Chapter 2. Planning Area Profile for Hazard Mitigation Analysis

A U.S. Territory since 1900, American Samoa is located in the central South Pacific Ocean, 2,566 miles from Honolulu Hawaii and 1,800 miles from Auckland, New Zealand. American Samoa has a total land area of approximately 77 square miles and consists of a group of five volcanic islands and two atolls (Rose Atoll and Swains Island).[2] The five volcanic islands, Tutuila, Aunu'u, Ofu, Olosega, and Ta'u, are the major inhabited islands. Tutuila is the largest island and the center of government. Ofu, Olosega, and Ta'u, collectively are referred to as the Manu'a Islands. The remoteness of the Territory of American Samoa contributes to challenges pre- and post-disaster. The map below depicts all of the islands of American Samoa.

Figure 2 American Samoa Base Map

At 58 square miles, Tutuila is the largest and oldest of the islands, and is the center of government and business. It is a long, narrow island lying SW-NE, is just over 20 miles in length, and ranges from 1 to 2

[2] American Samoa Statistical Yearbook, 2016, p.ix.

miles wide in the eastern half, and from 2 to 5 miles wide in the western half. Home to 95 percent of the territory's 60,200[3] residents, Tutuila is the historic capitol (Pago Pago), the seat of American Samoa's legislature and judiciary (Fagatogo), as well as the office of the Governor. Tutuila is often divided into 3 regions: the eastern district, the western district and Manu'a district. There are ten counties and 65 villages on Tutuila. The map below shows counties and selected villages. A population and housing units' spreadsheet from the 2010 Census is included in Appendix A.

