Penguin Taxon Advisory Group

Penguin Conservation

The Penguin TAG Newsletter

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In This Issue

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ASSOCIATION OF ZOOS & AQUARIUMS

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From the Editors

This issue features information about the *Punta San Juan Project* research center. Susana Cárdenas-Alayza and Marco Cardeña-Mormontoy describe the history of marine wildlife conservation, research, education and outreach efforts which have been ongoing at Punta San Juan for over 25 years. Since 2001, the *PSJP* has completed an annual Humboldt penguin census, and works closely with the Peruvian government to ensure that guano is sustainably harvested. This highly successful project is helping to protect one of the world's most productive marine ecosystems and largest Humboldt penguin colonies.

Vicky Croisant and Ann Knutson share their individual experiences at the *PSJP* reserve, where they assisted with the penguin census and guano-harvest monitoring. Their efforts are representative of the ongoing support and resources that AZA institutions provide for this project.

Dr. Paul Ponganis provides information on new advances achieved in emperor penguin research. Among the highlights are the use and refinement of satellite imagery techniques which have provided more accurate population estimates; the use of data-loggers in conjunction with film observations to better understand the energy-saving behavior of huddling; and the use of accelerometer-based data-loggers to further expand our knowledge of diving behavior and physiology.

Becky Elias traveled to New Zealand in November 2011 to assist with the rehabilitation of blue penguins affected by the *Rena* oil spill. She describes her experience there as a first-time responder. Despite the huge environmental impact and initial loss of hundreds of seabirds, the wildlife rescue effort was highly successful.

Steve Sarro and Jen Kottyan provide valuable information on utilizing kennel crates for Spheniscus penguin nesting. This simple alternative has proven to have many advantages over the traditional wooden nest box, and can easily be incorporated into existing and new penguin facilities.

Linda visited the *June Keyes Penguin Habitat* at the *Aquarium of the Pacific* in Long Beach, California, which opened in 2012. This exhibit features Magellanic penguins, including a few that were rescued after stranding in Brazil. This naturalistic habitat provides visitors with up-close penguin viewing opportunities, and includes interpretives with a strong emphasis on penguin natural history and conservation.

The Penguin TAG steering committee convened at the AZA mid-year meeting held in March of 2012. A synopsis of topics discussed is included, along with a list of current TAG steering committee members and an update on all AZA penguin programs.

One of our usual features, Recommended References, is not included in this issue, but look for it in the next issue. Instead, we provide a list of grants which may be applicable to penguin conservation, research and education efforts. We also include suggestions to aid with planning your Penguin Awareness Day and World Penguin Day events. Both provide great opportunities to engage guests and provide information about penguin conservation efforts.

We would like to thank everyone who contributed to this issue: Susana Cárdenas-Alayza and Marco Antonio Cardeña-Mormontoy (both from the Punta San Juan Project), Dr. Paul Ponganis (Scripps Institution of Oceanography), Becky Elias (Oiled Wildlife Care Network), Steve Sarro (Smithsonian's National Zoo), Jen Kottyan (Maryland Zoo), Vicky Croisant (Akron Zoo) and Ann Knutson (San Diego Zoo). Thanks also to Dudley Wigdahl and Karen Anderson (Long Beach Aquarium) for a hosting a behind-the-scenes tour of their new penguin habitat.

Penguin TAG Mission: To provide leadership for the management of penguins *ex situ* in order to maintain healthy, sustainable populations for the purpose of:

- Engendering appreciation for these charismatic species that are indicators of the health of marine and coastal environments.
- Promoting conservation concern and conservation action through education programs and internet resources.
- Furthering *in situ* conservation and research in support of *ex situ* management.

Penguin TAG Website: www.zoopenguins.org

The Aquarium of the Pacific Welcomes New Magellanic Penguins

Linda Henry, *Editor, PCN*

Among the new penguin exhibits to open in 2012 was the **June Keyes Penguin Habitat** at the **Aquarium of the Pacific** in Long Beach, California. The habitat is the new home for thirteen Magellanic penguins (*Spheniscus magellanicus*); the majority of which were received from other Association of Zoos and Aquariums (AZA) member organizations. A few of the birds in the colony were received from Brazil where they had been rescued, after stranding, but were considered unsuitable for return to their native habitat. The penguins made their debut in May.

View from inside the penguin habitat at June Keyes Penguin Habitat. *Photo by Linda Henry.*

Underwater viewing, June Keyes Penguin Habitat. *Photo by Linda Henry.*

The exhibit, which is situated outdoors with a partial canopy, has a desert-like appearance with a rocky shoreline and a steep cliff face along the back perimeter. At the base of this cliff are nesting holes constructed into the rockwork that lead to nesting burrows (sky kennels). The pool is about five feet deep and holds approximately 15,000 gallons of filtered sea water.

Acrylic panels line the visitor side of the exhibit allowing guests to interact with the penguins in an up-close, but non-contact, experience with great photo opportunities. Penguins can be viewed from both above and below the water, including from a small crawl space that gives a full underwater perspective.

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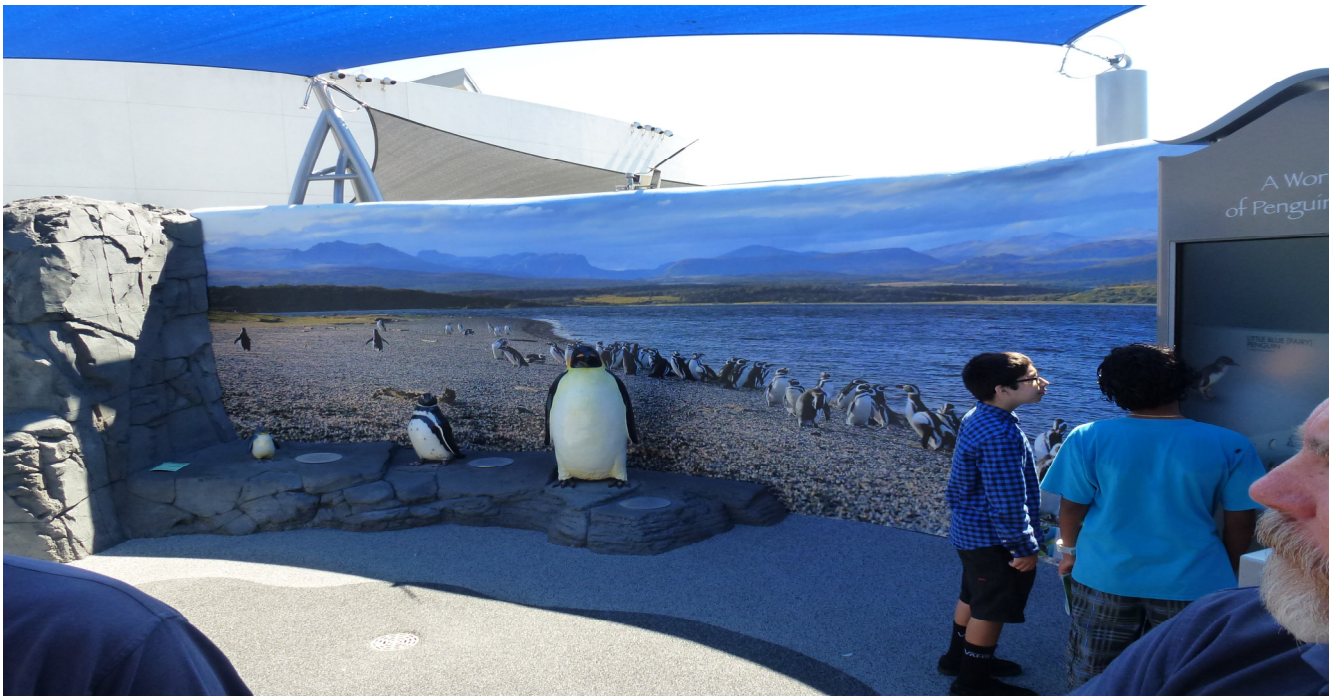
Educational and conservation messaging are strong elements in the area surrounding the exhibit viewing space. Learning elements include interactive touch screens highlighting all species of penguins and their natural histories, QR code links, life-size penguin statues and traditional interpretive signage. A portion of the



Touch screens to the right; photo op to the left. *Photo by Linda Henry.*

Nesting space. *Photo by Linda Henry.*

exhibits energy needs is supplied from solar panels adjacent to the exhibit. In the Great Hall, a multi-media immersive show further educates visitors about penguins. Other special events include behind-the-scenes opportunities and a Guest Speaker Series that hosts scientists such as Dr. Ginger Rebstock, who spoke at the Aquarium last July. Even after a full day at the Aquarium, visitors can revisit their penguin experience online via two webcams that are focused on the exhibit above and below the water.

Congratulations to the Aquarium of the Pacific on their new penguin exhibit. The PCN would like to thank Dudley Wigdahl, Curator of Birds and Mammals, and Karen Anderson, Aviculturist, who hosted my visit to the Aquarium in July. Be sure to make a virtual visit to see the penguins by going to the Aquarium of the Pacific website for webcam images at http://www.aquariumofpacific.org/exhibits/penguin_habitat/penguin_cam_above .

Recent Advances in Emperor Penguin Research

Paul J. Ponganis, *Research Physiologist, Center for Marine Biotechnology and Biomedicine, Scripps Institution of Oceanography, University of California San Diego, La Jolla, CA*

Our knowledge of the biology of emperor penguins (*Aptenodytes forsteri*) has increased significantly over the past 6 years. Some highlights include advances in a) satellite imagery of the distribution and size of colonies around the Antarctic continent, b) the physiology and dynamics of huddling, and c) investigation of the diving physiology and behavior of these birds.

