



Penguin Conservation

The Penguin TAG Newsletter

Volume 18; Number 2 November 2014



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OF ZOOS &
AQUARIUMS**

From the Editors

This issue features information about two New Zealand conservation organizations working to save the endangered yellow-eyed penguin. David McFarlane, Field Manager for the Yellow-eyed Penguin Trust, describes how YEP populations have endured low productivity, outbreaks of avian diphtheria, and unprecedented adult mortality for over a decade. The YEPT has been monitoring populations on mainland New Zealand and Stewart Island in an effort to better understand the causes of population decline. The group recently collaborated with the local fisheries and the Southern Seabird Solutions Trust to eliminate penguin bycatch.

McFarlane also provides information about the incidence of bill and cranial deformities seen in YEP chicks. The YEPT has been looking into potential causes for each, and also collaborated with veterinarians from Massey University to correct bill deformities. He describes how two sibling chicks were fitted with prosthetics that guided their scissor bills back into a normal position, resulting in their release back into the wild. Two posters explaining this corrective surgery were presented at IPC8 in Bristol last year.

Rosalie Goldsworthy, Manager of Penguin Rescue – Katiki Point Penguin Trust, provides a summary of all penguins admitted to the rehabilitation facility during the 2013/14 season. For over 20 years KPPT has operated the Penguin Hospital, rehabilitating and releasing sick and injured penguins. Katiki Point Penguin Trust also manages two yellow-eyed penguin reserves on the Moeraki Peninsula. Once bare pasture, these areas are now coastal forest habitat which support breeding colonies of YEPs.

Links for more information and to provide support for these organizations are as follows: Yellow-eyed Penguin Trust <http://www.yellow-eyedpenguin.org.nz/passion/support-the-trusts-work/become-a-trust-supporter> and Penguin Rescue - Katiki Point Charitable Trust <http://www.penguins.org.nz>.

The Penguin TAG steering committee convened at the AZA mid-year meeting in March 2014. Included is a summary of topics discussed, an update on AZA penguin programs and a current list of steering committee members. Please note that several items on the agenda have since been completed. Draft Breeding and Transfer Plans were posted for gentoo (Sharon Jarvis, September) and Humboldt (Alex Waier, October) penguins. Studbooks were published for Adelie (Lauren DuBois, July) and rockhopper (Amanda Ista, January) penguins. Population Viability Analyses (PVA's) were published between May and August for eleven penguin species currently *ex situ* in North America. The above listed documents can be found at www.aza.org in the Member's Only section.

The European Association of Zoo and Aquaria (EAZA) held a joint penguin TAG meeting in June 2014. Delegates from several countries were represented. A summary provides information on each of their penguin management programs.

In “*Waterpark*” for Penguins, Henry Doorly Zoo bird staff describe how they designed an enrichment water feature for their sub-Antarctic and African penguins.

Dr. Andrew Cushing describes an ongoing West Nile virus study in Humboldt penguins. Dr. Cushing received a grant from the American Association of Zoo Veterinarians (AAZV) for this study.

We thank all who have contributed to this issue including David McFarlane (Yellow-eyed Penguin Trust), Rosalie Goldsworthy (Penguin Rescue – Katiki Point Penguin Trust), Pierre DeWitt (Emmen Zoo), Jo Elliott (Edinburgh Zoo), Tom Schneider (Detroit Zoo), Stephanie McIntosh and Elizabeth Wickemeyer (Omaha's Henry Doorly Zoo), and Dr. Andrew Cushing (Cornell University).

And finally, we were very saddened to hear of the passing of Dr. Bernard Stonehouse this month. We feel privileged to have met him at IPC8, where he received a lifetime achievement award for having dedicated over 60 years to polar and penguin research. Dr. Stonehouse had numerous accomplishments in his lifetime. He was one of first individuals to observe the full breeding cycle of the emperor penguin. He authored numerous adult and children's books, and was instrumental in organizing the first International Penguin Conference in Dunedin, NZ. **We dedicate this issue to Dr. Stonehouse.** He was an inspiration for many and will be missed.

Penguin TAG Steering Committee

Chair: Tom Schneider, *Detroit Zoo*

Vice Chair: Heather Urquhart, *New England Aquarium*

Secretary: Gayle Sirpenski, *Mystic Aquarium*

Members: Sherry Branch, *SeaWorld of Orlando*, Ed Diebold, *Riverbanks Zoological Park*, Steve Sarro, *National Aviary*, Ric Urban, *Newport Aquarium*, Susan Cardillo, *Central Park Zoo*, Mary Jo Willis, *Denver Zoo*, Stephanie Huettner, *Omaha's Henry Doorly Zoo*, Diane Olsen, *Aquarium at Moody Gardens*, Geneve Darnell, *Jacksonville Zoo*, Mike Macek, *St. Louis Zoo*, Lauren DuBois, *SeaWorld San Diego*, Alex Waier, *Milwaukee County Zoo*

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

Current Threats Facing Yellow-eyed Penguins and New Conservation Initiatives

David McFarlane, *Field Manager, Yellow-eyed Penguin Trust, New Zealand*

The yellow-eyed penguin's (*Megadyptes antipodes*) mainland New Zealand & Stewart Island populations have in the past decade endured disastrous breeding seasons, periodic outbreaks of avian diphtheria, poor foraging and an unexplained adult mortality event unprecedented since 1990/91. A repeat of these events could put the continued survival of the penguin on the mainland in doubt.

Endemic to the south-east coast of New Zealand's South Island, Stewart Island and the sub-Antarctic Auckland & Campbell Islands, the yellow-eyed penguin is split into two conservation management units, mainland (400-600 breeding pairs) & sub-Antarctic (870-1100 pairs) (Seddon et al 2013).

Classified as "Endangered" by the IUCN on the basis of its restricted breeding range, poor quality terrestrial breeding habitat and extreme fluctuations in population numbers, the recent disastrous breeding seasons have been particularly concerning (2010 IUCN Red List).



Trust Field Manager, David McFarlane, noting info about dead YEP.



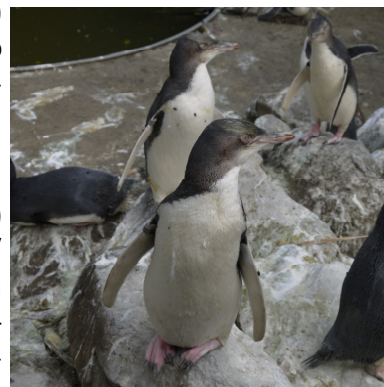
Adult and chicks at Long Point November 2012.

In the 2012/13 breeding season, at least 68 adult yellow-eyed penguins died of unexplained causes on the Otago Peninsula, the stronghold of the mainland population. Despite extensive testing by researchers from the University of Otago and Massey University, no evidence of infectious diseases or trauma were found and it was considered that marine bio-toxins or a toxic agent were responsible (Hunter et al 2013).

