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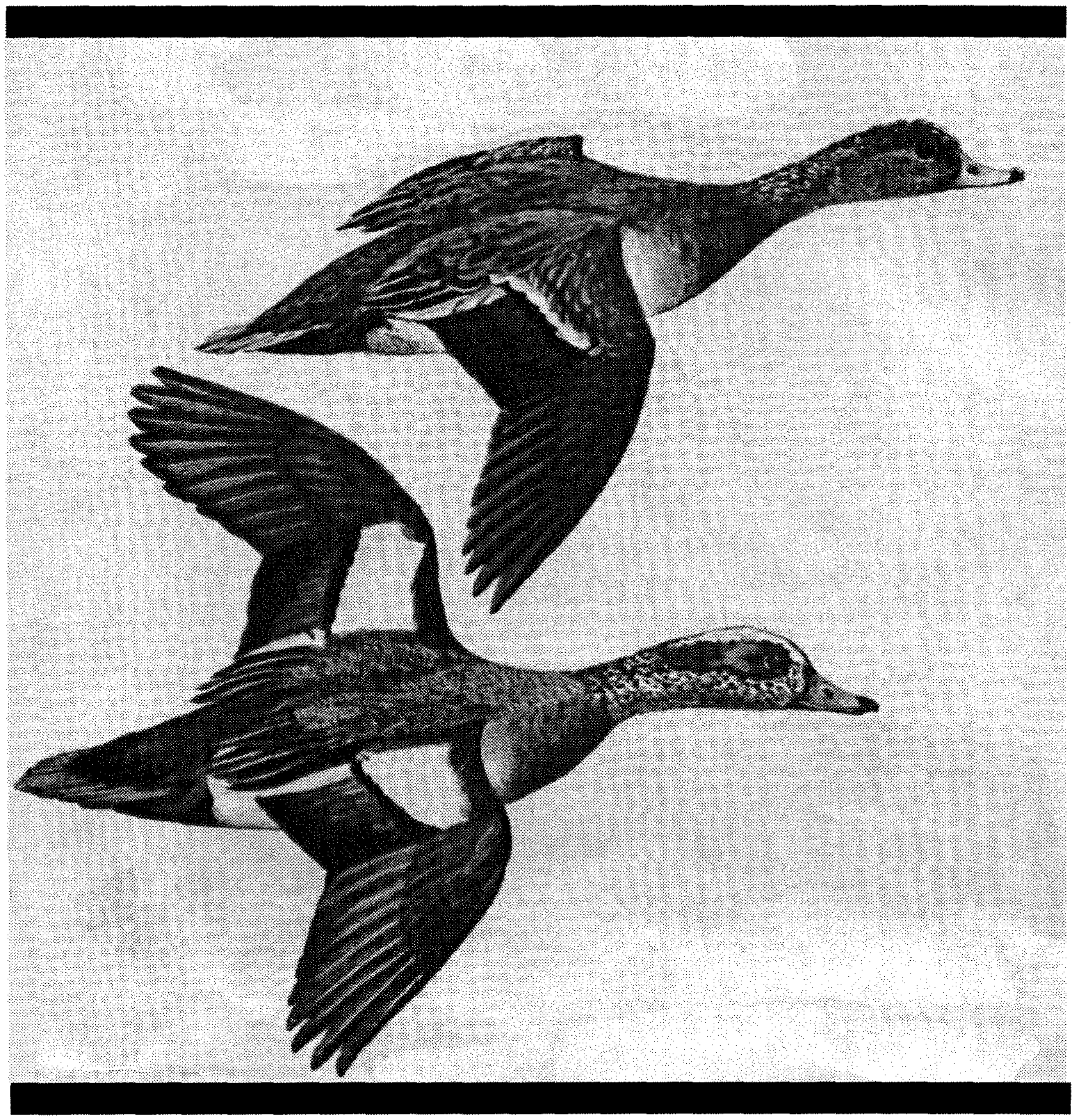
Waterfowl Production on the Central Seward Peninsula, Alaska: Final Report

R. R. Jandt and A. E. Morkill



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INVESTIGATORS: R.R. Jandt and A.E. Morkill

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Abstract

Abstract : Waterfowl brood surveys were conducted on public lands in the interior region of the Seward Peninsula, Alaska during 1989-1993. Production was monitored for four consecutive years on McCarthys Marsh and for three consecutive years in the upper Kuzitrin River basin. The 1993 estimated production of young ducks from the Kuzitrin flats was 4,888±1,857. Northern pintails (*Anas acuta*), and greater scaup (*Aythya marila*) were the most common breeders. Multi-year production averages are given for the two production areas and management implications are discussed.

