



## Managing Moose by Modeling Growth

### LESSON ONE First Steps

Key Concepts

Mathematical modeling process

Additive processes

Graphical, numerical, and symbolic representations

Linear functions

Function notation

A dirondack State Park is a six-million-acre wilderness area in upstate New York. It contains untouched forests mirrored in thousands of ponds and lakes, quiet wilderness trails, mountains with spectacular views, and sparkling streams and waterways. The forests contain spruce, fir, beech, birch, and maple trees. There are wildflowers and hundreds of species of shrubs, herbs, and grasses. Animal life includes hundreds of species of mammals, birds, reptiles, amphibians, and fish. Among the inhabitants are the golden eagle, spruce grouse, white-tailed deer, black bear, and moose.



Photo courtesy of David Matthews.

The moose make an interesting subject for modeling population growth. Prior to 1980, the last moose known to be in the park was shot in 1861. After 1980, however, some moose were seen there again. In 1988, it was estimated that 15–20 moose were in the park. In 1993, the estimate changed to 25–30 moose. The agency responsible for safeguarding the moose population is the New York State Department of Environmental Conservation (DEC). In 1993, a survey was conducted to determine what policies the public favored. A majority of the people responding to the survey favored a “gradual increase in the moose population as the animals migrate from nearby New England states and Canada” and “an expansion of their numbers through natural reproduction.”

Conservationists concerned over the long-term survival of moose suggested moving 100 moose into the park over a three-year period as a way of establishing a colony there. The DEC determined that such a plan would cost \$1.3 million. Suppose you were the commissioner of the DEC, and had to make a recommendation to the governor about this proposal. Having a mathematical model that describes how the population grows would help you decide whether it is worth spending the money.

#### DISCUSSION/REFLECTION

1. How does moving an additional 100 moose into the park better establish the herd?
2. What facts were provided to support the idea that the population has grown?
3. What two basic policy strategies for managing the population growth did the survey results support?