



# CONCHAS DAM

## Vegetation Inventory & Monitoring

U.S. Army Corps of Engineers

Albuquerque District

2023

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## Project Overview

The Conchas Dam Vegetation Management Plan project was funded in FY2023 as a SWNCP (Specific Work Not Commonly Performed) project through the Natural Resource Management (NRM) Program. The intent of this project was to develop a comprehensive vegetation management plan for the general management of vegetation relating to invasive plants, hazardous trees, native shrub and grasslands, and fire management in the various compartments contained within the Conchas Dam Fee Use Boundary. The Vegetation Management Plan includes guidance on implementing restoration activities relating to invasive plant management such as the detection, prevention, control, and eradication of New Mexico state-listed noxious weed species at Conchas Dam in addition to the restoration/reclamation of native habitat.

One component of the Conchas Dam Vegetation Management Plan was to identify and describe current plant community characteristics. In order to accomplish this, baseline data collection, vegetation inventories and surveys as well as GIS mapping was conducted. This Inventory and Monitoring Report describes the details of the methodology used and summarizes the results of our findings to include variables of plant species inventory, community structure, population diversity, and other habitat characteristics.

## Monitoring Objectives

Management objectives within Conchas Fee Lands will vary by Land Use and current habitat condition. The objectives of this inventory and monitoring effort were to collect baseline data from healthy habitats which are native and relatively undisturbed. These areas will serve as reference sites for restoration areas and will also serve as baseline data for future monitoring to be analyzed against in order to capture long term changes. The monitoring data collected will be used to:

- Establish reference state current condition.
- Evaluate the effects of current management.
- Detect change and identify trends that can be used to inform management practices via the science-based adaptive management approach.
- Learn how various factors may impact natural habitats.

## Data Collection Methodology

### Spatial Mapping

- Land Use from Conchas Master Plan 2022
- Natural Resource Level I Inventory - Vegetation Classifications
- Higher Resolution Vegetation Classifications based on plant associations/alliances described in NatureServe.
- **Invasive Plant Delineations:** Saltcedar and other invasive species populations are mapped by age/size class with reference to density/cover, live/dead status, and native plant community composition & %Cover. Plant community characteristics are documented for each polygon mapped as follows:

**Table 1.** Field Maps App geospatial data collection (mapping) should be set up following this table to create drop down menus as described.

Polygon ID	Species ID	Live/Dead Status	Age	Height	% Cover (Relative to entire polygon)	Native Plant Species Cover & Composition
			<1" DRC - Seedling	<2'		
			L	1-6" DRC - Sapling		
			D	>6" DRC - Old Growth		
Auto-generated	Choose code from plant list	Drop-down menu	Drop-down menu (3 options as listed above)	Drop-down menu (3 options as listed above)	Alpha numeric comment field	Alpha numeric comment field

## Permanent Quantitative Monitoring Plots

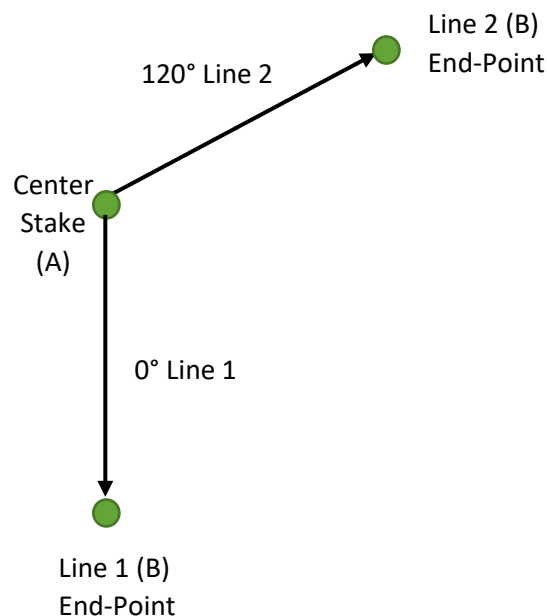
### Line-Point Intercept

Line-point intercept is a rapid, accurate methodology for quantifying vegetation cover as well as soil cover, litter, rocks and biotic crusts. The methodology used for this data collection effort was adopted from Herrick et. al. Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems Volume II – Long-Term Methods: Line-point Intercept (Appendix 3). This data was collected digitally using Survey 123 and entered into the S123 survey titled “Vegetation Line-Point Intercept Survey.”

