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## ***Diving Birds of North America: Appendices***

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# Appendix I

## Sources of Scientific and Vernacular Names

*Aechmophorus*—from the Greek *aichme*, spear, and *phoros*, bearing.  
*clarkii*—after John Clark, nineteenth-century American ornithologist.  
*occidentalis*—from Latin, western.  
*Aethia*—from the Greek *aithuia*, an Aristotelian and Homeric name for a water bird.  
*cristatella*—diminutive of the Latin *cristatus*, crested.  
*pusilla*—from Latin, small or petty.  
*pygmaea*—from Latin, pygmy.  
*Alca*—Latinized form of Scandinavian vernacular (*alk*, *alka*, *alke*) names for these birds.  
*torda*—from a Swedish vernacular name (*tordmule*) for the razorbill.  
*Alle*—possibly from the Latin *allex*, referring to the lack of a hallux.  
*Auk*—from the Danish and Norwegian names (*alke*) for the razorbill.  
*Brachyramphus*—from the Greek *brachys*, short, and *ramphos*, bill.  
*brevirostre*—from the Latin *brevis*, short, and *rostrum*, bill. The vernacular name Kittlitz is for F. H. Kittlitz (1779–1874), a German naturalist on a Russian expedition to Kamchatka, who collected the first specimens.  
*marmoratum*—from Latin, marbled.  
*Cepphus*—from the Greek *kepphus*, seabird.  
*columba*—from Latin, dove or pigeon.  
*grylle*—probably from Greek, meaning “I grunt.”  
*Cerorhinca*—from the Greek *keras*, horn, and *rynchos*, beak.  
*monocerata*—from the Greek *monos*, one, and *ceras*, horn.  
*Cyclorhynchus*—from the Greek *kycklos*, circle, and *rynchos*, beak.

*psittacula*—from the Latin *psittacus*, small parrot, in reference to the beak.  
Dovekie—a diminutive of dove.  
*Endomychura* (see also *Synthliboramphus*)—from the Greek *endomychos*, secret or hidden, and *oura*, tail, referring to the short tail.  
*Fratercula*—from the Latin *fraterculus*, meaning “little friar” or “little brother,” in reference to the general appearance.  
*arctica*—from Latin, of the arctic.  
*cirrhatta*—from the Latin *cirratus*, curled hair, in reference to the nuptial tufts.  
*corniculata*—from Latin, horned.  
*Gavia*—from Latin, sea mew, as used by Pliny.  
*adamsii*—after Edward Adams (1824–56), an English naval surgeon and naturalist on an arctic voyage during which he collected the first specimens.  
*arctica*—from Latin, of the arctic.  
*immer*—probably a variant of the English *ember* and the Swedish *immer* or *emmer*, gray or ash-like. Possibly also from the Latin *immersus*, to immerse.  
*stellata*—from Latin, starred, in reference to the speckled back.  
Grebe—from French, of uncertain meaning, but perhaps from *griabe*, a Savoyard word for a sea mew (or gull), or from the Breton *krib* meaning crest.  
Guillemot—A pet form of Guillaume, which is derived from the Old French name Willelm, and echoic of the juvenile’s “will” call.  
Loon—corruption of Shetland *loom* and related to the Icelandic *lōmr* and Swedish *lom*, lame or clumsy, referring to its helplessness on land.  
*Lunda*—from the Scandinavian *lunde* (Swedish *lunne*), a vernacular name for puffins.

Murre—apparently imitative of the murmuring sound produced by the birds. Possibly also related to *marrot*, *morrot*, dialect English terms for guillemots. The vernacular name murrelet, coined by E. Coues, is a diminutive of murre.

*Pinguinis*—New Latin for penguin; a combination of the Welsh words *pen*, head, and *gwyn*, white.

*impennis*—from the Latin *in*, negative, and *pinna*, feather, meaning flightless. The vernacular “gare-fowl” is from the Icelandic *geirfugl*.

*Plautus*—from Latin, flat-footed. See also *Alle*.

*Podiceps*—from the Latin *podicus*, rump, and *pes*, foot, or “rump-footed.”

*auritus*—from Latin, eared.

*dominicus*—see under *Tachybaptus*.

*grisegena*—from the Latin *griseus*, gray, and *gena*, cheek. The earlier vernacular name is after Carl Peter Holboell (1795–1856), Danish governor of South Greenland in the 1820s.

*nigricollis*—from the Latin *niger*, dark or black, and *collum*, neck.

