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AN ANNOTATED BIBLIOGRAPHY ON THE COPPER RIVER DELTA

WITH EMPHASIS ON WATERFOWL HABITAT MANAGEMENT AND IMPROVEMENTS

This annotated bibliography contains a list of references concerned primarily with management of resources on the Copper River Delta. Emphasis was placed on articles which would be of value in the development of a wetlands habitat management and improvement program.

The bibliography is based on a search through Chugach National Forest office files, Alaska Department of Fish and Game (Cordova office) files, literature in the University of Alaska libraries at Fairbanks, and additional references from U.S. Fish and Wildlife Service files in the Anchorage office. We want to thank cooperators for permitting use of their libraries and files.

This bibliography will constantly need updating. Pertinent references should be submitted to the wildlife biologist, Chugach National Forest, Cordova Work Center, Box 280, Cordova, Alaska 99574. A copy or reference to the location of each article in the bibliography can be obtained from the author.

By

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ANNOTATED BIBLIOGRAPHY ON THE COPPER RIVER DELTA

P G T I M R S¹

- T Addy, C.E. and L.G. MacNamara. 1948. Waterfowl management on small areas. Wildl. Mgmt. Inst., Wash, D.C. 80 pp.
- T This booklet describes numerous waterfowl habitat improvements, some of which are applicable to the Copper River Delta.
- I M Alaska Department of Fish and Game. 1960 - Present. Annual species inventory and status reports. Alaska Dept. Fish & Game, Juneau, Alaska.
- These series of reports are written annually for each species of game for the entire state prior to 1969. In 1969 and later years the reports give summarized data for each species by the 26 game management units.
- I M _____. 1960 - Present. Big game index file. Alaska Dept. Fish & Game, Juneau, Alaska.
- The big game index file is a record of survey and inventory data on big game in each management unit. Yearly records from 1960, in most cases, are available. The following are covered: seasonal distribution, migration, and concentration; sex and age composition; productivity, mortality; seasons, harvest, and hunting pressure; range and habitat; population trend; and management policies and proposals.
- I M S _____. Unknown. Map of Dusky Canada Goose nesting plots. Alaska Dept. Fish & Game, Cordova, Alaska. 1 map.
- This 1:63,360 scale, Cordova B-4 map has the 13 nesting plots established on the western Copper River Delta in 1966.
- T Anderson, D.R. and F.A. Glover. 1967. Effects of water manipulation on waterfowl production and habitat. Trans. N. Am. Wildl. Conf. 32:292-300.

¹ P - Planning, G - Geology, T - Wildlife Habitat Improvement, I - Wildlife Habitat Inventory, M - Wildlife Management, R - Public Relations, S - Study

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P G T I M R S

- P M Anonymous. 1962a. Minutes, Copper River game management meeting, February 1, 1962. Chugach Natl. For., Anch. Alaska. 5 pp.
- Summarized highlights of the meeting were: Oil exploration around the Ragged Mountains should be confined to periods outside the Trumpeter Swan breeding season (May to September).
- M _____. 1962b. Wildlife reactions observed from helicopter on August 18, 1962. Unpubl. memo in files of Alaska Dept. Fish & Game, Juneau, Alaska. 4 pp.
- Reactions of waterfowl, moose, coyote, black bear, and wolverine to a helicopter flying across the Copper River Delta at low altitude are described.
- T I _____. 1969. Progress in wetland development, Chippewa National Forest. Chippewa Natl. For., Cass Lake, Minn. 8 pp.
- This public-oriented, illustrated brochure describes wetland habitat improvements, and habitat inventory.
- T _____. 1970. Wetland development. Chippewa Natl. For., Cass Lake, Minn. 8 pp.
- This public-oriented, illustrated brochure describes progress on wetland habitat improvements. Techniques include: potholes, impoundments, nest boxes, and nesting islands.
- M R _____. 1971. Statement of purpose in restricting off-road vehicle use within the Copper Delta Game Management area. Memo in files of Chugach Natl. For., Anch., Alaska. 5 pp.
- This memo justifies the exclusion of off-road vehicles, except airboats, motorboats, and airplanes, in the Copper Delta Game Management Area.
- G M R _____. 1973. Highway guide to the Copper River Delta. Chugach Natl. For., Cordova, Alaska. 10 pp.
- This brochure is an account of the history, geology, and wildlife along the Copper River Highway between Cordova and the Copper River.

P G T I M R S

- R _____ . No Date. Copper River flats. Unpub. rept. in files of Alaska Dept. Fish & Game, Juneau, Alaska. 12 pp.

This report describes the Copper River Delta in terms of physiognomy, waterfowl use, and recreational use prior to the 1964 earthquake. Emphasis is placed on waterfowl species using the area, and hunting pressure.

- M Balser, D.S., H.H. Dill, and H.K. Nelson. 1968. Effect of predator reduction on waterfowl nesting success. J. Wildl. Mgmt. 32(4):669-682.

On an intensively studied waterfowl refuge in northwest Minnesota predator control efforts produced 60% more Class I ducklings than did units with no control. The methods of control are discussed and recommendations are given for control in areas where substantial nests losses occur.

- M Banko, W.E. 1960. The Trumpeter Swan. U.S. Fish & Wildl. Serv., N. Am. Fauna No. 63. 214 pp.

The historic and recent distribution and status of Trumpeter Swans--their habitat, life history, population dynamics, and management are described.

- G Barnes, F.F. 1951. A review of the geology and coal resources of the Bering River coal field, Alaska. U.S. Geol. Surv. Circ. 146. 11 pp.

Literature on the extent and quality of the Bering River coal deposits is summarized. Barnes concludes that large scale coal mining would not be economical.

- G _____ . 1967. Coal resources of Alaska. U.S. Geol. Surv. Bull. 1242-B. p. 30.

The Bering River coal field, approximately 50 square miles is described.

- T M Bartonek, J.C. and H.W. Murdy. 1970. Summer foods of lesser scaup in subarctic taiga. Arctic 23:35-44.

Twenty-five adult and 38 juvenile Lesser Scaup that were collected in taiga north of Great Slave Lake,

Northwest Territories, had eaten almost entirely animal matter (99%). Juveniles collected in mid-summer fed on free-swimming organisms such as Chaoborinae and Conchostraca; whereas juveniles collected in late summer and adults in June fed on bottom associated organisms such as amphipods, odonata, and corixids. Seeds, copepods, and cladocerans were seldom or never eaten. Most other organisms were consumed in proportions that were not significantly different from those in collected samples.

- M _____, J.G. King, and H.K. Nelson. 1971. Problems confronting migratory birds in Alaska. N. Am. Wildl. and Nat. Res. Conf. 36:345-361.

The inadequate protection of migratory bird habitats, the need for more biologists to manage populations, and the conflicts with industry, agriculture, hunting, and other resource uses are discussed.

- T M _____, and J.J. Hickey. 1969a. Food habits of canvasbacks, redheads, and lesser scaup in Manitoba. Condor 71: 280-290.

Invertebrates made up 87% and 92% respectively, of the summer foods taken by juvenile and adult female Canvasbacks. Tubers of Potamogeton comprised 95% of the esophageal contents of summer-collected adult males and 71% of fall-collected Canvasbacks. Esophagi from 83 summer-collected juvenile and adult female and male Redheads contained, respectively, 43, 81, and 86% animal material. Of 16 fall-collected Redheads, Chara was almost the only item found. Animal material formed 99, 89, and 99%, respectively of esophageal contents of 71 summer-collected juvenile and adult female and male Lesser Scaup. Amphipods were most important.

- T M _____, and _____. 1969b. Selective feeding by juvenile diving ducks in summer. Auk 86:443-457.

Foods eaten by 49 juvenile Canvasbacks and Redheads were compared with availability and abundance of potential foods as determined by dredge and net samples taken in 5 potholes near Minnedosa, Canada. Juvenile Canvasbacks and Redheads took 96 and 43% respectively, animal foods although these foods comprised only 57% of potentially available foods. Trichopteran larvae were preferred foods of both species.

P G T I M R S

T M

Beard, E.B. 1953. The importance of beaver in waterfowl management at the Seney National Wildlife Refuge. J. Wildl. Mgmt. 17(4):398-436.

Beaver ponds at Seney (Michigan) provided an interspersed cover and water, and an abundance of invertebrate foods for waterfowl. Management should maintain abandoned dams, create artificial ponds, and induce pond creation by beaver.

T M

Bednarik, K.E. 1963. Water-level manipulation and waterfowl harvests on the Magee Marsh. Game Res. in Ohio 2:145-158.

Waterfowl harvest is correlated with waterfowl populations, hunting pressure, and marsh conditions as determined by water-level manipulation. Results of drawdowns and refloodings, in terms of changes in vegetation and waterfowl use, are presented.

P G M

Behan, R.W. 1962. Letter to Regional Forester (Alaska). Chugach Natl. For., Anchorage, Alaska. 1 p. (June 29).

Richfield owns 50%, Sinclair 25%, and British Petroleum 25% of the oil leases near Bering River. The status of the Copper River leases was questioned.

P S

Buckman, R.E. 1973. Letter to C.A. Yates, Regional Forester, Region 10. Pac. N.W. For. & Range Expt. Sta., Portland, Oregon. 1 p. (May 1).

Research involvement on the Copper River Delta by the Institute of Northern Forestry and by the Pacific Northwest Forest and Range Experiment Station is discussed.

T

Chabreck, R.H. 1967. Weirs, plugs, and artificial potholes for the management of wildlife in coastal marshes. Marsh and Estuary Mgmt. Symp., La. State Univ. 28 pp.

Techniques and results of installing weirs and earthen plugs to flood tidal sloughs, and the use of pothole and ditch construction to create water openings in coastal Louisiana marshes are presented. Waterfowl use was greatest where weirs permitted saltwater at high tides to flood the area behind weirs.

P G T I M R S

- M Chapman, J.A., C.J. Henry, and H.M. Wight. 1969. The status, population dynamics, and harvest of the Dusky Canada Goose. Wildl. Monog. No. 18. 48 pp.

The present status of the Dusky Canada Goose is evaluated. Also, population dynamics and current harvest rates are determined. Banding data from young and adult geese banded on the nesting grounds, bag checks, a mail questionnaire, and a tail-feather survey for the wintering grounds in the Willamette Valley near Corvallis, Oregon were analyzed. Two-thirds of the harvest occurs in Oregon with the remainder in British Columbia, Washington, Alaska, and California in descending order. Immature geese are heavily harvested compared with other populations and are more than twice as vulnerable to hunting as adults.

- T M Chura, N.J. 1961. Food availability and preferences of juvenile mallards. Trans. N. Am. Wildl. Conf. 26: 121-133.

