

Cold Climate Penguins *Aptenodytes, Pygoscelis, Eudyptula, Eudyptes*

1. Animal Type: Bird
2. Conservation Status: Not globally threatened
 - a. Range/Habitat
 - i. Cold climate penguins live exclusively in Antarctica and other sub-Antarctic islands.
 - ii. When on land, cold climate penguins prefer icy remote islands free of predators.
 - iii. Penguins spend as much as 75% of their lives at sea.
3. Size: Varies per species
 - a. Species are not dimorphic (both male and female look similar), except Crested Penguins.
 - b. Emperor penguins are the largest species averaging 1.1m (3.7') tall and weighing 27-41 kg (60-90 lbs).
4. Social Structure
 - a. Colonial
 - b. Swim and feed in groups
5. Reproduction
 - a. Time of year
 - i. Antarctic spring through summer, except Emperors, which breed in Antarctic winter.
 - b. Number of young
 - i. Most species lay 2 eggs, except Emperors and Kings which lay one.
 - ii. Some species raise only the larger of the two young, while others attempt to raise both.
 - c. Rearing / Mothering
 - i. Both parents participate in raising young; both regurgitate food for the young, both keep them warm with their brood patch.
 - ii. Some species raise young in crèches (groups), but in these cases, individual parents feed their own chicks only.
 - iii. Chicks are cared for by their parents until their waterproof feathers grow in. This period of time ranges from 7 weeks to 13 months.
 - d. Special exhibit needs
 - i. Must provide nest sites specialized per species. Some species nest on beaches, between rocks, on steep slopes, in caves, etc. Nesting materials usually include pebbles and stones, molted feathers, and vegetation.
 1. Most penguins return to the same nesting site year after year.
6. Behavior
 - a. Nocturnal vs. Diurnal: Diurnal
 - b. Shy vs. Curious: Curious
 - c. Jumping Ability:
 - i. Rockhopper penguins hop easily across steep, rocky places. Other species are not very adept at jumping, and are rather clumsy on land.
 - d. Water Speed
 - i. Swims underwater 12 km per hour. Emperors swim at (*Aptenodytes forseteri*) average speeds of 11 km per hour.
 - e. Land Speed
 - i. Walks 1 to 2 km per hour. When in danger, runs faster than humans over snow or ice.
 - f. Unique Behaviors
 - i. Swim and porpoise (jumps, flies briefly, takes a breath, and dives back into the water).
7. Captivity
 - a. Frequency in captivity: Rare-Common
 - i. Penguins used to be a rare addition to any zoo.
 1. Most of the time they were Humboldt Penguins, or penguins that could survive the warmer temperatures outside.

2. Lately, as technology and travel has increased, so have the numbers of cold penguin exhibits. Now cold-climate penguins are seen at many larger-scale zoos and SeaWorld themeparks.

b. Noteworthy exhibits:

i. St. Louis Zoo

1. Designed by PGAV
2. 1200 square feet of outdoor space
3. 1200 square feet of indoor space
4. Opened in 2003
5. 40 coldwater penguins

ii. SeaWorld Orlando

1. 5745 square feet of exhibit
2. 270 penguins
3. Designed by PGAV
4. Opened in 1973

iii. SeaWorld San Diego

1. 300 penguins
2. 5170 square feet
3. Designed by PGAV
4. Opened in 1983

iv. Omaha Henry Doorly Zoo

1. Opened April 1st, 1995
2. Contains King, Gentoo, and Rockhopper penguins
3. Designed by Stanley J. How

c. Studies completed about penguins:

- i. http://en.wikipedia.org/wiki/Homosexual_behavior_in_animals
- ii. http://www.aspergillus.org.uk/secure/historical_papers/printed/Ainsworth49-30.pdf
- iii. <http://tuxxie.org/miscellany/faq.shtml>
- iv. http://www.falklandsconservation.com/news/2010/rockhopper_report.pdf

8. Husbandry Regulations and Recommendations

a. APHIS

i. Dry Rest Areas

1. King / Emperor: 108 sf per 6 penguins PLUS 9 sf per additional penguin
2. All Others: 48 sf per 6 penguins PLUS 4 sf per additional penguin

ii. Pool Size

1. Surface Area

- a. King / Emperor: 108 sf per 6 penguins PLUS 9 sf per additional penguin
- b. All Others: 48 sf per 6 penguins PLUS 4 sf per additional

2. Water Depth: Min. 4' for all species

b. Barriers (PGAV Recommended)

i. Land barriers

1. Rockhopper: 3' vertical
2. All other Cold Climate species: 18" vertical

ii. Above water barriers

1. 4' vertical above water level for all species

- c. Water Temperature
 - i. Adelie and Emperor: 39 – 45 deg F
 - ii. Other Cold Climate species: 39 – 55 deg F
 - d. Air Temperature Range
 - i. King, Gentoo, Chinstrap, Macaroni, Rockhopper: 22 - 52 deg F
 - ii. Adelie, Emperor: 19 - 30 deg F
 - e. Surfaces should be as smooth as possible to avoid Bumblefoot (common foot infections).
9. Enrichment
- a. Zoo Approved
 - i. Toys - alternate often to avoid boredom
 - 1. Brightly colored balls for play
 - 2. Frisbees
 - ii. Exhibit Variation Elements
 - 1. Sprinklers
 - 2. Varying water currents
 - 3. Sawhorses with strips of fabric under which birds can run
 - iii. Feeding
 - 1. Blocks of ice with frozen fish inside or other hidden food sources to encourage foraging behaviors
 - iv. Special Activities
 - 1. Out of exhibit supervised walks (when weather appropriate) such as “walk of the penguins” at Saint Louis Zoo
 - 2. “Penguathon” – Kelly Tarlton’s Antarctic Encounter and Underwater World, Auckland, New Zealand
 - a. King and Gentoo penguins “compete” in soccer, frisbee, surfing (on inflatable raft), swing ball and waddle races
 - i. Focus on enrichment, but doubles as meaningful entertainment
 - b. Other Untested Ideas
 - i. Exhibit Variation Elements
 - 1. Adding natural snow to exhibit
 - a. Keepers could crudely construct obstacles, mounds or tunnels out of the snow to temporarily alter exhibit
 - 2. Adding large and small ice obstacles into pools and exhibit
 - 3. Dumping ice cubes into pool
 - 4. Shooting water out of inlet to create bubbles
 - 5. Keeper interaction
 - a. Play with toy water gun
 - 6. Feeding
 - a. Varying feeding times and menu using full range of natural diet
10. Fun Facts:
- a. Collecting nesting materials for the baby is a bonding activity for penguin couples
 - b. Penguins can hold their breath for up to 20 minutes.
 - c. Penguins’ feathers are highly concentrated in order to insulate them against the cold Antarctic waters.
 - d. Penguins are counter-shaded (white on bellies, black on backs) in order to help camouflage them while swimming.

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