

# Vegetation Sampling of USACE Forest Restoration Sites in Corrales

Year I

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Data Report to Hawks Aloft Inc.

2007

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# **Vegetation Sampling of USACE Forest Restoration Sites in Corrales, Year I <sup>1</sup>**

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## **Introduction**

The Village of Corrales is currently performing selective removal of exotic vegetation from limited areas within the Corrales Bosque Preserve with the assistance of the Albuquerque District of the U.S. Army Corps of Engineers (Corps). These removals began in the spring of 2006 and will continue into 2007. The purpose of these removals is to reduce fire danger and prevent exotic vegetation from overtaking the Bosque, while still retaining wildlife habitat and the recreational value of the Bosque. In keeping with this goal, Hawks Aloft, Inc. (HAI) has been contracted to conduct monitoring of avian use and habitat in the removal sites. This monitoring commenced in the fall of 2006 prior to removal of vegetation and is continuing post-vegetation-removal in 2007. Concurrent vegetation sampling was required to determine existing vegetation composition and structure in the context of bird habitat, and to monitor changes and success resulting from exotic vegetation removals. HAI contracted with Natural Heritage New Mexico, UNM, to perform these vegetation measurements. Vegetation sampling along the HAI transects was performed by NHNM in the fall of 2006. The objective of this vegetation sampling was to provide information on current riparian vegetation characteristics for analysis of ecosystem change, impact assessment, and to aid in assessment of the restoration. This report provides the sampling methods and data collection locations which accompany the 2006 dataset.

## **Methods**

To enable comparisons with similar datasets the vegetation monitoring follows methodologies used by HAI and NHNM on other Corps sponsored monitoring transects in the Middle Rio Grande Bosque. These methodologies are based on those used by Hink and Ohmart in 1984<sup>3</sup> (hereafter referred to as H&O), with some modifications made to enhance future repeatability of data collection.

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<sup>1</sup> Work submitted in fulfillment of Purchase order #10302006-NH between the University of New Mexico and Hawks Aloft Inc.

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<sup>3</sup> Hink, V.C., and R.D. Ohmart. 1984. Middle Rio Grande Biological Survey. Prepared for U.S. Army Corps of Engineers, Albuquerque, NM. (Contract No. DACW47-81-C-0015).

## Transect Set Up

In August 2006 HAI established three H&O style transects for avian surveys (not including the drain transects) within the study area in the north Corrales Bosque. NHNM followed with vegetation sampling of these transects in October 2006 (Table 1). Start and end points of the transects were based on GPS locations provided by HAI. At each site, 2500-foot vegetation transects were established in straight lines with only slight changes in angle at the 500-foot points as necessary to ensure closure on the end point (transect placement was first designed in a GIS using the coordinates provided by HAI). However, in the case of transect NW28, where shrubs were very dense, the existing bird survey path was followed rather than cutting a new straight-line path through the vegetation. The downstream, southern end of each line was designated as the “0” end. Beginning with the 0 end, metal-tagged rebar pegs were placed every 250 feet extending two inches above ground (unless they were close to a trail, in which case they were flush with the ground with only the tag above). There are a total of 11 rebar per line. A GPS point was taken at every rebar with a hand-held Garmin receiver with an accuracy of  $\pm 10$  meters. An overview of the basic transect layout is shown in Figure 2. Four photographs were taken at each transect: one from each end down the line, and two from the center towards each end. Exact locations for the photographs were determined by visibility along the transect line, and recorded.

## Tree-Count Quadrats

Along the main vegetation transect line, trees and shrubs were counted in 100 x 50-foot quadrats starting at “0” and alternating right, then left down transect until the end or the 2500 foot mark for a total of 25 quadrats (e.g. 0-100 right, 100-200 left, 200-300 right, etc.). One-sided transects, along levees, were read consecutively on the survey side. Data from each tree quadrat was recorded separately. The tree quadrat lines were set using a 90-degree angle from the main line and 50-foot tapes.

All individual trees and shrubs over two feet tall were counted by species within diameter root crown (DRC) size classes of <2 inches, 2-6 inches, 6-12 inches, 12-18 inches, and >18 inches. Diameters greater than 18 inches were individually measured to the nearest inch. Boles that emerged separately from the ground (not touching) counted as separate individuals except for multi-stem shrub species such as saltcedar (*Tamarix ramosissima*), New Mexico olive (*Forestiera pubescens* var. *pubescens*), seepwillow (*Baccharis salicina*), coyote willow (*Salix exigua*), golden currant (*Ribes aureum*), southern jimmyweed (*Isocoma pluriflora*), rubber rabbitbush (*Chrysothamnus nauseosus*), and snakeweed (*Gutierrezia sarothrae*). Following the H&O methodology, shrubs had to be four feet apart to count as separate individuals, and in very dense stands each 4 x 4-foot square was considered to represent one individual. For saltcedar and New Mexico olive, individual stems greater than two inches DRC were still recorded. Height classes were 2-10 feet and >10 feet. Morphological condition categories included live, snag, resprout, and stump.

Table 1. Transects surveyed in 2006, with NHHM PlotID, Hawks Aloft, Inc. transect name, date survey initiated, general location and UTM coordinates for center point.

