ENVIRONMENTAL CONSIDERATIONS ON THE USE OF THE SUFFIELD MILITARY RESERVE FOR TANK AND ARTILLERY TRAINING

by

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Itinerary

The survey party comprised W. Stevens and J. Stelfox of the Department of Environment, Canadian Wildlife Service and A. Kjearsgaard of the Department of Agriculture, Soil Survey. On 17 August discussions were held with C.R. Iverson Director General of the Suffield Experimental Station, Dr. W.C. Stewart Director of Research and ~~Maj.~~ Capt. R.C.M. Wyld in charge of field operations, after which a flight over the military reserve was made in the afternoon. On 18 and 19 August ground transportation was provided by the Suffield Experimental Station and Major Wyld served as a most agreeable and informative guide. The following day a short discussion with Mr. Iverson and his staff concluded the survey.

In as much as there is a proposal for changing the use of a part of the military reserve from an experimental area to a training ground for tanks and artillery it was deemed advisable to look at the whole area from the standpoint of the potential impact on the environment and upon the wildlife that inhabits it. This was desirable because the Suffield area represents about the only locality of reasonably undisturbed mixed grass prairie remaining under federal government purview. The intention basically was to delineate any areas ecologically important from a wildlife standpoint and to suggest how damage to them might be ameliorated or avoided under the more intensive use proposed for the military reserve. Because there were known archaeological sites in the reserve which have been little

investigated we also looked for those and were able to discover two new ones which had not previously been reported. Maj. Wyld's knowledge of the reserve provided additional information in that regard.

Preliminary soils classifications had been made by the Canada Department of Agriculture Research Branch and Mr. Kjearsgaard was able to check on the accuracy of the soils information in the field. We also had at hand capability ratings for the waterfowl and wild ungulate resources, as well as periodic surveys of some of the wildlife species, (prepared by federal and provincial wildlife agencies). Those data were very useful as a background for the study, as was a preliminary report by Woynarski[1] which has already been distributed.

History

The Suffield area was settled around the turn of the century and some portions were ploughed while others were grazed, depending upon topographical and soil restrictions. Within what is now the military reserve there were small settlements and isolated farmsteads which persist now only as isolated clumps of trees in an otherwise treeless prairie. There was even a park of approximately two townships in size known as Wawaskesy National Park (Figure 1) that persisted until 15 June 1938 when it was transferred back to the provincial government by House of Commons Bill 154. Shortly thereafter most of the farms and leases in the present reserve (British Block) were bought or liquidated by government action and the land reverted to the federal government by Order in Council 368 of 31 March 1942.

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1 Woynarski, S.C. The Suffield Military Reserve, An Ecological Appraisal. Cdn. Wildl. Service, Edmonton. June 1971. 14 pp., maps and overlays.

In the early 1960's because of drought in the region, the grazing of cattle was allowed within the reserve. Regulation of that grazing was placed in the hands of the Canada Department of Agriculture. The Pasture Division of P.F.R.A. designated two large pastures west of the South Saskatchewan River of 112,000 acres and 33,280 acres respectively, enclosed them in 121 miles of fence and dug wells and dugouts for water. Grazing was allowed in 1961, 1962, 1963, 1964 and 1968 by as many as 5,000 cattle and 3,000 calves, but no livestock have grazed the area legally since then. As a further assistance to local ranchers access along the north and west sides of the reserve has been allowed for cutting hay around the edges of marshes and on old farmsteads. Until 1971, that activity was under the auspices of P.F.R.A., but the responsibility now has reverted to the Department of National Defence.

Present use of the reserve is confined to experimental studies by the Defence Research Board, whose activities have done little to discourage grazing by antelope, mule deer and white-tailed deer. In addition elk have been seen on the east side of the reserve, while Canada geese and rare prairie falcons, merlins and golden eagles nest on the cliffs overlooking the South Saskatchewan River. Grazing is supplied also to several hundred wild horses and an equal number of cattle which are in the area without permission.

