STATUS OF GREBES IN EASTERN WASHINGTON

By Charles F. Yocom, Stanley W. Harris and Henry A. Hansen

Since 1947, Eastern Washington has been the scene of an extensive program of waterfowl breeding ground surveys and studies. Incidental to these studies, the authors have collected rather extensive data concerning the status of the five species of grebes found in the state. They are Western Grebe (*Aechmophorus occidentalis*), Red-necked (Holboell's) Grebe (*Podiceps grisegena holböllii*), Horned Grebe (*Podiceps auritus cornutus*), Eared Grebe (*Podiceps caspicus californicus*), and Pied-billed Grebe (*Podilymbus podiceps podiceps*).

Area and Period of Study

Figure 1 shows that portion of Washington which is considered in this paper. The climate, topography, and vegetative zonation of the region have been described adequately by Yocom (1951), Daubenmire (1943), and Bretz (1928; 1932). The general region is one of limited rainfall, which occurs mostly in the winter months; much of this limited precipitation is collected in the many lakes, marshes, and depressions in the channeled scablands of the region during the spring run-off season. In addition, many of these scabland lakes apparently are supplied from underground water sources and hence are permanent waterbodies. Most of the waterbodies are relatively basic and support high populations of microcrustaceans (Fairbanks, 1950). For the most part, fish generally are absent from the potholes, marshes and shallow lakes, and are abundant in the deeper lakes.

The present paper summarizes the data on grebes that were collected by Yocom and Hansen from 1947 through 1954 on regular region-wide waterfowl breeding ground surveys, and by Harris (1954) during intensive studies in the Potholes Area of Grant County in 1950 and 1951. Most of the observations included are for the summer months; but Hansen conducted regular counts of waterfowl and grebes during the springs of 1948 through 1954 in Adams, Lincoln, Spokane, and Whitman counties. Harris's data for the Potholes Area of Grant County for the spring and fall of 1951 are rather complete. The authors have supplemented these records by other somewhat random observations made over the entire area in the winter, spring, and fall.

Status in Winter

Grebes are generally absent from eastern Washington between December 1 and March 15, although the ordinarily mild winter climate allows rivers and a few lakes to remain ice-free during most winters.

Single individuals or small flocks of Pied-billed Grebes occasionally spend the winter on rivers or lakes, but even these are rare, as is indicated by the fact that we only have nine records for the period of November 15 to March 1: two late November records for the Palouse River, Whitman County; four December records for the Snake River, Whitman County; one December record for the Yakima River, Yakima County; one January record for the Spokane River, Spokane County (Hudson and Yocom, 1954); and one February record for the Potholes Area, Grant County (Johnsgard, 1954).

In addition to these few Pied-billed Grebe records, we have a record of an unidentified grebe, probably an Eared or a Horned Grebe, on Kalotus Lake, Franklin County, on December 19, 1950; one Horned Grebe seen on the Snake River at Clarkston on January 27, 1952; and a Horned Grebe in winter plumage was taken at Pullman in January (Hudson and Yocom, 1954).

SPRING MIGRATION

After mid-March and during the month of April, all five species of grebes migrate into Eastern Washington in considerable numbers. Some of the earlier spring dates and localities are shown in Table 1.

TABLE 1

ARRIVAL DATES FOR GREBES IN EASTERN WASHINGTON

Species	*Earliest Date*	*Locality*
Western Grebe	March 29	Sprague Lake, Lincoln County
	March 29	Moses Lake, Grant County (Johnsgard, 1954)
	April 2	O'Sullivan Dam, Grant County (Harris and Yocom, 1952)
Red-necked Grebe	March 26	Lenore Lake, Grant County (Harris and and Yocom, 1952)
	April 15	Adams County
Horned Grebe	March 31	Palm Lake, Adams County
	April 14	O'Sullivan Dam, Grant County (Johnsgard, 1954)
Eared Grebe	March 23	O'Sullivan Dam, Grant County (Johnsgard, 1954)
	March 31	(Hudson and Yocom, 1954)
	April 5	Soap Lake, Grant County
	April 7	Lake Lenore, Grant County
Pied-billed Grebe	March 14	Sprague Lake, Lincoln County
	April 3	Potholes Area, Grant County
	April 4	Palm Lake, Adams County

Pied-billed, Western, and Red-necked Grebes usually appear in small flocks or as single individuals during spring migration. Most spring records for these species occur on or near known breeding areas and very little major movement is apparent.

