	>180	>180	>180	>180	0	0	Low	Low	None	Moderate (T)	Moderate (T)	Moderate (T, Y)	Moderate (T, Y)
F1	>180	>180	>180	>180	6-80	0	0	Moderate	Moderate	Occasional	Severe (M, F)	Severe (M, F)	Moderate (M, F)	Moderate (M, F)

SMOKE LAKESHORE

Biophysical Parameters								
Ecosystem/Ecosite	Vegetation	Landform and Surficial Materials	Soils	Slope (%)	Drainage	Surface Texture	Subsurface Texture	Permeability
GLACIOFLUVIAL								
GF1	Closed deciduous and mixedwood forest.	Undulating to gently rolling deep glaciofluvial sand deposits and occasional glaciofluvial sand veneers over fine textured moraine on upper slopes.	Eluviated Dystric Brunisols; Orthic Gray Luvisols	3-9	Well to moderately well	Sand	Sand and silty clay to clay	Rapid
GF2	Closed deciduous and mixedwood forest.	Coarse textured glaciofluvial veneers over fine textured moraine on gently rolling mid to lower slopes.	Orthic Gray Luvisols; Gleyed Gray Luvisols; Orthic Luvic Gleysols	3-15	Moderately well to poorly	Sand to loamy sand	Silty clay to clay	Slow
GF3	Closed deciduous and mixedwood forest.	Undulating to gently rolling coarse glaciofluvial veneers over fine textured moraine on lower slopes.	Gleyed Gray Luvisols; Orthic Luvic Gleysols	3-9	Imperfectly to poorly	Sand to loamy sand	Silty clay to clay	Slow

SMOKE LAKESHORE

Key to Limitation Factors (indicated in brackets under Landscape Evaluations)

- B - Shallow bedrock
- F - Flood hazard
- H - Potential frost action
- P - Low permeability
- R - Rockiness
- S - High shrink-swell potential
- T - Topography (steep slopes)
- M - Poor soil drainage
- X - Excessive soil permeability
- Y - Sandy surface soil texture

Ecosystem/Eosite	Biophysical Parameters (continued)										Landscape Evaluations					
	Depth to (cm)			Surface Rockiness Class	Surface Stoniness Class	Shrink-Swell Potential	Potential Frost Action	Flood Hazard	Buildings without Basements	Septic Tank Absorption Fields	Serviced Campgrounds	Picnic Areas				
	Bedrock	Impermeable Layer	Water Table													
GF1	>180	>180	>180	0	0	Low	Low	None	None	None	Moderate (Y)	Moderate (Y)	Moderate (Y)			
GF2	>180	>180	>180	0	0	High	High	None	Moderate (M, T)	Severe (M)	Moderate (M, T, Y)	Moderate (M, T, Y)	Moderate (M, T, Y)			
GF3	>180	>180	120-180	0	0	High	High	None	Severe (M)	Very Severe (M)	Severe (M)	Severe (M)	Severe (M)			

SMOKE LAKESHORE

Biophysical Parameters								
Ecosystem/ Ecosite	Vegetation	Landform and Surficial Materials	Soils	Slope (%)	Drainage	Surface Texture	Subsurface Texture	Permeability
GLACIOFLUVIAL AND MORaine								
GFR1	Closed deciduous and mixedwood forest.	Coarse textured glaciofluvial veneers over fine textured moraine with occasional fine textured moraine deposits on undulating to gently rolling mid to lower slopes.	Orthic Luvic Gleysols; Orthic Humic Gleysols; Gleyed Gray Luvisols	3-15	Poorly to imperfectly	Sand to sandy loam	Silty clay to clay	Slow
GFR2	Closed deciduous and mixedwood forest with small incursions of willow shrubland.	Gently rolling to undulating coarse glaciofluvial veneers over fine textured moraine with occasional fine textured moraine deposits north of Smoke Lake.	Gleyed Gray Luvisols; Orthic Luvic Gleysols	1-15	Imperfectly to poorly	Sand to cobbly silt loam	Silty clay to clay	Slow
GFD1	Closed coniferous and mixedwood forest with small incursions of willow shrubland.	Undulating to gently rolling coarse textured glaciofluvial veneers over fine textured moraine, and organic veneers over coarse glaciofluvial deposits on lower slopes and depressional areas.	Orthic Luvic Gleysol; peaty Orthic Gleysol; Orthic Humic Gleysol	3-9	Poorly	Sand to cobbly silt loam and humic organics	Clay to sand to cobbly silt loam	Slow

