NORTH AMERICAN SECTION Nº.8

Editor

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ANNOUNCEMENTS

Colour-marking

A number of colour-marking schemes will again be active in 1981 and observers are asked to be on the lookout for birds marked both this summer and in previous years. Details to be noted include species, date, place, colour of any dye and part of bird marked, and colour, number and position of colour-bands and metal band, including whether the bands were located on the 'upper' or 'lower' leg. Where the origin of the bird can be determined, a report may be sent directly to the bander as well as to the U.S. Banding Laboratory, U.S. Fish & Wildlife Service, Office of Migratory Bird Management, Laurel, Maryland 20811, U.S.A. The following are some of the schemes known to be operating in 1981 or in recent years - a fuller list is given in WSG Bulletin No. 29, N.A. Section No. 6, p. 27. Please contact the Editor if you would like a colour-marking scheme advertised.

1. <u>C.W.S. Studies in James Bay</u> The large-scale shorebird banding program run by the Canadian Wildlife Service in James Bay, Canada, will be continued in 1981. Birds are marked with picric acid and yellow or light blue colour-bands. Full details of sightings should be sent to Dr. R.I.G. Morrison, Canadian Wildlife Service, 1725 Woodward Drive, Ottawa, Ontario, Canada KIA OE7.

2. <u>Red Knot</u> A program of coordinated banding studies to investigate the migration of the Red Knot is being carried out by the Manomet Bird Observatory, with the involvement of the Canadian Wildlife Service. Over the past year, MBO staff have captured Red Knot in New Jersey, Massachusetts and Florida, and fieldwork is planned in Argentina in April 1981. Birds are being marked with picric acid and colour-bands. We are requesting anyone observing Red Knot to make a special effort to examine the birds for dye or colour-bands and to report any sightings to Brian A. Harrington, Manomet Bird Observatory, Manomet, Massachusetts 02345, U.S.A. - telephone (617)-224-6521. General observations on concentrations of Red Knot would also be very much appreciated, including reports where it can be ascertained that there were no colour-marked birds in a flock.

3. <u>Other projects</u> Please see listing in WSG Bulletin No. 29, N.A. Section No. 6, p. 27. Additional projects include: Marbled Godwits on Bodega Bay, California, by Peter G. Connors, Semipalmated Sandpipers at Churchill, Manitoba by Cheri L. Gratto and Baird's Sandpipers on Ellesmere Island by B. Witts and R.I.G. Morrison.

International Shorebird Survey Scheme

The I.S.S./Maritimes Shorebird Survey scheme will continue in 1981. It is providing very useful data on shorebird distribution over a wide geographical area and we should welcome the participation of both old and new volunteer observers. We are especially interested in expanding the survey network in Central and South America. If you are able to assist with the surveys or know of anyone else who might, please contact one of the following:

 for areas in Canada: Dr. R.I.G. Morrison, at the address above,
 for areas in the U.S.A., the Caribbean, Central and South America: Brian A. Harrington, Manomet Bird Observatory, Manomet, Massachusetts 02345, U.S.A.

PREDATOR-MOBBING BEHAVIOUR IN THE SHOREBIRDS OF NORTH AMERICA by Tex A. Sordahl

The function, context and control of mobbing are poorly understood (Curio 1978). Its presence or absence in a species does not relate simply to taxonomy (Altmann 1956). And while some attempts have been made to interpret the likelihood of mobbing as a function of social grouping patterns, especially the probability of having kin nearby (Rohwer et al. 1976), other factors must be involved. For example, some evidence suggests that mobbing is more common among larger species of related taxa (Hamilton 1975). In an attempt to gain insights about mobbing, I examined its occurrence in the North American Charadrii. The results of my survey are presented here. The determinants and functions of shorebird mobbing will be discussed in greater detail elsewhere (Sordahl ms).

At least four types of shorebird behaviour could be interpreted as mobbing: (1) the tendency of nonbreeding flocks of some species to follow or track hunting raptors while making rapid maneuvers; (2) the tendency of many shorebirds to respond to their flockmates' distress screams by flying around them (Rohwer et al. 1976); (3) the tendency of individuals to be attracted to predators, circle around them or even land nearby (e.g. Sordahl 1979: 566; see interpretation in Kruuk 1979); (4) the swoop-diving or dive-bombing displays, and the actual chasing of potential predators, that many shorebirds exhibit. In this paper I restrict the term mobbing to the last category of behaviours which should perhaps be referred to as attack-mobbing. Thus, I exclude behaviours which may be only curiosity or escape behaviour, and limit mobbing to actions which have a more direct anti-predator function. Several shorebirds exhibit a behaviour, apparently evolved specifically to prevent ungulates from stepping on nests, in which the incubating bird allows the mammal to approach within 1-2 steps before flushing into its face; this may deflect the mammal, but it should not be considered mobbing.

I classified shorebirds as either mobbers or non-mobbers, based on personal experience and questionnaires sent to researchers who have extensive field experience with particular species. The questionnaire explained the definition of mobbing used here and inquired simply whether or not a species had ever been observed mobbing potential predators of adults, eggs or chicks.

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Table 1. Size and occurrence of mobbing behaviour in shorebirds breeding in North America

