

DEPARTMENT OF RECREATION AND CONSERVATION  
FISH AND WILDLIFE BRANCH

WHEN REPLYING PLEASE STATE

OUR FILE NO. 79-07

YOUR FILE NO.

MEMORANDUM

TO W.A. McKay  
Wildlife Biologist  
Victoria, B.C.

FROM R. Goodlad  
Regional Supervisor  
Prince George, B.C.

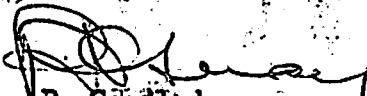
DATE April 24, 1973

Re: Application for Ecological Reserve (Report No. 108)

The application for an ecological reserve on Mayer Lake was discussed briefly with our Regional Wildlife Biologist and he favored prohibiting within the reserve such activities as the construction of guide's or trapper's cabins, the setting up of hunter's or fishermen's camps, and the use of motor boats on Mayer Lake.

Our former Fisheries Biologist M.E. Pinsent said there was no need to close the lake to controlled sport fishing as long as a desirable balance is maintained between predator trout and prey (black sticklebacks).

Conservation Officer A. Ackerman does not see an immediate need to close the reserve area to hunting, guiding or trapping but these activities could again be reconsidered for closure at some future time.

*for*  
  
R. Goodlad  
Regional Supervisor

RJG/jb

*Copy passed to Mr. Krajina Apr 30/73 - mck*

*Mayer Lake*

APPLICATION FOR ECOLOGICAL RESERVE

1. Legal description of the area (or general "Metes and bounds" description)
  
2. Geographical location (relate to nearest settlement, mountain, river, etc.)

Mayer Lake lying in the Queen Charlotte Islands,  
lowlands 6 or 7 miles west of Port  
Clements, B.C.

3. Indicate the biogeoclimatic zone of which the reserve is representative.

Coastal Western Hemlock Zone

4. Approximate total acreage.

16,200 acres.

5. Purpose of the reserve.

(a) Primary (state acreage)

To protect and provide example of habitat of an undescribed endemic species of stickleback (Gasterosteus) which is probably the only freshwater species of fish restricted to British Columbia. 16,200 acres would protect drainage and thus water quality of entire lake system.

(b) Others if any (state acreage)

(c) Buffer areas (state acreage)

6. Brief account of stickleback and habitat attached.

Signature A. E. Peden (s.n)  
I.B.P. Surveyor

CHECK SHEET (Mark VII) FOR SURVEY OF IBP AREAS\*

To be completed with reference to the GUIDE TO THE CHECK SHEET

Serial Number

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For Data Centre Use only

1. 1. Name of surveyor ..... Alex E. Peden .....
2. Address of surveyor ..... British Columbia Provincial Museum .....
- ..... Victoria, B.C. ....
- ..... Canada .....
3. Check Sheet completed (a) on site ..... (b) from records ..... XX .....
4. Date Check Sheet completed .....

2. 1. Name of IBP Area ..... Mayer Lake .....
2. Name of IBP Subdivision (or serial letter) .....
3. Map of IBP Area\* showing boundaries attached? Yes ..XX... No .....
4. Sketch map of IBP Area\*. Please mark direction of north, the scale and grid numbers where applicable.

See attached map segment from Port Clements sheet of the B.C. Dept. Lands and Forests 103 F/9 E (2nd edition, 1956).

\* For "IBP Area", read IBP Area and/or IBP Subdivision.

3. Location of IBP Area\*

1. Latitude.....53.....° .....40!..... N Longitude..132.....° .....03!..... W

2. Country .....Canada.....

State or Province ..British Columbia..... County .....

(State or Province ..... County .....) )

4. Administration

National 1. Official category .....

2. Address of administration .....

.....

.....

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.....

International Class

3.

Included in U.N. List	Rejected from U.N. List	Area with formal conservation status	No formal cons. status
(A)	(B)	(C)	(D)

5. Characteristics of IBP Area\*

1. Surface area (state units of measurement) .....16,186...acres...(approx.).....

2. Altitude (state units of measurement) Maximum .....300...feet.....

Minimum .....74±...feet.....

6. Climate

Nearest climatological station :

1. Name ....Tlell, Q.C.I.....

2. Climatological station on IBP Area\*? Yes ..... No ..X....

3. If (2) not, distance from edge of IBP Area\* (state units) .....6...or...7...miles.....

4. Direction from IBP Area\* ....East.....

5. Additional data sheet attached? Yes ..... No ..X....

9. Landscape

1. General Landscape (give brief description) ..Shallow, brown stained lake;.....  
 ..brown stained cracks bordered by wire vegetation and.....  
 ..coniferous forests, ..Some raised bog land.....

