1968 FIELD SURVEY OF COLONIAL FISH-EATING BIRDS IN THE KOOTENAY RIVER VALLEY OF BRITISH COLUMBIA

by

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This report summarizes all observations and activities of Canadian Wildlife Service personnel on pesticide investigations in the Duck Lake area of southern British Columbia in 1968. The investigations comprised a field survey and a collection of samples for pesticide analyses, and were the direct result of earlier discussions with members of the British Columbia Fish and Game Branch and Canadian Wildlife Service biologists in Vancouver. The primary objective was to determine the priority and feasibility of further studies of pesticide contamination of the several species of fish-eating birds which nest on Duck Lake and along the banks of the adjacent Kootenay River. In particular we were interested in obtaining information relative to the osprey, (Pandion haliaetus carolinensis), great blue heron (Ardea herodias herodias), and western grebe (Aechmophorus occidentalis) colonies.

Acknowledgements

We are indebted to personnel of the B.C. Fish and Wildlife Branch at Creston, particularly biologists Dwight Moore, Millard Wright, and student assistant Mr. Jack Floyd. The loan of various pieces of field equipment and the use of the airboat operated by Mr. Wright was also most helpful. In addition, we are grateful to Mr. B. Rough for his assistance in locating the nests earlier mapped by Mr. Isbister,

and to the B.C. Hydro-Electric Commission for the loan of equipment.

Method

Three separate visits were made to the area during June, July and August of 1968 by Mr. Bob Isbister, Mr. Stan Teeple and myself to determine the size of the colonies, plot the nest locations and record (data relative to the) occupancy of each nest. Where ever possible observations were made of nest success and a small number of specimens were collected for pesticide analyses. Investigations were restricted to the banks of the Kootenay River and the associated water bodies Duck Lake, Leach Lake and Six Mile Slough, as shown on accompanying Figures.

Investigations

On June 5th, 1968, Mr. Isbister visited the area to locate and plot the nest sites of the osprey and heron colonies on a 1: 126,720 map (Figs. 1 and 2). He located a total of 25 osprey nests and 2 heron colonies situated along the Kootenay River and its two main branches between No. 3 highway and the Kootenay Landing railway bridge. A single osprey nest was located on the west shore of Leach Lake and two nests were observed on the mountainside overlooking Kootenay Lake. Mr. Isbister was not able to positively determine nest occupancy and indicated that the birds were not overly concerned about the approaching boat and for the most part were not very vocal.

