

Ecological site QX197X01X505 Skeletal Pachic or Fulvic Forest

Last updated: 6/12/2025
Accessed: 03/12/2026

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 197X–Volcanic Islands of American Samoa

This MLRA consists of the islands of Tutuila, Aunuu, Ofu, Olosega, and Tau. The islands have extremely steep, highly dissected mountains, small valleys, and a narrow coastal plain. More than half of the area has slopes of more than 70 percent. The highest elevations are 3,056 feet (931 meters) on Tau and 2,142 feet (653 meters) on Tutuila. The islands consist of Pleistocene-age, basic igneous rocks, mainly basalt with some andesite and trachyte.

The climate is moist, warm, and humid. Average annual rainfall ranges from 125 inches (3,175 millimeters) to more than 250 inches (6,350 millimeters). Rainfall varies over short distances due to topography. The driest months are June through September; the wettest months are December through March. Average annual temperature is 81 degrees F (27 degrees C). Relative humidity is 73 to 90 percent throughout the year. Prevailing winds are easterly trade winds. Cyclones occasionally strike the area.

Soils are Mollisols, Andisols, Entisols, Oxisols, and Histosols. Soil moisture regimes are udic or perudic; the soil temperature regime is isohyperthermic. Natural vegetation is mostly tropical hardwood forest.

Classification relationships

This ecological site occurs within Major Land Resource Area (MLRA) 197 – Volcanic Islands of American Samoa.

Ecological site concept

This ecological site occurs on the islands of Tutuila, Ofu, Olosega, and Tau in American Samoa. It occurs on gently sloping to very steep (6 to 60 percent) talus slopes, mountainsides, foot slopes, and uplands at elevations ranging from 0 to 900 feet (0 to 277 meters) elevation. Easiest access is on the southeastern side of Tutuila and restricted elsewhere.

Soils are Pachic Hapludolls (Mollisols) or Eutric Fulvudands (Andisols). They formed in colluvium, alluvium, or volcanic ash. Soil temperature regimes are isohyperthermic; soil moisture regimes are udic. Average annual rainfall ranges from 150 to 250 inches (375 to 625 centimeters). Water runoff is slow to rapid. Effective rooting depths range from 20 to more than 60 inches (50 to more than 150 centimeters). All soil phases in this ecological site are skeletal, meaning that rock fragment content is 35 percent or more by volume. An important characteristic shared by all the soils is an epipedon that is 12 inches (30 centimeters) or more thick that has high (6 percent or more) organic carbon content.

This forest type has a stratified canopy. The upper canopy grows up to 100 feet (30 meters) tall. Ground cover is moderate to dense; epiphytes and lianas are common.

Associated sites

QX197X01X502	Sandy Littoral Forest Sandy Littoral Forest adjoins Skeletal Pachic or Fulvic Forest uplands, talus slopes, and mountain slopes descend to shorelines on coastal plains. Its soils are somewhat excessively and excessively drained Psamments that formed from coral sand and rubble and undergo occasional, very brief and brief flooding by seawater; Skeletal Pachic or Fulvic Forest has soils that are well drained Mollisols and Andisols that undergo no flooding.
QX197X01X504	Alluvial Valley Forest Alluvial Valley Forest adjoins Skeletal Pachic or Fulvic Forest where uplands, talus slopes, and mountain slopes descend to alluvium-filled valleys a low elevations. Its soils are somewhat poorly drained Cumulic Mollisols that undergo occasional brief flooding; Skeletal Pachic or Fulvic Forest has soils that are well drained Mollisols and Andisols that undergo no flooding.
QX197X01X508	Cinder Subsurface Forest Cinder Subsurface Forest adjoins Skeletal Pachic or Fulvic Forest where high-elevation (>900 feet) uplands and mountainsides descend to lower elevation (to 900 feet) uplands, mountainsides, and talus slopes. Its soils are Andisols with little or no rock content that overlie weathered cinders; Skeletal Pachic or Fulvic Forest has soils Mollisols and Andisols with high organic carbon and rock contents that overlie lava rock.

QX197X01X509	<p>Very Steep Forest</p> <p>Very Steep Forest adjoins Skeletal Pachic or Fulvic Forest where higher-elevation, very steep mountain slopes descend to lower-elevation, less-steep slopes. Its soils are Andisols and Andic Mollisols on slopes of 70 to 130 percent and with variable rock content; Skeletal Pachic or Fulvic Forest consists of Fulvudands Pachic Mollisols on slopes of 6 to 60 percent and having high rock content and high organic carbon content.</p>
QX197X01X001	<p>Coastal Marsh</p> <p>Coastal Marsh adjoins Skeletal Pachic or Fulvic Forest where uplands, talus slopes, and mountain slopes descend to coastal depressions that are cut off from the influence of ocean tides. Its soils are very poorly drained Mollic Psammaquents and Terric Haplosaprists that are often ponded and flooded (incomplete data in soil survey); Skeletal Pachic or Fulvic Forest has soils that are well drained Mollisols and Andisols that undergo no ponding or flooding.</p>

