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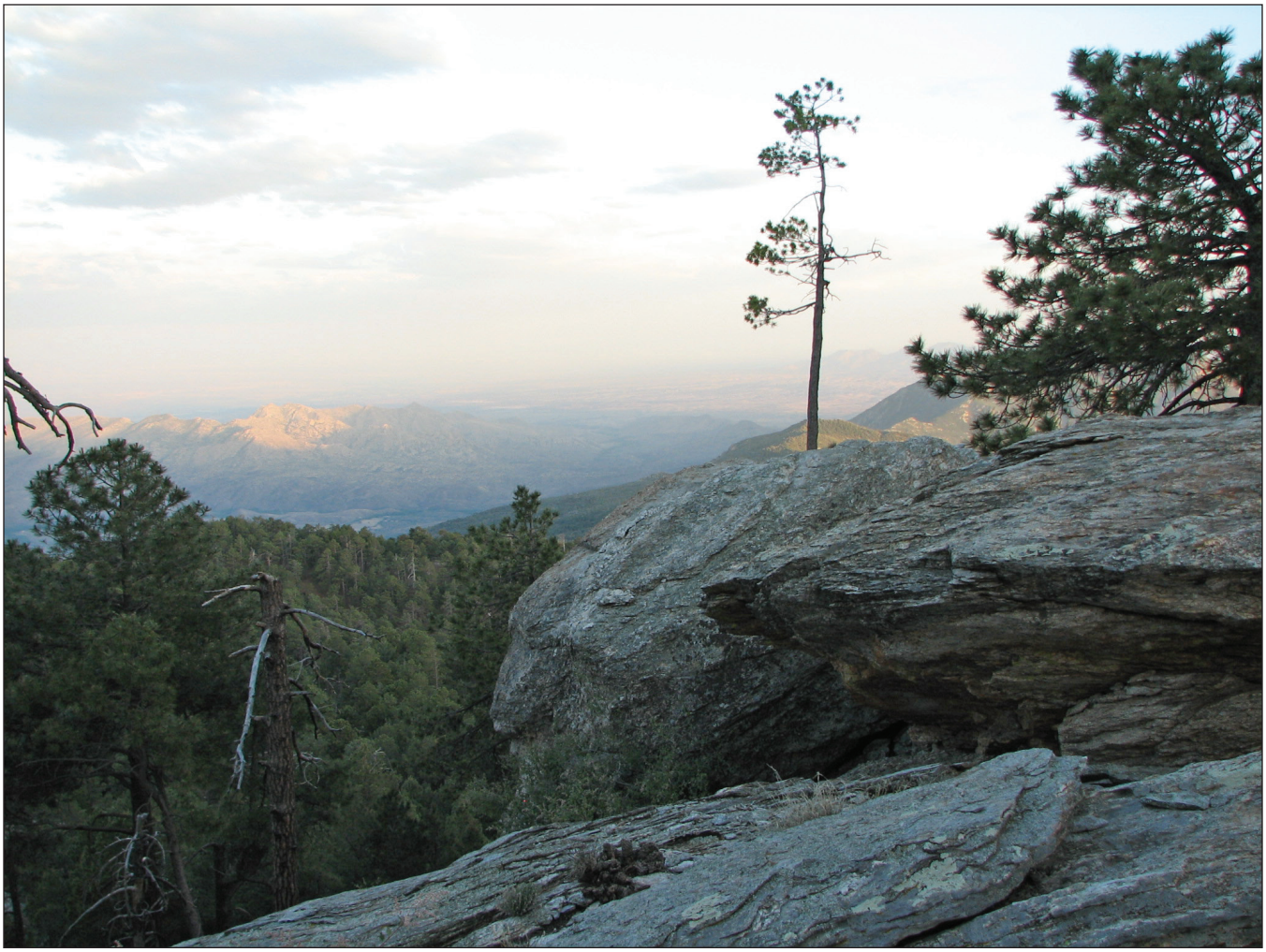
Terrestrial Vegetation and Soils Monitoring in the Rincon Mountain District, Saguaro National Park, 2008–2009

Natural Resource Technical Report NPS/SODN/NRDS—2010/118



ON THE COVER

Rincon Mountain District, Saguaro National Park. NPS photo.

Terrestrial Vegetation and Soils Monitoring in the Rincon Mountain District, Saguaro National Park, 2008–2009

Natural Resource Technical Report NPS/SODN/NRDS—2010/118

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The National Park Service, Natural Resource Program Center publishes a range of reports that address natural resource topics of interest and applicability to a broad audience in the National Park Service and others in natural resource management, including scientists, conservation and environmental constituencies, and the public.

The Natural Resource Data Series is intended for timely release of basic data sets and data summaries. Care has been taken to assure accuracy of raw data values, but a thorough analysis and interpretation of the data has not been completed. Consequently, the initial analyses of data in this report are provisional and subject to change.

All manuscripts in the series receive the appropriate level of peer review to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and designed and published in a professional manner. This report received informal peer review by subject-matter experts who were not directly involved in the collection, analysis, or reporting of the data.

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Executive Summary

This report summarizes provisional data collected by the Sonoran Desert Network during the first two seasons of terrestrial vegetation and soils monitoring in upland areas of the Rincon Mountain District of Saguaro National Park, in southern Arizona. Twenty-five permanent monitoring sites were sampled, with another 35 planned for 2010–2012, after which time a detailed status and trend report will be produced. This report summarizes effort to date, evaluates the sampling design in the context of our monitoring objectives, and suggests modifications to the design.

Based on estimates from this initial data, the current sampling design does an excellent job of providing statistical power to detect trends in perennial species and soil stability. The design also provides good power for detecting changes in lifeform composition and soil surface cover, although our projected power for a few variables failed to meet our initial design criteria. Species detectability appears to be very reasonable based on species-accumulation curves. Although only about 20% of the known park flora has been detected to date, it is important to note that monitoring under this protocol does not differentiate among annuals (with the exception of exotic plants); nor does it sample aquatic, riparian, or xeroriparian systems.

The elevation × soil texture stratification scheme appears to be effective, although vegetation-community similarity of the three strata that encompass lower-elevation sites (<4,500') did not differ significantly. This may be due to the small sample sizes of these more constrained areas of the park; we will investigate this question by adding three sites at lower elevations in 2010. Results will be analyzed in the 2010 data summary. Sampling efficiencies can be gained if the lack of differences is real.

Overall, we conclude that the sampling and response designs are efficient and effective, and should provide data that meet our monitoring objectives. We will continue to evaluate and adjust our sampling strategy annually, culminating in the full analysis for the comprehensive status and trends reports after the 2012 season. Therefore, it is important that results in this and other annual data summaries not be directly interpreted for evaluating the condition of park resources.

Acronyms

AVG	average
GRTS	Generalized Random Tessellation Stratified
MDC	minimum detectable change
n	number
NP	national park
NPS	National Park Service
RMD	Rincon Mountain District
RRQRR	Reversed Randomized Quadrant Recursive Raster
SD	standard deviation
Sdiff	standard deviation of the differences
SE	standard error
SODN	Sonoran Desert Network

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1 Introduction

1.1 Background

Generating more than 99.9% of Earth's biomass (Whittaker 1975), plants are the primary producers of life on our planet. Vegetation therefore represents much of the biological foundation of terrestrial ecosystems, and it comprises or interacts with all primary structural and functional components of these systems. Vegetation dynamics can indicate the integrity of ecological processes, productivity trends, and ecosystem interactions that can otherwise be difficult to monitor. Land management actions often focus on manipulating vegetation to achieve park management objectives, with defined conditions based on community structure or lifeform composition.

In the Sonoran Desert and Apache Highlands ecoregions (Bailey 1998), vegetation composition, distribution, and production are highly influenced by edaphic factors, such as soil texture, mineralogy depth, and landform type (McAuliffe 1999). Especially as they relate to water, these influences are magnified at local scales, as described by pioneering desert ecologist Forrest Shreve:

> The profound influence of soil upon desert vegetation is to be attributed to its strong control of the amount, availability and continuity of water supply. This fundamental requisite in plants is the most effective single factor in the differentiation of desert communities (Shreve 1951).

As such, a fundamental understanding of soils and landforms is essential for evaluating vegetation patterns and processes (McAuliffe 1999).

The Sonoran Desert Network (SODN), as part of the National Park Service's Inventory and Monitoring Program, has identified terrestrial vegetation and dynamic soil functional attributes as important ecosystem monitoring parameters, or "vital signs" (NPS 2005) that provide key insights into the integrity of terrestrial ecosystems at Saguaro National Park (NP; Figure 1.1). Indicators of terrestrial vegetation integrity include vegetation community structure, lifeform abundance, status and trends of established exotic plants, and early detection of previously undetected exotic plants. Indicators of soil dynamic function and erosion resistance include the cover of mineral soil, the stability of surface soil aggregates, and the abundance of biological soil crusts.

1.2 Goals and objectives

The overall goal of the SODN terrestrial vegetation and soils monitoring program is to ascertain broad-scale changes in vegetation and dynamic soils properties in the context of changes in other ecological drivers, stressors, processes, and focal resources of interest. This integrated approach explores patterns and identifies candidate explanations to support effective management and protection of park natural resources in a cumulative fashion, such that the results of each successive round of monitoring build upon the knowledge gained from previous efforts and related research and monitoring activities.

Specific, measurable objectives for SODN terrestrial vegetation and soils monitoring (Hubbard et al. in review) at Saguaro NP are to determine the status of and detect trends in (over 5-year intervals):

1. Terrestrial *vegetation cover* for common (≥10% absolute canopy cover) perennial species, including non-native plants, and all plant lifeforms.
2. Terrestrial *vegetation frequency* of uncommon (<10% absolute canopy cover) perennial species, including non-native plants.
3. Terrestrial *soil cover* by substrate classes (bare soil, litter, vegetation, biological soil crust, rock fragments of several size classes) that influence resistance to erosion.
4. Terrestrial *soil stability* of surface aggregates by stability class (1–6).
5. *Biological soil crust cover and frequency* by morphological group (lichen, moss, light cyanobacteria, dark cyanobacteria).

1.3 Scope of this report

This document summarizes the results of the first two years (2008 and 2009) of terrestrial vegetation and soils monitoring in the Rincon Mountain District of Saguaro NP. At 102,011 acres (41,300 hectares), Saguaro NP is the second-largest unit in the Sonoran Desert Network. Therefore, we employ a multi-year sampling strategy, in which one-fifth of the monitoring sites are sampled in

any given year, with the entire complement completed after five field seasons (= 2012). Therefore, only 2/5 of sampling has occurred to date, and we do not synthesize and interpret the current information in the context of status or trends. Instead, the objectives of this report are to:

1. Document the processed data from the first two years of this multi-year effort.
2. Evaluate the stratification approach and sample sizes based on vegetation similarity, estimated statistical power, and species detectability.
3. If warranted by the data, adjust strata and sample sizes to ensure we are meeting the monitoring objectives.

It is therefore critical that the reader not draw overall conclusions based on this report alone.

We will continue to produce annual data summaries and refine the sampling design as necessary, with a much more detailed and comprehensive synthesis report to be created after the final complement of sampling is completed in 2012. For an example of a final status and trend report, see Terrestrial Vegetation and Soils Monitoring at Fort Bowie National Historic Site: 2008 Status Report (Hubbard et al. 2010), available at: http://science.nature.nps.gov/im/units/sodn/docs/AR_FOBO_Uplands_2009.pdf.

Saguaro NP also includes the Tucson Mountain District, which we address as a separate unit, reflecting the disconnected nature and substantial inherent ecological differences between the two units. The thematic scope of this report is also limited to terrestrial ecosystems. Aquatic resources, including riparian and xeroriparian vegetation, are addressed in the SODN protocols for monitoring of streams, washes, and springs, rather than uplands.

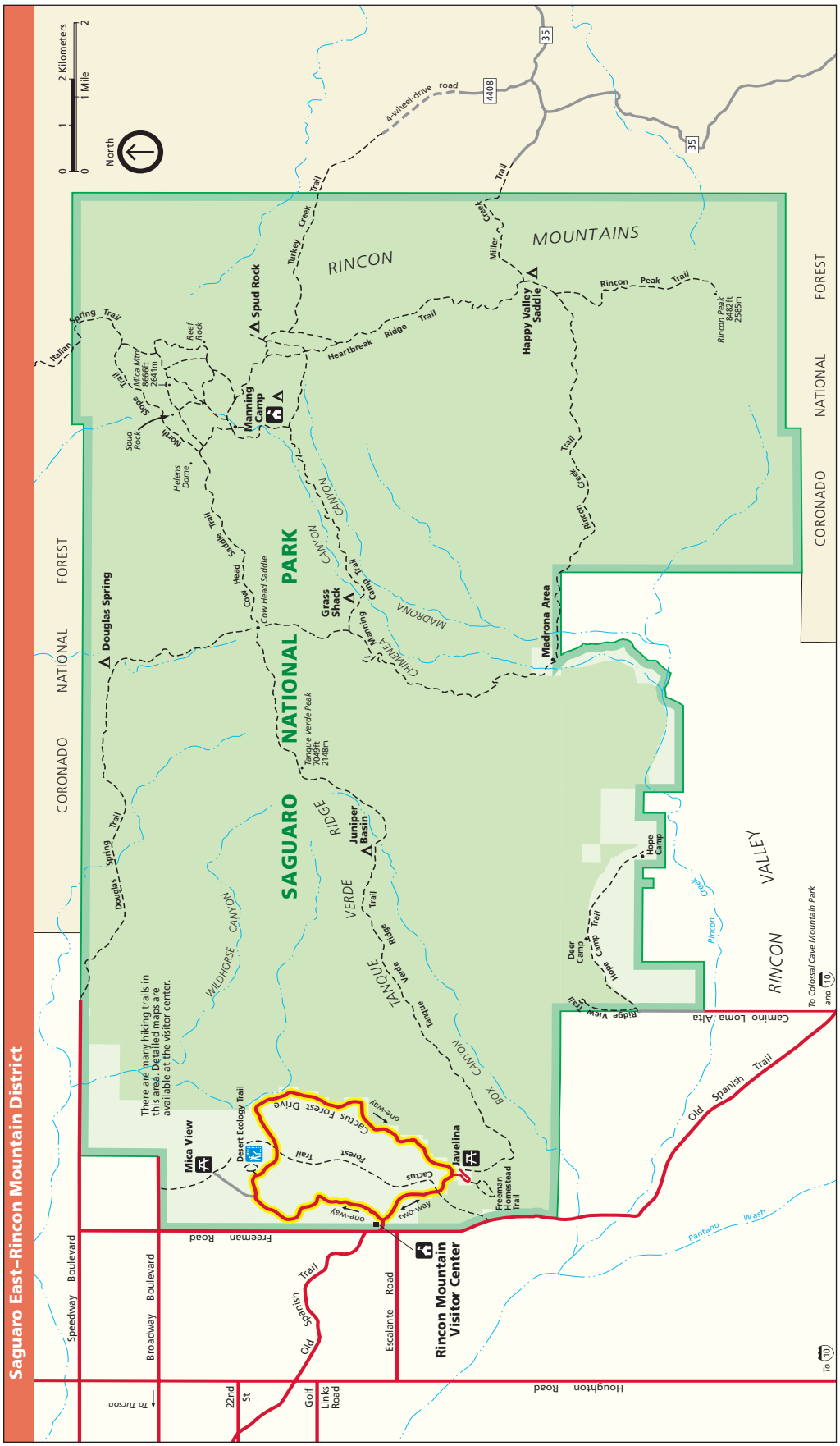


Figure 1.1. The Rincon Mountain District of Saguaro National Park.

2 Methods

2.1 Response design

The response design for this protocol employs permanent, 20 × 50-m sampling plots (Figure 2.1). The 50-m edges of the plot run parallel with the contours of the site. Vegetation sampling is performed, in conjunction with soil cover and stability measures, along six transects within each plot. In the spaces between transects (subplots), within-plot frequency is estimated by noting the occurrence of any plant species or lifeform not observed on the adjacent transects. See Hubbard and others (in review) for details on plot configuration and data collection.

2.1.1 Vegetation, biological soil crust, and soil cover (line-point intercept)

Line-point intercept is a common and efficient technique for measuring the vegetation cover of plants. Line-point intercept measures the number of "hits" of a given species out of the total number of points measured (Elzinga et al. 1998; Bonha m 1989). Vegetation was recorded within three height categories along each of the six transects using the line-point intercept method, with points spaced every 0.5 m (240 points total). The three height categories were field (<0.5 m), subcanopy (0.5–2.0 m), and canopy (>2.0 m). Perennial vegetation was recorded to species and annual vegetation was recorded to lifeform, with the exception of a suite of annual non-native plants that were recorded to the species level. Soil cover (see Hubbard et al. in review, SOP #4) was recorded by substrate class (e.g., rock, gravel, litter), with biological soil crust cover (SOP #7) recorded to morphological group (e.g., light cyanobacteria, dark cyanobacteria, lichen, moss).

2.1.2 Vegetation frequency (subplots)

The area between any two adjacent transects formed the boundary of 10 × 20-m subplots that were used to estimate within-plot frequency of perennial plant species, exotic plants, and all lifeforms. The occurrence of any species/lifeform not measured on the adjacent line-point transect was recorded to determine a within-plot frequency of 0–5. Figure 2.1 explains the relationship between each subplot and its corresponding adjacent transect.

2.1.3 Soil aggregate stability

Surface soil aggregate stability was measured using a modified wet aggregate stability method (Herrick et al. 2005a). Within each plot, samples were collected at pre-determined points on either side of the six line-point intercept transects. A total of 48 uniformly sized (2–3 mm thick and 6–8 mm on each side) samples were tested per plot, in groups of 16. Each sample was placed on a screen and soaked in water for five minutes. After five minutes, the samples were slowly dipped up and down in the water, with the remaining amount of soil recorded as an index of the wet aggregate stability of the sample. Samples were scored from 1 to 6, with 6 being the most stable.

2.1.4 Soil and site characterization

Proximate soil and landform factors are known to influence vegetation and dynamic soil function parameters at local scales (McAuliffe 1999). To characterize the soil and landscape attributes of each plot, a suite of topoedaphic variables was collected through site diagrams, repeat photo points, and collection of soil cores. Landform, slope position, and parent material were recorded at each plot. Flow-length diagrams were used to depict surface-flow patterns and document the slopes (%) and lengths (m) of the hillslope within and immediately upslope of each plot. Permanent photo points were established at each plot corner to characterize general site physiognomy and as an aid to interpreting quantitative trend data in successive sampling periods. In addition, general site descriptions (including observed disturbances, such as fire) were collected for each plot.

2.2 Sampling design

2.2.1 Overview

We allocated a total of 60 permanent monitoring plots in a spatially balanced arrangement (see Section 2.2.3), based on a priori expectations of required sample size to meet our criteria for statistical power and detectability (see Sections 2.2.5–2.2.6). Terrestrial vegetation and soils plots were proportionately allocated to five strata based on elevation and soil type (Figure 2.2.1a, Table 2.2.1). Stratification (see Section 3.2.2, Hubbard et al. in review) was employed to reduce spatial variability and increase sampling efficiency.

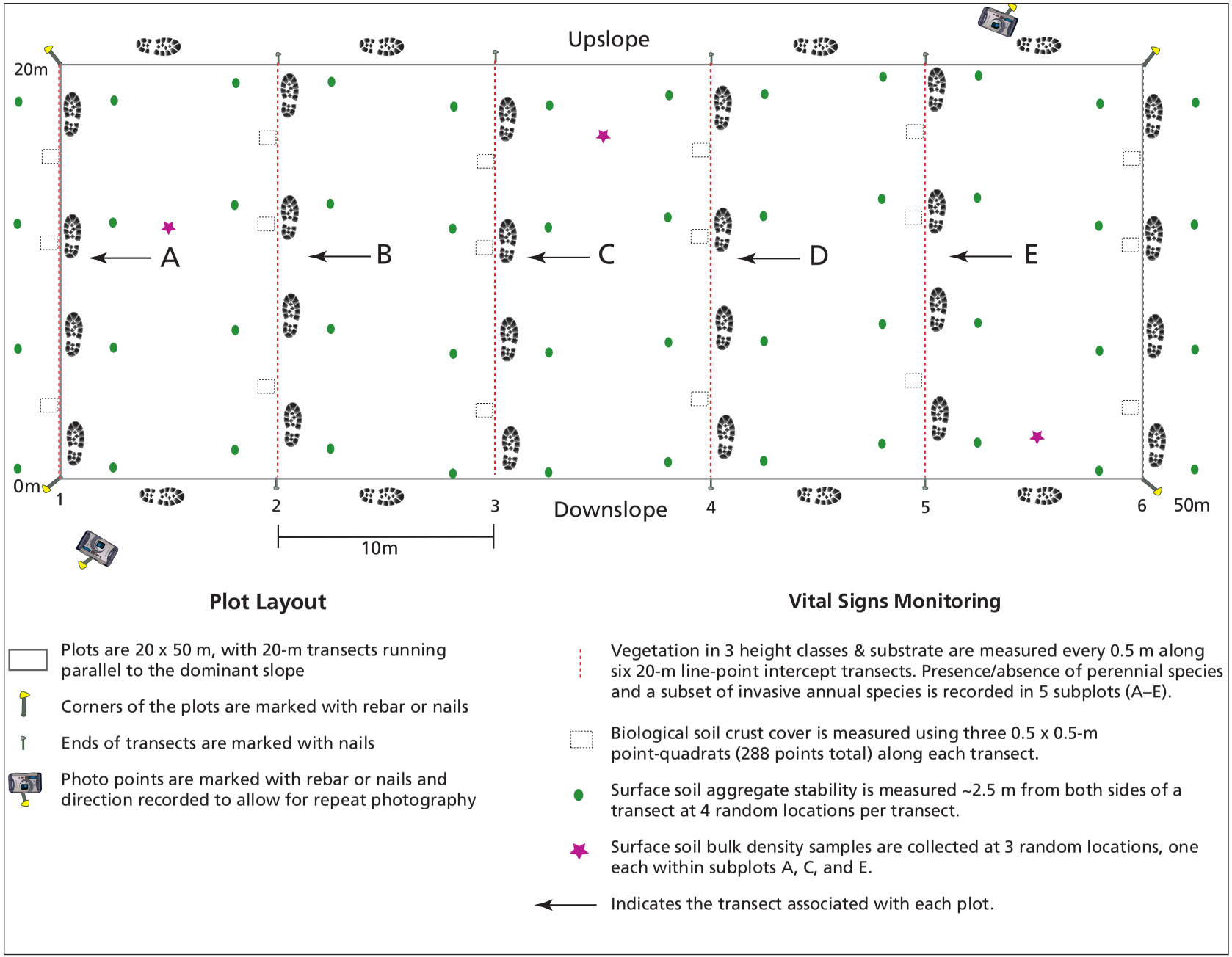


Figure 2.1. Terrestrial vegetation and soils monitoring plot design.

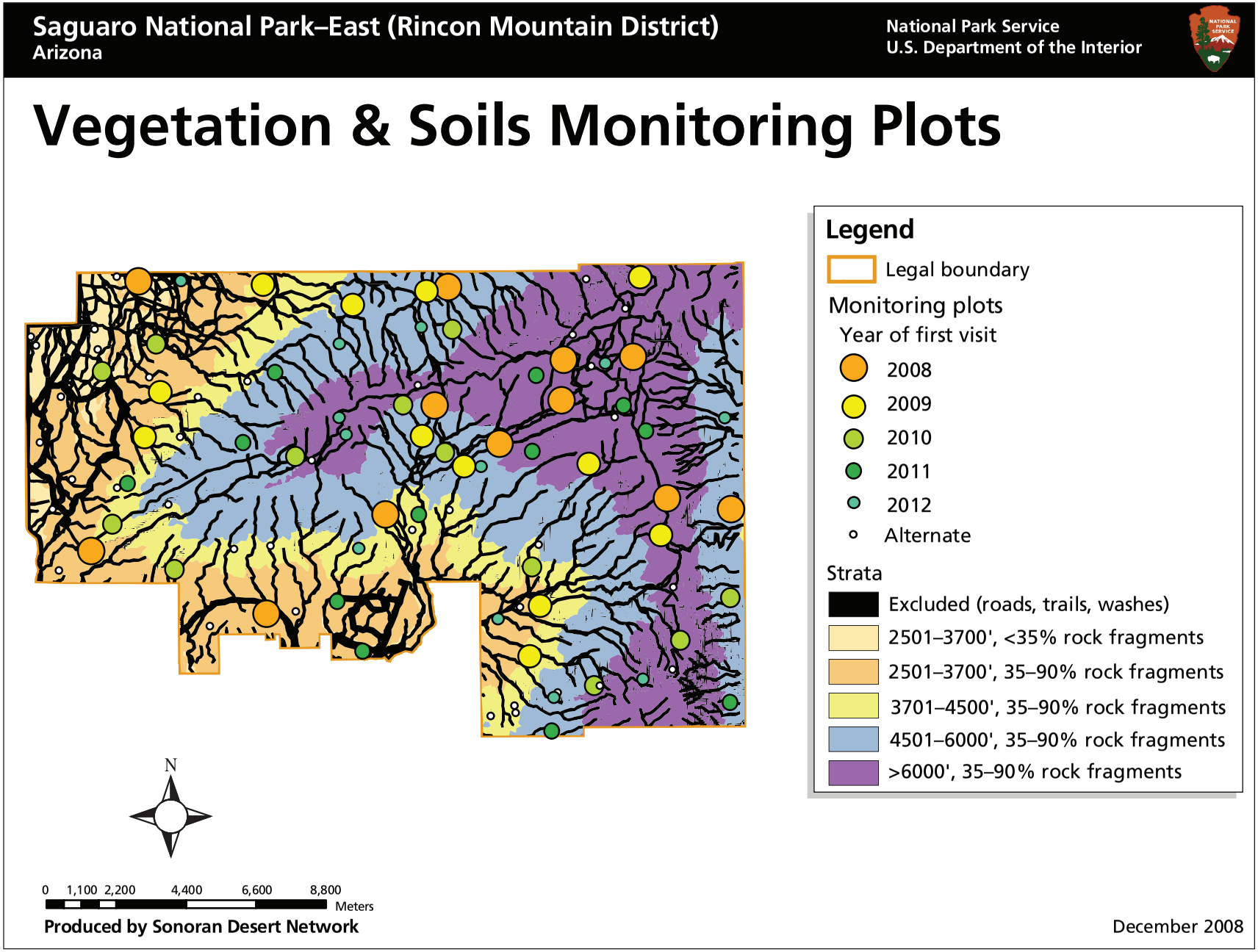


Figure 2.2.1a. Distribution of terrestrial vegetation and soils monitoring plots by strata, Rincon Mountain District, Saguaro NP.

Table 2.2.1. Allocation of permanent terrestrial vegetation and soils monitoring plots by strata, Rincon Mountain District, Saguaro NP.

Stratum	Total area (acres)	Percentage of total unit area	Percentage of total frame area	Number of plots per strata	Number of plots per strata every per year
Excluded	18,372	27	0	0	0
201	1,455	2*	3	2	1 or 0
202	9,045	13	19	11	2 or 3
302	6,575	10	13	8	1 or 2
402	16,719	25	34	21	4 or 5
502	14,952	22	31	18	3 or 4

*Strata with <5% of unit area are generally excluded. However, because it contains the "Cactus Forest" area, a prime management zone at Saguaro NP, we included the 201 stratum.

Access is a prime concern at the unit, as well. We used a cost-surface approach (Figure 2.2.1b), based on modeled travel time, to adjust inclusion probabilities for sampling plots. Appendix A of the monitoring protocol (Hubbard et al. in review) provides the details; essentially, plot locations were weighted toward sites that were more accessible, although all locations had a chance of being selected (except those excluded due to safety concerns or possible harm to resources; see Section 2.2.4). Consequently, inference from the plots at Saguaro NP is to all terrestrial areas of the unit by elevation × soil strata, excepting the areas discussed in Section 2.2.4 below.

2.2.2 Annual sampling

Permanent plots are employed to increase our ability to efficiently detect trends, by explicitly partitioning spatial and temporal variability (Elzinga et al. 1998). As with all designs, there are inherent tradeoffs with using permanent plots, as discussed in Hubbard and others (in review). The primary disadvantage at larger units (such as the Rincon Mountain District; RMD) is that sampling across landscapes (space) is reduced as field effort is dedicated to revisiting existing plots.

To ensure adequate spatial coverage, we employ a simple rotating panel design (McDonald 2003) that allocates plots annually, such that each plot is revisited every five years [1,4], in line with our assumptions regarding the timing of biologically meaningful change (Hubbard et al. in review). Using this approach, the total population of plots in a park is apportioned evenly per year. For the RMD, the total anticipated sample size is 60 plots; ideally, with 12 plots sampled each year (Table 2.2.2). However, site suitability and logistical constraints affect actual sampling effort each year.

The advantages of this design are that (1) the influence of interannual variation (i.e., noise) is less pronounced for the analysis of five-year

Table 2.2.2. Uplands sampling schedule for the Rincon Mountain District, Saguaro NP.

Strata	Plot numbers				
	2008	2009	2010	2011	2012
201, loamy soils, <3,700'	2		3		
202, rocky soils, <3,700'		3,4,5	6,7	8,9,12	10,11,13
302, rocky soils, 3,701–4,500'	1	4,7	12,13	14,16	15
402, rocky soils, 4,501–6,000'	1,3	2,5,6,7,8	9,10,12,13,15,16	14,22,23,24	17,19,20,21
502, rocky soils, >6,001'	1,2,3,6	5,7,8	9,10,11	12,13,14,18	15,16,17,19

Adjustments within and between strata may occur based on early results. Plots in bold red were added to replace unsuitable/inaccessible plots. Section 2.2.2 describes the stratification scheme.

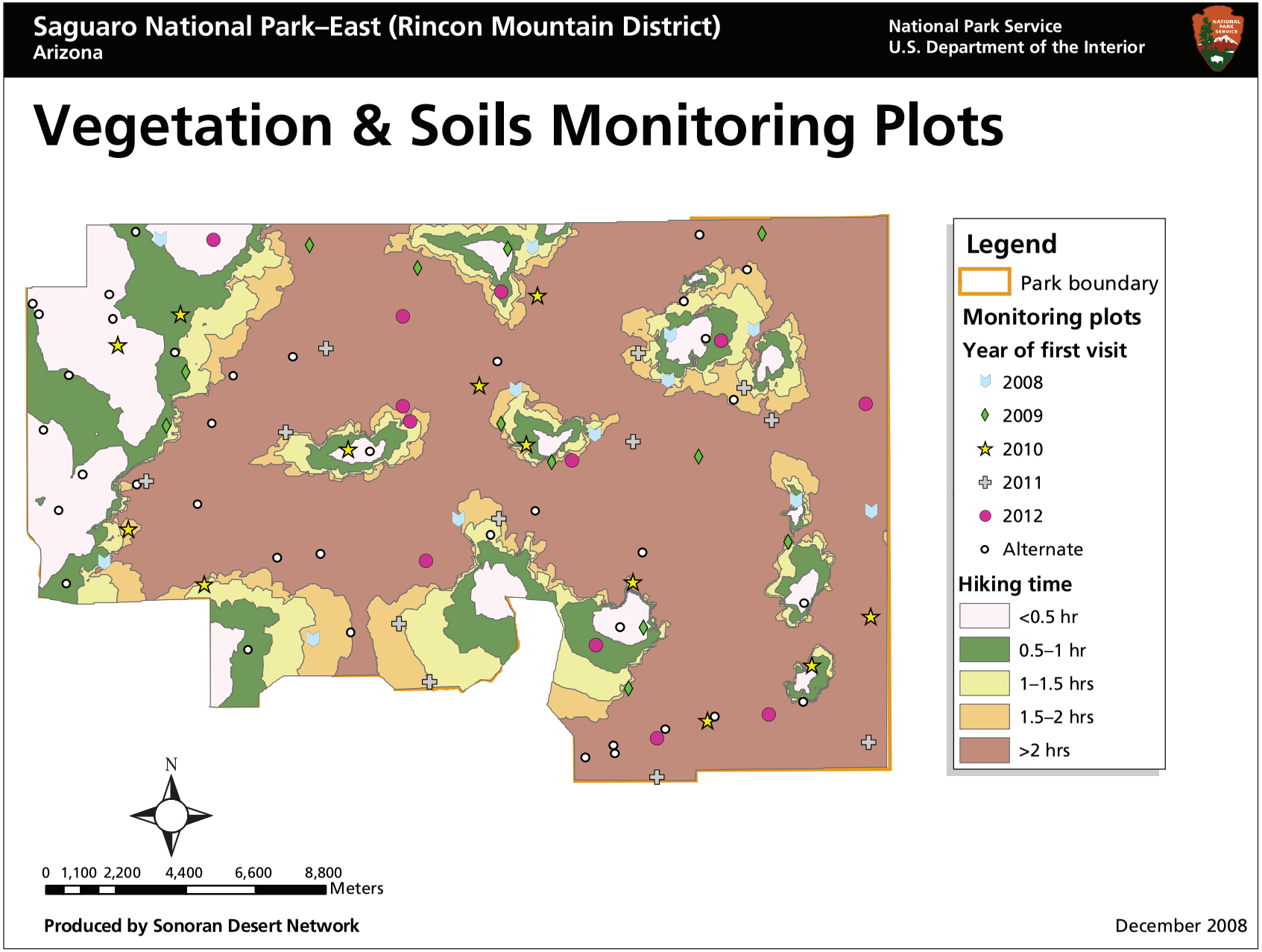


Figure 2.2.1b. Modeled travel time relative to terrestrial vegetation and soil plot locations, Rincon Mountain District, Saguaro NP. Travel time was used to create a cost surface that weighted plot selection toward more accessible sites.

trends; and (2) there are tremendous efficiency gains, from the perspective of fielding and funding sampling crews, as effort is spread evenly over five-year intervals. The disadvantages are that (1) the effects of individual stochastic events may be difficult to evaluate (Hubbard et al. in review) and (2) detecting trends requires at least 10 years of data collection (i.e., two sampling intervals for all plots). Rotating-panel designs generally allow trend detection over shorter time periods (particularly when a subset of the plots is monitored continually), but sampling intensity is unlikely to meet our statistical-power and species-detection goals (see Sections 2.5–2.6). We ruled out intensive annual monitoring of a subset of plots due to concerns over plot degradation, as discussed in the SODN natural and cultural resource compliance effort (NPS 2005b).

If a major disturbance (e.g., fire, extended periods of temperature extremes, mass soil movement) occurs in the intervening years, we may collect additional plot data to characterize and account for the potential effects of these important stochastic events.

2.2.3 Spatial balance

The spatial sampling design for this protocol employs permanent, 20 × 50-m sampling plots, allocated through a Reversed Randomized Quadrant-Recursive Raster (RRQRR) spatially balanced design (Theobald et al. 2007), using the "spatially balanced sample" function in the STARMAP Spatial Sampling Toolbox in ArcGIS 9.0 (http://www.spatialecology.com/htools/index.php). This tool produces a design that is spatially well-balanced, probability-based, flexible, and simple (Theobald et al. 2007). Because it tries to maximize the spatial independence between plots, the spatially-balanced sampling design should provide more information per plot, thus increasing efficiency (Theobald et al. 2007).

Spatially balanced designs, such as RRQRR (for polygon data) and the Generalized Random Tessellation Stratified (GRTS; for points and lines) approach (Stevens and Olsen 2004), are increasingly being applied to ecosystem monitoring (e.g., Environmental Protection Agency Ecological Monitoring and Assessment Program) because they provide the advantages of a probabilistic design (Stehman 1999) and ensure spatial balance regardless of overall sample size. RRQRR designs facilitate adding or removing sites in a spatially balanced manner if statistical power, financial considerations, or additional monitoring objectives warrant adjusting the sample size. This scaling ability is an important advantage, as (1) the number of plots per park cannot always be adequately estimated a priori (see Section 3.4.2, Hubbard et al. in review) and (2) future changes in technology, objectives, and budgets may necessitate increasing or decreasing sample sizes.

2.2.4 Sampling frame

The sampling frame for the RMD (see Figure 2.2.1a) includes all terrestrial areas within unit boundaries, except for the following:

- Slopes of ≥45° (for crew safety)
- Roads and buildings (including 100-m buffer)
- Trails, washes, and streams (including 50-m buffer)
- Selected fragile cultural features (e.g., Manning Cabin)

The total area excluded under these criteria was 18,372 acres (~7,435 ha), or 27% of the unit area.

2.2.5 Management assessment points as the link between science and management

To achieve the National Park Service's core mission of resource protection, resource management and monitoring must be explicitly linked (Bingham et al. 2007). We advocate the use of management assessment points as a bridge between science and management. Management assessment points are "pre-selected points along a continuum of resource-indicator values where scientists and managers have agreed to stop and assess the status or trend of a resource relative to program goals, natural variation, or potential concerns" (Bennetts et al. 2007).

Management assessment points therefore aid interpretation of ecological information within a management context. They do not define strict management or ecological thresholds, inevitably result in management actions, or reflect any legal or regulatory standard; they are only intended to serve as a potential early warning system allowing scientists and managers to pause, review the available information in detail, and consider options. Bennetts and others (2007) provided a detailed explanation of this concept and its application to monitoring and management of protected areas.