Photographs were taken at the start and at the endpoints of each transect line to allow for direct non-quantitative comparison of change over time. Methodology for photo monitoring is also adopted from Herrick et. al. Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems Volume II.

### Plot Configuration

Each monitoring plot consists of two 50-meter (m) transects. For each transect, a 50-m tape was stretched between two permanent stakes marking the start and end points for the transect. The two transect lines run in a “V” shape relative to each other at an Azimuth of 0° and 120°. Adjustments to these azimuths may have been made in the field, final azimuth placements were documented for each plot and transect line. Data was recorded at each meter for a total of 50 data points per transect line and 100 data points per plot.



## Plant Identification

To save time in the field, plant photos and collections were made and saved for post-field identification. When collecting specimens of unknown species for future identification, a sample of the plant was collected from an area away from the transect line. Plants along the transect line should never be collected, in order to maintain line vegetation integrity for future monitoring. Care must be taken to collect the best specimen possible, including flowering parts, leaves, and roots. The specimen should be carefully wrapped in paper with proper labeling and placed in a plant press. The paper containing the specimen should be labeled with the plant's corresponding code, date, site, transect line, point, and later with its correct identification.

## Transect Belt Survey

In addition to the 50 data points collected along each transect, a list of ALL species observed on each transect within a 1-m belt centered on the tape was recorded (i.e. within a half meter of either side of the tape). This data was entered into the Survey 123 using the survey titled "Vegetation Transect Belt Survey"

## Monitoring Plot Stratification

Data Collection plots were stratified by Land Use Classification as defined in the 2022 Conchas Master Plan. Plot locations within each Land Use Classification were further stratified by vegetation classification as defined the Conchas Dam Natural Resource Level 1 Inventory and plotted randomly. The objective of plot locations is to capture healthy habitat which is native and undisturbed. These will serve as reference sites for restoration areas and will also serve as baseline data for future monitoring to be analyzed against in order to capture long term changes.

## SITE SELECTION

A *stratified random plot selection* approach is used where the number of plots in each type of monitoring unit is predetermined but plot locations within each type of monitoring unit is randomly selected. A suite of 10 random GPS points were autogenerated for each Land Use Classification polygon. Each point was visited in the field and assessed against the following rejection criteria.

**Rejection Criteria** exclude areas that are anomalous as follows:

- Unusually high level of disturbance
- Plots must be located a minimum of 100 meters from a road, trail, two-track, or other highly disturbed area containing unnatural bare ground exposure.
- Avoid rock outcrops or slopes greater than 50 percent.
- Avoid areas that receive unusual amounts of water runoff.
- Avoid transition zones where plant community characteristics are not representative of the specified stratification by Vegetation Classification Type.

## MONITORING PLOT STRATIFICATION

Table2. Monitoring Plot Stratification and Veg Classifications

LAND USE	NR LEVEL 1 - VEG CLASS	<b>*Updated VEG CLASS</b>	Micro Habitat	NUMBER OF PLOTS	General Location	Plot Name
High Density Recreation	Temperate & Boreal Shrubland & Grassland		Rocky Outcrop Juniper Stands	0		
	Temperate Forest/wet.salt Meadow		Shoreline fluctuations	1	Central	CN04
Low Density Recreation	Temperate & Boreal Shrubland & Grassland		Rocky Outcrop Juniper shrubland	1	Southside	CN06
	Temperate Forest		Saltcedar will be mapped	0		
Project Operations	Temperate & Boreal Shrubland & Grassland		Saltcedar stand/dry shrub and grassland	1	Embankment tow drain	CN05
	Warm Semi-Desert Scrub & Grassland		Unidentified veg class	1	Dam Operations, east of emergency spillway	CN01
	Riparian		Perennial wet marsh	1	Stilling Basin	CN03 - cancelled
Environmentally Sensitive Area	Temperate & Boreal Shrubland & Grassland			0		
	Warm Semi-Desert Scrub & Grassland		Dry shrub and grassland		Boy scouts area, Southern Mesa Top	CN02; CN09
Wildlife Management Area	Temperate & Boreal Shrubland & Grassland		Grassland	0		
	Cool Semi-Desert Scrub & Grassland			0		
	Warm Semi-Desert Scrub & Grassland		Shrub and grassland	2	Saddle Dam Area	CN07, CN08

