

Western Riverside County MSHCP Biological Monitoring Program 2014 Rare Plant Survey Protocol

INTRODUCTION

The Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) includes 63 rare plants as Covered Species (Dudek & Associates 2003). For most of these species, the MSHCP requires the confirmation of a number of occurrences, often at specified sites, within the Conservation Area. Unless a given species-specific conservation objective has more rigorous requirements, the Biological Monitoring Program is obligated to survey for the distribution of covered plant species at least once every 8 years, with the goal of verifying occupancy at $\geq 75\%$ of the sites listed in the species objective. Some covered plant species also have a Species Objective that requires a specific level of conservation be demonstrated. These species are not considered adequately conserved under the MSHCP until the terms of the Species Objectives (usually a specified number of locations with a minimum number of individuals of the species in question) have been met.

Historic distribution information for covered plant species was consolidated for the MSHCP from a variety of sources including herbarium records, field notes, gray literature, and species databases. We reviewed the data and corrected the most obvious geo-referencing errors (e.g., locations outside the Plan Area, duplicate occurrences). Our aim was to reconcile the points aggregated in the historical database with the species-specific objectives set forth by the MSHCP (Dudek & Associates 2003).

After refining the historic distribution information, we attempted to field-verify occurrence records for each of the 63 covered plant species, in order to ascertain whether Species Objectives are being met and to determine future long-term monitoring needs. This was the primary focus for the first eight years (2005-2012) of the permit, the “inventory phase”. We are now in the “monitoring phase” of the program and have shifted our focus to monitoring Covered Species at verified locations at least once every eight years, as stipulated by the MSHCP.

In addition to monitoring verified occurrences, we will continue to search for new occurrences as reserve lands are acquired or as additional information about habitat suitability is obtained.

Goals and Objectives

1. Improve knowledge of covered plant species distribution within the Conservation Area.
 - a. Verify historical locations and document new locations of covered plant species in the Conservation Area.
 - b. Monitor continuing presence of covered plant species at confirmed locations at least once every eight years.
2. Improve knowledge of covered plant species’ ecology and habitat suitability needs.

- a. Collect species-specific information at observation sites such as species abundance, phenology, and population size.
 - b. Collect habitat information at survey sites to determine covariates associated with species presence.
3. Continue to test and refine the protocol for covered plant species surveys.

METHODS

Survey Design

We will conduct surveys for covered plant species throughout most of the spring, summer and fall depending on target species' growing seasons, and current status towards meeting monitoring objectives. Targeted species for the survey season are chosen according to the following priorities: time elapsed since last observation, species sensitivity, unique opportunistic environmental conditions (e.g. a good rain year, recent fire), and acquisition of new land or information that may help us locate populations that are difficult to detect. We are currently in the monitoring phase of the program and will divide our time between surveys that reconfirm aging observation records (monitoring) and searching for unconfirmed historical occurrences and other unmet species objectives (inventory).

Focused surveys for targeted species begin once the species are identifiable at a sentinel site, or at times similar to recent, local observation records. We also use the average flowering seasons listed in the Jepson Manual (Hickman 1993) and observed phenologies of commonly co-occurring species to help us determine the best times to conduct our rare plant surveys.

In order to meet and maintain species objectives we will conduct three types of rare plant surveys: Sentinel Surveys, Inventory Surveys and Monitoring Surveys.

Sentinel Surveys

Whenever possible, sentinel sites have been established in order to help time focused surveys appropriately. Sentinel sites are chosen based on accessibility and population robustness. Not all species have sentinel sites and some species have more than one. Sentinel surveys are brief and are used to decide if it is appropriate to conduct further surveys for targeted species. Populations occurring at sentinel sites will also require full monitoring surveys every eight years to collect the covariate data we record for meeting Species Objectives.

Inventory Surveys

Inventory surveys target unknown populations and unconfirmed records of historical occurrences. These involve thoroughly searching all appropriate habitat for species of interest within sampling stations. Sampling stations were created by superimposing a 250 m × 250 m grid layer over the entire Conservation Area in ArcGIS and giving each grid cell a unique identifying name (Station ID). This allows us to keep track of whether or not we have searched all appropriate conserved habitat for Covered Species. We will first search stations that contain

species records from the MSHCP Historical Database and then, if the targeted species is not detected, expand the effort to surrounding stations that contain suitable habitat. We cannot declare a species we did not detect during surveys to be a true absence, because a species may not have been detected due to differences in seasonality at a particular site, or because observers failed to detect the species. However, if several attempts are made over several seasons and over a range of environmental conditions, we may determine that the species is unlikely to be detected at a given site and defer our resources to conducting more productive surveys, until and unless additional helpful information is acquired. Priority will be given to surveying historical occurrences that meet defined Species Objectives.

