

The Canadian Field-Naturalist

Notes on the natural history of Donald F. McAlpine

In the high schools of New Brunswick in the early 1970s, a standard textbook for students of French as a second language featured the adventures of a fictional 15-year-old speleologist and aspiring scientist living in southwestern France (Dale and Dale 1964). Little did most of those students (myself among them) know that, in Donald McAlpine, we had a real-life teenaged investigator of local caves and cave life in our midst. By his early 20s, when he graduated with a B.A. in biology from the University of New Brunswick (UNB), Don had already authored several peer-reviewed scientific papers and other articles, mostly on the physical structure and fauna of solution caves in the province.

He reported a hibernating Tricoloured Bat (*Perimyotis subflavus*), the first provincial record of this

species (McAlpine 1976); examined the diversity and ecology of cave-dwelling earthworms with Dr. John Reynolds, who was then a professor at UNB (McAlpine and Reynolds 1977); documented cave-use by American Beaver (*Castor canadensis*; McAlpine 1977); and assessed the state of faunistic and ecological knowledge of these habitats in New Brunswick, emphasizing the need for further research (McAlpine 1979; see also McAlpine 1983a).

His curiosity and productivity are perennial. Dr. Donald F. McAlpine (Figure 1) is the long-time Research Curator of Zoology and Head of the Department of Natural History at the New Brunswick Museum (NBM). He is an unusually versatile biodiversity scientist who has made prolific contributions to knowledge, conservation, and public appreciation of Canada's terrestrial, freshwater, and marine biota, focussing on the Atlantic region. His published works include more than 160 peer-reviewed papers, 20 book chapters, a major edited book on the biodiversity of the Atlantic Maritime Ecozone (McAlpine and Smith 2010a), a co-authored volume on the mammals of Prince Edward Island (Curley *et al.* 2019), flashcard guides to freshwater mussels (McAlpine *et al.* 2021b) and freshwater fishes of conservation significance (McAlpine and Karstad *in press*) in the Maritimes, and many more natural history articles written for magazines, newsletters, and other forums. Don is, equally, and has long been, a generous mentor of students and citizen scientists; an instigator and genial leader of collaborative projects; and a tireless advocate for the key role of natural history museums in documenting and conserving biodiversity (McAlpine 1986, 1993, 2011, 2018a, 2022).

Growing up, Don lived in the city of Saint John, a few kilometres across town from the NBM. But every summer, after school was out, his family would move to their small cottage on the bank of the Wolastoq (Saint John River) at Grand Bay, about 15 km upriver from the city and the Bay of Fundy. By all indications, it was here that he emerged as a naturalist, with a special fondness for frogs, turtles, and their kin. With supportive parents, he soon found his way to the museum, and by his early teens was volunteering after school and on weekends in the NBM natural history collections. At the time, zoologist-curator



FIGURE 1. Donald McAlpine, in Kennedy Lakes Protected Natural Area (PNA), New Brunswick, 14 August 2022. Photo: Mathieu Léger.

Dr. Stan Gorham (1917–1984) was deeply engaged in building the NBM's systematic research collections of vertebrates (Gorham 1978; McAlpine 1986; Cook 1991). As a specialist in herpetology, with local, national, and international experience in field and museum work and scientific writing, he was an influential early mentor to Don. Others were David Christie—ornithologist, all-round naturalist, and at the time the head of the NBM science department—and Dr. Francis Cook (1935–2020)—curator of herpetology at the Canadian Museum of Nature, and long-serving Editor-in-Chief of *The Canadian Field-Naturalist* (CFN).

Don's early and continuing contributions to herpetology illustrate his uncommon ability to parlay opportunity and experience into diverse and evolving outcomes. Three of those early opportunities took him outside Canada: to Panama in 1979, Iceland in 1980, and the island of Jersey in the English Channel in 1981.

