



Chestnut-bellied Sandgrouse in Hawaii

by Peter W. C. Paton, Phillip R. Ashman, and Holly McEldowney

The Chestnut-Bellied Sandgrouse (*Pterocles exustus hindustan*) was introduced to Hawaii by the Hawaii Division of Fish and Game (HDFG) utilizing the U. S. Fish and Wildlife Service's (USFWS) Foreign Game Introduction Program. A total of 725 sandgrouse were released in 1961 and 1962: 493 on Hawaii Island, 118 on Kauai, and 114 on Molokai (HDFG 1961, 1962). The introduction of sandgrouse to Kauai and Molokai apparently failed (HDFG 1966). The Hawaii Island release was thought to be unsuccessful also, until this species was recently discovered in the Waimea area.

Chestnut-bellied Sandgrouse in flight closely resemble American Golden Plover (*Pluvialis dominica*) in size and body shape. However, sandgrouse have quicker wing beats, their tail comes to a sharp point, and small groups of sandgrouse normally fly in a tight flock, rather than the loose line or vee formation of plovers. Male Chestnut-bellied Sandgrouse (Fig. 1) have a solid tan back with a black band separating the buffy chest and chocolate brown abdomen. Females are dull buff in color, streaked with spots of dark brown or black, and their abdomen is slightly lighter than males. Young sandgrouse are overall dull buff, finely barred with blackish, and the abdomen and flanks are dull black (Christensen and Bohl 1964).

This species belongs to the order Columbiformes, which also includes pigeons and doves. In their natural range, India to west central Africa, they inhabit vast desert flats where the vegetation is sparse and water scarce; the annual rainfall in these areas varies from 12 to 25 cm. Sandgrouse are primarily seed eaters, and legumes constitute a major part of their diet (G. Christensen pers. comm.). It is not uncommon to find 2,000 to 3,000 birds congregated at a single waterhole, though they are most frequently observed in flocks of 5 to 30 individuals. The species is non-migratory; however, extensive local movements occur as sandgrouse will fly up to 16 km to utilize a watering site (Christian and Bohl 1964).

The HDFG on advice from the USFWS introduced Chestnut-bellied Sandgrouse to Hawaii because, "there are extensive habitat types within the vast, semiarid regions of the western United States which are largely deficient of native game birds" (Christensen and Bohl 1964). The Foreign Game Introduction Program needed a sedentary species able to withstand environmental extremes: cold weather, summer droughts, a minimum of food available, and limited water sources. Hawaii and Nevada were chosen for sandgrouse introductions (Christensen and Bohl 1964).

On Hawaii Island, birds were released at three different sites (Table 1). The HDFG hoped the sandgrouse would become established in the central plateau between Mauna Kea, Mauna Loa, and Hualalai, where the annual rainfall averages about 38cm (Armstrong 1973). This area is predominantly open shrub and grassland with a scattered to open canopy of low stature mamane (*Sophora chrysophylla*), and naio (*Myoporum sandwicense*). The understory consists of native shrubs (i.e. *Dodonaea* spp., *Bidens menziesii*, *Osteomeles anthyllidifolia*, *Chenopodium oahuense*), mixed native and exotic grasses (i.e. *Eragrostis atropioides*, *E. leptophylla*, *Panicum tenuifolium*, *Dactylis glomerata*, *Bromus* spp., *Avena fatua*), and exotic herbs (i.e. *Senecio sylvaticus*, *Heterotheca grandiflora*, *Verbesina encelioides*, *Achillea millefolium*).

The release at Pohakuloa was the most successful of the three on Hawaii Island. Birds continued to visit the release site until October 1961, when the onset of the gamebird hunting season apparently forced them to disperse to other areas (Walker 1963). The next and only other sightings at Pohakuloa were on 8 and 9 December 1962 when 15 birds, mostly males, were seen (Walker 1963). The last observation of sandgrouse at the Hualalai site was in August 1962 when 18 birds were sighted. Very few birds were noted at Ahumoa subsequent to their release, though one bird was seen at Puako in October 1962 which was thought to have come from the Ahumoa release (Walker 1963).

Biologists associated with the project did not observe any sandgrouse near any of the release sites after December 1962 and thought the program was a failure (Christensen and Bohl 1964, HDFG 1966). There were no further releases of Chestnut-bellied Sandgrouse on the island after 1962 to our knowledge (J. Giffin pers. comm.).