Wildlife Use

Woynarski's report mentioned the presence of a number of species of wildlife normally associated with the mixed grass and short grass prairies, but his list no doubt can be enlarged upon. That we recorded

additional species, including a hog-nosed snake which is said to be rare in Alberta, points up the need to conduct additional studies of the less obvious life forms.

Latest surveys by the provincial Fish and Wildlife Branch established a February population of only 175[2] antelope on the prairies and uplands of the reserve, although by July that number had been augmented to about 850 animals.[3] That population change demonstrates the tendency for antelope to migrate in and out of the area by season, using rougher and more sheltered terrain in winter. Antelope populations on the military reserve have decreased by 38 per cent since 1967, demonstrating the general population shifts caused by inclement weather that have been noted elsewhere in southern Alberta. It may reflect in addition, some competition for food with the growing numbers of horses within the reserve.

No hunting is allowed in the military area and the numbers of mule deer and white-tailed deer are said to be increasing. They generally were widely distributed over the area during our visit in good habitat presented by old shelterbelts, coulees and marshy areas. According to Woynarski's ungulate capability maps however, deer are dependent on the South Saskatchewan River flats, and the coulees running into the river during winter, as well as on the rougher shrub covered country known as the Middle Sandhills to the north-east.

Archaeological Sites

Where no farming has been undertaken in the past there still are a number of Indian rock cairns, camp-sites and tipi rings to be seen. Those sites have not been intensively studied, although the Glenbow

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2 Carr, H.D. Aerial Survey of Suffield Military Reserve, February 15 & 16, 1971. Alberta Fish and Wildlife Branch, 1971.

3 Erickson, G. Suffield Experimental Station Antelope Aerial Survey. Alberta Fish and Wildlife Branch, July 1971.

Foundation made some preliminary investigations several years ago. Dr. R.G. Forbis of the University of Calgary provided the location for most of the sites on the accompanying map, (Figure 1) and suggested the presence of an old "buffalo jump" south of the river near Drowning Ford. We discovered another site farther to the north that also may have a buffalo jump in the vicinity. Excavation of any of these Indian sites awaits the attention of experts with adequate resources. In view of the kinds of military activity likely to be allowed in the reserve it is important that the known sites be discovered. We were able to find two old camp-sites because extensive areas had recently been cleared of vegetation by fire, and the stone rings showed up clearly against the blackened prairie. There undoubtedly are many more to be found. Such evidence of aboriginal use forms as cogent a part of the natural prairie setting as the antelope, the soaring broadwinged hawks and the sagebrush.

Conflict of Uses

Several problems have arisen with the current uses of the area and more can be anticipated as the scale of use changes. The desirable intent must be to reduce conflict to as great an extent as possible, to zone for specific uses in particular areas, and to minimize damage to the environment.

Fire - Early in the summer Alberta was blessed with abundant rain and the response in the growth of the prairie grasses was gratifying. The dry weather of August however turned the vegetation to tinder and several fires within the Suffield reserve were caused by lightning strikes.

Despite a good system of fire guards there were at least 120 square miles of the prairie burned over; fortunately no fires escaped to the surrounding ranches and farms. Fire always has been a component of the great plains ecosystem and may have helped to maintain the short-grass prairie type of vegetation. Under natural conditions any one area was probably not burned very frequently so little damage to vegetation or soil resulted.

Live ammunition has not been used previously under field conditions on the Suffield reserve and the extent of the increase in the incidence of fires cannot be anticipated. Given the usual dry summers and the prevalent prairie winds it is highly likely that fires will become more prevalent. Increased effort and expense will be necessary to confine them to the firing ranges in use, to prevent their spread to adjacent private holdings and to keep them from damaging the natural prairie complex and its associated wildlife.

