Ichthyology & Herpetology 111, No. 2, 2023, 343–347

Donald A. Thomson (1932–2022), A Remembrance

Christine A. Flanagan[1] and Richard C. Brusca[2]

DONALD A. THOMSON, Professor Emeritus of the University of Arizona, enjoyed saying he was a marine scientist and ichthyologist in the Sonoran Desert. Those dissonant images invariably opened conversations revealing Don's passion for marine science and his research program of over 40 years in the Gulf of California (Sea of Cortez). Don produced major contributions to knowledge about the ecology and ichthyofauna of the Gulf. He published more than 37 scientific papers and book chapters, but many who travel to the Gulf know of him primarily from the *Tide Calendar of the Northern Gulf of California,* which he produced annually from 1967 to 1994 (later produced by CEDO, the *Centro Intercultural de Estudios de Desiertos y Océanos*), or by his two books on the fishes of Gulf of California. His *Reef Fishes of the Sea of Cortez*, published in 1979 by John Wiley and Sons with Lloyd Findley and Alex Kerstitch (revised and republished by the University of Texas Press in 2000), remains the definitive reference on rocky-bottom fishes in the Sea of Cortez. It was preceded by the *Gulf of California Fishwatcher's Guide*, with Nonie McKibbin (1976, 1978), a modest 79-page paperback with precise line drawings beautifully illustrated by Jenean Thomson, his wife. This first-ever field guide to Gulf fishes was self-published by Golden Puffer Press, sold out of his home, and marketed mostly by word-of-mouth; it nevertheless gained wide popularity and went through several printings. Its 209 species included the fishes most likely to be encountered by fishers and divers on near-shore rocky and sandy bottoms and in the tide pools of the northern Gulf. The *Guide* was significant in its time because it facilitated research and detailed observation of fishes and encouraged conversation among students, sport divers, and fishermen. Likely tattered, it can still be found in many personal libraries, having earned its place there as a repository of treasured memories.

In addition to Don's two books on Sea of Cortez fishes, his research papers ranged from: faunal biodiversity studies (e.g., Brusca and Thomson, 1977, the first faunal inventory of the Pulmo Reefs); predator–prey studies (e.g., Dungan et al., 1982); environmental impacts (e.g., Thomson et al., 1969; Robinson and Thomson, 1992); fish ecology (e.g., Thomson and Lehner, 1976; Thomson and Gilligan, 1983, 2002; Kotrschal and Thomson, 1986); fish taxonomy (e.g., Thomson and Eger, 1966; Moffat and Thomson, 1975); and behavioral biology of spawning in the Gulf Grunion, *Leuresthes sardina* (e.g., Reynolds and Thomson, 1974, 1979; Reynolds et al., 1976; Thomson and Muench, 1976). This scholarship grew from research based on extensive field work to investigate and document the ecology and biodiversity of fishes in an area poorly known and sparsely represented in natural history collections. As curator of the University of Arizona Fish Collection, he greatly expanded its holdings during his tenure. In 2021, the collection included more than 12,000 lots representing over 950 species and approximately 175,000 specimens accessioned between 1925 and 1998. However, the majority of the collections (about 75%) were made between 1964 and 1978, a period corresponding with Don's focused efforts to document the ichthyofauna of the Sea of Cortez. The current curator, Dr. Peter N. Reinthal, characterizes the geographic coverage of the fish collection as principally the Gulf of California and adjacent areas of the Tropical Eastern Pacific in Mexico with a significant element of freshwater fishes from Arizona and northwestern Mexico. The majority represent samples of rocky-bottom, near-shore habitats throughout the Gulf, from the mainland and Baja California shores as well as the Gulf islands. To a lesser extent, it includes fishes from seine and trawl samples of nearshore and offshore soft bottoms. These collections present a valuable "before" snapshot of a marine ecosystem