SATELLITE IMAGERY AND POPULATION CENSUSES

The utility of satellite imagery in assessment of emperor penguin colonies was first reported in 2007 (Barber-Meyer et al., 2007). And, in 2009, satellite documentation of guano stains on sea ice led to the identification of 10 previously unknown emperor penguin colonies (Fretwell and Trathan, 2009). Further refinement and calibration of satellite imagery with ground counts of penguins conducted at emperor penguin colonies primarily in the Ross Sea (Barber-Meyer et al., 2008) led to the first estimate of the total world population of emperor penguins in 2012 (Fretwell et al., 2012). That estimate was 595,000 birds, including about 238,000

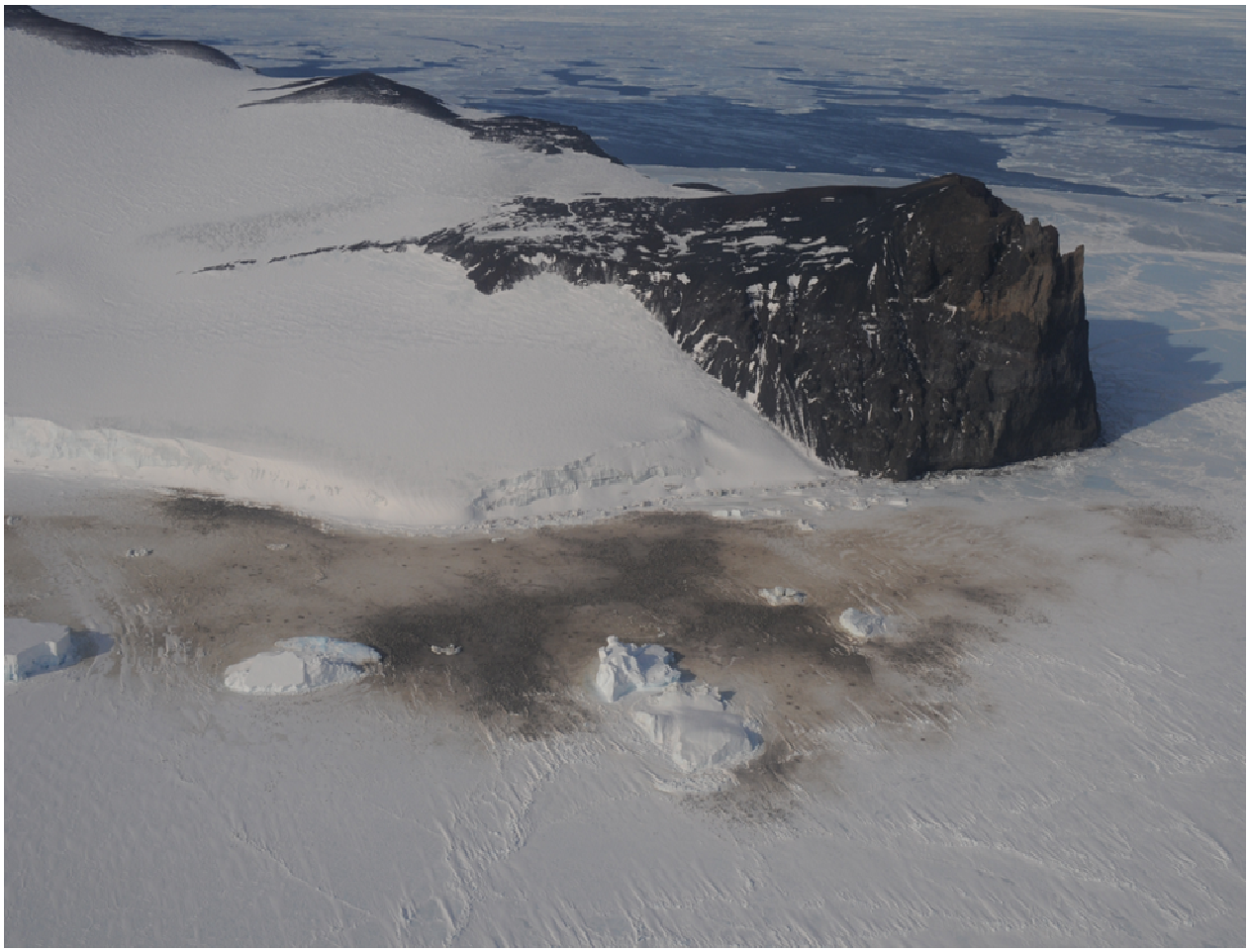


Fig. 1. Aerial overview of emperor penguin colony at Cape Washington, Antarctica in November, 2010. This is the second largest emperor penguin colony in the world, annually producing about 15,000 to 20,000 chicks. The guano stain on the sea ice allows detection of emperor penguin colonies by satellite imagery. Aerial censusing of this colony requires about 20 zoomed views to provide counts to ground truth satellite imagery.

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breeding pairs, which was much larger than prior estimates of 135,000 to 175,000 pairs. This larger estimate is primarily due to the satellite detection of the previously unknown colonies. The use of such satellite imagery techniques promises to be a valuable tool to monitor emperor penguin population trends during an era of ever-increasing climate change, pollution, and over-fishing. Already, one of the northernmost emperor penguin colonies has disappeared secondary to higher temperatures and loss of sea ice (Trathan et al., 2011). Predictions for some other colonies are ominous (Barbraud et al., 2011).

HUDDLES

Huddling by emperor penguins has long been known to be an energy-saving behavior that allows them to endure the prolonged fasting associated with courtship and egg incubation. By attaching temperature data loggers to the backs of marked males during the winter, researchers at France's duMont d'Urville station found that the males did not huddle continuously, and that only 36% of their time was spent in a huddle (Gilbert et al., 2006). The average huddle time was 1.6 hours, and a given bird typically engaged in six to eight huddles per day. Remarkably, at an average ambient temperature of -17^{o} C outside the colony, the temperatures recorded by the data loggers on the backs of the penguins were often above 0^{o} C during huddles. In tight huddles, temperatures were above 20^{o} C for 13 % of the huddling time, and could even reach 37.5^{o}C, close to the bird's core body temperature. Overall, there was a 51% reduction in metabolic rate of a bird free to huddle versus that of an isolated bird (Gilbert et al., 2008). About two-thirds of this reduction was due to reduction of cold-exposed surfaces, and the remainder to the mild microclimate within the huddle. A decrease of one degree C in body temperature also contributed to the lower energy requirements.

It has also long been wondered how a penguin moves from the periphery to the center of a huddle, and, indeed, how any bird moves within the huddle without disrupting it or causing a log jam. Recent film observations have revealed that, every 30 to 60 seconds, emperor penguins in a huddle take small steps that move in a coordinated manner as a wave throughout the entire huddle (Zitterbart et al., 2011). The penguins in a given huddle all face in the same direction; as result, the huddle moves forward with each wave. New penguins join the huddle at the trailing edge, and it is thought that the time a bird is in the center of the huddle is determined by the duration of the huddle, and the rate at which birds exit the huddle at the leading edge, and the rate at which new birds join the huddle at the trailing edge.

DIVING BEHAVIOR AND PHYSIOLOGY

During foraging trips to sea, emperor penguins routinely perform dives as deep as 500 meters and as long as 10 minutes. (Sato et al., 2011). Surface intervals after such dives are often quite short, usually less than a few minutes, consistent with predominant aerobic (oxygen-based) metabolism during such dives. On occasion, however, dives can be much longer, and the recovery after such dives can be quite protracted. Indeed, after a 27.6-minute dive, now the longest reported dive of an emperor penguin, an accelerometer-based data logger documented that it took six minutes before the bird stood up from the prone position in which it landed, another 20 minutes before it began to walk, and 8.4 hours before it dived again (Sato et al., 2011). During the first six minutes while the animal lay on its abdomen, the animal was so still that the accelerometers recorded chest wall movements associated with breathing, documenting an initial respiratory rate of 22 breaths per minute that declined to 16 breaths per minute over the six minute interval.

This prolonged surface period after the 27.6-minute dive was undoubtedly secondary to recovery from anaerobic metabolism and the lactate that was generated during the dive. Based on muscle metabolic rates determined from past measurements of myoglobin desaturation during dives (Williams et al., 2011), it has been estimated that muscle glycogen would be depleted about 30% at the end of that 27.6 min dive and that the muscle lactate concentration would be equivalent to that of a thoroughbred horse at full gallop (Williams et al., 2012). Thus, although not used routinely, emperor penguins do have remarkable anaerobic capacity which is quite valuable for a crisis situation.

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Another fascinating aspect of emperor penguin diving behavior are their occasional bursts of high-speed swimming to either escape an approaching predator or make a high jump exit onto the sea ice. From analysis of underwater video, maximal swim speeds are near 5 meters per second, and are always associated with a bubble trail exiting from the feather layer and trailing behind the animal (Davenport et al., 2011). These authors hypothesize that the air bubbles decrease the density and viscosity of the water layer around the penguin, thus reducing drag and allowing attainment of higher swim speeds. Engineers use a similar technique to speed movement of ships and other objects through water.

Fig. 2. Diving emperor penguins near exit hole at Cape Washington, Antarctica. Bubbles released from feathers as in bird at lower right have been proposed to decrease drag to allow higher speeds for exits (Davenport et al., 2011).

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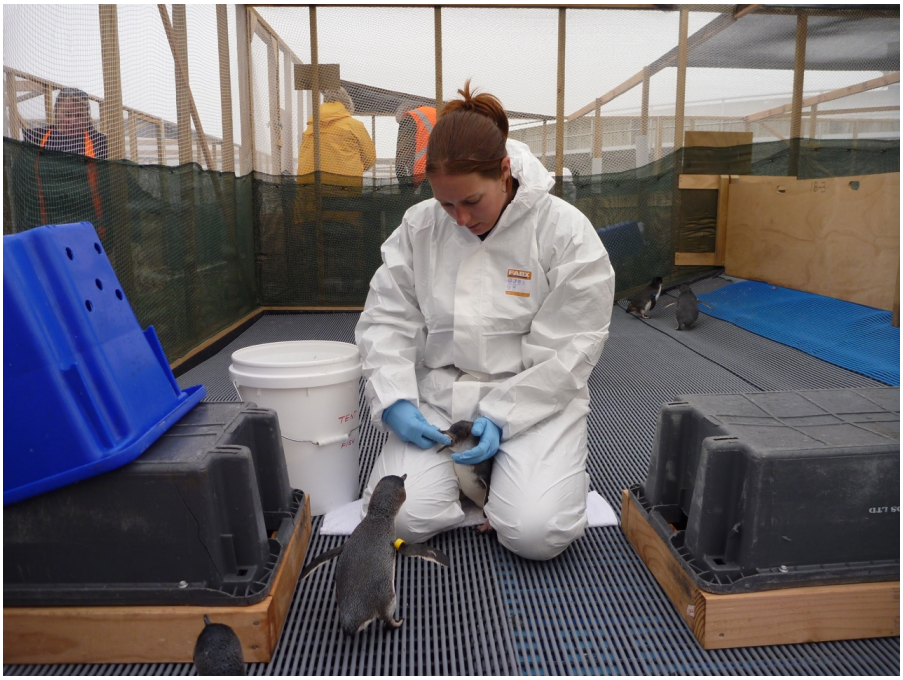
California's Oiled Wildlife Care Network (OWCN) Helps with Oil Spill Recovery in New Zealand

Becky Elias, *Volunteer Coordinator, OWCN, California*

I began my position as the Volunteer Coordinator for Oiled Wildlife Care Network (OWCN) in September of 2010. We are California's spill response group for oiled wildlife, with nine employees and a very dedicated group of over 1,500 pre-trained volunteers across the state. When starting with the OWCN, I spent a good deal of time meeting representatives from our 31 member organizations, and learning about the complex world of spill response. After having worked for a, thankfully, quiet year, I thought I had a good idea what my first spill response would be like. I knew in reality it would probably be different from what I pictured, but I was fairly confident that there would be two consistent factors. First, it would be in California; second, I would be surrounded and supported by my fabulous co-workers. I was a little off in my prediction.