Grazing and Haying - There has been no legal grazing in the military reservation since 1968 and so the dismantling of the P.F.R.A. pasture fences, corrals, and windmills should present no untoward hardship to the local ranchers.* Horses and cattle found within the area illegally may either have to be removed or take their chances against the live ammunition that will be employed. Such a decision will rest with their owners, but it may not be possible to round up all of such livestock and evict it permanently outside the perimeter fence, thus those stray

* The exception is the Drowning Ford Grazing Association now grazing land belonging to the military reserve south of the river.

animals will continue to represent a nuisance.

The cutting of hay within the block represents a different problem. It has been estimated that 150 thousand tons of native hay can be removed yearly from the northerly and westerly tier of townships. In a ranching country that represents a considerable resource that may have to be forfeited in the interest of public safety.

Clean-up and Reclamation - There is a lot of public sentiment at the present time with regard to environmental quality and the maintenance of a reasonably unspoiled landscape. Although only a portion of the Suffield reserve has been used by the Defence Research Board there are places where surplus and discarded materials are concentrated. Increased military useage will have the potential for greatly increasing the amount of litter strewn about over a prairie landscape where its presence is difficult to hide. In addition, with the use of live ammunition, the problem of unexploded rounds can present a hazard for the future, unless such rounds are promptly located and de-activated. Such considerations are much easier to resolve at the outset rather than waiting until a future time when the reserve might be put to other uses, not necessarily of a military nature.

Methods of clean-up and reclamation will depend upon the long-term proposals for the use of the landscape. If portions of it are to be used as natural areas then the rehabilitation of damaged sites should aim towards re-creating the natural scene. If grazing and haying are to be re-established the planting of such pasture species as wild ryegrass and crested wheatgrass might be encouraged. There is a need to make such

long-term decisions now as an aid to the persons charged with the control and administration of the area, and as a means of reducing the conflicts of interest that could arise without such planning.

Trafficability of Terrain

The preliminary soils map of the area supplied by the Soil Survey shows a wide variety of soil types within the 1,000 square miles of the military reserve (Appendix A). Soil types range from light to heavy, from sands and gravels to clay loams. Topography varies from flat to strongly rolling and hilly, with deeply incised watercourses in some areas. The ability to withstand damage by vehicular traffic will depend not only upon soil texture and slope, but also upon such accentuating factors as fire, rainfall and wind speed. Although no studies of the problems of trafficability by military vehicles are known to us, Mr. Kjearsgaard, has supplied an index map of trafficability based upon soil types and terrain slope. (Figure 2). In a dry prairie region wind damage can be quite as profound as water damage, and in the case of sandy areas, much more damaging. Most of the military reserve proposed for training use has medium to high trafficability and few restrictions on its use by tracked vehicles should be necessary. However, one area in the south has a low trafficability, and the Middle Sandhills in the north-east have a very low trafficability. For the southern area great care should be used in employing tracked vehicles so that blow-outs and the development of sand dunes will not occur.

In the Middle Sandhills area we feel that no tracked or wheeled vehicles should be permitted. That area is comprised of dunes of aeolian

sand most of which now are stabilized by vegetation, though many still are active. It is characterized by a choke cherry, sagebrush and needle grass community with inclusions of wolf willow and other shrubby species that help to bind the soil and prevent it from blowing away eastward toward the river and the adjacent farm lands. The presence of the abundant shrubby browse species, the hilly nature of the terrain and the relative isolation of the sand hills make them a very important natural area and an outstanding source of food and cover for antelope, deer, sharp-tailed grouse and associated species. The resident wildlife would be ill served if damage to the surface vegetation turned the area into an expanse of active sand dunes; and a unique piece of landscape would be ruined as a consequence. We suggest that the Middle Sandhills be reserved as a natural area (Figure 3).

