STATUS REPORT ON ENDANGERED WILDLIFE IN CANADA

Giant stickleback

COMMITTEE ON THE STATUS OF ENDANGERED WILDLIFE IN CANADA

COSEWIC

INTRODUCTION

The Committee on the Status of Endangered Wildlife in Canada, COSEWIC, is an organization of specialists from federal agencies, all provincial and territorial governments, and from nationally-based private conservation organizations. The Committee considers the best available information on wild species and subspecies whose survival in Canada may be in doubt. COSEWIC's job is threefold:

- to decide which species do not have a secure future in Canada,
- to agree on a category which best describes their situation,
- to publish the information on which this decision has been made.

COSEWIC does not act to remove adverse factors affecting wildlife; that is the responsibility of the agency which has legal jurisdiction over the species, under Canadian law.

Status Reports are the complete texts of scientific manuscripts used by Committee members in arriving at their decisions. They are available at cost-plus-handling from:

Canadian Nature Federation
75 Albert Street
Ottawa, Ontario
K1P 6G1

Summary Sheets are single pages of general information summarizing species classed as either "threatened" or "endangered". They are easily reproduced on photocopy machines and this is encouraged so that teachers and others may quickly produce copies for local needs. Summary sheets are free and may be obtained from provincial, territorial and federal wildlife agencies, and from nationally-based private conservation agencies. A central source where quantities may be obtained at cost is:

Canadian Wildlife Federation
1673 Carling Avenue
Ottawa, Ontario
K2A 1C4

The COSEWIC list reflects only those species which have been considered to date.

COMMITTEE ON THE STATUS OF ENDANGERED WILDLIFE IN CANADA

- C O S E W I C -

LIST OF SPECIES WITH DESIGNATED STATUS AS OF APRIL 1982

*N.I.A.C. = NOT IN ANY CATEGORY

BIRDS

Species	Status
White Pelican	THREATENED
Double-crested Cormorant	N.I.A.C.
Trumpeter Swan	RARE
Ferruginous Hawk	THREATENED
Gyrfalcon	N.I.A.C.
Peregrine Falcon:	
pealei	RARE
tundrius	THREATENED
anatum	ENDANGERED
Greater Prairie Chicken	ENDANGERED
Whooping Crane	ENDAGERED
Greater Sandhill Crane	N.I.A.C.
Piping Plover	THREATENED
Eskimo Curlew	ENDANGERED
Ivory Gull	RARE
Caspian Tern	RARE
Burrowing Owl	THREATENED
Great Gray Owl	RARE
Kirtland's Warbler	ENDANGERED
Ipswich Sparrow	RARE
Ross' Gull	RARE
Red-necked Grebe	N.I.A.C.
Prairie Falcon	N.I.A.C.

REPTILES AND AMPHIBIANS

Species	Status
Leatherback turtle	ENDANGERED

MAMMALS

Species	Status
Eastern Mole	RARE
Vancouver Island Marmot	ENDANGERED
Black-Tailed Prairie Dog	RARE
Fox Squirrel	N.I.A.C.
Pocket Gopher	RARE
Right Whale	ENDANGERED
Bowhead Whale	ENDANGERED
Swift Fox	EXTIRPATED
Grey Fox	RARE
Grizzly Bear	N.I.A.C.
Newfoundland Marten	N.I.A.C.
Black-footed Ferret	EXTIRPATED
Badger	N.I.A.C.
Sea Otter	ENDANGERED
Eastern Cougar	ENDANGERED
Peary Caribou	THREATENED
Wood Bison	ENDANGERED
Wolverine	RARE
Long-tailed Weasel	THREATENED
Humpback Whale	THREATENED

FISH

Shortnose Sturgeon	RARE
Speckled Dace	RARE
Giant Stickleback	RARE
Blueback Herring	N.I.A.C.

PLANTS

Species	Status
Furbish Lousewort *Pedicularis furbishiae*	ENDANGERED
Small white lady slipper *Cypripedium candidum*	ENDANGERED
Willow *Salix planifolia tyrrellii*	THREATENED
Thrift *Ameria maritima interior*	THREATENED
Small Whorled Pogonia *Isotria medeoloides*	ENDANGERED

THE COMMITTEE ON THE STATUS OF ENDANGERED WILDLIFE IN CANADA

APPROVED DEFINITIONS

SPECIES: "Species" means any species, subspecies, or geographically separate population.

