**APPENDIX 1**

**List of species, and species acronyms, for which there were sufficient data available for flight analysis.**

Coarse and cluster group designations, based directly on analysis of morphology (Figs. 2 - 4), are indicated by asterisk (\*). Flight speed group from Spear & Ainley (1997b); underlined numbers = likely inclusion).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Species Cluster level: Coarse | | | Fine | | Flight speed  Group |
| *Flappers* | | | | |  |
| AKCA\*, Cassin’s Auklet *Ptychoramphus aleuticus* | | A | | 1 | 25 |
| MRSP\*, Murrelet, *Endomychura, Synthliboramphus, Brachyramphus* spp. | | A | | 1 | 25 |
| DIPE\*, Diving Petrel, *Pelecanoides* spp. | | A | | 1 | *25* |
| GUPI\*, Pigeon Guillemot, *Cepphus columba* | | A | | 1 | 24 |
| AKRH\*, Rhinoceros Auklet, *Cerorhinca monoceratus* | | A | | 2 | 24 |
| PUTU\*, Tufted Puffin, *Fratercula cirrhata* | | A | | 2 | 24 |
| LOAR, Arctic Loon, *Gavia arctica* | | A | | 2 | 24 |
| MUCO\*, Common Murre, *Uria aalge* | | A | | 2 | 23 |
| COBR\*, Brandt’s Cormorant, *Phalacrocorax pennicillatus* | | A | | 3 | 22 |
| CODC, Double-crested Cormorant, *Ph. auritus* | | A | | 3 | 22 |
| COGU, Guanay Cormorant, *Ph. bougainvillae* | | A | | 3 | 22 |
| COPE\*, Pelagic Cormorant, *Ph. pelagicus* | | A | | 3 | 22 |
| GUBO, Bonaparte’s Gull, *Larus philadelphia* | | B | | 4 | 19 |
| GUSA, Sabine’s Gull, *Xema sabini* | | B | | 4 | 19 |
| JAEG\*, Jaeger, *Stercorarius* spp. | | B | | 4 | 16 |
| GUCA\*, California Gull, *L. californicus* | | B | | 4 | 18 |
| GUHR\*, Heermann’s Gull, *L. heermanni* | | B | | 4 | 18 |
| GULA, Laughing Gull, *L. atricilla* | | B | | 4 | 18 |
| KWBL\*, Black-legged Kittiwake, *Rissa tridactyla* | | B | | 4 | 18 |
| GUFR\*, Franklin’s Gull, *L. franklini* | | B | | 5 | 18 |
| TEAN, Antarctic Tern, *Sterna vittata* | | B | | 5 | 20 |
| TEAR\*, Arctic Tern, *S. paradisaea* | | B | | 5 | 20 |
| TEBL, Black Tern, *Chlidonias niger* | | B | | 5 | 20 |
| TEFA\*, Fairy or White Tern, *S. nereis* | | B | | 5 | 20 |
| TEIN\*, Inca tern, *Larosterna inca* | | B | | 5 | 20 |
| TESO\*, Sooty Tern, *Onycoprion fuscata* | | B | | 5 | 20 |
| GUDO, Dominican Gull, *L. dominicanus* | | B | | 6 | 17 |
| GUGW\*, Glaucous-winged Gull, *L. glaucesens* | | B | | 6 | 17 |
| GUHE\*, Herring Gull, *L. argentatus* | | B | | 6 | 17 |
| GUWE\*, Western Gull, *L. occidentalis* | | B | | 6 | 17 |
| GUST\*, Swallow-tailed Gull, *Creagrus furcatus* | | B | | 6 | 17 |
| PHAL\*, Phalarope, *Phalaropus* spp. | | B | | 7 | 21 |