Similar sites

QX197X01X503	<p>Lavaflow Forest</p> <p>Lavaflow Forest adjoins Skeletal Pachic or Fulvic Forest where talus slopes, uplands, and mountain slopes descend to young aa lava flows near the coast. Lavaflow Forest has organic soils with high rock content, slopes of 3 to 15 percent, elevations of 0 to 150 feet, and mean annual rainfall of 120 to 175 inches. Skeletal Pachic or Fulvic Forest has mineral soils with high organic carbon content and high rock content, slopes of 6 to 60 percent, elevations of 0 to 900 feet, and mean annual rainfall of 150 to 250 inches.</p>
--------------	--

Table 1. Dominant plant species

Tree	(1) <i>Dysoxylum</i> (2) <i>Myristica</i>
Shrub	Not specified
Herbaceous	Not specified

Legacy ID

F197XY505AS

Physiographic features

This ecological site occurs primarily on mountain foot slopes and mountain toe slopes, but also on valley floor.

Table 2. Representative physiographic features

Landforms	(1) Island > Mountain slope (2) Island > Valley floor
Runoff class	Low to high
Flooding frequency	None to occasional
Ponding frequency	None
Elevation	0–274 m
Slope	0–60%
Water table depth	122–152 cm
Aspect	Aspect is not a significant factor

Climatic features

The area is characterized by abundant rain and warm, humid days and nights. Average annual precipitation in this ecological site ranges from 159 to 198 inches (4040 to 5030 millimeters). Mean annual air temperature is 79 to 80F (27C). The driest period is June through September (winter), and the wettest is December through March (summer), although heavy showers and long, rainy periods can occur in any month. June, July, and August are the coolest months, and January, February, and March are the warmest. Daytime temperatures typically reach the upper 80s in summer and the middle 80s F in winter, while nighttime temperatures are in the middle 70s in summer and low 70s in winter.

The prevailing winds throughout the year are the easterly trade winds. They tend to be more directly from the east in December through March and mostly from the east-southeast and southeast during the rest of the year. The trade winds are less prevalent in summer than in winter. About 25 to 30 thunderstorms occur in an average year, mainly during the rainy season. The area lies across the path of tropical disturbances, including cyclones, that come usually from the north, but occasionally from east or west.

Table 3. Representative climatic features

Frost-free period (characteristic range)	365 days
Freeze-free period (characteristic range)	365 days
Precipitation total (characteristic range)	4,039-5,029 mm
Frost-free period (actual range)	365 days
Freeze-free period (actual range)	365 days
Precipitation total (actual range)	2,718-6,350 mm
Frost-free period (average)	365 days
Freeze-free period (average)	365 days

Precipitation total (average)

