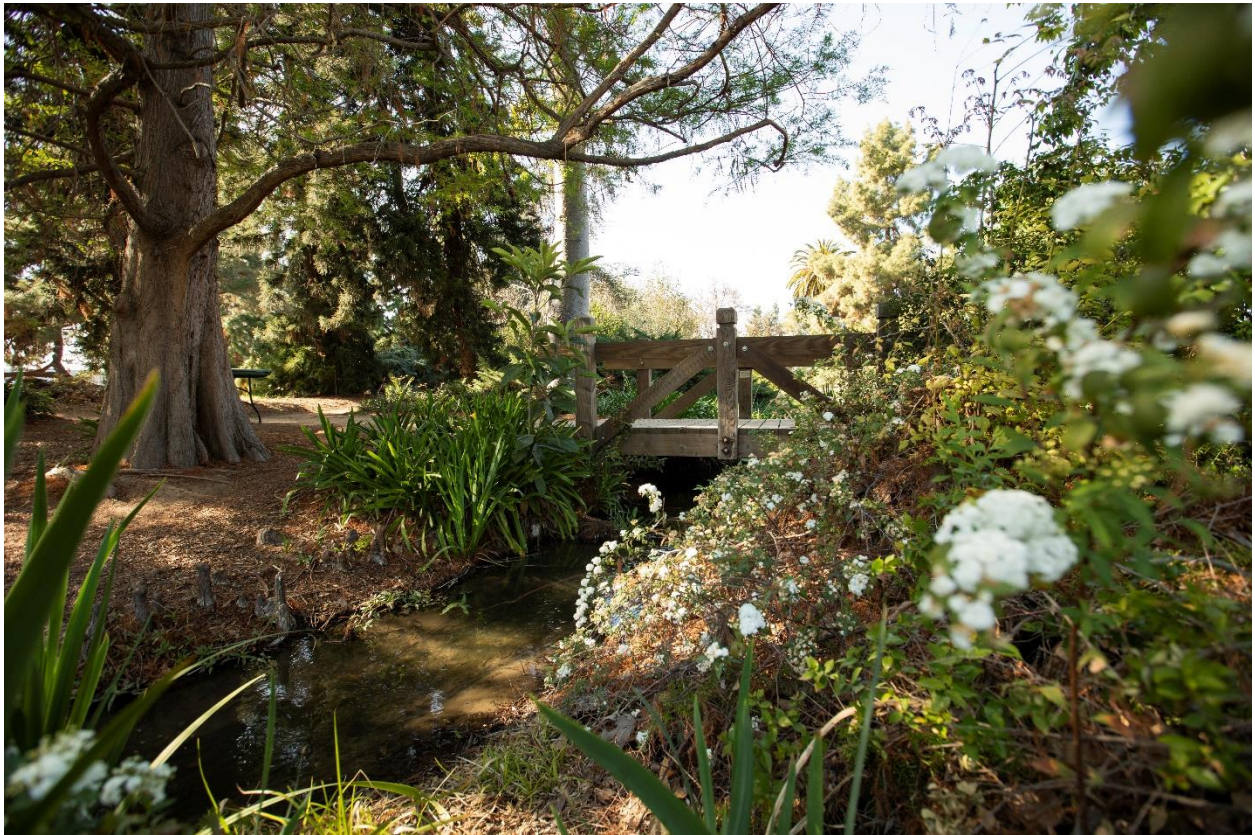




Arboretum and Botanical Garden

AT CAL STATE FULLERTON



LANDSCAPE MANAGEMENT PLAN

Updated April 2024

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Introduction - The plant collection at the Arboretum and Botanical Garden at Cal State Fullerton is the essence of the arboretum and forms the foundation upon which all other activities are built and/or support. The collection is one of the key factors in achieving our Level IV ArbNet Accreditation because it contains many rare or threatened species, wild collected specimens and cultivars of historical significance. Another important factor in achieving our accreditation is our vibrant nursery operation, which plays a critical role in supporting the collection. Managing the collection and operating the nursery is a complex endeavor. The purpose of this plan is to give a general description of the work performed by the horticulture staff and volunteers in order to successfully manage the landscape and the unique collection of plants it contains. This will provide insight to an outsider's perspective who is unfamiliar with these practices, but it can also be used by the horticulture staff for guidance in their work and managing seasonal priorities.

Horticulture Staff – Comprised of a Living Collections Curator, full time Horticulturists and part time Student Assistant Gardeners. There are also numerous volunteers who help perform all the necessary horticultural activities. The horticulturists must be well rounded individuals who have experience or are able to quickly learn the wide variety of tasks required to successfully manage the arboretum landscape. The arboretum is full of a very wide range of plants that have various horticultural requirements and our staff needs to be able to use their botanical and horticultural knowledge in order to interpret the plant needs and provide the best management practices. Our horticulturists are enthusiastic, life-long learners who are motivated to continually learn more about the collection and the best ways to care for it, which may sometimes require innovative, experimental methods. They must also be able to lead student assistants, peers, and volunteers through horticultural activities both in the garden and in the nursery.

Management approach and plan organization – In general the arboretum uses a naturalistic approach to horticulture. Many zones within the arboretum were created to emulate their respective vegetation types that exist in nature. Also, individual specimens are managed in such a way that allows them to grow as naturally as possible while still maintaining a certain aesthetic. A slightly more formal approach is used in event spaces and the Cultivated Collection. This plan gives a general description of the horticultural activities that take place in each of the individual areas throughout the arboretum which are divided by Collection and Zone. It is meant to be a living document that is continually edited and updated in the same manner in which the arboretum itself changes over time. It is also designed to be a functional document that briefly describes the general ideas behind the management of areas in the arboretum without going in to great detail.

Collections – All areas of the garden can be organized into one of four major collections: Mediterranean, Desert, Woodland and Cultivated. These collections correspond to the respective geographic location and/or climate zone within the world where the plants from a given collection grow naturally.

Zones – Each of the four main collections can then be divided into several smaller collections, which are referred to as zones. The zones contain plants from even more narrow geographic regions, taxonomic classifications or just the plant growth habit. The zones are assigned to the horticulturists for their focused areas of care. There is a total of 39 different zones. The following information is provided to guide the care and management of each zone.

Accreditation Compliance – The plants listed in this section are the plants of highest priority in each zone. The existence of these plants in our collection is the reason our collection meets the standards of Level IV ArbNet Accreditation.

Management Priority – Zones are rated as high, medium or low priority based on their relative importance, use and visitation. Zones used as formal event spaces or with important collections have a high priority rating, whereas zones that are infrequently visited may have a low priority rating.

Management Intensity – Again, zones are rated as high, medium or low depending on the amount of resources required to maintain the zone to the desired standard. Zones requiring consistent, perhaps weekly, maintenance are rated as high, whereas zones that require infrequent maintenance are rated as low.

Area Profile – A general description of the zone providing background information and distinguishing characteristics, etc.

Special Priorities – Important plants, tasks and projects that require consistent attention. Propagation of many of the plants in this section is a high priority.

Annual Care Plan – The regular tasks required to maintain an area arranged by season.

Weeds – Major weed problems that require special management.

Pests/Diseases – Any known pests or diseases that exist in an area and require special attention.

Curation – Curatorial plans and priorities within a given zone.

Long-term Projects – Plans and projects that can be performed within the annual operating budget by Arboretum staff in addition to routine maintenance.

Unbudgeted Projects – Larger projects requiring additional funding sources and other outside resources.

Volunteer Support – Estimated number of volunteer hours dedicated to a zone annually.

Arboretum & Botanical Garden Zone Map



MEDITERRANEAN COLLECTION



1. Mediterranean Collection

a. Zone - Front Entrance

- i. **Accreditation Compliance** - *Freylinia visseri*
- ii. **Management Priority** - High
- iii. **Management Intensity** - High
- iv. **Area Profile** – Everything outside the front gate, front half of waterfall slope from gate to nature center, west side of entry path from gate to second bridge. Collection of plants from several different Mediterranean climate zones; gives visitors a little taste of everything and is a good introduction to the arboretum with plants from around the world. The west side of the path is a blend of conifers and other woodland trees. We want this area well maintained since it is the first thing people see when visiting the arboretum. Also, it is involved with many events, etc.
- v. **Special Priorities** – Many *Encephalartos lehmannii*, and *Strelitzia juncea*, *Eremophila bignoniflora*, *Chrysanthemoides incana*, *Aloe plicatilis*, *Quercus engelmannii*, *Andropogon glomeratus*, ‘Fullerton Centennial’ rose
- vi. **Annual Care Plan**
 1. Winter – Alder, *Magnolia*, *Cercis*, Chinese elm pruning
 2. Spring – Trim *Muhlenbergia*, *Encelia* and *Salvia radula*; mulch, take cuttings
 3. Summer – Weeding, watering, pruning oaks in front, deadheading
 4. Fall – Wildflower seed sowing, native and other subshrub pruning and clean up, planting, ficus tree pruning, seed collection
- vii. **Weeds** – Typical weeds throughout arboretum; bad infestation of *Nothoscordum*, *Commelina*, and *Vinca* on west side of path; Veldt grass in and around *Chrysanthemoides*. Control *Encelia* and *Salvia radula* as needed
- viii. **Pests/Diseases** – N/A
- ix. **Curation** – Many well-established trees and shrubs. Need to add more at the subshrub and perennial/bulb layer. Develop plantings on the west side of entry path and stream.
- x. **Long-term Projects** – Connect existing irrigation control valves to the automated system.
- xi. **Unbudgeted Projects** - Install irrigation for Chinese elm and ginkgo trees. Install drought tolerant/native plantings among ginkgo trees. Consider planting more climate-appropriate trees to replace ginkgo trees.
- xii. **Volunteer Support** – N/A

b. Zone – Pavilion

- i. **Accreditation Compliance** - N/A
- ii. **Management Priority** - High
- iii. **Management Intensity** - High
- iv. **Area Profile** – Covers the beds surrounding the path from the Nature Center to the Pavilion, the sycamore trees, the slope on the backside of the waterfall all the way down to the Pavilion gate leading to the visitor parking lot. This area is planted almost entirely with California native plants, but there are some plants from other Mediterranean climates and the American Southwest. This area also includes large

container plants on the patio section. We want to keep it all well-maintained because it is a formal event rental space (consistent raking, sweeping, etc.).