Class I Mallard ducklings in Utah primarily fed on terrestrial invertebrates. Aquatic invertebrates were favored by Class Ic-III ducklings. Plants were favored by Class III and adult females just before flight.

- M R Clark, R.F. 1969. Letter to Regional Forester, Alaska Region of U.S. Forest Service. Chugach Natl. For., Anchorage, Alaska. 7 pp. (March 11).

The proposed restrictions on off-road vehicle use on the Copper River Delta Game Management Area are presented.

- T M Collias, N.E. and E.C. Collias. 1963. Selective feeding by wild ducklings of different species. Wilson Bull. 75:6-14.

Downy ducklings of different species tend to specialize on different kinds of invertebrates. Distribution of ducklings is roughly correlated to abundance of preferred food. Of the aquatic plants, bladderwort harbored more invertebrates than other aquatic vegetation.

- T Cook, A.H. and C.F. Powers. 1958. Early biochemical changes in the soils and water of artificially created marshes in New York. N.Y. Fish & Game J. 5(1):9-65.

Soil and water chemistry were studied in six artificially created marshes in New York over a two-year period. Productivity improved when drainage resulted in aeration of marsh soils. Fertility is better in ponds where surface rather than bottom waters are removed. A discussion of the effects of fertilizers is included. Potash (calcium) would be most suitable for releasing cations and increasing the amount of calcium in marsh waters.

- M R Coster, B.A. 1971. Letter to F.J. Keenan. U.S. For. Serv., Anchorage, Alaska. 1 p. (Sept. 20).

The Copper Delta Game Management Unit can be opened to tracked vehicle use for resource development. However, the Forest Service, Alaska Dept. Fish & Game, and State Div. of Lands must agree to issue permits.

- T M S _____. 1971. Letter to the Cordova District Ranger. Chugach Natl. For., Anchorage, Alaska. 1 p. (Dec. 13).

The coho salmon rearing ponds at Mile 18, Copper River Highway will be studied for future habitat improvement. One technique to be applied is the planting of willow shoots to control erosion at dikes.

- T M Cottam, C. 1939. Food habits of North American diving ducks. U.S. Dept. Agric. Tech. Bull. 643. 140 pp.

Food habits were studied in 22 species of divers from 6,665 adult and 140 juvenile stomachs. Plants of special importance to inland divers included Potamogeton pectinatus, P. perfoliatus, Ruppia maritima, and Najas flexilis, and N. guadalupensis. The sea ducks were primarily animal feeders.

- T Crow, J.H. 1967. Inundation of land surfaces by sea water: effects and regeneration. Unpub. manu., Chugach Natl. For., Anchorage, Alaska. 9 pp.

Literature on effects of saltwater inundation and of desalinization of soil and vegetation is summarized. Emphasis is placed on soil nutrients.

- I S _____. 1968. Plant ecology of the Copper River Delta, Alaska. Ph.D. Diss., Wash. State Univ., Pullman, Wash.. 120 pp.

P G T I M R S

Changes in vegetation from 1965 to 1967 on the Copper River Delta following the March 27, 1964 earthquake were documented. Data is presented showing seasonal invasion of species characteristic of vegetation belts further inland.

- P S Crupper, J.C. 1966. Planning (Copper River Delta ecological study). Chugach Natl. For., Anchorage, Alaska. 1 p.

The Alaska Dept. of Fish and Game will be conducting an ecological study on the Copper River Delta. Cooperation between the Forest Service and Fish and Game would benefit both agencies.

- P I M _____ . 1967. Planning (Copper River Delta ecological study) Chugach Natl. For., Anchorage, Alaska. 1 p.

Color prints of the Copper River Delta were taken aerially along transects in 1966.

- P S Cushwa, C. 1973. An analysis of Copper River Delta—Controller Bay research needs in Southcentral Alaska. Rept. to Pac. N.W. For. and Range Expt. Sta., Portland, Oregon. 7 pp.

Current research needs are discussed. Emphasis is placed on research of benefit to waterfowl habitat management.

- M Dwernychuk, L.W. and D.A. Boag. 1971. Ducks nesting in association with gulls—an ecological trap? Canad. J. Zool. 50:559-563.

Ring-billed and California gulls protected nesting ducks from egg losses by excluding other egg-eating birds from foraging. Estimated hatching success without human interference would exceed 90%. However, high duckling mortality was positively associated with gulls.

- M Ewaschuk, E. and D.A. Boag. 1972. Factors affecting hatching success of densely nesting Canada geese. J. Wildl. Mgmt. 36(4):1097-1106.

Hatching success of an island-nesting population of Canada geese in Alberta was correlated with presence of a gander in the nesting territory and to winning agonistic encounters with other geese. Nesting densities ranged from 8.0 to 10.7 nests/acre and nesting success ranged from 27 to 69% over a three-year period.

- G Fisher, C.A. 1910. Report on the Cunningham coal property, Controller Bay region, Alaska. U.S. Cong. Joint Comm. to Investigate, Dept. Int. and Bur. For. Hear., Vol. II pp. 1073-1092.

- G Fisher, C.A. and W.R. Calvert. 1914. Geology of the Bering River field and its relations to coal mining conditions. U.S. 63rd. Cong., 2nd. Sess., House Doc. 876. pp. 29-50.

- G Fisher, W.L. 1912. Alaskan coal problems. U.S. Bur. Mines Bull. 36. pp. 12-17.

Mining laws and development of the Bering River coal field are discussed.

- P S Grant, J.F. 1965. Letter to B. Silcock. Chugach Natl. For., Anchorage, Alaska. 3 pp.

The technique and cost of taking aerial photos over 130 miles of transects across the Copper River Delta is presented.

- P S _____. 1965. Wildlife habitat (Copper River Delta ecological study) aerial photography. Chugach Natl. For., Anchorage, Alaska. 5 pp.

Permission is requested to take aerial photos along transects across the Copper River Delta.

- T Griffith, R. 1948. Improving waterfowl habitat. Trans. N. Am. Wildl. Conf. 13:609-618.

Water-level control, grazing, disking, and plowing for habitat improvements are discussed.

P G T I M R S

T

_____. 1957. Management of waterfowl habitat on the National Wildlife Refuges. Trans. N. Am. Wildl. Conf. 22:215-220.

Management techniques discussed included: predator control, water-level manipulation, control of human access, grazing, and planting.

T

Hammond, M.C. and G.E. Mann. 1956. Waterfowl nesting islands. J. Wildl. Mgmt. 20(4):345-352.

Nesting islands improve waterfowl production because they are predator free, have a high edge effect, and provide water, food, loafing sites, and cover.

H

M

Hansen, H.A. 1959. Annual waterfowl report, Alaska, 1959. Bur. Sport Fish & Wildl. Juneau, Alaska. 8 pp. mimeo.

The 1959 aerial survey of breeding waterfowl (including Trumpeter Swans) is summarized.

M

_____. 1961. Loss of waterfowl production to tide floods. J. Wildl. Mgmt. 25(3):242-248.

This report documents the effects of tidal flooding on nesting waterfowl of the Copper River Delta. Both geese and ducks were capable of building up nests to prevent eggs from flooding.

M

_____. 1962. Canada geese of coastal Alaska. Trans. N. Am. Wildl. Conf. 27:301-319.

The breeding distribution of Dusky Canada Geese in relation to other adjacent subspecies is discussed. Migration timing and population estimates are compared with the Vancouver Canada Geese. A management plan is outlined for the Dusky Canada Goose.

M

_____. 1968. Pacific flyway Canada goose management--federal and state cooperation. IN, R.L. Hine and C. Schoenfeld (Eds.), Canada goose management. Dembar Ed. Res. Serv., Madison. pp. 43-49.

The population dynamics of Aleutian, Great Basin, and Dusky Canada Geese are discussed. Attention is focused on the hunter kill and methods of controlling the kill on the wintering grounds.

P G T I M R S

I M

- _____, P.E.K. Shepherd, J.G. King, and W.A. Troyer. 1971. The trumpeter swan in Alaska. Wildl. Monog. No. 26. 83 pp.

This study describes the extent of breeding range of the Trumpeter Swan in Alaska, ascertains the approximate breeding population, describes the migratory route and wintering grounds of the swan population, discusses possible adverse habitat alteration or disturbance through industrial development, presents a detailed ecological study of the swan breeding grounds on the lower Copper River, and presents the breeding biology of the Trumpeter Swan in the lower Copper River basin and the Kenai National Moose Range.

M R

- Hanson, P.D. 1959. Special use permits. U.S. For. Serv., Juneau, Alaska. 1 p.

Guidelines for special use cabins in the Big Glacier and Pete Dahl groups are given.

P

M

- _____. 1962. Letter to P.E.K. Shepherd. U.S. For. Serv., Juneau, Alaska. 1 p. (Dec. 12).

Controlled judicious use of helicopters is possible without too much unwarranted disturbance of waterfowl on the Copper River Delta according to Hanson.

M R

- Hardy, M.E. 1959. Special uses (Pete Dahl and Big Glacier Groups). Chugach Natl. For., Anchorage, Alaska. 5 pp.

Individual requests for cabin sites and continued cabin uses are considered for the private and special use cabins at Pete Dahl and Big Glacier on the Copper River Delta.

T

- Harris, S.W. and W.R. Marshall. 1963. Ecology of water-level manipulations on a northern marsh. Ecology 44(2):331-343.

Results from pond drawdowns of various durations at Agassiz NWR, Minnesota are presented. Most emergent aquatic plants developed with early season drawdowns, slow drainage, rich soil types, and small amounts of stranded algae.

P G T I M R S

- T Hasler, A.D. and W.G. Einsele. 1948. Fertilization for increasing productivity of natural inland waters. Trans, N. Am. Wildl. Conf. 13:527-552.

- P T S Havens, P. 1973. Letter to Julius Reynolds. Alaska Dept. Fish & Game, Anchorage, Alaska. 1 p.

The proposed U.S. Forest Service waterfowl habitat improvements for the Copper River Delta in 1973 are reviewed. Pothole blasting would be of little value. Emphasis should be placed on improving duck, not goose, production. Concern is expressed about possible flooding of goose nests. Some drawn down ponds should remain drained for one year. The possibility of fertilizing ponds needs investigation.

- I M Havens, P. and J. Reynolds. 1970. Trumpeter swan survey. Copper River. Alaska Dept. Fish and Game files, Cordova, Alaska.

An aerial survey of Trumpeter Swans and nests was made on May 12 and 13, 1970. Maps show the location of each observation.

- I M _____ and _____. 1972. Trumpeter swan survey, Copper River. Alaska Dept. Fish & Game. Cordova, Alaska.

Data on Trumpeter Swans and nests observed on an aerial survey of the Copper River Delta on June 16 and 18, 1972 is presented along with a map of the observations.