NMNH PlotID	Hawks Aloft Name	Date Read*	General Location	Easting**	Northing	One-sided
06CE022	NW26	20-Oct-06	Corrales Bosque N	354588	3904613	yes
06CE023	NW28	23-Oct-06	Corrales Bosque N	354738	3903220	no
06CE024	NW24	26-Oct-06	Corrales Bosque N	354654	3903345	yes

\*Date Read - date transects survey was begun. Some transects required more than one day to survey

\*\* UTM Nad27, Zone 13

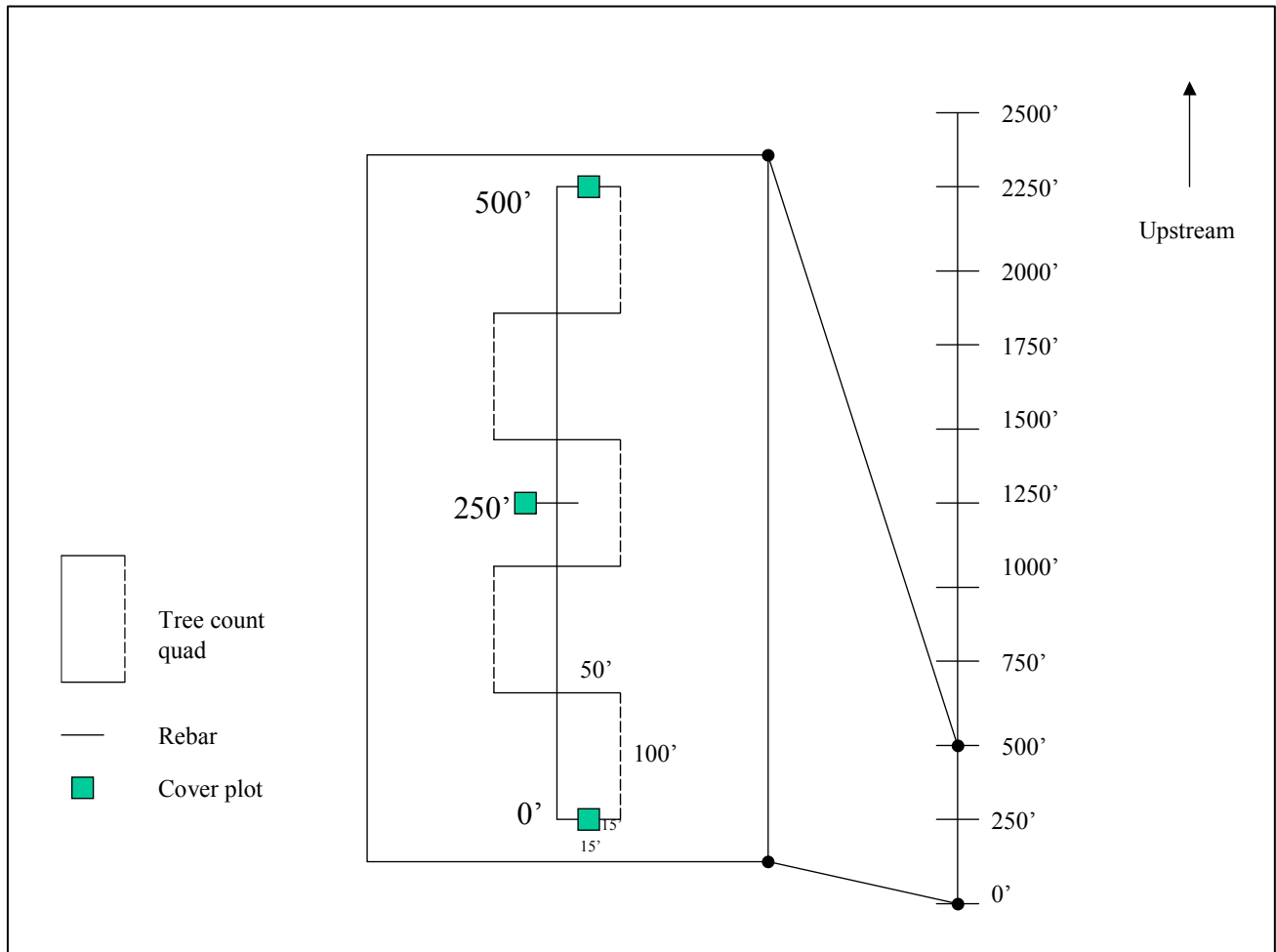


Figure 1. Overview of standard transect layout.

## Vegetation-Cover Quadrats

The original H&O methodology called for the placement of a pair of vegetation cover plots 50 feet apart from each other at 500-foot intervals along the transect. Hence, the two plots tended to be highly spatially auto-correlated. To overcome this, we modified the design to place a single cover plot at every 250-foot rebar along the transect from the 0-foot rebar to the 2250-foot rebar. This allowed for a more random and representative sample of the entire transect, while the total number of plots remained the same at 10 per transect. Plots were placed alternating right and then left down the line, so that the number of plots to either side of the line also remained the same, excepting one-sided lines where all plots were placed to the same side. The vegetation cover plots were 15 x 15 feet square; with their center placed 25 feet from the main vegetation transect line. The plot locations were measured out from the main line with a tape, and pin flags were used to delineate the corners of the plot.