INTRODUCTION

Alaska's public wetlands are becoming an increasingly valuable resource as continental waterfowl breeding habitat diminishes because of development and drought conditions. Of the original 87 million acres of wetland habitat in the conterminous United States, less than half remains (Tiner 1984). During drought years in the prairie states and provinces, more than half of all northern pintails and one third of all wigeons (*Anas americana*) breed in Alaska (Lensink and Derksen 1990). Inventories in 1989-1993 have helped to identify important wetlands on Bureau of Land Management (BLM) lands in the Kobuk District and to gain an understanding of species composition, habitat selection, and habitat quality. Such baseline data is essential to determine the impacts of development and various land management policies on breeding waterfowl.

Ground brood counts have been used in several places in Alaska to estimate waterfowl production based upon the number and size of broods counted during the peak of breeding season in July (Brubaker and Witmer 1989, Doyle 1989, FWS 1991). The Kobuk District BLM conducted brood surveys on the Seward Peninsula beginning in 1989. From 1989 to 1992, BLM conducted waterfowl brood surveys in McCarthys Marsh (Anderson and Robinson 1991a, 1991b). From 1991 to 1993, BLM also surveyed production on the wetlands along the upper Kuzitrin River, from near Bunker Hill to Lava Lake, with the cooperation of the National Park Service (NPS)-Bering Land Bridge National Preserve (Brown and Jandt 1992, Brown *et al.* 1993). Results from the 1993 field surveys and an evaluation of the multi-year inventory are included in this final report.

STUDY AREAS

McCarthys Marsh is located in the Fish River valley and is 520 km² in size (Fig. 1). The Bendeleben Mountains border the river flats to the north, and the Darby Mountains surround them on the east and southeast. The Fish River drains the basin, flowing south to Golovnin Bay off Norton Sound. McCarthys Marsh ranges in elevation from 15-90 m. Death Valley was also included in the McCarthys Marsh survey area, adding 182 km² of waterfowl habitat to the survey. Death Valley, east of the Darby Mountains, is drained by the Tubutulik River and its elevation averages 160 m.

The Kuzitrin River survey encompasses about 835 km² of the upper river basin between Bunker Hill and Lava Lake (Fig. 1). About one third of this area lies within the Bering Land Bridge National Preserve and most of the remainder is managed by the BLM–Kobuk District. The boundaries of this survey area were based on waterfowl production areas defined by the U.S. Fish and Wildlife Service (USF&WS), Office of Migratory Bird Management. The Kuzitrin, Noxapaga and Kougarok Rivers flow into the wetlands from the west and the north. The area is drained by the Kuzitrin River, which flows west to Imuruk Basin. In the northeastern part of the Kuzitrin study area there are extensive lava fields covering >200 km². The elevation of the Kuzitrin River survey area ranges from 15-90 m.

Plant communities in the two survey areas are similar. Forest cover is confined primarily to riparian zones, and is composed of white spruce (*Picea glauca*), black spruce (*Picea mariana*) and balsam poplar (*Populus balsamifera*), as well as willows (*Salix* spp.) and alders (*Alnus crispa*). Elsewhere, treeless tundra prevails with patches of various shrub communities, including dwarf birch (*Betula nana*), willows and alders. The predominant vegetation type in McCarthys Marsh is a complex of lichen tussock tundra and drainage ways/lake systems dominated by water sedge (*Carex aquatilis*) and white cottongrass (*Eriophorum scheuchzeri*) (Swanson *et al* 1985). The upper Kuzitrin River flats are primarily a low shrub-tussock tundra with Bigelow sedge (*C. bigelowi*), tussock cottongrass (*E. vaginatum*), Labrador tea (*Ledum decumbens*), lowbush cranberry (*Vaccinium vitis-idaea*) and cloudberry (*Rubus chaemaemorus*) (Swanson et al 1985). Some parts of the Kuzitrin valley also have lichen tusssock tundra. Parts of both areas burned in the 1970s: 18 km² in McCarthys Marsh in 1977 (Wagon Wheel burn) and approximately 90 km² in the Kuzitrin study area (combination of five fires in 1971).