In Panama, on a student expedition, he enlisted the help of fellow participants in a study of nesting behaviour in Leatherback Sea Turtle (*Dermochelys coriacea*; McAlpine 1980). Years later (2002–2004) he would serve on the Atlantic Leatherback Turtle Recovery Team of Fisheries and Oceans Canada and assess the status and conservation of marine turtles in British Columbia (McAlpine *et al.* 2004) and Canadian waters (McAlpine *et al.* 2007). Through his outreach to Maritime fishermen and colleagues at the Atlantic Veterinary College and Canadian Sea Turtle Network, the NBM has assembled important research collections of leatherbacks and other sea turtles. These include tissue samples, carapaces, and skeletal material salvaged from animals that were found dead on beaches or drowned in fishing gear. For many years, a whole-body mount of one such leatherback featured prominently in an exhibition on marine biodiversity conservation seen by thousands of visitors to the NBM. Meanwhile, a series of educational leaflets on endangered species in New Brunswick (conceived and written largely by Don) included the leatherback (McAlpine and Heward 1993) among the 20 numbers produced by the museum.

On Jersey, during an internship at what is now the Durrell Wildlife Conservation Trust, Don initiated and completed a study of activity patterns and correlated colour changes in captive individuals of Keel-scaled Boa (*Casarea dussumieri*), an at-risk snake species (IUCN Red Listed as Vulnerable; Cole *et al.* 2018) endemic to a single small island in the archipelago of Mauritius (McAlpine 1981, 1983b). In recent years, he and colleagues have examined several aspects of the biology and variability of Maritime Canadian populations of Common Gartersnake (*Thamnophis*

sirtalis pallidulus). The latest in this series of studies examines the multiple colour morphs occurring in these populations (McAlpine *et al.* 2022c). Although these are genetic variants of a polymorphic and widespread species, not analogous to physiological colour changes, the topic hints at a long-held interest. The spring and summer of 1981 were momentous for Don in quite another happily enduring way. It was on Jersey that he met his wife, Lynne.

Don's first scientific study of amphibians examined the status of Gray Treefrog (*Hyla versicolor*; recognized by Frost [2023] as *Dryophytes versicolor*) at what was then its only known locality in New Brunswick, a marsh within the city of Fredericton (McAlpine *et al.* 1980). This work contributed to protection of the site by the Nature Trust of New Brunswick as Hyla Park, the first area in Canada set aside expressly for amphibian conservation and related public education (McAlpine and Vail 2005; Wallace *et al.* 2023 [this CFN issue]). Hyla Park was also the setting of Don's M.Sc. research at UNB, in which he compared microhabitats and prey sizes among three family Ranidae frog species (McAlpine and Dilworth 1989). He has subsequently shown that the treefrog is expanding its range in the province, largely in anthropogenic habitats (McAlpine *et al.* 1991a, 2009; McAlpine 2023). Positing that losses or alteration of habitats might have caused historical declines of other amphibian species in the province, he found instead that the low degree of habitat specialization of most of these species appears to have offset such possible impacts (McAlpine 1997a, 2010). On the other hand, a study of Mink Frog (*Lithobates septentrionalis*; recognized by Frost [2023] as *Aquarana septentrionalis*) population numbers during an Eastern Spruce Budworm (*Choristoneura fumiferana*) outbreak in the 1970s–1990s showed adverse responses in areas sprayed with the insecticide fenitrothion (McAlpine *et al.* 1998).

For his Ph.D., also at UNB, Don investigated another dimension of amphibian biology that had received little previous attention in Canada. Under the direction of parasitologist Dr. Michael Burt (1938–2014), he carried out taxonomic and ecological studies of helminth communities in several species of New Brunswick frogs (e.g., McAlpine 1997b; McAlpine and Burt 1998a,b). His interest in parasitology has extended to host-groups as varied as whales (McAlpine *et al.* 1997), sharks (Adams *et al.* 1998; Pratt *et al.* 2010), and crayfish (Gelder *et al.* 2009). He also completed the editing of a major work on the nematodes of Canadian fishes (Arai and Smith 2016), following the death of co-editor Michael Burt.

