Cabo Vírgenes Mystery Spill: Challenges and Lessons Learned

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Introduction

Cabo Vírgenes is located in the northern tip of the Strait of Magellan, in southern Argentinean Patagonia (52°22'S – 68°24'W). It is the second largest continental breeding colony of Magellanic penguins (Spheniscus magellanicus), with approximately 90,000 breeding pairs (Schiavini et al., 2005). There are growing concerns related to the conservation of this species, as in 2004 the International Union for Conservation of Nature and Natural Resources' (IUCN) status of Magellanic penguins was changed from Lower Risk in 2000, to Near Threatened in 2004. The main threats to these birds are chronic oil pollution, over-fishing, and incidental captures in fishing nets (BirdLife International, 2004).

In early May 2006, several hundred oiled Magellanic penguins began washing ashore in the Cabo Vírgenes Provincial Reserve, in southern Argentina. Staff from Consejo Agrario Provincial de Santa Cruz (CAP) in charge of overseeing and monitoring tourism and other activities related to Protected Areas in the Santa Cruz Province, started capturing and stabilizing the birds in the field, utilizing improvised facilities. At the same time, on the southern part of the Strait of Magellan, in Chile, another 76 oiled birds had washed ashore at the colony in Isla Magdalena and were transferred for

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Figure 1 – Map of the southern portion of South America. Downloaded and adapted from http://www.guiageo-americas.com/mapas.htm

rehabilitation to Punta Arenas (Ricardo Matus pers. comm.). To assess geographical locations please see Figure 1.

Four International Fund for Animal Welfare (IFAW) Team members from Brazil and Argentina arrived in Rio Gallegos through an invitation from CAP to work along with local authorities and assist in the rescue and rehabilitation of the effected animals. Animals affected by chronic oil pollution in Argentina have been reported since the early seventies (Jehl, 1975), and in this case, as in most of them, the source of the oil remains unknown (Garcia-Borboroglu et al., 2006).

Case Report

Simultaneously while capturing and stabilizing birds in the field, CAP's staff, Fundación Patagonia Natural, IFAW and other collaborating institutions started adapting the local sailing club facility (Centro Marítimo Austral - CeMA), in Rio Gallegos, to be able to transfer the animals. Rio Gallegos is the capital of the Santa Cruz Province, located 139 km from the Cabo Vírgenes colony. CeMA's facilities were chosen to be adapted to treat oiled wildlife due to the following characteristics: availability of a warehouse and three smaller rooms to hold the birds while oiled; a second warehouse could be turned into washroom and drying room; a heated room available for meals and daily morning meetings for staff and volunteers. Also a pre-existing pool to teach kayaking could be used to pump water into pools set to waterproofing the birds after they were cleaned (see Figures 2, 3, 4 and 5).

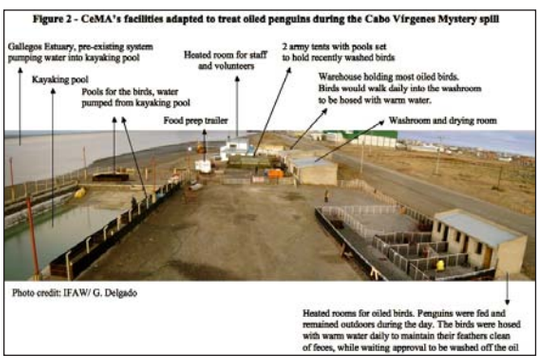

Figure 2 – A view from the makeshift facilities in Rio Gallegos, at the local sailing club Centro Marítimo Austral. Photo credit: IFAW/ G. Delgado

Figure 3 – The warehouse adapted to hold the oiled birds transferred from Cabo Vírgenes. Photo credit: IFAW/ V. Ruoppolo

