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Archived issues are available on the Penguin TAG website: www.zoopenguins.org
FROM THE EDITORS

It has been six months since the 7th International Penguin Conference marked the debut of this newsletter. Originally edited by Cynthia Cheney (Oregon Zoo), the Penguin Conservation Newsletter stopped publication in 2000. The Penguin Taxon Advisory Group (PTAG) now supports this publication as an electronic newsletter, and by link and password on the PTAG website (www.zoopenguins.org). It is published biannually in February and August. Among the goals of this newsletter is to build dialogue and information-sharing between field biologists and zoological institutions, to improve conservation messaging and build support for preserving penguins around the world.

In this issue we focus primarily on news and information relating to African penguins. Gayle Sirpenski (Mystic Aquarium) gives us an update on the recent African Penguin Chick Bolstering Project (APCBP) conducted by SANCCOB last November and December. Staff members from Mystic went to SANCCOB to assist with the project.

Dr. Allison Tuttle, also from Mystic Aquarium, describes the first case of Eastern Equine Encephalitis reported in an aquarium-held African penguin colony. She describes symptomatology along with tips for vector prevention. This is an important article about the susceptibility of *Spheniscus* to this emerging disease.

We also include a review of Dyan deNapoli’s recent book *The Great Penguin Rescue: 40,000 Penguins, a Devastating Oil Spill, and the Inspiring Story of the World’s Largest Animal Rescue*. We hope that zoos and aquariums will consider placing this book in their gift shops to further increase public awareness of the plight of this important species.

Finally, Dr. Pablo Garcia Borboroglu (President, Global Penguin Society) has provided information on the Global Penguin Society (GPS). Formed in 2009, this international alliance-building organization promotes the protection of penguin populations. Please visit the GPS website at www.globalpenguinsociety.org and become familiar with the many features available; click on the red “News” button for updates.

We thank all of the contributors for taking time to help us to deliver important and timely information about ongoing penguin research and needs. In our next issue we plan to focus attention on the South American *Spheniscus* penguins. Please contact the editors to submit articles or ideas, significant hatchings and events for the calendar.

Contributors to this issue: Mike Aguilera (SeaWorld California), Dr. Pablo Garcia Borboroglu (CONICET), Erin Merz (Sea Research Foundation), Margaret Roestorf (SANCCOB), Tom Schneider (Detroit Zoo), Dr. Richard Sherley (ADU, University of Cape Town), Gayle Sirpenski (Mystic Aquarium), Dr. Allison Tuttle (Mystic Aquarium), and Dr. Roberta Wallace (Milwaukee Zoo).

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**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
7th INTERNATIONAL PENGUIN CONFERENCE A SUCCESS

Linda Henry, Editor PCN

The New England Aquarium was host to the 7th International Penguin Conference (IPC) in Boston, Massachusetts 29 August through 3 September 2010. It was the first time the conference was held in the Northern Hemisphere. More than 180 scientists, government officials, conservation advocates and zoo and aquarium professionals were gathered together from 22 nations. Over the course of the five-day conference 72 oral presentations spanned five themes (breeding behavior, captive and medical, foraging, conservation and ecology, and global change) with more than 50 poster presentations.

The conference had many sobering messages about the conservation status of penguins. During an afternoon symposium organized by the Global Penguin Society entitled Penguin status in troubled oceans, the leading authors of the forthcoming book “Biology and Conservation of the World’s Penguins” presented rapid-fire species updates on population size, growth trends, main threats, research gaps and conservation priorities. Of the 18 species of penguins, 13 are considered endangered or threatened. It was apparent from the species summaries that many penguin species face the same four key threats: global climate change, introduced mammalian predators, pollution and fisheries mismanagement. Some species are now at their lowest recorded populations.

Ultimately, scientists agreed that more population censusing is needed and counting methods should be standardized. Scientists also stated that more work needs to be done to assess regional trends. Zoos and aquariums can help support research and conservation efforts through education and close-contact programs, events to raise awareness and funding, as partners in scientific investigations and by providing staff for field support. In particular, researchers cited the need for donations to support the purchase of data loggers such as GPS (global positioning system)/satellite tracking units, TDRs (time and depth recorders) and RFIDs (radio frequency identification technology). The possibility of testing attachment methods in zoological settings was also discussed to help reduce losses of this expensive equipment at sea. Such devices are essential to learning more about a species that spends the majority of its life at sea and for which non-breeding and winter habits are little known.

The week also included the African Penguin Connection, a private evening hosted by the Leiden Conservation Foundation and SANCCOB, to update conference delegates on African penguins and the work being done at SANCCOB. Later in the week, a public event featured lectures by scientists to bring further attention to the plight of penguins. The week ended with a dinner cruise on the Spirit of Boston and threats of an approaching hurricane (Earl). Heather Urquhart (New England Aquarium), the Chair of the International Steering Committee for the IPC, should be applauded for her diligence in coordinating this event. The 8th International Penguin Conference will be hosted in Bristol, England in 2013.

Abstracts from the 7th IPC can be accessed by going to www.penguinconference.org and downloading the complete abstract book.
THE AFRICAN PENGUIN CHICK BOLSTERING PROJECT

Gayle Sirpenski, Animal Management Specialist, Mystic Aquarium, Mystic, CT,
Margaret Roestorf, Dir. of Marketing, South African Foundation for the Conservation of Coastal Birds (SANCCOB), South Africa, Venessa Strauss, CEO SANCCOB, South Africa

It became official on October 29, 2010: The African penguin *Spheniscus demersus* is now listed as “Endangered” under the US Endangered Species Act. The species was also recently uplisted to Endangered on the IUCN Red List of Threatened Species. It’s no wonder that scientists are gravely concerned about the future of the African penguin. In 1956 there were an estimated 141,000 pairs of African penguins. Today, that number is approximately 21,000 breeding pairs in South Africa and immediate conservation action is required to arrest this alarming and continued downward trend. Over the past three generations (~28 years) there has been a 60.5% decline in the population. The reasons for this dramatic decline are many: Lack of adequate food, habitat loss, predation by Cape fur seals and kelp gulls, and climate change are all threatening their survival. If this species is to be saved from extinction, something must be done to help reverse this accelerating decline.