4,597 mm

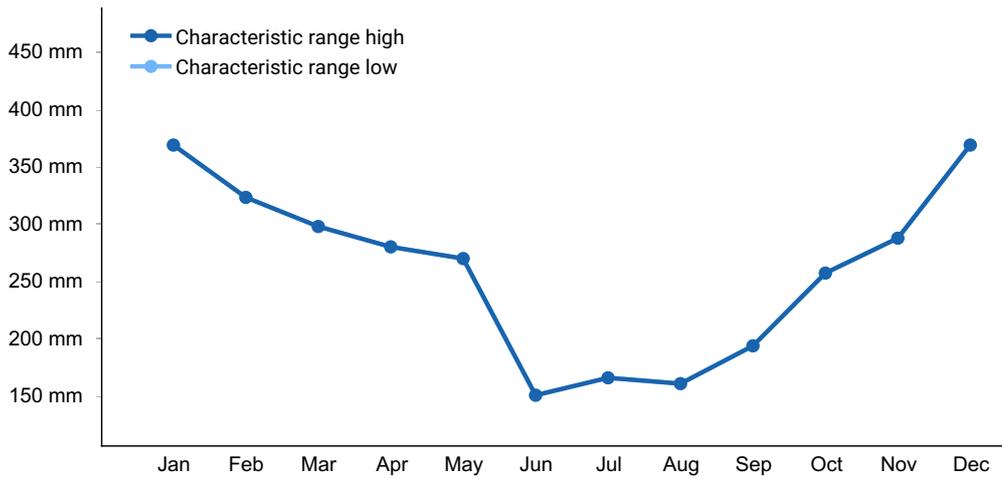


Figure 1. Monthly precipitation range

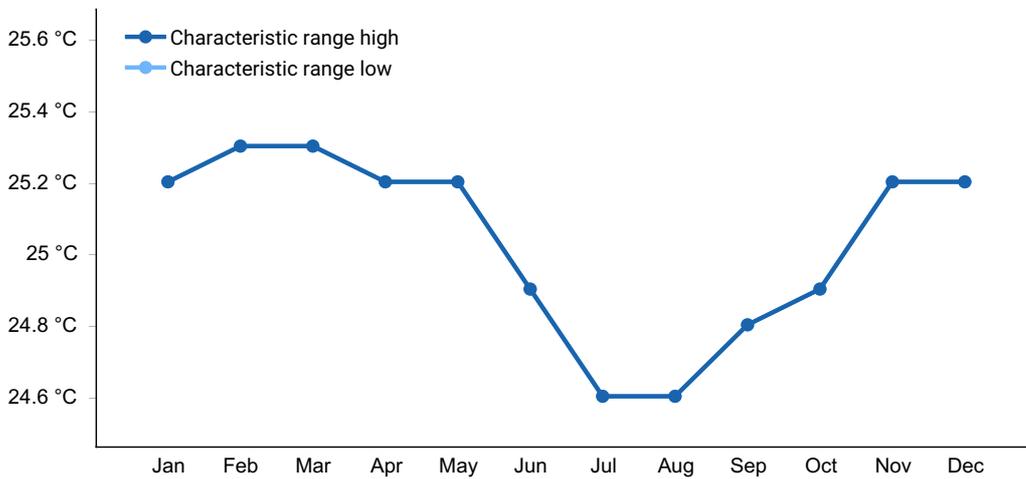


Figure 2. Monthly minimum temperature range

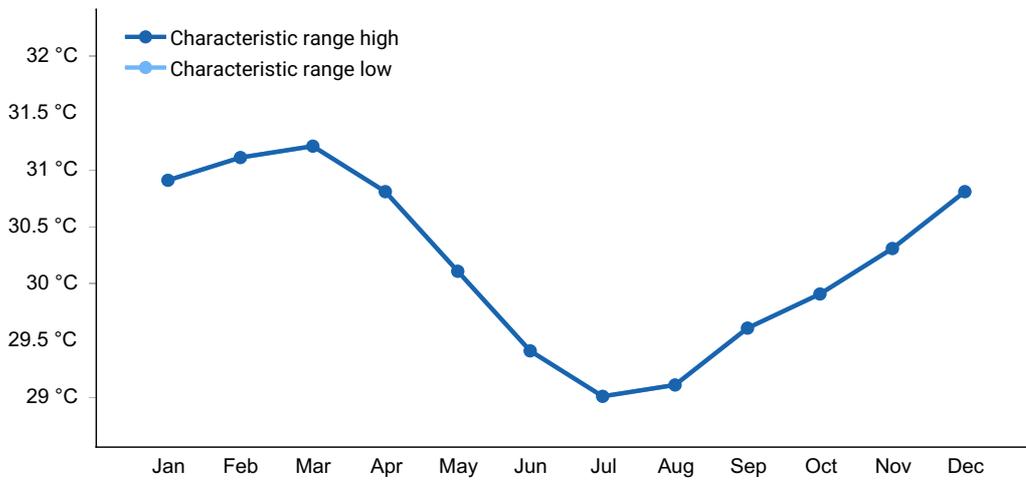


Figure 3. Monthly maximum temperature range

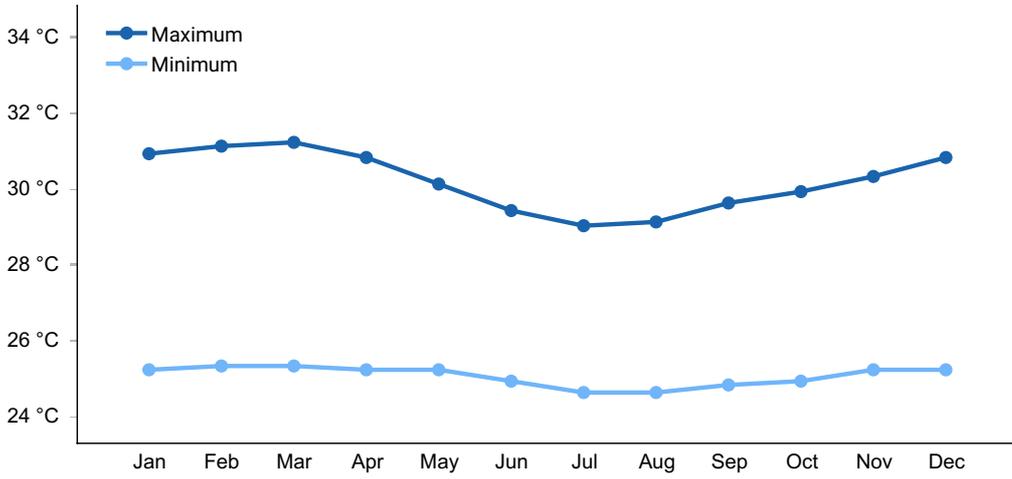


Figure 4. Monthly average minimum and maximum temperature

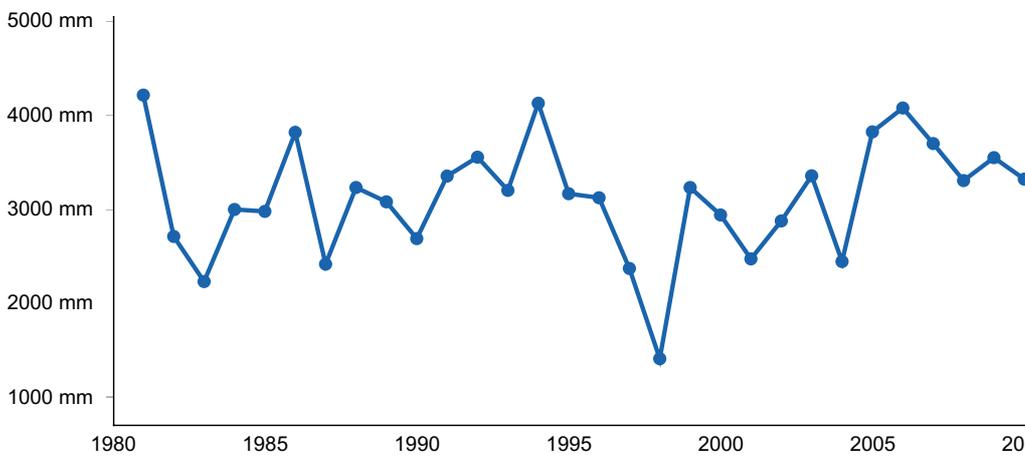


Figure 5. Annual precipitation pattern

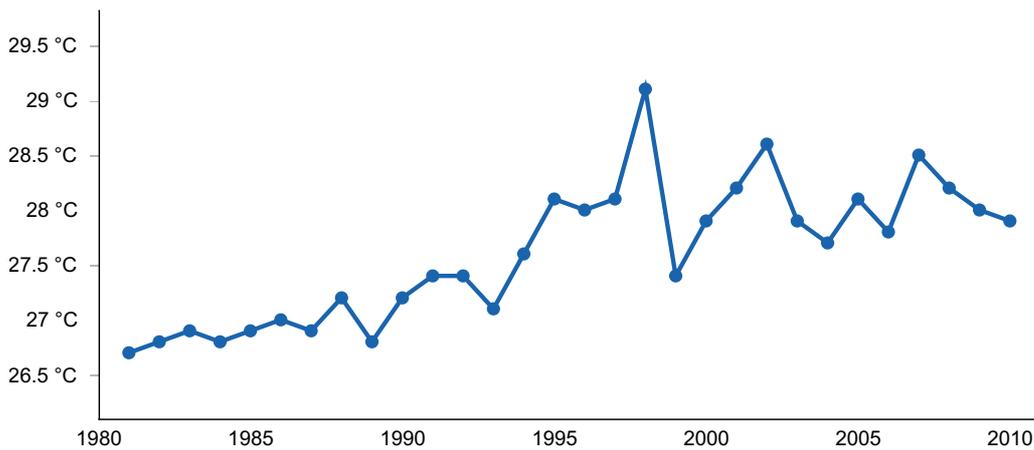


Figure 6. Annual average temperature pattern

Climate stations used

- (1) PAGO PAGO WSO AP [AQW00061705], AS

Influencing water features

There are no water features in this ecological site.

Soil features

AUA, PAVAI, SOGI VARIANT

Soils are Mollisols or Andisols. They are all skeletal (high rock content), and either pachic or fulvic (high organic matter content). They formed in colluvium, alluvium, or volcanic ash deposited over basic igneous rock. Soil temperature regimes are isohyperthermic; soil moisture regimes are udic to perudic. They are moderately deep to very deep and well drained.

Table 4. Representative soil features

Parent material	(1) Volcanic ash (2) Alluvium (3) Colluvium
Surface texture	(1) Very stony silty clay loam (2) Stony clay loam
Family particle size	(1) Medial-skeletal (2) Clayey-skeletal (3) Fine (4) Very-fine