The species was not recorded on Hawaii Island for almost 15 years. The lack of records after 1962 may be the result of observers looking in the wrong place for them. Evidently the habitat requirements of the sandgrouse were not fulfilled at the release site so they dispersed to the Waimea plateau area, which probably was not thoroughly explored by biologists associated with the project. When sandgrouse were released in Nevada, all the birds dispersed immediately and there were no further observations at the release sites. However, a male and female in good condition were recovered in Sonora, Mexico 20 months after their release in Nevada. This suggests that the sandgrouse found a habitat more suitable to the south (Christensen 1963).



Fig. 1. Male Chestnut-bellied Sandgrouse

Photo by Peter Paton

The recent discovery of sandgrouse on Hawaii Island occurred about 1976 or 1977 when Jon Giffin (pers. comm.) observed a few individuals flying across Highway 190, halfway between Waimea and the Saddle Road. Giffin and other observers continued to see sandgrouse in this area after 1977, with their numbers gradually increasing. In January 1980, P. Quentin Tomich (pers. comm.) observed approximately 15 individuals about 6 km west of Waimea adjacent to Highway 19.

McEldowney conducted field work on the proposed Waimea-Kawaihae road corridor from September 1980 to January 1981 with intermittent visits up to April 1981. The area surveyed was a 2,000 foot wide corridor parallel to the existing Waimea-Kawaihae highway from the Hamakua Kohala District boundary (2,800 feet) to sea level at Kawaihae. During this period, which coincided with a prolonged drought, sandgrouse were consistently seen between Highway 190 and about 2,000 feet elevation. Flock size ranged from 2 to 10. Smaller flocks were observed as low as 1,200 feet at cattle watering troughs and Keanuiamano Stream. The largest flock, approximately 40 birds, was observed near the Mana Road northeast of Waimea.

On 16 August 1981, Paton and Ashman observed a flock of 20 birds fly across Highway 190 at telephone pole number 765, 6 km south of Waimea. The birds landed near the highway, so we walked about 0.5 km east to find them.

Table 1. Chestnut-bellied Sandgrouse on Hawaii.

Release location	Date	Number of birds released	Release site elevation (feet)
Pohakuloa	March 1961	123	6,500
Ahumoa	March 1962	16	7,000
Ahumoa	May 1962	18 ¹	7,000
Hualalai	May 1962	80	6,000
Hualalai	May 1962	186	6,000

¹All females

Data from HDFG (1961, 1962).

We flushed over 100 birds in our brief inspection of the area. The birds left to the northeast in small flocks of 5 to 20 individuals. In early October 1981, Jon Giffin (pers. comm.) saw over 200 sandgrouse near Keanuiamano Stream west of Waimea. The birds were congregated along the stream bed where they could take advantage of one of the few water sources in the area. Paton and Ashman walked west of the Waimea dump along Keanuiamano Stream for 2 km on 24 October 1981 in search of sandgrouse. Thirty birds, mainly in pairs, were flushed from the ground. The largest flock, seven birds, was seen next to a cattle watering trough.

After a period of rain, Ashman, Avery Taylor, and Robert L. Pyle inspected these same areas on 28 December 1981, but failed to find any sandgrouse. At this time, the vegetation was much greener and significantly taller than in October. This change in the habitat characteristics was probably responsible for the dispersal of the birds.

The area that the sandgrouse are known to now occupy (Fig. 2) is currently managed as cattle pastureland and is dominated by exotic grasses and herbs. The wetter area east of Highway 190 to Makahalau is subject to more intensive range management practices including seeding of preferred forage species and plowing. These pastures are composed of primarily kikuyu grass (*Pennisetum clandestinum*), panogola grass (*Digitaria decumbenes*), African dropseed (*Sporobolus africanus*), and numerous herbs (i.e. *Lythrum maritimum*, *Solanum nigrum*, *Commelina diffusa*). The area west of the highway grows increasingly more arid with decreasing elevation. Used as open ranges, these areas are more sparsely vegetated and contain a higher percentage of both native and exotic shrubs (i.e. *Wikstroemia* spp. *Opuntia megacantha*, *Indigo fera suffruticosa*, *Sida* spp.). These exotic grass and herb communities, dominated by *Cynodon dactylon*,

