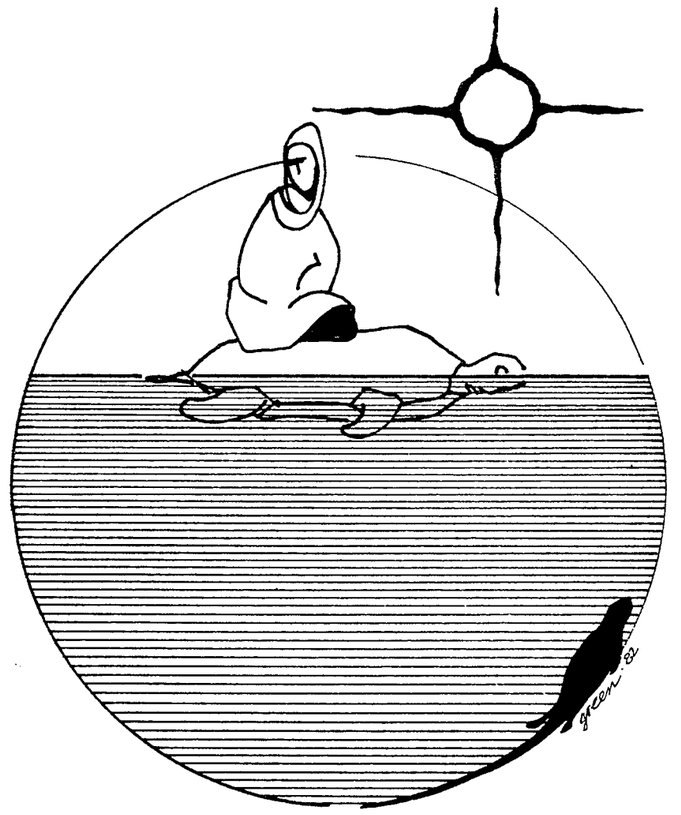
NETLEY MARSH

INTERPRETIVE DEVELOPMENT PLAN



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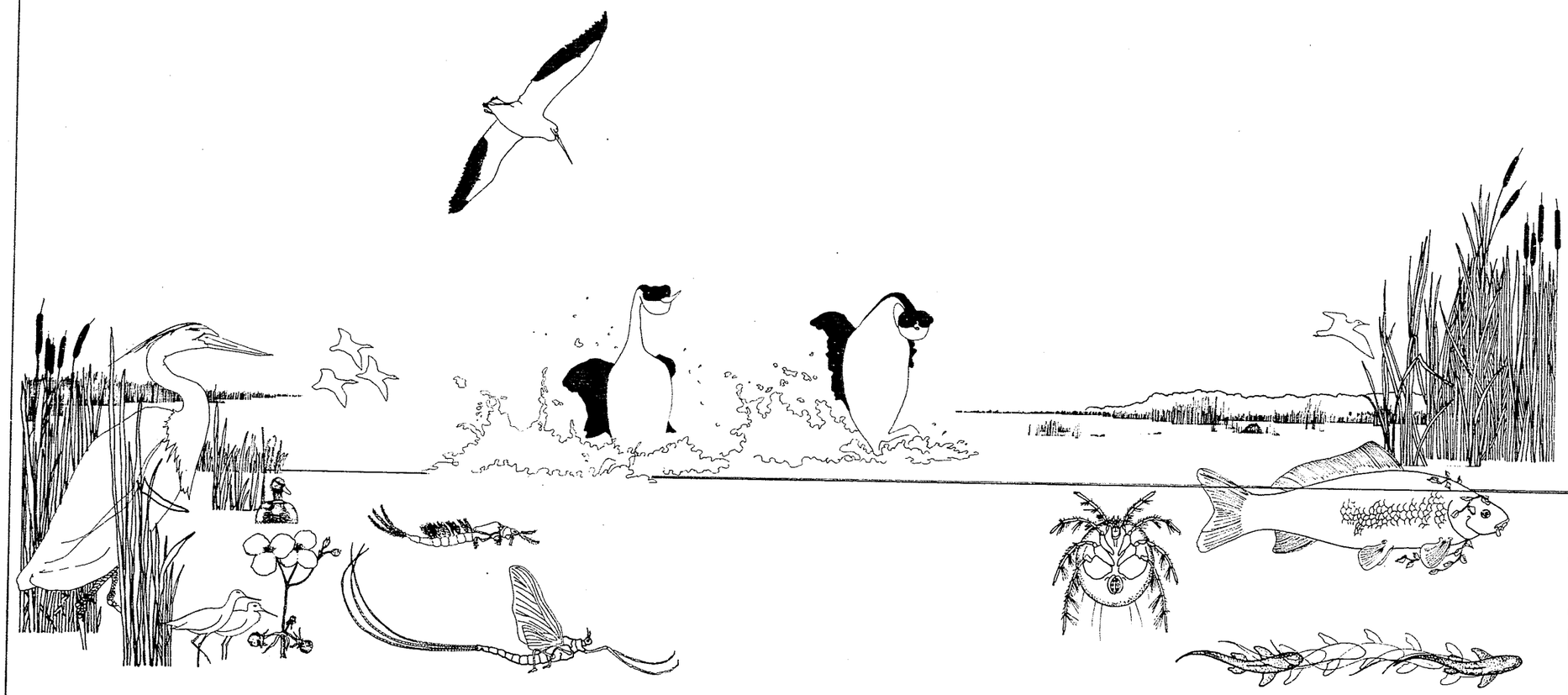


A
Practicum
Submitted
To
The
Faculty
Of
Graduate
Studies
In
Partial
Fulfilment
Of
The
Requirements
For
The
Degree
Of
Master
Of
Landscape
Architecture

Roger
Green
Department
Of
Landscape
Architecture
University
Of
Manitoba

"The ecological processes on the surface of the earth represent a kind of huge seamless web, a network of interconnections among living things and between living things and the chemical and physical environment – an endless process of interacting steps".

Barry Commoner 1971

NETLEY MARSH

INTERPRETIVE DEVELOPMENT PLAN

BY

ROGER JAMES GREEN

A practicum submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the requirements of the degree of

MASTER OF LANDSCAPE ARCHITECTURE

NETLEY MARSH
INTERPRETIVE DEVELOPMENT PLAN

EDUCATION
content

The educational roots of interpretation can be traced to the work of early scientists such as Petrarch, Copernicus, and Galileo who broke from the religious constraints of their day to study and teach the natural causes of various phenomena. WEAVER 1976
Although the basic idea originated with Aristotle and Socrates, it was not until the 17th century that Comenius formally recognized that learning was best facilitated through play and direct experience. WEAVER 1976
Educational theorists in the 18th and 19th centuries such as Pestalozzi and Froebel believed sense perception to be the foundation of knowledge and that first hand observation and experience were the keys to education. WEAVER 1976
Louis Agassiz brought the European concept of nature study to North America in 1847 and coined the phrase "STUDY NATURE, NOT BOOKS." DALY 1973
The integration of science into elementary schools began in 1889 when W.S. Jackson introduced Nature Study into the curriculum in Illinois. The distinguishing features of the new course were the utilization of the outdoors as both text book and classroom and the organization of course content around seasonal variations. DALY 1973
Contemporary 'Outdoor Education' has evolved from the nature study movement and plays an important role at all levels of education. SHARPE 1976

INTERPRETATION
activity

process

The recreational roots of interpretation have evolved from several sources. Since the 18th century botanical gardens, arboreta, zoological parks and museums have combined professional research with public education in recreational settings. WEAVER 1976
The world-wide explosion of interest in the natural sciences which occurred during the 18th and 19th centuries, combined with increasing urbanization stimulated the growth of outdoor recreation in natural settings. The popularity of such recreation was encouraged by the many field naturalists who happened to be excellent writers. Henry David Thoreau, John Muir, Catherine Parr Trail, Earnest Thompson Seton and many others captured the imaginations - and aroused the curiosity - of the reading public. WEAVER 1976
Naturalist's Clubs began to flourish in the 19th century. Many such organizations continue to involve professional and amateur naturalists and the interested public in scientific, educational and recreational activities.
Near the end of the 19th century the National Parks Movement finally united the public fascination with nature and thirst for understanding. Four bison were put on display at Banff in 1899 and people began asking questions. By 1915 labelled nature trails, guided field trips and lectures were popular features of Canada's first interpretive program. FOSTER 1978

context

RECREATION

Definition

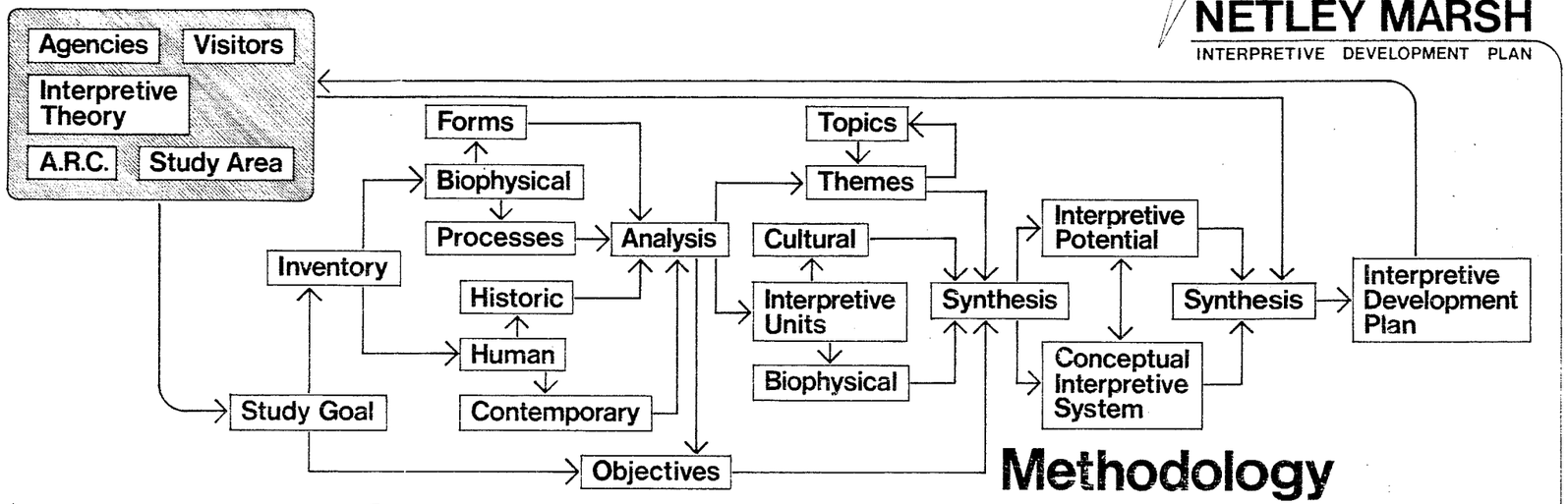
"Any communication process designed to reveal meanings and relationships of our cultural and natural heritage to the public through first hand involvement with an object, architecture, landscape or site."
THE CANADIAN ASSOCIATION OF INTERPRETERS JONES & DE LA 1977 p.10

Goals

Perception
Enhance visitor enjoyment by providing high quality educational/recreational experiences which enrich visitor awareness, appreciation and understanding of the resource. SHARPE 1976

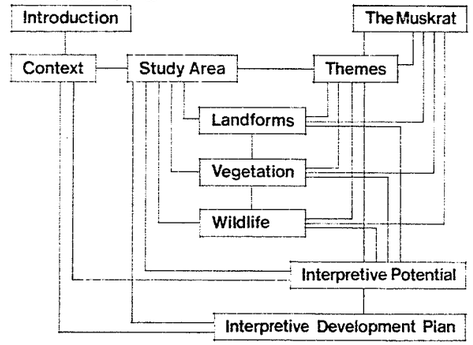
Protection
Positively influence visitor attitudes to the environment as a whole by encouraging the thoughtful and responsible use of the resource and minimizing the negative impacts of such use. SHARPE 1976

Promotion
Encourage public awareness and understanding of the intrinsic value of the resource, its managing agencies, and their programs. SHARPE 1976



Methodology

Structure



Contents

Interpretive Program
Defined as the total interpretive effort, including personnel, facilities, and all the interpretive activities within or related to a given area. SHARPE 1976

Principles
Different visitor groups require fundamentally different approaches to interpretation. Programs should respond to differences in age, mental and physical abilities, prior knowledge and experience, motivation and available time. SHARPE 1976
Visitors should be encouraged to participate selectively, at their own pace. SHARPE 1976
Programs should relate to the personality or experience of the visitor, progressing from the familiar to the unfamiliar. TILDEN 1967
Programs should be holistic rather than fragmented, emphasizing concepts and inter-relationships rather than facts and figures. TILDEN 1967
Programs should be provocative rather than instructive, encouraging participation, involvement, insight, sensitivity, self-expression and personal development. TILDEN 1967
Facilities should be safe, comfortable, convenient and responsive to the needs of the visitors and the program. SHARPE 1976
Facilities should be located and designed to minimize environmental damage and the intensity of use should not exceed the design capacities of facilities provided. SHARPE 1976
Facilities should be efficient in terms of servicing, maintenance and other operational aspects. SHARPE 1976
Facilities should be flexible and adaptable to new topics, techniques, technologies and shifts in visitor interest and program intensities. SHARPE 1976
The most effective interpretation is generally achieved through interpersonal communication in combination with direct contact with the subject. TILDEN 1967
Visitor activated dynamic exhibits are more effective than static written or graphic presentations. TILDEN 1967

Study Goal
To evaluate the A.R.C. Netley Creek interpretive proposals by producing an Interpretive Development Plan which establishes a conceptual framework for the development of an interpretive program for Netley Marsh.

Objectives
Identify and document the patterns and inter-relationships of the existing natural and cultural resources, land uses, and activities.
Identify and evaluate the range of interpretive topics and themes available in Netley Marsh.
Document the interpretive potential as related to identified themes.
Develop a conceptual interpretive system which provides a variety of interpretive opportunities appropriate to the study area.
Establish a development framework which fully integrates potential interpretive activities with the established recreational context.
The Interpretive Development Plan should provide the spatial and functional flexibility within which a variety of interpretive program alternatives may be explored.

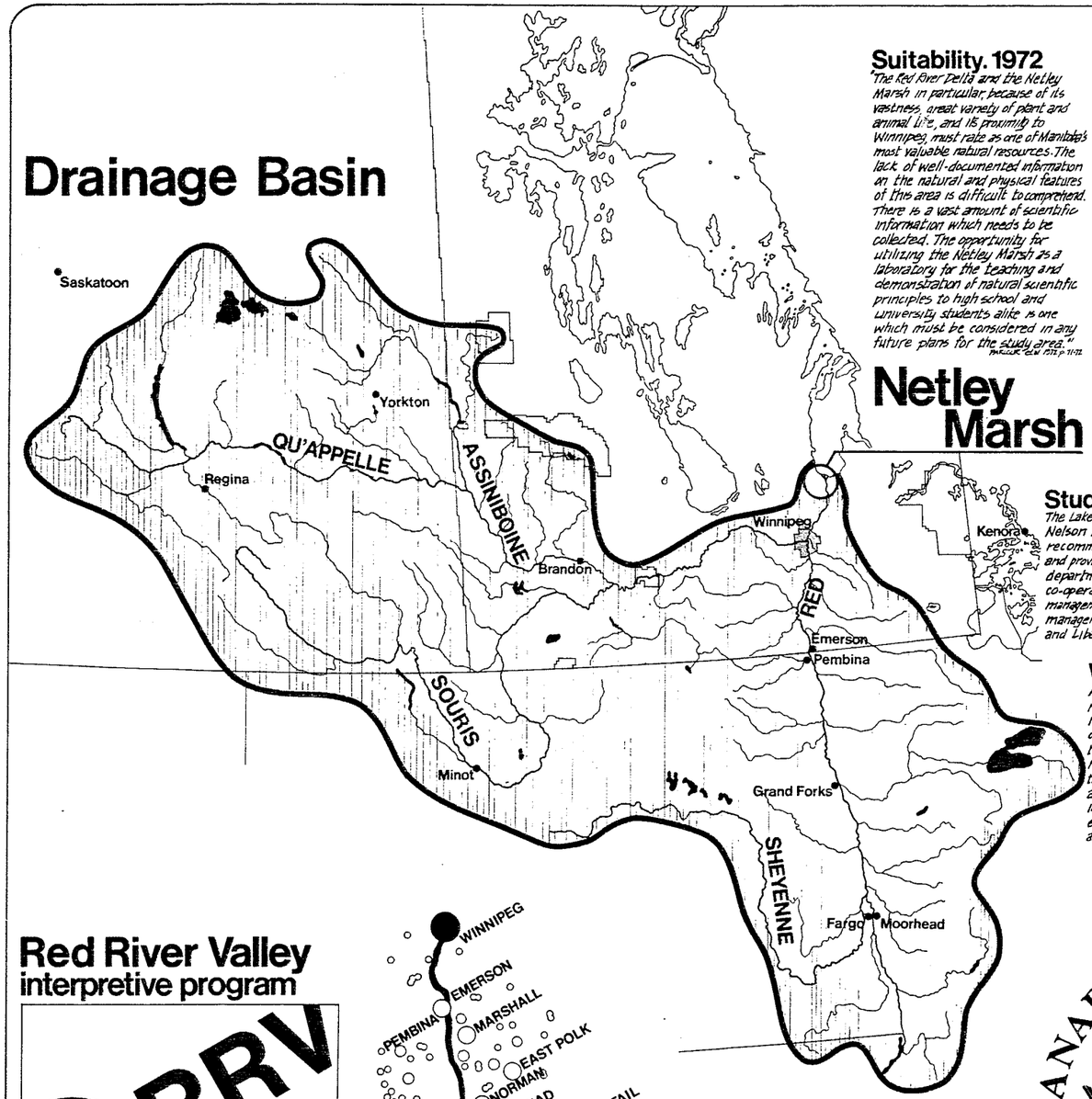
1. INTRODUCTION

R. GREEN 1987. LANDSCAPE ARCHITECTURE II & M

NETLEY MARSH

INTERPRETIVE DEVELOPMENT PLAN

Drainage Basin



Suitability. 1972

"The Red River Delta and the Netley Marsh in particular because of its vastness, great variety of plant and animal life, and its proximity to Winnipeg, must raise as one of Manitoba's most valuable natural resources. The lack of well-documented information on the natural and physical features of this area is difficult to comprehend. There is a vast amount of scientific information which needs to be collected. The opportunity for utilizing the Netley Marsh as a laboratory for the teaching and demonstration of natural scientific principles to high school and university students alike is one which must be considered in any future plans for the study area." MARLUK, GEN. INTR. p. 11-12.

