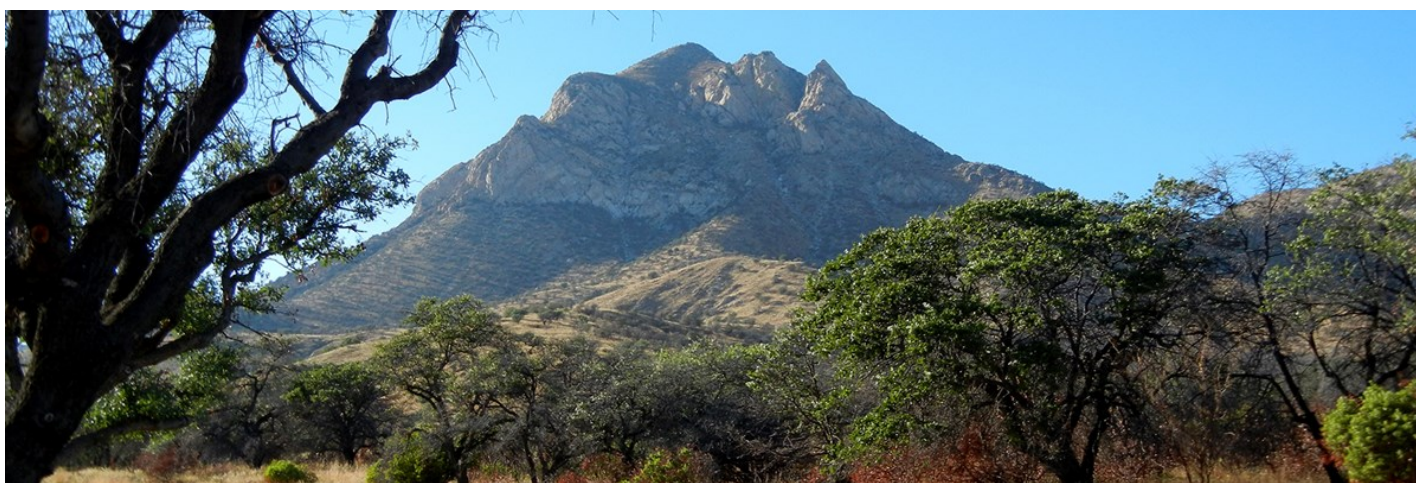


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Vegetation Mapping at Coronado National Memorial

Coronado National Memorial (/coro/)



Wondering where in the park to look for a certain bird? Trying to plan a prescribed fire? Need help identifying potential habitat for a threatened species? You need a vegetation map!

Vegetation maps visually display the distribution of vegetation communities across a landscape. Knowing what's growing where, and what kinds of habitat occur in a park, helps park managers with park planning, resource monitoring, interpretive programs, prescribed fire, and climate-change response, among other activities. Vegetation maps also provide a baseline for ecological studies.

