



Identification of Commonly Encountered Bird Species During California Oil Spills



PRBO Conservation Science unpublished document. Compiled by Renée Cormier, Diana Humple, and Pete Warzybok. Version 2.0 – last updated November 2012.

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The purpose of this document is to provide guidance on species identification, age and sex criteria for species commonly encountered during California oil spill events that will allow relatively quick identification, and age and sex determination. Accurate species identification (and age/sex determination when possible) is crucial during an oil spill as these data are used as legal evidence and for estimating the total mortality related to the spill. These data contribute to the ecological damage assessment made after each spill.

Each placard includes similar species that may pose identification challenges during a spill (including when body parts are missing) and was specifically designed for members of the Processing Strike Team who are already trained in bird identification and taking morphometric measurements. There are many useful guides that each contain important but sometimes conflicting information. We attempted to consolidate the most helpful criteria into one document to increase speed of processing. Information for each placard was gathered from existing sources (see Literature Cited section) and from the authors' examination and measurements of museum collections and live birds.

We acknowledge that during oil spill processing, each bird, live or dead, must be processed efficiently. Depending on how much

time is required to determine age and sex and depending on the number and species of birds being encountered during each spill, your supervisor may instruct you to skip age and sex data and simply identify individuals to species (or most specific possible taxonomic group).

How to use the accounts

Each placard has a front and a backside. The front is for species identification, and the back is for ageing and sexing. Criteria in bold are considered to be the best criteria to separate species or age/sex classes, but additional criteria are given for individuals with missing body parts or that cannot be determined for other reasons (e.g., heavily oiled, intermediate). In the top right hand corner of each placard's identification side, information is given on how to identify the group of birds from other similar species, if any. Below each species, age class or sex, criteria are listed that correspond to the criteria being determined. In some cases, one outlying measurement will distinguish an individual. Values in red are exclusive to the species, sex or age class being described and may be used alone for ID, sex or age determination, as long as other criteria given are not conflicting. In other cases, multiple criteria will be necessary, individuals will fall in the overlap of 2

categories, or be in too poor of condition to classify.

Because space limitations, photos are not included for all age and sex classes for each species. Photos generally show birds in basic or juvenile plumage since these tend to be the most difficult to identify.

The placards are treated as living documents and will be updated as new information is collected and after they are tested for practicality. Additional species will also be added in future iterations. Please send us your feedback (contact info on page 1).

Measurements

All measurements are given in mm. Wing measurements are of unflattened wing chord (Pyle 2008, p.6). Bill measurements vary among species and are always described (e.g., depth at distal end of nares). Tarsus shown in Pyle (2008, p. 11).

Age Classes Defined

We use the calendar year age system accepted by the USGS bird banding lab, and used by Pyle (2008). This system allows standardized age codes for each species with flexibility in the level specificity. Using this system, every bird has a “birthday” on January 1, so a bird that was a hatch-year (HY) bird on December 31 (in its first calendar year) would become a second-year (SY) bird

on January 1 (in its second calendar year). If a bird is definitely not an HY, but a more specific designation cannot be made, then the bird can be called after-hatch-year (AHY).

Age Codes: **HY** – Hatch-year, **SY** – Second-year, **TY** – Third-year, **AHY** – after hatch-year (older than HY), **ASY**, **ATY**, and so on.
U – Unknown age.

Abbreviations

exp cul = exposed culmen

gr covs = greater coverts

juv = juvenile

med covs = median coverts

PA = prealternate molt

pp = primaries

s covs = secondary coverts (lesser, medium and greater covs)

ss = secondaries

A note of caution for the user

Many species overlap in plumage and measurements among age and sex classes and are not reliably aged or sexed. Be conservative and classify individuals as unknown when you are unsure and for intermediate individuals.

Acknowledgments

The information presented in this document are based largely on data collected from other sources (see literature cited) and we are grateful for those that have contributed to these valuable resources. We would like to The California Academy of Sciences, especially Moe Flannery, and the Museum of Vertebrate Zoology at UC Berkeley, especially Carla Cicero for access to museum specimens. Sara Acosta, Tom Grey, Steve N. G. Howell, Ron LeValley, Stuart MacKay and Annie Schmidt generously provided images. All spread wing images were provided by the Slater Museum of Natural History, University of Puget Sound. Steve Howell also provided valuable feedback of species accounts.