2. Relief Type

	Flat	Undulating (0)-200 m.	Hilly 200-1000 m.	Mountainous > 1000 m.	%
Sharply dissected					
Gently dissected	50	50			100
Incised					
Skeletonised					
%	50	50			100%

3. Special landscape features (list) .....

.....

.....

10. Coastline of IBP Area\*

1. Protected bays and/or inlets                      Many     Few     None

2. Substratum. % of coast

Rock	Boulder Beach	Shingle Beach	Sand Beach	Shell Beach	Mud	Coral	Ice
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Physiography. % of coast

Cliffed	Sloping	Flat
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Special Coastal Features (list) .....

.....

.....

5. Tide. Maximum range (state units of measurement) .....

6. Total length of coastline :

Less than 1 km.     1-10 km.     Above 10 km.

11. Freshwater within IBP Area\*

1.

	Permanent	Intermittent
General		
Standing	XX	
Running	XX	

2. Standing Water

	Permanent	Intermittent	Unproductive	Productive
Swamps				
Ponds				
Lakes	XX			

3. Running Water

	Permanent	Intermittent
Springs, cold		
Springs, hot		
Streams	XX	
Rivers	outlet to lake	

4. Special freshwater features Deep, slow-moving creeks and large but shallow (maximum depth = 30 feet) lake with brown-stained water.

12. Salt and Brackish Water within IBP Area\*

Salt Lakes	<input type="checkbox"/>	Lagoon	<input type="checkbox"/>	.....	<input type="checkbox"/>
Estuaries	<input type="checkbox"/>	Salt pools	<input type="checkbox"/>	.....	<input type="checkbox"/>

13. Adjacent Water Bodies (not within IBP Area\*)

1. Fresh  Lake  River  outlet Stream

2. Salt and Brackish

Estuary	Salt lake	Salt pool	Lagoon	Ocean		

14. Outstanding Floral and Faunal Features

- 1. None .....
- 2. Fauna

	Species diversity	Abundance of individuals	Superabundance of individuals	Rare species	Threatened/Relict species	Spp. of biogeographical interest	Exceptional Associations	Breeding or Nesting Populations	Migrating Populations	Wintering Populations	Parapatric with <u>G. aculeatus</u>
Mammalia											
Aves											
Reptilia											
Amphibia											
Pisces			X	X			X	X			X
Insecta											

3. Names of main threatened, endemic, relict and rare species

...Gasterosteus sp... [This species has not been provided with a Latin name in the literature but Moodie (1972, Canadian Journal of Zoology 50: 721-732) indicates this population could be considered a biological species.]

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.....

.....

4. Flora

	Species diversity	Abundance of particular species	Rare species	Threatened/relict species	Spp. of biogeographical interest	Exceptional associations	Outstanding specimens				
Angiospermae :											
trees											
shrubs											
herbs											
grass											
Gymnospermae											
Pteridophyta											
Bryophyta											
Lichens and Algae											

5. Names of main threatened, endemic, relict and rare species

.....

.....

.....

15. Exceptional Interest of IBP Area\*

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.....

.....

.....

.....



16. Significant Human Impact

1. General : None in entire IBP Area\* .....  
 None in part of IBP Area\* ..... **XX** .....  
 Impact on entire IBP Area\* .....

2. Particular

	Past impact	Present impact	Trend			
			Increasing	Decreasing	No change	No information
Cultivation		X	X			
Drainage		X	X			
Other soil disturbance		X	X			
Grazing		X	X			
Selective flora disturbance						
Logging		X		X		
Plantation						
Hunting		X	X			
Removal of predators						
Pesticides						
Introductions — plants						
Introductions — animals		X	X			
Fire						
Permanent habitation		?	?			
Recreation and tourism		X	X			
Research		X		X		
Lake used for aircraft landing		X	X			

3. Additional details on each type of impact attached?  
 Yes ..... **X** ..... No .....

17.

Conservation Status

	Protection			Utilisation			Conservation Management			Permitted Research		
	none	partial	total	none	controlled	uncontrolled	none	to alter status	to maintain status	experimental	observational	prohibited
Flora	X			X								
Fauna	X			X								
Non-living	X			X								

18.

References

1. List major biological/geographical references for the IBP Area.  
Sheet attached? Yes ..... No .....
2. List main maps available for the IBP Area.  
List attached? Yes ..... No .....
3. Aerial photographs for the IBP Area available?  
For whole area ..... For part of area ..... None .....

19.

