

BOREAL MAMMALOGY  
ACM Wilderness Field Station Program

Long Course Description

The behavior, ecology and morphology of animals have been shaped by evolution, within the constraints of anatomy and physiology. Thus animals are adapted in many ways to the environments around them. In this course, we shall investigate the adaptations of mammals for life in the Quetico/Superior region.

Most mammals are secretive and more difficult to observe than some other animals, such as birds and insects. Mammals, however, often leave evidence of their activities: tracks and scats (feces) are often easy to find, scrapings associated with scent marks are often left on the ground or trees, well used trails can be found in the woods, and plants eaten by mammals have missing leaves, branches or bark. Many small mammals are easy to live-trap for studies of behavior, population dynamics and reproduction. And some mammals, such as squirrels and beavers, can be observed directly, if one has patience. Within the course of a month there is much that can be learned about the mammals of the Quetico/Superior.

The main topics for investigation in this course will be mammal life histories, foods, habitat choices and effects on habitat, populations, and natural history. We shall set up live-trapping grids to study small mammals, take hikes to find tracks, scats, animal trails, take day-trips by canoe and longer trips to places we can not reach on foot and that will give us opportunities not available near the field station to see mammals and their sign. We may also do some small experiments around beaver ponds. As much as possible, good weather will be used for outdoor activities and rainy weather to learn identification of mammals from study skins and skulls and to study mammal anatomy. During the last half of the course, students will work on independent projects concurrent with other class activities.

Because mammals of the Quetico/Superior exist within a backdrop of other living organisms with which they continually interact, identification of most trees and major plants and of common birds, other vertebrates and insects will be stressed.

The course will not follow a specific text but will have required readings. Field guides to mammals are necessary to learn identification of mammals, and students must have 2: one for mammals of North America or mammals of the region, and one for tracks. Other field guides will be handy to help with identification of flowers, birds, trees and so on. Binoculars are not required but those without them will probably wish they had brought them for bird watching and squirrel watching.

Mammal populations can fluctuate greatly from year to year so there is no way to predict with certainty that we shall be able to watch moose or beavers, that we shall be able to study small mammal social organization, or that we shall hear wolves howl. But we shall try it all.



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SUPPLIES EQUIPMENT AND BOOKS

SUPPLIES:

Notebooks: Soft or cloth bound notebooks for taking notes. Some students need fewer notebooks, some more. If you bring small notebooks (ca 10x15 cm), you will probably need more than 1. Waterproof notebooks are preferred because one can write (carefully) on wet pages with a soft (#2) pencil. Rite in the Rain is one brand of waterproof notebook, available through Ben Meadows (BenMeadows.com) and many other places. Other brands are available.

Journal notebook: One or more soft or cloth bound notebook for a daily journal. Most students prefer to keep their personal journals separate from their class notebooks but this is not necessary. Your personal journals will not be read by anyone else unless you wish them to be.

Pencils: No. 2 will write on damp paper without ripping (too much). Ball point pens are OK as long as they do not smear or the paper is not damp. Felt tip pens often have water soluble ink, leaving open the option of losing all your notes if your notebook goes in the drink (a very real possibility).

Equipment and Supplies you may enjoy but that are not required:

Dissecting kit (for learning how to make research study skins): Must have scalpel and extra blades, sharp scissors, 15 cm rule (or longer), needle and thread (these will also help in mending clothes).

Binoculars

Camera

Sketchbook

BOOKS required:

(Most of these books are available in both hardback and paperback; you are free to buy whichever you please. If new editions are available, buy the new editions.)

Heinselman, M. 1999. The Boundary Waters Wilderness Ecosystem. University of Minnesota Press, Minneapolis.

Leopold, A. 1948. A Sand County Almanac. Oxford University Press, New York. (You may in the future appreciate having bought this in hardback)

Brame, R. & D. Cole. 2011. NOLS Soft Paths. Stackpole Books, Harrisburg, Pennsylvania.

One of these (or another field guide to mammals of North America or the Great Lakes region):

Reid, F. 2006. A Field Guide to the Mammals. 4<sup>th</sup> edition. (Peterson Field Guide). Houghton Mifflin Co., Boston.

Jones, J. K., Jr & E. C. Birney. 1988. Handbook of Mammals of the North-Central States. University of Minnesota Press, Minneapolis.

or

Kurta, A. 1995. The Mammals of the Great Lakes States. revised edition. University of Michigan Press, East Lansing.

or

Hazard, E B. 1982. The Mammals of Minnesota. Bell Museum of Natural History, University of Minnesota, Minneapolis.

or

Powell, R. & C. Powell. 2016. Mammals of the North Woods. Kollath+Stenseth Publishing, Duluth, Minnesota.