Other Natural Areas

Woynarski's report and accompanying overlay maps designated the cliffs and pinnacles along the banks of the South Saskatchewan River as prime nesting habitat for the rare prairie falcons, golden eagles, and merlin hawks. Those sites are shared by Canada geese which resort to the same abrupt terrain for protection from predatory animals. Secure nesting sites are not numerous along the river and plans are under way to create artifical holes and ledges in order to attract more birds. Any disturbance of the birds during their nesting period or destruction of their nesting sites is to be avoided. The east side of the river is protected by its isolation from human activity, but the west side of the river has the

potential for much greater disturbance. The period from April to August is especially critical to these cliff nesting birds, and they should remain unmolested during that time.

As already stated, the ravines and coulees leading into the South Saskatchewan River offer food and shelter to grouse, antelope and deer during winter and for the sake of those species should be left reasonably undisturbed. For that purpose we suggest a buffer zone along the river that would include those ravines, landslips and other broken ground. In most cases a one mile strip should prove adequate for that purpose. An exception would have to be made in the vicinity of Drowning Ford because the low banks there provide access to that portion of the reserve south of the river.

There are blocks of reasonably undisturbed natural grasslands within the military reserve. Because of their protection from livestock grazing for 30 years they are as near to their original state as any areas known to us. The buffalo grasses, needle grasses and their associated species must now look as they did to the first settlers of the region. In our somewhat cursory examination of the reserve we delineated two adjacent grassland areas that might be considered for preservation in a natural state. One of those comprises the northern portion of the smaller P.F.R.A. pasture and contains a landmark known as the Twin Peaks (Figure 3). It has been lightly grazed, and at a known rate. The other area surrounds the Hogsback feature and is separated from the first by a roadway. It has not been grazed for many years.

These two areas of native grassland are valuable in their present state as reference areas whereby comparisons may be made with other

grasslands in the region not so protected.

Conclusions

The Departments of National Defence and of the Environment have agreed to work together to plan the use of the Suffield Range in such a way as to avoid damaging portions of the range which are of unusual value ecologically and archaeologically. It is felt that with proper zoning of the military reserve it should be possible to reduce environmental damage and yet serve the purposes of the type of military training proposed. Large portions of the reserve have been ploughed and tilled in the past, and although floristically they have tended again toward their original state they cannot now be called natural areas. Other portions, while still relatively undisturbed are not sufficiently unique that they cannot be duplicated elsewhere and so do not require rigid protection.

Although the pollution of the reserve by noxious substances is regulated by some federal and provincial legislation, such problems as the unexploded ammunition and discarded military hardware should be resolved at the outset by negotiation among the responsible agencies. Grass fires can be expected to represent a major problem to military use of the area during late summer. Their control and their effects should be studied and an agreement reached on what action is undertaken by the agencies using the reserve.

An opportunity for collaboration in the use and protection of the Suffield Military Reserve has been presented to the two departments of government. The chance to work together for mutual advantage and benefit must not be lost.

Recommendations:

