

# U.S. Fish and Wildlife Service (USFWS) Utah Field Office Guidelines for Conducting and Reporting Botanical Inventories and Monitoring of Federally Listed, Proposed and Candidate Plants



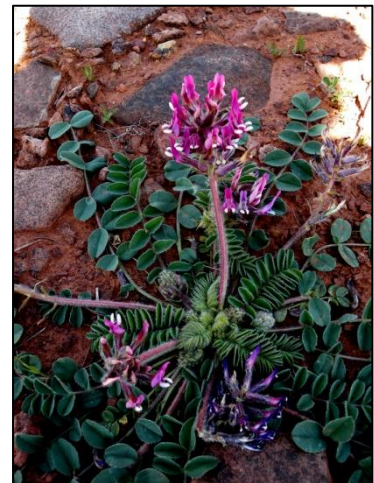
August 31, 2011



Barneby ridge-crest  
Jessi Brunson, USFWS



Jones cycladenia  
Daniela Roth, USFWS



Holmgren milk-vetch  
Daniela Roth, USFWS



Uinta Basin hookless cactus  
Bekee Hotze, USFWS



Dwarf bear-poppy  
Daniela Roth, USFWS



Last chance townsendia  
Daniela Roth, USFWS

## INTRODUCTION AND PURPOSE

These guidelines were developed by the USFWS Utah Field Office to clarify our office's minimum standards for botanical surveys for sensitive (federally listed, proposed and candidate) plant species (collectively referred to throughout this document as "target species"). Although developed with considerable input from various partners (agency and non-governmental personnel), these guidelines are solely intended to represent the recommendations of the USFWS Utah Field Office and should not be assumed to satisfy the expectations of any other entity.

These guidelines are intended to strengthen the quality of information used by the USFWS in assessing the status, trends, and vulnerability of target species to a wide array of factors and known threats. We also intend that these guidelines will be helpful to those who conduct and fund surveys by providing up-front guidance regarding our expectations for survey protocols and data reporting. These are intended as general guidelines establishing minimum criteria; the USFWS Utah Field Office reserves the right to establish additional standards on a case-by-case basis.

*Note: The Vernal Field Office of the BLM requires specific qualifications for conducting botanical field work in their jurisdiction; nothing in this document should be interpreted as replacing requirements in place by that (or any other) agency. Contact the BLM for additional information when working in areas under that agency's jurisdiction.*

### I. PERSONNEL QUALIFICATIONS

If the work is performed under contract, resumes should be included for every surveyor who will be working on a botanical survey or monitoring project. Resumes should include educational background (colleges and universities attended, and any diplomas and degrees received), botanical survey work history, and any related work experience. The following minimum qualifications are recommended:

#### A. Field Crew Leaders

Field crew leaders must meet the same qualifications as a botanist working for the Federal government (Botanist series 0430), namely:

- Degree: botany; or basic plant science that included at least 24 semester hours in botany. Two field seasons of surveying experience for special status species in the geographic area are highly recommended.

OR

- Combination of education and experience -- courses equivalent to a major in botany or basic plant science that included at least 24 semester hours in botany, as shown in A above, plus appropriate experience or additional education. Two field seasons of surveying experience for special status species in the geographic area are highly recommended.

Field crew leaders must be present with their crew during surveys and must have the ability to identify vascular plant species using whatever means necessary (e.g., dissecting microscopes, technical keys, and monographs, etc.). A crew leader should supervise no more than 5 technicians/field assistants. Crew leaders should possess a wide array of skills necessary to plan, oversee and conduct vascular plant surveys, particularly: training and experience with vascular plant survey methods; familiarity with the flora and geological formations of Utah; and the knowledge and ability to locate and identify target plant species.

Section III (GPS Data) establishes minimum standards for documenting and reporting survey efforts using GPS/GIS technology. Field crew leaders must either possess the skills to document the work of their entire crew in accordance with these standards, or ensure that at least one member of their crew is capable of doing this on behalf of the entire field crew.

### **B. Technicians/Field Assistants**

Field assistants must possess at least one year of biological coursework at the college level, to include:

- At least 6 semester hours in any combination of scientific or technical courses (biology, entomology, geology, or botany); and
- At least 1 course in plant taxonomy

Field assistants must have the ability to recognize special status plant species in Utah and use technical botanical keys appropriate to the area. While it is not necessary for every field assistant to possess GPS skills, every assistant should be capable of supporting the field crew's efforts to document surveys using field notes, paper maps, GPS, or other means necessary (see Section III for more information on how location data should be documented and reported).