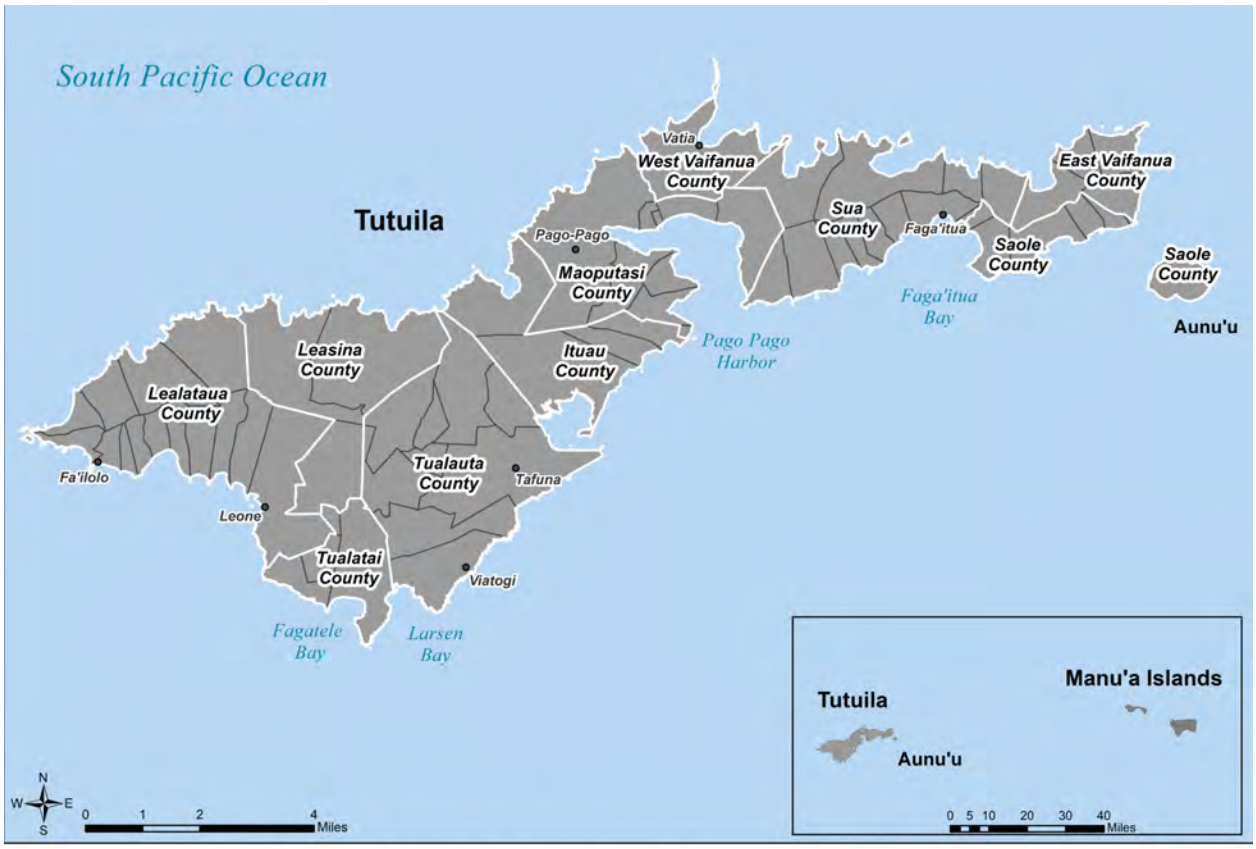

Figure 3 Tutuila and Aunu'u Islands Village and County Base Map

The tiny island of Aunu'u, approximately 375 acres in size (.59 square miles), lies 1 mile off the southeastern coast of Tutuila. According to the 2010 census fewer than 450 people live on the island. Aunu'u Island is included in Saole County that also has villages on Tutuila Island. Given the close proximity, there are regular commuter boats to and from the island.

It is recognized that American Samoa traditionally refers to areas of the islands as villages and districts (East District, West District, and Manu'a District), as opposed to county geographies. However, the best

[3] American Samoa Statistical Yearbook, 2016, p.1

available data for mapping and analysis boundaries was U.S. 2010 Census data, so the county geography was utilized. It is also recognized that the 2010 Census data did not include FoFo County, which is included as part of Lealatua County in this version of the plan (including the Village of Leone). Future revisions of this plan should move towards aligning the traditional American Samoan areas of reference with the best available data. The map below depicts the Eastern and Western Districts and their villages.

