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Appendix B

Seed Collection Protocol for Covered Plant Species

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1.0 Seed Collection General Information

1.1 Access Permits, Vouchers, and Seed Collection Timing

1. Collection teams shall have a copy of all permits and permission letters with them at all times when visiting sites or collecting seeds for this effort. The documents shall include:
 - a) a landowner permission memo or letter,
 - b) MSHCP permit, and
 - c) NDF collection/master permit for each taxon to be collected.

1.2 Focal Species Identification and Vouchers

- d) Focal species (Covered Plant Species and other species targeted for seed collection) shall be identified in the field by persons who are familiar with the identifying characteristics of each taxon and have demonstrated ability to identify each Focal species at different life stages.
- e) Voucher herbarium specimens and digital voucher photos (collectively, vouchers) shall be made.
 - i) A minimum of three digital voucher photos shall be taken to document each taxon, seeds/fruits collected and the habitat where collection is to be made.
 - ii) Voucher herbarium specimens shall be made to document the range of variability of each Focal species at that site.

1.3 Seed Collection Timing

- f) Persons familiar with the identifying characteristics of each Focal species shall make determinations of seed maturity at each collection site.
- g) General collection season suggestions for each Covered Plant Species are provided in Table 1 below. Other Focal species to be included will have overlap in the collection season with the Covered Plant Species targeted for collection.

TABLE 1. COVERED PLANT SPECIES SEED COLLECTION SEASON RECOMMENDATIONS		
Common Name	Scientific Name	Mature Seed Collection Season ¹
sticky ringstem	<i>Anulocaulis leiosolenus</i> var. <i>leiosolenus</i>	August – October
Las Vegas bearpoppy	<i>Arctomecon californica</i>	May – July
threecorner milkvetch	<i>Astragalus geyeri</i> var. <i>triquetrus</i>	June – September
alkali mariposa lily	<i>Calochortus striatus</i>	June – August
Blue Diamond cholla	<i>Cylindropuntia multigeniculata</i>	July – August
silverleaf sunray	<i>Enceliopsis argophylla</i>	June – July
Pahrump Valley buckwheat	<i>Eriogonum bifurcatum</i>	June – August
Las Vegas buckwheat	<i>Eriogonum corymbosum</i> var. <i>nilesii</i>	October – December
white-margined beardtongue	<i>Penstemon albomarginatus</i>	June – July
Parish phacelia	<i>Phacelia parishii</i>	June – July
St. George blue-eyed grass	<i>Sisyrinchium radicum</i>	June – August
Eastern Joshua tree	<i>Yucca jaegeriana</i>	July – September

¹ Specific seed collection timing will depend on locational factors such as elevation, and climactic conditions during the year in which collection takes place.