- v. **Special Priorities** – The California sycamore trees in the Pavilion are very prominent and these should be maintained with proper watering and pruning.
- vi. **Annual Care Plan**
 - 1. Winter – Prune sycamore trees and other shrubs, reduce watering *Uncarina*
 - 2. Spring – Cut back *Muhlenbergia lindheimeri* in early spring, adjust lights on sycamore trees, rake out Deer grass (cut back if needed), take cuttings
 - 3. Summer – Water, prune sycamores and adjust lights as needed, power wash concrete/building as needed
 - 4. Fall – Additional planting, shrub pruning/cut back native, cut back *Calylophus* hard every 2-3 years
- vii. **Weeds** – Bind weed among Deer grass around southern Pavilion. Nutsedge among *Calylophus* and *Gaillardia* bordering the pervious walkway.
- viii. **Pests/Diseases** – Polyphagous Shot Hole Borer in sycamore trees
- ix. **Curation** - Consider different seasonal container plants and adding to the salvia/encelia area north of classrooms. Fill in *Carex tumulicola* around sycamores. Add tall perennials toward interior of Deer grass and White sage area.
- x. **Long-term Projects** – Add deep watering tubes for sycamores
- xi. **Unbudgeted Projects** – Connect existing irrigation control valves to the automated system.
- xii. **Volunteer Support** – N/A

c. **Zone – Dry Border**

- i. **Accreditation Compliance** - N/A
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – Includes the beds directly east of the Pavilion, along the maintenance road. These beds contain mostly plants from Mediterranean climates, but also plants from other dryland regions. This area is a small testing ground for us to install plants that we want to keep an extra close eye on or that need extra care. Many of them are new plants that we have not experienced before or know little about. It is also used as a display area for plants that we grow for sales as well as mother stock for propagation.
- v. **Special Priorities** – There are a few Chilean plants to keep a close eye on and propagate; *Sphacele salviae*, *Flourensia thurifera*, *Bahia ambrosioides* and *Nolana crassulifolia*. Other plants to propagate include *Cistus albidus*, *Nolina lindheimeri*, *Garuleum pinnatifidum*, *Eriocephalus africanus*, *Centaurea gymnocarpa*, *Trichodesma scottii*, *Yucca pallida*.
- vi. **Annual Care Plan** -
 - 1. Winter – Take cuttings
 - 2. Spring – Add mulch
 - 3. Summer – Water once per week
 - 4. Fall – Prune small shrubs, sow seeds, planting
- vii. **Weeds** – *Echium giganteum* can become invasive, pockets of Nutsedge
- viii. **Pests/Diseases** - N/A

- ix. **Curation** – Continue to add perennials and small shrubs. Consider testing some bulb plantings.
- x. **Long-term Projects** - Connect existing irrigation control valves to the automated system.
- xi. **Unbudgeted Projects** – These beds may change with the construction of the Friends Terrace.
- xii. **Volunteer Support** – N/A

d. Zone – Chaparral Hill

- i. **Accreditation Compliance** - *Verbesina dissita*, *Mahonia nevinii*, *Nolina interrata*, *Hazardia orcuttii*
- ii. **Management Priority** – High
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – An area bound by the Horticulture Office to the Channel Islands Garden and the main path to the Nursery fence. Contains a collection of native plants largely from the chaparral vegetation zone, but also coastal sage scrub (flat area toward the south and west-facing slope) and oak woodland. This is an important area for educational tours because it is an example of our native vegetation in the surrounding mountains and the adaptations native plants have made in order to cope with long periods of drought. The soil that created the hill was moved here from the excavation for the CSUF Pollak Library. There are many mature trees and shrubs in this area and the overall aesthetic is for it to look as natural as possible. Requires minimal pruning to keep the paths clear, otherwise we allow the large shrubs to grow naturally.
- v. **Special Priorities** – Collection of native oak trees (nice *Quercus lobata* specimens); keep paths clear and maintained for educational tours. *Amorpha californica*, *Romneya trichocalyx*
- vi. **Annual Care Plan** -
 - 1. Winter – Weeding, take cuttings
 - 2. Spring – Mulch as needed, take cuttings
 - 3. Summer – Monitor pathways, collect seeds
 - 4. Fall – Sow wildflower seed, annual cutbacks, clean-up and planting
- vii. **Weeds** – Conyza and mustard; oak seedlings
- viii. **Pests/Diseases** – Keep an eye on oak health; we have had a few trees die.
- ix. **Curation** – Add local *Ceanothus* species. Propagate and plant more *Verbesina dissita*, *Mahonia nevinii*, and *Nolina interrata*. Increase diversity of northern slope by clearing weed trees and adding a more diverse collection. Increase diversity of west-facing slope, which is the Coastal Sage Scrub area. Add rare and threatened species from Orange County. *Dudleya spp.*, *Styrax redivivus*, *Garrya elliptica*, *Arctostaphylos spp.*
- x. **Long-term Projects** – Replace irrigation system spray nozzles with rotating nozzles. Find mystery valves.
- xi. **Unbudgeted Projects** –
- xii. **Volunteer Support** - 158 volunteer hours per year.

e. Zone – Native Meadow

- i. **Accreditation Compliance** - N/A
- ii. **Management Priority** - Medium
- iii. **Management Intensity** – Medium
- iv. **Area Profile** – Dominated by grasses, sedges and other perennials as well as many annual wildflowers that are all native to California. There are several fruit trees growing along the perimeter adjacent to the community garden plots; warm season grasses and sedges are planted among the trees. Our meadow emulates the typical grasslands found in California’s Mediterranean climate; the growing season begins in November (when we begin to receive rainfall) and ends in May or June (when we begin our dry summers). The meadow lies dormant from July through November. Wildflowers provide a beautiful display in the spring from March to May.
- v. **Special Priorities** - There are many bulbs planted along the roadside including *Bloomeria crocea*, *Dichelostemma capitata*, and *Calochortus splendens*. Soap plant, *Chlorogalum pomeridianum*, is scattered throughout the meadow. The California state grass, Purple needlegrass (*Nasella pulchra*), and the state flower California Poppy are both present in the meadow.
- vi. **Annual Care Plan** -
 1. Winter – Water as needed if it does not rain, control weeds as needed, spray gravel paths with herbicide
 2. Spring – Water as needed until the end of May, weeding as needed
 3. Summer – Dormant season, water the fruit trees adjacent to the community gardens
 4. Fall – Perform major clean up and cut backs in October, sow wildflower seeds at the beginning of November, begin watering in November if it does not rain
- vii. **Weeds** – Veldt grass, *Amsinckia*
- viii. **Pests/Diseases** - N/A
- ix. **Curation** – Add more bulbs and perennials; *Delphinium cardinale*, *D. parishii*, *Fritillaria biflora*, *Calochortus weedii* var. *intermedius*, *Allium munzii*, *Brodiaea filifolia*
- x. **Long-term Projects** – N/A
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

f. Zone - Channel Islands

- i. **Accreditation Compliance** - *Lyonothamnus floribundus* ssp. *aspleniifolius*, *Tritelia clementina*, *Quercus pacifica*, *Arctostaphylos catalinae*, *Dendromecon harfordii*, *Crossosoma californicum*, *Ceanothus megacarpus* var. *insularis*, *Malva occidentalis*, *Bergerocactus emoryi*
- ii. **Management Priority** - High
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This zone is bordered by the Nursery to the north, Chaparral Hill to the west, Canary Islands to the east and Baja California to the south. This is a collection of plants from the Channel Islands off the coast of Southern California and well-adapted to our Mediterranean climate. There are four vegetation types represented in the garden: coastal bluff, grassland, coastal sage scrub and island

chaparral. Many of these plants are considered rare because they are endemic to the Channel Islands and therefore have a very limited distribution. There is no automated irrigation here except for the northwestern portion.

