

Plant Survey of Rio Vista Natural Resource Park, Tucson, Arizona

Arizona Native Plant Society, Tucson Chapter
June 2020 – April 2021

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Rio Vista Natural Resource Park, 22 September 2020. Photo credit: Melanie Campbell-Carter, © 2020.

Final report submitted to:

The Rio Vista Conservation Project, Jennifer Shopland, manager
The City of Tucson Department of Parks and Recreation, Tucson, Pima County, Arizona

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Rio Vista Natural Resource Park is enjoyed by many people in a variety of ways—from picnicking to horseback riding to nature study. But the park’s primary purpose is to protect the native plants and animals that live there, as well as the ecological processes that sustain them. To support this purpose, the Tucson Chapter of the Arizona Native Plant Society (AZNPS) conducted a season-by-season survey of the plants of Rio Vista. This work was requested by the Rio Vista Conservation Project, in collaboration with the City of Tucson Department of Parks and Recreation (Tucson Parks and Recreation), the park’s land manager. This report describes our survey and its outcome, including recommendations by the coordinators for further study at the park.

Rio Vista Natural Resource Park is 35.6 acres in midtown Tucson, managed by Tucson Parks and Recreation. It was purchased by the City in 1987 and designated as the North Central District Park. Local activism resisted plans for intensive hardscaping and development of the park as a human recreation destination. Not until 1999 were plans accepted by all interested parties for limited human-targeted amenities and retention of large park areas as “natural” space. In 2008, Pima County funds were applied to irrigation and tree planting, restrooms, shade structures, lawn area improvements, and River Park Loop Trail access. In 2010, the park was officially named and dedicated by the City of Tucson as the Rio Vista Natural Resource Park.¹

Degradation of the natural areas of the park took place as the park became more popular with the rapidly growing metro Tucson population. Multiple factors created ground compaction, habitat loss, trail proliferation and other adverse effects that in recent years have spurred park supporters to explore ways to arrest or reverse ecosystem damage in the park.

Setting up the Survey

The Survey’s intention was to create a baseline plant list for the park, which could be used by the land manager and interested citizens as a resource for future study and conservation planning, a benchmark for evaluating ongoing park conditions or conservation initiatives, or any other application deemed valuable to the City of Tucson and the people it serves.

A comprehensive volunteer information packet^a was created in consultation with the manager of the Rio Vista Conservation Project. The electronic document included a survey description; guidelines for surveying; a description of the Conservation Project; documents describing each survey area, the locations of trails and flags in the park, and maps; and a data recording sheet.

Volunteer plant identifiers and data recorders were recruited from AZNPS and local park enthusiasts. Teams were assigned one or two survey areas and provided with maps and flagging in the park to denote area boundaries. Coordinators determined date ranges for the surveys, compiled and reviewed the collected data, and produced interim plant lists.

Plant Survey Activities

Four seasonally timed surveys of eight park areas were planned: Dry Summer, Post-monsoon, Fall, and Spring. Unfortunately, the 2020 monsoon season was the second driest in contemporary records, so the post-monsoon survey was not performed. Winter rains in 2020-2021 were also significantly below average, so this survey could be interpreted as a record of park plants that are able to live in significant drought conditions.

Surveyors covered the entire park, including the portions that have been most disturbed by human activity (the west side). They recorded both native and nonnative plant species. Some nonnatives persist from past cultivation on the property; some were planted by land managers; some may be invasive or may have been introduced by human or other park visitors.

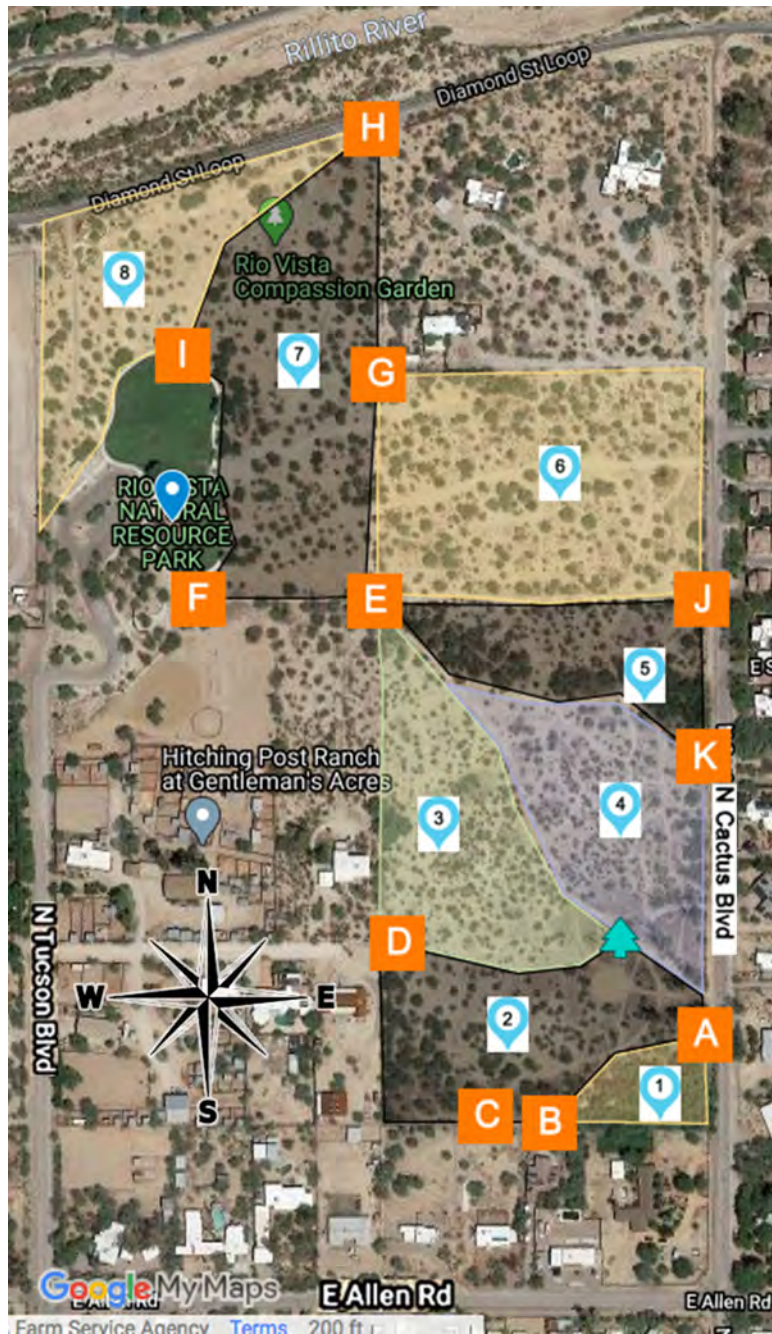


Figure 1. Map of Plant Survey areas (numbers on shaded areas) and temporary flags placed for volunteer orientation (letters).

Data Collection

Dry Summer

Eleven AZNPS members spent about 26 hours in the park between June 25 and July 27 2020, during the hot, dry season when many plants are dormant. They recorded 74 plants, 62 of which were identified to the species level.

Fall

Ten volunteers spent about 16 hours in the park between September 22 and October 26 2020. They recorded 30 additional species, some of which were new observations in a survey area and several that had not been noted in any area previously.

Spring

Thirteen volunteers spent about 22 hours in the park between March 21 and April 12 2021. They recorded 32 additional species.

Data Treatment

The survey coordinators compiled and sorted the field data. They used three online sources to refine the species identifications: the Integrated Taxonomic Information System (ITIS.gov), the USDA PLANTS database (plants.usda.gov), and SEINet (swbiodiversity.org/seinet).

Additional documents used for comparison are linked at the end of this report:

- a Pima County species-distribution list published in 2011^b
- a 2020 general survey of Rio Vista Natural Resource Park by Matthew B. Johnson and Patricia A. Rorabaugh^c
- plant list contributed by local biologists in 1997^d
- plant list contributed by Lindy Brigham^e from 2007-8.

Coordinators collaborated with the conservation project manager to establish references for plant names and forms to ensure consistency in reporting survey results.

