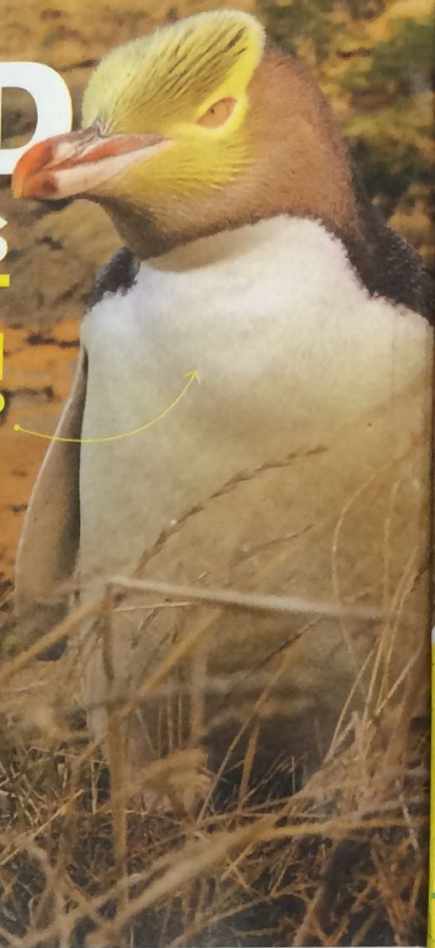


# HELPING AN ELUSIVE BIRD

## CAN SCIENTISTS SAVE THE RAREST PENGUIN ON EARTH?



**ESSENTIAL QUESTION:** Why might it be difficult for scientists to study penguins?

**T**he dense, wild undergrowth of a New Zealand forest might be the last place you would expect to find a penguin. But this environment is home to the mysterious yellow-eyed penguin (*Megadyptes antipodes*)—the rarest species of penguin in the world.

The yellow-eyed penguin lives only in certain parts of New Zealand and on several smaller islands in the sub-Antarctic (see map, right). There, it nests hidden in thick, low-lying shrubs. That *habitat*—an organism's natural home—is different from that of most penguins (see *Penguins Compared*, p. 22).

Many penguin species, like Emperor penguins, nest in

open areas and live together in large colonies. But yellow-eyed penguins prefer privacy. They make their nests out of sight from each other and the prying eyes of humans.

Fewer than 2,000 breeding pairs of yellow-eyed penguins are estimated to live in the wild. And the population is shrinking. In 2015, the number of breeding pairs on mainland New Zealand dropped by half. Scientists and conservationists are studying threats to the penguins to learn what may have wiped out such a large number of them. Many worry that the endangered birds could soon face extinction.

### A THREATENED EXISTENCE

Life is hard for the yellow-eyed penguin. Only 18 out of 100 chicks survive their first year. While that's about average for a seabird, those that do survive must endure many threats over the course of their lifetime.

**ONLY 18 PERCENT OF CHICKS SURVIVE THE FIRST YEAR**



## FALLING NUMBERS

In the 1990s, yellow-eyed penguin populations on South Island, New Zealand, hit their lowest levels ever recorded. Biologists worry that a recent decline could signal that the penguins' numbers are headed for an even bigger drop.

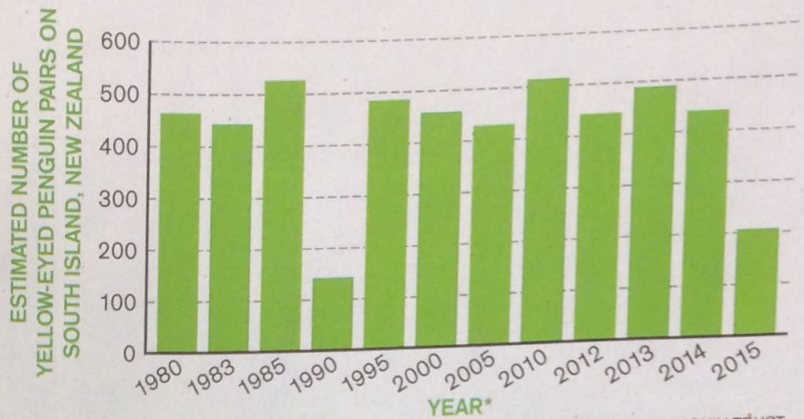
Even though yellow-eyed penguins nest in dense vegetation, they spend most of their time in the ocean, diving 40 to 120 meters (131 to 394 feet) below the water's surface. There they catch fish and other prey. But life at sea can be dangerous for the birds.

Commercial fishermen accidentally catch yellow-eyed penguins in their nets. Another consequence of fishing is that some species of fish are being hauled up faster than the populations can reproduce.

This is causing some fish to decline in numbers. *Overfishing* forces penguins to compete with other predators for food.

The fish yellow-eyed penguins rely on are also responding to *climate change*. Ocean temperatures have risen by about 0.07°C (0.13°F) per decade over the past century. Warming waters can drive fish deeper or farther out to sea where it's cooler—away from the penguins' nesting grounds. As a result, biologists hypothesize that yellow-eyed penguins must expend more energy when they hunt. At the same time, they're catching fewer or less-nutritious fish. This results in the penguins having a *caloric deficit*—the burning of more calories than are consumed.