SMOKE LAKESHORE

Key to Limitation Factors (indicated in brackets under Landscape Evaluations)

- B - Shallow bedrock
- F - Flood hazard
- H - Potential frost action
- P - Low permeability
- R - Rockiness
- S - High shrink-swell potential
- T - Topography (steep slopes)
- W - Poor soil drainage
- X - Excessive soil permeability
- Y - Sandy surface soil texture

Ecosystem/Ecosite	Biophysical Parameters (continued)						Landscape Evaluations					
	Depth to (cm)		Bedrock	Surface Rockiness Class	Surface Stoniness Class	Shrink-Swell Potential	Potential Frost Action	Flood Hazard	Buildings without Basements	Septic Tank Absorption Fields	Serviced Campgrounds	Picnic Areas
	Impermeable Layer	Water Table										
GF1	>180	60-120	>180	0	0	High	High	None	Severe (W)	Very Severe (W)	Severe (W)	Severe (W)
GF2	>180	120-180	>180	0	0	High	High	None	Severe (W)	Very Severe (W)	Severe (W)	Severe (W)
GF3	>180	60-120	>180	0	0	High	High	None	Severe (W)	Very Severe (W)	Severe (W)	Severe (W)

SMOKE LAKESHORE

Biophysical Parameters								
Ecosite/ Ecosite	Vegetation	Landform and Surficial Materials	Soils	Slope (%)	Drainage	Surface Texture	Subsurface Texture	Permeability
MORALINE								
M1	Closed deciduous and mixedwood forest.	Undulating to gently rolling fine textured moraine deposits on upper slopes.	Orthic Gray Luvisols; Gleyed Gray Luvisols	1-15	Moderately well to imperfectly	Sandy loam to silt loam	Clay to silty clay	Slow
M2	Closed mixedwood and deciduous forest.	Undulating to gently rolling fine textured moraine deposits on lower slope of Smoke Lake's north shore.	Gleyed Gray Luvisols; Orthic Luvic Gleysols; Orthic Gray Luvisols	1-9	Imperfectly to moderately well	Sandy loam to silt loam	Clay to silty clay	Slow
M3	Closed deciduous and mixedwood forest.	Undulating to gently rolling fine textured moraine deposits on upper and mid slopes.	Gleyed Gray Luvisols; Orthic Gray Luvisols	1-9	Imperfectly to moderately well	Silt loam to sandy loam	Clay to silty clay	Slow
M4	Closed deciduous and mixedwood forest with small incursions of willow shrubland.	Undulating to gently rolling fine textured moraine deposits on mid and lower slopes.	Gleyed Gray Luvisols; Orthic Luvic Gleysols	3-9	Imperfectly to poorly	Silt loam to sandy loam	Clay to silty clay	Slow

SMOKE LAKESHORE

Ecosection/ Ecosite	Biophysical Parameters (continued)										Landscape Evaluations			
	Depth to (cm)		Bedrock	Impermeable Layer	Water Table	Surface Rockiness Class	Surface Stoniness Class	Shrink- Swell Potential	Potential Frost Action	Flood Hazard	Buildings without Basements	Septic Tank Absorption Fields	Serviced Campgrounds	Picnic Areas
M1	>180	>180	>180	>180	>180	0	0	High	High	None	Moderate (W, T)	Severe (W)	Moderate (W, T)	Moderate (W, T)
* M2	>180	>180	80- >180	>180	>180	0	0	High	High	None	Moderate to Severe (W)	Severe to Very Severe (W)	Moderate to Severe (W)	Moderate to Severe (W)
M3	>180	>180	>180	>180	>180	0	0	High	High	None	Moderate (W)	Severe (W)	Moderate (W)	Moderate (W)
M4	>180	>180	120- 180	>180	120- 180	0	0	High	High	None	Severe (W)	Very Severe (W)	Severe (W)	Severe (W)

