Alberta Biodiversity Monitoring Institute (ABMI) Rare Vascular Plant 2012 to 2015 Field Survey Methods * *more detailed methods are presented in "Terrestrial Rare Vascular Plant Field Data Collection Protocol for the Lower Athabasca Region".*

ABMI vascular plant surveys were conducted each year in June, July and August from 2012 to 2015.

a) Site selection and establishment

At each target site selected by habitat suitability models and selected land cover types, two 50 X 50 m (0.25 ha) plots (plots labeled A and B) were established. Plot A was the target site defined by model-based sampling, while plot B was placed in a nearby contrasting habitat type a maximum of 200 m from Plot A. This paired plot design was done to accommodate safety protocols at the University of Alberta related to the maximum distance that co-workers can be from one another in the field using proper communication. Plots were positioned to avoid roads, have less than 25% of their area affected by human disturbance, and have maximum potential for finding rare plants (e.g. on open sand, rock faces, ephemeral habitats, or in transition zones between habitats). Plots were established by laying out a 50 X 50 m square boundary with the plot edges running in ordinal directions.

b) Physical characteristics of the plot

Physical characteristics were determined at the centre of each plot. The primary ecological site type (ecosite) of each plot was determined based on the dominant vegetation community and nutrient and moisture conditions within the 0.25 ha plot. Any secondary ecosite covering more than 10% (0.025 ha) of continuous habitat within the plot was also recorded, if present. At the centre of the plot the GPS location, dominant canopy tree, percent cover of bare ground and water, slope, aspect and the type and percent cover of human and natural disturbances were also recorded. At each plot, six photographs were taken: four photographs in the sub-ordinal directions from plot centre, one canopy photograph, and one photograph representative of the site. When mineral soil was present soil pH was determined using a Hellige-Truog test kit (pH measurements were not taken in fens or bogs).

c) Vascular plant surveys

Plots A and B were each surveyed for vascular plants by a trained technician[1]. A tablet computer program which limited allowable values (species names) and automatically recorded time observed was used for recording the data. In 2012 and 2013 two overlapping survey methods were used for the purpose of comparing Ecological Monitoring Committee for the Lower Athabasca (EMCLA) and ABMI practices. Prior to starting the survey 10 minutes were spent at plot centre populating a species list on which presence or absence was recorded once the survey began. This was done to limit the amount of survey time that was used typing in species names. The initial 20 minutes of survey time were used to complete an ABMI terrestrial protocol style survey (Figure 1). Technicians began recording species presence at plot centre and travelled in a direct line to within 5 m of a plot corner. They then travelled in a clockwise direction while observing the area between 5 – 10m from the edge of the plot. Each new species observed was recorded. A single circuit of the plot was completed in the 20 minutes allowed. In 2014 and 2015, the ABMI style search was no longer conducted.

[1] Technicians had a strong background in identifying vascular plants and were capable of identifying more than 80% of potential species encountered.

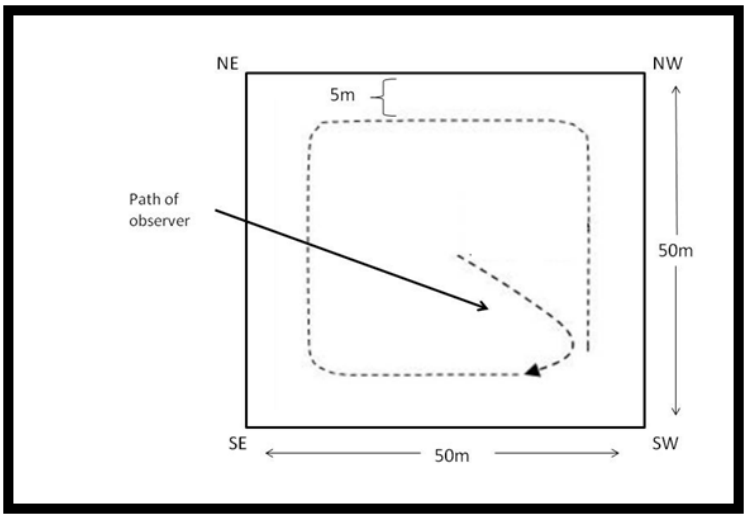

Figure 1. 20 minute circular ABMI terrestrial protocol style survey completed by the observer within each 0.25 ha plot.

