



CHALLENGE

Understanding and protecting endangered Southern right whales in Argentina's Peninsula Valdés.

SOLUTION

JMP® and SAS® analyze diverse types of data, and help produce and convey scientific information on right whales.

RESULTS

Researchers construct effective conservation strategies and management plans to protect the whales and their habitat.

MORE INFORMATION

www.oceanalliance.org/wci

www.jmp.com

Whale Conservation Institute

Protecting right whales

In Argentina's Peninsula Valdés, kelp gulls dive down toward the sparkling jewel-toned waters below, where endangered southern right whales return each May through December to mate and birth their calves.

The gulls gouge chunks of skin and blubber from the backs of the whales to eat. In response, the whales flinch violently, submerge and swim away fast.

These gull attacks have increased over the years and are damaging the quality of life for these endangered great whales. That's one of the recent findings of researchers at the Instituto de Conservación de Ballenas / Whale Conservation Institute (WCI). Since 1971, these scientists have studied the southern right whales that use the protected bays of Península Valdés as a nursery ground.

The Right Whale Program at WCI promotes the recovery of right whales worldwide through research, conservation and education. Software from SAS, including JMP, helps the Right Whale Program analyze its data, and produce and convey scientific

information. This information informs conservation strategies and management plans to protect the whales and their habitat.

Monitoring gull harassment

WCI researchers found that between 1974 and 2000, harassment by kelp gulls intensified and affected an increasingly larger proportion of whales in Peninsula Valdés. The impacts were especially harsh on mother-calf pairs. When attacked by gulls, mother-calf pairs traveled at tiring medium and fast speeds for 3.1 hours per day; by comparison, pairs who were not attacked traveled at such speeds for 0.8 hours. In addition, mother-calf pairs spent approximately 24 percent of daylight hours disturbed by gulls.

Because little food is available at Península Valdés, the whales can ill afford to lose their blubber reserves in gull attacks; mother whales rely on blubber reserves to support their calves' growth, behavioral development and migration to feeding grounds.'

**STATISTICAL
DISCOVERY.™
FROM SAS.**

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Whale Conservation Institute

Understanding choices in feeding grounds

In another project, WCI researchers studied how the whales that use the Peninsula for calving choose their feeding grounds. By following 131 individual whales, they found that the whales feed in different locations distributed over a considerable area. Using JMP to test for isotopic differences in skin samples, the researchers found that calves learn their feeding locations from their mothers and teach them to their daughters.

The implications of this finding are significant to conservation efforts. Faithfulness to feeding grounds may affect the ability of right whales to find and use new feeding areas, even when ocean-warming has reduced the abundance of the krill the whales consume.²

Estimating the ages of whales

In addition to knowing why whales feed where they do, researchers need to know the age of individual whales so they can understand population dynamics and estimate the demographic parameters of a species.

WCI researchers developed models based on allometric ratios of whales' head measurements to try to predict the ages of North Atlantic right whales using shipboard lateral photographs. This technique is non-intrusive, simple and inexpensive. Because it is based on measurement ratios, it eliminates the need to know the distance to the whales or to have a scale object close to them to estimate the age of live right whales whose year of birth is unknown. Researchers used SAS to perform multiple regression analysis on the measurement data and found that certain physical changes, such

as in the curvature of the snout, were strong predictors of age. The accuracy of age prediction decreased with age, most reliable for calves and least reliable for whales older than 8 years of age.³

¹ Rowntree, V.J., P. MacGuinness, K. Marshall, R. Payne, J. Seger, and M. Sironi. 1998. "Increased harassment of right whales (*Eubalaena australis*) by kelp gulls (*Larus dominicanus*) at Peninsula Valdés, Argentina." *Marine Mammal Science* 14(1):99-115.

² Valenzuela, Luciano (lead researcher), unpublished article under review in *Molecular Ecology*. For details, contact the author at valenzuela@biology.utah.edu.

³ Sironi, M., Kraus, S.D., Nordheim, E.V., Rowntree, V.J. and C.T. Snowdon. 2005. *Age estimation of North Atlantic right whales (*Eubalaena glacialis*) by allometric measurements on photographs. Paper SC/57/BRG7 presented to the International Whaling Commission Scientific Committee, June 2005. 14pp.*



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