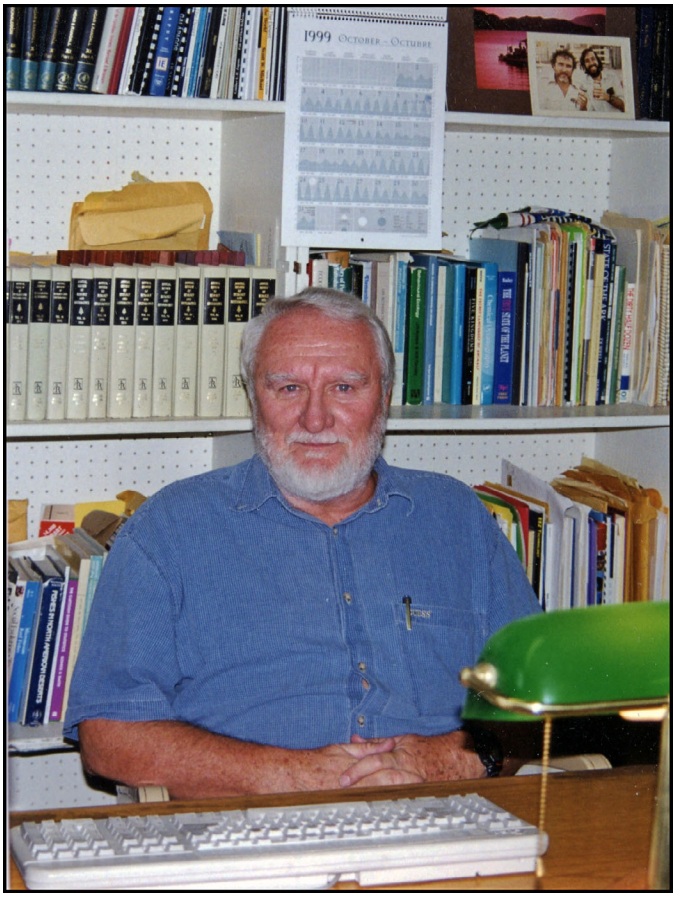

Fig. 1. Don in his office at the University of Arizona, circa 1999. Photo by Richard Brusca.

[1] 3121 W. Tucana St., Tucson, Arizona 85745; Email: cflanaga@verizon.net.
[2] Department of Ecology & Evolutionary Biology, University of Arizona, Tucson, Arizona 85721.
 DOI: 10.1643/t2023030 Published online: 14 July 2023

in the early stages of exploitation from recreational and commercial fishing that has resulted in significant and disruptive shifts in species abundance and composition within the fish communities of the Gulf today.

Don was born in Detroit, Michigan in 1932 and attended Catholic schools. He excelled at academics, and the religious training apparently didn't take, as in adulthood he became a confirmed atheist. His devotion was to the Detroit Tigers and he remained a lifelong fan. At 18, he honed his powers of observation and penchant for data collection by chronicling the stats and pivotal moments of every game of the 1951 season in a remarkable journal. His entries included pencil sketches of players landing a pitch or sliding into base. He attended the University of Michigan for his B.S. and M.S., narrowly missing being drafted into the military during the Korean War. His first exposure to the sea, a summer internship in Bermuda, ignited a lifelong passion for marine fishes that took him to Hawaii where he earned his Ph.D. in 1963 studying ostracitoxin in boxfishes.

While in Hawaii, Don became acquainted with Al Mead, a malacologist from the University of Arizona studying Hawaii's land snails. Mead was part of an effort at Arizona to establish a marine studies program. That connection was the gateway to years of research in the Gulf of California that began in the summer of 1963. As a freshly minted Ph.D. from Pieter van Weel's lab at the University of Hawaii, Don moved his family to Tucson to take a position in the University of Arizona's Department of Zoology as an Assistant Professor, Curator of Fishes, and head of the fledgling marine science program. In his own words:

"I met the Gulf of California in the fall of 1963 and I fell in love. My first trip to the Gulf was to Puerto Peñasco, and I was thoroughly excited to be able to study one of the greatest intertidal zones in the world ocean. But I soon realized that there was a lack of accurate tide tables, geographic information, and field guides of the fauna and flora. I felt like an explorer! The program evolved with the help of faculty and students and we were able get the data to predict the tides. I soon began what evolved into a 30-year study of the Gulf Grunion. With colleague John Hendrickson, who had experience in the Gulf, we recruited two dedicated graduate students, Rick Brusca (invertebrates) and Lloyd Findley (fishes), and began to establish the study collections that ultimately produced the three field guides that are still the standard references for the Gulf."

