

NAMIBIA & SOUTH AFRICA EXPEDITION

Field Study: How African Elephants Use Water

On expedition during Summer 2007, biologist Terrie Williams and her graduate student, Robin Dunkin, conducted a survey of general water use by African elephants, the world's largest land mammals. Carrying Wings WorldQuest Flag #5, Williams and Dunkin compared drinking and bathing habits of elephants in the harsh desert of northern Namibia and the bush veldt of South Africa. Their observations were part of a long-term plan to ensure that both animals and humans continue to have access to scarce water resources as climates change across southern Africa.



In stark contrast to the dusty deserts where elephants live in Namibia, Terrie Williams holds WWQ Flag #5 amid aloe plants in South Africa's lush Addo Elephant Park

HOW ELEPHANTS BEHAVE IN DIFFERENT CLIMATES

For weeks, the team observed elephant herd arrivals and departures at fresh-water drinking holes in South Africa's Addo Elephant Park, as well as several sites in northern Namibia – two entirely different environments. At all sites, the team saw elephants drinking water to quench their thirst, but in desert regions, elephants also used water to cool their skin. Elephants would soak their bodies in water, throw dust over their skin to seal in the moisture, and let the moisture be evaporated by dry air over the next few hours. Since elephants have no sweat glands, this process allows them to stay cool in hot, dry conditions.

THE WATERING HOLES AT ADDO

Terrie's watering-hole observation site in South Africa's Addo Elephant Park is surrounded by lush green vegetation. Home to more than 450 animals, the park supports a relatively dense elephant population. The elephants must share water resources with other large mammals, including various antelope and Cape Buffalo. When an elephant herd approaches a



A matriarch In Addo stands guard at the watering hole



In the dry Etosha Pan, elephants always form an orderly procession to and from the watering hole

watering hole, the matriarch stands at the edge to keep other animals at bay until her herd has finished drinking. She remains at this spot until her herd moves off into the bush. Vegetation also supplies moisture for the herd.

LIFE IN NAMIBIA'S ETOSHA PAN

When the team moved to the dry, desert climate of Namibia, they found that hydration was more challenging for elephant herds. In the rainy season, the Etosha Pan area is filled with water, but in the dry season, the caked, dusty plain is devoid of any moisture. After drinking and bathing in isolated watering holes, the elephants would scoop up dust with their trunks and fling it across their bodies, shooting the dust onto their backs, bellies, and behind the ears to seal water into their skin.

NEAR NAMIBIA'S OKAVANGO RIVER

After Etosha, Terrie went to a more remote region in northeast Namibia near the Okavango River, which borders lands used by the Owambo, Bushmen, Kavango people, and massive herds of elephants. Except for the areas immediately adjoining the river, water is extremely scarce. Terrie often saw young children and women walking for miles with water jugs balanced precariously on their heads as they transported water between villages and community spigots.

WHO

Terrie Williams and Robin Dunkin

WHAT

Observing elephant herds at watering holes

WHERE

Wildlife reserves in Central and Northeast Namibia and South Africa

WHY

To understand competition for fresh water resources between wildlife and humans



Elephants aren't the only ones needing water in dry northern Namibia. Here three young boys collect water for their families from a community spigot. Children may have to walk miles to retrieve potable drinking water

Terrie and her team also traveled with gallons of water that nearly reached the boiling point on the overheated floor of their 4x4 vehicle as it bumped along the sandy tracks of the Khaudom Game Reserve. The lone warden told them that local water holes were drying up and that the elephants were increasingly thirsty, when the unexpected occurred:



Elephant enjoys a cool drink of water

FROM TERRIE WILLIAM'S JOURNAL

"We had only been in the Khaudom park for an hour when under the cover of darkness a young bull elephant crashed through the thick brush and into our camp. Desperate for water, the elephant had smelled a small water spigot, which it snapped like a toothpick under the force of its trunk. Water spilled quickly onto the ground and the elephant began to suck it up greedily with its trunk. The elephant charged our team to prevent any competition. We quickly retreated into the truck where the elephant had us cornered for several hours as he slackened his thirst. During our captivity, we gained a new appreciation of the competition for water faced by local people living in areas occupied by elephants. Thirsty elephants generally will win.



Terrie Williams photographs an elephant at a watering hole in Namibia

Visit Terrie's Mammalian Physiology Lab on the Web:

<http://bio.research.ucsc.edu/people/williams>



Terrie's study areas in southern Africa

THE COMPETITION FOR FRESH WATER

In the following days Terrie's team watched herds of elephants and spoke with local people as they all searched for water. With changing climates and increasingly tight borders around lands, humans and animals are both facing scarcity as natural water holes evaporate. Terrie and her student's future work will be to develop daily and seasonal water budgets for elephants living in different African regions. Their future water survival plan for will consider the unique biological needs of elephant herds, the changing environment of Africa, and the water requirements of local people.

ABOUT TERRIE WILLIAMS

Terrie Williams is a marine biologist based at the University of California-Santa Cruz. Her discoveries are helping scientists to understand how large terrestrial and marine mammals cope with this period of climate change.

Following the 1989 Exxon Valdez oil spill, Williams directed the rescue and treatment of oil-covered sea otters. Additionally, Williams has traveled to Alaska to observe killer whales and beneath the sea ice of Antarctica to see the world through the eyes of the Weddell seals. In 2001, she documented how the lives of these seals are being affected by changing climate in Antarctica. In 2007, Terrie Williams was presented with the Wings WorldQuest Sea Award.



After a bath, Etosha elephants dust up to keep moisture in their skin

EXPEDITION TEAM

Principal Investigator:
Dr. Terrie M. Williams, UCSC

Graduate Student:
Robin Dunkin,
PhD candidate UCSC

Field Assistants:
Ross McClenahan, MA
James Estes, PhD

Expedition Sponsors:
Wings WorldQuest, US
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