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identification of LOONS

3 common in California

- **all loons:** straight pointed bills; long-bodied with legs set far back; 3 webbed toes (4th toe minute); flat tarsi.^A

Red-throated Loon (RTLO)



- bill slender; appears upturned
- exp cul 46-59 mm^B
- back feathers with 2 spots on each tip in non-breeding plumage (Oct-Mar)^{A,B}; spots can wear off by spring.
- wing 253-297^{B,C}

Pacific Loon (PALO)



- bill slender & straight
- exp cul 44-61 mm^B
- back feathers dark in non-breeding plumage (some feathers with spots may be retained from breeding plumage)^A
- wing 274-313^{B,C}

Common Loon (COLO)



- bill deep & straight
- **exp cul ≥ 69 mm (69-97)^B**
- headless from RTLO and PALO by wing ≥ 331 (331-401)^{B,C}

Yellow-billed Loon (YBLO)

Occasionally found in CA. From COLO by light bill (esp. along culmen) and by shape of lower mandible.



^A Hass & Parrish 2000, ^B Pyle 2008, ^C Ainley et al. 1993

ageing and sexing LOONS

Sex determination only possible for extreme individuals. You may sex an individual if one measurement falls inside the exclusive range for one sex, as long as the other measurement is within the overall range for that sex. Sexes alike in plumage.

SEXING^B

	Red-throated Loon		Pacific Loon		Common Loon	
	♂	♀	♂	♀	♂	♀
Bill Depth (at distal end of nares; mm)	11.3 – 13.7	9.8 – 12.0	12.0 – 14.2	10.9 – 12.6	19.4 – 24.7	16.3 – 21.7
	≥ 12.5	≤ 10.8	≥ 13.1	≤ 11.5	≥ 22.2	≤ 18.9
Exp. Cul. (mm)	49 – 59	46 – 54	48 – 61	44 – 56	74 – 97	69 – 93
	≥ 56	≤ 47	≥ 58	≤ 46	≥ 95	≤ 72

Age determination only possible for extreme individuals. Individuals that are > HY/SY, but where you're unsure which age class, should be aged AHY.

AGEING^B

	HY/SY	SY/TY	ASY/ATY
Red-throated Loon See Fig 159, p 214 in Pyle (2008)	white edging on s covs and back feathers (Oct -Dec); some edging will wear off from juv feathers; some juv feathers retained after limited PA in winter	med, gr covs with oval spots; back feathers with rectangles, ovals, or round spots (Oct - Apr), or unmarked Apr-Sep	med, gr covs with round spots; back feathers with round spots (Oct-Dec), or unmarked (Mar-Sep)
Pacific Loon See Fig 165, p 218 in Pyle (2008)	s covs and back feathers with narrow pale tips; may become mixed with unmarked or spotted feathers later in winter. Chin with partial or pale band.	s covs and back feathers unmarked or with small white spots (Sep-Apr). Chin with complete band (Sep-Mar)	s covs with bold white spots; back feathers unmarked, often with retained bold stripe patterned feathers (Sep-Mar). Chin with complete band (Sep-Mar)
Common Loon See Fig 169, p 222 in Pyle (2008)	s covs and back feathers with indistinct pale tips (Sep-Aug); may become mixed with unmarked or pale-tipped feathers (Feb-Aug).	s covs and back feathers unmarked or with ovals or squarish spots (Sep-Apr).	s covs glossy black with white spots; back feathers blackish with diffuse black spots mixed with worn black feathers with spots (Sep-Mar).

identification of SMALL GREBES

3 in California

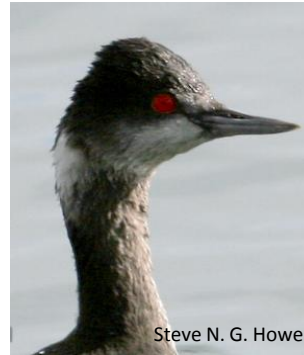
- **all grebes:** toes singly lobed (see coot for comparison) and tarsi flat
- **legs/feet only:** from phalaropes by tarsus >30mm^A
- **from large grebes:** wing<155mm, bill from distal end of nares >20mm^B

Pied-billed Grebe (PBGR)



- **easily separated from other grebes by bill shape (breeding birds with black band on bill)**
- ss dark (narrow white trailing edge)^C
- wing 115-143^C

Eared Grebe (EAGR)



