

ROBERT GEORGE FECHHELM (1948–2014)

Robert (Bob) George Fechhelm was born on 29 May 1948 in Englewood, New Jersey. He graduated from Bergenfield High School in New Jersey and enlisted in the U.S. Army during the Vietnam War, serving honorably from February 1969 through January 1972. He received his Bachelor of Science degree from Southhampton College in 1976. Beginning in 1977, he began researching the effects of temperature on the behavior and physiology of fishes, and he continued this line of research at Texas A&M University, where he received his Master of Science degree in 1981 under Dr. William H. Neill. Dr. Neill was one of the pioneers in developing a new experimental approach for determining behavioral thermoregulation in fishes.

At this same time, the effects on water temperature of solid-fill causeways extending from the shore to offshore docks and drilling islands in the nearshore Beaufort Sea emerged as a major environmental issue for Alaska. Flow divergence at the seaward tips of the causeways caused upwelling of cold, marine bottom water, which was advected into warm, nearshore waters used for feeding and migration by Arctic fishes.

When approached about working on this issue, Dr. Neill recommended Bob as the person to investigate the consequences of these temperature changes on the Arctic fish species of concern. Within a few weeks, in the summer of 1981, Bob travelled to northern Alaska and set up a state-of-the-art temperature preference study of the Arctic cisco (*Coregonus autumnalis*). This research led to the publication of two landmark research papers: one described the temperature preferences of the Arctic cisco, and the other used this information to predict the movements and distribution of Arctic cisco relative to temperature-salinity regimes near a Beaufort Sea causeway. Thus began Bob's lifelong passion for the study of Arctic fishes in northern Alaska. His research generated on the order of 24 publications on Arctic fishes in the formal literature, as well as scores of individual research reports. Bob received a PhD from Texas A&M University in 1995.

Bob's Arctic fish research interests were diverse. In addition to modeling movements of fish in environmental gradients, he investigated the role of winds on the recruitment of Arctic cisco from Canadian spawning grounds to Alaskan rearing habitats; the effects of temperature and salinity on the growth, condition, and mortality of several species of Arctic fishes; the role of winds on the dispersal patterns of other species of Arctic fishes; population dynamics and the role of density-dependence imposed by limited overwintering habitat; and even the genetics of Arctic fishes. He authored or co-authored several overview papers on the natural history of Arctic coastal fishes. In 2001, 20 years after emergence of the issue of causeway impacts on water temperature and fish, he published a definitive paper in this journal (*Arctic*) on the hydrographic effects of the causeways that had started his career, using a Before-After Control-Impact or BACI analysis.



Bob Fechhelm, Arctic fish ecologist.

While Bob's research focus was always on Arctic fishes, he was not limited to this arena. He was a classic scientist, thinking analytically in all matters, and he pursued other research topics of interest to him. These ranged from the ecology of small artificial cooling ponds in south Texas to the deep sea Gulf of Mexico. He did not shy away from new topics. For example, one of his best but least-known investigations was an assessment report on the effects of active-source, electromagnetic sounding systems on marine mammals, sea turtles, and elasmobranchs. He investigated the impacts of synthetic drilling fluids on macrofauna and megafauna assemblages at a deep-water drill site on the continental slope of the Gulf of Mexico. He was instrumental in developing and publishing assessment models to describe the population-level consequences of entrainment of fish eggs and larvae at offshore seawater intakes in the Gulf of Mexico. As always, key results were published in the formal literature. Bob was truly a "Renaissance man," gifted in a manner seldom seen in today's world, but he was also known for his cheerfulness in the field, even under the harshest of conditions.

Bob's Arctic research, spanning more than three decades, provided science with a new understanding of this ecosystem. His work was among the first to show how wind was the most controlling factor for virtually all aspects of the local ecology. The long-term monitoring program he helped design and implement is the only one of its kind for this part of the world and is a model of how such studies should be conducted. These foundation studies will be used this summer (2014) for two separate efforts regarding the effects of oil and gas activities on local fauna. Bob passed away on 21 April 2014. He was a good colleague and close friend. He will be missed.

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