- P S Helmers, A. 1973. Aerial photography. Inst. of Northern For., Fairbanks, Alaska. 4 pp.

The type, scale, and use of future aerial photography for the Copper River Delta is discussed. Emphasis is given to uses in relation to wildlife habitat.

- P S _____. 1973b. An analysis of Copper River Delta-Controller Bay research needs in southcentral Alaska. Inst. of Northern For., Fairbanks, Alaska. 7 pp.

The research possibilities for waterfowl and their habitat on the Copper River Delta are discussed. Recommendations include: collection and analysis

of baseline data on the structure and function of the ecosystem—prior to and after—man's influence, and habitat improvement for waterfowl. From these studies, guidelines can be developed for management of the Copper River Delta for waterfowl.

- I S _____. 1973c. Copper River Delta studies. Inst. of Northern For., Fairbanks, Alaska. 1 p.

The 1959 U.S.G.S. aerial photos of the Copper River Delta will be useful for planning a vegetation-mapping project.

- I S _____. 1973d. Letter to Richard E. Woodrow, Supervisor, Chugach Natl. For., Inst. of Northern For., Fairbanks, Alaska. 1 p. (Nov. 13).

The proposed aerial photography for the Copper River Delta in 1974 is discussed. Helmers recommends photography (in addition to 1:15,840 scale) of 1:3,960 for more detailed photo-interpretation.

- S _____. 1974. Cooperative aid agreement. Inst. of Northern For., Fairbanks, Alaska. 6 pp.

A memorandum of understanding between the Forest Service and the University of Minnesota describes responsibilities, liabilities, and funding for a joint hydrology study on the Copper River Delta.

- T Higer, A.L. and M.C. Kolipinski. 1967. Pull-up trap, a quantitative device for sampling shallow-water animals. Ecology 48:1008-1009.

A fine mesh net is suspended in shallow water over a set time period, then removed, and the aquatic invertebrates are counted.

- M Hochbaum, H.A. 1944. The canvasback on a prairie marsh. Am. Wildl. Inst., Wash. D.C. 201 pp.

The life history of the Canvasback is discussed in detail.

- T Hoffman, R.H. 1970. Waterfowl utilization of ponds blasted at Delta, Manitoba. J. Wildl. Mgmt. 34(3): 586-593.

Waterfowl use of 25 blasted ponds at the Delta Marsh in Manitoba revealed more breeding pairs per unit of shoreline, but greater fluctuation in abundance and less species diversity compared to surrounding wetlands. The elevated spoil was used heavily. Ponds provided isolation and loafing areas for breeding pairs of dabblers.

- T Hooper, R.M. 1972. Waterfowl use in relation to size and cost of potholes. J. Wildl. Mgmt. 36(2):459-468.

The sizes of potholes blasted with varying amounts of ammonium nitrate--fuel oil mixture are described. Duck use was evaluated in potholes over a three-year period. The optimum pothole size per duck visit was determined.

- T S Howse, N.R. 1971a. Letter to J.C. Raynor. Chugach Natl. For., Anchorage, Alaska. 3 pp. (Aug. 4).

The progress at the Mile 18 coho rearing ponds, and the failure of waterfowl food plantings at Eyak River pond are discussed.

- I S _____. 1971b. Preliminary report of water quality reconnaissance, Copper River Delta waterfowl habitat. Chugach Natl. For., Anchorage, Alaska. 14 pp. mimeo.

The following were determined for waters of ponds and lakes from Eyak Lake south to the coast of the Gulf of Alaska: temperature, turbidity, color, specific conductance, dissolved oxygen, carbon dioxide, hydrogen sulfide, pH, Alkalinity, hardness, flouride, chloride, sodium chloride, sulfate, nitrate, nitrite, phosphate, manganese, silica, iron, and copper content. Comments on aquatic invertebrates, and on vegetation are included.

- I S _____. 1972. Proposed evaluation study plan, Mile 18 Copper River Highway coho salmon rearing pond project. Chugach Natl. For., Anchorage, Alaska. 7 pp.

A study is proposed to gather baseline data on physical, chemical, and biological characteristics of a stream and two coho salmon rearing ponds at Mile 18.

P G T I M R S

- P S _____. 1973. Basic outline of joint U.S. Forest Service and Alaska Dept. of Fish and Game administration research study group - Copper-Bering River Deltas - June, 1973. 6 pp.:
- A joint Forest Service and Fish and Game meeting was held on 25 and 26 of June in Cordova. Future wildlife management work on the Copper and Bering River Deltas was discussed and an action plan was developed for future studies. A similar meeting was scheduled for April, 1974.
- S _____. 1974. Memo to Chugach National Forest Area Manager. Chugach Natl. For., Anchorage, Alaska. 3 pp. (Feb. 1).
- Progress made on the Copper Delta action plan developed in June, 1973 is presented.
- P T S _____, T.J. Sheehy, J. Paynor, C. O'Leary, and S. Harrison. 1973. Environmental analysis report for the waterfowl habitat improvement--Copper River Delta--1973. Chugach Natl. For., Anchorage, Alaska. 7 pp.
- Comments are presented on the Copper River Delta waterfowl habitat improvement study for the summer of 1973. This includes pothole blasting, pond draw-downs and damming of sloughs. Recommendations for improvement of the project include: a pre- and post-analysis of physical, biological, and chemical characteristics of ponds and a comprehensive waterfowl habitat management plan.
- I M Isleib, M.E. and B. Kessel. 1973. Birds of the North Gulf Coast-Prince William Sound Region, Alaska. Univ. Alaska Biol. Pap. No. 14. 149 pp.
- Status, abundance, habitat, and seasonal occurrence are discussed for 219 species of birds in the region. Of these, 111 species are primarily water related. A description of the migratory corridor and numbers of birds moving along the North Gulf Coast is presented.
- M R Jack, L.E. 1962. Surveys, studies, and plans (Copper Delta management plan). Chugach Natl. For., Cordova, Alaska. 1 p.

P G T I M R S

The moose transplant to the Copper River Delta is described. Concern is expressed for use of all-terrain vehicles on the Delta. Also, the need to replace habitat lost to hunter cabins was discussed.

T

Jewell, W.J. 1971. Aquatic weed decay. J. Water Pollut. Control Fed. 43:1457-1467.

- S Johnson, W.H. 1965. Planning, cartigraphy. U.S. For. Serv., Juneau, Alaska. 2 pp.

The details and purpose behind aerial photography along 130 miles of transects across the Copper River Delta are given. Approval of the photography is requested.

- S _____. 1968. Letter to H.Z. Hansen. U.S. For. Serv., Juneau, Alaska. 2 pp. (Oct. 21).

Details are presented for a Forest Service study to determine effects of the 1964 earthquake on waterfowl habitat of the Copper River Delta. Included are: 12 aerial photo transects, studies of waterfowl nesting by P.E.K. Shepherd of Alaska Dept. of Fish and Game, and J. Crow's study on plant succession.

G

Johnston, T.C. 1971. Natural oil seeps in or near the marine environment: a literature survey. Background Rept., U.S. Coast Guard Proj. No. 714141/002. 30 pp.

G

Kachadoorian, R. 1955. Engineering geology of the Katalla area. U.S. Geol. Surv. Misc. Geol. Inv. Map I-308.

G

_____. 1968. Effects of the earthquake of March 27, 1964 on the Alaska highway system. U.S. Geol. Surv. Prof. Pap. 545-C. 66 pp.

This report documents the effects of the 1964 earthquake on the Copper River Highway.

T

Kadlec, J.A. 1960. The effect of a drawdown on the ecology of a waterfowl impoundment. Mich. Dept. Conserv., Game Div. Rept. 2276. 181 pp.

The study determined the effects on soil, water, vegetation, invertebrates, and waterfowl of a draw-down on a waterfowl impoundment in the northcentral part of the Lower Peninsula of Michigan. Results indicated a definite increase in plant nutrients in the water as a result of the drawdown. Plant growth was best when the soil of the drawn-down pond remained moist. Invertebrate populations were considerably reduced after reflooding. Populations of breeding waterfowl did not change appreciably throughout the study.

- T _____ . 1962. Effects of a drawdown on a waterfowl impoundment. Ecology 43(4):749-753.

This study determined the effects of a drawdown on soil, water, vegetation, invertebrates, and populations of waterfowl. A marked increase in soil nitrates occurred. Invertebrate populations were considerably reduced. No major change in plant composition was noted. Emergent species increased in abundance and became food and cover for more ducks.

- T _____ , and M.L. Petoskey. 1961. Habitat management techniques for northern Michigan flooding projects. Mich. Dept. Conserv. Game Div. Inform. Circ. No. 124. 10 pp.

The value of many waterfowl habitat improvements is discussed. Techniques evaluated included: water-level manipulation, level ditches, potholes, nesting islands, food plantings, plowing soils, controlled burning, chemical control of nuisance plants, removal of trees and shrubs from impoundments, creation of meadows for nesting ducks near impoundments, fertilization of aquatic habitats, and artificial nest structures.

- M Keenan, F.J. 1971. Letter to J.C. Raynor. Alaska Dept. Nat. Res., Anchorage, Alaska. 1 p. (Sept. 13).

The Alaska Dept. of Natural Resources accepts the motorized land vehicle closure on the Copper River Delta Game Management Area. However, they request use of tracked vehicle for potential oil and gas exploration.

T

Keith, L.B. 1961. A study of waterfowl ecology on small impoundments in southeastern Alberta. Wildl. Monog. No. 6. 88 pp.

Populations, nesting densities, production, and mortality of ducks utilizing small impoundments in southeastern Alberta from 1953 to 1957 were studied. The relationship of water levels, plant production, and food for ducks was described. The value of mammal-free nesting islands for ducks was stressed. Management techniques to improve duck production are discussed.

I M

King, J.G. 1968a. Letter to L. Johnson. U.S. Fish and Wildl. Serv., Juneau, Alaska. 1 p.

Data sheets and maps with marked sightings of Trumpeter Swans and their nests from Cordova to Cape Yakataga were transferred to the Alaska Dept. of Fish and Game in Cordova.

I M

_____. 1968b. Trumpeter Swan survey, Alaska - 1968. U.S. Fish and Wildl. Serv., Juneau, Alaska. 43 pp.

A survey of Trumpeter Swans was made from August 13 to September 13, 1968. Of the 2,844 swans counted, 1,022 were along the North Gulf Coast. The average brood size was 3.89 young along the North Gulf Coast the highest of the six surveyed areas.

I M

_____, and C.J. Lensink. 1971. An evaluation of Alaskan habitat for migratory birds. U.S. Fish & Wildl. Serv., Wash. D.C. 46 pp + 17 tables.