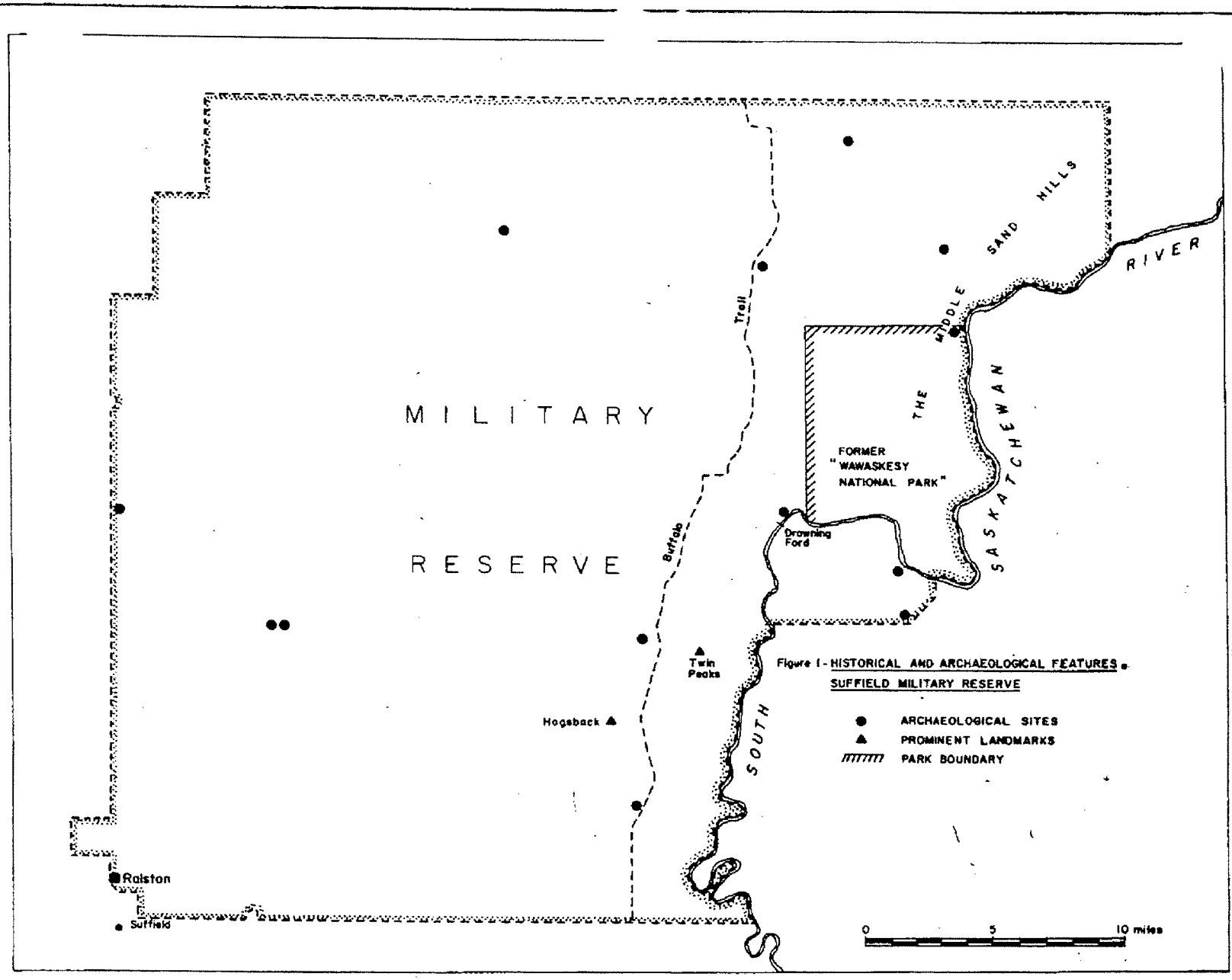
1. Plans for the management of the Suffield Military Reserve should be formulated not only for immediate purposes and uses, but also for the long term. Although proposals for pollution control, fire suppression and reclamation of damaged areas should be agreed upon as soon as possible, a statement of the eventual use of the reserve would be most useful.

2. The Department of National Defence and the Department of the Environment should select persons to serve on a local Consultative Group to provide advice to those responsible for the planning and operations within the military reserve. Additional assistance from other sources may be sought by the Group.

3. Vehicular traffic should be forbidden access to those land surfaces having a very low trafficability index.

4. Three natural reserves are proposed within the Suffield Military Reserve for the protection of ecologically valuable areas:
   a) A Middle Sandhills Natural Area
   b) A Mixed Grassland Natural Area
   c) A one mile River Buffer Strip

5. Historical objects and archaeological sites should be delineated and given protection against damage until such time as adequate studies of their value can be undertaken.