Ponds in these study areas are generally divided into oxbow or flood-formed lakes, or those of thermokarst origin. They vary widely in the amounts of associated aquatic and emergent vegetation. The most common types of emergent and

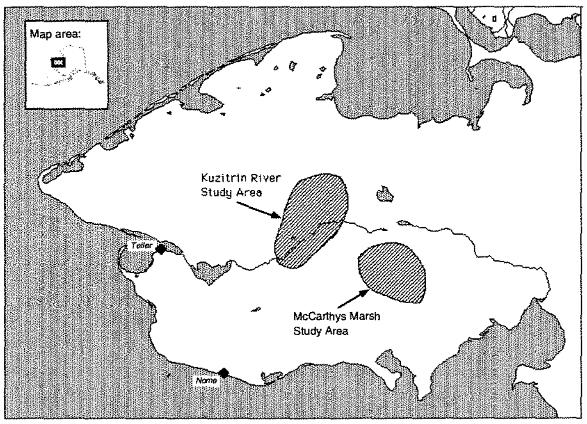
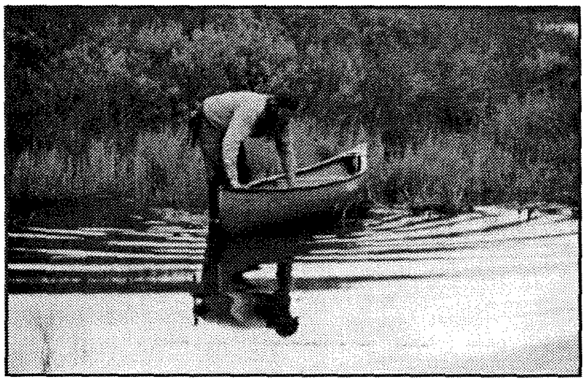


Figure 1. Study area locations on the Seward Peninsula, Alaska.



R. Brown prepares to conduct duck brood surveys in McCarthys Marsh.

submergent vegetation observed were buckbean (*Menyanthes trifoliata*), marsh fivefinger (*Potentilla palustris*), marsh marigold (*Caltha palustris*), yellow pond lily (*Nuphar polysephalum*), various sedges (*Carex*), water hemlock (*Cicuta mackenzieana*), bur reed (*Sparganium*), horsetail (*Equisetum*), bladderwort (*Utricularia vulgaris*), duckweed (*Lemna trisulca*) and pondweed (*Potamogeton*).

METHODS

Both McCarthys Marsh and the Kuzitrin River survey areas were divided into 2.6 km^2 plots defined by section lines on U.S. Geological Survey (USGS) 1:63,360 scale topographic maps. Each plot was stratified as "no habitat," "poor" or "other" (good) habitat based on water surface area, number of waterbodies and the presence of stream connections appearing on the maps. Lakes with water exchange from streams and that fluctuate with river systems are more productive than stagnant lakes and those with stable water levels (Lensink and Derksen 1990, Murphy *et al.* 1984). A random sampling of 13-15 plots in the "poor" and "other" strata were surveyed in each area, using the same plots in subsequent survey years. A detailed description of the stratification and sampling techniques can be found in the 1991 progress report (Brown and Jandt 1992).

A floatplane and a helicopter provided access to individual plots. Field methods followed those described in the FWS Standard Operating Procedures for ground brood surveys (1991). Survey teams walked or canoed around the ponds in sample plots using binoculars and spotting scopes to observe waterfowl. Duck broods were classified as age class I, II or III, according to Bellrose (1976). Priority was given to identifying, quantifying and aging broods, but all observed waterfowl were recorded. For more complete descriptions of the methods, see Anderson and Robinson (1991b). In some years, physical characteristics of ponds, such as pH, surface temperature, depth, and water clarity were recorded and plant specimens were collected.

We would like to express our gratitude to D. Chase and the NPS, Bering Land Bridge Park and Preserve staff for helping with the logistics of this survey. Biotechnician R. Brown played an integral role in helping collect and compile the data. Several others helped collect field data, including H. Brownell, R. Corbray, W. Gregg, H. Huntington, R. Jandt, and A. Morkill from BLM-Kobuk District, and N. Olson, B. Outwater, and T. Rodgers from the NPS. We thank pilot Buck Maxson of Arctic Air

Species	Broody Hens*	Other Adults	Total Adults	% of Total
Green-winged teal	13	41	54	5
American wigeon	14	62	76	7
Black scoter	7	70	77	7
Bufflehead	0	1	1	0
Common merganser	0	5	5	0
Greater scaup	25	501	526	46
Mallard	1	5	6	1
Northern pintail	32	263	295	26
Northern shoveler	8	2	10	1
Oldsquaw	7	34	41	4
Ruddy duck	0	1	1	0
Unidentified duck	0	16	16	1
White-winged scoter	2	22	24	2
Grand total	109	1023	1132	100

*With or without an observed brood

Table 1. Adult ducks observed in the Kuzitrin River study area, Alaska, 1993.