RARE SPECIES: Any indigenous species of fauna or flora that, because of its biological characteristics, or because it occurs at the fringe of its range, or for some other reason, exists in low numbers or in very restricted areas in Canada but is not a threatened species.

THREATENED SPECIES: Any indigenous species of fauna or flora that is likely to become endangered in Canada if the factors affecting its vulnerability do not become reversed.

ENDANGERED SPECIES: Any indigenous species of fauna or flora whose existence in Canada is threatened with immediate extinction through all or a significant portion of its range, owing to the action of man.

EXTIRPATED SPECIES: Any indigenous species of fauna or flora no longer existing in the wild in Canada but existing elsewhere.

EXTINCT SPECIES: Any species of fauna and flora formerly indigenous to Canada but no longer existing anywhere.

COMMITTEE ON THE STATUS OF ENDANGERED WILDLIFE IN CANADA

- C O S E W I C -

Status Report on

GIANT STICKLEBACK

in Canada
1980

Prepared by G. ERIC E. MOODIE

For DEPT. FISHERIES & OCEANS

Status Assigned to the Species by COSEWIC on APRIL 1980:

- RARE -

NOTES

1. This is not an official publication. It is a working document used by COSEWIC in assigning status according to criteria listed below. This report is released in its original form, in the interests of making scientific information available to the public.

2. Anyone wishing to quote or cite unpublished information contained in this report should contact the author through the agency noted above.

3. This report is the property of COSEWIC and the author. It may not be presented as the work of any other person or agency. When quoted as a source, following clearances noted above, both the author and COSEWIC must be credited.

4. Additional copies of this report may be obtained at nominal cost, from Canadian Nature Federation, 75 Albert Street, Ottawa, Ontario, K1P 6G1.

STATUS REPORT ON THE GIANT STICKLEBACK, *GASTEROSTEUS* sp.

To: National Committee on the Status of Endangered Wildlife in Canada

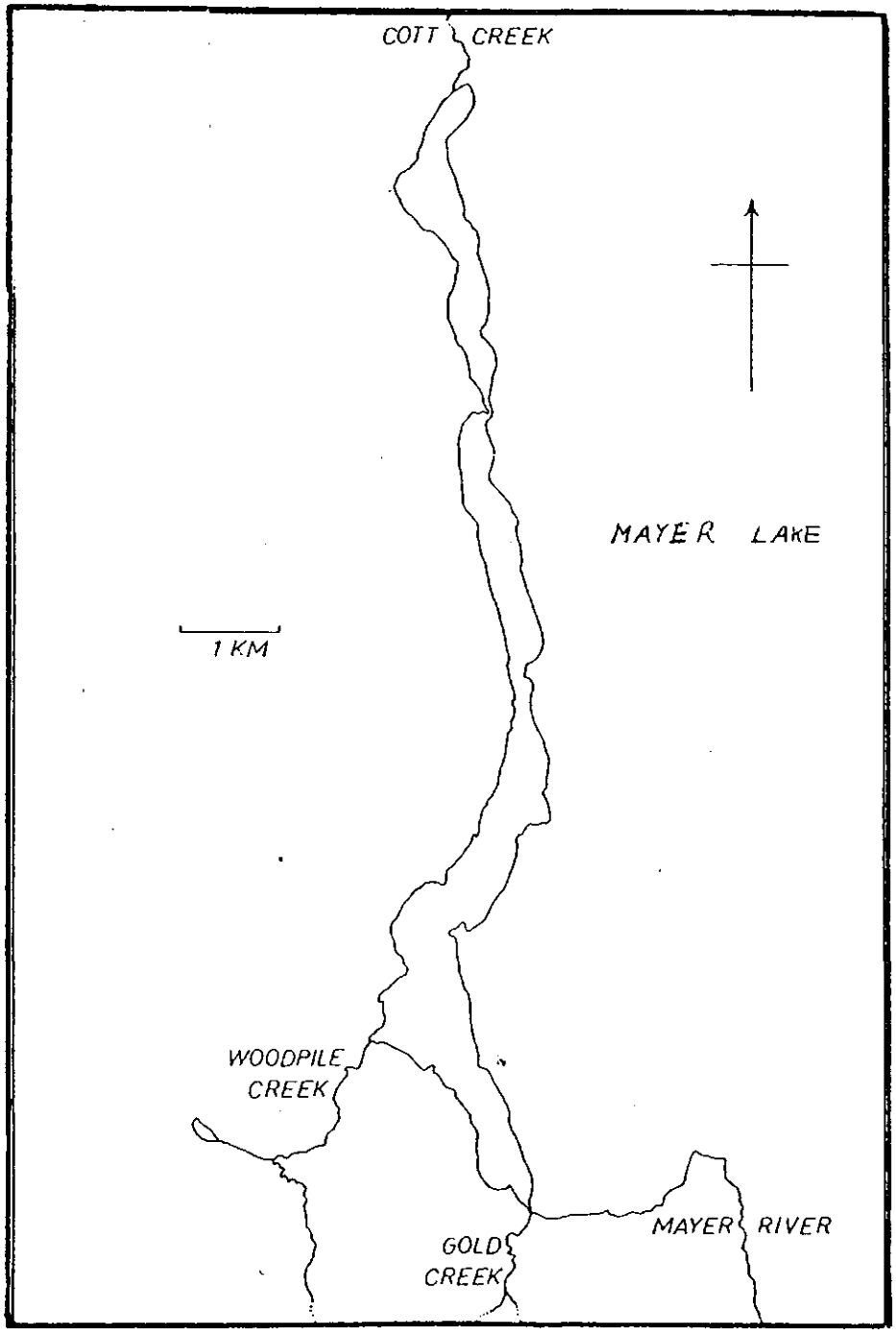
By: G. Eric E. Moodie, Department of Biology
University of Winnipeg, Winnipeg, Manitoba