Fortunately, help is being offered to the chicks through the African Penguin Chick Bolstering Project (APCBP). This project was initiated in 2006, lead by the Bristol Conservation and Science Foundation, UK (a sister organization to Bristol Zoo Gardens), and administered by SANCCOB. Other key partners in this important endeavor include CapeNature, the Animal Demography Unit (ADU) at the University of Cape Town, Robben Island Museum, the South African government’s Department of Environmental Affairs and the International Fund for Animal Welfare (IFAW). The APCBP was founded with the purpose of addressing issues related to the large scale rescue of abandoned and orphaned chicks. Its objectives include assessing the breeding fidelity of rearing and release sites in order to identify factors that are needed to establish new, sustainable colonies; addressing the loss of African penguins by supplementing the population with hand-reared birds; and increasing the local capacity to hand-rear chicks for release back to the wild.

November marks the end of the breeding season for the African penguin. The adults have done their best to rear the last chicks of the breeding season but the lengthening daylight tells them that the annual moult season is approaching. They are faced with certain death themselves if their body condition is poor going into the moult. The adults are forced by their own survival instinct to abandon the chicks and return to the sea to feed themselves. Because the adults must travel farther to find fish to feed the chicks, the amount of food provided to them is less than adequate for normal growth. As a result, many of the abandoned chicks are already undernourished and small at the time the parents leave.

In mid-November of last year, Venessa Strauss was put on alert that chicks may be coming. Hand-rearing penguin chicks in November and December has become an annual event at SANCCOB. The chicks are fondly known as their “Christmas Chicks”. Conservation managers from the Overstrand Municipality and CapeNature assessed the status of the chicks at Stony Point, a land based breeding colony at Betty’s Bay (approximately 200km east of Cape Town). They removed the abandoned chicks from the nests and trucked them to SANCCOB where they will spend about 6 weeks under the care of the staff and volunteers. It was noted by the staff that the birds admitted this year are in significantly poorer condition than birds from previous years. One chick brought to the center was close to fledging age but only weighed 980 grams instead of the normal 2.5 kilograms. In the days to follow a total of 459 chicks would be admitted to the SANCCOB facility. Chicks were also removed from Dyer Island, Robben Island and Boulders Beach.

(Continued on page 4)
At one point in the rescue effort, approximately 1% of the entire population of African penguins was under SANCCOB’s care.

Once admitted to the center, the chicks are sorted by size and condition. Chicks that are suffering from severe dehydration, injuries or infections are sent immediately to the ICU to be examined by Dr. Nola Parsons, SANCCOB’s veterinarian. Condition data (head measurements and mass) is also taken from each chick on admission and at release. As part of a larger project, the data collected at SANCCOB will be used by researchers to objectively evaluate the chicks’ condition on arrival as well as to determine the survivability of chicks based on their condition. For the next six weeks the chicks will be cared for by volunteers who are passionately devoted to this cause. Long days and strenuous routines are all part of the deal. Each chick is tube-fed between 3 to 5 times a day with an electrolyte solution, water and a special fish formula to ensure that their fluid and nutritional needs are adequately met. Once they can handle the rigors of the regime the chicks are also force-fed fish two to three times a day. When the chicks have grown their juvenile feathers, approximately 3-4 weeks into their rehabilitation, they are made to swim for increasing periods of time throughout the day. As their feather condition improves, the chicks become better suited to life in a frigid ocean. This forced swim time is believed to give the hand-reared chicks an important advantage over their wild counterparts. The SANCCOB chicks have had time to develop the large pectoral muscles so they are likely to be more efficient at catching fish and avoiding predators once they are self-reliant. They also have more stored body fat to help them get through the learning phase of catching fish for themselves.

From 2001 through 2009, 1,866 chicks abandoned as a result of their moulting parents were admitted to SANCCOB for hand-rearing. Eighty percent were successfully released. Venessa believes that the success of this project is due to the quick and collaborative working spirit of all those involved.

<table>
<thead>
<tr>
<th>Year</th>
<th>Robben Island</th>
<th>Dyer Island</th>
<th>Betty’s Bay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># admitted</td>
<td># released</td>
<td>% released</td>
</tr>
<tr>
<td>2001</td>
<td>32</td>
<td>10</td>
<td>31%</td>
</tr>
<tr>
<td>2002</td>
<td>24</td>
<td>10</td>
<td>42%</td>
</tr>
<tr>
<td>2003</td>
<td>4</td>
<td>2</td>
<td>50%</td>
</tr>
<tr>
<td>2004</td>
<td>6</td>
<td>3</td>
<td>50%</td>
</tr>
<tr>
<td>2005</td>
<td>3</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>2006</td>
<td>113</td>
<td>90</td>
<td>80%</td>
</tr>
<tr>
<td>2007</td>
<td>7</td>
<td>3</td>
<td>43%</td>
</tr>
<tr>
<td>2008</td>
<td>16</td>
<td>16</td>
<td>100%</td>
</tr>
<tr>
<td>2009</td>
<td>16</td>
<td>11</td>
<td>69%</td>
</tr>
</tbody>
</table>
Once released, scientists can only guess as to the direction the chicks choose to take on their search for food. The period of the African penguin’s life cycle from fledging until they return to breed at 3 to 4 years of age is poorly understood. The rescued chicks from the 2010 cohort presented an opportunity to study this stage of their life cycle. Satellite tracking packages were attached to 5 of the chicks prior to their release in Betty’s Bay and on Robben Island. The research component of the project is managed by the ADU and the Marine Research Institute in conjunction with the Department of Environmental Affairs: Oceans and Coasts.