The 2013/14 season was unusual throughout the mainland range, with extended egg laying, and lightweight chicks reflecting a poor foraging season most likely connected with warmer sea surface temperatures associated with a La Nina weather pattern. This mirrors similar comments from Professor Dee Boersma about the breeding season of Magellanic penguins at Punta Tombo reported in *Penguin Conservation Newsletter* (v.18; No. 1 – March 2014).

At the Trust's Long Point Reserve (Catlins District, south of Otago Peninsula) average fledging chick weights dropped almost a full kilogram, from 4.95 to 3.99kg in 2013/14, necessitating the removal of more than 30 chicks for supplementary feeding at the Penguin Place rehabilitation facility.

Further south on Stewart Island, Yellow-eyed Penguin Trust staff recorded a decline in chicks fledged per nest to 0.78 chicks (Codfish Island/Whenua Hou) and 0.6 chicks (Bravos Islands) and low reproductive success (no. fledged / no. eggs laid) from 45% and 47% in 2012/13 to 40% and 31% in 2013/14. While a long-lived seabird like the yellow-eyed penguin can withstand occasional poor breeding seasons, what confronts them now is successive years of low reproductive output.



YEP chicks in rehab at Penguin Place March 2014.

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Avian diphtheria has affected breeding success on Otago Peninsula since 2002, with further outbreaks in 2004, 2006, and the most recent large scale outbreak in November/December 2010 killing 42 chicks at Boulder Beach, Otago Peninsula. The disease affects young chicks, which exhibit diphtheritic mouth lesions causing death from starvation or pneumonia from the ingestion of the lesions. *Corynebacterium amycolatum* was isolated by Massey University microbiologists from chicks affected in 2010, the same bacterium found in the earlier outbreaks. It is hypothesised that an unidentified pox virus is causing the lesions and *Corynebacteria* is a secondary infection (Young 2010).

The Yellow-eyed Penguin Trust has also been exploring yellow-eyed penguin interactions with fisheries and has been discussing potential mitigation solutions with trawler and set net fishermen. This includes assisting with research into yellow-eyed penguin visual acuity and colour perception of set nets. Set netting is a fishing technique that has previously been observed by Ministry for Primary Industries observers to catch yellow-eyed penguins.



Release of rehabilitated chicks Otago Peninsula following adult mortality March 2013.

In a joint venture with local Otago fishermen and the Southern Seabird Solutions Trust, a DVD "Sharing Worlds" was filmed in February 2014 that has brought the conservation and fishing worlds together in a collaboration that the Trust hopes will allow each side to understand the others point of view and lead to the elimination of the bycatch of yellow-eyed penguins. For more information on the film visit: <http://www.yellow-eyedpenguin.org.nz/people/news-and-updates/sharing-worlds--seabirds-and-fishing>.

Unfortunately successive funding applications have been unsuccessful. These efforts include a recent application for a large Yellow-eyed Penguin Trust led multi-disciplinary marine based research project to examine the question of "what are the drivers of marine productivity" including consideration of the role of disease, as well as one in 2009 to investigate avian diphtheria.

The last decade of yellow-eyed penguin conservation has been extremely challenging. The initiatives described, arguably, offer the best hope for the survival of this penguin species, but without funding the future remains uncertain.

Unfortunately it seems that Dee Boersma's description of the penguin as a marine sentinel, reflecting the health of the wider ecosystem, has been borne out by the recent experiences of the yellow-eyed penguin.

Hunter S., Gartrell B, Roe W. and Alley M. Pathological investigation of a yellow-eyed penguin mass mortality (Jan to March 2013), (Internal report, 22 May, 2013, unpublished) Wildbase, Massey University, Palmerston North.

Gill, L.M. and J. T. Darby. Deaths in yellow-eyed penguins (*Megadyptes antipodes*) on the Otago Peninsula during the summer of 1990. New Zealand Veterinary Journal 41, 39-42, 1993.

IUCN. 2010. IUCN Red List of Threatened Species; <http://www.iucnredlist.org> (accessed 24 July 2014).

Seddon, P., U. Ellenberg and Y. Van Heezik. 2013. Yellow-eyed Penguin (*Megadyptes antipodes*). In Penguins Natural History and Conservation, ed P. Garcia Borboroglu and D. Boersma, 91-110. Seattle: University of Washington Press.

Young, M. A bad taste in the mouth – avian diphtheria in hoiho chicks. DOC Rare Bits Newsletter December 2010 (www.rarebits.co.nz).

Yellow-eyed Penguin Bill and Cranial Deformities

David McFarlane, *Field Manager, Yellow-eyed Penguin Trust, New Zealand*

Every year at fledging time the Yellow-eyed Penguin Trust weighs, measures and transponders over 100 yellow-eyed penguin chicks, and around 1-2 annually have crossed or scissor bills.

In 2013/14 two sibling yellow-eyed penguin chicks were picked up by Trust rangers at our Otapahi reserve (Otago Peninsula) during the fledging check with scissor bills. They were flown to Wildbase, Massey University, where they were examined and treated by the vets. The bills were mal-



Otapahi scissor bill YEP chick # 1 January 2014.

-aligned and as a result the tips had become overgrown. After CT scans the lower bills were surgically shortened and a prosthesis made from epoxy putty was attached to the upper bill, which acted to guide the lower bill into the correct position. Dr Serena Finlayson

(s.t.finlayson@massey.ac.nz), one of the veterinary residents at Wildbase, presented a poster on the surgical correction and use of prostheses on these YEPs at the 2014 International Aquatic Animal Medicine conference held at SeaWorld on the Gold Coast in May. Two posters dealing with corrective bill surgery were presented at the 8th International Penguin Conference in Bristol and are referenced below.

While scissor bill deformities are observed regularly, an outbreak of craniofacial deformities in yellow-eyed penguin chicks in 2008/09 was much rarer. No similar reports of mass outbreaks amongst seabirds were found in the scientific literature (Buckle et al 2014).

Okia Reserve (231ha) on Otago Peninsula was the first reserve purchased by the Yellow-eyed Penguin Trust in 1991. During the 2008-09 breeding season severe craniofacial deformity was found in 8 chicks. Six were euthanized for post mortem examination.

Yellow-eyed Penguin Trust Ranger Leith Thomson who discovered the chicks knew something was wrong even before seeing them up close. As he described them “they looked like hunched up, wheezing old men”.



Dorsal view of Otapahi scissor bill YEP chick January 2014.



Otapahi scissor bill YEP chick # 2 January 2014.



General view YEP nesting area north end Okia, scene of craniofacial deformities.

No cause was discovered despite extensive testing and review of land management practices at the site and adjacent marine area. Buckle *et al* postulated that the nature of the deformities suggested a point-source teratogenic event, such as genetic mutation, hyperthermia, or a toxic insult.

While the cause remains unclear the Trust has responded to the possibility of hyperthermia being a cause by carrying out a planting programme of native trees and shrubs at Okia in the penguin nesting area to provide more shade and cooler nesting opportunities.