Creating the Plant Lists

Seasonal Lists

In the appended seasonal Plant Lists, species are organized by growth habit (for example, tree, shrub, or vine). The coordinators assigned plants to these groups on the basis of their mature growth form, which may differ from their appearance in the park at the time of fieldwork. (For example, although an individual plant may have looked like a shrub when recorded on survey, it may eventually grow into a tree, and a very young shrub that did not appear woody when observed may mature into a plant with several woody stems.)

In order to standardize the terms used to describe growth habits we started with a document from the USDA Natural Resources Conservation Service which provides detailed definitions for the various plant forms. We then added three subgroups that described plants specific to our park: Succulent/Cactus, Geophyte/Bulb, and Partial Parasite. The resulting chart is included in the Volunteer Information Packet. A link^a to the entire packet is appended to this report.

Within growth-habit categories, plants are listed in alphabetical order within families. The data given for each plant are the survey area or areas in which they were recorded, common name, genus, species (if identified), and family. Nonnative species are listed in bold type. Photos submitted by surveyors are linked in a final column in the Fall Plant List.

Each seasonal Plant List contains “new” observations only. Observations may have been new to a single survey area, or new to the overall species list. Common plant names varied between surveyors; coordinators generally reported a single common name for each species based on the above reference sources. Scientific names were standardized using the reference sources named above. Variant reported scientific names were retained in parentheses on the data spreadsheets.

Rio Vista Natural Resource Park Plant List

The complete park plant list, compiled from the three seasonal surveys, is organized similarly to the seasonal lists. Species are sorted by growth habit, and alphabetized by family within each category. The area designation was replaced with the season in which the species was observed.

Conclusions

The Rio Vista Natural Resource Park Plant List provides a foundation for understanding the current status of park flora, investigating the park ecosystem, and identifying future conservation targets.

Identified species

A total of 101 species were identified within the park boundaries between May 2020 and April 2021. Native species dominated, with 84 identified.

**Table 1
Taxa by Growth Habit**

	Native	Nonnative	Total
Forb	25	2	27
Geophyte/Bulb	1	0	1
Grass	4	3	7
Partial parasite	1	0	1
Shrub	24	4	28
Succulent/Cactus	8	4	12
Tree	17	4	21
Vine	4	0	4
	84	17	101

Comparing park areas, the absolute highest number of species were located in area 8 (40 taxa) followed by areas 2 and 7 (34 taxa) and area 4 (33 taxa). Areas 7 and 8 are the west side of the park where the land managers actively manage irrigation and landscaping. Area 4 is east of areas 7 and 8, abutting and partially including an historic water drainage area. The absolute greatest number of nonnative species were found in Areas 1 and 8 (7 taxa) and Area 4 (6 taxa).

Table 2
Unique Taxa by Survey Area

	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8	Entire Park
Native	20	30	24	27	24	27	30	33	84
Nonnative	7	4	3	6	4	3	4	7	17
All taxa	27	34	27	33	28	30	34	40	101

approx. size in acres*	0.6	3.3	4.5	3	2.4	6	5.3	4.6	29.7
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Species density per acre

Native	33.33	9.09	5.33	9.00	10.00	4.50	5.66	7.17	2.83
Nonnative	11.67	1.21	0.67	2.00	1.67	0.50	0.75	1.52	0.57
All taxa	45.00	10.30	6.00	11.00	11.67	5.00	6.42	8.70	3.40

*estimated using Google Earth Pro measurement functions; lawn, parking and playground areas excluded

Adjusting those absolute numbers using the estimated acreage of each survey area, the highest overall species density was found in Area 1, at the southeast corner of the park. Area 1 is a slightly lower elevation, densely vegetated area that collects some stormwater and serves as a habitat for a wide variety of animals. No official trails traverse this area although occasionally human visitors and their pets are attracted by the visible wildlife paths leading into that area.

The seventeen nonnative plants identified in the park by the volunteers are:

- *Avena fatua*
- *Bromus rubens*
- *Buddleja marrubifolia*
- *Echinocactus grusonii*
- *Eucalyptus microtheca*
- *Hesperaloe funifera*
- *Hesperaloe parviflora*
- *Justicia spicigera*
- *Lamium amplexicaule*
- *Lantana camara*
- *Nerium oleander*
- *Olea europaea*
- *Opuntia microdasys*
- *Pistacia chinensis*
- *Schismus sp*
- *Searsia lancea*
- *Sisymbrium irio*

Comments by surveyors

Besides species identification, volunteers also recorded visible plant parts such as flowers or fruit, and occasionally offered comments related to plants in each area. Volunteers also submitted photos which were linked to the spreadsheets, and linked to the public list when possible.



Figure 3. *Aristolochia watsonii*
Photo credit: Gabrielle Woodbury, ©2020

John Scheuring, one of the volunteers, made an initial visit to the park in June 2020 and submitted a detailed report of the plants and character of the park which is appended to this report.

Surveying plants in a time of severe drought presented a challenge for our volunteers. In particular the identities of *Lycium*, *Condalia* and *Ziziphus* were practically impossible to determine without leaves, flowers or fruit. Some of the comments express this dilemma: “*Lycium*, dormant no leaves, will ID when actively growing”, “*Condalia*, barely leafing out, check after rains”, “Greythorn (*Ziziphus obtusifolia*) renamed from previous observation (*Condalia warnockii*)”.

Reference was also made to Mexican palo verde (*Parkinsonia aculeata*): “Not native to Tucson, but native to Pima County. At least a horticultural pest, hybridizes with other palo verdes”. John Scheuring, in his attached report, also recommends removing these as they proliferate.

Several grass species are present in the park and these comments were made regarding three of them:

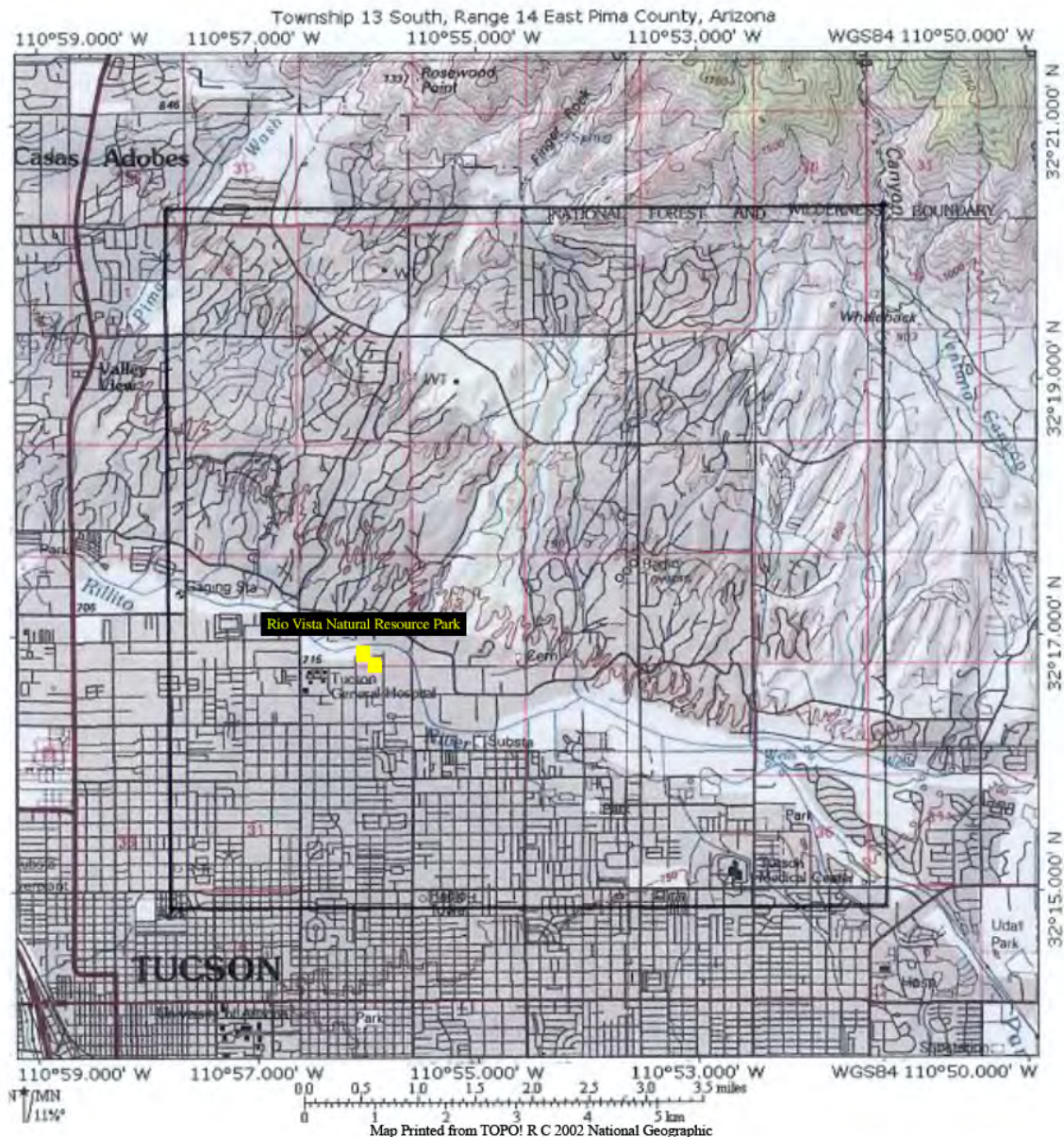
- Red Brome - an exotic and invasive winter annual. Fortunately it is concentrated in the green wash strip and the growth is modest. In wetter habitats it poses a real fire hazard, but not enough to be concerned about in Rio Vista.
- Mediterranean grass (*Schismus*) - a winter annual exotic grass fairly common in the park, especially thick in the green wash strip. Although it is exotic, it does provide ground cover and is not a fire danger. Best to just let it be, but not encourage it.
- Fluffgrass (*Dasyochloa pulchella*) - an under appreciated hero succession species. It is found in little patches here and there on the park and should be encouraged.