The decision to remove the abandoned chicks from the nest each year is based on sound research principles and extensive experience. If there had been no intervention, it is certain that these chicks would have died due to dehydration, heat stress and starvation. Evidence from recent research suggests that the introduction of fledglings has had a significant impact on conserving wild populations. Chicks that have been hand-reared show higher survivorship to breeding age and higher fecundity (Barham et al. 2008). The future of the African penguin is bleak given the many forces that seem to be plaguing them; many of which are out of our control. However, the rescue, rearing and release of these large numbers of orphaned chicks are considered a crucial component in the overall fight to conserve the African penguin in the wild.

SANCCOB is a non-profit organization dedicated to conserving and protecting South Africa’s sea birds. If you would like more information please visit their website http://www.sanccob.co.za


"[Eds. note: We asked Margaret Roestorf, Fundraising and Marketing Manager for SANCCOB, to elaborate on how zoos and aquariums, zoo keeper organizations and the general public can be of assistance to African penguins. We also wanted more information on how fish is sourced for SANCCOB as well as whether birds ever self-feed during their rehabilitation period. We thank Margaret for her responses below:

SANCCOB urges zoos and aquariums in the US to share this conservation message with their visitors and to include facts about wild African penguins in their presentations. To receive a DVD with relevant fresh information and photographs about African penguins in their natural environment email marketing@sanccob.co.za

To become part of the loyal zoo and aquarium community in the US which supports penguin conservation please visit www.sanccob.co.za and donate online.

FISH SOURCING: The fish we currently feed the penguins at SANCCOB is caught off the West Coast and South-East Coast (close to Port Elizabeth). At present there are fishing closures in place (both East and West Coast) around two of the major breeding colonies for seabirds. This fishing closure goes hand-in-hand with in-depth research to look at the impact of commercial fishing close to the seabird islands, especially during the breeding season. Sardine and anchovies in South Africa are consumed by the general public and a large portion

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of it is also used for producing other products, e.g., animal feed. We completely support the local fishing SASSI – The South African Sustainable Seafood Initiative and we recommend visitors to South Africa to download the SASSI pocket guide [here](#).

FEEDING CHICKS AT SANCCOB: One of the factors in our favor in terms of rearing abandoned African penguin chicks is that very little “wild” behavior (e.g. swimming, catching prey) is parent-taught. Once the chicks turn into waterproof blues, the parents stop feeding them and they venture out to sea and learn by themselves, or possibly from swimming/hunting with more experienced juveniles. At SANCCOB we make sure that none of the penguins that are released are imprinted on people. Some birds learn to “free feed” (take the fish by themselves) but juvenile and adult birds are usually force-fed until they are released."

**MYSTIC AQUARIUM HELPS WITH RESCUE OF SANCCOB’s 2010 ‘CHRISTMAS CHICKS’**

Mystic Aquarium *Supervisor of Penguins and Pinnipeds*, Laurie Macha, traveled to South Africa for two weeks to assist with the labor intensive hand-rearing of over 400 African penguin chicks.
EASTERN EQUINE ENCEPHALITIS: A NEW THREAT TO PENGUINS

Allison D. Tuttle, DVM, Diplomate ACZM, Staff Veterinarian & Director of Animal Care at Sea Research Foundation’s Mystic Aquarium, 55 Coogan Blvd, Mystic, CT 06355

Eastern Equine Encephalitis (EEE) is a single stranded RNA arbovirus in the Family Togaviridae, Genus *Alphavirus* that causes disease in mammal and bird species. EEE is considered to be an emerging disease; it is currently found in North, Central, and South America and the Caribbean, but its range grows each year. In the United States it is most commonly found in the Gulf and Atlantic Coast states.

Transmission of the EEE virus is via the bite of an infected arthropod. The mosquito, *Culiseta melanura*, is the most common North American vector; however, ticks, mites, and lice can also transmit the virus. Direct transmission has been documented in infected poultry flocks via semen, feather picking, and cannibalism. North American passerines and columbiformes are only moderately affected by the EEE virus and can act as a reservoir, disseminating the virus to arthropod vectors potentiating the cycle of the virus. While the EEE virus is only moderately pathogenic to birds native to North America, it can severely affect domestic poultry and exotic birds such as penguins, sometimes causing death. Mammals and exotic birds are considered dead end hosts, meaning they do not amplify or disseminate the virus. The virology of EEE varies widely by species and has not been documented in many avian species to date.

In 2003, the African penguin collection at Mystic Aquarium was infected with the EEE virus. Fourteen out of the colony's twenty-two penguins contracted the EEE virus. Clinical signs were anorexia, depression, lethargy, behavioral changes, regurgitation, ataxia, recumbency, seizures, vomiting, and diarrhea. One apparently clinically healthy bird showing no clinical signs also tested positive for the virus. The common clinical course was as follows. On the first and second day of clinical signs, affected birds were acutely anorexic and lethargic and exhibited behavioral changes such as anti-social behavior. By the third and fourth day of illness, birds began regurgitating assist-fed or tube-fed food and began to be ataxic. By day five, birds either started to clinically recover, or worsened and started having seizures and became recumbent. As an animal recovered, the ataxia and the regurgitation took the longest to resolve. The average clinical course was 12 +/- 5 days of clinical signs. The hematologic and plasma biochemical profiles of birds with this disease were also predictable. From the onset of clinical signs through two weeks thereafter, birds displayed a moderate to severe heterophilic leukocytosis, mild regenerative anemia, hyponatremia and hypochloremia, and elevations in plasma AST, globulin, and triglycerides. From three to five weeks post the onset of clinical signs, affected birds showed a moderate mixed heterophilic and lymphocytic leukocytosis, monocytesis, severe non-regenerative anemia, elevated creatine kinase, and continued hyponatremia, hypochloremia, and elevations in AST and triglyceride. Thereafter, birds showed a slow resolution back to normal values; complete resolution of complete blood count and plasma biochemical abnormalities took 67 +/- 24 days post the onset of clinical signs. During this outbreak, a number of differential diagnoses were pursued; however, the birds tested positive for only the EEE virus. Clinically sick penguins had positive serologic titers to EEE at 1:1280, and all but one non-sick penguin exhibited negative titers. Positive titers were further confirmed by virus isolation and RT-PCR.