Monitoring Surveys

Monitoring surveys are required for Covered Species every eight years unless otherwise indicated in the MSHCP document. The purpose of monitoring surveys is to document the continued presence of confirmed populations, in particular, those occurrences that meet defined Species Objectives. Polygons were created in ArcGIS representing the locations of the required occurrences as described by the MSHCP document. Some of these locations are very precise, while others are generalized over a large region.

During monitoring surveys, we will use GPS coordinates collected in previous surveys to relocate targeted species occurrences, searching the vicinity of the occurrences and adjacent habitat. Some species have multiple occurrences that fall within an objective polygon and satisfy a single objective requirement. In this case, we will attempt to monitor all of the known occurrences within the polygon, time allowing. However, the monitoring objective is considered met if only one of these occurrences is reconfirmed. We do not do a complete census of species distribution across the Plan Area, although we strive to inventory all occurrences as we become aware of them. Occurrences that are not required to meet plan objectives will be monitored, but priority is given to those that meet specified objectives. Covariate data (e.g., substrate, site impacts, co-occurring species) will be collected that may help us better understand species ecology and management needs, as well as alert us to populations in decline.

Field Methods

Surveys for rare plant species are conducted as either site visits (sentinel visits, monitoring surveys) or area searches (inventory surveys) to confirm presence of a target species, as detailed in the “Survey Design” section. Data collected during each survey includes general site information and whether or not the target species was found. Species-specific information that is recorded for all targeted plant species found during a survey includes the coordinates of the population center, estimates of population size, patch size, density and distribution, phenology, and covariate information. Specimen collections will be taken for newly observed occurrences only if the population exceeds 34 individuals. Some species or area restrictions may apply. The Botany Program Lead will tell surveyors whether or not a specimen collection is desired.

Field Procedure

Preparation

Survey assignments will be posted on the white board located in the plant room. Before going into the field, surveyors will upload relevant points to their handheld GPS units. Points files are located at *S:\Projects\Plants\1 Rare Plants\Points and Maps*. Blank datasheets are in the desk file drawer near the whiteboard or can be printed from the file located at *S:\Projects\Plants\Management\1. Rare Plants\Protocols&Datasheets*. Survey maps and additional equipment or instructions will be on the desk by the whiteboard or given to surveyors by the Botany Program Lead prior to surveys. Additional supplies can also be found on the equipment shelf in the plant room or in the inventory closet in the hallway.

Sentinel Surveys

“Sentinel sites” are areas with known and persistent populations of one or more target species. “Sentinel visits” occur at points with known species occurrences, but are not designated sentinel sites. We may do a sentinel visit at one of our monitored occurrences if it is more conveniently located near other survey sites scheduled for that day.

1. Surveyors will be given a map and GPS points for targeted species occurrences.
2. Surveyors will navigate to the given occurrence points and survey the area. We assume that these points are very accurate, so surveyors will only search within the immediate area of the confirmed occurrences (i.e., no farther than 50 meters.)
3. For all sentinel surveys, regardless of the outcome, surveyors will record general site information, including: observer initials, station ID, date, survey purpose, survey time in minutes, target species, and whether or not the species was found.
4. For target species found, surveyors will record species-specific information including: the UTM coordinates of the population center, estimate of population size recorded as either a number or a range (i.e., count class), approximate patch size, density and distribution types, and phenology percentages.
 - a. Other site data does not need to be recorded for sentinel surveys as these are sites for which this data has already been recorded and will be updated during monitoring surveys.
 - b. Any other relevant observations will be recorded in the notes section.
5. Photos of the species and habitat should always be taken.
6. Covered species observed that are *not* targeted should be recorded as incidentals on a separate *Internal Incidental Observation Form*. Blank incidental forms are located by the desk in the center of the main hallway or can be printed from the file located at *S:\Projects\Incidental Obs Forms*.

