PROJECT PLAN

THE ECOLOGY OF GREAT BLUE HERON COLONIES ON THE LOWER MAINLAND OF BRITISH COLUMBIA

by

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and

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September 25, 1978

Dr. Bristol Foster
Coordinator of Ecological Reserves
Land Management Branch
Ministry of Environment
Parliament Buildings
Victoria, B. C.

Your file *Votre référence*

Our file *Notre référence* 9050 herons

Dear Bristol:

The local Queen's Printer has recently completed for us a series of reports, and one project plan, which might be of some interest to you or to other members of your staff. Copies are enclosed. If you have any comments or suggestions they would be most welcome.

Work on our studies of Great Blue Herons on the lower mainland has progressed a great deal during the past summer. My technician, Mr. Simpson, was successful in banding 78 adults from the Pender Harbour colony - a record unique in North America so far as I know. If you, or any of your people, see Great Blue Herons with orange coloured and plainly numbered leg bands just above the tarsus we would be very pleased to know about it. The birds seem to have dispersed widely from the general area of the colony since the completion of nesting.

Sincerely yours,

John P. Kelsall

Encl.

P.S. I gather that Keith Simpson has already sent you a copy of the heron report - which is not included here.

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July 10, 1978

INTRODUCTION

Arising from its mandate as custodian of the Migratory Birds Convention Act, the Canadian Wildlife Service has a responsibility to monitor bird populations. The need for research on individual species is dependent on their well being at any given time. The range is from the obvious abundance and health of most species (i.e. the robin, Turdus migratorius) to endangered forms such as the whooping crane, Grus americana, that are reduced to remnant populations for various reasons. Little is known of the status of many species, particularly those that are naturally uncommon or local in distribution.

The great blue heron, Ardea herodias, is a spectacularly large, colonially-nesting wading bird at the top of a food chain. It is particularly vulnerable through urban and industrial development at two points in its life cycle. First its food may become contaminated with a wide spectrum of noxious substances, particularly in aquatic feeding areas. Second, its breeding colonies may be destroyed through cutting of the large preferred nesting trees during land clearing, even to the point where no suitable sites remain over wide areas of former range.

Herons in British Columbia have received some attention in the past, most work dealing either with specific colonies of birds - notably the colony on the University of British Columbia endowment lands - or with colony inventories and feeding ecology (Urhahn 1968, Paine 1972, Krebs 1974,

Mark 1974, Mark 1976. Unpublished data can be found in archives such as the Provincial Museum and in field notes and memories of a surprising number of professional and lay observers.

Valuable comparative material can be found in studies conducted on the Pacific coast of the United States (Henny and Bethers 1971, Pratt 1970, Werschkul et al. 1976, Werschkul et al. 1977). Vermeer and co-workers have described some aspects of heron colonies from the Canadian prairies (Vermeer 1969, Vermeer 1970, Vermeer 1973, Vermeer and Anweiler 1970, Vermeer and Hatch 1972). Much relevant work has come, and is coming from eastern North America, for example DesGranges (1978) and McAloney (1973). There is a relevant world wide literature on the ecology of herons and other large wading birds of direct relevance to this project proposal (i.e. Milstein et al. 1970 and Ward and Zahavi 1973).

Since the great blue heron is a common and publicly interesting species in coastal British Columbia, it seems appropriate to devote some current research to establishing its present status. Knowledge of the status of the herons and their colonies should indirectly also provide valuable insights into the status of cohabiting species and other environmental components.

Some preliminary investigations were made among nesting colonies on the lower mainland of British Columbia in 1977. The results, reported by Simpson and Kelsall (1978) show a viable and numerous heron population in 10 colonies. However, a 46 nest colony was inexplicably abandoned during the study. Preliminary results of the chemical analysis of eggs from one

colony also suggest a need for continued study. Polychlorinated biphenyls in particular show wide ranging values up to a very high 1000 ppm. There is reason to suspect that environmental pollution may be of greater importance in the ecology of herons to the northward (Powell River, Pender Harbour).

OBJECTIVES

1 - To inventory and describe heron colonies and compare their locations and numerical status (number of colonies and number of nests in each) with earlier observations.

2 - To determine reproductive success in representative colonies and to compare that with standards from the literature.

3 - To measure and predict the viability of heron colonies in terms of 1 and 2 above, and also through examination of eggs and dead birds for evidence of toxicants or disease and vulnerability to urban development, harassment and disturbance.

METHODS

(a) Location of colonies

The search for colonies will be confined to the lower mainland of British Columbia, extending inland to the vicinity of Chilliwack along the Fraser River and northward along the coast to the vicinity of Powell River. Searches will be conducted

through examination of the literature for past records, through contact with interested persons and through ground and air searches in likely areas. Some small and isolated colonies may be missed, but success so far in locating nest groups of less than a half dozen leads to a belief that significant numbers are unlikely to escape detection.