During the EEE outbreak, affected birds were treated with antibiotics, assist/force/tube feeding with vitamin supplementation to provide nutritional support during anorexia, metoclopramide to decrease regurgitation, fluid and electrolyte therapy as-needed to maintain hydration and proper electrolyte balance, and diazepam to control seizures. One bird was placed on itraconazole for a concurrent aspergillosis infection. One bird was administered phenobarbital to prevent seizures due to grand-mal seizure activity with good success. With intensive supportive care, thirteen of the fourteen affected birds survived. The one non-surviving bird was a seven-month old juvenile bird and it was euthanized due to progressively worsening condition despite intensive supportive care. Histopathology diagnosed a nonsuppurative encephalitis with necrosis and mineralization of the molecular layer of the cerebellum and white matter of the cerebrum and myocardial fiber necrosis and

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degeneration with interstitial histocytic myocarditis in the heart ventricle. The EEE virus was successfully isolated from the brain of this bird. Follow-up viral isolation attempts on recovered penguins were unrewarding.

This EEE outbreak in aquarium-maintained African penguins is the first case of this emerging disease in a penguin species and confirms that African penguins are susceptible to the virus. It is likely other penguin species are also susceptible. This case demonstrates that African penguins affected with EEE will show clinical signs which may be severe, will recover from the disease with intensive supportive care in most cases (juvenile and old birds may be less likely to recover), and will eliminate the virus following recovery. Facilities maintaining penguins should be vigilant in their on-campus mosquito control programs to help prevent EEE and other mosquito borne diseases such as West Nile Virus (WNV), and avian malaria. Options for this include regular removal of all standing water on campus as mosquitoes can breed in as small as a teaspoon of water, adding natural/nonchemical mosquito larvicides to ponds and drains, minimizing foliage near bird exhibits, placing screens on doors and fan intakes to keep mosquitoes out of the indoors spaces, and bringing birds indoors during peak mosquito hours of dusk and dawn when confirmed disease is present in the area. Finally, Fort Dodge produces a vaccine (West Nile Innovator + VEWT) that protects against WNV, Venezuelan Equine Encephalitis (VEE), EEE, and Western Equine Encephalitis (WEE). This vaccine has been used in African penguins in at least two North American facilities with good success in the prevention of disease and with minimal side effects (limited to partial or full day anorexia the day the vaccine was administered).

This case also has considerations for populations of wild penguins, especially the more temperate species that live amongst arthropod vectors. The EEE range has consistently expanded over the past decade. Should EEE expand to areas with native penguin populations that would be naïve to the virus, consequences could be severe. Considering the intensive supportive care that was required to recover the aquarium-maintained penguins from EEE, it is unlikely wild penguins that became infected would survive.

The above is a summary from a published article. The full citation is as follows: Tuttle, AD, Andreadis TG, Frasca S, and JL Dunn. 2005. Eastern equine encephalitis in a flock of African penguins maintained at an aquarium. *Journal of the American Veterinary Medical Association* 226(12): 2059-2062

A full pdf of the article can be obtained by contacting the author (atuttle@mysticaquarium.org).

**SIGNIFICANT HATCHES: Emperor Chick Hatches at SeaWorld San Diego, CA**

Linda Henry, SeaWorld aviculturist, introduces the 47 day-old to the emperor penguin colony for the first time. (Mike Aguilera, SeaWorld San Diego)

The emperor chick, now 66 days of age, is beginning to moult in juvenile feathers on her flipper tips. (Mike Aguilera, SeaWorld San Diego)
PENGUIN STATUS IN TROUBLED OCEANS


¹-CONICET, Argentina, pgborbor@cenpat.edu.ar; ²-University of Washington, U.S.; ³-British Antarctic Survey, U.K.; ⁴-Antarctic Research Trust, Germany; ⁵-Australian Antarctic Division, Australia; ⁶-CNRS, France; ⁷-University of California San Diego, U.S; ⁸-University of Otago, New Zealand; ⁹-Department of Environmental Affairs, South Africa; ¹⁰-Animal Demography Unit University of Cape Town, South Africa; ¹¹-Ministry of Fisheries and Marine Resources, Namibia; ¹²-Phillip Island Nature Parks, Australia; ¹³- The Peregrine Fund, USA; ¹⁴-Charles Darwin Foundation, Puerto Ayora, Galápagos Ecuador; ¹⁵-Galápagos National Park Service, Puerto Ayora, Galápagos, Ecuador; ¹⁶-University of Maryland, U.S. ¹⁷-Universidad Cayetano Heredia, Peru; ¹⁸-RSPB, U.K; ¹⁹-NOAA, U.S.

Marine and coastal ecosystems are undergoing unprecedented alterations in their processes and structure. Penguins are sensitive species impacted by these phenomena. As top predators, they are key constituents of marine ecosystems, and are indicators of the oceanic and coastal ecosystem health. We integrated the most updated information on distribution, abundance and trends for all penguin species. IUCN has listed 60% of the 18 penguin species as vulnerable or endangered. Some threatened species are at their lowest recorded populations: Galapagos, Yellow-eyed and Fiordland, with their restricted ranges, have less than 3,000 pairs; Humboldt, Snares and African, have less than 30,000 pairs. Even abundant species like the Macaroni, and the two Rockhopper species are in steep decline. Around 80% of the threatened species occur on islands, increasing their vulnerability to threats such as introduced predators. Threatened penguins are mainly concentrated in New Zealand, East-Pacific Coast (Galapagos and Peru-Chile), and South Africa. The status of penguin species is not improving. Anthropogenic sources of mortality are likely to increase and are drivers of the decline of penguins. Oceanic threats include climate change, marine pollution, and fisheries mismanagement. Prey availability potentially linked to climate variation is one of the most commonly suggested causes of population decline. Human activities, including irresponsible tourism, coastal development, and introduced predators, can have a major impact on penguin populations. As ocean samplers, penguins provide insight into the magnitude and location of marine conservation problems. Larger scale ecosystem-based conservation planning and more focused local efforts are needed for the successful conservation of many penguin species.