Inventory Surveys

1. Surveyors will be given a map and a list of target species, as well as GPS points for station boundaries and, if applicable, the points for historical records of targeted species.
2. Surveyors will thoroughly search assigned stations for target species in those species' appropriate habitats. Surveyors should also spot-check "inappropriate" habitat as sometimes our assumptions about habitat suitability are inaccurate.
3. Regardless of the outcome, surveyors will record general site information, including: observer initials, station ID, date, survey purpose, survey time in minutes, general site description, target species, whether or not the species was found, vegetation communities present, predominant phenology within three functional groups (herbaceous, shrub, and tree), site impacts, and whether or not the survey is "complete".
 - a. General description will include the name of the site if known, a brief description of dominant species, major topographic or hydrologic features, and anything else the surveyors feels is relevant to the survey.
 - b. When there are multiple phenologies present (e.g., some herbs are peak while others are late), the phenology of the majority of species present will be recorded.
 - c. A survey is considered complete if the surveyor feels that all appropriate habitat has been adequately surveyed. If, for example, only half of a station is completed, the surveyor will select "incomplete" and indicate the portion of the station surveyed (e.g., "NE half", "south of the road") in the notes field.
4. Surveyors will record species-specific information for all covered plant species found during targeted plant surveys including: UTM coordinates, abundance (exact or estimate), patch size, phenology, photo IDs, specimen ID, substrate, vegetation communities, site impacts, and the most dominant species within each functional group (tree, shrub, grass, native forb, and non-native forb).
 - a. Only one occurrence should be recorded for species found in small patches that are common in the landscape. If species occur in small patches that would be difficult to relocate in subsequent years, surveyors should record separate occurrence information for each patch.
 - b. Coordinates are taken as UTM's in NAD83 at the center or most dense portion of the occurrence.
 - c. If the size of the occurrence and distribution of individuals is appropriate, surveyors will record an exact count for abundance. Otherwise, surveyors may estimate the number of individuals in the occurrence by either an estimated count (e.g., 500) or by choosing a count class category. Surveyors will always record an exact count if required to meet a Demonstrate Conservation objective. For example, if 500 individuals are required, surveyors will carefully count individual plants until they have counted at least 500. They may then estimate the total population size and record that on the datasheet. This should be explained in the species results notes.
 - d. Surveyors will record phenology as percentages of individuals that are vegetative adults, flowering, fruiting, etc. Phenologies should add up to 100%. Individuals in bud are considered flowering.
 - e. Specimen collections will be taken for newly observed occurrences only if the

- population exceeds 34 individuals. Some species or area restrictions may apply. The Plant Program Lead will tell surveyors whether or not a specimen collection is desired.
- f. Surveyors will record vegetation communities in which target species are growing. This may differ from the vegetation communities recorded for stations.
 - g. Surveyors will record site impacts that directly influence the occurrence. This may differ from the site impacts recorded for stations.
 - h. Surveyors will record approximately three dominant species within each functional group (tree, shrub, grass, native forb, and non-native forb). More or less may be recorded as deemed appropriate to characterize the site.
5. Covered species observed that are *not* targeted should be recorded as incidentals on a separate *Internal Incidental Observation Form*. Blank incidental forms are located by the desk in the center of the main hallway or can be printed from the file located at *S:\Projects\Incidental Obs Forms*.

Monitoring Surveys

Monitoring surveys also occur near points with known species occurrences, but more data is recorded than for sentinel visits.

1. Surveyors will be given a map and GPS points for targeted species occurrences.
2. Surveyors will navigate to and survey in the area of the confirmed occurrences. We assume that these points are very accurate, however, populations can be dynamic. Since our purpose is to monitor occurrences that meet plan objectives, surveyors will search beyond the known points for as long as there is appropriate habitat and as far as the species occurrence population could likely extend. This will vary by species, but 100 meters is typically adequate.
3. Regardless of the outcome, surveyors will record general site information, including: observer initials, station ID, date, survey purpose, survey time in minutes, target species, whether or not the species was found, vegetation communities present, phenology within three functional groups (herbaceous, shrub, and tree), and site impacts.
 - a. When there are multiple phenologies present (e.g., some herbs are peak while others are late), the phenology of the majority of species present will be recorded.
4. Surveyors will record species-specific information for all targeted plant species found during monitoring surveys including: the UTM coordinates of the population center, a population size as accurate as is practicable (avoid using “count classes”), approximate patch size, density and distribution types, phenology percentages, substrate, vegetation community, site impacts, and co-occurring dominant species within functional groups. Surveyors may also record, in the species notes section, additional coordinates or information that helps describe the extent of the population patch (e.g. “southwest of the creek from xcoord, ycoord to xcoord, ycoord”).
 - a. Any other relevant observations will be recorded in the notes section.
5. Photos of the species and habitat should always be taken.