Large areas of human disturbance to the park include the Compassion Garden (approx. ¼ acre), the Amphitheater area at the northwest corner (approx. ¼ acre), the paved entry/parking lot/lawn/structures area on the west side (approx. 4 ¼ acres), and the labyrinth on the east side (approx. 1/3 acre). The west side areas are the location of relatively intensive ongoing landscaping activity by the land managers. The east side is subject to frequent informal visitor maintenance, aka “weeding and planting”, also resulting in anthropogenic alteration of ecological processes. Throughout the park, trail use by the land manager’s motor vehicles and recreational bicyclists compacts soil and widens trails intended for pedestrian and equestrian use only. Trail proliferation, off-leash dog activity and unauthorized camping also adversely impacts plant survival and diversity in the park.

Comparison to prior plant lists and surveys

Each reference plant list was compared to our plant survey in an Excel workbook. Each list, on a separate sheet, contains a highlighted column denoting plants also observed in the park in this survey. A link to that Excel workbook is appended to this report^f.

The Pima County township survey^b covers areas extending well into the foothills; many of the plants on that list would not be expected to occur at all in the park.



Map Showing Township and Adjacent Sections

Figure 3. From http://www.pima.gov/CMO/SDCP/species/TR/Updates_2011/T13S-R14E.pdf, page 5, accessed and annotated 5 May 2021.

Our Plant Survey volunteers' field identifications (June 2020 - April 2021) began a month *after* the initial general survey by Matt Johnson and Patricia Rorabaugh^c; that month of drought and extreme heat may partly account for the occasional variation between the two surveys. Johnson and Rorabaugh included several comments in their list mentioning drought and identification issues.

The 1997 Gori/Hawkins plant list^d is brief (20 species), yet several species are mentioned that were not observed in our survey. Missing were two cactus species (*Opuntia phaeacantha*, *Opuntia leptocaulis*), three forbs that might ordinarily be present in seasons of normal rainfall (*Mollugo verticillata*, *Allionia incarnata*, *Zinnia pumilla*), two nonnative species (tree of heaven and ornamental juniper), and fortunately, the newly designated noxious fountain grass.

The 2007-2008 Brigham list^e is a fairly extensive survey naming 53 species. Eight were identified in the spring, the remainder were post-monsoon observations. The 2020-2021 plant survey identified 29 plants from that list. Seventeen species of forbs, a grass, a vine, and two shrubs were observed by Brigham but were absent from the park in this survey, possibly due to drought conditions.

Recommendations

1. In this year of drought, some identifications were impossible due to lack of leaves, flowers, or fruits. Should the park receive normal or increased seasonal rainfall, additional surveys would likely make those identifications possible and reveal additional species that emerge with normal rainfall.
2. Extensive denuded areas and areas dominated by one species would benefit from coordinated restoration efforts. Those restoration efforts might also include recommending species for ongoing landscaping activities by the land manager in the more human-targeted sections of the park.
3. This survey provides a snapshot of the park's baseline flora which will be useful to address conservation and restoration activities. Future surveys could address more specific issues that this survey was not intended to answer, such as:
 - Phenology studies
 - Species distributions and dominance
 - Presence of invasive or threatened species
 - Identification and distribution of plant conservation targets
 - Identification and distribution of plants associated with wildlife conservation targets
4. The existing irrigation system is overdue for an inspection of its functionality, performance of repairs, and revision of its use with a goal of more efficient and prudent water consumption.
5. Revised stormwater management could mitigate drought conditions by redirecting larger amounts of street flow, that currently bypass the park, into natural drainage areas in the park that terminate in the Rillito. This would help support some of the largest native trees in the park and the habitats they create.
6. Continued efforts to refine the trail system will improve opportunities for overall biodiversity and habitat restoration.
7. Remnants of human activity that preceded the formation of the park, or remained after large park projects, may present hazards to park visitors of all types. Old fencing, wire, tree stakes, concrete, and other items should be safely removed.

Access to Plant Survey Data and Acknowledgments

All links in this report connect to the public Rio Vista Natural Resource Park Plant Survey documents, reference and source documents, and reports. Inquiries about data collection and reporting are welcomed at PlantSurvey2020@gmail.com, which is monitored by the Plant Survey coordinators.

All reports, diagrams, spreadsheets, and other documents generated by the Plant Survey are protected by U.S. copyright, which is owned by Friends of Rio Vista, a 501(c)(3) nonprofit organization formed in 2020 to support the Rio Vista Conservation Project and the City of Tucson Parks and Recreation Department. Inquiries related to citation, reproduction, distribution, electronic or print publication, and all other uses of any reports or data should be directed to ProRioVista@gmail.com, which is monitored by Jennifer Shopland, project manager of the Rio Vista Conservation Project and Chair of the Board of Directors of Friends of Rio Vista.

As the plant survey's coordinators, we would like to express our gratitude to our AZNPS colleagues and the local volunteers who braved heat, drought, and a global pandemic to collect data. We also wish to thank Tucson Parks and Recreation for permission to conduct the survey and for the department's support of conservation in the park. The Rio Vista Conservation Project, who commissioned this survey, is a local effort begun in 2019 to protect and restore the park. The AZNPS hopes our work will be a useful contribution to developing and implementing science-based conservation management tools by the City of Tucson.



Survey Coordinators

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Links:

^a[Volunteer Information Packet](#)

^b[Pima County species distribution list, 2011](#)

^c[General Plant Survey of Rio Vista, May 2020](#) (Johnson/Rorabaugh)

^d[1997 Gori/Hawkins plant list](#)

^e[2007-2008 Brigham plant list](#)

^f[Comparison to prior lists and surveys](#) (Excel workbook)

Footnote:




1. Park History, <https://rillitobendna.org/rio-vista-park.html#history>, accessed 17 April 2021.

Rio Vista Natural Resource Park Plant Survey

















June 2020 through April 2021









Plants in bold type are nonnative species.