Key to Limitation Factors (indicated
in brackets under Landscape Evalua-
tions)

- B - Shallow bedrock
- F - Flood hazard
- H - Potential frost action
- P - Low permeability
- R - Rockiness
- S - High shrink-swell potential
- T - Topography (steep slopes)
- W - Poor soil drainage
- X - Excessive soil permeability
- Y - Sandy surface soil texture

* Note: This ecosection includes the present Smoke Lake recreation area. Suitable expansion of buildings, campgrounds and picnic areas can occur especially in microsites where drainage is moderately well. A detailed ground investigation is necessary to locate these drier sites.

SMOKE LAKESHORE

Biophysical Parameters								
Ecosystem/ Ecosite	Vegetation	Landform and Surficial Materials	Soils	Slope (%)	Drainage	Surface Texture	Subsurface Texture	Permeability
MORAINE AND GLACIOFLUVIAL								
MGE1	Closed deciduous and mixedwood forest.	Gently rolling fine textured moraine deposits on upper slopes and coarse glaciofluvial veneers over fine textured moraine on lower slopes.	Orthic Gray Luvisols; Orthic Luvic Gleysols	3-15	Moderately well to poorly	Sandy loam to sand	Silty clay to clay	Slow
MORAINE AND ORGANIC								
M01	Closed mixedwood and coniferous forest.	Inclined and gently rolling fine textured moraine deposits on upper and mid-slopes with occasional organic veneers over fine textured moraine; seepage common.	Orthic Luvic Gleysols; peaty Orthic Gleysol	6-15	Poorly	Sandy loam to silt loam and humic organics	Silty clay to clay	Slow
ORGANIC								
O1	Closed coniferous forest; black spruce-tamarack fens and willow wetland.	Level to undulating organic veneers over coarse glaciofluvial and eolian deposits.	Terric Mesisols; peaty Orthic Gleysols; occasional Orthic Humic Gleysols	0-3	Very poorly to poorly	Mestic to humic organics	Sand to loamy sand	N/A

SMOKE LAKESHORE

Key to Limitation Factors (indicated in brackets under Landscape Evaluations)

- B - Shallow bedrock
- F - Flood hazard
- H - Potential frost action
- P - Low permeability
- R - Rockiness
- S - High shrink-swell potential
- T - Topography (steep slopes)
- W - Poor soil drainage
- X - Excessive soil permeability
- Y - Sandy surface soil texture

Ecosystem/Ecosite	Biophysical Parameters (continued)						Landscape Evaluations				
	Depth to (cm)		Surface Rockiness Class	Surface Stoniness Class	Shrink-Swell Potential	Potential Frost Action	Flood Hazard	Buildings without Basements	Septic Tank Absorption Fields	Serviced Campgrounds	Picnic Areas
	Bedrock	Impermeable Layer									
MGF1	>180	>180	>180	0	0	High	None	Moderate (H, T)	Severe (H)	Moderate (T, W)	Moderate (T, W)
MU1	>180	>180	60-120	0	0	High	None	Severe (H, T)	Very Severe (H)	Severe (H, T)	Severe (H, T)
O1	>180	>180	< 25	0	0	N/A	None	Very Severe (W)	Very Severe (W)	Very Severe (W)	Very Severe (W)