Canopy cover was measured by species in three layers: 0-2 feet, 2-15 feet and >15 feet. Total species canopy cover was given for the layer in which that species was most prominent. For example, with a tall annual forb such as the common sunflower (*Helianthus annuus*), where the majority of sunflower cover for a given plot was over two feet, all sunflower cover for that plot was given in the 2-15-foot category. Cover for woody species over 15 feet was measured in two ways. The first was from the original H&O methodology, using a spherical densiometer, and taking measurements in four cardinal directions from the center of each plot. However, the spherical densiometer only provides an overall cover for a plot, and not an estimate by species. Thus, an ocular estimate of cover for each species over 15 feet was also estimated in each direction for each plot. The spherical densiometer also estimates cover on a distance greater than the bounds of a 15 x 15-foot plot, so the two measurements of cover are often not congruent.

To evaluate overall diversity, besides recording all species and their cover values within the vegetation cover plots, a species list for the entire vegetation transect line was compiled to account for the presence of rarer species. Across the three transects surveyed in 2006 a total of 70 species were observed: 7 tree species, 12 shrubs, 18 graminoids and 32 forbs (Appendix A). Voucher specimens will be deposited at the University of New Mexico Herbarium.

## Database

Natural Heritage New Mexico created and populated a Microsoft Access database for all of the data collected. The database has a total of 15 tables, seven of which were created just for the USACE Rio Grande Bosque monitoring data, with an additional eight supporting tables from the NHHM Ecology database (Figure 2, Appendix B). A copy of the database, including the 2006 data, is provided on the CD included with this report. On the CD there is also a set of Microsoft Excel spreadsheet files created from the database, and containing the same data. The CD also includes a readme.txt file with instructions for use of the CD, a complete set of the photos from 2006, and a digital copy of this report.