Species	NUMBER OF YOUNG				NUMBER OF BROODS		
	GANG BROOD	ORPHAN BROOD	BROOD W/HEN	TOTAL YOUNG	BROODY HENS	BROODS*	TOTAL BROODS
Green-winged teal	0	1	51	52	3	9	13
American wigeon	30	0	44	74	2	11	19.5
Black scoter	0	0	30	30	0	7	7
Greater scaup	0	0	98	98	4	19	23
Mallard	0	1	6	7	0	2	2
Northern pintail	10	9	60	79	16	17	35.7
Northern shoveler	0	1	33	34	1	8	9
Oldsquaw	0	5	33	38	1	7	8
Unidentified duck	0	1	0	1	0	1	1
White-winged scoter	0	0	12	12	0	2	2
Grand total	40	18	367	425	27	81	120.2

* Does not include gang broods. In calculating total broods, number of young in gang broods was divided by the average historical brood size for that species.

Table 2. Species, type of broods, numbers of broods and young ducks observed in the Kuzitrin River study area, Alaska, 1993.

Guides for providing safe and efficient transportation. Also, we are grateful to our supervisor, H. Brownell, and the staff at the Alaska Interagency Fire Coordination Center for bearing with us through numerous contingency plans.

RESULTS

Waterfowl Production and Species Composition

Kuzitrin River Basin: 1993

The Kuzitrin River production area contains roughly 475 km^2 of wetland habitat, with 130 km^2 in the "other" stratum and 345 km^2 in the "poor" stratum. Fifteen plots were surveyed in 1993, including 10 plots in the "other" strata and 5 "poor" plots. Observers recorded 1,132 adult ducks with 425 young in 94 broods. In addition, 26 "broody" hens were observed exhibiting distraction displays although their broods were hidden or not observed. Observations other than ducks included 144 white-fronted geese (*Anser albifrons*), 191 Canada geese (*Branta canadensis*) with 8 young, 26 tundra swans (*Cygnus columbianus*) with 13 young, 45 red-necked grebes (*Podiceps grisegena*) with 10 young, 2 yellow-billed loons (*Gavia adamsii*), 18 Pacific loons (*G. pacifica*) with 2 young, 3 red-throated loons (*G. stellata*), and 14 sandhill cranes (*Grus canadensis*).

American wigeons, green-winged teals (*Anas crecca*), northern shovelers (*A. clypeata*) and northern pintails were the predominant dabbling ducks seen in the Kuzitrin River study area (Table 1). Wigeon broods composed 25% and pintails 45% of

Location	Agency	Young/km^2	Broods/km^2	Years	Reference
Kuzitrin River	BLM/NPS	10.9	2.5	91-93	This report
McCarthy's Marsh	BLM	9.7	2.2	89-92	This report
Pah River	BLM	2.1	0.5	1989	Anderson and Robinson 1991a
Pah River	BLM	4.5	0.8	1993	This report
Koyukuk	FWS	11.0	2.2	1990	Hodges and Conant 1990
Yukon Delta	FWS	9.8	2.4	1990	Hodges and Conant 1990
Selawik	FWS	4.5	—	1989	Brubaker and Witmer 1989
Selawik	FWS	7.5	1.6	1990	Hodges and Conant 1990

Table 3. Comparison of density of young ducks obtained during July brood surveys on several federally-managed wetland areas in Alaska.