Introduction & Objectives

Marine and coastal ecosystems are undergoing unprecedented alterations in their processes and structure. Penguins are sensitive species impacted by these phenomena. As top predators, they are key constituents of marine ecosystems, and are indicators of the oceanic and coastal ecosystem health.

We integrated the most updated information on distribution, abundance and trends for all penguin species. We present their conservation status; identify threats and geographic location of most threatened species.

Methods

Data was provided by 32 penguin researchers from 10 countries.

We extracted information from a book written by these authors that will be published in 2011: Biology and Conservation of the World’s penguins (García-Borboroglu, P. and Boersma P. D. eds.) University of Washington Press, Seattle U.S.A.

Results

CONSERVATION STATUS

IUCN has listed 60% of the 18 penguin species as vulnerable or endangered (Table 1). In the last 20 years 9 species have been upgraded.

(Continued on page 10)
<table>
<thead>
<tr>
<th>SPECIES</th>
<th>IUCN STATUS 2010</th>
<th>Abundance (pairs)</th>
<th>Global Population Trend</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Humboldt Spheniscus humboldti</td>
<td>VU</td>
<td>24,000</td>
<td>Declining</td>
<td>E Pacific</td>
</tr>
<tr>
<td>2-Galapagos Spheniscus mendiculus</td>
<td>EN</td>
<td>1,828</td>
<td>Declining</td>
<td>E Pacific</td>
</tr>
<tr>
<td>3-Magellanic Spheniscus magellanicus</td>
<td>NT</td>
<td>1,000,000 – 1,300,000</td>
<td>Stable - slight decline?</td>
<td>S America</td>
</tr>
<tr>
<td>4-African Spheniscus demersus</td>
<td>EN</td>
<td>25,000</td>
<td>Declining</td>
<td>S Africa</td>
</tr>
<tr>
<td>5-Rockhopper Northern Eudyptes moseleyi</td>
<td>EN</td>
<td>190,000-230000</td>
<td>Declining</td>
<td>SE Atlantic, S Indian</td>
</tr>
<tr>
<td>6-Rockhopper Southern Eudyptes chrysoome</td>
<td>VU</td>
<td>1,230,000</td>
<td>Declining</td>
<td>S America, S Indian, AU/NZ</td>
</tr>
<tr>
<td>7-Little/Blue Eudyptula minor</td>
<td>LC</td>
<td>600,000</td>
<td>Stable - slight decline?</td>
<td>AU/NZ</td>
</tr>
<tr>
<td>8-Snares Eudyptes robustus</td>
<td>VU</td>
<td>24,000-29,000</td>
<td>Stable</td>
<td>NZ</td>
</tr>
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<td>9-Fiordland Eudyptes pachyrhynchus</td>
<td>VU</td>
<td>2,500-3,000</td>
<td>Declining (unclear)</td>
<td>NZ</td>
</tr>
<tr>
<td>10-Erect-crested Eudyptes sclateri</td>
<td>EN</td>
<td>81,000</td>
<td>Declining</td>
<td>NZ</td>
</tr>
<tr>
<td>11-Maccaroni / Royal Eudyptes chrysophus / E. schlegeli</td>
<td>VU</td>
<td>19,000,000</td>
<td>Declining</td>
<td>S America, S Indian, Antarctic, Sub Antarctic</td>
</tr>
<tr>
<td>12-Yellow-eyed Megadyptes antipodes</td>
<td>EN</td>
<td>1,700</td>
<td>Unclear / fluctuating</td>
<td>NZ</td>
</tr>
<tr>
<td>13-Adelie Pygoscelis adeliae</td>
<td>LC</td>
<td>4,000,000-5,000,000</td>
<td>Stable</td>
<td>Antarctic</td>
</tr>
<tr>
<td>14-Chinstrap Pygoscelis antarcticus</td>
<td>LC</td>
<td>7,500,000</td>
<td>Declining</td>
<td>Antarctic/Sub Antarctic</td>
</tr>
<tr>
<td>15 Gentoo Pygoscelis papua</td>
<td>NT</td>
<td>387,000</td>
<td>Increasing</td>
<td>Antarctic/Sub Antarctic</td>
</tr>
<tr>
<td>16-King Aptenodytes patagonicus</td>
<td>LC</td>
<td>&gt;1,000,000</td>
<td>Increasing</td>
<td>S Indian, SW Atlantic, S AU</td>
</tr>
<tr>
<td>17-Emperor Aptenodytes forsteri</td>
<td>LC</td>
<td>Unknown</td>
<td>Insufficient data</td>
<td>Antarctic</td>
</tr>
</tbody>
</table>

Table 1. IUCN Red List

IUCN Red List Codes: LC = Least Concern, NT = Near Threatened, VU = Vulnerable, EN = Endangered
ABUNDANCE
- Some threatened species are at their lowest recorded populations: Galapagos, Yellow-eyed and Fiordland, with their restricted ranges, have less than 3,000 pairs; Humboldt, Snares and African, have less than 30,000 pairs (Table 1).
- Populations of six species of penguin are above 1 million pairs.

TRENDS
Populations of at least 9 species are declining (Table 1), four are relatively stable and 2 are increasing (Table 1). Even abundant species like the Macaroni, Chinstrap and the two Rockhopper species are in decline.