*Podilymbus*—an abbreviation of the Latin *podiceps*, rump-footed, combined with the Greek *kolymbus*, diver.

*podiceps*—see *Podiceps* above.

*Ptychoramphus*—from the Greek *ptychos*, fold, and *ramphos*, beak.

*aleutica*—Latin, of the Aleutian islands. The vernacular name is after John Cassin (1813–69), American ornithologist, for whom the Cassin

sparrow, Cassin finch, and Cassin kingbird were also named.

Puffin—from the Middle English *poffin* or *pophyn*, apparently in reference to the fat or “puffy” appearance of the adults and young.

*Synthliboramphus*—from the Greek *synthlibo*, to compress, and *ramphos*, beak.

*antiquum*—from Latin, ancient, or gray-headed.

*craveri*—after Fredrico Craveri (1815–90), Italian meteorologist thus honored by Tomasso Salvadori, who described the species.

*hypoleucus*—from the Greek *hypo*, under or less than, and *leukos*, white, referring to its absence of a white scapular stripe. The vernacular name Xantus is after John Xantus de Vesey (1825–94), the Hungarian naturalist who first collected the species.

*Tachybaptus*—from the Greek *tachys*, swift, and *bates*, treading or climbing.

*dominicus*—from Santo Domingo, in the West Indies.

Tystie—a common vernacular name for the black guillemot, apparently based on the species’ twittering notes.

*Uria*—from the Greek *ouria*, a kind of water bird.

*aalge*—a Danish word for the murre.

*lomvia*—Faroese for a kind of diving bird. The vernacular name Brünnich’s murre refers to M. T. Brünnich (1737–1827), a Danish zoologist.

# Appendix 2

## Keys to Identification of Loons, Grebes, and Auks

### KEY TO FAMILIES OF LOONS, GREBES, AND AUKS

- A. Hind toe large.
  - B. Anterior toes webbed, rectrices (tail feathers) extend beyond tail coverts . . . Gaviidae (loons).
  - BB. Anterior toes separately lobed; rectrices small and hidden by tail coverts . . . Podicipedidae (grebes).
- AA. Hind toe absent, front toes webbed . . . Alcidae (auks).

### KEY TO SPECIES OF NORTH AMERICAN LOONS (GAVIIDAE)

- A. Culmen at least 75 mm long (over 52 mm from nostril to tip) in adults, wing over 318 mm.
  - B. Bill blackish and slightly decurved along culmen, which is 75–90 mm long and has chin feathers terminating well posterior to nostrils . . . Common loon
  - BB. Bill never blackish beyond middle of culmen, rest yellowish to straw colored, the culmen (83–96 mm) nearly straight and the chin feathers reaching a point directly below the nostrils . . . Yellow-billed loon.
- AA. Culmen no more than 70 mm long (under 52 mm from nostril to tip) in adults, wing under 315 mm.
  - B. Tarsus longer than middle toe including claw; culmen slightly decurved and lower mandible not distinctly angulated . . . Arctic loon.
  - BB. Tarsus about as long as middle toe excluding its claw; culmen nearly straight and lower mandible somewhat angulated . . . Red-throated loon.