ABSTRACT

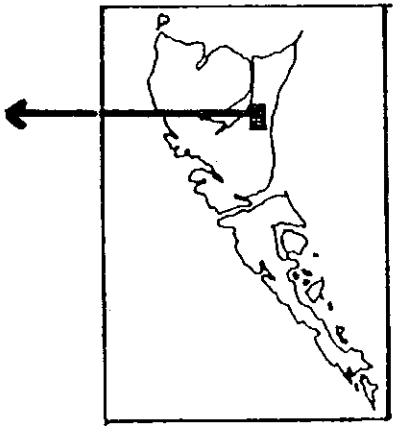
The population of Giant Sticklebacks appears to be stable. Population estimates have never been conducted, however, so it may be difficult to detect population trends until they are rather pronounced. The population does not appear to be under any immediate threat but this may change if densities of cutthroat trout decline due to the increasing pressure of angling. Trout densities should therefore be monitored as this predator is important in maintaining the phenotype of the Giant Stickleback and in excluding the common form of *Gasterosteus aculeatus* from the habitat of the Giant Stickleback.

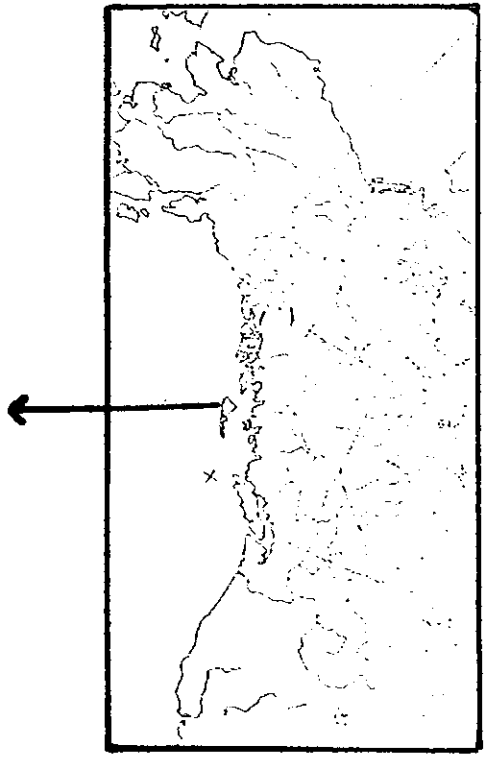
Giant Stickleback

1. Reviewed by the Sub-Committee on Fish, February 5, 1980
2. Recommended that Report be accepted and circulated.
3. Recommended Status: Rare.



