Preliminary Surveys for Ashy Storm-Petrels at Alcatraz Island, California, in August 2015

Harry R. Carter[1,3], Michael W. Parker[1] and Victoria Seher[2]

[1]California Institute of Environmental Studies
3408 Whaler Avenue, Davis, California 95616 USA

[2]National Park Service — Golden Gate National Recreation Area
Building 201, Fort Mason, San Francisco, California 94123 USA

[3]Contact Address: Carter Biological Consulting
1015 Hampshire Road, Victoria, British Columbia V8S 4S8 Canada

Alcatraz Island, showing the whitish SW cliffs on the left, associated with possible Ashy Storm-Petrel nesting habitats (Photo by M.W. Parker, 13 August 2015)

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Executive Summary

After the discovery of a probable dead adult Ashy Storm-Petrel (*Oceanodroma homochroa*) at Alcatraz Island, California, in 2014, preliminary surveys for breeding Ashy Storm-Petrels were conducted by the California Institute of Environmental Studies and the National Park Service in 2015. Two complete nights of mist-net captures (21:00-04:30 h PDT), with localized broadcasting of Ashy Storm-Petrel vocalizations to attract birds to the net site, were conducted at one location on the top of the SW cliffs near possible Ashy Storm-Petrel nesting habitat. On the nights of 11-12 and 13-14 August, during dark sky conditions near the new moon on 14 August and with low winds (<5-10 nautical miles per hour), no storm-petrels were captured, heard, or seen near the mist net. These results suggested that Ashy Storm-Petrels may not breed at Alcatraz Island. However, this low level of capture effort may have been insufficient to detect small numbers of breeding birds, especially if nests had failed earlier in the season, birds were not present every night in August, or small numbers of birds visited other parts of the island where broadcast vocalizations could not be heard. To finalize the status of the Ashy Storm-Petrel at Alcatraz Island, we recommend nest searches in possible Ashy Storm-Petrel nesting habitats (i.e., natural and artificial crevices) associated mainly with the SW cliffs and rubble piles in late August or early September 2016.

Introduction

The Ashy Storm-Petrel (*Oceanodroma homochroa*) is nearly endemic to California with only small numbers also breeding in northwestern Baja California, Mexico. Many concerns have been expressed about habitat degradation, declines, poor reproduction, and high mortality at certain colonies (Carter et al. 2008). The global population is less than 20,000 individuals, with >95% at 5 breeding concentrations (South Farallon Islands, San Miguel Island, Santa Barbara Island, NE Santa Cruz Island and NW Santa Cruz Island) (Ainley 1995; Carter et al., in press). These areas receive some protection from certain threats and some have been subject to restoration actions to benefit Ashy Storm-Petrel populations. Much less is known about the status of small colonies located throughout the range of the Ashy Storm-Petrel, due to insufficient surveys and monitoring.

The breeding distribution in the "Northern California" region (defined as Mendocino, Sonoma, Marin, and San Francisco counties; see Carter et al. 2015) is not well known, except at the South Farallon Islands. Ashy Storm-Petrels nest in small rock crevices and enter and depart from these crevices only at night, making small breeding colonies on nearshore rocks difficult to detect. Surveys of seabird colonies were conducted throughout this region in 1979-80 (Sowls et al. 1980) and 1989 (Carter et al. 1992) but many rocks and islands were not landed upon to search for storm-petrels breeding in rock crevices because of limited time and funding. By 1989, the only known colonies of Ashy Storm-Petrels in this region were at the South Farallon Islands (discovered in the late 19th century) and Bird Rock off Tomales Point (discovered in 1969 and 1972) (Ainley and Osborne 1973; Carter et al. 1992, 2008). In 2001, breeding was discovered at Stormy Stack (Whitworth et al. 2002). In 2012-2015, the status of the Bird Rock and Stormy

