How A Little Bit Of Cold Can Kill A Big Manatee, And What It Might Mean For The Species

While Florida may be warm enough even in the coldest winter months to attract sun-seeking tourists, when the thermometer does dip, it can prove deadly for endangered Florida manatees. Just why these plus-size animals would succumb in water cooled to just 68 degrees Fahrenheit has remained a mystery. Now, researchers from HARBOR BRANCH Oceanographic and other institutions have discovered for the first time the causes of this "cold stress syndrome" in Florida manatees.

The work, described in the current edition of the journal Aquatic Mammals, could significantly improve treatment for cold-stressed manatees. It could also help decide an ongoing controversial debate regarding the manatee's state endangered species status and aid in the development of plans to minimize the effects of power plant shutdowns on the manatees who have grown to depend on the warm water they release.

During cold spells, sick, sometimes emaciated manatees at times wash up along the coast of Florida afflicted with a puzzling combination of skin sores and infections that clinicians historically treated as separate ailments. In the new paper, lead author Dr. Gregory Bossart, Director of the Division of Marine Mammal Research and Conservation at HARBOR BRANCH, and colleagues, explain how long-term exposure to cold water can be responsible for this multi-faceted condition.

The team found that the cold stress syndrome stems from a cascade of physiological events and diseases initiated by cold water and manatees' limited ability to adapt to low temperature extremes. The study suggests that the animal's metabolism slows, leading to digestion problems, decreased appetite, and associated weight loss. These events, along with the possible release of certain hormones, weaken manatees' immune systems, making them vulnerable to environmental toxins as well as a variety of diseases, including pneumonia, intestinal infections, and perhaps even a manatee virus similar to one that causes human cervical cancer. This progression and its results are surprising given that manatees are known for their outstanding immune systems.

"This syndrome opens up the manatees to the long-term pathologic effects that can predispose the population to many other problems," says Dr. Bossart, who has studied both clinical marine mammal medicine and pathology and human pathology.

In the study, investigators performed necropsies—the animal form of an autopsy—on 12 manatees thought to have died from cold stress syndrome during the exceptionally harsh winter months between November 2000 and April 2001. Researchers found that each manatee showed signs of starvation, including a thinned blubber layer and an overall sunken appearance. In addition, at least 75 percent of
the animals had an abnormally low number of disease-fighting white blood cells called lymphocytes, various skin and intestinal lesions, heart degeneration and pneumonia.

Knowledge that the cold can cause even more devastating and extensive effects than previously realized could help managers decide how to deal with the closing and deregulation of aging and under-used power plants. More than 500 manatees have been spotted basking in the heated water near a single power plant on one winter day, according to Winifred Perkins, manager of environmental relations at the Florida Power and Light Company. Historically, manatees migrated only to relatively warm freshwater springs or far enough south to avoid colder water, but now reports indicate that over 60% of the population has grown accustomed to instead spending winters near balmy discharges from industrial plants. As outdated power plants are shut down these electric blankets are removed and some manatees are not able to find substitutes in time.

Manatees already die each year from the cold, and the fear is that future power plant closings and replacement with more efficient facilities that don’t churn out heated water could increase the number of deaths. "Some of these power plants provide warm water for up to hundreds of manatees and when you shut one down you could be talking about losing a substantial portion of the remaining population," says Dr. Bossart. In the past, manatee deaths are thought to have been caused by shutdowns of a power plant in Jacksonville and a paper mill in Fernandina Beach.

Florida officials are considering various means to address the problems surrounding manatee dependence on industrial outfalls. Potential solutions range from strict management of power plant closings to the creation of a network of artificial warm water refuges to replace decommissioned facilities. In the meantime, this new understanding of cold stress should improve efforts to treat and rehabilitate rescued manatees with the syndrome. Instead of dealing with each symptom in the sick manatees, and potentially releasing animals in need of further care, Dr. Bossart says now rehabilitators can deal with the overall syndrome, which is physically far-reaching and can last for months.

The study comes at a critical time when the Florida Fish and Wildlife Conservation Commission is discussing whether to down-list the Florida manatee classification with the state government from endangered to threatened. Although the downgrade would not impact current manatee protections such as slow speed boating zones and manatee sanctuaries, some environmentalists fear the change could give the public the impression that the manatee population is safely stabilized, eventually leading to loosened protection measures. Proponents of down-listing point to an increase in the population from about 1,500 in 1991 to the current rough estimate of 3,000.