Season ^a	Common Name	Genus	Species	Family
Forb/Herb				
	 Woolly tidestromia	<i>Tidestromia</i>	<i>lanuginosa</i>	Amaranthaceae
	 Hoary bowlesia	<i>Bowlesia</i>	<i>incana</i>	Apiaceae
	 Artemisia	<i>Artemisia</i>	<i>sp</i>	Asteraceae
	 Desert marigold	<i>Baileya</i>	<i>multiradiata</i>	Asteraceae
	 Star thistle	<i>Centaurea</i>	<i>sp.</i>	Asteraceae
	 Hoary tansyaster	<i>Dieteria</i>	<i>canescens</i>	Asteraceae
	 Tansy aster	<i>Machaeranthera</i>	<i>tagetina</i>	Asteraceae
	 Cudweed	<i>Pseudognaphalium</i>	<i>sp</i>	Asteraceae
	 Dogweed	<i>Thymophylla</i>	<i>sp</i>	Asteraceae
	 Golden crownbeard	<i>Verbesina</i>	<i>encelioides</i>	Asteraceae
	 Fiddleneck	<i>Amsinckia</i>	<i>intermedia</i>	Boraginaceae
	 Fiddleneck	<i>Amsinckia</i>	<i>sp.</i>	Boraginaceae
	 Cryptantha	<i>Cryptantha</i>	<i>sp</i>	Boraginaceae
	 Stickseed	<i>Lappula</i>	<i>sp</i>	Boraginaceae
	 London rocket	<i>Sisymbrium</i>	<i>irio</i>	Brassicaceae
	 Sandmat			Euphorbiaceae
	 Henbit	<i>Lamium</i>	<i>amplexicaule</i>	Lamiaceae
	 Lavender	<i>Lavandula</i>	<i>sp.</i>	Lamiaceae
	 Thurber's sandpaper plant	<i>Petalonyx</i>	<i>thurberi</i>	Loasaceae
	 Devil's claw	<i>Proboscidea</i>	<i>parviflora</i>	Martyniaceae
	 Spiderling	<i>Boerhavia</i>	<i>sp</i>	Nyctaginaceae
	 Primrose	<i>Oenothera</i>	<i>primiveris</i>	Onagraceae
	 Skeleton weed	<i>Eriogonum</i>	<i>deflexum</i>	Polygonaceae
	 Canaigre dock	<i>Rumex</i>	<i>hymenosepalus</i>	Polygonaceae
	 Datura	<i>Datura</i>	<i>wrightii</i>	Solanaceae
	 Desert tobacco	<i>Nicotiana</i>	<i>obtusifolia</i>	Solanaceae
	 Silverleaf nightshade	<i>Solanum</i>	<i>elaeagnifolium</i>	Solanaceae
Geophyte/Bulb				
	 Pipevine	<i>Aristolochia</i>	<i>watsonii</i>	Aristolochiaceae
Grass				
	 Purple three awn	<i>Aristida</i>	<i>purpurea</i>	Poaceae
	 Wild Oats	<i>Avena</i>	<i>fatua</i>	Poaceae
	 Red Brome	<i>Bromus</i>	<i>rubens</i>	Poaceae
	 Fluffgrass	<i>Dasyochloa</i>	<i>pulchella</i>	Poaceae
	 Deer muhly	<i>Muhlenbergia</i>	<i>rigens</i>	Poaceae
	 Mediterranean grass	<i>Schismus</i>	<i>barbatus</i>	Poaceae
	 Giant sacaton	<i>Sporobolus</i>	<i>wrightii</i>	Poaceae










Partial Parasite						
			Desert Mistletoe	<i>Phoradendron</i>	<i>californicum</i>	Santalaceae

Shrub ^b						
			Desert honeysuckle	<i>Anisacanthus</i>	<i>thurberi</i>	Acanthaceae
			Mexican honeysuckle	<i>Justicia</i>	<i>spicigera</i>	Acanthaceae
			Desert Elderberry	<i>Sambucus</i>	<i>nigra ssp. canadensis</i>	Adoxaceae
			Four-wing saltbush	<i>Atriplex</i>	<i>canescens</i>	Amaranthaceae
			Desert saltbush	<i>Atriplex</i>	<i>polycarpa</i>	Amaranthaceae
			Squaw bush	<i>Rhus</i>	<i>aromatica</i>	Anacardiaceae
			Oleander	<i>Nerium</i>	<i>oleander</i>	Apocynaceae
			Soap tree yucca	<i>Yucca</i>	<i>elata</i>	Asparagaceae
			Triangle leaf bursage	<i>Ambrosia</i>	<i>deltoidea</i>	Asteraceae
			Singlewhorl burrobrush	<i>Ambrosia</i>	<i>monogyra</i>	Asteraceae
			Cheesebush	<i>Ambrosia</i>	<i>salsola</i>	Asteraceae
			Desert broom	<i>Baccharis</i>	<i>sarothroides</i>	Asteraceae
			Brittle bush	<i>Encelia</i>	<i>farinosa</i>	Asteraceae
			Turpentine bush	<i>Ericameria</i>	<i>laricifolia</i>	Asteraceae
			Burweed	<i>Isocoma</i>	<i>tenuisecta</i>	Asteraceae
			Longleaf jointfir	<i>Ephedra</i>	<i>trifurca</i>	Ephedraceae
			Fairy duster	<i>Calliandra</i>	<i>eriphylla</i>	Fabaceae
			Desert senna	<i>Senna</i>	<i>covesii</i>	Fabaceae
			Ocotillo	<i>Fouquieria</i>	<i>splendens</i>	Fouquieriaceae
			Desert globe mallow	<i>Sphaeralcea</i>	<i>ambigua</i>	Malvaceae
			Arizona rosewood	<i>Vauquelinia</i>	<i>californica</i>	Rosaceae
			Woolly butterfly bush	<i>Buddleja</i>	<i>marrubiifolia</i>	Scrophulariaceae
			Texas ranger	<i>Leucophyllum</i>	<i>sp</i>	Scrophulariaceae
			Jojoba	<i>Simmondsia</i>	<i>chinensis</i>	Simmondsiaceae
			Wolfberry	<i>Lycium</i>	<i>sp.</i>	Solanaceae
			Pale desert thorn	<i>Lycium</i>	<i>pallidum</i>	Solanaceae
			Lantana	<i>Lantana</i>	<i>camara</i>	Verbenaceae
			Creosote bush	<i>Larrea</i>	<i>tridentata</i>	Zygophyllaceae





Succulent/Cactus						
			Parry agave truncata	<i>Agave</i>	<i>parryi var. truncata</i>	Asparagaceae
			Agave	<i>Agave</i>	<i>sp</i>	Asparagaceae
			Agave	<i>Agave</i>	<i>univittata</i>	Asparagaceae
			Giant hesperaloe	<i>Hesperaloe</i>	<i>funifera</i>	Asparagaceae
			Red yucca	<i>Hesperaloe</i>	<i>parviflora</i>	Asparagaceae
			Cane cholla	<i>Cylindropuntia</i>	<i>spiniosior</i>	Cactaceae
			Cholla	<i>Cylindropuntia</i>	<i>sp.</i>	Cactaceae
			Golden barrel cactus	<i>Echinocactus</i>	<i>grusonii</i>	Cactaceae

		Fishhook barrel	<i>Ferocactus</i>	<i>wislizeni</i>	Cactaceae
		Beaver tail prickly pear	<i>Opuntia</i>	<i>basilaris</i>	Cactaceae
		Bunny ears	<i>Opuntia</i>	<i>microdasys</i>	Cactaceae
		Santa rita prickly pear	<i>Opuntia</i>	<i>santa-rita</i>	Cactaceae

Tree ^c					
		Chinese pistache	<i>Pistacia</i>	<i>chinensis</i>	Anacardiaceae
		Littleleaf sumac	<i>Rhus</i>	<i>microphylla</i>	Anacardiaceae
		African sumac	<i>Searsia (formerly Rhus)</i>	<i>lancea</i>	Anacardiaceae
		Desert willow	<i>Chilopsis</i>	<i>linearis</i>	Bignoniaceae
		Desert hackberry	<i>Celtis</i>	<i>pallida</i>	Cannabaceae
		Netleaf hackberry	<i>Celtis</i>	<i>reticulata</i>	Cannabaceae
		wait a minute bush	<i>Mimosa</i>	<i>aculeaticarpa var. biuncij</i>	Fabaceae
		wait a minute bush	<i>Mimosa</i>	<i>biuncifera</i>	Fabaceae
		Mexican palo verde	<i>Parkinsonia</i>	<i>aculeata</i>	Fabaceae
		Blue palo verde	<i>Parkinsonia</i>	<i>florida</i>	Fabaceae
		Foothills palo verde	<i>Parkinsonia</i>	<i>microphylla</i>	Fabaceae
		Honey mesquite	<i>Prosopis</i>	<i>glandulosa</i>	Fabaceae
		Mesquite	<i>Prosopis</i>	<i>sp</i>	Fabaceae
		Velvet mesquite	<i>Prosopis</i>	<i>velutina</i>	Fabaceae
		Catclaw acacia	<i>Senegalia</i>	<i>greggii</i>	Fabaceae
		Whitethorn acacia	<i>Vachellia</i>	<i>constricta</i>	Fabaceae
		Eucalyptus	<i>Eucalyptus</i>	<i>microtheca</i>	Myrtaceae
		Olive	<i>Olea</i>	<i>europaea</i>	Oleaceae
		Graythorn	<i>Ziziphus</i>	<i>obtusifolia</i>	Rhamnaceae
		Condalia	<i>Condalia</i>	<i>warnockii</i>	Rhamnaceae
		Hop bush	<i>Dodonaea</i>	<i>viscosa</i>	Sapindaceae