| TROP\*, Tropicbird, *Phaethon* spp. | | B | | 8 | 13 |
|  | |  | |  |  |
| *Glide-flappers* | |  | |  |  |
| BOBF\*, Blue-footed Booby, *Sula nebouxii* | | C | | 9 | 15 |
| BOMA\*, Masked Booby, *Su. Dactylatra* | | C | | 9 | 15 |
| BOPE, Peruvian Booby, *Su. Variegata* | | C | | 9 | 15 |
| PELB\*, Brown Pelican, *Pelecanus occidentalis* | | C | | 11 | 14 |
| PELP, Peruvian Pelican, *Pe. Thagus* | | C | | 11 | 14 |
| SKMA\*, Maccormick’s or South Polar Skua, *Stercorarius maccormicki* | | C | | 12 | 16 |
| PEBL\*, Blue Petrel, *Halobaena coerulea* | | D | | 10 | 6 |
| PRIO\*, Prion, *Pachyptila* spp. | | D | | 10 | 6 |
| STAS, Ashy Storm-Petrel, *Oceanodroma homochroa* | | D | | 10 | 12 |
| STBL, Black Storm-Petrel, *O. melania* | | D | | 10 | 12 |
| STGA\*, Galapagos or Wedge-rumped Storm-Petrel, *O. tethys* | | D | | 10 | 12 |
| STHA, Harcourt’s or Band-rumped Storm-Petrel, *O. castro* | | D | | 10 | 12 |
| STLE, Leach’s Storm-Petrel, *O. leuchorhoa* | | D | | 10 | 12 |
| STMA, Markham’s Storm-Petrel, *O. markhami* | | D | | 10 | 12 |
| STFT, Fork-tailed Storm-Petrel, *O. furcata* | | D | | 10 | 12 |
| STLA, Least Storm-Petrel, *O. microsoma* | | D | | 10 | *12* |
|  | |  | |  |  |
| *Flap-gliders* | | | | |  |
| ALBF\*, Black-footed Albatross, *Phoebastria nigripes* | E | | 13 | | 1 |
| ALSA, Salvin’s Albatross, *Thalassarche salvini* | E | | 13 | | 1 |
| ALWV\*, Waved or Galapagos Albatross, *Th. irrorata* | E | | 13 | | 1 |
| FUGI\*, Giant Fulmar or Petel, *Macronectes* spp. | E | | 16 | | 3 |
| BOBR\*, Brown Booby, *Su. melanogaster* | F | | 14 | | 15 |
| BORF\*, Red-footed Booby, *Su. Sula* | F | | 14 | | 15 |
| PETA, Parkinson’s Petrel, *Procellaria parkinsoni* | F | | 14 | | 4 |
| PETH\*, White-chinned Petrel, *Pr. aequinoctialis* | F | | 14 | | 4 |
| FUAN\*, Antarctic Fulmar, *Fulmarus glacialoides* | F | | 15 | | 4 |
| FUNO\*, Northern Fulmar, *Fu. Glacialis* | F | | 15 | | 4 |
| PEAN\*, Antarctic Petrel, *Thalassoica antarctica* | F | | 17 | | 8 |
| SHSO\*, Sooty Shearwater, *Puffinus griseus* | F | | 17 | | 8 |
| PEBU\*, Bulwer’s Petrel, *Bulweria belwerii* | F | | 18 | | 7 |
| PTBW\*, Black-winged Petrel, *Pterodroma nigripennis* | F | | 18 | | 7 |
| PTCO\*, Cook’s Petrel, *Pt. cooki* | F | | 18 | | 7 |
| PTDE, DePhilipp’s Petrel, *Pt. defilippiana* | F | | 18 | | 7 |
| PTLE, White-winged Petrel, *Pt. leucoptera* | F | | 18 | | 7 |
| PTSJ\*, Stejneger’s Petrel, *Pt. longirostris* | F | | 18 | | 7 |
| PTPY\*, Pycroft’s Petrel, *Pt. pycrofti* | F | | 18 | | *7* |