One of these (or another field guide of animal tracks):

Murie, O J, M Elbroch & R T Peterson. 2005. A Field Guide to Animal Tracks. 3<sup>rd</sup> edition. (Peterson Field Guide) Houghton Mifflin Co., Boston.

or

Elbroch, M. 2003. Mammal Tracks & Sign: A Guide to North American Species. Stackpole Books.

or

Smith, R P. 1982. Animal Tracks and Signs of North America: Recognize & Interpret Wildlife Clues. Stackpole Books.

Books, optional (you will probably appreciate having some of these along):

Daniel, G. & J. Sullivan. 1981. A Sierra Club Naturalist's Guide to the North Woods of Michigan, Wisconsin, Minnesota. Sierra Club Books, San Francisco.

Field guides to Birds, Reptiles and Amphibians, Insects, Trees, Wildflowers and more will be handy.

*Fun books* (You will enjoy a relaxed afternoon with any of the following books):

Colinvaux, P. A. 1978. Why Big Fierce Animals Are Rare. Princeton Univ. Pr.

Errington, P. L. 1967. Of Predation and Life, Iowa St. Univ. Pr., Ames.

Errington, P. L. 1973. The Red Gods Call. Iowa St. Univ. Pr., Ames.

Gould, S. J. ~ Several collections of essays, all excellent ~Norton, New York.

Heinrich, B. - Any book you find but you might start with

1987. One Man's Owl. Princeton University Press

1989. Ravens in Winter. Summit Books, New York

1993. *A Year in the Maine Woods*. Addison-Wesley, Reading, Massachusetts

2000. *Mind of the Raven: Investigations & Adventures with Wolf-Birds*. HarperCollins Publishers, New York

Muir, J. ~ anything you can find, you might try:

Teale, E. W. (ed). 1954. *The Wilderness World of John Muir*. Houghton Mifflin Co., Boston.

Thoreau, H. D. ~ anything you can find. I strongly recommend his most recent book.

Thoreau, H D. 1993. *Faith in a Seed*. Island Press/Shearwater Books, Washington DC. (This is an amazing book, published over 125 years after Thoreau's death, showing his scientific and ecological thinking. Thoreau would have had much to discuss with Charles Darwin.)

## A CLASSIFICATION OF MAMMALS

(Those represented at the field station noted in *italics*)

| Orders                                  | Families            | Common names                  |
|---|---------------------|-------------------------------|
| Subclass: Prototheria                   |                     |                               |
| Platypoda                               | Ornithorhynchidae   | platypus                      |
| Tachyglossa                             | Tachyglossidae      | echidnas                      |
| Subclass: Theria                        |                     |                               |
| Infraclass: Marsupialia<br>(Metatheria) |                     |                               |
| Microbiotheria                          | Microbiotheriidae   | microbiotheriids              |
| Notoryctermorphia                       | Notoryctidae        | marsupial moles               |
| Dasyuromorphia                          | Dasyuridae          | predatory marsupials          |
|   | Myrmecobiidae       | numbats                       |
|   | Thylacinae          | thylacine                     |
| Peramelia                               | Peramelidae         | Australia bandicoots          |
|   | Peroryctidae        | New Guinea bandicoots         |
| Diprotodonta                            | Acrobatidae         | feathertail and pygmy gliders |
|   | Burramyidae         | pygmy possums                 |
|   | Hypsiprymnodontidae | musky rat-kangaroo            |
|   | Macropodidae        | kangaroos, wallabees          |
|   | Petauridae          | gliders and relatives         |
|   | Phalangeridae       | brush-tail possums, cuscuses  |
|   | Phascolarctidae     | koala                         |
|   | Potoraidae          | rat kangaroos and relative    |
|   | Pseudocheiridae     | ring-tailed possums           |
|   | Tarsipedidae        | honey possum                  |
|   | Vombatidae          | wombats                       |
| <i>Didelphimorphia</i>                  | <i>Didelphidae</i>  | <i>American possums</i>       |
| Paucituberculata                        | Caenolestidae       | shrew possums                 |
| Infraclass: Eutheria<br>(Placentalia)   |                     |                               |
| Cingulata                               | Chlamyphoridae      | armadillos                    |
|   | Dasyopidae          | long-nosed armadillos         |
| Pilosa                                  | Bradypodidae        | 2-toed sloths                 |
|   | Megalonychidae      | 3-toed sloths                 |
|   | Cyclopedidia        | silky anteater                |
|   | Myrmecophagidae     | giant anteater                |
| Hyracoidea                              | Procaviidae         | hyraxes                       |
| Sirenia                                 | Dudongidae          | dudongs                       |
|   | Trichechidae        | manatees                      |
| Proboscidea                             | Elephantidae        | elephants                     |
| Tubulidentata                           | Orycteropodidae     | aardvark                      |
| Macroscelidea                           | Macroscelididae     | elephant shrews               |
| Afrosoricida                            | Tenrecidae          | tenrecs                       |