Vine						
			Climbing milkweed	<i>Funastrum</i>	<i>cynanchoides</i>	Apocynaceae
			Rambling milkweed	<i>Funastrum</i>	<i>hirtellum</i>	Apocynaceae
		Morning glory	<i>Ipomoea</i>	<i>sp</i>	Convolvulaceae	
			Drummond's clematis	<i>Clematis</i>	<i>drummondii</i>	Ranunculaceae

Plant identifications by Arizona Native Plant Society, Tucson Chapter, June 2020 through April 2021
 Survey coordinators: Susan Husband and Melanie Campbell-Carter email: PlantSurvey2020@gmail.com
 List commissioned by Rio Vista Conservation Project in collaboration with City of Tucson Parks and Recreation Department
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^a Symbols designate season(s) in which plant was observed. The lack of a seasonal observation may reflect volunteer variations rather than actual absence of the plant.  dry summer  post-monsoon  fall  spring

^b Category contains shrubs (up to 5 m high) and subshrubs (< 0.5 m high)

^c Under certain environmental conditions, some tree species may develop a multistemmed or short growth form (< 4 m)
 Plants in bold type are nonnative species.

Arizona Native Plant Society, Tucson Chapter
Plant Survey of Rio Vista Natural Resource Park, Tucson, Arizona
Dry Summer Plant List

Rio Vista Natural Resource Park is enjoyed by many people in a variety of ways—from picnicking to horseback riding to nature study. But the park’s primary purpose is to protect the native plants and animals that live there, as well as the ecological processes that sustain them. To support this purpose, the Tucson Chapter of the Arizona Native Plant Society (AZNPS) is conducting a year-long, season-by-season survey of the plants of Rio Vista. This work initially was requested by the Rio Vista Conservation Project, in collaboration with the City of Tucson Department of Parks and Recreation (Tucson Parks and Recreation), the park’s land manager. The attached Dry Summer Plant List is the result of the first phase of the AZNPS plant survey.

How the Survey Works

Before fieldwork, the survey coordinators, Susan Husband and Melanie Campbell-Carter, prepared data-collection forms to be used by the volunteer surveyors. They also divided the park into eight survey areas (see attached map), so that plant identifications will have a geographic reference for future study. Surveyors cover the entire area of the park, including the portions that have been most disturbed by human activity (the west side). They record both native and nonnative plant species. Some nonnatives persist from past cultivation on the property; some were planted by land managers for aesthetic purposes; some may be invasive or may have been inadvertently introduced by humans.

Results of the Dry Summer Plant Survey

Eleven AZNPS members made a total of 23 visits to the park between May and July 2020, during the hot, dry season when many plants are dormant. They recorded 74 types of plants, 62 of which were identified to the species level.

The survey coordinators compiled and sorted the field data. They used several sources to refine the species identifications: the Integrated Taxonomic Information System (ITIS.gov), the USDA PLANTS database (plants.usda.gov), SEINet (swbiodiversity.org/seinet), a Pima County species-distribution list published in 2011, and a 2020 general survey of Rio Vista Natural Resource Park by Matthew B. Johnson and Patricia A. Rorabaugh. They also integrated information from records contributed by local biologists since 1997.

The Dry Summer Plant List

In the attached Dry Summer Plant List, species are organized by growth habit (for example, tree, shrub, or vine). The coordinators assigned plants to these groups on the basis of their mature growth form, which may differ from their appearance in the park at the time of fieldwork. (For example, although an individual plant may have looked like a shrub when recorded on survey, it may eventually grow into a tree, and a very young shrub that did not appear woody when observed may mature into a plant with several woody stems.)

Within growth-habit categories, plants are listed in alphabetical order within families. The data given for each plant are the survey area or areas in which they were recorded, common name, genus, species (if identified), and family. Nonnative species are listed in bold type.

The Future

The AZNPS plans to conduct more surveys over the coming months to document additional plants that emerge after summer and winter rains. Considering the shortage of rainfall this summer, an additional

survey after the 2021 monsoon season may be necessary. By surveying at different points throughout the year, they hope to create a comprehensive plant list for the park.

Acknowledgments

As the plant survey's coordinators, we would like to express our gratitude to our AZNPS colleagues who braved the heat of June and July to collect data. We also wish to thank Tucson Parks and Recreation for permission to conduct the survey and for the department's support of conservation in the park.

Most of all, we are delighted to be associated with the Rio Vista Conservation Project. This initiative was begun in 2019 as a local effort to protect and restore Rio Vista Natural Resource Park. In collaboration with Tucson Parks and Recreation, the Rio Vista Conservation Project is developing a comprehensive conservation plan for the park, which requires identification of natural assets, including plants. On the behalf of the AZNPS, we are proud to make this contribution to a science-based management tool for a public park.



Survey Coordinators

Susan Husband and Melanie Campbell-Carter

Rio Vista Natural Resource Park Plant Survey
Combined list of all areas, Dry Summer season 2020

Plants in bold type are nonnative species.

Area	Common Name	Genus	Species	Family
Forb/Herb				
4, 5, 6, 7, 8	Burweed	Isocoma	tenuisecta	Asteraceae
5, 6, 7	Desert senna	Senna	covesii	Fabaceae
5, 6, 7, 8	Globe mallow	Sphaeralcea	ambigua	Malvaceae
3, 4	Desert tobacco	Nicotiana	obtusifolia	Solanaceae
8	Mexican honeysuckle	Justicia	spicigera	Acanthaceae
3	Desert marigold	Baileya	multiradiata	Asteraceae
7, 8	Hoary tansyaster	Dieteria	canescens	Asteraceae
1, 6	Fiddleneck	Amsinckia	sp.	Boraginaceae
1, 6	Cryptantha	Cryptantha	sp.	Boraginaceae
1, 6	Stickseed	Lappula	sp.	Boraginaceae
1, 3, 4	London rocket	Sisymbrium	irio	Brassicaceae
2	Possibly caryoph	unknown	unknown	Caryophyllaceae
7	Lavender	Lavandula	sp..	Lamiaceae
2	Devil's claw	Proboscidea	parviflora	Martyniaceae
1	Spiderling ^a	Boerhavia	sp.	Nyctaginaceae
6	Skeleton weed	Eriogonum	deflexum	Polygonaceae
Grass				
1	Wild oats^a	Avena	fatua	Poaceae
1, 5, 6	Red brome	Bromus	rubens	Poaceae
5	Fluffgrass	Dasyochloa	pulchella	Poaceae
7	Deer muhly	Muhlenbergia	rigens	Poaceae
1, 5, 6, 7, 8	Mediterranean grass	Schismus	barbatus	Poaceae
8	Unknown tall grass			Poaceae
Partial Parasite				
1, 2, 6, 7, 8	Desert mistletoe	Phoradendron	californicum	Santalaceae
Shrub^b				
7	Desert honeysuckle	Anisacanthus	thurberi	Acanthaceae
7, 8	Four-wing saltbush	Atriplex	canescens	Amaranthaceae
8	Desert saltbush	Atriplex	polycarpa	Amaranthaceae
2, 4	Oleander	Nerium	oleander	Apocynaceae
5, 6	Triangle leaf bursage	Ambrosia	deltoidea	Asteraceae
1, 6	Singlewhorl burrobrush	Ambrosia	monogyra	Asteraceae
6	Cheesebush	Ambrosia	salsola	Asteraceae
1, 2, 3, 4, 5, 6, 7, 8	Desert broom	Baccharis	sarothroides	Asteraceae
6, 7, 8	Brittlebush	Encelia	farinosa	Asteraceae
2, 4, 5	Longleaf jointfir	Ephedra	trifurca	Ephedraceae
6, 7, 8	White thorn acacia	Vachellia (formerly Acacia)	constricta	Fabaceae
8	Ocotillo	Fouquieria	splendens	Fouquieriaceae
4	Sandpaper plant	Petalonyx	thurberi	Loasaceae
2, 3, 4	Kearny snakewood	Condalia	warnockii	Rhamnaceae
7, 8	Woolly butterfly bush	Buddleja	marrubiifolia	Scrophulariaceae
8	Jojoba	Simmondsia	chinensis	Simmondsiaceae
3, 4	Pale desert thorn	Lycium	pallidum	Solanaceae
1, 2, 5, 6, 7	Wolfberry	Lycium	sp.	Solanaceae
1	Lantana^a	Lantana	camara	Verbenaceae
1, 2, 3, 4, 5, 6, 7, 8	Creosote bush	Larrea	tridentata	Zygophyllaceae