- v. **Special Priorities** – Propagate these plants for sales. Keep dry stream bed clear.
 - vi. **Annual Care Plan** -
 - 1. Winter – Deadhead *Eriogonum giganteum*, prune *Platanus racemosa*, weeding
 - 2. Spring – Mulching, water as needed
 - 3. Summer – Water once per month, prune to keep paths clear
 - 4. Fall – Cut back *Encelia*, etc., remove *Eriogonum* where necessary, planting, sow wildflower seed, water as needed
 - vii. **Weeds** – Veldt grass, mustard, swinecress
 - viii. **Pests/Diseases** - N/A
 - ix. **Curation** – Establish *Coreopsis gigantea*, *Ceanothus arboreus*, *Eriogonum grande* var. *rubescens* and coastal strand/beach plants, *Munzothamnus blairii*
 - x. **Long-term Projects** - N/A
 - xi. **Unbudgeted Projects** - N/A
 - xii. **Volunteer Support** - 158 volunteer hours per year
- g. Zone - Canary Islands**
- i. **Accreditation Compliance** – *Solanum vespertilio*
 - ii. **Management Priority** - Low
 - iii. **Management Intensity** - Low
 - iv. **Area Profile** – Small area bordered by the Channel Islands to the west, Nursery to the north, Chile to the east and main trail to the south. Collection of plants from the Canary Islands. Interesting juxtaposition to Channel Islands because both island chains are in the Mediterranean climate.
 - v. **Special Priorities** – *Withania aristata*, *Centaurea canariensis*, *Euphorbia balsamifera*, *Euphorbia berthelotii*
 - vi. **Annual Care Plan**
 - 1. Winter – Weeding, take cuttings
 - 2. Spring - Mulching
 - 3. Summer – Reduce watering, seed collection
 - 4. Fall – Pruning as needed, planting, seed propagation
 - vii. **Weeds** - N/A
 - viii. **Pests/Diseases** - N/A
 - ix. **Curation** – Focus on dryland Canary Island endemic plants that can fit in this section of the garden. It is a small area so focus on small plants.
 - x. **Long-term Projects** - N/A
 - xi. **Unbudgeted Projects** - N/A
 - xii. **Volunteer Support** – N/A
- h. Zone - Chile**
- i. **Accreditation Compliance** - N/A
 - ii. **Management Priority** - Low
 - iii. **Management Intensity** - Low

- iv. **Area Profile** – A collection of plants from dryland Chile. Bordered by the Nursery to the west and main trail to the south. There is a lot of room for expansion in this section; however, the large open area adjacent to this section is in use as an American Rose Trial for Sustainability (ARTS) site from since spring 2019. Volunteers serve as evaluators for the rose trials.
- v. **Special Priorities** – *Cordia decandra*, *Larrea nitida*, *Puya venusta*, *Colliguaja odorifera*, *Calliandra chilensis*, *Croton chilensis*, *Oxalis gigantea*
- vi. **Annual Care Plan**
 - 1. Winter – Weeding, take cuttings
 - 2. Spring – Mulching, take cuttings
 - 3. Summer – Infrequent watering
 - 4. Fall – Pruning, planting, watering
- vii. **Weeds** – Cool season weeds (mustard and nettle, etc.)
- viii. **Pests/Diseases** – Scale on *Cordia decandra*
- ix. **Curation** – This is a large area with few plants. Add more plants from the Mediterranean regions of Chile; focus on Matorral vegetation.
- x. **Long-term Projects** – Augment plant collection, use ChileFlora as a seed source.
- xi. **Unbudgeted Projects** – Expansion into the open areas. Add irrigation, topography, rocks and many plants.
- xii. **Volunteer Support** – 192 volunteer hours per year

i. Zone - Baja California

- i. **Accreditation Compliance** – *Rosa minutifolia*, *Ferocactus viridescens*, *Malva occidentalis*, *Euphorbia misera*
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - Low
- iv. **Area Profile** – Collection of plants from northern Baja California that fall within the California Floristic Province. This vegetation type is characterized by a dense matrix of low shrubs. The area forms a relatively thin strip along the northern border of the Desert Collection along the main trail that goes past the back gate of the Nursery. The entire Baja collection is loosely divided into two vegetation zones, the California Floristic Province (western portion) and Desert (eastern portion).
- v. **Special Priorities** – *Quercus palmeri*, *Rhus lentii*, *Pachycereus pringlei*, *Nolina brandegeei*, *Burroughsia fastigiata*, *Viguiera lanata*, *Dudleya brittonii*, *Eriogonum wrightii* var. *membraneceum*
- vi. **Annual Care Plan**
 - 1. Winter - Weeding
 - 2. Spring – Seed collection, cuttings
 - 3. Summer – Infrequent watering, seed collection
 - 4. Fall – Pruning, seed sowing, cuttings
- vii. **Weeds** – *Moraea polystachya*, mustard
- viii. **Pests/Diseases** - N/A
- ix. **Curation** – This zone focuses on plants of northern Baja California that exist within the California Floristic Province. Priority should be placed on endemic, rare and endangered plants from this region. Rancho Santa Ana Botanic Garden intends to collect *Quercus cedrosensis* and send acorns to be planted in the garden.

- x. **Long-term Projects** – Possibly rehabilitating an abandoned irrigation system.
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

j. Zone - Mediterranean Rockery

- i. **Accreditation Compliance** - N/A
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – A small area across from the Succulent Garden on the eastern edge of the Deciduous Woodland. This is a collection of plants from the Mediterranean basin in general. It contains several unique bulbs and aroids and many small, woody perennials. The limestone rocks are used as markers for plants that go dormant in the summer such as *Arum pictum* and *Helicodieros* (low water in summer).
- v. **Special Priorities** – *Helicodieros muscivorus*, *Arum pictum*, *Arisarum vulgare*, *Tulipa clusiana*, *Urginea maritima*, *Iris unguicularis*, *Hypericum aegypticum*
- vi. **Annual Care Plan**
 - 1. Winter - Weeding
 - 2. Spring – Deadheading, mulching
 - 3. Summer – Seed collection, water new plants
 - 4. Fall – Pruning and general cleanup, seed starting
- vii. **Weeds** – Veldt grass, *Nothoscordum*
- viii. **Pests/Diseases** - N/A
- ix. **Curation** – More terrestrial aroids and bulbs. Concentrate on low-growing, woody perennials.
- x. **Long-term Projects** - N/A
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

k. Zone - Australia

- i. **Accreditation Compliance** - N/A
- ii. **Management Priority** - Low
- iii. **Management Intensity** - Low
- iv. **Area Profile** – Small area with a collection of dryland Australian plants, located as a small island surrounded by paths at the southern end of the south lawn. This zone has just begun and needs to be developed further. Focus on plants from Western Australia.
- v. **Special Priorities** – *Brachychiton rupestris*
- vi. **Annual Care Plan**
 - 1. Winter – Weeding, pruning
 - 2. Spring – Mulch, seed collection
 - 3. Summer - Watering
 - 4. Fall - Planting
- vii. **Weeds** - N/A
- viii. **Pests/Diseases** - N/A

- ix. **Curation** – There is a lot of open ground for planting in this zone. Concentrate on rare and endemic Australian plants that exist in dryland plant communities. May be a good area to add members of the Proteaceae.
- x. **Long-term Projects** – Discover what the mystery wires in the center of the bed go to and perhaps use them.
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

DESERT COLLECTION



2. Zone - General Desert

- i. **Accreditation Compliance** – *Cupressus dupreziana*, *Agave titanota*, *Agave victoriae-reginae*, *Echinocactus grusonii*, *Cephalocereus senilis*
- ii. **Management Priority** - High
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This zone does not have real clear borders, but it falls west of the top of the eastern berm, east of the main trail, south of the Baja Collection and north of the Mojave Collection. This zone contains plants from many different deserts around the world and is generally organized by plant families and growth habits. There are sections devoted to cactus, agaves, euphorbias, leguminous shrubs, etc. There is one area devoted to Opuntia.
- v. **Special Priorities** – Galapagos *Opuntia* from Dr. David Walkington’s Collection, *Fouquieria* collection, *Carnegiea gigantea*, *Mimosa laxiflora*
- vi. **Annual Care Plan**
 1. Winter – Weeding, cut back cactus as needed
 2. Spring - Pruning
 3. Summer – Watering, weeding, clean up broken cactus pieces (propagate)
 4. Fall – Sow wildflower seed
- vii. **Weeds** – Mustard, nettle, swinecress, telegraph weed
- viii. **Pests/Diseases** – Cochineal insect
- ix. **Curation** – Intermingle different types of plants into each of the sections of this zone (e.g. more woody perennials in the cactus section instead of just cactus). Add smaller plants around the existing large specimens.
- x. **Long-term Projects** – Rehabilitate abandoned irrigation systems. Create a clearer path system and defined beds.
- xi. **Unbudgeted Projects** - Consider creating raised beds for smaller succulents and other desert plants so that they do not get trampled by visitors or eaten by rabbits.
- xii. **Volunteer Support** - 155 volunteer hours per year.