Those words, penned in 2015 at the age of 83 for acceptance of an award by N-Gen (The Next Generation of Sonoran Researchers, an international organization of some 900 researchers), convey the energy, collegial spirit, and sense of wonder that propelled Don throughout his long career. But his appreciation for the Gulf transcended his love for that sea—he soon grasped that a semi-enclosed subtropical ocean spanning more than 8° latitude (nearly 900 km), surrounded by harsh desert, headed by the most significant river in the American Southwest, and framed by a wild coastline shaped by enormous tides and active tectonics offered limitless opportunities and inspiration for the study of marine systems and the spectrum of evolution.

Don served as major professor for over 40 M.S./Ph.D. students, and he was on the committees of many more. His enthusiasm and passion for learning was contagious, and he had a gift for awakening these qualities in others. Many of his students, in academic and government positions, produced

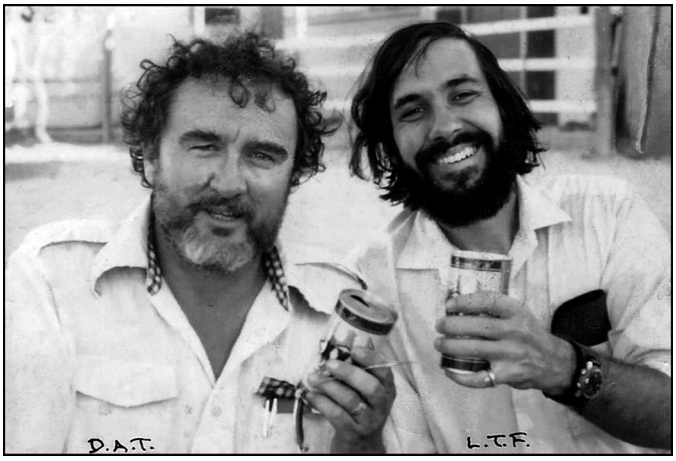

Fig. 2. Don Thomson and his first graduate student, Lloyd Findley, circa 1970. They remained close friends until Don's passing in 2022.

innovative research and worked to establish significant conservation efforts in the Gulf of California and beyond. Jeff Seminoff, Sarah Mesnick, Richard McCourt, Matt Gilligan, Fernando Zapata, David Lindquist, Wayne Van Voorhies, Peggy Turk-Boyer, Phil Hastings, Lloyd Findley, Richard Brusca, Jeff Leis, Christine Flanagan, and many others became accomplished leaders in their fields, changing the course of research, conservation, and education on local, national, and international levels. Irrespective of a student's interest, Don's mentoring centered on the power of observing nature and seeing it firsthand. Don fueled the innate curiosity in his students and encouraged close observation, sparking ideas around the patterns they observed in nature, leading to questions and hypotheses, and thus initiating the steps of scientific inquiry. He keenly understood how and when to apply the scientific method to field work and he demanded rigor, although in retrospect it was his ability to inspire and observe human nature that stands out. He often knew the direction of his students' passions before they knew it themselves. Many of his students speak of him "knowing just what to say at just the right moment, usually in a single comment" that let them see a clear way forward in their academic development. Indeed, Don reflected author-activist Jan Phillips's observation that "No matter how brilliant our attempts to inform, it is our ability to inspire that will turn the tides" (https://www.syracuseculturalworkers.com/mission; https://janphillips.com/).