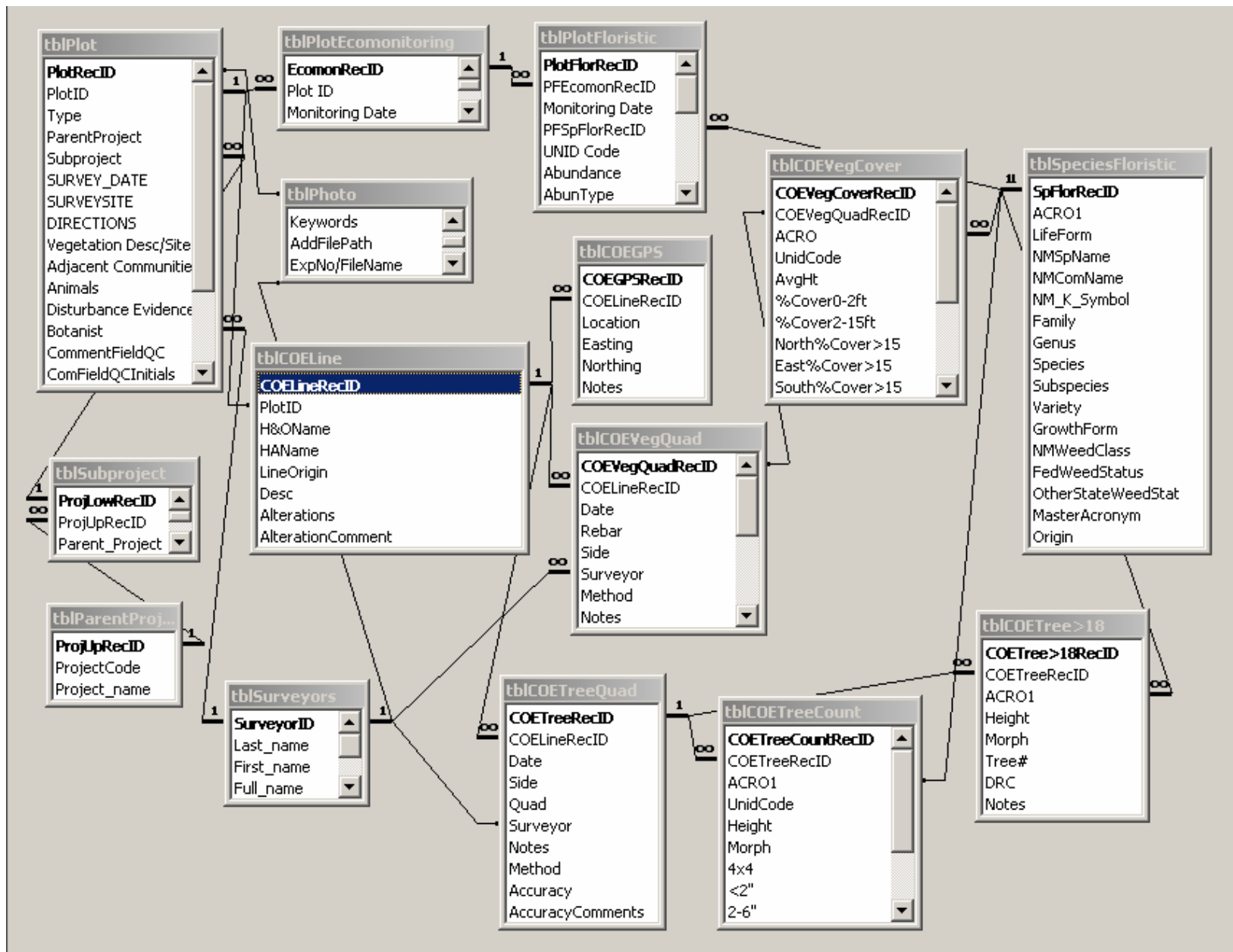


Figure 2. USACE Middle Rio Grande vegetation sampling database tables and their relationships to each other.

## Appendix A: Species list for 2006 Corrales Bosque Restoration Vegetation Monitoring.

Species Name	Common Name	NHNM ACRO	Kartez Symbol	Origin
<b>Trees</b>				
<i>Ailanthus altissima</i>	tree of heaven	AILALT	AIAL	Introduced
<i>Elaeagnus angustifolia</i>	Russian olive	ELAANG	ELAN	Introduced
<i>Juniperus monosperma</i>	oneseed juniper	JUNMON	JUMO	Native
<i>Populus deltoides</i> ssp. <i>wislizeni</i>	Rio Grande cottonwood	POPDELW	PODEW	Native
<i>Salix amygdaloides</i>	peachleaf willow	SALAMY	SAAM2	Native
<i>Salix gooddingii</i>	Goodding's willow	SALGOO	SAGO	Native
<i>Ulmus pumila</i>	Siberian elm	ULMPUM	ULPU	Introduced
<b>Shrubs</b>				
<i>Amorpha fruticosa</i>	desert indigobush	AMOFRU	AMFR	Native
<i>Artemisia filifolia</i>	sand sagebrush	ARTFIL	ARFI2	Native
<i>Atriplex canescens</i>	fourwing saltbush	ATRCAN	ATCA2	Native
<i>Baccharis salicina</i>	false willow	BACSAL	BASA	Native
<i>Clematis ligusticifolia</i>	western white clematis	CLELIG	CLLI2	Native
<i>Forestiera pubescens</i> var. <i>pubescens</i>	New Mexico olive	FORPUBP	FOPUP	Native
<i>Parthenocissus vitacea</i>	thicket creeper	PARVIT	PAVI5	Native
<i>Salix exigua</i>	coyote willow	SALEXI	SAEX	Native
<i>Shepherdia argentea</i>	silver buffaloberry	SHEARG	SHAR	Native
<i>Tamarix ramosissima</i>	saltcedar	TAMRAM	TARA	Introduced
<b>Sub-Shrubs</b>				
<i>Gutierrezia sarothrae</i>	broom snakeweed	GUTSAR	GUSA2	Native
<i>Phoradendron macrophyllum</i> ssp. <i>macrophyllum</i>	Colorado desert mistletoe	PHOMACM	PHMAM2	Native
<b>Graminoids</b>				
<i>Bothriochloa laguroides</i> ssp. <i>torreyana</i>	silver beardgrass	BOTLAGT	BOLAT	Native
<i>Bouteloua barbata</i>	sixweeks grama	BOUBAR	BOBA2	Native
<i>Bromus japonicus</i>	Japanese brome	BROJAP	BRJA	Introduced
<i>Cenchrus spinifex</i>	sandbur	CENSPI	CESP4	Native
<i>Chloris verticillata</i>	tumble windmill grass	CHLVER	CHVE2	Native
<i>Distichlis spicata</i>	inland saltgrass	DISSPI	DISP	Native
<i>Elymus canadensis</i>	Canada wildrye	ELYCAN	ELCA4	Native
<i>Elymus elymoides</i>	bottlebrush squirreltail	ELYELY	ELEL5	Native
<i>Elytrigia elongata</i>	tall wheatgrass	ELYELO	ELEL6	Introduced
<i>Eragrostis cilianensis</i>	stinkgrass	ERACIL	ERCI	Introduced
<i>Muhlenbergia asperifolia</i>	alkali muhly	MUHASP	MUAS	Native
<i>Munroa squarrosa</i>	false buffalograss	MUNSQU	MUSQ3	Native
<i>Panicum obtusum</i>	vine mesquite	PANOBT	PAOB	Native
<i>Pleuraphis jamesii</i>	galleta	PLEJAM	PLJA	Native
<i>Setaria leucopila</i>	streambed bristlegrass	SETLEU	SELE6	Native
<i>Sorghum halepense</i>	johnsongrass	SORHAL	SOHA	Introduced
<i>Sporobolus airoides</i>	alkali sacaton	SPOAIR	SPAI	Native
<i>Sporobolus cryptandrus</i>	sand dropseed	SPOCRY	SPCR	Native