Netley Marsh

Study Board. 1975

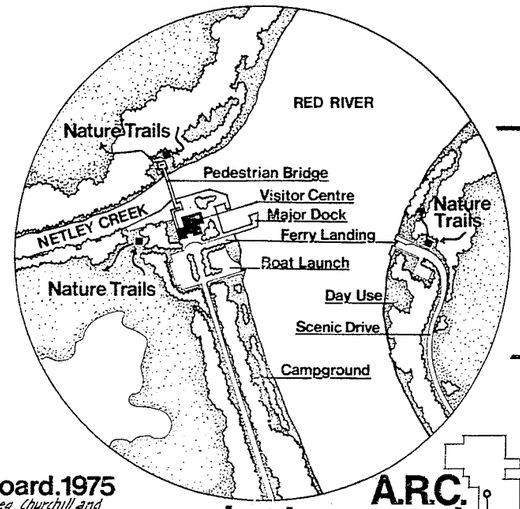
The Lake Winnipeg, Churchill and Nelson Rivers Study Board recommended "That the federal and provincial government departments and agencies co-operate to develop marsh management techniques and a management program for the Netley and Libau Marshes." LWS B. 1975 p. 98

Working Group. 1975

As a result of the Study Board recommendation the Lake Winnipeg Marshes Working Group recommended, on the basis of a cost-benefit analysis, that "A comprehensive study of Netley-Libau Marsh be undertaken for the purpose of formulating development and management plans which, if implemented, would preserve and enhance the natural resources of the area." THOMPSON ET AL 1975 p. 45

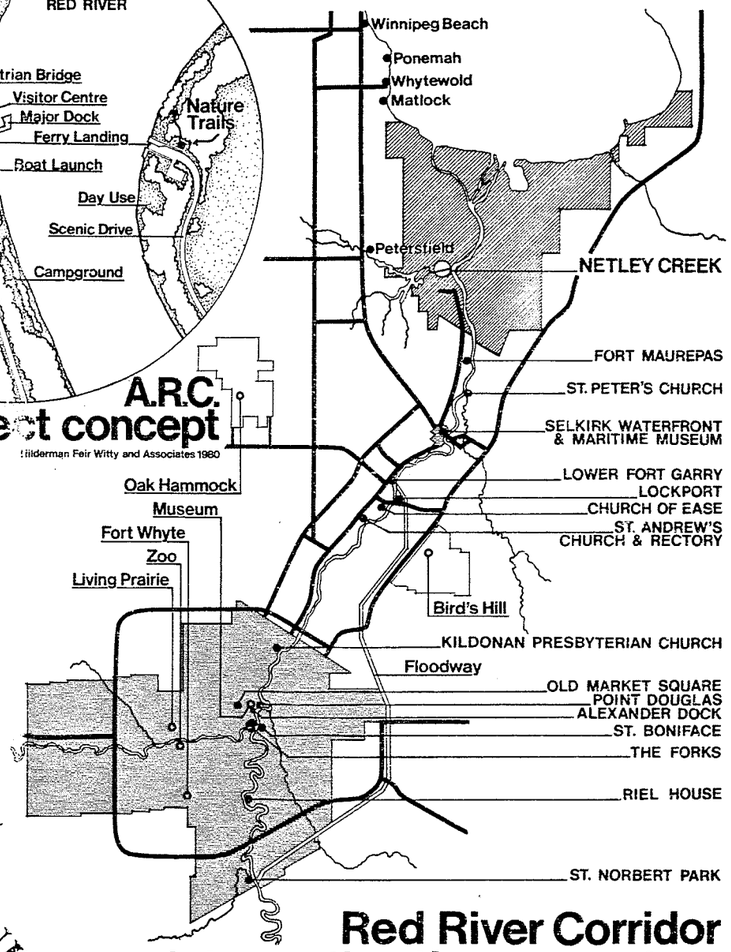
Marsh Study. 1979

One of the objectives of the Netley-Libau Marsh Study is "To identify alternatives for enhancing recreational opportunities." VASTERVISTI 1979 p. 2



A.R.C. project concept

Hilderman Feir Witty and Associates 1980

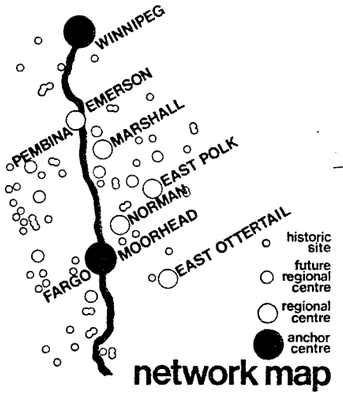


Red River Valley interpretive program

RRV

program identification

Joseph A Wetzel Associates 1976



network map

The Red River Valley Historical Society has proposed the establishment of a network of interpretive centres focusing on the unique natural and cultural heritage of the entire valley. The coordinated interpretive program, involving North and South Dakota, Minnesota, and Manitoba, would provide residents and tourists alike with a vast system of interpretive opportunities. A.R.C. et al 1976

agreement for recreation and conservation

The federal-provincial ARC program was initiated in 1973 "to satisfy increasing demand for heritage conservation and the provision of outdoor recreational opportunities." ARC. 1980 p. 4

The 1978 Red River Corridor agreement recognized the enormous development potential for a diverse and stimulating recreation system easily accessible to two-thirds of the population of Manitoba and the majority of visitors to the province. ARC. 1980

Red River Corridor interpretive theme centres

Hilderman Feir Witty and Associates 1980

The Corridor provides "numerous opportunities to educate and entertain through the development of coordinated interpretive theme centres which display the human and natural history of the area." ARC. 1980 p. 6

The Agreement provides that "Canada and Manitoba will coordinate their efforts and activities in order to establish effective educational, recreational and conservational management practises based on the natural, historical, and scenic heritage resources of the Red River Corridor." ARC. 1980 p. 25

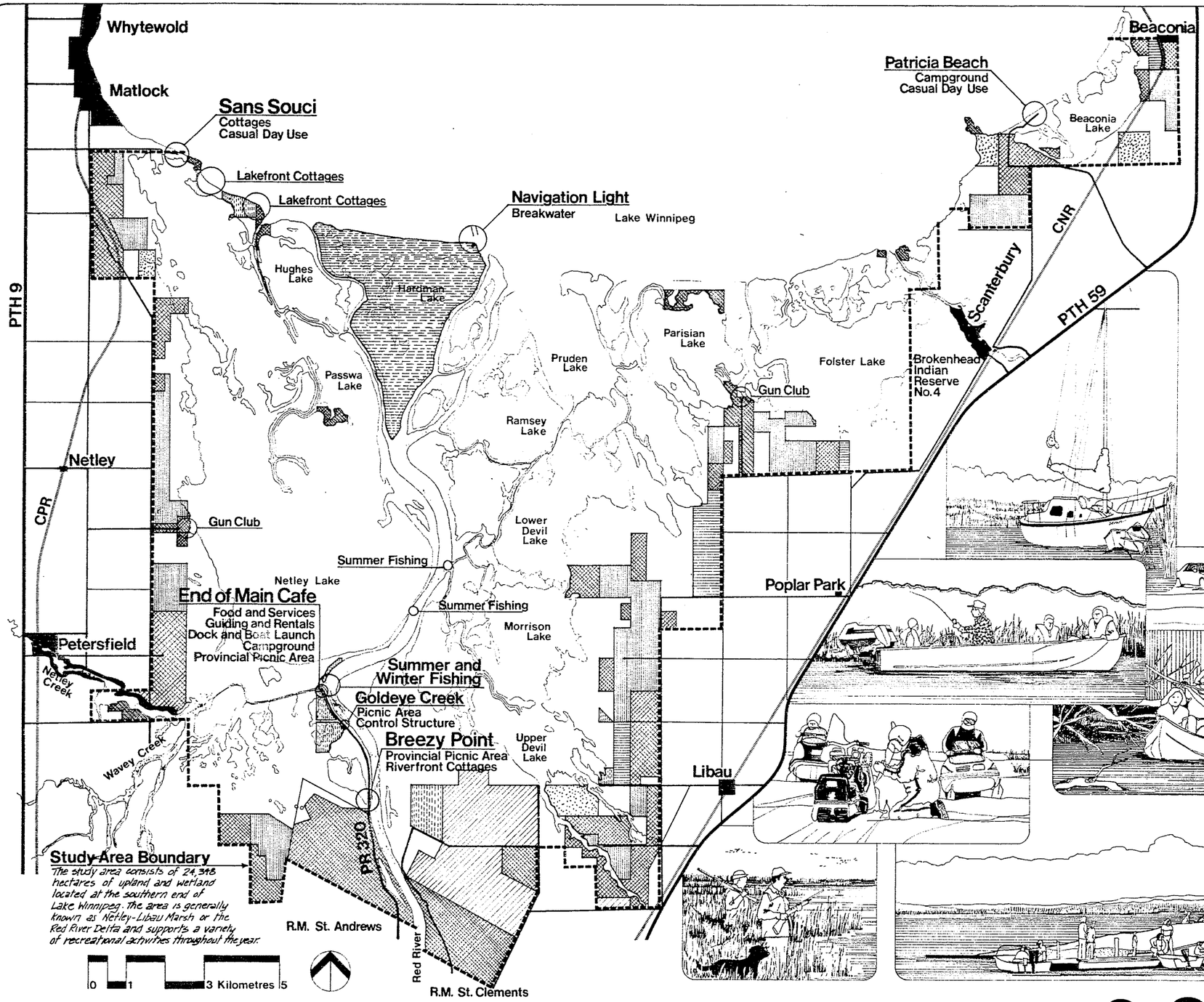
The system will "complement and serve as the northern terminus of the international Red River Valley Interpretive Program." ARC. 1980 p. 6

2. CONTEXT

R. GREEN 1982 LANDSCAPE ARCHITECTURE U of M.

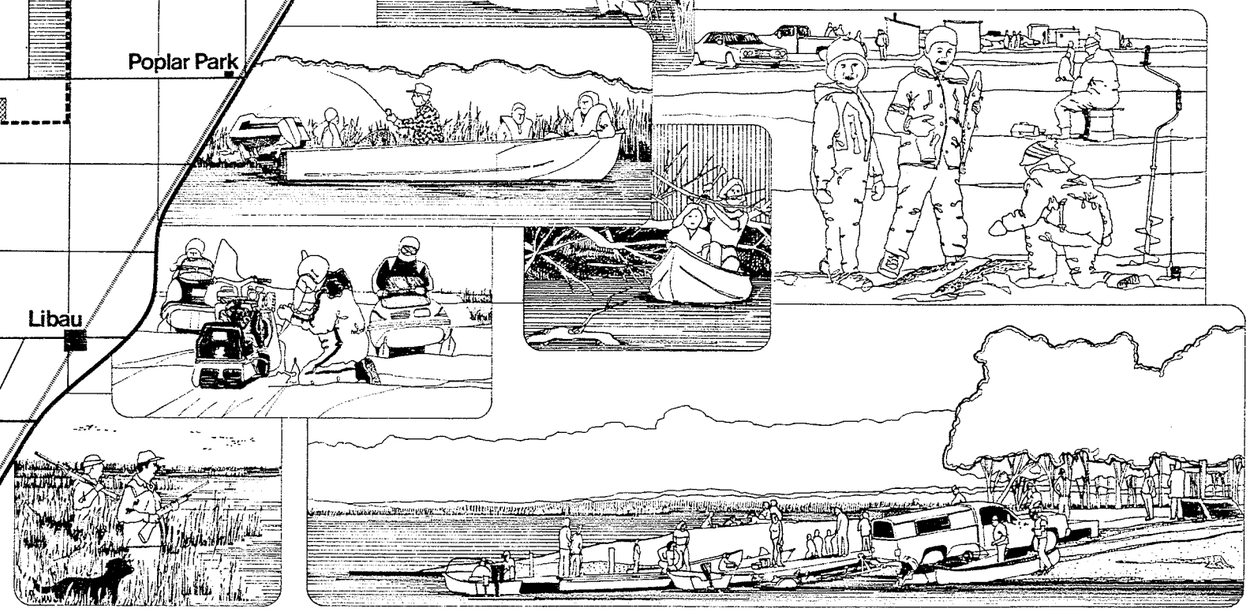
NETLEY MARSH

INTERPRETIVE DEVELOPMENT PLAN



Land Use

- Private Recreation
- Private Agriculture
- Waterfowl Refuge
- Nest Plot
- Public Shooting Ground
- Community Pasture
- Hay Lease
- Grazing Lease
- Municipal
- Indian Reserve
- Motor Boating



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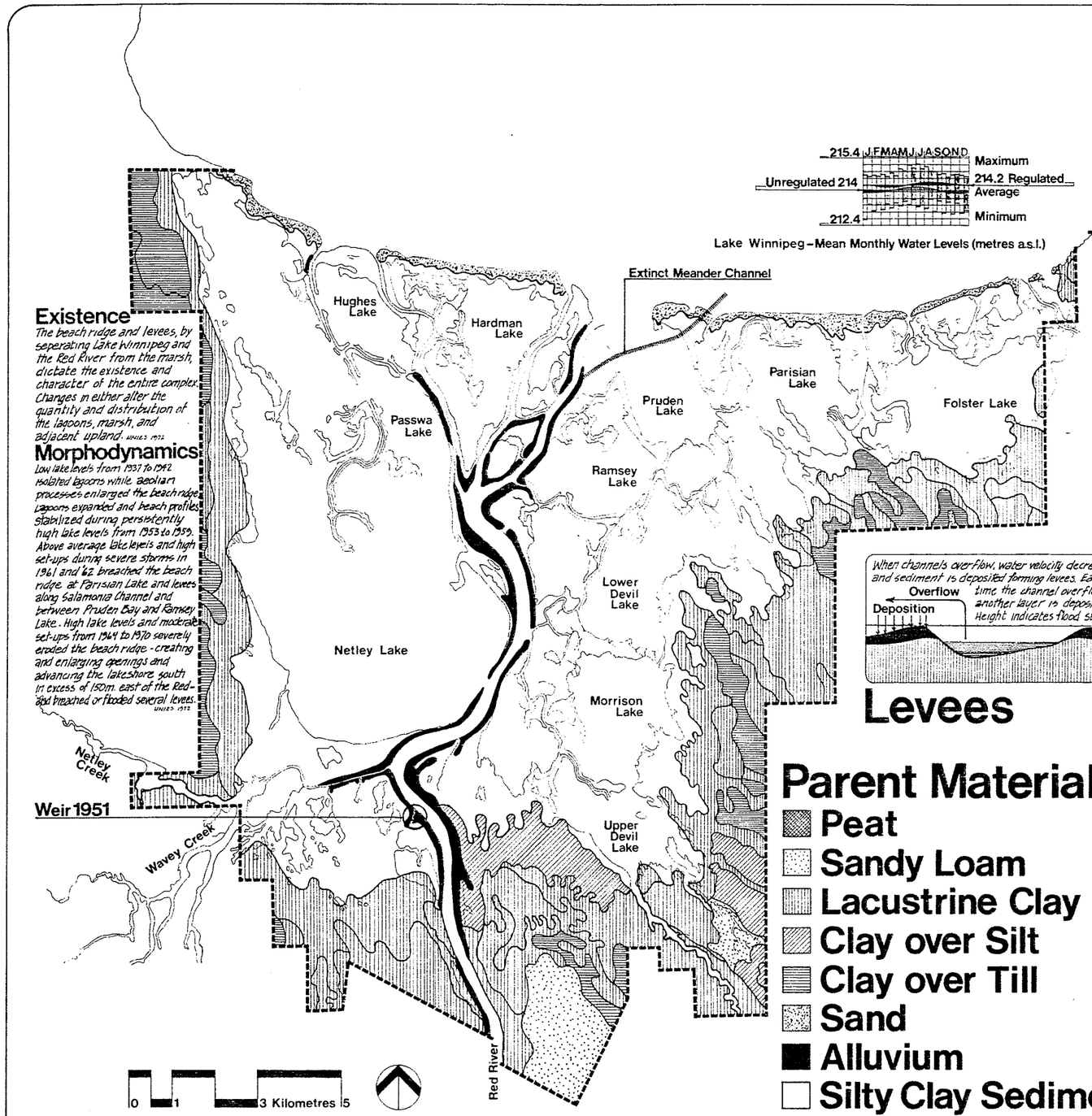
3. STUDY AREA

NETLEY MARSH

INTERPRETIVE DEVELOPMENT PLAN



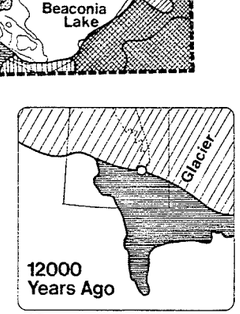
Existence

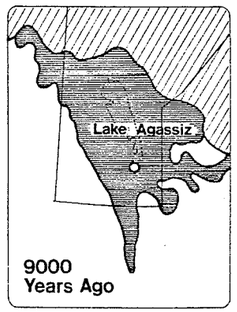
The beach ridge and levees, by separating Lake Winnipeg and the Red River from the marsh, dictate the existence and character of the entire complex. Changes in either alter the quantity and distribution of the lagoons, marsh, and adjacent upland. UNIES 1972

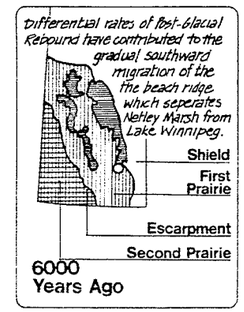
Morphodynamics

Low lake levels from 1937 to 1942 isolated lagoons while, aeolian processes enlarged the beach ridge. Lagoons expanded and beach profiles stabilized during persistently high lake levels from 1953 to 1959. Above average lake levels and high set-ups during severe storms in 1961 and '62 breached the beach ridge at Parisian Lake and levees along Salamonia Channel and between Pruden Bay and Ramsey Lake. High lake levels and moderate set-ups from 1964 to 1970 severely eroded the beach ridge - creating and enlarging openings and advancing the lakeshore south in excess of 150m. east of the Red - and breached or flooded several levees. UNIES 1972

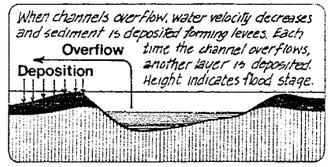
Lake Winnipeg - Mean Monthly Water Levels (metres a.s.l.)







Glacio-lacustrine Processes



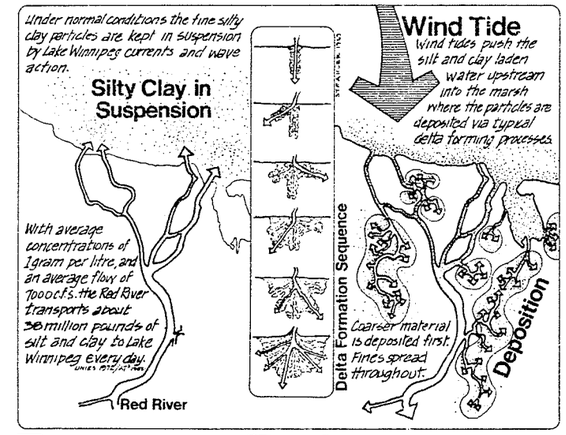
Levees

Parent Material

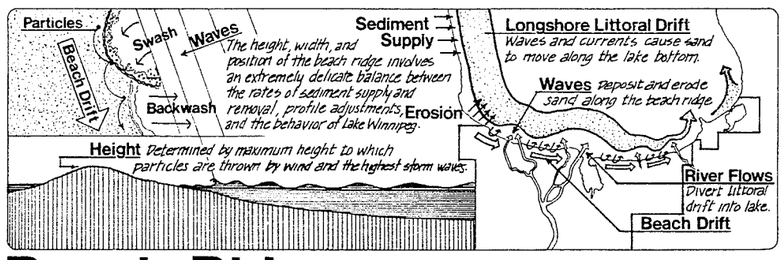
- Peat
- Sandy Loam
- Lacustrine Clay
- Clay over Silt
- Clay over Till
- Sand
- Alluvium
- Silty Clay Sediment

Wind Tides

Lake levels fluctuate over long period due to wet-dry climatic cycles; seasonally due to run-off and Hydro's operational requirements; and frequently throughout the ice free period because of wind set-ups. Short term increases in excess of one metre above still water levels have been recorded in the southern basin. Set-ups of only a few centimetres are noticeable throughout the marsh.



Reverse Deltas



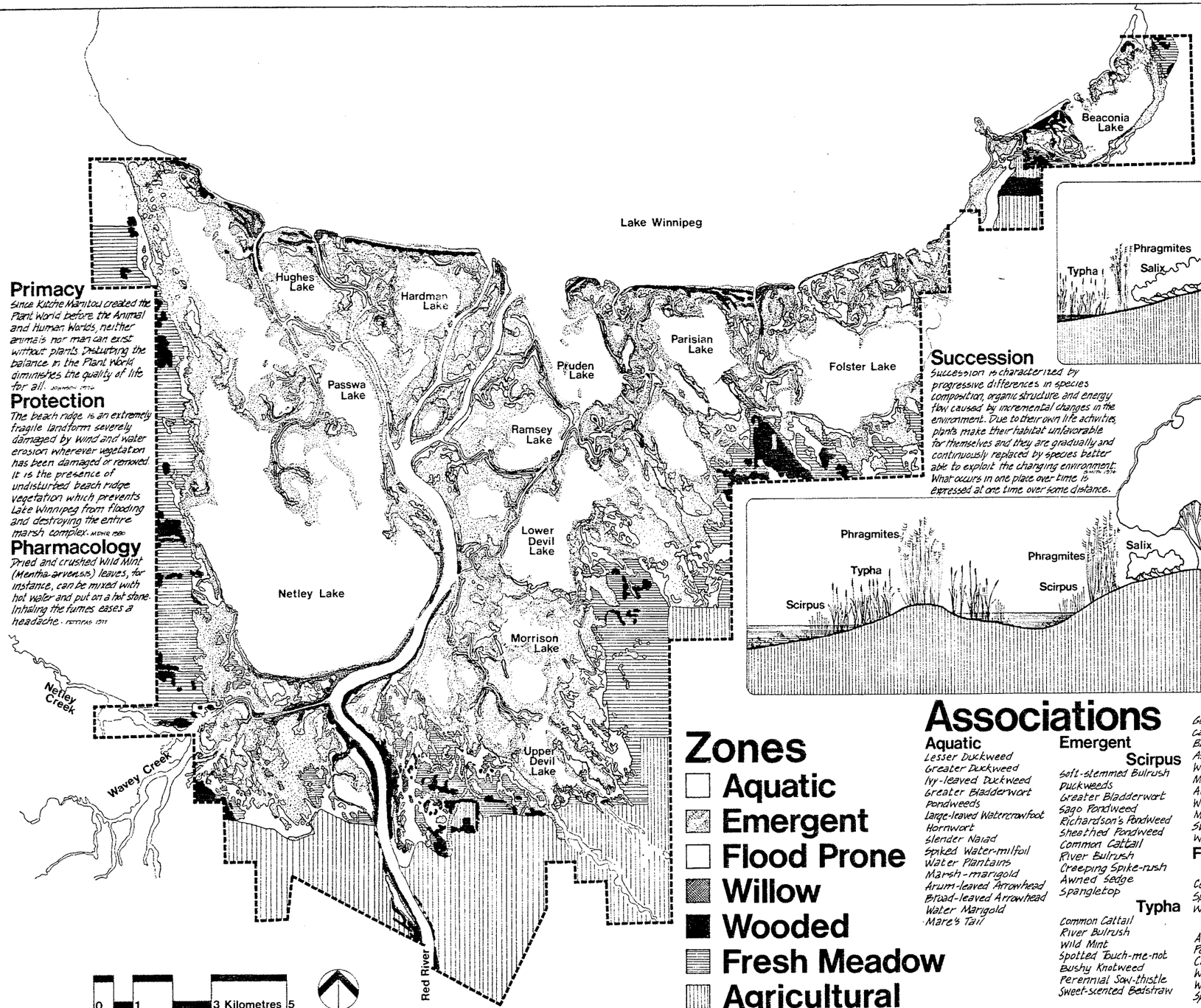
Beach Ridge

4. LANDFORMS

R. GREEN 1982 LANDSCAPE ARCHITECTURE U of M

NETLEY MARSH

INTERPRETIVE DEVELOPMENT PLAN



Primacy

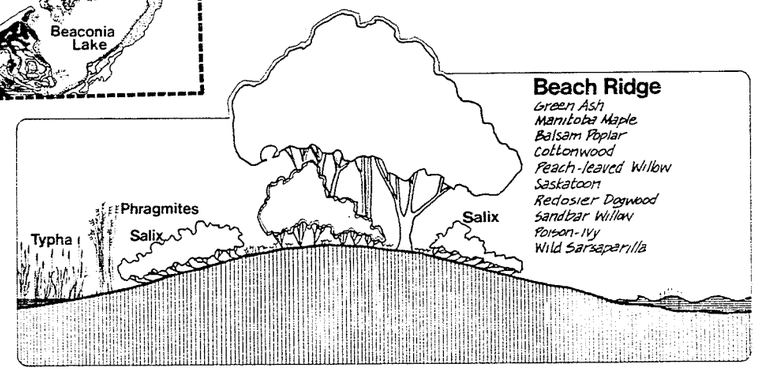
Since Kitche Manitou created the Plant World before the Animal and Human Worlds, neither animals nor man can exist without plants. Disturbing the balance in the Plant World diminishes the quality of life for all. SOWDEN 1970