Although no management assessment points have been formally established for Saguaro NP, we intend to develop assessments points relevant to terrestrial vegetation and soils as part of the Natural Resource Condition Assessment (NRCA) process (see http://www.nature.nps.gov/water/NRCondition_Assessment_Program/Index.cfm). We expect the NRCA effort at Saguaro NP to begin in 2012 or 2013, pending funding and approval from the National Park Service Water Resources Division. For an example of the application of management assessment points, see *Terrestrial Vegetation and Soils Monitoring at Fort Bowie National Historic Site: 2008 Status Report* (Hubbard et al. 2010), available at: http://science.nature.nps.gov/im/units/sodn/docs/AR_FOBO_Uplands_2009.pdf.

2.2.6 Statistical power to distinguish status from management assessment points

Estimating our statistical power to distinguish current conditions (i.e., status) from management assessment points (see previous section) is important for both protocol design (especially for determining adequate sample sizes) and data interpretation. Adequate sample size (number of plots) is estimated by (Herrick et al. 2005b):

$$n = \frac{(S)^2 (Z_\alpha + Z_\beta)^2}{(MDC)^2}$$

Where:

S = standard deviation of the sample,

Z_α = Z-coefficient for false change (Type I) error (set at 90%),

Z_β = Z-coefficient for missed-change (Type II) error (set at 10%), and

MDC = minimum detectable change from the assessment point (set at 5–20%).

Bonham (1989), Elzinga and others (1998), and Herrick and others (2005b) provide detailed discussions of statistical power to detect differences from a standard.

2.2.7 Statistical power to detect trends

Statistical power is also important for evaluating trends (change over time) in monitoring parameters. Adequate sample size (number of plots) for detecting a trend of a given size across a landscape with permanent plots is estimated from:

$$n = \frac{(S_{diff})^2 (Z_\alpha + Z_\beta)^2}{(MDC)^2}$$

Where:

S_{diff} = Standard deviation of the differences between paired samples,

Z_α = Z-coefficient for false change (Type I) error (set at 90%),

Z_β = Z-coefficient for missed-change (Type II) error (set at 10%), and

MDC = minimum detectable change size between time 1 and time 2 (set at 5–20%)

Because we only have one year of data for this report, we estimated "S_{diff}" using the following equation:

$$S_{diff} = (S_1)(\sqrt{(2(1-corr_{diff}))})$$

Where:

S_1 = Sample standard deviation among sampling units at first time period, and

$corr_{diff}$ = estimated correlation coefficient between time 1 and time 2, set at 0.75.

Bonham (1989), Elzinga and others (1998), and Herrick and others (2005b) provide detailed discussions of statistical power to detect trend.

2.2.8 Evaluation of strata

The terrestrial vegetation monitoring design apportions long-term monitoring sites to strata to improve the efficiency of parkwide estimation of monitoring parameters of interest. It is assumed that vegetation and dynamic soil functional attributes respond differently to environmental factors that can be clearly defined and are immutable over management and monitoring timescales (Bonham 1989).

To evaluate the efficiency and pertinence of our preselected elevation strata, we contrasted the similarity of the vegetation communities on each stratum using Analysis of Similarity (ANOSIM) and non-metric multidimensional scaling (NMDS), non-parametric, multivariate community analysis techniques that make few assumptions about the data, yielding a simple yet powerful analysis tool (Clarke and Warwick 2001).

3 Results

3.1 Vegetation monitoring results

3.1.1 Provisional results

A data summary of provisional results is provided in Appendix A.

3.1.2 New species

Our 2008–2009 monitoring detected one species previously unknown at Saguaro NP: the forb *Malacothrix sonorae*, Sonoran desert dandelion. A voucher specimen was collected for accession into the park collection, which is stored at the University of Arizona and managed through an agreement with SODN and the National Park Service Western Archeological Conservation Center.

3.2 Evaluation of strata

Analysis of similarity (ANOSIM) results indicated significant differences (P ≤2.2%) between plant communities in three strata groupings by elevation:

- <4,501' (201, 202, and 302 strata, collectively)
- 4,501–6,000' (402 stratum)
- >6,000' (502 stratum)

For sites below 4,501', soil type (i.e., fine-textured 201 sites vs. rocky 202 sites) and elevation (<3,700' vs. 3,701–4,500') did not significantly (P ≥10%) differentiate plant community composition. Non-metric multidimensional scaling (NMDS; Figure 3.2) illustrates the similarity of sites below 4,501', regardless of vegetation height class. See Table 3.2 for complete results.

3.3 Estimates of power, species detectability

3.3.1 Power to detect trends in plant lifeforms and common perennial species

Our proposed sampling design met or exceeded our expectations for statistical power to detect trends in common perennial species (i.e., to detect a 10% absolute change in foliar cover with 90% power and 10% chance of a false change error), based on our design criteria. Our data in-

Table 3.2. Analysis of similarity (ANOSIM) results for pairwise tests contrasting vegetation composition by strata for (a) field, (b) subcanopy, and (c) canopy height classes for terrestrial vegetation monitoring at the Rincon Mountain District, Saguaro NP, 2008–2009.

a. Field (<0.5 m)
Global R: 0.529, P = 0.1%

Groups	R	P
201 vs. 202	0.05	20.0%
201 vs. 302	0.833	10.0%
201 vs. 402	0.996	**2.2%**
201 vs. 502	0.489	**5.5%**
202 vs. 302	-0.185	80.0%
202 vs. 402	0.973	**0.6%**
202 vs. 502	0.616	**0.5%**
302 vs. 402	0.957	**0.6%**
302 vs. 502	0.633	**0.5%**
402 vs. 502	0.281	**0.9%**

b. Subcanopy (0.5–2.0 m)
Global R: 0.708, P = 0.1%

Groups	R	P
201 vs. 202	0.5	20.0%
201 vs. 302	0.5	20.0%
201 vs. 402	0.991	**2.2%**
201 vs. 502	1	**1.8%**
202 vs. 302	-0.222	80.0%
202 vs. 402	0.978	**0.6%**
202 vs. 502	1	**0.5%**
302 vs. 402	0.914	**0.6%**
302 vs. 502	0.892	**0.5%**
402 vs. 502	0.35	**0.2%**

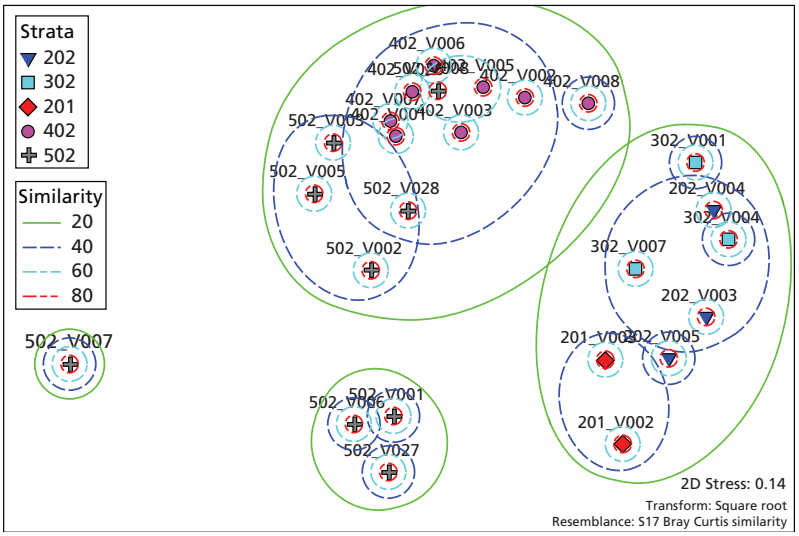
c. Canopy (>2.0 m)
Global R: 0.621, P = 0.1%

Groups	R	P
201 vs. 202	-0.083	70.0%
201 vs. 302	0.167	50.0%
201 vs. 402	0.713	**2.2%**
201 vs. 502	0.934	**1.8%**
202 vs. 302	-0.188	80.0%
202 vs. 402	0.677	**0.6%**
202 vs. 502	0.923	**0.5%**
302 vs. 402	0.71	**0.6%**
302 vs. 502	0.949	**0.5%**
402 vs. 502	0.42	**0.2%**

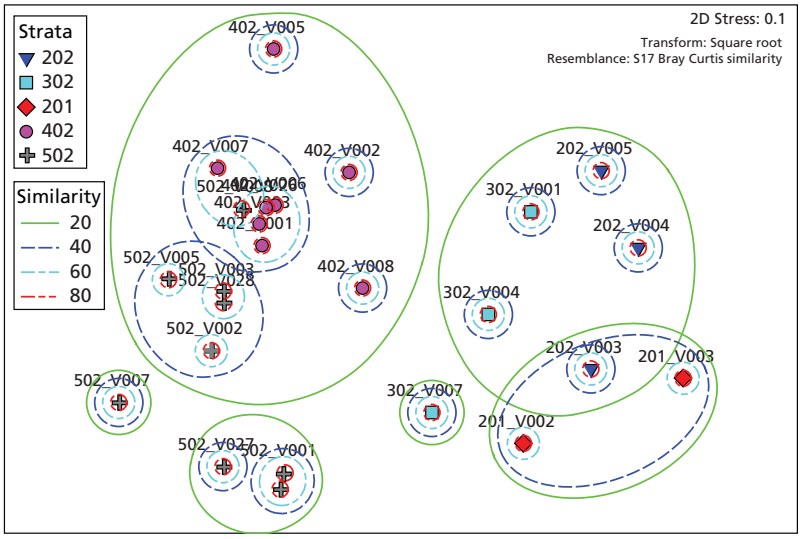
Bolded values are statistically significant at our selected P value threshold.

Figure 3.2. Non-metric multidimensional scaling indicating similarity of (a) field, (b) subcanopy, and (c) canopy layer communities. The distance between any two points increases as their composition and structure differ.

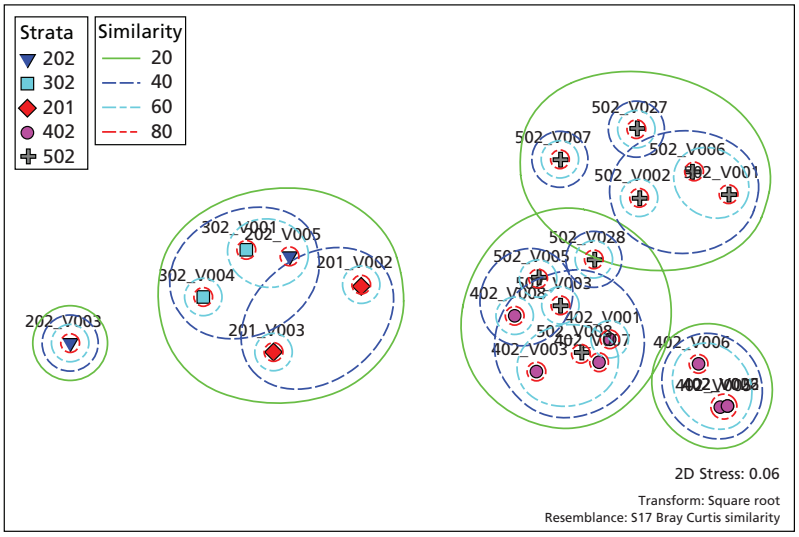
a) Field (<0.5 m)



b) Subcanopy (0.5–2.0 m)



c) Canopy (>2.0 m)



dicate that we will be able to detect a 5% change (absolute foliar cover) for nearly all detected perennial species with the current level of sampling intensity (see Appendix A).

Our statistical power to detect trends in most lifeforms also met or exceeded our criteria, with a few exceptions. Sites on fine-textured soils below 3,701' in elevation (201 stratum) were the most problematic, probably as a result of the small proposed sample size (n=2). For these sites, our power to detect trends in total foliar cover in the field and subcanopy layers failed to meet our change detection target, with estimated differences of only 12% and 18% (respectively) being detectable with our criteria and sample size (Appendix A, Tables A1 and A2). Annual grass lifeforms (field layer) and shrubs (subcanopy) were the primary contributors to cover in each layer, and were also beyond our target—at 19% and 12%, respectively—for the 201 stratum (Appendix A, Tables A1 and A2).

Power to detect changes in lifeform cover for the other strata was excellent, although estimated change detection for tree lifeforms and total canopy cover on sites above 6,000' barely failed to meet our design criteria, at 11% each (Appendix A, Table A3).

3.3.2 Power for trend in uncommon perennial species

Our design met or exceeded our sampling objectives for detecting trends in most uncommon perennial species (i.e., to detect at least a 10% change in within-plot frequency with 90% power and 10% chance of false change error) for species encountered only in frequency subplots. Nine species with relatively high within-plot frequencies and high variance had less power to detect change (Appendix A, Table A4) based on frequency. However, all of these species were also detected as vegetation cover along the line-point transects, which provide far more precise estimates and improved statistical power than frequency does (Tables A1–A3).

3.3.3 Plant species detectability

Line-point intercepts on the 25 monitoring sites sampled in 2008 and 2009 (see Figure 3.3.3a) detected 183 perennial species, and employing the frequency subplots added 51 perennial species. Slope decreased markedly on species accumulation curves (Figure 3.3.3b), suggesting diminishing returns for detecting new species with increased sampling intensity.

3.3.4 Power for trend in soil parameters

Our design met or exceeded our sampling objectives for most soil parameters (i.e., to detect at least a 10% change in within-plot frequency with 90% power and 10% chance of false change error) at the proposed sampling intensity (Appendix A, Table A5). Exceptions were litter and duff cover on fine- and coarse-textured sites below 3,701' (the 201 and 202 strata, respectively), and rock cover on coarse-textured sites below 3,701' (202 stratum). Soil stability met or exceeded our criteria for all strata.

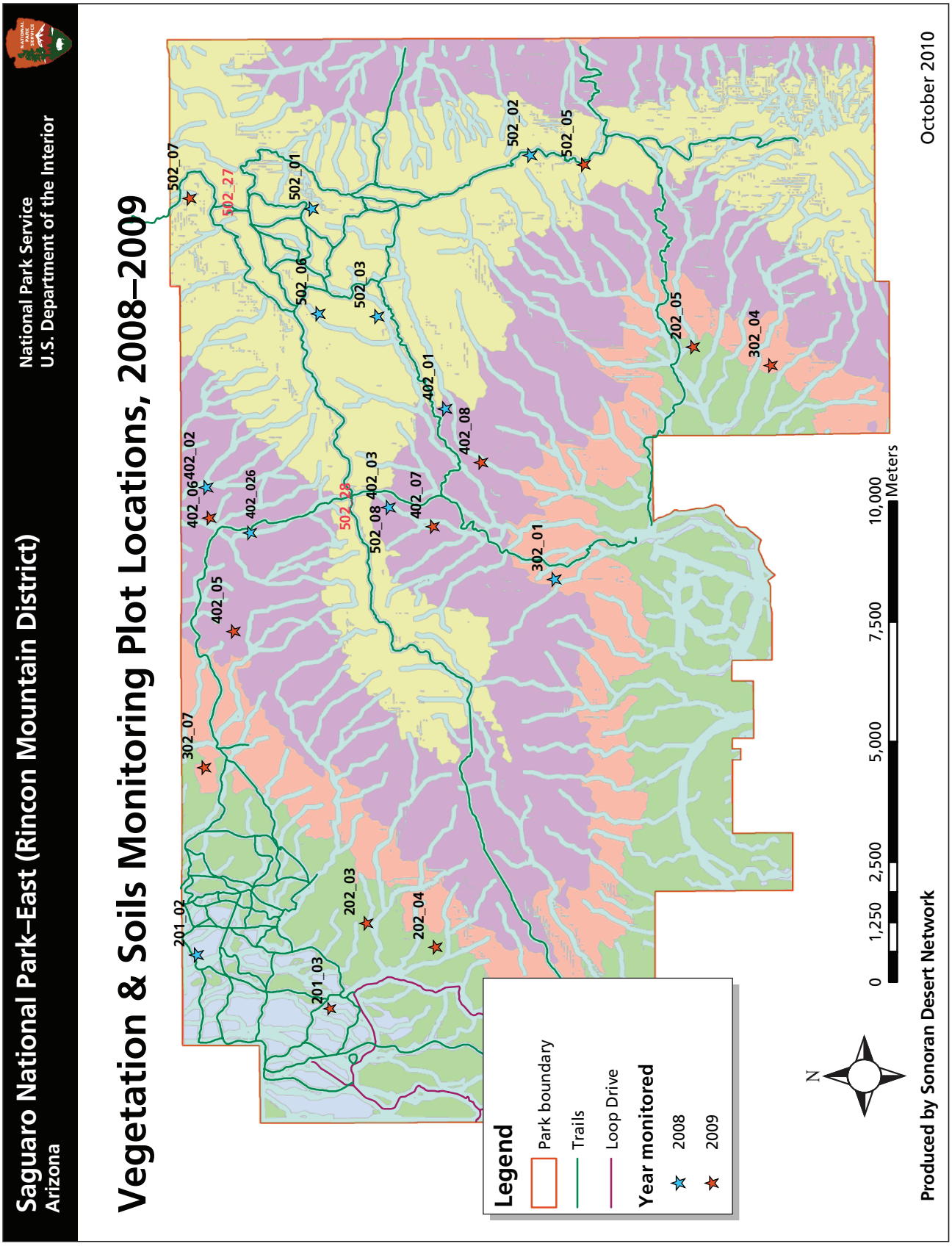


Figure 3.3.3a. Monitoring sites sampled in 2008 and 2009, Rincon Mountain District, Saguaro NP.

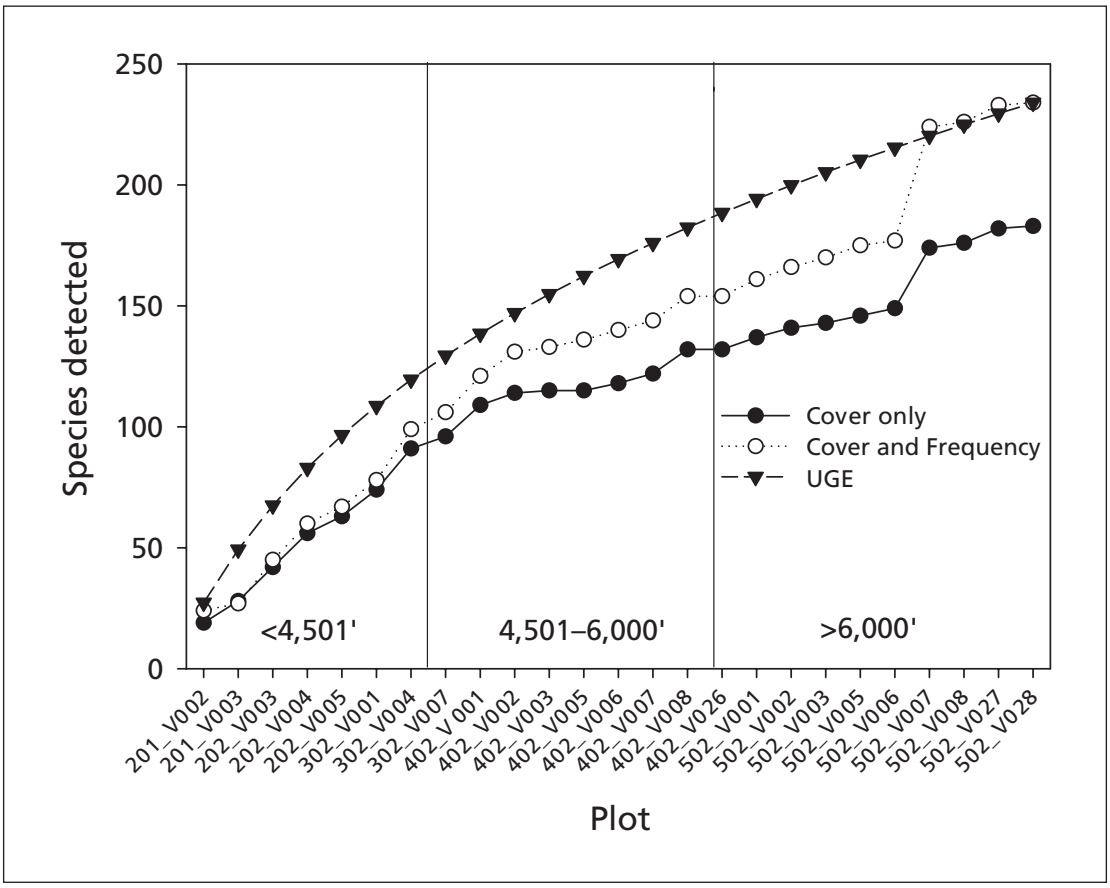


Figure 3.3.3b. Species area curves for cover and frequency data collected on terrestrial vegetation and soils plots in the Rincon Mountain District, Saguaro NP, 2008 and 2009. Curves show cumulative numbers of species detected as plots are added. UGE = mean species accumulation curve with samples entered in random order (Ugland et al. 2003).

4 Discussion

4.1 Are the strata effective?

Our results suggest that the vegetation communities at lower elevations are not well-differentiated by our strata (201, fine-textured sites, <3,701'; 202, rocky sites, <3,701'; 302, coarse-textured sites, 3,701–4500'). This may be an artifact of the small sample sizes of the smaller areas contained within these limited strata, or it may be that vegetation communities are sufficiently similar that strata could be combined. To evaluate this question, we will add three sites to stratum 201 in fall 2010, and reassess in the next annual data summary. If sample sizes are not responsible for the similarity between low-elevation sites, than we will conclude that the strata are not sufficiently different, and combine strata 201, 202, and 203. If combining strata is warranted, we could adjust our sample sizes downward for low-elevation monitoring and save field effort and cost.

The mid- and high-elevation (402 and 502, respectively) strata are efficient, and are clearly differentiated from each other and the lower sites. These strata should be maintained in the permanent monitoring design.

4.2 Does the sample size meet our criteria?

Estimated statistical power to detect change was excellent, based on the proposed sample size. In fact, we were pleased and surprised to have met (and nearly always exceeded) our target criteria for change detection for perennial species. Aggregating species to lifeforms tends to decrease power by increasing the mean and variance. However, we still met our power criteria for lifeforms, with a few minor exceptions. Sample size for statistical power is excellent, and does not require any adjustments.

We detected only 234 (20%) of the 1,170 known species in the Rincon Mountain District of Saguaro NP (Powell et al. 2006). However, less than 50% of the sites have been sampled, the sampling frame excludes aquatic, riparian, and xeroripiarian sites that are biodiversity hotspots, and annuals are not identified to species under this protocol. In addition, the flattening of the species accumulation curves suggested that our species detectability is quite reasonable. As a result, we do not recommend any increases in sample size for species detectability at this time. We will reassess this conclusion annually in future data summaries.

4.3 Implications for terrestrial vegetation and soils monitoring

This effort entailed some of the first terrestrial vegetation and soils monitoring performed in the SODN. Much of our focus was, therefore, on evaluating the efficacy of the sampling and response designs to support improvement of the protocol. We found the plot sampling design to be efficient; most plots were sampled within 2–4 hours, including tasks that will not need to be repeated in successive visits (e.g., initial plot layout, permanent marking and mapping, collection of in situ soil and landscape parameters).

In particular, stationing relatively large crews at Manning Camp for extended periods proved to be an effective, safe approach for sampling less accessible backcountry sites, whereas low-elevation sites could be efficiently measured through day trips at multiple access points. The high number of sites that failed to meet our criteria for safe access suggests that preliminary scouting of planned sites is likely a worthwhile endeavor.

After comparing these results with our monitoring objectives, we conclude that the sampling design is appropriate. We will re-evaluate the effectiveness of lower-elevation strata, as per Section 4.1, through additional sampling in fall 2010.

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Appendix A. Supplementary Data Tables

Unless otherwise noted, the following categories and notations apply throughout this appendix:

Stratum	Elevation	Description	Number of plots
201	2,501–3,700'	Loamy	2
202	2,501–3,700'	Very to Extremely Rocky	11
302	3,701–4,500'		8
402	4,501–6,000'		21
502	>6,000'		18

Layer	Stature
Field	<0.5 m
Subcanopy	0.5–2.0 m
Canopy	>2.0 m

- AVG = average
- MDC = minimum detectable change (% cover)
- n = required number of plots for power criteria
- SD = standard deviation
- Sdiff = standard deviation of the differences
- SE = standard error
- Highlighted species failed to meet our statistical power criteria.

Table A1a. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures		Across-plot measures					
Species	201_V02	201_V03	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs								
Allionia incarnata	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Antennaria marginata	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Artemisia ludoviciana	0.42%	0.00%	0.2%	0.3%	0.2%	0.2%	5%	1
Astrolepis cochisensis	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Boerhavia coccinea	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bommeria hispida	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Chamaesyce	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cheilanthes	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cheilanthes fendleri	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Commelina dianthifolia	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Conyza bonariensis	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dalea	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Daucus pusillus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Draba helleriana	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Erigeron oreophilus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eriogonum abertianum	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Evolvulus alsinoides	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Evolvulus arizonicus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Heuchera sanguinea	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Koanophyllon	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mentzelia	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Nicotiana obtusifolia	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Notholaena standleyi	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Oxalis	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Packera neomexicana	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pellaea wrightiana	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pseudognaphalium canescens ssp. *canescens*	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pteridium aquilinum	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Salvia arizonica	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Schoenocrambe linearifolia	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Selaginella arizonica	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Thalictrum fendleri	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Verbesina encelioides	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Viola canadensis	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Woodsia plummerae	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Graminoids								
Aristida purpurea	0.42%	0.00%	0.2%	0.3%	0.2%	0.2%	5%	1
Aristida schiedeana	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Aristida ternipes	0.00%	0.83%	0.4%	0.6%	0.4%	0.4%	5%	1

Table A1a. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures		Across-plot measures					
Species	**201_V02**	**201_V03**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Graminoids, cont.								
Aristida ternipes var. *gentilis*	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Blepharoneuron tricholepis	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua curtipendula	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua eriopoda	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua hirsuta	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua repens	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bromus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bromus ciliatus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bromus rubens	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Carex geophila	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dasyochloa pulchella	0.83%	0.42%	0.6%	0.3%	0.2%	0.2%	5%	1
Digitaria californica	0.00%	2.92%	1.5%	2.1%	1.5%	1.5%	5%	1
Elymus glaucus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Enneapogon mollis	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eragrostis intermedia	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eragrostis lehmanniana	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Heteropogon contortus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Leptochloa dubia	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lycurus setosus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Muhlenbergia emersleyi	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Muhlenbergia polycaulis	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Muhlenbergia porteri	3.75%	6.67%	5.2%	2.1%	1.5%	1.5%	5%	1
Panicum	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Panicum bulbosum	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Piptochaetium fimbriatum	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Piptochaetium pringlei	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Poa fendleriana	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Schizachyrium cirratum	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Setaria	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Setaria grisebachii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Sporobolus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trachypogon spicatus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Subshrubs								
Abutilon incanum	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Acacia angustissima	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ageratina herbacea	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ambrosia ambrosioides	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ayenia filiformis	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A1a. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures		Across-plot measures					
Species	**201_V02**	**201_V03**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Subshrubs, cont.								
Bouvardia ternifolia	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia atractyloides	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia californica	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia grandiflora	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Comandra umbellata	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dalea pulchra	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Encelia farinosa	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ericameria laricifolia	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eriogonum jamesii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eriogonum wrightii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Galium wrightii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ipomopsis multiflora	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lotus rigidus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Macrosiphonia brachysiphon	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Manihot angustiloba	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Nolina microcarpa	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Penstemon linarioides	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Porophyllum gracile	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Rubus neomexicanus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Senna covesii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Sphaeralcea	0.00%	0.42%	0.2%	0.3%	0.2%	0.2%	5%	1
Trichostema arizonicum	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Zinnia acerosa	5.83%	1.67%	3.8%	2.9%	2.1%	2.1%	5%	2
Shrubs								
Aloysia wrightii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Arctostaphylos pungens	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Calliandra	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Calliandra eriophylla	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ceanothus fendleri	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ceanothus integerrimus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Celtis ehrenbergiana	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Condalia	0.83%	0.00%	0.4%	0.6%	0.4%	0.4%	5%	1
Condalia correllii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Crossosoma bigelovii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ephedra	0.00%	0.42%	0.2%	0.3%	0.2%	0.2%	5%	1
Fouquieria splendens	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Garrya wrightii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Gossypium thurberi	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A1a. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures		Across-plot measures					
Species	**201_V02**	**201_V03**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Shrubs, cont.								
Holodiscus discolor	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Holodiscus dumosus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Jacquemontia pringlei	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Jatropha cardiophylla	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Larrea tridentata	6.25%	0.42%	3.3%	4.1%	2.9%	2.9%	7%	2
Lycium pallidum	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mimosa aculeaticarpa	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mimosa aculeaticarpa var. *biuncifera*	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Symphoricarpos oreophilus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Succulents								
Acalypha californica	0.42%	0.00%	0.2%	0.3%	0.2%	0.2%	5%	1
Agave palmeri	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Agave schottii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia bigelovii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia leptocaulis	2.08%	2.50%	2.3%	0.3%	0.2%	0.2%	5%	1
Cylindropuntia versicolor	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dasylirion wheeleri	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ferocactus wislizeni	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mammillaria	0.42%	0.00%	0.2%	0.3%	0.2%	0.2%	5%	1
Opuntia	0.42%	0.00%	0.2%	0.3%	0.2%	0.2%	5%	1
Opuntia engelmannii	1.67%	2.50%	2.1%	0.6%	0.4%	0.4%	5%	1
Opuntia phaeacantha	0.42%	2.08%	1.3%	1.2%	0.8%	0.8%	5%	1
Yucca madrensis	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trees								
Acacia constricta	7.50%	1.67%	4.6%	4.1%	2.9%	2.9%	7%	2
Acacia greggii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Celtis laevigata	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dodonaea viscosa	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Juniperus deppeana	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus discolor	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus ponderosa	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis velutina	0.42%	0.42%	0.4%	0.0%	0.0%	0.0%	5%	0
Pseudotsuga menziesii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus arizonica	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus emoryi	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus gambelii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus hypoleucoides	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus rugosa	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A1a. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures		Across-plot measures					
Species	**201_V02**	**201_V03**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Vines								
Galium aparine	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Janusia gracilis	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Totals by lifeform								
Annual Forb	0.00%	1.25%	0.6%	0.9%	0.6%	0.6%	5%	1
Annual Grass	0.00%	18.33%	9.2%	13.0%	9.2%	9.2%	19%	2
Perennial Forb	0.42%	0.00%	0.2%	0.3%	0.2%	0.2%	5%	1
Perennial Grass	5.00%	10.83%	7.9%	4.1%	2.9%	2.9%	7%	2
Subshrubs	5.83%	2.08%	4.0%	2.7%	1.9%	1.9%	5%	2
Shrubs	7.08%	0.83%	4.0%	4.4%	3.1%	3.1%	7%	2
Succulents	5.42%	7.08%	6.3%	1.2%	0.8%	0.8%	5%	1
Trees	7.92%	2.08%	5.0%	4.1%	2.9%	2.9%	7%	2
Snag	12.50%	12.92%	12.7%	0.3%	0.2%	0.2%	5%	1
Vines	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Total	31.67%	42.50%	37.1%	7.7%	5.4%	5.4%	12%	2

Table A1b. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures			Across-plot measures					
Species	202_V03	202_V04	202_V05	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs									
Allionia incarnata	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Antennaria marginata	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Artemisia ludoviciana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Astrolepis cochisensis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Boerhavia coccinea	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bommeria hispida	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Chamaesyce	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Cheilanthes	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cheilanthes fendleri	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Commelina dianthifolia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Conyza bonariensis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dalea	1.25%	0.00%	0.00%	0.4%	0.7%	0.4%	0.5%	5%	1
Daucus pusillus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Draba helleriana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Erigeron oreophilus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eriogonum abertianum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Evolvulus alsinoides	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Evolvulus arizonicus	0.00%	0.83%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Heuchera sanguinea	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Koanophyllon	0.00%	0.00%	5.00%	1.7%	2.9%	1.7%	2.0%	5%	2
Mentzelia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Nicotiana obtusifolia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Notholaena standleyi	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Oxalis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Packera neomexicana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pellaea wrightiana	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Pseudognaphalium canescens ssp. *canescens*	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pteridium aquilinum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Salvia arizonica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Schoenocrambe linearifolia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Selaginella arizonica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Thalictrum fendleri	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Verbesina encelioides	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Viola canadensis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Woodsia plummerae	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Graminoids									
Aristida purpurea	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Aristida schiedeana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Aristida ternipes	0.00%	0.42%	0.42%	0.3%	0.2%	0.1%	0.2%	5%	1

Table A1b. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures			Across-plot measures					
Species	**202_V03**	**202_V04**	**202_V05**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Graminoids, cont.									
Aristida ternipes var. *gentilis*	0.83%	0.00%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Blepharoneuron tricholepis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua curtipendula	0.00%	9.17%	0.00%	3.1%	5.3%	3.1%	3.7%	5%	5
Bouteloua eriopoda	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua hirsuta	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua repens	1.67%	0.42%	0.00%	0.7%	0.9%	0.5%	0.6%	5%	1
Bromus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bromus ciliatus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bromus rubens	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Carex geophila	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dasyochloa pulchella	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Digitaria californica	0.00%	0.42%	1.25%	0.6%	0.6%	0.4%	0.5%	5%	1
Elymus glaucus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Enneapogon mollis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eragrostis intermedia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eragrostis lehmanniana	0.00%	1.67%	5.00%	2.2%	2.5%	1.5%	1.8%	5%	2
Heteropogon contortus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Leptochloa dubia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lycurus setosus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Muhlenbergia emersleyi	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Muhlenbergia polycaulis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Muhlenbergia porteri	0.42%	2.08%	2.50%	1.7%	1.1%	0.6%	0.8%	5%	1
Panicum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Panicum bulbosum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Piptochaetium fimbriatum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Piptochaetium pringlei	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Poa fendleriana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Schizachyrium cirratum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Setaria	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Setaria grisebachii	0.00%	0.00%	0.42%	0.1%	0.2%	0.1%	0.2%	5%	1
Sporobolus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trachypogon spicatus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Subshrubs									
Abutilon incanum	0.00%	1.67%	0.00%	0.6%	1.0%	0.6%	0.7%	5%	1
Acacia angustissima	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ageratina herbacea	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ambrosia ambrosioides	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ayenia filiformis	0.00%	0.83%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Bouvardia ternifolia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A1b. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures			Across-plot measures					
Species	**202_V03**	**202_V04**	**202_V05**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Subshrubs, cont.									
Brickellia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia atractyloides	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia californica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia grandiflora	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Comandra umbellata	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dalea pulchra	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Encelia farinosa	17.50%	1.25%	0.00%	6.3%	9.8%	5.6%	6.9%	7%	9
Ericameria laricifolia	0.00%	1.25%	0.00%	0.4%	0.7%	0.4%	0.5%	5%	1
Eriogonum jamesii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eriogonum wrightii	0.00%	0.83%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Galium wrightii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ipomopsis multiflora	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lotus rigidus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Macrosiphonia brachysiphon	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Manihot angustiloba	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Nolina microcarpa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Penstemon linarioides	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Porophyllum gracile	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Rubus neomexicanus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Senna covesii	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Sphaeralcea	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trichostema arizonicum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Zinnia acerosa	0.00%	0.00%	0.42%	0.1%	0.2%	0.1%	0.2%	5%	1
Shrubs									
Aloysia wrightii	0.00%	0.00%	2.92%	1.0%	1.7%	1.0%	1.2%	5%	1
Arctostaphylos pungens	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Calliandra	0.00%	4.58%	0.00%	1.5%	2.6%	1.5%	1.9%	5%	2
Calliandra eriophylla	6.67%	0.00%	0.00%	2.2%	3.8%	2.2%	2.7%	5%	3
Ceanothus fendleri	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ceanothus integerrimus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Celtis ehrenbergiana	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Condalia	1.25%	0.00%	0.00%	0.4%	0.7%	0.4%	0.5%	5%	1
Condalia correllii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Crossosoma bigelovii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ephedra	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Fouquieria splendens	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Garrya wrightii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Gossypium thurberi	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Holodiscus discolor	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Holodiscus dumosus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A1b. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures			Across-plot measures					
Species	**202_V03**	**202_V04**	**202_V05**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Shrubs, cont.									
Jacquemontia pringlei	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Jatropha cardiophylla	2.08%	1.67%	0.00%	1.3%	1.1%	0.6%	0.8%	5%	1
Larrea tridentata	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lycium pallidum	0.00%	0.00%	0.83%	0.3%	0.5%	0.3%	0.3%	5%	1
Mimosa aculeaticarpa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mimosa aculeaticarpa var. *biuncifera*	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Symphoricarpos oreophilus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Succulents									
Acalypha californica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Agave palmeri	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Agave schottii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia bigelovii	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Cylindropuntia leptocaulis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia versicolor	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Dasylirion wheeleri	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ferocactus wislizeni	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mammillaria	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Opuntia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Opuntia engelmannii	1.67%	3.75%	2.08%	2.5%	1.1%	0.6%	0.8%	5%	1
Opuntia phaeacantha	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Yucca madrensis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trees									
Acacia constricta	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Acacia greggii	0.83%	2.92%	0.83%	1.5%	1.2%	0.7%	0.9%	5%	1
Celtis laevigata	0.00%	0.00%	2.50%	0.8%	1.4%	0.8%	1.0%	5%	1
Dodonaea viscosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Juniperus deppeana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus discolor	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus ponderosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis velutina	0.00%	0.00%	1.25%	0.4%	0.7%	0.4%	0.5%	5%	1
Pseudotsuga menziesii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus arizonica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus emoryi	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus gambelii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus hypoleucoides	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus rugosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Vines									
Galium aparine	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Janusia gracilis	8.33%	3.33%	0.00%	3.9%	4.2%	2.4%	3.0%	5%	4