Succulent/Cactus					
June-July 2020	8	Parry agave truncata	Agave	parryi var. truncata	Asparagaceae
June-July 2020	2	Agave	Agave	sp.	Asparagaceae
June-July 2020	2	Agave	Agave	sp.	Asparagaceae
June-July 2020	8	Giant hesperaloe	Hesperaloe	funifera	Asparagaceae
June-July 2020	8	Red yucca	Hesperaloe	parviflora	Asparagaceae
June-July 2020	7	Golden barrel cactus	Echinocactus	grusonii	Cactaceae
June-July 2020	8	Fishhook barrel	Ferocactus	wislizeni	Cactaceae
June-July 2020	8	Beaver tail prickly pear	Opuntia	basilaris	Cactaceae
June-July 2020	8	Santa Rita prickly pear	Opuntia	santa-rita	Cactaceae

Tree ^c					
June-July 2020	8	Chinese pistache	Pistacia	chinensis	Anacardiaceae
June-July 2020	8	Littleleaf sumac	Rhus	microphylla	Anacardiaceae
June-July 2020	1, 2, 3, 5	African sumac	Searsia (formerly Rhus)	lancea	Anacardiaceae
June-July 2020	7, 8	Desert willow	Chilopsis	linearis	Bignoniaceae
June-July 2020	8	Desert hackberry	Celtis	pallida	Cannabaceae
June-July 2020	5	Netleaf hackberry	Celtis	reticulata	Cannabaceae
June-July 2020	8	Acacia	Acacia		Fabaceae
June-July 2020	6	Catclaw mimosa ^a	Mimosa	aculeaticarpa var. biuncifera	Fabaceae
June-July 2020	1, 5	Mexican palo verde	Parkinsonia	aculeata	Fabaceae
June-July 2020	1, 5, 6, 7, 8	Blue palo verde	Parkinsonia	florida	Fabaceae
June-July 2020	2, 3, 4, 7, 8	Foothills palo verde	Parkinsonia	microphylla	Fabaceae
June-July 2020	7, 8	Honey mesquite	Prosopis	glandulosa	Fabaceae
June-July 2020	8	Unknown mesquite	Prosopis	sp.	Fabaceae
June-July 2020	1, 2, 3, 4, 5, 6, 7, 8	Velvet mesquite	Prosopis	velutina	Fabaceae
June-July 2020	1, 2, 3, 4, 5, 6, 7, 8	Catclaw acacia	Senegalia (formerly Acacia)	greggii	Fabaceae
June-July 2020	2, 4	Olive	Olea	europaea	Oleaceae
June-July 2020	2, 8	Graythorn	Ziziphus	obtusifolia	Rhamnaceae
June-July 2020	8	Arizona rosewood	Vauquelinia	californica	Rosaceae
June-July 2020	2	Hop bush	Dodonaea	viscosa	Sapindaceae

Vine					
June-July 2020	1	Climbing milkweed ^a	Funastrum	cynanchoides	Apocynaceae
June-July 2020	1	Morning glory species ^a	Ipomoea	sp.	Convolvulaceae
June-July 2020	1	Drummond's clematis ^a	Clematis	drummondii	Ranunculaceae

Plant identifications by Arizona Native Plant Society, Tucson Chapter, June and July 2020
Survey coordinators: Susan Husband and Melanie Campbell-Carter email: PlantSurvey2020@gmail.com
List commissioned by Rio Vista Conservation Project in collaboration with City of Tucson Parks and Recreation Department
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^a Common name added by survey coordinators

^b Category contains shrubs (up to 5 m high) and subshrubs (< 0.5 m high)

^c Under certain environmental conditions, some tree species may develop a multistemmed or short growth form (< 4 m)

Plants in bold type are nonnative species.



RIO VISTA CONSERVATION PROJECT

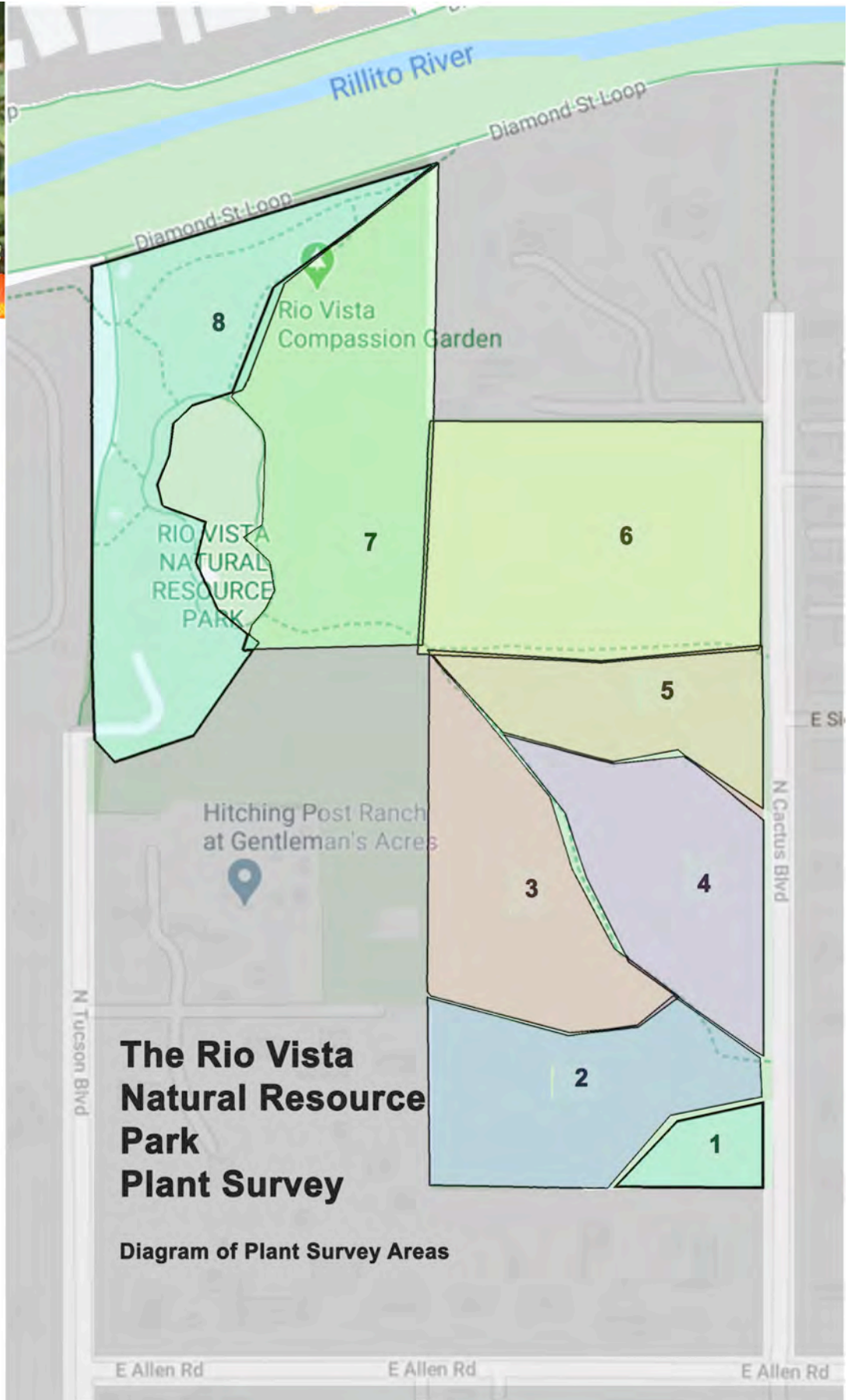
To protect and restore
Rio Vista Natural Resource Park

ProRioVista@gmail.com



The Arizona
Native Plant
Society

PlantSurvey2020@gmail.com



Rio Vista Natural Resource Park Plant Survey
Combined list of all areas, Fall season 2020

Plants in bold type are nonnative species.

