June 2021 CCAA Monitoring Protocol Addendum

These additions and changes described below result from coordination between the Program Administrator, CCAA Partners, and U.S. Fish and Wildlife Service following the Year 1 monitoring results. This addendum provides supplemental updates to the monitoring protocol described in the Monarch CCAA, Section 14.2.

Clarification on Sampling Unvegetated or Unsuitable Habitat Areas
Sampling should only occur in areas designated as adopted acres. **If a randomly selected plot is located in an unvegetated or otherwise unsuitable habitat area** (e.g. recently mowed, rock barrens, etc.), **Partners should proceed with sampling** at that location and note the conditions observed. Partners may wish to sample an additional randomly selected plot elsewhere to help characterize adopted acres.

Guidance on Unsafe Plot Locations
Safety is a primary concern in the implementation of the Monarch CCAA. Monitoring protocols in the CCAA are intended to be completed only in safe locations and done in accordance with each Partner organization's health and safety requirements.

If a sampling plot is determined to be in an unsafe location, the Partner shall relocate the plot by simply replacing the unsafe sampling location with another randomly selected location within the adopted acres (see Table 2 below). Document the plot relocation in your survey notes for future reference.

Updates to Sampling within Locations for Each Conservation Measure
The original *Plot Location* subsection in Section 14.2.2 of the Monarch CCAA encourages Partners to "*ensure that sampling is conducted in at least one location of each conservation measure implemented annually.*"

Based on Year 1 results, U.S. Fish and Wildlife Service and the Program Administrator agreed that random plot selection is more important than specific locations within each conservation measure. As a result, **Partners do not need to sample each individual conservation measure annually**.

Rationale: Following Year 1 of monitoring, we learned several important lessons relative to monitoring and conservation measures:

1. Sampling soon after some conservation measures are implemented (such as seeding or brush removal) may result in conditions that do not currently represent their eventual benefits to the monarch.

2. Adopted acres often stay the same, although conservation measures will shift year-to-year. For example, a single acre may have brush removal in one year, then targeted herbicide treatments the next year, and in Year 3 it may be considered a temporary habitat set-aside. Consequently, random sampling across multiple years is likely to provide data for most, if not all of the conservation measures.

3. The primary importance of CCAA monitoring is to determine whether suitable habitat exists where Partners have applied conservation measures across a wide and diverse network of adopted acres, not to assess individual conservation measures within each Partner's program. The latter would likely require a significant increase in the number of samples and a change in the sampling design.

Clarification on Random Plot Selection

Random plot selection is important to maintain the integrity of the data being collected by CCAA monitoring. Adhering to one of the random selection method(s) here will ensure the data collected as part of the Monarch CCAA will benefit your organization, the Program, and monarch conservation science. **The plot selection methods and randomization approaches shall be determined by each Partner and described in their implementation plan and annual report.**

Tables 1 and 2 summarize acceptable methods of random selection for the CCAA. Partners should first use a desktop method (Table 1) for random plot selection, then apply in-field methods (Table 2) as noted below.

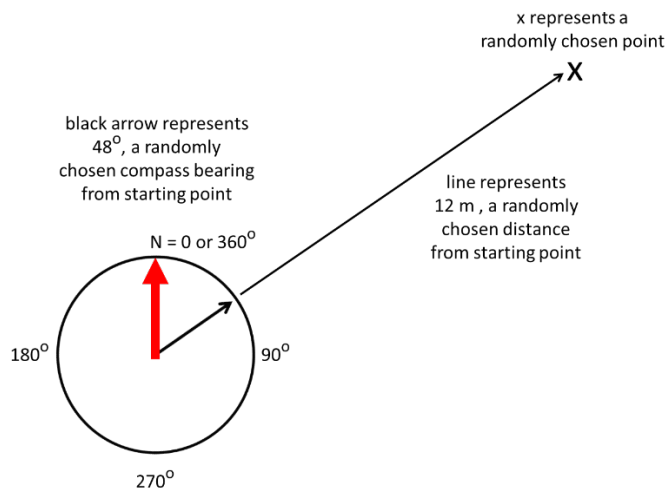**Table 1. Acceptable desktop random plot selection methods**

Acceptable Approaches	Examples	Considerations / Potential Sources of Bias to Minimize When Possible
Work planning random selection*	Random selection of plot locations from within adopted acres areas where other work activities (e.g., other surveys, work audits) are occurring.	Selection is biased by focusing on work areas. Resulting data would be representative of 'work areas' and not necessarily representative of all adopted acres. Need to define in-field random plot selection methods, see Table 2.
Pre-determined time random selection*	Introduce randomization by establishing a pre-determined time for sampling while surveyor is in the field (e.g. pause and conduct sampling at noon on Tuesday when working within an adopted acre).	Selection is biased by focusing on work areas. Surveyor may not be located in an adopted acre at the pre-determined time. Verify prior to sampling. Need to define in-field random plot selection methods. See Table 2.
Numeric plot generator*	Use random number selection of spans, mile-posts, or other locations within adopted acres.	Selection of plot location within mile-post, span, or other may result in bias while in the field. Incorporate methods to select plot location in the field to avoid this bias (see Table 2)..
Pre-existing random monitoring plots	Use Monarch Joint Venture's IMMP priority blocks map and localized points. Existing monitoring plots established for other purposes.	IMMP or existing plots may not be located within adopted acres. Verify prior to sampling.
GIS random plot generator	Geospatial selection of random points within mapped adopted acres.	None.

For selection methods noted with an asterisk (*) above, or in the event that a plot must be relocated in the field due to unsafe conditions or an additional sampling plot is desired, surveyors shall use one of the methods described in Table 2.

Table 2. Acceptable in-field random plot selection methods

Options for Random Selection of Plot Location	Apply to the Following Methods from Table 1	Description
Locate additional pre-determined, desktop-selected random plot locations	All	If additional randomly-selected plot locations are identified via the desktop selection methods, simply locate and sample at those pre-determined locations.
Random selection of "benchmark" locations (e.g., poles, mile posts, pipeline markers)	Work planning Numeric	Use reliable field markers to designate the sampling starting location for the randomly selected plot or apply another in-field method to select actual plot location (e.g., randomly selected compass bearing and distance – see next row and Figure 1). Define type(s) of allowable markers and sampling direction required.
Randomly selected compass bearing and distance	Work planning Pre-determined time Numeric	Use a number table or random number generating app[1] to randomly select a compass bearing and distance to select the plot location. Walk the random selected distance in the direction of the compass bearing and begin the plot. This method also requires the Partner to clarify how the starting point will first be selected (e.g., mile post, etc.).
In-field generators within a desktop selected site	Work planning Numeric	Within areas where work will be occurring, use random x,y coordinate tables or random number generator apps,[1] or plot generators in a GIS to define a plot location.

Figure 1. Method for using a randomly selected compass bearing and distance to avoid bias when basing plot location on a randomly selected starting point. Adapted from ecologyandevolution.org.