Stack colonies was further assessed (Carter et al. 2012, Henderson et al. 2014; B.H. Becker, unpubl. data). In 2012, breeding in Mendocino County was documented with additional surveys at many accessible rocks, after historical egg records from 1926 had been uncovered (Carter et al. 2008, 2015). Additional surveys in 1996-1997 in Monterey County also had resulted in the discovery of breeding Ashy Storm-Petrels on several small rocks within the Hurricane-Castle Rocks complex (McChesney et al. 2000).These findings strongly suggest that specific surveys for Ashy Storm-Petrels are needed on rocks and islands along the mainland coast of northern California to identify, monitor, and protect Ashy Storm-Petrel breeding colonies. Compared to larger colonies, smaller colonies often are more susceptible to extirpation from human-related impacts, although at times small colonies are less impacted by such impacts. Loss of any colony should be avoided because colonies may take decades or longer to re-establish, especially if a species remains at relatively low population levels.

In August 2014, a probable dead adult Ashy Storm-Petrel (Figure 1) was retrieved by M. Pierson from the old parade ground at Alcatraz Island, where large numbers of Western Gulls (*Larus occidentalis*) bred and roosted earlier in the year (V. Seher, unpubl. data). It was headless, had webbed feet, and appeared to have been swallowed and regurgitated by a gull. Unfortunately, the carcass was discarded before it could be examined more closely to confirm identification and best determine cause of death. Based on later examination of the photographs, H. Carter identified the bird as a probable Ashy Storm-Petrel. This carcass could have been brought to the island after a gull had killed or scavenged the storm-petrel elsewhere. However, the storm-petrel also could have been killed at Alcatraz Island, either when it visited the island without breeding or perhaps while it was breeding at the island, although breeding has not been detected previously at Alcatraz Island. Surveys for nocturnal crevice-nesting seabirds (i.e., storm-petrels or small alcids) were not conducted at Alcatraz Island during coast-wide seabird surveys in 1979-1980 or 1989 (Sowls et al. 1980; Carter et al. 1992). Little effort has been expended since 1989 to examine possible occurrence or nesting of storm-petrels and small alcids (e.g., Cassin's Auklet *Ptychoramphus aleuticus*) by NPS or other researchers. In 2001 or 2002, M. Hester (pers. comm.) listened for vocalizing nocturnal seabirds at night as she walked along the paths above the SW sliffs but did not hear any. Mist-net captures were not attempted (M. Hester and J. Thayer, pers. comm.). Nesting habitats for nocturnal crevice-nesting seabirds on Alcatraz Island have been heavily modified over time, as the island has been used as a U.S. Army fortification for the defense of San Francisco (1853-1907), a military prison (1907-1934), and a federal penitentiary (1934-1963). However, natural or artificial crevices may still exist on certain parts of the island that could be used for nesting by Ashy Storm-Petrels. Since 1972, Alcatraz Island has been managed by the National Park Service (NPS) and many historic structures have been preserved in place.

On 16 October 2014, H. Carter and V. Seher conducted a preliminary inspection of possible breeding habitats around the periphery of the island on foot. We concluded that storm-petrel breeding habitats may be present mainly along the tops of the SW cliffs where: (1) some portions of the cliffs did not appear to be altered and may contain some natural rock crevices; (2) rock walls above the SW cliffs showed signs of deterioration, with gaps that may provide artificial nesting habitat, as found at the South Farallon

Islands (Ainley et al. 1990; Carter et al. 2008); and (3) several large rubble piles (largely piles of cement slabs) exist from buildings demolished in the 1970s which may provide many potential nest sites, similar to natural boulder/scree piles where Ashy Storm-Petrels have been documented to breed. We also thought that some crevices may exist lower on the SW cliffs or in man-made habitats near the water that could be accessed only by boat. However, we could not closely inspect potential nesting habitats to confirm the suitability of this habitat for nesting storm-petrels, without special climbing expertise and NPS permission to access suspected areas.

In early 2015, NPS funded the California Institute of Environmental Studies (CIES) to conduct limited mist-net captures of Ashy Storm-Petrels at Alcatraz Island in 2015 to attempt to detect Ashy Storm-Petrels at Alcatraz Island. However, nest searches at the top of the cliffs (accessible by climbing over small rock walls) and in lower cliffs close to the ocean (accessible by drop off from a small boat) were not permitted by NPS in 2015.