Species Name	Common Name	NHNM ACRO	Kartez Symbol	Origin
<b>Forbs</b>				
Ambrosia psilostachya	Cuman ragweed	AMBPSI	AMPS	Native
Apocynum cannabinum	Indianhemp	APOCAN	APCA	Native
Asclepias subverticillata	whorled milkweed	ASCSUB	ASSU2	Native
Asparagus officinalis	garden asparagus	ASPOFF	ASOF	Introduced
Chamaesyce serpyllifolia	thymeleaf sandmat	CHASER2	CHSE6	Native
Chloracantha spinosa	spiny chloracantha	CHLSPI	CHSP11	Native
Cirsium spp.	thistle	CIRSIU	CIRSI	Native
Convolvulus arvensis	field bindweed	CONARV	COAR4	Introduced
Conyza canadensis	Canadian horseweed	CONCAN	COCA5	Native
Dieteria canescens	hoary aster	DIECAN	MACA2	Native
Equisetum laevigatum	smooth horsetail	EQU LAE	EQLA	Native
Euphorbia davidii	David's spurge	EUPDAV	EUDA5	Introduced
Euthamia occidentalis	western goldenrod	EUTOCC	EUOC4	Native
Gaura parviflora	velvetweed	GAUPAR	GAPA6	Native
Helianthus annuus	common sunflower	HELANN	HEAN3	Native
Helianthus petiolaris	prairie sunflower	HELPET	HEPE	Native
Heterotheca villosa	hairy goldenaster	HETVIL	HEVI4	Native
Kochia scoparia	common kochia	KOCSCO	KOSC	Introduced
Lactuca serriola	prickly lettuce	LACSER	LASE	Introduced
Melilotus officinalis	yellow sweetclover	MELOFF	MEOF	Introduced
Physalis virginiana	Virginia groundcherry	PHYVIR	PHVI5	Native
Polanisia dodecandra ssp. trachysperma	sandyseed clammyweed	POLDODT	PODOT	Native
Ratibida tagetes	green prairie coneflower	RATTAG	RATA	Native
Salsola tragus	prickly Russian thistle	SALTRA	SATR12	Introduced
Senecio riddellii	Riddell's ragwort	SENRID	SERI2	Native
Sisymbrium irio	London rocket	SISIRI	SIIR	Introduced
Solanum elaeagnifolium	silverleaf nightshade	SOLELA	SOEL	Native
Solidago canadensis	Canada goldenrod	SOLCAN	SOCA6	Native
Sonchus asper	spiny sowthistle	SONASP	SOAS	Introduced
Sphaeralcea incana	gray globemallow	SPHINC	SPIN2	Native
Symphotrichum ericoides	heath aster	SYMERI	SYER	Native
Xanthisma spinulosum	lacy tansyaster	XANSPI2	MAPI	Native
Xanthium strumarium	rough cocklebur	XANSTR	XAST	Native



## Appendix B: Database table descriptions with field names and descriptions.

### tblCOELine

This table stores data related to each transect: location, condition, description. Links to tblCOEGPS and tblPhoto to store UTM's for each rebar and data on photos taken at each transect. Links to tblCOETreeQuad for tree data and tblCOEVegQuad for vegetation cover data. Also links to tblPlot in NMNH Ecology database.

Name	Type	Size	Description
COELineRecID	Long Integer	4	Unique field to serve as primary key for tblCOELine.
PlotID	Long Integer	4	Plot id associated with each transect. Displaying Plot ID, but storing PlotRecID from tblPlot.
H&Oname	Text	50	Hink and Ohmart name for the line.
HAName	Text	50	Hawks Aloft name for the line.
LineOrigin	Text	50	Is this an original Hink and Ohmart line, was it moved by Hawks Aloft or is it a new Hawks Aloft line?
Desc	Memo	Open	General description of the transect.
Alterations	Text	50	Select whether the area the transect falls within has had; no alterations, alterations performed by man, alterations by fire, or alterations by both man and fire.
AlterationComment	Memo	Open	Comments relevant to the type of alterations or disturbance to the site.

### tblCOEGPS

This table stores UTM's (Nad27, Zone 13) for each rebar on each transect.

Name	Type	Size	Description
COEGPSRecID	Long Integer	4	Unique field to serve as the primary key for tblCOEGPS.
COELineRecID	Long Integer	4	Primary key from tblCOELine.
Location	Text	50	Location of the rebar in feet along the transect.
Easting	Long Integer	4	Easting of the gps location of the rebar on the transect (Nad 27, Zone 13).
Northing	Long Integer	4	Northing of the gps location of the rebar on the transect (Nad 27, Zone 13).
Notes	Memo	Open	Any notes relevant to the gps location of the rebar.

### tblCOETreeQuad

This table stores data relevant to each quad surveyed for trees: location, date, surveyor, method used. Links to tblCOETreeCount and tblCOETree>18, which store the stem counts and cover estimates for each species, and the diameter root crown of trees over 18" respectively.