Some of Don's colleagues, and many museum-goers and others, know him mainly in connection

with whale research and conservation. His trip to Iceland in 1980 gave him a visceral introduction to large cetaceans. From June to September of that year, he was employed as the Canadian observer of the Icelandic commercial whale hunt, reporting to the International Whaling Commission. Dividing his time between the deck of a whaling ship and an onshore processing station, he was able to retrieve and prepare skeletal material from several individuals of the targeted species: Sei Whale (*Balaenoptera borealis*), Fin Whale (*Balaenoptera physalus*), and Sperm Whale (*Physeter macrocephalus*). He also measured organ weights in a larger sample of the harvested animals, and reported his findings as a contribution to understanding the comparative physiology of these species (McAlpine 1985).

The skeletal material that he salvaged in Iceland became part of the NBM zoological collections. Over the ensuing years, through his wide collaboration and networking, and with the support of other NBM zoology staff (strong constitutions a job prerequisite), these collections have come to include the most comprehensive research holdings in any museum of the marine mammal fauna of Atlantic Canada (Figure 2a). As with the collections of sea

turtles, this material originates largely from animals that died after strandings or entanglements (see Nemiroff *et al.* 2010). Don has taken part in necropsies of a number of these individuals. Besides assessing the causes of death, these studies have yielded knowledge of the reproductive status and pathology of various cetaceans (e.g., McAlpine *et al.* 1999a; Daoust *et al.* 2022). Their broader goal is to contribute to reducing mortality resulting from human activities (see Van der Hoop *et al.* 2013). Don developed a particular interest in Pygmy Sperm Whale (*Kogia breviceps*) and Dwarf Sperm Whale (*Kogia sima*) after a Pygmy Sperm Whale washed ashore dead, in fresh condition, in Saint John in December 1992 (McAlpine *et al.* 1997). He has contributed authoritative accounts of these two rarely observed toothed whales, which are phylogenetic cousins of the much larger Sperm Whale, to standard international reference works on marine mammals (McAlpine 2014, 2018b).

The “Hall of the Great Whales” was among the centrepiece attractions of the NBM exhibition centre on the Saint John waterfront from 1996 to 2022. Conceived and developed by Don and the museum’s design and exhibition staff, it included the articulated skeleton and a life-size model of an adult female



FIGURE 2. Donald McAlpine. a. In the mammal collections storage area at the New Brunswick Museum, Saint John, New Brunswick (NB), 25 August 2020. b. At the entrance to a bat hibernaculum, White Cave, near Hillsborough, NB, 21 April 2015. Photo a: Julia Wright. Photo b: Karen Vanderwolf.

Northern Right Whale (*Eubalaena glacialis*), nicknamed Delilah, that died near Grand Manan in the Bay of Fundy in 1992 following a ship strike. The salvage of Delilah was facilitated by Laurie Murison (1959–2022), marine conservationist, long-time director of the Grand Manan Whale and Seabird Research Station, and a close colleague of Don. The model was created by noted whale biologist Dr. Paul Brodie, who Don first met in Iceland in 1980. The exhibition heightened public awareness of the threats faced by the North Atlantic Right Whale (listed as Critically Endangered by IUCN [Cooke 2020] and Endangered by the Canadian federal government [SARA Registry 2023]) and other large marine vertebrates in Atlantic Canadian waters. In so doing, it probably also contributed indirectly to the successful rerouting of a major shipping lane away from the area frequented by right whales near Grand Manan (Vanderlaan *et al.* 2008). In 2022, the NBM embarked on a comprehensive renewal of its exhibition and collections/research facilities. Although the exhibition centre will be closed during this process, the model of Delilah has been given a fitting new home in the Fundy Discovery Aquarium at the Huntsman Marine Science Centre in St. Andrews, New Brunswick.

The scope of Don's original research on the distribution, biology, and conservation of other vertebrates and invertebrates defies easy summary. He has also published, in some cases extensively, on fishes, birds, bats, shrews, rodents, seals, canids, felids, earthworms, freshwater and terrestrial molluscs, crayfish, woodlice, millipedes, and several orders of insects. Even this list is incomplete. The astonishing range is partly a reflection of the mandate of a curator of diverse collections, working in a region with few resident taxonomic specialists. It also illustrates Don's keen motivation to document and understand, across taxonomic groups, species' responses to environmental variation and change (McAlpine and Smith 2010b). His collaboration with many other biodiversity scientists and students, and the diversification and growth of the NBM natural history collections over the past several decades, can be seen in a similar light. For an example, see his and Dr. Aaron Fairweather's accounts of the history and development of the NBM insect collections (Fairweather and McAlpine 2011; McAlpine 2011, 2018c), and Don's tribute to odonatologist and NBM research associate Paul Brunelle (1952–2020; McAlpine 2020).