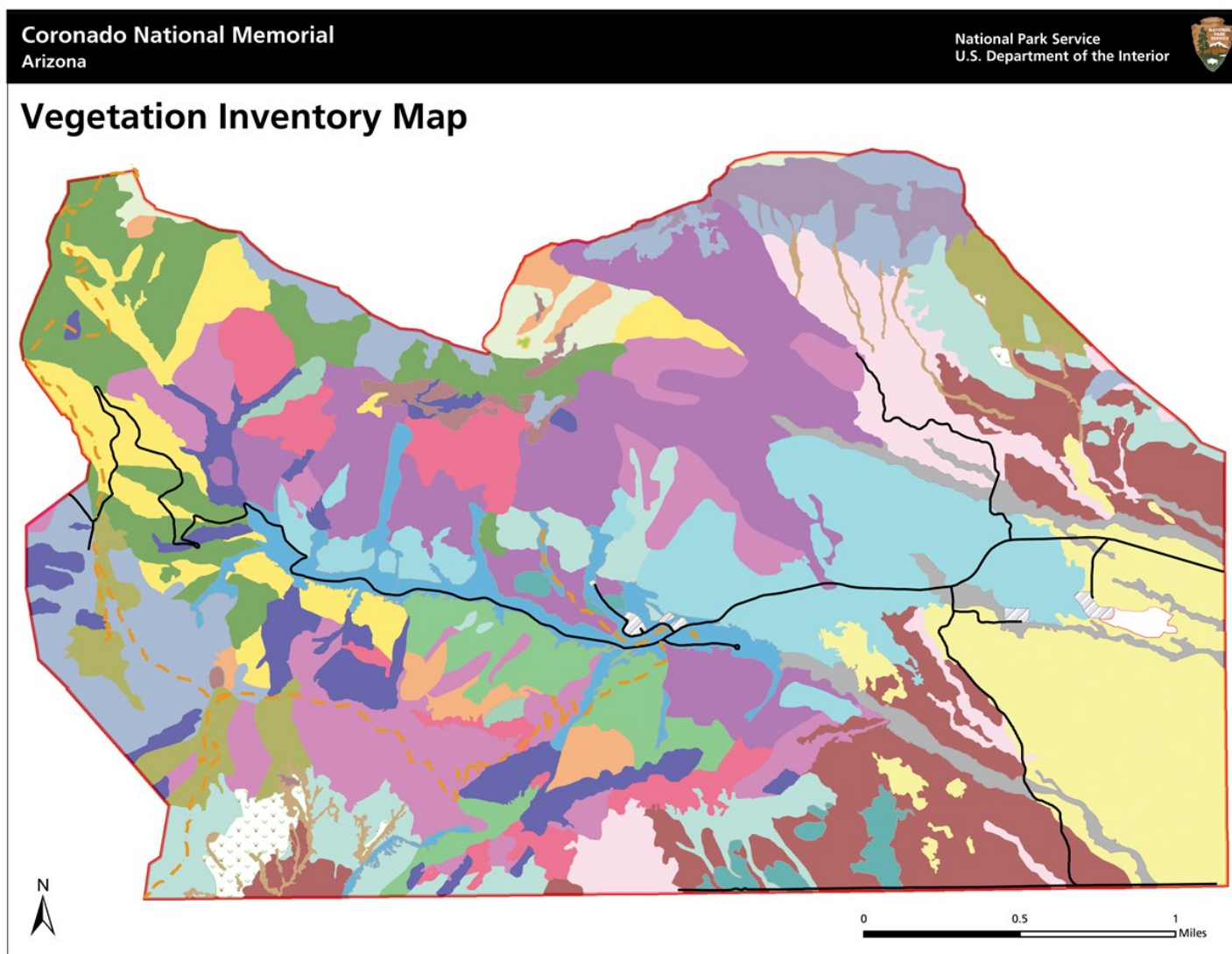
The National Park Service (NPS) **Vegetation Inventory Program** (<https://www.nps.gov/im/vegetation-mapping-inventory.htm>) aims to complete baseline mapping and classification inventories at more than 270 NPS units. Each map represents hundreds to thousands of hours of effort by ecologists, field technicians, GIS technicians, data managers, editors, and park staff. The teams gather aerial imagery, collect data from vegetation plots, classify vegetation types and write descriptions, assess the accuracy of the results, create a geodatabase and map, and write a final report. Each finished project comprises not just a map and report, but also an entire library of vegetation data and descriptive information.



The Monument Fire. NPS/A. Ruiz

At Coronado National Memorial, the **Sonoran Desert Network** (<https://www.nps.gov/im/sodn/index.htm>) conducted vegetation mapping from 2010 to 2016. The majority of data collection and mapping was completed during fall 2010. But in summer 2011, the Monument Fire caused the project to be placed on hold. When plot-sampling was eventually completed in 2013 and 2014, it incorporated the effects of this fire, which impacted about 92% of the park.

To create a vegetation map, vegetation is first classified into “associations” and/or “alliances,” which are assemblages of certain plant species repeatedly found in similar habitats. Those assemblages are then organized into map classes that represent existing vegetation and land uses. The final vegetation map for Coronado National Memorial is shown below.