b. Zone – Baja California Desert

- i. **Accreditation Compliance** - N/A
- ii. **Management Priority** – Medium
- iii. **Management Intensity** - Low
- iv. **Area Profile** – This zone is at the northeast corner of the Desert Collection. This zone includes plants from the central and southern desert regions of Baja California. There is a very loose transition between this zone and the California Floristic Province zone from Baja California. There are many pachycaulescent shrubs and other endemic plants to this region.
- v. **Special Priorities** – *Viscainoa geniculata*, *Fouquieria columnaris*, *Ficus palmeri*, *Pachycormus discolor*, *Rhus lentii*, *Bursera fagaroides*, *Pachycereus pringlei*, *Nolina brandegeei*
- vi. **Annual Care Plan**
 1. Winter - Weeding
 2. Spring – Seed collection, cuttings
 3. Summer – Watering once/month, seed collection
 4. Fall - N/A

- vii. **Weeds** - Mustard
- viii. **Pests/Diseases** - N/A
- ix. **Curation** – Concentrate on plants endemic to the Baja California desert regions including pachycaulescent shrubs, *Ferocactus*, *Amauria*, *Xylonagra*, etc.
- x. **Long-term Projects** - N/A
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

c. **Zone - South Africa**

- i. **Accreditation Compliance** – *Aloe pillansii*
- ii. **Management Priority** – Medium
- iii. **Management Intensity** - Low
- iv. **Area Profile** – Located on the eastern side of the Desert Collection, along the east-facing slope, with the Baja California collection to the north, Madagascar to the south, General Desert to the west and the path on to the east. This is a collection of plants from desert regions of eastern South Africa and Namibia. The collection is divided into plants that take summer water (south side) versus those that take winter water (north side).
- v. **Special Priorities** – *Cyphostemma juttae*, *Tylecodon paniculata*, *Tylecodon wallichii*, *Euryops wagneri*, *Aloe marlothii*
- vi. **Annual Care Plan**
 - 1. Winter – Water winter growing section if needed
 - 2. Spring – Collect seed from winter section
 - 3. Summer – Water summer growing section, deadhead
 - 4. Fall – Collect seed from summer section, prune/thin *Sisyndite sparteae*, sow seed
- vii. **Weeds** – Mustard and nettle, control *Sisyndite sparteae*
- viii. **Pests/Diseases** – Aloe mite on *Aloe barbaeae*
- ix. **Curation** – Can add many more small succulent plants from the southern African region. Bulbs would be a great addition but rabbits can be problematic. Identify *Sesamothamnus sp.*, *Pelargonium sp.*, *Senecio sp.*
- x. **Long-term Projects** - N/A
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

d. **Zone - Madagascar**

- i. **Accreditation Compliance** – *Aloe suzannae*, *Delonix floribunda*, *Didierea madagascariensis*
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - Low
- iv. **Area Profile** – Located on the southeast corner of the Desert Collection, east of the Mojave Garden, south of the South African Garden. This is a collection of plants from the arid southwestern region of Madagascar. There are many endemic plants and plants with very interesting and unique forms. Many of these plants were acquired from the Huntington Botanic Garden and are propagules from wild collected individuals. This area receives irrigation in the summer and none in the winter in

order to mimic the natural precipitation pattern in southwest Madagascar. Plants from this zone should be propagated for plant sales.

- v. **Special Priorities** – *Uncarina decaryi*, *Uncarina grandidieri*, *Operculicarya decaryi* (have male and female), *Erythrophysopsis aesculina*, *Alluaudia dumosa*, *A. comosa*, *Senna meridionalis*
- vi. **Annual Care Plan**
 - 1. Winter – Weeding, seed collection
 - 2. Spring - Begin watering in May if warm and no rain, take cuttings
 - 3. Summer – Water 1 to 2 times per month
 - 4. Fall – Seed collection, stop watering
- vii. **Weeds** – Mustard, nettle, spurge
- viii. **Pests/Diseases** - N/A
- ix. **Curation** – Add rare and/or endangered and endemic plants of Madagascar.
- x. **Long-term Projects** - N/A
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A
- xiii. **Student Engagement** – N/A

e. **Zone – Mojave Desert**

- i. **Accreditation Compliance** – *Castela emoryi*, *Opuntia basilaris* var. *brachyclada*, *Ferocactus cylindraceus*, *Cylindropuntia munzii*, *Grusonia parishii*
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This zone is located across from the Children’s Garden, south of the General Desert Zone and west of Madagascar. This is a collection of plants from the Mojave Desert; however, the lower southwest corner does hold some plants from the Colorado Desert. Most of these plants are opportunists and will grow any time of year that they receive water. We typically give the area some irrigation during the summer (once per month) and very little irrigation during the winter. Topography was added to the garden to emulate important features in the Mojave Desert such as desert wash, bajada, and mountains/rocks. The planting scheme also emulates these features in the desert so high elevation plants are planted further up the slopes than lower elevation plants. There are many wild collected specimens and plants acquired from the Rancho Santa Ana Botanic Garden contained in this collection.
- v. **Special Priorities** – Cacti *Echinocereus triglochidiatus*, *Dudleya saxosa*, *Petalonyx thurberi*, *Senna covesii*, *Xylorhiza tortifolia*, *Fouquieria splendens*, *Bahiopsis parishii*, *Salvia mohavensis*, *Berberis haematocarpa*, *Berberis fremontii*
- vi. **Annual Care Plan**
 - 1. Winter – Weeding, seed and cutting collection
 - 2. Spring – Keep paths clear, collect cactus cuttings
 - 3. Summer – Mimic summer monsoonal thundershowers with irrigation
 - 4. Fall – Sow annual wildflower seed, prune shrubs such as *Encelia farinosa*, *Hymenoclea salsola*, *Hyptis emoryi*
- vii. **Weeds** – Mustard, *Encelia* can become weedy; remove as needed, swinecress
- viii. **Pests/Diseases** - N/A

- ix. **Curation** - Good place to add wild-collected specimens from seed collected in the Mojave such as: *Mortonia utahensis*, *Scutellaria Mexicana*, *Peucephyllum schottii*, *Aloysia wrightii*, *Allionia incarnate*, *Amsonia tomentosa*, *Quercus turbinella*, *Berberis fremontii*, *Fendlerella utahensis*, *Glossopetalon pungens*, *Tetradymia agyraea*, *Lycium parishii*, *Salvia greatae*, *Tetracoccus hallii*, *Senna armata*
- x. **Long-term Projects** - N/A
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

f. Zone - Succulent Garden

- i. **Accreditation Compliance** – *Aloe dichotoma*, *Cassia angolensis*, *Dracaena draco*, *Agave titanota*
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This zone is bordered by the Mojave to the east, Sonoran Collection to the south, Deciduous Woodlands to the west, and Palm Grove to the north. This is a collection of succulent plants in general and does not have any geographic restrictions regarding their nativity. There are many aloes, agaves, euphorbias and woody lilies planted. This is a good area to show the diversity of the growth habits of succulents side by side. Cultivars of succulent plants can be used here as well.
- v. **Special Priorities** – *Aloe fleurentinorum*, *Acacia willardiana*, *Xanthorrhoea*, *Yucca filifera*
- vi. **Annual Care Plan**
 - 1. Winter – Weeding, keep shrubs in check
 - 2. Spring – May need to start watering, take cuttings
 - 3. Summer – Water once per month
 - 4. Fall – Deadheading, collect seeds
- vii. **Weeds** - N/A
- viii. **Pests/Diseases** – Aloe mite
- ix. **Curation** – There are so many more succulents that can be added to this area. Focus should remain on smaller plants since there are already quite a few large plants.
- x. **Long-term Projects** – Perhaps a section with a raised bed where smaller succulents could be planted and kept away from trampling and rabbits.
- xi. **Unbudgeted Projects**
- xii. **Volunteer Support** - 155 volunteer hours per year

g. Zone - Sonoran

- i. **Accreditation Compliance** - N/A
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This zone is located at the northern end of the Thorn Forest, west of the Farm, south of the Mojave and Succulent Garden, and East of the Ombu. The majority of the trees and shrubs in this zone were donated by Arthur Douglas. This collection holds plants from the Sonoran Desert, mostly from the desert, thornscrub and tropical deciduous forest biomes. The Sonoran Desert typically receives most of its precipitation during the monsoon season in July to September, so this zone should

be watered thoroughly in summer. Irrigation can be reduced in winter. There is no clear boundary between the Sonoran Zone and the Thorn Forest zone.