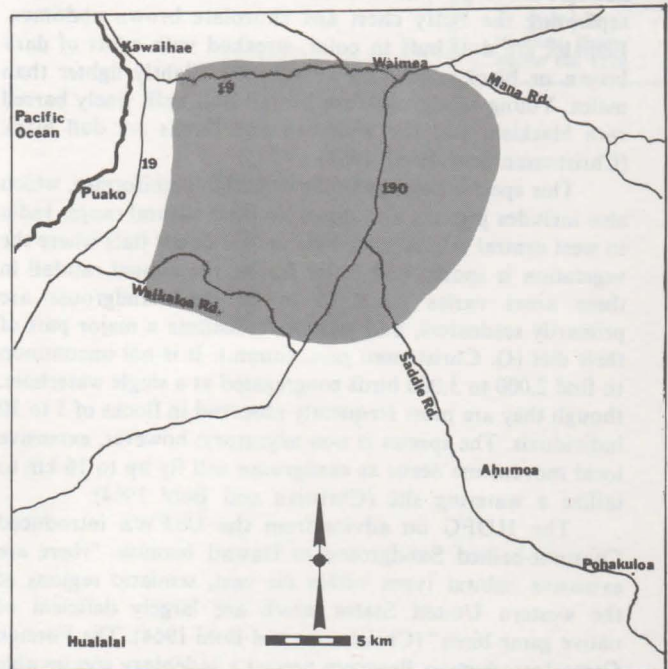


Fig. 2. -Release sites and the present range (shaded area) of Sandgrouse on Hawaii Island.

Rhynachlytrum repens, *Cassia leschenaultiana*, and *Plantago lanceolata*, also have a pronounced seasonal aspect. The cover of fountain grass (*Pennisetum setaceum*) has increased substantially in the last five years and now covers large tracts of the area. The vegetation near the stream resembles that of the wetter segments to the east and supports scattered patches of exotic trees (i.e. *Acacia decurrens*, *Grevillea robusta*). Annual precipitation ranges from 25 to 50 cm (Armstrong 1973).

Due to the abundance of sandgrouse in the Waimea Plateau area, the Board of Land and Natural Resources added the species to the huntable game list in the first week of November 1981 (Ron Bachman pers. comm.).

ACKNOWLEDGEMENTS

We would like to thank Ron Walker and Jon Giffin for access to HDFG information. Ron Walker, Jon Giffin, and Glen C. Christensen made helpful comments on this manuscript.

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RECORDS OF THE CASPIAN TERN IN THE HAWAIIAN ISLANDS

by Philip R. Ashman, Avery L. Taylor
and Sheila Doyle

The Caspian Tern (*Hydroprogne caspia*) is a cosmopolitan species that breeds on coasts and inland lakes in various parts of the world (Alexander 1963). Surprisingly, this species was not recorded in the Hawaiian Archipelago until 3 January 1979 when Rey Larson observed an adult in winter plumage at Salt Lake, Oahu (Pyle 1979). This individual was observed regularly at Kaluapuhi Pond on the Kaneohe Marine Corps Air Station through 24 September 1979, on 21 October 1979 and from mid-November 1979 until May 1980 (Pyle 1981). A Caspian Tern was observed at Kealia Pond, Maui on 6 October and 25-30 October 1979 (Pyle 1981). The Oahu bird was seen at Kaluapuhi on 21 October 1979, but no other reports are available of its presence or absence there during October 1979. The Oahu and Maui records may have been of the same individual.

A large tern was briefly observed by Phillip Bruner (pers. comm.) on 19 September 1981 on Oahu but he was unable to positively identify the bird.

On 9 November 1981 Meyer Ueoka et al. (pers. comm.) observed a Caspian Tern at Kana-ha Pond, Maui. The field marks he saw were: red-orange bill, black cap and "flashing" black primaries. This individual was also observed by a group of students from Evergreen State College, Washington, who independently verified the identification (M. Ueoka, pers. comm.) These observers noted that Hawaiian Stilts (*Himantopus mexicanus knudseni*) flushed from the pond when the tern flew over.

We observed an adult Caspian Tern in winter plumage near Aimakapa Pond in the North Kona District of Hawaii on 12 December 1981. When first observed the tern was standing on a rock ledge 10 m from the beach and 75 m from where we were standing. During the next 20 min we were able to approach to within 10 m of the bird. We used 8x30 and 7x26 binoculars and a 30x spotting scope to observe the tern. Lighting conditions were excellent. The bird flushed when a fisherman walked near it, and flew in front of us before alighting 100 m down the beach. We subsequently saw the tern in flight over Aimakapa Pond. When the tern flew over the pond many of the approximately 150 ducks present, predominantly Northern Shoveler (*Spatula clypeata*), flushed from their roosting places.



Caspian Tern at Aimakapa Pond 19 Dec. 1981.

photo by Peter Paton

The field characteristics that we noted were: large (about the size of a Ring-billed Gull, *Larus delawarensis*); stout red-orange bill as long as the head, with the outer 1/4 blackish and the very tip orange; the cap was black flecked with white and extended below the eye and ear and formed a "V" on the nape; dark eye with white eyelid; white breast, neck, belly and underparts; light gray back and wing with the tips of the primaries dark gray to black as seen from above and black as seen from below; the wings extended slightly beyond the tail when the tern was standing; white, slightly forked tail; black legs and feet.