Major drainage basins with wetlands habitat utilized by waterfowl and other migratory birds are described. Information is given on species composition and population size in each drainage basin.

I M

Klein, D.R. 1955. Migratory waterfowl studies--Copper River Delta, banding and production studies. U.S. Fish & Wildl. Serv., Juneau, Alaska. 4 pp. mimeo.

Waterfowl banding was initiated on the Copper River Delta on July 13, 1955 and continued through July 31, 1955. A total of 414 geese and 45 ducks were banded. Brood size counts and weights of banded birds were taken in conjunction with the banding operations.

P G T I M R S

I M

_____. Migratory waterfowl studies--Copper River Delta, banding and production studies. U.S. Fish & Wildl. Serv., Pittman-Robertson Work Plan C. pp. 3-6.

Banding results and production surveys in 1956 in the area between the Kokenhenic Channel of the Copper River and Alaganik Slough are summarized. Molting Canada geese were concentrated on lower Walhalla and Gus Stevens Sloughs. Total birds banded: 405 geese, 2 Trumpeter Swans, and 14 ducks. Use of sod nesting platforms (50) established in 1954 improved from no use in 1955 to use of 3 by Canada Geese and 7 by gulls.

T

Krecker, F.H. 1939. A comparative study of the animal population of certain submerged aquatic plants. Ecology 20:553-562.

Animal populations were found to be most abundant in Myriophyllum spicatum and next most abundant in Potamogeton spp. Finely divided, multi-leaved plants harbored the most invertebrates in the study of 7 aquatic plants in Lake Erie.

T

Krull, J.N. 1972. Aquatic plant-macroinvertebrate associations and waterfowl. J. Wildl. Mgmt. 34(4): 707-718.

Invertebrates and aquatic plants were sampled with an Ekman Dredge in shallow ponds in the Montezuma National Wildlife Refuge in New York. In order of decreasing biomass of invertebrates, the following plants were important: Lemna, Heteranthera, Ceratophyllum, Elodea, Najas, Potamogeton pectinatus, Utricularia vulgaris, and others. The mean biomass was 82 animals per 100 gms. of plant.

T

Kubichek, W.F. 1940. Collecting and storing seeds of waterfowl food plants for propagation. Trans. N. Am. Wildl. Conf. 5:364-368.

Sago pondweed can be collected by raking upper plant growth. Seeds can be dried on canvas for five days prior to storage and then planted. Methods for other plants are described.

I

S Leedy, R.R. 1966. Waterfowl and plant ecology studies on the Copper River Delta, Alaska, Summer of 1966.

Unpub. man. in files of Alaska Dept. Fish and Game,
Juneau, Alaska. 8 pp.

Dusky Canada Goose breeding biology and plant ecology
studies on the Copper River Delta in 1966 are summarized.

T

Linde, A.F. 1969. Techniques for wetland management.
Wisc. Dept. Nat. Res., Res. Rept. No. 45. 156 pp.

Techniques are presented for impoundment and pond
construction, water level manipulation, food and cover
plantings, nesting island construction, controlled
burning, vegetation control, land clearing, and level
ditching as practiced in the wetlands of Wisconsin.

T

Low, J.B. and F.C. Bellrose, Jr. 1944. The seed and
vegetative yield of waterfowl food plants in the
Illinois River Valley. J. Wildl. Mgmt. 8(1):7-22.

Food yield of waterfowl food plants was calculated for
samples taken from 19 lakes in the Illinois River
Valley. Millets were the highest seed producers.
Factors influencing yields included: water depth,
water transparency, soil type, and plant composition.

T

Lynch, J.J. 1941. The place of burning in management of
Gulf coast wildlife refuges. J. Wildl. Mgmt. 5(4):
454-457.

Burning was found to be useful for one or more of the
following: waterfowl habitat improvement, promotion
of food production, increasing availability of food,
protection from wild-fires, and facilitating fur
trapping.

T

MacNamara, L.G. 1949. Salt-marsh development of Tuckahoe,
New Jersey. Trans. N. Am. Wildl. Conf. 14:100-117.

Water-level manipulations in a salt marsh favored
emergent plant growth when drained in summer and
gradually reflooded in fall to allow waterfowl to
feed.

T

Martin, A.C. and F.M. Uhler. 1939. Food of game ducks in
the United States and Canada. US Dept. Agric. Tech.
Bull. No. 634. Reprinted in 1951 as Res. Rept. No. 30.
Wash., D.C. 308 pp.

Identification, value, and range of duck foods is described. Methods of propagation are given.

- T _____ . H.S. Zim, and A.L. Nelson. 1951. American wildlife and plants. McGraw-Hill Book Co., Inc., New York. 500 pp.

Food habit studies for wildlife in the conterminous United States are summarized. The value of food items is given for many species or species groups of birds, mammals, fish, amphibians, and reptiles. The relative value of plant species is listed for groups of birds and of mammals.

- T _____, R.C. Erickson, and S.H. Steenis. 1957. Improving duck marshes by weed control. U.S. Fish and Wildl. Serv., Circ. No. 19 (Rev.), Wash. D.C. 60 pp.

- G Martin, G.C. 1904. Petroleum fields of Alaska and the Bering River coal fields. U.S. Geol. Surv. Bull. 225. pp. 365-382.

- G _____ . 1905a. The petroleum fields of the Pacific Coast of Alaska, with an account of the Bering River coal deposits. U.S. Geol. Surv. Bull. No. 250. 64 pp.

The geology of the Controller Bay area is described. Petroleum deposits of Controller Bay and Cape Yakataga, and the Bering Coal fields are discussed in terms of occurrence, quality, and potential development.

- G _____ . 1905b. Notes on the petroleum fields of Alaska; Bering River coal fields. U.S. Geol. Surv. Bull. No. 259. pp. 128-129, 140-150.

The geology and means of development of the Controller Bay oil field is discussed. The geology, quality, and potential development of the Bering coal fields is also presented. Progress on existing developments is presented.

- G _____ . 1906. The distribution and character of the Bering River coal. U.S. Geol. Surv. Bull. 284. pp. 65-77.

The extent, quality, and potential development of the Bering coal fields is presented.

P G T I M R S

- G _____ . 1907. Petroleum at Controller Bay. U.S. Geol. Surv. Bull. 314. pp. 89-103.
- The geology, occurrence of oil, and exploitation of oil of Controller Bay is discussed.
- G _____ . 1908. Geology and mineral resources of the Controller Bay region, Alaska. U.S. Geol. Surv. Bull. No. 335. 141 pp.
- A detailed description of the geology of the Controller Bay region is presented. Emphasis is placed on coal deposits and oil deposits in the area. Development potential and problems of exploitation are also discussed.
- G _____ . 1921. Preliminary report of petroleum in Alaska. U.S. Geol. Surv. Bull. No. 719. pp. 11-32.
- The geology and potential development of oil exploitation at Controller Bay are described. The history of the development of the oil fields is presented along with the occurrence and significance of oil seepages.
- T I Mathiak, J.E. 1972. Wildlife management plan. Chippewa Natl. For., Cass Lake, Minn. 32 pp.
- Wildlife and their habitat in the Chippewa National Forest are described. Inventories and habitat improvement techniques are covered.
- T Mathiak, H.A. 1965. Pothole blasting for wildlife. Wisc. Conserv. Dept. Publ. No. 352. 31 pp.
- Details on the technique of blasting, and on the evaluation of blasted potholes for waterfowl are given. Use of ammonium nitrate and dynamite is covered.
- T I Mathisen, J. 1966. A plan for inventorying and developing wetland habitat on public lands. Symp. on Wood Duck Mgmt. and Res., Wildlife Mgmt. Inst., Wash, D.C. pp. 52-63.

Waterfowl habitat mapping on the Chippewa National Forest is described. Eight wetland types and the waterfowl use of them were inventoried. The development potential was calculated on the basis of a standardized cost for each improvement for a given acreage of habitat. The cost/benefit ratio was estimated and found favorable.

- T _____ . 1970. Some aspects of man-made impoundments on the Chippewa National Forest. Trans. Wildl. and Man-made Water Areas, N. Prairie Wildl. Res. Ctr., Jamestown, N.D. 9 pp.

Waterfowl use of man-made impoundments created on the Chippewa National Forest is described. To maintain productivity, ponds are drawn down periodically. These ponds have increased duck production and a greater abundance of non-game species. Research needs are discussed.

- T _____ . 1973. Wetlands management program. Chippewa Natl. For., Cass Lake, Minn. 1 p.

The process of developing a waterfowl habitat management program for the Chippewa National Forest is discussed. Cooperation was obtained from the Northern Prairie Wildlife Research Center and conservation groups.

- T _____, J. Byelich, and R. Padtke. 1964. The use of ammonium nitrate for marsh blasting. Trans. N. Am. Wildl. and Nat. Res. Conf. 29:143-149.

The techniques and economics of using ammonium nitrate to blast potholes for waterfowl are discussed.

- T Mattson, C.R. 1971. Letter to N.R. Howse. Natl. Marine Fish. Serv., Auke Bay, Alaska. 3 pp. (Nov. 11).

Methods of improving coho salmon rearing ponds are described. Use of cannery wastes (crab and salmon) could increase pH and add nitrates and phosphates.

- R Mayiock, C.P. 1957. Cordova recreation resource land use plan, Chugach Natl. For., Alaska Reg., Chugach Natl. For., Cordova, Alaska. 44 pp.

Recreational opportunities in the Cordova area are described.

P G T I M R S

- T McAtee, W.L. 1915. Eleven important wild-duck foods.
U.S. Dept. Agric. Bull. No. 205. 25 pp.
- The description, distribution, propagation, and value to ducks of 11 species of aquatic plants is presented.
- T M _____. 1922. Notes on the food habits of the shoveler or spoonbill duck (Spatula clypeata). Auk 39(3): 380-386.
- Of 70 shovelers collected from 12 states, 34.24% contained animal matter, more than one-half of which was molluscs, especially freshwater snails. Identifiable vegetable foods eaten (in order of decreasing importance) were: sedges, pondweeds, and grasses.
- T M McKnight, D.E. and J.B. Low. 1969. Factors affecting waterfowl production on a spring-fed salt marsh in Utah. Trans. N. Am. Wildl. and Nat. Res. Conf. 34:307-314.
- The changes in vegetation, abundance of invertebrates, and use by waterfowl of spring-fed impoundments in Utah is described. A substantial increase in brood use of newly flooded impoundments was attributed to abundance of invertebrates. Drawdowns and refloodings kept nutrients circulating and maintained high productivity.
- S Mickelson, P.G. 1973a. Progress report on Copper River Delta studies. Chugach Natl. For., Cordova, Alaska. 6 pp.
- Vegetation collections, a study on pond drawdowns, proposed waterfowl studies, records of bird sightings, and proposed public relations are described.
- I M _____. 1973b. Status and abundance of birds and mammals of the Copper River Delta, Alaska. Chugach Natl. For., Cordova, Alaska. 73 pp.
- The occurrence, distribution, and relative abundance of 39 mammal and 173 bird species are described.
- T S _____. 1974a. Environmental analysis report for waterfowl habitat improvements on the Copper River Delta-1974. Chugach Natl. For., Cordova, Alaska. 2 pp.