|                                       |                         |                                |
|---------------------------------------|-------------------------|--------------------------------|
| Microbiotheria<br><i>Eulipotyphla</i> | Chrysochloridae         | golden moles                   |
|                                       | Microbiotheriidae       | monito del monte               |
|                                       | Erinaceidae             | hedgehogs                      |
|                                       | Solenodontidae          | soledons                       |
|                                       | <i>Soricidae</i>        | <i>shrews</i>                  |
| Chiroptera                            | <i>Talpidae</i>         | <i>moles</i>                   |
|                                       | Craseonycteridae        | bumblebee bat                  |
|                                       | Emballonuridae          | sac-winged bats and relatives  |
|                                       | Furipteridae            | smoky bats and relatives       |
|                                       | Hipposideridae          | Old World leaf-nosed bats      |
|                                       | Megadermatidae          | false vampire bats             |
|                                       | Molossidae              | free-tailed bats               |
|                                       | Mormoopidae             | moustached bats and relatives  |
|                                       | Mystacinidae            | New Zealand short-tailed bats  |
|                                       | Myzopodidae             | Old World sucker-footed bats   |
|                                       | Natalidae               | funnel eared bats              |
|                                       | Noctilionidae           | bulldog bats                   |
|                                       | Nycteridae              | slit-faced bats                |
|                                       | Phyllostomidae          | New World leaf-nosed bats      |
|                                       | Pteropodidae            | flying foxes                   |
|                                       | Rhinolophidae           | horseshoe bats                 |
|                                       | Rhinopomatidae          | mouse-tailed bats              |
|                                       | Thyropteridae           | disc-winged bats               |
|                                       | <i>Vespertilionidae</i> | <i>evening bats</i>            |
|                                       | Cetartiodactyla         | Balaenidae                     |
| Balaenopteridae                       |                         | rorquals                       |
| Eschrichtiidae                        |                         | grey whale                     |
| Cetotheriidae                         |                         | pygmy right whale              |
| Delphinidae                           |                         | dolphins, orca, pilot whales   |
| Monodontidae                          |                         | beluga, narwhal                |
| Phocoenidae                           |                         | porpoises                      |
| Physeteridae                          |                         | sperm whales                   |
| Platanistidae                         |                         | river dolphins                 |
| Ziphiidae                             |                         | beaked dolphins                |
| Pontoporiidae                         |                         | franciscana                    |
| Lipotidae                             |                         | baiji                          |
| Iniidae                               |                         | Amazon river dolphins          |
| Kogiidae                              |                         | beaked whales                  |
| Suidae                                |                         | pigs                           |
| Tayassuidae                           |                         | peccaries                      |
| Antilocapridae                        |                         | pronghorn                      |
| Bovidae                               |                         | antelope, cattle, sheep, goats |
| Camelidae                             |                         | camels, llamas and relatives   |
| <i>Cervidae</i>                       |                         | <i>deer</i>                    |