On October 5th of 2011 the container vessel named *Rena*, struck the Astrolabe reef, approximately 14 miles off shore of the northeastern coast of New Zealand's north island, wedging it's bow onto the reef and causing major damage to the hull. The ship was carrying approximately 1700 metric tonnes (11,000 barrels) of heavy fuel oil and 200 metric tonnes (1,500 barrels) of marine diesel. Its cargo consisted of over 1300 containers, some of which were carrying hazardous materials. Additionally there were 25 crew members aboard the ship, all of which were safely evacuated several days later. In the first week after the Rena struck the reef, approximately 350 tonnes of oil was released into the waters outside of the Bay of Plenty. New Zealand's National Oiled Wildlife Response Team (NOWRT), coordinated by specialists from Massey University, was called into action and began set-up for what would become a major wildlife response. Part of NOWRT's response plan for oiled wildlife included reaching out for assistance from the various spill response groups around the world. Within days, Mike Ziccardi, Director of the OWCN, and several staff members from International Bird Rescue (an OWCN member organization), were en route to assist with the spill response.



Becky Elias feeding blue penguins at NOWRT facility. *Photo courtesy of Becky Elias.*

I received a call from Mike Ziccardi on a Tuesday afternoon in early November, asking if I could help out with personnel management and animal care, and by late Thursday I was on a plane to New Zealand, to help respond. My biggest discomfort was the thought of jumping into my first spill response alone, without the rest of the OWCN team, in a place I had never been to before. Essentially, I saw it as diving into chaos without a safety net. Of course my fears were completely unnecessary, and I found it rather easy to slip into working my first spill. This was made easier by the fact that the kiwi people are fantastically friendly and welcoming, and familiar and smiling International Bird Rescue faces greeted me on my first day. Also, the wildlife center was well set-up and organized. In fact, by the third or fourth day I couldn't remember why I had been nervous in the first place.

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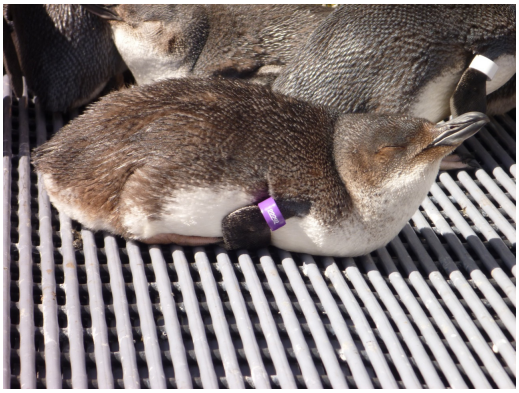
I learned a number of things at the spill, beyond the basic set-up and flow, and getting practice coordinating and managing people. Perhaps the most interesting to me, was simply seeing the response group function as a small community. It was fascinating to walk into the myriad of tents (aptly named Dwyerville for Bill Dwyer, the facilities manager) and realize that it was actually a small town. There were mess tents for eating and breaks, tents where supplies could be requested and picked up, tents that housed small kitchens, and of course bird tents for everything from intake to clean birds. Additionally, the people functioned like a community. Everyone was set to their tasks, but always happy to lend a hand, popping up seemingly out of nowhere when they were needed for off-hand tasks, such as carrying crates to be water-blasted, herding animals, or helping to siphon the pools. They say it takes a village to raise a child, but in this case it took a tent city to clean and release a little blue penguin.



Blue penguins at NOWRT facility. *Photo by Becky Elias.*

By the time my three weeks had come to an end, I was more than a little sad to go. I had obviously grown attached to the charismatic little penguins, but I had surprisingly grown even more attached to the other responders and the small community that had been set up, especially the Massey University folks, who had organized such a great response. However, leaving New Zealand, I had a profound sense of confidence in our own response network back home. While I can't say I'm eager for the next California spill, I can say that I'm assured that our network will also achieve the same kind of balance between hard work and support of each other that I saw in New Zealand.

Blue penguins released after *Rena* oil spill. *Photo by Becky Elias.*

In all, over 2,400 birds were collected dead, almost 1,500 of which were oiled. However, there was a silver lining to that cloud. Over 300 little blue penguins and 4 shags successfully navigated their journey from being oiled to cleaning and through the rest of their time in captivity to be released back to the wild over the course of several months. The last release occurred in February of 2012, after the few remaining penguins in captivity finished their molt, bringing the total to 95% of birds successfully treated and released back to the wild. This was an extraordinary success in the face of such a large environmental disaster.

Utilizing Travel Kennels for Penguin Nesting

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The Spheniscid penguins (African/*Spheniscus demersus*, Humboldt/*Spheniscus humboldti*, Magellanic/*Spheniscus magellanicus*, and Galapagos/*Spheniscus mendiculus*) utilize a variety of nesting strategies but are generally regarded as burrow nesters, digging cavities into the deep beds of guano in the wild. This presents some challenges for captive husbandry as burrowing into cement flooring is not often possible in an exhibit structure. An option that has worked well for indoor breeding areas are plastic pet travel crates. These crates, Vari-Kennel Brand, Large, 36" x 25" x 27", or Sky-Kennel Brand #300, 32" x 22.5" x 24 ", have been successfully used by many facilities for decades, including the Maryland Zoo in Baltimore (MZIB).

The Vari-Kennels have many advantages over wooden boxes, used historically. These advantages include the ability to thoroughly clean and disinfect the plastic containers, the ease and speed of exchanging clean kennels for soiled ones, and the ability to break them apart and "nest" them when not being used, saving storage space. The mesh door of the kennel is not needed, removed and stored for use later. The kennels have a lowered floor that allows substrate to be contained easily for the penguins inhabiting the kennel. This lowered floor with the raised doorway may not be high enough to contain wandering penguin chicks. After a few weeks of age, penguin chicks may wander out of the kennel, thereby placing them at risk from colony aggression. At MZIB, to reduce this risk, a custom-cut wooden insert was installed on each door back in the late-1980's. The inserts were roughly 4" in height and cut to fit into the door space. The wooden inserts were sanded smooth and then coated with a protective varnish. They were fastened securely through the plastic door jam with 1 ½" woodscrews. The inserts provided exceptional containment for chicks yet proved no deterrent for an adult penguin entering the kennel. Adult penguins easily hopped up and over this insert. As technology advanced and new products became available, MZIB modified the kennels. The wooden inserts were replaced with a composite board decking material (similar to "Trex®") and this has contributed to better disinfection when cleaned.

Vari-Kennel available from Doskocil Manufacturing Company, Inc., 4209 Barnett Street, Arlington, Texas 76017.

African Penguins at the MZIB. Note the composite insert.

In off-exhibit breeding rooms, these kennels function well especially as there is no need for a natural look. Many of the new penguin exhibits being built have nesting sites incorporated into the structure. The appearance is quite natural and the penguins take to the site readily. The challenge is cleaning these built-in nesting sites. If possible during the design phase of a new penguin exhibit, creating natural-appearing spaces that can hold a kennel would be something to consider. These kennels are an invaluable husbandry option and a worthwhile addition to your penguin husbandry program.

(Travel kennels are used for Magellanic penguin nesting in the June Keyes Penguin Habitat at the Aquarium of the Pacific—refer to photo on pg. 3).

The Punta San Juan Project–Protecting One of the World's Largest Colonies of Humboldt Penguins

Susana Cárdenas-Alayza and Marco Antonio Cardeña-Mormontoy, *Punta San Juan Project, Centre for Environmental Sustainability, Universidad Peruana Cayetano Heredia*

The Punta San Juan Project (PSJP) is the field based research center of the Punta San Juan (PSJ) guano reserve. PSJ is a 54-hectare peninsula located on the southern coast of Peru in the city of Marcona, in the province of Ica (Figure 1). For more than 25 years the PSJP has been dedicated to researching local wild populations of marine organisms at PSJ to better understand how they interact with the natural and human dimensions of their environment from a field-based perspective. At PSJ there are dense aggregations of the most charismatic marine megafauna of the Humboldt Current Ecosystem. PSJ supports Peru´s largest colony of Humboldt penguins, and important colonies of South American fur seals and South American sea lions. It is among the top ten breeding sites for Peru´s *guano birds*, which are the aggregation of three species of marine birds, Guanay cormorants, Peruvian pelicans and Peruvian boobies which can be found nesting together on headlands, islands and islets of the coast of Peru producing large quantities of guano. There is also permanent presence of other bird species like Inca terns, band-tailed gulls, snowy egrets, black oystercatchers, kelp gulls, amongst others. Sighting of other marine mammal species such as marine otters, humpback whales, common dolphins, dusky dolphins and bottlenose dolphins are also common at this site (Figure 2).