MILITARY
RESERVE
Buffalo Trail
THE MIDDLE SAND HILLS
SASKATCHEWAN RIVER
FORMER "WAWASKESY NATIONAL PARK"
Drowning Ford
Twin Peaks
Hogsback
SOUTH
Ralston
Suffield
0
5
10 miles
Figure 1 - HISTORICAL AND ARCHAEOLOGICAL FEATURES SUFFIELD MILITARY RESERVE
ARCHAEOLOGICAL SITES
PROMINENT LANDMARKS
PARK BOUNDARY

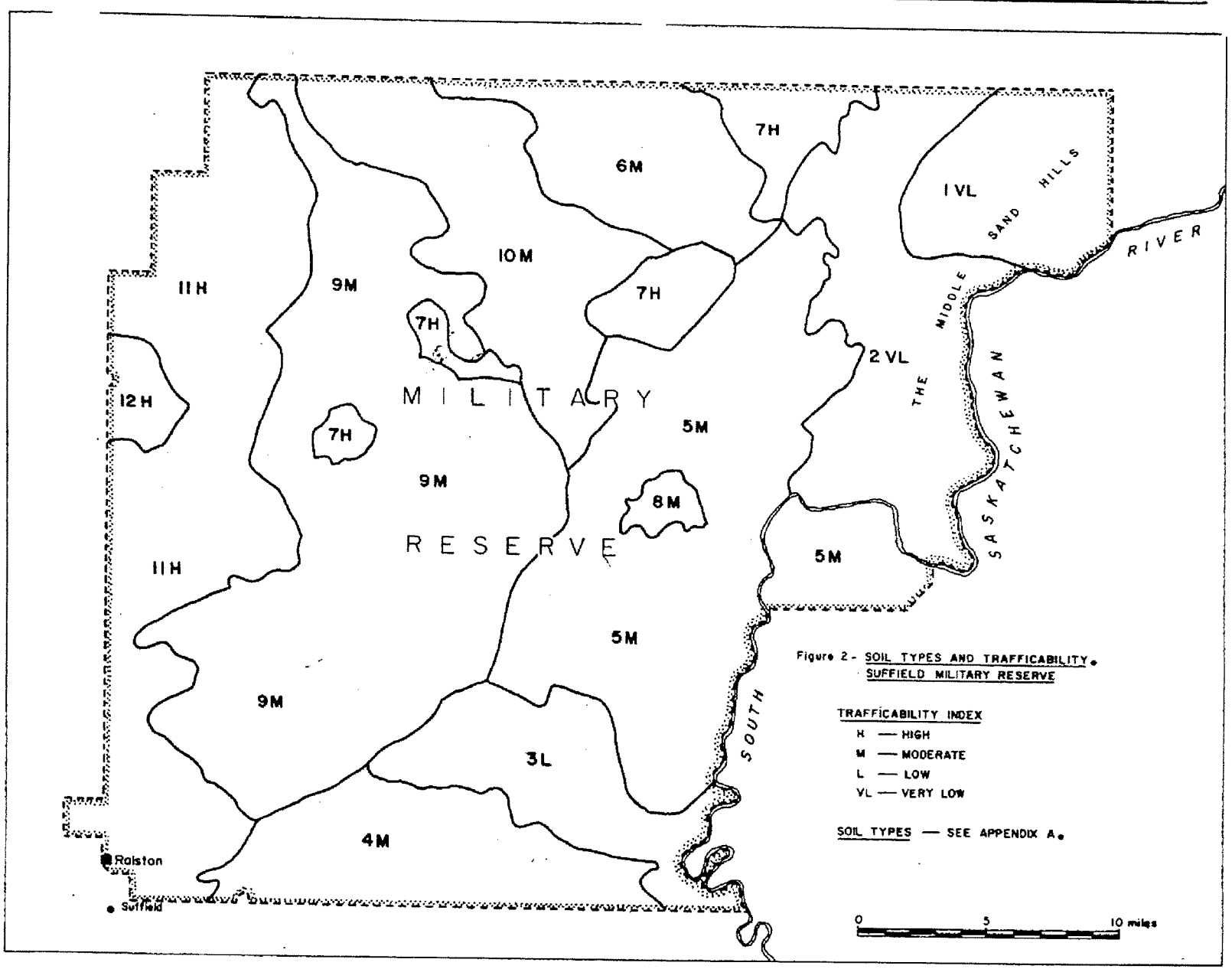


Figure 2 - SOIL TYPES AND TRAFFICABILITY.
SUFFIELD MILITARY RESERVE

TRAFFICABILITY INDEX

H — HIGH
M — MODERATE
L — LOW
VL — VERY LOW

SOIL TYPES — SEE APPENDIX A.