Range map for the Giant Stickleback, Gasterosteus sp.. The Giant Stickleback is found only in Mayer Lake.





DISTRIBUTION

The Giant Stickleback is found only in Mayer Lake (Lat. 53°40'N, Long. 132°02'W) on the eastern side of Graham Island, the largest of the Queen Charlotte Islands, in British Columbia.

PROTECTION

Mayer Lake and much of its drainage basin is within the boundary of a Provincial Park (Naikoon Park). The lake is thus protected from real-estate development and small scale (pole) logging which occurred in the past. Park status does not, however, restrict recreational activities such as fishing and boating. A 1971 recommendation that the lake and watershed be declared an Ecological Reserve to protect the Giant Stickleback and associated species was rejected by the provincial government.

POPULATION SIZE AND TREND

No population estimates have ever been made. The fish are patchily distributed in the lake with different age classes and sexes occuring in different areas during different seasons. Given the above circumstances, an estimate of actual numbers will be no more than a wild guess - my tentative prediction is that the population numbers a few hundred thousand. This fish has always been easy to seine in large numbers and their density does not appear to have changed since my first collections in 1966. The limited information suggests a stable population, however, the real population trend is unknown.

HABITAT

The Giant Stickleback has a localized distribution, as it occurs only in Mayer Lake. Mayer Lake is 12.1 Km long and averages 0.8 Km in width; its surface area is about 627 hectares. The maximum depth is about 9 m. The Giant Stickleback does not appear to enter either the three inlets or the outlet stream connected to the lake.

Until recently the rate of habitat change has been slow, but this may change in the near future. Improvements in transportation to the Queen Charlotte Islands are resulting in increased tourism. Both tourists and residents are putting more and more fishing pressure on cutthroat trout (Salmo clarki) in Mayer Lake. The Giant Stickleback is a fish whose phenotype has resulted from selection by predators such as cutthroat trout and common loons (Gavia immer). Should trout densities decline and loons leave the lake due to disturbance by boaters, one would predict the Giant Stickleback would be replaced by the typical form of stickleback which is found in the inlet streams of Mayer Lake.

Although the habitat is protected to some extent in that the Mayer Lake drainage basin is entirely on Crown land and largely within Niakoon Provincial Park, the biotic integrity of the community may be inadequately protected as a result of developing angling trends. It is doubtful whether one can confidently predict trout densities will be maintained under current angling regulations and enforcement practices. Depletion of trout stocks, introduction of non-native game fish and introduction of bait fish are all known possible consequences of over-fishing which would singly or collectively have a deleterious effect on the Giant Stickleback. The presence

of many mature (ie. large) cutthroat trout as well as common loons may be as important in the long term for the well-being of this population as an oligotrophic lake containing sand and gravel beaches for spawning is in the short term.

GENERAL BIOLOGY

The Giant Stickleback first reproduces in its third summer. During the breeding season males probably complete about five nesting cycles and then die. The number of clutches produced by females is not known, but they too probably reproduce only during their third summer and then die. Females produce an average of 257 eggs per clutch. The Giant Stickleback, like other members of the genus is territorial. Nesting males are found in clumps where the substrate is sand or gravel and there is some shelter such as Fontinalis or rocks. The reproductive rate in Mayer Lake appears to be normal.

Movement of the Giant Stickleback is limited, it appears to spend its entire life within the lake. During a three month period from May to August males concentrate in localities where there is a sand substrate, a gentle gradient and vegetation. These spawning areas are unprotected but are widespread.