*\*Vegetation Classification Update: based on data collection and NatureServe*



Table 3. Permanent Monitoring Plot Site List

OID	d_PlotID	d_PointID	d_Habitat	Habitat_other	General_comment	UTM_northing	UTM_easting	Date
1	CN01	1B	Upland Grassland		Mesquite and grass. azimuth 60 degrees no	3919739.126	574026.816	6/1/2023 20:45
2	CN01	Center	Upland Grassland		Mesquite and grass	3919714.474	573981.3922	6/1/2023 20:47
3	CN01	2B	Upland Grassland		azimuth 300 no	3919740.621	573942.5892	6/1/2023 20:44
4	CN02	1B	Other	rocky outcrop juniper shrubland	azimuth 210 no declination	3919095.403	572793.7433	6/1/2023 22:26
5	CN02	Center	Other	rocky outcrop juniper shrubland		3919134.994	572824.6618	6/1/2023 22:50
6	CN02	2B	Other	rocky outcrop juniper shrubland	azimuth 90 no declination	3919130.001	572874.8799	6/1/2023 22:53
7	CN03	1B	Lowland Native- Introduced Tamarisk Riparian Scrub		azimuth 230 no declination	3918075.313	573692.1671	6/2/2023 15:18
8	CN03	Center	Lowland Native- Introduced Tamarisk Riparian Scrub			3918101.418	573738.3116	6/2/2023 15:21
9	CN03	2B	Lowland Native- Introduced Tamarisk Riparian Scrub		Azimuth 30 no declination	3918134.981	573766.0281	6/2/2023 15:35
10	CN04	1B	Riparian Bare Ground/Rockland [non-channel]		azimuth 110 declination zero	3917194.555	573862.2111	6/2/2023 17:13
11	CN04	Center	Riparian Bare Ground/Rockland [non-channel]			3917218.13	573818.8387	6/2/2023 17:15
12	CN04	2B	Riparian Bare Ground/Rockland [non-channel]		azimuth 220 zero declination	3917179.559	573786.5226	6/2/2023 17:22
13	CN05	1B	Lowland Native- Introduced Tamarisk Riparian Scrub		azimuth 10 declination zero	3916482.219	574386.5419	6/2/2023 18:10
14	CN05	Center	Lowland Native- Introduced Tamarisk Riparian Scrub			3916439.12	574372.9491	6/2/2023 18:12
15	CN05	2B	Lowland Native- Introduced Tamarisk Riparian Scrub		azimuth 130 no declination	3916400.357	574406.0074	6/2/2023 18:17
16	CN05	Center	Lowland Native- Introduced Tamarisk Riparian Scrub			3916435.42	574368.5671	6/2/2023 18:18
17	CN06	1B	Upland Forest and Woodland		azimuth 210 declination zero	3915402.449	573596.3255	6/2/2023 18:50
18	CN06	Center	Upland Forest and Woodland			3915445.638	573621.2018	6/2/2023 19:00
19	CN06	2B	Upland Forest and Woodland		azimuth 330 declination zero	3915482.684	573600.7584	6/2/2023 18:57
20	CN07	1B	Other	flat grass and shrubland	azimuth 70 declination zero	3913294.31	571733.1037	6/2/2023 20:22
21	CN07	Center	Other	flat grass and shrubland		3913283.79	571685.5974	6/2/2023 20:30
22	CN07	2B	Other	flat grass and shrubland	azimuth 190 zero declination	3913233.446	571672.0866	6/2/2023 20:29
23	CN08	1B	Other	shrub and grassland	azimuth 120 zero declination	3912181.564	571156.5366	6/2/2023 20:56
24	CN08	Center	Other	shrub and grassland		3912204.809	571114.1152	6/2/2023 21:05
25	CN08	2B	Other	shrub and grassland	azimuth 240 zero declination	3912178.964	571069.1998	6/2/2023 21:03
26	CN09	Center	Other	juniper open woodland		3914210.371	571932.117	8/2/2023 17:18
27	CN09	2B	Other	juniper	center to end 80°	3914219.967	571980.826	8/2/2023 17:30
28	CN09	1B	Other	juniper	center to end 315°	3914238.43	571890.284	8/2/2023 17:29