Other Relevant Information

See attached report

Signed .....  
(Surveyor)

PROPOSED ECOLOGICAL RESERVE AT MAYER LAKE

Reasons for establishing a reserve here:

1. The largest known population of black Queen Charlotte stickleback (Gasterosteus sp.) occurs here. This undescribed species of stickleback is probably the only freshwater fish species whose geographic range is restricted entirely to British Columbia.
2. Individuals grow to lengths of at least 116 mm and are larger than those of other populations of Gasterosteus in British Columbia.
3. Mayer Lake is the only locality in British Columbia where black sticklebacks have been studied extensively.
4. The tributary streams to the lake have large populations of the typical freshwater threespined stickleback Gasterosteus aculeatus (leiurus) whose ecological interaction with black sticklebacks can be studied.
5. Black sticklebacks are the most common food item in the stomachs of cutthroat trout Salmo clarki, an abundant sport fish at Mayer Lake. Ample opportunity is thus provided for the study of predator-prey relationships.
6. Because the size of adult Gasterosteus specimens are smaller than most other fishes and such specimens are relatively hardy compared to salmonid-type fishes, sticklebacks provide better opportunity for laboratory experimentation in addition to field studies.
7. The highly brown-stained and presumably acidic water and the nearby coniferous and raised bog habitats are

characteristic of the eastern Queen Charlotte lowlands. They should provide good ecological studies on other plant and animal taxa. Detailed inventory on such non-fish taxa must await surveys by other biologists.

Disadvantages for an ecological reserve at Mayer Lake:

1. The entire drainage system to the lake should be included to protect the quality of the aquatic environment. This area might be considered rather large by some critics.
2. Although there is no permanent habitation around the lake (except for some shacks inhabited by hippies), the lake is readily accessible to the public, is used to a minor extent as a sport fishery, and is used to land seaplanes by residents of Port Clements 6 miles away (in poor weather, residents from Masset about 40 miles away also used the lake as an alternate base for seaplanes).
3. A highway now passes through the drainage area of the lake.

Description of Mayer Lake habitats:

Mayer Lake is a shallow body of water (maximum depth about 30 feet) about seven and a half miles long and  $\frac{1}{2}$  mile wide. The lake is situated on the eastern side of Graham Island (Lat.  $53^{\circ}40'$  N., Long.  $132^{\circ}02'$  W.) about six or seven miles east of Port Clements and lies at an elevation about 75 feet above sea level. Its waters are stained a dark brown, while its thinly vegetated shoreline is relatively waveswept. The shore region is charac-

terized by a low gradient and has a bottom of which 20% can be classified as mud, 54% as sand, 19% as pebble and 7% as rock habitats. Water temperatures taken between late April and August have ranged between 10° and 23°C. Apparently the shallow depth and frequent high winds prevent significant stratification. In winter, the lake occasionally freezes over for as long as 6 weeks.

Cott Creek at the north end and Woodpile and Gold Creeks near the south end are the most significant streams draining into the lake and their sluggish waters pass through what botanists term mire habitats. The bottom of these streams consist of organic ooze while their shorelines are vertical and composed of mud, sticks, Sphagnum or emergent grasses.

As part of the Queen Charlotte lowlands, Mayer Lake and its adjacent terrestrial habitat are apparently underlain by "unconsolidated glacial sands and silt that overlies flat or gently dipping Tertiary marine shales and sandstone" (Calder and Taylor, 1968). Raised bog, coniferous forest, and mire habitats are conspicuous but detailed description of the terrestrial habitats should await surveys by botanists.

Weather records are apparently not available for the lake. However, they are available for Tlell on the coast some seven miles to the east where average rainfalls of about 41 inches and snowfalls of about 21 inches have been recorded.

Morphological differences between typical freshwater and black sticklebacks at Mayer Lake:

Sticklebacks from Mayer Lake are illustrated in Fig. 1,2,3, 4,9,10,13, and 14. Differences between each type are:

	Freshwater ( <u>leiurus</u> )	Black Stickleback
Colour	- "straw-yellow with irregular dark bars and some gold pigmentation on the operculum and anteroventral region ...." Males develop extensive red in the anteroventral region during the breeding season.	- "uniformly melanitic except for opercular and anteroventral region which are bright silver... At onset of breeding season, sexually mature males lose silver color and assume a drab appearance... Most males assume a light grey or sooty black throat colour... 14-18% of the breeding males develop red throats... The red colour is never as extensive as that of <u>leiurus</u> ."
Body size	Average of mature females - 51 mm Average of mature males - smaller	Average of mature females - 90 mm Average of mature males - 80 mm
Gill raker count	Average - 16.6 Range - 13-21	Average - 21.2 Range - 17-27
Lateral plate count	Average - 4.7 Range - 3-7	Average - 6.8 Range - 4-8
Pelvic spine length into body length	Average - 6.4 Range - 5.3-8.5	Average - 5.3 Range - 4.3-7.0
Body depth into body length	Average - 4.4	Average - 4.6

Distribution of sticklebacks in Mayer Lake area:

Stickleback habitats in the Mayer Lake region are illustrated in Figures 15-20. The larger black stickleback is apparently distributed throughout the lake (Figs. 15, 19, and 20); however

they are most easily caught with seines during the summer breeding season when adults move into shallow water near shore. The males construct and guard nests on rocky or sandy bottoms with little or no cover (i.e., vegetation). The distribution of such nests are indicated by the sticks photographed in Figure 19. Black sticklebacks have not been found in inlet or outlet streams.