THREATS
- Oceanic threats include climate change, marine pollution, and fisheries mismanagement. Prey availability, potentially linked to climate variation, is one of the most commonly suggested causes of population decline. Human activities, including irresponsible tourism, coastal development, and introduced predators, can have a major impact on penguin populations.
- Around 80% of the threatened species occur on islands, increasing their vulnerability to threats such as introduced predators.

GEOGRAPHIC VIEWPOINT
- Threatened penguins are mainly concentrated in New Zealand (Yellow-eyed, Snares, Fiordland and Erect-crested), East-Pacific Coast (Galapagos and Humboldt), and South Africa (African) (Fig 1)
- Only 43 penguin “hotspots” — where at least 1% of the global penguin population for each species aggregates to breed—are left in the world (Fig. 2; Boersma and Van Buren 2003)
Discussion
The status of penguin species is not improving. Anthropogenic sources of mortality are likely to increase and are drivers of the decline of penguins.
As ocean samplers, penguins provide insight into the magnitude and location of marine conservation problems. Larger scale ecosystem-based conservation planning and more focused local efforts are needed for the successful conservation of many penguin species.

References

RECOMMENDED REFERENCES

Provided by Roberta Wallace, DVM, Milwaukee County Zoo


THE GLOBAL PENGUIN SOCIETY (GPS): The Penguin Advocacy for the Ocean

Provided by Dr. Pablo Garcia Borboroglu, President, Global Penguin Society

The fragile conservation status of most penguin populations mirrors the Southern Oceans condition and larger marine conservation problems of the world’s oceans.

Abstract. Ocean conservation is crucial to life in the sea, on the land and to the quality of human life. We are living in an unprecedented age of alterations to marine systems. Penguins are particularly impacted by these phenomena, and the International Union for the Conservation of Nature (IUCN) listed 60% of penguin species as vulnerable or endangered. Variations in ecosystem structure, processes, and productivity, caused mainly by climate change, pollution, and overfishing impoverish living systems. Penguins are sensitive to these changes, and can reflect the status of oceans, providing information about the nature, magnitude, and location of priority conservation issues. Penguins can increase awareness of ocean health, making us reconsider our policies and behaviors. As charismatic, keystone seascape species, penguins can foster public and political support for integrated ocean conservation.

The GLOBAL PENGUIN SOCIETY (GPS) is an international alliance-building force that promotes the protection of penguin populations. Penguin research and conservation group efforts are being integrated synergistically, speeding penguin and ocean conservation efforts. GPS has three inter-related components: science, management, and education. The Global Penguin Society is crucial to promote not only the conservation of penguin populations, but also to develop and advocate solutions for sustainable activities and management for marine environments.

Challenge statement. We need the oceans. Life on Earth began in the ocean and the well being of the planet depends on its health. We are all connected to the oceans evolutionarily, emotionally, spiritually, and to a great extent economically. Ocean conservation is fundamental to assure that ecosystems function and humanity and other living forms thrive. Unfortunately, we have initiated an unprecedented age of alterations to marine systems. Penguins are a species group particularly impacted by these phenomena. As meso-predators, penguins are key constituents of marine ecosystems, and are indicators of the oceanic and coastal ecosystem health.

Penguins are flightless Southern Hemisphere birds. They are long-lived, lay one or two eggs, and take several months to raise their offspring. They breed in colonies, and they depend on marine food sources that are spatially and temporarily unpredictable. Penguins make use of very wide geographical areas in the ocean while foraging and during wintering migrations. As a consequence, they are particularly sensitive to variations in ecosystem structure and processes, caused mainly by climate change, marine pollution, and extensive overfishing.

Earth’s current climate variability is unequivocal. Moreover, the Antarctic and Sub-Antarctic region is warming five times faster than the average rate of Earth's overall warming. The temperature of the Southern Ocean water has warmed down to a depth of 3,000 meters. Alterations in the patterns of sea ice, pack ice and fast ice formation and melting, together with increasing rain and snow precipitations, have changed the breeding and feeding habitat quality and availability for several penguin populations. Temperate penguin species have also been altered by climate variation through the increase in the frequency and intensity of environmental cycles, such as the El Niño Southern Oscillation. Consequently, shifts in abundance and distribution patterns, including dramatic population declines, modifications of breeding chronology, and reproductive failures have occurred.

(Continued on page 14)
In addition, penguins are among the most conspicuous victims of marine pollution. They are particularly vulnerable to petroleum spills because they swim low in the water, surface regularly to breathe, do not fly and are less able to avoid petroleum than other seabirds. Mortality of penguins from accidental and chronic petroleum discharge is a long term and large scale problem, having killed thousands of penguins in Africa, South America, Australia and New Zealand, and even Antarctica. The African penguin populations, in particular, have been devastated by this threat, in combination with guano harvest, egging and fishing, showing a decline from 1.5 million a hundred years ago to 25,000 pairs. Approximately 40,000 Magellanic penguins were killed each year by oil pollution within their breeding range in Argentina in the 1980s. Although there are 25 organizations in Brazil, Uruguay and Argentina dedicated to washing oiled penguins, there is no group to draw together conservation efforts on penguins. Current trends in the economy of the countries where penguins breed or migrate indicate an exponential increase in petroleum development suggesting that the risk of petroleum spills will increase.

**Fisheries** are also a threat to penguins. Large scale industrial fisheries starting in the mid 20th century removed enormous numbers of fish from the Southern Oceans. Some prey species for Sub-Antarctic penguins, such as mackerel icefish are 10% of their population size prior to fishing. Commercial fishing has also reduced the carrying capacity of the Benguela ecosystem for penguins to only 10 to 20% of what it was in the 1920s, and hence it is not a surprise that African penguins declined by 90%. Fishing of anchovy in the Pacific Ocean contributed to the tremendous decrease of Humboldt penguin from a million in the 1930s to less than 30,000 now. Expanding fisheries in the SW Atlantic will increasingly compete with Magellanic penguins. As prey continues to be reduced by commercial fishing, and climate perturbation become more common, penguin colonies will be harmed.