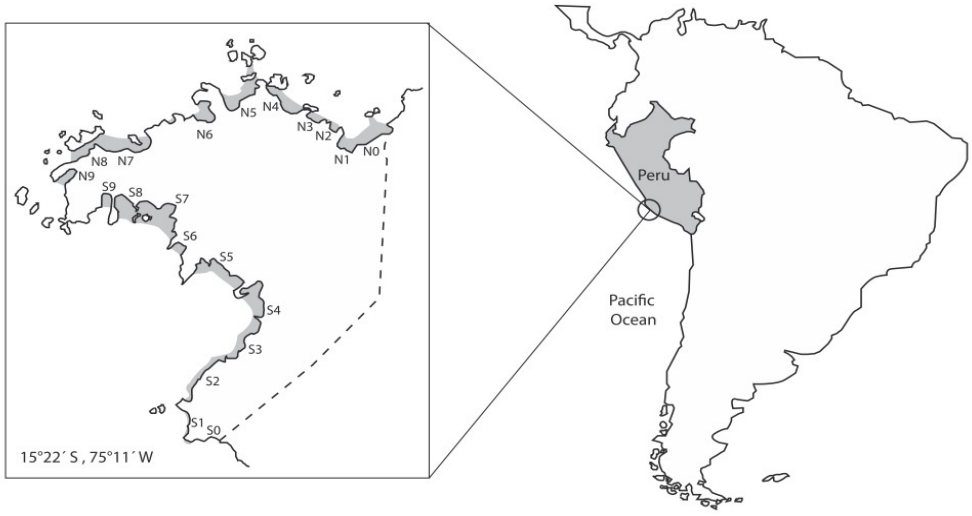

Figure 1. Map of South America and Peru (grey) signaling location of the Punta San Juan guano reserve denoting the location of the 20 beach sites within the reserve.

High biodiversity, but even more so, high abundance of marine predator aggregations are present at PSJ due to the high food availability very close to its coasts. This is due to its privileged geographic location and the effects of the nutrient-rich Humboldt Current System (HCS). The HCS is one of four major eastern boundary upwelling currents that generate the most productive marine ecosystems in the world (Chavez & Messié 2009). The Humboldt Current flows from south to north along the coasts of Peru and Chile, driven topographically by coastal upwelling proximate to the Pacific trench. PSJ is the point on the coast closest to the trench within the HCS thus providing high volumes of nutrient rich waters close to shore. This, together with a series of coupled oceanic-atmospheric features, has led PSJ to be recognized as the most productive marine-coastal place in the world (Bakun & Weeks 2008). This natural productivity, joint with more than 100 years of

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Guano is the accumulation of bird feces, which can be used as a natural fertilizer in agriculture practices. Peruvian seabird guano is a well-known fertilizer for its natural high levels of nitrogen and phosphate.

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protection given by the Peruvian government to headlands, islands and islets where guano birds congregate, allows the coexistence of large colonies of marine predators at protected sites like PSJ.

Figure 2. Some of the resident marine mammal and bird species frequently observed at Punta San Juan reserve (a) South American fur seals, (b) South American sea lions, (c) marine otters, (d) Humboldt penguins, (e) Guanay cormorants, (f) Peruvian boobies, (g) Inca terns and (h) Peruvian pelicans.

Since 1909, the Peruvian Guano Administration Company -and all the companies that proceeded it to look after guano as a natural resource- have protected guano bird breeding sites along the coast of Peru to boost their reproductive success. This protection has turned these sites into alternative refugees for other marine predators like South American fur seals, sea lions and Humboldt penguins (Majluf 1991). In case of headlands like PSJ, concrete walls were built to isolate them from access to predators (*e.g.*. foxes, humans, stray dogs) coupled with the permanent presence of a guard to provide full time onsite protection from land to a surrounding marine area of about 4 km^2. Then, in the late 1970s, Dr. Patricia Majluf -founder of the project- came to PSJ to conduct on site research of the wild populations of South American fur seals. It did not take long for Dr. Majluf´s research to turn into a long-term, multispecies initiative that looked after, researched and raised awareness on many of the wild populations thriving at this site.

At PSJ, protection from the government boosted by the local efforts of the PSJP, brought along new sources of funding, contact with international researchers, and has allowed training of Peruvian scientists generating key sources of information that have helped prove how important it is to establish a network of marine protected areas on the coast of Peru. In December of 2009, a network of 33 marine protected headlands, islands and islets has been established in Peru which is now under the care of SERNANP (*Servicio Nacional de Areas Naturales Protegidas* – National Service for Protected Areas, DS. Nº. 024-2009-MINAM). Since then, the PSJP has developed stable agreements to work together with SERNANP and Agrorural (current governmental agency that looks after guano) to provide protection of local wild populations as well as research and training to Peruvians to work in marine wildlife conservation, research, education and outreach.

Punta San Juan penguins and El Niño events

The current distribution of the Humboldt penguin extends from Foca Island (5°12S) in Peru to Punihuil Island (42°73S) in Chile (Hays 1984a; Araya and Todd 1987). The cold and productive waters of the Humboldt Current sustain penguins in this sub-tropical and unpredictable environment (Barber and Chavez 1983). Approximately every 2 – 7 years, the Humboldt Current Upwelling Ecosystem is affected by El Niño events, with increased sea surface temperatures and reduced primary productivity directly influencing the depth distribution and abundance of anchoveta, Humboldt penguins preferred prey item (Luna-Jorquera and Culik 2000). Due to this, during El Niño Southern Oscillations, the massive flood of warm waters into the Eastern Pacific

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Ocean caused a drastic reduction of productivity and extensive mortality of penguins and other marine wildlife (Hays 1984b, 1986; Trillmich and Ono 1991; Paredes and Zavalaga 1998). The populations of Humboldt penguins present at PSJ have been recognized as a significant portion relative to the rest of their distribution within Peru, and account for more than 50% of the Peruvian population for these species. However in 1997/98, after the drastic effects of the most intense El Niño event ever recorded, populations of marine predator species in Peru diminished between 60-80% (Paredes and Zavalaga 1998). This mortality also affected PSJ, leaving extremely diminished breeding colonies in 1998 (Paredes *et al.* 2003).

Humboldt Penguins at Punta San Juan

On the southern coast of Peru, Humboldt penguins can be found year-round at breeding sites, with PSJ being one of the most important historical breeding sites. Fortunately, local ocean productivity during the last 10 years has helped the Humboldt penguin colony at PSJ to rapidly recover from the drastic effects of the 1997/98 El Niño event, and to do so in other sites along the coast of Peru. Such is the case that it has been recognized as the largest colony of Humboldt penguins in Peru, and as one of the largest in their entire range. Close monitoring of the Humboldt penguin colony has allowed researchers of the PSJP to follow these trends at a population and an individual level.

Since 2001, the PSJP has been dedicated to year-round monitoring of the colony of Humboldt penguins at PSJ. As part of the efforts to extend breeding areas at PSJ, cement artificial nests made were placed on the outskirts of different breeding colonies (Paredes and Zavalaga 2001) and have shown to be successful by 2008 at many of the breeding sites (Figure 3). As part of the routine work of the PSJP, on site biologists check between 60-80 nests at one of the main penguin breeding beaches and monitor over 100 nests through direct observations at another beach. Weekly nest checks allow biologists to monitor the number of breeding pairs, number of eggs laid, number of chicks produced, and chick growth during the first and second breeding periods that occur between mid-March and late December (Figure 4). During the molting season, staff count how many penguins are molting and what stage of molting they are in. During nest checks, other important information is also collected pertaining to breeding behavior and predation. Staff also estimates Humboldt penguin abundance at the entire reserve year round. The PSJP is always wary of possible threats that could hamper Humboldt penguin conservation, such as predation by foxes, rats, etc. (Figure 5). These occurrences are also noted during next checks to take pertinent measures of mitigation to prevent mortality. Fortunately, due to the constant effort of on site biologists, the guards that take care of the guano birds and the presence of a well-kept concrete wall, Punta San Juan is very well isolated from the entry of predators.

Figure 3. Successful artificial nests for Humboldt penguins at Punta San Juan.

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Punta San Juan Project 2012

This year has been a busy year for penguins at the PSJP. Our year started with collaboration in Peru´s national Humboldt penguin census in January. Every year, two of members of the PSJP collaborate in this initiative by conducting abundance surveys at all penguin colonies located between Punta San Juan and Punta Coles covering the southern coast of Peru. Marco Cardeña, field coordinator of the PSJP, has participated in census at PSJ since 2001 under supervision of Dr. Patty McGill and Dr. Ann Tieber as a key member in these annual censuses since then. Simultaneously, other organizations count penguin abundance in north and central regions to have a complete snapshot of penguin abundance for Peru. In the month of May, data collection to measure the effects of nest characteristics and conservation efforts on the breeding success of Humboldt penguins, took place with the visit of Alonso Bussalleu. Alonso is working on his master's thesis measuring Humboldt penguin habitat quality in their main breeding habitats as key piece of information to prioritize conservation efforts in target areas. During the months of June and July we had the visit of Jim Clare, an award-winning wildlife cameraman, who filmed Humboldt penguins for two months during the breeding season for a documentary on penguins. By the end of July until mid October, the PSJP got the field station prepared to receive more than fifty volunteers (in teams of 8-12 people) as wildlife observers during the 2012 Punta San Juan Guano Harvest. During this time, curators, zookeepers, wildlife enthusiasts, biologists, veterinarians and undergraduate students from seven countries participated, collecting data and monitoring the work of guano harvesters to make sure that Humboldt penguin breeding areas were not hampered but this activity (Figure 6).