The waterfowl habitat improvement program for the Copper River Delta in 1974 is described, and justified on the basis of unacceptable alternatives.

- I M _____. 1974b. Fish and wildlife resources in the Martin Lakes area. Chugach Natl. For., Cordova, Alaska. 4 pp.

Fish, birds, and mammals observed in September and October, 1973, are described along with management suggestions.

- T _____. 1974c. Proposed waterfowl habitat improvements for the 1974 field season on the Copper River Delta. Chugach National Forest., Cordova, Alaska. 11 pp.

Proposed waterfowl habitat improvements for 1974 included: a study of pond drawdowns, effect of lime and fertilizers, plantings of Japanese millet, and installment of a wooden dam on a tidal slough in order to create a brackish reservoir.

- I M _____. 1974d. Report on Egg Islands, Copper River Delta, Alaska. Chugach Natl. For., Cordova, Alaska. 7 pp.

Observations of birds and mammals at Egg Island are summarized.

- P I M _____. 1974e. Report on scenic, fish, and wildlife resources related to the Carbon Creek coal mining project. Chugach Natl. For., Cordova, Alaska. 8 pp.

Existing information on scenic, fish, and wildlife resources, and probable impacts from a mining operation, are discussed for Shepherd Creek, Perring Lake, Katalla River, and Martin Islands.

- T S _____. 1974f. Waterfowl habitat improvements on the Copper River Delta for 1974. Chugach Natl. For., Cordova, Alaska. 14 pp.

A summary of studies on pond drawdowns, fertilization, and food plantings is presented along with an evaluation of each technique and recommendations for further study in 1975.

P G T I M R S

I M

_____. 1974g. Wildlife at Cottonwood Point and comments on other waterfowl staging areas. Chugach Natl. For. Cordova, Alaska. 6 pp.

Birds and mammals observations made east of the Copper River are summarized. The value of the Copper River Delta as a staging area is discussed.

I M

_____. 1974h. Wildlife of Castle Island--Copper River Delta. Chugach Natl. For., Cordova, Alaska. 5 pp.

Bird and mammal observations are summarized for the Castle Island area.

T

S

_____. 1975a. Administrative study on the wetlands habitat improvement techniques on the Copper River Delta. Chugach Natl. For., Cordova, Alaska. 6 pp.

A study is proposed to evaluate techniques for improving waterbird habitat.

P

M

_____. 1975b. Bering River--Controller Bay Trumpeter Swan management area cooperative agreement. Chugach Natl. For., Cordova, Alaska. 7 pp.

A cooperative agreement among the Forest Service, Fish and Wildlife Service, Alaska Dept. of Fish and Game, Alaska Dept. of Natural Resources, and the Chugach Natives is proposed. The area would be managed cooperatively primarily for fish and wildlife.

I M

S

_____. 1975c. Coho salmon rearing ponds, Mile 15-18, Copper River Highway. Chugach Natl. For., Cordova, Alaska. 4 pp.

A summary of spawning salmon, and winter conditions, at the coho rearing ponds along the Copper River Highway is given.

P

M

_____. 1975d. Copper River Delta management plan. Chugach Natl. For., Cordova, Alaska. 9 pp.

A revision of the Copper River Delta game management area management plan is presented. The revision proposes inclusion of Natives, and the U.S. Fish and Wildlife Service as cooperators. A five-year action plan is proposed.

P G T I M R S

I M

_____. 1975e. Fish and wildlife resources in Redwood Bay. Chugach Natl. For., Cordova, Alaska. 2 pp.

Observations made in July, 1974 on fish and wildlife at Redwood Bay are summarized.

P G I M

_____. 1975f. Impact on the Chugach National Forest of Outer Continental Shelf oil and gas leases. Chugach Natl. For., Cordova, Alaska. 28 pp.

Resources which may be affected by oil and gas exploration and production along the North Gulf Coast are summarized. Possible social-economic impacts are discussed and recommendations are given in order to cope with expected on-shore activities.

I M

_____. 1975g. Progress report on endangered, threatened, and unique species on the Chugach National Forest, 1975. Chugach Natl. For., Cordova, Alaska. 4 pp.

Status and abundance of six bird and three mammal species were presented. Progress on a cooperative agreement for a Trumpeter Swan management area was discussed. Bald Eagle and Dusky Canada Goose studies were summarized.

P I M

_____. 1975h. Resources in the Bering River-Controller Bay Trumpeter Swan management area. Chugach Natl. For., Cordova, Alaska. 5 pp.

Fish, wildlife, timber, and recreation resources of the Controller Bay area were described based on limited inventory data.

P T I S

_____. 1975i. Wetlands inventories and waterbird habitat inventories and a study of habitat improvement techniques.

T

Millar, J.B. 1969. Observations on the ecology of wetland vegetation. Saskatoon Wetlands Seminar. Canad. Wildl. Serv. Rept. Ser. No. 6. pp. 49-56.

Plant distribution and density were affected by availability of seed, moisture, soil chemistry, climatic factors, mode of reproduction, competition, and environmental disturbance.

P G T I M R S

- G Miller, D.J. 1951. Geology and oil possibilities of the Katalla district, Alaska. U.S. Geol. Surv. open file rept. 66 pp.
- G _____, T.G. Payne, and G. Gryc. 1959. Geology of possible petroleum provinces in Alaska, with an annotated bibliography, by E.H. Cobb. U.S. Geol. Surv. Bull. No. 1094. 131 pp.
- T M S Mitchell, K.E. 1969. Multiple use survey report, waterfowl habitat improvement, Cordova Ranger Dist., Chugach National Forest, Alaska Region. Chugach Natl. For., Cordova, Alaska. 5 pp.
- The decline in waterfowl abundance on the Copper River Delta since the 1964 earthquake is discussed. Plans are detailed for a waterfowl habitat improvement study using food plantings, and blasting a pothole.
- T _____ . 1971a. Construction of coho rearing ponds, Mile 18, Copper River Highway. Chugach Natl. For., Cordova, Alaska. 7 pp.
- Plans for repairing a dike and constructing ponds are presented.
- T S _____ . 1971b. Copper Delta waterfowl habitat project. Chugach Natl. For., Cordova, Alaska. 9 pp + 2 maps.
- The waterfowl food plantings on the Copper River Delta are described. Ten species (mostly non-native to Alaska) were planted in 16 ponds by sportsmen, Forest Service, and Fish and Game personnel. A plan for studying soil, water, and plant relations was outlined.
- T Moyle, J.B. 1945. Some chemical factors influencing the distribution of aquatic plants in Minnesota. Am. Midl. Nat., 34(2):402-420.
- Water chemistry is the single most important factor influencing the general distribution of aquatic plants in Minnesota. Other important factors included: Bottom soil and the physical nature of the water body.

P G T I M R S

- T _____ . 1961. Aquatic invertebrates as related to larger water plants and waterfowl. Minn. Dept. Conserv. Invest. Rept. No. 233. 24 pp.
- T _____, and N. Hotchkiss. 1945. The aquatic and marsh vegetation of Minnesota and its value to waterfowl. Minn. Dept. Conserv., Tech. Bull. No. 3. 122 pp.
- T Muenscher, W.C. 1936. Storage and germination of seeds of aquatic plants. Cornell Univ. Agric. Expt. Sta., Ithaca, N.Y. 17 pp.
- T Neess, J.C. 1946. Development and status of pond fertilization in central Europe. Trans. Am. Fish Soc. 76:335-358.
- Use of fertilizers in aquaculture in Europe is discussed. Lime generates an alkaline reaction, and releases fertilizing substances from colloids. The most limiting nutrient is phosphorus.
- M Nelson, U.C. 1952. Copper River Delta banding operations- July 15-25, 1952. U.S. Fish and Wildl. Serv., Juneau, Alaska. 3 pp (mimeo.).
- Banding operations between Glacier Slough and King Salmon Slough (between Pete Dahl and Walhalla Sloughs) from 15 to 25 July, are summarized. Geese preferred to nest in the high driftwood line. The composition of breeding ducks was estimated as: 25% Pintails, 20% Mallard, 20% American Wigeon, 10% Shoveler, 10% Gadwall, and 15% others.
- T Nichols, S.A. 1974. Mechanical and habitat manipulation for aquatic plant management. A review of techniques. Wisc. Dept. Nat. Res. Tech. Bull. No. 17. 34 pp.
- Management of nuisance aquatic plant growths is covered. Habitat manipulation techniques include: shading with dyes and black sheeting, dredging, sand and gravel blanketing, overwinter drawdown, and nutrient control. All but the use of dyes and nutrient limitation gave conclusive results for controlling plants.

P G T I M R S

- M Olson, S.T. 1954. Migratory waterfowl studies: Copper River Delta, banding and production studies. U.S. Fish and Wildl. Serv., Juneau, Alaska. Pittman-Robertson Rept. 9 pp. (mimeo.)

Banding and production surveys were conducted between Eyak River and the Kokenhenic Channel of the Copper River from July 1 to August 12, 1954. Peak of the duck hatch was 25-28, June (spring was estimated to be one week later than normal). Duck nesting densities ranged from 2.8 to 5.2 per square mile and goose nesting densities from 7.1 to 10.9 per square mile. None of 50 goose nesting platforms installed in 1953 was used. Peak of the duck molt was 22-29, July, By August 12, 50-75% of the young geese could fly and most ducks could take wing.

- S _____. 1965. Copper Delta administrative study. U.S. Forest Service, Juneau, Alaska. 10 pp.

The effects of the 1964 earthquake on the Copper River Delta are discussed. A plan to take aerial photographs and to cover map the Delta is proposed.

- I M _____. 1968. Preliminary report on Trumpeter Swan survey made between Cape Fairweather and Point Whithed, Gulf of Alaska. 10 pp.

A Trumpeter Swan aerial survey was conducted on the Chugach National Forest from August 13 to 16 in 1968. On the Copper River Delta and Martin River Flats, 494 swans were counted, a minimum population estimate. The average brood size was 4.4, the highest average of the entire Alaskan survey. Bering Lake and Martin Lakes were important gathering areas for flocks of non-breeding swans.

- P M _____. 1970. Controller Bay Trumpeter Swan management area proposal. U.S. For. Serv., Juneau, Alaska. 2 pp.