## **II. SURVEY GUIDELINES**

In this section, we first describe general survey guidelines applicable to most botanical surveys. These are followed by recommendations specific to three types of survey efforts frequently conducted for special status plant species: clearance surveys, status surveys, and monitoring efforts.

The recommendations in this section specifically address information that should be gathered while in the field. Sections III and IV addresses how this information should be summarized for purposes of reporting.

### **A. General guidelines**

1. Botanical surveys must be conducted in a manner that will maximize the likelihood of finding target species. For example, one of the most common reasons that we consider surveys inadequate is because they were conducted during portions of the year when

target species were not visible. Refer to Appendix A for appropriate species-specific survey dates based upon flowering and/or fruiting periods.

2. Multiple site visits may be necessary during a single field season to ensure that surveys are conducted during the appropriate life stage (usually flowering or fruiting) of all target species in the area.
3. Reference populations (i.e., other known occurrences of the target species) must be visited to confirm that target species are flowering, fruiting, or otherwise identifiable prior to initiating surveys. Reference populations should be documented with digital photos of the target species and habitat. For assistance in locating a reference population, contact the land management agency or the USFWS species lead (<http://www.fws.gov/utahfieldoffice/EndSppLeads.html>).
4. Document the overall biological setting, plant communities, topography, and soils, and any other environmental conditions (e.g., local precipitation patterns) that could influence the emergence of (and therefore the ability to detect) target species. To the maximum extent practical, include a comprehensive list of other vascular plant species associated with the areas where focused surveys were conducted for target species.
5. Document the level of survey effort, including the number of persons involved and the amount of time spent conducting surveys for target species.
6. At the outset, define whether the target species will be counted by clumps, rosettes, vegetative stems, flowering stems, and/or some other unit. Clearly indicate the unit used for all counts in all field notes and data collection forms.
7. Obtain separate counts of alive/dead, vegetative/reproductive, and adult/juvenile plants. Identify the life stage of all individuals of the target species that are located on the surveys. If actual seedlings (evidenced by cotyledons) are observed, make specific note of this important piece of evidence that recruitment is occurring.
8. Document the presence of target species using GPS. Refer to Section III (GPS Data).
9. Document the presence of target species with at least one high quality photograph of the plant and one of occupied habitat. If a large area is covered during the survey, take photographs at a representative number of locations, and make note of the unique identifier(s) of photos taken at specific GPS coordinates.
10. Photographs used in place of actual voucher specimens should be of sufficient scale and resolution to show the identifying characteristics of the given target species. Physical collection of plants (actual voucher specimens) may be necessary in cases of taxonomic ambiguities, habitat or range extensions. However, the collection of federally listed species on Federal lands requires a permit from the USFWS and typically also requires a permit from the Federal land management agency. Ensure that you have all necessary permits before collecting voucher specimens.
11. If species that could be confused with the target species are observed within the areas surveyed, identify them (by scientific name), and describe how these species were distinguished from the target species.
12. Specifically note the presence of existing or potential threats to the target species or its habitat (e.g., invasive exotic species, grazing, unmanaged or excessive recreational use). Assess the relative severity of these threats across all sites surveyed. If multiple threats are present at a given location, assess the relative importance of each threat at that site.

13. Use standard field forms for field observations, with clear and standardized means of assessing presence/absence and abundance of target species at a given location. Refer to Appendix C for some examples of commonly used field data collection forms.

## **B. Clearance surveys**

The objective of clearance surveys is to cover 100% of a given project area to determine presence of target species, and their distribution and abundance prior to ground-disturbing activities. These surveys are particularly used to document compliance with the provisions of Section 7 of the Endangered Species Act. Therefore, clearance surveys represent the primary means of assessing a proposed action's direct, indirect and cumulative effects to target species.

“Project area” refers to the specific area in which impacts may occur to target species in association with a proposed activity. As such, project areas may be linear features (e.g., rights-of-way) or polygons (e.g., well pads).