Name	Type	Size	Description
COETreeRecID	Long Integer	4	Unique field to serve as the primary key for tblCOETreeQuad
COELineRecID	Long Integer	4	Primary key from tblCOELine.
Date	Date	8	Date of survey.
Side	Text	50	Side of the transect on which the trees were counted.
Quad	Text	50	Location of quad along transect.
Surveyor	Long Integer	4	Displaying the full name of each surveyor, but storing the primary key from tblSurveyors, SurveyorID.
Notes	Memo	Open	Any comments or notes relevant to the tree count quads.
Method	Text	50	Count Methods were changed early in the survey, prior to transect NE03; select "Prior to NE03" if the transect was read before the change at NE03; select "After NE03" if after.
Accuracy	True/False	1	Mark yes or check if the accuracy of this count is reliable. Do not check if there are issues related to the count.
AccuracyComments	Memo	Open	Notes relevant to the issues with the accuracy of the count.

### tblCOETreeCount

This table links to tblTreeQuad; stores the stem count and cover (described as number of 4x4 squares) of each species surveyed within each tree quad. COETreeCountRecID, Long Integer, 4, Unique field to serve as the primary key for tblCOETreeCount.

Name	Type	Size	Description
COETreeRecID	Long Integer	4	Primary key from tblCOETreeQuad.
ACRO1	Long Integer	4	Displaying the acronym of the species counted, but storing the SpFlorRecID tblSpeciesFLoristic.
UnidCode	Text	50	Code assigned to collected, unidentified species.
Height	Text	50	Select whether the shrubs/trees counted were in the 2-10ft. height category or the >10ft. height category.
Morph	Text	50	Morphology of the trees/shrubs counted.
4x4	Long Integer	4	Number of 4x4 squares occupied by the canopy of the species surveyed.
<2"	Long Integer	4	Number of stems greater than 2" in diameter.

2-6"	Long Integer	4	Number of stems between 2" and 6" in diameter.
6-12"	Long Integer	4	Number of stems between 6" and 12" in diameter.
12-18"	Long Integer	4	Number of stems between 12" and 18" in diameter.
>18"	Long Integer	4	Number of stems greater than 18" in diameter.
Notes	Memo	Open	Any notes relevant to each species counted.

### **tblCOETree>18**

This table is linked to tblCOETreeQuad and stores diameter root crown for each tree over 18" in diameter.

Name	Type	Size	Description
COETree>18RecID	Long Integer	4	Unique field to serve as the primary key for tblCOETree>18.
COETreeRecID	Long Integer	4	Primary key from tblCOETreeQuad.
ACRO1	Long Integer	4	Displaying the acronym for each species surveyed, but storing SpFlorRecID from tblSpeciesFLoristic.
Height	Text	50	Select whether the shrubs/tree measured was in the 2-10ft. height category or the >10ft. height category.
Morph	Text	50	Morphology of the trees/shrub measured.
Tree#	Long Integer	4	Arbitrary number to separate individuals of the same species and tree quad with measurements greater than 18".
DRC	Double	8	Diameter root crown of individual trees greater than 18"; measurement taken in inches.
Notes	Memo	Open	Any comments relevant to the individual tree measured.

### **tblCOEVegQuad**

This table stores data relevant to each vegetation quad sampled: date, surveyor, method used. Links to tblCOEVegCover, which stores cover estimates for each species.

Name	Type	Size	Description
COEVegQuadRecID	Long Integer	4	Unique field to serve as the primary key for tblCOEVegQuad.
COELineRecID	Long Integer	4	Primary key from tblCOELine.
Date	Date	8	Date of the survey.
Rebar	Text	50	Rebar at which the vegetation quad was located
Side	Text	50	Side of the transect on which the vegetation quad was located.
Surveyor	Long Integer	4	Surveyor that took the data at vegetation quad.
Method	Text	50	Vegetation Cover methods were changed early in the survey; select "Original H&O" if the transect was read before the changes, or select "Modified Heritage" if after.
Notes	Memo	Open	Notes pertaining to the specific quad.
NorthSDCount	Long Integer	4	Dot counts from the spherical densiometer to the north .
EastSDCount	Long Integer	4	Dot counts from the spherical densiometer to the east
WestSDCount	Long Integer	4	Dot counts from the spherical densiometer to the west
SouthSDCount	Long Integer	4	Dot counts from the spherical densiometer to the south
SDCountComments	Memo	Open	Comments relevant to the spherical densiometer dot counts.
NorthSD%	Long Integer	4	Percentage calculated from the spherical densiometer dot counts.
EastSD%	Long Integer	4	Percentage calculated from the spherical densiometer dot counts.
SouthSD%	Long Integer	4	Percentage calculated from the spherical densiometer dot counts.
WestSD%	Long Integer	4	Percentage calculated from the spherical densiometer dot counts.

### **tblCOEVegCover**

This table stores cover estimates for each species surveyed within each vegetation quad. Links to tblCOEVegQuad and tblSpeciesFloristic.