### KEY TO SPECIES OF NORTH AMERICAN GREBES (PODICIPEDIDAE)

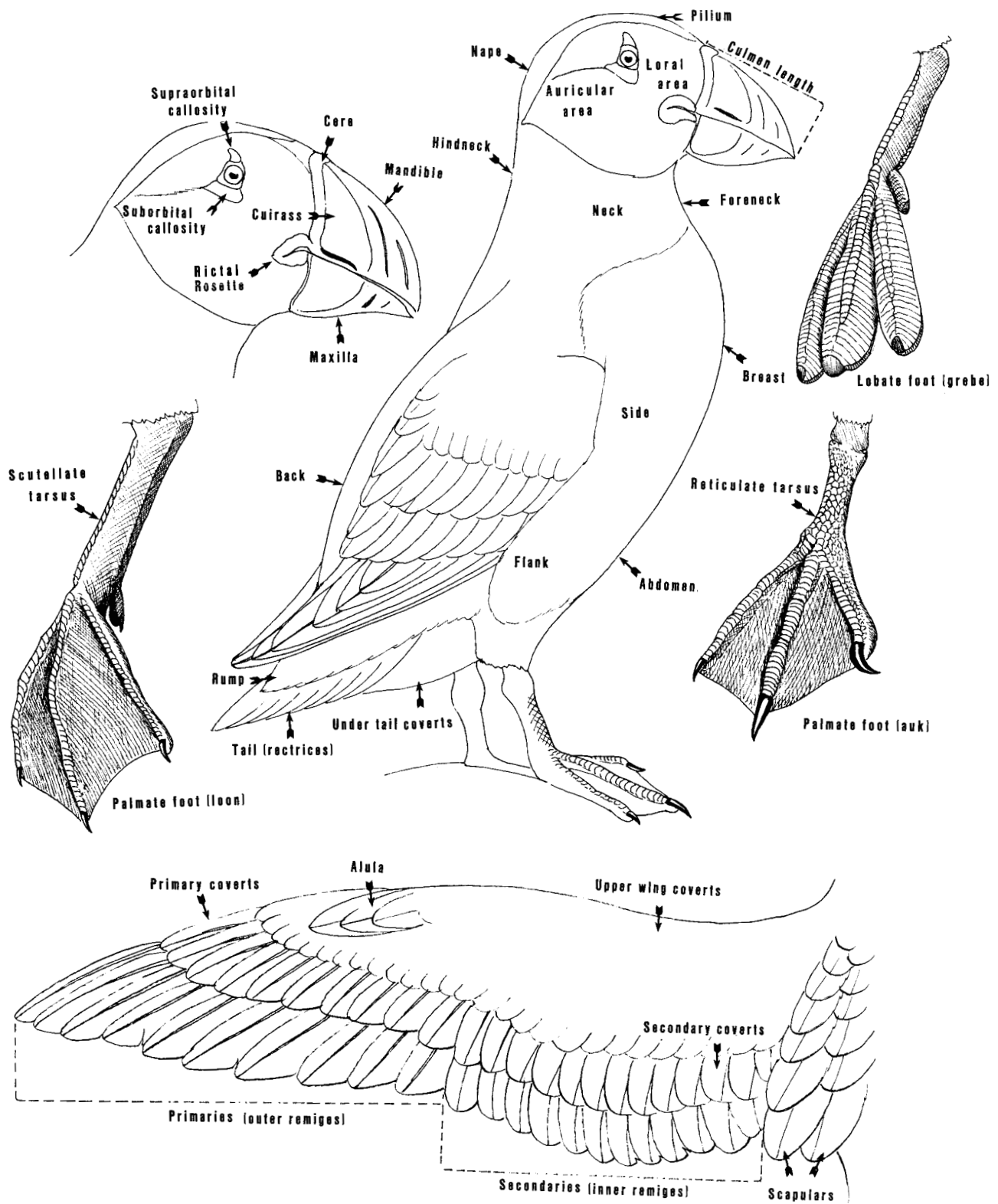
- A. Length of bill about twice its depth; secondaries all brownish on outer webs . . . Pied-billed grebe.
- AA. Length of bill at least three times its depth, white on both webs of secondaries.

- B. Length of bill about three times its depth; neck not as long as body.
- C. Wing under 100 mm; iris yellowish . . . Least grebe.
- CC. Wing over 120 mm; iris reddish.
  - D. Wing no more than 150 mm; bill under 8 mm deep at base.
    - E. Bill deeper than wide, culmen slightly decurved, and lower mandible not distinctly angulated; tarsus at least 44.5 mm . . . Horned grebe.
    - EE. Bill wider than deep, culmen nearly straight, and lower mandible distinctly angulated; tarsus up to 44.5 mm . . . Eared grebe.
  - DD. Wing over 150 mm; bill over 12 mm deep at base . . . Red-necked grebe.
- BB. Bill about five times as long as deep; neck about as long as body . . . Western grebe.
  - C. Black of crown not reaching lores or eyes; bill of adults yellow to orange . . . dark phase (*occidentalis*).
  - CC. Black of crown reaching below eyes and lores; bill of adults dull greenish yellow . . . light phase (*clarkii*).