- **bill depth \leq width** (at distal end of nares)^{A, B, C}
- **bill usually upturned w/o pale tip^C**
- pp1-3 *may* have white tips^C
- ss white
- wing 118 – 142^{C, D}



Horned Grebe (HOGGR)



- **bill depth > width** (at distal end of nares)^{A, B, C}
- **bill straight usually w/ pale tip^C**
- pp1-3 lack white tips^C
- ss white
- wing 126 – 151^{C, E}
- can show black in face in spring during molt

Unidentifiable birds will occur (GREB or EHGR)

- Unidentifiable small grebes (e.g., headless, scavenged) should be called GREB with “PBGR or EHGR” in the notes.
- Birds that are not PBGR but are not distinguishable as EAGR or HOGGR should be called EHGR.

^A Hass & Parrish 2000, ^B Ainley et al. 1993, ^C Pyle 2008, ^D Cullen et al. 1999, ^E Stedman 2000

ageing and sexing SMALL GREBES

You may sex an individual if at least one measurements (below) falls inside the exclusive range for one sex, as long as the other measurements (if applicable) are within the overall range for that sex.

SEXING^c

	Pied-billed Grebe		Eared Grebe		Horned Grebe	
	♂	♀	♂	♀	♂	♀
Bill Depth (at distal end of nares; mm)	10.0 – 12.2	8.1 – 10.1	Not useful		6.9 - 8.2	6.0 - 7.2
	≥ 10.6	≤ 9.5			≥ 7.7	≤ 6.4
Bill Depth (at proximal end of nares; mm)	Not useful		6.6 - 7.9	5.7 - 6.9	Not useful	
			≥ 7.4	≤ 6.1		
Bill Length (from distal end of nares; mm)	Not useful		15.2 – 18.5	12.7 – 16.1	Not useful	
			≥ 16.6	≤ 14.7		

Age determination is not possible for most individuals.

AGEING^c

	HY/SY	AHY/ASY	U/AHY
Pied-billed Grebe	face striped	N/A	lack stripes on face
Eared Grebe	brown head & upperparts; retained juv scapular feathers	black head & upperparts	mixed brown & black head & upperparts; lack juv feathers
Horned Grebe	retained juv scapular feathers	N/A	lack juv feathers



EAGR/HOGR retained juv scapular



HY/SY AHY/ASY
EAGR

identification of LARGE GREBES

3 in California

Red-necked Grebe (RNGR)



- bill from distal end of nares: 25-43mm^A
- tarsus 49-71mm^A
- wing 180-212mm^A
- shorter and brownish neck, stockier bill, more silvery underparts, wings with white leading edge and white restricted to ss (not in pp)

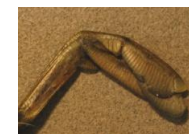
Intermediates & Unidentifiable Birds

- if cannot distinguish b/w WEGR & CLGR (e.g., face pattern & especially bill intermediate): identify as WCGR
- if cannot distinguish b/w RNGR & WCGR: identify as GREB and in notes write "WCGR or RNGR"

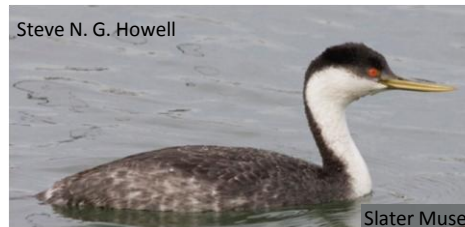


Note lemon-yellow bill lacks orange, but also lacks black on underside (if present, visible from side view) of lower mandible; face more like WEGR

- **all grebes:** toes singly lobed (see coot for comparison) and tarsi flattened
- **from small grebes:** wing > 155mm, bill from distal end of nares > 25mm^{A, B}



Western Grebe (WEGR)

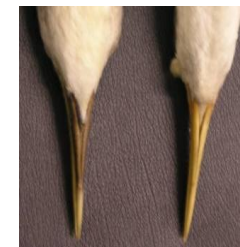


Clark's Grebe (CLGR)



Both Western & Clark's Grebes:

- bill from distal end of nares: 46-68mm^A
- tarsus 67-84mm^A
- wing 164-215mm^{A, B}
- long neck, more slender bill, white underparts, no white leading edge on wing, variable amount of white in both pp and ss (not restricted to ss)



	WEGR	CLGR
Bill Color	yellow-green or pale lemony yellow	orange-yellow or bright yellow; base generally with orange/red
Bottom of Lower Mandible	with black (photo above; LEFT)	without black (photo above RIGHT; black on bill restricted to top of upper mandible)
Face Pattern around Eye	eye in black or gray part of face; generally black- or gray-lored	eye in white or gray part of face; generally white-lored, sometimes gray

ageing and sexing

LARGE GREBES

You may sex an individual if at least one measurements (below) falls inside the exclusive range for one sex, as long as the other measurement is within the overall range for that sex. Note that female bills have a more upturned appearance while male bills appear straighter; both have a recurved lower mandible but only males have decurved upper mandible.