Legend

-  Park boundary
-  Developed
-  Roads
-  Trails
-  Sparse rock outcrop
-  1 *Pinus (discolor - cembroides) / Quercus arizonica / Muhlenbergia emersleyi* Woodland Association
-  2 *Pinus discolor (Quercus emoryi) / (Quercus toumeyi) / Perennial Grass Woodland and Wooded Shrubland Association (P)*
-  3 *Quercus emoryi / Mixed Perennial Grass Tree Savanna Association (P)*
-  4 *Quercus arizonica / Mixed Shrub / Mixed Perennial Grass Tree Savanna Association (P)*
-  5 *Quercus arizonica - Quercus emoryi / Mixed Perennial Grass Woodland Association (P)*
-  6 *Quercus arizonica / Bouteloua curtipendula* Scrub Woodland Association
-  7 *Quercus emoryi / Bouteloua curtipendula* Scrub Woodland Association
-  8 *Quercus emoryi / Arctostaphylos pungens / Mixed Perennial Grass Wooded Shrubland Association (P)*
-  9 *Quercus emoryi / Mixed Shrub Intermittently Flooded Tree Savanna Association (P)*
-  10 *Quercus oblongifolia / Mixed Perennial Grass Tree Savanna Association (P)*
-  11 *Quercus arizonica - Quercus emoryi* Intermittently Flooded Woodland Association (P)
-  12 *Quercus arizonica - Quercus hypoleucoides* Shrubland Association (P)
-  13 *Quercus rugosa (Quercus hypoleucoides)* Shrubland Association (P)
-  14 [*Quercus turbinella - Quercus rugosa - Quercus hypoleucoides*] Shrubland Association (P)
-  15 *Quercus gambelii (Quercus rugosa)* Shrubland Association (P)
-  16 *Dasyllirion wheeleri / Bouteloua curtipendula - Heteropogon contortus* Shrubland Association (P)
-  17 *Dasyllirion wheeleri / Bouteloua curtipendula* Shrub Grassland Association
-  18 [*Cercocarpus montanus - Garrya wrightii*] / Mixed Perennial Grass Wooded Shrub Savanna Association (P)
-  19 [*Cercocarpus montanus - Rhus virens*] Shrubby Rock Outcrop Association (P)
-  20 [*Aloysia wrightii - Eysenhardtia orthocarpa*] / Mixed Perennial Grass Shrub Savanna and Shrubland Association (P)
-  21 [*Aloysia wrightii - Parthenium incanum*] Shrubland Association (P)
-  22 (*Quercus* sp.) / [*Rhus virens - Garrya wrightii - Eysenhardtia orthocarpa - Aloysia wrightii*] Intermittently Flooded Shrubland Association (P)
-  23 (*Prosopis velutina - Baccharis sarothroides*) / *Eragrostis lehmanniana* Herbaceous Association (P)
-  24 (*Agave palmeri - Mimosa aculeaticarpa*) / Mixed Perennial Grass (*Calliandra eriophylla*) Herbaceous Association (P)
-  25 *Baccharis sarothroides / Bothriochloa barbinodis (Eragrostis lehmanniana)* Shrub Savanna Association (PS)

At Coronado National Memorial, the Sonoran Desert Network crew developed 25 map classes represented by 192 map polygons.

The mapped vegetation communities ranged from dense, non-native grasslands dominated by Lehmann lovegrass to steep expanses of exposed bedrock dominated by mountain mahogany and evergreen sumac.

The Emory oak / Sideoats grama Scrub Woodland Association covered the most area, at over 223 hectares (551 acres), or 11.6% of the park. Gambel oak (Netleaf oak) Shrubland covered the least, at under a quarter of a hectare (0.58 acres). (Map classes follow established naming conventions related to dominant or diagnostic species in each association.)

The herbaceous-dominated areas in the park's southeast corner were mapped predominantly as two communities, the (Palmer's century plant - Catclaw mimosa) / Mixed Perennial Grass (Fairyduster) Herbaceous Association and the (Velvet mesquite - Desertbroom) / Lehmann lovegrass Herbaceous Association. Taken together, these two communities represent ~18% of the total park landscape. They are of specific concern to park staff because agave is an important food source for the endangered lesser long-nosed bat.

Woodland communities containing pinyon pine covered approximately 8% of the total park landscape. Other woodlands, dominated by either white oak or emory oak, were more extensive, together covering 19% of the park.



Example of Emory oak / Sideoats grama Scrub Woodland, the most frequently found vegetation association at Coronado National Memorial. NPS photo.



Pointleaf manzanita. Photo ©Patrick J. Alexander (Creative Commons license).

All **25 final associations**

[\(/articles/sodn_coro_vm.htm#CP_JUMP_6087357\)](#) were altered by the Monument Fire. The degree to which they were altered varied greatly. The largest, longest-lasting changes occurred in communities dominated by species with low resistance and/or resilience to fire. These species included pointleaf manzanita and border pinyon.

Pointleaf manzanita must recolonize through the germination of seeds released from a dormant state by fire. Typically, recruitment occurs 1–5 years of the fire event. However, as of five years post-fire, no seedlings had been observed during field work. It is possible that only a small seed bank of pointleaf manzanita was able to accumulate between a 1988 fire and the Monument Fire. It is also possible that the fire did not cause enough soil heating to rouse the seeds from dormancy.

Sonoran Desert Network crews have also not documented any evidence of border-pinyon recruitment in the five years since the fire. Because Coronado National Memorial experienced severe-to-extreme drought before and after the Monument Fire, conditions for border-pinyon seed production and germination were less than ideal.