Monitoring Plot Locations

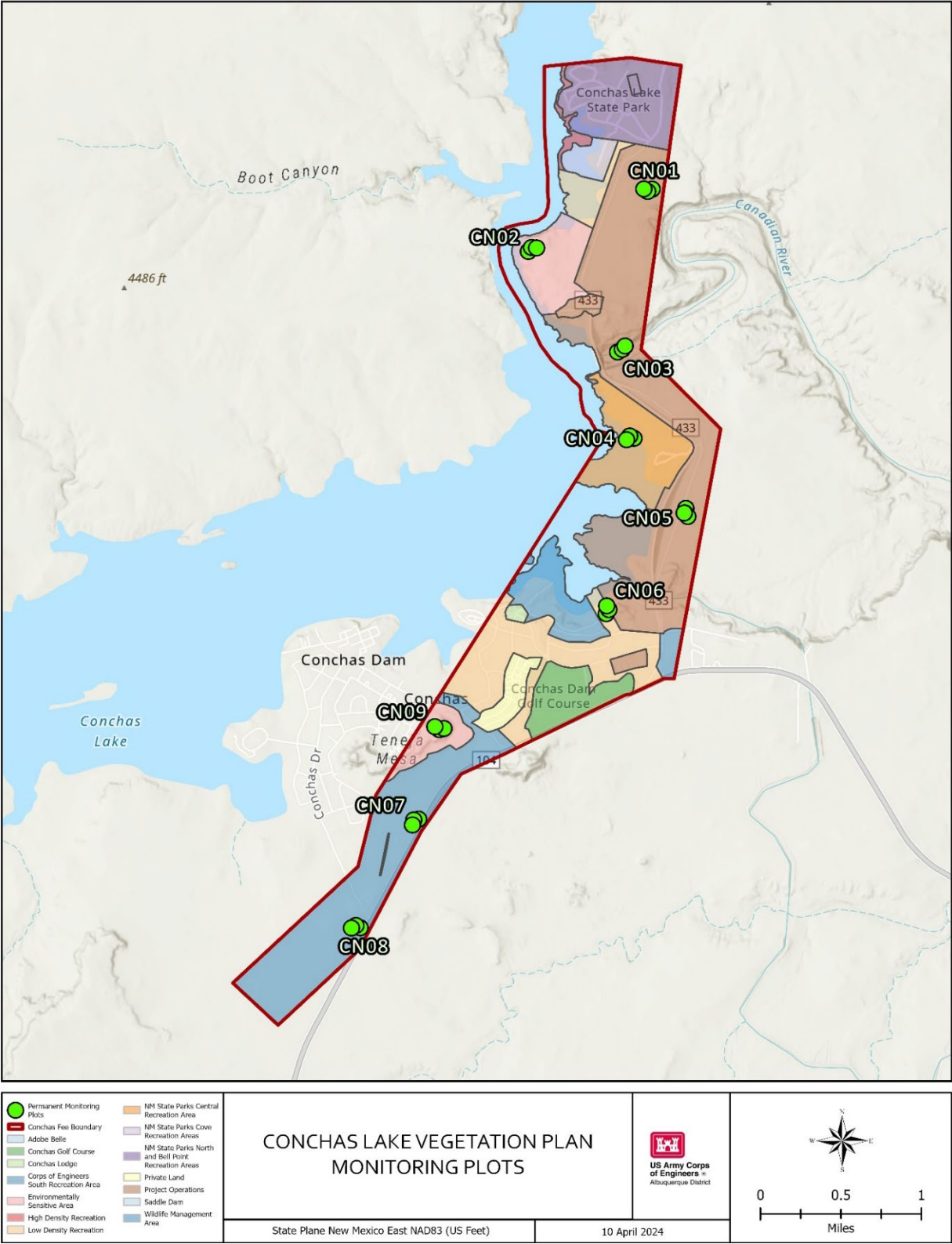


Figure 1. Map of Permanent Monitoring Plot Locations



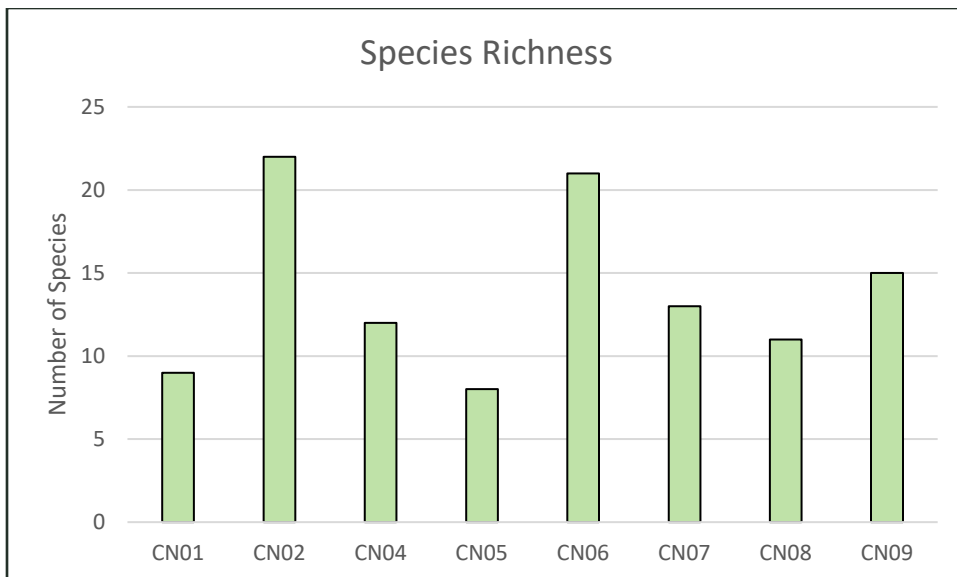
## Data Summary by Plot

### DATA SUMMARY FIGURES & CHARTS

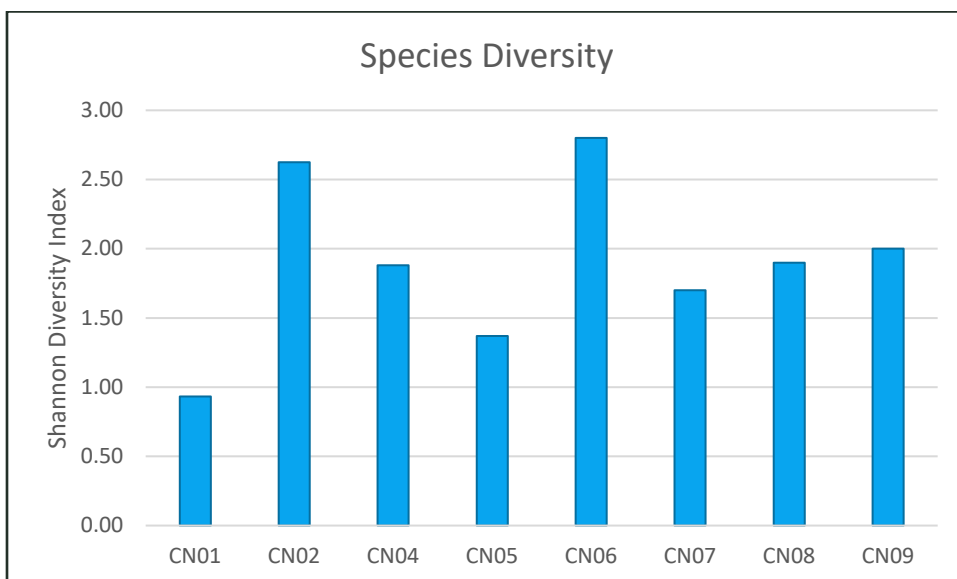
- Comprehensive Summaries for Site Comparisons
  - Species Richness
  - Species Diversity (Shannon Diversity Index)
  - Total Percent Canopy Cover
  - Percent Canopy Cover by Nativity
  - Abundance by Functional Group
- FOR EACH SITE
  - Species Lists
  - Species Abundances
  - Percent Cover by Functional Group
  - Percent cover by Nativity