SEXING	Western Grebe		Clark's Grebe	
	♀	♂	♀	♂
Bill length (distal end of nares to tip; mm): <i>Bill length for sexing (exclusive):</i>	46-58 ^{A,B} ≤49	51-68 ^{A,B} ≥60	46-56 ^A ≤52	54-66 ^A ≥58
Bill depth (at proximal end of nares): <i>Bill depth for sexing (exclusive):</i>	9.1-12.0 ^{A,B} ≤11.3	11.8-14.6 ^A ≥12.5	8.9-11.3 ^A ≤10.5	11.0-14.2 ^{A,B} ≥11.8

AGEING: Birds with iris brownish can be aged HY/SY.

Full-grown birds with black head plumage and iris orange-red to red should generally be aged U/AHY.

Red-necked Grebe

SEXING: male=female, similar in plumage & measurements^A

AGEING: Birds with iris pale/yellowish or brownish with yellow ring, and/or scapulars with long downy juvenile feathers can be aged as HY/SY.

Birds with iris brown and scapulars lacking downy feathers should be aged U/AHY.

identification of CORMORANTS

3 in California

- **all cormorants:** Large, elongated bodies, long necks, long bills with hooked tip on upper mandible, totipalmate webbed feet turned outward, short thick legs



Pelagic Cormorant (PECO)



- size small/slender; bill short/slender; tail long
- Immature** - breast and facial skin blackish (Jun-Dec)
- Adult**
 - blackish; green-purple sheen.
 - red facial skin
 - in breeding shows distinctive white flanks

Brandt's Cormorant (BRAC)



- size medium/stocky; bill long/thick; tail short
- Immature** - breast pale brown to bleached (Jul-Feb) and gular dull gray
- Adult**
 - black; slight blue/green sheen.
 - in breeding has blue gular pouch edged with buffy feathers & white philoplumes on side of head, neck and scapulars.

Double-crested Cormorant (DCCO)



- size large/stocky; bill short/thick; tail long
- Immature** - breast pale brown to white – can extend to belly (Jun-Dec) and gular & facial skin dull orange-yellow
- Adult**
 - black; dull green or bronze sheen.
 - orange-yellow skin on face, base of bill and gular pouch distinctive year-round.

Measurements (mm) to aid in the identification of cormorants. Measurements that fall in the exclusive range for a species may be used for identification as long as other criteria are in range for that species.

	Bill Length (exp cul)	Bill Depth (at distal end of feathers)	Tail	Tarsus	Wing
PECO ^{A, B, C}	41-56 <u>≤ 49</u>	8 -14 <u>≤ 13</u>	121-152	41-60 <u>≤ 51</u>	220-290 <u>≤ 253</u>
BRAC ^{A, B, D}	60-80 <u>≥ 65</u>	15-22	98-138 <u>≤ 119</u>	58-72	255-305
DCCO ^{A, B, E}	51-63	15--20	125-172 <u>≥ 154</u>	53-74	270-330 <u>≥ 307</u>



^APyle 2008, ^BHass and Parrish 2000, ^CHobson 1997, ^DWallace and Wallace 1998, ^EHatch and Weseloh 1999

ageing and sexing CORMORANTS

Sex determination only possible for extreme individuals. You may sex an individual if at least one measurements (below) falls inside the exclusive range for one sex, as long as the other measurements (if applicable) are within the overall range for that sex. Sexes alike in plumage.