The water system developed for bird washing included a total of 5,000 liters of clean water, which was contained in two Fastanks® (Fast Engineering Ltd., Antrim, Northern Ireland), outside the washroom. The water was pumped from the Fastank into the water heaters through the use of pressure pumps of 1 Hp. Four water heaters were installed to provide two washing and two rinsing stations, but as the water was kept outside, it reached very low temperatures and an adaptation had to made. The water had to be put through two heaters to get to a warm enough temperature for washing birds. This fact reduced the washing and rinsing stations to only one of each. Inside the washroom, 200L containers were used to store hot water for filling the tubs while washing birds. The wastewater was kept in 200L barrels and pumped out of the washroom, whenever necessary, to be stored in containers outside. The municipality removed the contaminated waste-water for appropriate disposal, when the response was over. The clean water containers were filled daily by a water-truck, sent in by the municipality.

Figures 4 and 5 – Warehouse adapted into a washroom. Before and after. Photo credits: IFAW/ R. Pinho da Silva and IFAW/ V. Ruoppolo

On May 18, the first 182 oiled penguins were transferred from Cabo Vírgenes to the makeshift facilities at CeMA, in Rio Gallegos, using an enclosed truck. Two were juvenile Rockhopper penguins (Eudyptes chrysocome chrysocome), and 180 Magellanics, all adults. CAP's field team remained on site, capturing more birds, as the weather and tides allowed. In the following days another 42 birds were brought to CeMA, totaling 224 birds for treatment. The first two days with the birds in Rio Gallegos were dedicated to performing individual examinations and creating intake records for all birds in care.

Intake procedures were based on International Bird Rescue Research Center (IBRRC) protocols and included:

- Registering capture information on the Live Intake Log;
- individual identification with temporary colored bands;
- physical examination, including body weight, temperature and condition; checking for wounds, burns and injuries; lung auscultation and degree of oiling;
- blood sampling to evaluate packed cell volume (PCV), buffy coat (BC) and total protein (TP);
- oral administration of re-hydrating solution - NaCl 0,9%.

This opportunity was used to train CAP's personnel and volunteers to handle and evaluate the birds individually. The birds were separated into groups, keeping weaker animals under heat lamps and increased nutritional needs were addressed to help them gain weight faster. Fish formula, with added vitamins and Ensure® (Abbott Laboratories) was tube fed to weaker animals two to three times daily. Veterinary attention was available at all times and specific cases were treated accordingly. All oiled birds were re-hydrated once a day and given a fish with vitamins supplementation, before feeding them non-supplemented fish. The birds were taught to eat using "penguin feeding boxes" (Callahan, 2001) since the beginning of the response, aiming to minimize handling after they were clean and regaining waterproofing. All birds were fed fish twice daily.

Obtaining high quality fish was incredibly challenging in Rio Gallegos due to the fact that it was not fishing season, and fish had to be brought from different localities. Different kinds of fish were used and these included silverside - *Odonthestes bonariensis,* Patagonian blennie - *Eleginops maclovinus,* menhaden - Brevoortia aurea cut into smaller edible pieces and Spanish sardine - *Sardina pilchardus*.

Birds were considered approved for washing when presenting all of the following: normal body temperature (39-41˚C), PCV >30%, BC <2%, TP ≥3g/dl, fair body condition, no wounds and normal behavior. Most birds were washed between May 20th and June 16th. IBRRC protocols were again followed for washing, rinsing and drying. The animals were cleaned in a 1-2% solution of Magistral® (Procter & Gamble) dishwashing detergent in warm water (39-43ºC), until no traces of oil could be found. In most cases it took between 20 and 30 minutes to wash each bird. Birds were then meticulously rinsed with warm water at high pressure through a special nozzle (Oxygenics® Skincare Series, Modesto, CA, USA), until all the detergent could be removed. The rinsing process took another 20 to 30 minutes. Once rinsed, the birds were tubed with 120 mL of re-hydrating solution and placed in the drying room where infrared lamps were set up for the purpose. The penguins remained in the drying room until the next day. On the day after washing, they were fed and moved to the tents, where they had access to pools.