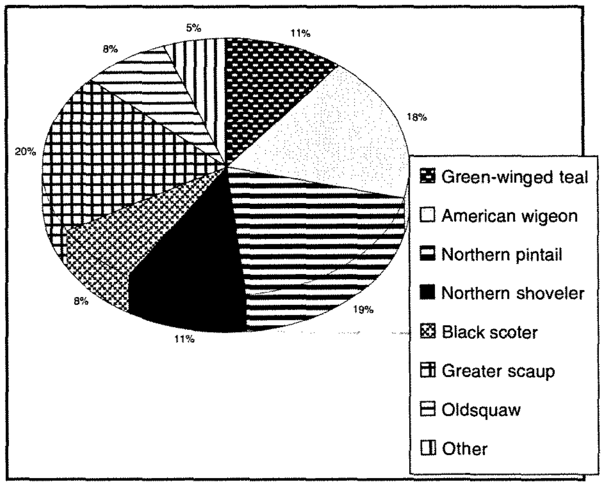


Figure 2. Species composition of duck broods in the Kuzitrin River wetlands, Alaska, 1993.

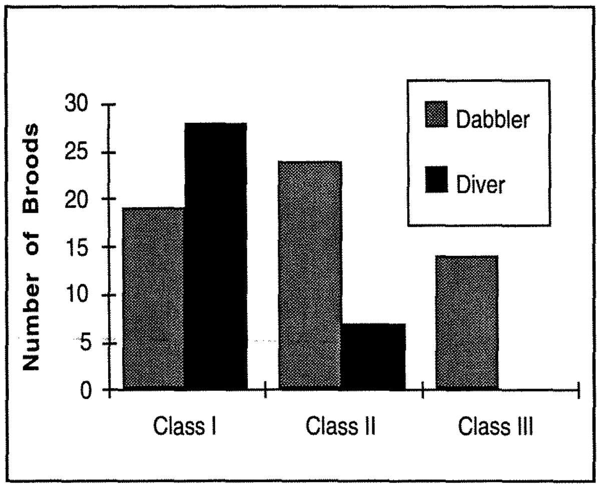


Figure 3. Number of broods in the three major age classes for dabblers and divers in the Kuzitrin River study area, Alaska, 1993.

the dabbler broods observed (Table 2, Fig. 2). Greater scaups, oldsquaws (*Clangula hyemalis*), and black scoters (*Melanitta nigra*) were the most common diving ducks, with scaups accounting for over half (58%) of the diver broods.

The average brood size across age classes (considering only observed broods of known size) for northern pintails was 3.1 (n=14), for American wigeons was 4.3 (n=16), and for greater scaups was 4.8 (n=17). These values are slightly lower than statewide multi-year averages of 4.34 for northern pintails, 4.87 for American wigeons and 6.22 for greater scaups (Hodges and Witmer 1990).

DISCUSSION

Timing of the 1993 brood survey may have been a little early for detecting the maximum number of diver broods because most were still in the downy stage (Class I) with none fully fledged (Class III) (Fig. 3). This indicates that some diver broods may not have hatched yet, and may account for the large number of scaup broody hens observed compared to other years. Timing should have been nearly optimal to see the largest number of dabbler broods, as 42% of them were in the partially-fledged stage (Class II).

The four-year average number of broods/km^2 produced in McCarthys Marsh was 9.7, while the three-year average for the Kuzitrin was 10.9. The number of young produced varies considerably from year to year, so it is useful to have more than one year's data to use in estimating productivity of wetlands for waterfowl. Figure 4 shows the variation in production among the three survey years in the Kuzitrin study area. In Table 3, the density of young waterfowl produced on BLM-managed wetlands are compared with some of the interior Alaska wildlife refuges. These averages are based on the entire basin, or management area, which of course contains some areas unsuitable for waterfowl. It is interesting to note that in spite of their small size, the Seward Peninsula wetlands are roughly comparable on a per unit basis to the much larger refuges. The Seward Peninsula has one of the highest densities of waterfowl breeding pairs (determined by aerial surveys in early spring) in the state, after the Copper River Delta and the Yukon Flats (Conant and Hodges 1985). Of course, the overall production of these two areas is dwarfed by larger wetland areas of the state; for example, the Yukon-Kuskokwim delta which encompasses 29,556 mi^2 (76,845 km$^{2)}$.