| PETC\*, Cape Petrel, *Daption capensis* | F | | 19 | | 4 |
| PETS\*, Snow Petrel, *Pagodroma nivea* | F | | 19 | | 4 |
| SHAU, Audubon’s Shearwater, *Pu. auduboni* | F | | 19 | | 9 |
| SHBV, Black-vented Shearwater, *Pu. opistholmelas* | F | | 19 | | 9 |
| SHCH\*, Christmas Shearwater*, Pu. nativitatus* | F | | 19 | | 9 |
| SHMA, Manx Shearwater, *Pu. Puffinus* | F | | 19 | | 9 |
| SHNE\*, Newell’s Shearwater, *Pu.newelli* | F | | 19 | | 9 |
| SHTO, Towsend’s Shearwater, *Pu. townsendi* | F | | 19 | | 9 |
| PTTA\*, Tahiti Petrel, *Pt. rostrata* | F | | 20 | | 2 |
| PTWN\*, White-necked Petrel, *Pt. externa* | F | | 20 | | 2 |
| PTJF\*, Juan Fernandez Petrel, *Pt. externa* | F | | 20 | | 2 |
| PTKE\*, Kermadec Petrel, *Pt. neglecta* | F | | 20 | | 2 |
| PTMU\*, Murphy’s Petrel, *Pt. murphyi* | F | | 20 | | 2 |
| PTGW, Great-winged Petrel, *Pt. macroptera* | F | | 20 | | 2 |
| PTHA, Hawaiian Petrel, *Pt. sandwichensis* | F | | 20 | | 2 |
| PTGA, Galapagos Petrel, *Pt. phaeopygia* | F | | 20 | | 2 |
| PTHE\*, Herald Petrel, *Pt. heraldica* | F | | 20 | | 2 |
| PTPH\*, Phoenix Petrel, *Pt. alba* | F | | 20 | | 2 |
| SHBU\*, Buller’s Shearwater, *Pu. Bulleri* | F | | 20 | | 5 |
| SHPF, Pink-footed Shearwater, *Pu. creatopus* | F | | 20 | | 5 |
| SHWT\*, Wedge-tailed Shearwater, *Pu. pacificus* | F | | 20 | |  |
| PTKG\*, Kerguelen Petel, *Lugensa brevirostris* | F | | 21 | | 7 |
| PTMO\*, Mottled Petrel, *Pt. inexpectata* | F | | 21 | | 7 |
| SHST\*, Short-tailed Shearwater, *Pu. Tenuirostris* | F | | 21 | | 8 |
|  |  | |  | |  |
| *Gliders* | | | | |  |
| ALBB, Black-browed Albatross, *Thalassarche melanophris* | G | | 22 | | 1 |
| ALLA, Laysan Albatross, *Phoebastria immutabilis* | G | | 22 | | 1 |
| PTSP, Soft-plumaged Petrel, *Pt. mollis* | G | | 22 | | 2 |
| PTWH, White-headed Petrel, *Pt. lessoni* | G | | 22 | | 2 |
| SHGR, Greater Shearwater, *Pu. Gravis* | G | | 22 | | 5 |
|  |  | |  | |  |
| *Sea-anchor soarers* | | | | |  |
| STBB, Black-bellied Storm-Petrel, *Fregetta tropica* | H | | 23 | | 11 |
| STEL, Elliot’s Storm-Petrel, *Oceanites gracilis* | H | | 23 | | 11 |
| STWB, White-bellied Storm-Petrel*, Fregetta grallaria* | H | | 23 | | 11 |
| STWF, White-faced Storm-Petrel, *Pelagodroma marina* | H | | 23 | | 11 |
| STHO, Hornby’s Storm-Petrel, *Oc. Hornbyi* | H | | 23 | | 12 |
| STWI, Wilson’s Storm-Petrel, *Oceanites wilsoni* | H | | 23 | | 10 |
|  |  | |  | |  |
| *Soarers* | | | | |  |
| FRIG, Frigatebird, *Fregata* spp. | I | | 24 | |  |