Similar species that could occur in Hawaii are the Royal Tern (*Thalasseus maximus*) which is found on the coasts of North and South America and the Crested Tern (*Thalasseus bergii*) which is found in the tropical Pacific Ocean, the Indian Ocean and the Persian Gulf (Tuck and Heinzel 1980). However, the white foreheads, more deeply forked tails and different bill colors (orange-red in the Royal Tern, and yellow in the Crested Tern) of these species rule them out as possibilities. Neither of these species have been recorded in Hawaii.

A frequent visitor to Aimakapa Pond told us that the bird had been present for "about two weeks". Peter W.C. Paton was able to take several good photographs of the tern at Aimakapa on 19 December 1981. Ashman and Taylor returned to Aimakapa on 28 December 1981 but did not see the bird. Paton and Taylor observed a Caspian Tern in flight at Hilo, Hawaii, several times during the period of 27 January through 4 February 1982 but they were unable to determine if it was the same individual as the bird seen at Aimakapa.

A Caspian Tern was recorded during the Honolulu Christmas Bird Count at Kaluapuhi Pond on 20 December 1981 by Ron Walker (R.L. Pyle, pers. comm.). Pyle saw the bird again on 24 December 1981 and noted that it frequented the same area as the 1979-80 Oahu bird. This bird had a uniformly red bill and therefore was not the same individual that we observed on Hawaii.

These recent observations indicate that at least two and perhaps three Caspian Terns were present in the Hawaiian Islands this past winter season. Based on the lengthy stay of the 1979-80 Oahu bird and the visibility of this large, strikingly plumaged species, we expect that there will be more observations of these individuals in the months to come.

ACKNOWLEDGMENTS

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COMMENTS ON PROPOSED 10-METER TELESCOPE FOR MAUNA KEA

Editors' note: In January 1982 the University of Hawaii solicited HAS input in the preparation of an environmental impact statement (EIS) for the construction of a proposed 10-meter telescope on Mauna Kea by the California Institute of Technology. In a February reply our Big Island Representative, Mae Mull, requested that HAS be made a consulted party on the environmental aspects of the development, noting that an extensive biological survey was needed and that a comprehensive EIS for all projected development at the summit (and downslope) should be prepared. The draft EIS (DEIS) for the 10-meter telescope alone was subsequently prepared. The following excerpts are from the comments on that DEIS submitted on 21 June 1982 by Mae Mull.

The biological resources of the summit region and of the proposed construction area within the summit are not adequately treated in the draft statement. Biological surveys conducted by specialists in the field were too short, too limited in scope or not conducted on site at all. The immense value to science of the newly found aeolian ecosystem at the Mauna Kea summit is not recognized and its existence there is scarcely acknowledged in the body of the text. The entomology specialist in high stress environments spent only two days in March at the construction site -- under heavy snow -- for an exceedingly brief and incomplete survey of the arthropod fauna.

There was no field survey at all of the vegetation at the summit with reference to the California Institute of Technology (CIT) site -- only an archival report. Society members who visit the summit from time to time frequently observe lichens on the undersides of rocks and boulders, apparently of several kinds. Ample field studies over an annual cycle by botanists and entomologists are clearly needed to adequately describe the unreported environmental setting and the potential impacts of construction projects on the fragile ecosystem.

The biological composition of nearby Lake Waiau is not adequately addressed...No reference is made to the intensive study of the biology of Lake Waiau first conducted in 1976 by Jane Massey, a doctoral candidate in the Department of Botany, University of Hawaii at Manoa. Since three observatories have been constructed since the Massey study, it would be timely to replicate her research to determine the present

biology of the lake and to see whether any changes are attributable to pollution.

Again the Society emphasizes that the time is ripe for the comprehensive EIS on the University's Research and Development Plan for Mauna Kea which encompasses construction projects at the summit and downslope into the 1990s. The framework for that EIS would be the extensive biological surveys of the whole Science Reserve from the summit down to the boundary at approximately 12,000 feet elevation.

Instead of scurrying ahead with the CIT project and leaving undone the necessary biological data gathering and evaluation, it would seem a more judicious course -- consonant with the careful planning and high goals of the University's Development Plan for Mauna Kea -- to proceed with the comprehensive EIS and its integral data acquisition.

Here is a timely opportunity for the Institute for Astronomy to adopt an educational program on the biological wonders of the summit region so that all users will respect the ground surfaces as the habitats of small-sized animals unique to Mauna Kea.