Protection

The beach ridge is an extremely fragile landform severely damaged by wind and water erosion wherever vegetation has been damaged or removed. It is the presence of undisturbed beach ridge vegetation which prevents Lake Winnipeg from flooding and destroying the entire marsh complex. MOYLE 1980

Pharmacology

Dried and crushed Wild Mint (Mentha arvensis) leaves, for instance, can be mixed with hot water and put on a hot stone. Inhaling the fumes eases a headache. - TESTIMAS 1977

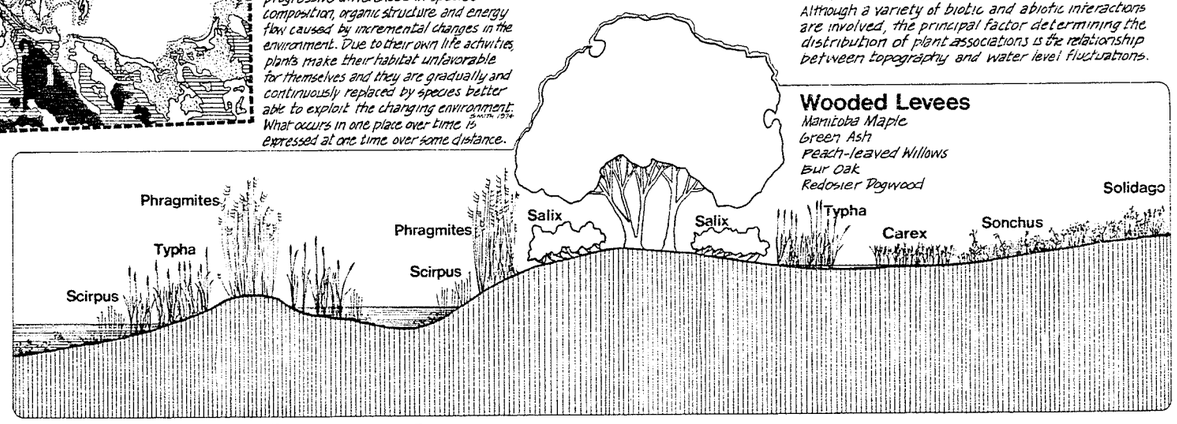


Succession

Succession is characterized by progressive differences in species composition, organic structure and energy flow caused by incremental changes in the environment. Due to their own life activities, plants make their habitat unfavorable for themselves and they are gradually and continuously replaced by species better able to exploit the changing environment. What occurs in one place over time is expressed at one time over some distance. SMITH 1974

Distribution

Although a variety of biotic and abiotic interactions are involved, the principal factor determining the distribution of plant associations is the relationship between topography and water level fluctuations.



Zones

- Aquatic
- Emergent
- Flood Prone
- Willow
- Wooded
- Fresh Meadow
- Agricultural

Associations

Aquatic
Lesser Duckweed
Greater Duckweed
Ivy-leaved Duckweed
Greater Bladderwort
Pondweeds
Large-leaved Watercrowfoot
Hornwort
Slender Naiad
Spiked Water-milfoil
Water Plantains
Marsh-marigold
Arum-leaved Arrowhead
Broad-leaved Arrowhead
Water Marigold
Mare's Tail

Emergent

Scirpus
Soft-stemmed Bulrush
Duckweeds
Greater Bladderwort
Sago Pondweed
Richardson's Pondweed
Sheathed Pondweed
Common Cattail
River Bulrush
Creeping Spike-rush
Awned Sedge
Spangletop

Typha
Common Cattail
River Bulrush
Wild Mint
Spotted Touch-me-not
Bushy Knotweed
Perennial Sow-thistle
Sweet-scented Bedstraw
Goosefoot
Canada Thistle
Buttercups
Asters
Water-horehound
Marsh Hedge-nettle
Awned Sedge
Western Water-horehound
Marsh Willowherb
Swamp Persicaria
Willows

Flood Prone
Phragmites
Common Reed Grass
Spotted Touch-me-not
Wild Mint

Carex
Awned Sedge
Perennial Sow-thistle
Canada Thistle
Wild Mint
Water-horehound
Spotted Touch-me-not
Common Cattail
River Bulrush
Sweet Flag
Beaked Sedge
Spangletop

Fresh Meadow
Sonchus
Perennial Sow-thistle
Wild Mint
Canada Thistle
Upland White Goldenrod
Sartwell's Sedge
Awned Sedge
Creeping Spike-rush
Silverweed
Doorweeds
Marsh Hedge-nettle
Western Water-horehound
Canada Anemone
Goldenrods
Water-horehound
Quack Grass
Sweet Cicely
Philadelphia Fleabane
American Vetch
Northern Bedstraw

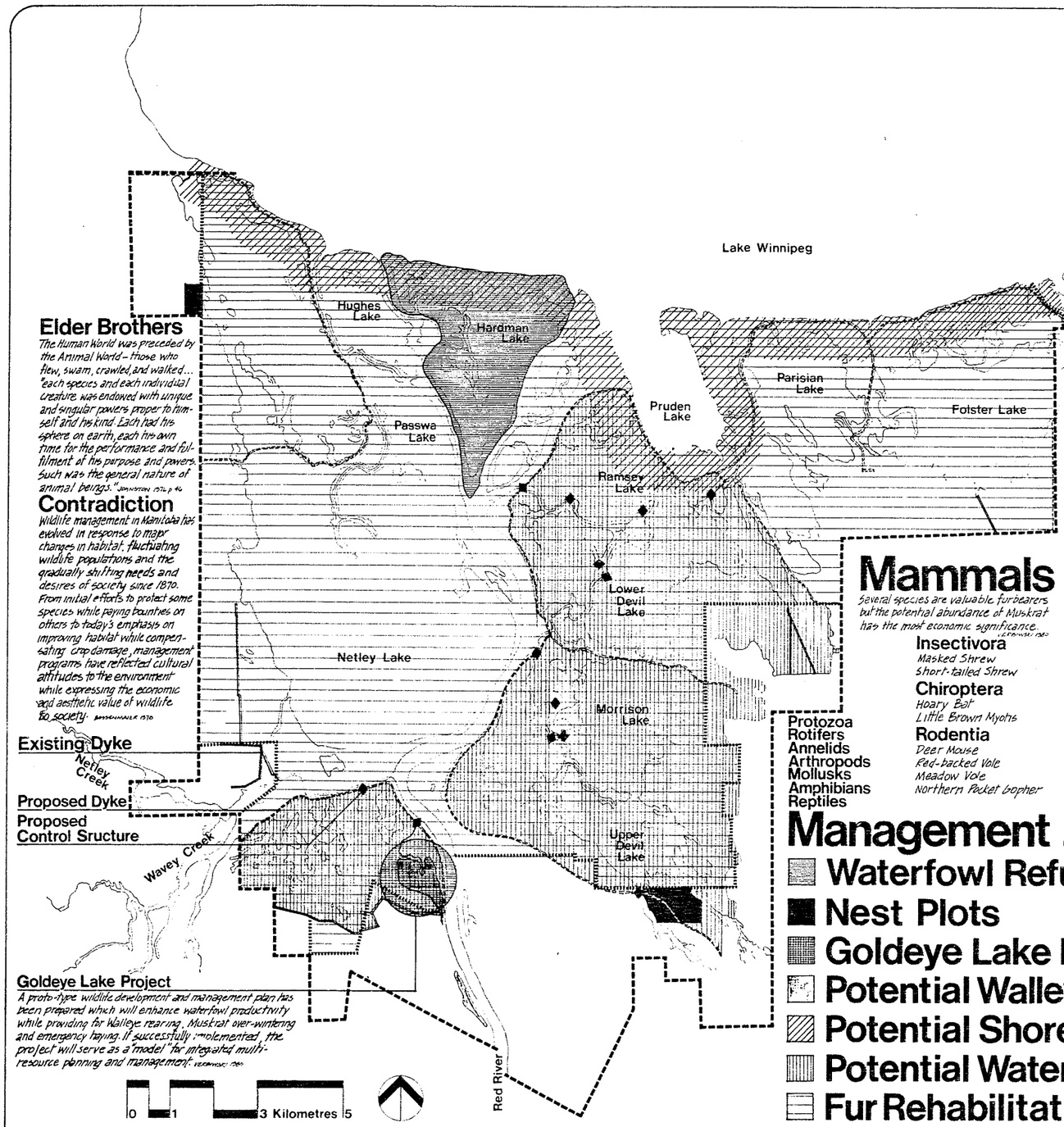
Solidago
Upland White Goldenrod
Perennial Sow-thistle
Silverweed
Wild Mint
Canada Thistle
Dandelion
White Clover
Canada Anemone
American Vetch
Yarrow
Common Plantain
Alfalfa
Yellow Sweet-clover
Water Hemlock
Sartwell's Sedge
Awned Sedge
Quack Grass
Timothy
Northern Reed Grass
Kentucky Blue Grass

5. VEGETATION

R. GREEN 1982 LANDSCAPE ARCHITECTURE U.of M.

NETLEY MARSH

INTERPRETIVE DEVELOPMENT PLAN



Elder Brothers

The Human World was preceded by the Animal World – those who flew, swam, crawled, and walked... "each species and each individual creature, was endowed with unique and singular powers proper to himself and his kind. Each had his sphere on earth, each his own time for the performance and fulfilment of his purpose and powers. Such was the general nature of animal beings." JOHNSTON 1976 p 46

Contradiction

Wildlife management in Manitoba has evolved in response to major changes in habitat, fluctuating wildlife populations and the gradually shifting needs and desires of society since 1870. From initial efforts to protect some species while paying bounties on others to today's emphasis on improving habitat while compensating crop damage, management programs have reflected cultural attitudes to the environment while expressing the economic and aesthetic value of wildlife to society. BOSCHMAN 1970

Existing Dyke

Proposed Dyke

Proposed Control Sructure

Goldeye Lake Project

A proto-type wildlife development and management plan has been prepared which will enhance waterfowl productivity while providing for Walleye rearing. Muskrat over-wintering and emergency haying. If successfully implemented, the project will serve as a "model" for integrated multi-resource planning and management. KROWSKI 1980

Mammals

Several species are valuable furbearers but the potential abundance of Muskrat has the most economic significance. KROWSKI 1980

Insectivora
Masked Shrew
Short-tailed Shrew

Chiroptera
Hoary Bat
Little Brown Myotis

Rodentia
Deer Mouse
Red-backed Vole
Meadow Vole
Northern Pocket Gopher
Richardson's ground-squirrel
Thirteen-lined Ground-squirrel
Franklin's Ground-squirrel
Eastern Grey Squirrel
Woodchuck
Muskrat
Beaver

Carnivora
Long-tailed Weasel
Short-tailed Weasel
Mink
Striped Skunk
Badger
Raccoon
Fox
Coyote

Artiodactyla
White-tailed Deer

Protozoa
Rotifers
Annelids
Arthropods
Mollusks
Amphibians
Reptiles

Fishes

Netley Marsh is the source of up to 3/4 of the frozen bait fish marketed in Manitoba. THOMPSON ET AL 1978

Osteoglossiformes
Goldeye
Mooneye

Salmoniformes
Tullibees
Lake Whitefish
Central Mudminnow
Northern Pike

Siluriformes
Channel Catfish
Bullheads
Madtom

Atheriniformes
Banded Killifish

Perciformes
Black Crappie
Perch
Sauger
Walleye
Darters
Drum

Birds

The interspersion of vegetation and water is essential to the production of waterfowl. Bird watchers outnumber bird hunters by more than 4 to 1. ROBERTS 1980

Gaviiformes
Common Loon

Podicipediformes
Western Grebe
Red-necked Grebe
Horned Grebe
Eared Grebe
Pied-billed Grebe

Pelecaniformes
White Pelican
Double-crested Cormorant

Anseriiformes
Whistling Swan
Canada Goose
White-fronted Goose
Snow Goose
Ross' Goose
Mallard
Black Duck
Gadwall
Pintail
Green-winged Teal
Blue-winged Teal
Cinnamon Teal
American Wigeon
Northern Shoveler
Wood Duck
Redhead
Ring-necked Duck
Canvasback
Greater Scaup
Lesser Scaup
Common Goldeneye
Buffalehead
White-winged Scoter
Hooded Merganser
Common Merganser
Red-breasted Merganser

Cypriniformes
Common Sucker
Silver Redhorse
Carp
Silver Chub
Minnows
Shiners

Falconiformes
Goshawk
Sharp-shinned Hawk
Cooper's Hawk
Red-tailed Hawk
Broad-winged Hawk
Swainson's Hawk
Rough-legged Hawk
Golden Eagle
Bald Eagle
Marsh Hawk
Osprey
Gryfalcon
Prairie Falcon
Peregrine Falcon
Merlin
American Kestrel

Galliformes
Ruffed Grouse
Sharp-tailed Grouse
Grey Partridge

Ciconiiformes
Great Blue Heron
Great Egret
Black-crowned Night Heron
Least Bittern
American Bittern

Gruiformes
Sandhill Crane
Virginia Rail
Sora
Yellow Rail
American Coot

Charadriiformes
Semipalmated Plover
Piping Plover
Killdeer
American Golden Plover
Black-bellied Plover
Ruddy Turnstone
Common Snipe
Whimbrel
Upland Sandpiper
Spotted Sandpiper
Solitary Sandpiper
Willet
Greater Yellowlegs
Lesser Yellowlegs
Short-billed Dowitcher
Long-billed Dowitcher
Stilt Sandpiper
Semipalmated Sandpiper
Buff-breasted Sandpiper
Marbled Godwit
Hudsonian Godwit
Sanderling
American Avocet
Wilson's Phalarope
Northern Phalarope
Herring Gull
Ring-billed Gull
Franklins Gull
Bonaparte's Gull
Forster's Tern
Common Tern
Caspian Tern
Black Tern

Columbiformes
Rock Dove
Mourning Dove

Cuculiformes
Black-billed Cuckoo

Stigiformes
Screech Owl
Great Horned Owl
Snowy Owl
Burrowing Owl
Long-eared Owl
Short-eared Owl

Caprimulgiformes
Whip-poor-will
Common Nighthawk

Apodiformes
Ruby-throated Hummingbird

Coraciiformes
Belted Kingfisher

Piciformes
Common Flicker
Yellow-bellied Sapsucker
Hairy Woodpecker
Downy Woodpecker

Passeriformes
Eastern Kingbird
Western Kingbird
Great Crested Flycatcher
Eastern Phoebe
Yellow-bellied Flycatcher
Alder Flycatcher
Least Flycatcher
Eastern Wood Pewee
Olive-sided Flycatcher
Horned Lark
Tree Swallow
Bank Swallow
Rough-winged Swallow
Barn Swallow
Cliff Swallow
Purple Martin
Blue Jay
Black-billed Magpie
Common Raven
Common Crow
Black-capped Chickadee
House Wren
Long-billed Marsh Wren
Short-billed Marsh Wren
Gray Catbird
Brown Thrasher
American Robin
Hermit Thrush
Swainson's Thrush
Gray-cheeked Thrush
Veery
Golden-crowned Kinglet
Ruby-crowned Kinglet
Water Pipet
Cedar Waxwing
Northern Shrike
Common Starling
Solitary Vireo
Red-eyed Vireo
Philadelphia Vireo
Warbling Vireo
Black-and-white Warbler
Golden-winged Warbler
Tennessee Warbler
Nashville Warbler
Yellow Warbler
Magnolia Warbler
Cape May Warbler
Yellow-rumped Warbler
Black-throated Green Warbler
Blackburnian Warbler
Chestnut-sided Warbler
Bay-breasted Warbler
Blackpoll Warbler
Palm Warbler
Ovenbird
Northern Waterthrush
Mourning Warbler
Common Yellowthroat
Wilson's Warbler
Canada Warbler
American Redstart
House Sparrow
Bobolink
Western Meadowlark
Yellow-headed Blackbird
Red-winged Blackbird
Baltimore Oriole
Rusty Blackbird
Brewer's Blackbird
Common Grackle
Brown-headed Cowbird
Scarlet Tanager
Rose-breasted Grosbeak
Evening Grosbeak
Purple Finch
Pine Grosbeak
Hoary Redpoll
Pine Siskin
American Goldfinch
White-winged Crossbill
Savannah Sparrow
LeConte's Sparrow
Sharp-tailed Sparrow
Vesper Sparrow
Lark Sparrow
Dark-eyed Junco
Tree Sparrow
Chipping Sparrow
Harris' Sparrow
White-crowned Sparrow
White-throated Sparrow
Fox Sparrow
Lincoln's Sparrow
Song Sparrow
Lapland Longspur
Smith's Longspur
Chestnut-collared Longspur
Snow Bunting

Note:
Species Lists are preliminary only.

Management Zones

- Waterfowl Refuge
- Nest Plots
- Goldeye Lake Project
- Potential Walleye Rearing Basin
- Potential Shoreline Reserve
- Potential Water Level Management
- Fur Rehabilitation Block 1943-1954

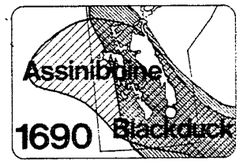
6. WILDLIFE

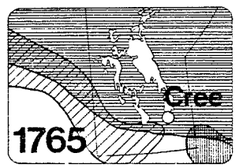
R. GREEN 1982. LANDSCAPE ARCHITECTURE. U of M

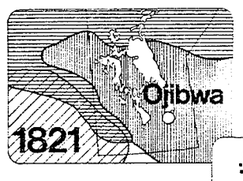
NETLEY MARSH

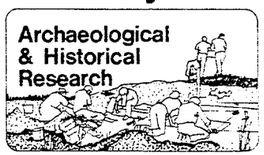
INTERPRETIVE DEVELOPMENT PLAN

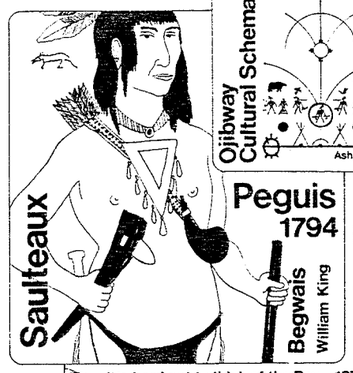
Prehistory

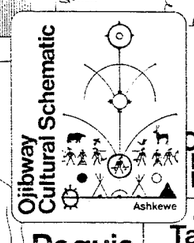




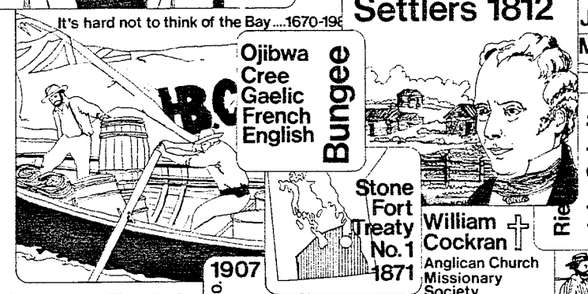








North West Company
Fort Maurepas
Ouckidoat
Joseph Frobisher
Alexander Henry
Miles Macdonell
Henry Prince
Rindisbacher
John Tanner 1792
Peguis 1794
Nee-poo-win Sipi
Riviére aux Morts
Nipou Cipi
Netley Creek



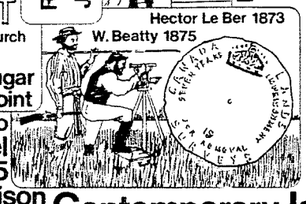
Selkirk Settlers 1812

Ojibwa
Cree
Gaelic
French
English
Bungee

Stone Fort Treaty No.1 1871

William Cockran
Anglican Church Missionary Society
Sugar Point

John West 1820
Market Hunting
John Schultz
Frog Farming?