In 2012 and 2013, after the initial 20 minute ABMI style survey the EMCLA technicians began a time unlimited survey. This was the only survey that was conducted in 2014 and 2015. Starting at the terminus of the first survey the technician searched for plants while walking in an east-west pattern that mimicked a series of 50 m parallel belt transects where technicians scanned a 2 to 4 m wide (1 - 2 m per side) zone (Figure 2) area. Searches of individual plots were terminated when the technician had surveyed the entire area thoroughly and believed that all vascular plant species had been observed.

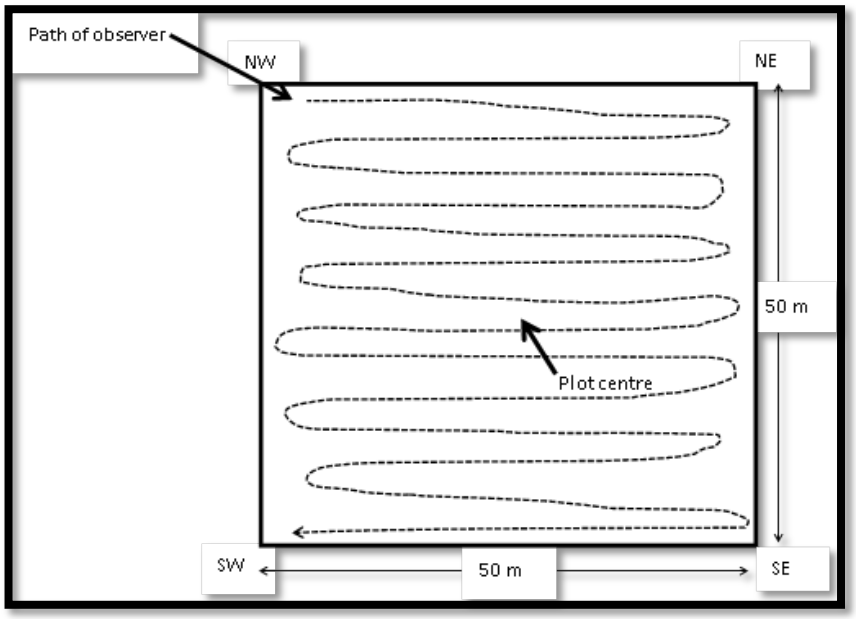

Figure 2. Quasi-parallel (50 m x 2 m) belt transect survey to be conducted by the observer within each 0.25 ha plot.

Unknown species were collected for later identification with the use of taxonomic keys and field guides. Species that could not be identified by the technician were pressed, labeled with a unique identifier, and sent to a specialist for expert identification.

A species was considered rare when it was designated as S1, S2, or S3 by the Alberta Conservation Information Management System (ACIMS). When a rare species (or suspected rare species) was encountered during a survey, the location of the population was marked using flagging tape and additional information was collected on these populations after the survey was complete so that the total survey time was not inflated by the collection of these data. Information collected per species was consistent with the ACIMS Rare Native Plant Survey Form. This included GPS location, population size (number of individuals and extent of the population), phenological stage, microsite conditions, moisture, light levels, and land use. Specimens of rare species were collected for verification by a specialist if the populations had more than 20 individuals and appeared healthy. For populations under 20 individuals a photograph was taken.

d) Detectability and observer bias

Seventy-one sites (approximately 11%) were randomly selected for an examination of species detectability and observer bias between technicians. At these sites, each technician surveyed both A and B plots in the manner described above at different times so that neither technician was aware of what information was collected by the other technician.