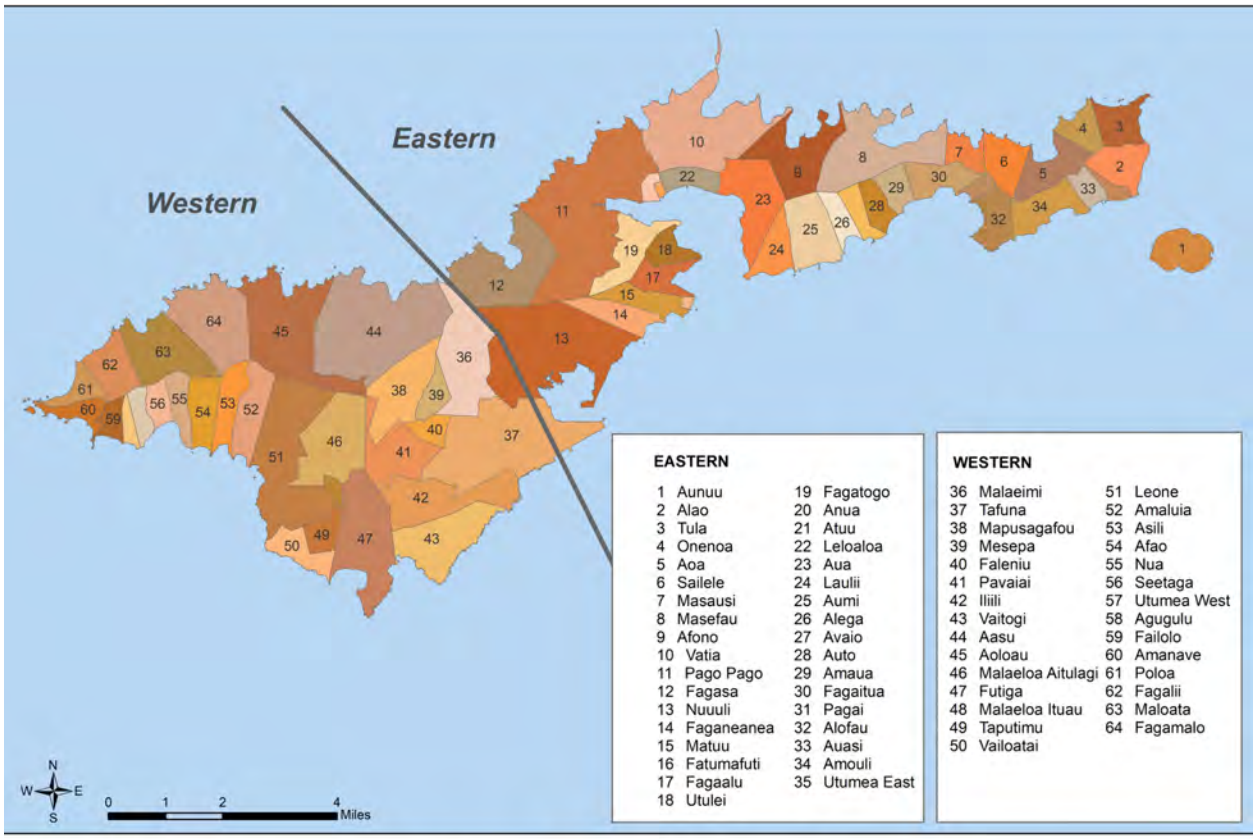

Figure 4 Tutuila Island Eastern and Western District Villages

The three islands of Ofu, Olosega and Ta'u, collectively referred to as the Manu'a islands, lie 70 miles east of Tutuila with a population of about 1,100. Ta'u is the largest of the three islands at 6.5-mile square miles followed by Ofu (2.8 square miles) and Olosega (2.0 square miles). Access is made by boat or plane. The map below shows the counties in the Manu'a Islands. Swains Island, with a population of approximately 17 lies 240 miles north of Tutuila, and the uninhabited Rose Atoll is a National Wildlife Sanctuary 180 miles to the east. The Manu'a Islands can be considered an underserved community. The current government is making an effort to build up the Manu'a Islands via the current American Samoa's Comprehensive Economic Development Strategy.