Relatively large flocks of Eared Grebes, sometimes containing several Horned Grebes, usually occur on both breeding and non-breeding lakes during April. In late April and early May, either northward migration or dispersal to breeding areas usually results in a disappearance of Horned Grebes from these flocks. This is illustrated by the following data for West Medical Lake, Spokane County, for 1949:

Date	*Number of Horned Grebes*	*Number of Eared Grebes*
April 11	0	13
April 18	(mixed flock of 92 birds)	
April 25	(mixed flock of 108 birds, more Eared than Horned Grebes)	
May 2	10	43
May 9	0	85
May 16	0	105
May 23	0	73
May 30	0	113

Eared Grebes are generally well established on their breeding areas in May and begin nesting in June.

BREEDING

Relative Abundance

All five species of grebes are known to breed in Eastern Washington. The population counts of all summer resident grebes for the summers of 1949, 1950 and 1951 as shown below are indicative of the relative breeding abundance of these five species of grebes.

TABLE 2

RELATIVE ABUNDANCE OF GREBES OBSERVED ON BREEDING GROUNDS

Year	*Eared Grebe*	*Pied-billed Grebe*	*Western Grebe*	*Red-necked Grebe*	*Horned Grebe*
1949	950+	150	100	30	5
1950	1000+	250	100	15	10
1951	1500+	175	75	10	25

Known Breeding Locations

The Eared Grebe is the most abundant species in Eastern Washington and usually occurs in rather large breeding colonies consisting of 50 to

several hundred birds. Prior to the flooding of the Grand Coulee equalizing reservoir, the lakes of the Upper Grand Coulee in Grant County supported large colonies of Eared Grebes. Other known major nesting locations were Goose and Duley Lakes, Okanogan County; the Del Rio Potholes Area of Douglas County; Turnbull National Wildlife Refuge, Spokane County; Potholes in the Lamont Area of Whitman County; the Harry Harder Ranch Area of Adams County; and Twelve Mile Slough in Adams County. In addition to these major areas, broods or nests have been observed in small numbers on several other areas over the entire region (Fig. 1.).

The Pied-billed Grebe is the most widely and uniformly distributed species but is not as common as the Eared Grebe owing to its more

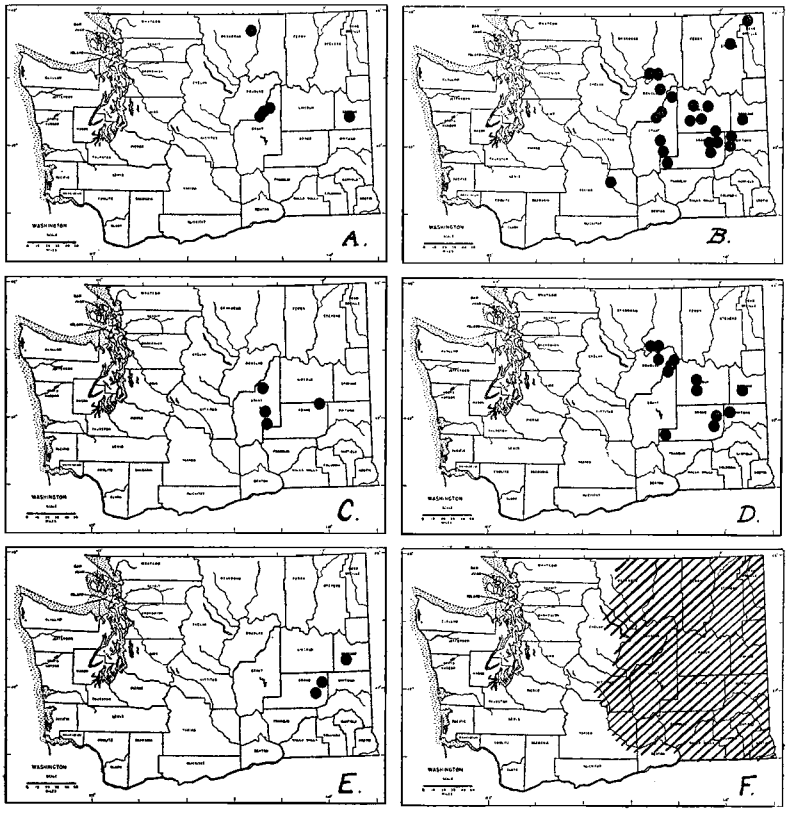

FIGURE 1. *A*, Known breeding areas for Red-necked Grebe; *B*, known breeding areas for Pied-billed Grebe; *C*, known breeding areas for Western Grebe; *D*, known breeding areas for Eared Grebe; *E*, known breeding areas for Horned Grebe; *F*, shaded area of eastern Washington under study during this investigation.