(b) Description of colonies

A standard format will be used for the description of colonies, to include the physical surroundings, the number, size and species of nesting trees, the density and height of nests, the known history of the colony and any features of interest or concern. Photography will be used extensively.

(c) Measurement of reproductive success

Reproductive success will be measured by sampling individual nests within colonies and determining numbers of eggs laid, numbers of eggs hatched and numbers of young fledged. The last will be considered the most important statistic and will involve enumerating young about to fly on nests being monitored.

(d) Measurements of health

Egg shells will be routinely collected for measurement of thickness as an indicator of health. Eggs will be collected through random sampling for analysis for heavy metals and other possible toxicants. However, birds will not be specially taken for the above purpose

unless strong evidence is found supporting a need to collect to explain apparently limiting phenomena. One colony, which seems to be using shellfish for food (a most unusual occurrence), will receive special attention.

(e) Measurement of colony vulnerability

Circumstances indicating vulnerability of colonies, especially to destruction through urban development and harassment will be studied. Historical records will be assessed. The accent will be on determining how colonies adjust to new locations. A major colony, at Pender Harbour, currently endangered, may provide a suitable subject for study. Plans to mark birds from that, and perhaps other colonies, tentatively involve use of nets at bait impoundments for capture of the birds, and the use of coloured, numbered leg bands for distant recognition of individuals.[1]

A comparison of reproductive success between large and small colonies may also provide a measure of vulnerability. Predation, particularly avian predation on nests which has already been observed, will be assessed as opportunity permits.

MANPOWER

The persons principally involved, all of the Canadian Wildlife Service,

[1] At the time of writing upward to 70% of the nesting birds at Pender Harbour (66 individuals) have been captured and marked with individually recognizable bands - a banding success unique with herons in North America to the best of our knowledge.

Pacific and Yukon Region are as follows:

- John P. Kelsall, Research Scientist, principal investigator (ecology and project design)
- P. E. Whitehead, Biologist, principal investigator (toxicology and specimen analysis)
- Keith Simpson, Research Technician, responsible for direction and execution of field studies.

In addition contracts may be necessary from time to time for skilled tree climbers, specialized chemical analysis and aircraft search and surveillance.

TIME FRAME

The project is proposed as a three year study at the end of which results will be assessed and emergent recommendations made. Included will be the field season just past - March 1977 to March 1978 - when heronries in the lower Fraser River area were located and assessed. The study will be directed primarily northward to Powell River during nesting in 1978, with some monitoring of the colonies studied in 1977. Studies of nesting disturbance and displacement will commence in 1978 and will continue in 1979. Collections for examination for possible effects of noxious substances will continue throughout as seem warranted. Egg shells, eggs and dead or dying birds will be taken - the egg materials systematically and the birds fortuitously. Nesting displacement studies may require the marking of birds in either or both of 1978 and 1979 so that they will be individually identifiable. A completion report should be prepared by December 1979.

COOPERATORS

As it has to this point, the project will rely heavily on assistance and advice from people with the B. C. Provincial Museum and Fish and Wildlife Branch. Most important however, have been (and will be) contacts developed by Mr. Simpson with local natural history clubs and interested private citizens. The latter groups have provided much help ranging from access to nesting colonies to active participation in search and surveillance activities.

It is essential that interest be maintained by two way information flow. We must keep our cooperators informed of our progress.

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Banding Proposal - Great Blue Herons at Pender Harbour, B.C.

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and

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Appendix to Project Plan. - The Ecology of Great Blue Heron colonies on the Lower Mainland of British Columbia.

A planned study of the great blue heron colony at Pender Harbour, B.C. could be greatly enhanced by marking adult birds during the summer of 1978. Short term studies could yield information on summer feeding range and feeding site selection for individual birds. Longer term studies could yield information on fidelity to individual colonies by adult and juvenile birds for different nesting seasons, nest preference for returning birds, pair bonding (seasonal or lifetime), dispersal of juveniles and survival rates. Of particular interest in the Pender Harbour colony is the possibility of relocation caused by subdivision development. Banding studies might supply information on the distance moved, the time taken to re-establish, nesting success and whether the colony remained as a unit or split up.

The study requires a banding system which would provide visible individual

identification without killing or re-capturing the birds. We propose the use of a single colour (red) plastic leg band with a readable, vertical, 4 digit code repeated three times around the band.

We estimate that it may be possible to band up to 100 herons from the Pender Harbour colony. We hope to begin banding in June of 1978 and the project will span at least one and possibly several years. The type of band used will be readily visible and we have the co-operation of local residents and naturalists for obtaining "sighting" recoveries. From experience with other species, we expect no adverse effects on the birds and feel that the markers will easily last for the duration of our study.

We would appreciate having immediate approval for the above outlined local project. The banding office might wish to consider, now or later, the following suggestions.