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Behbehani S, Dimapilis-Resueno A. An isolated case of beak injury in a female African penguin at The Scientific Center, State of Kuwait. Poster session presented at: 8th International Penguin Conference; 2013 September 2-6; Bristol, UK.

Buckle KN, Young MJ & Alley MR (2014): Investigation of an outbreak of craniofacial deformity in yellow-eyed penguin (*Megadyptes antipodes*) chicks, New Zealand Veterinary Journal, DOI:10.1080/00480169.2014.906332.

Finlayson, S (Wildbase, Institute of Veterinary, Animal and Biomedical Sciences, Massey University) Cross-billed chicks. Hoiho – Yellow-eyed Penguin Trust Newsletter, May 2014.

Shaw T, Stander N, Steenkamp G. A collective effort to save yet another African penguin: Beak's long journey to recovery. Poster session presented at: 8th International Penguin Conference; 2013 September 2-6; Bristol, UK.



View of Okia north-end nesting area and Victory Beach.

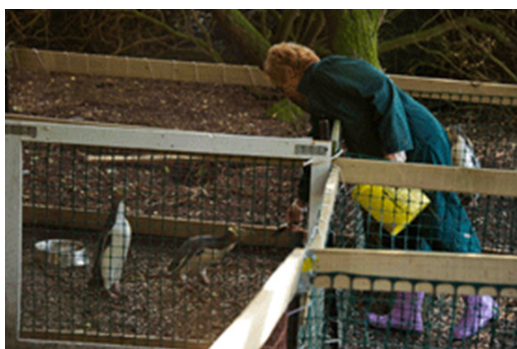
Photo credits for both Yellow-eyed Penguin Trust articles courtesy of YEPT.

Penguin Rescue - Katiki Point Charitable Trust: 2013/14 Summary of Rescues and Returns

Rosalie Goldsworthy, Manager, Penguin Rescue - Katiki Point Charitable Trust, Moeraki, New Zealand

Our most labour-intensive strategy for rescuing penguins involves picking up shipwrecked penguins from the local beaches and treating, rehabilitating, and then releasing them.

The birds we rescue are compromised and on the beach because they cannot cope in the ocean – it may be temperature related or due to exhaustion. Either way, without help, they will very likely die so we bring them into care. This season just gone we rescued 124 penguins.



Rosalie Goldsworthy, Manager, feeding rescued YEPs at Penguin Rescue.



Yellow-eyed penguins at Katiki Point.

Once the penguins have recovered and meet the release criteria, they are then released. This takes an average of 30 days. Because we have a safe place to let them go, we can do a soft release. This means carrying them down to the shore and putting them into a pen with a view of the water for a week. They are fed once a day and then the gate is opened and they are free to go. Some leave immediately and some stay on, getting fed daily until they choose to leave. See table below for our season statistics.

Summary of all penguins admitted to the Penguin Rescue rehabilitation facility in the 2013/14 season.

		Total	Proportion of total	Dead	Release rate
Yellow-eyed penguins from North Otago					
	adults	26	25%	1	96%
	juveniles	38	36%	2	95%
	pre-fledging chicks	36	34%	3	92%
	post-fledging chicks	6	6%	1	83%
	total	106		7	93%
Yellow-eyed penguins from Otago Peninsula					
	adults	1		0	100% at Otago peninsula
	juveniles	9		0	100% at Otago peninsula
	total	10			
Other species:					
Rockhopper penguin		1		0	100%
Fiordland crested penguin		1		0	100%
Snares crested penguin		2		0	100%
Erect-crested penguin		2		1	100%
White-flippered penguin		1		0	100%
Little penguin		1		0	100%
Total of all penguins		124		8	94%

Photos courtesy of Rosalie Goldsworthy.

Penguin TAG Meeting Summary - AZA Mid-Year March 2014, Memphis, TN

Steering Committee – *Tom Schneider, Detroit Zoo*. All SC members that were present were introduced. See Addendum A for the current Steering Committee members.

RCP Update - *Tom Schneider, Detroit Zoo*. The Regional Collection Plan that was approved in 2010 is due to be updated at the end of the year. A space survey request was sent out in April. We need an 80% response rate so please complete it as soon as you can.

Animal Care Manuals - *Tom Schneider, Detroit Zoo*. The Penguin ACM has undergone two edits and the last edit was sent to AZA in early May. This should be approved and distributed this summer.

Species Update - *Tom Schneider, Detroit Zoo*. An update on the status of all program species was presented. See Addendum B.

Population Viability Analysis - *Lisa Faust, Lincoln Park Zoo*. Lisa gave a presentation on the penguin PVAs that are currently being analyzed by the Alexander Center for Applied Population Biology and the Population Management Center at the Lincoln Park Zoo. These reports will identify each population's challenges and develop key actions needed to improve or sustain the population's viability. These reports will be posted on the AZA website on each SSP's page, and emails will be sent to notify penguin IRs and program leaders as each report is posted. See <http://www.lpzoo.org/conservation-science/project/modeling-future-zoo-and-aquarium-populations>.

Education Committee Report - *Elizabeth Mulkerrin, Omaha's Henry Doorly Zoo*. The Education Committee had several conference calls and met at the National AZA conference in KC. They developed a survey to determine the needs of AZA organizations and to develop an education action plan.

The results of the survey are:

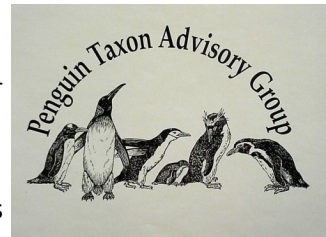
- ◆ The penguin community needs and wants a place to get the resources for public and informal science education programs on conservation issues, activities and curriculum pieces, and messaging.
- ◆ How do you find reliable information/resources related to penguins?
- ◆ People don't use Penguin TAG website much. They get some information from AZA website and Listserv.

The Education Committee recommends the following actions:

- ◆ Develop a Penguin TAG message that focuses on the big global issues that impact penguins.
- ◆ Disseminate messages and resources.
- ◆ Further development of the website to be used as a resource.
- ◆ Developing a tool kit for messages to zoos and aquariums.

Education and Outreach Penguins - *Steve Sarro, National Zoo*. These programs have become very popular in recent years. Steve Sarro gave a presentation discussing the pros and cons of penguin programs and many of the challenges of an outreach program. Many considerations must be reviewed before the outreach program is set into place. While exceptionally effective, these programs should not be entered into lightly but thoughtfully with long-term husbandry and SSP needs in mind. Please contact Steve for additional information.

Humboldt Penguin Reports - *Mike Macek, St. Louis Zoo*. Mike gave a report on a summit meeting he attended in Lima, Peru with Humboldt Penguin Conservation Partners Sean Putney, Kansas City Zoo, Mike Adkesson, Brookfield Zoo and Peruvian NGO, The Center for Environmental Sustainability. The summit identified action



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Penguin TAG Meeting Summary continued

items required to submit a Ministry of the Environment management application for Punta San Juan. Punta San Juan was incorporated into the Peruvian Protected Areas System in 2009. Due to the lack of resources the Peruvian government does not have the resources to manage Punta San Juan. Peru does have a mechanism by which a Peruvian private entity or NGO can apply for a management contract.