- v. **Special Priorities** – *Ceiba acuminata*, *Lysiloma divaricatum*, *Caesalpinia cacalaco*, *Quercus oblongifolia*, *Nolina nelson*, *Salvia miniata*
- vi. **Annual Care Plan**
 - 1. Winter – Prune trees and salvias
 - 2. Spring – Planting, weeding, cutting collection
 - 3. Summer – Watering, keep paths clear, take cuttings
 - 4. Fall – Seed collection
- vii. **Weeds** – Veldt grass infestation is intense in this zone, commelina
- viii. **Pests/Diseases** - N/A
- ix. **Curation** – There is an area adjacent to the Farm that could be expanded into. There have been a few oak trees planted there already. Otherwise, the emphasis should be on adding plants at the perennial and small shrub level.
- x. **Long-term Projects** - N/A
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

WOODLAND COLLECTION



3. Woodland Collection

a. Zone - Conifers

- i. **Accreditation Compliance** – *Cupressus guadelupensis, Pinus torreyana, Juniperus cedrus, Podocarpus henkelii, Cedrus libani, Sequoiadendron giganteum, Zea perennis*
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This zone forms a long strip between the pond and stream system to the western fence line, beginning with the *Pinus torreyana* near the front gate to the *Cupressus cashmeriana* near the redwoods. This is a collection of many different types of conifers from around the world and does not follow any geographic restrictions. Genera are loosely planted together. There is a collection of grasses along the stream at the southern end of the zone.
- v. **Special Priorities** – *Cupressus cashmeriana, Agathis robusta*. Keep the stream exiting the pond clear.
- vi. **Annual Care Plan**
 1. Winter – Pruning, weeding, cut back iris along pond and stream, prune vines on fence
 2. Spring - Mulching
 3. Summer – Weeding, trim vines on fence as needed
 4. Fall - N/A
- vii. **Weeds** – North end has an intense *Nothoscordum* infestation. Patch of nutsedge by the bald cypress. *Commelina, Nothoscordum, and Vinca* weeds at north end. Veldt grass throughout.
- viii. **Pests/Diseases** – Check for mites throughout the year.
- ix. **Curation** – Dwarf, low-growing conifers; *Abies concolor, Picea pungens, Pinus patula, Larix sp.*
- x. **Long-term Projects** - N/A
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

b. Zone - Redwoods

- i. **Accreditation Compliance** – *Sequoia sempervirens, Berberis nevinii*
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This zone is south of the Conifers, north of the Moist Transition Zone and between the western fence line and stream system. This zone is planted with a grove of coast redwood trees, *Sequoia sempervirens*. There are also other shrubs that are native to the same area as *Sequoia* trees planted in this area. The goal is to emulate the northern California coastal redwood forest; however, there are some other plants mixed into this area as well. The coast redwood is not well adapted to our climate, soil and water in southern California, and many of the redwoods have died as a result. They require ample water throughout the year.
- v. **Special Priorities** – *Aristolochia californica*
- vi. **Annual Care Plan**

1. Winter – Weeding, pruning
 2. Spring – Watering, mulching
 3. Summer – Watering, weeding
 4. Fall - Planting
- vii. **Weeds** – Veldt grass
- viii. **Pests/Diseases** – Monitor for mites
- ix. **Curation** – We have removed several dead trees, which has made room for more trees. We can try Redwood cultivars that are more tolerant of southern Californian conditions. Also, add buffer trees along the western fence to reduce the edge effect on the redwoods; they seem to do better when they have protection from neighboring trees. There is space along the stream side where we can plant more plants associated with redwood trees; concentrate on plants that have a more southern distribution and may be more hardy than the redwoods themselves. Perhaps try conifers with a more southern distribution.
- x. **Long-term Projects** – Soil amendments of some type. There seems to be a layer of clay on the top of the soil. Perhaps that can be scraped away so that water can penetrate the soil beneath faster. Also, perhaps soil aeration and the addition of mycorrhizae would benefit the Redwoods.
- xi. **Unbudgeted Projects** – Adding drip irrigation to this zone to be able to meet the watering requirements easier.
- xii. **Volunteer Support** – N/A

c. **Zone – Dry Palm Grove**

- i. **Accreditation Compliance** – *Sabal uresana*, *Brahea edulis*, *Jubaea chilensis*
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This zone is a large swath that is south of the Heritage House, Arbor and Children’s Garden, and north of the Deciduous Woodland. This area has been known as the Dry Palm Grove, but that name can be a little misleading. In general, these palms do come from arid regions in the world; however, the habitats where they exist are generally located in mesic areas such as oases and canyon bottoms. Therefore, they require a moderate to high amount of water, especially in summer. There does not seem to be any pattern to the manner in which the palms have been planted; they are simply scattered throughout the zone.
- v. **Special Priorities** – *Butia eriospatha*, *Bismarckia nobilis*, *Phoenix theophrasti*
- vi. **Annual Care Plan**
 1. Winter – Weeding, hold off on water
 2. Spring – Pruning of old fronds (only up to the horizontal), planting, mulching, fertilize as needed (have seen magnesium deficiency in some Brahea)
 3. Summer – More pruning as needed, seed collection, regular water
 4. Fall – Seed collection, reduce watering
- vii. **Weeds** – In some cases the palms themselves become weedy, control *Solanum asperolanatum* at the west end of the grove
- viii. **Pests/Diseases** – Monitor for diamond scale

- ix. **Curation** – Continue to add palms from arid regions; there is plenty of space on the east end of the grove
- x. **Long-term Projects** – A drip irrigation system was installed in summer of 2018; the paths need to be repaired with decomposed granite
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

d. Zone - Antiquities

- i. **Accreditation Compliance** – *Ginkgo biloba*, *Metasequoia glyptostroboides*
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This is a small circular zone located along the east side of the stream at northwest corner of the Deciduous Woodland. The theme of this zone is primitive plants and living fossils. Many of these plants were known from the fossil record before they were known to be extant. There are both cone-bearing plants and plants that have primitive flowers. There is also a Brontosaurus topiary to maintain.
- v. **Special Priorities** – *Michelia doltsopa*, *Eupomatia laurina*
- vi. **Annual Care Plan**
 - 1. Winter – Prune trees while deciduous, take hardwood cuttings
 - 2. Spring – Planting, weeding and mulching
 - 3. Summer – Ensure plants receive adequate irrigation
 - 4. Fall – Seed collecting
- vii. **Weeds** – Veldt grass, nettle, *Allium triquetrum*, *Rumex*, *Oxalis*
- viii. **Pests/Diseases** – Scale on *Michelia*
- ix. **Curation** – There is a lot of room for additional plants here to complete both the theme and spatial distribution. This zone would ideally hold specimens that show the entire evolution of land plants from gymnosperms to angiosperms with bilaterally symmetrical flowers and an assortment of leaf shapes. *Wollemia nobilis*
- x. **Long-term Projects** - N/A
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

e. Zone - Deciduous Woodland

- i. **Accreditation Compliance** – *Juglans californica*, *Rhus coriaria*
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This zone is a large area at the center of the arboretum located east of the stream, south of the palms and north of the south lawn. This zone is planted with many deciduous trees and shrubs and is loosely arranged geographically; there are representative species from northeastern America, central Europe, and northeastern Asia. There have been additions of more climate appropriate deciduous trees from western America such as *Fraxinus velutina* and *Juglans californica*. Several trees have been lost to the Polyphagous Shot Hole Borer such as *Acer negundo*, *Quercus macrocarpa*, and *Aesculus californica*. However, there are still representatives of these trees which have either sprouted from seeds or basal sprouts. Other trees have been lost due to drought or other climate issues, including birch trees. There is

currently a large opening in the canopy and room for planting in the center and eastern portion of the zone. There are some shrubs, groundcovers and winter-flowering bulbs planted in the understory, but there is still plenty of room to expand these plantings. There is a small Mediterranean rockery installed on the eastern edge of the zone just north of the Ombu tree.

- v. **Special Priorities** – *Greyia sutherlandii*, *Diospyros spp.*
- vi. **Annual Care Plan**
 - 1. Winter – Pruning of trees and shrubs during winter dormancy, hardwood cuttings, cutback *Gaura* and spray veldt grass
 - 2. Spring – Weeding, mulching, planting
 - 3. Summer – Supplemental watering, pruning deadwood out of trees/shrubs
 - 4. Fall - N/A
- vii. **Weeds** – Veldt grass, *Allium triquetrum* is spreading rapidly, *Koelreuteria*
- viii. **Pests/Diseases** – Polyphagous Shot Hole Borer
- ix. **Curation** – Add more large trees in the center and eastern portion of the zone. Add more understory plants throughout the zone. Keep *Allium triquetrum* localized to one large swath at the center of the zone; remove individuals that stray from that area.
- x. **Long-term Projects** – There is a lot of pruning that needs to be done to the trees throughout the zone. We would also like to amend the soil in this zone by adding compost and possibly mycorrhizae.
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** - 315 volunteer hours per year

f. **Zone - Ombu Area**

- i. **Accreditation Compliance** – *Diospyros villosa*, *Howea forsteriana*, *Cycas seemannii*, *Delonix regia*
- ii. **Management Priority** - High
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This zone is located south of the Deciduous Woodland and north of the South Lawn. The ombu tree is the focal point of this zone, and the surrounding area is planted with a variety of subtropical plants from around the world that give this zone a tropical feel. However, it should be noted that the ombu and the surrounding plants are not truly tropical plants. The ombu itself is actually from the Pampas grassland of Argentina. The plants in this zone do not represent one specific region of the world but are instead meant to provide a tropical appearance. This zone is well-established and densely planted; there is not much room for new plantings. The ombu was one of the first trees planted in the arboretum. It is a very fast-growing tree and has reached an immense size.
- v. **Special Priorities** – *Phytolacca dioica x weberbaueri*, *Catha edulis*, *Gardenia thunbergii*, *Heteropyxis natalensis*, *Diospyros* collection, *Asparagus* collection, *Chamaedorea spp.*
- vi. **Annual Care Plan**
 - 1. Winter – Prune shrubs and trees
 - 2. Spring – Weeding, mulching
 - 3. Summer – Watering, take cuttings
 - 4. Fall – Annual pruning of ombu in September, seed collection