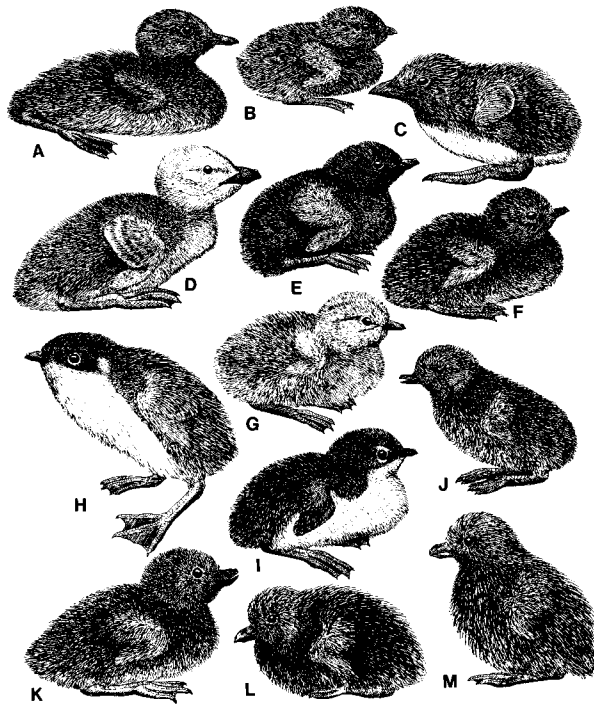
### KEY TO SPECIES OF NORTH AMERICAN AUKS (ALCIDAE)

- A. Forehead feathering extends forward to nostrils, often hiding them; bill never with accessory pieces in adults.
- B. Wing under 140 mm; culmen under 25 mm; nostrils oval to circular (murrelets and dovekie).
- C. Tarsus with entirely reticulated (networklike) scale pattern.
- D. Tarsus much shorter than middle toe without claw; scapulars never black.

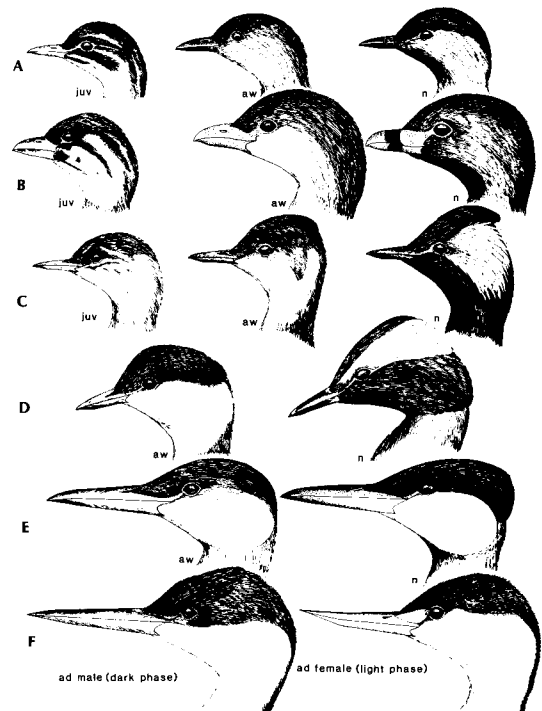
- E. Total culmen length at least 25 mm; lateral rectrices brownish or only narrowly edged with white . . . Marbled murrelet.
- EE. Total culmen length under 15 mm; lateral rectrices white or mostly white . . . Kittlitz murrelet.
- DD. Tarsus at least as long as middle toe without claw; scapulars black.
  - E. Under wing coverts white, and inner webs of distal primaries, sides, and flank feathers tipped with white . . . Xantus murrelet.
  - EE. Under wing coverts and primaries variably brownish gray; sides and flank feathers lacking white tips . . . Craveri murrelet.
- CC. Scales on lower front of tarsus scutellate (aligned vertically).
  - D. Bill deeper than wide; 14 rectrices . . . Ancient murrelet.
  - DD. Bill as wide as deep; 12 rectrices . . . Dovekie.
- BB. Wing over 140 mm; exposed culmen at least 25 mm; nostrils linear (auks, murres, and guillemots).
  - C. White upper wing coverts; feathers not extending beyond anterior edge of nostrils, thus exposing them.
    - D. Under wing coverts white, normally 12 rectrices . . . Black guillemot.
    - DD. Under wing coverts brownish gray; 14 rectrices . . . Pigeon guillemot.
  - CC. Black upper wing coverts; nostrils entirely hidden by feathering on upper mandible.
    - D. Exposed culmen 30–40 mm; wing over 175 mm.
      - E. Depth of bill at base nearly equal to the exposed culmen; bill relatively short (to 35 mm) and blunt tipped . . . Razorbill.
      - EE. Depth of bill at base less than a third of the exposed culmen; bill longer (over 38 mm) and sharply pointed.
        - F. Depth of bill at nostrils less than a third of exposed culmen; crown and hindneck brownish; no white stripe on mandible . . . Common murre.
- FF. Depth of bill at nostrils more than a third of exposed culmen; crown and hindneck blackish; white stripe present on edge of upper mandible . . . Thick-billed murre.
- DD. Exposed culmen at least 75 mm; wing under 175 mm . . . Great auk.
- AA. Forehead feathering well separated from nostrils; bill usually with seasonal accessory pieces in adults (puffins and auklets).
  - B. Wing under 160 mm; tarsus with reticulate (networklike) scale pattern; iris whitish in adults (typical auklets).
    - C. Width of bill at base greater than its basal depth.
      - D. Bill grayish and depressed basally; adults never with white “mustache” or crest . . . Cassin auklet.
      - DD. Bill reddish and not depressed; white “mustache” and crest present in adults . . . Whiskered auklet.
    - CC. Width of bill at base less than its depth.
      - D. Tip of lower mandible bluntly truncated; underparts grayish; adults crested . . . Crested auklet.
      - DD. Tip of lower mandible pointed; underparts white; adults never crested.
        - E. Bill pointed and gradually tapering; cheeks and throat variably white . . . Least auklet.
        - EE. Bill strongly rounded, with lower mandible upturned; cheeks and throat pale gray to dusky . . . Parakeet auklet.
- BB. Wing at least 160 mm; iris usually brownish or yellowish; scales on lower front of tarsus scutellate (aligned vertically).
  - C. Depth of bill no more than twice its length; breast brown to grayish black.
    - D. Culmen under 40 mm; inner toe claw normally shaped . . . Rhinoceros auklet.
    - DD. Culmen over 50 mm; inner toe claw curved inward . . . Tufted puffin.
  - CC. Depth of bill at least three times its width; breast and abdomen entirely white.
    - D. Tail no more than 53 mm; grooves on sides of bill very oblique . . . Atlantic puffin.
    - DD. Tail at least 60 mm; grooves on sides of bill nearly vertical . . . Horned puffin.