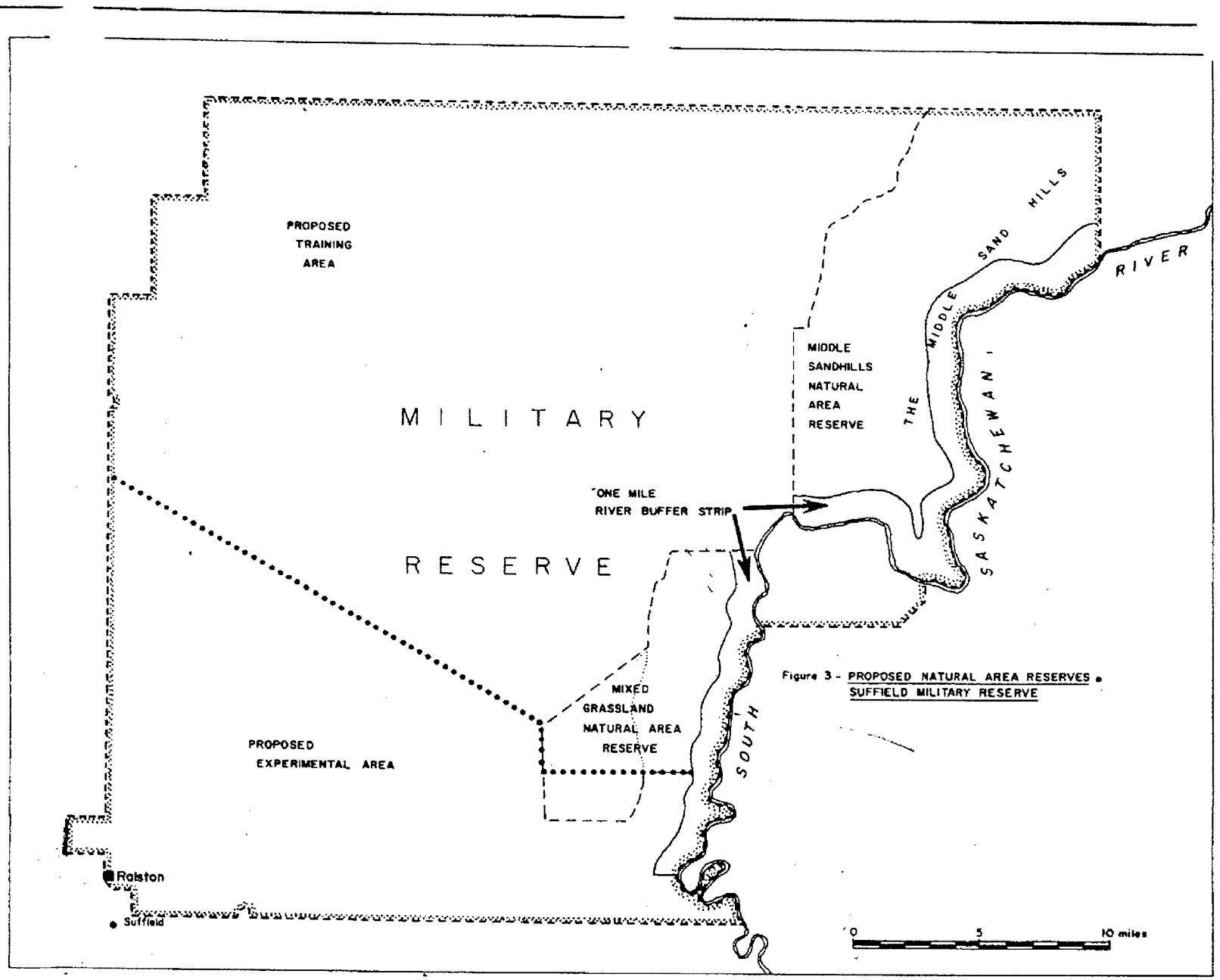


Figure 3 - PROPOSED NATURAL AREA RESERVES
SUFFIELD MILITARY RESERVE

APPENDIX A

SOIL TYPES AND THEIR TRAFFICABILITY
SUFFIELD MILITARY RESERVE
(SEE FIGURE 2)

AREA 1

Soil:	Dune Sand
Parent Material:	Aeolian sand
Topography:	Strongly rolling and hilly (slopes > 15%)
Trafficability:	Very low

AREA 2

Soil:	Orthic Brown Chernozems (70%) Dune Sand (30%)
Parent Material:	Mixed sands and very fine gravels
Topography:	Undulating to moderately rolling (slopes 2 - 15%)
Trafficability:	Very low

AREA 3

Soil:	Orthic Brown Chernozems (primarily Cavendish loamy sand series)
Parent Material:	Alluvial and/or aeolian
Topography:	Undulating and gently rolling (slopes 2 - 9%)
Trafficability:	Low

AREA 4

Soil:	Orthic Brown Chernozems (mixed Cavendish sandy loam and Foremost series)
Parent Material:	Mixed alluvial and/or aeolian sands and sandy loam to loam till
Topography:	Undulating and gently rolling (slopes 2 - 9%)
Trafficability:	Medium

AREA 5

Soil:	Orthic Brown Chernozems (contains a high percentage of the Foremost series)
Parent Material:	Primarily coarse textured (sandy loam to loam) till
Topography:	Gently rolling and moderately rolling (slopes 5 - 15%)
Trafficability:	Medium

AREA 6

Soil:	Stony Orthic Brown Chernozems