1. Clearance surveys must include an assessment of all potential habitat within the project area, including a buffer. The standard buffer for clearance surveys is 300 feet from the project area, however the necessary buffer may vary depending on the scope of the project and target species. For additional guidance and to define an appropriate buffer, contact USFWS species lead in our office prior to conducting surveys (<http://www.fws.gov/utahfieldoffice/EndSppLeads.html>).
2. Clearance surveys are typically conducted by walking belt transects (of a fixed width) throughout all areas of potential habitat. Refer to Appendix A for species-specific transect widths to be used in clearance surveys. Use of other survey techniques may be appropriate in limited instances, however these exceptions must be discussed ahead of time with our office and the lead action agency.
3. Unless otherwise specified by our office, clearance surveys are valid for a period of one year.
4. If the target species is not found, clearly indicate whether or not the surveyed habitat appeared suitable for the target species, and provide photographic documentation:
  - a. If habitat appeared suitable but the target species was not observed, indicate whether or not the species may have gone undetected, and why. Assess the likelihood that the target species was present but undetected.
  - b. If surveyed habitat is deemed unsuitable for the target species, provide an explanation of the criteria used for making this determination.
5. Recognize that adverse conditions may prevent field crews from determining presence or identifying some target species in areas of potential habitat. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any year. We may require botanical inventory(-ies) in subsequent year(s) if adverse conditions likely reduced the ability to observe the target species in areas of potential habitat(s). Discuss such conditions with our office's species lead and the lead action agency.
6. If the target species is present and is associated with wetlands, make note of the direction and integrity of flow of surface hydrology. If the target species is (are) affected by off-site hydrological influences, make note of these factors.

### **C. Status surveys**

Status surveys document the distribution and abundance of one or more target species over a specific geographic area at a specific point in time. Status surveys typically consist of visits to previously known locations and areas not previously known to be occupied. These surveys usually encompass a substantial portion of the total known range of the species, and frequently the entire range. Relative to clearance surveys and most monitoring efforts, status surveys tend to involve less intensive survey effort at any given site, in exchange for surveying across a wider geographic area (i.e., larger number of potential sites). Status surveys are similar to monitoring efforts (see the section on monitoring, below) in that they can involve repeated observations at the same location(s) over time, but are typically less quantitative. Although every effort should be made to conduct status surveys in a manner that enables some degree of assessment as to whether conditions have changed relative to previous surveys, these types of surveys primarily characterize only coarse spatial patterns as opposed to the fine-scale, quantitative trends in populations that monitoring efforts seek to detect.

1. Status report surveys must include visits to all known populations/sites within the geographic scope of the survey effort; usually this means visits to all known (current and historical) populations of the species.
2. To the maximum extent possible, these surveys should also include visits to areas with the potential to contain the target species (potential habitat). Criteria used to identify potential habitat (prior to field surveys) should be explicitly stated.
3. While in the field, all areas identified as potential habitat should be assessed for the presence of the target species (e.g., occupied habitat). Areas found not to contain the target species should be assessed for the presence of conditions suitable for the target species (e.g., suitable habitat that is apparently unoccupied).
4. While in the field, make note of existing and former patterns of land use within the surrounding landscape.

In addition to documenting the presence of target species, characterize the density and abundance of the target species in absolute numbers (e.g., via direct and precise counts) or in relative terms (e.g., by estimates using standardized categorical ranges). Structure field observations to provide meaningful comparisons of abundance and density among all locations visited during the course of the survey.

### **D. Monitoring surveys**

In contrast to clearance or status surveys, “monitoring” typically involves structured, repeated assessments of a target species in a manner that investigates the species response to one or more environmental or human-caused factors. Monitoring programs can take many different approaches depending upon the target species, the number of monitoring locations, site conditions, and the objectives of the effort. The nature of the questions being addressed and the level of certainty expected from the data will largely dictate the methods used. Refer to Appendix B for some resources that may assist in the design of

monitoring objectives and sampling regimes; a review of the principles and contents of these sources is beyond the scope of these guidelines.

There are fundamental components of any successful monitoring program. At a minimum, monitoring efforts must consist of the following:

1. Monitoring plans must be developed prior to initiating the effort. Section IV contains specific recommendations for the basic components of a monitoring plan.
2. Monitoring reports must be produced for each discrete period of data collection (typically annually), in accordance with the frequency specified in the monitoring plan. Section IV provides general reporting guidelines, as well as reporting recommendations specific to monitoring efforts.
3. Electronic files (spreadsheet format) must be developed to track and evaluate the raw data.
4. Adaptive management mechanisms must be in place for key parties (agencies and their contractors) to review and comment on the monitoring program, and to revise the program as necessary. In most instances, this should consist of regular face-to-face meetings among appropriate personnel, with site visits as needed.