He shared his love of the marine littoral and Sea of Cortez with literally thousands of undergraduates through his Oceanography, Ichthyology, and Marine Biology classes. Students responded to his engaging teaching style and eagerly signed up for his infamous field trips to Mexico. To this day, mention his name and field-trip stories abound—tales of breathtaking Gulf Grunion runs on the beach at El Golfo de Santa Clara, the five-week-long summer camping and diving trips along the coasts of Baja California and Sonora, the crack-of-dawn tide pooling, the oppressive heat, relentless mosquitoes, broken down Volkswagens (usually his), and the line for the showers. But the stories always end with how the experience changed their lives. Some students changed majors mid-course. Jeff Leis, following parental wishes, was a pre-med undergraduate student at the University of Arizona when he took Don's Ichthyology class.

Fig. 3. A typical camp along the Baja shore of the Gulf of California during the marine ecology summer course, circa 1977. Don's orange VW van is in the center. The dramatic landscapes, remote sites, and rich biota encouraged group cohesion and focus on the field work.

Fig. 4. A favorite camp at an abandoned resort along the Baja coast provided an ideal "low-tech" setting for camp meetings and student reports, circa 1977. Don's field trips took place in the halcyon days before internet and cell phones competed for student attention. Don (standing) commonly wore "DAT" shirts in the field. Photo by Christine Flanagan.

Looking back, Leis credits him with opening the door to a life of research, a Ph.D. from the University of Hawaii, and a career at the Australian Museum Research Institute. Not all undergraduates made career decisions based on their experiences with Don, but most were forever imprinted with a love of marine ecology and a passion for the conservation of our oceans. As a group, they endure as both a professional and a lay audience that advocates for Gulf of California conservation.

Much of Don's early research focused on the endemic Gulf Grunion, *Leuresthes sardina*. They come onto the beach to spawn, depositing eggs in the sand on a descending series of high spring tides, with subsequent hatching and return to the sea of the larvae a fortnight later in the next series of high spring tides. He and his students worked out the precise conditions that determined the pattern of spawning in the Gulf. He could tell you the most probable day and approximate time of the run for a given location by looking at the tide calendar. But at the beach he would watch, evaluate the conditions, sometimes for several hours, and then say, "they'll start coming onto the beach within the next 5 minutes." And they always did. For years he was the recognized expert interviewed by the media and consulted by international film crews traveling to the Gulf for the purpose of filming one of the spectacular Gulf Grunion runs.

Many of his students called him DAT, for his initials, a nickname he embraced and preferred over Don or Donald, and indicative of his affable nature. He was memorable, often intense, and bore a striking (and suitable) resemblance to Ernest Hemingway. But he was also approachable and lacked the slightest trace of hubris—qualities that encouraged, and never intimidated, young students. He understood the power of hands-on experiences and of letting students discover their own answers. He knew when to push, state the obvious, or give a supportive nod. Some would say he was patient to a fault, but he also could be gruff at times, demanding honesty and integrity from those around him and questioning: What did you see? How would that idea make sense? What does that behavior mean? In a typical example, a student in his summer class casually reported noticing how body sizes declined in blennies over decreasing latitudes down the Gulf coast of Baja. The observation was potentially notable because the latitude–body size pattern was first described for land mammals and thought to be related to endothermy. The argument and challenge was immediately set: "Back it up with data!"

Don's humility and foresight impacted the course of marine science in unforeseen ways. In a fitting tribute to his inspirational adviser, Matt Gilligan (Ph.D., 1980) credits Don with taking him on as a graduate student after he was discouraged in other University of Arizona faculty interviews: "Don was my last meeting of the day. He was interested in my undergraduate research project, started asking me questions, and we connected." Matt went on to become a well-known fish biologist with more than 30 publications, including a field guide to the fishes off the Georgia coast. In hindsight, Matt sees Don as a model mentor. In Don's footsteps, he established a marine science program at Savannah State College (now University), the first at a historically black college and the first in Georgia. Succeeding against the odds, the thriving field research program is competitive and attracts a wide diversity of in-state and out-of-state students. In 2018, Matt was honored with the national Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring. Don saw that potential in Matt when others didn't, and only with the passage of time will the full significance of Matt's leadership be known as his efforts to promote diversity in marine sciences continue to cascade across generations.

