Abstract

Caribbean flamingos (*Phoenicopterus ruber*) were extirpated from the Virgin Islands in the 1960s. Reintroduction efforts, begun in the 1980s, have established two colonies in the British Virgin Islands: One on the historical breeding salt ponds of Anegada numbering approximately 200, and a second averaging 300 on the adapted natural salt ponds of Sir Richard Branson’s private Necker Island as of the conclusion of this six-year study in 2014. Six roaming flamingos, part of the original reintroduction, make private Guana Island their home base. The Necker colony is free flying yet remains largely in situ year-round due to protected habitat, abundance of water, and supplemental feeding, allowing them to breed successfully since 2010. The reintroduction provides valuable information for restoration and reintroduction efforts in other areas where flamingos have historically been found but have not been observed of late.

Resumen

El flamencos caribeño (*Phoenicopterus ruber*) fue extirpados de las Islas Vírgenes en la década de 1960. Los esfuerzos de reintroducción, iniciados en la década de 1980, han establecido dos colonias en las Islas Vírgenes Británicas: una en las salinas de reproducción histórica de Anegada con aproximadamente 200 individuos, y otra con un promedio de 300 individuos en las salinas naturales de la Isla Necker, la isla privada de Sir Richard Branson, al concluir este estudio de seis años en 2014. Seis flamencos itinerantes, parte de la reintroducción original, se encuentran en Isla Guana. La colonia de Necker es de vuelo libre, pero permanece en gran parte durante todo el año debido al hábitat protegido, la abundancia de agua y la alimentación complementaria, lo que les permite reproducirse exitosamente desde 2010. Esta reintroducción proporciona información valiosa para los esfuerzos de restauración y reintroducción en otras áreas donde los flamencos se han encontrado históricamente pero no se han observado más recientemente.

Résumé

sites fréquentés par les flamants dans le passé, mais où ils n'ont pas été observés récemment.

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Introduction

Anegada is a flat, 39 km$^2$ limestone accretion island with a population of approximately 300 people and a tourist economy. A series of intermittent salt ponds dot the eastern end of the island. Seven, mostly interconnected and somewhat inaccessible salt ponds in excess of 460 hectares constitute one of the largest wetlands in the Lesser Antilles. (Scott and Carbonell, 1986; Jarecki, 2004). The Western Salt Ponds were declared a Ramsar protected wetland May 11, 1999. A coordinated effort in the 1980s led by Dr. James Lazell, president of The Conservation Agency, brought eight Caribbean flamingos reared at the Bermuda Aquarium, Museum and Zoo (BAMZ) to Dr. Henry Jarecki’s private Guana Island to test the viability of a larger reintroduction. The test proved successful and in 1992, The Conservation Agency in collaboration with Dr. Numi Mitchell, James Conyers of BAMZ, Rondell Smith of Anegada, and the Guana Wildlife Sanctuary released 22 flamingos on Anegada and eight on Guana Island. The British Virgin Islands National Parks Trust (NPT) is charged with monitoring the growing colony on Anegada.

On Necker Island, Sir Richard Branson’s engineers expanded the two seasonal salt ponds on his 30 hectare home/resort island to a combined ~1 hectare size by 2014, plumbing them to the ocean with a levelling system of 8 cm PVC intake/outflow pipe in order drain excess water in hurricanes and heavy rains and add water in the dry season, thus maintaining valuable shoreline for flamingo propagation. Freshwater holds built into each pond supply clean drinking and bathing water for the birds. Both ponds are at most 0.8 metres deep with half-horsepower aerators in their centres to pull water up and return a fountain flow of 1.5 pounds of oxygen per hour around the clock (Robertson, 2011) to assist beneficial bacteria in processing waste.

Flamingos and their habitats on Necker Island

Sir Richard’s first two pairs of flamingos from the Camagüey, Cuba reserve arrived on Necker in January 2006 via private jet under the supervision of an ocean consultant and flamingo expert. Forty more flamingos arrived from Cuba in March 2007. The third and last shipment of 120 arrived in June 2009. The 120 flamingos were microchipped and lightly pinioned, allowing them limited flight. An effort was made to balance the sex ratio at 45% male and 55% female, all between two and three years of age (Bernier, 2011). Necker Island flamingos have two pond shape choices; elliptical, mangrove encased “Long Pond” in the centre of the island, and the nearly round “Bali Hi Pond”, with a sandy spit of northern shoreline and a mud lined inland southern shore (Figure 1). Long Pond was surveyed in 2011 to be 162 metres long and 53 metres wide, with a narrow neck at its western end. Bali Hi Pond runs 67 metres east/west and 56 metres north/south (Downing, 2011)- see Figure 2. Both ponds have since been slightly expanded; Long Pond’s eastern sandy shore was dredged to create new areas of interest for waterbirds, and Bali Hi Pond had water added to achieve an optimal year-round level reaching just above mid-tibiotarsus at pond centre.
Following the deaths of two flamingos from broken legs in August 2010, Sir Richard, his engineer and crew plucked forty to fifty backhoe buckets, at two tons of rock each, from the Bali Hi Pond surrounds where the flamingos mate and rear their chicks (Robertson, 2011) to provide flamingos with gentle pond bottoms and shorelines. The 10 metre height of the native black mangrove (*Avicennia germinans*) and sharp hillside rise to the north, restricts flight from Long Pond to the fairway for take-off. Round Bali Hi Pond is...
open to the sea on the north. Remaining shores rise steeply and/or are covered with tall brush, cacti and palm trees. Flamingos may circle Bali Hi Pond in a spiral attempt at flight, but they cannot rise above its perimeters to leave the pond except to the north.