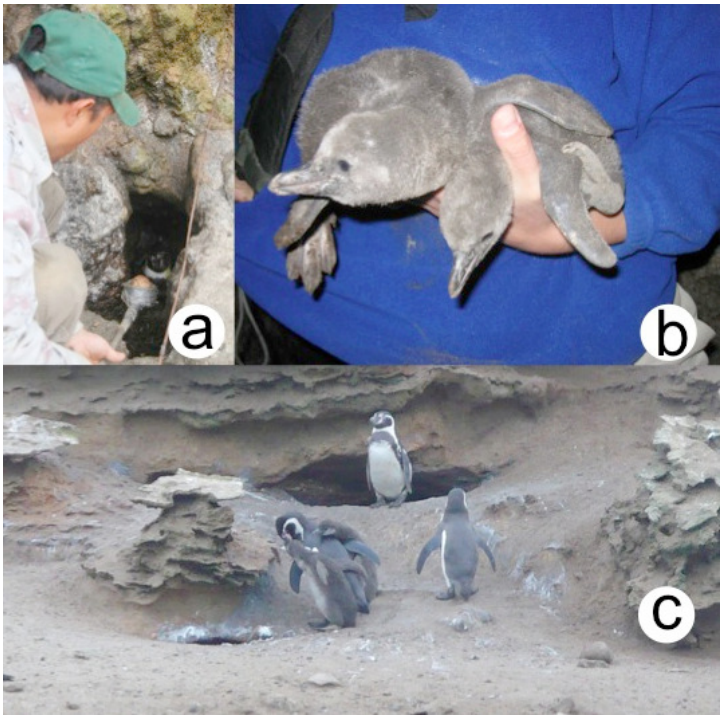

Figure 4. Nest checks are conducted routinely to monitor reproduction of approximately 120-160 Humboldt penguins breeding pairs and the growth and development of their chicks. Photographs show (a) handling of eggs, (b) chicks and (c) observations of parental care from an observation blind.

Towards Sustainable Guano Harvests at Punta San Juan

Since 2001, at Punta San Juan there has been an ongoing effort to help the PSJP work towards sustainable guano harvests to prevent the impact of guano extraction on the colony of Humboldt penguins. Since guano is one of the main substrates used by Humboldt penguins in Peru to dig their burrows, in the past, unregulated guano extractions hampered penguin breeding sites, and therefore population numbers. Periods of at least 4 years of no disturbance are crucial to allow for guano build up and bird recovery. Finally, the time of year when the harvest take place, intangible areas and minimum set distances of workers from penguin colonies are other measures of mitigation to prevent impacts on penguin populations (Figure 7). This involves close coordination of PSJP staff with the Peruvian government entities in charge of guano extraction and protected areas, as well as a team of onsite volunteers during the harvest for surveillance of daily harvest activities, measures of rapid response and data collection during the harvest.

Sustainable guano harvests are key for Humboldt penguin survival, and thus are key for Punta San Juan and to the PSJP. The PSJP is very grateful to all the organizations that have helped us make guano harvests with

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the presence of volunteers possible at Punta San Juan. This was only possible with the joint efforts between the Humboldt Penguin Species Survival Plan, the Penguin Taxon Advisory Group, and more than 15 zoos that helped fund us through this incredible experience. With the information collected by volunteers at the reserve during the harvest, the PSJP will extend recommendations to the Peruvian government on what measures should be taken at guano harvests all along the coast of Peru to avoid impacts on Humboldt penguin populations in Peru as a whole. Some of the new aspects of the PSJP include monitoring duration, depths and maximum distances of Humboldt penguin foraging trips at sea to extend further recommendations on how marine limits of the PSJ reserve can better protect Humboldt penguins in the ocean realm.

Figure 5. Andean foxes (*Lycalopex culpaeus*) are amongst the natural predators of Humboldt penguins along the coast of southern Peru.

Acknowledgements

The PSJP is very grateful to the Punta San Juan Research Consortium (St. Louis Zoo, Brookfield Zoo and Philadelphia Zoo) for funding the annual budget of the PSJP to date; a special thanks to Alex Waier Humboldt Penguin coordinator for SSP North America who actively helped acquire the funds for the 2012 Guano Harvest, the GEF Humboldt Project for funding coordinator salaries, Sea World & Busch Gardens Conservation Fund for supporting the extension of the guano harvest, and all the zoos and all the volunteers who helped make the surveillance and data collection during the guano harvest a success. We would like to thank Santiago Quintanilla and Gerson Pizardi for help designing Figures 1 and 2 respectively. Finally, we are grateful to thank SERNANP and Agrorural for their collaboration, and to the Centre for Environmental Sustainability of Universidad Peruana Cayetano Heredia (CSA-UPCH) for being a constant source of logistic support for the PSJP.

Figure 6. Groups of volunteers that helped monitor and mitigate impacts towards Humboldt penguin colonies during the 2012 Punta San Juan guano harvest.

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Figure 7. Intangible guano extraction areas and a human-tall blind were adopted as measures to mitigate the impact of the guano harvest on Humboldt penguins at Punta San Juan guano reserve.

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Experiencing the Punta San Juan Guano Harvest

Vicky Croisant, *Senior Wild Animal Keeper, Akron Zoological Park, Akron, OH*

As a zookeeper, I've dreamt about seeing the wild relatives of the Humboldt penguins (*Spheniscus humboldti*) I work with at the Akron Zoo but never thought I would actually make the journey to South America. Thanks to a donation to the Zoo's Conservation Fund, I received the opportunity of a lifetime – I got to spend two weeks in Punta San Juan, Peru, to help monitor the guano harvest.

The two weeks spent at the Punta San Juan reserve weren't a vacation and we weren't staying at a hotel. The volunteers were up by 5:30 am every morning to do census counts on the north and south beaches, and to monitor the guano extraction site. The field house we stayed in only had electricity from 6 pm to 9 pm, when the generator was turned on, and the toilets were flushed with buckets of sea water. Showers were every other night and the water was only slightly better than lukewarm. The field work may have been taxing but the fact you could watch a group of South American fur seals (*Arctocephalus australis*) from the balcony of the house or witness the most gorgeous sunsets over the water every night was worth it. I wouldn't have changed a moment.

Holding a pair of Humboldt penguin chicks , approximately 3-to 4 -weeks old. *Photo provided by Vicky Croisant.*

Orientation started within a half hour of arriving on the reserve. It was a perfect example of information overload. There was so much to learn in a short amount of time. For me though, it was surprising how quickly the unfamiliar became familiar. After a day or two everyone was comfortable with their jobs, whether measuring the guano extraction polygons or counting the hundreds of penguins, fur seals and sea lions (*Otaria flavescens*) that call Punta San Juan home. I never would've thought I'd be distinguishing one beach from another so easily when they all looked exactly the same that first morning. My job was to census the north beaches and I would almost consider myself something of an expert when it comes to identifying fur seals and sea lions because I counted so many of them.

A colony of Humboldt penguins on beach S4 in Punta San Juan. *Photo by Vicky Croisant.*

My personal choice for the best part of the experience was getting to participate in penguin nest checks. Having worked with captive Humboldts for almost seven years it was absolutely amazing to have the opportunity to work with them up close in the wild. PSJ staff member Marco Cardeña taught us about their methodology for handling eggs and birds. Meticulous records are kept on each nest, each clutch of eggs and each adult. Regular biometric data is collected to help determine breeding success and population dynamics. Of the more closely monitored colonies, nests are pinpointed on a map of the beach and individually numbered. Most of the penguins are banded or toe-tagged for identification and tracking.

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Punta San Juan contains the largest breeding colony of Humboldt penguins in Peru, and having the ability to collect data about it is invaluable.

Through observations and conversations, I also learned more information about the penguins that I'm excited to share with Akron Zoo staff and guests. The birds don't necessarily mate for life but tend to rotate partners every three or four years, most likely to help keep the colony genetically diverse. Nests aren't just burrows in guano or sand – they can be hidden between rocks or inside caves. Penguins are far more agile than you would think. I saw them transiting up and down steep slopes and rock faces with ease.

One of the major goals of zoos everywhere is to make a connection between people and wildlife. That's a connection I'm part of every day and sometimes take for granted simply because it's my job to work with exotic animals. I'm happy to say that after spending those two weeks at Punta San Juan my connection to wildlife is refreshed and renewed. I never for a moment took for granted the fact that I was observing multiple species in their natural habitat every day. I'm excited to share my experiences with anyone interested in listening or looking at pictures.

Having an experience like this is something I wish all zookeepers could share because, in the end, it can only make us better at our jobs, better at educating the public and better champions for the environment.

Penguin Awareness Day and World Penguin Day Event Ideas: Save the Date!

- **Black and White Cocktail reception** at your zoo or aquarium
- **Wear Black and White** and get a discount on admission on the date(s)
- Special **meet and greet with penguin keepers**
- **Behind the Scenes tours**
- **Black and White Fun Run/Walk** at your zoo or aquarium
- **Educational activities and crafts** for younger visitors
- **Scavenger Hunt** for a penguin: hide a "penguin" (photo, penguin plush or similar) in the zoo to be found by the kids with conservation clues starting at the penguin exhibit
- **Penguin Statue** decoration contest for local businesses or organizations then display throughout your zoo or aquarium
- **Bring your "Penguin" (Plush) to the Aquarium Day** (for kids)
- **Black Cake and White Ice Cream** event
- **Keeper Lectures** on penguin conservation, care or breeding
- **Meet and Greets** with penguins
- **Media** visits to highlight the day(s); live video from inside your penguin exhibit
- **Night Golfing** (see what *Aquarium of Niagara* has done http://www.aquariumofniagara.org/Putting4Penguins2012.pdf)
- **Guest Scientist Lecture Science Series** with topics covering the spectrum of penguin conservation issues
- **Family Movie Night** with a screening of *Happy Feet* or *March of the Penguins*
- **Your Ideas here:_____**

Events can be "free with admission" or at additional cost with proceeds to benefit penguin conservation. Proceeds from sales of penguin print paintings or note cards could also benefit penguin conservation. Most field biologists would be happy to receive enough funding for a GPS tracker to further their work. Let ***PCN*** know what activities were held at your zoo or aquarium.

My Journey to Punta San Juan

Ann Knutson, *Avian Propagation Center Keeper, San Diego Zoo*

The Punta San Juan Reserve in San Juan de Marcona, Peru was created thirty years ago to preserve safe nesting and roosting habitat for birds such as Guanay cormorants, Peruvian pelicans and Peruvian boobies and to allow for regulated and sustainable harvest of their guano. The Peruvian government built a wall that turned a small peninsula into an artificial island that helped isolate the birds from people and predators on the mainland. The guano is not only important to the Peruvian economy as a high quality, natural fertilizer but also to another bird species - the Humboldt penguin. These enigmatic creatures are found in Chile and Peru, and the colony in Punta San Juan is the largest in Peru. The penguins burrow into the guano to make their nests, keeping their chicks sheltered from weather and predators.