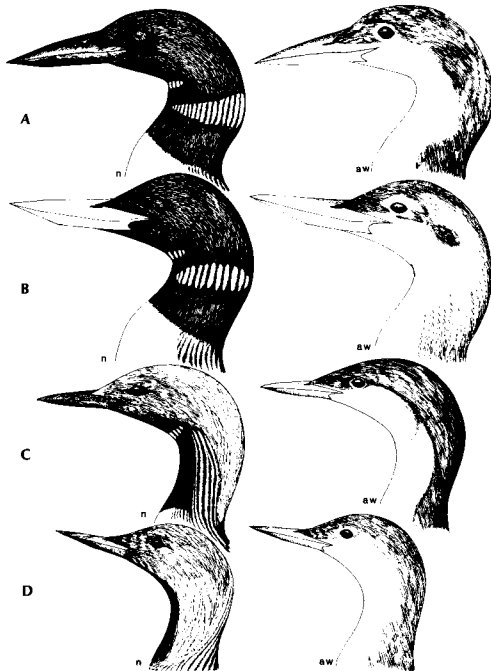
48. External features of loons, grebes, and auks.



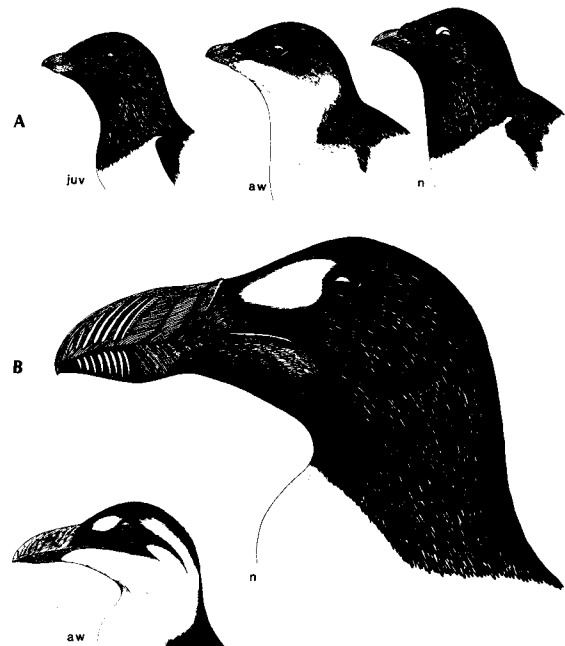
49. Representative downy young: A, common loon; B, dovekie; C, common murre; D, razorbill; E, pigeon guillemot; F, Cassin auklet; G, Kittlitz murrelet; H, ancient murrelet; I, Xantus murrelet; J, least auklet; K, parakeet auklet; L, rhinoceros auklet; M, tufted puffin.