We had little success in attempting to relate observations to habitat characteristics such as pH, water hardness and temperature. Dabbler broods did not show a correlation with any of these variables, although diver broods seemed to correlate positively with pH (Brown and Jandt 1992). Other

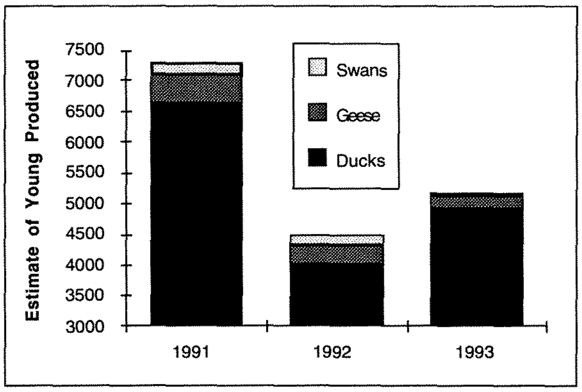


Figure 4. Estimated number of young ducks, geese and swans produced in Kuzitrin River valley, Alaska, from brood survey data obtained in 1991-1993.

R Jandt examines a fledgling duck from the Kuzitrin survey.

investigators have attempted to correlate brood use and production with physical characteristics, and for the most part, it has been very difficult to obtain consistant results. Bertram (1992) looked at a number of chemical and physical variables in relation to brood density and found waterbody area to be the only variable with a reasonably good correlation to brood density. However, Murphy *et al.* (1984) found that while larger ponds had greater species richness, the smaller ponds supported the greatest density of ducks, and felt that hydrologic connection to a creek system, with resultant higher levels of nutrients such as phosphate and nitrite, was the key factor in determining habitat use by ducks. Seppi (1993) also looked at a number of different variables, and concluded that shoreline length of ponds had the greatest positive association with brood use. Heglund (1992) failed to produce a good predictive model of habitat use by broods on the Yukon Flats, after intensive study. She attributed part of the difficulty to the tendency of ducks to select ponds based on factors other than the habitat quality, such as the presence of other ducks, called the "decoy effect." Thus, although research into the factors that influence habitat preference for waterfowl at the individual pond level continues, it has been difficult to develop hard and fast criteria for these factors. Biologists attempting to evaluate habitat quality for waterfowl may have to continue to rely on their general knowledge of limiting factors and realize that a variety of things can influence habitat selection under differing conditions, both spatially and temporally.

Conclusions and Management Implications

Both the McCarthys Marsh and Kuzitrin waterfowl production areas are contained in the Bendeleben Mountains Planning Subunit of the Northwest Management Framework Plan (BLM 1982). Although the McCarthys Marsh area was identified as an important waterfowl nesting area in this plan and in the Seward 1008 Study Decision Record (BLM 1983), the Kuzitrin basin was not described as such. In future plans, the value of both areas for waterfowl production should be recognized and considered in Environmental Assessments, Environmental Impact Statements, and the permitting of authorized uses, such as reindeer herding and mining. The North American Waterfowl Management Plan (FWS 1986) recommends that "... public land management agencies should ... regulate land uses to prevent the destruction or degradation of waterfowl habitats." The baseline production data obtained during 1989-1993 provides the foundation for monitoring adverse impacts to waterfowl nesting habitat due to future developments and land uses on the Seward Peninsula.

In the larger perspective of ecosystem management, waterfowl serve as one of the measurable indicators of the health of the pond riparian ecosystems in this area. Riparian areas are lands adjacent to creeks, streams, rivers, and lakes where vegetation is strongly influenced by the presence of water. Riparian areas are considered some of the most biologically diverse habitats, providing food and cover for a variety of wildlife and fish. Wetland habitats support the highest population densities of both breeding and non-breeding birds on the Seward Peninsula (Kessel 1989), including songbirds, shorebirds, waterfowl and raptors. Incidental observations have been recorded of a number of mammalian species in the wetland areas during the waterfowl surveys, including moose, muskox, porcupine, muskrat, otter and beaver. BLM is mandated to conserve and maintain the long-term productivity of riparian areas, and to restore damaged areas to a level of production comparable to that prior to the disturbance. In order to do this, it is essential to know pre-disturbance production values, which was one of the goals of these studies.

The BLM's Fish and Wildlife 2000 plan (BLM 1987) directs each District to identify and rank by importance key waterfowl habitat areas on public lands. In addition, a strategy plan has been developed which specifically instructs the Bureau to conduct habitat inventories and evaluations to determine condition and improvement potential of 170 waterfowl habitat management areas covering nearly 12 million acres by the year 2000 (BLM 1989). The production data from these studies on the Seward Peninsula has provided a quantitative and biologically-based means for accomplishing this ranking. Three waterfowl production areas have been surveyed using the ground brood count methodology in the Kobuk District. Based on the total production of waterfowl, it appears that the Kuzitrin River basin is the most productive area, followed by the McCarthys Marsh area, and the Pah River Flats (Anderson and Robinson 1991a, Jandt and Morkill 1994 is the least important as far as overall production (Fig. 5).