Patty McGill, Dallas Zoo, reported on the ongoing Humboldt census work in Peru. A summary of the report is titled, *15 Years and Counting: The Status of Humboldt Penguins in Peru Based on Annual Censuses*.

Penguin Conservation Newsletter - *Linda Henry, Sea World San Diego*. The spring edition of the TAG's newsletter, *Penguin Conservation*, was distributed in March. It is posted on the ASAG website. The editors, Linda Henry Linda.Henry@SeaWorld.Com and Jessica Jozwiak jjozwiak@dzs.org are looking for articles for this publication. Contact them if you would like to contribute or would like to be added to the distribution list.

Eighth International Penguin Conference (IPC) – *Heather Urquhart, New England Aquarium*. This conference was held 2-6 September 2013 in Bristol, UK. Ten AZA institutions were represented including Detroit Zoo, New England Aquarium, St. Louis Zoo, Sea World San Diego, Mystic Aquarium, National Zoo, Indianapolis Zoo, Moody Gardens, Riverbanks Zoo, and Woodland Park Zoo. The 9th IPC will be held in South Africa in 2016 and the 10th in New Zealand in 2019. Contact Heather for more information.

Addendum A. Steering Committee Members

Name	E-mail address	Institution	Title	Term
Tom Schneider	tschneider@dzs.org	Detroit Zoo	Chair	
Heather Urquhart	hurquhart@neaq.org	New England Aquarium	Vice-Chair	2012-2015
Gayle Sirpenski	gsirpenski@searesearch.com	Mystic Aquarium	Secretary	2014-2016
Sherry Branch	Sherry.Branch@SeaWorld.com	SeaWorld of Orlando		2012-2014
Ed Diebold	ediebold@riverbanks.org	Riverbanks Zoo		2012-2014
Steve Sarro	SarroS@si.edu	National Zoo		2012-2014
Rick Urban	rurban@newportaquarium.com	Newport Aquarium		2012-2014
Susan Cardillo	scardillo@wcs.org	Central Park Zoo		2012-2014
Mary Jo Willis	mjwillis@denverzoo.org	Denver Zoo		2013-2015
Stephanie Huettnner	registrar@amahazoo.com	Omaha Zoo		2014-2016
Diane Olsen	dolsen@moodygardens.com	Moody Gardens		2014-2016
Geneve Darnell	darnell@jacksonvillezoo.org	Jacksonville Zoo		2014-2016
Mike Macek	macek@stlzoo.org	St. Louis Zoo		2014-2016
Lauren DuBois	Lauren.Dubois@SeaWorld.com	SeaWorld San Diego		2013-2015
Alex Waier	Alex.Waier@Milwcnty.com	Milwaukee County Zoo		2013-2015

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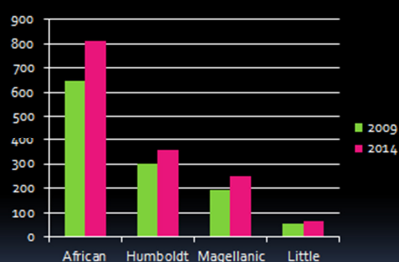
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Penguin TAG Meeting Summary continued

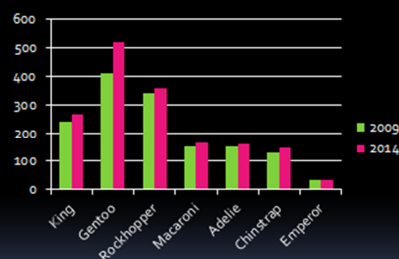
Addendum B. Penguin Programs, March 2014

Species	Program Status	Program Manager	Date of Last Plan	Date of Last Studbook	No. of Specimens	No. of Institutions	IUCN Status
African Penguin	GREEN SSP	Steve Sarro National Zoo	Nov-13	Jun-13	812 (428.376.8)	48	VU
Humboldt Penguin	GREEN SSP	Alex Waier Milwaukee Zoo	Aug-13	Aug-13	355 (181.172.2)	19	VU
Magellanic Penguin	GREEN SSP	Nancy Gonzalez Bronx Zoo	Mar-12	Nov-11	247 (134.108.5)	15	NT
Short-crested Rockhopper Penguin	GREEN SSP	Amanda Ista Milwaukee Zoo (Currently Vacant)	Feb-12	Jan-14	328 (142.169.17)	19	VU
Macaroni Penguin	GREEN SSP	Jessica Jozwiak Detroit Zoo	Mar-11	Dec-09	163 (77.78.8)	7	VU
King Penguin	GREEN SSP	Linda Henry SeaWorld San Diego	Oct-13	Mar-13	266 (135.117.14)	16	LC
Gentoo Penguin	GREEN SSP	Sharon Jarvis SeaWorld Orlando	Feb-12	Jun-12	520 (220.251.49)	17	NT
Adelie Penguin	GREEN SSP	Lauren DuBois SeaWorld San Diego	Mar-12	Mar-10	155 (78.75.2)	3	LC
Chinstrap Penguin	YELLOW SSP	Bob Flores SeaWorld San Antonio	Mar-07	Feb-14	147 (74.66.7)	4	LC
Little Penguin	YELLOW SSP	Heather Urquhart New England Aq.	Oct-11	Jan-14	64 (32.32)	4	LC
Long-crested Rockhopper Penguin	RED PROGRAM	Amanda Ista Milwaukee Zoo (Currently Vacant)	Feb-12	Jan-14	34 (20.14)	5	END
Emperor Penguin	MONITORED	Linda Henry SeaWorld San Diego			32 (14.18)	1	LC

Temperate Penguins



Sub-Antarctic/Antarctic Penguins



EAZA Penguin TAG Meeting, June 2014, EAZA Bird TAG Meetings, Alpen, Netherlands

Including European (EAZA), American (AZA) and Japanese (JAZA) Penguin TAG Information

EAZA (European Association of Zoos and Aquaria) Penguin TAG - Chair: *Pierre De Wit, Emmen Zoo; Vice-Chair: Jo Elliot, Edinburgh Zoo:*

- ◆ Varying role of penguins in different regions.
- ◆ What is the value and feasibility of a GSMP (Global Species Management Plan)?
- ◆ Need to consider space, expertise, species uniqueness, institutional demand, welfare/ethics, and policies.
- ◆ EAZA Regional Collection Plan (RCP) - Decision tree regionally based now, but want to expand to be more globally based.