Table A1b. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures			Across-plot measures					
Species	**202_V03**	**202_V04**	**202_V05**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Totals by lifeform									
Annual Forb	1.67%	2.92%	0.42%	1.7%	1.3%	0.7%	0.9%	5%	1
Annual Grass	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Perennial Forb	1.25%	2.08%	5.00%	2.8%	2.0%	1.1%	1.4%	5%	1
Perennial Grass	2.92%	14.17%	9.58%	8.9%	5.7%	3.3%	4.0%	5%	6
Subshrubs	18.33%	6.25%	0.42%	8.3%	9.1%	5.3%	6.5%	6%	10
Shrubs	10.42%	6.67%	3.75%	6.9%	3.3%	1.9%	2.4%	5%	2
Succulents	2.50%	3.75%	2.08%	2.8%	0.9%	0.5%	0.6%	5%	1
Trees	0.83%	2.92%	4.58%	2.8%	1.9%	1.1%	1.3%	5%	1
Snag	7.08%	3.33%	3.75%	4.7%	2.1%	1.2%	1.5%	5%	1
Vines	8.33%	3.33%	0.00%	3.9%	4.2%	2.4%	3.0%	5%	4
Total	46.67%	42.08%	25.83%	38.2%	10.9%	6.3%	7.7%	7%	11

Table A1c. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures			Across-plot measures					
Species	V302_01	302_V04	302_V07	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs									
Allionia incarnata	0.00%	0.00%	1.67%	0.6%	1.0%	0.6%	0.7%	5%	1
Antennaria marginata	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Artemisia ludoviciana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Astrolepis cochisensis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Boerhavia coccinea	0.83%	0.00%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Bommeria hispida	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Chamaesyce	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cheilanthes	0.00%	0.00%	0.42%	0.1%	0.2%	0.1%	0.2%	5%	1
Cheilanthes fendleri	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Commelina dianthifolia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Conyza bonariensis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dalea	0.00%	0.00%	8.33%	2.8%	4.8%	2.8%	3.4%	5%	4
Daucus pusillus	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Draba helleriana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Erigeron oreophilus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eriogonum abertianum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Evolvulus alsinoides	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Evolvulus arizonicus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Heuchera sanguinea	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Koanophyllon	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mentzelia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Nicotiana obtusifolia	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Notholaena standleyi	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Oxalis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Packera neomexicana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pellaea wrightiana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pseudognaphalium canescens ssp. *canescens*	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pteridium aquilinum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Salvia arizonica	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Schoenocrambe linearifolia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Selaginella arizonica	0.00%	1.25%	0.00%	0.4%	0.7%	0.4%	0.5%	5%	1
Thalictrum fendleri	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Verbesina encelioides	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Viola canadensis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Woodsia plummerae	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Graminoids									
Aristida purpurea	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Aristida schiedeana	0.00%	3.33%	0.00%	1.1%	1.9%	1.1%	1.4%	5%	1
Aristida ternipes	9.17%	4.58%	0.42%	4.7%	4.4%	2.5%	3.1%	5%	4
Aristida ternipes var. *gentilis*	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A1c. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures			Across-plot measures					
Species	**V302_01**	**302_V04**	**302_V07**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Graminoids, cont.									
Blepharoneuron tricholepis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua	0.00%	0.83%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Bouteloua curtipendula	9.58%	10.42%	4.17%	8.1%	3.4%	2.0%	2.4%	5%	2
Bouteloua eriopoda	2.50%	0.00%	0.00%	0.8%	1.4%	0.8%	1.0%	5%	1
Bouteloua hirsuta	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua repens	1.67%	0.42%	0.42%	0.8%	0.7%	0.4%	0.5%	5%	1
Bromus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bromus ciliatus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bromus rubens	0.83%	0.00%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Carex geophila	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dasyochloa pulchella	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Digitaria californica	2.08%	2.08%	0.00%	1.4%	1.2%	0.7%	0.9%	5%	1
Elymus glaucus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Enneapogon mollis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eragrostis intermedia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eragrostis lehmanniana	2.50%	0.00%	0.00%	0.8%	1.4%	0.8%	1.0%	5%	1
Heteropogon contortus	0.00%	1.25%	0.00%	0.4%	0.7%	0.4%	0.5%	5%	1
Leptochloa dubia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lycurus setosus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Muhlenbergia emersleyi	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Muhlenbergia polycaulis	0.00%	0.00%	0.83%	0.3%	0.5%	0.3%	0.3%	5%	1
Muhlenbergia porteri	9.17%	2.50%	3.75%	5.1%	3.5%	2.0%	2.5%	5%	3
Panicum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Panicum bulbosum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Piptochaetium fimbriatum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Piptochaetium pringlei	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Poa fendleriana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Schizachyrium cirratum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Setaria	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Setaria grisebachii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Sporobolus	0.00%	4.17%	0.00%	1.4%	2.4%	1.4%	1.7%	5%	1
Trachypogon spicatus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Subshrubs									
Abutilon incanum	0.42%	0.00%	0.42%	0.3%	0.2%	0.1%	0.2%	5%	1
Acacia angustissima	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ageratina herbacea	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ambrosia ambrosioides	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Ayenia filiformis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouvardia ternifolia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia	1.67%	0.00%	0.00%	0.6%	1.0%	0.6%	0.7%	5%	1

Table A1c. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures			Across-plot measures					
Species	**V302_01**	**302_V04**	**302_V07**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Subshrubs, cont.									
Brickellia atractyloides	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Brickellia californica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia grandiflora	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Comandra umbellata	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dalea pulchra	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Encelia farinosa	0.00%	0.42%	3.75%	1.4%	2.1%	1.2%	1.5%	5%	1
Ericameria laricifolia	2.92%	0.42%	0.00%	1.1%	1.6%	0.9%	1.1%	5%	1
Eriogonum jamesii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eriogonum wrightii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Galium wrightii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ipomopsis multiflora	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lotus rigidus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Macrosiphonia brachysiphon	0.00%	1.25%	0.00%	0.4%	0.7%	0.4%	0.5%	5%	1
Manihot angustiloba	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Nolina microcarpa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Penstemon linarioides	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Porophyllum gracile	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Rubus neomexicanus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Senna covesii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Sphaeralcea	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trichostema arizonicum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Zinnia acerosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Shrubs									
Aloysia wrightii	0.83%	0.00%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Arctostaphylos pungens	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Calliandra	0.42%	0.00%	4.58%	1.7%	2.5%	1.5%	1.8%	5%	2
Calliandra eriophylla	0.00%	1.67%	0.00%	0.6%	1.0%	0.6%	0.7%	5%	1
Ceanothus fendleri	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ceanothus integerrimus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Celtis ehrenbergiana	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Condalia	0.00%	1.25%	0.00%	0.4%	0.7%	0.4%	0.5%	5%	1
Condalia correllii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Crossosoma bigelovii	0.83%	0.00%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Ephedra	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Fouquieria splendens	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Garrya wrightii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Gossypium thurberi	0.42%	0.42%	0.00%	0.3%	0.2%	0.1%	0.2%	5%	1
Holodiscus discolor	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Holodiscus dumosus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Jacquemontia pringlei	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A1c. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures			Across-plot measures					
Species	**V302_01**	**302_V04**	**302_V07**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Shrubs, cont.									
Jatropha cardiophylla	0.00%	1.25%	0.00%	0.4%	0.7%	0.4%	0.5%	5%	1
Larrea tridentata	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lycium pallidum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mimosa aculeaticarpa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mimosa aculeaticarpa var. *biuncifera*	3.33%	0.00%	0.00%	1.1%	1.9%	1.1%	1.4%	5%	1
Symphoricarpos oreophilus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Succulents									
Acalypha californica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Agave palmeri	1.25%	0.42%	0.00%	0.6%	0.6%	0.4%	0.5%	5%	1
Agave schottii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia bigelovii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia leptocaulis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia versicolor	0.00%	0.42%	0.42%	0.3%	0.2%	0.1%	0.2%	5%	1
Dasylirion wheeleri	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ferocactus wislizeni	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Mammillaria	0.00%	0.42%	0.42%	0.3%	0.2%	0.1%	0.2%	5%	1
Opuntia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Opuntia engelmannii	6.25%	0.83%	0.42%	2.5%	3.3%	1.9%	2.3%	5%	2
Opuntia phaeacantha	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Yucca madrensis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trees									
Acacia constricta	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Acacia greggii	0.00%	0.42%	0.83%	0.4%	0.4%	0.2%	0.3%	5%	1
Celtis laevigata	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dodonaea viscosa	0.00%	1.67%	0.00%	0.6%	1.0%	0.6%	0.7%	5%	1
Juniperus deppeana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus discolor	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus ponderosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis velutina	3.33%	0.42%	0.00%	1.3%	1.8%	1.0%	1.3%	5%	1
Pseudotsuga menziesii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus arizonica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus emoryi	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus gambelii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus hypoleucoides	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus rugosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Vines									
Galium aparine	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Janusia gracilis	0.00%	2.50%	1.67%	1.4%	1.3%	0.7%	0.9%	5%	1

Table A1c. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures			Across-plot measures					
Species	**V302_01**	**302_V04**	**302_V07**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Totals by lifeform									
Annual Forb	2.08%	0.42%	0.42%	1.0%	1.0%	0.6%	0.7%	5%	1
Annual Grass	0.42%	0.00%	1.25%	0.6%	0.6%	0.4%	0.5%	5%	1
Perennial Forb	1.25%	2.08%	10.42%	4.6%	5.1%	2.9%	3.6%	5%	5
Perennial Grass	38.75%	30.00%	9.58%	26.1%	15.0%	8.6%	10.6%	11%	8
Subshrubs	5.00%	2.92%	4.17%	4.0%	1.0%	0.6%	0.7%	5%	1
Shrubs	6.25%	5.00%	4.58%	5.3%	0.9%	0.5%	0.6%	5%	1
Succulents	7.50%	2.50%	1.25%	3.8%	3.3%	1.9%	2.3%	5%	2
Trees	3.33%	2.50%	0.83%	2.2%	1.3%	0.7%	0.9%	5%	1
Snag	1.25%	7.92%	11.67%	6.9%	5.3%	3.0%	3.7%	5%	5
Vines	0.00%	2.50%	1.67%	1.4%	1.3%	0.7%	0.9%	5%	1
Total	64.58%	47.92%	34.17%	48.9%	15.2%	8.8%	10.8%	12%	7

Table A1d. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures								Across-plot measures					
Species	402_V01	402_V02	402_V03	402_V05	402_V06	402_V07	402_V08	402_V26	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs														
Allionia incarnata	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Antennaria marginata	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Artemisia ludoviciana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.92%	0.00%	0.4%	1.0%	0.4%	0.7%	5%	1
Astrolepis cochisensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.67%	0.00%	0.8%	2.4%	0.8%	1.7%	5%	1
Boerhavia coccinea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bommeria hispida	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.1%	0.1%	0.1%	0.1%	5%	1
Chamaesyce	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cheilanthes	2.50%	0.42%	0.00%	0.42%	0.00%	0.00%	0.00%	0.00%	0.4%	0.9%	0.3%	0.6%	5%	1
Cheilanthes fendleri	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.1%	0.1%	0.1%	0.1%	5%	1
Commelina dianthifolia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Conyza bonariensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dalea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Daucus pusillus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Draba helleriana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Erigeron oreophilus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eriogonum abertianum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.1%	0.1%	0.1%	0.1%	5%	1
Evolvulus alsinoides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Evolvulus arizonicus	0.00%	1.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.2%	0.4%	0.2%	0.3%	5%	1
Heuchera sanguinea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Koanophyllon	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mentzelia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Nicotiana obtusifolia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Notholaena standleyi	0.42%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.1%	0.1%	0.1%	0.1%	5%	1
Oxalis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Packera neomexicana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pellaea wrightiana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pseudognaphalium canescens ssp. *canescens*	2.92%	0.00%	1.25%	0.00%	0.00%	0.00%	0.00%	1.67%	0.7%	1.1%	0.4%	0.8%	5%	1

Table A1d. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures								Across-plot measures					
Species	**402_V01**	**402_V02**	**402_V03**	**402_V05**	**402_V06**	**402_V07**	**402_V08**	**402_V26**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Forbs/Herbs, cont.														
Pteridium aquilinum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Salvia arizonica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Schoenocrambe linearifolia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Selaginella arizonica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Thalictrum fendleri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Verbesina encelioides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.50%	0.00%	0.3%	0.9%	0.3%	0.6%	5%	1
Viola canadensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Woodsia plummerae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Graminoids														
Aristida purpurea	0.00%	2.08%	0.00%	0.83%	0.00%	0.00%	1.25%	0.00%	0.5%	0.8%	0.3%	0.6%	5%	1
Aristida schiedeana	0.00%	0.42%	0.00%	0.42%	0.00%	5.42%	0.00%	0.00%	0.8%	1.9%	0.7%	1.3%	5%	1
Aristida ternipes	0.00%	5.42%	4.17%	0.42%	3.75%	0.42%	0.42%	0.00%	1.8%	2.2%	0.8%	1.6%	5%	1
Aristida ternipes var. *gentilis*	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Blepharoneuron tricholepis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua curtipendula	0.00%	6.25%	4.17%	0.42%	1.67%	0.83%	2.50%	0.00%	2.0%	2.2%	0.8%	1.6%	5%	1
Bouteloua eriopoda	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua hirsuta	0.00%	1.67%	0.42%	0.00%	0.00%	0.00%	0.00%	0.00%	0.3%	0.6%	0.2%	0.4%	5%	1
Bouteloua repens	0.00%	0.42%	0.42%	3.33%	0.00%	0.00%	0.00%	0.00%	0.5%	1.2%	0.4%	0.8%	5%	1
Bromus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bromus ciliatus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bromus rubens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Carex geophila	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dasyochloa pulchella	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Digitaria californica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Elymus glaucus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Enneapogon mollis	0.00%	0.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Eragrostis intermedia	0.00%	0.42%	0.00%	0.42%	0.83%	0.00%	0.00%	0.00%	0.2%	0.3%	0.1%	0.2%	5%	1

Table A1d. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures								Across-plot measures					
Species	**402_V01**	**402_V02**	**402_V03**	**402_V05**	**402_V06**	**402_V07**	**402_V08**	**402_V26**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Graminoids, cont.														
Eragrostis lehmanniana	0.00%	0.42%	0.00%	0.83%	0.83%	0.00%	0.42%	2.50%	0.6%	0.8%	0.3%	0.6%	5%	1
Heteropogon contortus	0.00%	10.42%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.3%	3.7%	1.3%	2.6%	5%	3
Leptochloa dubia	0.00%	2.08%	0.00%	0.42%	0.42%	0.00%	0.00%	0.00%	0.4%	0.7%	0.3%	0.5%	5%	1
Lycurus setosus	0.42%	0.83%	0.00%	1.25%	0.83%	2.50%	0.00%	0.00%	0.7%	0.9%	0.3%	0.6%	5%	1
Muhlenbergia emersleyi	9.58%	8.75%	15.83%	25.00%	36.25%	4.58%	0.42%	47.08%	18.4%	16.4%	5.8%	11.6%	8%	18
Muhlenbergia polycaulis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Muhlenbergia porteri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Panicum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.1%	0.1%	0.1%	0.1%	5%	1
Panicum bulbosum	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Piptochaetium fimbriatum	0.83%	0.00%	2.92%	0.00%	0.00%	2.50%	0.00%	0.00%	0.8%	1.2%	0.4%	0.9%	5%	1
Piptochaetium pringlei	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Poa fendleriana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Schizachyrium cirratum	0.00%	0.00%	0.00%	0.00%	1.25%	0.00%	0.00%	0.00%	0.2%	0.4%	0.2%	0.3%	5%	1
Setaria	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Setaria grisebachii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Sporobolus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trachypogon spicatus	1.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.2%	0.4%	0.2%	0.3%	5%	1
Subshrubs														
Abutilon incanum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Acacia angustissima	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.08%	0.00%	0.9%	2.5%	0.9%	1.8%	5%	2
Ageratina herbacea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ambrosia ambrosioides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ayenia filiformis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouvardia ternifolia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia atractyloides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia californica	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.1%	0.1%	0.1%	0.1%	5%	1
Brickellia grandiflora	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A1d. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures								Across-plot measures					
Species	**402_V01**	**402_V02**	**402_V03**	**402_V05**	**402_V06**	**402_V07**	**402_V08**	**402_V26**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Subshrubs, cont.														
Comandra umbellata	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dalea pulchra	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Encelia farinosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ericameria laricifolia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%	0.00%	0.2%	0.4%	0.2%	0.3%	5%	1
Eriogonum jamesii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.1%	0.1%	0.1%	0.1%	5%	1
Eriogonum wrightii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Galium wrightii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.1%	0.1%	0.1%	0.1%	5%	1
Ipomopsis multiflora	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lotus rigidus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Macrosiphonia brachysiphon	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Manihot angustiloba	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Nolina microcarpa	4.17%	0.00%	4.17%	2.08%	5.83%	10.83%	0.42%	3.33%	3.9%	3.4%	1.2%	2.4%	5%	3
Penstemon linarioides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Porophyllum gracile	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Rubus neomexicanus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Senna covesii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Sphaeralcea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trichostema arizonicum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Zinnia acerosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Shrubs														
Aloysia wrightii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Arctostaphylos pungens	4.58%	1.25%	11.67%	0.00%	5.00%	10.00%	1.67%	9.58%	5.5%	4.5%	1.6%	3.2%	5%	4
Calliandra	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Calliandra eriophylla	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ceanothus fendleri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ceanothus integerrimus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Celtis ehrenbergiana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Condalia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A1d. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures								Across-plot measures					
Species	**402_V01**	**402_V02**	**402_V03**	**402_V05**	**402_V06**	**402_V07**	**402_V08**	**402_V26**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Shrubs, cont.														
Condalia correllii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Crossosoma bigelovii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ephedra	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Fouquieria splendens	0.42%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.1%	0.2%	0.1%	0.1%	5%	1
Garrya wrightii	1.67%	0.00%	0.83%	0.00%	0.00%	2.50%	0.00%	0.00%	0.6%	1.0%	0.3%	0.7%	5%	1
Gossypium thurberi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.1%	0.1%	0.1%	0.1%	5%	1
Holodiscus discolor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Holodiscus dumosus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Jacquemontia pringlei	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Jatropha cardiophylla	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Larrea tridentata	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lycium pallidum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mimosa aculeaticarpa	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%	0.00%	0.00%	0.2%	0.4%	0.2%	0.3%	5%	1
Mimosa aculeaticarpa var. *biuncifera*	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.1%	0.3%	0.1%	0.2%	5%	1
Symphoricarpos oreophilus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Succulents														
Acalypha californica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Agave palmeri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	1.25%	0.2%	0.4%	0.2%	0.3%	5%	1
Agave schottii	0.42%	1.67%	1.25%	13.75%	0.00%	0.00%	2.50%	2.08%	2.7%	4.6%	1.6%	3.2%	5%	4
Cylindropuntia bigelovii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia leptocaulis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia versicolor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dasylirion wheeleri	3.33%	0.42%	0.00%	0.00%	0.00%	0.00%	2.08%	0.00%	0.7%	1.3%	0.5%	0.9%	5%	1
Ferocactus wislizeni	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mammillaria	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Opuntia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Opuntia engelmannii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A1d. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures								Across-plot measures					
Species	**402_V01**	**402_V02**	**402_V03**	**402_V05**	**402_V06**	**402_V07**	**402_V08**	**402_V26**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Succulents, cont.														
Opuntia phaeacantha	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Yucca madrensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trees														
Acacia constricta	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Acacia greggii	0.00%	2.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.3%	0.7%	0.3%	0.5%	5%	1
Celtis laevigata	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dodonaea viscosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Juniperus deppeana	0.42%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.1%	0.1%	0.1%	0.1%	5%	1
Pinus discolor	1.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.2%	0.4%	0.2%	0.3%	5%	1
Pinus ponderosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis velutina	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pseudotsuga menziesii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus arizonica	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Quercus emoryi	1.25%	0.42%	0.42%	0.00%	0.00%	0.00%	0.00%	0.83%	0.4%	0.5%	0.2%	0.3%	5%	1
Quercus gambelii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus hypoleucoides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus rugosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Vines														
Galium aparine	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Janusia gracilis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A1d. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures								Across-plot measures					
Species	402_V01	402_V02	402_V03	402_V05	402_V06	402_V07	402_V08	402_V26	AVG	SD	SE	Sdiff	MDC	n=
Totals by lifeform														
Annual Forb	0.42%	0.00%	5.83%	0.83%	0.00%	0.00%	2.08%	0.00%	1.1%	2.0%	0.7%	1.4%	5%	1
Annual Grass	1.25%	1.67%	8.75%	0.00%	0.00%	0.00%	0.00%	0.83%	1.6%	3.0%	1.1%	2.1%	5%	2
Perennial Forb	5.83%	1.67%	1.25%	0.42%	0.42%	0.42%	12.50%	1.67%	3.0%	4.2%	1.5%	3.0%	5%	4
Perennial Grass	12.08%	40.00%	27.92%	33.33%	46.67%	16.25%	6.25%	49.58%	29.0%	16.2%	5.7%	11.5%	8%	18
Subshrubs	4.17%	0.00%	4.17%	2.08%	5.83%	11.25%	11.25%	3.33%	5.3%	4.1%	1.4%	2.9%	5%	3
Shrubs	6.67%	1.25%	12.50%	0.00%	5.42%	13.75%	2.92%	10.42%	6.6%	5.2%	1.8%	3.7%	5%	5
Succulents	3.75%	2.08%	1.25%	13.75%	0.00%	0.00%	5.00%	3.33%	3.6%	4.5%	1.6%	3.1%	5%	4
Trees	2.92%	2.50%	0.42%	0.00%	0.00%	0.83%	0.00%	0.83%	0.9%	1.2%	0.4%	0.8%	5%	1
Snag	9.17%	5.00%	2.92%	4.17%	3.75%	7.92%	27.92%	5.00%	8.2%	8.2%	2.9%	5.8%	5%	12
Vines	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Total	37.08%	49.17%	62.08%	50.42%	58.33%	42.50%	40.00%	70.00%	51.2%	11.5%	4.1%	8.1%	6%	16

Table A1e. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 502 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures									Across-plot measures					
Species	502_V01	502_V02	502_V03	502_V05	502_V06	502_V07	502_V08	502_V27	502_V28	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs															
Allionia incarnata	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Antennaria marginata	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Artemisia ludoviciana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Astrolepis cochisensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Boerhavia coccinea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bommeria hispida	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Chamaesyce	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cheilanthes	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.42%	0.00%	0.42%	0.1%	0.2%	0.1%	0.1%	5%	1
Cheilanthes fendleri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Commelina dianthifolia	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Conyza bonariensis	0.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Dalea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Daucus pusillus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Draba helleriana	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Erigeron oreophilus	0.42%	0.00%	0.00%	0.00%	1.25%	0.00%	0.00%	0.00%	0.00%	0.2%	0.4%	0.1%	0.3%	5%	1
Eriogonum abertianum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Evolvulus alsinoides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Evolvulus arizonicus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Heuchera sanguinea	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Koanophyllon	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mentzelia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Nicotiana obtusifolia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Notholaena standleyi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Oxalis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.83%	0.00%	0.6%	1.9%	0.6%	1.4%	5%	1
Packera neomexicana	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Pellaea wrightiana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pseudognaphalium canescens ssp. *canescens*	0.00%	0.00%	1.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.2%	0.6%	0.2%	0.4%	5%	1

Table A1e. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 502 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures									Across-plot measures					
Species	**502_V01**	**502_V02**	**502_V03**	**502_V05**	**502_V06**	**502_V07**	**502_V08**	**502_V27**	**502_V28**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Forbs/Herbs, cont.															
Pteridium aquilinum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.92%	0.00%	0.3%	1.0%	0.3%	0.7%	5%	1
Salvia arizonica	0.00%	0.00%	0.00%	0.00%	1.25%	0.00%	0.00%	0.00%	0.00%	0.1%	0.4%	0.1%	0.3%	5%	1
Schoenocrambe linearifolia	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Selaginella arizonica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Thalictrum fendleri	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Verbesina encelioides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Viola canadensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Woodsia plummerae	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.33%	0.00%	0.4%	1.1%	0.4%	0.8%	5%	1
Graminoids															
Aristida purpurea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Aristida schiedeana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Aristida ternipes	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Aristida ternipes var. *gentilis*	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Blepharoneuron tricholepis	35.83%	0.42%	0.00%	0.00%	11.67%	0.00%	0.00%	0.83%	0.00%	5.4%	12.0%	4.0%	8.5%	6%	18
Bouteloua	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua curtipendula	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.92%	0.00%	0.00%	0.3%	1.0%	0.3%	0.7%	5%	1
Bouteloua eriopoda	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua hirsuta	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua repens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.67%	0.00%	0.00%	0.2%	0.6%	0.2%	0.4%	5%	1
Bromus	0.00%	0.00%	0.00%	0.00%	0.00%	2.08%	0.00%	0.00%	0.00%	0.2%	0.7%	0.2%	0.5%	5%	1
Bromus ciliatus	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	1.67%	0.00%	0.2%	0.6%	0.2%	0.4%	5%	1
Bromus rubens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Carex geophila	0.00%	0.00%	0.00%	0.00%	0.00%	1.67%	0.00%	0.00%	0.00%	0.2%	0.6%	0.2%	0.4%	5%	1
Dasyochloa pulchella	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Digitaria californica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Elymus glaucus	0.00%	0.00%	0.00%	0.00%	0.00%	3.33%	0.00%	0.00%	0.00%	0.4%	1.1%	0.4%	0.8%	5%	1

Table A1e. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 502 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures									Across-plot measures					
Species	**502_V01**	**502_V02**	**502_V03**	**502_V05**	**502_V06**	**502_V07**	**502_V08**	**502_V27**	**502_V28**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Graminoids, cont.															
Enneapogon mollis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eragrostis intermedia	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.1%	5%	1
Eragrostis lehmanniana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Heteropogon contortus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Leptochloa dubia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lycurus setosus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Muhlenbergia emersleyi	0.00%	1.25%	9.17%	0.83%	0.00%	0.00%	29.58%	0.00%	2.08%	4.8%	9.8%	3.3%	6.9%	5%	17
Muhlenbergia polycaulis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Muhlenbergia porteri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Panicum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Panicum bulbosum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.0%	0.1%	0.0%	0.1%	5%	1
Piptochaetium fimbriatum	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.1%	5%	1
Piptochaetium pringlei	0.00%	0.00%	1.25%	0.00%	1.67%	0.00%	0.00%	0.00%	0.00%	0.3%	0.7%	0.2%	0.5%	5%	1
Poa fendleriana	0.00%	0.00%	0.00%	0.00%	0.00%	9.17%	0.00%	0.00%	0.00%	1.0%	3.1%	1.0%	2.2%	5%	2
Schizachyrium cirratum	0.00%	0.00%	1.25%	0.00%	0.00%	0.00%	1.25%	0.00%	0.00%	0.3%	0.6%	0.2%	0.4%	5%	1
Setaria	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Setaria grisebachii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Sporobolus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trachypogon spicatus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Subshrubs															
Abutilon incanum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Acacia angustissima	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ageratina herbacea	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Ambrosia ambrosioides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ayenia filiformis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouvardia ternifolia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Brickellia	2.92%	0.00%	0.00%	1.67%	0.00%	0.00%	0.00%	1.67%	0.83%	0.8%	1.1%	0.4%	0.8%	5%	1
Brickellia atractyloides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A1e. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 502 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures									Across-plot measures					
Species	**502_V01**	**502_V02**	**502_V03**	**502_V05**	**502_V06**	**502_V07**	**502_V08**	**502_V27**	**502_V28**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Subshrubs, cont.															
Brickellia californica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia grandiflora	0.00%	0.00%	0.00%	0.00%	2.92%	0.42%	0.00%	0.00%	0.00%	0.4%	1.0%	0.3%	0.7%	5%	1
Comandra umbellata	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%	0.00%	0.00%	0.00%	0.1%	0.4%	0.1%	0.3%	5%	1
Dalea pulchra	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Encelia farinosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ericameria laricifolia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eriogonum jamesii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eriogonum wrightii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Galium wrightii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ipomopsis multiflora	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Lotus rigidus	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Macrosiphonia brachysiphon	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Manihot angustiloba	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Nolina microcarpa	0.00%	0.00%	0.00%	1.25%	0.00%	0.00%	3.75%	0.00%	0.00%	0.6%	1.3%	0.4%	0.9%	5%	1
Penstemon linarioides	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%	0.00%	0.00%	0.00%	0.1%	0.4%	0.1%	0.3%	5%	1
Porophyllum gracile	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Rubus neomexicanus	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Senna covesii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Sphaeralcea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trichostema arizonicum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Zinnia acerosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Shrubs															
Aloysia wrightii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Arctostaphylos pungens	0.00%	7.08%	13.33%	21.25%	0.00%	0.00%	2.92%	0.00%	13.75%	6.5%	7.9%	2.6%	5.6%	5%	11
Calliandra	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Calliandra eriophylla	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ceanothus fendleri	0.00%	1.67%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.00%	0.2%	0.6%	0.2%	0.4%	5%	1

Table A1e. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 502 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures									Across-plot measures					
Species	**502_V01**	**502_V02**	**502_V03**	**502_V05**	**502_V06**	**502_V07**	**502_V08**	**502_V27**	**502_V28**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Shrubs, cont.															
Ceanothus integerrimus	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Celtis ehrenbergiana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Condalia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Condalia correllii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Crossosoma bigelovii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ephedra	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Fouquieria splendens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Garrya wrightii	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	1.67%	0.00%	2.92%	0.6%	1.0%	0.3%	0.7%	5%	1
Gossypium thurberi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Holodiscus discolor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Holodiscus dumosus	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Jacquemontia pringlei	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Jatropha cardiophylla	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Larrea tridentata	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lycium pallidum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mimosa aculeaticarpa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%	0.00%	0.00%	0.1%	0.4%	0.1%	0.3%	5%	1
Mimosa aculeaticarpa var. *biuncifera*	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Symphoricarpos oreophilus	0.00%	0.00%	0.00%	0.00%	0.00%	1.67%	0.00%	0.00%	0.00%	0.2%	0.6%	0.2%	0.4%	5%	1
Succulents															
Acalypha californica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Agave palmeri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Agave schottii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	10.42%	0.00%	0.00%	1.2%	3.5%	1.2%	2.5%	5%	3
Cylindropuntia bigelovii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia leptocaulis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia versicolor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dasylirion wheeleri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.67%	0.00%	0.00%	0.2%	0.6%	0.2%	0.4%	5%	1
Ferocactus wislizeni	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A1e. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 502 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures									Across-plot measures					
Species	**502_V01**	**502_V02**	**502_V03**	**502_V05**	**502_V06**	**502_V07**	**502_V08**	**502_V27**	**502_V28**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Succulents, cont.															
Mammillaria	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Opuntia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Opuntia engelmannii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Opuntia phaeacantha	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Yucca madrensis	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Trees															
Acacia constricta	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Acacia greggii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Celtis laevigata	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dodonaea viscosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Juniperus deppeana	0.00%	0.42%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.42%	0.1%	0.2%	0.1%	0.1%	5%	1
Pinus discolor	0.00%	0.00%	1.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.1%	0.4%	0.1%	0.3%	5%	1
Pinus ponderosa	0.00%	0.83%	0.00%	0.00%	1.25%	0.00%	0.00%	0.00%	0.00%	0.2%	0.5%	0.2%	0.3%	5%	1
Prosopis velutina	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pseudotsuga menziesii	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Quercus arizonica	0.00%	0.00%	1.25%	5.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.8%	1.9%	0.6%	1.4%	5%	1
Quercus emoryi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Quercus gambelii	0.00%	0.00%	0.00%	0.00%	0.00%	2.08%	0.00%	0.00%	0.00%	0.2%	0.7%	0.2%	0.5%	5%	1
Quercus hypoleucoides	0.00%	4.58%	0.83%	14.58%	0.00%	2.92%	0.00%	0.00%	0.00%	2.5%	4.8%	1.6%	3.4%	5%	4
Quercus rugosa	0.00%	6.67%	0.00%	0.00%	2.08%	2.08%	0.00%	0.00%	0.00%	1.2%	2.2%	0.7%	1.6%	5%	1
Vines															
Galium aparine	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Janusia gracilis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A1e. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, 502 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures									Across-plot measures					
Species	**502_V01**	**502_V02**	**502_V03**	**502_V05**	**502_V06**	**502_V07**	**502_V08**	**502_V27**	**502_V28**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Totals by lifeform															
Annual Forb	5.00%	4.58%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	2.92%	1.4%	2.1%	0.7%	1.5%	5%	1
Annual Grass	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	6.25%	0.8%	2.1%	0.7%	1.5%	5%	1
Perennial Forb	1.25%	0.00%	2.50%	0.83%	2.50%	2.92%	1.25%	12.50%	0.42%	2.7%	3.8%	1.3%	2.7%	5%	3
Perennial Grass	35.83%	1.67%	11.67%	1.25%	13.75%	16.67%	37.08%	2.50%	2.50%	13.7%	14.1%	4.7%	10.0%	7%	18
Subshrubs	2.92%	0.00%	0.00%	2.92%	2.92%	5.42%	4.58%	1.67%	0.83%	2.4%	1.9%	0.6%	1.4%	5%	1
Shrubs	0.00%	8.75%	13.33%	21.67%	0.42%	2.92%	5.83%	0.42%	16.67%	7.8%	7.9%	2.6%	5.6%	5%	11
Succulents	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	13.33%	0.00%	0.00%	1.5%	4.4%	1.5%	3.1%	5%	4
Trees	0.00%	12.50%	3.33%	20.42%	3.33%	7.50%	0.83%	0.00%	0.42%	5.4%	7.0%	2.3%	5.0%	5%	9
Snag	4.17%	13.33%	5.42%	6.67%	10.83%	2.50%	6.25%	14.58%	5.83%	7.7%	4.2%	1.4%	3.0%	5%	3
Vines	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Total	45.00	27.50%	31.25%	47.08%	23.75%	36.25%	63.33%	17.08%	30.00%	35.7%	14.1%	4.7%	10.0%	7%	18

Table A1f. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, all strata (60 plots), Rincon Mountain District, Saguaro NP, 2008–2009.