Currently, some species of penguins face hazards within their colonies related to inadequate management of human activities, such as egging, irresponsible tourism, coastal development, and introduced predators.

**To what extent is the condition of the marine environment mirrored by penguin populations’ conservation status?** Penguins use a wide range of marine habitats covering hundreds and even thousands of kilometers in their foraging and wintering migrations. Therefore, they explore a relatively large portion of the vast Southern Oceans. In addition, their life history traits make them sensitive to the condition of their environment. As ocean samplers, they can serve as cost-effective indicators of the health of the oceans they inhabit, allowing us to have a better scientific insight into the nature, magnitude and location of priority marine conservation issues to address.

But science is not sufficient to fix conservation problems by itself. Most environmental problems have social roots, and the answers will only be found in the social arena. We need to increase awareness of what is happening to the ocean to catalyze changes in people’s behavior. Unmistakably, penguins are the perfect tool to inspire major changes in actions and choices of individuals, of businesses, of governments, and of the international community. Penguins, as a charismatic flagship species group, can create public and political interest and generate support. They can be a vehicle for integrated ocean conservation, and allow the protection of many other marine species and their habitats through ecosystem-based marine conservation planning. However, strategy, synergy and integration are lacking.

The goal of the Global Penguin Society is to promote the protection of penguin populations, helping them thrive through the environmental bottleneck the planet is undergoing, developing and advocating solutions for sustainable marine activities and management. Penguins are conservation objects as well as tools for ocean conservation. To achieve this goal we consolidated an alliance-building force called **The Global Penguin Society (GPS)**. This organization has three inter-related components: science, management, and education. The Society fosters the production and use of the good science needed for the conservation and adequate management of penguins and marine environments at local, regional, and global scales. To improve management, GPS uses science to educate communities, decision makers and provide recommendations for policy makers. The Society extends their impact by forming partnerships to meet common goals, integrating many conservation...
and research groups into a team, working synergistically. GPS is an international forum for conservation NGOs, academic and research institutions, individual projects, local communities and other partners to work together strategically for the conservation of penguins and oceans.

Some of the activities we are carrying out include:

1. Continue strengthening GPS as an international science-based penguin conservation coalition.
2. Create the IUCN Penguin Specialist Group.
5. Write a Book containing updated information relevant for conservation for all penguin species.
6. Collaborate and formulate advice for governments based on scientific, technical and empirical evidence.
7. Work through local partners with communities, linking local stakeholders to policy change using penguins, helping generate sustainable incomes mainly in developing countries.
8. Design effective communication strategies and campaign to reach specific audiences with clear messages.
10. Increase interaction through our website www.globalpenguinsociety.org where you can find updated information on all penguin species and details about GPS. It provides information and facilitates communication, also linking all conservation and management efforts to policy and decision makers, the media and other stakeholders.

GPS fosters the signature and implementation of multilateral agreements, like international declarations and protocols. Migration ranges often extend across borders of many countries, so we will promote the generation of regional conventions for the conservation of penguins.

Statement on the marine conservation impact. The oceans are in trouble, and so are penguins. Many species of penguins are becoming more endangered and the increasing anthropogenic sources of mortality are an important driving factor in their decline.

Penguin conservation problems are not necessarily based on the lack of data but on the lack of actions derived from those facts. We seek to provide direction in this endeavor, because people care about penguins and the problems are often well documented, but in many cases the lack of integration and the absence of a unified vision limits the scope of conservation achievements.

Earth’s current climate variability in addition to other threats is impacting directly on the iconic penguin species. Penguin status foreshadows the urgent need to protect oceans that sustain and enrich people’s lives and livelihoods. The Global penguin Society provides an opportunity to engage the public and couple scientists and managers to improving stewardship of penguins and oceans.

Finally, the Coalition will promote the generation and use of science-based conservation and increase integration of findings, help assess the status of penguin populations, educate and advise governments and communities, influence policies, take action through community-based processes when appropriate, and campaign through the media to educate people about how to improve the quality of life for both penguins and people.

Short references:
AZA GRANT RESOURCES

Tom Schneider, Penguin TAG Chair

There are a number of AZA institutions that award grants or funding for field conservation projects. Most are relatively small, from $1000 to $10,000, but some provide larger amounts. Below are the websites describing the grant opportunities, or if a website is not available, the institution and contact information for the person that can provide the grant information. More detailed information on all grants will appear soon on the Penguin TAG’s website; http://zoopenguins.org/about.html

The SeaWorld-Busch Gardens Conservation Fund
http://www.swbg-conservationfund.org/index.htm

The Disney Worldwide Conservation Fund
http://conservation.wdwpublicaffairs.com/

The AZA Conservation Endowment Fund
http://www.aza.org/cef/

Chicago Zoological Society
Grants up to $5000
http://www.czs.org/czs/CBOTGrant.aspx

John Ball Zoo Society Wildlife Conservation Fund
Grant amount are from $500 to $2500
http://www.johnballzoosociety.org/conservation.php

Riverbanks Zoological Garden
Grant amounts are from $1000 to $5000
Contact Ed Diebold at ediebold@riverbanks.org

Columbus Zoo and Aquarium
Grant amounts are from $1000 to $10,000
Funds for equipment
Contact Carrie Pratt at carrie.pratt@columbuszoo.org

Phoenix Zoo Conservation Grant Program
Grant amounts to $3000
Send inquiries to conservation@thephxzoo.com

St. Louis Zoological Park Field Research for Conservation Program
Grant amounts to $10,000
Contact Mike Macek at macek@stlzoo.org
BOOK REVIEW

Jessica Jozwiak, Editor PCN


On June 23, 2000, the iron-ore carrier MV Treasure sank off the coast of Cape Town, South Africa, spilling 1,300 tons of oil into Table Bay during the height of the African penguin breeding season. Not only would one of the most successful breeding seasons on record be lost, but the survival of 41% of the world’s population of African penguins, a species already classified by the IUCN as vulnerable, was imperiled.