About a third of Don's research publications report new provincial, regional, national, or North American species-occurrence records. Invariably, these are meticulously researched papers providing historical and ecological context and, increasingly, the results of genetic and stable isotope analyses. Nearly

all are co-authored with colleagues and students. A few examples, in chronological order, are papers on American Mud Earthworm (*Sparganophilus tamesis*; synonym *Sparganophilus eiseni*), one of only two native species among the 21 earthworm species that have been found in New Brunswick to date (McAlpine *et al.* 2001, 2022a); Pickerel Frog (*Rana palustris*; recognized by Frost [2023] as *Lithobates palustris*) on Prince Edward Island (McAlpine *et al.* 2006); Ocean Pout (*Zoarces americanus*) and Ocean Sunfish (*Mola mola*) in the Saint John River system (McAlpine 2013); a wild-origin Gray Wolf–Eastern Wolf hybrid (*Canis lupus* × *Canis lycaon*) in New Brunswick (McAlpine *et al.* 2015); Spring Field Cricket (*Gryllus veletis*) in the Maritime provinces (Lewis *et al.* 2019); and island and mainland populations of White-Footed Deer Mouse (*Peromyscus leucopus*) in New Brunswick (Huyhn *et al.* 2021a,b).

Complementing these studies, Don has paid close attention to non-native and potentially invasive species, and native species undergoing what are or may be anthropogenic changes in distribution, abundance, or breeding status. Examples fitting these broad categories include Gray Treefrog, noted above; gulls (Astle and McAlpine 1985; McAlpine *et al.* 2005); seals (e.g., McAlpine *et al.* 1999b; Lucas and McAlpine 2002); Gray Fox (*Urocyon cinereoargenteus*; McAlpine *et al.* 2008, 2016a); a wild-origin Greylag Goose (*Anser anser*; McAlpine *et al.* 2020b); and Silver-haired Bat (*Lasionycteris noctivagans*; McAlpine *et al.* 2021a). Among invertebrates, examples include Spinycheek Crayfish (*Faxonius* [formerly *Orconectes*] *limosus*; McAlpine *et al.* 1991b; Lambert *et al.* 2007), Southern White River Crayfish (*Procambarus zonangulus*; McAlpine *et al.* 2020a), Common Freshwater Jellyfish (*Craspedacusta sowerbyi*; McAlpine *et al.* 2002), Common Ridgeback woodlouse (*Haplophthalmus mengii*; McAlpine and Fairweather 2016), Chinese Mystery Snail (*Cipangopaludina chinensis*; McAlpine *et al.* 2016b; Kingsbury *et al.* 2021), millipedes (McAlpine and Shear 2018; McAlpine 2019), and earthworms (McAlpine *et al.* 2022a,b).

One of the most severely consequential invasive organisms in North America in recent decades has been the fungus *Pseudogymnoascus destructans* (*Pd*), the causal agent of white-nose syndrome (WNS) in bats. When the disease was first detected in upstate New York in 2006, Don realized that a narrow window of time remained in New Brunswick during which the pre-white-nose status of hibernating bat populations and co-occurring biota could be documented. His previous caving experience and bat research put him in a good position to undertake the work, but it would be physically and logistically challenging. By good fortune, an intrepid student of mammalogy, Karen

Vanderwolf, embraced the opportunity to work on the project for her M.Sc. thesis at UNB, with Dr. Graham Forbes and Don as co-supervisors. They were joined by mycologist and NBM research associate Dr. David Malloch, who guided the study of fungi originating from Karen's and Don's intensive sampling efforts in caves and mines (Figures 2b and 3c).