Figure 1. Headless probable Ashy Storm-Petrel found at Alcatraz Island in August 2014 (Photo by M. Pierson).

Methods

Field Plan

To reduce field and travel costs, we conducted 2015 surveys only in August to maximize the possible numbers of storm-petrels in mist nets per night and minimize any disturbance to other nesting birds. Based on timing of breeding at the South Farallon Islands (Ainley et al. 1990) and Bird Rock (Carter et al. 1992, 2012, Henderson et al. 2014), all Ashy Storm-Petrel eggs have been laid by August and most birds are feeding chicks but no chicks have fledged yet, assuming average reproduction and attendance patterns in 2015. Both members of the pair return to the nest site to feed the chick every 1-3 days which increases the chance of at least one member of the pair being present in flight at the colony, compared to the incubation period when one adult is at the nest for 2-3 days at a time (Ainley 1995). Field work occurred during a one-week period timed near the new moon on 14 August. Within a week of a new moon, darker night conditions occur (although city lights also illuminate Alcatraz nightly) which can lead to greater colony visitation by storm-petrels when it may be easier to avoid avian predators. Two nights of mist-net captures were considered to be the minimum necessary for small colonies to reduce the possibility of selecting a single night when adults may not be returning to the colony.

Mist-Net Captures

A single nylon mist net (70 dernier, 2 ply, 30 mm mesh size, 2.6 m high x 9 m long) was used for capturing storm-petrels from 21:00 to 04:30 h (PDT) at Area A (Figure 2) on the top of the cliffs (altitude ~ 10-15 m) on the SW side of the island. This was the only part of the top of the cliffs that was accessible with minimal disturbance to other wildlife. In particular, Brandt's Cormorants (*Phalacrocorax penicillatus*) breed along the cliff tops to the east and below and NW of the net site which we were careful not to disturb. The net was set up perpendicular to the shoreline in the center of a 6-m wide old roadway (Figure 3). A 1-m high rock wall occurred on the seaward side of the net and a 2-m high rock wall on the landward side. Ideally, we would not want the lower part of the net blocked by these walls but no other more suitable location was available without increased disturbance to nesting and roosting gulls and cormorants. A portable CD player broadcasting Ashy Storm-Petrel vocalizations was placed on the ground at the center of the mist-net to attract storm-petrels to the net site (Carter et al. 1992). For all storm-petrels captured, we planned to band them (band size 1B), record brood patch score, take morphological body measurements (culmen, tarsus, wing length, tail length), measure body weight, and take photographs.

Figure 2. Google earth image of Alcatraz Island, showing locations for the mist net (Area A) and rubble piles (Area B).

Figure 3. Mist net set up in the center of an old 6 m-wide roadway at the top of the SW cliffs (Photo by M.W. Parker, 13 August 2015). Note 2 m-high retaining wall on the landward side of the net and a 1-m wide retaining wall on the seaward side of the net. In the background, the cormorant monitoring blind can be seen.

Results

11-12 August

The mist net was operated from 21:00 to 04:30 by HRC, MWP and M. Pierson but no storm-petrels were captured, heard or observed. Excellent weather conditions persisted throughout the night, with <5 kn wind from 21:32 to 04:30 (Table 1). The CD player performed well, although we changed the batteries at 02:19 to maintain a higher volume.

13-14 August

The mist net was operated from 21:00 to 04:30 by HRC, MWP and VS but no storm-petrels were captured, heard or seen. Excellent weather conditions persisted throughout the night, with 5-10 kn winds from 21:30 to 23:01 and <5 kn wind from 23:01 to 04:30 (Table 1). The CD player performed well all night.

Ambient Light

Despite dark sky conditions on both nights, ambient light levels were fairly high because of illumination from mainland light sources. The net was quite visible due to direct illumination from these sources and due to illumination of the whitish cement wall on the landward side of the net. If storm-petrels were present, we would have expected much net avoidance and a lack of captures in the bottom shelves of the net due to the closeness of the 1-2 m high walls but, since none were heard or seen, these factors did not affect our results. We could not determine if relatively high ambient light levels were a deterrent to Ashy Storm-Petrels for visiting Alcatraz Island.