2.0 Seed and Data Collection

2.1 Seed Collection Methods

1. In Zone A, 100 percent of available mature seed will be collected during seed collection efforts from all Covered Plant species found on lands accessible to the DCP that may be disturbed by Covered Activities during construction. For private property, the DCP will be notified of planned disturbance upon submittal of project plans to a Permittee for review and approval.
2. In Zone B, 50 percent of available mature seed will be collected within the disposal boundary, except for Eastern Joshua tree and Blue Diamond cholla for which 100 percent of mature available seed will be collected, as practicable.
 - a) For private property in Zone B, if a project is proposed in areas likely to support occurrences of Covered Plant Species based on the species accounts and habitat models, the DCP will request landowner permission to access the property for seed collection prior to disturbance.
 - b) For lands within a proposed disposal boundary, the DCP will coordinate with BLM to require seed collection before parcels go to auction for BLM disposal. Surveys will be conducted to confirm presence of Covered Plant Species prior to seed collection, and the surveys will provide updated information on Covered Plant Species locations and recommended timing for seed collection. If seed collection is completed prior to transfer of disposal lands to private landowners, no further seed collection is required prior to disturbance. If seed collection is not completed prior to transfer to private land ownership, 2.1.2.a will be followed.
 - c) In collaboration with regional seed collection programs such as the U.S. Fish and Wildlife Service's proposed "Promoting Native Plants for Restoration, Landscaping, and Water Conservation" program, additional seeds of native plant species beyond the targeted Covered Plant Species may be collected. Additional Focal species and percentage seed to be collected will be coordinated with the regional program lead. Seeds of additional native plant species may also be collected if native seed stocks for MSHCP Amendment restoration projects need to be augmented. In these instances, Focal species and percentage seed to be collected will be based on MSHCP Amendment restoration project needs.
3. All plants shall be examined in the field for seed maturity prior to seed collection, and only mature seeds will be collected.
 - a) Prior to fruit maturation, cloth bags may be placed around ripening fruits of Las Vegas bearpoppy, threecorner milkvetch, and white-margined beardtongue taxa to capture the maximum number of seeds as the fruits naturally dry and split open.
 - b) Paper bags or envelopes shall be used to collect seeds of all species in the field. Seams at the bottom of paper bags or envelopes shall be taped to ensure that small seeds do not fall out. Large collections can be made using plastic buckets and then transferred into cloth or paper bags.
 - c) Efforts shall be made to minimize excess plant material (chaff) collected with seed.
 - d) Seeds collected at a single location for a single taxon shall be bagged together.
 - e) It is assumed all collection will be conducted by hand because of the limited species to be collected. However, if based on the scale of seed collection at a site and other methods are

recommended for collection, the DCP will coordinate with U.S. Fish and Wildlife Service for approval of alternate collection methods for Covered Plant Species or the regional seed collection program lead for other Focal species.

2.2 Data Collection

1. During seed collection, data about each collection of seed shall be recorded on data sheets or in a digital data logger form.
 - a) Separate data sheets or forms shall be completed for each taxon collected at each locality (see Attachment 1).
 - b) Data recorded shall include the date and location of the area where collection is made, collector name(s), description of the microhabitat where the taxon was found, voucher photos and voucher herbarium specimens collected, and approximate number of plants from which the seeds were collected.
 - c) Notes shall be made if there is any indication that the occurrence may be non-natural and the result of human actions (i.e., plants growing on spoil piles or in gravel that appears to have been transported to the site).
 - d) Data sheets or forms shall note that the collected seeds are the property of the Desert Conservation Program (DCP).

3.0 Collection Treatment and Storage

3.1 Post Collection Treatment of Seed, Vouchers and Data

1. Collected seed, data, and vouchers shall be transported to and stored at the Las Vegas Springs Preserve horticultural laboratory or equivalent seed cleaning and storage facility.
 - a) Seeds
 - i) Collected seed materials shall be initially stored in an area with moderate temperatures and low relative humidity with good air circulation prior to seed cleaning. Do not freeze seeds.
 - ii) Collected seed materials shall be cleaned to remove excess chaff and other materials prior to long term storage.
 - iii) Cleaned seeds shall be placed in woven PVC, polyethylene (such as Tyvek®), or nylon packets, or equivalent.
 - iv) Seed packets shall be cataloged and stored inside of a rodent and insect-resistant container.
 - v) If seeds need to be shipped for cleaning or storage, protocols from the Bureau of Land Management Seeds of Success program will be followed.
 - b) Vouchers
 - i) Voucher photos shall be stored and labeled by taxon, date and collection location, or by collection ascension number as appropriate.
 - ii) Voucher herbarium specimens shall be pressed and mounted on herbarium sheets for all collections made and deposited in the Wesley Niles Herbarium at University of Nevada Las Vegas (or equivalent facility).

- iii) Voucher photos and lists of prepared and deposited voucher herbarium specimens will be provided to the DCP with periodic reports.
- c) Data
- i) Collection field data sheets shall be transcribed or digital data forms will be uploaded into a seed collection database and the originals stored as a backup.
 - ii) Periodic reports on the disposition of collected and stored seeds shall be provided to the DCP by the seed storage facility, and these reports will be available from the DCP for inspection upon request.