SMOKE LAKESHORE

Biophysical Parameters								
Ecosection/ Ecosite	Vegetation	Landform and Surficial Materials	Soils	Slope (%)	Drainage	Surface Texture	Subsurface Texture	Permeability
U2	Black spruce-tamarack fens, willow wetland and sedge wetland.	Level to depressional organic deposits.	Typic Mesisols; Typic Fibrisols; Terric Mesisols	0- 3	Very poorly	Fibric to mesic organics	Mesic organics	N/A
ORGANIC AND EOLIAN								
OE1	Black spruce-tamarack fens with occasional open pine stands on dunes.	Level to undulating organic veneers over eolian sand and scattered dune ridges.	Terric Mesisols; Eluviated Dystric Brunisols; Orthic Luvic Gleysols	1-30	Very poorly to well	Mesic to humic organic and sand	Sand	N/A
OE2	Black spruce-tamarack fens, closed coniferous forest and willow wetland.	Level to undulating organic veneers over eolian sands with occasional scattered eolian sand deposits.	Terric Mesisols; peaty Orthic Gleysols; Orthic Humic Gleysols	1- 9	Very poorly to poorly	Mesic organic and sand	Sand	N/A
OGF1	Willow shrubland and wet sedge meadows with scattered deciduous stands and occasional black spruce forest on lower slopes.	Level to inclined and gently rolling organic veneers over coarse glaciofluvial deposits on lower slopes with occasional scattered coarse glaciofluvial deposits.	peaty Orthic Gleysols; Orthic Humic Gleysols; Orthic Luvic Gleysols	0- 9	Poorly	Humic organics and sand	Sandy loam to loamy sand	Moderate

SMOKE LAKESHORE

Key to Limitation Factors (indicated in brackets under Landscape Evaluations)

- B - Shallow bedrock
- F - Flood hazard
- H - Potential frost action
- P - Low permeability
- R - Rockiness
- S - High shrink-swell potential
- T - Topography
- W - Poor soil drainage
- X - Excessive soil permeability
- Y - Sandy surface soil texture

Ecosystem/ Ecosite	Biophysical Parameters (continued)							Landscape Evaluations				
	Depth to (cm)			Surface Rockiness Class	Surface Stoniness Class	Shrink- Swell Potential	Potential Frost Action	Flood Hazard	Buildings without Basements	Septic Tank Absorption Fields	Serviced Campgrounds	Picnic Areas
	Bedrock	Impermeable Layer	Water Table									
02	>180	>180	< 25	0	0	N/A	N/A	Fre- quent	Very Severe (W, F)	Very Severe (W, F)	Very Severe (W, F)	Very Severe (W, F)
0E1	0	>180	< 25	0	0	N/A	N/A	None	Very Severe (W)	Very Severe (W)	Very Severe (W)	Very Severe (W)
0E2	0	>180	< 25	0	0	N/A	N/A	None	Very Severe (W)	Very Severe (W)	Very Severe (W)	Very Severe (W)
0GF1	>180	>180	60- 120	0	0	Low	Low	None	Severe (W)	Very Severe (W)	Severe (W)	Severe (W)

SMOKE LAKESHORE

Biophysical Parameters								
Ecoregion/ Ecosite	Vegetation	Landform and Surficial Materials	Soils	Slope (%)	Drainage	Surface Texture	Subsurface Texture	Permeability
041	Closed mixedwood and coniferous forest.	Inclined and undulating organic veneers over fine textured moraine and occasional fine textured moraine deposits on lower slopes adjacent to Smoke Lake; seepage common.	peaty Orthic Gleysols; Orthic Humic Gleysols; Orthic Luvis Gleysols	1- 5	Poorly	Humic organics and silt loam to sandy loam	Silty clay to clay	Slow

SMOKE LAKESHORE

Key to Limitation Factors (Indicated in brackets under Landscape Evaluations)

- B - Shallow bedrock
- F - Flood hazard
- H - Potential frost action
- P - Low permeability
- R - Rockiness
- S - High shrink-swell potential
- T - Topography (steep slopes)
- W - Poor soil drainage
- X - Excessive soil permeability
- Y - Sandy surface soil texture

Ecosystem/ Ecosite	Biophysical Parameters (continued)						Landscape Evaluations				
	Depth to (cm)		Surface Rockiness Class	Surface Stoniness Class	Shrink-Swell Potential	Potential Frost Action	Flood Hazard	Buildings without Basements	Septic Tank Absorption Fields	Serviced Campgrounds	Picnic Areas
	Bedrock	Impervious Layer									
UP1	>180	>180	0	0	High	High	None	Severe (W)	Very Severe (W)	Severe (W)	Severe (W)

APPENDIX 3

RATIONALE FOR THE 100 METRE LAKE SHORE BUFFER

Rationale for the 100 metre buffer is as follows:

- a. Precedent - A 100 metre shoreline buffer is becoming a standard feature in recent lake planning efforts. This was implemented in the I.D. 16 Area Structure Plan for Sturgeon Lake. On a number of other lakes a 100 metre shoreline buffer has been implemented in the last ten years: Long Lake, North Buck Lake and others. If the buffer on these two lakes were reduced it could have negative implications on lakes where this principle is already accepted. Viable backshore recreation developments occur on lakes which require a 100 metre shoreline buffer.