Drainage class	Well drained
Permeability class	Very slow to moderate
Depth to restrictive layer	122–152 cm
Soil depth	122–152 cm
Surface fragment cover ≤3"	0%
Surface fragment cover >3"	0–2%
Available water capacity (0-101.6cm)	7.62–12.7 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–1
Soil reaction (1:1 water) (0-101.6cm)	5.6–7.3

Subsurface fragment volume $\leq 3''$ (0-101.6cm)	7–28%
Subsurface fragment volume $> 3''$ (0-101.6cm)	2–29%

Table 5. Representative soil features (actual values)

Drainage class	Somewhat excessively drained to well drained
Permeability class	Not specified
Depth to restrictive layer	Not specified
Soil depth	Not specified
Surface fragment cover $\leq 3''$	Not specified
Surface fragment cover $> 3''$	Not specified
Available water capacity (0-101.6cm)	Not specified
Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	Not specified
Subsurface fragment volume $\leq 3''$ (0-101.6cm)	Not specified
Subsurface fragment volume $> 3''$ (0-101.6cm)	Not specified

Ecological dynamics

The main natural disturbance is strong storms that can damage or kill vegetation by high wind speeds. The main human disturbance is burning or clearing of native vegetation to create grassland and abandonment of grassland that results in at least temporary dominance of introduced weedy plants.