Beginning their surveys in early 2009, Karen and Don found the first New Brunswick bats infected and killed by *Pd* in March 2011 (McAlpine *et al.* 2011; Vanderwolf *et al.* 2012). By 2015, more than 99% of Little Brown Bat (*Myotis lucifugus*) and Northern Long-eared Bat (*Myotis septentrionalis*) in the known hibernacula in the province had succumbed, and no Tricoloured Bats have been observed in New Brunswick since 2013 (Vanderwolf and McAlpine 2021). Karen, Don, David, and colleagues have published nearly 20 research papers to date on the environmental characteristics and biota of the New Brunswick

hibernacula, before and after the arrival of *Pd*. These deal with the cave microclimates (e.g., Vanderwolf *et al.* 2012; Vanderwolf and McAlpine 2021), their fungal diversity (e.g., Vanderwolf *et al.* 2013, 2019; Malloch *et al.* 2016), and potential vectors and reservoirs of *Pd* (e.g., Vanderwolf *et al.* 2016). This work has yielded the most comprehensive findings currently available on the fungal biota of the affected bat species and for any caves in Canada—backed up by live cultures deposited in the UAMH Center for Global Microfungal Biodiversity at the University of Toronto, and dried specimens in the NBM herbarium (Vanderwolf *et al.* 2019). From this solid foundation, Karen extended her WNS research widely beyond New Brunswick and completed her Ph.D. thesis at Trent University in 2022 on aspects of the “mycobiome” of bats, with Don as a member of her supervisory committee.

Given his broad interests and expertise, it was natural that Don would take the lead in organizing and



FIGURE 3. Donald McAlpine (DFM) with students and colleagues. a. Left to right: Howard Huynh, Aaron Fairweather, Laura Hill, DFM, and Derek Durston, in Caledonia Gorge Protected Natural Area (PNA), New Brunswick (NB), 23 August 2012. b. Left to right: DFM, Jake Lewis, Madelaine Empey, and Rachel Fullerton-Quin, in Spednic Lake PNA, NB, 19 August 2017. c. Left to right: Karen Vanderwolf, David Malloch, and DFM, en route to bat hibernaculum in Markhamville Mine, NB, 11 March 2011. d. Botany and mycology field lab at BiotaNB, DFM in foreground, Kennedy Lakes PNA, NB, 27 June 2019. e. Sign on entrance-door to zoology field lab, Kennedy Lakes PNA, NB, 6 July 2019. Photos a and b: Karen Vanderwolf. Photo c: Randall Miller. Photos d and e: Stephen Clayden.

editing the book *Assessment of Species Diversity in the Atlantic Maritime Ecozone* (McAlpine and Smith 2010a). Ten years in the making, this includes 31 chapters by 51 researchers from across Canada and elsewhere. It is one of only a few such works, and the only one formally published, that synthesizes knowledge of the biodiversity of an entire Canadian ecozone. Fifteen terrestrial ecozones are recognized nationally. Among these, the Atlantic Maritime Ecozone comprises the Maritime Provinces of New Brunswick, Nova Scotia, and Prince Edward Island; the Appalachian region of eastern Quebec and Gaspésie; and the Îles-de-la-Madeleine (McAlpine and Smith 2010a). In a review of the book published in CFN, Dr. Paul Catling called it “a great achievement” and “a major source for anyone interested in Canada’s biodiversity as well as that of northeastern North America” (Catling 2012: 71). He added: “It will provide a basis for research and teaching and a vast source of general information [...] Naturally we hope that its example and standard can be followed” (Catling 2012: 74).

The most ambitious project conceived and led by Don is BiotaNB. Every year since 2009—with a two-year hiatus during the COVID-19 pandemic—BiotaNB has brought together a group typically including 40 to 60 taxonomic experts, students, volunteers, and several artists-in-residence for two weeks of intensive field studies in New Brunswick’s larger protected natural areas (PNAs). Its primary goal is to build a base of knowledge supporting conservation of species and ecosystem diversity in the province. It also provides opportunities for students to work with experienced biodiversity specialists, and for interaction among scientists and artists as they explore the PNAs (Figures 3a,b,d,e and 4). A student-led project during BiotaNB was the first to examine the incidence of the chytrid fungus, *Batrachochytrium dendrobatidis*, in a range of amphibian species in New Brunswick (Jongsma *et al.* 2019).