Don was also unflappable. With most of his research based in Mexico and the nearest site more than four hours south of the university, there frequently arose urgencies, crises, late departures, disabled vehicles, miscommunications, electrical outages, and unpredictable situations—always taken in stride. One student, called urgently out of class to his office, was greeted calmly with: "Call your mother. She received a phone call from the State Department. She called me and wants to know if you are alive. I told her you were a few hours ago."

In part, the success of the marine program, and of Don's many students, lay in the magic of the Sea of Cortez itself,

wholly contained within the Republic of Mexico. Don was grateful for the welcome he always received there and for the international cooperation he enjoyed with many Mexican scientists over the years. He was also grateful for the financial and administrative support for the marine program by the University of Arizona, and credited the efforts of Al Mead, John Hendrickson, Joe Schreiber, Bob Hoshaw, and many others who also were early supporters.

We are all a product of our times. Don's career spanned a period of breakneck developments in research, theory, technology, and computing across the spectrum of biological sciences. In the final decade of his career at UA, the newly established Department of Ecology and Evolutionary Biology (EEB) bore little resemblance to the Department of Zoology that he joined in 1963. Older colleagues had retired, and many of the new hires brought research interests focused in evolutionary theory, mathematical ecology, and the growing field of molecular biology. They also brought new ideas about educating students. University support for some programs, marine science included, was discontinued or radically restructured, a reflection of the wider trends in academics. Field courses for students were greatly diminished. However, the Marine Ecology course that Don established lives on, and he took heart that his student Katrina Mangin (Ph.D., 1991) became a prominent part of the marine science presence in today's EEB. CEDO, the marine field station in Puerto Peñasco, Sonora that he supported in its establishment more than 40 years ago is also part of his legacy. It continues to host classes and researchers, and it now works with fishing communities to facilitate ecosystem conservation in the northern Gulf.

Student memories of Don invariably include his family. From the beginning of his tenure, the boundaries between family and students were blurred. Students were frequently at his home for seminars, and his children were often on the summer field trips in Mexico. His wife Jenean, an accomplished professional artist, supported his career in ways that are hard to imagine in our current times. When he arrived, *in loco parentis* was firmly in place and the UA did not allow female students to travel to Mexico in classes. Later, the policy was revised to allow female students to participate in field trips, but only if there was a female chaperone along. The duty fell to Jenean, with their four young children in tow.

Don retired in 1998. He lived long enough to see his legacy—based in teaching, field observations and research, collections, and, above all, mentorship—contribute to a foundation for the science and scientists we need today to face the challenges of Earth's (and humanity's) future. He was at heart an optimist and never lost his love for the Sea of Cortez, nor his faith and wonder in nature, nor enthusiasm for research. In the closing words of remarks sent to N-Gen (see above) he wrote: "I envy all of you for tackling the exciting and innumerable challenges facing you both within and beyond this region. You know them better than I. Just remember that the oceans, with your help, have great resilience."

Throughout his career, Don nurtured both family and students, developing deep relationships that endured long past the ending of classes or conferring of degrees. Many former students continued to visit or correspond with him decades after they graduated. Jenean, his partner of 55 years, passed away in 2012 and he mourned her until his own death came in 2022. Don passed away on May 20, 2022, at the age of 90, with his family by his side at his home in Tucson, Arizona. He is survived by his four children, Erin Thomson, Kurt Thomson, Lisa Thomson, all of Tucson, Arizona, and Madelon Severson, of Snowmass, Colorado, and hundreds of students spread across the nation and several continents. He is missed by all.

ACKNOWLEDGMENTS

The authors are grateful for the many students, colleagues, and family members of Don Thomson who shared their experiences with us over the years and in the preparation of this manuscript. We thank Chris In-Albon, Matt Gilligan, Erin Thomson, Karl Flessa, Richard Michod, Peter Reinthal, Deborah Goldberg, and Judie Bronstein for their timely and helpful comments.