Species	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs						
Allionia incarnata	0.1%	0.35%	0.07%	0.3%	5%	1
Antennaria marginata	0.0%	0.09%	0.02%	0.1%	5%	1
Artemisia ludoviciana	0.1%	0.60%	0.12%	0.4%	5%	1
Astrolepis cochisensis	0.3%	1.36%	0.27%	1.0%	5%	1
Boerhavia coccinea	0.0%	0.06%	0.01%	0.0%	5%	1
Bommeria hispida	0.1%	0.19%	0.04%	0.1%	5%	1
Chamaesyce	0.0%	0.09%	0.02%	0.1%	5%	1
Cheilanthes	0.2%	0.52%	0.10%	0.4%	5%	1
Cheilanthes fendleri	0.0%	0.09%	0.02%	0.1%	5%	1
Commelina dianthifolia	0.0%	0.17%	0.03%	0.1%	5%	1
Conyza bonariensis	0.0%	0.17%	0.03%	0.1%	5%	1
Dalea	0.5%	1.77%	0.35%	1.3%	5%	1
Daucus pusillus	0.0%	0.03%	0.01%	0.0%	5%	1
Draba helleriana	0.0%	0.17%	0.03%	0.1%	5%	1
Erigeron oreophilus	0.1%	0.27%	0.05%	0.2%	5%	1
Eriogonum abertianum	0.0%	0.09%	0.02%	0.1%	5%	1
Evolvulus alsinoides	0.0%	0.09%	0.02%	0.1%	5%	1
Evolvulus arizonicus	0.1%	0.30%	0.06%	0.2%	5%	1
Heuchera sanguinea	0.0%	0.09%	0.02%	0.1%	5%	1
Koanophyllon	0.2%	1.02%	0.20%	0.7%	5%	1
Mentzelia	0.0%	0.09%	0.02%	0.1%	5%	1
Nicotiana obtusifolia	0.0%	0.03%	0.01%	0.0%	5%	1
Notholaena standleyi	0.0%	0.09%	0.02%	0.1%	5%	1
Oxalis	0.2%	1.19%	0.24%	0.8%	5%	1
Packera neomexicana	0.0%	0.09%	0.02%	0.1%	5%	1
Pellaea wrightiana	0.0%	0.09%	0.02%	0.1%	5%	1
Pseudognaphalium canescens ssp. *canescens*	0.3%	0.76%	0.15%	0.5%	5%	1
Pteridium aquilinum	0.1%	0.60%	0.12%	0.4%	5%	1
Salvia arizonica	0.1%	0.26%	0.05%	0.2%	5%	1
Schoenocrambe linearifolia	0.0%	0.09%	0.02%	0.1%	5%	1
Selaginella arizonica	0.0%	0.09%	0.02%	0.1%	5%	1
Thalictrum fendleri	0.0%	0.09%	0.02%	0.1%	5%	1
Verbesina encelioides	0.1%	0.51%	0.10%	0.4%	5%	1
Viola canadensis	0.0%	0.09%	0.02%	0.1%	5%	1
Woodsia plummerae	0.1%	0.68%	0.14%	0.5%	5%	1
Graminoids						
Aristida purpurea	0.2%	0.50%	0.10%	0.4%	5%	1
Aristida schiedeana	0.3%	1.12%	0.22%	0.8%	5%	1
Aristida ternipes	0.9%	1.69%	0.34%	1.2%	5%	1
Aristida ternipes var. *gentilis*	0.0%	0.17%	0.03%	0.1%	5%	1
Blepharoneuron tricholepis	2.0%	7.58%	1.52%	5.4%	5%	10
Bouteloua	0.0%	0.06%	0.01%	0.0%	5%	1

Table A1f. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, all strata (60 plots), Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	AVG	SD	SE	Sdiff	MDC	n=
Graminoids, cont.						
Bouteloua curtipendula	1.7%	2.75%	0.55%	1.9%	5%	2
Bouteloua eriopoda	0.0%	0.17%	0.03%	0.1%	5%	1
Bouteloua hirsuta	0.1%	0.35%	0.07%	0.2%	5%	1
Bouteloua repens	0.4%	0.80%	0.16%	0.6%	5%	1
Bromus	0.1%	0.43%	0.09%	0.3%	5%	1
Bromus ciliatus	0.1%	0.35%	0.07%	0.2%	5%	1
Bromus rubens	0.0%	0.06%	0.01%	0.0%	5%	1
Carex geophila	0.1%	0.34%	0.07%	0.2%	5%	1
Dasyochloa pulchella	0.1%	0.19%	0.04%	0.1%	5%	1
Digitaria californica	0.3%	0.69%	0.14%	0.5%	5%	1
Elymus glaucus	0.1%	0.68%	0.14%	0.5%	5%	1
Enneapogon mollis	0.0%	0.17%	0.03%	0.1%	5%	1
Eragrostis intermedia	0.1%	0.22%	0.04%	0.2%	5%	1
Eragrostis lehmanniana	0.5%	1.14%	0.23%	0.8%	5%	1
Heteropogon contortus	0.5%	2.12%	0.42%	1.5%	5%	1
Leptochloa dubia	0.1%	0.43%	0.09%	0.3%	5%	1
Lycurus setosus	0.2%	0.59%	0.12%	0.4%	5%	1
Muhlenbergia emersleyi	7.9%	13.27%	2.65%	9.4%	5%	31
Muhlenbergia polycaulis	0.0%	0.18%	0.04%	0.1%	5%	1
Muhlenbergia porteri	1.0%	1.92%	0.38%	1.4%	5%	1
Panicum	0.0%	0.09%	0.02%	0.1%	5%	1
Panicum bulbosum	0.1%	0.19%	0.04%	0.1%	5%	1
Piptochaetium fimbriatum	0.3%	0.77%	0.15%	0.5%	5%	1
Piptochaetium pringlei	0.1%	0.42%	0.08%	0.3%	5%	1
Poa fendleriana	0.4%	1.87%	0.37%	1.3%	5%	1
Schizachyrium cirratum	0.2%	0.42%	0.08%	0.3%	5%	1
Setaria	0.0%	0.03%	0.01%	0.0%	5%	1
Setaria grisebachii	0.0%	0.09%	0.02%	0.1%	5%	1
Sporobolus	0.1%	0.28%	0.06%	0.2%	5%	1
Trachypogon spicatus	0.1%	0.26%	0.05%	0.2%	5%	1
Subshrubs						
Abutilon incanum	0.1%	0.35%	0.07%	0.2%	5%	1
Acacia angustissima	0.3%	1.45%	0.29%	1.0%	5%	1
Ageratina herbacea	0.0%	0.17%	0.03%	0.1%	5%	1
Ambrosia ambrosioides	0.0%	0.03%	0.01%	0.0%	5%	1
Ayenia filiformis	0.0%	0.17%	0.03%	0.1%	5%	1
Bouvardia ternifolia	0.0%	0.09%	0.02%	0.1%	5%	1
Brickellia	0.3%	0.74%	0.15%	0.5%	5%	1
Brickellia atractyloides	0.0%	0.03%	0.01%	0.0%	5%	1
Brickellia californica	0.0%	0.09%	0.02%	0.1%	5%	1
Brickellia grandiflora	0.1%	0.60%	0.12%	0.4%	5%	1
Comandra umbellata	0.1%	0.26%	0.05%	0.2%	5%	1

Table A1f. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, all strata (60 plots), Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	AVG	SD	SE	Sdiff	MDC	n=
Subshrubs, cont.						
Dalea pulchra	0.0%	0.09%	0.02%	0.1%	5%	1
Encelia farinosa	1.0%	3.61%	0.72%	2.6%	5%	3
Ericameria laricifolia	0.2%	0.41%	0.08%	0.3%	5%	1
Eriogonum jamesii	0.0%	0.09%	0.02%	0.1%	5%	1
Eriogonum wrightii	0.1%	0.24%	0.05%	0.2%	5%	1
Galium wrightii	0.0%	0.09%	0.02%	0.1%	5%	1
Ipomopsis multiflora	0.0%	0.09%	0.02%	0.1%	5%	1
Lotus rigidus	0.0%	0.09%	0.02%	0.1%	5%	1
Macrosiphonia brachysiphon	0.0%	0.09%	0.02%	0.1%	5%	1
Manihot angustiloba	0.0%	0.17%	0.03%	0.1%	5%	1
Nolina microcarpa	1.5%	2.67%	0.53%	1.9%	5%	2
Penstemon linarioides	0.1%	0.26%	0.05%	0.2%	5%	1
Porophyllum gracile	0.0%	0.09%	0.02%	0.1%	5%	1
Rubus neomexicanus	0.0%	0.17%	0.03%	0.1%	5%	1
Senna covesii	0.0%	0.09%	0.02%	0.1%	5%	1
Sphaeralcea	0.0%	0.09%	0.02%	0.1%	5%	1
Trichostema arizonicum	0.0%	0.09%	0.02%	0.1%	5%	1
Zinnia acerosa	0.3%	1.22%	0.24%	0.9%	5%	1
Shrubs						
Aloysia wrightii	0.1%	0.60%	0.12%	0.4%	5%	1
Arctostaphylos pungens	4.3%	5.98%	1.20%	4.2%	5%	7
Calliandra	0.5%	1.32%	0.26%	0.9%	5%	1
Calliandra eriophylla	0.3%	1.36%	0.27%	1.0%	5%	1
Ceanothus fendleri	0.1%	0.35%	0.07%	0.2%	5%	1
Ceanothus integerrimus	0.0%	0.17%	0.03%	0.1%	5%	1
Celtis ehrenbergiana	0.0%	0.09%	0.02%	0.1%	5%	1
Condalia	0.1%	0.31%	0.06%	0.2%	5%	1
Condalia correllii	0.0%	0.17%	0.03%	0.1%	5%	1
Crossosoma bigelovii	0.0%	0.06%	0.01%	0.0%	5%	1
Ephedra	0.0%	0.09%	0.02%	0.1%	5%	1
Fouquieria splendens	0.0%	0.12%	0.02%	0.1%	5%	1
Garrya wrightii	0.4%	0.86%	0.17%	0.6%	5%	1
Gossypium thurberi	0.0%	0.10%	0.02%	0.1%	5%	1
Holodiscus discolor	0.0%	0.09%	0.02%	0.1%	5%	1
Holodiscus dumosus	0.0%	0.09%	0.02%	0.1%	5%	1
Jacquemontia pringlei	0.0%	0.09%	0.02%	0.1%	5%	1
Jatropha cardiophylla	0.2%	0.53%	0.11%	0.4%	5%	1
Larrea tridentata	0.3%	1.27%	0.25%	0.9%	5%	1
Lycium pallidum	0.0%	0.17%	0.03%	0.1%	5%	1
Mimosa aculeaticarpa	0.1%	0.35%	0.07%	0.2%	5%	1
Mimosa aculeaticarpa var. *biuncifera*	0.1%	0.28%	0.06%	0.2%	5%	1
Symphoricarpos oreophilus	0.1%	0.34%	0.07%	0.2%	5%	1

Table A1f. Within-plot cover values (%) for species measured in the field layer of terrestrial vegetation and soils plots, all strata (60 plots), Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	AVG	SD	SE	Sdiff	MDC	n=
Succulents						
Acalypha californica	0.0%	0.09%	0.02%	0.1%	5%	1
Agave palmeri	0.1%	0.29%	0.06%	0.2%	5%	1
Agave schottii	1.3%	3.42%	0.68%	2.4%	5%	3
Cylindropuntia bigelovii	0.0%	0.09%	0.02%	0.1%	5%	1
Cylindropuntia leptocaulis	0.2%	0.65%	0.13%	0.5%	5%	1
Cylindropuntia versicolor	0.0%	0.13%	0.03%	0.1%	5%	1
Dasylirion wheeleri	0.3%	0.84%	0.17%	0.6%	5%	1
Ferocactus wislizeni	0.0%	0.03%	0.01%	0.0%	5%	1
Mammillaria	0.0%	0.13%	0.03%	0.1%	5%	1
Opuntia	0.0%	0.09%	0.02%	0.1%	5%	1
Opuntia engelmannii	0.6%	1.10%	0.22%	0.8%	5%	1
Opuntia phaeacantha	0.1%	0.43%	0.09%	0.3%	5%	1
Yucca madrensis	0.1%	0.19%	0.04%	0.1%	5%	1
Trees						
Acacia constricta	0.4%	1.55%	0.31%	1.1%	5%	1
Acacia greggii	0.3%	0.74%	0.15%	0.5%	5%	1
Celtis laevigata	0.1%	0.51%	0.10%	0.4%	5%	1
Dodonaea viscosa	0.0%	0.11%	0.02%	0.1%	5%	1
Juniperus deppeana	0.1%	0.16%	0.03%	0.1%	5%	1
Pinus discolor	0.1%	0.35%	0.07%	0.2%	5%	1
Pinus ponderosa	0.1%	0.30%	0.06%	0.2%	5%	1
Prosopis velutina	0.1%	0.36%	0.07%	0.3%	5%	1
Pseudotsuga menziesii	0.0%	0.09%	0.02%	0.1%	5%	1
Quercus arizonica	0.3%	1.21%	0.24%	0.9%	5%	1
Quercus emoryi	0.1%	0.32%	0.06%	0.2%	5%	1
Quercus gambelii	0.1%	0.43%	0.09%	0.3%	5%	1
Quercus hypoleucoides	1.0%	3.10%	0.62%	2.2%	5%	2
Quercus rugosa	0.5%	1.45%	0.29%	1.0%	5%	1
Vines						
Galium aparine	0.0%	0.17%	0.03%	0.1%	5%	1
Janusia gracilis	0.6%	1.82%	0.36%	1.3%	5%	1
Totals by lifeform						
Annual Forb	1.2%	1.76%	0.35%	1.2%	5%	1
Annual Grass	1.7%	4.13%	0.83%	2.9%	5%	3
Perennial Forb	3.0%	3.75%	0.75%	2.7%	5%	3
Perennial Grass	18.0%	15.11%	3.02%	10.7%	5%	39
Subshrubs	4.4%	4.22%	0.84%	3.0%	5%	4
Shrubs	6.7%	5.75%	1.15%	4.1%	5%	6
Succulents	2.9%	3.88%	0.78%	2.7%	5%	3
Trees	3.2%	4.77%	0.95%	3.4%	5%	4
Snag	8.1%	5.58%	1.12%	3.9%	5%	6
Vines	0.6%	1.82%	0.36%	1.3%	5%	1
Total	41.8%	13.27%	2.65%	9.4%	5%	31

Table A2a. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures		Across-plot measures					
Species	201_V02	201_V03	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs								
Artemisia ludoviciana	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Astrolepis cochisensis	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Boerhavia coccinea	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Dalea	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Koanophyllon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Thalictrum fendleri	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Verbesina encelioides	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Graminoids								
Aristida schiedeana	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Aristida ternipes	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Aristida ternipes var. *gentilis*	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Blepharoneuron tricholepis	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua curtipendula	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua repens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Digitaria californica	0.0%	0.4%	0.2%	0.3%	0.2%	0.2%	5%	1
Eragrostis lehmanniana	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Heteropogon contortus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Leptochloa dubia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Muhlenbergia emersleyi	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Piptochaetium fimbriatum	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Piptochaetium pringlei	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Schizachyrium cirratum	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Sporobolus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Subshrubs								
Abutilon incanum	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Acacia angustissima	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia grandiflora	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Dalea pulchra	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Encelia farinosa	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Ericameria laricifolia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Koanophyllon solidaginifolium	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Nolina microcarpa	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Phoradendron californicum	0.4%	0.0%	0.2%	0.3%	0.2%	0.2%	5%	1
Rubus neomexicanus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Shrubs								
Aloysia wrightii	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Amorpha californica	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Arctostaphylos pungens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A2a. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures		Across-plot measures					
Species	**201_V02**	**201_V03**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Shrubs, cont.								
Calliandra	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Ceanothus greggii	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Ceanothus integerrimus	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Celtis ehrenbergiana	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Condalia	1.7%	0.0%	0.8%	1.2%	0.7%	0.8%	5%	1
Crossosoma bigelovii	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Fouquieria splendens	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Frangula californica	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Garrya wrightii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Gossypium thurberi	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Holodiscus discolor	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Holodiscus dumosus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Jatropha cardiophylla	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Larrea tridentata	10.83%	0.83%	5.8%	7.1%	4.1%	5.0%	5%	9
Lycium macrodon	0.00%	0.83%	0.4%	0.6%	0.3%	0.4%	5%	1
Lycium pallidum	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mimosa aculeaticarpa	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mimosa aculeaticarpa var. *biuncifera*	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Symphoricarpos oreophilus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ziziphus obtusifolia	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Succulents								
Agave palmeri	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia acanthocarpa	0.00%	0.42%	0.2%	0.3%	0.2%	0.2%	5%	1
Cylindropuntia versicolor	0.00%	1.67%	0.8%	1.2%	0.7%	0.8%	5%	1
Dasylirion wheeleri	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Opuntia engelmannii	0.00%	0.42%	0.2%	0.3%	0.2%	0.2%	5%	1
Trees								
Acacia constricta	12.08%	9.17%	10.6%	2.1%	1.2%	1.5%	5%	1
Acacia greggii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Celtis laevigata	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Celtis laevigata var. *reticulata*	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dodonaea viscosa	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Juniperus deppeana	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Parkinsonia microphylla	2.08%	0.00%	1.0%	1.5%	0.9%	1.0%	5%	1
Pinus discolor	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus ponderosa	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis glandulosa	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis velutina	5.00%	1.25%	3.1%	2.7%	1.5%	1.9%	5%	2

Table A2a. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures		Across-plot measures					
Species	**201_V02**	**201_V03**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Trees, cont.								
Pseudotsuga menziesii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus arizonica	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus emoryi	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus gambelii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus hypoleucoides	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus rugosa	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus toumeyi	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus turbinella	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Salix exigua	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Vines								
Janusia gracilis	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Totals by lifeform								
Annual Forb	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Annual Grass	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Perennial Forb	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5%	0
Perennial Grass	0.0%	0.4%	0.2%	0.3%	0.2%	0.2%	5%	1
Subshrubs	0.4%	0.0%	0.2%	0.3%	0.2%	0.2%	5%	1
Shrubs	12.5%	1.7%	7.1%	7.7%	4.4%	5.4%	12%	2
Succulents	0.00%	2.50%	1.3%	1.8%	1.0%	1.3%	5%	1
Trees	19.17%	10.42%	14.8%	6.2%	3.6%	4.4%	10%	2
Snag	0.42%	0.00%	0.2%	0.3%	0.2%	0.2%	5%	1
Vines	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Total	32.08%	15.00%	23.5%	12.1%	7.0%	8.5%	18%	2

Table A2b. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures			Across-plot measures					
Species	202_V03	202_V04	202_V05	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs									
Artemisia ludoviciana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Astrolepis cochisensis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Boerhavia coccinea	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dalea	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Koanophyllon	0.00%	0.00%	0.42%	0.1%	0.2%	0.1%	0.2%	5%	1
Thalictrum fendleri	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Verbesina encelioides	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Graminoids									
Aristida schiedeana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Aristida ternipes	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Aristida ternipes var. *gentilis*	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Blepharoneuron tricholepis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua curtipendula	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua repens	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Digitaria californica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eragrostis lehmanniana	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Heteropogon contortus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Leptochloa dubia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Muhlenbergia emersleyi	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Piptochaetium fimbriatum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Piptochaetium pringlei	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Schizachyrium cirratum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Sporobolus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Subshrubs									
Abutilon incanum	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Acacia angustissima	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia grandiflora	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dalea pulchra	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Encelia farinosa	1.25%	0.00%	0.00%	0.4%	0.7%	0.4%	0.5%	5%	1
Ericameria laricifolia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Koanophyllon solidaginifolium	0.00%	0.00%	0.42%	0.1%	0.2%	0.1%	0.2%	5%	1
Nolina microcarpa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Phoradendron californicum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Rubus neomexicanus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Shrubs									
Aloysia wrightii	0.00%	0.00%	0.42%	0.1%	0.2%	0.1%	0.2%	5%	1
Amorpha californica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A2b. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures			Across-plot measures					
Species	**202_V03**	**202_V04**	**202_V05**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Shrubs, cont.									
Arctostaphylos pungens	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Calliandra	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ceanothus greggii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ceanothus integerrimus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Celtis ehrenbergiana	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Condalia	2.50%	0.00%	0.00%	0.8%	1.4%	0.8%	1.0%	5%	1
Crossosoma bigelovii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Fouquieria splendens	1.25%	0.42%	0.00%	0.6%	0.6%	0.4%	0.5%	5%	1
Frangula californica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Garrya wrightii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Gossypium thurberi	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Holodiscus discolor	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Holodiscus dumosus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Jatropha cardiophylla	1.67%	0.42%	0.00%	0.7%	0.9%	0.5%	0.6%	5%	1
Larrea tridentata	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lycium macrodon	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lycium pallidum	0.00%	0.00%	1.67%	0.6%	1.0%	0.6%	0.7%	5%	1
Mimosa aculeaticarpa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mimosa aculeaticarpa var. *biuncifera*	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Symphoricarpos oreophilus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ziziphus obtusifolia	0.00%	0.00%	0.42%	0.1%	0.2%	0.1%	0.2%	5%	1
Succulents									
Agave palmeri	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia acanthocarpa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia versicolor	3.33%	0.00%	0.00%	1.1%	1.9%	1.1%	1.4%	5%	1
Dasylirion wheeleri	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Opuntia engelmannii	1.25%	0.42%	0.42%	0.7%	0.5%	0.3%	0.3%	5%	1
Trees									
Acacia constricta	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Acacia greggii	0.42%	1.25%	2.92%	1.5%	1.3%	0.7%	0.9%	5%	1
Celtis laevigata	0.00%	0.42%	7.08%	2.5%	4.0%	2.3%	2.8%	5%	3
Celtis laevigata var. *reticulata*	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Dodonaea viscosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Juniperus deppeana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Parkinsonia microphylla	0.83%	0.00%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Pinus discolor	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus ponderosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A2b. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures			Across-plot measures					
Species	**202_V03**	**202_V04**	**202_V05**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Trees, cont.									
Prosopis glandulosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis velutina	0.00%	1.25%	15.42%	5.6%	8.6%	4.9%	6.1%	6%	9
Pseudotsuga menziesii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus arizonica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus emoryi	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus gambelii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus hypoleucoides	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus rugosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus toumeyi	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus turbinella	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Salix exigua	0.00%	0.00%	0.83%	0.3%	0.5%	0.3%	0.3%	5%	1
Vines									
Janusia gracilis	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Totals by lifeform									
Annual Forb	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Annual Grass	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Perennial Forb	0.4%	0.0%	0.4%	0.3%	0.2%	0.1%	0.2%	5%	1
Perennial Grass	0.4%	0.4%	0.0%	0.3%	0.2%	0.1%	0.2%	5%	1
Subshrubs	1.3%	0.8%	0.4%	0.8%	0.4%	0.2%	0.3%	5%	1
Shrubs	5.4%	1.3%	2.5%	3.1%	2.1%	1.2%	1.5%	5%	1
Succulents	4.58%	0.42%	0.42%	1.8%	2.4%	1.4%	1.7%	5%	1
Trees	1.67%	2.92%	26.25%	10.3%	13.8%	8.0%	9.8%	9%	11
Snag	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Vines	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Total	13.75%	6.25%	30.00%	16.7%	12.1%	7.0%	8.6%	8%	10

Table A2c. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures			Across-plot measures					
Species	V302_01	302_V04	302_V07	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs									
Artemisia ludoviciana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Astrolepis cochisensis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Boerhavia coccinea	0.83%	0.00%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Dalea	0.00%	0.00%	5.83%	1.9%	3.4%	1.9%	2.4%	5%	2
Koanophyllon	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Thalictrum fendleri	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Verbesina encelioides	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Graminoids									
Aristida schiedeana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Aristida ternipes	4.17%	0.00%	0.00%	1.4%	2.4%	1.4%	1.7%	5%	1
Aristida ternipes var. *gentilis*	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Blepharoneuron tricholepis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua curtipendula	1.25%	0.42%	0.00%	0.6%	0.6%	0.4%	0.5%	5%	1
Bouteloua repens	0.42%	0.00%	0.42%	0.3%	0.2%	0.1%	0.2%	5%	1
Digitaria californica	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Eragrostis lehmanniana	2.08%	0.00%	0.00%	0.7%	1.2%	0.7%	0.9%	5%	1
Heteropogon contortus	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Leptochloa dubia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Muhlenbergia emersleyi	2.50%	0.00%	0.00%	0.8%	1.4%	0.8%	1.0%	5%	1
Piptochaetium fimbriatum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Piptochaetium pringlei	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Schizachyrium cirratum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Sporobolus	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Subshrubs									
Abutilon incanum	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Acacia angustissima	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia grandiflora	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dalea pulchra	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Encelia farinosa	0.00%	0.83%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Ericameria laricifolia	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Koanophyllon solidaginifolium	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Nolina microcarpa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Phoradendron californicum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Rubus neomexicanus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Shrubs									
Aloysia wrightii	0.83%	0.00%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Amorpha californica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Arctostaphylos pungens	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Calliandra	0.00%	0.00%	0.42%	0.1%	0.2%	0.1%	0.2%	5%	1

Table A2c. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures			Across-plot measures					
Species	**V302_01**	**302_V04**	**302_V07**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Shrubs, cont.									
Ceanothus greggii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ceanothus integerrimus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Celtis ehrenbergiana	0.00%	2.50%	0.00%	0.8%	1.4%	0.8%	1.0%	5%	1
Condalia	0.00%	2.92%	0.00%	1.0%	1.7%	1.0%	1.2%	5%	1
Crossosoma bigelovii	0.83%	0.00%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Fouquieria splendens	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Frangula californica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Garrya wrightii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Gossypium thurberi	0.42%	2.08%	0.00%	0.8%	1.1%	0.6%	0.8%	5%	1
Holodiscus discolor	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Holodiscus dumosus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Jatropha cardiophylla	0.00%	2.50%	0.00%	0.8%	1.4%	0.8%	1.0%	5%	1
Larrea tridentata	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lycium macrodon	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lycium pallidum	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mimosa aculeaticarpa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mimosa aculeaticarpa var. *biuncifera*	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Symphoricarpos oreophilus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ziziphus obtusifolia	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Succulents									
Agave palmeri	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia acanthocarpa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia versicolor	1.67%	0.42%	0.83%	1.0%	0.6%	0.4%	0.5%	5%	1
Dasylirion wheeleri	0.00%	0.00%	0.83%	0.3%	0.5%	0.3%	0.3%	5%	1
Opuntia engelmannii	1.25%	0.83%	0.00%	0.7%	0.6%	0.4%	0.5%	5%	1
Trees									
Acacia constricta	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Acacia greggii	0.00%	1.67%	1.25%	1.0%	0.9%	0.5%	0.6%	5%	1
Celtis laevigata	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Celtis laevigata var. *reticulata*	0.83%	0.00%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Dodonaea viscosa	0.00%	5.83%	0.00%	1.9%	3.4%	1.9%	2.4%	5%	2
Juniperus deppeana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Parkinsonia microphylla	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus discolor	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus ponderosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis glandulosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis velutina	16.25%	8.75%	0.00%	8.3%	8.1%	4.7%	5.8%	6%	8
Pseudotsuga menziesii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus arizonica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A2c. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures			Across-plot measures					
Species	**V302_01**	**302_V04**	**302_V07**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Trees, cont.									
Quercus emoryi	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus gambelii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus hypoleucoides	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus rugosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus toumeyi	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus turbinella	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Salix exigua	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Vines									
Janusia gracilis	0.00%	0.83%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Totals by lifeform									
Annual Forb	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Annual Grass	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Perennial Forb	0.8%	0.0%	5.8%	2.2%	3.2%	1.8%	2.2%	5%	2
Perennial Grass	10.8%	1.3%	0.4%	4.2%	5.8%	3.3%	4.1%	5%	6
Subshrubs	0.8%	0.8%	0.0%	0.6%	0.5%	0.3%	0.3%	5%	1
Shrubs	2.1%	10.4%	0.4%	4.3%	5.4%	3.1%	3.8%	5%	5
Succulents	2.92%	1.25%	1.67%	1.9%	0.9%	0.5%	0.6%	5%	1
Trees	17.08%	16.25%	1.25%	11.5%	8.9%	5.1%	6.3%	7%	7
Snag	0.00%	2.08%	0.83%	1.0%	1.0%	0.6%	0.7%	5%	1
Vines	0.00%	0.83%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Total	34.58%	30.83%	9.58%	25.0%	13.5%	7.8%	9.5%	10%	8

Table A2d. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures								Across-plot measures					
Species	402_V01	402_V02	402_V03	402_V05	402_V06	402_V07	402_V08	402_V26	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs														
Artemisia ludoviciana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.67%	0.00%	0.2%	0.6%	0.2%	0.4%	5%	1
Astrolepis cochisensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.1%	0.1%	0.1%	0.1%	5%	1
Boerhavia coccinea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dalea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Koanophyllon	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Thalictrum fendleri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Verbesina encelioides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.08%	0.00%	0.3%	0.7%	0.3%	0.5%	5%	1
Graminoids														
Aristida schiedeana	0.00%	0.42%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.1%	0.1%	0.1%	0.1%	5%	1
Aristida ternipes	0.00%	0.00%	1.25%	0.00%	0.83%	0.00%	0.00%	0.00%	0.3%	0.5%	0.2%	0.3%	5%	1
Aristida ternipes var. *gentilis*	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Blepharoneuron tricholepis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Bouteloua curtipendula	0.00%	0.42%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.1%	5%	1
Bouteloua repens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Digitaria californica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eragrostis lehmanniana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Heteropogon contortus	0.00%	2.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.3%	0.7%	0.3%	0.5%	5%	1
Leptochloa dubia	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Muhlenbergia emersleyi	1.25%	0.42%	1.67%	0.42%	5.00%	0.42%	0.42%	14.17%	3.0%	4.8%	1.7%	3.4%	5%	4
Piptochaetium fimbriatum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Piptochaetium pringlei	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Schizachyrium cirratum	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.1%	0.1%	0.1%	0.1%	5%	1
Sporobolus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Subshrubs														
Abutilon incanum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Acacia angustissima	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.08%	0.00%	0.3%	0.7%	0.3%	0.5%	5%	1
Brickellia grandiflora	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.1%	0.1%	0.1%	0.1%	5%	1
Dalea pulchra	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A2d. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures								Across-plot measures					
Species	**402_V01**	**402_V02**	**402_V03**	**402_V05**	**402_V06**	**402_V07**	**402_V08**	**402_V26**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Subshrubs, cont.														
Encelia farinosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ericameria laricifolia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Koanophyllon solidaginifolium	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Nolina microcarpa	3.33%	0.00%	2.50%	1.67%	3.75%	7.92%	0.00%	2.92%	2.8%	2.5%	0.9%	1.8%	5%	2
Phoradendron californicum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Rubus neomexicanus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Shrubs														
Aloysia wrightii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Amorpha californica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Arctostaphylos pungens	5.83%	5.42%	19.17%	0.00%	13.75%	14.58%	3.75%	16.67%	9.9%	7.0%	2.5%	4.9%	5%	9
Calliandra	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ceanothus greggii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ceanothus integerrimus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Celtis ehrenbergiana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Condalia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%	0.00%	0.2%	0.4%	0.2%	0.3%	5%	1
Crossosoma bigelovii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Fouquieria splendens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Frangula californica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Garrya wrightii	2.08%	0.00%	2.08%	0.00%	0.00%	8.75%	1.25%	0.42%	1.8%	2.9%	1.0%	2.1%	5%	2
Gossypium thurberi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.50%	0.00%	0.3%	0.9%	0.3%	0.6%	5%	1
Holodiscus discolor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Holodiscus dumosus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Jatropha cardiophylla	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Larrea tridentata	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lycium macrodon	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lycium pallidum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mimosa aculeaticarpa	0.00%	0.00%	0.00%	0.00%	0.00%	1.67%	4.17%	0.00%	0.7%	1.5%	0.5%	1.1%	5%	1

Table A2d. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures								Across-plot measures					
Species	**402_V01**	**402_V02**	**402_V03**	**402_V05**	**402_V06**	**402_V07**	**402_V08**	**402_V26**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Shrubs, cont.														
Mimosa aculeaticarpa var. *biuncifera*	0.00%	0.00%	1.67%	0.00%	0.00%	0.00%	0.00%	0.42%	0.3%	0.6%	0.2%	0.4%	5%	1
Symphoricarpos oreophilus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ziziphus obtusifolia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Succulents														
Agave palmeri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.1%	0.1%	0.1%	0.1%	5%	1
Cylindropuntia acanthocarpa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia versicolor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dasylirion wheeleri	1.25%	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%	0.00%	0.3%	0.6%	0.2%	0.4%	5%	1
Opuntia engelmannii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trees														
Acacia constricta	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Acacia greggii	0.00%	2.08%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.3%	0.7%	0.3%	0.5%	5%	1
Celtis laevigata	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Celtis laevigata var. *reticulata*	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dodonaea viscosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Juniperus deppeana	0.00%	0.00%	4.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.5%	1.5%	0.5%	1.0%	5%	1
Parkinsonia microphylla	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus discolor	5.42%	0.00%	1.25%	0.00%	0.00%	3.75%	0.00%	0.00%	1.3%	2.1%	0.7%	1.5%	5%	1
Pinus ponderosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis glandulosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%	0.00%	0.2%	0.4%	0.2%	0.3%	5%	1
Prosopis velutina	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%	0.00%	0.2%	0.4%	0.2%	0.3%	5%	1
Pseudotsuga menziesii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus arizonica	0.00%	0.00%	0.00%	0.00%	0.00%	4.17%	0.83%	0.00%	0.6%	1.5%	0.5%	1.0%	5%	1
Quercus emoryi	3.33%	2.08%	0.83%	1.67%	2.50%	2.08%	0.00%	2.92%	1.9%	1.1%	0.4%	0.8%	5%	1
Quercus gambelii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus hypoleucoides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus rugosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A2d. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures								Across-plot measures					
Species	**402_V01**	**402_V02**	**402_V03**	**402_V05**	**402_V06**	**402_V07**	**402_V08**	**402_V26**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Trees, cont.														
Quercus toumeyi	0.00%	0.00%	0.00%	0.00%	0.00%	1.67%	0.00%	0.00%	0.2%	0.6%	0.2%	0.4%	5%	1
Quercus turbinella	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Salix exigua	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Vines														
Janusia gracilis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Totals by lifeform														
Annual Forb	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Annual Grass	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Perennial Forb	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.2%	0.0%	0.5%	1.5%	0.5%	1.0%	5%	1
Perennial Grass	1.3%	3.3%	2.9%	0.4%	7.1%	0.4%	0.8%	14.2%	3.8%	4.7%	1.7%	3.4%	5%	4
Subshrubs	3.3%	0.0%	2.5%	1.7%	3.8%	8.3%	2.1%	2.9%	3.1%	2.4%	0.9%	1.7%	5%	1
Shrubs	7.9%	5.4%	22.9%	0.0%	13.8%	25.0%	12.9%	17.5%	13.2%	8.6%	3.0%	6.1%	5%	13
Succulents	1.25%	0.00%	0.00%	0.00%	0.00%	0.00%	1.67%	0.00%	0.4%	0.7%	0.2%	0.5%	5%	1
Trees	8.75%	4.17%	6.25%	1.67%	2.50%	11.67%	3.33%	2.92%	5.2%	3.5%	1.2%	2.5%	5%	3
Snag	4.17%	0.00%	1.67%	0.00%	1.25%	0.00%	8.75%	1.25%	2.1%	3.0%	1.1%	2.1%	5%	2
Vines	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Total	22.50%	12.92%	34.58%	3.75%	27.08%	45.42%	25.00%	37.50%	26.1%	13.4%	4.8%	9.5%	7%	16

Table A2e. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 502 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures									Across-plot measures					
Species	**502_V01**	**502_V02**	**502_V03**	**502_V05**	**502_V06**	**502_V07**	**502_V08**	**502_V27**	**502_V28**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Forbs/Herbs															
Artemisia ludoviciana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Astrolepis cochisensis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Boerhavia coccinea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dalea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Koanophyllon	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Thalictrum fendleri	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Verbesina encelioides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Graminoids															
Aristida schiedeana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Aristida ternipes	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Aristida ternipes var. *gentilis*	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Blepharoneuron tricholepis	1.67%	0.00%	0.00%	0.00%	4.17%	0.00%	0.00%	0.00%	0.00%	0.6%	1.4%	0.5%	1.0%	5%	1
Bouteloua curtipendula	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%	0.00%	0.00%	0.1%	0.4%	0.1%	0.3%	5%	1
Bouteloua repens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Digitaria californica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Eragrostis lehmanniana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Heteropogon contortus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Leptochloa dubia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Muhlenbergia emersleyi	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	2.50%	0.00%	0.42%	0.4%	0.8%	0.3%	0.6%	5%	1
Piptochaetium fimbriatum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Piptochaetium pringlei	0.00%	0.00%	0.42%	0.00%	0.42%	0.00%	0.00%	0.00%	0.00%	0.1%	0.2%	0.1%	0.1%	5%	1
Schizachyrium cirratum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Sporobolus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Subshrubs															
Abutilon incanum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Acacia angustissima	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Brickellia grandiflora	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Dalea pulchra	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A2e. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 502 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures									Across-plot measures					
Species	**502_V01**	**502_V02**	**502_V03**	**502_V05**	**502_V06**	**502_V07**	**502_V08**	**502_V27**	**502_V28**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Subshrubs, cont.															
Encelia farinosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ericameria laricifolia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Koanophyllon solidaginifolium	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Nolina microcarpa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.75%	0.00%	0.00%	0.4%	1.3%	0.4%	0.9%	5%	1
Phoradendron californicum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Rubus neomexicanus	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Shrubs															
Aloysia wrightii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Amorpha californica	0.00%	0.00%	0.00%	0.00%	0.00%	2.08%	0.00%	0.00%	0.00%	0.2%	0.7%	0.2%	0.5%	5%	1
Arctostaphylos pungens	0.00%	6.25%	21.25%	24.17%	0.00%	0.00%	7.92%	0.00%	21.67%	9.0%	10.4%	3.5%	7.4%	6%	13
Calliandra	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Ceanothus greggii	0.00%	0.00%	0.00%	1.25%	0.00%	0.00%	0.00%	0.00%	0.00%	0.1%	0.4%	0.1%	0.3%	5%	1
Ceanothus integerrimus	0.00%	0.00%	0.00%	0.00%	0.00%	1.67%	0.00%	0.00%	0.00%	0.2%	0.6%	0.2%	0.4%	5%	1
Celtis ehrenbergiana	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Condalia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Crossosoma bigelovii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Fouquieria splendens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Frangula californica	0.00%	0.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Garrya wrightii	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	7.08%	0.00%	2.08%	1.1%	2.4%	0.8%	1.7%	5%	1
Gossypium thurberi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Holodiscus discolor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.83%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Holodiscus dumosus	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%	0.00%	0.00%	0.00%	0.1%	0.4%	0.1%	0.3%	5%	1
Jatropha cardiophylla	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Larrea tridentata	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lycium macrodon	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Lycium pallidum	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Mimosa aculeaticarpa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.92%	0.00%	0.00%	0.3%	1.0%	0.3%	0.7%	5%	1

Table A2e. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 502 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures									Across-plot measures					
Species	**502_V01**	**502_V02**	**502_V03**	**502_V05**	**502_V06**	**502_V07**	**502_V08**	**502_V27**	**502_V28**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Shrubs, cont.															
Mimosa aculeaticarpa var. *biuncifera*	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Symphoricarpos oreophilus	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	0.00%	0.00%	0.0%	0.1%	0.0%	0.1%	5%	1
Ziziphus obtusifolia	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Succulents															
Agave palmeri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia acanthocarpa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia versicolor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dasylirion wheeleri	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Opuntia engelmannii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trees															
Acacia constricta	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Acacia greggii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Celtis laevigata	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Celtis laevigata var. *reticulata*	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Dodonaea viscosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Juniperus deppeana	0.00%	0.42%	0.42%	0.00%	0.00%	0.00%	1.25%	0.00%	0.00%	0.2%	0.4%	0.1%	0.3%	5%	1
Parkinsonia microphylla	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus discolor	0.00%	0.00%	5.42%	0.00%	0.00%	1.25%	11.67%	0.00%	0.00%	2.0%	4.0%	1.3%	2.8%	5%	3
Pinus ponderosa	0.83%	0.83%	0.00%	0.00%	2.08%	0.00%	0.00%	0.00%	0.00%	0.4%	0.7%	0.2%	0.5%	5%	1
Prosopis glandulosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis velutina	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pseudotsuga menziesii	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.00%	4.17%	0.00%	0.5%	1.4%	0.5%	1.0%	5%	1
Quercus arizonica	0.00%	0.00%	5.00%	10.83%	0.00%	0.00%	2.92%	0.00%	0.00%	2.1%	3.7%	1.2%	2.6%	5%	3
Quercus emoryi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.67%	0.00%	0.00%	0.2%	0.6%	0.2%	0.4%	5%	1
Quercus gambelii	0.00%	0.00%	0.00%	0.00%	0.42%	2.92%	0.00%	0.00%	0.00%	0.4%	1.0%	0.3%	0.7%	5%	1
Quercus hypoleucoides	0.00%	17.08%	3.75%	20.00%	0.00%	6.67%	0.00%	0.00%	2.92%	5.6%	7.7%	2.6%	5.5%	5%	11

Table A2e. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, 502 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

	Individual plot measures									Across-plot measures					
Species	**502_V01**	**502_V02**	**502_V03**	**502_V05**	**502_V06**	**502_V07**	**502_V08**	**502_V27**	**502_V28**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Trees, cont.															
Quercus rugosa	0.00%	17.50%	0.00%	0.00%	0.00%	2.50%	0.00%	0.00%	2.50%	2.5%	5.7%	1.9%	4.1%	5%	6
Quercus toumeyi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus turbinella	0.00%	0.00%	0.00%	0.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.1%	0.3%	0.1%	0.2%	5%	1
Salix exigua	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Vines															
Janusia gracilis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Totals by lifeform															
Annual Forb	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Annual Grass	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Perennial Forb	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	5%	1
Perennial Grass	1.7%	0.0%	1.3%	0.0%	4.6%	0.0%	5.0%	0.0%	0.4%	1.4%	2.0%	0.7%	1.4%	5%	1
Subshrubs	0.0%	0.0%	0.0%	0.0%	0.4%	0.8%	3.8%	0.0%	0.0%	0.6%	1.2%	0.4%	0.9%	5%	1
Shrubs	0.0%	7.1%	21.3%	25.8%	0.0%	5.4%	17.9%	0.8%	23.8%	11.3%	10.8%	3.6%	7.6%	6%	14
Succulents	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trees	0.83%	35.83%	14.58%	31.67%	2.50%	13.75%	17.50%	4.17%	5.42%	14.0%	12.6%	4.2%	8.9%	7%	14
Snag	3.33%	4.58%	3.75%	0.83%	2.92%	1.25%	2.50%	4.58%	7.08%	3.4%	1.9%	0.6%	1.3%	5%	1
Vines	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Total	2.50%	42.92%	37.08%	57.50%	7.50%	20.42%	44.17%	5.00%	29.58%	27.4%	19.7%	6.6%	13.9%	10%	17

Table A2f. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, all strata (n = 60), Rincon Mountain District, Saguaro NP, 2008–2009.