State and transition model

Skeletal Pachic or Fulvic Forest F197XY505AS

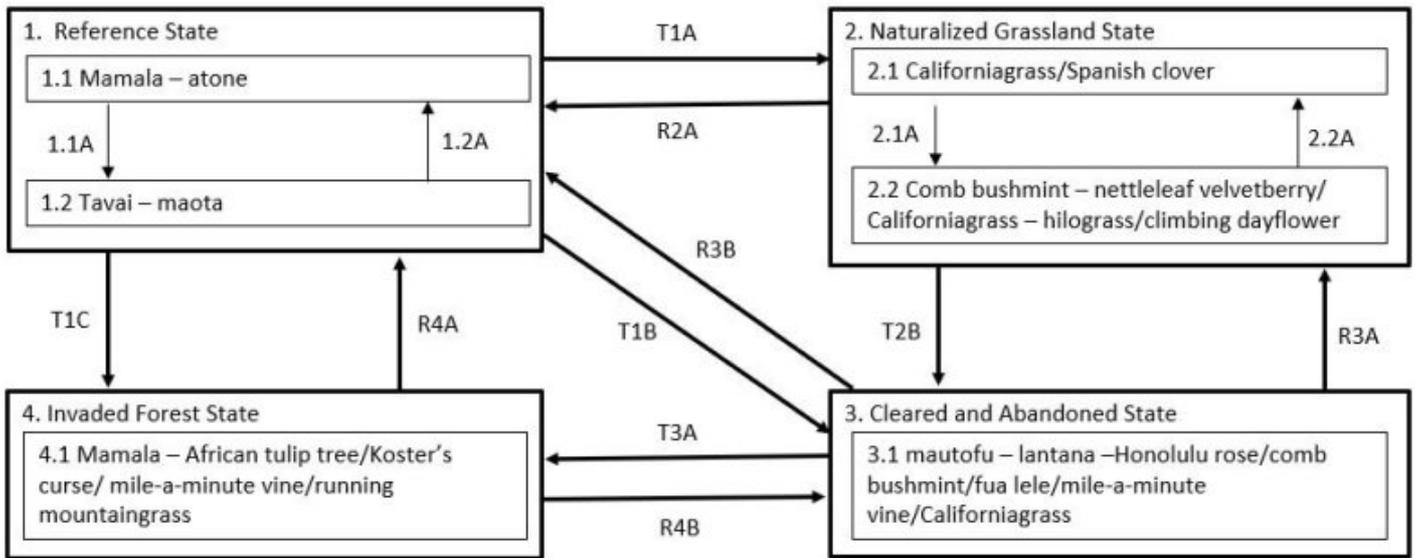


Figure 7. State and Transition Model (STM) for F197XY505AS (Skeletal Pachic or Fulvic Forest).

State 1 Reference State

This ecological site is forest with a very tall (80 to 100 feet or 25 to 30 meters), stratified tree canopy. Ground cover is moderately dense to dense. Epiphytes and lianas are common.

Community 1.1 Mamala - atone/lomagamma

Dominant tree species are mamala (*Homalanthus nutans*), maota (*Dysoxylum maota*), fuafua (*Kleinhovia hospita*), atone (*Myristica inutilis*), mamalava (*Planchonella samoensis*), ifi (*Inocarpus fagifer*), auauli (*Diospyros samoensis*), fanaio (*Sterculia fanaiho*), and mati vao (*Ficus scabra*). The subcanopy usually consists of auauli (*Diospyros samoensis*), atone (*Myristica inutilis*), and/or falaga (*Barringtonia samoensis*). Nontree species are diverse. Examples of these include the native creeping and climbing fern lomagramma (*Lomagamma cordipinna*). Other ferns are bird’s nest fern (*Asplenium nidus*), musk fern (*Microsorium grossum*), *Nephrolepis biserrata*, *Asplenium marattioides*, and *Tectaria dissecta*. Two common epiphytic orchids are *Dendrobium dactylodes* and *Dendrobium biflorum*. Common lianas are sea bean (*Mucuna gigantea*), mamalupe (*Faradaya amicornum*), St. Thomas bean (*Entada phaseoloides*), and *Gynochthodes epiphytica*. Climbing vines include fue manogi (*Piper graeffei*) and fue laufao (*Epipremnum pinnatum*).