Center for Conservation in Punta San Juan, Peru - *Mike Macek, St. Louis Zoo:*

- ◆ Area of importance for Humboldt penguins and favorable area for food for birds
- ◆ Largest breeding area for Humboldts in Peru [~40,000]
- ◆ Threats from predation, disturbance to nesting areas, hunting, industrial fisheries [2nd largest unregulated fishery in the world] compete with penguin for food, guano harvesting
- ◆ San Juan Consortium: St. Louis Zoo, Brookfield Zoo and Philadelphia Zoo started in 2001 to protect site—built a wall to protect guano resource [from cormorants] which also protects the penguins; provided funding to provide permanent staff; partner with ACOREMA NGO which does education outreach to local communities
- ◆ 2013 Int'l penguin conference in Bristol UK presented information on project
- ◆ 2012 3rd sustainable guano harvest “penguin safe” which blocks off areas for the birds so that harvesting can still occur; 45 volunteers helped from around the world including 21 volunteers from Peru
- ◆ Project does censusing of wild populations, annual health assessments of penguins, but also non-penguin species as well.
- ◆ In 2009, guano site incorporated into “Peruvian Protected Area” system

AZA (Association of Zoos and Aquariums) Penguin TAG - Chair: *Tom Schneider, Detroit Zoo:*

- ◆ 5th Regional Collection Plan (RCP) due January 2015. General overview of TAG, mission statement, action plan, space survey; estimated space for ~3800 birds in 5 years
- ◆ TAG newsletter provides information for field researchers and zoo managers
- ◆ RCPs available to EAZA members
- ◆ Many arctic populations started out from egg collecting by SeaWorld in the early 80s and have been managed well since that time [hence large number of green SSPs].

AZA Population Viability Analysis (PVA) Project overview — *Lisa Faust, Lincoln Park Zoo:*

- ◆ Working with AZA Penguin TAG to determine long term sustainability and factors impacting captive population; enable global community to identify regional specialization; challenges identified: space restriction for arctic species, limited centers of breeding expertise, large demographic gaps in many populations

JAZA (Japanese Association of Zoos and Aquariums) Penguin TAG — *Masanori Kurita, Port of Nagoya Public Aquarium:*

- ◆ 12 species represented in zoos [5 species managed as species management program; remaining species managed as studbooks]

Emperor penguin:

- ◆ EAZA: Not managed
- ◆ AZA: 32 at SeaWorld San Diego - aging population; monitored by SWSD. Species is likely to be phased out.
- ◆ JAZA: 21 birds in two zoos; only one pair breeding; birds seem unusually small - perhaps related to permit which required they only collect small chicks; increase communication between AZA and JAZA

King penguin:

- ◆ EAZA: 246 birds in EAZA in 15 zoos; population skewed towards males; 14 hatches in 6 zoos in 2013; population growing thru births vs imports in the last few years
- ◆ AZA: 266 birds in 16 zoos; green SSP with projections of 95% GD in 100 years. AZA could increase breeding for export to other regions; DNA sex eggs could help with supplying correct sexes to other regions
- ◆ JAZA: 289 birds in 27 zoos represented by two subspecies, studbook keeper hesitant to merge populations but not managed separate in other regions

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EAZA Penguin TAG Meeting continued

Gentoo penguin:

- ◆ EAZA: 470 birds split into two subspecies; both populations sustainable in EU but population not growing fast enough to meet demand for birds
- ◆ AZA: Green SSP [95% GD at 100 years] with 520 birds at 17 zoos; breeding restricted but could breed to meet demand for other regions; managed as one population vs splitting into 2 subspecies
- ◆ JAZA: Managed as two populations with over 350 birds total; population increasing; genetic work shows little genetic variation in wild populations

Chinstrap penguin:

- ◆ EAZA: No program; 26 birds in two zoos aging, non-breeding population; need to determine relatedness and future birds in EU
- ◆ AZA: Yellow SSP with 147 birds in four zoos but expect to be green SSP soon; at carrying capacity; possible for export to EAZA
- ◆ JAZA: 80 birds in two zoos; breeding export to zoos in China; separate genetic population from AZA and EAZA

Adelie penguin:

- ◆ EAZA: Just four birds left, phase out
- ◆ AZA: 160 birds at three zoos; green SSP; maintain [not grow] population
- ◆ JAZA: 180 birds in four zoos; reached carrying capacity

Little blue penguin:

- ◆ EAZA: No birds in Europe but there is interest and a zoo wants to champion the species; good example of regional roles
- ◆ AZA: 64 birds at three zoos; yellow SSP with GD (Genetic Diversity) struggling; MOU (Memorandum of Understanding) between AZA and ZAA to work cooperatively to bolster population; import arriving from AUS summer '14
- ◆ ZAA (Zoo Aquarium Association, Australasian Region): 220 birds in 16 zoos managed at subspecies level; male skewed population; pedigree mostly known; two zoos breed reliably; birds occasionally come in from rehab sources; Int'l studbook run by Nick Boyle Taronga Zoo; AUS government considers western wild population separate and Perth Zoo has removed their population of birds and manages it separately for release back to the wild; would like to see collaborative effort in husbandry

African penguin:

- ◆ EAZA: ~2000 birds in 49 zoos; <10% known pedigree; encourage SANCCOB support from EAZA members
- ◆ AZA: Green SSP with 812 birds in 48 zoos; encourage SANCCOB support from AZA members; species is in high demand so needs lots of breeding each year
- ◆ JAZA: 412 birds in 19 zoos; eggs from hybrids recommended to be broken
- ◆ PAAZA (Pan-African Association of Zoos and Aquaria): In situ and ex situ collaboration; 8 zoos with birds; talking with conservation authorities about release to the wild to areas where the fish are [new areas]

Humboldt penguin:

- ◆ EAZA: Studbook outdated but data entry is progressing; ~2500 birds in 80 zoos; EEP committee developed for dealing with numbers of birds – welfare issues related to surplus birds
- ◆ AZA: 355 birds at 19 zoos; green SSP; <94% GD at 100 years
- ◆ JAZA: ~2000 birds at 70 zoos

Magellanic penguin:

- ◆ EAZA: 116 birds in 9 zoos; not a program species now, but recommendation is to make it one
- ◆ AZA: 247 birds; green SSP with GD >90% in 100 years
- ◆ JAZA: Population stable now, but will decrease in the future; founder number small; need to exchange birds with EAZA

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EAZA Penguin TAG Meeting continued

Macaroni penguin:

EAZA: 50 birds in two zoos; interregional cooperation good idea for management in EU

AZA: 163 birds in 7 zoos; green SSP with >GD at 100 years; not bred as well as other AZA species

JAZA: 18 birds in 6 zoos; need to work globally

Rockhopper penguin:

- ◆ EAZA: [Northern race 77 birds in 5 zoos] but really one population breeding well; demographic, breeding husbandry problems; recommendations for EEP population; [southern race 55 birds in 5 zoos not sustainable]
- ◆ AZA: 318 birds at 5 zoos; Red program with GD <70% in 100 years; demographics OK but genetics are poor; need to work with EAZA if want to keep population, but otherwise phase out
- ◆ JAZA: 65 birds [northern race] population decreasing but believed due to poor husbandry so if this can change, population may rebound

AZA Animal Care Manual: Draft submitted and awaiting 30 day review period

EAZA Manual: 15 years old and needs to be updated; merge experience with AZA and JAZA

EAZA Avian Malaria update: Establishing new guidelines; working to unify projects and research into a 3 year action plan. Update results every 3 years

Ongoing Study: West Nile Virus Maternal Antibody Transmission and Vaccine Protocols in the Humboldt Penguin

Dr. Andrew Cushing, *Department of Clinical Science, Cornell University*, 2013 AAZV Research Grant Recipient
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Penguins are one of the most instantly recognised and iconic birds in the world. They have been portrayed in numerous films, TV programmes and children's books – where their unusually upright stance and waddling gait endear themselves to people of all ages.

