

ABSTRACT

This report combines data for procellariiform seabird colony searches conducted in 2005, sporadic surveys for procellariiformes between 2001 and 2005, as well as seabird radar surveys conducted in 2002 at Hawai'i Volcanoes National Park. The objectives of these surveys were to inventory procellariiform species diversity and identify seabird flight corridors and breeding seabird colony sites within park boundaries. Specifically, goals were to locate nesting colonies of Newell's Shearwater (*Puffinus auricularis newelli*) which is listed as threatened by the US Fish and Wildlife Service and Band-rumped Storm-Petrel (*Oceanodroma castro*), a candidate species for listing. Radar surveys were intended to provide information to assist in targeted foot searches for seabird colonies. Reports and results of radar surveys are summarized, but no new radar surveys were conducted in 2005. We performed nighttime and daytime auditory and visual surveys at a variety of locations and a range of elevations within Hawai'i Volcanoes National Park to document Newell's Shearwater and Band-rumped Storm-Petrel activity. Data from nighttime auditory surveys and incidental reports collected in previous years are also summarized. Seabirds recorded at high elevations included Hawaiian Petrels (*Pterodroma sandwichensis*), federally listed as endangered, and Band-rumped Storm. We identified one possible Band-rumped Storm-Petrel nest location, but only continued monitoring will confirm nesting. We did not detect any Newell's Shearwaters at mid-elevation sites. However, based on incidental reports of Newell's Shearwaters calling repeatedly near the trailhead of the Kalapana trail, the rain forest remaining in the East Rift Zone is likely to be the one location at which this species continues to nest at Hawai'i Volcanoes National Park. We also documented Newell's Shearwaters at a coastal location, but the birds were most likely prospecting for or transiting to nesting sites.

INTRODUCTION

Seabirds in Hawai`i have suffered drastic declines in numbers as a result of human influence, both historically and prehistorically. The entire avifauna of Hawai`i was much more varied and numerous before the arrival of humans to the Hawaiian Islands (Olson and James 1982a). Endemic avifauna of Hawai`i suffered significant prehistoric extinctions and depletions due to habitat modification and predation by Polynesians and the mammals they brought to Hawai`i (Olson and James 1982a; Athens et al. 1991). Several species of ground nesting seabirds were eaten by Hawaiians (Athens et al. 1991) but burrowing seabirds would have also been vulnerable to predation by the dogs (*Canis familiaris*), rats (*Rattus exulans*), and pigs (*Sus scrofa*), that arrived in Hawai`i with Polynesians (Olson and James 1982b). Though predation contributed to the decline of seabirds, destruction of nesting habitat through clearing of land for Hawaiian agriculture may have also been an important factor (Olson and James 1982b; Cuddihy and Stone 1990). On Hawai`i Island, once-significant breeding populations of Hawaiian Petrels (*Pterodroma sandwichensis*, HAPE) remained in only very small numbers by the end of the 20th century (Richardson 1954; Banko 1980b; Conant 1980). Abundant Newell's Shearwater (*Puffinus auricularis newelli*, NESH) breeding colonies once known historically from Hawai`i, Maui, Molokai and Kaua`i (Banko 1980) remained only on Kaua`i (Banko 1980) but small populations apparently persisted on other islands including Hawai`i (Ainley et al. 1997; Conant 1980; Reynolds and Ritchotte 1997). No nests of Band-rumped Storm-petrels (*Oceanodroma castro*, BSTP) have been found on Hawai`i Island, but breeding colonies are suspected in remote locations inaccessible to predators (Slotterback 2002; NPS unpublished data). Harvesting seabirds for human consumption is no longer a factor in their decline, but the downward population trend continues due to modern threats such as habitat destruction, habitat fragmentation, avian disease, climate change and predation by introduced mammals (Hodges, 1994; Hodges and Nagata, 2001; Hu et al., 2001) and by owls (Ainley 1997). In addition, attraction to bright lights may lure fledglings off course, causing them to be stunned and fall prey to predators, or to collide with buildings, wires, tall vegetation, and vehicles (Reed et al. 1985; Telfer et al. 1987; Simons and Hodges 1998).