Dominant plant species

- (*Dysoxylum*), tree

- nutmeg (*Myristica*), tree

Community 1.2

Tavai – maota

The same tree species as in Community Phase 1.1 remain in this phase, but other native tree species, commonly tavai (*Rhus taitensis*) and maota (*Dysoxylum maota*) can join the canopy as the forest regrows. Ground vegetation becomes temporarily more abundant. Epiphytes are less common than in 1.1.

Dominant plant species

- (*Rhus taitensis*), tree
- (*Dysoxylum*), tree

Pathway P1.1A

Community 1.1 to 1.2

Storms that damage or kill trees causes a phase change from 1.1 to 1.2 typified by a partial, temporary change in dominant tree species and a temporary increase in ground level vegetation.

Pathway P1.2A

Community 1.2 to 1.1

This community phase will revert to phase 1.1 with gradual regrowth of native species when given adequate time to recover after disturbance.

State 2

Naturalized Grassland State

This state consists of two community phases; it has been cleared of natural vegetation and planted or colonized with introduced grass species. It can be used for cattle grazing.

Community 2.1

Californiagrass/Spanish clover

This community phase is dominated by californiagrass (also called para grass) (*Urochloa mutica*). When not excessively grazed, it includes the legume Spanish clover (also called zarzabacoa comun) (*Desmodium incanum*). There may be small amounts of hilograss (*Paspalum conjugatum*) and climbing dayflower (*Commelina diffusa*) present.

Dominant plant species

- para grass (*Urochloa mutica*), grass
- zarzabacoa comun (*Desmodium incanum*), other herbaceous

Community 2.2

Comb bushmint – nettleleaf velvetberry/Californiagrass – hilograss/climbing dayflower

This community phase consists largely of Californiagrass and some hilograss. Shrubs, vines, and forbs occupy some of the site due to reduction of grass competitiveness by excessive grazing. Some common species include mile-a-minute vine (*Mikania micrantha*); fua lele (*Crassocephalum crepidioides*) a large, invasive forb; climbing dayflower (*Commelina diffusa*), a low-growing invasive forb; comb bushmint (*Hyptis pectinata*), a shrub; mautofu (*Triumfetta rhomboidea*), a tall shrub; and nettleleaf velvetberry (*Stachytarpheta urticifolia*), a low shrub.

Dominant plant species

- comb bushmint (*Hyptis pectinata*), shrub
- nettleleaf velvetberry (*Stachytarpheta urticifolia*), shrub
- para grass (*Urochloa mutica*), grass
- hilograss (*Paspalum conjugatum*), grass
- climbing dayflower (*Commelina diffusa*), other herbaceous

Pathway P2.1A

Community 2.1 to 2.2

Community phase 2.1 will change to 2.2 by invasion of the site by shrubs and forbs. This process is facilitated by excessive grazing, which reduces the competitive advantage of Californiagrass.

Pathway P2.2A

Community 2.2 to 2.1

Community phase 2.2 can shift back to phase 2.1 by reducing grazing pressure on Californiagrass and, when necessary, performing spot weed control on shrubs and vines

State 3

Cleared and Abandoned State

This state consists of one community phase dominated by a variable mixture of small trees, shrubs, vines, forbs, and grasses that thrive in sunny environments. Remnant Californiagrass and hilograss are present.

Community 3.1

Lantana – Honolulu rose/fua lele/mile-a-minute vine/Californiagrass

This community phase remnant stands of Californiagrass and hilograss with a variable

array of shrubs, forbs, vines, and young trees that thrive in sunny environments. Shrubs such as lantana (*Lantana camara*), Honolulu rose (*Clerodendrum chinense*), comb bushmint (*Hyptis pectinata*), mautofu (*Triumfetta rhomboidea*), and nettleleaf velvetberry (*Stachytarpheta urticifolia*) are dominant. The shrub layer may also include seedlings and saplings of any native trees that may have persisted on or near the site or invasive, introduced tree species such as African tulip tree (*Spathodea campanulata*), red beadtrees (*Adenanthera pavonina*), and tamaligi or peacocks plume (*Falcataria moluccana*). Mile-a-minute vine (*Mikania micrantha*) and the large, introduced forb fua lele (*Crassocephalum crepidioides*) may be present.

Dominant plant species

- lantana (*Lantana camara*), shrub
- stickbush (*Clerodendrum chinense*), shrub
- para grass (*Urochloa mutica*), grass
- redflower ragleaf (*Crassocephalum crepidioides*), other herbaceous
- mile-a-minute (*Mikania micrantha*), other herbaceous

State 4

Invaded Forest State

This state consists of one community phase. It is forest with both overstory and understory composed of a variable mix of native and introduced species. The actual species composition on a given site depends on the original native species composition, the disturbance history, and the species composition existing near the site before, during, and after disturbances.