Species	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs						
Artemisia ludoviciana	0.1%	0.34%	0.07%	0.2%	5%	1
Astrolepis cochisensis	0.0%	0.09%	0.02%	0.1%	5%	1
Boerhavia coccinea	0.0%	0.06%	0.01%	0.0%	5%	1
Dalea	0.3%	1.24%	0.25%	0.9%	5%	1
Koanophyllon	0.0%	0.09%	0.02%	0.1%	5%	1
Thalictrum fendleri	0.0%	0.09%	0.02%	0.1%	5%	1
Verbesina encelioides	0.1%	0.43%	0.09%	0.3%	5%	1
Graminoids						
Aristida schiedeana	0.0%	0.12%	0.02%	0.1%	5%	1
Aristida ternipes	0.1%	0.40%	0.08%	0.3%	5%	1
Aristida ternipes var. *gentilis*	0.0%	0.09%	0.02%	0.1%	5%	1
Blepharoneuron tricholepis	0.2%	0.90%	0.18%	0.6%	5%	1
Bouteloua curtipendula	0.1%	0.29%	0.06%	0.2%	5%	1
Bouteloua repens	0.0%	0.10%	0.02%	0.1%	5%	1
Digitaria californica	0.0%	0.09%	0.02%	0.1%	5%	1
Eragrostis lehmanniana	0.0%	0.16%	0.03%	0.1%	5%	1
Heteropogon contortus	0.1%	0.42%	0.08%	0.3%	5%	1
Leptochloa dubia	0.0%	0.17%	0.03%	0.1%	5%	1
Muhlenbergia emersleyi	1.2%	2.99%	0.60%	2.1%	5%	2
Piptochaetium fimbriatum	0.0%	0.09%	0.02%	0.1%	5%	1
Piptochaetium pringlei	0.0%	0.12%	0.02%	0.1%	5%	1
Schizachyrium cirratum	0.0%	0.12%	0.02%	0.1%	5%	1
Sporobolus	0.0%	0.03%	0.01%	0.0%	5%	1
Subshrubs						
Abutilon incanum	0.0%	0.09%	0.02%	0.1%	5%	1
Acacia angustissima	0.1%	0.43%	0.09%	0.3%	5%	1
Brickellia grandiflora	0.0%	0.12%	0.02%	0.1%	5%	1
Dalea pulchra	0.0%	0.09%	0.02%	0.1%	5%	1
Encelia farinosa	0.1%	0.26%	0.05%	0.2%	5%	1
Ericameria laricifolia	0.0%	0.03%	0.01%	0.0%	5%	1
Koanophyllon solidaginifolium	0.0%	0.09%	0.02%	0.1%	5%	1
Nolina microcarpa	1.1%	2.00%	0.40%	1.4%	5%	1
Phoradendron californicum	0.0%	0.09%	0.02%	0.1%	5%	1
Rubus neomexicanus	0.0%	0.17%	0.03%	0.1%	5%	1
Shrubs						
Aloysia wrightii	0.0%	0.10%	0.02%	0.1%	5%	1
Amorpha californica	0.1%	0.43%	0.09%	0.3%	5%	1
Arctostaphylos pungens	6.7%	8.49%	1.70%	6.0%	5%	13
Calliandra	0.0%	0.09%	0.02%	0.1%	5%	1
Ceanothus greggii	0.1%	0.26%	0.05%	0.2%	5%	1
Ceanothus integerrimus	0.1%	0.34%	0.07%	0.2%	5%	1
Celtis ehrenbergiana	0.1%	0.19%	0.04%	0.1%	5%	1
Condalia	0.3%	0.65%	0.13%	0.5%	5%	1

Table A2f. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, all strata (n = 60), Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	AVG	SD	SE	Sdiff	MDC	n=
Shrubs, cont.						
Crossosoma bigelovii	0.0%	0.06%	0.01%	0.0%	5%	1
Fouquieria splendens	0.1%	0.27%	0.05%	0.2%	5%	1
Frangula californica	0.0%	0.17%	0.03%	0.1%	5%	1
Garrya wrightii	1.0%	2.26%	0.45%	1.6%	5%	1
Gossypium thurberi	0.1%	0.53%	0.11%	0.4%	5%	1
Holodiscus discolor	0.0%	0.17%	0.03%	0.1%	5%	1
Holodiscus dumosus	0.1%	0.26%	0.05%	0.2%	5%	1
Jatropha cardiophylla	0.1%	0.38%	0.08%	0.3%	5%	1
Larrea tridentata	0.5%	2.21%	0.44%	1.6%	5%	1
Lycium macrodon	0.0%	0.17%	0.03%	0.1%	5%	1
Lycium pallidum	0.1%	0.34%	0.07%	0.2%	5%	1
Mimosa aculeaticarpa	0.4%	1.05%	0.21%	0.7%	5%	1
Mimosa aculeaticarpa var. *biuncifera*	0.1%	0.35%	0.07%	0.2%	5%	1
Symphoricarpos oreophilus	0.0%	0.09%	0.02%	0.1%	5%	1
Ziziphus obtusifolia	0.0%	0.09%	0.02%	0.1%	5%	1
Succulents						
Agave palmeri	0.0%	0.09%	0.02%	0.1%	5%	1
Cylindropuntia acanthocarpa	0.0%	0.09%	0.02%	0.1%	5%	1
Cylindropuntia versicolor	0.3%	0.77%	0.15%	0.5%	5%	1
Dasylirion wheeleri	0.2%	0.38%	0.08%	0.3%	5%	1
Opuntia engelmannii	0.1%	0.31%	0.06%	0.2%	5%	1
Trees						
Acacia constricta	0.9%	3.03%	0.61%	2.1%	5%	2
Acacia greggii	0.4%	0.77%	0.15%	0.5%	5%	1
Celtis laevigata	0.3%	1.44%	0.29%	1.0%	5%	1
Celtis laevigata var. *reticulata*	0.0%	0.10%	0.02%	0.1%	5%	1
Dodonaea viscosa	0.1%	0.40%	0.08%	0.3%	5%	1
Juniperus deppeana	0.3%	0.88%	0.18%	0.6%	5%	1
Parkinsonia microphylla	0.1%	0.45%	0.09%	0.3%	5%	1
Pinus discolor	1.2%	2.78%	0.56%	2.0%	5%	2
Pinus ponderosa	0.2%	0.47%	0.09%	0.3%	5%	1
Prosopis glandulosa	0.1%	0.26%	0.05%	0.2%	5%	1
Prosopis velutina	1.4%	3.57%	0.71%	2.5%	5%	3
Pseudotsuga menziesii	0.2%	0.85%	0.17%	0.6%	5%	1
Quercus arizonica	1.0%	2.51%	0.50%	1.8%	5%	2
Quercus emoryi	0.7%	1.12%	0.22%	0.8%	5%	1
Quercus gambelii	0.1%	0.60%	0.12%	0.4%	5%	1
Quercus hypoleucoides	2.1%	5.33%	1.07%	3.8%	5%	5
Quercus rugosa	0.9%	3.60%	0.72%	2.5%	5%	3
Quercus toumeyi	0.1%	0.34%	0.07%	0.2%	5%	1
Quercus turbinella	0.0%	0.17%	0.03%	0.1%	5%	1
Salix exigua	0.0%	0.17%	0.03%	0.1%	5%	1

Table A2f. Within-plot cover values (%) for species measured in the subcanopy layer of terrestrial vegetation and soils plots, all strata (n = 60), Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	AVG	SD	SE	Sdiff	MDC	n=
Vines						
Janusia gracilis	0.0%	0.10%	0.02%	0.1%	5%	1
Totals by lifeform						
Annual Forb	0.0%	0.00%	0.00%	0.0%	5%	0
Annual Grass	0.0%	0.00%	0.00%	0.0%	5%	0
Perennial Forb	0.6%	1.46%	0.29%	1.0%	5%	1
Perennial Grass	2.0%	3.24%	0.65%	2.3%	5%	2
Subshrubs	1.4%	1.97%	0.39%	1.4%	5%	1
Shrubs	9.8%	9.07%	1.81%	6.4%	5%	15
Succulents	0.6%	1.14%	0.23%	0.8%	5%	1
Trees	10.0%	9.88%	1.98%	7.0%	5%	17
Snag	2.1%	2.39%	0.48%	1.7%	5%	1
Vines	0.0%	0.10%	0.02%	0.1%	5%	1
Total	24.5%	15.18%	3.04%	10.7%	5%	40

Table A3a. Within-plot cover values (%) for species measured in the canopy layer of terrestrial vegetation and soils plots, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures		Across-plot measures					
Species	201_V02	201_V03	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs								
Lamium amplexicaule	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Shrubs								
Arctostaphylos pungens	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Fouquieria splendens	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Garrya wrightii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Holodiscus dumosus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Larrea tridentata	0.00%	0.42%	0.2%	0.3%	0.2%	0.2%	5%	1
Succulents								
Carnegiea gigantea	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia versicolor	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trees								
Acacia constricta	0.83%	2.08%	1.5%	0.9%	0.6%	0.6%	5%	1
Juniperus deppeana	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Parkinsonia microphylla	2.92%	0.00%	1.5%	2.1%	1.5%	1.5%	5%	1
Pinus	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus arizonica	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus discolor	0.42%	0.00%	0.2%	0.3%	0.2%	0.2%	5%	1
Pinus flexilis	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus ponderosa	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis glandulosa	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis velutina	5.42%	1.25%	3.3%	2.9%	2.1%	2.1%	5%	2
Pseudotsuga menziesii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus arizonica	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus emoryi	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus gambelii	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus hypoleucoides	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus rugosa	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus toumeyi	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Totals by lifeform								
Annual Forb	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Annual Grass	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Perennial Forb	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Perennial Grass	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Subshrubs	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Shrubs	0.00%	0.42%	0.2%	0.3%	0.2%	0.2%	5%	1
Succulents	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trees	9.58%	3.33%	6.5%	4.4%	3.1%	3.1%	7%	2
Snag	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Vines	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Total	9.58%	3.75%	6.7%	4.1%	2.9%	2.9%	7%	2

Table A3b. Within-plot cover values (%) for species measured in the canopy layer of terrestrial vegetation and soils plots, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures			Across-plot measures					
Species	202_V03	202_V04	202_V05	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs									
Lamium amplexicaule	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Shrubs									
Arctostaphylos pungens	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Fouquieria splendens	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Garrya wrightii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Holodiscus dumosus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Larrea tridentata	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Succulents									
Carnegiea gigantea	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia versicolor	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Trees									
Acacia constricta	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Juniperus deppeana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Parkinsonia microphylla	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus arizonica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus discolor	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus flexilis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus ponderosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis glandulosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis velutina	0.00%	0.00%	7.08%	2.4%	4.1%	2.4%	2.9%	5%	3
Pseudotsuga menziesii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus arizonica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus emoryi	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus gambelii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus hypoleucoides	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus rugosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus toumeyi	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Totals by lifeform									
Annual Forb	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Annual Grass	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Perennial Forb	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Perennial Grass	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Subshrubs	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Shrubs	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Succulents	0.42%	0.00%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Trees	0.00%	0.00%	7.08%	2.4%	4.1%	2.4%	2.9%	5%	3
Snag	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Vines	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Total	0.42%	0.00%	7.08%	2.5%	4.0%	2.3%	2.8%	5%	3

Table A3c. Within-plot cover values (%) for species measured in the canopy layer of terrestrial vegetation and soils plots, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Site			Across-plot measures					
Species	V302_01	302_V04	302_V07	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs									
Lamium amplexicaule	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Shrubs									
Arctostaphylos pungens	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Fouquieria splendens	0.83%	0.83%	0.00%	0.6%	0.5%	0.3%	0.3%	5%	1
Garrya wrightii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Holodiscus dumosus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Larrea tridentata	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Succulents									
Carnegiea gigantea	0.00%	0.83%	0.00%	0.3%	0.5%	0.3%	0.3%	5%	1
Cylindropuntia versicolor	0.00%	0.42%	0.00%	0.1%	0.2%	0.1%	0.2%	5%	1
Trees									
Acacia constricta	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Juniperus deppeana	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Parkinsonia microphylla	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus arizonica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus discolor	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus flexilis	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus ponderosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis glandulosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis velutina	23.33%	2.50%	0.00%	8.6%	12.8%	7.4%	9.1%	10%	7
Pseudotsuga menziesii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus arizonica	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus emoryi	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus gambelii	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus hypoleucoides	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus rugosa	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus toumeyi	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Totals by lifeform									
Annual Forb	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Annual Grass	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Perennial Forb	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Perennial Grass	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Subshrubs	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Shrubs	0.83%	0.83%	0.00%	0.6%	0.5%	0.3%	0.3%	5%	1
Succulents	0.00%	1.25%	0.00%	0.4%	0.7%	0.4%	0.5%	5%	1
Trees	23.33%	2.50%	0.00%	8.6%	12.8%	7.4%	9.1%	10%	7
Snag	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Vines	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Total	24.17%	4.58%	0.00%	9.6%	12.8%	7.4%	9.1%	10%	8

Table A3d. Within-plot cover values (%) for species measured in the canopy layer of terrestrial vegetation and soils plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

Species	Individual plot measures								Across-plot measures					
	402_V01	402_V02	402_V03	402_V05	402_V06	402_V07	402_V08	402_V26	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs														
Lamium amplexicaule	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Shrubs														
Arctostaphylos pungens	2.08%	0.00%	4.58%	0.00%	0.00%	0.00%	0.00%	0.00%	0.8%	1.7%	0.6%	1.2%	5%	1
Fouquieria splendens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Garrya wrightii	0.00%	0.00%	0.83%	0.00%	0.00%	0.42%	0.00%	0.00%	0.2%	0.3%	0.1%	0.2%	5%	1
Holodiscus dumosus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Larrea tridentata	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Succulents														
Carnegiea gigantea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia versicolor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trees														
Acacia constricta	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Juniperus deppeana	0.00%	0.00%	10.42%	0.00%	0.00%	3.33%	0.00%	0.00%	1.7%	3.7%	1.3%	2.6%	5%	3
Parkinsonia microphylla	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus arizonica	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus discolor	11.25%	0.00%	6.25%	0.00%	0.00%	2.92%	0.00%	0.00%	2.6%	4.2%	1.5%	3.0%	5%	3
Pinus flexilis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus ponderosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Prosopis glandulosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.50%	0.00%	0.3%	0.9%	0.3%	0.6%	5%	1
Prosopis velutina	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pseudotsuga menziesii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus arizonica	1.67%	0.00%	3.75%	0.00%	0.00%	5.83%	5.42%	0.00%	2.1%	2.5%	0.9%	1.8%	5%	2
Quercus emoryi	8.75%	1.67%	0.00%	2.92%	2.50%	3.75%	0.00%	1.67%	2.7%	2.8%	1.0%	2.0%	5%	2
Quercus gambelii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus hypoleucoides	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus rugosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Quercus toumeyi	0.00%	0.00%	0.00%	0.00%	0.00%	2.08%	0.00%	0.00%	0.3%	0.7%	0.3%	0.5%	5%	1

Table A3d. Within-plot cover values (%) for species measured in the canopy layer of terrestrial vegetation and soils plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Individual plot measures								Across-plot measures					
	402_V01	402_V02	402_V03	402_V05	402_V06	402_V07	402_V08	402_V26	AVG	SD	SE	Sdiff	MDC	n=
Totals by lifeform														
Annual Forb	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Annual Grass	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Perennial Forb	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Perennial Grass	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Subshrubs	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Shrubs	2.08%	0.00%	5.42%	0.00%	0.00%	0.42%	0.00%	0.00%	1.0%	1.9%	0.7%	1.4%	5%	1
Succulents	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trees	21.67%	1.67%	20.42%	2.92%	2.50%	17.92%	7.92%	1.67%	9.6%	8.9%	3.1%	6.3%	5%	14
Snag	1.25%	0.00%	0.00%	0.00%	0.42%	0.42%	0.83%	0.00%	0.4%	0.5%	0.2%	0.3%	5%	1
Vines	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Total	23.75%	1.67%	25.83%	2.92%	2.50%	18.33%	7.92%	1.67%	10.6%	10.4%	3.7%	7.3%	5%	19

Table A3e. Within-plot cover values (%) for species measured in the canopy layer of terrestrial vegetation and soils plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures									Across-plot measures					
Species	502_V01	502_V02	502_V03	502_V05	502_V06	502_V07	502_V08	502_V27	502_V28	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs															
Lamium amplexicaule	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.0%	0.1%	0.0%	0.1%	5%	1
Shrubs															
Arctostaphylos pungens	0.00%	1.25%	0.42%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.2%	0.4%	0.1%	0.3%	5%	1
Fouquieria splendens	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Garrya wrightii	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%	0.00%	0.00%	0.1%	0.4%	0.1%	0.3%	5%	1
Holodiscus dumosus	0.00%	0.00%	0.00%	0.00%	0.00%	2.50%	0.00%	0.00%	0.00%	0.3%	0.8%	0.3%	0.6%	5%	1
Larrea tridentata	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Succulents															
Carnegiea gigantea	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Cylindropuntia versicolor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trees															
Acacia constricta	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Juniperus deppeana	0.00%	0.00%	3.33%	0.00%	0.00%	0.00%	7.50%	0.00%	3.75%	1.6%	2.7%	0.9%	1.9%	5%	2
Parkinsonia microphylla	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pinus	3.75%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.4%	1.3%	0.4%	0.9%	5%	1
Pinus arizonica	0.00%	0.00%	0.00%	0.00%	0.00%	19.17%	0.00%	0.00%	0.00%	2.1%	6.4%	2.1%	4.5%	5%	7
Pinus discolor	0.00%	0.00%	24.17%	0.00%	0.00%	0.42%	16.67%	0.00%	0.83%	4.7%	9.1%	3.0%	6.5%	5%	15
Pinus flexilis	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.92%	0.00%	0.3%	1.0%	0.3%	0.7%	5%	1
Pinus ponderosa	47.92%	5.42%	0.00%	0.00%	27.92%	0.00%	0.00%	1.25%	0.00%	9.2%	17.1%	5.7%	12.1%	9%	15
Prosopis glandulosa	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0

Table A3e. Within-plot cover values (%) for species measured in the canopy layer of terrestrial vegetation and soils plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

	Individual plot measures									Across-plot measures					
Species	**502_V01**	**502_V02**	**502_V03**	**502_V05**	**502_V06**	**502_V07**	**502_V08**	**502_V27**	**502_V28**	**AVG**	**SD**	**SE**	**Sdiff**	**MDC**	**n=**
Trees, cont.															
Prosopis velutina	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Pseudotsuga menziesii	0.00%	0.00%	0.00%	0.00%	0.00%	13.75%	0.00%	57.50%	0.00%	7.9%	19.1%	6.4%	13.5%	10%	16
Quercus arizonica	0.00%	0.00%	17.50%	3.75%	0.00%	0.00%	3.33%	0.00%	0.00%	2.7%	5.7%	1.9%	4.1%	5%	6
Quercus emoryi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.25%	0.00%	0.00%	0.1%	0.4%	0.1%	0.3%	5%	1
Quercus gambelii	0.00%	0.00%	0.00%	0.00%	8.75%	16.67%	0.00%	0.00%	0.00%	2.8%	5.9%	2.0%	4.2%	5%	7
Quercus hypoleucoides	0.00%	8.75%	4.17%	4.17%	0.00%	1.67%	0.00%	0.00%	1.67%	2.3%	3.0%	1.0%	2.1%	5%	2
Quercus rugosa	0.00%	8.33%	0.00%	0.00%	6.25%	7.08%	0.00%	0.00%	0.00%	2.4%	3.6%	1.2%	2.6%	5%	3
Quercus toumeyi	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Totals by lifeform															
Annual Forb	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Annual Grass	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Perennial Forb	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.42%	0.0%	0.1%	0.0%	0.1%	5%	1
Perennial Grass	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Subshrubs	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Shrubs	0.00%	1.25%	0.42%	0.00%	0.00%	2.50%	1.25%	0.00%	0.42%	0.6%	0.9%	0.3%	0.6%	5%	1
Succulents	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Trees	51.67%	22.50%	49.17%	7.92%	42.92%	58.75%	28.75%	61.67%	6.25%	36.6%	21.1%	7.0%	14.9%	11%	16
Snag	4.58%	2.08%	1.25%	0.42%	3.33%	1.67%	0.42%	8.75%	2.92%	2.8%	2.6%	0.9%	1.8%	5%	2
Vines	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0%	0.0%	0.0%	0.0%	5%	0
Total	51.67%	23.75%	49.58%	7.92%	42.92%	61.25%	30.00%	61.67%	7.08%	37.3%	21.1%	7.0%	14.9%	11%	16

Table A3f. Within-plot cover values (%) for species measured in the canopy layer of terrestrial vegetation and soils plots, all strata (n = 60), Rincon Mountain District, Saguaro NP, 2008–2009.

Species	AVG	SD	SE	Sdiff	MDC	n=
Forbs/Herbs						
Lamium amplexicaule	0.0%	0.09%	0.02%	0.1%	5%	1
Shrubs						
Arctostaphylos pungens	0.4%	1.02%	0.20%	0.7%	5%	1
Fouquieria splendens	0.0%	0.11%	0.02%	0.1%	5%	1
Garrya wrightii	0.1%	0.31%	0.06%	0.2%	5%	1
Holodiscus dumosus	0.1%	0.51%	0.10%	0.4%	5%	1
Larrea tridentata	0.0%	0.09%	0.02%	0.1%	5%	1
Succulents						
Carnegiea gigantea	0.0%	0.06%	0.01%	0.0%	5%	1
Cylindropuntia versicolor	0.0%	0.09%	0.02%	0.1%	5%	1
Trees						
Acacia constricta	0.1%	0.45%	0.09%	0.3%	5%	1
Juniperus deppeana	1.2%	2.70%	0.54%	1.9%	5%	2
Parkinsonia microphylla	0.1%	0.60%	0.12%	0.4%	5%	1
Pinus	0.2%	0.77%	0.15%	0.5%	5%	1
Pinus arizonica	0.8%	3.91%	0.78%	2.8%	5%	3
Pinus discolor	2.6%	6.16%	1.23%	4.4%	5%	7
Pinus flexilis	0.1%	0.60%	0.12%	0.4%	5%	1
Pinus ponderosa	3.4%	11.08%	2.22%	7.8%	5%	21
Prosopis glandulosa	0.1%	0.51%	0.10%	0.4%	5%	1
Prosopis velutina	0.9%	2.42%	0.48%	1.7%	5%	1
Pseudotsuga menziesii	3.0%	11.95%	2.39%	8.4%	5%	25
Quercus arizonica	1.7%	3.85%	0.77%	2.7%	5%	3
Quercus emoryi	0.9%	1.99%	0.40%	1.4%	5%	1
Quercus gambelii	1.1%	3.77%	0.75%	2.7%	5%	3
Quercus hypoleucoides	0.9%	2.08%	0.42%	1.5%	5%	1
Quercus rugosa	0.9%	2.46%	0.49%	1.7%	5%	2
Quercus toumeyi	0.1%	0.43%	0.09%	0.3%	5%	1
Totals by lifeform						
Annual Forb	0.0%	0.00%	0.00%	0.0%	5%	0
Annual Grass	0.0%	0.00%	0.00%	0.0%	5%	0
Perennial Forb	0.0%	0.09%	0.02%	0.1%	5%	1
Perennial Grass	0.0%	0.00%	0.00%	0.0%	5%	0
Subshrubs	0.0%	0.00%	0.00%	0.0%	5%	0
Shrubs	0.6%	1.23%	0.25%	0.9%	5%	1
Succulents	0.0%	0.12%	0.02%	0.1%	5%	1
Trees	18.1%	20.06%	4.01%	14.2%	6%	48
Snag	1.2%	2.04%	0.41%	1.4%	5%	1
Vines	0.0%	0.00%	0.00%	0.0%	5%	0
Total	18.8%	20.36%	4.07%	14.4%	6%	50

Table A4a. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

Species	Nativity	Within-plot frequency (0–5)		Within-plot frequency (%)		# sites	Landscape frequency
		201_V02	201_V03	Mean	SE		
Forbs/Herbs							
Acalypha	N/A	0	0	0%	0.0%	0	0%
Acourtia wrightii	Native	0	0	0%	0.0%	0	0%
Allionia incarnata	Native	0	0	0%	0.0%	0	0%
Antennaria marginata	Native	0	0	0%	0.0%	0	0%
Arenaria lanuginosa	Native	0	0	0%	0.0%	0	0%
Artemisia ludoviciana	Native	4	0	40%	40.0%	1	50%
Astrolepis cochisensis	Native	0	0	0%	0.0%	0	0%
Astrolepis sinuata	Native	0	0	0%	0.0%	0	0%
Bahia absinthifolia	Native	0	0	0%	0.0%	0	0%
Bahia dissecta	Native	0	0	0%	0.0%	0	0%
Boerhavia	N/A	0	0	0%	0.0%	0	0%
Boerhavia coccinea	Native	0	0	0%	0.0%	0	0%
Bommeria hispida	Native	0	0	0%	0.0%	0	0%
Chamaesyce	N/A	0	0	0%	0.0%	0	0%
Cheilanthes	N/A	0	0	0%	0.0%	0	0%
Cheilanthes fendleri	Native	0	0	0%	0.0%	0	0%
Chenopodium	N/A	0	0	0%	0.0%	0	0%
Cologania angustifolia	Native	0	0	0%	0.0%	0	0%
Commelina dianthifolia	Native	0	0	0%	0.0%	0	0%
Commelina erecta	Native	0	0	0%	0.0%	0	0%
Conyza bonariensis	Non-native	0	0	0%	0.0%	0	0%
Dalea	N/A	0	0	0%	0.0%	0	0%
Daucus pusillus	Native	0	0	0%	0.0%	0	0%
Dieteria bigelovii	Native	0	0	0%	0.0%	0	0%
Draba helleriana	Native	0	0	0%	0.0%	0	0%
Drymaria leptophylla	Native	0	0	0%	0.0%	0	0%
Dryopteris filix-mas	Native	0	0	0%	0.0%	0	0%
Erigeron oreophilus	Native	0	0	0%	0.0%	0	0%
Eriogonum abertianum	Native	0	0	0%	0.0%	0	0%
Euphorbia heterophylla	Native	0	0	0%	0.0%	0	0%
Evolvulus alsinoides	Native	0	0	0%	0.0%	0	0%
Evolvulus arizonicus	Native	0	0	0%	0.0%	0	0%
Gnaphalium	N/A	0	0	0%	0.0%	0	0%
Hedeoma nana	Native	0	0	0%	0.0%	0	0%
Heterotheca	N/A	0	0	0%	0.0%	0	0%
Heuchera sanguinea	Native	0	0	0%	0.0%	0	0%
Ipomoea	N/A	0	0	0%	0.0%	0	0%

Table A4a. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

Species	Nativity	Within-plot frequency (0–5)		Within-plot frequency (%)		# sites	Landscape frequency
		201_V02	201_V03	Mean	SE		
Forbs/Herbs, cont.							
Koanophyllon	N/A	0	0	0%	0.0%	0	0%
Lamium amplexicaule	Non-native	0	0	0%	0.0%	0	0%
Linum neomexicanum	Native	0	0	0%	0.0%	0	0%
Lithospermum multiflorum	Native	0	0	0%	0.0%	0	0%
Lotus	N/A	0	0	0%	0.0%	0	0%
Machaeranthera tagetina	Native	0	0	0%	0.0%	0	0%
*Malacothrix sonorae**	Native	0	0	0%	0.0%	0	0%
Mentzelia	N/A	0	0	0%	0.0%	0	0%
Monarda citriodora	Native	0	0	0%	0.0%	0	0%
Notholaena standleyi	Native	0	0	0%	0.0%	0	0%
Oxalis	Native	0	0	0%	0.0%	0	0%
Packera neomexicana	Native	0	0	0%	0.0%	0	0%
Pellaea truncata	Native	0	0	0%	0.0%	0	0%
Pellaea wrightiana	Native	0	0	0%	0.0%	0	0%
Pseudognaphalium canescens	Native	0	0	0%	0.0%	0	0%
Pseudognaphalium canescens ssp. *canescens*	Native	0	0	0%	0.0%	0	0%
Pseudognaphalium leucocephalum	Native	0	0	0%	0.0%	0	0%
Pteridium aquilinum	Native	0	0	0%	0.0%	0	0%
Salvia arizonica	Native	0	0	0%	0.0%	0	0%
Schoenocrambe linearifolia	Native	0	0	0%	0.0%	0	0%
Scrophularia parviflora	Native	0	0	0%	0.0%	0	0%
Sedum cockerellii	Native	0	0	0%	0.0%	0	0%
Selaginella arizonica	Native	0	0	0%	0.0%	0	0%
Solidago velutina	Native	0	0	0%	0.0%	0	0%
Thalictrum fendleri	Native	0	0	0%	0.0%	0	0%
Verbesina encelioides	Native	0	0	0%	0.0%	0	0%
Viola canadensis	Native	0	0	0%	0.0%	0	0%
Woodsia plummerae	Native	0	0	0%	0.0%	0	0%
Xanthisma gracile	Native	0	0	0%	0.0%	0	0%
Graminoids							
Aristida purpurea	Native	2	0	20%	20.0%	1	50%
Aristida schiedeana	Native	0	0	0%	0.0%	0	0%
Aristida ternipes	Native	1	2	30%	10.0%	2	100%
Aristida ternipes var. *gentilis*	Native	0	0	0%	0.0%	0	0%
Blepharoneuron tricholepis	Native	0	0	0%	0.0%	0	0%
Bothriochloa barbinodis	Native	0	0	0%	0.0%	0	0%

Table A4a. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

Species	Nativity	Within-plot frequency (0–5)		Within-plot frequency (%)		# sites	Landscape frequency
		201_V02	201_V03	Mean	SE		
Graminoids, cont.							
Bouteloua aristidoides	Native	0	0	0%	0.0%	0	0%
Bouteloua curtipendula	Native	0	0	0%	0.0%	0	0%
Bouteloua eriopoda	Native	0	0	0%	0.0%	0	0%
Bouteloua hirsuta	Native	0	0	0%	0.0%	0	0%
Bouteloua repens	Native	0	0	0%	0.0%	0	0%
Bromus ciliatus	Native	0	0	0%	0.0%	0	0%
Bromus rubens	Non-native	0	0	0%	0.0%	0	0%
Carex geophila	Native	0	0	0%	0.0%	0	0%
Dasyochloa pulchella	Native	3	1	40%	20.0%	2	100%
Digitaria californica	Native	0	3	30%	30.0%	1	50%
Echinochloa	N/A	0	0	0%	0.0%	0	0%
Elymus glaucus	Native	0	0	0%	0.0%	0	0%
Eragrostis intermedia	Native	0	0	0%	0.0%	0	0%
Eragrostis lehmanniana	Non-native	0	0	0%	0.0%	0	0%
Eriochloa lemmonii	Native	0	0	0%	0.0%	0	0%
Heteropogon contortus	Native	0	0	0%	0.0%	0	0%
Leptochloa dubia	Native	0	0	0%	0.0%	0	0%
Lycurus setosus	Native	0	0	0%	0.0%	0	0%
Muhlenbergia emersleyi	Native	0	0	0%	0.0%	0	0%
Muhlenbergia polycaulis	Native	0	0	0%	0.0%	0	0%
Muhlenbergia porteri	Native	5	4	90%	10.0%	2	100%
Panicum bulbosum	Native	0	0	0%	0.0%	0	0%
Piptochaetium fimbriatum	Native	0	0	0%	0.0%	0	0%
Piptochaetium pringlei	Native	0	0	0%	0.0%	0	0%
Poa fendleriana	Native	0	0	0%	0.0%	0	0%
Schizachyrium cirratum	Native	0	0	0%	0.0%	0	0%
Setaria grisebachii	Native	0	0	0%	0.0%	0	0%
Sporobolus	N/A	0	0	0%	0.0%	0	0%
Trachypogon spicatus	Native	0	0	0%	0.0%	0	0%
Subshrubs							
Abutilon incanum	Native	0	0	0%	0.0%	0	0%
Acacia angustissima	Native	0	0	0%	0.0%	0	0%
Ageratina herbacea	Native	0	0	0%	0.0%	0	0%
Ambrosia ambrosioides	Native	0	0	0%	0.0%	0	0%
Ayenia filiformis	Native	0	0	0%	0.0%	0	0%
Bouvardia ternifolia	Native	0	0	0%	0.0%	0	0%
Brickellia californica	Native	0	0	0%	0.0%	0	0%