Previous bird surveys have been conducted at HAVO (Banko and Banko 1979; Conant 1980a, 1981; Hu et al. 2001), but none have systematically surveyed procellariiform seabirds throughout the park. Repeated auditory and visual detections of BSTP, a candidate for listing under the Endangered Species Act, in subalpine areas of HAVO suggests that they do nest on Mauna Loa (HAVO Resources Management unpubl. data). Potential also exists that remnant colonies of the threatened NESH occur in mid-elevation rain forests (700-1000 m elevation) in the East Rift Zone of Kīlauea. Any colonies remaining are in dire need of protection and active management.

Hawaiian Petrels, listed as endangered by the US Fish and Wildlife Service (USFWS), are the most consistently monitored seabird species at HAVO. This species was thought extirpated from Hawai`i Island until rediscovered on Mauna Kea in 1954 (Richardson and Woodside 1954) and on Mauna Loa in 1980 (Conant 1980b). Seabird surveys at HAVO have focused on HAPE in subalpine areas between 1,825 m and 3,050 m elevation. Attempts by the HAVO Resources Management (RM) division to survey for and monitor HAPE nests began in 1992, continued through 1997, and were reinitiated in late 2000. Regular monitoring of HAPE and sporadic predator control continue at known colonies.

Band-rumped Storm-Petrels are considered the rarest breeding seabird in Hawai'i (Banko et al. 1991; Slotterback 2002). Though no colonies or nests have been found, there is ample evidence that they breed on Hawai'i Island. Banko et al. (1991) identified three BSTP carcasses collected from Hawai'i Island from 1949 and later documented BSTP calling on Mauna Loa. One of the carcasses was found along the Southwest Rift Zone of Mauna Loa, an area now inside the recently added Kahuku portion of HAVO. Further evidence of BSTP nesting on Mauna Loa includes two carcasses of this species found at 2,600 m in 1994, a carcass collected at 2,440 m in 2003, one BSTP caught in mist nets at 2,600 m in 2003, and one adult found dead under power lines on the Mauna Loa Observatory Road in 2003 (HAVO RM unpubl. data). In addition, BSTP vocalizations are heard regularly at high elevations on Mauna Loa. This evidence suggests that BSTP still breed on Mauna Loa, possibly in close proximity to HAPE. The intent of this inventory was to locate BSTP colonies in preparation for protective management.

Few records documenting NESH colonies within HAVO exist. Evidence from 1972 of a small breeding colony at Makaopuhi Crater included a carcass and bird calls in the area (Banko 1980). Banko (1980) also reported NESH in the vicinity of the park offshore of Kalapana in 1970 and 1975. More recently, Reynolds and Ritchotte (1997) found evidence of NESH nesting in forested pit craters in the Puna district adjacent to HAVO. These observations led us to believe that NESH may still nest in HAVO.

Wedge-tailed Shearwaters (*Puffinus pacificus*, WTSH) are common on most of the remote Northwestern Hawaiian Islands and still breed on some of the main Hawaiian Islands and associated offshore islets (Harrison 1990; Whittow 1997). This species is not known to regularly occur within Hawai'i Volcanoes National Park, but recent nest burrows found at Kaloko-Honokōhau National Historical Park indicate that WTSH still attempt to nest on some parts of Hawaii Island (D. Hu, NPS, pers. comm.)

This procellariiform seabird inventory at HAVO was carried out to provide preliminary data for these nocturnal seabirds. More specifically, the objectives of these surveys were to document diversity of procellariiform seabirds and identify seabird flight corridors as well as breeding seabird colony sites at HAVO. This report includes results of radar surveys conducted in 2002 as well as a short review of three published radar studies (1994-2002). Also included are results of targeted ground searches and auditory and nightvision surveys conducted in 2005, as well as sporadic surveys and incidental observations by HAVO crews for the years 2001 to 2005.