Mr. Stan Teeple and Mr. Bob Gibbon visited the area and carried

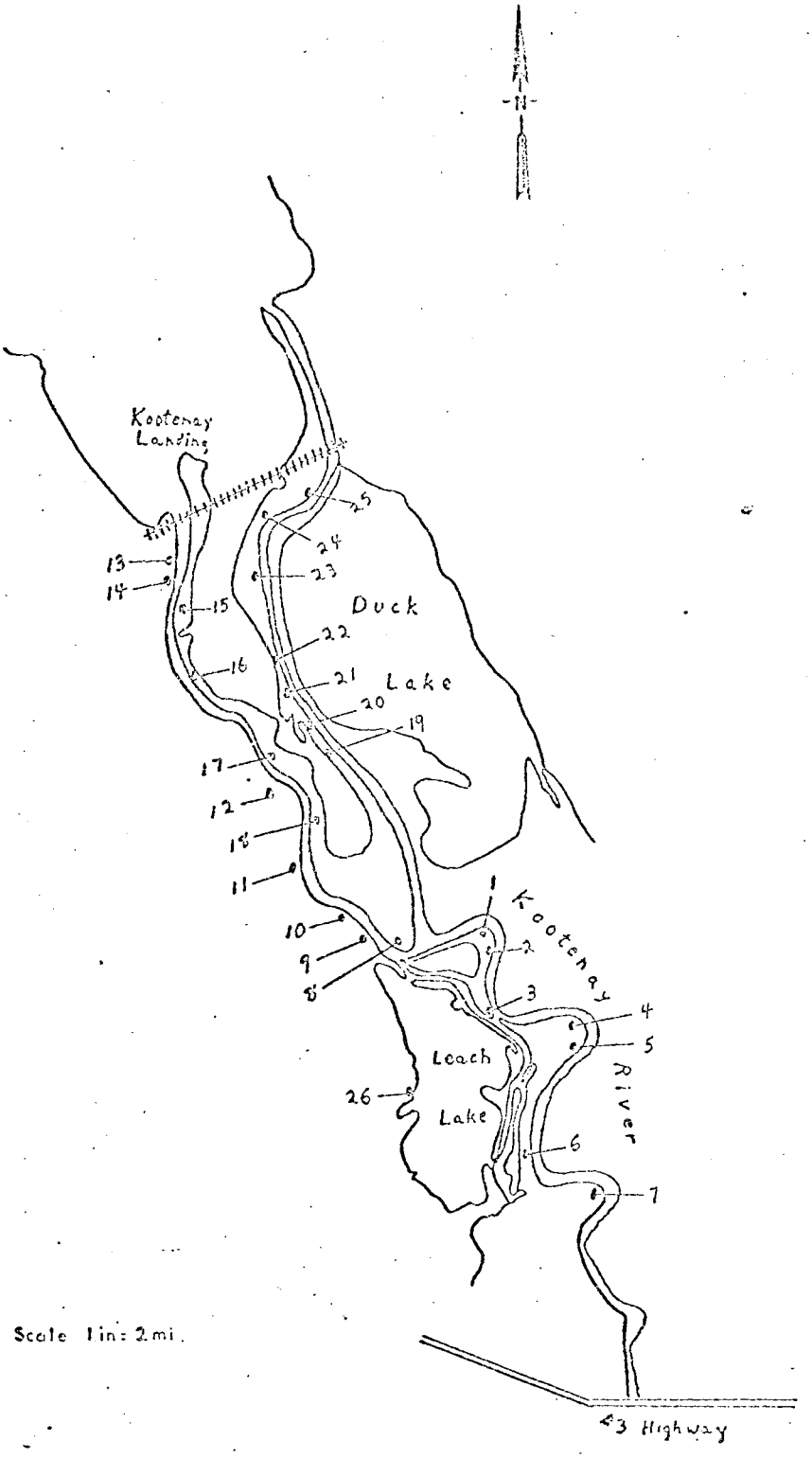

Fig. 1 osprey nest locations in the Kootenay River Valley

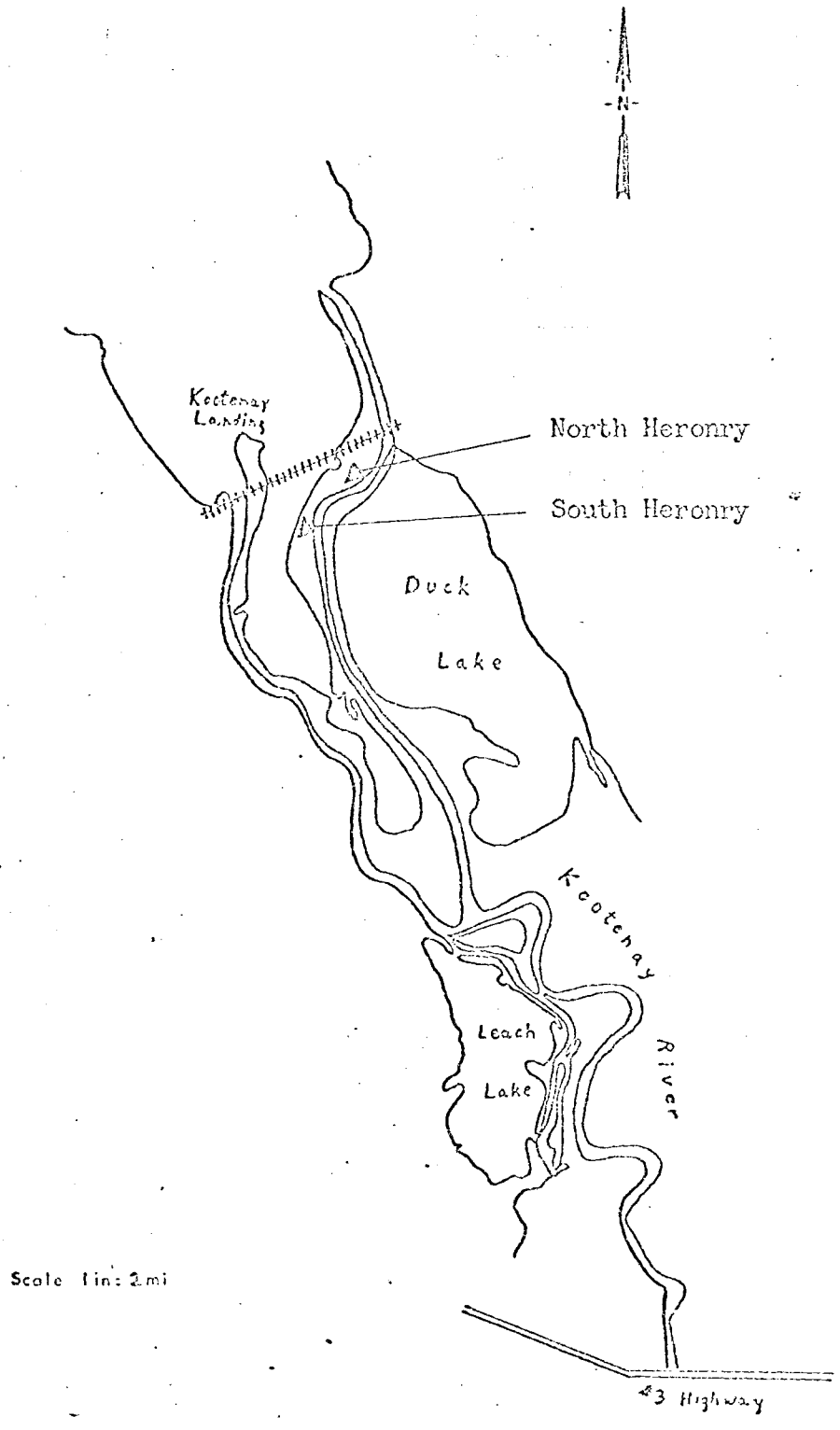

Fig. 2 location of the two heronries adjacent to Duck Lake

out field investigations between July 31st and August 7th. On July 31st all the osprey nests and the two heronries were visited and observed from a boat. On August 4th - 6th the nests were re-visited and an observer went ashore at each nest and heronry to make a detailed inspection under the nest trees for evidence of occupancy. During these investigations Mr. Teeple collected several specimens of local birds and fish to be analyzed for organochlorine pesticide residues.

On August 30th and 31st, I made the final investigation on the colonies to assess the feasibility of specific studies related to pesticides and fish-eating birds in this area. On August 31st, field investigations were carried out with the cooperation and assistance of Mr. Millard Wright and Mr. Jack Floyd of the British Columbia Fish and Game Branch. Discussions were held with these men about their observations on the feeding habits of the birds, the effect of annual floods and possible sources of pollution or pesticide contamination.

Collection of specimens for pesticide residue analysis

Most of the waterfowl observed by airboat on the lakes in the vicinity of Creston were resident mallard and wood ducks. Three adult mallards, a wood duck and widgeon, were collected on Six Mile Slough. Two juvenile wood ducks were captured by hand and a third juvenile wood duck which had drowned in a duck trap on Duck Lake was also collected. Although a few yellow-legs and killdeer were

seen in the area, spotted sandpipers were the main resident shorebirds. Six spotted sandpipers (4 adults and 2 juveniles) were collected for residue analysis. Samples of breast muscle, brain, and body fat were taken from the mallards, the adult wood duck and the widgeon while the juvenile wood ducks and the sandpipers were preserved. All were Air Expressed, frozen, to the Ontario Research Foundation in Toronto on August 8th. Samples of 7 western grebe eggs were also collected by Mr. Jack Floyd on July 31st and sent to the Ontario Research Foundation for analysis. At the time of writing, reports from these analyses have not been received.