Name	Type	Size	Description
COEVegCoverRecID	Long Integer	4	Unique field to serve as the primary key for tblCOEVegCover.
COEVegQuadRecID	Long Integer	4	Primary key from tblCOEVegQuad.
ACRO	Long Integer	4	Displaying the acronym for each species surveyed, but storingSpFlorRecID from tblSpeciesFLoristic.
UnidCode	Text	50	Unidentified code number from field data
AvgHt	Double	8	Average height for the species in feet.
%Cover0-2ft	Double	8	Percent cover under 2ft tall.
%Cover2-15ft	Double	8	Percent cover from 2-15ft tall.
North%Cover>15	Double	8	Percent cover of species over 15ft tall within the north.
East%Cover>15	Double	8	Percent cover of species over 15ft tall within the east.
South%Cover>15	Double	8	Percent cover of species over 15ft tall within the south.
West%Cover>15	Double	8	Percent cover of species over 15ft tall within the west.
NorthSDCount	Long Integer	4	Dot counts from the spherical densiometer to the north
EastSDCount	Long Integer	4	Dot counts from the spherical densiometer to the east
WestSDCount	Long Integer	4	Dot counts from the spherical densiometer to the west
SouthSDCount	Long Integer	4	Dot counts from the spherical densiometer to the south
SDCountType	Text	50	Select whether this spherical densiometer count was for the entire quad - "Total count", or if it was for the species in this record - "Count for this species".
Notes	Memo	Open	Any comments relevant to the individual species within this quad.

## **tblSpeciesFloristic**

This table contains information for each of species found, and is a basic table from the NMNH Ecology database.

Name	Type	Size	Description
SpFlorRecID	Long Integer	4	Primary key for the species floristic table.
ACRO1	Text	8	NHNM 7 letter code
LifeForm	Double	8	1=tree 2=shrub 3=grass 4=forb 5=lichen/algae/fungi 6=other
NMSpName	Text	60	NHNM Accepted full name, genus and species, variety or subspecies, and, if plant is a tree, growth form.
NMComName	Text	35	Common name as assigned by NHNM botanist
NM_K_Symbol	Text	50	Kartez symbol for current New Mexico name.
Family	Text	50	
Genus	Text	50	
Species	Text	50	
Subspecies	Text	50	
Variety	Text	50	
GrowthForm	Text	50	text field describing the stages of tree growth: seedling, yng regen, adv regen, mature.
NMWeedClass	Text	2	NM Weed status class - A, B or C from state weed status link to tblNMWeedClass
FedWeedStatus	True/False	1	Is this plant federal listed as a noxious weed? See tblFedWeeds
OtherStateWeedStat	True/False	1	Does this plant have noxious weed status in a state other than NM? see tblOtherStateWeeds
MasterAcronym	Text	8	NHNM grouping acronyms
Origin	Text	15	Native or Introduced

## **tblPlot**

This table contains all the basic data for a plot, and is the base table for records in the NMNH Ecology database.

Name	Type	Size	Description
PlotRecID	Long Integer	4	Unique number to identify each record and serve as the primary key.
PlotID	Text	7	Plots are named with a standard of last two digits of year, team leader's or projects initials, and 3 digits in numerical order as plots are established, e.g. 03AB001, 03AB002, etc.
Type	Text	3	RP Releve Plot, QP Quick Plot, VP Video Plot, MP Map Point
ParentProject	Long Integer	4	Storing Record ID from Project table and showing project code.
Subproject	Long Integer	4	Storing Record ID from subproject table and showing subproject code.
SURVEY_DATE	Date	8	Date the survey took place.
SURVEYSITE	Text	255	Sites delineated for the purpose of the field work only, usually assigned by project manager.
DIRECTIONS	Memo	Open	Directions that can be useful in finding the plot again.
Vegetation Desc/Site Features	Memo	Open	Description of the vegetation and any significant site features.
Adjacent Communities	Memo	Open	Any communities surrounding the occurrence surveyed.
Animals	Memo	Open	Any evidence or sighting of animals.
Disturbance Evidence	Memo	Open	Any evidence of disturbance. e.g. tire tracks, cropping/grazing, garbage, fire scars, etc.
Botanist	Long Integer	4	The surveyor that served as the botanist for the plot.
CommentFieldQC	True/False	1	Were the comment fields qcd for appropriate language?
ComFieldQCInitials	Text	3	Initials of the person responsible for qcng the comment fields.
CommFieldQCDate	Date	8	Date the comment fields were qcd.
DataQC	True/False	1	Were the following fields qcd: Plot type, Project/Subproject, Date, Surveyor, Botanist, UTMs, Community Acronyms, Ground Cover, Life Form Cover.
DataQCInitials	Text	3	Initials of the person responsible for qcng the above data fields.
DataQCDate	Date	8	Date the data fields were qcd.
OrigPlotID	Text	25	If the plot came from a source outside of NHNM or an alternate ID was created for data entry, enter the original plot id here.

## **tblPhoto**

This table stores data concerning the photos taken at a plot or for a project. Stores information such as focal length, exposure number, and the location the print/slide is archived.

Name	Type	Size	Description
PhotoRecID	Long Integer	4	Unique number to identify each record and serve as the primary key.
Source	Text	50	Was the photo from a plot; not from a plot, but from Heritage; or from an outside source?
PhotoPlotRecID	Long Integer	4	Plot ID for the plot at which the photo taken.
Project	Long Integer	4	Storing Record ID from Project table and showing project code.
Subproject	Long Integer	4	Storing Record ID from subproject table and showing subproject code.