solitary social behavior. Broods and nests have been observed over the entire region during the summer. Major breeding areas were the Potholes of Grant County (Harris and Yocom, 1952; Johnsgard, 1954); the Harry Harder Ranch Area, Adams County; Turnbull National Wildlife Refuge, Spokane County; the Lakes of the Grand Coulee, Grant County; the potholes of the Del Rio Area, Douglas County; the lakes of central Lincoln County; and Goose and Duley Lakes of Okanogan County.

The Western Grebe is the third most common breeding grebe in Eastern Washington and occurs in fewer, smaller, and less well defined colonies than the Eared Grebe. Sprague Lake, Lincoln County, and Moses Lake, Potholes Reservoir, and Lake Lenore, Grant County are known breeding locations.

The Horned and Red-necked Grebes are both uncommon breeders in Eastern Washington, occurring at scattered locations where they are quite solitary and anti-social in their breeding habits. Most known breeding records for Red-necked Grebe are from Blue Lake, Park Lake, and Lake Lenore in the Grand Coulee of Grant County, but we also have observed nests and broods at Wannakut Lake, Okanogan County; and at Turnbull National Wildlife Refuge, Spokane County. Horned Grebe nests and broods have been recorded on the potholes of the Harder Ranch in Adams County; on Alkali Lake, Spokane County; and near Twelve Mile Slough in Adams County.

Other Summer Records

In addition to the known breeding locations as listed above and located on Figure 1, individuals or flocks of adults which may or may not represent breeding birds have been observed in various other locations over the area during the summer months. These adult summer records for Pied-billed and Eared Grebes have been scattered widely over the entire area. Incidental records of Western Grebes have usually been restricted to larger lakes over the area and in much fewer locations than either Pied-billed or Eared Grebes.

The bulk of summer records of Red-necked Grebe have been from the Grand Coulee Area. In addition to the breeding records cited above, we have only five summer records from outside the Grand Coulee: one August record from Palmer Lake, Okanogan County; one June record from the Pend Orille River, Pend Orille County; two August records from Stevens County; and one June record from Spokane County.

In addition to known breeding areas listed previously, the Horned Grebe has been observed in summer at the following locations: three June records for the Potholes, Grant County; one June record, Soap Lake, Grant County; one June record, Lake Lenore, Grant County; one

June and one July record for the Harry Harder Ranch Area, Adams County; two July records for Turnbull National Wildlife Refuge, Spokane County; one July record for Ivy Lake, Lincoln County; one July record for Sullivan Lake, Lincoln County; and one August record for White Mud Lake, Stevens County.

Nest and Brood Data

Pied-billed Grebe.—The Pied-billed Grebe is the earliest nesting grebe in Eastern Washington. Most broods observed were classified into age classes as downy, 1/3, 1/2, 2/3, or 3/4 grown. The distribution of 90 broods so classified with respect to the time they were observed is shown in Table 3.

TABLE 3

AGE CLASSIFICATION OF PIED-BILLED GREBE BROODS OBSERVED IN EASTERN WASHINGTON

Age Class	*May*	1–15 *June*	16–30 *June*	1–15 *July*	16–31 *July*	*August*
1/3 or less.....	1	11	10	12	14	4
1/2 to 2/3.....	0	5	10	5	10	3
Over 2/3.....	0	2	0	1	1	1

An interpretation of these data must consider that the bulk of the observations were made after June 15 each year and that many young grebes 2/3 grown or older were probably not tallied due to confusion with adults. Our earliest record is one brood of four young about 1/3 grown in the Potholes Area, Grant County, May 26, 1951. Most records of broods less than 1/3 grown are for June and July. Because actual age equalivants for these size classes are unknown, it is impossible to calculate an exact peak period of hatching for the Pied-billed Grebe. However, it appears that hatching begins in early or mid-May and ends in mid or late August with a general peak in late June and early July.