6. Covered species observed that are *not* targeted should be recorded as incidentals on a separate *Internal Incidental Observation Form*. Blank incidental forms are located by the desk in the center of the main hallway or can be printed from the file located at *S:\Projects\Incidental Obs Forms*.

Office Tasks

After returning from the field, surveyors will upload all photographs referenced on data sheets, rename them according to the standard described below, and file them in the appropriate data photos folder (*S:\Projects\Data_Photos\RarePlants*). The naming standard for photos is date, observer initials, and jpeg number (YYYYMMDD_INI_#####). Plant collections will be labeled, put in the plant press on top of the equipment shelf, and the collection form put in the Collections notebook. Completed survey data sheets will be put in the file pocket next to the whiteboard. Incidental forms will be put in the file pocket in the hallway.

Equipment

- Assignment maps
- Clipboard
- Data sheets
- Digital camera
- GPS unit
- Plant identification aids

Optional Equipment

- Declinated compass
- Flags or flagging
- Plant press
- Pruning shears
- Snake gaiters
- Two-way radios
- Weed digger

TRAINING

From 2005 through early 2010 extensive training was conducted yearly in the early spring prior to field surveys. Members of the rare plant field crew were instructed in identification of common plant families and all 63 covered plant species. Crew members studied photographs and herbarium specimens of target species as well as closely related or potentially confusing species. Crew members were required to become familiar with key identification features of each species and the habitat types where Covered Species occur, and then were tested to determine if they could correctly identify targeted covered plant species.

Surveyors were trained in the identification of plant species using the dichotomous keys found in *The Jepson Manual*, reviewing specimens at the UCR Herbarium, looking through materials (slideshows, guide books) of rare plant species available on the Monitoring Program server, and online resources including Jepson eFlora and the Calflora website. Surveyors were trained in a number of other field tasks in order to conduct rare plant surveys, such as proper plant collection techniques and estimating plant cover and population size. This training occurred in the field under the direction of the Botany Program Lead and other experienced surveyors.

We have had no new members on the botany crew since 2010. In preparation for the 2014 survey season crew members will re-familiarize themselves with targeted Covered Species by reviewing plant keys, photographs and specimens, and by visiting sentinel sites of known species occurrences prior to surveys. Other Monitoring Program personnel (not botany crew members) will occasionally be assigned to assist experienced crew with rare plant surveys. Inexperienced personnel will not conduct surveys alone and only experienced personnel will confirm the identifications of Covered Species located during surveys.

Training Results

Field personnel that successfully complete rare plant identification and plant collection training are able to perform the following:

- Navigate to, and survey within, a survey station using a handheld GPS
- Identify Covered plant species and co-occurring plant species using dichotomous keys, Monitoring Program materials, and approved internet resources
- Estimate plant population size and phenology
- Record data for plant species on survey data forms
- Identify when it is appropriate to collect a specimen, in order not to violate reserve regulations and not to jeopardize the persistence of the plant population in question
- Collect an herbarium-quality specimen
- Use the MSHCP and UCR Herbariums

DATA MANAGEMENT

The Botany Program Lead reviews survey objectives and ensures information recorded on datasheets accurately reflects those objectives. The Lead also coordinates with the Data Manager to develop the database forms where data will be entered from the field datasheets. The Data Manager ensures that database forms are updated and ready for data entry.

Data entry follows the standard protocol established by the Monitoring Program. Data are entered into the database using a form created for each project. Because Biologists often participate in multiple surveys at any given time, data entry often occurs between other field responsibilities and as office time allowed. One person enters data and a second person verifies the entries independently (i.e., quality control). Once completed, the Lead and Data Manager review the entries and correct errors. The Data Manager verifies/validates the data once all errors have been corrected.

DATA ANALYSIS

Standard data analysis will not occur at this time. Rare plant surveys consist of documenting presence of covered plant species to meet species objectives as required by the MSHCP, and as outlined briefly below. We do not perform a complete census of species, nor do we use a sampling design that allows for statistical analyses such as trend or covariate correlations. Covariate data collected is observational, assists in alerting us to possible threats to plant populations, and provides a “snapshot” of the habitat in which plant species are likely to be found.