The Sonoran Desert Network will continue to monitor post-fire **vegetation and soils** (<https://www.nps.gov/im/sodn/vegetation-soils.htm>) at Coronado National Memorial as part of its long-term **vital signs monitoring program** (<https://www.nps.gov/im/sodn/monitoring.htm>).

*Information in this article was summarized from S. E. Studd, J. Galvin, and J. A. Hubbard. 2018. **Vegetation Inventory, Mapping, and Characterization Report, Coronado National Memorial** (<https://irma.nps.gov/DataStore/Reference/Profile/2257543>).*

Vegetation Associations at Coronado National Memorial

#	Association
1	Border pinyon / Arizona white oak / Bullgrass Woodland and Forest Association (/im/sodn/upload/CORO_OnePagers-1.pdf)
2	Border pinyon (Emory oak) / (Toumey oak) / Mixed Perennial Grass Woodland and Wooded Shrubland Association (/im/sodn/upload/CORO_OnePagers-2.pdf)
3	Emory oak / Mixed Perennial Grass Tree Savanna Association (/im/sodn/upload/CORO_OnePagers-3.pdf)
4	Arizona white oak / Mixed Perennial Grass Tree Savanna Association (/im/sodn/upload/CORO_OnePagers-4.pdf)
5	Arizona white oak - Emory oak / Mixed Perennial Grass Woodland Association (/im/sodn/upload/CORO_OnePagers-5.pdf)
6	Arizona white oak / Sideoats grama Scrub Woodland Association (/im/sodn/upload/CORO_OnePagers-6.pdf)
7	Emory oak / Sideoats grama Scrub Woodland Association (/im/sodn/upload/CORO_OnePagers-7.pdf)
8	Emory oak / Pointleaf manzanita / Mixed Perennial Grass Wooded Shrubland Association (/im/sodn/upload/CORO_OnePagers-8.pdf)
9	Emory oak / Mixed Shrub Intermittently Flooded Tree Savanna Association (/im/sodn/upload/CORO_OnePagers-9.pdf)
10	Mexican blue oak / Mixed Perennial Grass Tree Savanna Association (/im/sodn/upload/CORO_OnePagers-10.pdf)

#	Association
11	Arizona white oak - Emory oak Intermittently Flooded Woodland Association (/im/sodn/upload/CORO_OnePagers-11.pdf)
12	Arizona white oak - Silverleaf oak Shrubland Association (/im/sodn/upload/CORO_OnePagers-12.pdf)
13	Netleaf oak (Silverleaf oak) Shrubland Association (/im/sodn/upload/CORO_OnePagers-13.pdf)
14	[Sonoran scrub oak - Netleaf oak - Silverleaf oak] Shrubland Association (/im/sodn/upload/CORO_OnePagers-14.pdf)
15	Gambel oak (Netleaf oak) Shrubland Association (/im/sodn/upload/CORO_OnePagers-15.pdf)
16	Common sotol / Sideoats grama - Tanglehead Shrubland Association (/im/sodn/upload/CORO_OnePagers-16.pdf)
17	Common sotol / Sideoats grama Shrub Savanna Association (/im/sodn/upload/CORO_OnePagers-17.pdf)
18	[Mountain mahogany - Wright's silktassel] / Mixed Perennial Grass Wooded Shrub Savanna Association (/im/sodn/upload/CORO_OnePagers-18.pdf)
19	[Mountain mahogany - Evergreen sumac] Shrubby Rock Outcrop (/im/sodn/upload/CORO_OnePagers-19.pdf)
20	[Wright's beebrush - Tahitian kidneywood] / Mixed Perennial Grass Shrub Savanna and Shrubland Association (/im/sodn/upload/CORO_OnePagers-20.pdf)
21	[Wright's beebrush - Mariola] Shrubland Association (/im/sodn/upload/CORO_OnePagers-21.pdf)
22	(Oak) / [Evergreen sumac - Wright's silktassel - Tahitian kidneywood - Wright's beebrush] Intermittently Flooded Shrubland Association (/im/sodn/upload/CORO_OnePagers-22.pdf)
23	(Velvet mesquite - Desertbroom) / Lehmann lovegrass Herbaceous Association (/im/sodn/upload/CORO_OnePagers-23.pdf)
24	(Palmer's century plant - Catclaw mimosa) / Mixed Perennial Grass (Fairyduster) Herbaceous Association (/im/sodn/upload/CORO_OnePagers-24.pdf)
25	Desertbroom / Cane bluestem (Lehmann lovegrass) Shrub Savanna Association (/im/sodn/upload/CORO_OnePagers-25.pdf)

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