### **III. GPS DATA: DATA COLLECTION AND REPORTING**

While in the field, the location information of target species must be documented according to the standards set by Utah's Geospatial Technical Committee. This committee, which is made up of Federal, State, and County officials, has standardized data collection for our state to be in UTM Zone 12, NAD 83. The location, expressed in x (or easting) and y (or northing) coordinates, and additional site/attribute data should be provided in electronic file format. Electronic data must be provided in a manner that allows them to be directly imported into a GIS without the additional time and error associated with transcription. At a minimum, location data must be reported as follows:

1. A statement indicating the make, model, precision capabilities (e.g., recreational, mapping, or survey grade) and the datum and coordinate system of the GPS used to collect the data.
2. The electronic file containing location coordinates must be provided in one of the following *electronic* file formats:
  - i. any one of the many commonly used file formats for vector data (e.g., shapefile, coverage, feature class, geodatabase, digital line graph, computer-aided design (CAD, or AutoCAD)),
  - ii. a spreadsheet, or
  - iii. a delimited text file.
3. Each unique location (whether a point, line or polygon) must be accompanied by the following information in separate fields:
  - i. unique location identifier (e.g., waypoint number, ID field, etc.)

- ii. target species present
- iii. date of observation
- iv. waypoint accuracy, in meters
- v. unique photo identifier (e.g., filename of any photographs associated with that specific location)
- vi. the number of plants at that location (if data is collected separately by seedling/juvenile/vegetative/flowering/fruited, these data should be presented in separate fields with field names clearly identifying the nature of the data in that field)
- vii. comments on threats to the target species (as appropriate, if specific to a given location)
- viii. comments on the vigor of the target species (as appropriate, if specific to a given location)
- ix. additional fields, as necessary

GPS data should be differentially corrected while in the field (using real-time methods) or postprocessed later in the office before being submitted to our office. Refer to the following URLs for background information for, and methods of, differential correction:

<http://www.esri.com/news/arcuser/0103/differential1of2.html>

<http://www.spatial-ed.com/gps/gps-basics/135-differential-correction-methods.html>

If the GPS data contains a combination of positive and negative survey data (with respect to the presence of target species), it should be possible to quickly identify negative survey data by querying or sorting on a single field – this should not require manual review and sorting of records based upon narrative data found in one or more comment fields (or the accompanying report).

#### **IV. REPORTING**

##### **A. General Guidelines**

Regardless of the type of survey (or monitoring) effort being conducted, botanical field reports must include:

1. A description of the biological setting, including plant community, topography, soils, potential habitat of target species, and an evaluation of environmental conditions, such as timing or quantity of rainfall, which may influence the performance and expression of target species.
2. An overview map showing the location(s) surveyed, with sufficient scale and resolution for someone unfamiliar with these areas to locate them.
3. Survey methodologies and dates.



4. A description of the level of survey effort, specifically including the number of people conducting surveys and amount of time spent surveying each project area.
5. If the survey encompasses current or historical locations for the target species that were previously mapped by the Utah Natural Heritage Program (UNHP), provide a map depicting the specific locations where UNHP mapped the species, accompanied by a unique UNHP identifier (typically the Element Occurrence number) for each location. In the map and accompanying report, clearly indicate whether the survey results include new locations, or updated information for previously mapped locations.
6. A summary of abundance (count) data for the target species, with separate tallies for alive/dead, vegetative/reproductive, adult/juvenile. The unit of measurement (clumps, rosettes, stems, or other) should be clearly specified.
7. Assessments of the vigor of the target species (e.g., disease, predation, and/or mortality), regardless of whether the causes are known. If certain factors are suspected as contributing to these patterns, identify them and assess the likelihood that they are actually contributing to reduced vigor in the target species.
8. Assessments of threats to the target species (e.g., invasive exotic species, unmanaged and excessive recreational use, over-grazing, etc.). To the extent possible, distinguish between threats that are clearly affecting the status (vegetative vigor and/or reproduction) of the target species, and those that are present but do not yet appear to be affecting the target species.
9. Copies of field data sheets.
10. Electronic copies of all photographs. Photographs captured using film (as opposed to digital) cameras should be scanned at high resolution, and saved in a universally recognized file format for images (e.g., JPEG, TIFF, etc.).