Species weight in grams ² mobiles ³ reference ² Jacmidae American Jacama spinose m-85, f-113 yes Jamid & Betts 1978 Meantican Jacama Jacama spinose m-85, f-113 yes Main 107 Marcian Oystercatter Hamatopus spillatus 640 yes MAI, DTF Back Oystercatter Hamatopus meticana 340 yes DMI American Avocit Recurvitrosts apericana 340 yes DMI American Avocit Recurvitrosts apericana 340 yes DMI American Avocit Recurvitrosts apericana 340 yes DMI Stillater Charaditis enclous 43 56 MAR, DFF Stillater Charaditis enclous 43 56 MAR, DFF Stillater Charaditis enclous 1074 50 MAR, DFF, DFF, DFF, DFF, DFF, DFF, DFF, DF		n n suite anna an suite an su		
Jacanidas American Jacama <u>Jacama spinosa</u> m-85, f-113 yes Jenni & Betts 1978 Heartopolide American Orgeterather <u>Heamatopus pachmani</u> , 709 yes Black Oxiterather <u>Heamatopus pachmani</u> , 709 yes Pithug Plover <u>Charadrius scripalarus</u> 64 no Main Killder <u>Duradrius vicierus</u> 99 no 745 Subick <u>Duradrius vicierus</u> 99 no 745 Subick <u>Duradrius vicierus</u> 1074 no 757 Munisis Plover <u>Charadrius notianus</u> 1074 no 768 Surfiid <u>Aphrize virgeta</u> 847 Meters <u>Sandpiper Calidris pusils</u> 847 Muteriangel Sandpiper <u>Calidris pusils</u> 847 Muteriangel Sandpiper <u>Calidris noticus</u> 142-154 no 847 Sanderline <u>Calidris ala</u> 75-89 no 75, DT 846 847 847 847 847 847 847 847 847	Species	weight in grams ^a	mobbing ^b	reference ^C
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Haematopolidae American Aysteratcher <u>Haematopus pallatus</u> American Aysteratcher <u>Haematopus maxicanus</u> Back-Merican Aysteratcher <u>Haematopus maxicanus</u> Semipalmated Plover <u>Charadrius wilsonia</u> Semipalmated Plover <u>Charadrius minotanus</u> Kilideer <u>Charadrius wilsonia</u> Sonop Plover <u>Charadrius minotanus</u> Sonop Plover <u>Charadrius minotanus</u> Natis <u>Plover Charadrius minotanus</u> Sonop Plover <u>Charadrius minotanus</u> Natis <u>Plover Charadrius minotanus</u> Sonop Plover <u>Charadrius minotanus sonop</u> Note <u>Charadrius plonesa colopaneus</u> Note <u>Charadrius minotanus so</u>	American Jacana <u>Jacana spinosa</u>	m-85, f-113	yes	Jenni & Betts 1978
American Opstercatcher Hematopus hallatug 680 yes MAR, DFP Black Opstercatcher Hematopus hacheni, 709 yes DAW Recurvirostridae 340 yes DFP, TAS Marcian Avaoti Recurvirostra american 128-170 yes TAS Charadrilae 64 no DG, MAR, BK, DFP Wilson's Plover Charadrius sectorus 64 no MAR, MAR, BK, DFP Wilson's Plover Charadrius sectorus 57 no TAS Point Plover Charadrius sectorus 57 no TAS Sony Plover Charadrius sectorus 1074 no MAR Satury Diver Charadrius sectorus 1037 no TAS Scalapacidae 122-184 no STN, DF, BUR, BUR 1927 Scalapacidae 122-184 no STN, DF, BUR 1927 Scalapacidae 122-184 no STN, DF, BUR 1927 Scalapacidae 122-184 no STN, DF, BUR 1927 Scalapacidae 124-184 no STN, DF, BUR 1927 Scalapacidae 12	Haematopodidae			
Black Opsteroatcher <u>Exematopus bachmani</u> 709 yes DJM Recurvirostridae Aserican Avoost <u>Recurvirostra americana</u> 340 yes DFF, IAS Black-neeked Still <u>Himatopus moxicanus</u> 128-170 yes TAS Charadrius vilsonia Semipalmated Plover <u>Charadrius semipalmatus</u> 64 no MAH Killdeer <u>Charadrius vilsonia</u> 99 no TAS Sonop Plover <u>Charadrius semipalmatus</u> 64 no MAH, DFF Note <u>Charadrius selections</u> 37 no TAS Mountain Plover <u>Charadrius semipalmatus</u> 1074 no KAD Lesser Goldan Plover <u>Thiubalis dominica</u> 113-170 yes DFF, Drevr 1961:181 Black-heilied Plover <u>Thiubalis dominica</u> 113-170 yes DFF, Drevr 1961:181 Sanderline <u>Sinthius alexandrius semipalmatus</u> 1074 no KAD Esseng Goldan Plover <u>Thiubalis semistaria</u> 283 yes JFH, DFF, BBM 1957 Soloparidae Calidridinae Surfirid <u>calidris alexandrine</u> 142-184 no SFN, BBM Red Knot <u>Calidris canutus</u> 142 yes DFF, Party 1961:181 Lesser Goldar Plover <u>Thiubalis semistaria</u> 23-43 no SFN, DFF, PAF, TAS Meutern Sandpiper <u>Calidris pusila</u> 23-43 no SFN, DFF, PAF, TAS Meutern Sandpiper <u>Calidris pusila</u> 17-28 no KK Less Sandpiper <u>Calidris mintili</u> 31-44 no KK, DFF, PAF, TAS Metern Sandpiper <u>Calidris mintili</u> 31-64 no KK, DFF, PAF, TAS Metern Sandpiper <u>Calidris mintili</u> 31-64 no KK, DFF, PAF, TAS Metern Sandpiper <u>Calidris mintili</u> 31-64 no KK, DFF, PAF, TAS Metern Sandpiper <u>Calidris mintili</u> 31-64 no KK, DFF, PAF, TAS Carles Sandpiper <u>Calidris mintili</u> 31-64 no KK, DFF, PAF, TAS Metern Sandpiper <u>Calidris mintili</u> 31-64 no KK, DFF, DFF, PAF, TAS Metern Sandpiper <u>Calidris mintili</u> 31-64 no KK, DFF, DFF, FAF Budionica Coditis <u>Sinchi</u> 57-85 no DDC Dualia <u>Calidris antiniana</u> 57-85 no DDC Dua	American Oystercatcher <u>Haematopus palliatus</u>	680	yes	MAH, DFP
Recurvitorificae American Noroot Ecouryitotra americana Black-necked Stil Hanatopus moxicanus 128-170 yes Tas Chardrilde Santpalmated Plover Chardrius sempalmatus Milaon's Plover Chardrius sempalmatus 64 no MAR Killder Chardrius meladus 89 no Tas 99 no Tas 99 no Tas 90 no PR, PR Parales 1970 90 no Tas 90 no PR, PR Parales 1970 90 no Tas 90 no PR Parales 1970 90 no PR P	Black Oystercatcher Haematopus bachmani	7 0 9	yes	DJM