My journey to Punta San Juan began 5 years ago when I started taking care of a colony of Humboldt penguins at the Sedgwick County Zoo in Wichita, Kansas. As a penguin keeper, I talked about Punta San Juan on a daily basis. The basic facts were ingrained in my head better than my own parents' birthdays. I had pictures of Punta San Juan that I shared year round. In the fall of 2011, I learned that the Sedgwick County Zoo planned to send two keepers to Punta San Juan the following summer to help monitor the Guano Harvest. It was an exciting opportunity to be involved with a conservation project that was dear to my heart, but I was considering another opportunity at the same time. I had been offered a job as a keeper at the San Diego Zoo.

Kelly Hielman from Philadelphia Zoo doing tag checks of South American fur seals from a blind above the beach. *Photo by Ann Knutson.*

I chose to join the San Diego Zoo with the resolution that no matter what it took, I was going to get myself to Peru to volunteer at Punta San Juan. I took time off from work, and started saving the money, and gathering the gear that I would need. As I began to prepare, I was surprised to find out that my husband wanted to participate as well and we continued to prepare for the trip together. A week before the trip I read a couple of blog posts written by Rick Urban from The Newport Aquarium. He spoke of Punta San Juan, the beauty all around, and the TICKS! That is when I started looking at what I was doing. I was spending my "extra" money and my vacation time and leaving my human family for three weeks to go sit in ticks!?! I hoped that it would all be worth it!

After a 9-hour flight to Lima, we connected with other keepers from different states and boarded an overnight bus to Marcona. Along the way we began to get to know each other, and shared the different trials and tribulations that we had each endured to be on this trip – some people had loss of funding, multiple layovers, hours upon hours of traveling, language barriers, health issues, etc. – but we all had one thing that inspired us and kept us going – the love of Humboldt penguins!

We arrived at Punta San Juan at 0600. The bus parked in the middle of a dark dirt road with other abandoned busses on the road, but no sign of where we were. When we finally found the courage to get off the bus, we were met by Marco Cardeña. Marco is one of the two head scientists for the Punta San Juan Reserve and his dedication to the penguins and other animals of PSJ is, in itself, very inspiring. We piled all of our belongings into the back of his pick-up truck and then took off for the Reserve.

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The drive took us through the most barren desert that a person can imagine. When we got to the reserve, we entered through a gate in the wall that spans the width of the small peninsula which protects the reserve from predators and human contact that could threaten the penguins and other sea birds, and pulled up to the research station, which would be our home for the next two weeks.

The research station is a house with 8 rooms, each with a bunk bed and small closet. There are two bathrooms with limited water hooked up to the sinks, but not to the toilets. We had to do a bucket brigade from the ocean to the bathroom to fill a trash can that we could then use to flush the toilets. We had electricity for 3 hours every night, which was provided by a generator, but otherwise we used headlamps and candles to see in the dark. We were able to shower every other day, when 8-10 of us would pile into the small pick-up truck and drive over to the "G-house" on the outskirts of Marcona.

What the research station may lack in common luxuries, it makes up for in the view from the front porch. The research station sits up the hill overlooking the ocean. From the porch we could see penguins, boobies, fur seals, sea lions, and a plethora of other sea creatures. When we saw the view on that first early morning it stopped us in our tracks, and not one of us could remember how tired or cranky we were after our overnight bus ride. There is such bountiful life at the reserve. In that moment, I began to realize that everything we had been through to make it on this trip was worth it.

We began our stay with a tour of the beaches of Punta San Juan during which we were each given our respective assignments and shown where the majority of our time would be spent for each. There were three different jobs that we could be assigned to for the two weeks that we were there: doing census counts, checking tags, or monitoring the guano harvest. Each job was done in two 3-hour shifts every day, a morning shift that began at 0600 and an afternoon shift that began at 1500.

The Wall that protects Punta San Juan Reserve from humans and mainland predators. *Photo by Ann Knutson.*

Those volunteers doing census counts counted hundreds and sometimes thousands of penguins, fur seals, and sea lions each day. The animals, of course, were not waiting around in a helpful line to be counted and getting an accurate count of such a large and dynamic assembly was a challenge. Each of the census counts had to be within five of each other or they would count everything again, sometimes recounting the same area nine or ten times!

The tag checking group, which I was a part of, checked and documented South American fur seal tags. Fur seals are tagged during the breeding season when mothers are very protective of their pups. The pups are grabbed and the mother follows, and researchers take measurements, tests, and samples from each and then tag them with a specific color of tag for that year. Each tag can tell you whether the seal is a pup, yearling, or adult, what year it was tagged, and whether it is a male or female. Both the census group and tag checks did their jobs from the tops of cliffs looking down with binoculars, telescopes, and cameras.

The guano harvest monitors worked in teams of three which went out to monitor disturbance of the birds by the workers harvesting the guano. They also kept track of the number of trucks that carried the guano away,

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and recorded GPS coordinates for the area that was harvested that day. Another part of the guano monitor's job was to create and move a blind that shielded the workers from the view of the penguins in the largest breeding colony that was very close to where the workers were harvesting.

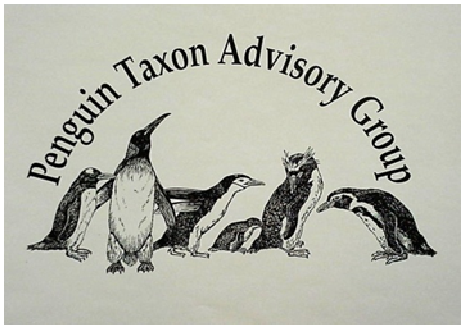
To date, monitoring the guano harvest at Punta San Juan has successfully maintained an environment in which the guano-producing birds have flourished. In turn, more guano can be harvested. In the 11 years since monitoring began, the Humboldt penguin population has increased 367%. Due to the success of the project, the Peruvian government has created a system of national reserves to try to replicate what has been done in Punta San Juan. There are now 33 islands protected in the system of national reserves.

Ann Knutson and Marco Cardeña doing a nest check. *Photo provided by Ann Knutson.*

When we were not working, there were other amazing opportunities to contribute. One of those was assisting with penguin nest checks. When we found a nest, we marked it on a map, then scooped the eggs from it using a little basket on a pole, and marked and measured the eggs. We marked adults with toe tags rather than wing bands which have been shown create drag on a swimming Penguin. In the wild where that drag makes them slower than the penguin next to them, that can be the difference between life and death.

Humboldt penguins nest atop a cliff at S8 beach. *Photo by Ann Knutson.*

Throughout the two weeks, we all worked very closely with our groups to accomplish our different jobs and we grew very close to these strangers that we had only met days before. Every day, a cook came in and made amazing Peruvian dishes for lunch. We would all dish up and sit around a giant dinner table and share stories from our morning shifts or from our lives outside of the reserve. After two weeks of working together and living together, we were a family. We laughed together, sang together, danced, and sometimes even argued together. When the time came to leave, we all looked forward to getting back to our families and lives at home, but at the same time, we were sad to leave our Punta San Juan family. Even though most of us are very far apart, I know that we have made a bond that will last a lifetime. Together we made memories that will continue to inspire us in our lives and careers.



Penguin TAG Meeting - AZA Mid-Year 2012

Meeting Minutes, Palm Springs, CA
28 March 2012

Steering Committee Elections – Completed in January 2012. Sherry Branch (SeaWorld), Ed Diebold (Riverbanks Zoo), Ric Urban (Newport Aq.), and Steve Sarro (National Aviary) were re-elected for another 3 year term. Susan Cardillo (Central Park Zoo) was elected as a new SC member. Welcome Susan!! *See Addendum A. for a complete list of the Steering Committee members.*

RCP Update – The current RCP was approved in 2010. Under the new WCMC guidelines TAGs have 5 years to submit their next edition. Our next edition is not due until spring 2015 but Tom would like to do a mini-update this winter. A full space survey will not be done with this update, but all IRs will be contacted to see if there have been any major changes in institutional plans since 2009 (when the last space survey was done). Zoos are asked to allow a 3 year lead time to identify birds if you are planning a new exhibit.

Action Plan – Most of the items have been completed or are in progress. This list is dynamic and needs to be updated with the winter 2012 RCP update. Please forward any new penguin projects or programs to Tom.

Program Status – Overall the number of penguins in our TAG have grown from ~2400 to 2700 which shows that the populations are well managed. *See Addendum B. for a complete list of the species designations and population information.*

Little Blue Penguin Update – (Heather Urquhart, New England Aquarium). There is an agreement in place between AZA and the Zoo Association of Australian to acquire viable breeding birds from Australia. Heather will continue to manage the US population and studbook and merge the data with the international studbook. This agreement will ensure a smoother process for importing additional penguins in the future. In June 2012 an import of 20 little penguins is planned.

Emperor Penguin Update – (Linda Henry, SeaWorld in San Diego). The entire NA population of emperor penguins is held at SWSD. This population will be managed as a Monitored Population. In Dec 2011 SWSD had the opportunity to work with Dr. Paul Ponganis, who conducts diving research on emperor penguins in Antarctica. Linda, Lauren DuBois and Dr. Judy St. Leger traveled to Ponganis' "Penguin Ranch" on McMurdo Sound. They returned with a group of juvenile emperors that will be housed at SWSD and used for additional studies by Dr. Ponganis. Linda reported that the young emperors acclimated very well to the Penguin Encounter.

Penguin Conservation Newsletter – Editors of the newsletter, Linda Henry and Jessica Jozwiak have just published the fourth edition (Vol. 16. Number 1.) in pdf format. This was sent out via the TAG listserve. Contact Linda Linda.Henry@SeaWorld.com if you would like to be added to the mailing list. This publication will also appear on the ASAG website soon. Linda and Jessica are always looking for interesting contributions to the PCN. Photos of new exhibits, novel husbandry techniques and programs are all welcomed additions. Contact Linda or Jessica (jjozwiak@detroitzoo.org) for information on how to submit an article. Archived issues are available on the Penguin TAG website: www.zoopenguins.org

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TAG Website – Tom reported that the site expired for a brief time and a number of the recent updates were lost. The website will be renewed and the TAG will retain the same domain for five years. Updates in many areas of the site are needed. Program Leaders are strongly encouraged to look at the species information and provide Heather Urquhart hurquhart@neaq.org with comments, corrections and new project information. Dave Di Gregorio has agreed to help maintain the TAG webpage. We hope to update this in 2013.