The species-specific objectives listed in the MSHCP specify a certain number of locations, occurrences, records, and/or localities for each species, and often include a list of areas where the species should be found. For distributional objectives the MSHCP uses, but does not define, the terms: location, locality, and occurrence. Throughout the species accounts, when referring to distributional objectives, those three terms are often used interchangeably. We define “occurrence” as the unit to describe a group of individuals meeting the criteria for one location in the species objective. When species objectives have a one-to-one relationship between number of occurrences and locations where they are to be found, we have a very clear idea of what constitutes an occurrence. For example, Objective 2 for *Mimulus clevelandii* requires that we “(i)nclude within the MSHCP Conservation Area the two known [occurrences] of this species on Santiago Peak in the Santa Ana Mountains and on the Northern Slopes of the Agua Tibia Mountains.” Other species objectives require a specified number of known occurrences to be included in the Conservation Area without listing each specific site where the species will be conserved. For example, Objective 2 for *Penstemon californicus* requires that we “(i)nclude within the MSHCP Conservation Area at least 15 occurrences in Aguanga, Blackburn Canyon, and the San Jacinto Mountains.” When distinct locations for each occurrence are not specified, we are unable to apply a single definition of “occurrence”. Instead, we define “occurrence” on a case-by-case basis, factoring in, when available, the typical spatial distribution of the species, general ecology, geography, and conservation intent. In addition, we use a combination of a close reading of the MSHCP Species Account and Fish and Wildlife Service Biological Opinion

(USFWS 2004), as well as the original data points shown in the MSHCP Historical Database, to delineate, to the best of our abilities, the known occurrences to which the objectives refer.

Under the MSHCP, some species are not considered adequately conserved until additional goals, beyond the conservation of historic occurrences, are met. For demonstrate-conservation objectives, the MSHCP uses the term “locality” and defines its minimum dimensions as 1 quarter section. We have expanded the use of this criteria for any Species Objective where species have multiple required occurrences within a continuous population that has no clear boundaries. We use an overlay of USGS townships and ranges and count no more than 1 occurrence per quarter-section and call this the “quarter-section rule”.

For the purpose of clarity, the term “locality” will only be used when referring to demonstrate-conservation objectives. The species-specific objective typically lists a minimum number of individuals that must be present for a given occupied site to qualify as a locality, unless a smaller population has been demonstrated to be self-sustaining. We use the highest number of individuals counted in an area in a single day to determine the total number of individuals at a locality to avoid over-counting individuals. A few species have demonstrate-conservation objectives that only ask for a specific number of localities without regard to the number of individuals at each locality.

LITERATURE CITED

- Calflora: Information on California plants for education, research and conservation. [web application]. 2014. Berkeley, California: The Calflora Database [a non-profit organization]. Available: <http://www.calflora.org/>
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- Hickman, J.C., Editor. 1993. The Jepson Manual: higher plants of California. University of California Press, Berkeley, CA.
- [USFWS] U.S. Fish and Wildlife Service. 2004. Intra-Service Biological and Conference Opinion on Issuance of an Incidental Take Permit for the Western Riverside County Multiple Species Habitat Conservation Plan (File FWS-WRIV- 870.19). Carlsbad, CA. June 2004.

Appendix A-1. Datasheet for Rare Plant Surveys.

Entered by: _____
 Checked by _____
 Page ___ of ___

**MSHCP Biological Monitoring Program
 Rare Plant Survey**

- **Observer(s) Initials:** _____ **Grid ID:** _____ **Date:** _____
- **Survey Purpose:** *Inventory* *Sentinel Site* *Monitoring* **Survey Time:** _____ *min.* **Complete** / **Incomplete**
- **Survey Incomplete Notes:** _____
- **General area description, dominant species:** _____

➤ **Target species assessment:** (Unknown, Found, Other):

Species	Objective ID (not req.)	Assessment	Species	Objective ID (not req.)	Assessment

➤ **Veg. Communities** (circle all that apply):

Dunes, Scrubland, Chaparral, CSS, Grass/Herb, Alkali playa, Meadow, Native grass, Non-native grass, Vernal pool, Riparian, Riparian scrub, Riparian woodland, Marsh, Broad-leaved woodland, Coniferous woodland, Rock Field

➤ **Dominant phenology:** (Early, Peak, Late, NA) **Herb Layer:** (E / P / L / NA) **Shrub:** (E / P / L / NA) **Tree:** (E / P / L / NA)

➤ **Site Impacts and Intensity** (Circle and indicate Low, Medium or High intensity)

4 Grazing/ browsing	55 On-site development	73 Fire break	81 Erosion
5 Invasive Exotics	57 OHV use (off trail/road)	75 Dirt trail	82 Disking/tilling
6 Logging	64 Dumping	76 Dirt road	83 Misc. soil disturbance
7 Small scale woody cutting	67 Litter	77 Paved road	84 Hydrologic modification
42 Fire (recent)	68 Vandalism	79 Artificial inundation	90 Other (specify)
49 Insect/disease damage	70 Off-trail trampling	80 Mowing	