Observations of species

Osprey

A total of 25 osprey nests were observed along the Kootenay River and the two main branches which empty into Kootenay Lake: a minimum of eight and possibly as many as sixteen of these nests were occupied in 1968. The latter figure represents the total number of nests which had a pair of osprey present during one or more of our visits. The number of birds observed in the immediate vicinity of the nest varied from 22 on August 31st to a maximum of 29 on July 31st. It is doubtful that all of the birds nesting were observed during any one visit. This premise is supported by the absence of one of a pair from several of the successful nests during our visits to the area. Table 1 summarizes our observations on each visit.

Table 1. FIELD OBSERVATIONS - KOOTENAY RIVER OSPREY COLONY

Nest No.	July 31	Aug 8	Aug 31	number of yng.	opt.
#1	one adult osprey present.	no ospreys seen; no droppings under nest.	one osprey near nest.		
#2	one adult osprey present.	one adult near nest; no droppings below nest.	one osprey flew from nest.		
#3	two ospreys flying about one possibly from nest #1 or # 2.	no ospreys seen; no droppings below nest.	two ospreys flying near nest.		x
#4	two ospreys flying about one appeared to be carrying a fish.	no ospreys seen; no droppings below nest.	no ospreys near the nest.		x
#5	two adults near the nest, one young bird seen on the nest, no adults present on return trip.	two adults present calling loudly, droppings under nest; two young birds on the nest.	two ospreys at the nest.	2	x
#6	one adult on the nest.	two adults present giving the alarm call, droppings under the nest.	one adult near the nest.		x
#7	no ospreys present, fresh green plant material on the edge of the nest.	one osprey nearby, silent; no droppings below the nest.	no ospreys present.		
#8	one osprey in the vicinity of the nest.	no activity, skull and bones of a yng(?) osprey near the nest tree.	no ospreys present.		
#9	adult sitting in a near by tree; two young birds sitting on the nest.	two adults present and very noisy, two yng birds in the nest, droppings on the ground.	one osprey flying near the nest tree.	2	x
#10	one adult sitting on the edge of the nest.	two adults present and noisy, two yng birds on the nest.	one osprey flying near the nest.	2	x
#11	one adult flew from the nest. One young bird on the nest.	two adults present and mildly alarmed. Many droppings at the base of the tree.	two adults and two yng osprey at the nest. Young begging.	2	x

Nest No.	July 31	Aug 8	Aug 31	number of yng.	osp.
#12	no activity near the nest.	one osprey near the nest.	one osprey near the nest.		
#13	two ospreys present.	two adults present and mildly agitated. One bird returned to the nest on our departure.	two adults and two yng birds present. Young birds begging for food.	2	x
#14	two ospreys present.	no activity	no activity		x
#15	one osprey flying near the nest.	one osprey near the nest.	no activity		
#16	appears unused.	no activity.	two ospreys flying near the nest.		x
#17	unused.	unused	no activity		
#18	no activity observed	no activity	one osprey present		
#19	two ospreys perched in an adjacent tree.	no birds present at first then two appeared and circled overhead, a few droppings below the nest.	no activity		x
#20	no activity - nest not complete.	no activity	no activity		
#21	two adult osprey present	a very few droppings below the nest also an old nest was found on the ground.	no activity		x
#22	nest appears freshly built, two ospreys nearby.	two ospreys circled high overhead; a very few droppings.	no activity		x
#23	four ospreys were seen flying in the vicinity of the nest; one bird flew from the nest.	four ospreys observed flying overhead, many droppings below the nest. Nest tree girdled by beavers.	2 birds present	2	x
#24	one osprey calling and flying nearby.	a great many droppings below the nest. Two osprey circled and called.	two adults and two young osprey at the nest.	2	x

Nest No.	July 31	Aug 8	Aug 31	number of yng.	[illegible]
#25	two ospreys present	one young bird on the nest and two adults circling above. Fresh wing of a young bird below the nest (osprey ?).	two birds present at the nest.	1	x
#26	not located	——	——		
				15	16