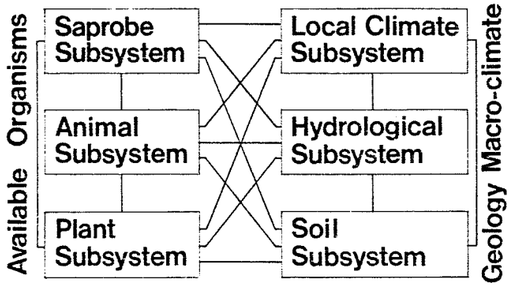


1907
$5000.
St. Peter's Reserve Surrendered
F.R.E.D. 1971
Manitoba Hydro Lake Level Regulation 1975
Garrison

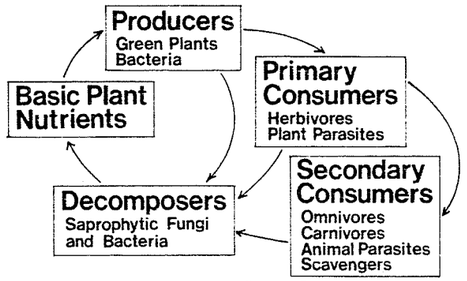
Exploration Exploita
Transportation
Settlement Agriculture
Recreation Conservation

Cultural History

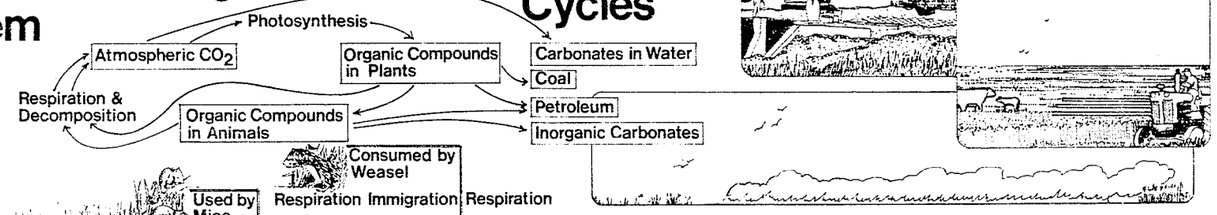
Natural History

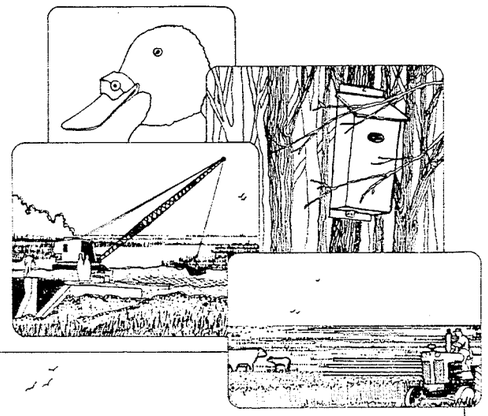


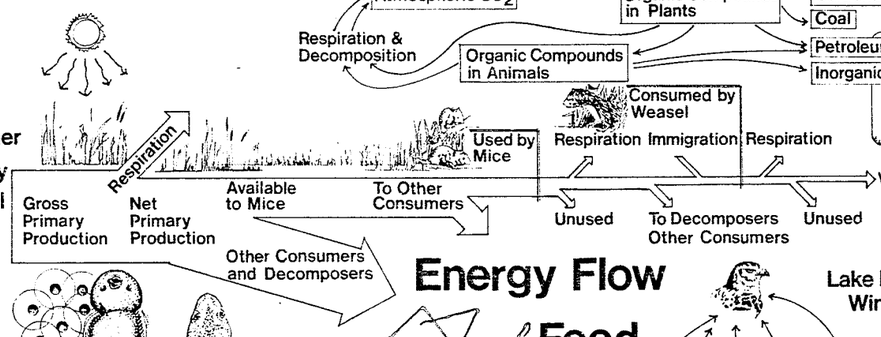
The Ecosystem



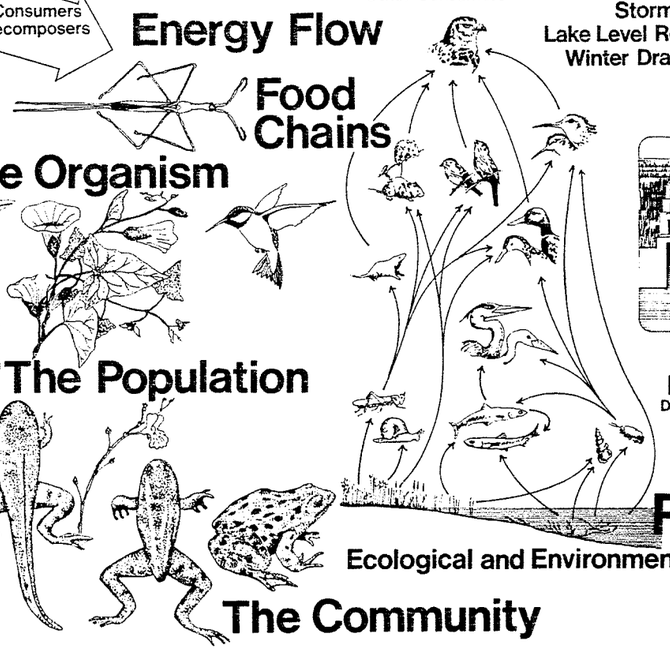
Biogeochemical Cycles



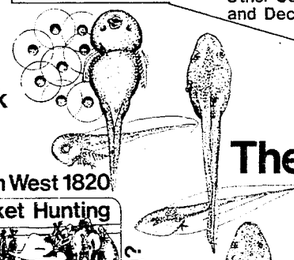




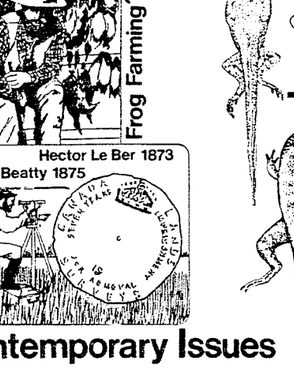
Energy Flow



Food Chains



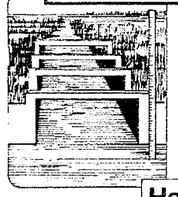
The Organism

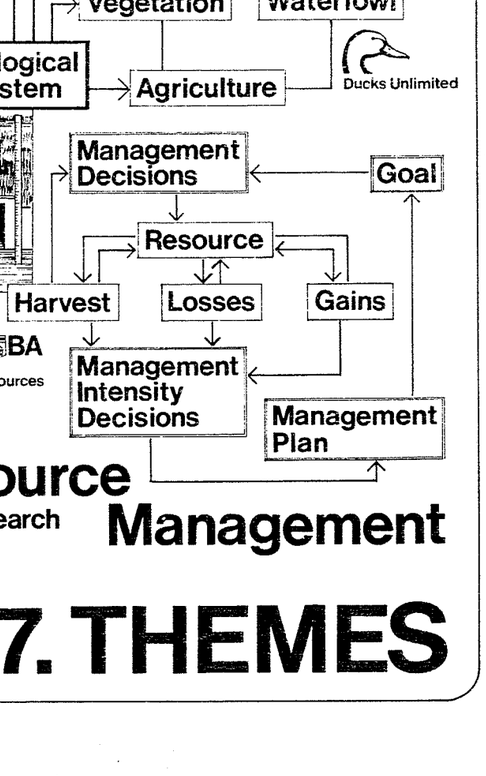


The Population

The Community

Storm Set-ups
Lake Level Regulation
Winter Draw-downs





Ecological and Environmental Research

Resource Management

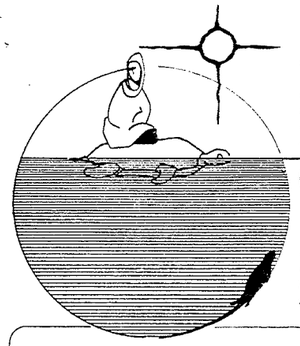
Contemporary Issues

7. THEMES

R. GREEN 1982 LANDSCAPE ARCHITECTURE U of M

NETLEY MARSH

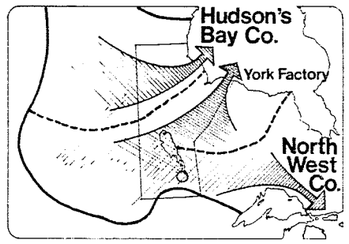
INTERPRETIVE DEVELOPMENT PLAN



sensing her lonliness, the water creatures invited Sky-woman to join them on the vast sea that had once been the earth. Resting on the back of a turtle, she asked for soil from the bottom. The beaver, fisher, marten, and loon each tried and failed. Despite their shame, the others laughed when the lowly muskrat prepared to dive.

Creation Myth

Although originally scorned for his lack of strength and endurance, the laughter turned to despair as time passed. After the others had given up on him Wuzhushk floated to the surface - near death ... with a bit of mud which Sky-woman turned into an island on the turtle's back. As the island grew and the water subsided Sky-woman re-built the Ojibway landscape. JOHNSON 1916



The Western Fur Trade

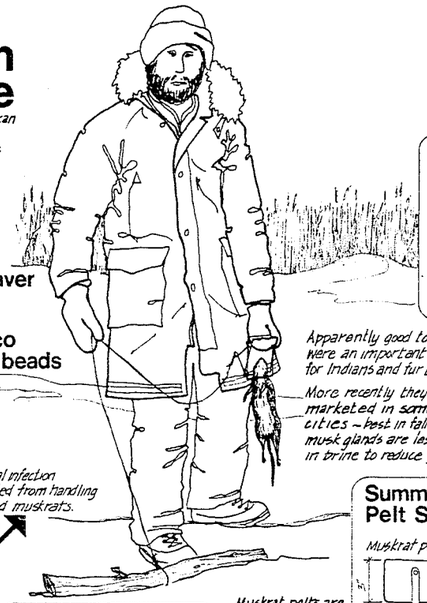
The fur trade is basic to North American history. INNIS 1930

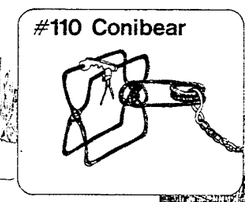
From 1670 until 1870 "The fur trade was the most pervasive force influencing the economic and political development of Western Canada" RICH 1939 p.ix

142,634 muskrats were harvested at Netley Marsh in 1945. VAREWSKI 1950

10-12 Prime Muskrat equalled 1 Made Beaver
worth 1 quart brandy
or 1 hatchet
or 1 pound tobacco
or 1/2 pound small beads

1982 Price - $7.20

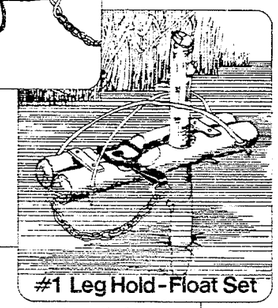




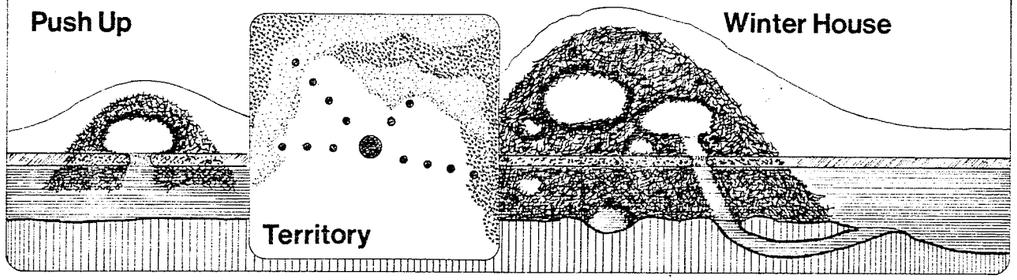
#110 Conibear

Apparently good to eat, muskrat were an important source of food for Indians and fur trader/explorers. RAY 1974

More recently they have been marketed in some large U.S. cities - best in fall and winter when musk glands are less active - soak in brine to reduce gamey taste. BANFIELD 1974



#1 Leg Hold - Float Set

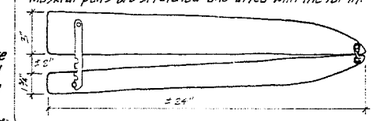


Tularemia
Death
Flu-like Symptoms

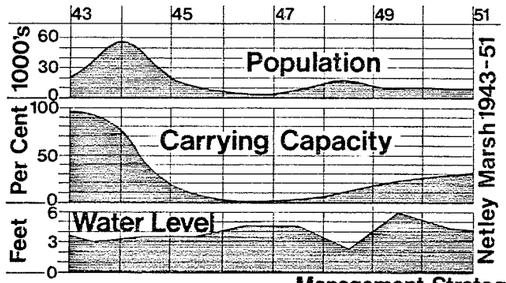
Bacterial infection contracted from handling infected muskrats.

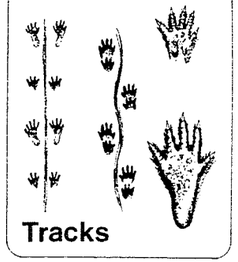
Summerberry Pelt Stretcher

Muskrat pelts are stretched and dried with the fur in.



Muskrat pelts are 'cased' - skinned inside out from vent to head like a tube. STORR 1980





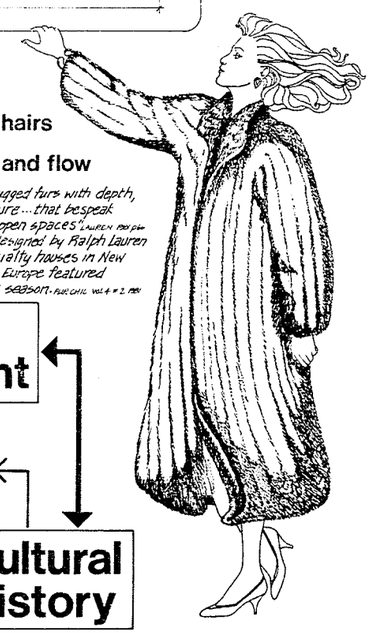
Muskrats occupy a wide variety of aquatic habitats: 1-4 m water, emergents, and soft bottom.

Range

Prime Pelts

Creamy white flesh side
Soft pliable oily leather
Completely covered by guard hairs
Thick deep underfur
Glossy appearance - full of life and flow

"I have always liked rugged furs with depth, character and texture ... that bespeak prairies ... and wide open spaces" LAUREN 1981 p.6m The Tepper Collection, designed by Ralph Lauren and available at specialty houses in New York, Montreal and Europe featured muskrat in the 1981 season. FUR CHIC Vol. 4 # 2. 1981



Management Strategy

Optimize habitat quality and quantity.
Maintain breeding stock to maximize reproduction and population growth
Harvest excess population to prevent habitat destruction and starvation
MCLEOD

Life Cycle

Independent juveniles	Sexually mature yearlings				2-12 Kits born naked blind and helpless		Week 1	Week 2	Week 3	Week 4	Week 5
							Movement Fur begins to grow	Eyes open and activity increases	Very active - start to swim and take plant food	Weaned - good swimmers and fully furred	More or less independent juveniles
Periodic epidemics of Errington's Disease		Prime pelts Males potent by spring break-up	Male aggression fighting and travel Severe predation	Mating	28 Day Gestation	First Litters	2nd Litters	3rd Litters	Males impotent	Rare 4th Litters	House building	Pushups built as ice forms	Salvage trapping
J	F	M	A	M	J	J	A	S	O	N	D		

Ondatra zibethicus alba

Food

Cattails
Bulrushes
Horsetails
Sweet Flag
Burreeds
Pondweeds
Reed Grass
Arrowhead
Sedges

Predators

Mink
Northern Pike
Coyote
Gyrfalcon
Great Horned Owl

Winter Adaptations

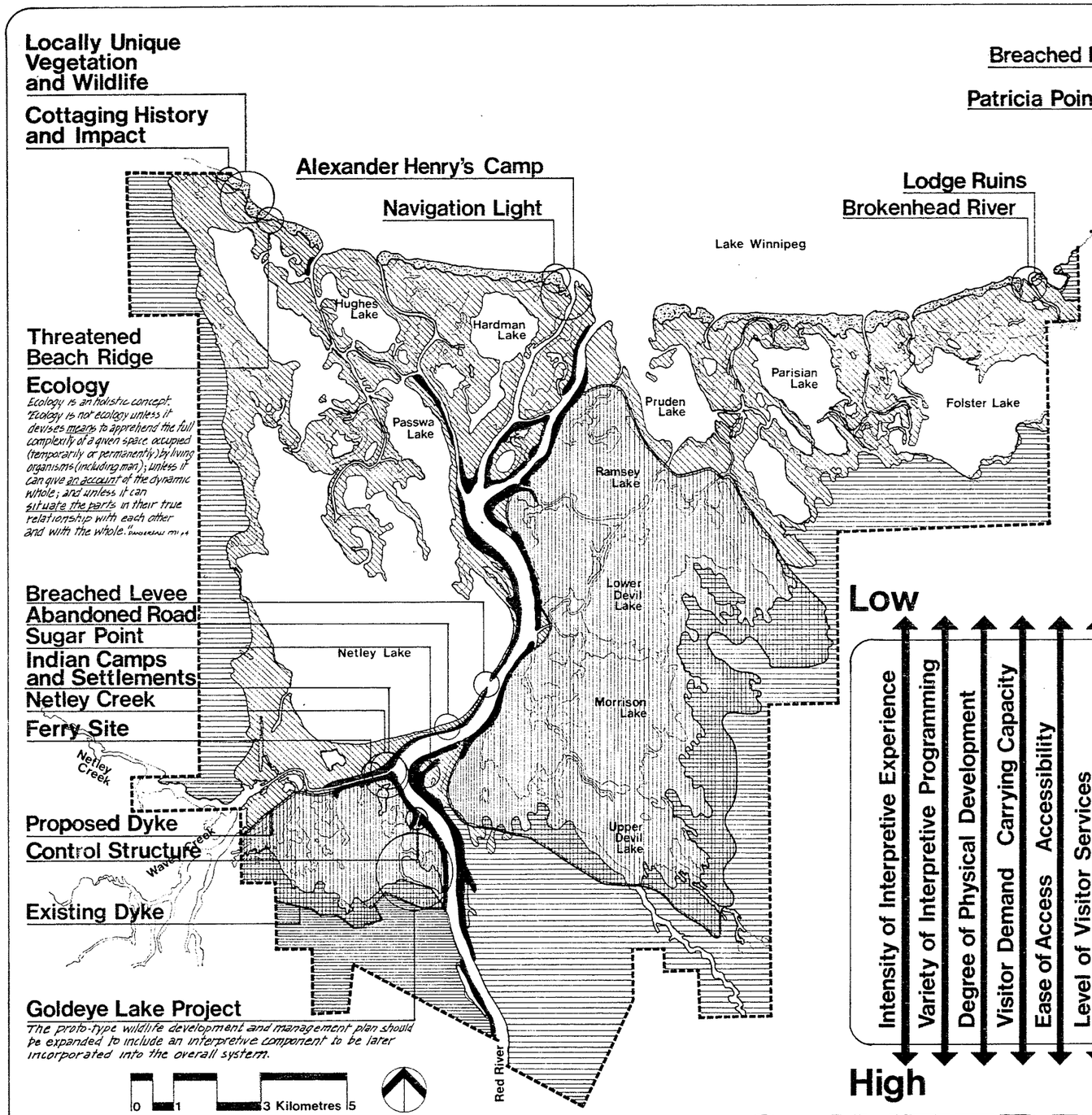
Muskrats are active throughout the winter. Immersion in near freezing water could cause severe heat loss leading to hypothermia. Muskrats have a variety of adaptive mechanisms for keeping warm. Dense waterproof underfur maintains air layer when submerged. Temperature of extremities drops to that of surroundings. A thermal blanket of brown fat warms blood returning from cooled periphery and selectively warms sensitive organs such as kidneys and spinal cord. Body temperature is elevated before entering water. Group occupied insulated houses efficiently store body heat. Muskrats frequently withdraw for re-warming to push ups which are arranged to provide access throughout the home range via short swims. 'Freeze-out' is the most serious threat in winter. MACARTHUR 1977

8. THE MUSKRAT

R. GREEN 1982 LANDSCAPE ARCHITECTURE U of M

NETLEY MARSH

INTERPRETIVE DEVELOPMENT PLAN



Ecology

Ecology is an holistic concept. "Ecology is not ecology unless it devises means to apprehend the full complexity of a given space occupied (temporarily or permanently) by living organisms (including man); unless it can give an account of the dynamic whole; and unless it can situate the parts in their true relationship with each other and with the whole." ENGELEN 1981

Visitors

Traditional interpretive planning efforts address the issue of visitors by planning for specific user groups such as local residents, tourists, school groups, etc. or use types such as class room visits, naturalist clubs, family outings etc.

This plan recognizes the need to account for a broad spectrum of visitors in every classification in order to provide interpretive opportunities of great diversity. The variety of existing users and the potential visitors within the region requires a flexible interpretive system featuring numerous combinations of recreation and education experiences within the context of Netley Marsh.