Copies of the full report (including appendices) should be sent to:

- Utah Natural Heritage Program (with copies of NHP field survey forms)
- Applicable/affected land owners and/or management agencies
- USFWS Utah Field Office (mailing address: 2369 West Orton Circle, West Valley City, Utah 84119).

## **B. Clearance Surveys**

In addition to the general guidelines above, reports for clearance surveys should also include:

1. Map(s) depicting the specific properties surveyed, with the following information clearly indicated:
  - i. Scale bar and map orientation (e.g., North arrow)
  - ii. Project/parcel boundaries
  - iii. Map quadrangle name
  - iv. Specific areas where target species was found to be present, with clear relationships to areas to be affected by project activities.
2. Descriptions of the spatial extent (in acres or river/stream miles, as appropriate) of habitats occupied by the target species;

3. Descriptions of the spatial extent of apparently suitable but unoccupied habitat;
4. Comprehensive list of vascular plant species occurring on the project site, by habitat (plant community) type;
5. Assessments of the overall biological significance or ecological quality of the project site, in a local and regional context;
6. Assessments of the significance of the project site to the target species, in a local and regional (range-wide) context; and
7. Descriptions of the direction and integrity of flow of surface hydrology, particularly if the target species are associated with wetlands. If target species is (are) affected by adjacent off-site hydrological influences, describe these factors.

### **C. Status Surveys**

In addition to the general guidelines above, status survey reports should also include:

1. Assessments of the ecological condition and integrity of the landscape(s) in which surveyed locations occur, with specific emphasis on patterns of disturbance or fragmentation, or other threats to the ecosystem (e.g., invasive exotic species, unmanaged and excessive recreational use, over-grazing, etc.).
2. Assessments of land use(s) within the larger landscape as well as the specific areas of occupied and potentially suitable habitat.
3. Assessments of the relative density of target species among all areas surveyed.
4. Separate calculations of the acres of occupied habitat of the target species at each discrete survey location and cumulatively over all areas surveyed. The appropriate geographic scales at which to summarize this information will require professional judgment as well as coordination with our office and the entity funding the survey.
5. Assessments of how each of the above factors has changed relative to any prior status surveys conducted for the target species (this is the historical reference point against which all assessments of current conditions should be gauged). However, these discussions should appropriately state any known limitations in comparisons to prior surveys (e.g., different survey methods, different personnel, climate conditions such as drought). Refer to the discussion under Section II.C regarding these and other cautions, and do not overstate the ability to detect changes in abundance or density of the target species (or other factors).

Draft copies of status reports should be circulated to our office's species lead for preliminary review and comment. Failure to satisfactorily address our comments in final versions may result in these reports not being accepted by our office.

## **D. Monitoring Reports**

Because monitoring activities usually involve repeated assessments of a target species over a period of time that usually spans several years, clear and consistent reporting of monitoring activities is particularly challenging. Although monitoring programs will vary significantly depending upon a variety of factors (as discussed above), nearly every monitoring effort must be accompanied by the following documents:

1. Monitoring plan describing:
  - i. objective(s) of the effort;
  - ii. methods of data collection, a rationale for the methods chosen and a brief discussion of any alternative methods considered but rejected;
  - iii. questions to be addressed during data analysis;
  - iv. anticipated frequency of data collection and reporting;
  - v. format for monitoring reports; and
  - vi. entity(-ies) responsible for conducting monitoring, analyzing and reporting on the monitoring data, and distributing the monitoring reports.
  
2. Monitoring reports that include:
  - i. A format modeled after peer-reviewed scientific papers, with an Introduction, Materials/Methods, Results, and Discussion sections;
  - ii. References to applicable monitoring plans, and explain any deviations from those plans;
  - iii. References to prior years of monitoring reports, as applicable;
  - iv. Map(s) of monitoring locations at a sufficient spatial scale that someone unfamiliar with these areas could locate them;
  - v. Summaries of data for the most recent period of data collection (in tabular, graphical and narrative format, as appropriate);
  - vi. Analysis of apparent trends over the entire period of time for which data are available;
  - vii. Assessments of apparent threats to the target species, and the relative severity of these threats;
  - viii. Specific, focused assessments of
    - 1) management recommendations, and
    - 2) whether revisions are needed to the monitoring plan;
  - ix. Copies of field data collection forms (examples provided in Appendix C).