Location	Text	42	General location at which the photos were taken. e.g., Bandelier National Monument, Holloman AFB, etc.
Date	Date	8	Date the photo was taken.
PhotoLogRollNo	Text	50	The name used to identify the roll of film on the photo log.
Keywords	Memo	Open	Keywords to help identify the subject matter of the photo. e.g. Short grass prairie, mixed conifer forest, Blue spruce fringe forest, Texas Horned Lizard, etc.
AddFilePath	Text	50	Additional directory info for digital photos beyond general subproject photo location.
ExpNo/FileName	Text	50	The number of the individual exposure taken or, in the case of digital photos, the file name for the individual photo.
Photographer	Text	50	Name of the person who shot the photo.
Azm	Long Integer	4	Azimuth or direction the photo was taken.
FocalLength	Long Integer	4	Focal length of the photo.
Desc1	Text	42	Description of the subject matter of the photo. e.g., across slope from plot center.
Desc2	Text	42	If description is longer than 42 characters (label program limitation), put overflow here.
Sensitive	True/False	1	Does this photo contain a sensitive element or community?
Comments	Memo	Open	Any comments relevant to this individual exposure.
Film/Dig	Text	50	Was photo originally shot on film or digital camera?

### **tblPlotEcomonitoring**

This table connects tblPlot to tblPlotFloristic. It allows data from more than one visit to a plot location to be recorded.

Name	Type	Size	Description
EcomonRecID	Long Integer	4	Unique number to identify each record and serve as primary key.
Plot ID	Text	7	Plot ID from tblPlot
Monitoring Date	Date	8	Date Plot was visited/revisited.
MonitoringComments	Memo	Open	Comments relevant to this visit to the plot.
PlotFlorQC	True/False	1	Was plot floristic qcd?
PlotFIQCInitials	Text	3	Initials of the person responsible for qcinq plot floristic.
PlotFIQCDate	Date	8	Date floristic was qcd.

### **tblPlotFloristic**

Stores data and id for each plant recorded at the plot, e.g. abundance value, collection info, and notes taken at plot.

Name	Type	Size	Description
PlotFlorRecID	Long Integer	4	Primary key for plot floristic.
PFEcomonRecID	Long Integer	4	Record id from ecomonitoring table.
Monitoring Date	Date	8	Date of the survey.
PFSpFlorRecID	Long Integer	4	Storing the record id from species floristic, but looking up ACROI.
UNID Code	Text	50	Unidentified code number from field data
Abundance	Double	8	Should contain *only* Percentage cover values - either directly from the field or converted scalars - unconverted scalar values belong in the field AbunScalar
AbunType	Text	50	Explains missing values and gives info on how abundance was measured in the field (see look up tblPlotFlorAbunType for information on codes)
KDKscalar	Text	5	Unconverted Modified Domin-Krajina scalar abundance values read up from tblModDomKrajinaScalar
Height in Meters	Double	8	Average height measured in meters.
Number of Vouchers	Text	5	How many specimens were collected? If plant was not collected, but is a unid from another plot, enter NO.
Specimen Number	Text	10	Specimen number from the data sheet. (F1, G4, T2, etc.)
UNMCatalogNumber	Text	10	Numbering system used by UNM herbarium.
Field label	Text	50	What was written on the label in the field.
Quality	Text	2	Quality of the vouchered specimen.
Det by	Text	50	Who was responsible for identifying the vouchered specimen?
Distribution	Text	50	What herbaria received the specimen?
Comments	Text	250	Any comments relevant to this particular plant, including references to other plots where the plant was collected.
Phenology	Text	50	Flowering, fruiting or dead annual

### **tblSurveyors**

This table contains information on the surveyors at Natural Heritage New Mexico.

Name	Type	Size	Description
SurveyorID	Long Integer	4	Primary key for Surveyor table
Last_name	Text	50	Surveyors last name
First_name	Text	50	Surveyors first name plus middle initials if relevant
Full_name	Text	50	Surveyors full name first, initials, last
Initials	Text	50	Surveyors initials
Plot_Initials	Text	50	Surveyors initials as used in PlotIDs
Surveyor_type	Text	50	How was this person connected to NMNHP?

### **tblParentProject**

This table contains information describing each Parent Project.

Name	Type	Size	Description
ProjUpRecID	Long Integer	4	Primary key for the ProjectUpper table.
ProjectCode	Text	50	Code used to identify the project.
Project_name	Text	50	Full project name.

### **tblSubproject**

This table contains information describing each Subproject.

Name	Type	Size	Description
ProjLowRecID	Long Integer	4	Primary key for the ProjectLower table.
ProjUpRecID	Long Integer	4	Primary key from the ProjectUpper table.
Parent_Project	Text	50	The main project that this subproject falls under.
SubprojectCode	Text	50	Project code for the subproject.
Subproject_name	Text	50	Full name of the project.
Description	Memo	0	Description of what the subproject entails.
Start Date	Date	8	Date work started.
End Date	Date	8	Date subproject was completed.
Supervisor	Long Integer	4	Person responsible for organizing the subproject.
PI	Long Integer	4	Person responsible for overseeing the parent project.
Photos	True/False	1	Are there photos associated with this subproject?
DigPhoto_Loc	Text	250	Directory path to master photo directory for subproject.