TOTAL NESTS OBSERVED - 26

ADULTS PER VISIT. JULY 31 -29
AUG 8 -24
AUG -22

PAIRS AT NESTS - 16 (OCCUPIED)
NESTS WITH YOUNG- 8
TOTAL YOUNG OBSERVED - 15

PRODUCTION - PER SUCCESSFUL NEST 1.9
- PER OCCUPIED NEST .95

YOUNG KNOWN TO HAVE FLEDGED - 6

Table 2. Field Observations on Two Kootenay River Great Blue Heron Colonies

North Heronry – 22 Great Blue Heron nests in 6 trees

	TOTAL
7 nests – no young birds	0
6 nests – 1 young bird	6
8 nests – 2 young birds	16
1 nest – 3 young birds	3
Total young observed	25

South Heronry – ± 58 nests (±) in an undetermined number of trees

	TOTAL
56 nests – no young birds	-0
1 nest – 1 young bird	-1
1 nest – 2 young birds	-2
Total young observed	3

Great Blue Herons

Although Mr. Teeple saw no adult birds at the heronries, and I recorded only 6 great blue herons leaving the heronry on August 31st, Mr. Teeple recorded 80 nests. Seventeen of these were positively occupied and produced a total of 28 birds. Mr. Teeple's remarks on the heronries are as follows: "No adult herons were seen in the immediate vicinity of the nests although a number of individual birds were seen along the river and the lake shores. Droppings on the ground beneath the southernmost colony suggest that most of the nests had had young in them during the 1968 breeding season. Most of the young herons in both colonies appeared to be nearly adult size." A summary of Mr. Teeple's observations are listed on Table 2.

Western Grebes

On August 31st approximately 150 western grebes were observed swimming on Kootenay Lake near the mouth of the Kootenay River. Later the same day a small number were observed near the bank of Duck Lake (Fig. 3). Fifteen birds were observed sitting on nests while another 20 birds were swimming and diving nearby. There were several other nests which were not occupied, and it was not possible to determine the total number of active nests without disturbing the birds. Assuming grebes from the two lakes were members of the same colony, I estimate the total number does not exceed 200 individuals with a total of 16 and possibly as high as 25 occupied nests in 1968.

