Volunteer Protocols for
Mapping of *Stipa pulchra* and *Dipterostemon capitatus*
on the San Marcos Foothills West Mesa

Channel Islands Restoration
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1. Site Description

On the West Mesa of the San Marcos Foothills, mostly grasses cover the rolling hills. These grasses include several species that were introduced to California, primarily from Europe, but they also include purple needlegrass a native "bunchgrass" which is California's state grass. Its scientific name is *Stipa pulchra* (aka *Nassella pulchra* in some texts and web sites), and it is a keystone species among grasslands across the state. Grasslands are very diverse and provide habitat for a variety of insects, birds, and mammals. There are also numerous plant species and wildflowers that depend on grasslands to thrive. Due to disturbances such as development, agriculture, and the introduction of non-native species, over 90% of grasslands have been lost in California.

2. Introduction

To document the health and status of the West Mesa grassland before starting major restoration, CIR is mapping purple needlegrass on the Foothills. There are large swaths and patches of needlegrass throughout the West Mesa, mixed with large areas of non-native annual grasses. We are also mapping occurrences of a native wildflower whose scientific name is *Dipterostemon capitatus* whose common name is wild hyacinth or "blue dicks" (from its older but more commonly used name *Dichelostemma capitatum*) which grows from an underground bulblike structure called a corm. The blue flowers grow atop a narrow stem and have narrow leaves at the base.

3. Safety

When in the field or on the trail, be cautious and keep your eye where you step. The trails have ruts, and off trail, there may be holes, hidden rocks and debris, as well as sensitive flora and fauna. You will be working in pairs; if your mapping partner has to leave for any reason, please inform CIR staff.

Weather conditions on the foothills can change rapidly. Wear clothing that can be layered, a hat with a brim, bring sunscreen, and carry water. Please be aware that there are no restrooms on the San Marcos Foothills.

4. Method

A. Tools and materials

Before heading out into the field, each volunteer team will need some basic materials. Team members must work together, so each team needs one of the following items:

- Phone with GPS capability and ArcGIS Survey 123 loaded (see next item below)
- 20 colored pin flags (several of four different colors)
- Tape measure
- Handheld radio
- Note pad and pen(s)
- Paper map of the property with the assigned square(s) highlighted in yellow

B. ArcGIS Survey 123

- We will be using ArcGIS Survey 123, a phone app, to record survey data.
- Please see the instructions here *https://tinyurl.com/CIR-SMF-survey* to download the app on your phone and connect to the survey before entering the Foothills.
- The app will display a satellite view of the West Mesa, with a grid of 50-meter x 50-meter squares superimposed on the satellite view (50 meters is approximately 164 feet).
- Most grid plots are square, although some on the boundaries are not.
- Each plot has a letter and number for identification purposes. The lowest grid ID is A1; the highest ID is S9.

C. Locate your grid

- Using ArcGIS Survey 123, locate the grid squares that you have been assigned to survey for needle grass and blue dicks.
- Tip: When you set out from the entrance each mapping session, use your phone (even if you have a paper map) to find your grid to verify the phone app is working correctly for you.
- Each team of two will travel to their assigned grid.

D. Mark your grid

- Using your phone and the Survey 123 app, locate the first corner of your 50m x 50m square. See Tips below.
- Place a pin flag at the corner. If an adjacent square has already been flagged, see Tips below.
- Mark the other three corners
- Leave these four corner flags in place when you are done.

Tips:

- The location of each corner of the square will be not be perfect since the GPS in phones have an error rate of between 10 and 15 feet.

- Look carefully for the location of the corners of squares that have already been surveyed, so that you can use the same corner points to “anchor“ your square to the other flagged plots.
- The flag color should be the same for each corner you place. If possible, your corner flags should be a <u>different</u> color than the flags of the immediately adjacent grids which share the corner.
- It is more important that areas are not missed or double counted than it is for the corner flag location to be “exact” according to Survey 123. Even if your phone says that you are several feet from a corner, place your flag immediately next to the corner flag of an adjacent grid.
    - You may need to use your hands to flatten the grass around your flag so it will be visible by you and/or others later. If you have questions about the location of your grid, ask CIR staff before starting your survey.

E. Species density assessment

Note: This step is extremely important. If you locate “high density” areas after you have started recording, you may have to halt your survey. It is very difficult for other people to pick up where you left off.

- Estimate the density of target species (see Tips on Density Estimation below)
- Low density areas are defined as having purple needle grass plants more than 3 meters/10 feet apart, **or** blue dicks more than 3m/10’ apart.
- “High density” areas have one of our survey plants species regularly located within 3m/10’ from each other.
- Your square may have a mixture of high and low density patches.
    - If plants of a given species are closer than 3m/10’, we will use a different survey method.
    - Make a rough estimate of what percentage of your square is low density for both species.
    - If an area (or the entire square) has just a few purple needlegrass every 3m/10’, for the purposes of your count, it is not high density.
- Record your initial assessment of low density percent.
- If there are high density patches, report it to CIR staff before mapping. And they will either tell you to begin surveying or move to a new grid. If you move to a new grid, leave the corner flags in place.

Tips on Density Estimation:

- Density is species specific:
    - If blue dicks are growing next to needle grass, but the blue dicks are over 3m/10’ away from other blue dicks, it is still low density for blue dicks.
    - If purple needle grass from the above example is within 3m of other needle grass, the area might be considered high density for needle grass.

F. Begin your survey (low density squares)
Note:

- Do not start mapping a square if you do not have sufficient time to finish it. Only start mapping a square if you are confident that you can and will have the time to finish it.
- Low density squares may seem relatively easy and quick to map since there are not many target plants. This survey is attempting to find "outlier" plants of these two species, so it is important to be attentive even in low density areas.

  - Start your survey by walking next to your partner from one corner of the square along the gridline shown on the app to the other corner (50 meters away) while looking for plants.
  - If you notice plants that are on the unsurveyed side of your current path, wait until you come across them on a future track to count them.
  - Tips:
    - You can temporarily place a pin flag by as yet unsurveyed plants to remind you to count them on a future traverse of the square.
    - You can also temporarily place pin flags next to some of the plants you have recorded to help mark where you have already surveyed. You may want to use different colored flags to indicate surveyed vs. unsurveyed plants.
    - Remember to remove these temporary flags when you are done with a given area so you can reuse them.
  - After you have completed one track, move over a few feet towards the inside of your square and walk in the other direction on another straight line and continue recording.
    - Initially, you will want to walk with little space between your previous tracks to ensure that you are not missing any plants. As you gain experience spotting the plants, you can allow more space between your back-and-forth paths.
    - The more plants you are likely to find, the closer you should make your back-and-forth paths to each other.
    - Do not walk more than six feet away from your previous path, even in a square that does not contain many plants.
  - Should you encounter areas that have more than an occasional plant of the same species within 3m/10' of each other, you may need to revise your assessment and report to CIR staff that the plot has high density areas. If you can't contact staff, flag and record the plants in question and note the point you have stopped, along with the direction of your path/area you surveyed. If there are only a few of these areas, flag them and continue your survey.
  - When you are finished with the square, make note of what the letter/number designator for your plot, pick up the temporary pin flags (unless they mark a high density area) and leave the flags that mark each corner of the square.