Alaska Arctic Vegetation Archive: Cape Thompson Vegetation Plots (see Addendum)

The vegetation of the Cape Thompson region at Ogotoruk Creek was described by A. W. Johnson et al. during the U.S. Atomic Energy Commission’s Project Chariot Studies from 1959-1963 funded under Contract No. AT (04-3)-310. Cape Thompson is on the Chukchi Sea on the Lisburne Peninsula in the Arctic Foothills of the Brooks Range. Ogotoruk Creek, a small stream 16 km in length, joins the sea southeast of Cape Thompson.

Two vegetation studies were carried out as part of the larger project investigating the environment of the Cape Thompson region. The first study describes the vegetation and flora of the region (Johnson et al. 1966). Fifty-four plots were permanently marked with wooden or metal stakes. In the initial year, 1959, a list of plant species was made and an estimate of cover by class was recorded for high shrubs, low shrubs, herbaceous plants, bare ground, and open water. A tentative classification system was prepared for the vegetation types in the valley based on this data. In 1960, the line intercept method was chosen for quantitative measurement and two permanent 50 m line intercepts were established parallel to each other in every plot. The intercepts were divided into 10 m segments and the species intercepting the first 2 m of each segment were recorded. Calculations made using this data resulted in values for the frequency of each species per plot, the percent of ground it covered, and relative cover in terms of all species in the plot and an importance value for each species. These data are not archived in the Alaska Arctic Vegetation Archive’s Turboveg database because they do not satisfy the criteria of having complete species lists with associated cover abundance values.

Some of these source data are archived in the UAF Rasmuson Library, Alaska Polar Regions Collections (in boxes). A document listing the contents of these boxes is available for download. A draft report by Viereck et al. (1960; also available for download) gives the results of the line intercept vegetation study as well as a germination study. Additional data were added in 2017 (see Addendum).

The second study investigated plant succession on frost scars, also called frost boils or nonsorted circles, at Ogotoruk Creek (Johnson and Neiland 1983).

For reference, the abstract from their publication is as follows: ‘Plant succession on frost scars was studied at Ogotoruk Creek, Alaska. In 1961, 326 frost scars were marked for long-term study. The initial physical and biological measurements were repeated several times. In 1965, four transects were established and later revisited to learn if new frost disturbance is occurring. Frost scars at Ogotoruk Creek are convex, primarily oval areas of fine-grained soil with a modal size of about 1 m in diameter. They occur on surfaces of from 1-3' and cover up to 50% of the ground surface. Many frost scars show surface activity due to frost action, but repeated mapping of them indicates that they neither expand nor contract laterally. Repeated measurements along fixed lines suggest that new frost scars are not being formed at present. Plants invade bare areas at Ogotoruk Creek by seeds or vegetative reproduction. Plants growing on frost scars are subject to frost heaving, uplift and disruption from needle ice formation, and wind erosion and desiccation. A direct relationship exists between plant cover on frost scars and soil moisture surrounding the scar. During the 20 years of the study both positive and negative changes in plant cover were recorded. A consistent pattern of plant succession was not detected.’ Data are given as percent cover for total vegetation for each frost scar. These data are archived with the Arctic Long Term Ecological Research (LTER) website at the Marine Biological Laboratory, University of Chicago (<http://arc.lternet.edu/al-johnsons-cape-thompson-frost-scars>) and are comprised of scanned plot photos and pages from A. W. Johnson’s field notebook for the years 1961, 1962, 1963, 1964, 1965, 1972, and 1980.

References:

Johnson, A. W., L. A. Viereck, R. E. Johnson, H. Melchior. 1966. Vegetation and flora. In Pages 277-354 in N. J. Wilimosvsky editor and J. N. Wolfe, associate editor. United States Committee on Environmental Studies for Project, C. Environment of the Cape Thompson Region, Alaska. PNE 481. Clearing house for Federal Scientific and Technical Information, National Bureau of Standards, U. S. Department of Commerce, Springfield, Virginia.

Johnson, A. W. and B. J. Neiland. 1983. An analysis of plant succession on frost scars 1961-1980. Proceedings from the Permafrost: Fourth International Conference. University of Alaska, Fairbanks, AK 1983. pp. 537-542.

Viereck, L. A., R. E. Johnson, and H. R. Melchior. 1960. Ogotoruk Creek Botanical Investigations Cape Thompson, Alaska. Phase III – Progress Report. 80 pp.

ADDENDUM: Scanned data added in 2017. In 2004, two of Albert W. Johnson’s 1-acre plots (plots 12 and 1) were relocated by a party including Corinne Munger, Albert W. Johnson, D. A. ‘Skip’ Walker, and Carrie McNaughten. They documented sites within plots 12 and 1 using a handheld GPS unit. These latitudes and longitudes are included in a scan of D. A. ‘Skip’ Walker’s field notebook. In addition, the vegetation map with 23 of the 1-acre plot locations associated with the Johnson et al. 1966 publication was scanned and added as a .jpg to our files as well as a .pdf of Johnson et al. 1966.