A meeting was held between the Forest Service and Fish and Game to discuss a proposed Trumpeter Swan management area for Controller Bay. Management agencies were to inventory the resources of the Controller Bay area, and determine the status of land ownership, of oil and gas leases, and coal development plans. The group was to make further plans in a meeting scheduled for October, 1970.

P G T I M R S

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M

_____. 1973. Letter to R. Woodrow, acting area manager.
U.S. For. Serv. (Planning Team) Anchorage, Alaska.
2 pp. (Aug. 23).

Concern is expressed over goose habitat manipulation on the Copper River Delta in view of Oregon hunters limiting the population. Duck habitat improvement is encouraged. A full-time wetlands biologist for the Copper River Delta is requested.

T

Perensovich, M.M., Jr. 1970. Report on the Stikine waterfowl pothole blasting project. North Tongass Natl. For., Juneau, Alaska. 15 pp.

Techniques and success of pothole blasting on the Stikine Flats are summarized. An evaluation of the blasting technique is given and improvements in the technique are suggested.

T

Peterson, E. 1952. Marsh drainage. Trans. N. Am. Wildl. Conf. 17:123-131.

T

M

Pirnie, M.D. 1935. Michigan waterfowl management. Mich. Dept. Conserv., Game Div., Lansing, Mich. 328 pp.

Waterfowl habitat management techniques in addition to waterfowl management practices are included in this book.

M

Pirtle, R.B. 1971. Letter to K. Mitchell. Alaska Dept. Fish & Game, Cordova, Alaska. 1 p. (June, 10).

The Alaska Dept. of Fish and Game endorses the coho salmon rearing pond project at Mile 18, Copper River Highway.

T

Provost, M.W. 1948. Marsh blasting as a wildlife management technique. J. Wildl. Mgmt. 12(4): 350-387.

Various pothole blasting designs are evaluated. Blasting efficiency and the evaluation of results on vegetation and wildlife are also presented.

P

M R

Raynor, J.C. 1967. Wildlife. Chugach Natl. For., Anchorage, Alaska. 2 pp.

P G T I M R S

The action plan for 1967 for the Copper River Delta game management area is discussed. Restrictions are proposed for off-road vehicle use and cabin construction and use.

- M _____ . 1970. Powerlines vs. swans. Chugach Natl. For., Anchorage, Alaska. 3 pp.

The hazard of overhead power lines to flying Trumpeter Swans is discussed.

- M R _____ . 1971a. Letter to R. Somerville. Chugach Natl. For., Anchorage, Alaska. 1 p. (Sept. 17).

The U.S. Forest Service will permit use of tracked vehicles for hunting "under certain conditions if the need arises."

- M R _____ . 1971b. Letter to Regional Forester. Chugach Natl. For., Anchorage, Alaska. 16 pp. (July 22).

Closure of the Copper River Delta game management area to off-road land vehicles is justified. The regulations and a detailed description of the area closed is included. A summary of public responses to the regulations is included.

- P _____ . 1971c. Multiple use survey report—coho pond, Mile 18. Chugach Natl. For., Anchorage, Alaska. 1 p.

Development of coho salmon rearing ponds at Mile 18, Copper River Highway is planned.

- I M _____ . 1972a. Annual wildlife report, FY 1972. Chugach Natl. For., Anchorage, Alaska. 16 pp.

Fish and wildlife habitat improvement and coordination projects are summarized.

- M R _____ . 1972b. Order of the Regional Forester, closing of the Copper River Delta game management unit to motorized vehicle use in Alaska. U.S. For. Serv. Juneau, Alaska. 4 pp.

P G T I M R S

The Copper River Delta game management area will be closed to motorized land vehicles except that snow machines will be permitted between December 1 and March 31.

M R S _____. 1973. Annual wildlife accomplishment progress report. Chugach Natl. For., Anchorage, Alaska. 9 pp.

Wildlife projects on the Chugach National Forest in the first half of fiscal year 1973 are summarized. Details on Dusky Canada Goose banding, ATV closure of the game management area, and coho salmon rearing ponds, are presented.

G Reimnitz, E. and N.F. Marshall. 1965. Effects of the Alaska earthquake and tsunami on recent deltaic sediments. J. Geophys. Res. 70:2363-2376.

The following changes on the Copper River Delta were caused by the 1964 earthquake: sand dikes, sand pipes, slumps, faults, and joints. Seiches caused by the earthquake planed off the upper two or three feet of the tidal flats, leaving eroded materials in deeper channels and sloughs.

M Reynolds, J. 1971. Letter to P. Havens. Alaska Dept. Fish and Game, Cordova, Alaska. 2 pp.

The rapid movement of waterfowl migrating from Cook Inlet through the Prince William Sound and Copper River area during October 11 and 12 is documented.

I S _____. 1972. Description of goose nest plots and pictures taken--Copper River Delta--second week of July, 1972. Alaska Dept. Fish and Game, Cordova, Alaska. 1 p.

A description of the Dusky Canada Goose nesting plots on the Copper River Delta is presented. Photos of each are on file in Cordova, Anchorage, and Juneau.

I M R Rhode, C.J. 1956. Letter to A.W. Greeley, Regional Forester, Juneau. U.S. Fish & Wildl. Serv., Juneau, Alaska. 1 p. (March 16).

The importance of the Copper River Delta to waterfowl and for hunting is discussed.

P G T I M R S

- T Robel, R.J. 1962. Changes in submersed vegetation following a change in water level. J. Wildl. Mgmt. 26:221-224.
- G Rosenberg, D.H. 1972. Oil and gas seeps of the northern Gulf of Alaska. In D.H. Rosenberg (Ed.), A review of the oceanography and renewable resources of the northern Gulf of Alaska. Inst. of Marine Sci. Rept. R72-73., Univ. Alaska. pp. 143-148.
- The history of the Controller Bay oil seeps is presented.
- T Scott, T.G. and W.L. Dever. 1940. Blasting to improve wildlife environment in marshes. J. Wildl. Mgmt. 4(4):373-374.
- The use of dynamite to open up stands of marsh vegetation is presented. A ditch 9 to 12 feet wide with a variable depth and a length of 1½ feet could be blasted by one stick of dynamite.
- I M Shepherd, P.E.K. 1959. Summary of 1959 duck nesting and brood production studies, Copper River Delta, Alaska.
- The breeding densities, nesting success, and production of ducks in 1959 on the Copper River Delta are presented. Nesting densities reached 50 nests per square mile. Of 132 duck nests, 76.5% were successful, while predators destroyed 18.1%. Nesting phenology was determined. Brood counts were made.
- I M R _____ . 1960. A brief review of the major considerations for joint management of the Copper River Delta waterfowl populations for the United States Forest Service. Alaska Dept. Fish & Game, Fairbanks, Alaska. 9 pp.
- The importance of the Copper River Delta as a Trumpeter Swan breeding grounds is documented. The breeding grounds should be closed to human use from May through August. Hunting camps should be confined to groups if located in the critical nesting habitat of Dusky Canada Geese (between Alaganik and Gus Stevens Sloughs). Waterfowl hunting is assessed and better access through installation of boat launching ramps is recommended.

I M

_____. 1961. Mortality studies of western Canada geese—Copper River Delta. Alaska Dept. Fish & Game, Pittman Robertson Rept. W-6-R-2, I-3a. pp. 50-57.

In the summer of 1960, 619 Canada Geese were banded on the Copper River Delta. Molting flocks of 1000 to 1500 geese were noted in the Glacier and Tiedeman Slough area. Eight flocks of 200 to 500 geese were observed in the Castle, Grass, and Storey Island areas. Geese were captured by driving birds into a corral, rather than by dip-netting.

I M

_____. 1964. Monthly report of activities, May-June, 1964. Alaska Dept. Fish & Game, Juneau, Alaska. 6 pp.

Waterfowl investigations in the spring of 1964 were made on the Copper River Delta and two other locations. Nesting densities were sampled in all three areas.

G I M

_____. 1965. A preliminary evaluation of earthquake damage to waterfowl habitat in southcentral Alaska. 45th. Ann. Conf. West. Assoc. State Game & Fish Comm. 9 pp.

The effect on waterfowl habitat of the Copper River Delta as a result of the 1964 earthquake is described. Ground fissures resulted in drained ponds. Lack of tidal inundation has lowered pond salinity. Sloughs are shallow or going dry. A lower nesting success and an increase in predation was noted for waterfowl nests. A discussion of future habitat changes due to succession is discussed.

M S

_____. 1966. Waterfowl. Alaska Dept. Fish & Game Pittman-Robertson Work Plan H (W-6-R) and C (W-13-R). pp. 1-7.

A plant succession study and a waterfowl nesting study on the Copper River Delta are discussed. As a result of the 1964 earthquake, breeding areas are more accessible to mammalian predators. Of 221 Dusky Canada Goose nests in 1965, 67 (30.3%) were destroyed compared with 3 (1.3%) in 1959 for 222 nests.

M S

_____. 1968. Small game and furbearer investigations. Alaska Fed. Aid Wildl. Rest. Proj. W-13-R-2 & 3. 5 pp.

On the Copper River Delta 15, five-acre Dusky Canada Goose nesting plots were established. Of the nests located in these plots 61% were in sedge vegetation.

- T M S Sheridan, W.L. 1970. Coho salmon habitat improvement on glacial outwash plains. U.S. For. Serv., Juneau, Alaska. 5 pp.

A detailed plan for development of coho salmon rearing ponds in proposed gravel pits in the Yakutat and Cordova areas is presented.

- S _____. 1972. Letter to the Forest Supervisor, Chugach Natl. For., U.S. For. Serv., Juneau, Alaska. 2 pp. (Jan. 4).

The final planning steps for an administrative study on coho salmon rearing ponds at Mile 18, Copper River Highway, are presented.

- I Shaw, S.P. and C.G. Fredine. 1956. Wetlands of the United States: their extent and value to waterfowl and other wildlife. U.S. Fish & Wildl. Serv., Circ. No. 39. 67 pp.

Problems of saving wetlands after a long history of exploitation are discussed. Types and usefulness of wetland soils are categorized. Wetlands in the United States were inventoried and classified into 20 types. Uses of the inventory for waterfowl habitat improvement, for other wildlife, and for recreation are discussed.

- P M Sindorf, J.G. 1962. Letter to Jay Grant, Forest Supervisor, Chugach National Forest. Richfield Oil Corp., Anchorage, Alaska. 1 pp. + 1 map.

The operation of a gravity survey in the area between Kokenhenic and Little Glacier Slough is requested. Use of a helicopter and a three-man crew would be required.

- T Singleton, J.R. 1965. Waterfowl habitat management in Texas, water depth and water levels. Texas Parks and Wildl. Dept. Bull. No. 47. 68 pp.