Potential Predators

For the first 1-2 hours on 11-12 August, adult Western Gulls (*Larus occidentalis*) showed much interest in the mist net, hovering overhead and standing near the net, but then they settled down (Table 1). One adult gull was caught in the net at 22:57 and quickly removed. Only occasional interest was shown later in the night by adult gulls and chicks, as well as briefly by a fledgling Black-crowned Night-Heron (*Nycticorax nycticorax*) which left the net area when a light was shone upon it. On 13-14 August, adult Western Gulls again showed some interest in the mist net for the first 1-2 hours, hovering overhead and standing near the net, but then settled down (Table 1). Only occasional interest was shown later in the night by adult gulls. We considered that the presence of large numbers of breeding Western Gulls, known predators of Ashy Storm-Petrels at the South Farallon Islands, may be a deterrent to Ashy Storm-Petrels for visiting Alcatraz Island. Black-crowned Night-Herons also likely would be a predator, if Ashy Storm-Petrels visited the island. Black Rats (*Rattus rattus*) and Norway Rats (*R. norvegicus*) have not been introduced to Alcatraz Island and feral cats (*Felis catus*) do not currently occur on the island.

Table 1. Weather, net, and gull notes during mist-net captures at Alcatraz Island in August 2015.

Date	Net Notes	Weather Notes	Gull Notes
11-12 Aug	21:01 – net open, lights of SF and Golden Gate Bridge (GGB) very clear 21:32 – net billowing slightly 22:01 – net billowing slightly 22:09 – net is not wet from high fog 22:55 – net partly illuminated by ambient light 02:19 – changed batteries in the CD player to maintain sound volume 04:30 – net closed, CD player off, still dark, need to move to quarters	21:01 – clear sky (CS), no moon, wind W, 6-8 kn 21:32 – 4-5 kn 22:01 – 2-3 kn 22:16 – some fog seen over San Francisco (SF) and the Presidio 22:39 – 5 kn; more fog over SF 22:55 – 3-5 kn 23:00 – 2-3 kn 23:44 – partly cloudy (PC)(3/10), as fog enters the bay 23:50 – cloudy (C)(8/10), 1-2 kn 00:24 – 1-2 kn 00:44 – wind calm 01:33 – C (9/10), 1-2 kn 02:55 – C (8/10), calm 03:43 – C (9/10), 3-4 kn 04:10 – C (10/10), calm 04:26 – C (9/10), 2 kn, light fog over SF and GGB	21:26-21:30 – adult on high wall and 5 hovering 10-30 feet above net 21:39-22:01 – 1-3 adults hovering 10 feet over net 22:33 – little gull interest now 22:57 – adult caught in net and released 00:06 – adult hovering 5 feet over net 00:24 – several adults hovering 20-30 feet over net 01:33 – chased chick away from jumping off the high wall and landing beside the net 02:09 – adults and chicks quiet now. Before this, adults were arriving and departing in the dark 02:28 – chased BCNH fledgling from CD player area 02:40 – BCNH fledgling returned but left when flashlighted 03:30 – adult on short wall 04:26 – first adult arrived to feed chicks
13-14 Aug	21:00 – net open, net billowing, lights of SF, GGB and Sausalito very clear, fog over SF to GGB 22:12 – net billowing 22:47 – some billowing 23:49 – very little billowing 04:30 – net closed, CD player off	21:00 – CS, wind NW, 10-12 kn 21:28 – 8-10 kn 21:46 – a few bright lights above Fort Mason from ball fields are illuminating the net 22:12 – 8-10 kn 22:21 – 6-8 kn, bright lights over Fort Mason are less bright 22:47 – 6-8 kn 22:59 – 6-8 kn 23:01 – 4-5 kn 23:12 – C(8/10) 23:49 – PC(3/10), 2-3 kn, fog changing 23:51 – periodically calm, then small gusts to 3 kn 00:17 – PC(2/10), 1-2 kn 00:54 – CS but fog over SF, bright lights over Fort Mason are very low 01:22 – CS, 3-4 kn 02:07 – PC(4/10), 3-5 kn 02:17 – CS, 2-3 kn 02:40 – PC(3/10), 3-4 kn 02:52 – PC(2/10), 3-4 kn 03:06 – PC(4/10), 3-4 kn	21:40 – a few gulls hovering 30-40 feet over net, less than previous night 22:24 – 2 adults hovering 10 feet above net but they left when flashlighted 22:47 – adult hovering briefly over net 22:55 – adult on short wall but left when flashlighted 01:22 – 1 adult calling briefly overhead in response to CD player 02:52 – adults calling overhead but possible due to flashlight