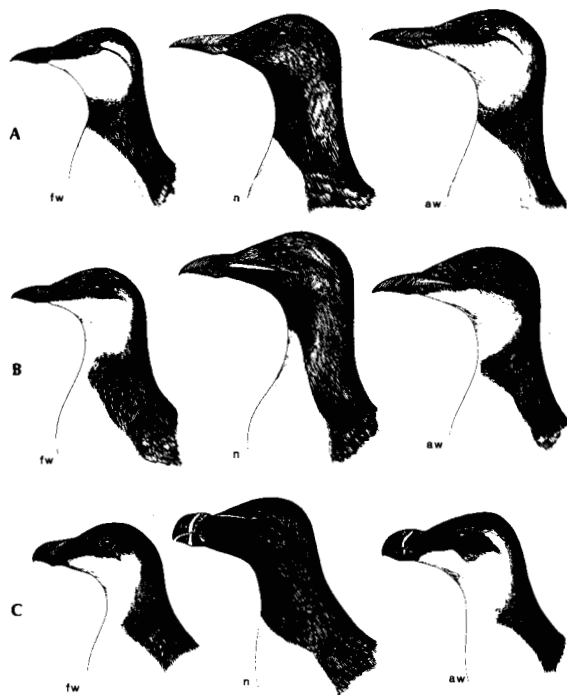
51. Head profiles of North American grebes: A, least, B, pied-billed, C, eared, D, horned, E, red-necked, and F, western, showing juvenal (juv), adult winter (aw), nuptial (n), and adult (ad) male and female plumages.



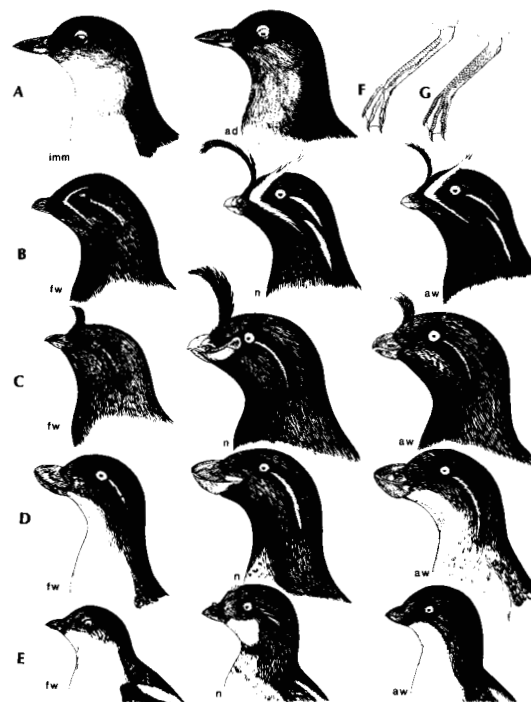
50. Head profiles of adult loons: A, common, B, yellow-billed, C, arctic, and D, red-throated, showing nuptial (n) and adult winter (aw) plumages.



52. Head profiles of A, dovekie and B, great auk, showing juvenal (juv), adult winter (aw), and nuptial (n) plumages. The adult winter plumage illustrated for the great auk is somewhat tentative and shown in reduced size.



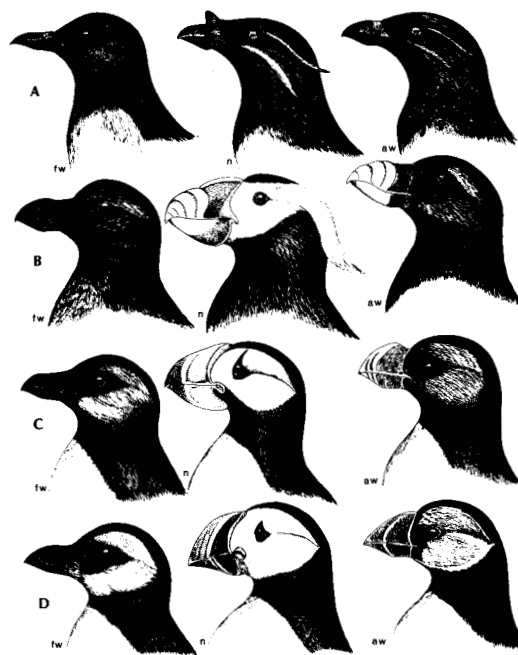
53. Head profiles: A, common murre, B, thick-billed murre, and C, razorbill, showing first-winter (fw), nuptial (n), and adult winter (aw) plumages.