There are at least 18 different species of penguin worldwide which live exclusively in the southern hemisphere and not always in cold climates. Humboldt penguins (*Spheniscus humboldti*) are a threatened South American species that are kept in zoological institutions worldwide, and it is for work in this species that I was awarded the American Association of Zoo Veterinarians (AAZV) grant for research into West Nile Virus <http://www.aazv.org/?page=916>.

West Nile Disease can affect and kill captive penguin species. Although many zoos vaccinate their animals and try to reduce exposure to mosquitoes which transmit the virus, outbreaks have been reported in the literature. The purpose of our research is to assess how well the penguins respond to the vaccine and how vaccination prior to laying eggs affects antibody levels in the chicks. In addition, I am investigating how long the maternally derived antibody titres persist in the chicks and at their response to vaccination. Antibody titres are measured in blood from the birds and yolk from eggs from pairs of birds deemed too closely related to produce genetically viable offspring. Venipuncture in penguins can be a challenge, especially with their strong beak and propensity to wiggle at just the wrong time. They are not as cute and cuddly as the books and television shows would have you believe!

We are utilizing two populations of Humboldt's from the Rosamond Gifford Zoo and a partner institution. We are still collecting data. I hope that the results of these investigations can be used to provide a platform for the development of an assigned and useful vaccination protocol to protect this wonderful species. And that measurement of antibody titres can be used in ex situ situations to better assess vaccine needs or uses in order to provide a higher level of protection for our North American populations.

I would like to sincerely thank the AAZV for their kind and generous award of the research grant.

“Waterpark” for Penguins

Stephanie McIntosh, *Aquarium Bird Keeper* and Elizabeth Wickemeyer, *Senior Keeper, Bird Department, Omaha’s Henry Doorly Zoo and Aquarium*

At Omaha’s Henry Doorly Zoo and Aquarium, the bird department is always thinking of new enrichment items for their animals.

One enrichment idea came about because keepers noticed that the penguins love to play with water. During cleaning tasks with a 3” hose (to melt snow) and a 1” hose (for rockwork and windows) keepers observed that the birds, especially the rockhopper penguin chicks, ran through the water streams. To further encourage this behavior a water spray bar was invented.



Water spray bar enrichment feature inside the sub-Antarctic penguin habitat at Omaha’s Henry Doorly Zoo.



Water spray bar enrichment feature inside the African penguin habitat at Omaha’s Henry Doorly Zoo.

For the sub-Antarctic penguin display, a spray bar was made using 3/4” schedule 80 PVC (schedule 40 also works fine) and fittings, measuring 3 feet x 3 feet, so even the king penguins could interact with it. When it was first introduced to the display the gentoos were not fans! But now, everyone appears to tolerate it, especially the five 2013 hatched rockhopper penguin youngsters! We have a few other penguins that are interested but have not ventured far enough to go through it, but hopefully soon.

A second spray bar was constructed; approximately 21” tall x 21” wide, for the African penguins. At first they were not sure what to think, and were less curious about it than expected. They avoided it for the first week, but once they were accustomed to seeing it, they all stood closer to it and several penguins ventured underneath. The crew used leftover PVC pieces, and only had to purchase a few things. Schedule 40 PVC was used for a smaller version for the alcid display.



Juvenile southern rockhopper penguins using the spray bar enrichment feature.



Juvenile southern rockhoppers walking under the water spray bar.

To make one spray bar, it cost no more than \$25. All enrichment is done in the exhibit, including the spray bars, when visitors are present. Most of the observations are made from the public area, and the staff can interact with the guests and answer any questions at the same time. It seems, for penguins at least, there is never too much water.

Photos courtesy of Omaha’s Henry Doorly Zoo and Aquarium.

Penguin Listserv Summaries

Original Listserv question:		<i>We are seeing some of our female Humboldt penguins ingesting small rocks during the breeding season and are wondering if other institutions have observed this? We suspect that this may be a behavior to increase calcium levels prior to lay. Does anyone provide any supplements or oyster shell, etc. to their female penguins during the breeding season? And if so, how is it being provided?</i>
San Francisco Zoo	Magellanic	In the past we provided additional calcium during egg laying for our Magellanic penguins, but after nutritional analysis deemed it unnecessary due to the heavy amount of calcium they get in their herring. It's been a couple of years that we haven't used it, and have had no issues.
Dallas Zoo	African	We had an issue a few years back where one female penguin was choosing exclusively the variety of fish being offered that did not have enough calcium for egg laying and end of season eggs were a little soft-shelled. So if all of the fish being offered has sufficient calcium for egg laying, then there should be no issue. However, if one of the diet species is low and the birds prefer that fish type, especially if exclusively, there may be reason to supplement during egg laying. We started that female on supplementation during breeding season that year.

Original Listserv question:		<i>Looking for suggestions on the most cost-efficient means to extend the time between pool cleanings. Our current system [is] a basic dump and fill pool with a single sand filter....No chillers, ozone, etc. The volume is [approximately] 25,000 gallons. Though the exhibit faces north, the only shade is provided by the attached building, so portions of the pool are in the sun throughout the day. Algae, both on the walls and turning the water green, is our nemesis.</i>
Racine Zoo	African	As several people asked me to share responses, I will provide a quick summary so far for all. The most common suggestions included: 1. Implement a chlorination and pH control system 2. Implement a bromination system 3. Just start controlling the pH to make sure it is not in an "algae-friendly" range ...the impression [is] that at least some of the above items alone had the potential to add weeks between pool cleanings. At least one facility just using a chlorination and pH control system (in addition to sand filters) reported routinely going over a month between pool dumps in the summer. I did get a range of thoughts on chlorine. Some were anti-chlorine due to the possible negative impact on the birds. Some found a level of chlorine that seemed to get the job done without any apparent effect on the birds. ... I did receive an example of an overnight chlorination protocol with dechlorination done in the morning before the penguins go out.
Zoo Boise	Magellanic	We are trying to come up with a way to take care of our algae problem that doesn't require us to constantly drain and bleach our pool. We have been working to improve our filtration system and installed an ozonator. While helpful, they are not solving the algae problem.