Bali Hi Pond, the flamingos’ preferred nesting site, provides a clear view in all directions for protection, displays and socializing, with suitable mud and grass to build nests on protected shores. The bowl accommodates 300 flamingos comfortably. Dense scrub behind the nesting area enhances security. In the first two months of pre-mating displays the colony faces inland in wing salute. Perhaps they use the bowl’s sound effects as echolocation to scan for danger, or to amplify their calls to ward off potential threats. The flamingos mate once they ascertain it is safe to do so and at that point, wing salutes either face the centre of the pond, or the nesting flamingos. Bali Hi Pond has one large, black mangrove tree dividing its southern shore in a 40/60, east/west split. This mangrove is an important physical feature for the colony and was wisely left intact when considering expanding available nesting area. It is a neighbourhood divider, social meeting place and source of fun for young birds to chase each other around. When in bloom, flamingos will eat the small sessile clusters of white flowers. Mangrove roots shelter crustaceans, fiddler and land crabs, and house white-cheeked pintails (Anas bahamensis). Dangling dark green seedpods entice flamingos to grab at the fruit for play. Tall grasses planted around the nesting shore secure the earth in heavy rains and provide nest-building material. Flamingos strip and eat the grass seeds.

There are no significant predators on Necker Island. Laughing gulls (Larus atricilla) return annually for a summer breeding season and are suspected of absconding with weak flamingo chicks. Magnificent frigatebirds (Fregata magnificens) have hunted chicks on the pond, but barriers of tall, puffed out flamingos and sheltering trees thwarted their efforts. Human intrusion is the greatest threat, as it is on Anegada. Visitors to Necker are not allowed access to the nesting area. With reintroduction to outlying islands, people and their pets are potentially the greatest harassment risk to nesting flamingos.

Necker Island provides daily supplemental feedings of Extruded Flamingo Maintenance Diet tossed directly into Bali Hi Pond (Figure 3). In 2011 a nugget specially formulated to sink was used May into October during the annual migration of laughing gulls that are potential chick predators and a nuisance at feeding time. Since 2012, supplemental feeding during gull season switched to after dark when gulls return to their nests on the far side of the island.

Figure 3: Supplemental feeding of the flamingos on Necker Island.
Attempts to introduce brine shrimp have been largely unsuccessful. In March 2011 brine shrimp cysts hatched near a water pipe after a rain but did not survive to the larval stage. Necker’s black mangrove thrives where salinity levels are highest, and brine shrimp cysts require fresh water to hatch. With the scarcity of brine shrimp in Virgin Island salt ponds, flamingos seek the abundant larvae of tiny salt pan fiddler crabs (*Uca burgeri*), occasionally snacking on an adult near their nests (Figure 4). Necker’s ponds were rimmed with these shore-cleaning, mangrove-aerating crustaceans. Flamingos grasp twigs and grasses beneath the water with their feet and run them through their bills to collect larvae.

Figure 4: Salt pan fiddler crabs.

Thick algal mats develop throughout both ponds. The mats are dispersed by flamingo foot traffic, and then eaten. Or they up-end into where a pond is deepest, bottoms up. Pintails collect the orts dredged up from the benthic layer by flamingos. An arcing swath of rich black mud supplying vitamins, minerals and bacterial flora forms where the aeration fountain outflow ends on Bali Hi Pond (Figure 5). Male flamingos will march along the shore in pre-mating displays, females and immature flamingos feed in the mud for vitally important calcium derived from tiny decaying snail shells.

Figure 5: “Black mud crescent” in Bali Hi Pond.

In the first 19 years of reintroduction, the Anegada flamingo population grew from 22 to 187, with the NPT representative believing the ponds may have reached their self-sustained carrying capacity (Smith, 2011). Necker Island’s introduced colony of 164 contributed 206 flamingos in its first eight years. The Guana Island birds are not known to have bred on Guana, but a male and female did find younger mates on Necker, with whom they produced healthy offspring (an example of which is shown in Figure 6).
Conclusions

Human occupation limits Caribbean flamingo nesting in former habitats. Installing flamingos on ponds they would not self-populate requires a diligent, continuous commitment to water quality testing and control. A mechanical system is needed to maintain water levels in seasonally-affected locations, and during drought conditions and torrential rains. Supplemental feeding will be needed to accommodate expanding populations anchored to limited resources. These support systems are expensive and impractical where electricity is an issue and private funds are not available.

Flamingos are long-lived and should not be pinioned in reintroduction; they will likely need to leave their location in a weather event (such the catastrophic hurricanes of 2017) or due to threats, or to relieve the pressure of eventual overpopulation. The Necker test ponds have demonstrated the limitations of flamingo flight from properly, topographically landscaped breeding ponds. Narrow, mangrove-encased Long Pond allows flight only down its length. If the north shore of Bali Hi Pond were bermed and planted with vegetation 10 metres high or more, flamingos would find it difficult to lift out of deep water and gain enough speed to leave the pond. Should the flamingos need to leave their pond, trees or barriers could be removed.

A deep bowl-shaped habitat could eliminate pinioning and allow flamingos the space to congregate and breed in a manner most natural to them. The Necker and Anegada flamingos travel to neighbouring islands in both the US and British Virgin islands to the delight of the people living there (Figure 7). Then they leave and return, perhaps due to human over-exuberance at their sightings. The quality of the enhanced physical attributes and protection on Necker Island allows the hidden strength of the Necker colony, its ability to organise as a community, to flourish.
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References