Table A4a. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

Species	Nativity	Within-plot frequency (0–5)		Within-plot frequency (%)		# sites	Landscape frequency
		201_V02	201_V03	Mean	SE		
Subshrubs, cont.							
Brickellia grandiflora	Native	0	0	0%	0.0%	0	0%
Brickellia simplex	Native	0	0	0%	0.0%	0	0%
Comandra umbellata	Native	0	0	0%	0.0%	0	0%
Dalea albiflora	Native	0	0	0%	0.0%	0	0%
Dalea pulchra	Native	0	0	0%	0.0%	0	0%
Encelia farinosa	Native	1	0	10%	10.0%	1	50%
Ericameria laricifolia	Native	0	0	0%	0.0%	0	0%
Erigeron speciosus	Native	0	0	0%	0.0%	0	0%
Eriogonum jamesii	Native	0	0	0%	0.0%	0	0%
Eriogonum wrightii	Native	0	0	0%	0.0%	0	0%
Galium wrightii	Native	0	0	0%	0.0%	0	0%
Geranium caespitosum	Native	0	0	0%	0.0%	0	0%
Hibiscus coulteri	Native	0	0	0%	0.0%	0	0%
Ipomopsis multiflora	Native	0	0	0%	0.0%	0	0%
Isocoma tenuisecta	Native	0	0	0%	0.0%	0	0%
Lotus rigidus	Native	0	0	0%	0.0%	0	0%
Macrosiphonia brachysiphon	Native	0	0	0%	0.0%	0	0%
Manihot angustiloba	Native	0	0	0%	0.0%	0	0%
Nolina microcarpa	Native	0	0	0%	0.0%	0	0%
Penstemon linarioides	Native	0	0	0%	0.0%	0	0%
Phoradendron californicum	Native	1	0	10%	10.0%	1	50%
Porophyllum gracile	Native	0	0	0%	0.0%	0	0%
Rubus neomexicanus	Native	0	0	0%	0.0%	0	0%
Senna covesii	Native	0	0	0%	0.0%	0	0%
Sphaeralcea	N/A	3	1	40%	20.0%	2	100%
Tagetes lemmonii	Native	0	0	0%	0.0%	0	0%
Talinum paniculatum	Native	0	0	0%	0.0%	0	0%
Trichostema arizonicum	Native	0	0	0%	0.0%	0	0%
Trixis californica	Native	0	0	0%	0.0%	0	0%
Zinnia acerosa	Native	5	2	70%	30.0%	2	100%
Shrubs							
Aloysia wrightii	Native	0	0	0%	0.0%	0	0%
Amorpha californica	Native	0	0	0%	0.0%	0	0%
Anisacanthus thurberi	Native	0	0	0%	0.0%	0	0%
Arctostaphylos pungens	Native	0	0	0%	0.0%	0	0%
Baccharis sarothroides	Native	0	0	0%	0.0%	0	0%
Berberis wilcoxii	Native	0	0	0%	0.0%	0	0%

Table A4a. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

Species	Nativity	Within-plot frequency (0–5)		Within-plot frequency (%)		# sites	Landscape frequency
		201_V02	201_V03	Mean	SE		
Shrubs, cont.							
Calliandra eriophylla	Native	0	0	0%	0.0%	0	0%
Ceanothus fendleri	Native	0	0	0%	0.0%	0	0%
Ceanothus greggii	Native	0	0	0%	0.0%	0	0%
Ceanothus integerrimus	Native	0	0	0%	0.0%	0	0%
Celtis ehrenbergiana	Native	0	0	0%	0.0%	0	0%
Condalia correllii	Native	4	0	40%	40.0%	1	50%
Crossosoma bigelovii	Native	0	0	0%	0.0%	0	0%
Ephedra	N/A	1	1	20%	0.0%	2	100%
Fouquieria splendens	Native	0	0	0%	0.0%	0	0%
Frangula californica	Native	0	0	0%	0.0%	0	0%
Garrya wrightii	Native	0	0	0%	0.0%	0	0%
Gossypium thurberi	Native	0	0	0%	0.0%	0	0%
Holodiscus discolor	Native	0	0	0%	0.0%	0	0%
Holodiscus dumosus	Native	0	0	0%	0.0%	0	0%
Jacquemontia pringlei	Native	0	0	0%	0.0%	0	0%
Jatropha cardiophylla	Native	0	0	0%	0.0%	0	0%
Larrea tridentata	Native	5	2	70%	30.0%	2	100%
Lycium pallidum	Native	0	0	0%	0.0%	0	0%
Mimosa aculeaticarpa	Native	0	0	0%	0.0%	0	0%
Mimosa aculeaticarpa var. *biuncifera*	Native	0	0	0%	0.0%	0	0%
Robinia neomexicana	Native	0	0	0%	0.0%	0	0%
Symphoricarpos oreophilus	Native	0	0	0%	0.0%	0	0%
Ziziphus obtusifolia	Native	0	0	0%	0.0%	0	0%
Succulents							
Acalypha californica	Native	1	0	10%	10.0%	1	50%
Agave palmeri	Native	0	0	0%	0.0%	0	0%
Agave parryi	Native	0	0	0%	0.0%	0	0%
Agave schottii	Native	0	0	0%	0.0%	0	0%
Carnegiea gigantea	Native	1	0	10%	10.0%	1	50%
Cylindropuntia acanthocarpa	Native	0	1	10%	10.0%	1	50%
Cylindropuntia bigelovii	Native	0	0	0%	0.0%	0	0%
Cylindropuntia leptocaulis	Native	1	2	30%	10.0%	2	100%
Cylindropuntia versicolor	Native	0	1	10%	10.0%	1	50%
Dasylirion wheeleri	Native	0	0	0%	0.0%	0	0%
Echinocereus pectinatus	Native	2	0	20%	20.0%	1	50%
Ferocactus wislizeni	Native	2	0	20%	20.0%	1	50%
Mammillaria grahamii	Native	4	0	40%	40.0%	1	50%

Table A4a. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

Species	Nativity	Within-plot frequency (0–5)		Within-plot frequency (%)		# sites	Landscape frequency
		201_V02	201_V03	Mean	SE		
Succulents, cont.							
Opuntia engelmannii	Native	5	2	70%	30.0%	2	100%
Opuntia phaeacantha	Native	3	2	50%	10.0%	2	100%
Yucca madrensis	Native	0	0	0%	0.0%	0	0%
Trees							
Acacia constricta	Native	5	5	100%	0.0%	2	100%
Acacia greggii	Native	0	0	0%	0.0%	0	0%
Arbutus arizonica	Native	0	0	0%	0.0%	0	0%
Celtis laevigata var. *reticulata*	Native	0	0	0%	0.0%	0	0%
Dodonaea viscosa	Native	0	0	0%	0.0%	0	0%
Erythrina flabelliformis	Native	0	0	0%	0.0%	0	0%
Juniperus deppeana	Native	0	0	0%	0.0%	0	0%
Parkinsonia microphylla	Native	5	0	50%	50.0%	1	50%
Pinus arizonica	Native	0	0	0%	0.0%	0	0%
Pinus discolor	Native	1	0	10%	10.0%	1	50%
Pinus ponderosa	Native	0	0	0%	0.0%	0	0%
Populus fremontii	Native	0	0	0%	0.0%	0	0%
Prosopis glandulosa	Native	0	0	0%	0.0%	0	0%
Prosopis velutina	Native	3	2	50%	10.0%	2	100%
Pseudotsuga menziesii	Native	0	0	0%	0.0%	0	0%
Quercus arizonica	Native	0	0	0%	0.0%	0	0%
Quercus chrysolepis	Native	0	0	0%	0.0%	0	0%
Quercus emoryi	Native	0	0	0%	0.0%	0	0%
Quercus gambelii	Native	0	0	0%	0.0%	0	0%
Quercus hypoleucoides	Native	0	0	0%	0.0%	0	0%
Quercus oblongifolia	Native	0	0	0%	0.0%	0	0%
Quercus rugosa	Native	0	0	0%	0.0%	0	0%
Quercus toumeyi	Native	0	0	0%	0.0%	0	0%
Quercus turbinella	Native	0	0	0%	0.0%	0	0%
Rhamnus crocea	Native	0	0	0%	0.0%	0	0%
Salix exigua	Native	0	0	0%	0.0%	0	0%
Vines							
Galium aparine	Native	0	0	0%	0.0%	0	0%
Janusia gracilis	Native	0	0	0%	0.0%	0	0%
Lonicera albiflora	Native	0	0	0%	0.0%	0	0%
Phaseolus	Native	0	0	0%	0.0%	0	0%
Vicia pulchella	Native	0	0	0%	0.0%	0	0%

Table A4a. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

Species	Nativity	Within-plot frequency (0–5)		Within-plot frequency (%)		# sites	Landscape frequency
		201_V02	201_V03	Mean	SE		
Fern							
Fern	N/A	0	0	0%	0.0%	0	0%
N/A							
Aster	N/A	0	0	0%	0.0%	0	0%
Astrolepis	N/A	0	0	0%	0.0%	0	0%
Calandrinia	N/A	0	0	0%	0.0%	0	0%
Castilleja	N/A	0	0	0%	0.0%	0	0%
Cirsium	N/A	0	0	0%	0.0%	0	0%
Cyperus	N/A	0	0	0%	0.0%	0	0%
Draba	Native	0	0	0%	0.0%	0	0%
Dryopteris	N/A	0	0	0%	0.0%	0	0%
Erigeron	N/A	0	0	0%	0.0%	0	0%
Eriogonum	N/A	0	0	0%	0.0%	0	0%
Galium	N/A	0	0	0%	0.0%	0	0%
Hieracium	N/A	0	0	0%	0.0%	0	0%
Lupinus	N/A	0	0	0%	0.0%	0	0%
Macranthera	N/A	0	0	0%	0.0%	0	0%
Trifolium	N/A	0	0	0%	0.0%	0	0%
Verbena	N/A	0	0	0%	0.0%	0	0%
Viola	N/A	0	0	0%	0.0%	0	0%

*new to park species lists

Table A4b. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

Species	Nativity	Within-plot frequency (0–5)			Within-plot frequency (%)		# sites	Landscape frequency
		202_V03	202_V04	202_V05	Mean	SE		
Forbs/Herbs								
Acalypha	N/A	0	0	0	0%	0.0%	0	0%
Acourtia wrightii	Native	0	0	0	0%	0.0%	0	0%
Allionia incarnata	Native	0	0	0	0%	0.0%	0	0%
Antennaria marginata	Native	0	0	0	0%	0.0%	0	0%
Arenaria lanuginosa	Native	0	0	0	0%	0.0%	0	0%
Artemisia ludoviciana	Native	0	0	0	0%	0.0%	0	0%
Astrolepis cochisensis	Native	0	0	0	0%	0.0%	0	0%
Astrolepis sinuata	Native	0	0	0	0%	0.0%	0	0%
Bahia absinthifolia	Native	0	0	0	0%	0.0%	0	0%
Bahia dissecta	Native	0	0	0	0%	0.0%	0	0%
Boerhavia	N/A	0	0	0	0%	0.0%	0	0%
Boerhavia coccinea	Native	0	0	0	0%	0.0%	0	0%
Bommeria hispida	Native	0	0	0	0%	0.0%	0	0%
Chamaesyce	N/A	0	3	0	20%	20.0%	1	33%
Cheilanthes	N/A	0	0	0	0%	0.0%	0	0%
Cheilanthes fendleri	Native	0	0	0	0%	0.0%	0	0%
Chenopodium	N/A	0	0	0	0%	0.0%	0	0%
Cologania angustifolia	Native	0	0	0	0%	0.0%	0	0%
Commelina dianthifolia	Native	0	0	0	0%	0.0%	0	0%
Commelina erecta	Native	0	0	0	0%	0.0%	0	0%
Conyza bonariensis	Non-native	0	0	0	0%	0.0%	0	0%
Dalea	N/A	3	0	0	20%	20.0%	1	33%
Daucus pusillus	Native	0	0	0	0%	0.0%	0	0%
Dieteria bigelovii	Native	0	0	0	0%	0.0%	0	0%
Draba helleriana	Native	0	0	0	0%	0.0%	0	0%
Drymaria leptophylla	Native	0	0	0	0%	0.0%	0	0%
Dryopteris filix-mas	Native	0	0	0	0%	0.0%	0	0%
Erigeron oreophilus	Native	0	0	0	0%	0.0%	0	0%
Eriogonum abertianum	Native	0	0	0	0%	0.0%	0	0%
Euphorbia heterophylla	Native	0	0	0	0%	0.0%	0	0%
Evolvulus alsinoides	Native	0	1	0	7%	6.7%	1	33%
Evolvulus arizonicus	Native	0	2	0	13%	13.3%	1	33%
Gnaphalium	N/A	0	0	0	0%	0.0%	0	0%
Hedeoma nana	Native	0	0	0	0%	0.0%	0	0%
Heterotheca	N/A	0	0	0	0%	0.0%	0	0%
Heuchera sanguinea	Native	0	0	0	0%	0.0%	0	0%
Ipomoea	N/A	0	0	0	0%	0.0%	0	0%

Table A4b. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)			Within-plot frequency (%)		# sites	Landscape frequency
		202_V03	202_V04	202_V05	Mean	SE		
Forbs/Herbs, cont.								
Koanophyllon	N/A	0	0	4	27%	26.7%	1	33%
Lamium amplexicaule	Non-native	0	0	0	0%	0.0%	0	0%
Linum neomexicanum	Native	0	0	0	0%	0.0%	0	0%
Lithospermum multiflorum	Native	0	0	0	0%	0.0%	0	0%
Lotus	N/A	0	0	0	0%	0.0%	0	0%
Machaeranthera tagetina	Native	0	0	0	0%	0.0%	0	0%
*Malacothrix sonorae**	Native	0	0	0	0%	0.0%	0	0%
Mentzelia	N/A	0	0	0	0%	0.0%	0	0%
Monarda citriodora	Native	0	0	0	0%	0.0%	0	0%
Notholaena standleyi	Native	1	0	0	7%	6.7%	1	33%
Oxalis	Native	0	0	0	0%	0.0%	0	0%
Packera neomexicana	Native	0	0	0	0%	0.0%	0	0%
Pellaea truncata	Native	0	0	0	0%	0.0%	0	0%
Pellaea wrightiana	Native	0	2	0	13%	13.3%	1	33%
Pseudognaphalium canescens	Native	0	0	0	0%	0.0%	0	0%
Pseudognaphalium canescens ssp. *canescens*	Native	0	0	0	0%	0.0%	0	0%
Pseudognaphalium leucocephalum	Native	0	0	0	0%	0.0%	0	0%
Pteridium aquilinum	Native	0	0	0	0%	0.0%	0	0%
Salvia arizonica	Native	0	0	0	0%	0.0%	0	0%
Schoenocrambe linearifolia	Native	0	0	0	0%	0.0%	0	0%
Scrophularia parviflora	Native	0	0	0	0%	0.0%	0	0%
Sedum cockerellii	Native	0	0	0	0%	0.0%	0	0%
Selaginella arizonica	Native	0	0	0	0%	0.0%	0	0%
Solidago velutina	Native	0	0	0	0%	0.0%	0	0%
Thalictrum fendleri	Native	0	0	0	0%	0.0%	0	0%
Verbesina encelioides	Native	0	0	0	0%	0.0%	0	0%
Viola canadensis	Native	0	0	0	0%	0.0%	0	0%
Woodsia plummerae	Native	0	0	0	0%	0.0%	0	0%
Xanthisma gracile	Native	0	0	0	0%	0.0%	0	0%
Graminoids								
Aristida purpurea	Native	0	0	0	0%	0.0%	0	0%
Aristida schiedeana	Native	0	0	0	0%	0.0%	0	0%
Aristida ternipes	Native	0	1	2	20%	11.5%	2	67%
Aristida ternipes var. *gentilis*	Native	3	0	0	20%	20.0%	1	33%
Blepharoneuron tricholepis	Native	0	0	0	0%	0.0%	0	0%
Bothriochloa barbinodis	Native	0	0	0	0%	0.0%	0	0%
Bouteloua aristidoides	Native	0	0	0	0%	0.0%	0	0%

Table A4b. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)			Within-plot frequency (%)		# sites	Landscape frequency
		202_V03	202_V04	202_V05	Mean	SE		
Graminoids, cont.								
Bouteloua curtipendula	Native	0	4	0	27%	26.7%	1	33%
Bouteloua eriopoda	Native	0	0	0	0%	0.0%	0	0%
Bouteloua hirsuta	Native	0	0	0	0%	0.0%	0	0%
Bouteloua repens	Native	5	5	0	67%	33.3%	2	67%
Bromus ciliatus	Native	0	0	0	0%	0.0%	0	0%
Bromus rubens	Non-native	0	0	0	0%	0.0%	0	0%
Carex geophila	Native	0	0	0	0%	0.0%	0	0%
Dasyochloa pulchella	Native	0	0	0	0%	0.0%	0	0%
Digitaria californica	Native	0	1	3	27%	17.6%	2	67%
Echinochloa	N/A	0	0	0	0%	0.0%	0	0%
Elymus glaucus	Native	0	0	0	0%	0.0%	0	0%
Eragrostis intermedia	Native	0	0	0	0%	0.0%	0	0%
Eragrostis lehmanniana	Non-native	0	4	5	60%	30.6%	2	67%
Eriochloa lemmonii	Native	0	0	0	0%	0.0%	0	0%
Heteropogon contortus	Native	0	1	0	7%	6.7%	1	33%
Leptochloa dubia	Native	0	0	0	0%	0.0%	0	0%
Lycurus setosus	Native	0	0	0	0%	0.0%	0	0%
Muhlenbergia emersleyi	Native	0	0	0	0%	0.0%	0	0%
Muhlenbergia polycaulis	Native	0	0	0	0%	0.0%	0	0%
Muhlenbergia porteri	Native	1	3	3	47%	13.3%	3	100%
Panicum bulbosum	Native	0	0	0	0%	0.0%	0	0%
Piptochaetium fimbriatum	Native	0	0	0	0%	0.0%	0	0%
Piptochaetium pringlei	Native	0	0	0	0%	0.0%	0	0%
Poa fendleriana	Native	0	0	0	0%	0.0%	0	0%
Schizachyrium cirratum	Native	0	0	0	0%	0.0%	0	0%
Setaria grisebachii	Native	0	0	2	13%	13.3%	1	33%
Sporobolus	N/A	0	0	0	0%	0.0%	0	0%
Trachypogon spicatus	Native	0	0	0	0%	0.0%	0	0%
Subshrubs								
Abutilon incanum	Native	3	5	2	67%	17.6%	3	100%
Acacia angustissima	Native	0	0	0	0%	0.0%	0	0%
Ageratina herbacea	Native	0	0	0	0%	0.0%	0	0%
Ambrosia ambrosioides	Native	0	0	3	20%	20.0%	1	33%
Ayenia filiformis	Native	0	1	0	7%	6.7%	1	33%
Bouvardia ternifolia	Native	0	0	0	0%	0.0%	0	0%
Brickellia californica	Native	0	0	0	0%	0.0%	0	0%
Brickellia grandiflora	Native	0	0	0	0%	0.0%	0	0%

Table A4b. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)			Within-plot frequency (%)		# sites	Landscape frequency
		202_V03	202_V04	202_V05	Mean	SE		
Subshrubs, cont.								
Brickellia simplex	Native	0	0	0	0%	0.0%	0	0%
Comandra umbellata	Native	0	0	0	0%	0.0%	0	0%
Dalea albiflora	Native	0	0	0	0%	0.0%	0	0%
Dalea pulchra	Native	0	4	0	27%	26.7%	1	33%
Encelia farinosa	Native	5	5	2	80%	20.0%	3	100%
Ericameria laricifolia	Native	1	4	1	40%	20.0%	3	100%
Erigeron speciosus	Native	0	0	0	0%	0.0%	0	0%
Eriogonum jamesii	Native	0	0	0	0%	0.0%	0	0%
Eriogonum wrightii	Native	1	3	0	27%	17.6%	2	67%
Galium wrightii	Native	0	0	0	0%	0.0%	0	0%
Geranium caespitosum	Native	0	0	0	0%	0.0%	0	0%
Hibiscus coulteri	Native	0	0	0	0%	0.0%	0	0%
Ipomopsis multiflora	Native	0	0	0	0%	0.0%	0	0%
Isocoma tenuisecta	Native	0	0	2	13%	13.3%	1	33%
Lotus rigidus	Native	0	0	0	0%	0.0%	0	0%
Macrosiphonia brachysiphon	Native	0	0	0	0%	0.0%	0	0%
Manihot angustiloba	Native	0	0	0	0%	0.0%	0	0%
Nolina microcarpa	Native	0	0	0	0%	0.0%	0	0%
Penstemon linarioides	Native	0	0	0	0%	0.0%	0	0%
Phoradendron californicum	Native	0	0	0	0%	0.0%	0	0%
Porophyllum gracile	Native	1	0	0	7%	6.7%	1	33%
Rubus neomexicanus	Native	0	0	0	0%	0.0%	0	0%
Senna covesii	Native	2	1	0	20%	11.5%	2	67%
Sphaeralcea	N/A	0	1	0	7%	6.7%	1	33%
Tagetes lemmonii	Native	0	0	0	0%	0.0%	0	0%
Talinum paniculatum	Native	0	1	0	7%	6.7%	1	33%
Trichostema arizonicum	Native	0	0	0	0%	0.0%	0	0%
Trixis californica	Native	1	3	2	40%	11.5%	3	100%
Zinnia acerosa	Native	0	0	3	20%	20.0%	1	33%
Shrubs								
Aloysia wrightii	Native	0	1	4	33%	24.0%	2	67%
Amorpha californica	Native	0	0	0	0%	0.0%	0	0%
Anisacanthus thurberi	Native	0	0	0	0%	0.0%	0	0%
Arctostaphylos pungens	Native	0	0	0	0%	0.0%	0	0%
Baccharis sarothroides	Native	0	0	0	0%	0.0%	0	0%
Berberis wilcoxii	Native	0	0	0	0%	0.0%	0	0%
Calliandra eriophylla	Native	5	5	0	67%	33.3%	2	67%

Table A4b. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)			Within-plot frequency (%)		# sites	Landscape frequency
		202_V03	202_V04	202_V05	Mean	SE		
Shrubs, cont.								
Ceanothus fendleri	Native	0	0	0	0%	0.0%	0	0%
Ceanothus greggii	Native	0	0	0	0%	0.0%	0	0%
Ceanothus integerrimus	Native	0	0	0	0%	0.0%	0	0%
Celtis ehrenbergiana	Native	0	1	0	7%	6.7%	1	33%
Condalia correllii	Native	5	0	0	33%	33.3%	1	33%
Crossosoma bigelovii	Native	0	0	0	0%	0.0%	0	0%
Ephedra	N/A	0	0	0	0%	0.0%	0	0%
Fouquieria splendens	Native	5	5	0	67%	33.3%	2	67%
Frangula californica	Native	0	0	0	0%	0.0%	0	0%
Garrya wrightii	Native	0	0	0	0%	0.0%	0	0%
Gossypium thurberi	Native	0	0	0	0%	0.0%	0	0%
Holodiscus discolor	Native	0	0	0	0%	0.0%	0	0%
Holodiscus dumosus	Native	0	0	0	0%	0.0%	0	0%
Jacquemontia pringlei	Native	2	0	0	13%	13.3%	1	33%
Jatropha cardiophylla	Native	5	5	1	73%	26.7%	3	100%
Larrea tridentata	Native	0	0	0	0%	0.0%	0	0%
Lycium pallidum	Native	0	2	4	40%	23.1%	2	67%
Mimosa aculeaticarpa	Native	0	0	0	0%	0.0%	0	0%
Mimosa aculeaticarpa var. *biuncifera*	Native	0	0	0	0%	0.0%	0	0%
Robinia neomexicana	Native	0	0	0	0%	0.0%	0	0%
Symphoricarpos oreophilus	Native	0	0	0	0%	0.0%	0	0%
Ziziphus obtusifolia	Native	0	0	2	13%	13.3%	1	33%
Succulents								
Acalypha californica	Native	0	0	0	0%	0.0%	0	0%
Agave palmeri	Native	0	0	1	7%	6.7%	1	33%
Agave parryi	Native	0	0	0	0%	0.0%	0	0%
Agave schottii	Native	0	0	0	0%	0.0%	0	0%
Carnegiea gigantea	Native	4	1	1	40%	20.0%	3	100%
Cylindropuntia acanthocarpa	Native	0	0	0	0%	0.0%	0	0%
Cylindropuntia bigelovii	Native	1	0	0	7%	6.7%	1	33%
Cylindropuntia leptocaulis	Native	0	0	0	0%	0.0%	0	0%
Cylindropuntia versicolor	Native	2	0	0	13%	13.3%	1	33%
Dasylirion wheeleri	Native	0	1	0	7%	6.7%	1	33%
Echinocereus pectinatus	Native	0	0	0	0%	0.0%	0	0%
Ferocactus wislizeni	Native	4	4	5	87%	6.7%	3	100%
Mammillaria grahamii	Native	4	3	0	47%	24.0%	2	67%
Opuntia engelmannii	Native	5	5	4	93%	6.7%	3	100%

Table A4b. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)			Within-plot frequency (%)		# sites	Landscape frequency
		202_V03	202_V04	202_V05	Mean	SE		
Succulents, cont.								
Opuntia phaeacantha	Native	0	0	0	0%	0.0%	0	0%
Yucca madrensis	Native	0	0	0	0%	0.0%	0	0%
Trees								
Acacia constricta	Native	0	0	0	0%	0.0%	0	0%
Acacia greggii	Native	4	5	5	93%	6.7%	3	100%
Arbutus arizonica	Native	0	0	0	0%	0.0%	0	0%
Celtis laevigata var. *reticulata*	Native	2	2	5	60%	20.0%	3	100%
Dodonaea viscosa	Native	0	0	0	0%	0.0%	0	0%
Erythrina flabelliformis	Native	0	0	0	0%	0.0%	0	0%
Juniperus deppeana	Native	0	0	0	0%	0.0%	0	0%
Parkinsonia microphylla	Native	3	1	0	27%	17.6%	2	67%
Pinus arizonica	Native	0	0	0	0%	0.0%	0	0%
Pinus discolor	Native	0	0	0	0%	0.0%	0	0%
Pinus ponderosa	Native	0	0	0	0%	0.0%	0	0%
Populus fremontii	Native	0	0	0	0%	0.0%	0	0%
Prosopis glandulosa	Native	0	0	0	0%	0.0%	0	0%
Prosopis velutina	Native	1	1	5	47%	26.7%	3	100%
Pseudotsuga menziesii	Native	0	0	0	0%	0.0%	0	0%
Quercus arizonica	Native	0	0	0	0%	0.0%	0	0%
Quercus chrysolepis	Native	0	0	0	0%	0.0%	0	0%
Quercus emoryi	Native	0	0	0	0%	0.0%	0	0%
Quercus gambelii	Native	0	0	0	0%	0.0%	0	0%
Quercus hypoleucoides	Native	0	0	0	0%	0.0%	0	0%
Quercus oblongifolia	Native	0	0	0	0%	0.0%	0	0%
Quercus rugosa	Native	0	0	0	0%	0.0%	0	0%
Quercus toumeyi	Native	0	0	0	0%	0.0%	0	0%
Quercus turbinella	Native	0	0	0	0%	0.0%	0	0%
Rhamnus crocea	Native	0	0	0	0%	0.0%	0	0%
Salix exigua	Native	0	0	5	33%	33.3%	1	33%
Vines								
Galium aparine	Native	0	0	0	0%	0.0%	0	0%
Janusia gracilis	Native	5	5	1	73%	26.7%	3	100%
Lonicera albiflora	Native	0	0	0	0%	0.0%	0	0%
Phaseolus	Native	0	0	0	0%	0.0%	0	0%
Vicia pulchella	Native	0	0	0	0%	0.0%	0	0%
Fern								
Fern	N/A	0	1	1	13%	6.7%	2	67%

Table A4b. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)			Within-plot frequency (%)		# sites	Landscape frequency
		202_V03	202_V04	202_V05	Mean	SE		
N/A								
Aster	N/A	0	0	0	0%	0.0%	0	0%
Astrolepis	N/A	0	0	0	0%	0.0%	0	0%
Calandrinia	N/A	0	0	0	0%	0.0%	0	0%
Castilleja	N/A	0	0	0	0%	0.0%	0	0%
Cirsium	N/A	0	0	0	0%	0.0%	0	0%
Cyperus	N/A	0	0	0	0%	0.0%	0	0%
Draba	Native	0	0	0	0%	0.0%	0	0%
Dryopteris	N/A	0	0	0	0%	0.0%	0	0%
Erigeron	N/A	0	0	0	0%	0.0%	0	0%
Eriogonum	N/A	0	0	0	0%	0.0%	0	0%
Galium	N/A	0	0	0	0%	0.0%	0	0%
Hieracium	N/A	0	0	0	0%	0.0%	0	0%
Lupinus	N/A	0	0	0	0%	0.0%	0	0%
Macranthera	N/A	0	0	0	0%	0.0%	0	0%
Trifolium	N/A	0	0	0	0%	0.0%	0	0%
Verbena	N/A	0	0	0	0%	0.0%	0	0%
Viola	N/A	0	0	0	0%	0.0%	0	0%

*new to park species lists

Table A4c. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

Species	Nativity	Within-plot frequency (0–5)			Within-plot frequency (%)		# sites	Landscape frequency
		V302_01	302_V04	302_V07	Mean	SE		
Forbs/Herbs								
Acalypha	N/A	0	1	0	7%	6.7%	1	33%
Acourtia wrightii	Native	0	1	0	7%	6.7%	1	33%
Allionia incarnata	Native	0	1	4	33%	24.0%	2	67%
Antennaria marginata	Native	0	0	0	0%	0.0%	0	0%
Arenaria lanuginosa	Native	0	0	0	0%	0.0%	0	0%
Artemisia ludoviciana	Native	1	0	0	7%	6.7%	1	33%
Astrolepis cochisensis	Native	0	0	0	0%	0.0%	0	0%
Astrolepis sinuata	Native	0	3	0	20%	20.0%	1	33%
Bahia absinthifolia	Native	0	1	0	7%	6.7%	1	33%
Bahia dissecta	Native	0	0	0	0%	0.0%	0	0%
Boerhavia	N/A	0	0	0	0%	0.0%	0	0%
Boerhavia coccinea	Native	1	0	0	7%	6.7%	1	33%
Bommeria hispida	Native	0	0	0	0%	0.0%	0	0%
Chamaesyce	N/A	0	0	1	7%	6.7%	1	33%
Cheilanthes	N/A	0	3	1	27%	17.6%	2	67%
Cheilanthes fendleri	Native	0	0	0	0%	0.0%	0	0%
Chenopodium	N/A	2	0	0	13%	13.3%	1	33%
Cologania angustifolia	Native	0	0	0	0%	0.0%	0	0%
Commelina dianthifolia	Native	0	0	0	0%	0.0%	0	0%
Commelina erecta	Native	0	0	0	0%	0.0%	0	0%
Conyza bonariensis	Non-native	0	0	0	0%	0.0%	0	0%
Dalea	N/A	0	0	4	27%	26.7%	1	33%
Daucus pusillus	Native	0	2	0	13%	13.3%	1	33%
Dieteria bigelovii	Native	0	0	0	0%	0.0%	0	0%
Draba helleriana	Native	0	0	0	0%	0.0%	0	0%
Drymaria leptophylla	Native	0	0	0	0%	0.0%	0	0%
Dryopteris filix-mas	Native	0	0	0	0%	0.0%	0	0%
Erigeron oreophilus	Native	0	0	0	0%	0.0%	0	0%
Eriogonum abertianum	Native	0	0	0	0%	0.0%	0	0%
Euphorbia heterophylla	Native	1	0	0	7%	6.7%	1	33%
Evolvulus alsinoides	Native	0	0	0	0%	0.0%	0	0%
Evolvulus arizonicus	Native	0	0	0	0%	0.0%	0	0%
Gnaphalium	N/A	0	0	0	0%	0.0%	0	0%
Hedeoma nana	Native	0	0	0	0%	0.0%	0	0%
Heterotheca	N/A	0	0	0	0%	0.0%	0	0%
Heuchera sanguinea	Native	0	0	0	0%	0.0%	0	0%
Ipomoea	N/A	0	1	0	7%	6.7%	1	33%
Koanophyllon	N/A	0	0	0	0%	0.0%	0	0%

Table A4c. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)			Within-plot frequency (%)		# sites	Landscape frequency
		V302_01	302_V04	302_V07	Mean	SE		
Forbs/Herbs, cont.								
Lamium amplexicaule	Non-native	0	0	0	0%	0.0%	0	0%
Linum neomexicanum	Native	0	0	0	0%	0.0%	0	0%
Lithospermum multiflorum	Native	0	0	0	0%	0.0%	0	0%
Lotus	N/A	0	0	0	0%	0.0%	0	0%
Machaeranthera tagetina	Native	0	0	0	0%	0.0%	0	0%
*Malacothrix sonorae**	Native	0	0	0	0%	0.0%	0	0%
Mentzelia	N/A	0	0	0	0%	0.0%	0	0%
Monarda citriodora	Native	0	0	0	0%	0.0%	0	0%
Notholaena standleyi	Native	0	0	0	0%	0.0%	0	0%
Oxalis	Native	0	0	0	0%	0.0%	0	0%
Packera neomexicana	Native	0	0	0	0%	0.0%	0	0%
Pellaea truncata	Native	0	0	0	0%	0.0%	0	0%
Pellaea wrightiana	Native	0	0	1	7%	6.7%	1	33%
Pseudognaphalium canescens	Native	1	0	0	7%	6.7%	1	33%
Pseudognaphalium canescens ssp. *canescens*	Native	0	0	0	0%	0.0%	0	0%
Pseudognaphalium leucocephalum	Native	0	0	0	0%	0.0%	0	0%
Pteridium aquilinum	Native	0	0	0	0%	0.0%	0	0%
Salvia arizonica	Native	0	1	0	7%	6.7%	1	33%
Schoenocrambe linearifolia	Native	0	0	0	0%	0.0%	0	0%
Scrophularia parviflora	Native	0	0	0	0%	0.0%	0	0%
Sedum cockerellii	Native	0	0	0	0%	0.0%	0	0%
Selaginella arizonica	Native	0	4	0	27%	26.7%	1	33%
Solidago velutina	Native	0	0	0	0%	0.0%	0	0%
Thalictrum fendleri	Native	0	0	0	0%	0.0%	0	0%
Verbesina encelioides	Native	0	0	0	0%	0.0%	0	0%
Viola canadensis	Native	0	0	0	0%	0.0%	0	0%
Woodsia plummerae	Native	0	0	0	0%	0.0%	0	0%
Xanthisma gracile	Native	0	0	0	0%	0.0%	0	0%
Graminoids								
Aristida purpurea	Native	1	0	0	7%	6.7%	1	33%
Aristida schiedeana	Native	0	4	0	27%	26.7%	1	33%
Aristida ternipes	Native	5	5	4	93%	6.7%	3	100%
Aristida ternipes var. *gentilis*	Native	0	0	0	0%	0.0%	0	0%
Blepharoneuron tricholepis	Native	0	0	0	0%	0.0%	0	0%
Bothriochloa barbinodis	Native	0	0	1	7%	6.7%	1	33%
Bouteloua aristidoides	Native	0	0	0	0%	0.0%	0	0%
Bouteloua curtipendula	Native	5	5	4	93%	6.7%	3	100%
Bouteloua eriopoda	Native	2	0	0	13%	13.3%	1	33%

Table A4c. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)			Within-plot frequency (%)		# sites	Landscape frequency
		V302_01	302_V04	302_V07	Mean	SE		
Graminoids, cont.								
Bouteloua hirsuta	Native	0	0	1	7%	6.7%	1	33%
Bouteloua repens	Native	3	2	4	60%	11.5%	3	100%
Bromus ciliatus	Native	0	0	0	0%	0.0%	0	0%
Bromus rubens	Non-native	2	2	1	33%	6.7%	3	100%
Carex geophila	Native	0	0	0	0%	0.0%	0	0%
Dasyochloa pulchella	Native	0	0	0	0%	0.0%	0	0%
Digitaria californica	Native	3	4	1	53%	17.6%	3	100%
Echinochloa	N/A	0	0	1	7%	6.7%	1	33%
Elymus glaucus	Native	0	0	0	0%	0.0%	0	0%
Eragrostis intermedia	Native	0	0	0	0%	0.0%	0	0%
Eragrostis lehmanniana	Non-native	4	0	0	27%	26.7%	1	33%
Eriochloa lemmonii	Native	0	0	0	0%	0.0%	0	0%
Heteropogon contortus	Native	2	3	0	33%	17.6%	2	67%
Leptochloa dubia	Native	0	0	0	0%	0.0%	0	0%
Lycurus setosus	Native	0	0	0	0%	0.0%	0	0%
Muhlenbergia emersleyi	Native	3	0	0	20%	20.0%	1	33%
Muhlenbergia polycaulis	Native	0	0	2	13%	13.3%	1	33%
Muhlenbergia porteri	Native	4	5	1	67%	24.0%	3	100%
Panicum bulbosum	Native	0	0	0	0%	0.0%	0	0%
Piptochaetium fimbriatum	Native	0	0	0	0%	0.0%	0	0%
Piptochaetium pringlei	Native	1	0	0	7%	6.7%	1	33%
Poa fendleriana	Native	0	0	0	0%	0.0%	0	0%
Schizachyrium cirratum	Native	0	1	0	7%	6.7%	1	33%
Setaria grisebachii	Native	0	1	0	7%	6.7%	1	33%
Sporobolus	N/A	0	3	0	20%	20.0%	1	33%
Trachypogon spicatus	Native	0	0	0	0%	0.0%	0	0%
Subshrubs								
Abutilon incanum	Native	2	5	1	53%	24.0%	3	100%
Acacia angustissima	Native	0	0	0	0%	0.0%	0	0%
Ageratina herbacea	Native	0	0	0	0%	0.0%	0	0%
Ambrosia ambrosioides	Native	1	2	0	20%	11.5%	2	67%
Ayenia filiformis	Native	0	0	0	0%	0.0%	0	0%
Bouvardia ternifolia	Native	0	0	0	0%	0.0%	0	0%
Brickellia californica	Native	0	0	0	0%	0.0%	0	0%
Brickellia grandiflora	Native	0	0	0	0%	0.0%	0	0%
Brickellia simplex	Native	0	0	0	0%	0.0%	0	0%
Comandra umbellata	Native	0	0	0	0%	0.0%	0	0%
Dalea albiflora	Native	0	0	0	0%	0.0%	0	0%