SEXING	Pelagic Cormorant ^{A,B,C}		Brandt's Cormorant ^{A,B,D}		Double-crested Cormorant ^{A,B,E}	
	♂	♀	♂	♀	♂	♀
Bill Depth (at distal end of feathers)	10.5-14.2 ≥ 11.5	8.3-11.1 ≤ 10.0	18.4-21.6 ≥ 19.5	15.4-18.8 ≤ 18.0	17.9-20.2 ≥ 18.8	15.1-18.3 ≤ 17.4
Bill Length (exposed culmen)	Not useful		67-77 ≥ 72	61-69 ≤ 65	Not useful	
Tar	Not useful		63-72 ≥ 69	58-67 ≤ 61	Not useful	
Wg	230-301 ≥ 290	220-285 ≤ 225	270-305 ≥ 290	255-284 ≤ 265	290-332 ≥ 325	277-320 ≤ 285

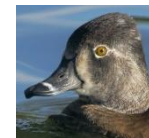
Immature cormorants have more extensive brown plumage, ornamentation reduced or absent. Use table below to determine age (adapted from Pyle 2008 and PRBO unpublished data). Difficult to assess on heavily oiled birds.

AGEING	HY/SY		SY/TY	ASY/ATY
Pelagic Cormorant	crown upperparts and breast brownish; facial skin brown; eye brown, becoming greenish during 1 st winter	mixed brown and glossy black, breast dark brown; reduced white flanks; facial skin dull red; eye medium-bright green		black with purple-green sheen; facial skin bright red; extensive white on flanks (Feb-Aug); eye bright yellow-green
Brandt's Cormorant	crown, upperparts and belly brown; no ornamental plumes; gular dull bluish gray; eye brown, becoming greenish during 1 st winter	mixed brown and glossy black, extensive brown on breast and belly; gular pouch dull blue-gray; plumes reduced; eye medium-bright blue		black with blue-green sheen; extensive plumes (Jan-Aug); gular bright blue edged with buffy feathers; eye bright cobalt blue
Double-crested Cormorant	crown and upperparts brown, breast and abdomen pale brown to whitish; ornamental crests absent; eye brown, becoming greenish during 1 st winter	mixed brown and glossy black, breast dark brown; ornamental crests present but reduced; eye medium-bright green		uniformly black with dull green or bronze sheen; facial skin, gular pouch, base of bill orange-yellow; crests extensive; eye bright green

identification of SCAUP

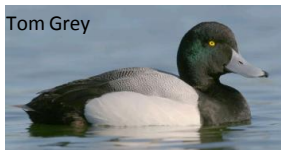
2 in California

- **from Ring-necked Duck:** by white on ss; lack of white outline on bill in adult male plumage; and from females and immatures by lack of eye ring.



Female RNDU by Tom Grey

Greater Scaup (GRSC)



Tom Grey



Tom Grey



Slater Museum

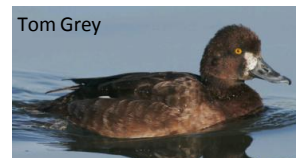
GRSC



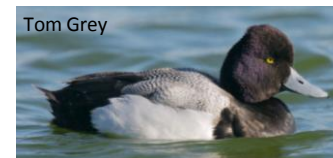
Tom Grey

- Larger bill: values in red below can be used for ID.
- Peak on head in front of eye and often appear rounder than LESC (can feel on birds in hand).
- PP with more white by age/sex (**see note below**)

Lesser Scaup (LESC)



Tom Grey



Tom Grey



Tom Grey



Slater Museum

LESC or young ♀ GRSC

- Smaller bill: values in red below can be used for ID.
- Peak on head behind eye (can feel on birds in hand)
- PP with no to little white (**see note below**)

	GRSC	LESC
Back of head to bill tip; mm ^C	≥ 97 (92 – 105)	≤ 90 (82 – 95)
Bill nail width; mm ^{C, D}	≥ 7.1 (6.1 – 8.7)	≤ 5.9 (4.5 – 6.9)
Dist. b/w nares at distal end; mm ^D	≥ 9.8 (8.9 – 10.8)	≤ 8.4 (7.2 – 9.3)



Above: Nail width measurement

Unidentifiable birds will occur (SCAU)

- Intermediates and those with characteristics of both species should be classified as scaup species (SCAU).
- **Note:** The extent of white in the wing is not reliable as a sole criterium to separate scaup species, as suggested by some guides. GRSC typically have a lot of white in the wing, while LESC typically have little to no white in the PP. The amount of white varies by age/sex and there is a large amount of overlap b/w the two species.

^A Hass & Parrish 2000, ^B Ainley et al. 1993, ^C Pyle 2008, ^D PRBO data

ageing and sexing SCAUP

Aside from AHY/ASY males in breeding plumage, other age/sex classes should be aged first before sexing. If age determination not possible, it is likely not possible to sex the individual.