Biophysical Units

- Unmanaged Marsh
- Managed Marsh
- Beach Ridge — Lake-Marsh
- Levee — River-Marsh
- Upland — Parkland-Marsh
- Agriculture
- Open Water

Biodynamics

Before 1960 Netley Marsh consisted of about 50 individual biologically closed water bodies not severely influenced by Lake Winnipeg. In the last 20 years the marsh has been reduced to 17 biologically open systems intimately related to and greatly influenced by the changing water levels of the lake. VERKUYLEN 1980

Conceptual Interpretive System

Low — High

Intensity of Interpretive Experience
Variety of Interpretive Programming
Degree of Physical Development
Visitor Demand Carrying Capacity
Ease of Access Accessibility
Level of Visitor Services
Maintenance Visitor Management

Matrix

No developed access
No interpretive development
No visitor services

Satellites

Boat or vehicle access
Concentration of interpretive resources supporting recreational resources or facilities
Visitor Reception Areas, Outdoor Displays, Self-guiding Networks
Limited visitor services

Core

Boat and vehicle access
Major concentration of interpretive resources
Major recreational focus
Visitor Reception Area, Visitor Centre, Outdoor Displays, Labelled and self-guiding Networks, Demonstration Areas, Look-out Towers etc.
Full visitor services

Curious Naturalists

Curious Tourists

Duration of Visits
Frequency of Visits
Level of Effort Required
Degree of Solitude
Degree of Personal Risk

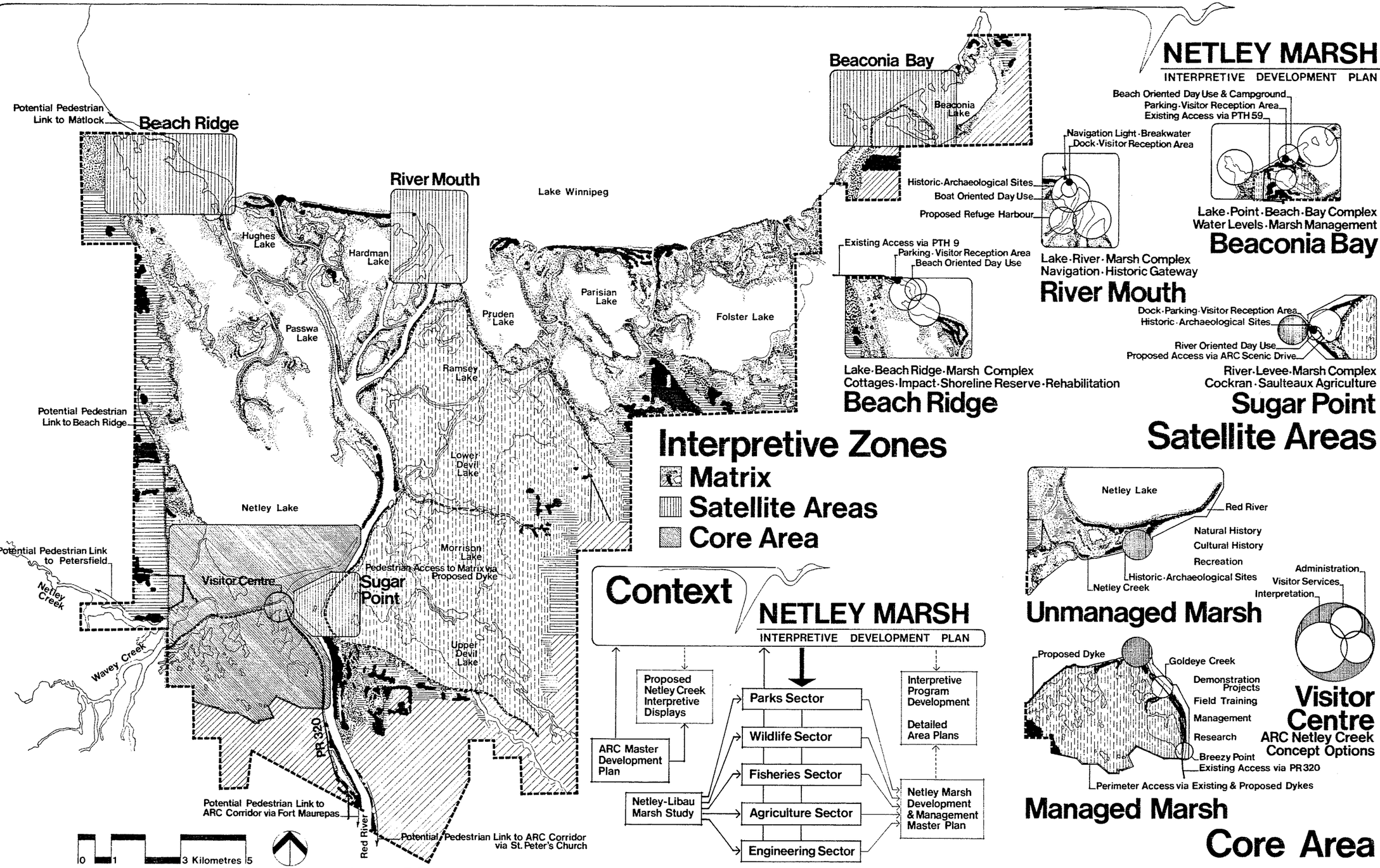
High — Low

9. INTERPRETIVE POTENTIAL

R. GREEN 1982 LANDSCAPE ARCHITECTURE U of M

NETLEY MARSH

INTERPRETIVE DEVELOPMENT PLAN



Interpretive Zones

- Matrix
- Satellite Areas
- Core Area

Context

Lake-Beach Ridge-Marsh Complex
Cottages-Impact-Shoreline Reserve-Rehabilitation

Beach Ridge

Lake-Point-Beach-Bay Complex
Water Levels-Marsh Management

Beaconia Bay

Lake-River-Marsh Complex
Navigation-Historic Gateway

River Mouth

River-Levee-Marsh Complex
Cockran-Saulteaux Agriculture

Sugar Point

Satellite Areas

Unmanaged Marsh

Visitor Centre

ARC Netley Creek
Concept Options

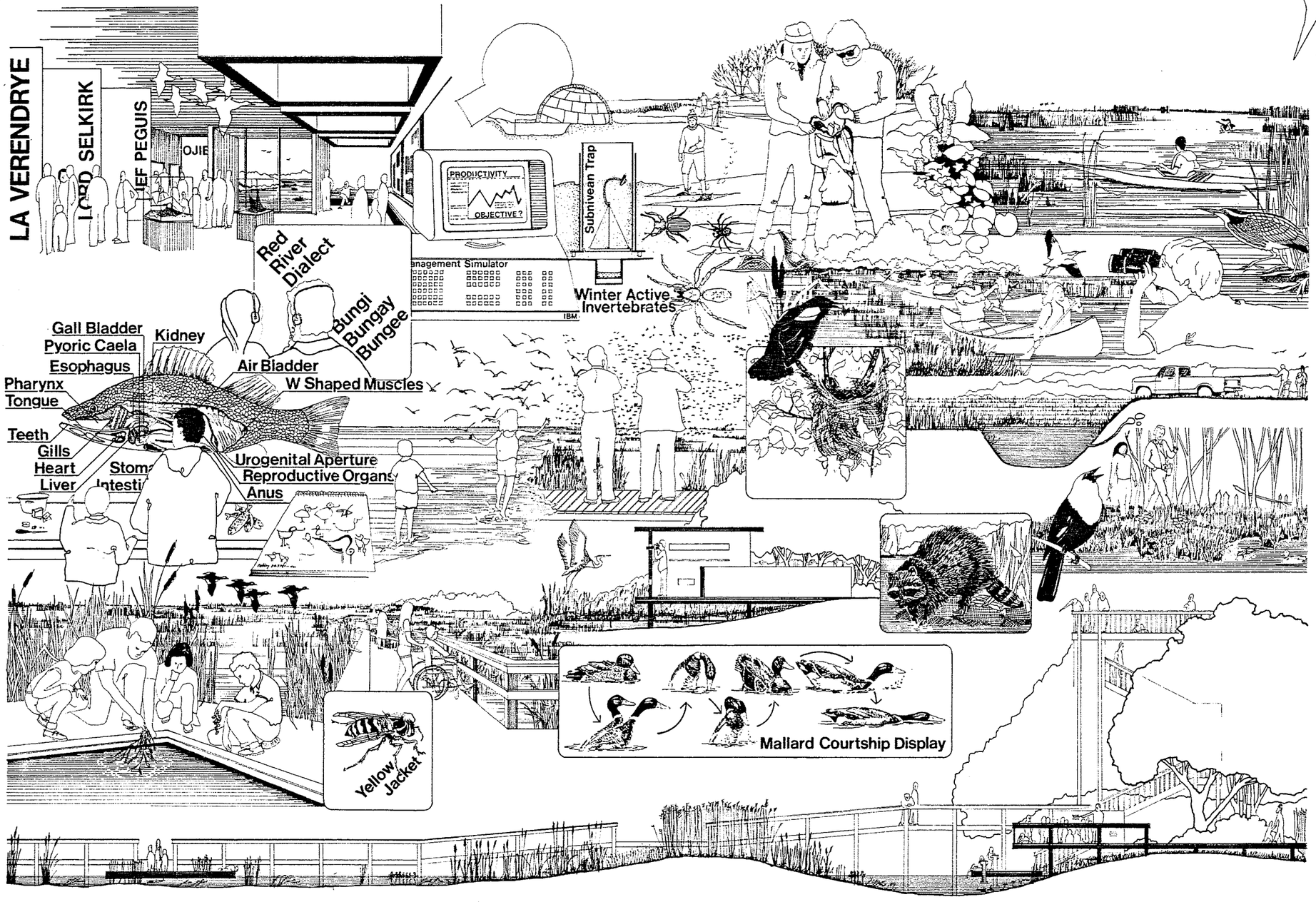
Managed Marsh

Core Area

10. INTERPRETIVE DEVELOPMENT PLAN

NETLEY MARSH

INTERPRETIVE DEVELOPMENT PLAN



Summary

In addition to confirming the appropriateness of the ARC Netley Creek Interpretive Proposals, this study clearly demonstrates an incredible potential for interpretive programming throughout the entire marsh. The study identifies the key areas within which an integrated interpretive system should be developed, summarizes the principal themes to be interpreted and offers the following recommendations:

Recommendations

The Netley Marsh Interpretive Development Plan should be considered a conceptual framework for interpretive development in Netley Marsh.

Responsible agencies should proceed with interpretive development on the basis of the Netley Marsh Development and Management Master Plan, the ARC Red River Corridor Master Development Plan and this study.

Core Area
Expand the Goldeye Lake Wildlife Development and Management Plan to include Interpretive Development Studies for eventual incorporation into the overall core area system.

Complete proposed archaeological and historical research at the junction of Netley Creek and the Red River prior to the preparation of a detailed area plan for the Core.

Proceed with ARC Interpretive Displays at Netley Creek as an interim measure until proposed Visitor Centre proceeds.

Establish an initial Interpretive Program in conjunction with the completed displays at Netley Creek.

Beach Ridge Satellite
Undertake historical and archaeological research prior to preparation of a detailed area plan.

Initial displays should encourage thoughtful use of the beach ridge and promote the need for a shoreline reserve to protect the ridge and preserve the marsh as a whole.

River Mouth Satellite
Undertake historical and archaeological research prior to preparation of detailed area plans.

Interpretive development should proceed with the development of the proposed Harbour of Refuge.

Beaconia Bay Satellite
Undertake detailed area plan and include interpretive development to complement existing or proposed recreation development.

Sugar Point Satellite
Undertake archaeological and historical research and prepare detailed area plan prior to development of proposed ARC scenic drive and ferry crossing.

Matrix
No interpretive development should occur within this zone although future recreation development proposals may be evaluated with respect to the appropriateness of additional satellites.

Thanks

To my committee - Barry Hilderman (chairman) Barry Verbiwski and Ted McLachlan - for their patience and assistance, the friendly folks at 504 Queen Street for their support throughout, and especially Judy Crosby for getting me going.

SASKATOON MAY 1982.

"That thing called 'nature study', ... constitutes the first embryonic groping of the mass-mind toward perception....
To promote perception is the only truly creative part of recreational engineering".
Aldo Leopold 1949

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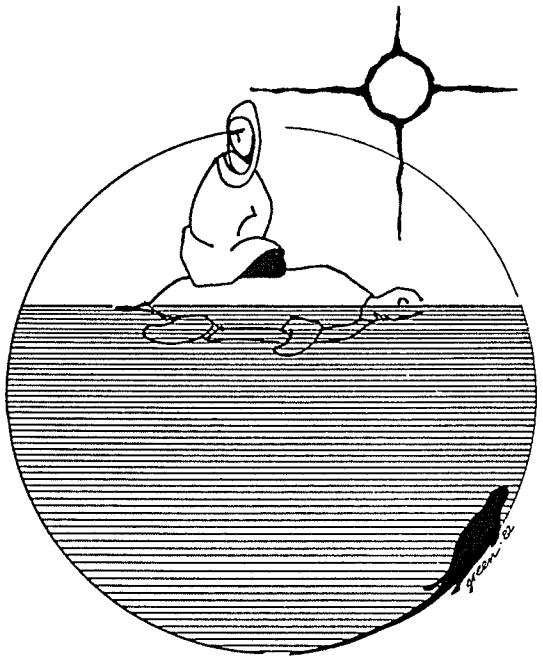
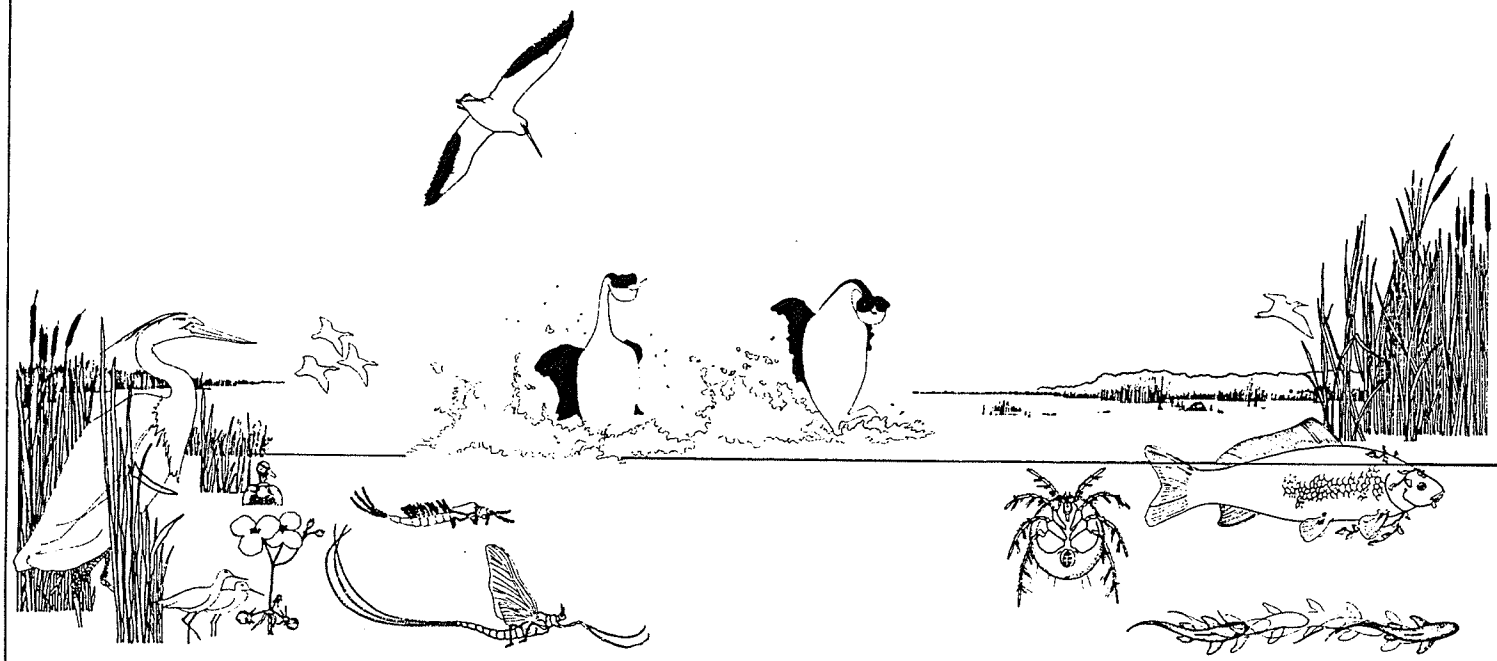


NETLEY MARSH

INTERPRETIVE DEVELOPMENT PLAN



A
Practicum
Submitted
To
The
Faculty
Of
Graduate
Studies
In
Partial
Fulfilment
Of
The
Requirements
For
The
Degree
Of
Master
Of
Landscape
Architecture

Roger
Green
Department
Of
Landscape
Architecture
University
Of
Manitoba

"The ecological processes on the surface of the earth represent a kind of huge seamless web, a network of interconnections among living things and between living things and the chemical and physical environment – an endless process of interacting steps".

Barry Commoner 1971

NETLEY MARSH
INTERPRETIVE DEVELOPMENT PLAN

EDUCATION
content

The educational roots of interpretation can be traced to the work of early scientists such as Pythagoras, Copernicus and Galileo who broke from the religious constraints of their day to study and teach the natural causes of various phenomena.

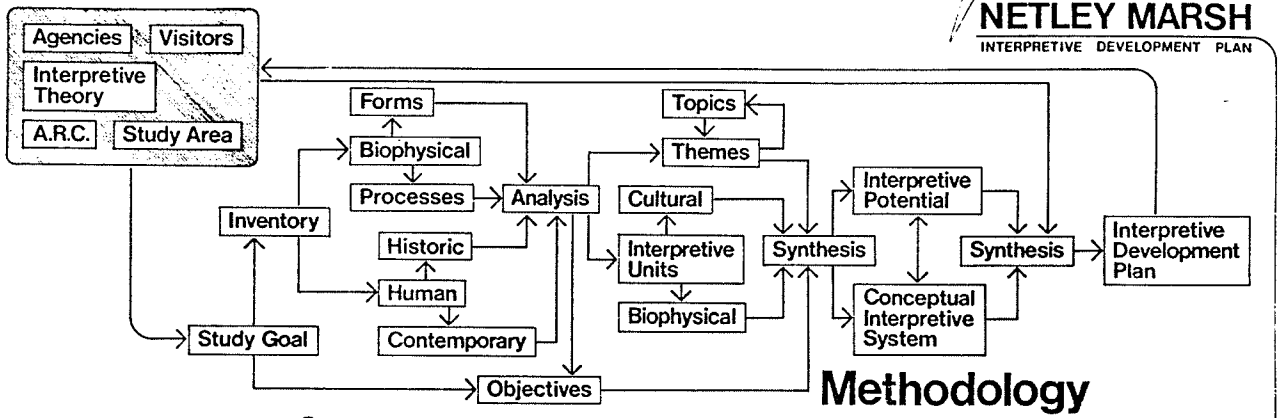
Although the basic idea originated with Aristotle and Socrates, it was not until the 17th century that Comenius formally recognized that learning was best facilitated through play and direct experience.

Educational theorists in the 18th and 19th centuries such as Pestalozzi and Froebel believed sense perception to be the foundation of knowledge and that first hand observation and experience were the keys to education.

Louis Agassiz brought the European concept of nature study to North America in 1847 and coined the phrase "Study Nature, Not Books."

The integration of science into elementary schools began in 1809 when W.S. Jackson introduced Nature Study into the curriculum in Illinois. The distinguishing features of the new course were the utilization of the outdoors as both text book and classroom and the organization of course content around seasonal variations.

Contemporary 'Outdoor Education' has evolved from the nature study movement and plays an important role at all levels of education.



Methodology

activity

INTERPRETATION

process

context

RECREATION

The recreational roots of interpretation have evolved from several sources. Since the 18th century botanical gardens, arboreta, zoological parks and museums have combined professional research with public education in recreational settings.

The world-wide explosion of interest in the natural sciences which occurred during the 18th and 19th centuries, combined with increasing urbanization stimulated the growth of outdoor recreation in natural settings. The popularity of such recreation was encouraged by the many field naturalists who happened to be excellent writers. Henry David Thoreau, John Muir, Catherine Parr Traill, Earnest Thompson Seton and many others captured the imaginations - and aroused the curiosity - of the reading public.

Naturalist's Clubs began to flourish in the 19th century. Many such organizations continue to involve professional and amateur naturalists and the interested public in scientific, educational and recreational activities.

Near the end of the 19th century the National Parks Movement, finally united the public fascination with nature and thirst for understanding. Four bison were put on display at Banff in 1899 and people began asking questions. By 1915 labelled nature trails, guided field trips and lectures were popular features of Canada's first interpretive program.

Definition

"Any communication process designed to reveal meanings and relationships of our cultural and natural heritage to the public through first hand involvement with an object, architecture, landscape or site."

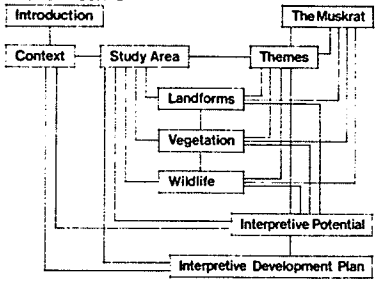
Goals

Perception
Enhance visitor enjoyment by providing high quality educational/recreational experiences which enrich visitor awareness, appreciation and understanding of the resource.

Protection
Positively influence visitor attitudes to the environment as a whole by encouraging the thoughtful and responsible use of the resource and minimizing the negative impacts of such use.

Promotion
Encourage public awareness and understanding of the intrinsic value of the resource, its managing agencies, and their programs.

Structure



Contents

Interpretive Program

Defined as the total interpretive effort, including personnel, facilities, and all the interpretive activities within or related to a given area.

Principles

Different visitor groups require fundamentally different approaches to interpretation. Programs should respond to differences in age, mental and physical abilities, prior knowledge and experience, motivation and available time.

Visitors should be encouraged to participate selectively, at their own pace.

Programs should relate to the personality or experience of the visitor, progressing from the familiar to the unfamiliar.

Programs should be holistic rather than fragmented, emphasizing concepts and interrelationships rather than facts and figures.

Programs should be provocative rather than instructive, encouraging participation, involvement, insight, sensitivity, self-expression and personal development.

Facilities should be safe, comfortable, convenient and responsive to the needs of the visitors and the program.

Facilities should be located and designed to minimize environmental damage and the intensity of use should not exceed the design capacities of facilities provided.

Facilities should be efficient in terms of servicing, maintenance and other operational aspects.

Facilities should be flexible and adaptable to new topics, techniques, technologies and shifts in visitor interest and program intensities.

The most effective interpretation is generally achieved through interpersonal communication in combination with direct contact with the subject.

Visitor activated dynamic exhibits are more effective than static written or graphic presentations.

Study Goal

To evaluate the ARC Netley Creek interpretive proposals by producing an Interpretive Development Plan which establishes a conceptual framework for the development of an interpretive program for Netley Marsh.

Objectives

Identify and document the patterns and inter-relationships of the existing natural and cultural resources, land uses, and activities.

Identify and evaluate the range of interpretive topics and themes available in Netley Marsh.

Document the interpretive potential as related to identified themes.