IATA Live Animal Regulations (LAR): Proposed changes to CR22 for Penguins (Gayle Sirpenski). In the fall of 2011 Frank Kohn (USFWS) and Steve Olson (AZA) presented a proposal to include the symbol for the rigid plastic kennels (aka sky kennel/pet carrier) in CR 22. This was approved by the IATA Board. The symbol will appear in the approved materials section of the next edition of the LARs. If penguins are shipped in rigid plastic kennels prior to the issuance of the next edition, it is advisable to contact the airline prior to arrival at the airport to let them know the penguins will be shipped in this type of container. Frank would also be willing to contact the airline on our behalf and if necessary, obtain written confirmation that this carrier type has been approved. Contact Gayle with questions. In March 2012 a second proposal was submitted to the IATA Board. This proposal was necessary to include the fixed-wall, plastic "tote" style container typically used for the transport of the larger species of penguins. A survey was conducted to provide the justification for the safe use of this carrier. SeaWorld and Moody Gardens contributed to this information. This proposal also addressed the outdated methods and language of CR22. On April 25th Frank will present this proposal at the IATA meeting in Montreal. Information on the outcome will be forthcoming. *Late Update: This was approved at the IATA meeting. Gayle will send more information through the list serve.*

8th International Penguin Conference (IPC) – This conference will be held 2-6 September 2013 in Bristol, UK. See http://combine.cs.bris.ac.uk/ipc/ for additional information. Tom has spoken with the EAZA TAG Chair about having a joint captive penguin meeting in conjunction with this conference. More information to follow.

Animal Care Manuals – The Steering Committee is continuing work on the ACM chapters. Many chapters are complete and it is anticipated that this document will be available in early 2013. The ACMs need to be updated every 5 years.

African penguin SSP – (Steve Sarro, Gayle Sirpenski) Steve reported that the SSP met in July 2011 for a planning meeting. Thanks to the Newport Aquarium for hosting the meeting! The current population included 819 individuals at 53 institutions. The target population was set at 1030 to accommodate the expected future growth from new exhibits coming on line in the next 2 years. The current GD is 98.71%. In order to increase the population by 11% over 2 years the breeding and transfer plan is recommending 170 to 214 hatches per year. During the business portion of the meeting the Steering Committee approved a $3700 donation towards the purchase of data loggers used to track the movements of the rehabilitated chicks from SANCCOB. The SSP strongly encourages all penguin institutions to consider making a donation to support *in situ* conservation. Finally, the SSP welcomes three new members to the Steering Committee: Jen Kottyan, (Maryland Zoo), Jen Odell (Georgia Aq.) and Beth Rich (Tautphaus Park Zoo).

Presentation by Margaret Roestorf (SANCCOB) - "*SANCCOB and Partners - What's being done to save wild African penguins*?" Margaret is the Director of Development at SANCCOB and one of a 'two-woman' senior management team that runs the organization. SANCCOB's contribution to *in situ* African penguin conservation over the years has been exceptional and Margaret is truly the driving force behind their success. Margaret's incredible passion for her work has been instrumental in raising awareness of the eminent threats to African penguins and other sea birds in South Africa. During this presentation she described the projects and initiatives in which SANCCOB is currently involved. The US institutions are encouraged to contact Margaret for additional information on how they can get involved. development@sanccob.co.za.

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Addendum A. Steering Committee

	Name	e-mail	Institution	
1	**Tom Schneider**	tschneider@detroitzoo.org	**Detroit Zoological Institute**	TAG Chair
2	**Heather Urquhart**	hurquhart@neaq.org	**New England Aquarium**	TAG Vice Chair
3	**Gayle Sirpenski**	gsirpenski@mysticaquarium.org	**Mystic Aquarium**	TAG Secretary
4	**Sherry Branch**	sherry.branch@seaworld.com	**Sea World of Orlando**	
5	**Ed Diebold**	ediebold@riverbanks.org	**Riverbanks Zoological Park**	
6	**Steve Sarro**	sarros@si.edu	**National Aviary**	
7	**Rick Urban**	rurban@newportaquarium.com	**Newport Aquarium**	
8	**Susan Cardillo**	scardillo@wcs.org	**Central Park Zoo**	
9	**Karen Waterfall**	kwaterfall@indyzoo.com	**Indianapolis Zoological Society**	
10	**Stephanie Huettner**	registrar@amahazoo.com	**Omaha Zoo**	
11	**Diane Olsen**	dolsen@moodygardens.com	**Moody Gardens**	
12	**Cheryl Dykstra**	cheryl.dykstra@kentcountymi.gov	**John Ball Zoo**	
13	**Mike Macek**	macek@stlzoo.org	**St. Louis Zoo**	
14	**Lauren DuBois**	Lauren.DuBois@SeaWorld.com	**Sea World San Diego**	
15	**Alex Waier**	Alex.Waier@milwcnty.com	**Milwaukee County Zoo**	

Addendum B. Penguin Programs – April 2012

	2010 RCP Status	Current Status	IUCN Status	Date of Last PMC Plan	Date of Last Studbook	Number of Specimens	# of Institutions
African Penguin	SSP	GREEN	VU	Nov-11	May-11	819 (440.373.6)	53
Humboldt Penguin	SSP	GREEN	VU	Oct-11	Jun-09	318 (170.148)	16
Magellanic Penguin	PMP	GREEN	NT	Mar-12	Nov-11	228 (126.100.2)	15
Short-crested Rockhopper Penguin	PMP	GREEN	VU	Feb-12	Jan-10	318 (140.164.14)	17
Macaroni Penguin	PMP	GREEN	VU	Mar-11	Dec-09	163 (77.78.8)	7
King Penguin	PMP	GREEN	LC	Oct-11	May-11	270 (130.124.16)	16
Gentoo Penguin	PMP	GREEN	NT	Jun-12	Feb-12	457(200.233.24)	15
Adelie Penguin	PMP	GREEN	LC	Jul-12	Mar-10	151 (79.72)	3
Chinstrap Penguin	PMP	YELLOW	LC	Jul-12	Oct-12	134 (71.63)	4
Little Penguin	PMP	YELLOW	LC	Oct-11	Mar 11	54 (29.25.0)	4
Long-crested Rockhopper Penguin	Phase -out	RED	END	Feb-12	Jan-10	39 (23.15.1)	5
Emperor Penguin	DERP	Monitored	LC	NA	NA	35 (17.18)	1

Fundraising Opportunities

British Ecological Society -- Research Grants and Outreach Grants. The BES makes Research Grants in support of scientific ecological research where there are limited alternative sources of funding. Small projects can be awarded up to £5,000, and early-career ecologists can apply for funding up to £20 thousand. There are no restrictions on nationality or residence of applicants, or where they carry out their research work. Additionally, BES offers Outreach Grants of up to £2,000 to encourage its members and others to promote ecological science to a wide audience. The application deadlines are 17 September 2012 and 04 March 2013 for both types of grants. Link Research Grants<http://www.britishecologicalsociety.org/grants/research/index.php> Link Outreach Grants <http://www.britishecologicalsociety.org/grants/outreach/index.php>

Riverbanks Zoo and Garden -- International Wildlife Conservation. The Riverbanks Zoo and Garden (USA) makes grants for field conservation; habitat management; conservation education; ex situ captive breeding; animal health and welfare; and other themes in wildlife research and conservation. Grants generally range from US $1,000 to US $5,000. Link <http://www.riverbanks.org/conservationcare/fund.shtml>

Phoenix Zoo -- Grants for Conservation and Science. The Phoenix Zoo (Arizona, USA) makes small grants to support wildlife conservation and science worldwide. First-year grants are limited to US $3,000. Priority is for practical projects that help build capacity, and that involve local communities. The application period is 01 November through 01 December each year. Link<http://www.clemetzoo.com/apetag/Forms/phoenix-zoo-cons-grant-application.pdf>

Academy of Sciences for the Developing World (TWAS) – Grants for International Scientific Meetings in Developing Countries. TWAS makes grants in support of conferences, workshops, symposia, and special meetings in developing countries. Requests are submitted by the organizers of the meetings (i.e., not by individual participants). Grants are intended for air tickets, and do not normally exceed US $5,000. Application deadlines are 01 June and 01 December each year. Link<http://twas.ictp.it/prog/meetings/support-for-international-scientific-meetings>

French Global Environment Facility (FFEM) -- Small Grants, Phase 3. Phase 3 (2011-2013) of FFEM's Small-Scale Initiatives makes grants for biodiversity conservation in West and Central Africa, Madagascar, and Mozambique. Grants are a maximum of €50,000 -- subject to co-financing requirements -- for NGO conservation organizations in eligible countries. For NGOs meeting the relevant criteria, pre-proposals can be submitted at any time before 31 December 2012. Link<http://www.ffem.fr/cache/offonce/lang/en/accueil/PPI;jsessionid=9A77C0FF280112D3D34931A997A99B75>

Safari Club International Foundation – Grants 2013. SCI makes grants for wildlife conservation and research in Africa, Asia, and North America. Applications for small grants can be submitted any time, but applications for grants over US $5,000 should be submitted by 31 December for consideration in the following year. Link<http://www.safariclubfoundation.org/content/index.cfm?action=view&content_id=2773>

SeaWorld and Busch Gardens -- Conservation Fund. The Conservation Fund makes grants for wildlife conservation, research, and education. Most grants are US $5,000 to US $25,000 for one year. Applications are accepted from U.S. non-profit organizations, non-profit organizations in other countries, governmental entities, accredited universities and research centers, and institutions accredited by AZA or AMMPA. Link<http://www.swbg-conservationfund.org/grantPolicies.htm>

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Rolex Awards -- Young Laureates 2014. The Rolex Awards for Enterprise support pioneering work in five areas: applied technology; cultural heritage; environment; exploration and discovery; and science and health. Projects are assessed on their originality, potential for impact, feasibility, and the candidates' own spirit of enterprise. The 2014 series of Awards will be devoted to Young Laureates, ages 18 to 30, of all nationalities and backgrounds. Each Young Laureate will receive CHF 50,000 over two years. The deadline for pre-applications is 31 May 2013. Link<http://www.rolexawards.com/about/apply>