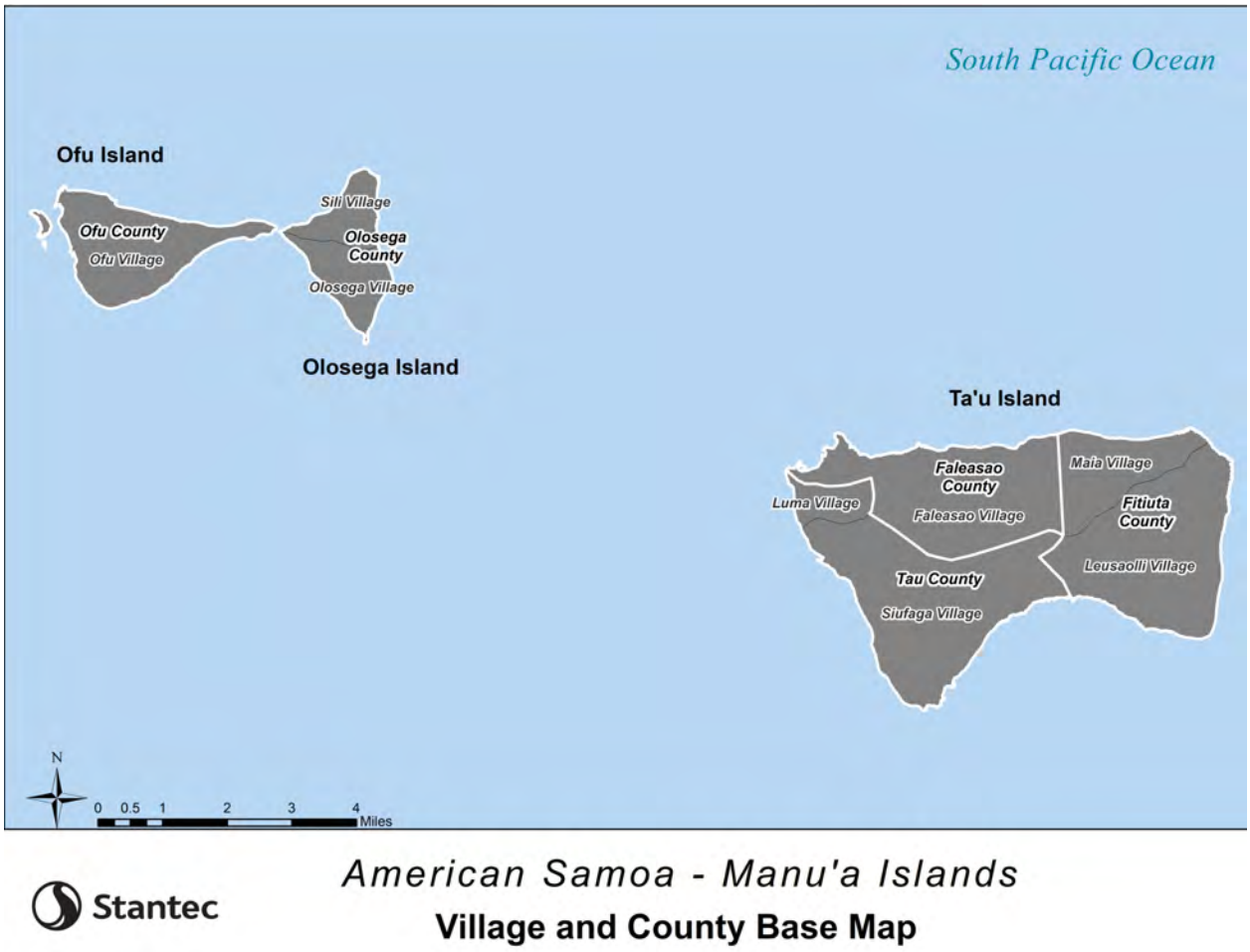

Figure 5 Manu'a Islands Village and County Base Map

2.1 Geography

Emerging from the ocean floor two to three miles below the ocean's surface, American Samoa formed as a result of volcanic activity over a hot spot in the Pacific Plate. Tectonic uplifts and volcanic activity during the early formation period of the islands have led to steep inclines and sharp cliffs being the dominant geographical features of the main islands. Peak elevations reach 3,100 feet on Ta'u Island (Lata Mountain), and 2,142 feet on Tutuila Island (Matafao Peak). Only 34 percent or 16,695 acres of the land in American Samoa has a slope of 30 percent or less. Deep valleys radiating from the summit of each distinct volcanic cone provide natural drainage.

Streams discharging at the heads of small embayment's have developed small coastal plains. This topography causes flooding and landslide hazards. Tutuila's natural deep-water harbor has given the islands their strategic value during the past two centuries. Narrow sand and coral rubble beaches rim approximately 25 percent of the coastline wherever fringing reefs exist. Such reefs are primarily on the calmer south shore of the islands and on average extend out to sea 200 feet. Exposed to severe marine erosion, the north shore coasts of the islands are primarily steep volcanic cliffs.

The rugged terrain and salty environment make for limited suitable development and additional factors to consider with building materials. As noted above, the terrain includes very steep slopes and floodplain areas in flatter places. As population pressures increase, building in less suitable areas, such as on steep slopes, excavated landslide areas, and near floodplains is becoming more common. However, development in higher risk areas has resulted in past landslides (2003) and puts population at risk. In addition to building location, the marine environment creates a need for suitable building materials. Proximity to the reef and salt spray exposure creates a highly corrosive marine environment, which has caused the construction industry to seriously reevaluate building materials. For instance, the expected useful life of standard metal guardrails is reduced by 50 percent as a result of the salt air.[4] Corrosion-resistant materials are encouraged such as concrete, plastics and stainless steel. The appropriate material will depend on the item being constructed and determined by professional guidance.

2.2 Climate

Located within the Tropic of Capricorn and 14 degrees south of the equator, American Samoa has a maritime climate with copious rainfall and warm humid days and nights. Temperatures in the islands range between 73 and 93 degrees Fahrenheit and relative humidity ranges between 73 and 84 percent throughout the year. As a result, vegetation is moderately dense, with many coconut, banana, and other tropical fruit trees, grasses, and low growing brush. Depending on topography, precipitation ranges from 125 inches in some areas, to approximately 250 inches in others. The village of Pago Pago, including a major international port, less than 4 miles north of the airport and open to the prevailing wind, receives nearly 200 inches of rain per year. The crest of the mountain range receives well above 250 inches. In recent years, the airport weather station has recorded at least trace amounts of rain about 300 days per year, with nearly 175 days receiving rainfall of 0.10 inch or more.

The drier months are June through September (southern winter) and the wettest, December through March (southern summer). However, the seasonal rainfall may vary widely in individual years, and heavy showers and long rainy periods can occur in any month. Thunderstorms are less frequent than might be expected, considering the moisture and instability of the tropical air mass that usually overlies the Samoa Islands. Flooding rains are common, and although some of these are associated with hurricanes and tropical storms, they can occur at other times as well.

June, July and August are the coolest months and January, February, and March, are the warmest. Afternoon temperatures reach the upper-80s (F˚) in summer, and mid 80s (F˚) in the winter, while nighttime temperatures fall to the mid-70s (F˚) in summer, and low-70s (F˚) in winter. The highest recorded temperatures at the airport were in the low-90s (F˚), and the lowest near 60 (F˚).

[4] American Samoa Government (2003). Retrieved August 8, 2014 from http://www.asg-gov.com/islandinfo.htm.