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Black-necked Skilt <u>Hisantopus mexicanus</u> 128-170 yes TAS Charadridae Sampainated Plover <u>Charadrius signofa</u> 64 no MAR Wilson's Plover <u>Charadrius melodum</u> 64 no MAR Kilider <u>Charadrius melodum</u> 64 no MAR Snowy Plover <u>Charadrius melodum</u> 57 no TAS Muntain Plover <u>Charadrius melodum</u> 57 no WDS Sonoy Plover <u>Charadrius melodum</u> 113-170 yes DFF, Drury 1961:181 Black-beliad Plover <u>Huvialis dominica</u> 113-170 yes DFF, Drury 1961:181 Scolopacidae Calidriine 142-184 no SFM, RBM Scolopacidae Samderling <u>Calidris autum</u> 142-184 no SFM, RBM Sanderling <u>Calidris autum</u> 142 yes DFF, Dent 1927 Sanderling <u>Calidris mutila</u> 23-43 no SFM, RFM Western Sandpiper <u>Calidris mutila</u> 17-28 no KK, DFP Mitserumed Sandpiper <u>Calidris functilis</u> 17-28 no SFM, DFF, FAP, TAS Western Sandpiper <u>Calidris minutilis</u> 17-28 no SFM, DFF, FAP, TAS Dectoral Sandpiper <u>Calidris functicis</u> 37-65 no SFM, DFF, FAP, TAS Dectoral Sandpiper <u>Cal</u>	American Avocet <u>Recurvirostra americana</u>	340	yes	DFP, TAS
Charderizate Semipalested Plover Charderius semipalmatus Milaon's Plover Charderius vulsenia Milaon's Plover Charderius vulsenia Milaon's Plover Charderius successful Piping Plover Charderius alexandrinus Sonow Plover Charderius alexandrinus Sonow Plover Charderius alexandrinus Sonow Plover Charderius alexandrinus Sonow Plover Charderius entranus Lesser Golden Plover Pluvialis domitica Black-bellied Plover Pluvialis domitica Black-bellied Plover Pluvialis domitica Sonofinate Calidridinae Surfixir Aphriza virgata Sonofina Charderius alexandrinus Sonofina Charderius alexandrinus Sonofina Charderius alexandrinus Sonofina Charderius alexandrinus Sonofinate Calidris andrise virgata Sonofinate Sanderius Calidris andrise Sonofinated Sonofinated Sonofinated Sonofina Calidris nutical Sonofinated Sonofina Calidris for Sono Sonofinated Sonofina Calidris for Sono Sonofinationa Calidris alpina Sonofinated Sonofine Calidris pelicons Sonofine American Sonofina Calidris pelicons Sonofine American Sonofina Calidris pelicons Sonofine American Sonofina Capella gallinago Sonofine American Sonofine Capella gallinag	Black-necked Stilt <u>Himantopus mexicanus</u>	128-170	yes	TAS
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Rilder Charactius vorlierus 99 no TAS Piping Flover Charactius malodum 57 no TAS Mountain Flover Charactius malodum 57 no TAS Mountain Flover Charactius malodum 57 no TAS Mountain Flover Charactius malodum 13-170 yes DPF, Drury 1961:181 Black-belind Flover Fluxialis equatarola 283 yes DPF, Bent 1927 Scolopacidae Calidridinae 142 yes DPF, Bent 1927 Scolopacidae String for Calidris number of the second string calidris mauri 23-43 no SFM, PFP, NP, TAS Senfoalmated Sandpiper Calidris pusilla 23-43 no SFM, PFP, APF, TAS String for the second string calidris mauri and the second string calidris for the second string calidris mauri and the second string calidris for the second string calidris second string calidris for the second string calidris second string calidris for the second string calidris maintima and second string calidris maintima and second string calidris second second string calidris second second string calidris second string calidris second string calidris second calidris second calidris second calid	Wilson's Plover <u>Charadrius wilsonia</u>	64	no	МАН
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NomeNo	Snowy Ployer Charadrius alexandrinus	43+04	no	MAH, DFP TAS
Lesser Golden Plover Plovialis dominica Black-belied Plover Plovialis squatarola 283 yes JFM, DFP, BBM 1957 Scolopacidae Calidrii av Jrgata Red Knot Calidris avirgata Red Knot Calidris avirgata Sanderling Calidris alba Sanderling Calidris fusion Red Knot Calidris mauri 23-43 no SFM, DFP, FAR, TAS Western Sandelper Calidris fusicollis 17-28 no Kt. DFP, FAR, TAS Sanderling Calidris fusicollis 35-50 no TAS, Drury 1951 Baird's Sandelper Calidris fusicollis 35-50 no TAS, Drury 1951 Pectoral Sandelper Calidris fusicollis 35-50 no Curlew Sandelper Calidris maintima 57-85 no Purple Sandelper Calidris maintima 57-85 no DGC Dunin Calidris fusicollis 57-72 no Stitl Sandelper Calidris maintima 57-85 no DGC Dunin Calidris fusicollis 57-85 no Purple Sandelper Calidris maintima 57-85 no DGC Dunin Calidris fusicollis 57-85 no Stitl Sandelper Calidris fusicollis 57-85 no Purple Sandelper Calidris fusicollis 5	Mountain Plover Charadrius montanus	107đ	no	WDG
Black-bellied PloverPlovialis squatarola283yesJPM, DPP, HBhn 1957ScolopacidaeCalidridinaeSurfbird Aphriza virgata142-184noSFM, RBWRed Knot Calidris antus142yesDPF, Bant 1927Sanderling Calidris antus142yesDFF, Parmelce 1970Senjalamated Sandpiper Calidris murit23-43noDF, Parmelce 1970Senjalamated Sandpiper Calidris minutilla17-28noBKLeast Sandpiper Calidris functiolis35-50noTAS, Drury 1961Baird's Sandpiper Calidris functiolis35-50noFAS, Drury 1961Petronal Sandpiper Calidris functiolis57-92noFA, Drury 1961Batrd's Sandpiper Calidris maritima57-85noDFMPurple Sandpiper Calidris forrugines99noFAPPurple Sandpiper Calidris maritima57-85noDOCDualting alpina43-71noJRJ, SFM, DFP, FAPStift Sandpiper Calidris maritima57-85noDOCDualting alpinae50-71noJRJ, SFM, DFP, FAPStift Sandpiper Calidris maritima57-85noPM, JFW, DFPStoft-biled Dowitcher Limnodromus griseus71-90NC, JRS, RBWScolopacinae29-177noBK, DS, DTScolopacinae205-359yesJRJ, BK, PFP, KaP, Hagar 1966Bar-tailed Codvit Limosa hemastica255-359yesJRJ, BK, PFP, SASBudisona Godvit Limosa hemastica260-510yesAlten 192	Lesser Golden Plover Pluvialis dominica	113-170	yes	DFP, Drury 1961:181