It would be desirable to co-ordinate coloured leg banding of herons throughout North America to prevent conflicts and confusion. We suggest dividing the continent into three colour areas based on the known distribution of great blue herons (Fig. 1). Since coastal (within 100 miles of ocean) and southern colonies are believed to be mainly resident and not migratory, two colours could be used for eastern (yellow) and western (red) colonies. A third colour (green) could be used for interior and northern migratory birds. That system would have the advantage of offering immediate detection, through colour identification, of any unusual movements between coastal and interior regions or between eastern and western

regions. Separate allocation of individual codes between regions would prevent any possible duplication. If all local projects could be co-ordinated through the banding office, substantial new information could be gained with minimal individual effort and confusion. The need for a co-ordinated visible marking system for birds is becoming more apparent as research projects proliferate. It would therefore be desirable if the banding office would consider a program for supply and control similar to that for metal leg bands. We would be happy to assist in organizing such a large scale program, if desired.

April 6, 1978

Note: As of July 1978 the above proposal seems to be in a process of active implementation with some modifications. Mr. Simpson's success in colour banding herons at Pender Harbour is the subject of a footnote on page 5 of the main project proposal.

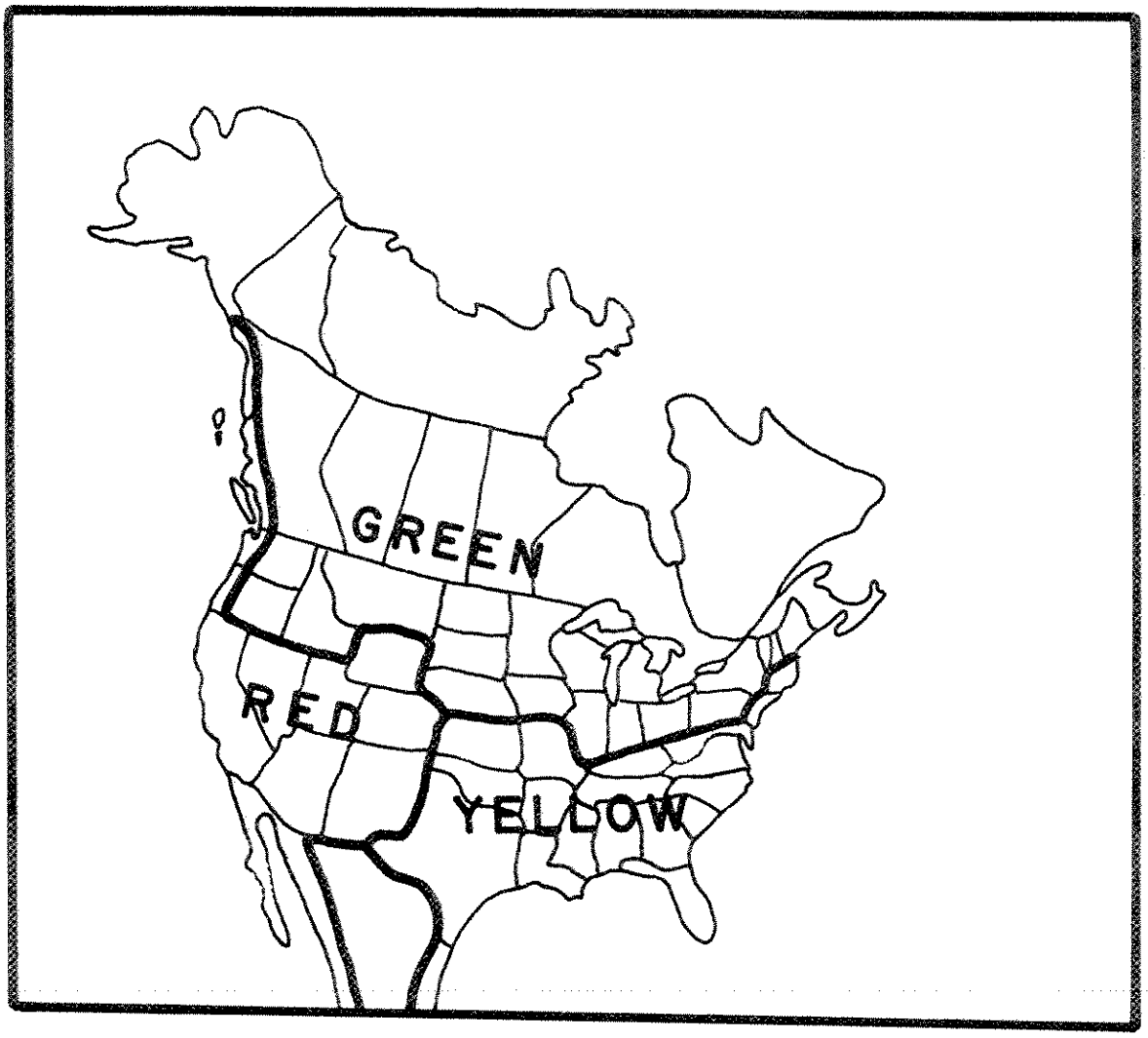

FIGURE 1. Preliminary division of North America for band colours based on the great blue heron distribution.