For nearly a century, oil spills and oiled penguins have been commonplace in this region due to the high volume of shipping traffic which must travel through treacherous waters. After an oil spill disaster in 1968, SANCCOB (South African Foundation for the Conservation of Coastal Birds) was established as Cape Town’s first seabird rescue facility. Since their inception, they have become a leader in saving the lives of oiled and injured penguins, and other seabirds. Before the MV Treasure, the most devastating oil spill had been the Apollo Sea, another iron-ore carrier that sank off the coast of Dassen Island in 1994, oiling approximately 10,000 penguins. Only half of these penguins would survive. As the range of the MV Treasure spill expanded and hundreds of oil-soaked penguins began congregating on the beaches, SANCCOB along with local officials began to realize that the consequences of this spill would be devastating. A plea for help was sent to the international community, which would result in the largest and most successful animal rescue in history.

Dyan deNapoli, a penguin aquarist at the New England Aquarium, was one of 110 zoo and aquarium professionals and 12,500 volunteers from around the world that would travel to South Africa during the three-month rescue effort. She served as a rehabilitation manager during the initial phase, and in the Great Penguin Rescue, vividly describes her first-hand account of the rehabilitation of nearly 19,000 oiled penguins and over 3,300 abandoned chicks brought into the SANCCOB facility and the massive Salt River warehouse.

The Great Penguin Rescue also chronicles the ongoing plight of the African penguin. DeNapoli describes how a multitude of issues, most notably egg collection, guano harvesting and the depletion of their food source by overfishing, have all contributed to the decline of this species. African penguins have been impacted by oiling more than any other seabird. Approximately 1,000 oiled penguins arrive at SANCCOB every year due to mystery spills. The combination of these pressures has resulted in a 95% population decline in the last fifty years; fifty-percent of the population has been lost in the last ten years. These staggering numbers prompted an appeal by scientists to reclassify this species as endangered. As this book was going to press, the African penguin was listed as endangered on the IUCN Red List of Threatened Species and the U.S. Endangered Species Act.

DeNapoli not only provides well-researched and detailed documentation of this rescue effort, but also illustrates how individuals and groups from different factions can unite to make a difference. By the time the rescue effort came to a close, 59 facilities representing 14 countries would send specialists, which included penguin keepers and managers, veterinarians, and wildlife rescue workers. In addition, up to a 1,000 volunteers, most of which had no previous penguin care experience, arrived daily to assist. This enormous rescue effort would not have been successful without them.

Inspired by her experience during the rescue effort and her work with penguins, Dyan deNapoli left her job as a penguin aquarist and formed an educational company, The Penguin Lady. She is committed to raising awareness about penguin behavior and conservation through lectures and guest appearances, and donates a percentage of the proceeds from all lectures to penguin conservation efforts. DeNapoli is donating 20% of the proceeds from The Great Penguin Rescue to penguin rescue, conservation and research organizations, and Gulf oil spill rescue efforts. To find out more about Dyan deNapoli and read her blog visit www.ThePenguinLady.com.
RECOMMENDED WEBSITES

We recommend that you bookmark the following websites for frequent reference:


Penguin Watch is a newly launched website, the development of which began after discussions both at the 7th IPC as well as the recent Biodiversity Management Plan (BMP) held in Arniston, South Africa. Penguin Watch and an associated website SP-INFORM aim to provide tools for communication and collaboration about African penguins as well as other Spheniscus species. Dr. Richard Sherley, a member of the editorial board and primary contact for the website writes, “Penguin Watch is designed to disseminate up to date information about the issues facing penguins in the wild, especially the African penguin.” The target audience is “the community of individuals and organizations who take an interest in penguins, and especially those involved in captive management…” There are plans to deploy satellite transmitters onto juvenile African penguins in the coming months and Penguin Watch will be there to provide ongoing news as it happens. (SP-INFORM is password controlled; contact Dr. Sherley at richard[dot]sherley[@]uct[dot]ac[dot]za if you are interested in signing up).

**Seabirds.net**: [http://www.seabirds.net/](http://www.seabirds.net/)

The 1st World Seabird Conference (WSC) was held last September 2010 in Victoria, B.C., Canada. Over 950 participants from 40 countries attended the five-day conference (including many who had attended the 7th IPC the previous week). The conference was developed as a means to address the global issues and data needs of this diverse group of birds. 1st WSC workshop abstracts and summaries can be viewed at Seabirds.net along with a variety of links and resources. You can learn more about the 1st WSC at [http://www.worldseabirdconference.com](http://www.worldseabirdconference.com). Seabird.net says that future plans may include a second WSC possibly slated for 2015 or the formation of a World Seabird Union.

**Antarctic and Southern Ocean Coalition**: [http://www.asoc.org](http://www.asoc.org)

The Antarctic and Southern Ocean Coalition was formed in 1978. Since then it has been granted observer status in the Antarctic Treaty System (1991) and now attends annual meetings. It is an NGO advocating for Antarctic environmental protections including issues related to tourism, shipping and climate change and focuses efforts on participation in Antarctic governance, advocating for specific conservation goals and raising public awareness about the Antarctic. ASOC is working to create Marine Protected Areas (MPAs) in the Southern Ocean, e.g., in the Ross Sea. This website provides a wide variety of information on these topics via reports, news and publication updates and a blog. Anyone interested in the Antarctic should spend time exploring this website. In particular, we recommend readers view the Scientists’ Consensus Statement on Protection of the Ross Sea (now signed by 463 scientists from 37 countries) [http://www.asoc.org/storage/documents/MPAs/Ross_Sea_Scientists_Statement_November.pdf](http://www.asoc.org/storage/documents/MPAs/Ross_Sea_Scientists_Statement_November.pdf).

[Ed. Note: Thank you to Dr. Richard Sherley who provided information for this article. Other information was obtained from the websites listed.]