Valid data on the size of broods for grebes are very difficult to obtain owing to the nature of the brooding habits of the birds. The authors feel that most observed brood sizes are minimal owing to the fact that some of the young in a brood possibly are not tallied. The *observed* sizes of 95 Pied-billed Grebe broods are shown in Table 4.

From these data it would seem that most Pied-billed Grebe broods average about three observable young per brood. However, actual sizes probably average slightly larger than this.

Broods of Pied-billed Grebes have been observed on waterbodies ranging from less than one-half acre to several hundred acres in size.

TABLE 4

SIZE OF PIED-BILLED GREBE BROODS OBSERVED

Observed Brood Size	*Number of broods in each age class*					
	Downy	*1 wk. to ⅓*	*⅓ to ⅔*	*⅔ to full grown*	*Undet.*	*Total*
1	3	3	7	0	0	13
2	3	7	15	3	3	31
3	7	10	5	1	4	27
4	1	3	3	1	1	9
5	4	2	2	0	0	8
6	0	3	1	0	3	7
Average Size	3.0	3.1	2.4	2.6	3.6	2.9

There is a definite tendency for the species to select permanent potholes and lakes where there is little danger of drought eliminating the water areas. In the Potholes Area of Grant County, 73 per cent of the "permanent" potholes tallied in late August at the end of hot weather and termination of recession of waterlevels were less than one-half acre in size whereas 25 per cent were between one and five acres in size (Harris, 1952). An even higher percentage of small potholes occurred at the beginning of hot weather in June. In this area, Pied-billed Grebes were not attracted to the very small potholes even though they were abundant and many appeared to fulfill the cover requirements for nesting of grebes. Only three per cent of the Pied-billed Grebe broods were found on potholes less than one-half acre in size; 80 percent occurred on potholes one to five acres in size; and 17 percent were on areas larger than five acres. Thus 97 percent of the grebes were nesting on 27 percent of the potholes. Observations on Pied-billed Grebes in other areas tend to corroborate these data.

In general, the waterbody used by breeding Pied-billed Grebes was one that supported stands of permanent perennial emergent vegetation, usually Viscid Bulrush (*Scirpus acutus*) or Cattail (*Typha latifolia*), and had areas of open water which apparently was preferred by the grebes over the vegetated areas for feeding and escape cover. In the Potholes Area, 53 percent of the broods were observed using open water as a feeding and escape cover area, 41 percent used *Scirpus acutus*, and six percent used Baltic Rush (*Jancus balticus*) (Harris, 1954).

Western Grebe.—In general, the Western Grebe is an early nesting species in Eastern Washington, although apparently not as early as the Pied-billed Grebe. We have records of courting birds for late April and early May. Nesting begins in early May or late April. The following

records for 1949 on Sprague Lake, Lincoln County, illustrate the chronology of the nesting season:

Date	*Number of Western Grebes*	*Activity*
March 31.....	5	First appearance
April 4.....	2	
April 11.....	2	
April 25.....	2 pr.	Both pairs courting
May 2.....	6	Nesting, saw birds on nest from shore
May 18.....	20	12 nests, see below

The nests of May 18th were in a colony at the south end of the lake. The nests were built on floating platforms of dead stems of Viscid Bulrush in over 30 inches of water. Five nests contained no eggs, two nests contained four eggs each, three contained three eggs each, one nest had three intact eggs and one broken egg, and one nest had one intact and two broken eggs. The broken eggs possibly were the result of predation by a colony of eleven pairs of Ring-billed Gulls (*Larus delawarensis*) which were nesting 300 yards away.

The eggs of the Western Grebes contained nearly full term embryos and it was estimated that they would have hatched within a few days. The eggs were resting in wet vegetation so that they were constantly moist. The nests were located on the fringe of a large bed of Viscid Bulrush adjacent to deep water.

Sprague Lake, which is typical of the known Western Grebe breeding areas of Eastern Washington, is a large lake with some shoreline vegetation and contains large populations of fish. Lawrence (1950) and Munro (1941) indicate that fishes are a major item of food for Western Grebes.