Draft copies of monitoring plans and reports should be submitted to our office's species lead for preliminary review and comment. Failure to satisfactorily address our comments in final version(s) of these documents may result in these reports not being accepted by our office.

**APPENDIX A: SPECIES SPECIFIC SURVEY PERIOD AND TRANSECT WIDTH**

<b><i>SPECIES</i></b>	<b><i>SURVEY PERIOD</i></b>	<b><i>TRANSECT WIDTH<sup>a</sup></i></b>
<i>Arctomecon humilis</i>	Mid April – May	10 – 20 ft
<i>Asclepias welshii</i>	June – September	25 – 50 ft
<i>Astragalus anserinus</i>	May – June	10 – 20 ft
<i>Astragalus ampullarioides</i>	April – May	10 – 20 ft
<i>Astragalus desereticus</i>	May – June	10 – 20 ft
<i>Astragalus holmgreniorum</i>	April – May	10 – 20 ft
<i>Astragalus montii</i>	July – August	10 ft
<i>Carex specuicola</i>	May – September	N/A, habitat not suitable for transects
<i>Cycladenia humilis var. jonesii</i>	April – June	10 – 20 ft
<i>Eriogonum corymbosum var. nilesii</i>	September - October	10 – 20 ft
<i>Eriogonum soredium</i>	Mid June - July	10 – 20 ft
<i>Lepidium barnebyanum</i>	May – June	10 – 20 ft
<i>Lepidium ostleri</i>	Mid June - July	5 ft
<i>Lesquerella tumulosa</i>	May – June	5 – 10 ft
<i>Pediocactus despainii</i>	April – May	3 ft
<i>Pediocactus sileri</i>	April – June	3 – 6 ft
<i>Pediocactus winkleri</i>	March – April	3 ft
<i>Penstemon scariosus var. albifluvis</i>	May – June	10 – 20 ft
<i>Penstemon grahamii</i>	May – June	10 ft
<i>Phacelia argillacea</i>	June	10 ft
<i>Primula maguirei</i>	May	N/A, habitat not suitable for transects
<i>Ranunculus aestivalis</i>	July	5 ft
<i>Schoenocrambe argillacea</i>	May to early June	3 – 5 ft unless habitat too steep for transects and then habitat is assumed occupied
<i>Schoenocrambe barnebyi</i>	May to early June	5 – 10 ft

<sup>a</sup> Transect widths represent the average distance (width) that can be adequately surveyed per person in each pass through potentially occupied habitat, for purposes of clearance surveys. Some transect widths are expressed as a range (minimum – maximum). The actual transect width used may depend upon site conditions and other factors (timing and purpose of survey); work with the USFWS species lead and the lead action agency (e.g., the permitting or land management agency) as appropriate to determine the widths to be used for any specific survey effort.

<b><i>SPECIES</i></b>	<b><i>SURVEY PERIOD</i></b>	<b><i>TRANSECT WIDTH</i></b> <sup>a</sup>
<i>Schoenocrambe suffrutescens</i>	Mid April – early August	10 ft
<i>Sclerocactus brevispinus</i>	Mid March – June 30	3 – 6 ft
<i>Sclerocactus wrightiae</i>	Mid April – early June	3 – 6 ft
<i>Sclerocactus wetlandicus</i>	Anytime without snow cover	3 – 6 ft
<i>Sphaeralcea gierischii</i>	April to Early June	10 – 20 ft
<i>Spiranthes diluvialis</i>	August	In some areas, habitat restricted to narrow band along water edge, not wide enough for multiple transects; in other habitats (wet meadows) transects up to 6 feet apart may be walked
<i>Townsendia aprica</i>	April – May	3ft
<i>Trifolium friscanum</i>	May - June	10 – 20 ft

<sup>a</sup> Transect widths represent the average distance (width) that can be adequately surveyed per person in each pass through potentially occupied habitat, for purposes of clearance surveys. Some transect widths are expressed as a range (minimum – maximum). The actual transect width used may depend upon site conditions and other factors (timing and purpose of survey); work with the USFWS species lead and the lead action agency (e.g., the permitting or land management agency) as appropriate to determine the widths to be used for any specific survey effort.