Through open house events, BiotaNB has enabled community members near the protected areas to engage with researchers and artists, learn about their discoveries and creative work, and share local knowledge. In addition to its research findings, reported in more than 60 peer-reviewed papers to date, the project has yielded a substantial body of artworks in diverse media, a book of poetry, and a feature film (see McAlpine 2022). On a practical level, its success has hinged on Don’s skill and hard work as an organizer and fund-raiser, and on the technical and logistic prowess of other NBM natural history staff and volunteers. (Many participants would note the camaraderie and delicious evening meals as further keys to the success of the field program.)

BiotaNB has been a formative multi-year experience for a number of students who acknowledge Don as an influential mentor. Among the BiotaNB “alumni” are Aaron Fairweather (Ph.D., 2023, University of Guelph; ant diversity and ecology), Madeline Empey (current Ph.D. candidate, University of Ottawa; amphibian ecotoxicology), Howard Huynh (Ph.D., 2018, Texas Tech University; mammal systematics, morphology, and biogeography), Gregory Jongsma (Ph.D., 2022, University of Florida; frog systematics and phylogeography), Jake Lewis (M.Sc., 2022, University of Ottawa; beetle systematics), and Karen Vanderwolf (Ph.D., 2022, see above). As a member of supervisory or examining committees, Don has mentored three other doctoral students and more than 20 M.Sc. students. Many others who have worked as undergraduate summer students in the NBM zoology section have pursued careers in wildlife and conservation biology, health sciences, and teaching.

Don’s service on scientific panels, steering committees, and other organizations has also been extensive. Groups in which he has been especially active include the Canadian Herpetological Society (including the Canadian Amphibian and Reptile Conservation Network, CARCNET); the Alliance of Natural History Museums of Canada; the New Brunswick Scientific Advisory Committee on Protected Natural Areas; the New Brunswick Committee on the Status of Species-at-Risk; and the Stonehammer UNESCO Global GeoPark. He has also served on the editorial boards of several research journals, including CFN, of which he has been an Associate Editor since 2003.

His accomplishments in biodiversity research and conservation, collections development, and public education have been recognized by national awards from the Canadian Council on Ecological Areas (1997), the Canadian Museums Association (1997), the Canadian Wildlife Federation (2015), and the Canadian Herpetological Society (2022). Also, the NBM received a Visionary Award in 1996 from the Gulf of Maine Council on the Marine Environment for its “provision of scientific advice to governments and the private sector on the natural history and conservation of the Bay of Fundy and Gulf of Maine” and “long commitment to promoting public awareness of marine science”.

It was Don’s advocacy that led to the creation of a curatorial position in geology and palaeontology at the NBM in 1986 and another in botany and mycology in 1987. Dr. Randall (Randy) Miller and I were hired in turn in those years, and the two of us and Don worked closely together for the next 30 years. It often felt like we were channeling the spirits of our early counterparts—the small group of geologists, zoologists, and botanists who pursued the scientific work of



FIGURE 4. The BiotaNB “lab” in the Queens County Courthouse Museum, Gaagetown, New Brunswick during the Grand Lake Protected Natural Area bioblitz, 12 August 2014. From left to right: Virginia Zoll (foreground/below), David Malloch (above), Bruce Malloch, Amanda Bremner, Karen Vanderwolf (below window), Kendra Driscoll (looking into microscope), Greg Jongsma (almost hidden behind table at back), Annegret Nicolai, Robert Forsyth, Bianca Langille (wearing a ballcap), Don McAlpine, and Howie Huynh. Photo: Dwayne Lepitzki.

the Natural History Society of New Brunswick, forerunner of the NBM, in the mid to late 1800s and early 1900s. Randy retired in 2016 and I followed in 2018. Happily, the work continues, with new curators joining experienced technicians and bringing fresh expertise and ambitions to the NBM, while keeping the doors open to old-timers. Don, too, just might “retire” one of these years. That surely won’t mean putting away his collecting net or setting down his pen. He seems bound to stay closely engaged in the NBM and wider natural history communities that he has done so much to foster.

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STEPHEN R. CLAYDEN

Guest Editor, *The Canadian Field-Naturalist*, and
Department of Natural History
New Brunswick Museum, Saint John, NB, Canada