The typical freshwater (leiurus) stickleback is found in Gold Creek (Fig. 16 and 17), Woodpile and Cott Creeks and near creek mouths, but rarely in the lake proper. Individuals judged to be hybrids were found but they appear to be less numerous and restricted to near the mouths of inlet streams such as that of Woodpile Creek illustrated in Figure 18.

Flora:

The aquatic flora in breeding habitat of black sticklebacks is largely composed of Fontinalis, Nuphar, and Isoetes. In June of 1972 a very small collection of terrestrial plants was gathered near the shoreline and later identified by Dr. Brayshaw of the B.C. Provincial Museum. These included the following:

Pinus contorta  
Tsuga heterophylla  
Thuja plicata  
Picea sitchensis not collected  
Carex obnupta  
Carex sitchensis (?)  
Alnus rubra  
Brassica campestris (?)  
Barbarea sp.  
Malus fusca  
Viola palustris  
Ledum groenlandicum  
Kalmia polifolia  
Menziesia ferruginea  
Gaultheria shallon  
Vaccinium uliginosum  
Trientalis europea ssp. arctica

Terrestrial vertebrates observed in June, 1970:

Northwestern toad, Bufo boreas Baird and Girard  
Pacific tree toad, Hyla regilla Baird and Girard - introduced?  
Sitka deer, Odocoileus virginianus ochrourus Merriam - introduced  
Homo sapiens - introduced.

Aquatic vertebrates:

Fish species such as that illustrated in Figure 12 are very dark coloured. This is probably an adaptation for cryptic pigmentation that blends with the very dark brown water of the region. Except for work with Gasterosteus, no other studies have been made to determine if the pigment of the other fish species is also due largely to genetic factors. Populations of the following species were found in addition to Gasterosteus:

Coho salmon, Oncorhynchus kisutch (Walbaum)  
Coastal cutthroat trout, Salmo clarki clarki Richardson  
Dolly Varden, Salvelinus malma (Walbaum)  
Prickly sculpin, Cottus asper Richardson

Invertebrates (Need further collection and study):

Hirudinea, Haemonsis marmorata (Say); this abundant leech feeds on the eggs of Gasterosteus.  
Amphipoda, Hyalella azteca Sauss. this tiny crustacean was abundant on the bottom of the littoral zone.

Present and potential uses:

No significant industry or other commercial uses of the Mayer Lake region were observed during Peden and Moodie's trip to the area in June. Although the trees in the area appeared too scrubby for commercial use, it was reported that at one time a marginal logging operation had harvested the few larger trees growing next to the lake margin.

Sea planes use the lake as a landing area; however, the improvement or creation of alternate landing facilities at nearby



towns could minimize this activity.

A small float at the point of road access is used extensively by fishermen and hunters. Carcasses of recently shot deer were numerous near this float. We feel that complete protection of the Mayer Lake<sup>region</sup> as an ecological reserve is most desirable, but if this is impossible, then a park could provide a satisfactory alternative if certain requirements to protect the sticklebacks were observed. These conditions would be:

- complete protection of all waters draining into the lake so as to maintain the present quality of these brown-stained waters.
- Although fishing in itself is not harmful, a sustained yield basis of harvesting the trout should be considered. Overfishing the trout population should directly affect the population balance of the prey (i.e., black sticklebacks). If the black colouration and spine length of Gasterosteus in Mayer Lake are a balanced genetic polymorphism maintained by natural selection from trout predation, then a reduction of the numbers of trout and consequently predation could affect the nature of these characters in the Gasterosteus population over a period of time.
- To compensate for overfishing, stocks of trout from other localities should not be introduced until studies determine if the local trout population has unique genetic attributes found only in Mayer Lake.
- Great care should be taken to prevent the introduction

- of baitfish or other competitor species by fisherman.
- Because fisherman or other campers inevitably pollute the environment with refuse, exhaust fumes from outboard motors, etc., adequate precautions should be made to prevent these sources of pollution:
  - Because sticklebacks use the shallow inshore waters for reproduction, undue disturbances of the water and substrate in these areas should be prevented.

As noted earlier, a hippie family lives on a floating shack on the lake and have produced a primitive garden among the tree stumps nearby. Transients periodically use another shack near the point of road access. Alternative habitation elsewhere should be found for these people if Mayer Lake is to be made into an ecological reserve.