➤ **Species Occurrence Information:**

Coordinates		Habitat Photo			
Species Code	Spec Certain? Yes / No	Species Photos		Specimen ID (not required)	
Patch Size	Density	Distribution	Count Exact -or- Count Estimate	-or- Count Class	
% Seedlings	% Saplings	% Vegetative	% Flowering	% Fruiting	% Desiccated

Notes: _____

- **Dominant trees:** _____
- Dominant shrubs:** _____
- Dominant native forbs:** _____
- Dominant exotic forbs:** _____
- Dominant grasses:** _____

- **Substrate** (list all): _____ **Local Veg. Community:** _____
- Local impacts** (Impact/Intensity/Note): 1) _____ / _____ / _____ 2) _____ / _____ / _____
- 3) _____ / _____ / _____ 4) _____ / _____ / _____ 5) _____ / _____ / _____

Count Classes: 1- <25, 2- 25 - <100, 3- 100 - <250, 4- 250 - <1000, 5- >1000
Density classes: 1- >25 per m², 2- 1 - 25 per m², 3- 1-5 meters between individuals, 4- 5-10 meters bet. individuals, 5- >10 meters bet. individuals
Distribution Types: 1- fairly evenly distributed, 2- densest at point taken and gradually decreasing, 3- dense in clumps / uneven across patch
Patch size: 1- <10 m² (r=1.78 m), 2- 10 m² - <100 m² (r=5.64 m), 3- 100 m²- <1,000 m² (r=17.84 m), 4 ≥ 1,000 m²
Substrates: Cliff, Gravel, Litter, Log, Moss, Rock, Soil, Water

Appendix A-2. Datasheet for additional rare plant observations.

Entered by: _____
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**MSHCP Biological Monitoring Program
 Rare Plant Survey - Species Occurrence Information (cont.)**

Observer(s) Initials: _____ Grid ID: _____ Date: _____

Coordinates			Habitat Photo		
Species Code		Spec Certain? Yes / No	Species Photos		Specimen ID (not required)
Patch Size	Density	Distribution	Count Exact -or- Count Estimate	-or- Count Class	
% Seedlings	% Saplings	% Vegetative	% Flowering	% Fruiting	% Desiccated

Notes: _____

- Dominant trees: _____
- Dominant shrubs: _____
- Dominant native forbs: _____
- Dominant exotic forbs: _____
- Dominant grasses: _____

- Substrate (list all): _____ Local Veg. Community: _____
- Local impacts (Impact/Intensity/Note): 1) _____ / _____ / _____ 2) _____ / _____ / _____
- 3) _____ / _____ / _____ 4) _____ / _____ / _____ 5) _____ / _____ / _____

Coordinates			Habitat Photo		
Species Code		Spec Certain? Yes / No	Species Photos		Specimen ID (not required)
Patch Size	Density	Distribution	Count Exact -or- Count Estimate	-or- Count Class	
% Seedlings	% Saplings	% Vegetative	% Flowering	% Fruiting	% Desiccated

Notes: _____

- Dominant trees: _____
- Dominant shrubs: _____
- Dominant native forbs: _____
- Dominant exotic forbs: _____
- Dominant grasses: _____

- Substrate (list all): _____ Local Veg. Community: _____
- Local impacts (Impact/Intensity/Note): 1) _____ / _____ / _____ 2) _____ / _____ / _____
- 3) _____ / _____ / _____ 4) _____ / _____ / _____ 5) _____ / _____ / _____

Count Classes: 1- <25, 2- 25 - <100, 3- 100 - <250, 4- 250 - <1000, 5- >1000
Density classes: 1- >25 per m², 2- 1 - 25 per m², 3- 1-5 meters between individuals, 4- 5-10 meters bet. individuals, 5- >10 meters bet. individuals
Distribution Types: 1- fairly evenly distributed, 2- densest at point taken and gradually decreasing, 3- dense in clumps / uneven across patch
Patch size: 1- <10 m² (r=1.78 m), 2- 10 m² - <100 m² (r=5.64 m), 3- 100 m² - <1,000 m² (r=17.84 m), 4 ≥ 1,000 m²
Substrates: Cliff, Gravel, Litter, Log, Moss, Rock, Soil, Water