**Table 4. Comprehensive Summary of Plant Community Characteristics by Site**

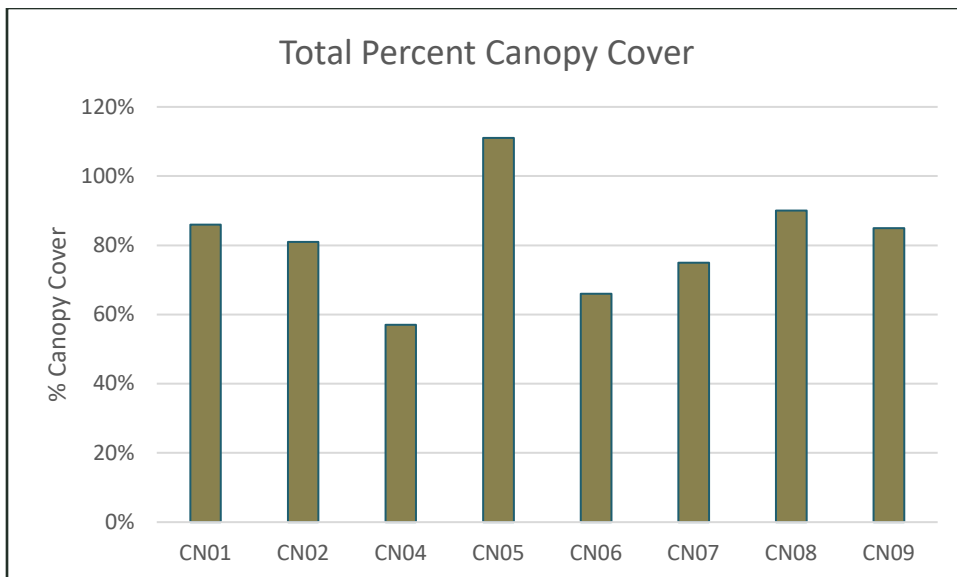
<i>Site</i>	CN01	CN02	CN04	CN05	CN06	CN07	CN08	CN09
<b><i>Species Richness</i></b>	9	22	12	8	21	13	11	15
<b><i>Species Diversity</i></b>	0.93	2.62	1.88	1.37	2.8	1.7	1.9	2
<b><i>Percent Canopy Cover</i></b>	86%	81%	57%	111%	66%	75%	90%	85%
<b><i>Percent Introduced Plant Cover</i></b>	0%	0%	27%	9%	3%	0%	1%	0%
<b><i>Land Use Classification</i></b>	Project Operations	Env. Sensitive Area	High Density Recreation	Project Operations	Low Density Recreation	Wildlife Management Area	Wildlife Management Area	Env. Sensitive Area
<b><i>Vegetation Association</i></b>	Warm Semi-Desert Scrub & Grassland	Warm Semi-Desert Scrub & Grassland	Temperate Forest/wet.salt Meadow	Temperate & Boreal Shrubland & Grassland	Temperate & Boreal Shrubland & Grassland	Warm Semi-Desert Scrub & Grassland	Warm Semi-Desert Scrub & Grassland	Warm Semi-Desert Scrub & Grassland



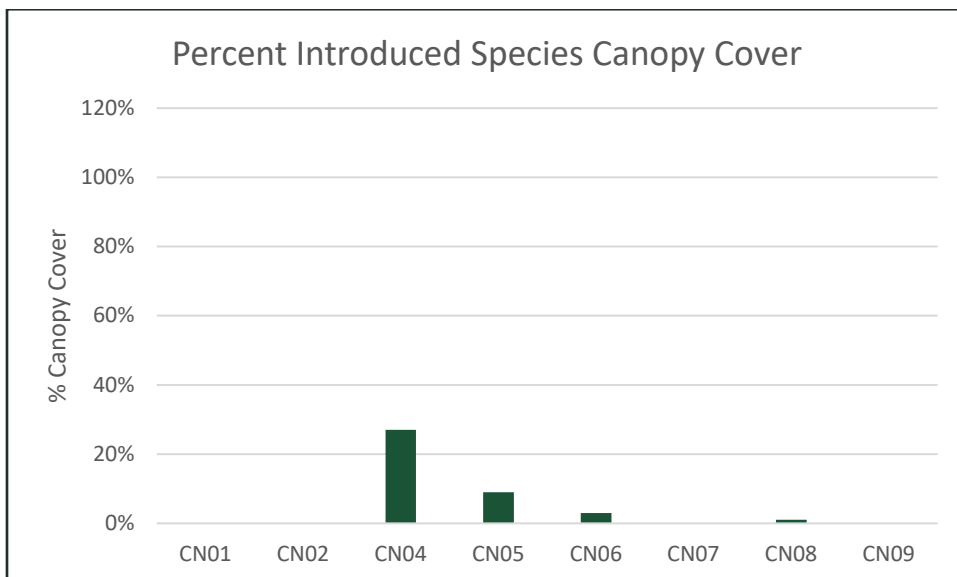
**Figure 2. Number of distinct species encountered at each Site.**