LITERATURE CITED

Brusca, R. C., and D. A. Thomson. 1977. The Pulmo Reefs of Baja California—true coral reef formation in the Gulf of California. Ciencias Marinas 1:37–53.

Dungan, M. L., T. E. Miller, and D. A. Thomson. 1982. Catastrophic decline of a top carnivore in the Gulf of California rocky intertidal zone. Science 216:989–991.

Kotrschal, K., and D. A. Thomson. 1986. Feeding patterns in eastern tropical Pacific blennioid fishes (Teleostei: Tripterygiidae, Labrisomidae, Chaenopsidae, Blenniidae). Oecologica (Berlin) 70:367–378.

Moffat, N. A., and D. A. Thomson. 1975. Taxonomic status of the Gulf Grunion (*Leuresthes sardina*) and its relationship to the California Grunion (*L. tenuis*). Transactions of the San Diego Society of Natural History 18:75–84.

Reynolds, W. W., and D. A. Thomson. 1974. Responses of young Gulf Grunion, *Leuresthes sardina*, to gradients of temperature, light, turbulence and oxygen. Copeia 1974: 747–758.

Reynolds, W. W., and D. A. Thomson. 1979. Temperature and salinity tolerances of young Gulf of California Grunion, *Leuresthes sardina* (Atheriniformes: Atherinidae). Journal of Marine Research 32:7–45.

Reynolds, W. W., D. A. Thomson, and M. E. Casterlin. 1976. Temperature and salinity tolerances of larval Californian Grunion, *Leuresthes tenuis* (Ayres): a comparison with Gulf Grunion, *L. sardina* (Jenkins & Evermann). Journal of Experimental Marine Biology and Ecology 24: 73–82.

Robinson, J. A., and D. A. Thomson. 1992. Status of the Pulmo Coral Reefs in the lower Gulf of California. Environmental Conservation 19:261–264.

Thomson, D. A., and W. H. Eger. 1966. Guide to the Families of the Common Fishes of the Gulf of California. University of Arizona Press, Tucson, Arizona.

Thomson, D. A., L. T. Findley, and A. N. Kerstitch. 1979. Reef Fishes of the Sea of Cortez: The Rocky-Shore Fishes of the Gulf of California. John Wiley and Sons, New York.

Thomson, D. A., L. T. Findley, and A. N. Kerstitch. 2000. Reef Fishes of the Sea of Cortez—The Rocky Shore Fishes of the Gulf of California. Revised edition. University of Texas Press, Austin, Texas.

Thomson, D. A., and M. R. Gilligan. 1983. The rocky-shore fishes, p. 98–129. *In*: Island Biogeography in the Sea of

Cortez. T. J. Case and M. L. Cody (eds.). University California Press, Berkeley.

Thomson, D. A., and M. R. Gilligan. 2002. Rocky-shore fishes, p. 154–180. *In*: A New Island Biogeography of the Sea of Cortés. T. J. Case, M. L. Cody, and E. Ezcurra (eds.). Oxford University Press, New York.

Thomson, D. A., and C. E. Lehner. 1976. Resilience of a rocky-intertidal fish community in physically unstable environment. Journal of Experimental Marine Biology and Ecology 22:1–29.

Thomson, D. A., and N. McKibbin. 1976. Gulf of California Fishwatcher's Guide. Golden Puffer Press, Tucson, Arizona.

Thomson, D. A., and N. McKibbin. 1978. Peces del Golfo de California. [Traducción de M. Mahieux.] Centro de Investigaciones Científicas y Tecnológicas, Universidad de Sonora, Hermosillo, Sonora, México.

Thomson, D. A., A. R. Mead, and J. F. Schreiber, Jr. (Eds.). 1969. Environmental impact of brine effluents on Gulf of California. U.S. Department of the Interior, Office of Saline Water Research and Development Progress, Report No. 387.

Thomson, D. A., and K. A. Muench. 1976. Influence of tides and waves on the spawning behavior of the Gulf of California Grunion, *Leuresthes sardina* (Jenkins and Evermann). Bulletin of the Southern California Academy of Sciences 75:198–203.