Solopacidae Galidridinae Surfbird Aphriza virgata 142 yes DFP, Bant 1927 Sanderling Galidris canutus 142 yes DFP, Parmelee 1970 Senipalmated Sandpiper Calidris puglia 23-43 no DFP, Parmelee 1970 Western Sandpiper Calidris muri 23-43 no DFP, Parmelee 1970 Western Sandpiper Calidris muri 23-43 no DFP, Parmelee 1970 Rufous-necked Sandpiper Calidris fuecicollis 17-28 no BK Least Sandpiper Calidris fuecicollis 35-50 no TAS, Drury 1961 Baird's Sandpiper Calidris maritima 57-92 no SFM, DFP, FAP, TAS Petoral Sandpiper Calidris maritima 57-85 no DDC Dunlin Calidris mitonemis 57-72 no SFM, DFP, FAP, TAS Still Sandpiper Midris mitonemis 57-85 no DDC Dunlin Calidris mitonemis griseus 71-99 no WE, TAS, RBW Solopacinae 71-99 no WE, DS, DT Gallingsinine 255-359 yes JJJ, DFP, Hagar 1966 Common Snipe Capella gallinsgo 92-177 no WE, NS, DT Solopacinae 71-99 no WE, DS, DT Solopacinae 265-359 yes JJJ	Black-bellied Plover Pluvialis squatarola	283	yes	JPM, DFP, Höhn 1957
Calidridinae142-184noSFN, REWBed Knot Calidris canutus142yesDFP, Bent 1927Sanderling Calidris canutus57-89noDFP, Parmelee 1970Semipalanated Sandpiper Calidris pusilla23-43noDS, DTRufous-necked Sandpiper Calidris minutilla17-28noDK, DFPRufous-necked Sandpiper Calidris functional17-28noBKBatrd's Sandpiper Calidris minutilla17-28noBKPettoral Sandpiper Calidris functiona57-92noSKM, DFPBatrd's Sandpiper Calidris for calidris35-64noBK, Dury 1961Pettoral Sandpiper Calidris forruginae99noFAPPurple Sandpiper Calidris ptilocnemis57-85noDDCDunin Calidris alpina43-71noJRJ, SHN, DFP, FAPStilt Sandpiper Micropalama himantopus50-71noJRJ, SHN, JPF, FAPShuft-biled Dowitcher Limnodromus griseus11-99noKFC, JRJLong-billed Dowitcher Limnodromus griseus128noBK, DS, DTScolapacinae255-359yesJRJ, DFP, Hagar 1966Martisinae255-359yesJRJ, DFP, Skeel 1978Batra-tailed Godwit Limosa Iaponica198-454yesKK, Bent 1927Marbied Codwit Limosa Iaponica269-510yesJRJ, DFP, Skeel 1978Bar-tailed Godwit Limosa Iaponica163-27yesJRJ, NK, DFP, Skeel 1978Bristle-thighed Curlew Numenius tahitensis340-454yesAllen 1948:760<	Scolopacidae			
SurfbirdAphriza142-184noSFM, REWRed Kuot Calidris cantus142yesDFP, Bent 1927SanderlingCalidris alba57-89noDFP, Parmelee 1970Semipalmated SandpiperCalidris mouri23-43noDF, DTP, Parmelee 1970Western SandpiperCalidris mouri23-43noDF, DTRufous-necked SandpiperCalidris mouri23-43noDF, DTRufous-necked SandpiperCalidris mouri17-28noHKLeast SandpiperCalidris miturilla17-28noHKBaird's SandpiperCalidris melancical35-50noTAS, Drury 1961Pettoral SandpiperCalidris melancicas57-92noSFM, DFP, FAP, TASCurlew SandpiperCalidris maritima57-85noDDCPurple SandpiperCalidris maritima57-85noDDCPurple SandpiperCalidris mintopus57-85noDDCDunlinCalidris anitonomis57-85noDDCDunlinCalidris mintopus57-85noDDCStift SandpiperTingites subruficollis57-85noFK, DS, DTScologaciae22-177noSK, DS, DTCommon SnipeCapella gallinago92-177noFK, DS, DTScologaciae71-99noWEC, STAAmerican WoodcokPhilohela minorm-156, f-213noTJD, OSPTringinae184219641970Hudsonian Godw	Calidridinae			
Red Knot Galidris cantures142yesDFP, Bent 1927Sanderling Calidris alba57-89noDFP, Parmelee 1970Semipalmated Sandpiper Calidris musilla23-43noDFP, Parmelee 1970Western Sandpiper Calidris musilla17-28noDFP, TAP, TASWestern Sandpiper Calidris fuscicollis17-28noDK, DFPWhite-rumped Sandpiper Calidris fuscicollis35-50noTAS, Dury 1961Baird's Gandpiper Calidris melantos57-82noSK, DTP, FAP, TASPurple Sandpiper Calidris melantos57-82noSK, DTP, FAP, TASCurlew Sandpiper Calidris prilocnemis57-85noDRGDunlin Calidria alpina57-85noDRGDunlin Calidria alpina57-85noDRGStilt Sandpiper Calidris prilocnemis50-71noJRJ, SFM, DFP, FAPSuffree Micropalama himatropus50-71noJRJ, SFM, DFP, FAPGallinagininae71-99noWEC, JRJCommon Snipe Capella gallinago92-177noBK, DS, DTScolopacinae128noBK, DS, DTAmerican Woodcock Philohela minorm-156, f-213noTJD, OSPTringinae1600411 Limosa haemastica255-359yesJRJ, DFP, Hagar 1966Bar-tailed Codvit Limosa haemastica255-10yesJRJ, BK, DFP, Skeel 1978Bristle-thighed Curlew Numenius borealis36-77yesJRJ, BK, DFP, Skeel 1978Bristle-thighed Curlew Numenius borealis454?Whimb	Surfbird Aphriza virgata	142-184	no	SFM, RBW
SanderlingCalidris alba57-89noDFP, Parmelee 1970SemipalmatedSandpiperCalidris pusilla23-43noSFM, DFP, FAP, TASWestern SandpiperCalidris mauri23-43noDS, DTRufous-necked SandpiperCalidris functicalis17-28noDK,Mute-runnedSandpiperCalidris functicalis35-50noTAS, Drury 1961Baird's SandpiperCalidris melanotos57-82noSFM, DFP, FAP, TASCurlewSandpiperCalidris melanotos57-85noDK,CurlewSandpiperCalidris maritima57-85noDCGPurpleSandpiperCalidris functionemis57-85noDCGDunlinCalidris functionemis57-85noDCGDunlinCalidris functionemis57-85noDRGStilt SandpiperMicropalama himantopus50-71noJRJ, EHM, Jehl 1973Buff-breasted SandpiperTryngites subruficollis57-85noFM, JFM, DFPGalinagininaeCommon SnipeCapella gallinago92-177noBK, TAS, RBWScolopacinae71-99noWEG, JRJBE, DFP, Hagar 1966Marcican WoodcockPhilohela minorm-156, f-213noTJD, OSPTringinae11modromus griseus71-99noKG, KFH, MAHHudsonian Godvit Limosa heemastica255-359yesJRJ, BK, DFP, Skeel 1978Bartatele Codvit Limosa heemastica269-510yesWEG, KFH, MAH	Red Knot Calidris canutus	142	yes	DFP, Bent 1927