## **APPENDIX B.**

### Resources for developing and implementing monitoring programs

The following resources address the many considerations of developing and implementing monitoring programs addressing many issues within the broad arena of natural resource management. As evidenced by their titles, some of these documents specifically address the issue of monitoring target (rare) species, and plant species in particular.

Bureau of Land Management, Measuring and Monitoring Plant Populations.  
Available at <http://www.blm.gov/nstc/library/pdf/MeasAndMon.pdf>.

Elzinga, C.L. et al. 2001. Measuring and Monitoring Plant and Animal Populations. Blackwell Science, Inc. ISBN 0-632-04442-X. 360 pp. Includes appendices.

USFS. Photo point monitoring handbook: part A – field procedures. Gen. Tech. Rep. PNW-GTR-526. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 48 p. 2 parts.

## APPENDIX C.

### EXAMPLE FIELD DATA COLLECTION FORMS

The following examples should help to encourage consistency in observation and reporting among field crews and among survey sites. Deciding which form to use will depend upon the objectives of the survey effort – e.g., clearance surveys or status surveys. Due to the complex and species- or site-specific nature of most monitoring efforts, it is unlikely that any single example will adequately suit the needs of any given monitoring program. Refer to Appendix B for resources to help in the design of monitoring programs, including field data collection forms.

Example 1. The Utah Natural Heritage Program's Plant Survey Form is available at: [http://dwrcdc.nr.utah.gov/ucdc/viewreports/Plant\\_Field\\_Form.pdf](http://dwrcdc.nr.utah.gov/ucdc/viewreports/Plant_Field_Form.pdf).

Example 2. The Bureau of Land Management (BLM; Richfield and Price Field Offices), National Park Service (NPS, Capitol Reef National Park) and the USFWS (Utah Field Office) have formed an Interagency Rare Plant Team to focus on rare plant conservation in central Utah. This team has drafted a form to standardize repeat inventories of rare plants (last version dated March, 2011). This form is not yet available online, but is provided on the following pages.

**REPEAT INVENTORY MONITORING FORM  
(SITE VISIT ACCOUNT (SVA))**

DB# \_\_\_\_\_ entered into database on \_\_\_\_\_ by \_\_\_\_\_

Verified DB on \_\_\_\_\_ by \_\_\_\_\_

New Site? yes no

Entered into GIS on \_\_\_\_\_ by \_\_\_\_\_

Revisit? yes no

Verified GIS on \_\_\_\_\_ by \_\_\_\_\_

If revisit, plants found again? yes no

Photo files renamed on \_\_\_\_\_ by \_\_\_\_\_

Site Name: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Source of lead: \_\_\_\_\_

Species Found: \_\_\_\_\_ Species Code: \_\_\_\_\_

Surveyor(s): \_\_\_\_\_

Quad Name(s): \_\_\_\_\_ State: \_\_\_\_\_ County(ies): \_\_\_\_\_

Township(s): \_\_\_\_\_ Range(s): \_\_\_\_\_ Section(s): \_\_\_\_\_

UTM North: \_\_\_\_\_ UTM East: \_\_\_\_\_ UTM Zone: \_\_\_\_\_ Datum: \_\_\_\_\_

UTM Precision (Circle one): Corrected GPS Field Recorded GPS Determined from map

GPS unit(s) used: \_\_\_\_\_ GPS File Name(s): \_\_\_\_\_

**Site Location/Directions to site:** Start directions from a specific known location and describe in detail the roads, trails, and routes taken to get to general area, then refer to nearby landmarks to concisely describe the site's location. Also describe the location of plants within the site, especially if plants would be difficult for someone not familiar with the site to relocate using only attached maps.

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\_\_\_\_\_  
\_\_\_\_\_

**Written Description** (Describe the site, including such things as vegetation, significant species, aquatic features, notable landforms, natural disturbances, natural hazards, etc):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Transect Width: \_\_\_\_\_

Landowner (Circle one): BLM USFS NPS State of Utah Private Other:

Owner unit (Circle one): CARE Dixie NF Fishlake NF Richfield BLM Price BLM Other:

USFS subunit (Circle one): Beaver RD Escalante RD FillmoreRD Fremont River RD Richfield RD



**Current use of site:**

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**Surrounding land use** (Describe physical structures and land use practices in the surrounding area, such as housing, agricultural, recreational, etc.):