- vii. **Weeds** – Veldt grass
- viii. **Pests/Diseases** - N/A
- ix. **Curation** – Thin *Bromelia balansae*; there is not a lot of space to add plants in this zone so management of the current plants is the priority
- x. **Long-term Projects** – Install a barrier around the ombu so that people will stop climbing on it.
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

g. Zone - Thorn Forest

- i. **Accreditation Compliance** – *Dioon spinulosum*
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This zone is located mostly south of the Sonoran zone, east of the main path to the eastern fence line, south past the Dorm Gate to the beginning of the southern Subtropical zone. This zone contains many thorny trees from different thorn forests around the world such as Mexico and Africa. There are some understory plantings consisting mostly of different *Salvia*. This zone is closely interwoven with sections of the Sonoran zone and it is difficult to clearly divide the two zones.
- v. **Special Priorities** – *Chorisia insignis, Acacia caven, Mentzelia arborescens*
- vi. **Annual Care Plan**
 - 1. Winter – Cutback *Salvia*, tree pruning as needed, weeding
 - 2. Spring - Mulching
 - 3. Summer – Watering, weeding
 - 4. Fall – Seed collection
- vii. **Weeds** – Veldt grass
- viii. **Pests/Diseases** - N/A
- ix. **Curation** – There are many large mature trees in this zone, so any additional plants would most likely go in the understory. There are several *Callistemon viminalis* planted near the Dorm Gate, which could be removed since they do not fit the theme. Determine and delineate the Sonoran zone from the Thorn Forest if possible.
- x. **Long-term Projects** – Possibly add plants outside the dorm gate.
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

h. Zone - Moist Transition

- i. **Accreditation Compliance** - N/A
- ii. **Management Priority** - Low
- iii. **Management Intensity** - Low
- iv. **Area Profile** – This zone is located along the western path and the fence line, south of the Redwood zone, and north of the Ficus zone. This zone forms a transition zone between the temperate conifer zone and the beginning of the subtropical zones. There is no geographic distinction in this zone; there are plants from many parts of the world and they are scattered throughout the zone. In general, they require moderate water.

- v. **Special Priorities** – *Distylium racemosum*
- vi. **Annual Care Plan**
 - 1. Winter – Weeding, prune vines and trees along outside of fence line
 - 2. Spring – Mulching, pruning, take cuttings
 - 3. Summer – Pruning/hedging as needed for path clearance, seed collection
 - 4. Fall - N/A
- vii. **Weeds** – Patches of veldt grass
- viii. **Pests/Diseases** – Whitefly on *Azara celestrina*
- ix. **Curation** – There is not much space for additional plants in this zone so we should just maintain what is there. Propagate *Distylium racemosum* and move to more sun.
- x. **Long-term Projects** - N/A
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

i. Zone - Tropical Hill

- i. **Accreditation Compliance** – *Dioon spinulosum*, *Encephalartos woodii x natalensis*, *E. horridus*, *Howea forsteriana*, *Ravenea rivularis*, *Zamia furfuracea*, *Cycas circinalis*
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This zone is on the hill located at the southwest corner of the south pond and is bound by the pond and stream on the north and east sides, and the main path on the west and south sides. This zone holds a collection of subtropical plants from around the world; there are many cycads and palms planted here. The topography of this zone adds a very interesting element and the paths are edged with pieces of old broken concrete. The valve that runs the irrigation in this zone is broken and the valve that runs the "swamp" area has a wiring issue. This zone needs to be watered manually. It is also important to keep the stream exiting the pond clear. The paths in this zone need to be raked frequently.
- v. **Special Priorities** – "MAD 40 tree" (unknown species from Madagascar), *Handroanthus chrysotrichus*, *Ceratozamia mexicana*, *Pavonia candida*
- vi. **Annual Care Plan**
 - 1. Winter – Pruning large shrubs, weeding, prune vines along the fence, cutback aquatic plants
 - 2. Spring – Mulching, planting, cutback taro
 - 3. Summer – Watering, mid-season vine pruning along fence, cutback aquatic vegetation as needed
 - 4. Fall – Weed tree removal, keep stream clear, cycad pollination
- vii. **Weeds** – *Alectryon subcinereum*, *Cyperus papyrus* along pond edge
- viii. **Pests/Diseases** - N/A
- ix. **Curation** – Add more subtropical perennials among cycads and palms and on the top and west side of hill. Propagate *Pavonia candida*. Replant *Caryota urens* and *Tournefortia acutiflora*. Add to ginger collection.
- x. **Long-term Projects** – Repair valve that operates irrigation.
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

j. Zone - Ficus

- i. **Accreditation Compliance** - N/A
- ii. **Management Priority** - Low
- iii. **Management Intensity** - Low
- iv. **Area Profile** – This zone is centrally located south of the South Lawn and Tropical Hill and pump bridge, and north of the Southern Subtropical zone. This zone is primarily planted with *Ficus* trees from around the world, but there are a few other trees, shrubs and cycads in this area as well. The *Ficus* zone contains both old and new world species, but they are mostly from the old world. There are many mature *Ficus* trees in this zone and there is not much space for additional plantings. The trees have created a dense canopy, which provides deep shade, mulch and seems to prevent weeds. Efforts should focus on maintaining the current trees.
- v. **Special Priorities** – *Ficus petiolaris*, *Ficus geniculata* var. *abnormalis*, *Ficus palmata*, *Ficus socotrana*, *Ficus microcarpa* ‘Aurea’
- vi. **Annual Care Plan**
 1. Winter - Pruning
 2. Spring - Mulching
 3. Summer – Prune for path clearance
 4. Fall – Take cuttings
- vii. **Weeds** - N/A
- viii. **Pests/Diseases** - N/A
- ix. **Curation** – Propagate *Ficus palmata*
- x. **Long-term Projects** - N/A
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

k. Zone - Subtropical

- i. **Accreditation Compliance** – *Dioon spinulosum*, *Encephalartos horridus*, *E. arenarius*, *Hibiscus clayi*, *Passiflora jamesonii*, *Stangeria eriopus*, *Zamia furfuracea*, *Guihaia argyrata*, *Obetia ficifolia*, *Tecoma fulva*, *Brunfelsia densifolia*
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This is a large zone at the southern end of the arboretum, south of the Ficus zone. This zone is a collection of subtropical plants from different regions of the world and is generally arranged geographically. It is in a horseshoe pattern and starting from the northeast corner and moving clockwise you have the following geographic regions: Americas, Asia, Australasia, Pacific Islands, Africa, and Madagascar. The central area within the horseshoe is a transition area between all the geographic regions. There are vines planted around the perimeter fence. This zone is relatively young considering it was created around the year 2000, but there are some specimens that seem quite mature. There is still a lot of open planting space in this zone but weed control has been an issue.
- v. **Special Priorities** – *Ficus craterostoma*, *F. dameropsis*, *Aristolochia arborescens*, *Robinsonella cordata*, *Delonix regia*, *Hibiscus arnottianus*, *H. bojerianus*,

Strophanthus boivinii, *Anogeissus dhofarica*, *Moringa drouhardii*. *Ficus religiosa* was blessed by the Dalai Lama while at CSUF in 2000.

- vi. **Annual Care Plan**
 - 1. Winter – Tree and shrub pruning, weeding, prune vines along fence
 - 2. Spring – Mulching, thin bamboo, planting, take cuttings, spray seedy grasses
 - 3. Summer – Watering, mid-season pruning, cycad pollination
 - 4. Fall – Cycad pollination
- vii. **Weeds** – Veldt grass, patches of Bermuda grass, horseweed, sow thistle
- viii. **Pests/Diseases** - N/A
- ix. **Curation** – Lots of room for additions to each of the geographic themes. Replant *Dombeya cacuminum*. Acquire *Kigelia Africana*.
- x. **Long-term Projects** – Weed control, soil building, path improvements
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** - 315 volunteer hours per year