Life on the shore isn't any easier for yellow-eyed penguins. People have cleared land for farming, destroying much of the bird's forest



\*Data was not collected for certain years. SOURCE: YELLOW-EYED PENGUIN TRUST

ALSO KNOWN AS HOIHO, OR NOISE SHOUTER, DUE TO THEIR SHRILL CALL

habitat. People have also introduced *invasive*, or non-native, animals like ferrets and stoats into the yellow-eyed penguins' habitat. These predators often eat the penguins' eggs. And stressed-out, malnourished penguins are highly susceptible to diseases, like *avian diphtheria*—a deadly type of bacterial infection in birds.

"They're facing a suite of problems on land and at sea," says Trudi Webster, a science adviser for the Yellow-eyed Penguin Trust, an organization in New Zealand devoted to protecting yellow-eyed penguins. "And there are interactions between all of these problems that just make it worse."

Some combination of these factors led to one of the steepest drops in yellow-eyed penguin populations in recorded history. From 2014 to 2015, the number of breeding pairs on South Island, New Zealand, fell from approximately 439 to just 205 (see *Falling Numbers*, above). If scientists don't come up with solutions fast, the bird may soon die out completely. Luckily, no one is giving up yet.

### NEW HOPE?

Researchers like Webster are cautiously hopeful about yellow-eyed penguins' future. Over the past two decades, scientists and volunteers have dedicated themselves to protecting the birds.

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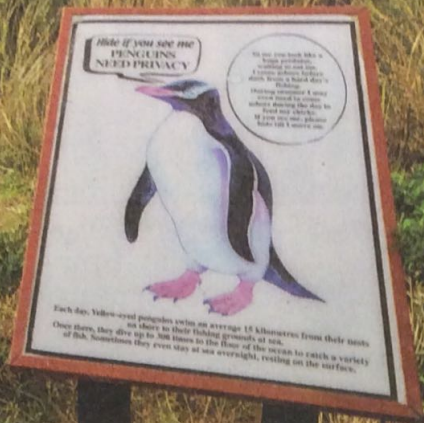
## YELLOW-EYED COLONIES

Yellow-eyed penguins live only in a few colonies spread across South Island, New Zealand, and some smaller islands farther south.





**ATTENTION, TOURISTS:** Tourism helps raise money and awareness for penguins, but too much foot traffic around breeding grounds can stress the birds.



**A NEW HOME:** Much of the penguins' habitat has been destroyed, so volunteers create wooden nesting shelters for the birds.

Many successful programs involve local citizens and conservation groups trapping and killing invasive animals that prey on penguin eggs and chicks. Other organizations have set up rehabilitation facilities that take in underweight penguins to feed them and provide medical treatments.

**CORE QUESTION**

Cite three factors affecting yellow-eyed penguins, and brainstorm possible solutions to address them.

One of the most exciting projects starts at the nest. Yolanda van Heezik, a wildlife biologist at the University of Otago in New Zealand, and her students are working to identify yellow-eyed penguin “superbreeders.” These are penguins that naturally produce more, and healthier, chicks than average. Their chicks also have a higher rate of survival and often go on to become superbreeders themselves.

Van Heezik says that figuring out what makes these penguins superbreeders could

be a key to encouraging higher breeding rates among other yellow-eyed penguins. Genetic studies will try to determine if there are specific *genes*, or units of hereditary material, that influence breeding and survival rates. In addition, researchers are studying the parenting habits of superbreeders to get ideas on how to increase the number of chicks that survive their first year. For instance, researchers will see if superbreeders feed their chicks in a way that's more beneficial to the chicks' health.

Yellow-eyed penguins will still face many obstacles. But these research, breeding, and conservation programs could give them a fighting chance. “They’re a fantastic penguin,” says Van Heezik. “I just hope we can come up with a solution to save them.” ❁ —Jacob Batchelor

**PENGUINS COMPARED**

The yellow-eyed penguin is a midsize penguin species. See how it compares with some of its penguin relatives.



**FAIRY PENGUIN**  
HEIGHT: 12 inches  
LOCATION: Australia and New Zealand



**SNARES PENGUIN**  
HEIGHT: 24 in.  
LOCATION: Islands south of New Zealand



**YELLOW-EYED PENGUIN**  
HEIGHT: 26 in.  
LOCATION: New Zealand



**HUMBOLDT PENGUIN**  
HEIGHT: 28 in.  
LOCATION: Peru and Chile



**KING PENGUIN**  
HEIGHT: 35 in.  
LOCATION: Antarctica



**EMPEROR PENGUIN**  
HEIGHT: 50 in.  
LOCATION: Antarctica

TERRY WHITTAKER/ALAMY STOCK PHOTO (SIGN); NICOLE ANDERSEN/ALAMY STOCK PHOTO (HABITAT); LOUISE HEUSINKVELD; GETTY IMAGES (FAIRY); BARRY BLAND/NATUREPL.COM (SNARES); CONNIE BRANSILVER/PHOTO RESEARCHERS, C. (YELLOW-EYED); JERRY YOUNG/DORLING KINDERSLEY