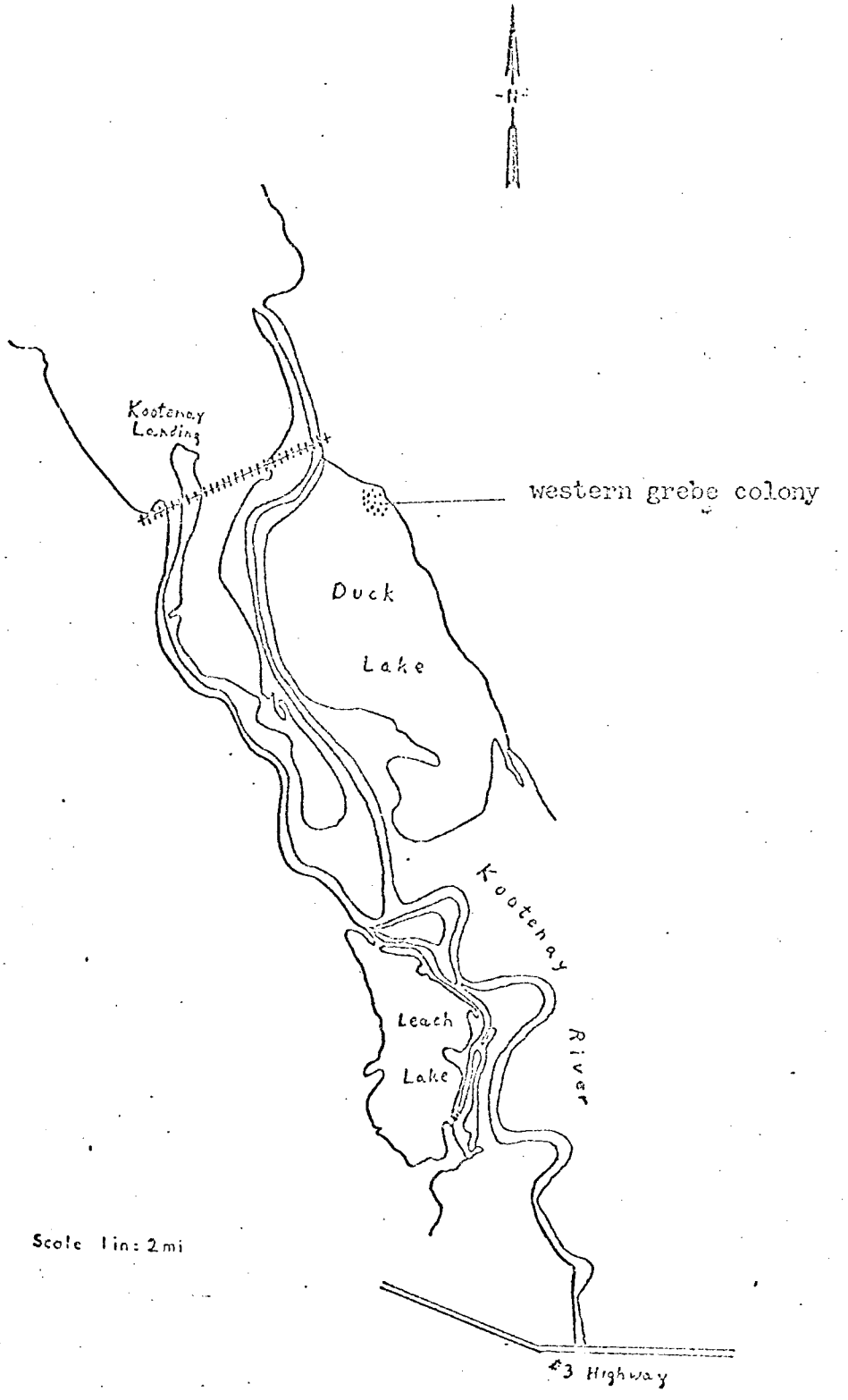

Fig. 3 approximate location of the western grebe colony in Duck Lake

Conclusions

Our investigations indicate that active colonies of osprey, great blue herons, and western grebes are located in proximity to one another in the Kootenay River Valley. Field observations indicate that all three species breed in the area. Data on productivity are lacking. Field investigations suggest that several pairs of great blue heron successfully raised young in 1968. Our field observations also suggest that 16 pairs of osprey apparently fledged 15 young birds or .9 per occupied nest. Compared to the normal osprey nest success of 2.2 to 2.5 young per nest in the Eastern United States (Ames, 1966), this suggests low productivity. No figures of productivity are available for the western grebe colony on Duck Lake. Advanced embryos in the 7 eggs which were collected by Mr. Floyd showed they were fertile and suggest that hatching success would have been high. The presence of incubating grebes on August the 31st was not expected. Cowan and Munro (1947) record western grebes with eggs at Williams Lake, British Columbia on June 1st, 1939, July 12th, 1938 and with eggs and young, June 5th, 1942. We do not know if our observations indicate delayed nesting, staggered nesting, or second nesting by this species on Duck Lake.

Recommendations

Since the osprey has declined and is still declining in many areas of this continent, and since decreased productivity has been associated with these declines in the Eastern United States. the low

productivity of the ospreys in the Duck Lake area warrants further investigation. The presence of the colonies of osprey, great blue heron and western grebe presents a unique opportunity for a comparative study of the food chains, pesticide levels, and the effects of pesticide on these three fish-eating species. To verify the results of the 1968 observations it would be desirable to follow-up our investigation in 1969 and at the same time make a serious attempt to obtain a sample of eggs from each of the three species for residue analysis.

References

Ames, Peter L. 1966. DDT residues in the eggs of the osprey in the north-eastern United States and their relation to nesting success. The Journal of Applied Ecology, 3 Supplement 87-97.