Community 4.1

Mamala – African tulip tree/Koster’s curse/ mile-a-minute vine/running mountaingrass

The overstory consists of large trees. Any of the native species listed for State 1 Reference may be present. Introduced tree species are likely to be present; common examples of these are African tulip tree (*Spathodea campanulata*), tamaligi or peacocks plume (*Falcataria moluccana*), and red beanttrees (*Adenanthera pavonina*). The understory consists of an unpredictable mixture of native and introduced shrubs, ferns, vines, forbs, and grasses that have some shade tolerance. See State 1 Reference for examples of native species. Common examples of introduced understory species are the shrubs Koster’s curse (*Clidemia hirta*) and Honolulu rose (*Clerodendrum chinense*), mile-a-minute vine (*Mikania micrantha*) and running mountaingrass (*Oplismenus compositus*).

Dominant plant species

- (*Dysoxylum*), tree
- African tuliptree (*Spathodea campanulata*), tree
- soapbush (*Clidemia hirta*), shrub

- running mountaingrass (*Oplismenus compositus*), grass
- mile-a-minute (*Mikania micrantha*), other herbaceous

Transition T1A

State 1 to 2

The Reference State (1) transitions to the Naturalized Grassland State (2) by removal of native vegetation and planting, or allowing colonization by, introduced grass species.

Transition T1B

State 1 to 3

The Reference State (1) transitions to the Cleared and Abandoned State (3) if previously cleared of forest and then abandoned. This allows heliophytes, both native and introduced, to temporarily cover the ground.

Transition T1C

State 1 to 4

The Reference State (1) transitions to the Invaded Forest State (4) by wind damage to the forest when there is a nearby source of seeds of invasive species or, more gradually, by damage to the forest understory by ungulates, especially feral pigs, when there is a source of seeds of invasive species.

Restoration pathway R2A

State 2 to 1

The Naturalized Grassland State (2) could theoretically be restored to the Reference State (1) by suppression of grassland vegetation and replanting with native species. Natural reseeding by native forest species can be expected if there is a nearby stand of suitable species.

Transition T2B

State 2 to 3

The Naturalized Grassland State (2) transitions to the Cleared and Abandoned State (3) with abandonment of grasslands, which are invaded by low-statured, native and/or introduced heliophytes.

Restoration pathway R3B

State 3 to 1

The Cleared and Abandoned State (3) may be restored to the Reference State (1). The intensity of active restoration measures will be determined by the presence or lack of

nearby native forest or, at least, some native trees as well as the density and species mix of grasses, vines, shrubs, and invasive trees present on the site, especially if many competitive introduced species are present.

Restoration pathway R3A

State 3 to 2

The Cleared and Abandoned State (3) may be restored to the Naturalized Grassland State (2) by land clearing, weed control, and replanting grasses.

Transition T3A

State 3 to 4

The Cleared and Abandoned State (3) transitions to the Invaded Forest State (4) by growth of an overstory of trees with an understory of shade-tolerant shrubs, vines, ferns, forbs, and grasses. The species mix is variable but may be mostly introduced species or a combination of native and introduced species.

Restoration pathway R4A

State 4 to 1

The Invaded Forest State (4) can be restored to the Reference State (1). The difficulty, cost, and likelihood of success will depend on the species composition and amount and competitiveness of introduced species present on a given site.

Restoration pathway R4B

State 4 to 3

The Invaded Forest State (4) can be restored to the Cleared and Abandoned State (3). After this “restoration,” the Cleared and Abandoned State (3) is likely to rapidly transition back to the Invaded Forest State (4) due to presence of an abundant tree seed bank in the soil.

Additional community tables

Other references

Annotated References for F197XY505AS Skeletal Pachic or Fulvic Forest

Dixon JB and Schulze DG, eds. 2002. Soil Mineralogy with Environmental Applications. Volume 7. Soil Science Society of America. Available online at: <https://access.onlinelibrary.wiley.com/doi/book/10.2136/sssabookser7> Exhaustive treatment of basics of soil mineralogy and implications for environmental management.

Forestry Program, Division of Community and Natural Resources. 2010. American Samoa

Forest Assessment and Resource Strategy. American Samoa Community College, Pago Pago, American Samoa. Some discussion of disturbances, threats, and invasive species.

Green K, G Kittel, C Lopez, A Ainsworth, M Selvig, V Vaivai, K Akamine, M Tukman, and G Kudray. Vegetation Mapping Inventory Project, National Park of American Samoa. USDI-NPS Natural Resource Stewardship and Science. Fort Collins, Colorado. Discussion and maps of fine-scale vegetation associations, including Appendix with data including elevation ranges, litter, bare, and surface rockiness.

Kirch PV. 2000. *On the Road of the Winds: An Archaeological History of the Pacific Islands Before European Contact*. Berkeley: University of California Press. General discussion of effects of prehistoric Polynesians on native vegetation.