CULTIVATED COLLECTION



4. Cultivated Collection

a. Zone - Rare Fruit

- i. **Accreditation Compliance** - N/A
- ii. **Management Priority** - High
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This zone surrounds Orchard Lawn and is a collection of subtropical fruit trees from Asia and Central and South America. It has many mature trees with a few openings where trees have died in the past. It is irrigated with a drip irrigation system that is connected to different hose bibs throughout the orchard. There is room to add a few trees, but also some small shrubs and other perennials that are used as food in order to create more of a food forest situation. Need to frequently pick up fallen fruit.
- v. **Special Priorities** – Harvest fruit to sell at the Nature Center or for tastings. Late summer into fall is the prime time.
- vi. **Annual Care Plan**
 1. Winter – Pruning, reduce watering
 2. Spring – Mulching, planting, weeding
 3. Summer – Harvest fruit, summer pruning
 4. Fall – Pruning, harvest fruit
- vii. **Weeds** – Nutsedge creeping into beds from lawn
- viii. **Pests/Diseases** – Mealy bug, Argentine ants
- ix. **Curation** – Addition of a few more trees, but mostly small shrubs and perennials to create an understory. Acquire paw paw, papaya, kiwis, mango, sugar cane
- x. **Long-term Projects** – Develop the understory to create a food forest.
- xi. **Unbudgeted Projects** - Potentially connect drip system to automated valves.
- xii. **Volunteer Support** - 235 volunteer hours per year

b. Zone - Orchard Lawn

- i. **Accreditation Compliance** - N/A
- ii. **Management Priority** - High
- iii. **Management Intensity** - High
- iv. **Area Profile** – This zone is the lawn located to the north of Heritage House. This area is one of the primary spaces for many different events throughout the year. The event season typically lasts from March through October. Keep this area looking nice for all the events that are held there.
- v. **Special Priorities** - N/A
- vi. **Annual Care Plan**
 1. Winter – Keep the lawn closed, water as needed to establish new seed, weed control
 2. Spring – Fertilize as needed, mow weekly
 3. Summer – Fertilize as needed, mow weekly, increase watering
 4. Fall – Close access to the lawn after the final event of the season, aerate, overseed, and add topser to repair lawn
- vii. **Weeds** – Nutsedge, oxalis, crabgrass

- viii. **Pests/Diseases** – Rabbits feed on the lawn, gophers, fire ants, watch for fungal diseases
- ix. **Curation** - N/A
- x. **Long-term Projects** - N/A
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – N/A

c. Zone - Perennial Bed

- i. **Accreditation Compliance** – *Freylinia visseri*, *Salvia penstemonoides*, *Echinacea tennesseensis*, *Quercus engelmannii*
- ii. **Management Priority** - High
- iii. **Management Intensity** - High
- iv. **Area Profile** – This zone surrounds the west and south sides of Oak Hall. It is a collection of many different types of perennials which are typically available in the horticultural trade. The plan is to have dense plantings of perennials throughout the beds; short plants along the main path, and taller plants toward the rear of the beds, close to the building. This is an area to showcase beautiful flowering plants and also to propagate those plants in order to provide them for sale.
- v. **Special Priorities** – There are many beautiful plants held in this collection and they attract a lot of attention. Our goal is to use this area to drive plant sales at the Nature Center by having examples of the plants for sale planted in this area and marked with signage. *Orpheum*, *Sisyrinchium striatum*, *Melianthus major*, *Cantua spp.*
- vi. **Annual Care Plan**
 - 1. Winter – Cutbacks, divisions, weeding, mulching/composting
 - 2. Spring – Planting, deadheading
 - 3. Summer – Watering, deadheading, take cuttings
 - 4. Fall – Cutbacks, seed collection
- vii. **Weeds** – Nutsedge along path to the maintenance yard, *Nothoscordum* around the base of *Quercus engelmannii*
- viii. **Pests/Diseases** - N/A
- ix. **Curation** – New perennials should be added to this area on a regular basis in order to experiment with plants that will work well in our climate.
- x. **Long-term Projects** – Repair the decomposed granite pathway through the center. Plant more plants in the southeast corner; possibly transition into native plants.
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** – 120 volunteer hours per year

d. Zone - Rose Garden

- i. **Accreditation Compliance** - N/A
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - High
- iv. **Area Profile** – This zone is located at the southeast corner of Orchard Lawn, south of the Community Gardens, and north of the Avocados. This zone can be divided into two sections, the old garden roses and the hybrid tea roses. The old garden roses are planted in the long strip on both sides of the gazebo and are irrigated with drip irrigation. The hybrid teas are planted in the mounded beds along the brick pathway

and are irrigated using sprinklers with spray heads. As the name suggests, the old garden roses are cultivars that have existed for a very long time and were some of the first rose cultivars created. They have a variety of different growth habits, but in general they are relatively large, rangy plants. The hybrid tea section has many different cultivars of the more modern style rose. These roses are generally more compact plants and can be kept smaller.

- v. **Special Priorities** – Maintain the collection of old garden roses. These roses are more difficult to replace and hold historical significance.
- vi. **Annual Care Plan**
 - 1. Winter – Prune hybrid teas hard, thin old garden roses as needed, plant bare root plants as needed, add compost, dormant spray
 - 2. Spring – Weeding, mulching, fertilizing
 - 3. Summer – Deadheading, weeding, watering
 - 4. Fall – Deadheading, reduce watering
- vii. **Weeds** - Nutsedge
- viii. **Pests/Diseases** – Typical rose pests/problems - aphids, thrips, mildew
- ix. **Curation** – Maintain old garden rose collection. Propagate and replant as needed. Acquire any missing cultivars. Add more hybrid teas as needed.
- x. **Long-term Projects** - N/A
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** - 470 volunteer hours per year

e. **Zone - Heritage House**

- i. **Accreditation Compliance** - N/A
- ii. **Management Priority** - High
- iii. **Management Intensity** - High
- iv. **Area Profile** – This zone contains all the plantings around the Heritage House from the sundial and surrounding beds in the front, to the fenced in doctor’s garden and wisteria arbor in the rear. It contains many different types of plantings involving roses, hedges, California natives, annuals, perennials, herbs and the wisteria vine. With all these different types of plantings comes many different types of requirements for maintaining the area. The roses in the front of the house are David Austin hybrid teas, and they share the space with *Teucrium fruticans* ‘Azureum’ hedges. Immediately surrounding the house, inside the fence, are California native plants, with the exception of the northside, which contains a few different shrubs. This section is planted informally in a naturalistic design, and presents an example of a California native landscape in an area the size of a typical yard in residential areas in the surrounding area. Behind the house there is a small herb garden, a perennial bed surrounding an orange tree and two beds at the entrance to the arbor. The arbor beds contain ‘Iceberg’ roses, a few other perennials and a rotating display of annuals. The wisteria arbor is a space where events are held, particularly weddings. The final section is the Doctor’s Garden, which contains medicinal plants.
- v. **Special Priorities** – The goal here is to provide a well maintained landscape to be used as a setting for weddings and other special events.
- vi. **Annual Care Plan**

1. Winter – Prune Wisteria and roses in January, divide perennials and herbs as needed, add compost
 2. Spring – Plant annuals and perennials, trim hedges as needed, weeding, deadheading/general pruning
 3. Summer – Trim hedges as needed, weeding
 4. Fall – Weed control, prune (plant) California natives, cutback herbs and Doctor’s Garden as needed, prune cape chestnut, cutback *Romneya*
- vii. **Weeds** – Nutsedge, Bermuda grass
 - viii. **Pests/Diseases** – Argentine ants
 - ix. **Curation** – Replace dead roses in the front of the house. Add annuals, perennials and herbs as needed.
 - x. **Long-term Projects** - N/A
 - xi. **Unbudgeted Projects** – N/A
 - xii. **Volunteer Support** - 780 volunteer hours per year

f. Zone - Oranges/Citrus

- i. **Accreditation Compliance** – Plant Collections Network Citrus Collection
- ii. **Management Priority** - High
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This zone is centered on the orange grove behind Heritage House, but also includes citrus trees in other parts of the arboretum such as the Rare Fruit Orchard, and the citrus trees along the north side of Heritage House and those surrounding the community gardens. This collection is designated as a nationally accredited plant collection through the Plant Collections Network of the American Public Garden Association. The small orange grove of eight trees provides an example of the local agricultural history.
- v. **Special Priorities** – *Citrofortunella mitis* ‘Variegata’
- vi. **Annual Care Plan**
 1. Winter – Harvest fruit, pruning
 2. Spring - Mulching
 3. Summer – Harvest ‘Valencia’ fruit and anything else that is ripe
 4. Fall – Pruning as needed
- vii. **Weeds** - N/A
- viii. **Pests/Diseases** – Citrus red scale, mealy bug, Asian citrus psyllid, Huanglongbing disease
- ix. **Curation** – More trees should be added in order to diversify collection
- x. **Long-term Projects** - N/A
- xi. **Unbudgeted Projects** – Install drip irrigation system for citrus trees.
- xii. **Volunteer Support** - 235 volunteer hours per year

g. Zone - Avocados

- i. **Accreditation Compliance** - N/A
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - Medium
- iv. **Area Profile** – This zone is sandwiched between the Children’s Garden on the east and the Orange grove and wisteria arbor to the west. This avocado grove provides

another example of the local agricultural history. There are three rows of avocado trees running north to south, each one is a different cultivar. The cultivars from east to west are ‘Fuerte’, ‘Bacon’, and ‘Hass’. The final avocado tree at the southeast corner of the grove is *Persea yunnanensis*. This zone does have a sprinkler system installed with spray heads, but we typically use the manual drip system to irrigate the trees on a weekly basis.