Discussion

Detecting breeding by Ashy Storm-Petrels at nearshore colonies on rocks and islands in northern California is difficult, because: (1) nest searches without the use of climbing equipment are difficult or not possible at many small coastal rocks and islands where only one or a few nests may occur per island (Carter et al. 2015); and (2) mist-net captures may not detect presence when breeding occurs in small numbers because adults may not visit the nest each night during the breeding season, due to long incubation shifts (1-8 d, usually 2-3 days), gaps between chick feedings (1-3 days), or nest failures (Ainley 1995). However, if birds are present at a colony, they appear to be attracted to the net site from distances as far away as 50-100 m by broadcast vocalizations and either become tangled in the net or they at least vocalize in flight or fly silently over the mist net. Whether a bird is captured in the mist net or only detected near the net can depend on ambient light levels, weather conditions, capture avoidance, and individual behavior.

Our limited mist-net capture effort in August 2015 failed to capture or detect any storm-petrels near the mist net under favorable moon and wind conditions. We can confidently conclude that Ashy Storm-Petrels were unlikely to be present within 50-100 m of the net site (i.e., most of the SW cliffs) on both nights. While this information clarified that a large colony of Ashy Storm-Petrels was not present at Alcatraz Island, it did not prove absence of Ashy Storm-Petrels. When Ashy Storm-Petrels nest in small numbers, the lack of captures or detections in August also is consistent with: (1) birds present earlier in the breeding season but not in August (e.g., through nest failure); (2) birds present on other nights in August (e.g., non-daily nest visits); or (3) birds present on other parts of the island not examined with the mist net (e.g., birds at the rubble piles).

To finalize the breeding status of Ashy Storm-Petrels at Alcatraz Island, we recommend nest searches in possible nesting habitats in late August or early September 2016 (after other wildlife have completed breeding to prevent disturbance). Each potential nest crevice would be visually checked for nesting activity, using a bright flashlight, and assessed for storm-petrel odor which can often be smelled at well-visited nest sites. Chief possible nesting habitats to examine include: (1) natural crevices at the tops of portions of the SW cliffs that are accessible by climbing over rock walls; (2) natural crevices on the lower parts of the SW cliffs that are accessible by boat; (3) artificial crevices in rock walls above the SW cliffs (Figure 4); (4) artificial crevices in rubble piles (Figure 5); and (5) artificial crevices in all other man-made habitats along the shoreline of the island that are boat-accessible. Nest searches can result in evidence of storm-petrel breeding through finding active nests (with eggs, chicks, adults in incubation posture, and hatched eggshell fragments), failed nests (with broken eggshell fragments or dead chicks), and visited potential nest sites (empty sites with odor or crevices that are too deep to examine with a flashlight but odor is present). Work on the tops of the SW cliffs must be conducted carefully, with a harness and safety line attached to an anchor, after NPS approval of a safety plan. Work through drop offs with a small inflatable boat must be conducted by free climbing but only easily accessible natural and artificial crevices would be inspected. If a lack of nesting evidence was found after these nest searches, we would be able to confidently conclude that Ashy Storm-Petrels currently do not breed at Alcatraz Island.

Figure 4. Rock wall above the SW cliffs, showing gaps caused by deterioration which may provide artificial crevices for nesting Ashy Storm-Petrels (Photo by M.W. Parker, 13 August 2015).

Figure 5. Rubble piles located on the south side of Alcatraz Island, facing downtown San Francisco, which may have suitable nesting habitat for Ashy Storm-Petrels (Photo by M.W. Parker, 13 August 2015).

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