55. Head profiles: A, Cassin auklet, B, whiskered auklet, C, crested auklet, D, parakeet auklet, and E, least auklet, showing first-winter (fw), immature (imm), nuptial (n), adult (ad), and adult winter (aw) plumages. Also shown are leg scaling patterns: F, typical murrelets and G, auklets.



54. Head profiles: A, black guillemot, B, pigeon guillemot, C, marbled murrelet, D, Kittlitz murrelet, E, ancient murrelet, F, Xantus murrelet, and G, Craveri murrelet, showing first-winter (fw), nuptial (n), adult winter (aw), and adult (ad) plumages.



56. Head profiles: A, rhinoceros auklet, B, tufted puffin, C, horned puffin, and D, Atlantic puffin, showing first-winter (fw), nuptial (n), and adult winter (aw) plumages.



# Appendix 3

## Major North American Auk Colonies (Shown in Figure 4)

Index No.	Specific Location	State or Region	Major Species	Total Species	Estimated Total Auk Population
1	Channel Islands	California	Cassin auklet, Xantus murrelet	3	23,000
2	Farallon Islands	California	Cassin auklet, common murre	5	127,000
3	Castle Rock	California	Common murre, Cassin auklet	5	44,000
4	Three Arch Rocks	Oregon	Common murre	3	80,000
5	Copalis Beach	Washington	Rhinoceros auklet	5	22,000
6	Destruction Island	Washington	Rhinoceros auklet	5	15,000
7	Protection Island	Washington	Rhinoceros auklet	3	34,000
8	Triangle Island	British Columbia	Cassin auklet, tufted puffin	5	250,000
9	Queen Charlotte Island	British Columbia	Ancient murrelet, Cassin and rhinoceros auklets	5	80,000
10	Forrester Island	Alaska	Tufted puffin, rhinoceros auklet, ancient murrelet	7	100,000
11	Chiswell Islands	Alaska	Common murre, tufted puffin	5	60,000
12	Middleton Island	Alaska	Tufted puffin, common murre	6	20,000
13	Barren Islands	Alaska	Tufted puffin, common murre, horned puffin	8	310,000
14	Kodiak and Trinity islands	Alaska	Common murre, tufted puffin	6	280,000
15	Cape Newenham, Hagemeister islands	Alaska	Common murre, tufted puffin	6	1,350,000
16	Nunivak Island	Alaska	Common murre, tufted puffin	7	300,000
17	Saint Lawrence Island	Alaska	Least and crested auklets, murres	10	2,000,000
18	King Island	Alaska	Murres, least, crested, and parakeet auklets	9	240,000

(continued)

**Major North American Auk Colonies (Continued)**

Index No.	Specific Location	State or Region	Major Species	Total Species	Estimated Total Auk Population
19	Little Diomed Island	Alaska	Least and crested auklets, murre, horned puffin	10	1,200,000
20	Cape Thompson	Alaska	Common and thick-billed murres	3	10,000
21	Cape Lisburne	Alaska	Common and thick-billed murres	6	100,000
22	Attu and Semichi islands	Alaska	Murres, tufted puffin	6	45,000
23	Agattu Island	Alaska	Murres, tufted puffin	6	30,000
24	Buldir Island	Alaska	Crested and least auklets, murres, puffins	12	430,000
25	Kiska Island	Alaska	Crested and least auklets	4	25,000
26	Segula and Semisopochnoi islands	Alaska	Least auklet, murres, puffins	9	170,000
27	Delarof Island	Alaska	Least, parakeet, and crested auklets, puffins	10	660,000
28	Adak and Kanaga islands	Alaska	Puffins, pigeon guillemot	8	33,000
29	Atka Island	Alaska	Tufted puffin, crested auklet	9	120,000
30	Chagulak Island	Alaska	Murres, parakeet auklet	5	120,000
31	Kagamil Island	Alaska	Murres	3	286,000
32	Umnak Island	Alaska	Murres, puffins	6	100,000
33	Unalaska and Baby islands	Alaska	Tufted puffin	8	100,000
34	Krenitzin Islands	Alaska	Tufted puffin	5	500,000
35	Saint Paul (Pribilofs)	Alaska	Murres, parakeet and least auklets	7	200,000
36	Saint George (Pribilofs)	Alaska	Murres, parakeet and least auklets	7	2,000,000
37	Sandman Reefs	Alaska	Puffins, Cassin auklet	8	150,000
38	Stepovak Bay area	Alaska	Puffins, murres, auklets	10	700,000
39	Shumagan Islands	Alaska	Puffins, murres	9	400,000
40	Semidi Islands	Alaska	Puffins, murres	9	1,000,000
41	Prince Leopold Island	Franklin district	Thick-billed murre	2	150,000
42	Cape Hay	Bylot Island	Thick-billed murre	1	800,000
43	Cape Graham Moore	Bylot Island	Thick-billed murre	1	40,000
44	Cambridge Point	Coberg Island	Thick-billed murre	1	400,000
45	Saunders Island	Greenland	Thick-billed murre	1	400,000
46	Agpat	Greenland	Thick-billed murre	3	200,000
47	Agparssuit (Kap Shakleton)	Greenland	Thick-billed murre	3	970,000