- v. **Special Priorities** – *Persea Americana* ‘Bacon’, *Persea yunnanensis*
- vi. **Annual Care Plan**
 - 1. Winter – Reduce irrigation
 - 2. Spring – Mulching, weeding, fertilize if needed
 - 3. Summer – Regular irrigation
 - 4. Fall – Pruning
- vii. **Weeds** – *Nothoscordum gracile*, Nasturtium
- viii. **Pests/Diseases** – Polyphagous Shot Hole Borer
- ix. **Curation** – Propagate ‘Bacon’ avocado.
- x. **Long-term Projects** - N/A
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** - 235 volunteer hours per year

h. Zone - Children’s Garden

- i. **Accreditation Compliance** – *Juglans regia* ‘Placentia’
- ii. **Management Priority** - High
- iii. **Management Intensity** - High
- iv. **Area Profile** – This zone is located west of the Desert Collection, east of the avocados, north of the palms and south of the meadow. This zone is a place for children to play and learn. It is laid out in a manner that allows visitors to experience the five senses through plants. There are several structures and props throughout the garden that are there for the amusement of children. There are several different sections within this zone including raised beds for fruits and vegetables, an area with scented plants, bunch grasses, succulent plants, walnut trees, an arbor for kiwi and passion fruit vines, two topiaries and several potted plants.
- v. **Special Priorities** – Cotton plant, maintain structures and props
- vi. **Annual Care Plan**
 - 1. Winter – Rake out bunch grasses, prune grapevine, prune fruit and walnut trees, weeding
 - 2. Spring – Plant warm season crops and gourds, mulching
 - 3. Summer – Watering, take cuttings
 - 4. Fall – Plant cool season crops and sweet peas, collect seeds
- vii. **Weeds** - N/A
- viii. **Pests/Diseases** – Rabbits, rats
- ix. **Curation** – Add more succulent plants
- x. **Long-term Projects** – Repair fence around perimeter, install deep watering tubes for caterpillar topiary, and create raised beds for planting succulents.
- xi. **Unbudgeted Projects** – N/A
- xii. **Volunteer Support** - 416 volunteer hours per year

i. Zone - Stone/Pome Orchard

- i. **Accreditation Compliance** - N/A
- ii. **Management Priority** - Medium
- iii. **Management Intensity** - High
- iv. **Area Profile** – This zone is on the hill east of the Desert Collection. It is a collection of different stone and pome fruit trees, some of them are hybrids such as apriums and pluots. The goal is to maintain these trees at a manageable size that could be used in a typical residential front or back yard, and to use this collection to teach classes about growing fruit trees. This zone also provides examples of many cultivars, which can be observed by visitors who can use these examples to help decide on which cultivars to plant in their yards. The trees are planted according to fruit ripening times with ripening beginning at the southeast and moving north. This zone is irrigated manually using the installed drip system.
- v. **Special Priorities** - N/A
- vi. **Annual Care Plan**
 1. Winter – Reduce watering, heavy pruning, dormant spray, weeding
 2. Spring – Mulching, harvesting, pest control
 3. Summer – Regular watering, summer pruning, harvesting
 4. Fall - Harvesting
- vii. **Weeds** – Nettle, mustard
- viii. **Pests/Diseases** – Aphids, leaf curl, phytophthora
- ix. **Curation** – Replace trees that have died, acquire cherry trees
- x. **Long-term Projects** – Retrofit drip irrigation system.
- xi. **Unbudgeted Projects** - N/A
- xii. **Volunteer Support** - 235 volunteer hours per year.

j. Zone - Farm

- i. **Accreditation Compliance** - N/A
- ii. **Management Priority** - High
- iii. **Management Intensity** - High
- iv. **Area Profile** – This zone is located on the far eastern side of the arboretum, south of the Stone/Pome Fruit Orchard. This area is used to grow many different types of row crops on a seasonal basis. There are only a few permanently planted plants such as sugar cane, pomegranates, kaffir lime leaf, a fig tree, herbs and a grape vine. Drip irrigation is used throughout the rows using drip tape. The Farm is a cooperative effort between U-ACRE and Hart Community Homes and the arboretum. Most of the produce goes to the Monkey Business Café in Fullerton and is used in preparing meals. This operation teaches participants from the Monkey Business Café and Hart Community Homes and students involved in the U-ACRE program how to successfully grow food. This area can also be used to teach and inspire visitors about growing food crops.
- v. **Special Priorities** - N/A
- vi. **Annual Care Plan**
 1. Winter – Weeding, harvesting, stagger plantings for prolonged harvest, plant onions

2. Spring – Add compost, bed preparation, begin warm season crops, weeding, harvest remaining cool season crops
 3. Summer – Watering, weeding, harvesting
 4. Fall – Add compost, bed preparation, begin cool season crops, harvest remaining warm season crops, cover crop as needed, plant garlic
- vii. **Weeds** – Nutsedge infestation in flat area west of pomegranates, bindweed, Bermuda grass in patches
 - viii. **Pests/Diseases** – Squirrels, rabbits, gophers, rats
 - ix. **Curation** - N/A
 - x. **Long-term Projects** - N/A
 - xi. **Unbudgeted Projects** - N/A
 - xii. **Volunteer Support** – N/A
 - i. **Nursery Operations** – The Nursery is north of the Channel Islands Collection, and south of North Campus Drive. It includes a green house, shade house, plant layout area, maintenance building and office space. Two horticulturists lead volunteers through all manner of plant propagation that varies according to season and available plant material. In the period from December to March the nursery operations are focused on growing approximately 20,000 vegetable plants for the annual Veggiepalooza plant sale. Our vibrant nursery operation is another component to our ArbNet Level IV Accreditation. Specifically, the ability to propagate rare and threatened plants from our collection in order to safeguard and distribute those plants is critical for our accreditation.
 - ii. **Volunteer Support** – 2,208 volunteer hours per year.

Lawns – General best practices for lawn care are performed seasonally throughout the year.

Warm season – Mow and edge weekly, maximum irrigation, fertilize every 3 months

Cool season – Mow and edge as needed (every other week), reduce irrigation.

Repairs and Maintenance – Event season takes place from spring to fall, therefore it is very difficult to perform any repairs during that time. Repair bare spots, manage weeds, aerate and over-seed in the fall.

Flower Field – The Arboretum’s flower field is a 1/8-acre seasonal display space that allows visitors the opportunity to appreciate the beauty of flowers, watch the field grow and change through the seasons, and learn about botanical and horticultural topics. The flower field encourages guests to revisit the arboretum to witness changes in the field and offers the Arboretum a fundraising opportunity. Interns will use the field as an outdoor laboratory to gain real-world experience. They will steward the Arboretum’s flower field and build programming and interpretive content around the field. Arboretum Horticulture Staff members will supervise and mentor the student interns.

Ponds and Streams – Maintain stream flow by clearing out debris as needed; especially after windy conditions. Make sure the outlets of the ponds can drain freely. Clean pump screen on a daily basis; more often during windy conditions. Clear invasive vegetation in the ponds in early fall. Cut back iris along edges in late winter. Snake the storm drain at the final pond in fall.

East Side/Perimeter – The east side and perimeter of the arboretum are relatively low maintenance areas that require seasonal attention. Weed control is the major task in these zones and is necessary throughout the rainy season from November to May. During this time weeds are controlled by herbicides as needed. Our goal is to spray the weeds while they are small. Some weeds need to be removed manually and this is typically performed two to three times per year. There are also many vines growing on the perimeter fence; these vines require hard pruning in the winter (December or January) and more lightly throughout the rest of the year as needed. Most tree pruning along the perimeter should be done in the winter as well.

Decomposed Granite Paths – Repair decomposed granite paths as needed throughout the year. Perform major repairs at the end of the rainy season (April/May) to fix erosion problems. Use a power compactor during major repairs to achieve necessary compaction.

Compost – Compost is very valuable for the garden and allows us to recycle materials back into the garden and divert green waste from the landfill. Plant material from the arboretum is added to the compost piles as it is produced and horse manure is added weekly. We use a three-pile system and create long windrows approximately six feet high and wide. We turn and water compost piles on a weekly basis. The arboretum produces around 250 cubic yards of compost annually.

Irrigation – Centrally controlled system with six controllers throughout the arboretum which operate 128 valves. Not all areas are covered by automated irrigation; those areas are watered manually using irrigation control valves, hoses with attached sprinklers or modular drip systems.

Equipment – Perform routine equipment maintenance every six months in October and April. Repairs are performed as needed.

Weekends – Two staff members are required to work on the weekends to open and close the arboretum and perform other routine functions such as granting volunteers access to certain buildings. The staff members also check on nursery watering needs, inspect event areas to ensure they meet our standards, help with special events, perform routine garden clean up tasks, and patrol the arboretum to ensure guests are following the rules.

Regular Tasks

Daily - Clean the waterfall pump screen. May need to be cleaned multiple times per day in windy conditions.

Daily - Nursery and container plants must be checked for adequate watering on a daily basis. The watering requirements vary by season; there are three major watering days in summer (Monday, Wednesday, Friday) and two major days in winter (Tuesday, Friday) with transition times in spring and fall.

Daily - Debris and downed limb collection occurs as needed throughout the arboretum, but must be checked daily.

Weekly - Garden zones must be checked and watered as necessary using various schedules for the assortment of zones. Supplemental watering is based on water requirements of the plants in each zone and adjusted seasonally.

Twice annually – Clean and wax interpretive signs with Armor All and Marine Wax in spring and fall.

Annually – Cleanout storm drain at the end of the pond and stream system in the fall.