NEW IDENTIFICATIONS^a Fall 2020

Date	Area	Common Name	Genus	Species	Family	Photo Link
Forb/Herb						
Sept-Oct 2020	1, 2, 3	Woolly tidestromia	Tidestromia	lanuginosa	Amaranthaceae	Tidestromia
Sept-Oct 2020	3	Artemisia	Artemisia	sp.	Asteraceae	
Sept-Oct 2020	6	Tansy aster	Machaeranthera	tagetina	Asteraceae	
Sept-Oct 2020	2	Dogweed	Thymophylla	sp.	Asteraceae	dogweed
		Golden crownbeard /				
Sept-Oct 2020	1, 2, 6	cowpen daisy	Verbesina	encelioides	Asteraceae	Verbesina
Sept-Oct 2020	6	Stickseed	Lappula	sp.	Boraginaceae	
Sept-Oct 2020	2	London rocket	Sisymbrium	irio	Brassicaceae	
Sept-Oct 2020	7	Thurber's sandpaper plant	Petalonyx	thurberi	Loasaceae	
Sept-Oct 2020	2	Spiderling	Boerhavia	sp.	Nyctaginaceae	
Sept-Oct 2020	2	Datura	Datura	wrightii	Solanaceae	Datura
Sept-Oct 2020	2, 7	Desert tobacco	Nicotiana	obtusifolia	Solanaceae	
Sept-Oct 2020	1	Silverleaf nightshade	Solanum	elaeagnifolium	Solanaceae	
Geophyte/Bulb						
Sept-Oct 2020	2, 3, 4, 7	Pipevine	Aristolochia	watsonii	Aristolochiaceae	Pipevine seed pod
Partial Parasite						
Sept-Oct 2020	3, 5	Desert mistletoe	Phoradendron	californicum	Santalaceae	
Shrub^b						
Sept-Oct 2020	6	Four-wing saltbush	Atriplex	canescens	Amaranthaceae	
Sept-Oct 2020	6	Oleander	Nerium	oleander	Apocynaceae	
Sept-Oct 2020	3	Soaptree yucca	Yucca	elata	Asparagaceae	
Sept-Oct 2020	7	Turpentine bush	Ericameria	laricifolia	Asteraceae	
Sept-Oct 2020	2	Cholla			Cactaceae	
Sept-Oct 2020	2	Pale desert thorn	Lycium	pallidum	Solanaceae	Lycium flowers
Sept-Oct 2020	3	Desert senna	Senna	covesii	Fabaceae	
Sept-Oct 2020	3	Globe mallow	Sphaeralcea	ambigua	Malvaceae	
Succulent/Cactus						
Sept-Oct 2020	4	Agave	Agave	sp.	Asparagaceae	
Sept-Oct 2020	4	Bunny ears	Opuntia	microdasys	Cactaceae	introduced
Tree^c						
Sept-Oct 2020	2	Desert hackberry	Celtis	pallida	Cannabaceae	hackberry
Sept-Oct 2020	2	Mexican palo verde	Parkinsonia	aculeata	Fabaceae	
Sept-Oct 2020	4	Blue Palo verde	Parkinsonia	florida	Fabaceae	
Vine						
Sept-Oct 2020	2, 3, 5	Fringed twinevine	Funastrum	cynanchoides	Apocynaceae	
Sept-Oct 2020	7	Rambling Milkweed	Funastrum	hirtellum	Apocynaceae	
Sept-Oct 2020	2, 5	Drummond's clematis	Clematis	drummondi	Ranunculaceae	Clematis

Plant identifications by Arizona Native Plant Society, Tucson Chapter, March and April 2021

Survey coordinators: Susan Husband and Melanie Campbell-Carter email: PlantSurvey2020@gmail.com

List commissioned by Rio Vista Conservation Project in collaboration with City of Tucson Parks and Recreation Department

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^a Observations new to a survey area. Plants may have been identified in other areas previously.

^b Category contains shrubs (up to 5 m high) and subshrubs (< 0.5 m high)

^c Under certain environmental conditions, some tree species may develop a multistemmed or short growth form (< 4

Plants in bold type are nonnative species.

Rio Vista Natural Resource Park Plant Survey
Combined list of all areas, Spring season 2021

Plants in bold type are nonnative species.

NEW IDENTIFICATIONS^a Spring 2021

Area	Common Name	Genus	Species	Family
Forb/Herb				
1,5	Hoary bowlesia	<i>Bowlesia</i>	<i>incana</i>	Apiaceae
4	Cudweed	<i>Pseudognaphalium</i>	<i>sp</i>	Asteraceae
4,5	Fiddleneck	<i>Amsinckia</i>	<i>intermedia</i>	Boraginaceae
4,8	Cryptantha	<i>Cryptantha</i>	<i>sp</i>	Boraginaceae
4	Stickseed	<i>Lappula</i>	<i>sp</i>	Boraginaceae
7	London rocket	<i>Sisymbrium</i>	<i>Irio</i>	Brassicaceae
4	Sandmat			Euphorbiaceae
1	Henbit	<i>Lamium</i>	<i>amplexicaule</i>	Lamiaceae
4	Primrose	<i>Oenothera</i>	<i>primiveris</i>	Onagraceae
3, 5, 7	Canaigre dock	<i>Rumex</i>	<i>hymenosepalus</i>	Polygonaceae
Grass				
8	Red Brome	<i>Bromus</i>	<i>rubens</i>	Poaceae
8	Giant sacaton	<i>Sporobolus</i>	<i>wrightii</i>	Poaceae
Partial Parasite				
4	Mistletoe	<i>Phoradendron</i>	<i>californica</i>	Santalaceae
Shrub^b				
8	Desert elderberry	<i>Sambucus</i>	<i>nigra ssp. canadensis</i>	Adoxaceae
8	Squaw bush	<i>Rhus</i>	<i>aromatica</i>	Anacardiaceae
4	Soap tree yucca	<i>Yucca</i>	<i>elata</i>	Asparagaceae
4	White ragweed	<i>Ambrosia</i>	<i>salsola</i>	Asteraceae
3	Burrow weed	<i>Isocoma</i>	<i>tenuisecta</i>	Asteraceae
3	Ephedra	<i>Ephedra</i>	<i>trifurca</i>	Ephedraceae
7	Fairy duster	<i>Calliandra</i>	<i>eriphylla</i>	Fabaceae
4	Texas ranger	<i>Leucophyllum</i>	<i>sp</i>	Scrophulariaceae
Succulent/Cactus				
3	Agave	<i>Agave</i>	<i>univittata</i>	Asparagaceae
6	Cane cholla	<i>Cylindropuntia</i>	<i>spinosior</i>	Cactaceae
3	Bunny ears	<i>Opuntia</i>	<i>microdasys</i>	Cactaceae
Tree^c				
4	Russian sumac	<i>Searsia</i>	<i>lancea</i>	Anacardiaceae
4, 7	Mexican palo verde	<i>Parkinsonia</i>	<i>aculeata</i>	Fabaceae
3	Blue palo verde	<i>Parkinsonia</i>	<i>florida</i>	Fabaceae
6	Foothills palo verde	<i>Parkinsonia</i>	<i>microphylla</i>	Fabaceae
4	White thorn acacia	<i>Vachellia</i>	<i>constricta</i>	Fabaceae
4	Eucalyptus	<i>Eucalyptus</i>	<i>microtheca</i>	Myrtaceae
5, 7	Greythorn	<i>Ziziphus</i>	<i>obtusifolia</i>	Rhamnaceae
Vine				
4	Climbing milkweed	<i>Funistrum</i>	<i>cynanchoides</i>	Apocynaceae

Plant identifications by Arizona Native Plant Society, Tucson Chapter, March and April 2021

Survey coordinators: Susan Husband and Melanie Campbell-Carter email: PlantSurvey2020@gmail.com

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^a Observations new to a survey area. Plants may have been identified in other areas previously.