However, the inevitable shutdown of power plants should be taken into account in the debate over the manatee’s endangered status, according to the study authors, because the closings could dramatically increase mortality in a population that already suffers from various threats such as boat collisions and red tide poisoning. Furthermore, Dr. Bossart says the cold stress syndrome could cause future reproductive and health problems for those manatees that survive the initial cold exposure but are not brought into rehabilitation facilities. The state wildlife commission is expected to decide on the status issue this November.

This story has been adapted from a news release issued by Harbor Branch Oceanographic Institution.
Manatee Status Gets Temporary Reprieve

The Florida Fish and Wildlife Conservation Commission (FWC) has delayed voting on a proposal to down-list the status of the Florida manatee from endangered to threatened until November of 2004.

By Animal News Center (ANC), 12/5/2003
by Becky A. Dayhuff

The Florida Fish and Wildlife Conservation Commission (FWC) has delayed voting on a proposal to down-list the status of the Florida manatee from endangered to threatened until November of 2004.

Originally scheduled to vote on the downlisting November 19th, 2003, the FWC announced it would delay the vote until its relisting criteria are revised.

The announcement, made at a FWC meeting in the Florida Keys, was met with enthusiasm by various environmental groups and Florida residents who have fought for decades to protect the dwindling population of manatees.

Wildlife Advocacy Project Executive Director Susannah Lindberg stated after the meeting, "They're waiting until they have all their ducks in a row. It's what we wanted to happen."

One of the criteria used by the FWC in the down-listing proposal was whether the Florida manatee is at risk of becoming extinct within the next 45 years. A computer generated model indicates that the manatee population will decrease by 50 percent within the 45 year time frame.

According to Gil McRae, director of the Florida Marine Research Institute, in order for the manatees to remain listed as a state endangered species, the computer model must show an 80 percent population loss.

Before becoming endangered by the impact of human activity, the gentle, giant Florida manatees existed for a million years in relative safety. Distant relatives of elephants (as evidenced by their wrinkled furrowed faces and remnant nails on their flippers), the slow-moving, air breathing manatees now face ever increasing threats to their survival.

The first manatee death from a boating strike did not occur until the 1940s, but as Florida's population influx began after WWII, manatee deaths from human related activity began to rise and continues to increase each year.

Over 350 manatees have died in Florida waters to date, which exceeds 10 percent of the approximate 3,300 total population counted statewide in January 2003. Mortality statistics prove more than 20 percent of the 350+ died from boating strikes.

Many of Florida's living manatees bear scars and disfigurements from both propeller cuts that
leave a series of closely spaced deep slashing marks across their bodies, and 'skeg' cuts, the name given to long deep cuts inflicted by the V-shaped section of the keels immediately in front of the rudders.

Scars are so prevalent that researchers use scarring patterns to identify individual manatees. The Florida Marine Research Institute maintains a large catalog of manatees photos showing the individual scarring patterns.

Blunt trauma injuries from high speed strikes by boat hulls result in additional deaths occurring several days after the strikes although researchers are often handicapped in determining the exact cause due to decomposition.

In these cases, post-mortem exams demonstrate bone crushing injuries including skull fractures and broken ribs, leading scientists to assume death from brain damage and lung injuries.

This author has seen manatees unable to swim adequately due to completely amputated flippers and partial amputations of the large paddle shaped tails manatees use to propel themselves through the water.

During one winter's research this author was frequently accompanied by a female manatee who had a large compressed skull fracture and demonstrated obvious signs of brain trauma.

Manatees roam Florida's coastal waters during warmer months. As coastal water temperatures drop in the winter the cold-intolerant manatees must travel to inland springs and power plants where water temperatures remain a constant 72 degrees.

Manatees are highly susceptible to frost bite and resultant infections. Additionally, water colder than 72 degrees over an extended period of time causes the manatees' metabolism to slow precariously to the point they are unable to sustain life.

Given those factors, Florida's manatees must move inland when cold weather arrives.

Seeking the warmer waters of the springs, Florida's manatees traverse inland waterways and rivers where they encounter an ever increasing number of watercraft.

While speed zones and sanctuaries have been established, enforcing those zones is a continuing problem due to a lack of manpower and funding.

Many environmentalists, marine biologists, and veterinarians express grave concern that the manatees' rate of reproduction cannot keep pace with the annual death rate if current trends continue.

The FWC is required to accept public comment prior to down-listing any species. Interested parties may go to http://floridaconservation.org/emailus/feedback.asp and register opinions regarding the proposed down-listing.