AGEING ^c	HY/SY		AHY/ASY	
S COVS	Most to all narrow, rounded and relatively worn (Oct-Sept)		Broad and fresh (Oct-Sept)	
rect shape	Tapered and/or replaced and pentagon shaped at tip (Oct-Sept)		Pentagon shaped at tip (Oct-Sept; central rects sometimes replaced in PA in Feb-Sep)	
	↓	↓	↓	↓
SEXING ^c	♀	♂	♀	♂
head, body	brown	brown becoming dull purple/green, black and white	brown w/ little or no purple/green, black and/or white	glossy purple/green, black & white (flanks can be mottled through Dec).
spotting on gr covs	slight to none	slight	slight to moderate	substantial

identification of SCOTERS

3 in California

Surf Scoter (SUSC)



- easily separated from other scoters & seaducks by bill shape (see below; note vertical line of bill at base); variable amount of swelling near base of bill
- feet either red, orange, or orange-brown with black webs^C

White-winged Scoter (WWSC)



- easily separated from other scoters & seaducks by bill shape (see below; note “smile” shape of bill extending to posterior)
- feet orange or brown with black webs^C
- white patch on wing (ss and, for some age/sex classes, gr covs)

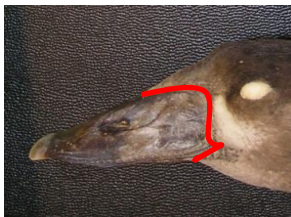
Black Scoter (BLSC)



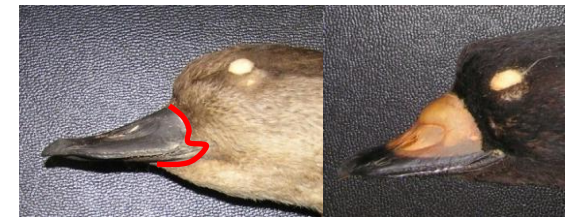
- adult males & some immature males easily separated from other scoters & seaducks by knobby bill (see below)
- females and juv males separated from other spp by diagnostic face pattern (pale face contrasting with dark cap), some by bill (see below)
- feet black or greenish brownish with black webs^C

BILL SHAPES & PATTERNS

SUSC bill:
pattern outlined
in red is similar
for all
sexes/ages,
although overall
shape and color
differ



WWSC bill:
pattern outlined
in red is similar
for all sexes/ages,
although overall
shape and color
differ



BLSC bill shape and pattern (left=females / juv male; right = male). Pattern outlined in red shows distinctness from other scoters (not necessarily other seaducks)

ageing and sexing SCOTERS

SUSC^{A,B,E}:

Belly color	Upperparts & breast	Bill color	Nape with white patch?	Classify Age As:	Classify Sex As:
pale brown to whitish	brown	no orange or white (can have yellow)	no	HY/SY	≤ Dec 31 st : unknown ≥ Jan 1 st : female
pale brown to whitish	brown, mottled black, or black	with some orange (not just yellow) and/or white	possibly	HY/SY	male
pale to dark brown	brown	no orange or white (can have yellow)	yes, although not bold	AHY/ASY	female
black	black	boldly multicolored with orange, red, white	yes, distinct	AHY/ASY	male

WWSC^{A,B,E}:

Belly color	Bill color	Bill knob	White comma by eye	Classify Age As:	Classify Sex As:
pale to medium brown	lacks yellow/orange	absent	absent	U/AHY	≤ Dec 31 st : unknown ≥ Jan 1 st : female
pale to medium brown	with some yellow / orange	absent or partially developed	variable	HY/SY	male
dark brown	lacks yellow/orange	absent or very small	variable	AHY/ASY	female
dark	with bold orange	prominent	bold	AHY/ASY	male

BLSC^{A,B,E}:

Color of upperparts & breast	Bill color	Bill knob	Classify Age As:	Classify Sex As:
brown or mottled lightly black	dark with no or yellow or yellow tinge	absent or small	U/AHY	unknown
brown	dark with extensive (but not bold) yellow	absent or small	HY/SY	male
brown heavily mottled with blackish, or black	dark with no yellow to extensive (but not bold) yellow	absent or small	HY/SY	male
black	dark with bold yellow	distinct	AHY/ASY	male

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