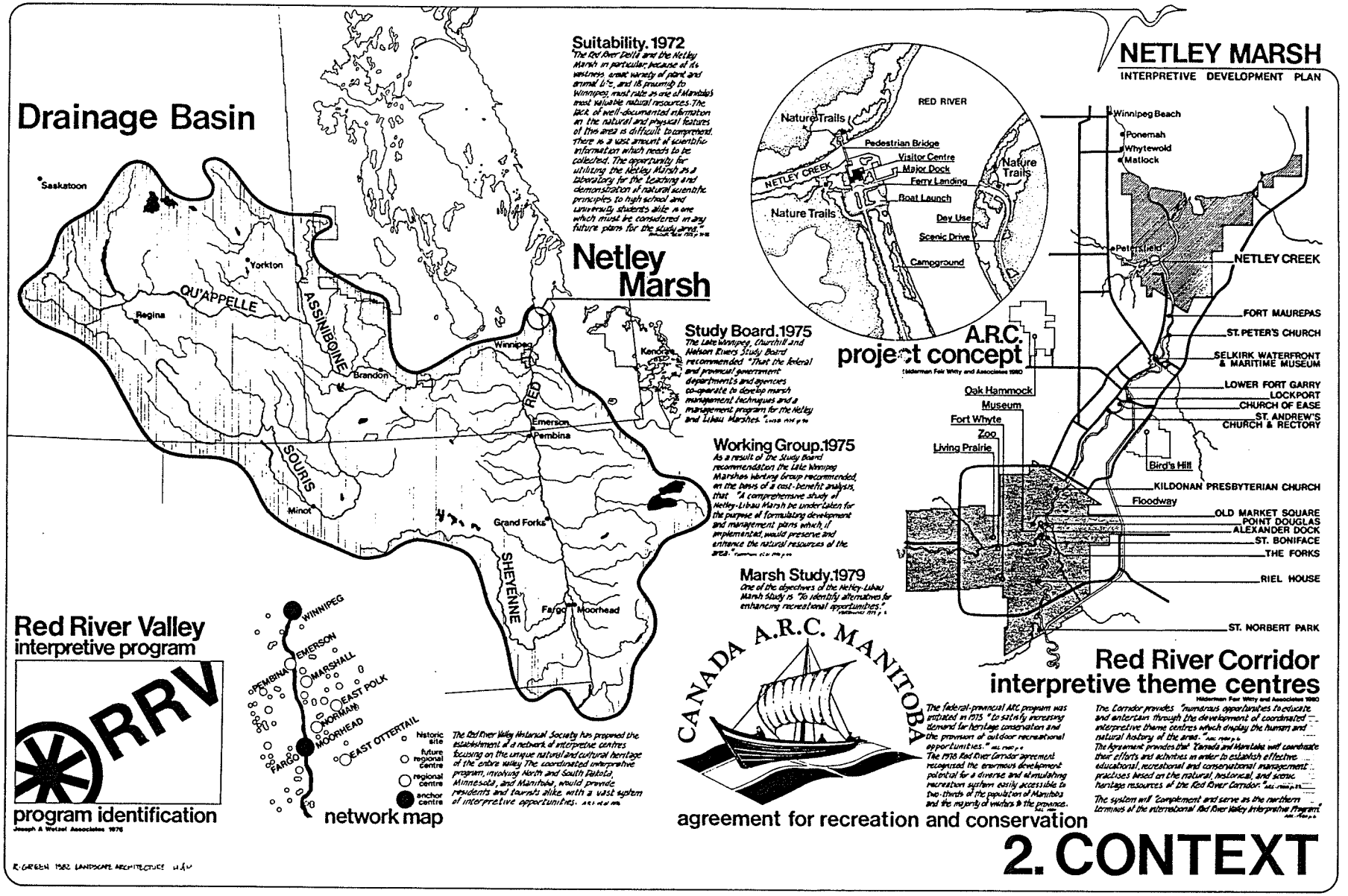
Develop a conceptual interpretive system which provides a variety of interpretive opportunities appropriate to the study area.

Establish a development framework which fully integrates potential interpretive activities with the established recreational context.

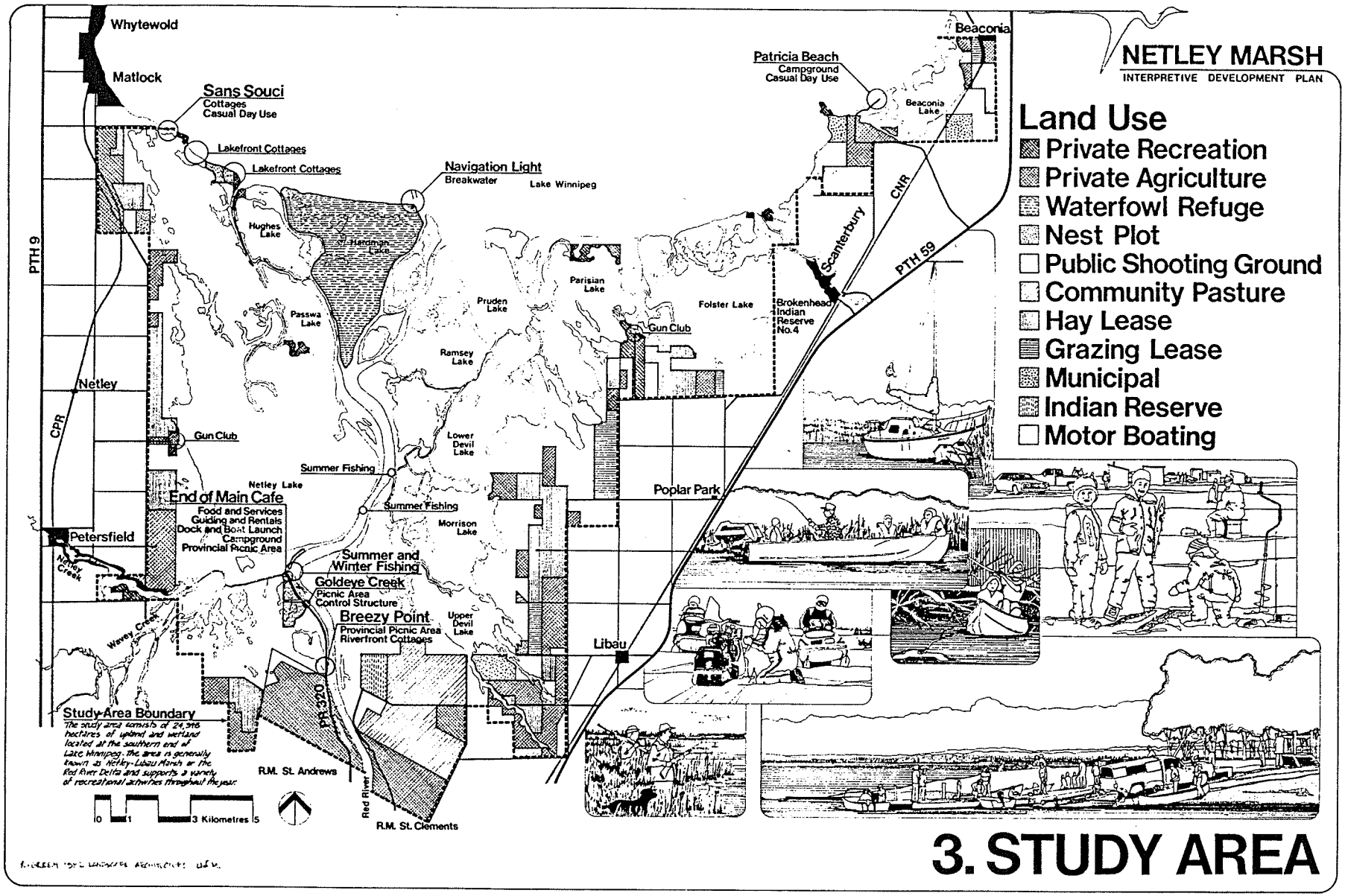
The Interpretive Development Plan should provide the spatial and functional flexibility within which a variety of interpretive program alternatives may be explored.

1. INTRODUCTION

R. GREEN 1977 / LANDSCAPE ARCHITECTURE U.B.C.

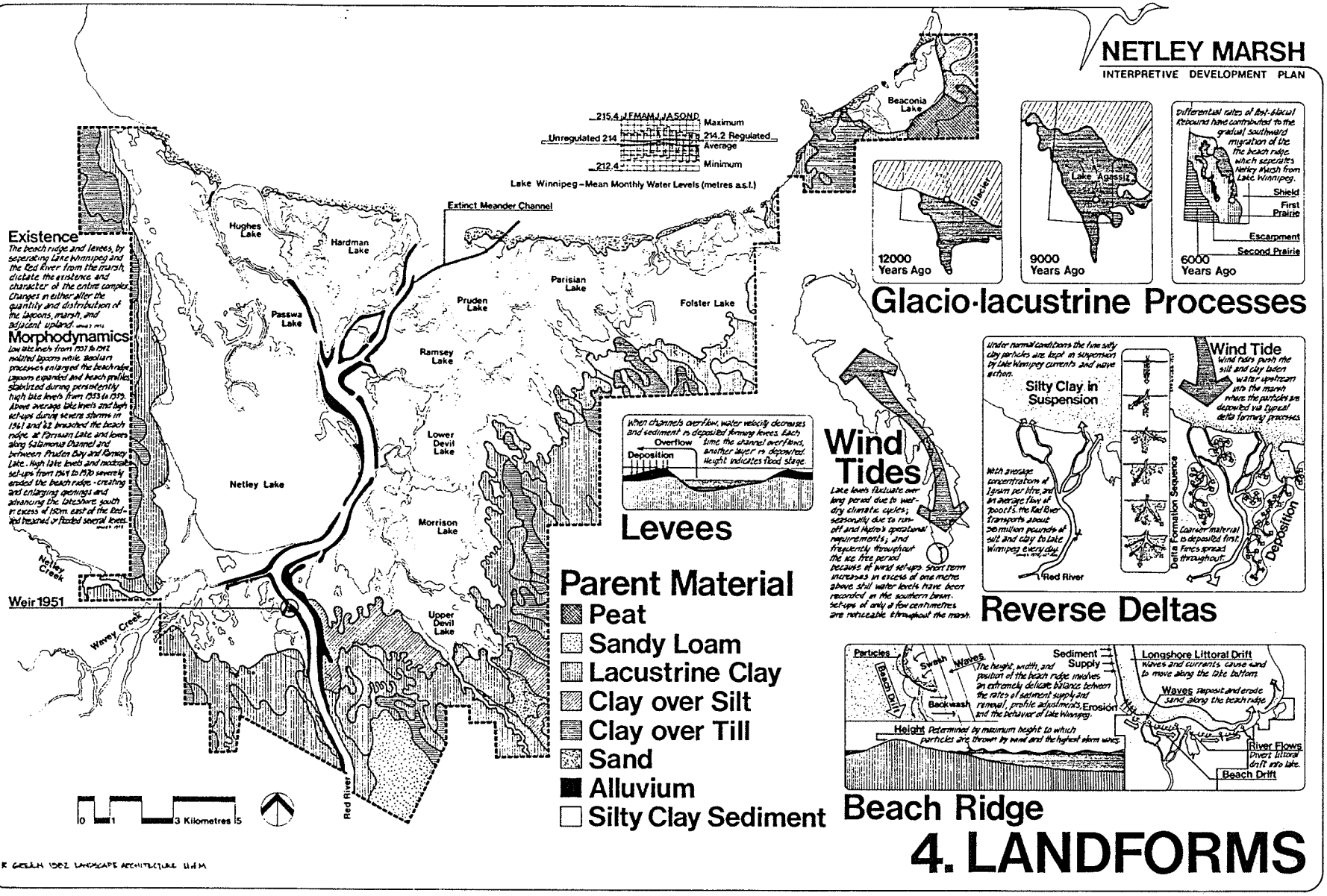

Drainage Basin
Saskatoon
Yorkton
Regina
QU'APPELLE
ASSINIBOINE
Brandon
Winnipeg
Kenora
RED
Emerson
Pembina
SOURIS
Minot
Grand Forks
SHEYENNE
Fargo
Moorhead
Suitability. 1972
"The Red River Delta and the Netley Marsh in particular, because of its vastness, great variety of plant and animal life, and its proximity to Winnipeg, must rate as one of Manitoba's most valuable natural resources. The lack of well-documented information on the natural and physical features of this area is difficult to comprehend. There is a vast amount of scientific information which needs to be collected. The opportunity for utilizing the Netley Marsh as a laboratory for the teaching and demonstration of natural scientific principles to high school and university students alike is one which must be considered in any future plans for the study area."
Netley Marsh
Study Board. 1975
The Lake Winnipeg, Churchill and Nelson Rivers Study Board recommended "That the federal and provincial governments' departments and agencies co-operate to develop marsh management techniques and a management program for the Netley and Libau Marshes."
Working Group. 1975
As a result of the Study Board recommendation the Lake Winnipeg Marshes Working Group recommended, on the basis of a cost-benefit analysis, that "A comprehensive study of Netley-Libau Marsh be undertaken for the purpose of formulating development and management plans which, if implemented, would preserve and enhance the natural resources of the area."
Marsh Study. 1979
One of the objectives of the Netley-Libau Marsh Study is "To identify alternatives for enhancing recreational opportunities."
NETLEY MARSH
INTERPRETIVE DEVELOPMENT PLAN
RED RIVER
Nature Trails
Pedestrian Bridge
Visitor Centre
Major Dock
Ferry Landing
Boat Launch
Dog Use
Scenic Drive
Campground
NETLEY CREEK
Nature Trails
Nature Trails
A.R.C. project concept
Hilderman Fair Whitty and Associates 1980
Winnipeg Beach
Ponemah
Whytewold
Matlock
Petersfield
NETLEY CREEK
FORT MAUREPAS
ST. PETER'S CHURCH
SELKIRK WATERFRONT & MARITIME MUSEUM
LOWER FORT GARRY
LOCKPORT
CHURCH OF EASE
ST. ANDREW'S CHURCH & RECTORY
Oak Hammock
Museum
Fort Whyte
Zoo
Living Prairie
Bird's Hill
KILDONAN PRESBYTERIAN CHURCH
Floodway
OLD MARKET SQUARE
POINT DOUGLAS
ALEXANDER DOCK
ST. BONIFACE
THE FORKS
RIEL HOUSE
ST. NORBERT PARK
Red River Corridor interpretive theme centres
Hilderman Fair Whitty and Associates 1980
The Corridor provides "numerous opportunities to educate and entertain through the development of coordinated interpretive theme centres which display the human and natural history of the area."
The Agreement provides that "Canada and Manitoba will coordinate their efforts and activities in order to establish effective educational, recreational and conservational management practises based on the natural, historical, and scenic heritage resources of the Red River Corridor."
The system will "complement and serve as the northern terminus of the international Red River Valley Interpretive Program."
Red River Valley interpretive program
RRV
program identification
Joseph A Weisel Associates 1976
WINNIPEG
EMERSON
PEMBINA
MARSHALL
EAST POLK
NORMAN
MOORHEAD
FARGO
EAST OTTERTAIL
historic site
future regional centre
regional centre
anchor centre
network map
The Red River Valley Historical Society has proposed the establishment of a network of interpretive centres focusing on the unique natural and cultural heritage of the entire valley. The coordinated interpretive program, involving North and South Dakota, Minnesota, and Manitoba, would provide residents and tourists alike, with a vast system of interpretive opportunities.
CANADA A.R.C. MANITOBA
agreement for recreation and conservation
The federal-provincial ARC program was initiated in 1975 "to satisfy increasing demand for heritage conservation and the provision of outdoor recreational opportunities."
The 1978 Red River Corridor agreement recognized the enormous development potential for a diverse and stimulating recreation system easily accessible to two-thirds of the population of Manitoba and the majority of visitors to the province.
R. GREEN 1982 LANDSCAPE ARCHITECTURE U.M.

2. CONTEXT


NETLEY MARSH
INTERPRETIVE DEVELOPMENT PLAN
Land Use
Private Recreation
Private Agriculture
Waterfowl Refuge
Nest Plot
Public Shooting Ground
Community Pasture
Hay Lease
Grazing Lease
Municipal
Indian Reserve
Motor Boating
Whytewold
Matlock
Sans Souci
Cottages
Casual Day Use
Lakefront Cottages
Lakefront Cottages
Navigation Light
Breakwater
Lake Winnipeg
Patricia Beach
Campground
Casual Day Use
Beaconia
Beaconia Lake
CNR
Scanterbury
PTH 59
PTH 9
Hughes Lake
Henderson Lake
Parisian Lake
Pruden Lake
Folster Lake
Brokenhead Indian Reserve No.4
Gun Club
Passwa Lake
Ramsey Lake
Netley
CPR
Gun Club
Lower Devil Lake
Summer Fishing
Netley Lake
End of Main Cafe
Food and Services
Guiding and Rentals
Dock and Boat Launch
Campground
Provincial Picnic Area
Summer Fishing
Morrison Lake
Poplar Park
Petersfield
Summer and Winter Fishing
Goldeye Creek
Picnic Area
Control Structure
Breezy Point
Provincial Picnic Area
Riverfront Cottages
Upper Devil Lake
Libau
Study Area Boundary
The study area consists of 24,916 hectares of upland and wetland located at the southern end of Lake Winnipeg. The area is generally known as Netley-Libau Marsh or the Red River Delta and supports a variety of recreational activities throughout the year.
PR 320
R.M. St. Andrews
R.M. St. Clements
Red River
0 1 3 Kilometres 5
3. STUDY AREA

NETLEY MARSH

INTERPRETIVE DEVELOPMENT PLAN

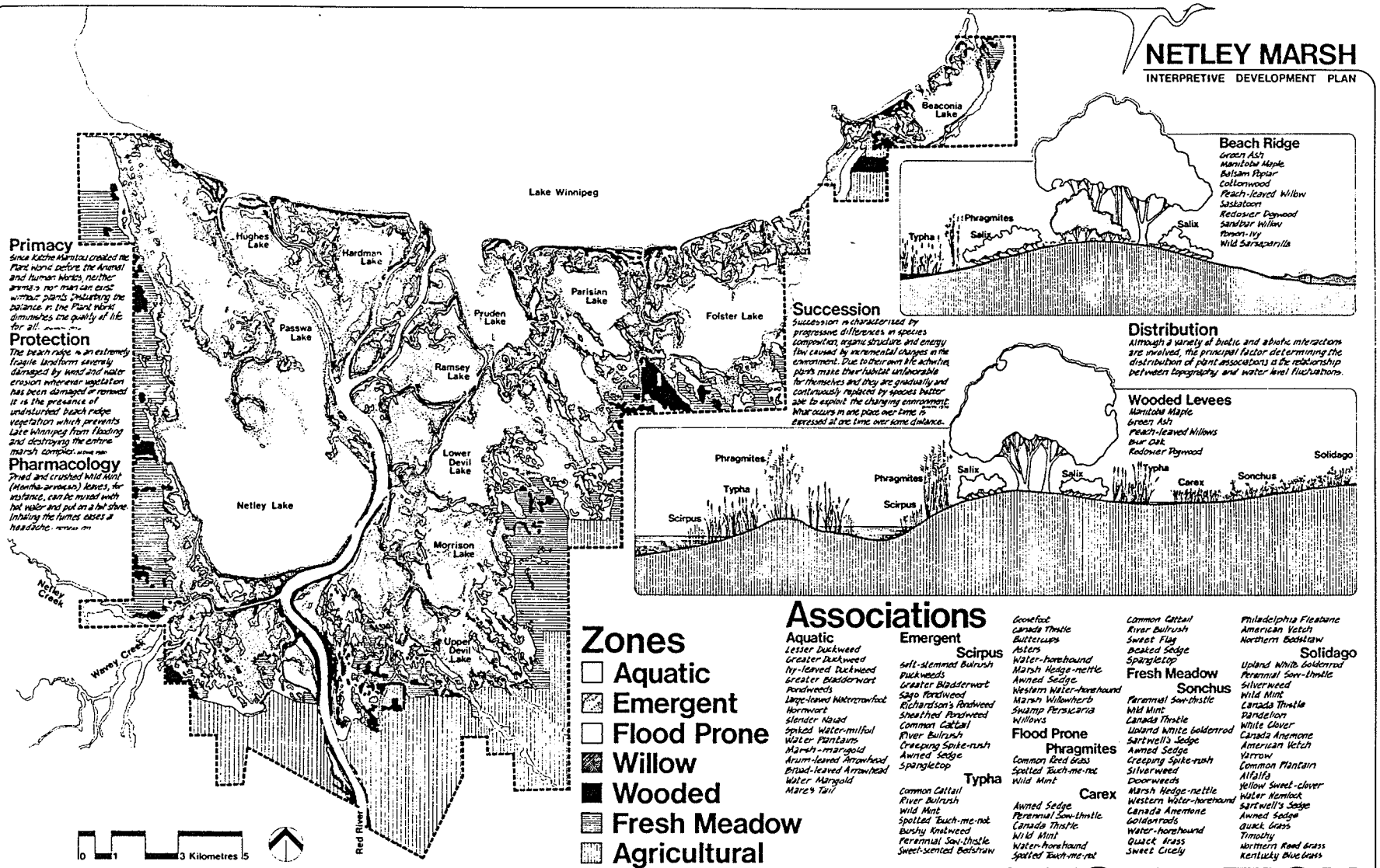


4. LANDFORMS

R GREEN 1982 LANDSCAPE ARCHITECTURE U of M

NETLEY MARSH

INTERPRETIVE DEVELOPMENT PLAN



Primacy

Since Kitche Manitou created the Plant World before the Animal and human Works, neither animals nor man can exist without plants. Disturbing the balance in the Plant World diminishes the quality of life for all.