On lakes such as Lac St. Anne, Pigeon Lake, Gull Lake and Sturgeon Lake where an insignificant buffer or no buffer was implemented problems with lakeshore land use have evolved. Cottagers eventually "assumed" ownership of the narrow buffer regardless of the actual public ownership. No effort was made to preserve the public use area along the lake front to the lot lines. Consequently, cottagers established barricades such as fences and retaining walls along the lot line to the lake edge. This prevents the public from using public land.

- b. Protection of shoreline aquatic vegetation - Both lakes are noted for the walleye fisheries. This feature has attracted local residents and regional tourists to the lakes for a number of years. Because of this recreational use, the A.F.S. established a campground on each lake to allow fishermen to stay for a number of days to enjoy this experience. Walleye catch rates now almost equal the annual allowable harvest. With increased recreation use on the lake management techniques are required to ensure adequate population levels are maintained.

This, in turn, requires that the critical habitat for perch (walleye prey) and walleye be maintained as much as possible. Walleye and perch habitat consists of the emergent and subemergent shoreline aquatic vegetation.

It is perceived that the 100 metre distance from the lake to the closest cottages will discourage ad hoc beach development and the construction

of temporary docks which are difficult to prevent and control. Some aquatic vegetation will already be sacrificed with allowing dock and beach developments in conjunction with backshore development. This fisheries aspect is, perhaps, the most limiting factor in management of the lake.

- c. Ensuring public access to the lakeshore - A major recreation resource management objective of this plan, in line with provincial policy, is to maintain public access to both lakes. One means of implementing this objective is by reserving the shoreline area around the lake for public use. Public in this case is interpreted as people who must not gain access to a beach or lake shore development indirectly by paying a fee to stay at a commercial operation. This prime recreation resource is reserved for all people. It is thought that anything less than a 100 metre shoreline area is inadequate for appropriate management.
- d. Water quality - Numerous guidelines are required to ensure the water quality of the lakes do not degrade any further. As mentioned in section 3.7 water quality in both lakes is poor. An adequate buffer is required to ensure water quality does not degrade further due to unforeseen sewage disposal problems. Also, siltation of spawning areas must be minimized by discouraging ad hoc shoreline development.
- e. Aesthetics - The lakes are known for their wilderness recreation experience. It is important that this feature be maintained by the use of adequate guidelines for resource and recreation development.
- f. Public support - When the Yellowhead Planning Commission held hearings on their regional plan the public strongly supported large lakeshore buffers.
- g. Protection of wildlife habitat - Shoreline areas of lakes provide important wildlife habitat. Due to the presence of water, cover, and food in close proximity this habitat is used more heavily than would be expected on

the basis of area alone. Such sites provide for use by semiaquatic mammals, numerous species of birds and a variety of terrestrial mammals, amphibians and reptiles. An undisturbed buffer will help to maintain potential nesting and feeding sites as well as a travel corridor for movement of animals around the lakes.

APPENDIX 4

E.R.C.B. LEVEL CLARIFICATION OF SOUR GAS
AND OIL WELLS AROUND SMOKE LAKE

Sour Gas Wells

<u>Well I.D.</u>	<u>H₂S Level</u>
11-1-62-20-W5M	3
16-1-62-20-W5M	3
12-13-62-20-W5M	3
7-14-62-20-W5M	3
1-22-62-20-W5M	3
9-22-62-20-W5M	3
12-22-62-20-W5M	1
2-23-62-20-W5M	2
6-23-62-20-W5M	3
14-23-62-20-W5M	3
4-26-62-20-W5M	1
3-27-62-20-W5M	2
11-27-62-20-W5M	1
6-33-62-20-W5M	1

Oil Wells*

<u>Well I.D.</u>	<u>H₂S Level</u>
12-3-62-20-W5M	1
2-10-62-20-W5M	1

*Only those oil wells given an H₂S level designation by the Board are listed.