4.0 Allowable Uses of Collected Seed

Seeds will be stored as described above and available for regional use in restoration, propagation, and research. Use of the seeds will not be exclusive for MSHCP Amendment projects. The seeds collected as part of the MSHCP Amendment will help supply regional programs and seed banks with a locally and regionally appropriate seed source. MSHCP Amendment restoration projects will obtain seed from the same regional storage facility or program or other appropriate native seed source programs or businesses.

A portion of seeds collected from Zones A and B (no greater than 20%) will also be offered to international and national seed banks that seek to preserve the genetic diversity of native species. Several of these seed banks allow the donor to withdraw seeds if requested. These include member institutions of the Center for Plant Conservation; the U.S. Department of Agriculture, Fort Collins National Center for Genetic Resources Preservation and their National Collection of Endangered Plants; the Royal Botanic Gardens, Kew Millennium Seed Bank or equivalent.

Attachment 1. Covered Plant Species Seed Collection Data From

PRE-COLLECTION CHECKLIST

This section is for your reference only and not required as part of the data collected by the Desert Conservation Program for the Clark County Multiple Species Habitat Conservation Program. The conditions indicated in **boldface** describe ideal population size and seed dispersal stage for seed collecting.

Assess Population & Seed Dispersal Stage				
Approximate area of population:	(feet, yards, miles.....)			
Approximate total number of individual plants present and accessible:	0-50	50-500	500-5000	> 5000
Evidence of disturbance or damage:	<i>Resown</i>	<i>Burnt</i>	<i>Sprayed</i>	No damage
Readiness of population for seed collection: give percentages or circle the most frequently occurring:				
	<i>Vegetative</i>	<i>In flower</i>	<i>Immature seeds</i>	Around natural dispersal
				<i>Post dispersal</i>
Estimate the number of individual plants at natural dispersal stage:	<50	>50		
Is the population:				
	<u>A single population</u>	<i>A population with distinct sub-populations (Can you sample separately or from the most suitable?)</i>		
Assess Seed Quality & Availability				
On a typical individual, where on the plant/branch/fruit is the seed at natural dispersal stage:	Recognized			
Using a cut test on the seeds at this stage, give percentages or circle the most frequently occurring:				
	Healthy	<i>Insect-damaged</i>	<i>Empty</i>	<i>Moldy</i>
				<i>Malformed/other damage</i>
Estimate the number of healthy seeds per fruit:				
Estimate the number of fruits per individual plant:				

Data Collection form on the following pages.

Date(s) collected:		Collector name(s):	
		Collection number:	
LOCATION DATA			
State:		Land owner:	<i>BLM Private Other</i>
County:		Non-BLM permission filed:	
Location details:			
GPS type:			
Spatial data Info (coordinates, polygon name, file type, etc.):			
COLLECTION DATA			
Family:		No. of plants sampled (estimate):	
Genus:		No. of plants found (estimate):	
Species:		Area sampled (acres):	
Subspecies/Variety:		Seeds collected from:	<i>Plants Ground Both Unknown</i>
Common name:			
Growth form:	<i>Tree Annual Herb Perennial Herb Succulent or Cactus</i>		
Field notes to assist in identification of pressed specimen (e.g. flower color):			
Seed storage location:			
LOCATION DATA			
State:			
County:			
Land owner:	<i>BLM Private Other</i>	Non-BLM permission filed:	<i>Y N</i>
Location details:			
HABITAT DATA			
Associated species:			
Microhabitat description:			
Modifying factors:	<i>Mowed Burned Grazed Flooded Seeded Trampled Other:</i>		

Evidence of Non-natural Population? (i.e. plants growing on spoil piles, or transported material):			
Land form:		Slope (degrees):	
Land use:		Aspect:	<i>N NE E SE S SW W NW</i>
<u>HERBARIUM AND PHOTO VOUCHERS</u>			
Number of photo vouchers:		Photo numbers:	
Number of pressed specimens:		Voucher ID numbers:	
Receiving Herbaria Names:			
<u>SPECIALIST IDENTIFICATION</u>			
Identified by (include name, organizational affiliation):			
<u>Note: Collected seeds are the property of the Desert Conservation Program</u>			

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