The Giant Stickleback feeds in the limnetic zone, on zooplankton. It is tolerant of human disturbance and responds readily to change. Unfortunately it is its ability to respond to change that makes change undesirable. Response to change could lead to adaptive alterations of the phenotype and hybridization with the typical sticklebacks of the streams, in which case the unique nature of the Giant Stickleback would be lost even though population densities might not change. This stickleback is susceptible to fluctuations in water level through its dependence on shallow beaches during the spawning season. High water forces the fish to nest at depths where exposure to trout is increased. Drops in water level during the breeding season can expose the eggs to excessively high temperatures and cause the male to abandon the nest. Fluctuations in water level are becoming more common in the Queen Charlotte Islands as the beaver (Castor canadensis) introduced after World War II, expands its range.

LIMITING FACTORS

The population appears to be stable. Numbers may be regulated by the availability of spawning sites and by predation. Fluctuating water levels resulting from beaver activity will probably influence the availability of spawning sites. Unfortunately there appears to be no way of controlling beaver densities. The number of predators, however, can be managed.

SPECIAL SIGNIFICANCE OF THE SPECIES

The Giant Stickleback was the first and remains one of only two of a number of unique Canadian stickleback populations to be studied and described. It differs from other morphologically similar species in that it is parapatric with the typical form of Gasterosteus aculeatus. Other similar populations exist but are probably genetically unrelated

and the result of convergence.

The taxonomic status of the Giant Stickleback has not been decided; in many respects the population fulfills the requirements of the Biological Species Definition. Most of those working on Gasterosteus in the Pacific Northwest feel, nevertheless, that to describe new species at a time when research is continuing and new findings constantly emerging would be unwise.

Although the Giant Stickleback of Mayer Lake has been singled out for attention, this is largely the consequence of its being the first unusual stickleback on the Canadian west coast to be studied and publicized. Actually there are a number of equally significant forms of Gasterosteus in the Queen Charlotte Islands which may be more easily endangered than the one in Mayer Lake. Sticklebacks in Boulton Lake for example are unexposed to predation by fish and so have lost many of the defensive spines characteristic of the genus. Game fish could easily be introduced to this lake with results that would probably be disastrous for its extremely differentiated sticklebacks.

RECOMMENDATIONS/MANAGEMENT OPTIONS

Many residents of the Queen Charlotte Islands are aware that the islands were probably a glacial refugium for some species and contain many endemic species and sub-species. A public education program could expand on this awareness and bring such information to the attention of visitors so that the islands would be seen more as "Canada's Galapogos" and less as a place to go to exploit nature. An education program could also stress the damage that has often resulted when exotic species have been introduced to islands and other ecosystems.

The chief management need appears to be the enforcement of appropriate catch quotas for trout fishermen.

EVALUATION

No population decline is apparent and as long as the trout population does not decline, or steps are taken to prevent overfishing of trout, the Giant Stickleback population should survive.

REFERENCES

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Dr. A.E. PEDEN, Curator of Aquatic Zoology, B.C. Provincial Museum,
Victoria, B. C.

LITERATURE

1971 A.E. Peden. Three proposed ecological reserves for sticklebacks (Gasterosteus) on the Queen Charlotte Islands. Unpublished report. 63 pp.

1972 G.E.E. Moodie. Predation, natural selection and adaptation in an unusual threespine stickleback. Heredity 28: 155-167.

1972 G.E.E. Moodie. Morphology, life history and ecology of an unusual stickleback (Gasterosteus aculeatus) in the Queen Charlotte Islands, Canada. Canadian Journal of Zoology 50: 721-732.

1973 G.E.E. Moodie & T.E. Reimchen. Endemism and conservation of sticklebacks in the Queen Charlotte Islands. Canadian Field-Naturalist 87: 173-175.

1976 G.E.E. Moodie & T.E. Reimchen. Phenetic variation and habitat differences in Gasterosteus populations of the Queen Charlotte Islands. Systematic Zoology 25: 49-61.

1976 G.E.E. Moodie and T.E. Reimchen. Glacial refugia, endemism and stickleback populations of the Queen Charlotte Islands, British Columbia. Canadian Field-Naturalist 90: 471-474.

ACKNOWLEDGEMENTS

Dr. T.E. Reimchen, a resident of the Queen Charlotte Islands for the past six years and active in stickleback research there, provided current information on all aspects of this report. During his years on the islands Tom Reimchen has served as an advocate for the sticklebacks and environmental protection in general. He deserves much of the credit for the level of environmental awareness that exists in the Queen Charlotte Islands.