(continued)

**Major North American Auk Colonies (*Continued*)**

Index No.	Specific Location	State or Region	Major Species	Total Species	Estimated Total Auk Population
48	Sagdleg Island	Greenland	Thick-billed murre	1	300,000
49	Arveprinsens Island	Greenland	Thick-billed murre	1	100,000
50	Reid Bay	Baffin Island	Thick-billed murre	1	400,000
51	Hantzch Island	Franklin district	Thick-billed murre	1	100,000
52	Cape Wolstenholme and Digges Island	Quebec	Thick-billed murre	1	2,000,000
53	Akpatok Island	Quebec	Thick-billed murre	1	1,200,000
54	Gannet Islands	Labrador	Atlantic puffin, common murre, razorbill	4	160,000
55	Bonaventure Island	New Brunswick	Common murre	3	35,000
56	Funk Island	Newfoundland	Common murre	4	1,000,000
57	Green and Great islands	Newfoundland	Atlantic puffin, common murre	4	500,000

*Major sources:* CALIFORNIA: Varoujean 1979; SOWLS et al. 1980. OREGON: Varoujean 1979; Varoujean and Pitman 1979. WASHINGTON: Varoujean 1979; Manuwal and Campbell 1979. BRITISH COLUMBIA: Manuwal and Campbell 1979; Drent and Guiguet 1961. ALASKA: Manuwal and Campbell 1979; SOWLS, Hatch, and Lensink 1978. EASTERN CANADA: BROWN et al. 1975; Nettleship 1980. ATLANTIC COAST: Erwin and Korschgen 1979. Additional data on Atlantic Coast colonies may be found in Nettleship and Birkhead (1985), which appeared after this manuscript went into production.

# Appendix 4

## Summer Abundance and Breeding Status of Grebes at Selected National Wildlife Refuges

National Wildlife Refuge	State	Grebe Species					
		Least	Pied-billed	Horned	Red-necked	Eared	Western
Agassiz	Minnesota		C	C	C	C	C
Arrowwood	North Dakota		C	U	R	C	C
Audubon	North Dakota		C	o	o	C	C
Bear Lake	Idaho		C			C	A
Bear River	Utah		C			O	A
Benton Lake	Montana		U			A	o
Bowdoin	Montana		C			C	C
C. M. Russell	Montana		C			C	C
Crescent Lake	Nebraska		C	r		A	C
Klamath Basin <sup>a</sup>	Oregon/California		C	r	U	A	A
Lacreek	South Dakota		C			C	C
Laguna Atascosa	Texas	C	C	o			
Malheur	Oregon		A	O		A	A
Medicine Lake	Montana		C	C	r	A	A
Ninepipe/Pablo	Montana		U	U	C	U	C
Ruby Lake	Nevada		C			C	R
Sand Lake	South Dakota		A			A	A
Souris Loop <sup>b</sup>	North Dakota		C	U	U	C	C
Turnbull	Washington		C	R	r	A	r
Valentine	Nebraska		C			C	C
Waubay	South Dakota		C	O	c	C	C

NOTE: Letters indicate relative abundance: a, abundant; c, common; u, uncommon; o, occasional; r, rare. Upper-case letters indicate known breeding at the specified location.

<sup>a</sup>Includes Upper and Lower Klamath, Bear Valley, Tule Lake, and Clear Lake refuges.

<sup>b</sup>Includes Lostwood, J. Clark Salyer, Des Lacs, and Upper Souris refuges.