Semipalmated Sandpiper Calidris pusilla 23-43 no 5FM, DFP, FAP, TAS Western Sandpiper Calidris murii 23-43 no 5FM, DFP, FAP, TAS Least Sandpiper Calidris muriila 17-28 no JK, Kr. DFP White-rumped Sandpiper Calidris fuscicollis 35-50 no TAS, Drury 1961 Baird's Sandpiper Calidris melanotos 57-92 no 5FM, DFP, FAP, TAS Curlew Sandpiper Calidris melanotos 57-92 no FAP Purple Sandpiper Calidris melanotos 57-85 no EHM Rock Sandpiper Calidris prince Suff-breasted Sandpiper Calidris melanotos 57-85 no EHM Rock Sandpiper Calidris prince Suff-breasted Sandpiper Tryngites subruficollis 57-85 no FM, JFP, FAP, TAS Stilt Sandpiper Tryngites subruficollis 57-85 no FM, JFP, FAP, TAF Stilt Sandpiper Tryngites subruficollis 57-85 no FM, JFP, JFP, FAP Stilt Sandpiper Calidris prince Common Snipe Capella gallinago 92-177 no JKJ, EHM, Jehl 1973 Buff-breasted Sandpiper Tryngites subruficollis 57-85 no FM, JFP, MB, JFP, JFP Scolopacinae Common Snipe Capella gallinago 92-177 no JKJ, EHM, Jehl 1973 Scolopacinae American Woodcock Philohela minor m-156, f-213 no TJD, OSP Tringinae Hudsonian Godwit Limosa haemastica 198-454 yes JKJ, DFP, Hagar 1966 Bartatled Cordwit Limosa haemastica 255-359 yes JKJ, DFP, Skeel 1978 Marbiel Ourie Direasting 567 yes JKJ, DFP, Skeel 1978 Marbiel Curlew Numenius tabitiensis 540-7 Unamenius braeopus 577 yes JKJ, NFP, Skeel 1978 Dristic-thighed Curlew Numenius tabitiensis 454 ? Whimbrel Numenius barealis 454 ? Whimbrel Numenius tabitiensis 340-454 yes BK, Bent 1927 Marbiel Curlew Numenius tabitiensis 567 yes JKJ, NFP, Skeel 1978 Dristic-thighed Curlew Numenius tabitiensis 567 yes Allen 1948;760 Long-billed Curlew Numenius tabitiensis 163-227 yes Cabrielson 1944 Lesser Yellowlegs Tringa melanoleuca 163-227 yes Cabrielson 1944 Lesser Yellowlegs Tringa flavipee 78-128 yes Nandall 1961, Matthiessen 196 Solitary Sandpiper Tringa solitaria 36-700 no KMW, Weeden 1965 Willet Catoptrophorus semipalmatus 177-360 yes DFP, TAS, Bent 1929 Willet Catoptrophorus semipalmatus 177-360 yes MAH, TAS	Sanderling <u>Calidris alba</u>	57-89	no	DFP, Parmelee 1970
Western Sandpiper Calidris mutri23-43noDS, DTRufous-necked Sandpiper Calidris minutilla17-28noBKLeast Sandpiper Calidris minutilla17-28noJKJ, BK, DFPWhite-rumped Sandpiper Calidris bairdii35-50noTKS, Drury 1961Baird's Sandpiper Calidris melanotos57-92noSFM, DFP, FAP, TASCurlew Sandpiper Calidris melanotos57-85noDDCPurple Sandpiper Calidris maritima57-85noDDCDualin Calidris pilocnemis57-85noDDCDualin Calidris pilocnemis50-71noJKJ, SFM, DFP, FAPStift Sandpiper Capella gallinago92-177noJKJ, SFM, DFP, FAPGalinagininae71-99noWEC, JKJCommon Snipe Capella gallinago92-177noBK, DS, DTScolopacinae128noBK, DS, DTScolopacinae128noKK, MS, DSAmerican WoodcockPhilohela minorm-156, f-213noTJD, OSPTringinae269-510yesWEG, KFH, MAHBudsonian Godvit Limosa haemastica269-510yesKK, BK, DFP, Skeel 1978Bar-tailed Codvit Limosa haemastica269-510yesJKJ, BK, DFP, Skeel 1978Bristlee Lingea Pilowensis360-454yesAllen 1948:760Long-billed Codvit Limosa haemastica269-510yesJKJ, BK, DFP, Skeel 1978Bristlee Lingea Pilowensis340-454yesAllen 1948:760Long-billed Codvit Limosa haemastica269	Semipalmated Sandpiper Calidris pusilla	23-43	no	SFM, DFP, FAP, TAS
Ruitous-necked sandpiper Calidris ruitcollis1/-28noEKLeast Sandpiper Calidris fuscicollis35-50noTAS, Drury 1961Baird's Sandpiper Calidris maintima35-64noBK, Drury 1961Pectoral Sandpiper Calidris melanotos57-92noSFM, DFP, FAP, TASCurlew Sandpiper Calidris maritima57-85noDMGPurple Sandpiper Calidris maritima57-85noDMGDunlin Calidris alpina43-71noJRJ, SFM, DFP, FAPStilt Sandpiper Calidris prince50-71noJRJ, SFM, DFP, FAPStilt Sandpiper Capelama himantopus50-71noJRJ, SFM, DFPSuff-breasted Sandpiper Tryngites subruficollis57-85noPMGallinaginiae022-177noEK, TAS, RBWCommon Snipe Capella gallinago92-177noEK, TAS, RBWShort-billed Dowitcher Limnodromus griseus71-99noEK, TAS, RBWScolopacinae128noJK, BK, DFP, Hagar 1966American Woodcock Philohela minorm-156, f-213noTJD, OSPTringinae255-359yesJRJ, DFP, Hagar 1966Bar-tailed Godwit Limosa haemastica255-359yesJRJ, BK, DFP, Skeel 1978Hudsonian Godwit Limosa fedoa269-510yesWEG, KFH, MAHEskimo Curlew Numenius tahitiensis360-454yesJRJ, BK, DFP, Skeel 1978Drighter Mutenius americanus907yesDoven 1975Creater Yellowlegs Tringa flowipes78-227yesGabriels	Western Sandpiper <u>Calidris mauri</u>	23-43	no	DS, DT
Least Samopher (dailing minutilia)17-26noJR, BK, DPPWhite-rumped Sandpiper (alidris function)35-50noTAS, Drury 1961Baird's Sandpiper (alidris melanotos)57-92noFK, DFP, FAP, TASCurlew Sandpiper (alidris ferruginea)99noFAPPurple Sandpiper (alidris ferruginea)57-85noDDGDunlin (alidris alpina)57-85noDDGStilt Sandpiper (Micropalama himantopus)50-71noJRJ, SK, DFP, FAPStilt Sandpiper (Micropalama himantopus)50-71noJRJ, SK, DFPGallinagininae620-71noJRJ, SK, DFPGallinagininae128noBK, DS, DTScolopacinae128noBK, DS, DTScolopacinae128noBK, DS, DTScolopacinae11modromus scolopaceus128noAmerican WoodcockPhilohela minorm-156, f-213noTringinae255-359yesJRJ, BK, DFP, Skeel 1978Bar-tailed Godwit Limosa haemastica255-359yesJRJ, BK, DFP, Skeel 1978Bar-tailed Godwit Limosa haemastica256-310yesWEG, KFN, MAHEskimo Curlew Numenius barealis43-71yesJRJ, BK, DFP, Skeel 1978Bristle-thighed Curlew Numenius tahitiensis340-454yesJIE, NPF, Skeel 1978Bristle-thighed Curlew Numenius americanus907yesDFP, TASUpland Sandpiper Bartramia longicauda170-198yesRuhali 1961, Matthiessen 196Solitary Sandp	Rufous-necked Sandpiper <u>Calidris ruficollis</u>	17-28	no	BK