The IFAW team worked for six weeks in Rio Gallegos, but due to very cold weather and low water temperatures, the birds had difficulty regaining their natural waterproofing. With outside temperatures ranging from -4 to -14ºC, birds were spending little time in the outdoor pools, drastically hindering the waterproofing process. Additional indoor pools were constructed and heat sources were brought in to encourage the birds to swim and preen more. Unfortunately, the birds were not able to get completely dry with the limited heat in the buildings and the ambient temperature. This forced

Figure 6 – Unloading the birds off the C-130, in Mar del Plata. Photo credit: IFAW/ V. Ruoppolo

Figure 7 – Part of Fundación Mundo Marino's facilities for rehabilitation of marine fauna. Photo credit: IFAW/ V. Ruoppolo

the team to decide to move the birds somewhere with better facilities and weather conditions.

In an unprecedented response, on July 11th the government of Santa Cruz Province and the Argentine Air Force (Fuerza Aérea Argentina) relocated 195 penguins to warmer weather to San Clemente del Tuyú, where Fundación Mundo Marino's (FMM) permanent rehabilitation facilities are located (36º20'S - 56º44'W). The birds were relocated using large plastic totes that each held approximately 20 birds, and the totes were then placed in a C-130 aircraft for flying for three and a half hours into Mar del Plata (Figure 6), and then into an enclosed (well ventilated) truck for another two hours. Three days before transportation and five days after the arrival, a prophylactic treatment with Itraconazole (50 mg/bird, once a day) was given to all birds in care, aiming to prevent Aspergillosis due to the stress imposed by transport (Penguin TAG, 2003). Once in San Clemente (Figure 7), teams from IFAW, FMM and CAP helped the birds finish their recovery. The birds reacted quickly to the warmer weather, preening and swimming non-stop. The combination of warmer weather, better facilities, unlimited clean water for the pools and better fish for feeding the animals was successful.

Figure 8 – Magellanic penguins released in Punta Rasa, San Clemente del Tuyú, on July 31st 2006. Photo credit: IFAW/ V. Ruoppolo

The first birds were released on July 31st with a great deal of

media coverage (Figure 8). A succession of smaller releases followed with the final results of 65.1% (146/224) release rate.

Penguins were approved for release according to the following criteria (IBRRC SOP) determined during the pre-release evaluation: PCV ≥ 38 %; BC < 2%; TP ≥ 3.0 g/dl; normal behavior and feeding well: good body condition; absence of wounds or any obvious infectious diseases; lungs clear; feathers 100% waterproof after swimming for one hour in a pool with no haul out.

Apart from adequate facilities, warmer weather and fish availability, San Clemente del Tuyú was decided to be an appropriate release site due to being within the geographic distribution for the species. The decision to move the birds north was made in accordance with local authorities and with the support from different Argentinean researchers working with Magellanic penguins.

Discussion

The successful rehabilitation of oiled birds is difficult in any circumstance and it was apparent, once again, that there must be a certain level of infrastructure at the rehabilitation location to be able to support an oiled wildlife response. In this case, low water temperatures, hard water, combined with cold weather meant the birds were hesitant to spend any time in the water, struggling to regain their waterproofing because they weren't swimming voluntarily. While the team was able to overcome many of the obstacles of being in a remote location, ultimately, the fact that there wasn't adequate heated space for the pools meant that the birds were not able to get waterproof.

It is also of note that since these animals were properly stabilized, they could successfully be transported some 2,500 km via plane with little impact on their health.

Due to the IFAW Penguin Network (Ruoppolo et al., 2005) and IFAW's extensive work with penguins in South America, our own stainless steel bands were purchased and a website for band returns was developed in Spanish, Portuguese and English (IFAW, 2006). Our goal is to mark penguin species rehabilitated during oiled wildlife responses, always following species limitations for banding (Petersen et al., 2005) and working under local banding permits. Having our banding program gives us the ability to develop our own post-release monitoring program, not depending on third parties to obtain band returns and stimulating the IFAW Penguin Network member institutions to band their rehabilitated animals for release.