Munro, J. A. and I. McT. Cowan. 1947. A Review of The Bird Fauna of British Columbia. British Columbia Provincial Museum Special Publication No. 2. 285 pp.

Specimen Number	Description (a)	Total Wt. (gm)	Analysis No. (b)	% Fat	% Water	Pesticide Residues ppm (c) DDE	Dieldrin	DDD	p,p'-DDT	o,p DDT	HEPT. EP.
	WESTERN GREBE 70 ✓	17.65	1189	79.3	6.0	0.064	0.006	0.009	0.011	0.003	ND
	~~2. Pooled brain, FRANKLIN GULL~~										
	~~53, 54, 56, 57, 58, 59 ✓~~	~~93.29~~	~~1215~~	~~78.6~~	~~6.7~~	~~0.242~~	~~0.200~~	~~0.018~~	~~0.024~~	~~ND~~	~~0.420~~
	3. Pooled egg contents, WESTERN GREBE										
	66, 67, 68, 69, 71, 72 ✓	162.8	1147	71.0	15.3	15.4	0.069	1.92	0.707	ND	ND
69-113	Osprey, Kootenay, B.C. #23	52.75	345*	4.3	81.7	6.11	0.017	0.182	0.150	0.023	
-114	" " " # 9	52.17	346*	3.7	83.0	3.37	0.005	0.166	0.049	0.014	
-115	Great B. Heron " "	45.38	347*	5.7	81.7	6.55	0.035	2.44	2.52	0.606	
-116	" " " " " # 2	45.90	348*	6.0	82.0	6.46	0.027	0.063	0.119	0.015	
-117	Western Grebe Duck L BC #1	29.63	349	7.3	78.7	1.09	0.019	0.013	0.014	0.010	
-118	" " " " " #2	27.55	350*	6.7	79.7	2.05	0.021	0.152	0.112	0.011	
-119	" " " " " #3	29.45	351	3.3	79.0	1.17	0.015	0.010	0.017	0.008	
-120	" " " " " #4	24.51	352	8.3	77.7	2.02	0.027	0.020	0.021	0.028	
-121	" " " " " #5	25.98	353	7.7	79.3	1.54	0.012	0.004	0.018	0.011	
	WESTERN GREBE, ADULT - Various Tissues										
69-136	Duck Lake, B.C. - brain	2.71 lb.	368*	7.6	80.0	0.821	0.007	0.223	0.096	0.012	
	- do - breast muscle		369*	4.0	68.0	5.40	0.047	0.826	0.137	0.045	
	- do - body fat		370*	69.3	28.0	73.9	3.04	13.9	8.04	3.91	
	VARIOUS SPECIES - Brain Tissues										
69-137	Great B. Heron (nestling -3 pooled) Koot. Alta.	283.8 (j)	371	2.3	89.0	0.932	0.029	0.044	0.039	0.011	
-138	Great B. Heron nestling Kootenay, Alta.	632.4	372	2.6	86.9	0.093	0.002	0.005	0.002	0.005	

compared to 69 levels below. Ther is very high possibly due to one or two had eggs in the sample

Heron & Osprey seem comparable. The osprey probably is most susceptible

* indicates PCB's - see next page

Western Grebe #69-136. liver Hg 3.29.

Analysis Number	DDD Before	DDD After	p,p'-DDT Before	p,p'-DDT After	HE Before	HE After	PCB[b] (ppm)
BC 345	0.182	0.168	0.150	0.139	0.023	0.020	0.328
346	0.166	0.152	0.049	0.023	0.014	0.014	0.351
347	2.44	0.623	2.52	0.160	0.606	0.018	25.9
348	0.063	0.046	0.119	0.112	0.015	0.012	0.036
350	0.152	ND	0.112	0.004	0.011	0.012	1.70
BC 368	0.223	0.063	0.096	0.002	0.012	0.005	1.29
369	0.826	0.549	0.137	0.008	0.045	0.025	2.11
370	13.9	9.28	8.04	3.55	3.91	0.220	46.5