Maine is and piper Calidris Instructions335-64InterformBaird's Sandpiper Calidris mainting57-92noFR, Drury 1961Pectoral Sandpiper Calidris ferruginea99noFAPPurple Sandpiper Calidris mainting57-85noEHMRock Sandpiper Calidris antitima57-85noDDGDunlin Calidris alpina43-71noJRJ, SFM, DFP, FAPStift Sandpiper Micropalama himantopus50-71noJRJ, EHM, Jahl 1973Buff-breasted Sandpiper Tryngites subruficollis57-85noDDGGallinagininae62-177noJRJ, SFM, DFP, FAPCommon Snipe Capella gallinago92-177noBK, TAS, RBWScolopacinae71-99noBK, DS, DTAmerican Woodcock Philohela minorm-156, f-213noTJD, OSPTringinae100100-454yesJRJ, DFP, Hagar 1966Bar-tailed Godwit Limosa haemastica255-359yesJRJ, DFP, Hagar 1966Bar-tailed Codwit Limosa faedoa269-510yesMcG, KFH, MAHEskimo Curlew Numenius brealis454?Winbrel Numenius phacepusBristle-thighed Curlew Numenius tahitiensis340-454yesAllen 1948:760Long-billed Curlew Numenius americanus907yesDrP, TASUpland Sandpiper Bartramia longicauda170-198yesBowen 1975Greater Yellowlegs Tringa melanoleuca163-227yesGabrielson 1944Lesser Yellowlegs Tringa flavipes71-135noRW, Weeden 1965	White-rumped Sandpiper Calidris fuscicallic	17-28	no	JRJ, BK, DFP
Pactoral SandpiperCalify melanotos Calify for melanotos55-57100SRM, DFP, FAP, TASPerciple SandpiperCalify for maritima Calify is aptina57-85noFAPPurple SandpiperCalify is maritima Calify alpina57-85noDDCDunlinCalify alpina43-71noJRJ, SFM, DFP, FAPStilt SandpiperCalify alpina43-71noJRJ, SFM, DFP, FAPStilt SandpiperMicropalama himantopus Stilt Sandpiper50-71noJRJ, SFM, DFP, FAPGalinagininaeCommon SnipeCapella gallinago Soft-t-billed Dowitcher92-177noBK, TAS, RBWScolopacinae American WoodcockPhilohela minor Himodromus griseus American Woodcockm-156, f-213noTJD, OSPTringinae Hudsonian GodwitLimosa haemastica Limosa haemastica Softy255-359yesJRJ, DFP, Hagar 1966Bar-tailed GodwitLimosa haemastica Limosa haemastica Softy256-7359yesJRJ, DFP, Hagar 1966Bar-tailed GodwitLimosa haemastica Limosa haemastica Softy256-7359yesJRJ, BK, DFP, Skeel 1978Bristle-thighed CurlewNumenius tahitiensis Softy340-454yesAllen 1948:760Ung-billed DowitesLimosa fedoa Limosa fedoa Softy269-510yesAllen 1948:760Ung-billed CurlewNumenius americanus Softy977yesDrJR, SFP, TASBristle-thighed CurlewNumenius americanus Softy977yesGabrielson 1944Lesser Ye	Baird's Sandpiper Calidris bairdii	35-64	no	RAS, Drury 1961
Curlew SandpiperCalidrisferruginea99noFAPPurple SandpiperCalidrismaritima57-85noEHMRock SandpiperCalidrisprince57-85noDDGDunlinCalidrisalidrisstillSFM, DFP, FAPStillSandpiperMicropalama himantopus50-7-85noJRJ, SFM, DFP, FAPStillSandpiperTryngitessubruficollis57-85noJRJ, SFM, DFP, FAPGalidrisGalidrisSont-billedDowitcherLimnodromus griseus71-99noBK, TAS, RBWScolopacinaeCommon SatpeCapella gallinago92-177noBK, TAS, RBWScolopacinaeAmerican WoodcockPhilohela minorm-156, f-213noTJD, OSPTringinaeHudsonian GodwitLimosa haemastica255-359yesJRJ, DFP, Hagar 1966Bar-tailed GodwitLimosa haemastica269-510yesWEG, KFH, MAHBartelied GodwitLimosa fedoa269-510yesWEG, KFH, MAHEakino CurlewNumenius phaeopus567yesJRJ, BK, DFP, Skeel 1978Bristle-thighed CurlewNumenius tahitiensis340-454yesAllen 1948:760Upland SandpiperTringa nelanoleuca163-227yesGabrielson 1944Lesser YellowlegsTringa flavines71-138yesGabrielson 1944Lesser YellowlegsTringa flavines71-340yesMaH, TASSolitary SandpiperTringa flavines <t< td=""><td>Pectoral Sandpiper Calidris melanotos</td><td>57-92</td><td>no</td><td>SFM. DFP. FAP. TAS</td></t<>	Pectoral Sandpiper Calidris melanotos	57-92	no	SFM. DFP. FAP. TAS
Purple SandpiperCalidris maritima57-85noEHMRock SandpiperCalidris ptilornemis57-85noDDGDunlinCalidris alpina43-71noJRJ, SFM, DFP, FAPStilt SandpiperMicropalama himantopus50-71noJRJ, EHM, Jehl 1973Buff-breasted SandpiperTryngites subuficollis57-85noPM, JPM, DFPGallinagininaeCommon SnipeCapella gallinago92-177noBK, TAS, RBWShort-billed DowitcherLimnodromus griseus71-99noWEG, JRJLong-billed DowitcherLimnodromus scolopaceus12.8noTJD, OSPTringinaeMarcican WoodcockPhilohela minorm-156, f-213noTJD, OSPTringinaeMarbiel CodvitLimosa haemastica255-359yesJRJ, DFP, Hagar 1966Bar-tailed CodvitLimosa fedoa269-510yesWEG, KFH, MAHBakton CurlewNumenius borealis454?WhimbrelNumenius tahitiensis340-454yesJRJ, BKP, Skeel 1978Bristle-thighed CurlewNumenius americanus907yesDFF, TASUpland SandpiperBartmaia longicauda170-198yesBowen 1975Greater YellowlegsTringa flavines78-128yesRandall 1961, Matthiessen 1966Solitary SandpiperArtinga melanoleuca163-227yesGabrielson 1944Lesser YellowlegsTringa flavines78-128yesRandall 1961, Matthiessen 1966Solitary Sa	Curlew Sandpiper Calidris ferruginea	99	no	FAP
Rock SandpiperCalidris ptilocnemis57-85noDDCDunlinCalidris alpina43-71noJRJ, SFM, DFP, FAPStilt SandpiperMicropalama himantopus50-71noJRJ, EHM, Jehl 1973Buff-breasted SandpiperTryngites subruficollis57-85noPM, JPM, DFPGallinagininaeCommon SnipeCapella gallinago92-177noBK, TAS, RBWCommon SnipeCapella gallinago92-177noBK, TAS, RBWShort-billed DowitcherLimnodromus griseus71-99noWEC, JRJLong-billed DowitcherLimnodromus scolopaceus128noBK, DS, DTScolopacinaeAmerican WoodcockPhilohela minorm-156, f-213noTJD, OSPTringinaeHudsonian GodwitLimosa haemastica255-359yesJRJ, DFP, Hagar 1966Bar-tailed CodwitLimosa fadoa269-510yesWEC, KFH, MAHBeskino CurlewNumenius borealis46??WhimbrelNumenius tahitiensis340-454yesJRJ, BK, DFP, Skeel 1978Bristle-thighed CurlewNumenius tahitiensis340-454yesBore 1975Creater YellowlegsTringa melanoleuca170-198yesBowen 1975Upland SandpiperTringa melanoleuca162-77yesRandall 1961, Matthiessen 1966Solitary SandpiperTringa flavipes78-128yesRandall 1961, Matthiessen 1966Solitary SandpiperTringa flavipes78-128yesRandall 1965<	Purple Sandpiper Calidris maritima	57-85	no	EHM