All of the birds released during the Cabo Vírgenes spill response were banded with IFAW's stainless steel bands. Another 54 birds rehabilitated and released simultaneously in Punta Arenas, Chile, were banded with these flipper bands. Currently, Fundación Mundo Marino, in northern Argentina, is also using these bands on their rehabilitated birds released.

Some of the strengths and challenges of this response are discussed below.

Strengths:

1) CAP's positive attitude and determination to rehabilitate these birds made this response a success;

2) IFAW was previously known by name through the Environmental Crisis Action Plan (FMM & FPN, 2005), which allowed CAP's invitation and IFAW's personnel filling managing positions on the charts;

Figure 9 – IFAW band returns from two of the Cabo Vírgenes spill birds, as of June 1st 2007. Downloaded and adapted from http://www.guiageo-americas.com/mapas.htm

3) CAP's political positioning to obtain the Air Force's support to airlift the birds to the Buenos Aires Province;

4) Volunteers from the Rio Gallegos community were available to assist with the rehabilitation process;

5) Better facilities were available at Fundación Mundo Marino and the birds could be transferred there;

6) IFAW's support to the ER Team on the ground for an extended period of time, which allowed for oversight throughout the entire process of rehabilitation;

7) Penguins are very sensitive to Aspergillosis (Penguin TAG, 2003). The prophylactic treatment given to all birds in care before and after transportation has prevented the disease from occurring, as no cases were diagnosed during the necropsies of all deceased animals during the rehabilitation process;

8) Two band returns were reported (Figure 9):

- IF-0085 was captured oiled around 2 May 2006, in Cabo Vírgenes. It was released in San Clemente del Tuyú (Playa Norte), 2,500 km north from the capture location, on 10 August 2006. It was spotted alive on two different occasions, at Isla Magdalena in Chile, even further south from the Cabo Vírgenes colony, on 16 January and 29 February 2007. The bird was in very good body condition in both occasions and in pre-molt on February 29th. Figure 10 shows the bird on 16 January. These returns were reported by Corporación Nacional Forestal (CONAF), the Chilean authority in charge of the penguin colony at Isla Magdalena, and Mr. Ricardo Matus, an ornithologist based in Punta Arenas. This report indicates that other birds could have returned to southern Argentina and Chile. Working close with authorities and researchers monitoring the colonies will promote more band returns of live birds during the breeding and migrating seasons;

Figure 10 – Re-sighting of IF-0085 on Isla Magdalena, Chile, on 16 January 2007. Photo credit: CONAF/ R. Fernandez

- IF-0022 was released on July 31st 2006, in San Clemente del Tuyú. This bird was found dead in Necochea on 26th August, among a group of 54 dead Magellanic penguins, all freshly dead and in good body condition. These animals were most probably caught in a fishing net, as they were reported washing ashore all together and in good body condition. This information was reported through a phone call, and the collector mentioned another two IFAW banded birds, but the numbers weren't recorded. The collector, Mr. Rodrigo Sierra, hasn't gone back to the site and the information was lost. Apart from the sad news that the animal was found dead, this band return has shown important background information, including that the bird was alive for almost a month after it was released, that it was able to find a larger group of birds for foraging and migrating, and that it died of other causes.

Challenges:

1) Inclement cold weather created insurmountable problems for both the birds and the staff and necessitated the moving of the birds north;
2) Less daylight due to the time of year meant that the staff had limited daylight hours to care for birds;
3) The team was dependent on third parties to obtain water to fill out the pools and containers (Fastanks) resulting in the loss of precious time, meaning oiled birds waited longer for cleaning;
4) Even when hoses were left running to fill the tanks overnight to provide enough water to wash birds the next day, the water stored outdoors froze overnight, which caused the team to lose time as well;
5) Water heaters had to be installed in-line, to be able to heat the water to the necessary temperature to wash the birds;
6) It was difficult to obtain good quality fish of appropriate type due to the time of year and the remoteness of the region;
7) Pools and other equipment had to be purchased in Buenos Aires and flown to Rio Gallegos, which meant waiting several days for appropriate equipment.

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