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Original Listserv question:		<i>Has anyone had success with encouraging certain birds to pair up with each other?</i>
Milwaukee County Zoo	Humboldt	We have successfully broken pair bonds and reestablished new ones by taking the two penguins that need to be paired and put them together on the floor of our burrow room with a nest box and a pool and kept them together down there for about a month. They still can see the other penguins and call to them but really have no choice but to hang out with the new bird. They usually decide that they like each other, and pretty quickly. Watch for mutual preening and other pair behaviors to determine when to put them back out with the group, usually holding them separate for a month is long enough. We also had little to no problems putting them back in with the group; we just let them out at feeding time and they joined right in with the mix without issue. Also giving them toys and favorite treats together while separated seems to help but is not necessary. I personally think that it makes the whole experience of being away from the group more pleasant. Only once did this not work: we had two incompatible penguins where the male [aggressed upon] the female repeatedly so we separated them and contacted the SSP and requested that she be paired with another bird in our flock. It was OK and they produced a chick together this summer.
San Francisco Zoo	Magellanic	With our large colony of Magellanic penguins (currently 48) we've only had success playing match maker with two "single" birds. We have tried, but are always unsuccessful at building pairs with a bird that already has a pair bond. When pairing our single birds, we move the pair off exhibit, where they are housed together for several weeks. This "vacation" usually does the trick! We do this "match-making" a month or two before breeding season (which with Magellanics is set pretty firmly). We've had situations where it looks like they separate upon their return to the exhibit, but then as the season begins, they link back together.

Original Listserv question:		<i>What are some of the artificial nesting materials being offered to penguins?</i>
Greensboro Science Center	African	We use air tubing cut into 6-8 inch pieces and burn the ends closed. It mimics sticks and is very easy to clean. We also use straw and wood wool.
Six Flags Discovery Kingdom	African	We have been using lavender for the past few years and happy with it. Penguins love it and it keeps the smell down. We also use fire and rubber hose pieces. The fire hose pieces are nice because we can just run them through the washer to clean. Some facilities have reported problems with rubber hose pieces. We use 8 inch pieces and have never had a problem.
Cal Academy of Sciences	African	We like car wash material; sturdy, easy to clean. We order rolls from Gallop Brush Company and cut it into strips.
Jacksonville Zoo	Magellanic	We tried lavender and the penguins seemed fine with it but it was costly. Our Magellanics seem to favor long leaf bamboo. We change out the bamboo as we would any browse items.

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Original Listserv question:		<i>What [do] institutions use for padding the tops of shipping crates so that birds don't [injure] themselves during shipment?</i>
Jacksonville Zoo and Gardens		In some of our crates we use Enkamat. We have it for our penguins and when pieces start to curl up at the cut edges, we use the left over parts in crates. Our hospital staff has started using it in hospital stalls for birds and other animals in quarantine; that cannot be on concrete surfaces. We have found many different ways to use the Enkamat and find it to be a great product. It is a flexible three-dimensional mat for immediate, permanent erosion protection on the most varied slope types.
Santa Barbara Zoo		We use Enkamat a lot in our holdings and I have used it at two different facilities. We use it smooth side up to reduce the chance of toenails getting stuck in the loops. We also avoid using it for any species with long toes (cranes, pigeons, pheasants). I mostly use it with waterfowl, penguins and flamingos.
California Academy of Sciences Steinhart Aquarium		We use Nomad matting over Dri-dek when shipping penguins. We also use that combo in their nest boxes-have never had a nail issue.
Minnesota Zoo	Humboldt	We use 1/4 inch foam from JoAnn's Fabrics. It comes in rolls. We have also used shelf liner hot-glued to the top of a crate and indoor/outdoor carpeting.
Tracy Aviary		We use indoor/outdoor carpeting. We try to use it repeatedly rather than rebuilding a shipping crate every time.
Columbus Zoo and Aquarium	African	We have used egg-crate style foam (used for beds) cut to fit but it cannot be cleaned. Has anyone tried yoga mats? Can they be cleaned?
St. Louis Zoo		Interlocking kids play mats, same stuff we use for concrete floors under nest boxes with fledging chicks.
Buttonwood Park Zoo		Interlocking child foam play mats work well, are cheap (12"x12" mat for less than \$1) and can be reused a few times.
Disney		It takes some searching to find the right style and size to fit your crate, but you could use outdoor patio furniture cushions. Or make the padding/foam removable and cover with a king size pillow case.
Indianapolis Zoo		Recently we have been using foam flooring (www.overstock.com/Home-Garden/Ultimate-Comfort-16-square-foot-Blue-Foam-Flooring/4687492/product.html) that can be bought at many locations. We apply heavy duty Velcro to the matting and then the top of the crate. The foam is then removable and easily cleaned and can be used again and again.
Toledo Zoo		Toledo has used blue camping mat for padding at the tops of shipping crates.

News and Updates

September 2014: **Penguin Animal Care Manual** is published on the AZA website. Many thanks are extended to the authors and reviewers who volunteered many hours to complete this expansive document.

The **Maryland Zoo in Baltimore** opened its new African Penguin habitat called **Penguin Coast**.

August 2014: Conservation experts are advocating for **marine-protected areas** to safeguard penguins. Penguins rank as the second most threatened group of seabirds; the 2013 IUCN Red List assessed 11 of the 18 species of penguins as threatened (up from the five species on the Red List in 1996). A recent review published in *Conservation Biology* identifies **habitat degradation, pollution and fishing** as the major threats facing penguins and other marine organisms (see Trathan, et al, *Recommended References*, this issue). The authors identified the penguin species breeding in South America, Africa and Oceania as most at risk and therefore recommended these areas be prioritized for conservation action. Specifically, the authors urge establishing marine-protected areas as a tool in the proper management of marine resources. Ultimately, the authors contend that penguins and other marine communities are at considerable risk and require action today to conserve these populations into the future.

Penguin feather-loss disorder has now been discovered in Antarctica. Two Adelie penguin chicks in Hope Bay colony have been recorded with feather loss (Barbosa, *et al*, *Recommended References*). This is the first time the feather-loss disorder has been recorded in Antarctic birds. No other affected chicks were found in the large rookery. As reported by Dr. Nola Parsons, SANCCOB, in the October 2011 issue of the PCN (Vol 15 No 2) feather-loss disorder was first observed in African penguin chicks at SANCCOB in 2006. Since then similar feather loss has been documented in Magellanic penguin chicks in South America. Little is known about the disease and the cause is not defined.

A **“colossus penguin” fossil** from about 40 M years ago was unearthed in Antarctica by Dr. Carolina Acosta Hospitaleche. The fossil remains were found on **Seymour Island on the Antarctic Peninsula**, an area rich in fossil penguin bones. It is estimated that the large flightless bird, dubbed *Palaeudyptes klekowskii*, may have stood 6 feet tall and weighed up to 115 kg. Forty million years later, the largest living penguin is the emperor penguin at just 4 feet tall and averages less than 46 kg.

July 2014: Researchers say that the **secret language of penguins is now decoded**. In an article published in the journal PLoS ONE (Favaro, *et al*, *Recommended References*, this issue) the study analyzed simultaneous video and audio recordings of African penguins at Zoom Torino. The analyses found six distinctive vocalizations: for adults these are *contact call*, *agonistic call*, *ecstatic display song* and *mutual display song*; for chicks it is a *begging peep* and among unweaned juveniles a *begging moan*.