DunlinCalidris alpina43-71noJRJ, SFM, DFP, FAPStilt SandpiperMicropalama himantopus50-71noJRJ, EHM, Jehl 1973Buff-breasted SandpiperTryngites subuficollis57-85noPM, JFM, DFFGallinagininaeCommon SnipeCapella gallinago92-177noEK, TAS, RBWShort-billed DowitcherLimnodromus griseus71-99noWEG, JRJLong-billed DowitcherLimnodromus scolopaceus128noBK, DS, DTScolopacinaeAmerican WoodcockPhilohela minorm-156, f-213noTJD, OSPTringinaeHudsonian GodwitLimosa haemastica255-359yesJRJ, FF, Hagar 1966Bar-tailed CodvitLimosa faqona269-510yesWEG, KFH, MAHEskimo CurlewNumenius borealis454?WhimbrelNumenius barealis340-454yesJRJ, SFM, DFP, Skeel 1978Bristle-thighed CurlewNumenius tahitiensis340-454yesDFP, TASUpland SandpiperBartrania longicauda170-198yesDefre 1975Greater YellowlegsTringa melanoleuca163-227yesGabrielson 1944Lesser YellowlegsTringa flavipes78-128yesRandali 1961, Matthiessen 1966Solitary SandpiperArtinga solitaria36-70enoMKWSolitary SandpiperArtinga flavipes78-128yesRandali 1961, Matthiessen 1966Solitary SandpiperArtinga flavipes77-340noKK, RBW </td <td>Rock Sandpiper Calidris ptilocnemis</td> <td>57-85</td> <td>no</td> <td>DDG</td>	Rock Sandpiper Calidris ptilocnemis	57-85	no	DDG
Stilt SandpiperMicropalama himantopus50-71noJRJ, EEM, Jehl 1973Buff-breasted SandpiperTryngites subruficollis57-85noPM, JPM, DFPGallinagininaeCommon SnipeCapella gallinago92-177noBK, TAS, RBWShort-billed DowitcherLimnodromus griseus71-99noWEG, JRJLong-billed DowitcherLimnodromus sciopaceus128noBK, DS, DTScolopacinaeAmerican WoodcockPhilohela minorm-156, f-213noTJD, OSPTringinae198-454yesJRJ, EFP, Hagar 1966Hudsonian GodwitLimosa haemastica255-359yesJRJ, DFP, Hagar 1966Bar-tailed CodwitLimosa fedoa269-510yesWEG, KFH, MAHEskino CurlewNumenius borealis454?WhimbrelNumenius borealis567yesJRJ, BK, DFP, Skeel 1978Bristle-thighed CurlewNumenius tahitiensis340-454yesAllen 1948:760Long-billed CurlewNumenius tahitiensis340-454yesBowen 1975Greater YellowlegsTringa melanoleuca163-227yesGabrielson 1944Lesser YellowlegsTringa melanoleuca163-227yesRandall 1961, Matthiessen 196Solitary SandpiperArtinga solitaria36-70°noLWOWindering Tattler Heteroscelus incanus71-135noRW, RBWSpotted SandpiperArtinga solitaria36-70°noLWOWandering TattlerHeteroscelus incanus <td>Dunlin <u>Calidris alpina</u></td> <td>43-71</td> <td>no</td> <td>JRJ, SFM, DFP, FAP</td>	Dunlin <u>Calidris alpina</u>	43-71	no	JRJ, SFM, DFP, FAP
Buff-breasted SandpiperTryngites subruticollis57-85noPM, JPM, DFPGallinagininaeCommon SnipeCapella gallinago92-177noBK, TAS, RBWShort-billed DowitcherLimnodromus griseus71-99noWEG, JRJLong-billed DowitcherLimnodromus scolopaceus128noBK, DS, DTScolopacinaeAmerican WoodcockPhilohela minorm-156, f-213noTJD, OSPTringinaeHudsonian GodwitLimosa haemastica198-454yesJK, Bent 1927Marbled GodwitLimosa fadoa269-510yesWEG, KFH, MAHEskimo CurlewNumenius phaeopus567yesJRJ, BK, DFP, Skeel 1978Bristle-thighed CurlewNumenius tahitiensis340-454yesDFP, TASUpland SandpiperTringa melanoleuca163-227yesGabrielson 1975Greater YellowlegsTringa melanoleuca163-227yesRandall 1961, Matthiessen 196Solitary SandpiperTringa melanoleuca163-227yesRandall 1961, Matthiessen 196Solitary SandpiperTringa solitaria43-64noBK, RBWSoptted SandpiperActitis macularia36-70enoLWOWandering TattlerHeteroscelus incanus71-135noRBW, Weeden 1965WilletCatoptrophorus semipalmatus170-140yesDFP, TAS, Bent 1929Black TurnstoneArenaria melanocephala128yesDFP, TAS, Bent 1929Black TurnstoneArenaria melanocephala	Stilt Sandpiper Micropalama himantopus	50-71	no	JRJ, EHM, Jehl 1973
Gallinagininae Common Snipe Capella gallinago92-177noBK, TAS, RBW WEG, JRJ Long-billed DowitcherShort-billed DowitcherLimmodromus griseus71-99noWEG, JRJ Long-billed DowitcherScolopacinae American WoodcockPhilohela minorm-156, f-213noTJD, OSPTringinae Hudsonian GodwitLimosa haemastica Limosa haemastica Limosa fedoa255-359yesJRJ, DFP, Hagar 1966Bar-tailed CodwitLimosa haemastica Limosa fedoa269-510yesWEG, KFH, MAHEskimo Curlew Numenius borealis Whimbrel454?WhimbrelNumenius brealis340-454yesAllen 1948:760Bristle-thighed Curlew Numenius tahitiensis Upland Sandpiper340-454yesBowen 1975Greater YellowlegsTringa melanoleuca Tringa flavipes163-227yesGabrielson 1944Lesser YellowlegsTringa flavipes78-128yesRandall 1961, Matthiessen 1965 Solitary Sandpiper71-135noEW, Weeden 1965WilletCatoptrophorus semipalmatus177-340yesDFP, TAS, Bent 1929Nathiessen 1929Black TurnstoneArenaria interpres Arenaria melanocephala128yesDFP, TAS, Bent 1929Black TurnstoneArenaria melanocephala128yesCMH, Bent 1929	Buff-breasted Sandpiper <u>Tryngites subruficollis</u>	57-85	no	PM, JPM, DFP
Short-billedDowitcherLimnodromus scolopaceus128noWK, DS, DTScolopacinaeAmerican WoodcockPhilohela minorm-156, f-213noTJD, OSPTringinaeHudsonian GodwitLimosa haemastica255-359yesJRJ, DFP, Hagar 1966Bar-tailedGodwitLimosa haemastica269-510yesWEG, KFH, MAHEskimo CurlewNumenius borealis454?WhimbrelNumenius phaeopus567yesJRJ, BK, DFP, Skeel 1978Bristle-thighedCurlewNumenius tahitiensis340-454yesUplandSandpiperBartramia longicauda170-198yesDugandInfo.227yesGabrielson 1944Lesser YellowlegsTringa melanoleuca163-227yesSolitarySandpiperAstria43-64noBK, RBWSpottedSandpiper71-135noRuddy TurnstoneArenaria36-70°noLWOWandering TattleHetorosclus incanus71-135noRBW, Weeden 1965WilletCatoptrophorus semipalmatus177-340yesMH, TASArenariinaeRuddy TurnstoneArenaria interpres128yesDFP, TAS, Bent 1929Black TurnstoneArenaria interpres128yesDFP, TAS, Bent 1929Bhataronedinae128yesOFP, TAS, Bent 1929	Gallinagininae	02 177		
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Northern Phalarope Phalaropus lobatus 28-50 no DFP. DS. DT	Northern Phalarope Phalaropus lobatus	28-50	no	DFP, DS, DT
Red Phalarope Phalaropus fulicarius 43-64 no DFP, FAP, DS. DT	Red Phalarope Phalaropus fulicarius	43-64	no	DFP, FAP, DS, DT