Table A4c. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)			Within-plot frequency (%)		# sites	Landscape frequency
		V302_01	302_V04	302_V07	Mean	SE		
Subshrubs, cont.								
Dalea pulchra	Native	0	0	0	0%	0.0%	0	0%
Encelia farinosa	Native	0	1	4	33%	24.0%	2	67%
Ericameria laricifolia	Native	5	2	1	53%	24.0%	3	100%
Erigeron speciosus	Native	0	0	0	0%	0.0%	0	0%
Eriogonum jamesii	Native	0	0	0	0%	0.0%	0	0%
Eriogonum wrightii	Native	0	1	0	7%	6.7%	1	33%
Galium wrightii	Native	0	0	0	0%	0.0%	0	0%
Geranium caespitosum	Native	0	0	0	0%	0.0%	0	0%
Hibiscus coulteri	Native	0	4	0	27%	26.7%	1	33%
Ipomopsis multiflora	Native	0	0	0	0%	0.0%	0	0%
Isocoma tenuisecta	Native	0	0	0	0%	0.0%	0	0%
Lotus rigidus	Native	0	0	0	0%	0.0%	0	0%
Macrosiphonia brachysiphon	Native	0	3	0	20%	20.0%	1	33%
Manihot angustiloba	Native	0	0	0	0%	0.0%	0	0%
Nolina microcarpa	Native	0	0	1	7%	6.7%	1	33%
Penstemon linarioides	Native	0	0	0	0%	0.0%	0	0%
Phoradendron californicum	Native	0	0	0	0%	0.0%	0	0%
Porophyllum gracile	Native	0	0	1	7%	6.7%	1	33%
Rubus neomexicanus	Native	0	0	0	0%	0.0%	0	0%
Senna covesii	Native	0	0	0	0%	0.0%	0	0%
Sphaeralcea	N/A	0	2	0	13%	13.3%	1	33%
Tagetes lemmonii	Native	0	0	0	0%	0.0%	0	0%
Talinum paniculatum	Native	0	0	0	0%	0.0%	0	0%
Trichostema arizonicum	Native	0	0	0	0%	0.0%	0	0%
Trixis californica	Native	0	1	1	13%	6.7%	2	67%
Zinnia acerosa	Native	0	0	1	7%	6.7%	1	33%
Shrubs								
Aloysia wrightii	Native	1	0	0	7%	6.7%	1	33%
Amorpha californica	Native	0	0	0	0%	0.0%	0	0%
Anisacanthus thurberi	Native	0	1	0	7%	6.7%	1	33%
Arctostaphylos pungens	Native	0	0	0	0%	0.0%	0	0%
Baccharis sarothroides	Native	0	0	0	0%	0.0%	0	0%
Berberis wilcoxii	Native	0	0	0	0%	0.0%	0	0%
Calliandra eriophylla	Native	2	4	5	73%	17.6%	3	100%
Ceanothus fendleri	Native	0	0	0	0%	0.0%	0	0%
Ceanothus greggii	Native	0	0	0	0%	0.0%	0	0%
Ceanothus integerrimus	Native	0	0	0	0%	0.0%	0	0%
Celtis ehrenbergiana	Native	0	1	0	7%	6.7%	1	33%

Table A4c. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)			Within-plot frequency (%)		# sites	Landscape frequency
		V302_01	302_V04	302_V07	Mean	SE		
Shrubs, cont.								
Condalia correllii	Native	0	2	0	13%	13.3%	1	33%
Crossosoma bigelovii	Native	3	0	0	20%	20.0%	1	33%
Ephedra	N/A	0	0	0	0%	0.0%	0	0%
Fouquieria splendens	Native	4	3	0	47%	24.0%	2	67%
Frangula californica	Native	0	0	0	0%	0.0%	0	0%
Garrya wrightii	Native	0	0	0	0%	0.0%	0	0%
Gossypium thurberi	Native	2	5	0	47%	29.1%	2	67%
Holodiscus discolor	Native	0	0	0	0%	0.0%	0	0%
Holodiscus dumosus	Native	0	0	0	0%	0.0%	0	0%
Jacquemontia pringlei	Native	0	0	0	0%	0.0%	0	0%
Jatropha cardiophylla	Native	0	4	1	33%	24.0%	2	67%
Larrea tridentata	Native	0	0	0	0%	0.0%	0	0%
Lycium pallidum	Native	0	1	0	7%	6.7%	1	33%
Mimosa aculeaticarpa	Native	0	0	0	0%	0.0%	0	0%
Mimosa aculeaticarpa var. *biuncifera*	Native	2	0	0	13%	13.3%	1	33%
Robinia neomexicana	Native	0	0	0	0%	0.0%	0	0%
Symphoricarpos oreophilus	Native	0	0	0	0%	0.0%	0	0%
Ziziphus obtusifolia	Native	0	3	0	20%	20.0%	1	33%
Succulents								
Acalypha californica	Native	0	0	0	0%	0.0%	0	0%
Agave palmeri	Native	4	4	0	53%	26.7%	2	67%
Agave parryi	Native	0	0	0	0%	0.0%	0	0%
Agave schottii	Native	0	0	0	0%	0.0%	0	0%
Carnegiea gigantea	Native	0	2	0	13%	13.3%	1	33%
Cylindropuntia acanthocarpa	Native	0	0	0	0%	0.0%	0	0%
Cylindropuntia bigelovii	Native	0	0	0	0%	0.0%	0	0%
Cylindropuntia leptocaulis	Native	0	0	0	0%	0.0%	0	0%
Cylindropuntia versicolor	Native	4	2	2	53%	13.3%	3	100%
Dasylirion wheeleri	Native	0	2	4	40%	23.1%	2	67%
Echinocereus pectinatus	Native	0	0	0	0%	0.0%	0	0%
Ferocactus wislizeni	Native	4	4	2	67%	13.3%	3	100%
Mammillaria grahamii	Native	1	4	2	47%	17.6%	3	100%
Opuntia engelmannii	Native	5	2	5	80%	20.0%	3	100%
Opuntia phaeacantha	Native	0	0	0	0%	0.0%	0	0%
Yucca madrensis	Native	0	0	0	0%	0.0%	0	0%
Trees								
Acacia constricta	Native	0	0	0	0%	0.0%	0	0%
Acacia greggii	Native	1	2	4	47%	17.6%	3	100%

Table A4c. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)			Within-plot frequency (%)		# sites	Landscape frequency
		V302_01	302_V04	302_V07	Mean	SE		
Trees, cont.								
Arbutus arizonica	Native	0	0	0	0%	0.0%	0	0%
Celtis laevigata var. *reticulata*	Native	1	0	1	13%	6.7%	2	67%
Dodonaea viscosa	Native	0	5	0	33%	33.3%	1	33%
Erythrina flabelliformis	Native	0	0	0	0%	0.0%	0	0%
Juniperus deppeana	Native	0	0	0	0%	0.0%	0	0%
Parkinsonia microphylla	Native	0	0	2	13%	13.3%	1	33%
Pinus arizonica	Native	0	0	0	0%	0.0%	0	0%
Pinus discolor	Native	0	0	0	0%	0.0%	0	0%
Pinus ponderosa	Native	0	0	0	0%	0.0%	0	0%
Populus fremontii	Native	0	0	0	0%	0.0%	0	0%
Prosopis glandulosa	Native	0	0	0	0%	0.0%	0	0%
Prosopis velutina	Native	5	5	1	73%	26.7%	3	100%
Pseudotsuga menziesii	Native	0	0	0	0%	0.0%	0	0%
Quercus arizonica	Native	0	0	0	0%	0.0%	0	0%
Quercus chrysolepis	Native	0	0	0	0%	0.0%	0	0%
Quercus emoryi	Native	0	0	0	0%	0.0%	0	0%
Quercus gambelii	Native	0	0	0	0%	0.0%	0	0%
Quercus hypoleucoides	Native	0	0	0	0%	0.0%	0	0%
Quercus oblongifolia	Native	0	0	0	0%	0.0%	0	0%
Quercus rugosa	Native	0	0	0	0%	0.0%	0	0%
Quercus toumeyi	Native	0	0	0	0%	0.0%	0	0%
Quercus turbinella	Native	0	0	0	0%	0.0%	0	0%
Rhamnus crocea	Native	0	0	0	0%	0.0%	0	0%
Salix exigua	Native	0	0	0	0%	0.0%	0	0%
Vines								
Galium aparine	Native	0	0	0	0%	0.0%	0	0%
Janusia gracilis	Native	0	4	3	47%	24.0%	2	67%
Lonicera albiflora	Native	0	0	0	0%	0.0%	0	0%
Phaseolus	Native	0	3	0	20%	20.0%	1	33%
Vicia pulchella	Native	0	0	0	0%	0.0%	0	0%
Fern								
Fern	N/A	1	0	0	7%	6.7%	1	33%
N/A								
Aster	N/A	0	4	0	27%	26.7%	1	33%
Astrolepis	N/A	0	0	0	0%	0.0%	0	0%
Calandrinia	N/A	0	1	0	7%	6.7%	1	33%
Castilleja	N/A	0	0	0	0%	0.0%	0	0%
Cirsium	N/A	0	2	0	13%	13.3%	1	33%

Table A4c. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)			Within-plot frequency (%)		# sites	Landscape frequency
		V302_01	302_V04	302_V07	Mean	SE		
N/A, cont.								
Cyperus	N/A	0	0	0	0%	0.0%	0	0%
Draba	Native	0	0	0	0%	0.0%	0	0%
Dryopteris	N/A	0	0	0	0%	0.0%	0	0%
Erigeron	N/A	0	0	0	0%	0.0%	0	0%
Eriogonum	N/A	0	0	4	27%	26.7%	1	33%
Galium	N/A	0	0	0	0%	0.0%	0	0%
Hieracium	N/A	0	0	0	0%	0.0%	0	0%
Lupinus	N/A	0	0	0	0%	0.0%	0	0%
Macranthera	N/A	0	0	0	0%	0.0%	0	0%
Trifolium	N/A	0	0	0	0%	0.0%	0	0%
Verbena	N/A	0	0	0	0%	0.0%	0	0%
Viola	N/A	0	0	0	0%	0.0%	0	0%

*new to park species lists

Table A4d. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

Species	Nativity	Within-plot frequency (0–5)								Within-plot frequency (%)		# sites	Landscape frequency
		402_V01	402_V02	402_V03	402_V05	402_V06	402_V07	402_V08	402_V26	Mean	SE		
Forbs/Herbs													
Acalypha	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Acourtia wrightii	Native	0	0	0	0	0	0	2	0	5%	5.0%	1	13%
Allionia incarnata	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Antennaria marginata	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Arenaria lanuginosa	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Artemisia ludoviciana	Native	0	0	0	0	0	0	4	0	10%	10.0%	1	13%
Astrolepis cochisensis	Native	0	0	0	0	0	0	5	0	13%	12.5%	1	13%
Astrolepis sinuata	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Bahia absinthifolia	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Bahia dissecta	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Boerhavia	N/A	0	1	0	0	0	0	0	0	3%	2.5%	1	13%
Boerhavia coccinea	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Bommeria hispida	Native	0	0	1	0	0	0	1	0	5%	3.3%	2	25%
Chamaesyce	N/A	0	0	0	0	0	0	1	0	3%	2.5%	1	13%
Cheilanthes	N/A	3	3	0	5	2	0	0	0	33%	13.6%	4	50%
Cheilanthes fendleri	Native	0	0	0	0	0	3	0	0	8%	7.5%	1	13%
Chenopodium	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Cologania angustifolia	Native	0	0	0	3	0	0	0	0	8%	7.5%	1	13%
Commelina dianthifolia	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Commelina erecta	Native	4	0	0	0	0	0	0	0	10%	10.0%	1	13%
Conyza bonariensis	Non-native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Dalea	N/A	0	0	0	1	0	0	0	0	3%	2.5%	1	13%
Daucus pusillus	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Dieteria bigelovii	Native	0	0	0	4	2	0	0	0	15%	10.5%	2	25%
Draba helleriana	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Drymaria leptophylla	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Dryopteris filix-mas	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Erigeron oreophilus	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Eriogonum abertianum	Native	0	0	0	0	0	0	2	0	5%	5.0%	1	13%
Euphorbia heterophylla	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Evolvulus alsinoides	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Evolvulus arizonicus	Native	0	4	0	0	0	0	0	0	10%	10.0%	1	13%
Gnaphalium	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Hedeoma nana	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Heterotheca	N/A	0	1	0	0	0	0	0	0	3%	2.5%	1	13%
Heuchera sanguinea	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Ipomoea	N/A	0	0	0	0	0	0	0	1	3%	2.5%	1	13%
Koanophyllon	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%

Table A4d. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)								Within-plot frequency (%)		# sites	Landscape frequency
		402_V01	402_V02	402_V03	402_V05	402_V06	402_V07	402_V08	402_V26	Mean	SE		
Forbs/Herbs, cont.													
Lamium amplexicaule	Non-native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Linum neomexicanum	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Lithospermum multiflorum	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Lotus	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Machaeranthera tagetina	Native	0	4	0	0	0	0	0	0	10%	10.0%	1	13%
*Malacothrix sonorae**	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Mentzelia	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Monarda citriodora	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Notholaena standleyi	Native	4	0	0	0	0	0	0	0	10%	10.0%	1	13%
Oxalis	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Packera neomexicana	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Pellaea truncata	Native	3	0	1	0	0	0	0	0	10%	7.6%	2	25%
Pellaea wrightiana	Native	0	1	0	1	1	0	0	0	8%	3.7%	3	38%
Pseudognaphalium canescens	Native	0	0	0	0	0	0	2	0	5%	5.0%	1	13%
Pseudognaphalium canescens ssp. *canescens*	Native	3	0	4	0	0	0	0	5	30%	15.1%	3	38%
Pseudognaphalium leucocephalum	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Pteridium aquilinum	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Salvia arizonica	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Schoenocrambe linearifolia	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Scrophularia parviflora	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Sedum cockerellii	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Selaginella arizonica	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Solidago velutina	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Thalictrum fendleri	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Verbesina encelioides	Native	0	0	0	0	0	0	5	0	13%	12.5%	1	13%
Viola canadensis	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Woodsia plummerae	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Xanthisma gracile	Native	0	0	0	0	0	0	2	0	5%	5.0%	1	13%
Graminoids													
Aristida purpurea	Native	0	4	0	3	0	0	3	0	25%	12.4%	3	38%
Aristida schiedeana	Native	0	4	0	1	0	4	0	0	23%	12.8%	3	38%
Aristida ternipes	Native	1	4	3	3	5	1	2	1	50%	10.7%	8	100%
Aristida ternipes var. *gentilis*	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Blepharoneuron tricholepis	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Bothriochloa barbinodis	Native	0	2	0	1	0	0	0	0	8%	5.3%	2	25%
Bouteloua aristidoides	Native	0	1	0	0	0	0	0	0	3%	2.5%	1	13%
Bouteloua curtipendula	Native	1	5	3	2	5	3	4	0	58%	12.8%	7	88%

Table A4d. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)								Within-plot frequency (%)		# sites	Landscape frequency
		402_V01	402_V02	402_V03	402_V05	402_V06	402_V07	402_V08	402_V26	Mean	SE		
Graminoids, cont.													
Bouteloua eriopoda	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Bouteloua hirsuta	Native	0	5	1	0	0	0	3	0	23%	13.3%	3	38%
Bouteloua repens	Native	0	3	1	5	3	0	0	0	30%	13.6%	4	50%
Bromus ciliatus	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Bromus rubens	Non-native	0	0	0	1	0	0	0	0	3%	2.5%	1	13%
Carex geophila	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Dasyochloa pulchella	Native	0	0	0	0	1	0	0	0	3%	2.5%	1	13%
Digitaria californica	Native	0	0	0	0	0	0	2	0	5%	5.0%	1	13%
Echinochloa	N/A	0	0	0	2	0	0	0	0	5%	5.0%	1	13%
Elymus glaucus	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Eragrostis intermedia	Native	0	3	0	2	5	1	1	0	30%	12.5%	5	63%
Eragrostis lehmanniana	Non-native	1	1	0	5	4	0	2	3	40%	13.1%	6	75%
Eriochloa lemmonii	Native	1	0	0	0	1	0	0	0	5%	3.3%	2	25%
Heteropogon contortus	Native	0	5	0	0	0	0	3	0	20%	13.6%	2	25%
Leptochloa dubia	Native	0	5	0	2	2	0	0	0	23%	12.8%	3	38%
Lycurus setosus	Native	1	3	2	2	3	4	1	0	40%	9.3%	7	88%
Muhlenbergia emersleyi	Native	5	3	5	5	5	5	3	5	90%	6.5%	8	100%
Muhlenbergia polycaulis	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Muhlenbergia porteri	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Panicum bulbosum	Native	0	0	0	0	0	0	1	0	3%	2.5%	1	13%
Piptochaetium fimbriatum	Native	1	0	3	0	0	3	0	0	18%	9.6%	3	38%
Piptochaetium pringlei	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Poa fendleriana	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Schizachyrium cirratum	Native	0	0	0	0	3	0	0	0	8%	7.5%	1	13%
Setaria grisebachii	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Sporobolus	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Trachypogon spicatus	Native	2	0	0	0	0	0	0	0	5%	5.0%	1	13%
Subshrubs													
Abutilon incanum	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Acacia angustissima	Native	0	0	0	0	0	0	5	0	13%	12.5%	1	13%
Ageratina herbacea	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Ambrosia ambrosioides	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Ayenia filiformis	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Bouvardia ternifolia	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Brickellia californica	Native	0	0	0	0	1	0	1	0	5%	3.3%	2	25%
Brickellia grandiflora	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Brickellia simplex	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Comandra umbellata	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Dalea albiflora	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%

Table A4d. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)								Within-plot frequency (%)		# sites	Landscape frequency
		402_V01	402_V02	402_V03	402_V05	402_V06	402_V07	402_V08	402_V26	Mean	SE		
Subshrubs, cont.													
Dalea pulchra	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Encelia farinosa	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Ericameria laricifolia	Native	0	2	0	0	0	0	3	0	13%	8.4%	2	25%
Erigeron speciosus	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Eriogonum jamesii	Native	0	0	0	0	0	0	1	0	3%	2.5%	1	13%
Eriogonum wrightii	Native	0	0	0	0	0	0	2	0	5%	5.0%	1	13%
Galium wrightii	Native	0	0	0	0	0	0	4	0	10%	10.0%	1	13%
Geranium caespitosum	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Hibiscus coulteri	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Ipomopsis multiflora	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Isocoma tenuisecta	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Lotus rigidus	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Macrosiphonia brachysiphon	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Manihot angustiloba	Native	0	0	0	0	0	0	1	0	3%	2.5%	1	13%
Nolina microcarpa	Native	4	4	3	4	5	5	1	5	78%	9.6%	8	100%
Penstemon linarioides	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Phoradendron californicum	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Porophyllum gracile	Native	0	0	0	1	0	0	0	0	3%	2.5%	1	13%
Rubus neomexicanus	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Senna covesii	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Sphaeralcea	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Tagetes lemmonii	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Talinum paniculatum	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Trichostema arizonicum	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Trixis californica	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Zinnia acerosa	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Shrubs													
Aloysia wrightii	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Amorpha californica	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Anisacanthus thurberi	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Arctostaphylos pungens	Native	4	5	5	1	5	5	4	5	85%	9.8%	8	100%
Baccharis sarothroides	Native	0	2	1	0	2	0	0	1	15%	6.3%	4	50%
Berberis wilcoxii	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Calliandra eriophylla	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Ceanothus fendleri	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Ceanothus greggii	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Ceanothus integerrimus	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Celtis ehrenbergiana	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Condalia correllii	Native	0	0	0	0	0	0	5	0	13%	12.5%	1	13%

Table A4d. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)								Within-plot frequency (%)		# sites	Landscape frequency
		402_V01	402_V02	402_V03	402_V05	402_V06	402_V07	402_V08	402_V26	Mean	SE		
Shrubs, cont.													
Crossosoma bigelovii	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Ephedra	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Fouquieria splendens	Native	1	0	0	0	1	0	2	0	10%	5.3%	3	38%
Frangula californica	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Garrya wrightii	Native	3	0	4	0	0	4	2	1	35%	12.4%	5	63%
Gossypium thurberi	Native	0	0	0	0	0	0	5	0	13%	12.5%	1	13%
Holodiscus discolor	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Holodiscus dumosus	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Jacquemontia pringlei	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Jatropha cardiophylla	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Larrea tridentata	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Lycium pallidum	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Mimosa aculeaticarpa	Native	0	0	0	0	0	5	2	0	18%	12.8%	2	25%
Mimosa aculeaticarpa var. *biuncifera*	Native	0	0	2	0	0	0	0	4	15%	10.5%	2	25%
Robinia neomexicana	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Symphoricarpos oreophilus	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Ziziphus obtusifolia	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Succulents													
Acalypha californica	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Agave palmeri	Native	4	0	2	0	1	1	0	3	28%	10.6%	5	63%
Agave parryi	Native	1	0	0	0	0	0	0	1	5%	3.3%	2	25%
Agave schottii	Native	5	1	1	5	3	0	4	4	58%	13.9%	7	88%
Carnegiea gigantea	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Cylindropuntia acanthocarpa	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Cylindropuntia bigelovii	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Cylindropuntia leptocaulis	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Cylindropuntia versicolor	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Dasylirion wheeleri	Native	5	2	0	1	0	0	4	2	35%	13.5%	5	63%
Echinocereus pectinatus	Native	1	0	0	0	0	0	2	0	8%	5.3%	2	25%
Ferocactus wislizeni	Native	0	0	1	1	0	0	3	0	13%	7.5%	3	38%
Mammillaria grahamii	Native	0	1	0	0	0	0	3	0	10%	7.6%	2	25%
Opuntia engelmannii	Native	1	0	0	2	1	0	0	0	10%	5.3%	3	38%
Opuntia phaeacantha	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Yucca madrensis	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Trees													
Acacia constricta	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Acacia greggii	Native	0	3	0	0	0	0	0	0	8%	7.5%	1	13%
Arbutus arizonica	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%

Table A4d. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)								Within-plot frequency (%)		# sites	Landscape frequency
		402_V01	402_V02	402_V03	402_V05	402_V06	402_V07	402_V08	402_V26	Mean	SE		
Trees, cont.													
Celtis laevigata var. *reticulata*	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Dodonaea viscosa	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Erythrina flabelliformis	Native	0	0	0	0	1	0	0	0	3%	2.5%	1	13%
Juniperus deppeana	Native	2	0	5	0	0	4	0	0	28%	14.6%	3	38%
Parkinsonia microphylla	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Pinus arizonica	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Pinus discolor	Native	5	0	4	0	0	5	0	0	35%	17.2%	3	38%
Pinus ponderosa	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Populus fremontii	Native	0	0	0	0	1	0	0	0	3%	2.5%	1	13%
Prosopis glandulosa	Native	0	0	0	0	0	0	2	0	5%	5.0%	1	13%
Prosopis velutina	Native	0	0	0	0	0	0	2	0	5%	5.0%	1	13%
Pseudotsuga menziesii	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Quercus arizonica	Native	2	0	1	1	0	5	4	0	33%	13.6%	5	63%
Quercus chrysolepis	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Quercus emoryi	Native	5	5	1	3	3	2	0	4	58%	12.8%	7	88%
Quercus gambelii	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Quercus hypoleucoides	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Quercus oblongifolia	Native	0	0	0	0	1	0	0	0	3%	2.5%	1	13%
Quercus rugosa	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Quercus toumeyi	Native	0	0	0	0	0	2	0	0	5%	5.0%	1	13%
Quercus turbinella	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Rhamnus crocea	Native	0	0	0	0	0	1	0	0	3%	2.5%	1	13%
Salix exigua	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Vines													
Galium aparine	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Janusia gracilis	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Lonicera albiflora	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Phaseolus	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Vicia pulchella	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Fern													
Fern	N/A	1	0	0	0	0	0	0	1	5%	3.3%	2	25%
N/A													
Aster	N/A	0	0	0	1	0	0	0	0	3%	2.5%	1	13%
Astrolepis	N/A	3	0	0	0	0	0	0	0	8%	7.5%	1	13%
Calandrinia	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Castilleja	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Cirsium	N/A	0	1	0	0	0	0	0	0	3%	2.5%	1	13%
Cyperus	N/A	0	0	2	0	1	0	0	1	10%	5.3%	3	38%
Draba	Native	0	0	0	0	0	0	0	0	0%	0.0%	0	0%

Table A4d. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)								Within-plot frequency (%)		# sites	Landscape frequency
		402_V01	402_V02	402_V03	402_V05	402_V06	402_V07	402_V08	402_V26	Mean	SE		
N/A, cont.													
Dryopteris	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Erigeron	N/A	0	0	0	1	0	0	0	0	3%	2.5%	1	13%
Eriogonum	N/A	0	2	0	0	0	1	0	0	8%	5.3%	2	25%
Galium	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Hieracium	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Lupinus	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Macranthera	N/A	0	1	0	0	0	0	0	0	3%	2.5%	1	13%
Trifolium	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Verbena	N/A	0	2	0	0	0	0	0	0	5%	5.0%	1	13%
Viola	N/A	0	0	0	0	0	0	0	0	0%	0.0%	0	0%

*new to park species lists

Table A4e. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

		Within-plot frequency (0–5)									Within-plot frequency (%)			
Species	Nativity	502_V01	502_V02	502_V03	502_V05	502_V06	502_V07	502_V08	502_V27	502_V28	Mean	SE	# sites	Landscape frequency
Forbs/Herbs														
Acalypha	N/A	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Acourtia wrightii	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Allionia incarnata	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Antennaria marginata	Native	0	0	0	0	0	5	0	0	0	11%	11.1%	1	13%
Arenaria lanuginosa	Native	0	0	0	0	0	1	0	0	0	2%	2.2%	1	13%
Artemisia ludoviciana	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Astrolepis cochisensis	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Astrolepis sinuata	Native	0	0	0	0	0	0	3	0	0	7%	6.7%	1	13%
Bahia absinthifolia	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Bahia dissecta	Native	0	0	0	0	0	1	0	0	0	2%	2.2%	1	13%
Boerhavia	N/A	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Boerhavia coccinea	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Bommeria hispida	Native	0	0	0	0	0	0	4	0	0	9%	8.9%	1	13%
Chamaesyce	N/A	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Cheilanthes	N/A	0	0	0	1	1	4	5	0	3	31%	13.0%	5	63%
Cheilanthes fendleri	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Chenopodium	N/A	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Cologania angustifolia	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Commelina dianthifolia	Native	0	0	0	3	0	2	0	0	0	11%	7.5%	2	25%
Commelina erecta	Native	0	0	0	1	0	0	0	0	0	2%	2.2%	1	13%
Conyza bonariensis	Non-native	2	0	0	0	2	0	0	2	0	13%	6.7%	3	38%
Dalea	N/A	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Daucus pusillus	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Dieteria bigelovii	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Draba helleriana	Native	0	0	1	0	0	0	0	5	0	13%	11.1%	2	25%
Drymaria leptophylla	Native	0	0	0	0	0	1	0	0	0	2%	2.2%	1	13%
Dryopteris filix-mas	Native	0	0	0	0	0	1	0	1	0	4%	2.9%	2	25%
Erigeron oreophilus	Native	4	0	3	0	3	0	0	0	0	22%	11.3%	3	38%
Eriogonum abertianum	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Euphorbia heterophylla	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Evolvulus alsinoides	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Evolvulus arizonicus	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Gnaphalium	N/A	2	0	0	0	0	0	0	0	0	4%	4.4%	1	13%
Hedeoma nana	Native	0	0	0	1	0	0	0	0	0	2%	2.2%	1	13%
Heterotheca	N/A	0	0	0	0	0	1	0	0	0	2%	2.2%	1	13%
Heuchera sanguinea	Native	0	0	0	0	0	3	0	0	1	9%	6.8%	2	25%
Ipomoea	N/A	0	0	0	0	0	1	0	0	0	2%	2.2%	1	13%
Koanophyllon	N/A	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%

Table A4e. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)									Within-plot frequency (%)		# sites	Landscape frequency
		502_V01	502_V02	502_V03	502_V05	502_V06	502_V07	502_V08	502_V27	502_V28	Mean	SE		
Forbs/Herbs, cont.														
Lamium amplexicaule	Non-native	0	0	0	0	0	0	0	0	1	2%	2.2%	1	13%
Linum neomexicanum	Native	0	0	0	0	0	2	0	0	0	4%	4.4%	1	13%
Lithospermum multiflorum	Native	0	0	0	0	0	2	0	0	0	4%	4.4%	1	13%
Lotus	N/A	0	0	0	0	0	1	0	0	0	2%	2.2%	1	13%
Machaeranthera tagetina	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
*Malacothrix sonorae**	Native	0	0	0	0	0	0	0	1	0	2%	2.2%	1	13%
Mentzelia	N/A	0	0	0	0	0	0	0	1	0	2%	2.2%	1	13%
Monarda citriodora	Native	0	0	0	0	0	1	0	0	0	2%	2.2%	1	13%
Notholaena standleyi	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Oxalis	Native	0	0	0	0	0	0	0	5	0	11%	11.1%	1	13%
Packera neomexicana	Native	0	0	0	0	0	3	0	0	0	7%	6.7%	1	13%
Pellaea truncata	Native	0	0	0	0	0	0	3	0	0	7%	6.7%	1	13%
Pellaea wrightiana	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Pseudognaphalium canescens	Native	0	4	0	0	0	4	1	0	0	20%	11.5%	3	38%
Pseudognaphalium canescens ssp. *canescens*	Native	0	0	4	0	0	0	0	1	0	11%	8.9%	2	25%
Pseudognaphalium leucocephalum	Native	0	0	0	0	0	3	0	0	0	7%	6.7%	1	13%
Pteridium aquilinum	Native	0	0	0	0	0	0	0	4	0	9%	8.9%	1	13%
Salvia arizonica	Native	0	0	0	0	1	0	0	0	0	2%	2.2%	1	13%
Schoenocrambe linearifolia	Native	0	0	0	0	0	1	0	0	0	2%	2.2%	1	13%
Scrophularia parviflora	Native	0	0	0	0	0	4	0	0	0	9%	8.9%	1	13%
Sedum cockerellii	Native	0	0	0	0	0	2	0	0	0	4%	4.4%	1	13%
Selaginella arizonica	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Solidago velutina	Native	0	0	0	0	0	1	0	0	0	2%	2.2%	1	13%
Thalictrum fendleri	Native	0	3	0	0	0	5	0	0	0	18%	12.2%	2	25%
Verbesina encelioides	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Viola canadensis	Native	0	0	0	0	0	1	0	2	0	7%	4.7%	2	25%
Woodsia plummerae	Native	0	0	0	0	0	0	0	3	0	7%	6.7%	1	13%
Xanthisma gracile	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Graminoids														
Aristida purpurea	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Aristida schiedeana	Native	0	0	0	0	0	0	2	0	0	4%	4.4%	1	13%
Aristida ternipes	Native	0	0	0	2	0	0	0	0	0	4%	4.4%	1	13%
Aristida ternipes var. *gentilis*	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Blepharoneuron tricholepis	Native	5	0	0	0	3	2	0	3	0	29%	12.5%	4	50%
Bothriochloa barbinodis	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%

Table A4e. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)									Within-plot frequency (%)		# sites	Landscape frequency
		502_V01	502_V02	502_V03	502_V05	502_V06	502_V07	502_V08	502_V27	502_V28	Mean	SE		
Graminoids, cont.														
Bouteloua aristidoides	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Bouteloua curtipendula	Native	0	0	0	0	0	0	4	0	0	9%	8.9%	1	13%
Bouteloua eriopoda	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Bouteloua hirsuta	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Bouteloua repens	Native	0	0	0	0	0	0	3	0	0	7%	6.7%	1	13%
Bromus ciliatus	Native	0	0	0	0	2	0	0	5	0	16%	11.4%	2	25%
Bromus rubens	Non-native	0	0	0	0	0	5	0	0	0	11%	11.1%	1	13%
Carex geophila	Native	0	0	0	0	0	3	0	0	0	7%	6.7%	1	13%
Dasyochloa pulchella	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Digitaria californica	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Echinochloa	N/A	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Elymus glaucus	Native	0	0	0	0	0	5	0	0	0	11%	11.1%	1	13%
Eragrostis intermedia	Native	0	0	0	2	0	0	2	0	0	9%	5.9%	2	25%
Eragrostis lehmanniana	Non-native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Eriochloa lemmonii	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Heteropogon contortus	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Leptochloa dubia	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Lycurus setosus	Native	0	0	0	0	0	0	1	0	0	2%	2.2%	1	13%
Muhlenbergia emersleyi	Native	0	4	5	2	0	0	5	0	3	42%	14.7%	5	63%
Muhlenbergia polycaulis	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Muhlenbergia porteri	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Panicum bulbosum	Native	0	0	0	0	0	0	0	0	1	2%	2.2%	1	13%
Piptochaetium fimbriatum	Native	0	0	0	0	0	1	3	0	0	9%	6.8%	2	25%
Piptochaetium pringlei	Native	0	0	2	0	1	0	0	0	0	7%	4.7%	2	25%
Poa fendleriana	Native	0	0	0	0	0	5	0	0	0	11%	11.1%	1	13%
Schizachyrium cirratum	Native	0	0	2	0	0	0	4	0	0	13%	9.4%	2	25%
Setaria grisebachii	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Sporobolus	N/A	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Trachypogon spicatus	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Shrubs														
Abutilon incanum	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Acacia angustissima	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Ageratina herbacea	Native	0	0	0	0	0	3	0	0	0	7%	6.7%	1	13%
Ambrosia ambrosioides	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Ayenia filiformis	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Bouvardia ternifolia	Native	0	0	0	0	0	0	5	0	0	11%	11.1%	1	13%
Brickellia californica	Native	0	0	0	0	0	0	2	0	1	7%	4.7%	2	25%
Brickellia grandiflora	Native	0	0	2	0	5	4	0	0	0	24%	13.2%	3	38%

Table A4e. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)									Within-plot frequency (%)		# sites	Landscape frequency
		502_V01	502_V02	502_V03	502_V05	502_V06	502_V07	502_V08	502_V27	502_V28	Mean	SE		
Shrubs, cont.														
Brickellia simplex	Native	0	0	0	0	0	2	0	0	0	4%	4.4%	1	13%
Comandra umbellata	Native	0	0	0	0	0	3	0	0	0	7%	6.7%	1	13%
Dalea albiflora	Native	0	0	0	1	0	0	1	0	0	4%	2.9%	2	25%
Dalea pulchra	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Encelia farinosa	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Ericameria laricifolia	Native	0	0	0	0	0	0	0	0	1	2%	2.2%	1	13%
Erigeron speciosus	Native	0	0	0	0	0	3	0	0	0	7%	6.7%	1	13%
Eriogonum jamesii	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Eriogonum wrightii	Native	0	0	0	0	0	0	2	0	0	4%	4.4%	1	13%
Galium wrightii	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Geranium caespitosum	Native	0	0	0	0	0	3	0	0	0	7%	6.7%	1	13%
Hibiscus coulteri	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Ipomopsis multiflora	Native	0	0	0	0	0	2	0	0	0	4%	4.4%	1	13%
Isocoma tenuisecta	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Lotus rigidus	Native	0	0	0	0	0	1	0	0	0	2%	2.2%	1	13%
Macrosiphonia brachysiphon	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Manihot angustiloba	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Nolina microcarpa	Native	0	0	0	4	0	0	5	0	0	20%	13.3%	2	25%
Penstemon linarioides	Native	0	0	0	0	0	3	0	0	0	7%	6.7%	1	13%
Phoradendron californicum	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Porophyllum gracile	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Rubus neomexicanus	Native	0	0	0	0	0	3	0	0	0	7%	6.7%	1	13%
Senna covesii	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Sphaeralcea	N/A	0	0	0	0	0	2	0	0	0	4%	4.4%	1	13%
Tagetes lemmonii	Native	0	0	1	0	0	0	0	0	0	2%	2.2%	1	13%
Talinum paniculatum	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Trichostema arizonicum	Native	0	0	0	0	0	0	4	0	0	9%	8.9%	1	13%
Trixis californica	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Zinnia acerosa	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Shrubs														
Aloysia wrightii	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Amorpha californica	Native	0	0	0	0	0	2	0	0	0	4%	4.4%	1	13%
Anisacanthus thurberi	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Arctostaphylos pungens	Native	0	5	5	5	0	0	5	0	5	56%	17.6%	5	63%
Baccharis sarothroides	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Berberis wilcoxii	Native	0	0	0	0	0	1	0	0	0	2%	2.2%	1	13%
Calliandra eriophylla	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%