The creation of a large artificial lake behind O'Sullivan Dam in the Potholes Area of Grant County has afforded an unusual opportunity to observe the rate of occupancy of a new habitat by Western Grebes. In the spring of 1950 about 600 surface acres of water were impounded behind the newly completed dam. After the heavy spring run-off was completed, this lake was allowed to recede to about 300 acres in size. It was held at approximately this level during the summers of 1950 and 1951. The nearest area occupied regularly by Western Grebes prior to the creation of Potholes Reservoir was Moses Lake, 10 miles to the north across shifting sand dunes. Moses Lake has long been noted as a breeding area for Western Grebes.

In early June of 1950, there were 15 Western Grebes on the Potholes Reservoir. Although no nests or broods were observed in either 1950 or 1951, there was a regular population of ten to fifteen birds on the lake all summer both years and courting occasionally was observed in May.

It is possible that broods could have escaped detection on the large lake although very little emergent vegetation was present during these years.

In the spring of 1952, the impoundment of the entire area began and was very far progressed in 1953 and 1954 when several square miles had been inundated. During the summer of 1953, the resident population had increased to at least 52 birds and the species was known to breed in 1953 and 1954 (Johnsgard, 1954).

Eared Grebe.—The Eared Grebe is typically a late nester in Eastern Washington and usually the hatching period extends from mid-June to August. From the data available, it appears that the earliest nesting begins in mid-May and the bulk of the nests are started near the first of June. Eared Grebe broods were classified into downy, ¼, ⅓, and ½ grown size classes when observed in the field. The following distribution of more than 94 young grebes (not broods) by size class and dates ob-

TABLE 5

YOUNG EARED GREBES OBSERVED IN EASTERN WASHINGTON

	Number of Young Observed			
Age Class	*June 16–30*	*July 1–15*	*July 16–31*	*August*
Downy	3	4	7	0
¼ to ⅓ grown	0	14	37+ many*	7
½ grown	0	0	18+ many*	4

* The term "many" indicates the size classes of young observed in very large colonies involving hundreds of adults and young where it was impossible to tally the relative numbers of young of different size classes.

served indicate the general late hatching for Eared Grebes compared to similar data for the Pied-billed Grebes listed previously. These data would indicate that the bulk of the Eared Grebes hatch in July in Eastern Washington.

We have been unable to obtain reliable data on brood sizes of Eared Grebes owing to their colonial nesting habits, which make it impossible to separate individual broods in most instances, and because many adults are still nesting while others are attending young. General observations usually have indicated about one young per adult in most colonies in late July when most young were afloat. However the average clutch size appears to be four eggs.

Large colonies of Eared Grebes usually are found on relatively large waterbodies. Although the species does breed occasionally on quite small lakes and potholes, the number of adults concerned on these smaller areas nearly always is small. The approximate numbers of adult birds contained in colonies on representative large and small waterbodies illustrate this fact (Table 6). Even on the large lakes where a large

TABLE 6

ADULT EARED GREBES IN BREEDING COLONIES IN EASTERN WASHINGTON

Large Areas		
Area	*Year*	*No. Adults Counted*
Twelve Mile Slough	1949	145+
Twelve Mile Slough	1950	100+
Turnbull Refuge (Upper Turnbull Lake)	1948	200+
Turnbull Refuge (Upper Turnbull Lake)	1949	66+
Turnbull Refuge (Upper Turnbull Lake)	1950	115+
Goose Lake, Okanogan County	1949	200+
Upper Grand Coulee:		
Devil's Lake	1949	105+
Tule Lake	1950	200+
Steamboat Marsh	1950	75+
Small Areas		
Area	*Year*	*No. Adults Counted*
Alkali Flat—Ewan	1949	2
20 Acre Lake, Lamont	1949	31
20 Acre Lake, Lamont	1950	22
8 Acre Lake, Lamont	1950	14
5 Acre Pothole, Del Rio	1950	18+
12 Acre Pothole, Del Rio	1950	14
Small Roadside Pothole Near Benge, Adams County	1950	15+
½ Acre Bay, Small Pothole Near Twelve Mile Slough	1950	25+

number of grebes collected in one breeding colony, the actual nesting area often was quite restricted in size, with all the nests for the colony contained in only a few acres of emergent vegetation. An example of this situation is illustrated by the fact that in July of 1949 on Twelve Mile Slough, Adams County, 70 nests representing a colony of 145+ adults were concentrated into an area about 100 yards from shore.