Adelie penguin population estimates got a boost this year. Using a combination of high-resolution satellite imagery and ground counts, researchers Heather Lynch and Michele LaRue now estimate that the world population of Adelie penguins is higher than previously thought. Their findings, published in *The Auk*, report a breeding population 53% higher than 1993 estimates and that, though colonies on the Antarctic Peninsula are in decline, there has been an increase in the population in East Antarctica. Find a link to the full research article entitled **First global census of the Adélie Penguin** in this issue under *Recommended References* or at the University of Minnesota link at <http://discover.umn.edu/news/science-technology/new-study-finds-adelie-penguin-population-rise>.

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News and Updates continued

June 2014: In June Dr. Dee Boersma announced the launch of **a new website dedicated to Galapagos penguins** www.iGalapagos.org. The website is designed to provide information on the health of the environment and animals in the Galapagos using photograph sharing to enhance research and promote conservation awareness. As Dee put it in her letter to supporters, **"Pictures may be worth 1000 words"** as they can tell us when penguins are molting, when juveniles are present, and when penguins are mostly foraging at sea." Check out the website and share it with zoo and aquarium visitors. It is yet another opportunity for citizen science.

A study, conducted by biologists at Woods Hole Oceanographic Institution (**Projected continent-wide declines of the emperor penguin under climate change**) found that emperor penguins are at risk for decline due to climate change. Climate models project sea ice declines that would negatively influence emperor penguins with their populations projected to decline by up to 50% by the year 2100.

SeaWorld San Diego announced more groundbreaking AI results with Magellanic penguins. **The first chick to be conceived using frozen-then-thawed semen** hatched in May of this year. This is a first for any species of penguin. This success represents future hope for augmenting sustainability efforts in this and other species of penguins.

May 2014: As reported on the Nelson Mandela Metropolitan University website, Dr. Pierre Pistorius and a team of students found **declines in seabirds on Marion Island, including among macaroni, southern rock-hopper, Gentoo and king penguins**. Dr. Pistorius is quoted as saying, "...The Antarctic Polar Front, an important foraging area, is moving further south and away from the island due to ocean warming and this places greater energy demands on foraging seabirds commuting back and forth to provide food for their chicks." Dr. Pistorius goes on to describe, "...They are arriving in poorer body condition than they did 10 to 20 years ago" indicating that food is limited. NMMU's research on the island is conducted within the South African National Antarctic Programme (SANAP) and in collaboration with the Department of Environmental Affairs (DEA) and the Percy FitzPatrick Institute for African Ornithology. See the full story at <http://news.nmmu.ac.za/News/Declining-numbers-of-seabirds-at-Marion-Island>.

February 2014: **Gulls follow fishing vessels and, it turns out, so do yellow-eyed penguins**. Researchers working at the University of Otago have discovered that yellow-eyed penguins forage in straight lines by following furrows in the sea floor made by fishing trawlers. (Mattern, *et al*, *Recommended References*).

December 2013: **Penguins were in the news as models for the future management of traffic flow**. Emperor penguins form tight huddles for social thermoregulation. But rather than acting as individuals they were found to act as a unit: when any penguin moves even just a few inches, it triggers waves of motion in every direction as the other penguins respond and move. It is important to understand this action and response in a moving group as automobile designers work to develop vehicles that respond to objects in close proximity and in motion.

October 2013: A study published in the Journal of Zoology found that **crested penguin males head home earlier than females** by an average of 9 days. <http://onlinelibrary.wiley.com/doi/10.1111/jzo.12080/pdf>.

Aquarium of Niagara announces plans to expand and refurbish their Humboldt penguin habitat.

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Websites We Like

<http://conservationmagazine.org>. Sign up for the free newsletters “This Week’s Good Read” and/or “Weekly Dispatch”. The information discussed can help to shape conservation conversations with zoo and aquarium visitors.

<http://www.penguinscience.com/index.php>. “Understanding penguin response to climate and ecosystem change.”

<http://www.globalpenguinsociety.org>. “...GPS The first and only coalition of its kind to take an international and independent approach to the conservation penguins and their habitats.” Find great information resources and news updates all about penguins.

<http://www.penguinstudies.org>. Penguin Sentinels, University of Washington. Keep up with Turbo the Penguin or learn more about ongoing studies of Galapagos and Magellanic penguins.

<http://www.zoopenguins.org>. Website for the AZA Penguin Taxon Advisory Group.

<http://www.aviansag.org>. Website for the AZA Avian Scientific Advisory Group. Find information on developing lighting schemes for penguins in human care and understanding avian vision in the “Members Only” section.

Events and Announcements

September 2014: **Penguin Animal Care Manual** (ACM) published on the AZA website https://www.aza.org/uploadedFiles/Animal_Care_and_Management/Husbandry,_Health,_and_Welfare/Husbandry_and_Animal_Care/Penguin%20Care%20Manual%20AZA%20Final%202014.pdf.

22 October 2014: **33rd meeting of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)**. See a video highlighting the commission's work. <https://www.youtube.com/channel/UCYt7y9BjiirrQ92z-WRNoIA>.

January 2015: Susie Kasielke, Los Angeles Zoo, is gauging interest and availability for an **Avian Egg Workshop** in 2015. Send inquiries to skasielke@aol.com.

20 January 2015: **Penguin Awareness Day**. Use this day to promote penguins and inspire people to take responsibility for the future of our oceans.

21-27 March 2015: The **Avian Scientific Advisory Group** will be hosting bird workshops, which will include a **Penguin Workshop**, at the AZA Mid Year Meeting <https://www.aza.org/midyearmeeting>. Consider a donation to ASAG to support Zoo and Aquarium avian programs, conservation of bird species and to advance avicultural knowledge. Learn more at www.aviansag.org.

28 March 2015: **9th Annual Earth Hour**, 8:30 PM – 9:30 PM local time zones. Individuals are encouraged to turn off non-essential lights for one hour as a **symbol of their commitment to the planet**.

March 2015: The **North American Penguin Regional Collection Plan (RCP) 2015-2020** slated for completion.

22 April 2015: **Earth Day**. Be part of the movement worldwide! www.earthday.org.

25 April 2015: **World Penguin Day**. This day is another opportunity for zoos and aquariums to connect the plight of penguins with each individual's power to take action to improve our world and be examples for conservation change.

16 May 2015: **Endangered Species Day**. All penguins in human care are ambassadors for their taxa; their charisma can be the beginning of a connection to those species at risk. Celebrate the power of "ONE", **the power that each person possesses to make a difference through each choice they make** on Endangered Species Day and every day. <http://www.endangered.org/campaigns/endangered-species-day>.

8 June 2014: **World Oceans Day**. Make an ocean promise! <http://worldoceansday.org>.

26-30 October 2015: **2nd World Seabird Conference**, Cape Town, South Africa. <http://www.worldseabirdconference.com/2nd-world-seabird-conference>.

2016: **9th International Penguin Conference**, South Africa.