APPENDIX 5

PROPOSED ALLOCATION OF RECREATION UNITS
IN REJECTED DEVELOPMENT ALTERNATIVES

ALTERNATIVE 1 - Minimal Development

	Existing Allocation		Proposed Allocation		Total Allocation		Total
	AFS	Private	AFS	Private	AFS	Private	
	Iosegun	61	10	50	--	111	
Smoke	45	6	50	--	95	6	101

ALTERNATIVE 3 - Maximum Allowable Development

	Existing Allocation		Proposed Allocation		Total Allocation		Total
	AFS	Private	AFS	Private	AFS	Private	
	Iosegun	61	10	50	164	111	
Smoke	45	6	50	156	95	162	257

A.F.S. - Alberta Forest Service

Private - non-profit, commercial and private recreation developments.

APPENDIX 6

IOSEGUN AND SMOKE LAKES WATERSHED MANAGEMENT

TERRAIN STRATIFICATION

(completed by the Alberta Forest Service)

Watershed Management Terrain Stratification

The terrain stratification method is based on an interpretation of information provided by the Ecological Land Classification Ecosystem Map. The product is a map overlay that assigns Low, Moderate and High sensitivity ratings to ecosystems. The ratings are determined by the following criteria:

- 1) Slope: 0-25%, 25-45% and 45%+
rating increases with slope class
- 2) Material Stability:
rating increases with the occurrence of fine textured, eolian and saprolitic materials
- 3) Source Areas: interpreted from drainage characteristics, soil order and proximity to watercourses
includes watercourses
- 4) Organics: all organic and organic dominated areas are given a high rating.

RATINGS:

- Low:**
- less than 25% slopes
 - few source areas
 - stable soils

Normal operating groundrules, guidelines and conditions generally apply.

- Moderate:**
- slopes 25-45% or
 - extensive source areas or
 - sensitive soils (eg. eolian or saprolitic)

Generally requires further ground investigation because of potential problem areas. Specific operational limitations/restrictions may be required.

- High:**
- slopes greater than 45% and/or
 - extensive source areas and
 - sensitive soils

Requires ground investigation, detailed planning and definite limitations/restrictions regarding: type and intensity of development, season of operation, type of equipment, etc.

Frequently inoperable or removed from development plans.

IOSEGUN LAKE SHORE

Fluvial: all fluvials are rated HIGH

GL1, GL2: MODERATE:
poorly drained, fine textured materials with some organics

GLE1, GLE2: MODERATE:
poorly drained, fine textured materials with eolian veneers

GLEQ1: HIGH:
very poorly drained, fine textured materials with organics: fens/humic gleysols, etc.

OGL1, O1, O2, O3: HIGH: organic and organic dominated areas

SHOKE LAKE

ELUVIAL: all fluvials rated HIGH

E1..EQ1: HIGH:
up to 30% slopes, eolian (and some organic)
deposits, well to poorly drained

GE1: LOW:
well drained, level area

GE2..GE3: MODERATE:
moderately well to poorly drained, fine textured
materials

GEM1..GEM2 MODERATE:
imperfectly to poorly drained, fine textured
materials

GEQ1: HIGH:
poorly drained, fine textured with some organics,
primarily gleysolic soils

M1..M3: LOW:
gently rolling, moderately well drained

M2..M4: MODERATE:
poorly drained, fine textured, proximity to lake
(M2)

MGF1: MODERATE:
moderately to poorly drained, fine textured
materials, gleysols

MO1: HIGH:
poorly drained, gently rolling fine textured
deposits with some organics, seepage area

Q1..Q2: HIGH:
organics, very poorly drained

QE1: HIGH:
organic and eolian, up to 30 % slopes, very poorly
to well drained

QE2..QGF1..QM1: HIGH:
organic and eolian, very poorly drained