a-converted to metric from Palmer 1967; most single values are upper limits, m-male, f-female

b-aggressive swooping at predators

b-aggressive swooping at predators
 c-initials represent personal observations (TAS) or personal communications from: TJD - Thomas J. Dwyer, DDG - Daniel D. Gibson, WEG - W. Earl Godfrey, WDG - Walter D. Graul, CMH - Colleen M. Handel, KFH - Kenneth F. Higgins, MAH - Marshall A. Howe, JRJ - Joseph R. Jehl, Jr., BK - Brina Kessell, SFM - Stephen F. MacLean, Jr., DJM - Dennis J. Martin, PM - Philip Martin, EHM - Edward H. Miller, JPM - J. Peter Myers, LWO - Lewis W. Oring, DFP - David F. Parmelee, OSP - Olin Sewall Pettingill, Jr., FAP - Frank A. Piteika, DS - Doughas Schamel, DT - Diané Tracy and RBW - Robert B. Weeden.
 d-from Graul 1973

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e-L.W. Oring, pers. comm.

Table 1 presents the results for 51 of the 52 species that breed in North America. It is clear that only the larger species mob predators, and that mobbing does not follow taxonomic lines. Mobbing occurs in at least one species in every family. Within the large family Scolopacidae, mobbing occurs in three of six subfamilies. It is striking that most plovers do not mob, but that the two largest species do; that most calidridines do not mob, but that at least one of the two largest species does; and that most tringines do mob, but that the three smallest species do not. Within the Charadriidae it is also noteworthy that while few members of the Charadriinae mob, most if not all members of the larger-sized Vanellinae (which do not breed in North America) do (W.D. Graul pers. comm.). Although many morphological and ecological factors influence the antipredator behaviour of shorebirds, the occurrence of attack-mobbing appears to be largely size-dependent, with a size threshold at ca. 100-120 grams body weight. No information was available for the Eskimo Curlew, but the data obtained lead to the prediction that it is a mobbing species.

The relationship between size and mobbing has been noted previously in a general way. The occurrence of dive-bombing behaviour in various gulls, terns, jaegers and shorebirds led Hamilton (1975:86) to suggest that it originated in the ancestors of the Charadriiformes and has been retained by the larger species. Assuming that this order is monophyletic (Strauch 1976, 1978), such a view is appealing but would require the modification that the behaviour has also been lost in the Alcidae, a group whose poor aerobatic skills probably preclude efficient mobbing.

I found no evidence that any shorebird mobs predators in the non-breeding season; in fact, I suspect that mobbing is contingent upon the presence of eggs of young in all shorebirds, as it is in American Avocets and Black-necked Stilts (unpublished data). It is widely held that adult shorebirds protect themselves best from predators by forming flocks (Goss-Custard 1970, Page and Whitacre 1975, Shanewise and Herman 1979), some of the best evidence being that even species which are territorial in the winter form compact flocks when raptors appear (Myers 1980). Thus, the function of mobbing in shorebirds appears to be chiefly the protection of eggs and young. Secondarily it may protect adults, who at nesting time abandon the safety of flocks to incubate on relatively isolated territories (if mobbing causes a predator to hunt that area less frequently).

Not apparent in Table 1 is that variation exists within the two categories, mobber and non-mobber. Relatively small mobbing species are less aggressive or are observed mobbing less often than larger mobbing species - e.g. Lesser Colden Plover (Drury 1961:213), Upland Sandpiper (K.F. Higgins pers. comm.), Lesser Yellowlegs (Gabrielson 1944, R. Frisch pers comm.), Black-necked Stilt (pers. obs., Hamilton 1975:88). And large non-mobbing species are more aggressive than smaller non-mobbing species - e.g. Surfbird (R. Frisch pers. comm.), Wandering Tattler (R. Frisch pers. comm.). Thus, there may be some scaling of behaviour with size.

Another intriguing possibility is geographical variation in mobbing behaviour. In a few cases, one of the observers listed in Table 1 reported that a species does not mob predators while other sources indicated that is does. I assumed that the few observer discrepancies resulted from differences in experience with particular species under the appropriate circumstances (it requires greater experience with a species to state confidently that it does not mob than to state that it does). However, information available on the Lesser Golden Plover suggests geographical variation. Observations throughout the breeding season indicate that the population at Barrow, Alaska, does not mob (pers. obs., J.P. Myers pers. comm., B.J. McCaffery pers. comm.), whereas other populations apparently do exhibit mobbing (D.F. Parmelee pers. comm., Drury 1961:181). If such geographical variation exists, it will be a challenge to specify the causal differences in selective regimes.

The breeding behaviour of several species and populations is poorly known; further study of breeding shorebirds, and compilations of the mobbing behaviour of shorebirds from other parts of the world, will clarify the ideas presented above. It is apparent from this brief review that the likelihood of mobbing in North American Charadrii is related to size. The regularity across different families in the threshold body weight is striking, particularly given the wide diversity of social systems represented in this group. Thus, in shorebirds it may be possible to explain the presence or absence of mobbing in quite simple terms, the principal determinants being that (1) young or eggs are nearby, and (2) an individual is large enough to have an effect on the predator.

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Addendum

I have recently received information that suggests geographical variation in the predator-mobbing behaviour of another shorebird species, the Upland Sandpiper. Observers have reported an absence of mobbing by Upland Sandpipers in Alaska (B. Kessel pers. comm.), Manitoba (E.H. Miller pers. comm.), and North Dakota (K.F. Higgins pers. comm.). However, Daniel E. Bowen (pers. comm.) described unequivocal examples of mobbing of humans and one instance of mobbing of a coyote (<u>Canis latrans</u>) in Kansas. He further opined that only parents with young weighing less than 30 g exhibit mobbing. If this is true, and certainly it is clear that in many species both the intensity and the form of antipredator behaviour change during the nesting cycle (pers. obs., unpubl. data), it underscores the importance of making observations throughout the breeding season.

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WINTERING BEHAVIOUR AND SITE FAITHFULNESS OF AMERICAN GOLDEN PLOVERS PLUVIALIS DOMINICA FULVA IN HAWAII

by Oscar W. Johnson, Patricia Johnson and Philip Bruner

In August 1979, we initiated a comprehensive study of the wintering biology of the American Golden Plover on the island of Oahu, Hawaii. The major areas under investigation are: behaviour, moult and fat cycles, and the chronology of migration. Certain preliminary findings through October 1980 can be reported at this time.

Adult plovers reach their wintering grounds beginning in August. Most still retained one quarter to one half of their breeding plumage upon arrival. Juveniles did not begin to arrive until late September.

During the winter of 1979-80, we caught plovers in mist-nets and colour-banded them for individual identification. We subsequently chronicled the behaviour of 37 marked birds over extended periods through spring migration, 25-26 April 1980.

The wintering population was composed of territorial and non-territorial birds in approximately equal proportions. Of the banded birds, 23 were territorial and 14 non-territorial. Territories were occupied in a wide range of habitats, with lawns and brushy pastures especially favoured. Territorial birds fed, loafed, preened, and slept on their territories during daylight hours for the entire winter cycle. At night, they roosted communally on nearby small islands. (Note: The study site for this work lacked the urban roof-top roosts found elsewhere on the island: such roosts are described in the next paper.- Ed.). Territorial defence behaviours ranged from brief confrontations and chases to violent aerial fights, and were particularly intense during territory establishment in fall. Based on collected specimens, some juveniles of both sexes established territories, but most territory holders were adults, predominantly males.

In fall 1980, 30 of 37 marked birds (81%) returned to the study area. Each returning individual behaved as it had during the previous winter: in all, 16 territorial and 14 non-territorial. Moreover, each of the territorial birds reoccupied the same territory it had defended previously.

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