|                       |                    |  |
|-----------------------|--------------------|--|
|                       | Giraffidae         | giraffes                                 |
|                       | Hippopotamidae     | hippopotamus                             |
|                       | Moschidae          | musk deer                                |
|                       | Tragulidae         | chevrotans, mouse deer                   |
| Pholidota             | Manidae            | pangolin                                 |
| <i>Carnivora</i>      | <i>Canidae</i>     | <i>canids</i>                            |
|                       | <i>Mephitidae</i>  | <i>skunks</i>                            |
|                       | <i>Mustelidae</i>  | <i>weasels, otters, badgers</i>          |
|                       | Odobenidae         | walrus                                   |
|                       | Otariidae          | sealions                                 |
|                       | Phocidae           | seals                                    |
| Carnivore (continued) | <i>Procyonidae</i> | <i>raccoons, ringtails and relatives</i> |
|                       | <i>Ailuridae</i>   | <i>red panda</i>                         |
|                       | <i>Ursidae</i>     | <i>bears</i>                             |
|                       | <i>Felidae</i>     | <i>cats</i>                              |
|                       | Prionodontidae     | linsang                                  |
|                       | Herpestidae        | mongooses                                |
|                       | Hyaenidae          | hyaenas                                  |
|                       | Nandiniidae        | African palm civet                       |
|                       | Eupleridae         | Malagasy carnivores                      |
|                       | Viverridae         | civets, genets                           |
| Perissodactyla        | Equidae            | horses, asses                            |
|                       | Tapiridae          | tapirs                                   |
|                       | Rhinocerotidae     | rhinoceroses                             |
| Scandentia            | Ptilocercidae      | pen-tailed treeshrew                     |
|                       | Tupaiaidae         | treeshrews                               |
| <i>Lagomorpha</i>     | <i>Leporidae</i>   | <i>hares and rabbits</i>                 |
|                       | Ochotonidae        | picas                                    |
| <i>Rodentia</i>       | Abrocomidae        | chinchilla rats                          |
|                       | Anomaluridae       | scaly-tailed squirrels                   |
|                       | Apodontidae        | mountain beaver                          |
|                       | Bathyergidae       | mole rats                                |
|                       | Calomyscidae       | mouse-like hamster                       |
|                       | Capromyidae        | West Indian hutias                       |
|                       | <i>Castoridae</i>  | <i>beavers</i>                           |
|                       | Caviidae           | cavies                                   |
|                       | Chinchillidae      | chinchilla                               |
|                       | <i>Cricetidae</i>  | <i>New World rats and mice</i>           |
|                       | Ctenodactylidae    | gundis                                   |
|                       | Ctenomyidae        | tuco-tucos                               |
|                       | Cuniculidae        | paca                                     |
|                       | Dasyproctidae      | agoutis                                  |
|                       | Diatomyidae        | Leotian rock rat                         |
|                       | Dinomyidae         | pacarana                                 |

|                      |                      |                               |
|----------------------|----------------------|-------------------------------|
|                      | Dipodidae            | jerboas, jumping mice         |
|                      | Echimyidae           | spiny rats                    |
|                      | <i>Erethizonidae</i> | <i>New World porcupines</i>   |
|                      | Geomyidae            | pocket gophers                |
|                      | Gliridae             | mormice                       |
|                      | Heterocephaliidae    | naked mole-rat                |
|                      | Heteromyidae         | kangaroos rats, pocket mice   |
|                      | Hydrochaeridae       | capybara                      |
|                      | Hystricidae          | Old World porcupines          |
|                      | Muridae              | Old World rats and mice       |
|                      | Myocastoridae        | coypus and nutria             |
|                      | Myoxidae             | dormice                       |
|                      | Nesomyidae           | more Old World rats and mice  |
|                      | Octodontidae         | degus, rock rats              |
|                      | Pedetidae            | spring hare                   |
|                      | Petromuridae         | dassie rat                    |
| Rodentia (continued) | Placanthomyidae      | spiny and pygmy dormice       |
|                      | <i>Sciuridae</i>     | <i>squirrels</i>              |
|                      | Spalacidae           | bamboo rats, spalax           |
|                      | Thryonomyidae        | cane rats                     |
|                      | <i>Zapodidae</i>     | <i>jumping mice</i>           |
| Primata              | Cheirogaleidae       | drawf and mouse lemurs        |
|                      | Daubentoniidae       | aye-aye                       |
|                      | Galagonidae          | galagos, bushbabies           |
|                      | Indriidae            | indirs, sifakas and relatives |
|                      | Lemuridae            | true lmurs                    |
|                      | Lepilemuridae        | sportive lemur                |
|                      | Lorisidae            | lorises                       |
|                      | Megalapidae          | sportive lemurs               |
|                      | Tarsiidae            | tarsiers                      |
|                      | Aotidae              | night monkey                  |
|                      | Atelidae             | howler, spider, wooly monkeys |
|                      | Callitrichidae       | marmosets and tamarins        |
|                      | Cebidae              | squirrel, capuchin monkeys    |
|                      | Pitheciidae          | uakari, saki                  |
|                      | Cercopithecidae      | Old World monkeys             |
|                      | <i>Hominidae</i>     | <i>great apes and man</i>     |
|                      | Hylobatidae          | gibbons                       |
| Dermoptera           | Cynocephalidae       | culogo                        |