Table A4e. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

		Within-plot frequency (0–5)									Within-plot frequency (%)			
Species	**Nativity**	**502_V01**	**502_V02**	**502_V03**	**502_V05**	**502_V06**	**502_V07**	**502_V08**	**502_V27**	**502_V28**	**Mean**	**SE**	**# sites**	**Landscape frequency**
Shrubs, cont.														
Ceanothus fendleri	Native	2	3	0	0	2	0	0	0	0	16%	8.0%	3	38%
Ceanothus greggii	Native	0	0	0	2	0	0	0	0	0	4%	4.4%	1	13%
Ceanothus integerrimus	Native	0	0	0	0	0	3	0	0	0	7%	6.7%	1	13%
Celtis ehrenbergiana	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Condalia correllii	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Crossosoma bigelovii	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Ephedra	N/A	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Fouquieria splendens	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Frangula californica	Native	0	1	0	0	0	0	0	0	0	2%	2.2%	1	13%
Garrya wrightii	Native	0	0	1	3	0	0	5	0	4	29%	13.4%	4	50%
Gossypium thurberi	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Holodiscus discolor	Native	0	0	0	0	0	0	0	2	0	4%	4.4%	1	13%
Holodiscus dumosus	Native	0	0	0	0	0	2	0	0	0	4%	4.4%	1	13%
Jacquemontia pringlei	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Jatropha cardiophylla	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Larrea tridentata	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Lycium pallidum	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Mimosa aculeaticarpa	Native	0	0	0	0	0	0	5	0	0	11%	11.1%	1	13%
Mimosa aculeaticarpa var. *biuncifera*	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Robinia neomexicana	Native	0	0	0	0	0	2	0	0	0	4%	4.4%	1	13%
Symphoricarpos oreophilus	Native	0	0	0	0	0	4	0	0	0	9%	8.9%	1	13%
Ziziphus obtusifolia	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Succulents														
Acalypha californica	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Agave palmeri	Native	0	0	0	0	0	0	4	0	0	9%	8.9%	1	13%
Agave parryi	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Agave schottii	Native	0	0	0	0	0	0	5	0	0	11%	11.1%	1	13%
Carnegiea gigantea	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Cylindropuntia acanthocarpa	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Cylindropuntia bigelovii	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Cylindropuntia leptocaulis	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Cylindropuntia versicolor	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Dasylirion wheeleri	Native	0	0	0	0	0	0	4	0	0	9%	8.9%	1	13%
Echinocereus pectinatus	Native	0	0	0	0	3	0	0	0	1	9%	6.8%	2	25%
Ferocactus wislizeni	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Mammillaria grahamii	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%

Table A4e. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)									Within-plot frequency (%)		# sites	Landscape frequency
		502_V01	502_V02	502_V03	502_V05	502_V06	502_V07	502_V08	502_V27	502_V28	Mean	SE		
Trees														
Opuntia engelmannii	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Opuntia phaeacantha	Native	0	0	0	0	0	0	0	0	2	4%	4.4%	1	13%
Yucca madrensis	Native	0	0	1	0	0	0	2	0	0	7%	4.7%	2	25%
Acacia constricta	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Acacia greggii	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Arbutus arizonica	Native	0	2	1	0	0	0	0	0	0	7%	4.7%	2	25%
Celtis laevigata var. *reticulata*	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Dodonaea viscosa	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Erythrina flabelliformis	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Juniperus deppeana	Native	0	4	5	1	0	0	5	0	3	40%	14.9%	5	63%
Parkinsonia microphylla	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Pinus arizonica	Native	0	0	0	0	0	4	0	0	0	9%	8.9%	1	13%
Pinus discolor	Native	0	2	5	0	0	1	5	0	3	36%	14.1%	5	63%
Pinus ponderosa	Native	5	3	1	0	5	0	0	4	0	40%	14.9%	5	63%
Populus fremontii	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Prosopis glandulosa	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Prosopis velutina	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Pseudotsuga menziesii	Native	0	0	0	0	0	4	0	5	0	20%	13.3%	2	25%
Quercus arizonica	Native	0	0	5	4	0	0	3	0	1	29%	13.4%	4	50%
Quercus chrysolepis	Native	0	0	0	0	0	1	0	0	0	2%	2.2%	1	13%
Quercus emoryi	Native	0	0	0	0	0	0	4	0	0	9%	8.9%	1	13%
Quercus gambelii	Native	0	0	0	0	2	5	0	1	0	18%	11.3%	3	38%
Quercus hypoleucoides	Native	0	5	5	5	1	1	0	0	4	47%	15.6%	6	75%
Quercus oblongifolia	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Quercus rugosa	Native	2	5	2	0	2	5	0	0	5	47%	14.5%	6	75%
Quercus toumeyi	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Quercus turbinella	Native	0	0	0	2	0	0	0	0	0	4%	4.4%	1	13%
Rhamnus crocea	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Salix exigua	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Vines														
Galium aparine	Native	0	0	0	0	0	2	0	0	0	4%	4.4%	1	13%
Janusia gracilis	Native	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Lonicera albiflora	Native	0	0	0	0	0	3	0	0	0	7%	6.7%	1	13%
Phaseolus	Native	0	0	0	2	0	0	0	0	0	4%	4.4%	1	13%
Vicia pulchella	Native	0	0	0	0	0	4	0	2	0	13%	9.4%	2	25%
Fern														
Fern	N/A	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%

Table A4e. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Within-plot frequency (0–5)									Within-plot frequency (%)		# sites	Landscape frequency
		502_V01	502_V02	502_V03	502_V05	502_V06	502_V07	502_V08	502_V27	502_V28	Mean	SE		
N/A														
Aster	N/A	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Astrolepis	N/A	0	2	0	0	0	0	0	0	0	4%	4.4%	1	13%
Calandrinia	N/A	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
N/A, cont.														
Castilleja	N/A	0	0	0	0	0	2	0	0	0	4%	4.4%	1	13%
Cirsium	N/A	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Cyperus	N/A	2	0	0	1	0	1	0	1	0	11%	4.8%	4	50%
Draba	Native	0	0	0	0	0	1	0	0	0	2%	2.2%	1	13%
Dryopteris	N/A	0	0	0	0	0	1	0	0	0	2%	2.2%	1	13%
Erigeron	N/A	0	0	0	0	0	4	0	0	0	9%	8.9%	1	13%
Eriogonum	N/A	0	0	0	1	0	0	0	0	0	2%	2.2%	1	13%
Galium	N/A	0	0	0	0	0	5	1	5	0	24%	14.4%	3	38%
Hieracium	N/A	0	0	0	0	0	1	0	0	0	2%	2.2%	1	13%
Lupinus	N/A	0	1	0	0	0	0	0	0	0	2%	2.2%	1	13%
Macranthera	N/A	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Trifolium	N/A	0	0	0	0	0	0	0	1	0	2%	2.2%	1	13%
Verbena	N/A	0	0	0	0	0	0	0	0	0	0%	0.0%	0	0%
Viola	N/A	0	0	0	0	0	1	0	0	0	2%	2.2%	1	13%

*new to park species lists

Table A4f. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, all strata (n = 60), Rincon Mountain District, Saguaro NP, 2008–2009.

Species	Nativity	Landscape frequency	Sdiff	MDC	n
Forbs/Herbs					
Acalypha	N/A	4%	3%	5%	3
Acourtia wrightii	Native	8%	6%	5%	14
Allionia incarnata	Native	8%	12%	5%	46
Antennaria marginata	Native	4%	14%	6%	48
Arenaria lanuginosa	Native	4%	3%	5%	3
Artemisia ludoviciana	Native	12%	16%	6%	59
Astrolepis cochisensis	Native	4%	14%	6%	48
Astrolepis sinuata	Native	8%	12%	5%	48
Bahia absinthifolia	Native	4%	3%	5%	3
Bahia dissecta	Native	4%	3%	5%	3
Boerhavia	N/A	4%	3%	5%	3
Boerhavia coccinea	Native	4%	3%	5%	3
Bommeria hispida	Native	12%	12%	5%	48
Chamaesyce	N/A	12%	9%	5%	29
Cheilanthes	N/A	44%	24%	10%	51
Cheilanthes fendleri	Native	4%	8%	5%	25
Chenopodium	N/A	4%	6%	5%	11
Cologania angustifolia	Native	4%	8%	5%	25
Commelina dianthifolia	Native	8%	10%	5%	35
Commelina erecta	Native	8%	12%	5%	46
Conyza bonariensis	Non-native	12%	9%	5%	31
Dalea	N/A	12%	14%	6%	47
Daucus pusillus	Native	4%	6%	5%	11
Dieteria bigelovii	Native	8%	12%	5%	53
Draba helleriana	Native	8%	14%	6%	49
Drymaria leptophylla	Native	4%	3%	5%	3
Dryopteris filix-mas	Native	8%	4%	5%	6
Erigeron oreophilus	Native	12%	16%	6%	60
Eriogonum abertianum	Native	4%	6%	5%	11
Euphorbia heterophylla	Native	4%	3%	5%	3
Evolvulus alsinoides	Native	4%	3%	5%	3
Evolvulus arizonicus	Native	8%	12%	5%	53
Gnaphalium	N/A	4%	6%	5%	11
Hedeoma nana	Native	4%	3%	5%	3
Heterotheca	N/A	8%	4%	5%	6
Heuchera sanguinea	Native	8%	9%	5%	27
Ipomoea	N/A	12%	5%	5%	8
Koanophyllon	N/A	4%	11%	5%	44
Lamium amplexicaule	Non-native	4%	3%	5%	3
Linum neomexicanum	Native	4%	6%	5%	11
Lithospermum multiflorum	Native	4%	6%	5%	11
Lotus	N/A	4%	3%	5%	3

Table A4f. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, all strata (n = 60), Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Landscape frequency	Sdiff	MDC	n
Forbs/Herbs, cont.					
Machaeranthera tagetina	Native	4%	11%	5%	44
Malacothrix sonorae*	**Native**	4%	3%	5%	3
Mentzelia	N/A	4%	3%	5%	3
Monarda citriodora	Native	4%	3%	5%	3
Notholaena standleyi	Native	8%	12%	5%	46
Oxalis	Native	4%	14%	6%	48
Packera neomexicana	Native	4%	8%	5%	25
Pellaea truncata	Native	12%	12%	5%	49
Pellaea wrightiana	Native	20%	7%	5%	19
Pseudognaphalium canescens	Native	20%	16%	7%	47
Pseudognaphalium canescens ssp. *canescens*	Native	20%	21%	9%	49
Pseudognaphalium leucocephalum	Native	4%	8%	5%	25
Pteridium aquilinum	Native	4%	11%	5%	44
Salvia arizonica	Native	8%	4%	5%	6
Schoenocrambe linearifolia	Native	4%	3%	5%	3
Scrophularia parviflora	Native	4%	11%	5%	44
Sedum cockerellii	Native	4%	6%	5%	11
Selaginella arizonica	Native	4%	11%	5%	44
Solidago velutina	Native	4%	3%	5%	3
Thalictrum fendleri	Native	8%	16%	7%	46
Verbesina encelioides	Native	4%	14%	6%	48
Viola canadensis	Native	8%	6%	5%	14
Woodsia plummerae	Native	4%	8%	5%	25
Xanthisma gracile	Native	4%	6%	5%	11
Graminoids					
Aristida purpurea	Native	20%	16%	7%	47
Aristida schiedeana	Native	20%	19%	8%	49
Aristida ternipes	Native	64%	25%	10%	54
Aristida ternipes var. *gentilis*	Native	4%	8%	5%	25
Blepharoneuron tricholepis	Native	16%	18%	7%	59
Bothriochloa barbinodis	Native	12%	7%	5%	16
Bouteloua aristidoides	Native	4%	3%	5%	3
Bouteloua curtipendula	Native	48%	30%	12%	53
Bouteloua eriopoda	Native	4%	6%	5%	11
Bouteloua hirsuta	Native	16%	16%	5%	91
Bouteloua repens	Native	40%	27%	11%	51
Bromus ciliatus	Native	8%	15%	6%	54
Bromus rubens	Non-native	20%	16%	6%	60
Carex geophila	Native	4%	8%	5%	25
Dasyochloa pulchella	Native	12%	9%	5%	29
Digitaria californica	Native	28%	18%	7%	55
Echinochloa	N/A	8%	6%	5%	14

Table A4f. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, all strata (n = 60), Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Landscape frequency	Sdiff	MDC	n
Graminoids, cont.					
Elymus glaucus	Native	4%	14%	6%	48
Eragrostis intermedia	Native	28%	18%	7%	55
Eragrostis lehmanniana	Non-native	36%	26%	10%	57
Eriochloa lemmonii	Native	8%	4%	5%	6
Heteropogon contortus	Native	20%	18%	7%	59
Leptochloa dubia	Native	12%	16%	6%	59
Lycurus setosus	Native	32%	17%	7%	49
Muhlenbergia emersleyi	Native	56%	32%	12%	60
Muhlenbergia polycaulis	Native	4%	6%	5%	11
Muhlenbergia porteri	Native	32%	25%	10%	54
Panicum bulbosum	Native	8%	4%	5%	6
Piptochaetium fimbriatum	Native	20%	14%	6%	48
Piptochaetium pringlei	Native	12%	7%	5%	16
Poa fendleriana	Native	4%	14%	6%	48
Schizachyrium cirratum	Native	16%	15%	6%	52
Setaria grisebachii	Native	8%	6%	5%	14
Sporobolus	N/A	4%	8%	5%	25
Trachypogon spicatus	Native	4%	6%	5%	11
Subshrubs					
Abutilon incanum	Native	24%	21%	9%	49
Acacia angustissima	Native	4%	14%	6%	48
Ageratina herbacea	Native	4%	8%	5%	25
Ambrosia ambrosioides	Native	12%	10%	5%	36
Ayenia filiformis	Native	4%	3%	5%	3
Bouvardia ternifolia	Native	4%	14%	6%	48
Brickellia californica	Native	16%	7%	5%	18
Brickellia grandiflora	Native	12%	18%	7%	59
Brickellia simplex	Native	4%	6%	5%	11
Comandra umbellata	Native	4%	8%	5%	25
Dalea albiflora	Native	8%	4%	5%	6
Dalea pulchra	Native	4%	11%	5%	44
Encelia farinosa	Native	24%	22%	9%	52
Ericameria laricifolia	Native	36%	20%	8%	52
Erigeron speciosus	Native	4%	8%	5%	25
Eriogonum jamesii	Native	4%	3%	5%	3
Eriogonum wrightii	Native	20%	11%	5%	45
Galium wrightii	Native	4%	11%	5%	44
Geranium caespitosum	Native	4%	8%	5%	25
Hibiscus coulteri	Native	4%	11%	5%	44
Ipomopsis multiflora	Native	4%	6%	5%	11
Isocoma tenuisecta	Native	4%	6%	5%	11
Lotus rigidus	Native	4%	3%	5%	3

Table A4f. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, all strata (n = 60), Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Landscape frequency	Sdiff	MDC	n
Subshrubs, cont.					
Macrosiphonia brachysiphon	Native	4%	8%	5%	25
Manihot angustiloba	Native	4%	3%	5%	3
Nolina microcarpa	Native	44%	30%	12%	54
Penstemon linarioides	Native	4%	8%	5%	25
Phoradendron californicum	Native	4%	3%	5%	3
Porophyllum gracile	Native	12%	5%	5%	8
Rubus neomexicanus	Native	4%	8%	5%	25
Senna covesii	Native	8%	6%	5%	14
Sphaeralcea	N/A	20%	11%	5%	45
Tagetes lemmonii	Native	4%	3%	5%	3
Talinum paniculatum	Native	4%	3%	5%	3
Trichostema arizonicum	Native	4%	11%	5%	44
Trixis californica	Native	20%	11%	5%	39
Zinnia acerosa	Native	16%	17%	7%	50
Shrubs					
Aloysia wrightii	Native	12%	12%	5%	48
Amorpha californica	Native	4%	6%	5%	11
Anisacanthus thurberi	Native	4%	3%	5%	3
Arctostaphylos pungens	Native	52%	35%	14%	53
Baccharis sarothroides	Native	16%	8%	5%	25
Berberis wilcoxii	Native	4%	3%	5%	3
Calliandra eriophylla	Native	20%	25%	10%	55
Ceanothus fendleri	Native	12%	11%	5%	43
Ceanothus greggii	Native	4%	6%	5%	11
Ceanothus integerrimus	Native	4%	8%	5%	25
Celtis ehrenbergiana	Native	8%	4%	5%	6
Condalia correllii	Native	16%	22%	9%	53
Crossosoma bigelovii	Native	4%	8%	5%	25
Ephedra	N/A	8%	4%	5%	6
Fouquieria splendens	Native	28%	23%	9%	56
Frangula californica	Native	4%	3%	5%	3
Garrya wrightii	Native	36%	24%	9%	60
Gossypium thurberi	Native	12%	20%	8%	54
Holodiscus discolor	Native	4%	6%	5%	11
Holodiscus dumosus	Native	4%	6%	5%	11
Jacquemontia pringlei	Native	4%	6%	5%	11
Jatropha cardiophylla	Native	20%	22%	9%	51
Larrea tridentata	Native	8%	15%	6%	54
Lycium pallidum	Native	12%	13%	5%	55
Mimosa aculeaticarpa	Native	12%	20%	8%	54
Mimosa aculeaticarpa var. *biuncifera*	Native	12%	13%	6%	43
Robinia neomexicana	Native	4%	6%	5%	11

Table A4f. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, all strata (n = 60), Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Landscape frequency	Sdiff	MDC	n
Shrubs, cont.					
Symphoricarpos oreophilus	Native	4%	11%	5%	44
Ziziphus obtusifolia	Native	8%	10%	5%	35
Succulents					
Acalypha californica	Native	4%	3%	5%	3
Agave palmeri	Native	36%	22%	9%	50
Agave parryi	Native	8%	4%	5%	6
Agave schottii	Native	32%	27%	11%	51
Carnegiea gigantea	Native	20%	13%	5%	57
Cylindropuntia acanthocarpa	Native	4%	3%	5%	3
Cylindropuntia bigelovii	Native	4%	3%	5%	3
Cylindropuntia leptocaulis	Native	8%	6%	5%	14
Cylindropuntia versicolor	Native	20%	14%	6%	48
Dasylirion wheeleri	Native	36%	23%	9%	55
Echinocereus pectinatus	Native	20%	11%	5%	45
Ferocactus wislizeni	Native	40%	24%	10%	52
Mammillaria grahamii	Native	32%	21%	8%	59
Opuntia engelmannii	Native	44%	29%	11%	59
Opuntia phaeacantha	Native	12%	11%	5%	43
Yucca madrensis	Native	8%	6%	5%	14
Trees					
Acacia constricta	Native	8%	20%	8%	52
Acacia greggii	Native	28%	25%	10%	52
Arbutus arizonica	Native	8%	6%	5%	14
Celtis laevigata var. *reticulata*	Native	20%	16%	6%	60
Dodonaea viscosa	Native	4%	14%	6%	48
Erythrina flabelliformis	Native	4%	3%	5%	3
Juniperus deppeana	Native	32%	27%	11%	52
Parkinsonia microphylla	Native	16%	17%	7%	50
Pinus arizonica	Native	4%	11%	5%	44
Pinus discolor	Native	36%	28%	11%	55
Pinus ponderosa	Native	20%	23%	9%	56
Populus fremontii	Native	4%	3%	5%	3
Prosopis glandulosa	Native	4%	6%	5%	11
Prosopis velutina	Native	36%	24%	10%	50
Pseudotsuga menziesii	Native	8%	18%	7%	55
Quercus arizonica	Native	36%	24%	10%	51
Quercus chrysolepis	Native	4%	3%	5%	3
Quercus emoryi	Native	32%	25%	10%	54
Quercus gambelii	Native	12%	15%	6%	55
Quercus hypoleucoides	Native	24%	25%	10%	54
Quercus oblongifolia	Native	4%	3%	5%	3
Quercus rugosa	Native	24%	24%	10%	50

Table A4f. Within-plot and landscape frequency (%) for all plots and species sampled on monitoring plots, all strata (n = 60), Rincon Mountain District, Saguaro NP, 2008–2009, cont.

Species	Nativity	Landscape frequency	Sdiff	MDC	n
Trees, cont.					
Quercus toumeyi	Native	4%	6%	5%	11
Quercus turbinella	Native	4%	6%	5%	11
Rhamnus crocea	Native	4%	3%	5%	3
Salix exigua	Native	4%	14%	6%	48
Vines					
Galium aparine	Native	4%	6%	5%	11
Janusia gracilis	Native	20%	23%	9%	56
Lonicera albiflora	Native	4%	8%	5%	25
Phaseolus	Native	8%	10%	5%	35
Vicia pulchella	Native	8%	12%	5%	53
Fern					
Fern	N/A	20%	6%	5%	12
N/A					
Aster	N/A	8%	12%	5%	46
Astrolepis	N/A	8%	10%	5%	35
Calandrinia	N/A	4%	3%	5%	3
Castilleja	N/A	4%	6%	5%	11
Cirsium	N/A	8%	6%	5%	14
Cyperus	N/A	28%	9%	5%	28
Draba	Native	4%	3%	5%	3
Dryopteris	N/A	4%	3%	5%	3
Erigeron	N/A	8%	12%	5%	46
Eriogonum	N/A	16%	13%	5%	56
Galium	N/A	12%	20%	8%	52
Hieracium	N/A	4%	3%	5%	3
Lupinus	N/A	4%	3%	5%	3
Macranthera	N/A	4%	3%	5%	3
Trifolium	N/A	4%	3%	5%	3
Verbena	N/A	4%	6%	5%	11
Viola	N/A	4%	3%	5%	3

*new to park species lists

Table A5a. Soil substrate (% by class) and surface aggregate stability class (mean and SE) and proportion of samples in "very stable" (=6) category, by monitoring plot, 201 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

Decreasing erosion hazard ↓

Parameter	201_V02	201_V03	AVG	SD	SE	Sdiff	MDC	n=
Substrate								
Bare soil (<2 mm) - no overhead cover	6%	6%	6.0%	0.3%	0.2%	0.2%	5%	1
Bare soil (<2 mm) - under vegetation	10%	9%	9.8%	0.9%	0.6%	0.6%	5%	1
Litter and duff (organic matter)	21%	33%	26.9%	8.5%	6.0%	6.0%	13%	2
Light cyanobacteria	8%	0%	4.2%	5.9%	4.2%	4.2%	9%	2
Dark cyanobacteria	0%	0%	0.2%	0.3%	0.2%	0.2%	5%	1
Lichen	1%	5%	3.1%	3.2%	2.3%	2.3%	5%	2
Moss	0%	0%	0.2%	0.3%	0.2%	0.2%	5%	1
Plant base	2%	5%	3.3%	1.8%	1.2%	1.2%	5%	1
Gravel (2–75 mm)	45%	41%	42.7%	2.7%	1.9%	1.9%	5%	2
Rock (76–600 mm)	2%	0%	1.0%	1.5%	1.0%	1.0%	5%	1
Lichen on rock	0%	0%	0.4%	0.0%	0.0%	0.0%	5%	0
Bedrock	4%	0%	2.1%	2.9%	2.1%	2.1%	5%	2
Surface Soil Aggregate Stability								
Under vegetation								
Average soil stability	4.88	5.10	4.99	0.15	0.11	0.11	0.5	1
SD	1.45	1.14						
SE	0.28	0.20						
% samples "very stable"	**42%**	**45%**	**44%**	**2%**	**1%**	**1%**	**5%**	**1**
n	26	31						
No vegetation cover								
Average soil stability	3.68	4.18	3.93	0.35	0.25	0.25	0.5	2
SD	1.21	1.98						
SE	0.32	0.48						
% samples "very stable"	**5%**	**47%**						
n	22	17						

"n" = number of samples collected per plot.
Red denotes values below a management assessment point.

Table A5b. Soil substrate (% by class) and surface aggregate stability class (mean and SE) and proportion of samples in "very stable" (=6) category, by monitoring plot, 202 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

Decreasing erosion hazard

Parameter	202_V03	202_V04	202_V05	AVG	SD	SE	Sdiff	MDC	n=
Substrate									
Bare soil (<2 mm) - no overhead cover	3%	7%	11%	6.8%	4.0%	2.3%	2.8%	5%	3
Bare soil (<2 mm) - under vegetation	6%	7%	3%	5.3%	1.7%	1.0%	1.2%	5%	1
Litter and duff (organic matter)	15%	18%	62%	31.7%	26.4%	15.2%	18.6%	17%	11
Light cyanobacteria	0%	0%	2%	0.7%	1.2%	0.7%	0.9%	5%	1
Dark cyanobacteria	0%	0%	0%	0.3%	0.2%	0.1%	0.2%	5%	1
Lichen	0%	1%	0%	0.6%	0.6%	0.4%	0.5%	5%	1
Moss	0%	15%	1%	5.6%	8.6%	4.9%	6.1%	6%	9
Plant base	1%	2%	4%	2.2%	1.5%	0.8%	1.0%	5%	1
Gravel (2–75 mm)	60%	16%	11%	29.0%	27.0%	15.6%	19.1%	17%	11
Rock (76–600 mm)	6%	13%	2%	6.9%	5.2%	3.0%	3.7%	5%	5
Lichen on rock	0%	0%	0%	0.1%	0.2%	0.1%	0.2%	5%	1
Bedrock	9%	21%	3%	10.8%	9.1%	5.3%	6.5%	6%	10
Surface Soil Aggregate Stability									
Under vegetation									
Average soil stability	**2.67**	4.91	4.95	4.18	1.31	0.76	0.92	0.9	10
SD	2.29	1.28	1.54						
SE	0.42	0.27	0.34						
% samples "very stable"	**27%**	**43%**	**60%**						
n	30	23	20						
No vegetation cover									
Average soil stability	**2.12**	5.28	4.00	3.80	1.59	0.92	1.12	1.0	11
SD	1.83	1.23	1.87						
SE	0.44	0.29	0.52						
% samples "very stable"	**12%**	**67%**	**23%**						
n	17	18	13						

"n" = number of samples collected per plot.
Red denotes values below a management assessment point.

Table A5c. Soil substrate (% by class) and surface aggregate stability class (mean and SE) and proportion of samples in "very stable" (=6) category, by monitoring plot, 302 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

Decreasing erosion hazard ↓

	V302_01	302_V04	302_V07	AVG	SD	SE	Sdiff	MDC	n=
Substrate									
Bare soil (<2 mm) - no overhead cover	2%	1%	8%	3.5%	3.5%	2.0%	2.5%	5%	3
Bare soil (<2 mm) - under vegetation	5%	13%	5%	7.9%	4.3%	2.5%	3.1%	5%	4
Litter and duff (organic matter)	54%	37%	27%	39.0%	13.7%	7.9%	9.7%	10%	8
Light cyanobacteria	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	5%	0
Dark cyanobacteria	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	5%	0
Lichen	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	5%	0
Moss	0%	1%	0%	0.4%	0.7%	0.4%	0.5%	5%	1
Plant base	2%	3%	3%	2.2%	0.5%	0.3%	0.3%	5%	1
Gravel (2–75 mm)	13%	12%	35%	20.0%	13.0%	7.5%	9.2%	10%	8
Rock (76–600 mm)	5%	23%	13%	13.2%	9.0%	5.2%	6.3%	7%	8
Lichen on rock	0%	2%	2%	1.1%	1.0%	0.6%	0.7%	5%	1
Bedrock	20%	9%	9%	12.5%	6.5%	3.8%	4.6%	5%	8
Surface Soil Aggregate Stability									
Under vegetation									
Average soil stability	5.32	4.71	4.22	4.75	0.55	0.32	0.39	0.5	6
SD	1.08	1.32	2.11						
SE	0.22	0.24	0.35						
% samples "very stable"	**78%**	**35%**	**42%**	1					
n	23	31	36						
No vegetation cover									
Average soil stability	**2.00**	4.00	3.90	3.30	1.13	0.65	0.80	0.9	7
SD	1.41	1.50	2.13						
SE	1.00	0.50	0.67						
% samples "very stable"	**0%**	**11%**	**30%**						
n	2	9	10						

"n" = number of samples collected per plot.
Red denotes values below a management assessment point.

Table A5d. Soil substrate (% by class) and surface aggregate stability class (mean and SE) and proportion of samples in "very stable" (=6) category, by monitoring plot, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

Decreasing erosion hazard ↓

Substrate	402_V01	402_V02	402_V03	402_V05	402_V06	402_V07	402_V08	402_V26	AVG	SD	SE	Sdiff	MDC	n=
Substrate														
Bare soil (<2 mm) - no overhead cover	1%	3%	1%	5%	3%	3%	1%	1%	2.3%	1.5%	0.5%	1.1%	5%	1
Bare soil (<2 mm) - under vegetation	2%	4%	2%	7%	6%	3%	2%	5%	3.9%	1.9%	0.7%	1.3%	5%	1
Litter and duff (organic matter)	36%	38%	67%	27%	25%	63%	50%	37%	42.9%	15.5%	5.5%	11.0%	7%	21
Light cyanobacteria	0%	0%	0%	0%	0%	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	5%	0
Dark cyanobacteria	0%	0%	0%	0%	0%	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	5%	0
Lichen	0%	0%	0%	0%	0%	0%	0%	0%	0.1%	0.1%	0.1%	0.1%	5%	1
Moss	0%	0%	0%	7%	0%	0%	0%	0%	0.9%	2.5%	0.9%	1.8%	5%	2
Plant base	3%	6%	4%	11%	13%	4%	10%	15%	8.2%	4.6%	1.6%	3.2%	5%	4
Gravel (2–75 mm)	18%	38%	22%	26%	42%	23%	8%	25%	25.2%	10.8%	3.8%	7.6%	5%	20
Rock (76–600 mm)	2%	3%	1%	7%	3%	3%	1%	12%	3.8%	3.7%	1.3%	2.6%	5%	3
Lichen on rock	0%	1%	0%	2%	0%	2%	1%	0%	0.7%	0.7%	0.2%	0.5%	5%	1
Bedrock	37%	7%	4%	9%	7%	0%	27%	5%	12.0%	12.8%	4.5%	9.1%	6%	20
Surface Soil Aggregate Stability														
Under vegetation														
Average soil stability	**2.81**	4.41	4.39	4.23	4.00	**2.50**	4.71	3.90	3.87	0.79	0.28	0.56	0.5	11
SD	2.43	2.00	2.17	1.77	1.92	2.07	1.45	2.27						
SE	0.61	0.35	0.45	0.38	0.37	0.49	0.32	0.42						
% samples "very stable"	**31%**	**47%**	**52%**	**36%**	**33%**	**17%**	**38%**	**45%**						
n	16	32	23	22	27	18	21	29						
No vegetation cover														
Average soil stability	**1.83**	5.42	3.33	3.89	**2.86**	**2.33**	**2.67**	**2.62**	3.12	1.12	0.39	0.79	0.6	15
SD	2.04	0.67	1.63	1.97	2.14	2.07	1.51	1.98						
SE	0.83	0.19	0.67	0.46	0.57	0.84	0.61	0.55						
% samples "very stable"	**17%**	**50%**	**0%**	**33%**	**14%**	**0%**	**0%**	**0%**						
n	6	12	6	18	14	6	6	13						

"n" = number of samples collected per plot.
Red denotes values below a management assessment point.

Table A5e. Soil substrate (% by class) and surface aggregate stability class (mean and SE) and proportion of samples in "very stable" (=6) category, by monitoring plot, 402 stratum, Rincon Mountain District, Saguaro NP, 2008–2009.

Decreasing erosion hazard ↓

Parameter	502_V01	502_V02	502_V03	502_V05	502_V06	502_V07	502_V08	502_V27	502_V28	AVG	SD	SE	Sdiff	MDC	n=
Substrate															
Bare soil (<2 mm) - no overhead cover	0%	3%	1%	0%	2%	0%	0%	1%	2%	1.1%	1.0%	0.3%	0.7%	5%	1
Bare soil (<2 mm) - under vegetation	0%	9%	4%	1%	3%	4%	3%	7%	0%	3.4%	3.0%	1.0%	2.1%	5%	2
Litter and duff (organic matter)	87%	64%	82%	61%	69%	78%	57%	73%	53%	69.2%	11.7%	3.9%	8.3%	6%	17
Light cyanobacteria	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	5%	0
Dark cyanobacteria	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.0%	0.0%	0.0%	0.0%	5%	0
Lichen	0%	2%	3%	0%	0%	0%	0%	0%	0%	0.6%	1.1%	0.4%	0.8%	5%	1
Moss	0%	0%	0%	0%	1%	0%	0%	1%	1%	0.5%	0.5%	0.2%	0.4%	5%	1
Plant base	1%	1%	2%	0%	0%	1%	16%	0%	1%	2.5%	5.0%	1.7%	3.6%	5%	5
Gravel (2–75 mm)	11%	15%	3%	18%	8%	10%	18%	13%	25%	13.5%	6.4%	2.1%	4.5%	5%	7
Rock (76–600 mm)	1%	4%	3%	10%	6%	4%	1%	5%	3%	4.1%	2.8%	0.9%	2.0%	5%	2
Lichen on rock	0%	0%	0%	1%	3%	1%	3%	0%	0%	0.9%	1.3%	0.4%	0.9%	5%	1
Bedrock	0%	1%	3%	9%	7%	1%	2%	0%	15%	4.1%	5.0%	1.7%	3.5%	5%	5
Surface Soil Aggregate Stability															
Under vegetation															
Average soil stability	n/a	4.57	3.90	4.18	5.60	3.13	**1.94**	3.80	3.63	3.84	1.063	0.376	0.752	0.6	14
SD	n/a	2.32	2.17	1.82	0.75	2.26	1.56	2.25	2.19						
SE	n/a	0.64	0.49	0.39	0.17	0.47	0.27	0.45	0.50						
% samples "very stable"	n/a	**54%**	**40%**	**36%**	**70%**	**30%**	**3%**	**36%**	**32%**						
n	n/a	13	20	22	20	23	34	25	19						
No vegetation cover															
Average soil stability	n/a	2.92	1	3.11	5.29	**1.80**	**1.00**	**2.33**	3.21	2.58	1.40	0.50	0.99	0.7	18
SD	n/a	2.18	n/a	1.83	1.25	1.79	0.00	2.31	2.39						
SE	n/a	0.60	n/a	0.61	0.47	0.80	0.00	1.33	0.64						
% samples "very stable"	n/a	**8%**	**0%**	**11%**	**71%**	**0%**	**0%**	**0%**	**36%**						
n	n/a	1	1	9	7	5	8	3	14						

"n" = number of samples collected per plot.
Red denotes values below a management assessment point.

Table A5f. Soil substrate (% by class) and surface aggregate stability class (mean and SE) and proportion of samples in "very stable" (=6) category, by monitoring plot, all strata (60 plots), Rincon Mountain District, Saguaro NP, 2008–2009.

Decreasing erosion hazard ↓

Parameter	AVG	SD	SE	Sdiff	MDC	n=
Substrate						
Bare soil (<2 mm) - no overhead cover	3.0%	2.75%	0.55%	1.9%	5%	2
Bare soil (<2 mm) - under vegetation	4.6%	2.87%	0.57%	2.0%	5%	2
Litter and duff (organic matter)	49.2%	21.56%	4.31%	15.2%	6%	56
Light cyanobacteria	0.4%	1.74%	0.35%	1.2%	5%	1
Dark cyanobacteria	0.1%	0.14%	0.03%	0.1%	5%	1
Lichen	0.6%	1.26%	0.25%	0.9%	5%	1
Moss	1.2%	3.35%	0.67%	2.4%	5%	2
Plant base	4.4%	4.81%	0.96%	3.4%	5%	4
Gravel (2–75 mm)	22.9%	13.97%	2.79%	9.9%	5%	34
Rock (76–600 mm)	4.8%	4.17%	0.83%	3.0%	5%	3
Lichen on rock	0.7%	0.92%	0.18%	0.7%	5%	1
Bedrock	8.0%	9.10%	1.82%	6.4%	5%	15
Surface Soil Aggregate Stability						
Under vegetation						
Average soil stability	4.05	0.922	0.1882	0.652	0.5	15
SD						
SE						
% samples "very stable"						
n						
No vegetation cover						
Average soil stability	3.13	1.23	0.25	0.87	0.5	26
SD						
SE						
% samples "very stable"						
n						

"n" = number of samples collected per plot.

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