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Report II 1972-1975

PROGRESS REPORT OF THE RESEARCH PROJECT
ON
THE ECOLOGY OF THE SPRUCE-FIR FOREST TYPE
OF
ISLE ROYALE NATIONAL PARK
FIRE ECOLOGY PHASE
SUBMITTED TO THE NATIONAL PARK SERVICE
OCTOBER 12, 1972
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LOGISTICS

In early June 1972, after careful selection, William Karr, Thomas O'Connor, and David Larson, all Michigan Tech undergraduate students, were hired as field assistants with project funds. Another undergraduate student, Marshall Gilbert, hired under the Federal Work Study Program, was employed as a field assistant at the beginning of the summer and later as a laboratory assistant to help analyze soils. The field assistants and I, the field equipment, and supplies were transported to Isle Royale via motor vessel Ranger III on June 16. This transportation was provided without charge by N.P.S. A base camp was set up in the Rock Harbor area in a special campground designated for research personnel by the administration of Isle Royale National Park. Steven Shetron and Martin Jurgensen, soil scientists from Michigan Tech, were hired for 1 and 2 weeks respectively during the middle of the summer. Shetron, an expert on soil classification, analyzed the soil horizon in each of the study plots so that he could accurately describe, classify, and name these soils using the classification system of the U.S. Department of Agriculture. Jurgensen sampled liter depths. Field assistants returned to the mainland on September 8 after a commendable performance in the field.

FIELD WORK

Nine new study plots varying in size from 1/3 to 2 acres, were set up in stands of varying age. In each, trees were sampled by the quarters method. At each sampling point one of the four trees sampled was bored with an increment borer to determine its age. In addition, the following was sampled at each sampling point: (A) per cent cover of ground cover species and of mosses and lichens in 1 square meter quadrat, (B) number and height of seedlings of each

tree species in the same 1 square meter quadrat, (C) number of saplings of each tree species in a 10 square meter plot, (D) number of moose pellet groups within a circle of radius 6 meters and (E) soil depth as estimated by driving a long metal rod into the ground. In each seedling sampled, the type of substrate on which it germinated was noted (litter, mineral soil, moss, or rotted log). The volume of each windfall stem within a 2 meter strip straddling the sampling line was estimated between sampling points. Three soil pits were dug in each plot and analyzed by Steve Shetron. Shetron described the thickness and characteristics of each soil horizon and took samples of each for laboratory analysis of texture, nutrients, organic matter, and pH. Depth to mineral soil was measured at these pits as well as at six additional points in each plot by Martin Jurgensen. The nine plots sampled this summer added to the 8 plots sampled in previous summers, makes up a total of 17 plots to date.

In addition to plots, trees were also sampled along transects run approximately perpendicular to the parallel ridges and valleys and extending from Lake Superior to points 1 1/2 to 2 miles inland. One transect was run entirely in the 1936 burn and the other, in stands burned about 100 years ago. Trees of each species were counted in each of 4 age classes along the transect. These transects should yield information on the relative abundance of the various pioneer tree species, the average composition of 36 year and 100 year old forests, and the change in species composition with distance inland from the climate-moderating waters of Lake Superior.

LABORATORY WORK AND DATA PROCESSING

The remainder of the work for this year will be carried on at the Michigan Technological University at Houghton, Michigan between October, 1972 and June, 1973. The increment cores will be processed to determine tree ages. From these, age structure diagrams will be constructed for each stand. Quantitative data from each plot will be processed to obtain for each stand, the overall density and basal area, the relative density and relative basal area of each tree species, the seedling and sapling densities for each tree species, the percent cover of each ground cover species, the percent cover of mosses and lichens, the average soil depth, the average depth to mineral soil, the volume of windfall stems per hectare, the moose pellet group density and the percent of seedlings of each tree species germinated on each of the substrata types. Soil samples will be analyzed in the University soil laboratories for texture, organic matter, nutrients, and pH. Soil horizon data will be analyzed so that the soils of each stand can be classified and named according to the system of the United States Department of Agriculture.