Protection

The beach ridge is an extremely fragile landform severely damaged by wind and water erosion wherever vegetation has been damaged or removed. It is the presence of undisturbed beach ridge vegetation which prevents Lake Winnipeg from flooding and destroying the entire marsh complex.

Pharmacology

Dried and crushed Wild Mint (Mentha arvensis) leaves, for instance, can be mixed with hot water and put on a hot stone. Inhaling the fumes eases a headache.

Succession

Succession is characterized by progressive differences in species composition, organic structure and energy flow caused by incremental changes in the environment. Due to their environ. effects, plants make their habitat unfavorable for themselves and they are gradually and continuously replaced by species better able to exploit the changing environment. What occurs in one place over time is expressed at one time over some distance.

Distribution

Although a variety of biotic and abiotic interactions are involved, the principal factor determining the distribution of plant associations is the relationship between topography and water level fluctuations.

Zones

- Aquatic
- Emergent
- Flood Prone
- Willow
- Wooded
- Fresh Meadow
- Agricultural

Associations

Aquatic

Lesser Duckweed
Greater Duckweed
Ivy-leaved Duckweed
Greater Bladderwort
Pondweeds
Large-leaved Watercrowfoot
Hornwort
Slender Naiad
Spiked Water-milfoil
Water Plantains
Marsh-marigold
Arum-leaved Arrowhead
Broad-leaved Arrowhead
Water Marigold
Mare's Tail

Emergent

Scirpus

Soft-stemmed Bulrush
Duckweeds
Greater Bladderwort
Sago Pondweed
Richardson's Pondweed
Sheathed Pondweed
Common Cattail
River Bulrush
Creeping Spike-rush
Awned Sedge
Spangletop

Typha

Common Cattail
River Bulrush
Wild Mint
Spotted Touch-me-not
Bushy Knotweed
Perennial Sow-thistle
Sweet-scented Bedstraw
Goosefoot
Canada Thistle
Buttercups
Asters
Water-horehound
Marsh Hedge-nettle
Awned Sedge
Western Water-horehound
Marsh Willowherb
Swamp Persicaria
Willows

Flood Prone

Phragmites

Common Reed Grass
Spotted Touch-me-not
Wild Mint

Carex

Awned Sedge
Perennial Sow-thistle
Canada Thistle
Wild Mint
Water-horehound
Spotted Touch-me-not
Common Cattail
River Bulrush
Sweet Flag
Beaked Sedge
Spangletop

Fresh Meadow

Sonchus

Perennial Sow-thistle
Wild Mint
Canada Thistle
Upland White Goldenrod
Sartwell's Sedge
Awned Sedge
Creeping Spike-rush
Silverweed
Doorweeds
Marsh Hedge-nettle
Western Water-horehound
Canada Anemone
Goldenrods
Water-horehound
Quack Grass
Sweet Cicely
Philadelphia Fleabane
American Vetch
Northern Bedstraw

Solidago

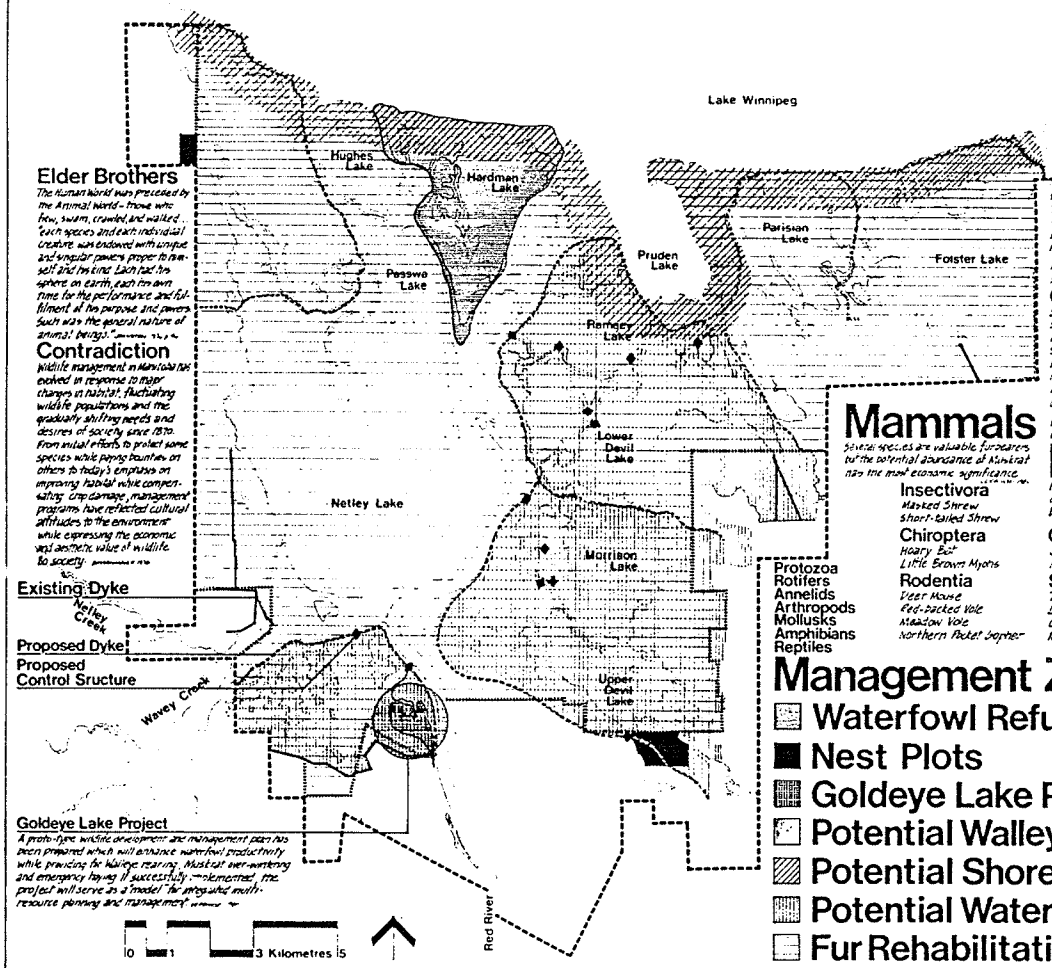
Upland White Goldenrod
Perennial Sow-thistle
Silverweed
Wild Mint
Canada Thistle
Dandelion
White Clover
Canada Anemone
American Vetch
Yarrow
Common Plantain
Alfalfa
Yellow Sweet-clover
Water Hemlock
Sartwell's Sedge
Awned Sedge
Quack Grass
Timothy
Northern Reed Grass
Kentucky Blue Grass

5. VEGETATION

R. GREEN MAEL LANDSCAPE ARCHITECTURE, U.B.C.

NETLEY MARSH

INTERPRETIVE DEVELOPMENT PLAN



Elder Brothers

The human world was preceded by the Animal World - those who flew, swam, crawled, and walked... "each species and each individual creature was endowed with unique and singular powers proper to itself and its kind. Each had its sphere on earth, each its own time for the performance and fulfilment of its purpose and powers. Such was the general nature of animal beings."

Contradiction

Wildlife management in Manitoba has evolved in response to major changes in habitat, fluctuating wildlife populations and the gradually shifting needs and desires of society since 1870. From initial efforts to protect some species while paying bounties on others to today's emphases on improving habitat while compensating crop damage, management programs have reflected cultural attitudes to the environment while expressing the economic and aesthetic value of wildlife to society.

Existing Dyke

Proposed Dyke

Proposed Control Sructure

Goldeye Lake Project

A proto-type wildlife development and management plan has been prepared which will enhance waterfowl productivity while providing for walleye rearing. Habitat over-wintering and emergency haying if successfully implemented, the project will serve as a "model" for integrated multi-resource planning and management.

Protozoa
Rotifers
Annelids
Arthropods
Mollusks
Amphibians
Reptiles

Mammals

Several species are valuable for either the potential abundance of habitat or the most economic significance.

Insectivora
Masked Shrew
Short-tailed Shrew

Chiroptera
Hoary Bat
Little Brown Myotis

Rodentia
Deer Mouse
Red-backed Vole
Meadow Vole
Northern Pocket Gopher
Richardson's Ground-squirrel
Thirteen-lined Ground-squirrel
Franklin's Ground-squirrel
Eastern Grey Squirrel
Muskrat
Beaver

Carnivora
Long-tailed Weasel
Short-tailed Weasel
Mink
Striped Skunk
Badger
Raccoon
Fox
Coyote

Artiodactyla
White-tailed Deer

Fishes

Netley Marsh is the source of up to 3/4 of the frozen bait fish marketed in Manitoba

Osteoglossiformes
Goldeye
Mooneye

Salmoniformes
Tullibees
Lake Whitefish
Central Mudminnow
Northern Pike

Cypriniformes
Common Sucker
Silver Redhorse
Carp
Silver Shiner
Minnows
Shiners

Siluriformes
Channel Catfish
Bullheads
Madtom

Atheriniformes
Banded Killifish

Perciformes
Black Crappie
Perch
Sauger
Walleye
Darters
Drum

Management Zones

- Waterfowl Refuge
- Nest Plots
- Goldeye Lake Project
- Potential Walleye Rearing Basin
- Potential Shoreline Reserve
- Potential Water Level Management
- Fur Rehabilitation Block 1943-1954

Birds

The interspersion of vegetation and water is essential to the production of waterfowl. Bird watchers outnumber hunters by more than 4 to 1.

Gaviiformes
Common Loon

Podicipediformes
Western Grebe
Red-necked Grebe
Horned Grebe
Eared Grebe
Pied-billed Grebe

Pelecaniformes
White Pelican
Double-crested Cormorant

Anseriformes
Whistling Swan
Canada Goose
White-fronted Goose
Snow Goose
Ross' Goose
Mallard
Black Duck
Gadwall
Pintail
Green-winged Teal
Blue-winged Teal
Cinnamon Teal
American Wigeon
Northern Shoveler
Wood Duck
Redhead
Ring-necked Duck
Canvasback
Greater Scaup
Lesser Scaup
Common Goldeneye
Bufflehead
White-winged Scoter
Hooded Merganser
Common Merganser
Red-breasted Merganser

Falconiformes
Goshawk
Sharp-shinned Hawk
Cooper's Hawk
Red-tailed Hawk
Broad-winged Hawk
Swainson's Hawk
Rough-legged Hawk
Golden Eagle
Bald Eagle
Marsh Hawk
Osprey
Gyrfalcon
Prairie Falcon
Peregrine Falcon
Merlin
American Kestrel

Galliformes
Ruffed Grouse
Sharp-tailed Grouse
Grey Partridge

Ciconiiformes
Great Blue Heron
Great Egret
Black-crowned Night Heron
Least Bittern
American Bittern

Gruiformes
Sandhill Crane
Virginia Rail
Sora
Yellow Rail
American Coot

Charadriiformes
Semipalmated Plover
Piping Plover
Killdeer
American Golden Plover
Black-bellied Plover
Ruddy Turnstone
Common Snipe
Whimbrel
Upland Sandpiper
Spotted Sandpiper
Solitary Sandpiper
Willet
Greater Yellowlegs
Lesser Yellowlegs
Short-billed Dowitcher
Long-billed Dowitcher
Stilt Sandpiper
Semipalmated Sandpiper
Buff-breasted Sandpiper
Marbled Godwit
Hudsonian Godwit
Sanderling
American Avocet
Wilson's Phalarope
Northern Phalarope
Herring Gull
Ring-billed Gull
Franklin's Gull
Bonaparte's Gull
Forster's Tern
Common Tern
Caspian Tern
Black Tern

Columbiformes
Rock Dove
Mourning Dove

Cuculiformes
Black-billed Cuckoo

Stigiformes
Screech Owl
Great Horned Owl
Snowy Owl
Burrowing Owl
Long-eared Owl
Short-eared Owl

Caprimulgiformes
Whip-poor-will
Common Nighthawk

Apodiformes
Ruby-throated Hummingbird

Coraciiformes
Belted Kingfisher

Piciformes
Common Flicker
Yellow-bellied Sapsucker
Hairy Woodpecker
Downy Woodpecker

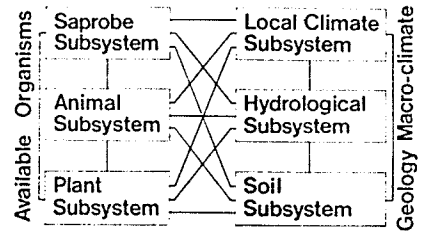
Passeriformes
Eastern Kingbird
Western Kingbird
Great Crested Flycatcher
Eastern Phoebe
Yellow-bellied Flycatcher
Alder Flycatcher
Least Flycatcher
Eastern Wood Pewee
Olive-sided Flycatcher
Horned Lark
Tree Swallow
Bank Swallow
Rough-winged Swallow
Barn Swallow
Cliff Swallow
Purple Martin
Blue Jay
Black-billed Magpie
Common Raven
Common Crow
Black-capped Chickadee
House Wren
Long-billed Marsh Wren
Short-billed Marsh Wren
Gray Catbird
Brown Thrasher
American Robin
Hermit Thrush
Swainson's Thrush
Gray-cheeked Thrush
Veery
Golden-crowned Kinglet
Ruby-crowned Kinglet
Water Pipit
Cedar Waxwing
Northern Shrike
Common Starling
Solitary Vireo
Red-eyed Vireo
Philadelphia Vireo
Warbling Vireo
Black-and-white Warbler
Golden-winged Warbler
Tennessee Warbler
Nashville Warbler
Yellow Warbler
Magnolia Warbler
Cape May Warbler
Yellow-rumped Warbler
Black-throated Green Warbler
Blackburnian Warbler
Chestnut-sided Warbler
Bay-breasted Warbler
Blackpoll Warbler
Palm Warbler
Ovenbird
Northern Waterthrush
Mourning Warbler
Common Yellowthroat
Wilson's Warbler
Canada Warbler
American Redstart
House Sparrow
Bobolink
Western Meadowlark
Yellow-headed Blackbird
Red-winged Blackbird
Baltimore Oriole
Rusty Blackbird
Brewer's Blackbird
Common Grackle
Brown-headed Cowbird
Scarlet Tanager
Rose-breasted Grosbeak
Evening Grosbeak
Purple Finch
Pine Grosbeak
Hoary Redpoll
Pine Siskin
American Goldfinch
White-winged Crossbill
Savannah Sparrow
LeConte's Sparrow
Sharp-tailed Sparrow
Vesper Sparrow
Lark Sparrow
Dark-eyed Junco
Tree Sparrow
Chipping Sparrow
Harris' Sparrow
White-crowned Sparrow
White-throated Sparrow
Fox Sparrow
Lincoln's Sparrow
Song Sparrow
Lapland Longspur
Smith's Longspur
Chestnut-collared Longspur
Snow Bunting

Note:
species lists are preliminary only.

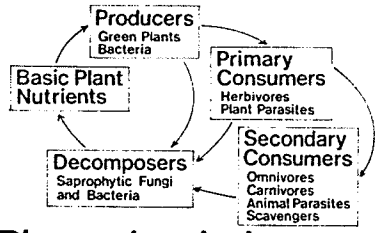
6. WILDLIFE

NETLEY MARSH
INTERPRETIVE DEVELOPMENT PLAN

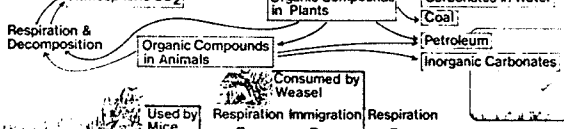
Natural History

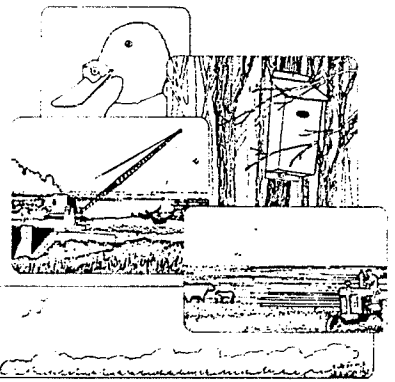


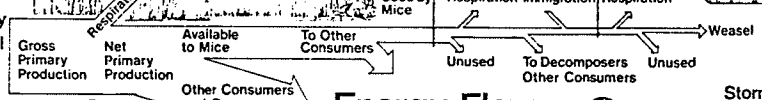
The Ecosystem



Biogeochemical Cycles







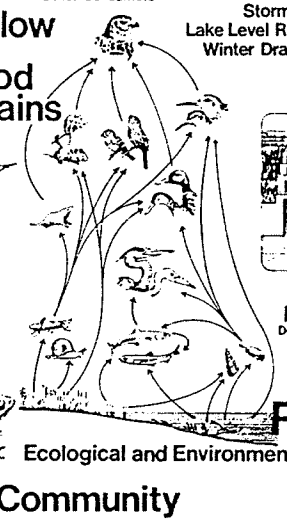
Energy Flow

Food Chains

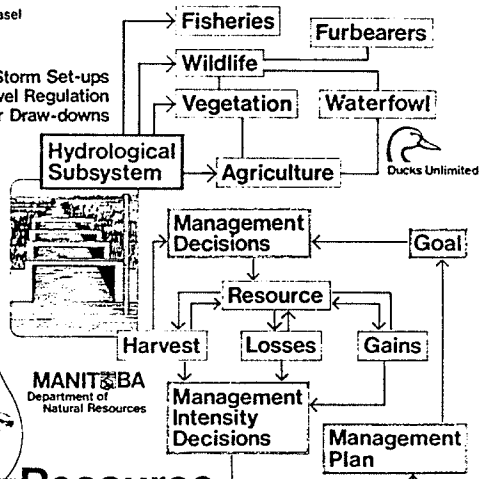
The Organism

The Population

The Community

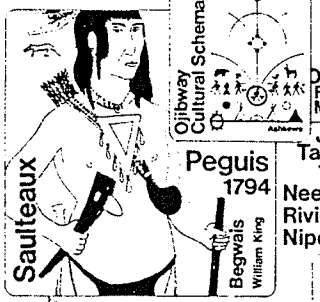


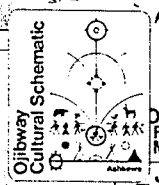
Ecological and Environmental Research



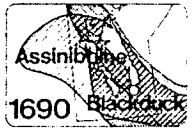
Resource Management

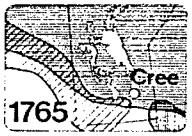
Cultural History

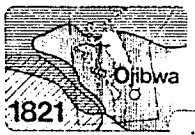


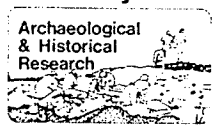


Prehistory









La Vérendrye 1734

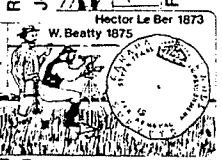
North West Company
Fort Maurepas
Ouckidoat
Joseph Frobisher
Alexander Henry
Miles Macdonell
Henry Prince
Rindisbacher

John Tanner 1792

Peguis 1794

Nee-poo-win Sipi
Rivière aux Morts
Nipou Cipi
Netley Creek

Selkirk Settlers 1812



Stone Fort Treaty No. 1 1871
William Cockran
Anglican Church Missionary Society
Sugar Point
St. Peter's Reserve Surrendered
F.R.E.D. 1971
Manitoba Hydro Lake Level Regulation 1975
Garrison

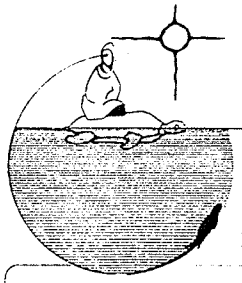
Exploration Exploita
Transportation
Settlement Agriculture
Recreation Conservation

Contemporary Issues

Cultural History

7. THEMES

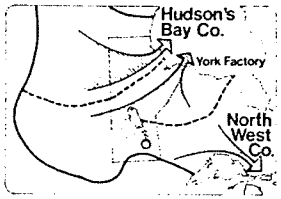
NETLEY MARSH
INTERPRETIVE DEVELOPMENT PLAN



Creation Myth

sensing her loneliness, the water creatures invited Sky-woman to join them on the vast sea that had once been the earth. Resting on the back of a turtle she asked for soil from the bottom. The beaver, fisher, marten and lynx each tried and failed. Despite their scorn, the others laughed when the lowly muskrat prepared to dive.

Although originally scorned for his lack of strength and endurance, the laughter turned to despair as time passed. After the others had given up on him Muskrat floated to the surface - near death - with a bit of mud which Sky-woman turned into an island on the turtle's back. As the island grew and the water subsided Sky-woman re-built the Ojibway landscape.

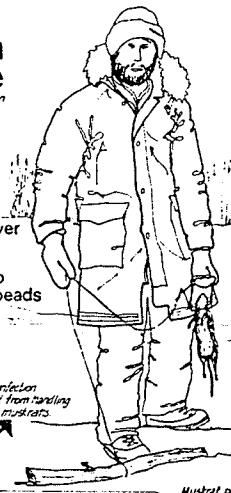


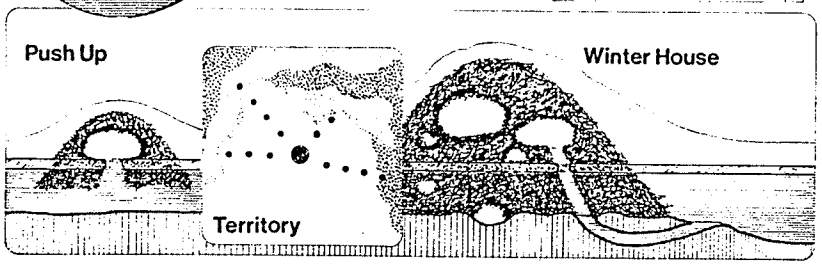
The Western Fur Trade

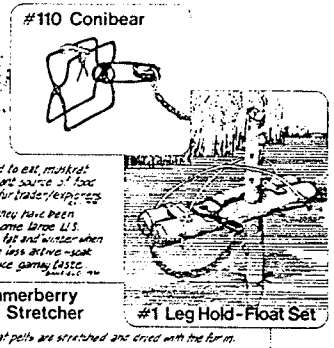
The fur trade is basic to North American history. ... From 1670 until 1870 "the fur trade was the most pervasive force influencing the economic and political development of Western Canada". ... In 1964 muskrats were harvested at Netley Marsh in 1945. ...