Mueller-Dombois D and FR Fosberg. 1998. *Vegetation of the Tropical Pacific Islands*. Springer-Verlag, New York. General account of tropical Pacific Island vegetation, with section on Hawaii. Discussion of likely effect of stoniness on soil moisture storage in dry habitats.

Sene DM. 2020. Forest Action Plan. Forestry Program, American Samoa Community College, Pago Pago, American Samoa. Discussions of forest types, disturbances, and succession.

Soil Survey Staff. 2014. *Soil Taxonomy, Twelfth Edition*. USDA – NRCS. Standard book of soil taxonomy; useful for terminology and interpretation of soils.

Space JC and T Flynn. 2000. Observations on invasive plant species in American Samoa. USDA Forest Service, Pacific Southwest Research Station, Honolulu. <http://www.hear.org/pier/references/pierref000021.htm> Recent, detailed report on invasive and potentially-invasive plants in American Samoa.

USDA-NRCS. 2011. *Soil Survey Laboratory Information Manual*. Soil Survey Investigations Report No. 45, Version 2.0. National Soil Survey Center, Lincoln, Nebraska. Provides additional insight for interpretation of soils information.

USDA-NRCS. 2006. *Major Land Resource Regions*. USDA Agriculture Handbook 296. <http://soils.usda.gov/MLRAExplorer> Description of MLRAs of Hawaii.

USDA-SCS. 1984. *Soil Survey of Islands of American Samoa*. Nakamura S, Chavez CL and MW Roybal, in cooperation with the Government of American Samoa. The latest NRCS soil survey for these islands. Some of the taxonomic names are outdated.

USDI-FWS. 1982. *Wildlife and Wildlife Habitat of American Samoa. II. Accounts of Flora and Fauna*. R Banks, editor. Washington DC. Discussion of vegetation as habitat types for local fauna. Good climate discussion.

USDI-NPS. 2009. Natural History Guide to American Samoa, 3rd Edition. P. Craig, editor. National Park of Samoa, Department of Marine and Wildlife Resources-American Samoa, American Samoa Community College-Community and Natural Resources Division. General reference for terrestrial and marine resources of American Samoa, with color photographs.

Webb EL. 2009. A Guide to the Native Ornamental Trees of American Samoa. Department of Marine and Wildlife Resources, Government of American Samoa. Guide to the more common and/or useful native trees recommended for planting in American Samoa, with color photographs and individual descriptions.

Webb EL and S Fa`aumu. 1999. Diversity and structure of tropical rain forest of Tutuila, American Samoa: effects of site age and substrate. *Plant Ecology* 44: 257-274. Information on wind disturbances and their effect on forest succession on Tutuila.

Whistler WA. 2004. Rainforest Trees of Samoa. Isle Botanica, Honolulu. A guide to the common lowland and foothill forest trees of the Samoan archipelago.

Whistler WA. 2002. The Samoan Rainforest. Isle Botanica, Honolulu. A guide to the various vegetation types of the Samoan archipelago, with some reference to landscape and soils, and based on extensive fieldwork.

Whistler WA. 1995. Wayside Plants of the Islands: A Guide to the Lowland Flora of the Pacific Islands. Isle Botanica, Honolulu. Reference of common introduced plant species in lowland areas of the Pacific Islands including American Samoa; with color photographs.

Whistler WA. 1994. Botanical Inventory of the Proposed Tutuila and Ofu Units of the National Park of American Samoa. Technical Report 87. National Park Service. Honolulu. Discussion of vegetation types within area of American Samoa National Park on Tutuila and Ofu.

Whistler WA. 1992. Botanical Inventory of the Proposed Ta`u Unit of the National Park of American Samoa. Technical Report 83. National Park Service. Honolulu. Discussion of vegetation types within area of American Samoa National Park on Ta`u.

Contributors

David Clausnitzer PhD

John Proctor

Ann Tan

Carolyn Auwelo

Daniel Bowman

Jennifer Fedenko

Amy Koch

Kendra Moseley

Sarah Quistberg
Jill Ficke-Beaton
Daniel Block
Brendan Brazee
Curtis Talbot

Acknowledgments

Assistance, advice, review, and/or insights:

Michael Constantinides, NRCS-PIA
Jennifer Higashino, USFWS and NRCS
Mike Kolman, NRCS

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	03/12/2026
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

-
4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

 5. **Number of gullies and erosion associated with gullies:**

 6. **Extent of wind scoured, blowouts and/or depositional areas:**

 7. **Amount of litter movement (describe size and distance expected to travel):**

 8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

 9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

 10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

 11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

 12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant:

Sub-dominant:

Other:

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**
-

14. **Average percent litter cover (%) and depth (in):**
-

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**
-

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**
-

17. **Perennial plant reproductive capability:**
-