^b Category contains shrubs (up to 5 m high) and subshrubs (< 0.5 m high)

^c Under certain environmental conditions, some tree species may develop a multistemmed or short growth form (< 4 m)

Plants in bold type are nonnative species.

Report by John Scheuring about Rio Vista Natural Resource Park, visited 7 June 2020
Received 14 June 2020 via email; reproduced with permission

It was a real treat to visit the park for the first time last Sunday.

What a little jewel tucked into your neighborhood!

Your work is quite obvious and is making a big difference in reducing the social trail compaction and invasive control, especially African Sumac.

My first impression was the almost artificial homogeneity of species and terrain. But I quickly recognized very rich north-south and east-west contrasts with a nice diagonal drainage green habitat. Certainly there are various micro habitats that can be identified with their own species mixes and densities.

Here are a few observations grouped by canopy levels

Trees

Mesquites. I was relieved to see only our native Velvet Mesquite (*Prosopis velutina*) and no Honey or exotic mesquites or hybrids. The COT did a careful job only planting that species. Also it looks like COT resisted the temptation to overplant the mesquites from the beginning. That being said, there are now some border effects along the paths where tree growth is unnaturally dense and overgrown. You, with COT permission, might consider thinning out that overgrowth and density to keep the balance and natural “viewsheds” along the paths.

Palo Verdes. The COT wisely chose to plant a preponderance of blue palo verdes (*Parkinsonia florida*) among the mesquites. Blues fit well in riparian flood plains. I was delighted to see a sprinkling of Foothill palo verdes (*Parkinsonia micophylla*) on more upland, drier microhabitats. You might consider seeding more Foothill PVs in some of the dry patches that have become over run with creosote bushes.

Catclaw Acacia (*Senegalensis greggii*) look to have been planted at the same time as the mesquites and blue palo verdes. These are extremely hardy and fit well in this mesquite bosque. Aghsin, they have become overgrown and a bit crowded along some of the pathways due to the unintended water harvesting off the paths.

Whitethorn Acacia (*Vachellia constricta*). It appears that whitethorns were not planted at the outset and the very few plants today are from blow in seed. You might consider planting more of this species from seed to boost species diversity. Whitethorn certainly would fit well here.

Netleaf Hackberry (*Celtis reticulata*). There are a couple nice specimens tucked into the lush green drainage strip. These trees are a welcome species to the park and are veritable bird magnets.

Mexican Palo Verde (*Parkinsonia aculeata*) was obviously not planted by COT and the seed has been blowing into the park from adjacent neighborhoods, including the east fence line of the park. ***Mexican palo verde is an extremely weedy species and does not belong in the park.*** This species grows rapidly, is an abundant and fecund seed producer, and quickly dies back in response to stress of any kind. Fortunately it has not yet spread throughout the park. Most individuals are in the NE quadrant of the park with relatively few individuals that are currently setting seed. I encourage you to remove existing trees and sapling trees as soon as they are identified.

Tamarisk (*T* spp) is growing in clusters on the south and west edges of the park. There are a few individuals on the inside of the park that should be removed over time.

Eucalyptus is growing in clusters on the south side of the park. A few dead Eucalyptus trees have been intelligently left to serve as raptor perches.

African sumac (*Rhus lancea*) is growing in clusters and several of them have been cut out by volunteers. All of the cut out trees are now resprouting and will continue to resprout in response to cutting over many years. It would be faster to spot spray herbicide on resprouts. The COT Parks and Rec management has allowed AZNPS certified volunteers to cut Mexican Palo verde resprouts on Sentinel Peak City Park. I suggest that you ask permission for AZNPS to do such spot sprays twice a year on cut African Sumac and Mexican Palo Verde stumps in Rio Vista.

Brush

Desert Hackberry. (*Celtis pallida*). There are several nice specimens here and there around the park. In fact you might consider either planting or seeding more in areas that are not too dry. Desert hackberry is a fantastic bird plant and provides important umbrage for quail against winged and furry predators. In natural desert habitats, desert hackberries often grow at the base and edges of trees rather than alone out in the open.

Wolfberries (*Lycium* spp). It appears that COT planted several wolfberries from the outset. There are a couple different wolfberry species well adapted to such floodplain habitats. In the untouched desert however, most wolfberries grow alongside desert trees and seem to profit from umbrage and extra rainwater near and under tree dewlines.

Ephedra (*Ephedra* spp). A few very nice and large showy individuals that were obviously there before the installation of the park. These plants are worth babying to keep them thriving. In the open desert ephedra plants are often seen near swales or old dead cacti debris that soak up and conserve rainwater. You might think about putting in some subtle swales near some ephedra plants that appear to be dying from thirst.

Condalia (*C warnockii*). There are a handful of *Condalia* plants scattered here and there in the park. These are wonderful natives that add diversity, dark green foliage and bird food and umbrage. You might treat them with the same TLC as the ephedra plants.

Creosote (*Larrea divaricata*). Creosote is a native species and does fit in the species mix of the park, but it can become weedy and get out of control. If it is allowed to just seed and multiply on its own, it will slowly take over huge swathes of the park, outcompeting even large established trees. There are several very large plants now producing copious amounts of seed that in turn are producing hundreds of little creosote plants. I encourage you to clip out the very large plants found mostly on the east side of the park, especially those favored by extra water along the pathways. It will also be important to constantly clip out young plants to keep the species mix and balance. There are some monoculture creosote areas forming where you could now go in and plant Foothill Palo Verdes which should establish and thrive in such areas. Once the Palo Verdes emerge, you will of course need to thin back adjacent creosotes.

Desert Broom (*Baccharis sarrothroides*). Just like creosote, desert broom is a native species that can very quickly become weedy. There are now some huge desert broom plants growing throughout the park and producing prodigious amounts of seed. Infestation is exacerbated by a large number of seed producing desert broom plants growing along the east fence row. I suggest that you clip out and kill all female desert broom plants. This will be a big project but can be done little by little over years. Just as the creosote, you will need to take out young plants throughout the park before they become seed producers.

Singlewhorl Burrobrush (*Ambrosia monogyra*) is very common in desert washes and their floodplains. Individuals are found in Rio Vista growing in wetter areas. They belong there.

Sub brushes

Burroweed (*Isocoma tenuisecta*) is the most common sub brush in the park. It is fine and belongs there.

Triangle-leaf bursage (*Ambrosia deltoidea*) is a key desert climax sub brush that is long lived and provides abundant leaf drop little over theyears. There are many incipient stands of this species that need to be encouraged.

Desert Senna (*Senna covesii*) is a perennial legume and grows nicely in small stands here and there throughout the park. They provide spring color and abundant leafdrop and litter.

Forbs and grasses.

Globe mallow (*Sphaeralcia ambigua*) is growing throughout the park. provides spring color and leaf and plant litter.

Indian Mallow (*Abutilon incanum*) is found in relatively small numbers in the park but fits nicely in this habitat.

Dogweed (*Thymophylla pentachaeta*) is a pretty yellow composite and fairly common in the park. It should be encouraged.

Purple three-awn grass (*Aristida purpurea*) is a perennial native found sporadically throughout the park and most noticeably along the green wash belt.

Fluffgrass (*Dasyochloa pulchella*) is an under appreciated hero succession species. It is found in little patches here and there on the park and should be encouraged.

Mediterranean grass (*Schizmus* spp) is a winter annual exotic grass fairly common in the park, especially thick in the green wash strip. Although it is exotic, it does provide ground cover and is not a fire danger. Best to just let it be, but not encourage it.

Red Brome (*Bromus rubrus*) is an exotic and invasive winter annual. Fortunately it is concentrated in the green wash strip and the growth is modest. In wetter habitats it poses a real fire hazard, but not enough to be concerned about in Rio Vista.

I hope some of these comments will be useful for you.

I would be happy to come through a couple times a year to see how things are going.

I am copying Matt Johnson who can certainly make corrections and fill in important points that I have missed.

All the best!

John