The astronomy objective of the Mauna Kea Plan reads: "Recognize the world-wide significance of Mauna Kea's summit for astronomical research and set a limitation for facilities based on need and environmental concerns" (emphasis added).

The intent of the Plan to limit facilities on the mountain is demonstrated by the Plan's requirement that every application for a facility must be accompanied by a "comprehensive justification report" with the contents prescribed. The draft EIS fails to provide the required justification information. If the justification data are sent only to the Board of Land and Natural Resources, there is no opportunity for public review and comment. These data should be available to the public, at least in the final EIS.

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AUGUST PROGRAM:

PLOVER MIGRATION IN THE PACIFIC

The Monday, 16 August general meeting at McCully-Moiliili Library will feature a slide presentation by Dr. Oscar W. Johnson entitled, "Migration of the Golden Plover in the Pacific".

Dr. Johnson is currently a professor at Moorhead State University in Minnesota. He has done research projects on the Golden plover at Enewetak Atoll in the past, and is presently involved in studying the plovers at Bellows Air Force Station, Oahu.

The meeting begins at 7:30 p.m. Everyone is cordially invited to attend what promises to be an interesting and informative program.

SEPTEMBER 'ELEPAIO PASTE-UP

The September edition of the 'Elepaio will be pasted-up beginning at 8:30 a.m. on Saturday, 14 August, at the home of Marie Morin, 1415 Victoria St. #1515. Call Marie at 533-7530 beforehand. All members are welcome to participate; no experience necessary.

AUGUST FIELD TRIP:

MANANA ISLAND

The Sunday, 15 August field trip will be to the state seabird sanctuary Manana (Rabbit) Island. The trip was previously announced in the May issue.

The number of people allowed on the Island is limited. The trip is already full; however, during the May trip to Manana there were several no-shows and a few more people could have gone.

The cost for the boat ride is \$5, to be paid in advance. The boat will leave from the Makai Pier, just north of Sea Life Park at 7:30 a.m. and will return around 1 to 2 p.m. Be prepared for the possibility of getting completely wet. Wear tabs or tennis shoes to protect your feet, and protect camera gear or binoculars in double plastic bags or waterproof containers.

Call Audrey Newman (546-5608) if you are interested in being on the waiting list, or if you'd like more information.

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The Living Bird Quarterly is the Laboratory of Ornithology's brand new magazine for everyone interested in the study of birds. It replaces the Laboratory's former publication, *The Living Bird*, which will be produced occasionally as a supplement.

The quarterly will bring members feature articles about all aspects of bird life: habitat, physiology, behavior, conservation, anecdotes, and reviews. It will be illustrated with color and black-and-white photographs, and original drawings and paintings.

For more information, contact Jill Crane at the Laboratory of Ornithology, Cornell Univ., 159 Sapsucker Woods Road, Ithaca, N.Y. 14850.

NOTE TO CONTRIBUTORS TO THE 'ELEPAIO

All contributions concerning natural history and conservation are welcomed, especially those pertaining to the Pacific area. The Editorial Committee wishes to encourage especially material from the various Pacific Islands, such as the Trust Territories, Guam, Samoa, and other areas. Articles on all natural history subjects are solicited.

It would facilitate the processing and review of your contribution if it could be submitted typewritten and double-spaced, although this is not a requirement. All articles of a scientific nature are sent out for comments to at least two reviewers familiar with the subject.

To insure proper handling and rapid publication of your contribution, it should be mailed to the co-editors, and sent to Marie Morin, 1415 Victoria St., #1515, Honolulu, HI 96822.

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CALENDAR OF EVENTS

- Aug. 9 (Monday). Board meeting at the home of Wayne Gagné, 2310 Ferdinand Ave., Honolulu, at 7 p.m. (941-5659).
- Aug. 15 (Sunday). Field trip to Manana Island, for those with reservations (to get on waiting list, see notice on p. 14). Boat leaves Makai Pier at 7:30 a.m. and ride is \$5. Carefully read notice on p. 14.
- Aug. 16 (Monday). Regular meeting, featuring *Migration of the Golden Plover in the Pacific*. McCulley-Moiliili Library at 2211 S. King St., Honolulu, at 7:30 p.m.

TABLE OF CONTENTS

Vol. 43, No. 2, August 1982

Chestnut-bellied Sandgrouse in Hawaii	
Peter W.C. Paton, Phillip R. Ashman, and Holly McEldowney.....	9
Records of the Caspian Tern in the Hawaiian Islands	
Philip R. Ashman, Avery L. Taylor, and Sheila Doyle.....	11
Comments on Proposed 10-Meter Telescope for Mauna Kea	
Mae E. Mull.....	13

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