National Geographic Conservation Trust. The objective of the Conservation Trust is to support conservation activities around the world as they fit within the mission of the National Geographic Society. The trust will fund projects that contribute significantly to the preservation and sustainable use of the Earth's biological, cultural, and historical resources. While grant amounts vary greatly, most range from US $15,000 to $20,000. As National Geographic Society funds are intended to function as complementary support, the trust strongly encourages applicants to seek additional, concurrent funding from other funding agencies. Applications should be submitted at least 10 months before the project is to begin. Link<http://www.nationalgeographic.com/explorers/grants-programs/conservation-trust-application/>

PADI Foundation. The PADI FOUNDATION encourages and supports underwater science, environmental projects, and education. The Foundation will fund and assist worthwhile projects that will enrich mankind's understanding of the aquatic environment and encourage sensitivity to and protection of the delicate ecological balance of underwater life. In 2013, the Foundation expects to award a total of approximately $180,000 and will consider proposals with budgets up to $20,000 although the average for proposals will be on the order of $5,000 to $10,000. The Foundation will not fund overhead or other indirect expenses. All applications must be submitted beginning November 1, 2012 and no later than February 1, 2013. Link<http://www.padifoundation.org/>

Prince Bernhard Nature Fund. The Prince Bernhard Nature Fund was established in 1994 by the late Prince Bernhard of the Netherlands. The Fund's mission is to support small, preferably local initiatives towards the conservation and wise use of nature and the natural resource base. Effectively their Fund aims to help save critically endangered flora and fauna. Due to the limited nature of their funding (their grants do not exceed 25,000 Euro), the Fund prefers to act as a catalyzer of larger initiatives, and link its project support as much as possible to larger themes and organizations. Deadline for Applications are annually 1 April and 1 October. Link<http://www.pbnf.nl/>

Rufford Small Grants for Nature Conservation. The Rufford Small Grants Foundation provides funding for small nature/biodiversity conservation projects and pilot programmes in developing countries. You may only apply for funding once in any 12-month period. Applications are normally processed within 12 weeks, except for Continuation / Completion grants where the review process may take up to six months. Link<http://apply.ruffordsmallgrants.org/>

Oiled Wildlife Care Network (OWCN). Supporting hypothesis-driven research conducted by the best possible investigators helps to broaden the knowledge base on both acute and long-term effects of oil in the environment. The OWCN strongly encourages collaborative research projects by funding studies conducted by their members and the research community. Each year they sponsor as much as $250,000 toward projects relating to the effects of oil on wildlife. Link< http://www.owcn.org/research/index.cfm>

News and Updates (Since the March 2012 Issue)

Conservation Magazine, a publication endorsed by Dr. Dee Boersma and whose partners include the University of Washington, the Nature Conservancy, the World Wildlife Fund and others, is offering a holiday subscription rate: **Buy one gift subscription for $24 and give a second gift subscription for free**. This magazine brings environmental issues to the forefront with a scientific perspective. The stated mission is to "raise the bar on environmental thinking and writing". The magazine also includes an e-newsletter with updates on topics covered in each issue. There are 6 issues per year. Go to http://www.conservationmagazine.org to learn more and to subscribe.

The Penguin TAG Facebook page was launched in 2012 and is moderated by Anthony Brown of the San Francisco Zoo. Anthony wrote the PCN: "In the interest of expanding the Penguin TAG's reach, there is now a Penguin TAG Facebook page! Penguin news (from the field and zoos/aquariums) will be posted on this page, making this a great way to stay up to date with what's happening in the wonderful world of penguins! If you have a story, video, or article you'd like to share (or suggestions/ideas for the page) – you can either email it to anthonyb@sfzoo.org or better yet, post it to the Penguin TAG's Facebook page wall: http://facebook.com/PenguinTAG".

On September 1st oil began to leak again from *SELI 1* and approximately 254 seabirds were taken into care at **SANCCOB.** Originally grounded in 2009, the *SELI 1* **continues to release oil into the marine environment** near Table Bay, a main feeding ground for seabirds from Robben Island. In a report issued October 1, Francois Louw, SANCCOB's Development and Marketing Coordinator, reported that SANCCOB had released 57 African penguins in good condition; a total of 221 oiled seabirds were washed at SANCCOB in the first two weeks of September.

The Last Ocean premiered August 1 at the New Zealand International Film Festival in Auckland, New Zealand. The film is a documentary that focuses on the **impacts of commercial fishing in Antarctica**. Directed by nature cameraman Peter Young, the film grew out of a paper written in 2004 by Dr. David Ainley. The photography is beautiful and the scenery expansive but the message is important. Go to http://www.lastocean.org to view the trailer and to learn more about how to protect The Last Ocean. If information is power then everyone should start here to empower themselves.

South Africa released the first **Draft Biodiversity Management Plan for the African Penguin** in August. The report states: "This is the first management plan for the species and will lay the foundation for the plans that will follow. In laying the foundation for future plans this plan concentrates substantially on establishing guidelines around various aspects of African Penguin conservation and consolidating existing conservation work". The 72-page document is available online at http://www.environment.gov.za/sites/default/files/gazetted_notices/nemba_spheniscusdemersus_bmp_g35607gen663.pdf.

Denmark **Legoland** opened their new penguin exhibit ***Penguin Bay*** in May. See video behind-the-scenes at http://www.youtube.com/watch?v=l2WuvLt_3vc .

The **Calgary Zoo** opened their new penguin exhibit called the ***Penguin Plunge*** in February. The new exhibit has a familiar design concept. Visit http://www.calgarysun.com/2012/02/17/penguin-exhibit-opens-at-zoo to see images from visitor preview day.

Events and Announcements

PENGUIN AWARENESS DAY, January 20, 2013. *See event ideas on page 17.*
WORLD PENGUIN DAY, April 25, 2013.
WORLD OCEANS DAY, June 8, 2013. http://worldoceansday.org and http://www.un.org/en/events/oceansday
8TH INTERNATIONAL PENGUIN CONFERENCE, September 2-6, 2013 in Bristol, UK.
http://combine.cs.bris.ac.uk/ipc
AVIAN INCUBATION WORKSHOP, November 18-22, 2013. Presented by San Diego Global.
aiw@sandiegozoo.org Registration is $300. *See flyer on page 27.*

Instructors

Patricia Witman is the Animal Care Manager of the San Diego Zoo's Avian Propagation Center (APC). She has been with San Diego Zoo Global for over 30 years with at least 25 of those involved with artificial incubation and hand-rearing birds. Pat has a B.A. in Zoology from Humboldt State University. Pat has been sharing her wealth of experience through the Avian Incubation Workshop since 2008.

Susie Kasielke received her B.S. in Avian Science from the University of California at Davis. She has over 30 years of avian experience at both the Disney's Animal Kingdom and Los Angeles Zoo and has served as Curator of Birds since 2001. She has been teaching workshops on avian incubation for nearly 20 years.

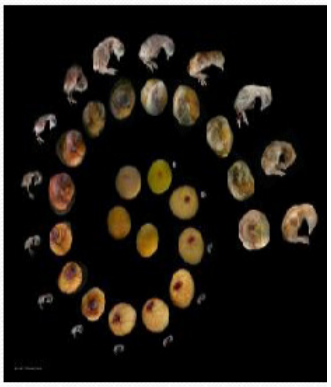
Dr. Thomas Jensen has spent the last 12 years studying avian reproductive physiology at the San Diego Zoo Institute for Conservation Research. He received his Ph.D. in avian reproductive physiology from the University of Notre Dame.

Jessica Theule received her B.S. in Ecology and Evolutionary Biology from UCLA. She has worked at the APC since 2007 where is primarily responsible for artificial incubation.

Previous Participants

San Diego Zoo
San Diego Zoo's Safari Park
Hawaii Endangered Bird Conservation Program
San Clemente Loggerhead Shrike Program
SeaWorld, San Diego
US Fish and Wildlife Service
Fresno Chaffee Zoo
Virginia Zoo
Santa Barbara Zoo
Racine Zoo
British Colombia Ministry of Natural Resource Operations
Guam Division of Aquatic and Wildlife Resource
African Lion Safari, Canada
Durrell Wildlife Conservation Trust
The International Centre for Birds of Prey
Weltvogelpark, Walsrode

Avian Incubation Workshop



Presented by

SAN DIEGO ZOO GLOBAL

Lecture Subjects

- Hatchery Management
  - Design
  - Equipment
  - Sanitation
  - Record keeping
- Egg Management
  - Weight Loss Management
  - Factors Affecting Hatchability
  - Embryo sexing
  - Egg Repair
- The Hatching Process
- Hatching Assistance
- Egg Necropsy -What to look for
- Egg -Formation
  - Structure
  - Extra-embryonic Membranes

Practical Lab Subjects

- Candling and break-out of chicken embryos
  - Early developmental stages
  - Mid developmental stages
  - Late developmental stages
- Break-out necropsy of exotic eggs
- In-ovo blood collection for sexing
- End of week wrap-up
  - Full set candling
  - Full set break-out
  - Developmental milestones

Behind-the-Scenes Tours

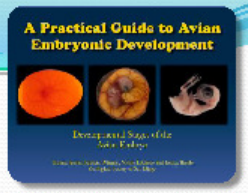
- San Diego Zoo Avian Propagation Center
- San Diego Zoo Bird Exhibits
- SDZ Safari Park Bird Breeding Facility
- SeaWorld Propagation Facilities

LECTURES and LABS are held in our state-of-the art Conservation Education Laboratory located at the Beckman Center for Conservation Research

"I found all the items I learned in this workshop very valuable."

"I'm a hands-on learner and I will always remember what we did."

"A great balance of science and the practical applications for it."



LAB MANUAL includes detailed photographs of candled eggs, membranes, and embryos to illustrate embryonic development from both inside and outside of the egg!

Cost of the workshop is $300 (includes lab manual, lunches, and snacks).
Class size is limited.
For more information and dates, contact:

AIW@sandiegozoo.org