Important waterfowl plants of Texas and the methods of transplanting them are described. Included is a discussion of the following factors which affect plant production: fertility, site preparation, water quality, and water levels. Methods for control of low value plants are discussed. Habitat management practices including: burning, drawdowns, and impoundments are discussed.

- T Smith, R.H. 1942. Management of salt marshes on the Atlantic coast of the United States. Trans. N. Am. Wildl. Conf. 7:272-277.

- M R Somerville, R. 1968. Letter to W.J. Watts. Alaska Dept. Fish and Game, Anchorage, Alaska. 2 pp.

Use of all-terrain vehicles to retrieve moose killed on the Copper River Delta game management area should be permitted. However, the weight of these vehicles should be restricted to under 0.75 pounds per square inch displacement when empty.

- M R _____. 1971. Letter to John Raynor. Alaska Dept. Fish & Game, Anchorage, Alaska. 1 p. (Sept. 10).

The Alaska Dept. of Fish and Game agrees with the closure to motorized land vehicles in the Copper River Delta Game Management area, but wants the option of tracked vehicle use for hunting east of the Copper River.

- T M Sooter, C.A. 1946. Habits of coyotes in destroying nests and eggs of waterfowl. J. Wildl. Mgmt. 10(1):33-38.

A description and photos of coyote-destroyed duck eggs is presented. Notes on caching behavior of eggs by coyotes are presented.

- M Sows, L.K. 1950. Techniques for waterfowl nesting studies. Trans. N. Am. Wildl. Conf. 14:478-489.

Techniques for nest location, nest trapping, and marking of waterfowl are presented.

P G T I M R S

I M

Standerwick, J. 1967. Wildlife management plan, Cordova Ranger District, Chugach National Forest. Chugach Natl. For., Cordova, Alaska. 39 pp.

A wildlife habitat management plan where game is managed on a sustained-yield basis is presented. Species included are: salmon, deer, moose, and waterfowl.

T

Strong, R. 1966. Munuscong Bay waterfowl habitat improvement project using ammonium nitrate blasting. Mich. Dept. Conserv., unpubl. rept. 6 pp. (mimeo).

Experimentation with placement and charge of ammonium nitrate and dynamite is described. The technique for blasting a 20 x 50 x 3 foot pothole is described.

T

Swindale, D. and L.R. Jahn. 1956. Results of sampling the submerged vegetation in some central and northern Wisconsin flowages, with notes on environment. Wisc. Wildl. Res. 15(3):25-43.

G

Tarr, R.S. and L. Martin. 1914. Alaskan glacial studies of the National Geographic Society in the Yakutat Bay, Prince William Sound, and lower Copper River regions. Natl. Geog. Soc., Wash., D.C. 498 pp.

The report includes surveys of glaciers along the Copper River Delta and east of the Copper River.

R

Tarrant, R.F. 1973. Copper River Delta breeding grounds for the Dusky Canada Goose. U.S. For. Serv., Portland, Oregon, 2 pp.

Publications and photographs of Dusky Canada Geese breeding grounds are requested.

T I M

Thompson, T.L. 1972. Annual wildlife report. Chugach Natl. For., Cordova, Alaska. 4 pp.

A summary of fish and wildlife improvements for the Cordova area is presented. A progress report on the coho salmon rearing ponds is included.

P G T I M R S

- I M S _____. 1973a. Administrative study--coho salmon rearing ponds, Mile 18, Copper River Highway. Chugach Natl. For., Cordova, Alaska. 3 pp.

A winter survey of water, ice, and coho salmon abundance for the coho rearing ponds at Mile 18, Copper River Highway, is presented.

- I S _____. 1973b. Copper River Delta study--control area photo transects. Chugach Natl. For., Cordova, Alaska. 2 pp.

A photo transect, 7,800 feet long with 39 photo points, was established on August 9, 1973 on the south bank of Alaganik Slough.

- I S _____. 1973c. Copper River Delta study--photo transect. Alaganik--Pete Dahl control area. Chugach Natl. For., Cordova, Alaska. 5 pp. + photos.

On August 9, 1973, 39 permanent photo points on a 7,800 foot rectangular transect were established. A color photo was taken at each 200 foot interval, except two were taken at each corner of the rectangle. The purpose of the photo transects is to document plant succession.

- I _____. 1973d. Critical nesting habitat--Copper and Bering River Deltas. Chugach Natl. For., Cordova, Alaska. 3 pp.

The most important areas on the Copper River and Bering River Deltas for nesting Dusky Canada Geese and Trumpeter Swans were delineated. For geese, 31,539 acres and for swans 73,805 acres were described as critical areas. On these further issuance of gas and oil leases should be prohibited.

- P M _____. 1973e. Study plan--Copper River Delta. Chugach Natl. For., Cordova, Alaska. 12 pp.

Guidelines for resource management in view of increased accessibility, and of exploitation of coal, oil and gas, are suggested.

P G T I M R S

T M

_____. 1973f. USDA, Forest Service environmental analysis report, waterfowl habitat improvement, Copper River Delta--1973. Chugach Natl. For., Cordova, Alaska. 12 pp.

Plans to create small potholes by blasting with high explosives, damming of a slough with a wooden dam, and pond water-level manipulation are presented. The environmental impact, alternatives, and advantages of the improvements are discussed.

T I

_____. 1973g. Waterfowl habitat improvement study progress report--11/73. Chugach Natl. For., Cordova, Alaska. 22 pp.

Progress made on waterfowl habitat alternations in 1973 is summarized. Techniques used included: pothole blasting, pond water drawdowns, and food plantings. The drained ponds attracted dabbling ducks and shorebirds. Progress is given for reference vegetation collections, slide files, soil and habitat mapping, and photo transect establishment.

M

Timm, D. 1972a. Letter to C. Kebbe. Alaska Dept. Fish & Game, Juneau, Alaska. 2 pp. (August 1).

The 1972 Dusky Canada Goose banding on the Copper River Delta is summarized. Only 417 were banded (including only 1 young). Production of young was poor in 1972.

M R

_____. 1972b. Report of survey and inventory activities--waterfowl. Alaska Dept. Fish & Game, Fed. Aid Wildl. Rest., Proj. W-17-4, Job. No. 10, pp. 10-15.

Data on the composition and productivity of the Dusky Canada Goose population is presented. Spring was three weeks late in 1971 and nesting densities were 30 to 50% below normal. Predation on eggs was high, 24%. Based on aerial counts of flocks, an estimated 16.2% of the population was composed of juveniles. A total of 423 geese were banded on the Copper River Delta in 1971. Band returns for immatures indicate the population is under very heavy hunting pressure and may be overharvested.

Field bag check indicate that hunters killed Mallards, Pintails, wigeon, and Green-winged Teal (in order of decreasing abundance). An average of 2.31 waterfowl were killed per hunter per day.

P G T I M R S

M

_____. 1973a. Dusky Canada Goose management policy and management plan. (rough draft). Alaska Dept. Fish and Game, Juneau, Alaska. 6 pp.

A management policy and plan for the Dusky Canada Goose population is proposed. The history of the population is reviewed. Management policy is based on a sustained-yield basis. The management goal calls for an annual post-hunting season population of 20,000-25,000 geese. To reach this goal mid-winter inventories, pre-hunting season banding, and winter banding are required.

T M

_____. 1973b. Letter to Frank Kozlick. Alaska Dept. Fish & Game, Juneau, Alaska. 2 pp. (June 29).

The possibility of using California State duck stamp funds for habitat improvement on the Copper River Delta is questioned.

P

S

_____. 1973c. Letter to Jim Bartonek. Alaska Dept. Fish & Game, Juneau, Alaska. 2 pp. (July 30).

Possible waterfowl research projects in the Cordova area are suggested. These include: (1) factors limiting duck production on the Copper River Delta, (2) effects of some human alterations of a natural area on waterfowl use of that area, (3) waterfowl use in response to alterations of some natural ponds on the Copper River Delta, and (4) magnitude and role of nest predation on the Dusky Canada Goose, in a changing habitat.

M

_____. 1973d. Letter to John Chattin, Dick Rodgers, and Chett Kebbe. Alaska Dept. Fish & Game, Juneau, Alaska. 2 pp.

Production surveys, banding activities, and the population status of Dusky Canada Geese on the Copper River Delta are summarized for 1973.

T

_____. 1973e. Letter to Julius Reynolds. Alaska Dept. Fish & Game, Juneau, Alaska. 2 pp.

The Forest Service proposed waterfowl habitat improvements are reviewed. Pothole blasting is discouraged. Use of sewer pipe to drain ponds

probably would not work, but a ditch with a control gate would suffice. Prior to and after the experiment, invertebrates should be sampled.

- M _____ . 1974a. Cooperative management agreements. In, Report of survey and inventory activities--waterfowl. Proj. Prog. Rept., Fed. Aid Wildl. Rest. Proj. W-17-6, Job. Nos. 11 & 22. Vol V. pp. 24-30.

On May 15, 1974 a breeding pairs survey was flown over 38 three-mile transects across the Copper River Delta. An estimated 23,441 ducks, 17,696 geese, 551 swans, and 1,124 loons were calculated based on the aerial survey. This is a 15% decrease in breeding duck pairs compared with pre-1964 averages. However, the 1974 survey was conducted too early, and the population estimate included breeding birds and some migrants.

On May 3, 4, 5, 1974 a Trumpeter Swan survey was flown over the coast from Cordova to Cape Yakataga. Ninety-one nests and 571 swans were counted.

- M _____ . 1974b. Dusky Canada Goose studies. In, Report of survey and inventory activities--waterfowl. Proj. Prog. Rept., Fed. Aid Wildl. Rest. Proj. W-17-6, Job Nos. 11 & 22. Vol. V. pp. 20-21.

A formal management plan for Dusky Canada Geese has been developed. The January, 1973 mid-winter inventory was 16,000 geese. The January, 1974 mid-winter inventory was an estimated 18,400 geese reflecting a better production year. Immatures comprised 36% of the population in late July, 1973. On July 29, 1973, 494 geese were banded including 104 with yellow neck collars. Tail feathers were collected from birds shot prior to September 15, 1973. Average length was 153 mm for adults and 136 mm for immatures.

- M R _____ . 1974c. Waterfowl harvest and hunter activity. In, Report of survey and inventory activities--waterfowl. Proj. Prog. Rept., Fed. Aid Wildl. Rest. Proj. W-17-6, Job. Nos. 11 & ww. Vol. V. pp 2-19.

Snipe, duck, goose, and crane harvest data and hunter activity are given for the 1973-1974 migratory bird hunting season on the Copper River Delta.

Hunters spent an estimated 3,819 days on the Delta, and shot 6,357 ducks (fourth highest kill in the State), and 1,343 geese (third highest kill in the State).