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**HABITAT**

(Circle appropriate categories)

ASPECT		SLOPE (degrees)	LIGHT	TOPOGRAPHIC POSITION	MOISTURE
W	NW	flat	Open	Crest	Inundated (hydric)
E	NE	0-10	Partial	Upper slope	Intermittently flooded
S	SW	10-35	Filtered	Mid-slope	Saturated (wet-mesic)
N	SE	35+	Shade	Lower slope	Moist (mesic)
none		vertical		Bottom	Dry-mesic
multiple				All	Dry (xeric)

**Elevation Range:** \_\_\_\_\_ ft /m to \_\_\_\_\_ ft /m **Elevation at GPS Point:** \_\_\_\_\_ ft /m

**Associated plant community:**

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**Associated plant species (list in order of dominance):**

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**Soil/Geologic Formation:**

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**Full extent of occurrence mapped?** (Circle one):    yes    no

**Estimated # of acres of potential habitat in the immediate area:** \_\_\_\_\_ (check only one category)

< 1 acre	6 – 20 acres	41 – 80 acres	121-160 acres
1 - 5 acres	21- 40 acres	81 – 120 acres	> 160 acres

**BIOLOGY**

<b>PHENOLOGY</b> (must sum to 100%)	<b>POPULATION ESTIMATE</b> (check one)	<b>ACTUAL PLANT COUNT</b>	
%in leaf	1-10	<b>At Site:</b>	
%in bud	11-50		
%in flower	51-100	<b>In Polygon:</b>	
%immature fruit	101-1000		
%mature fruit	1001-10,000	Note: The count within the survey polygon <b>includes</b> the site count.	
%seed dispersing	10,000-50,000		
%dormant	> 50,000		

<b>AGE STRUCTURE</b> (must sum to 100%)	<b>VIGOR</b> (check one)
%seedlings	very feeble
%immature	feeble
%mature	normal
%senescent	vigorous
%unknown	exceptionally vigorous

**Comments on biology:**

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**Evidence of reproduction:** yes no **Explain:** \_\_\_\_\_

**Evidence of disease, predation, etc:** yes no **Explain:** \_\_\_\_\_

**IDENTIFICATION**

**Do other members of the same genus occur at this site? If yes, list species, any hybridization, etc.?**

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**Identification problems? If yes, explain:**

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**Specimen(s) collected?** (Circle one): yes no

**PHOTOGRAPHS**

**Photograph(s) taken?** (Circle one): yes no **Camera(s) used:** \_\_\_\_\_

**Describe photographs** (Use photo #'s. State if it's a close-up or habitat view, direction or bearing faced, etc.):

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**CONSERVATION**

<b>Site Risk Category</b>	<b>Yes</b>
High Risk	
Moderate Risk	
Low Risk	

(see definitions below)

Check the box or boxes that apply as justification for selection of risk category. Write comment in notes section below if further explanation is needed.

<b>High Risk:</b>		<b>Moderate Risk:</b>	<b>Low Risk:</b>
Adjacent to an actively used OHV play area or trail (designated or undesignated)	<b>Within ¼ mile of livestock concentration area:</b> (circle which) *Stockpond or other water source *Corral * Mineral supplements * Livestock trail * High value forage area * Shaded area	More than ¼ mile from livestock concentration area.	Area inaccessible to livestock and OHV's due to topography or geology.
Within ¼ mile of maintained primary road (collection issues)	Currently or recently occupied by livestock	Evidence of past livestock use in the area	Area within protective fencing
Visitor use; Hikers (trampling or collection issues)	Evidence of recent ATV use in the area	Evidence of past ATV use in the area	Lack of vegetation to attract livestock

**Evidence of disturbances** (describe any unnatural on-site disturbances):

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**NUMBER OF SURVEYORS:** \_\_\_\_\_

**SURVEY TIME FOR SITE:** \_\_\_\_\_ hours

**SURVEY TIME FOR ENTIRE SURVEY AREA** (including time at site): \_\_\_\_\_ hours

You **MUST** attach a map showing the site location, the area occupied by the plants (if able to determine this), and the area surveyed. Use some facsimile (copy machine or GIS-generated) of the appropriate portion of the standard USGS topographic quadrangle as your base. The site name, date, species name, and number of plants found should be indicated on the map. You may also draw a sketch of the site on the back of this sheet to show finer detail.