Parent Material:	Stony coarse textured till
Topography:	Stongly rolling (slopes 15 - 30%)
Trafficability:	Medium

AREA 7

Soil:	Orthic Brown Chernozems (primarily Chin loam series)
Parent Material:	Alluvial lacustrine
Topography:	Undulating, occasional gently rolling (slopes 2 - 5%)
Trafficability:	High

AREA 8

Soil:	Eroded Solonetz (carbonated to surface)
Parent Material:	Lacustrine
Topography:	Nearly level to gently undulating (slopes 0.5 - 1%)
Trafficability:	Medium

AREA 9

Soil:	Orthic Brown Chernozems (primarily Maleb series)
Parent Material:	Primarily medium textured (clay loam) till
Topography:	Gently rolling to strongly rolling (slopes 5 - 30%)
Trafficability:	Medium to High

AREA 10

Soil:	Orthic Brown Chernozems with numerous stony knolls
Parent Material:	Stony medium textured (clay loam) till
Topography:	Moderately rolling to strongly rolling (slopes 9 - 30%)
Trafficability:	Medium to High

AREA 11

Soil:	Primarily Orthic Brown Chernozems (Maleb series) with mixed Solonetzic soils
Parent Material:	Medium textured (clay loam) till
Topography:	Undulating to gently rolling (slopes 2 - 9%)
Trafficability:	High

AREA 12

Soil:	Brown Solonetz (Hemaruka series)
Parent Material:	Medium textured (clay loam) till
Topography:	Undulating (slopes 2 - 5%)
Trafficability:	High