Nests that we have observed usually have been located in short emergent cover of the spike rush type. Of four small colonies where cover types were noted in 1950, two colonies were located in *Scripus americanus* (Del Rio Pothole Area, Douglas County); one was in Creeping Spike Rush (*Eleocharis macrostachya*) (Benge, Adams County); and one was in Baltic Rush (*Juncus balticus*) (near Twelve Mile Slough, Adams County).

On July 2, 1953, a large colony of Eared Grebes nesting at Turnbull National Wildlife Refuge, Cheney, Washington, were inspected by Yocom. Fifty nests were seen in a relatively small area in clumps

of Viscid Bulrush; most of the nests had from three to five eggs per clutch. The floating nest platforms were masses of vegetation consisting entirely of Green Milfoil (*Myriophyllum verticillatum*). A Pied-billed Grebe nest found in the same lake was a larger mass of floating vegetation made of Viscid Bulrush. Two eggs were in this nest.

The first Eared Grebes known to nest at Turnbull National Wildlife Refuge after it was created consisted of four pairs that nested in 1944. By 1948 the colony had increased to the size where John Parrish estimated that about 400 nests were located on Upper and Lower Turnbull lakes. The nests that he observed had from two to six eggs per clutch, and averaged about four eggs per nest. On July 19, the first eggs were known to have hatched; nests continued to hatch as late as mid-August.

FALL MIGRATION

We have been able to obtain little reliable data concerning the fall migration of grebes in Eastern Washington. In general fall migration is seen as a gradual disappearance from breeding areas during September, October, and November. After mid-November, very few grebes are observed in Eastern Washington and by early December what few remain can be considered as wintering birds.

Some of the later fall dates and the localities are as follows:

Species	*Latest Date*	*Locality*
Western Grebe	November 28	Sprague Lake, Lincoln County
	November 28	Snake River, Almota, Whitman County
	December 4	O'Sullivan Dam, Grant County (Johnsgard, 1954)
Red- necked Grebe	October 24	Blue and Park lakes, Grant County
Horned Grebe	November 5	Potholes, Grant County
	November 7	Sprague Lake, Lincoln County
Eared Grebe	November 22	Lake Lenore, Grant County (3000+ birds)
	November 31	Sprague Lake, Lincoln County

It is impossible to list departure dates for the Pied-billed Grebe since we have a scattering of records for all months of the year.

LITERATURE CITED

BRETZ, J. H. 1928. The channeled scablands of eastern Washington. Geog. Rev., **18:** 446–477.

BRETZ, J. H. 1932. The Grand Coulee. Amer. Geog. Soc. Sp. Publ. **15:** 1–89.

DAUBENMIRE, R. F. 1942. An ecological study of the vegetation of southeastern Washington and adjacent Idaho. Ecol. Mono. **12:** 53–79.

FAIRBANKS, C. W. 1950. A study of the microcrustacea of some of the alkali lakes of the Columbia Basin area. Unpubl. master's thesis, State Coll. Wash.

HARRIS, S. W. 1952. An ecological study of the waterfowl of the Potholes area, Grant County, Washington. Unpubl. master's thesis, State Coll. Wash. 187 pp.

HARRIS, S. W. 1954. An ecological study of the waterfowl of the Potholes area, Grant County, Washington. Amer. Midl. Nat. **52:** 403–432.

HARRIS, S. W. AND C. F. YOCOM. 1952. Birds of the lower Grand Coulee and Potholes area, Grant County, Washington. Murrelet, **33(2):** 18–28.

HUDSON, G. E. AND C. F. YOCOM. 1954. A distributional list of the birds of Southeastern Washington. Research Studies of the State Coll. of Washington **22(1):** 1–56.

JOHNSGARD, P. A. 1954. Birds observed in the Potholes region during 1953–54. Murrelet **35(2):** 25–31.

LAWRENCE, C. E. 1950. The diving and feeding activity of the western grebe on the breeding grounds. Condor **52(1):** 3–16.

MUNRO, J. A. 1941. Studies of waterfowl in British Columbia, the grebes. Occ. Paper No. 3, Provincial Museum, 71 pp.

YOCOM, C. F. 1951. Waterfowl and their food plants in Washington. Univ. Wash. Press. Seattle xvi + 272 pp.

Humboldt State College, Arcata, Calif.; Minnesota Division of Game and Fish, St. Paul, Minn.; and U.S. Fish and Wildlife Service, Juneau, Alaska. *July 9, 1957.*