10-12 Prime Muskrat
equalled 1 Made Beaver
worth 1 quart brandy
or 1 hatchet
or 1 pound tobacco
or 1/2 pound small beads

1982 Price - $7.20



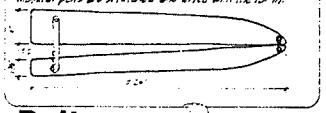




Apparently good to eat, muskrat were an important source of food for Indians and fur traders/explorers.

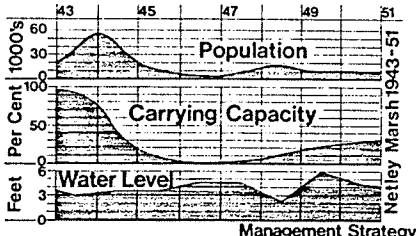
More recently they have been marketed in some large U.S. cities - best in fall and winter when stored glands are less active - soak in brine to reduce gamey taste.

Tularemia Death Flu-like Symptoms — Bacterial infection contacted from handling infected muskrats.



Muskrat pelts are stretched and dried with the fur in.

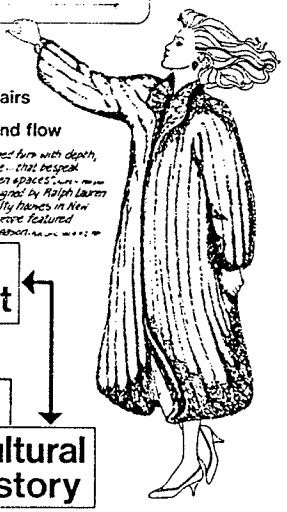
Muskrat pelts are 'cased' - skinned inside out from vent to head like a tube.



Muskrats occupy a wide variety of aquatic habitats: 1-9 m water, emergents, and soft bottom.

Prime Pelts

Creamy white flesh side
Soft pliable oily leather
Completely covered by guard hairs
Thick deep underfur
Glossy appearance-full of life and flow



"I have always used rugged furs with depth, character and texture - that bespeak prairies ... and wide open spaces". ... The Ranger Coat (far), designed by Ralph Lauren and available at specialty stores in New York, Montreal and Europe featured muskrat in the 1981 season. ...

Life Cycle

Management Strategy
Optimize habitat quality and quantity.
Maintain breeding stock to maximize reproduction and population growth.
Harvest excess population to prevent habitat destruction and starvation.

Independent juveniles	Sexually mature yearlings					2-12 Kits born naked blind and helpless	Week 1: Movement - Fur begins to grow	Week 2: Eyes open and activity increases	Week 3: Very active - start to swim and take plant food	Week 4: Weaned - good swimmers and fully furred	Week 5: More or less independent juveniles												
Periodic epidemics of Errington's Disease		Prime pelts	Males potent by spring breakup	Male aggression	Home range and travel	Severe predation	Mating	28 Day Gestation	First Litters		2nd Litters		3rd Litters	Males impotent	Rare 4th Litters	House building			Pushups built as ice forms		Salvage trapping		
J	F	M	A	M	J	J	A	S	O	N	D												

Food

Cattails
Bulrushes
Horsetails
Sweet Flag
Burreeds
Pondweeds
Reed Grass
Arrowhead
Sedges

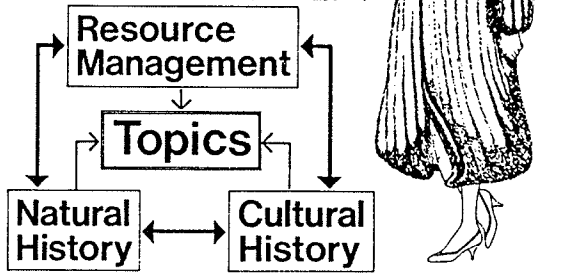
Predators

Mink
Northern Pike
Coyote
Gyrfalcon
Great Horned Owl

Ondatra zibethicus alba

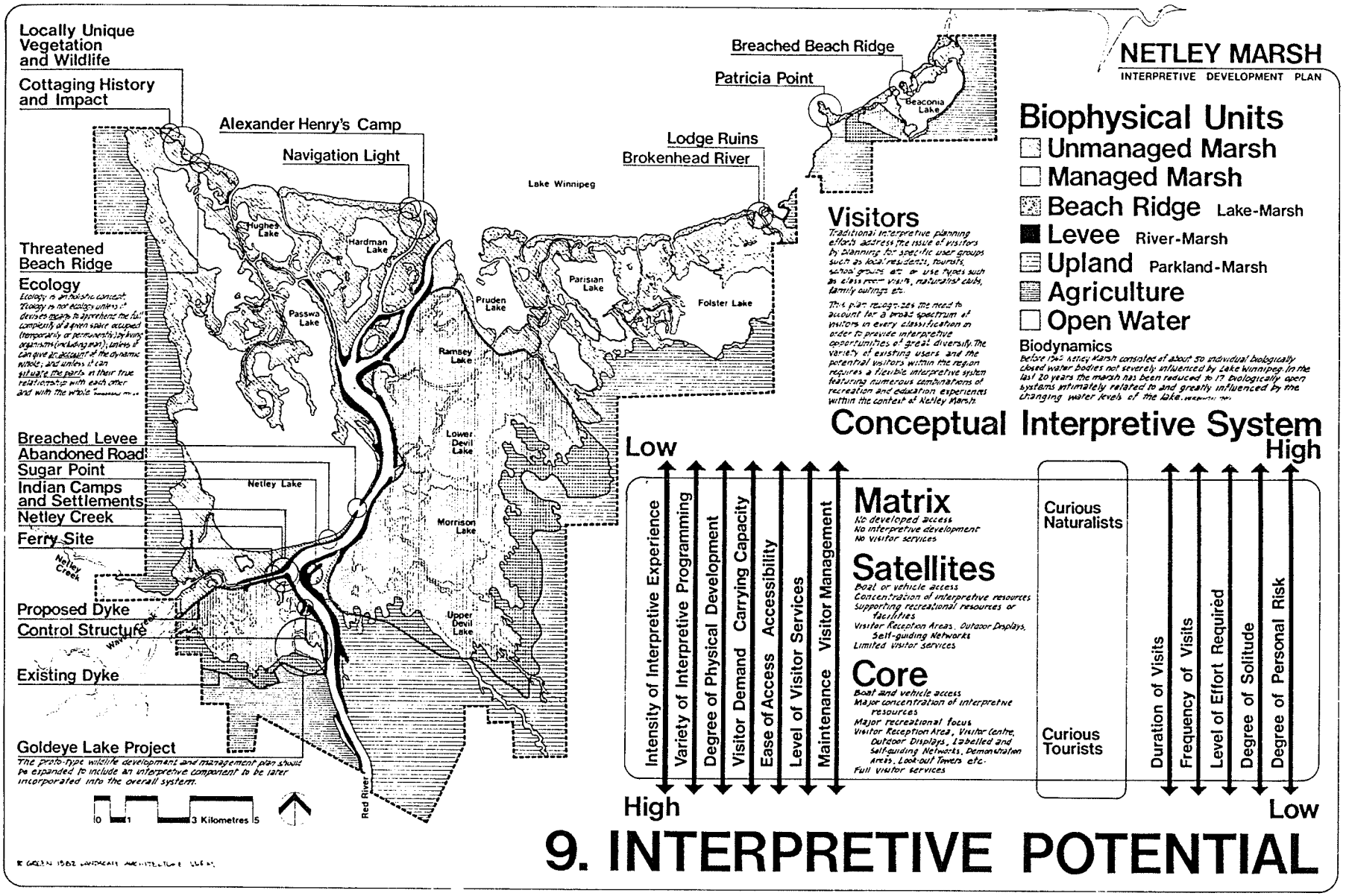
Winter Adaptations

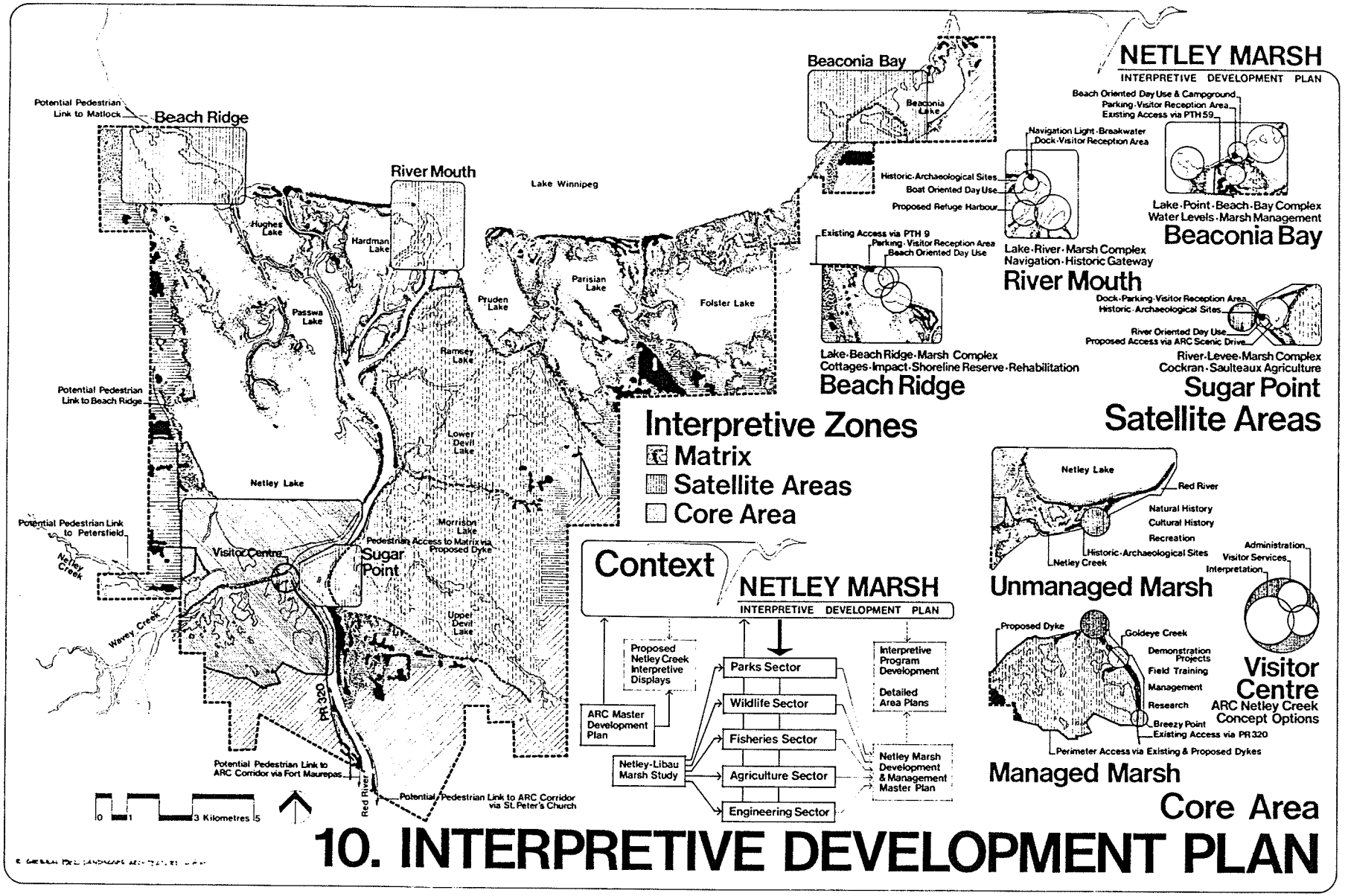
Muskrats are active throughout the winter immersed in near-freezing water could cause severe heat loss leading to hypothermia. Muskrats have a variety of adaptive mechanisms for keeping warm. Dense waterproof underfur maintains air layer when submerged. Temperature of extremities drops to that of surroundings. A thermal blanket of brown fat warms blood returning from cooled periphery and selectively warms sensitive organs such as kidneys and spinal cord. Body temperature is elevated before entering water. Group occupied insulated houses efficiently store body heat. Muskrats frequently withdraw for re-warming to push ups, which are arranged to provide access throughout the home range via short swims. "Freeze-out" is the most serious threat in winter. ...



8. THE MUSKRAT

R. GREEN 1982 LANDSCAPE ARCHITECTURE U.B.C.

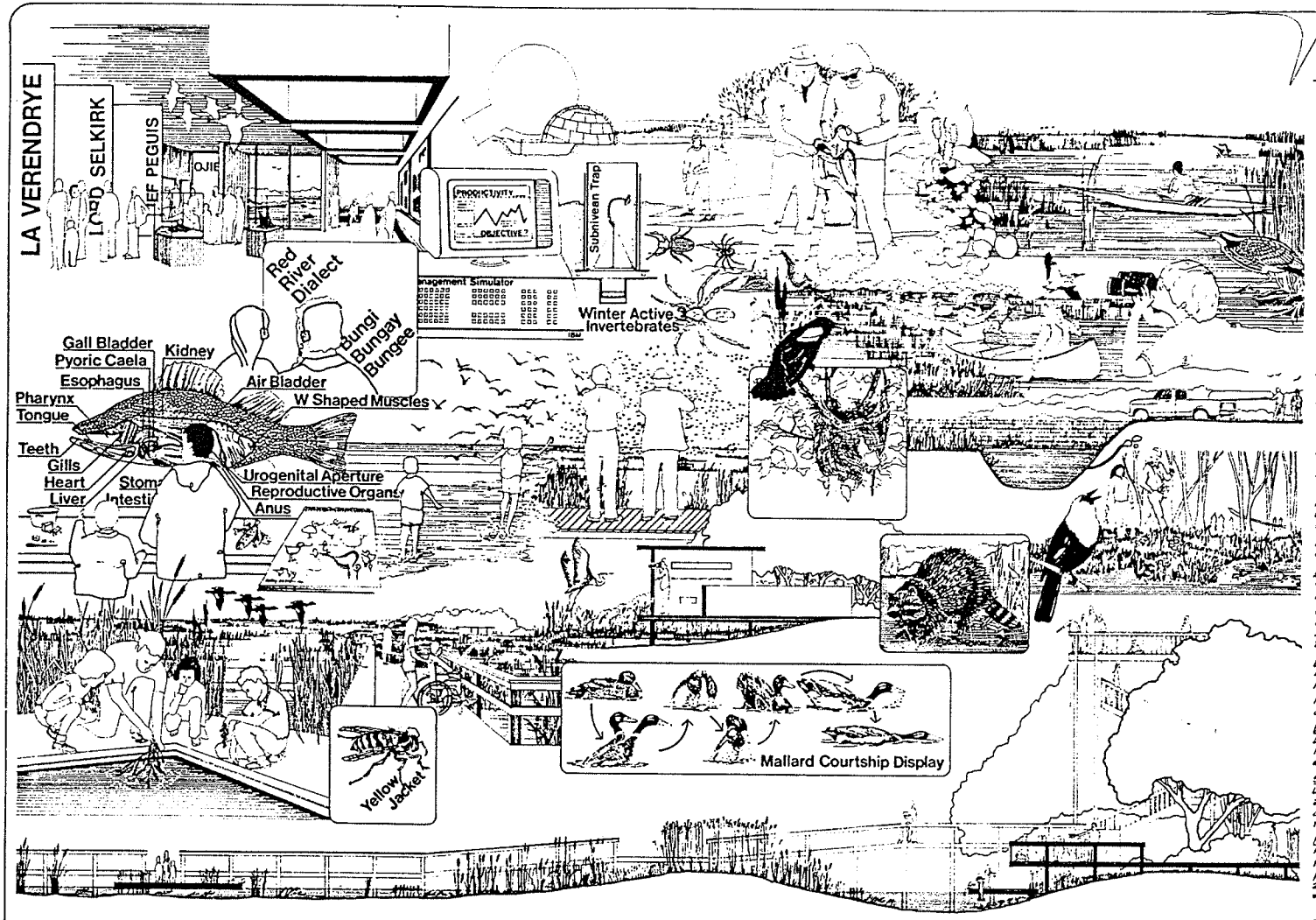

Locally Unique Vegetation and Wildlife
Cottaging History and Impact
Alexander Henry's Camp
Navigation Light
Threatened Beach Ridge
Ecology
Ecology in an holistic context.
"Ecology is not ecology unless it devotes equal attention to the full complexity of a given system occupied (temporarily or permanently) by living organisms (including man); unless it can give an account of the dynamic whole; and unless it can situate the parts in their true relationship with each other and with the whole"
Breached Levee
Abandoned Road
Sugar Point
Indian Camps and Settlements
Netley Creek
Ferry Site
Proposed Dyke
Control Structure
Existing Dyke
Goldeye Lake Project
The proto-type wildlife development and management plan should be expanded to include an interpretive component to be later incorporated into the overall system.
Hughes Lake
Hardman Lake
Passwa Lake
Ramsey Lake
Lower Devil Lake
Morrison Lake
Upper Devil Lake
Netley Lake
Netley Creek
Red River
Lake Winnipeg
Pruden Lake
Parisian Lake
Folster Lake
Lodge Ruins
Brokenhead River
Breached Beach Ridge
Patricia Point
Beaconia Lake
0 1 3 Kilometres 5
NETLEY MARSH
INTERPRETIVE DEVELOPMENT PLAN
Biophysical Units
Unmanaged Marsh
Managed Marsh
Beach Ridge Lake-Marsh
Levee River-Marsh
Upland Parkland-Marsh
Agriculture
Open Water
Biodynamics
Before the Netley Marsh consisted of about 50 individual biologically closed water bodies not severely influenced by Lake Winnipeg. In the last 20 years the marsh has been reduced to 17 biologically open systems intimately related to and greatly influenced by the changing water levels of the lake.
Visitors
Traditional interpretive planning efforts address the issue of visitors by planning for specific user groups such as local residents, tourists, school groups etc. or use types such as class room visits, naturalist walks, family outings etc.
This plan recognizes the need to account for a broad spectrum of visitors in every classification in order to provide interpretive opportunities of great diversity. The variety of existing users and the potential visitors within the region requires a flexible interpretive system featuring numerous combinations of recreation and education experiences within the context of Netley Marsh.
Conceptual Interpretive System
Low
High
Intensity of Interpretive Experience
Variety of Interpretive Programming
Degree of Physical Development
Visitor Demand Carrying Capacity
Ease of Access Accessibility
Level of Visitor Services
Maintenance Visitor Management
Matrix
No developed access
No interpretive development
No visitor services
Satellites
Boat or vehicle access
Concentration of interpretive resources supporting recreational resources or facilities
Visitor Reception Areas, Outdoor Displays, Self-guiding Networks
Limited visitor services
Core
Boat and vehicle access
Major concentration of interpretive resources
Major recreational focus
Visitor Reception Area, Visitor Centre, Outdoor Displays, Labelled and Self-guiding Networks, Demonstration Areas, Look-out Towers etc.
Full visitor services
Curious Naturalists
Curious Tourists
Duration of Visits
Frequency of Visits
Level of Effort Required
Degree of Solitude
Degree of Personal Risk
High
Low
9. INTERPRETIVE POTENTIAL



10. INTERPRETIVE DEVELOPMENT PLAN

NETLEY MARSH

INTERPRETIVE DEVELOPMENT PLAN



"That thing called 'nature study', ... constitutes the first embryonic groping of the mass-mind toward perception....
To promote perception is the only truly creative part of recreational engineering".
Aldo Leopold 1949

Summary

In addition to confirming the appropriateness of the ARC Netley Creek Interpretive Proposals, this study clearly demonstrates an incredible potential for interpretive programming throughout the entire marsh. The study identifies the key areas within which an integrated interpretive system should be developed, summarizes the principal themes to be interpreted and offers the following recommendations.

Recommendations

The Netley Marsh Interpretive Development Plan should be considered a conceptual framework for interpretive development in Netley Marsh.

Responsible agencies should proceed with interpretive development on the basis of the Netley Marsh Development and Management Master Plan, the ARC Red River Corridor Master Development Plan and this study.

Core Area

Expand the Goldeye Lake Wildlife Development and Management Plan to include interpretive development studies for eventual incorporation into the overall core area system.

Complete proposed archaeological and historical research at the junction of Netley Creek and the Red River prior to the preparation of a detailed area plan for the core.

Proceed with ARC interpretive Displays at Netley Creek as an interim measure until proposed Visitor Centre proceeds.

Establish an initial interpretive Program in conjunction with the completed displays at Netley Creek.

Beach Ridge Satellite

Undertake historical and archaeological research prior to preparation of a detailed area plan.

Initial displays should encourage thoughtful use of the beach ridge and promote the need for a shoreline reserve to protect the ridge and preserve the marsh as a whole.

River Mouth Satellite

Undertake historical and archaeological research prior to preparation of detailed area plans.

Interpretive development should proceed with the development of the proposed Harbour of Refuge.

Beaconia Bay Satellite

Undertake detailed area plan and include interpretive development to complement existing or proposed recreation development.

Sugar Point Satellite

Undertake archaeological and historical research and prepare detailed area plan prior to development of proposed ARC scenic drive and ferry crossing.

Matrix

No interpretive development should occur within this zone although future recreation development proposals may be evaluated with respect to the appropriateness of additional satellites.

Thanks

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