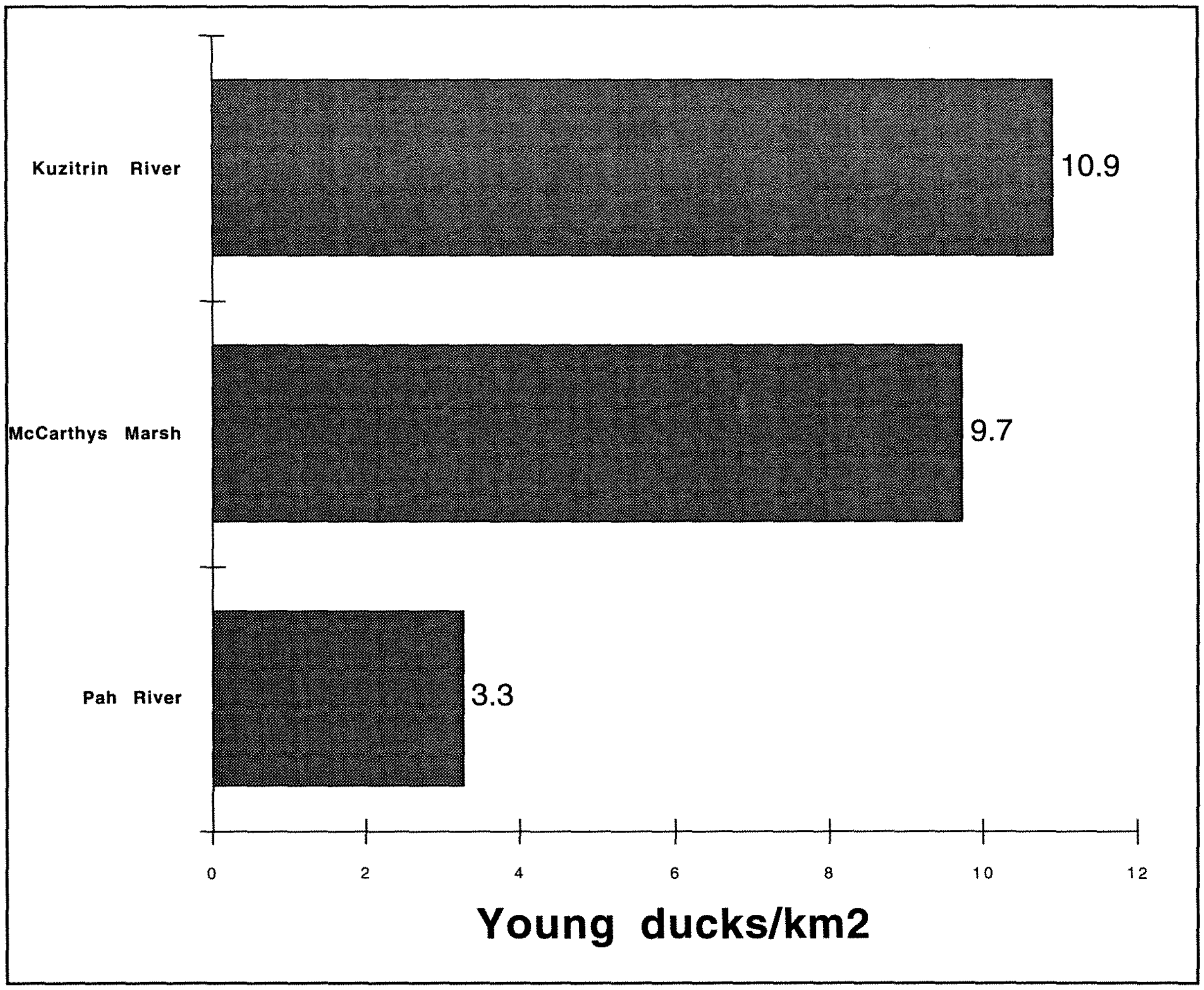


Figure 5. Comparison of young ducks/km^2 produced on three areas where BLM brood surveys were conducted. Kuzitrin River and McCarthys Marsh are three- and four-year averages, respectively, while the value given for Pah River is the average of 1989 and 1993 results.

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