I M

Trainer, C.E. 1959. The 1959 Western Canada Goose (*Branta canadensis occidentalis*) study of the Copper River Delta, Alaska. 9 pp. In, Annual Waterfowl report, Alaska. U.S. Fish & Wildl. Serv., Juneau, Alaska.

The nesting habitat, breeding density, nesting success, and phenology during the 1959 breeding season is described. In addition, the effect of flooding, predators, and human activity on nesting geese and their eggs is described. A description of the census techniques and banding operation is included.

I M

_____. 1967. Appraisal of Canada Goose nesting densities on the Copper River Delta, Alaska. 9 pp:

Estimations of goose nesting densities based on size and quality of habitat are given.

T

Truax, W.C. and L.F. Gunther. 1951. The effectiveness of game management techniques employed on Horicon Marsh. Trans. N. Am. Wildl. Conf. 16:326-330.

A description of waterfowl habitat techniques and their success at Horicon marsh are described.

G

Tuthill, S.J. and W.M. Laird. 1966. Geomorphic effect of the earthquake of March 27, 1964 in the Martin-Bering Rivers area, Alaska. U.S. Geol. Surv. Prof. Pap. 543-B. 29 pp.

Bering Lake went from an intertidal lake to a smaller lake above tidal influence as a result of the 1964 earthquake. Little Martin Lake no longer receives glacial floodwaters from Martin River. Effects of the earthquake on fish, land snails, and furbearers are superficially covered.

T

Uhler, F.M. 1944. Control of undesirable plants in waterfowl habitats. Trans. N. Am. Wildl. Conf. 9:295-303.

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The following techniques for controlling objectionable aquatic plants are discussed: burning, herbicides, mowers, weed crushers, water-level manipulation, hand labor, and biological control.

- T _____ . 1956. New habitats for waterfowl. Trans. N. Am. Wildl. Conf. 21:453-469.

Artificial impoundment construction, maintenance, and improvement is discussed.

- I M U.S. Fish and Wildlife Service. 1951. Aerial waterfowl composition counts on Copper River Delta. U.S. Fish & Wildl. Serv., Anchorage, Alaska. 1 p.

Two transects totalling 46 linear miles were flown between the Heney Mountains and Storey Island Slough. The coastal transect of 22 miles had 10.4 geese per square mile and 8 ducks per square mile. The inland transect had 13.3 geese and 9.0 ducks per square mile. Mallard, American Wigeon, Pintail, Greater Scaup were the most common (in decreasing order).

- I M _____ . 1952. Waterfowl aerial composition count on Copper River Delta. U.S. Fish & Wildl. Serv., Anchorage, Alaska. 1 p.

In a 23.0 square mile sample area out of 400 square miles of Copper River Delta, 20.2 pairs of waterfowl per square mile were estimated in 1951 compared with 41.3 pairs in 1952. Based on 90% positive identification, the following composition was estimated: Canada Geese 36%, Trumpeter Swan 3%, Pintail 13%, Mallard 15%, American Wigeon 7%, Green-winged Teal 1%, Shoveler 7%, Scaup 15%, and Scoter 3%.

- I M _____ . 1954. Alaska aerial survey---1954, sampling methods and area covered. U.S. Fish & Wildl. Serv., Anchorage, Alaska. 4 pp.

The 1,536 square mile Copper River Delta had a mean pair density of 39.1 ducks per square mile or 60,058 pairs. The mean density was the highest of the areas surveyed in the State.

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Species composition was: 18% Mallard, 21% Pintail
4% Green-winged Teal, 10% American Wigeon, 2% Shove-
ler, 36% scaup, 2% goldeneye, 1% Canvasback and
6% others (Gadwall, Mergansers, Scoter etc.).

I M

_____. 1954b. Alaska aerial transects, breeding pairs
survey of ducks. U.S. Fish & Wildl. Serv., Anch.,
Alaska. 7 pp.

Breeding pairs survey data indicates abundance and
species composition of ducks on the Copper River
Delta on May 26, 1954.

I M

_____. 1954c. Miscellaneous raw data on numbers and
species observed on migration, habitat types, and
waterfowl production during the 1954 breeding sea-
son on the Copper River Delta. U.S. Fish & Wildl.
Serv., Anchorage, Alaska.

M

_____. 1954d. Records of waterfowl composition during
spring migration. U.S. Fish & Wildl. Serv., Anch.,
Alaska. 5 pp.

From April 1 to May 5 observations were made of
waterfowl around Eyal River, Pete Dahl Slough, and
Martin River. These data indicate changes in
species composition during migration.

G

Wahrhaftig, C. 1965. Physiographic divisions of Alaska.
U.S. Geol. Surv. Prof. Pap. No. 482. pp. 38-39.

A description of the topography, and geology of the
Copper River Delta and Valley is given.

G

Waller, P.M. 1966. Effects of the March, 1964 earth-
quake on the hydrology of south-central Alaska.
U.S. Geol. Surv. Prof. Pap. No. 544A. 27 pp.

The Copper River Delta was uplifted about six feet
by the 1964 earthquake.

S Watts, W.J. 1967. Letter to P.E.K. Shepherd. Chugach
Natl. For., Cordova, Alaska. 1 p. (Aug. 8).

Cooperation is planned between the Forest Service
and ADF&G for a plant ecology study by John Crow
on the Copper River Delta.

P G T I M P S

P

- _____. 1967b. Studies (Copper Delta ecological study).
Chugach Natl. For., Cordova, Alaska. 1 p.

Inquiry is made for the 1966 aerial photos taken
along transects across the Copper River Delta.

S

- _____. 1968. Planning (Copper River Delta ecology
study). Chugach Natl. For., Cordova, Alaska. 1 p.

The Institute of Northern Forestry should undertake
a study of aerial photos to determine the ecological
effects of plant succession on the Copper River
Delta.

P

M

S

- _____. 1969. Copper Delta game management plan.
Chugach Natl. For., Cordova, Alaska. 2 pp.

On September 12, a meeting was held between the
Forest Service and the Fish and Game. ADF&G wants
to make an inspection of fish and wildlife in the
proposed Bering River roadway. Investigation of
duck food plantings should be continued. Alder
encroachment on the Delta should be documented and
methods of control determined. The game management
area should be enlarged to include: Bering River
and Controller Bay. Further restrictions on ATV's
were recommended.

P

M

- _____. 1970a. Cordova district's wildlife plan.
Chugach Natl. For., Cordova, Alaska. 4 pp.

Wildlife projects are planned for fiscal years 1971
through 1975.

M

- _____. 1970b. Letter to the Forest Supervisor. Chugach
Natl. For., Cordova, Alaska. 1 p. (Dec. 14).

A report evaluating beaver bafflers is requested.
A beaver observation area could be set aside on the
Copper River Delta.

M

- _____. 1971a. Accomplishment report Mile 18 Copper
River Highway coho pond project. Chugach Natl. For.,
Cordova, Alaska. 11 pp.

Reconstruction of a dike for a pond on the north
side of the highway and the construction of a pond

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for coho salmon rearing south of the road at Mile 18 are described.

P

_____. 1971b. Letter to Forest Supervisor, Chugach Natl. For., Cordova, Alaska. 1 p. (Aug. 17).

The Coast and Geodetic Survey has taken color, infra red, and black and white photos of the coast from Katalla to the Heney Range in 1971. These photos cover the tidal flats plus a coastal strip to eight miles onshore.

M P

_____. 1971c. Letter to Forest Supervisor, Chugach Natl. For., Chugach Natl. For., Cordova, Alaska. 5 pp.

Restrictions and justification for closure of the Copper River Delta Game Management Area to motorized vehicles are given.

T M

_____. 1972a. Copper Delta Game Management Area. Chugach Natl. For., Cordova, Alaska. 2 pp.

Landing of Dusky Canada Geese on August 7, 1972 is described. Dick Podgers of the W.L. Finley National Wildlife Refuge recommended pond drawdowns to stimulate growth of waterfowl foods.

P I M

_____. 1972b. Multiple use replanning management unit writeups and base maps. Chugach Natl. For., Cordova, Alaska. 40 pp.

Planning in the Cordova area will involve inventory of the following resources: recreation, fish, wildlife, and timber. Areas of special interest include: the Copper Delta Game Management area, the Copper Delta sandbars, Copper River sand dunes, McKinley Lake, Siamese Lakes, Sheridan Glacier, and Martin River.

T

S

_____. 1973a. Waterfowl habitat improvement. Copper River Delta. Chugach Natl. For., Cordova, Alaska.

Further waterfowl habitat improvement studies west of Pete Pahl Slough are justified. This area should be reclassified as a roaded area, and justification is given.

P G T I M P S

P _____ . 1973b. Multiple use replanning management unit writeups. Chugach Natl. For., Cordova, Alaska.

Revised descriptions of units in the Cordova area are given.

M Weeden, P., P. LePoux, and B. Milliker. 1969. Waterfowl report. Alaska Dept. Fish & Game. Pittman-Fobertson Proj. W-13 P 3, and W 17-1. 19 pp.

G. Williams, F.Y. 1914. Mining conditions in the Bering River field, Alaska, as a result of the field examination of the United States Navy Alaskan coal investigating expedition. In, Report on coal in Alaska for use in United States Navy. 63rd. Cong. 2nd. Sess., House Doc. 876.

P M Woodrow, P.F. 1973a. Copper River Delta study. Chugach Natl. For., Anchorage. Alaska. 9 pp.

A summary of the joint Forest Service and Fish and Game meeting held on June 26, and 27, 1973 is given. Previous work on the Copper River Delta was discussed and a future action plan was developed.

T S _____ . 1973b. Letter to Cordova District Ranger. Chugach Natl. For. Anchorage, Alaska. 1 p. (Apr. 27).

A comprehensive administrative study should be developed for waterfowl habitat improvement on the Copper River Delta.

S _____ . 1973c. Letter to wildlife resource assistant Cordova. Chugach Natl. For., Anchorage, Alaska. 6 pp. (June 14).

The area west of Pete Dahl Slough is classed as a "roaded" area, thus eliminating the need for an Environmental Impact Statement prior to waterfowl habitat development.

T Yocum, C.F. 1951. Waterfowl and their food plants in Washington. Univ. Wash. Press. Seattle, WA. 272 pp.

T

_____. 1952. Techniques used to increase nesting of Canada Geese. J. Wildl. Mgmt. 16:425-428.

Nesting density of Canada Geese can be increased by providing nesting platforms, and by dragging driftwood onto poorly vegetated islands in rivers.

I W

_____. 1963. July bird life in the Copper River Delta country, Alaska, 1962. The Murrelet 44:28-34.

An annotated list of birds seen on the Copper River Delta during July, 1962 is given.

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