**Figure 3. Species Diversity per Site.**



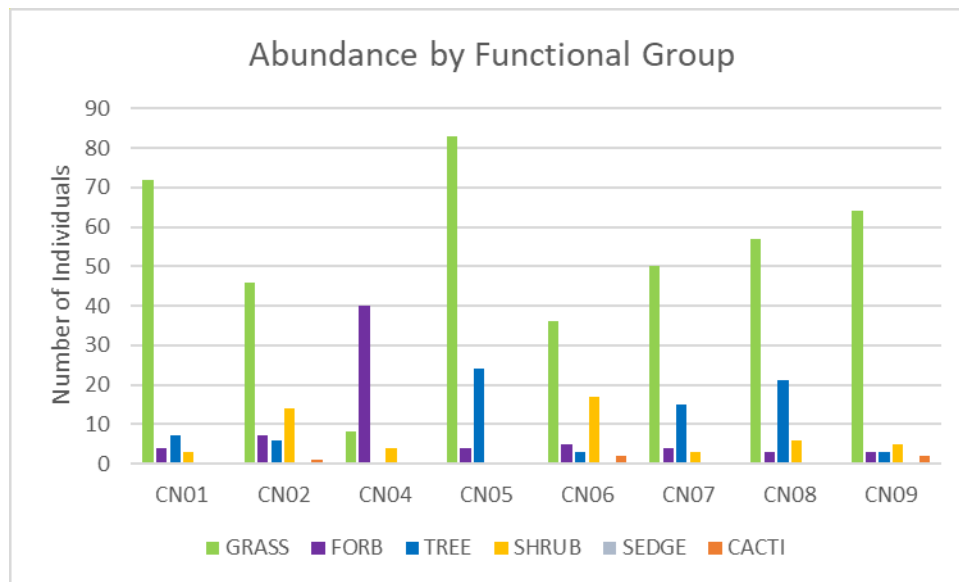
**Figure 4. Total percent canopy cover per Site.**



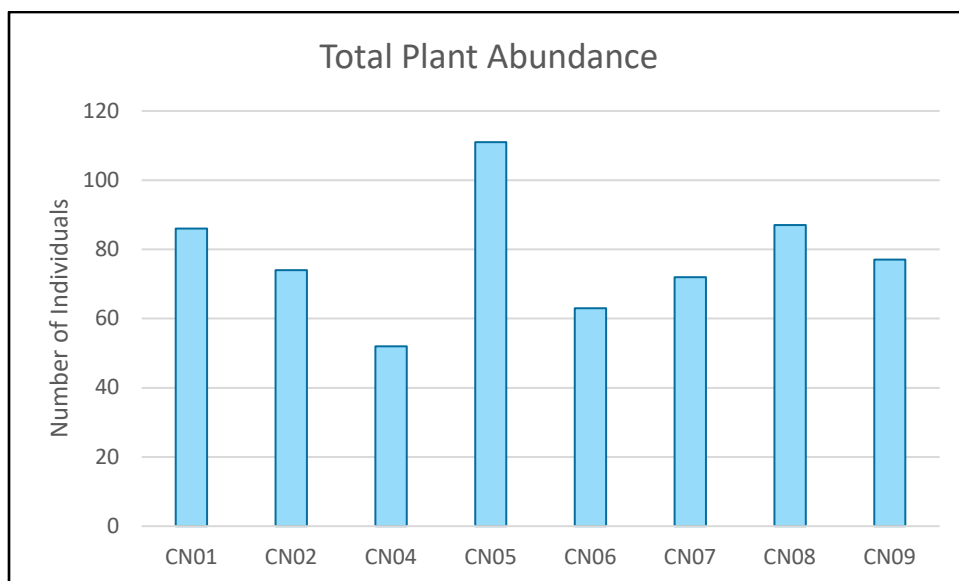
**Figure 5. Total percent introduced species canopy cover per Site.**

**TABLE 5. Summary of total plant individuals by functional group per Site.**

<i>Functional Group</i>	CN01	CN02	CN04	CN05	CN06	CN07	CN08	CN09
<i>GRASS</i>	72	46	8	83	36	50	57	64
<i>FORB</i>	4	7	40	4	5	4	3	3
<i>TREE</i>	7	6	0	24	3	15	21	3
<i>SHRUB</i>	3	14	4	0	17	3	6	5
<i>SEDGE</i>	0	0	0	0	0	0	0	0
<i>CACTI</i>	0	1	0	0	2	0	0	2
<b>Abundance TOTAL</b>	<b>86</b>	<b>74</b>	<b>52</b>	<b>111</b>	<b>63</b>	<b>72</b>	<b>87</b>	<b>77</b>



**Figure 6. Total individual plant counts distributed by Functional Group per Site.**



**Figure 7. Total individual plant counts per Site.**