Easterly trade winds prevail throughout the year, and tend to be easterly December through March, but are predominantly from the ESE and SE during the rest of the year. The trade winds are less prevalent in summer than in winter, often interrupted by the proximity of small tropical storms, bands of converging winds, or one of the low-pressure systems higher in the atmosphere, all of which help make summer the rainy season. At other times, the absence of the trade winds is marked by periods of light and variable westerly to northerly winds and by land and sea breezes. Although strong at times, these winds are often quite light, and may reflect the nighttime drainage of cooled air from the mountains west and north of the airport.

2.3 Demographics

According to the 2010 U.S. Census, the total population in American Samoa was 55,519 persons including 52,928 persons on Tutuila and 1,143 in Manu'a (176 persons on Ofu, 177 persons on Olosega, and 790 persons on Ta'u). The population for each village is shown in Appendix A. In Tutuila, the population is heavily concentrated in the Tafuna Plain, in the Western District, since this is the largest area of flat or gently sloping terrain. The village with the highest population is Tafuna at nearly 8,000 persons. Nu'uuli is the second largest village (approximately 4,000 persons) and Pago Pago is the third largest village (approximately 3,600 persons).

The village with the lowest reported population is Maloata (approximately 8 persons), which is located on the northwestern side of Tutuila. In Manu'a, the eight villages range in population from five to 183, with an average of 143. The most populated village is Luma, on the island of Tau. The table below shows the 2010 Census Housing Unit Counts in Each District and County[5] and the table below that shows the population for each village.

Table 2 2010 Census Housing Unit Counts

2010 Census Housing Unit Counts in American Samoa: District and County

Geographic Area	Total Housing Units
American Samoa	**10,963**
Eastern District	4,490
Ituau county	936
Ma'oputasi county	1,999
Sa'ole county	466
Sua county	595
Vaifanua county	494
Manu'a District	376

[5] https://www.census.gov/population/www/cen2010/island_area/as.html

Faleasao county	40
Fitiuta county	70
Ofu county	103
Olosega county	79
Ta'u county	84
Rose Island	0
Swains Island	7
Western District	6,090
Lealataua county	1,038
Leasina county	336
Tualatai county	636
Tualauta county	4,080

Source: U.S. Census Bureau, 2010 Census for American Samoa.

Until the 2010 Census, the Territory's population had been increasing each decade with double-digit percent change growth, shown in the table below. The population growth in American Samoa has been attributed to a combination of high fertility rates and immigration.[6] The 2010 U.S. Census shows the population declined slightly from 2000 to 2010. (Appendix A includes two graphics showing census results). The population more than doubled between 1970 and 2000 from approximately 25,000 persons to over 55,000 persons. In addition, it is suspected that persons live undocumented on the island and thus are not reported in the U.S. Census estimates. This increased population and density is impacting its environment and resources.

"The population density (average number of persons per square kilometer) in 2010 was 331. This number could be a lot higher given the ruggedness and steep mountainous landscaping of the islands. People move to other places because of economic reasons, availability of land resources, and socio-political stability. The Manu'a Island residents continued to relocate to the main island of Tutuila looking for better economic opportunities or attending schools. Tutuila's population shifted from the Eastern District to the Western District in the past decades. In the 2010 Census, there were 31,329 people living in the Western District while 23,030 people live in the Eastern District."[7]

Table 3 Population Change 1970-2010

Year	American Samoa Population	Population Change from the previous decade	Percent Change (growth/decline)
1970	25,065	--	--
1980	30,538	+5,473	22%
1990	45,043	+14,505	47%
2000	55,885	+10,842	24%

[6] Section 309 Assessment and Strategy for the American Samoa Coastal Management Program. (2011). American Samoa Coastal Management Program. Retrieved August 8, 2014 from http://coastalmanagement.noaa.gov/mystate/docs/ as3092011.pdf

[7] American Samoa Statistical Yearbook 2012. (2012). Department of Commerce Statistic Division. Retrieved August 8, 2014 from http://www.doc.as/wp-content/uploads/2011/06/2012-Statistical-Yearbook-1.pdf

Year	American Samoa Population	Population Change from the previous decade	Percent Change (growth/decline)
2010	55,419	-366	-1%

Tutuila has experienced much of the Territory's population growth. The population density on Tutuila has reached an alarming 1.6 people per acre (or 1,047 persons per square mile). Nearly 90% of the Territory's population resides on this island, primarily on the Tafuna Plain and around Pago Pago Harbor. High population densities in those areas have impacted many aspects of life, including significantly straining the existing infrastructure (roads, water supply, wastewater, etc.), causing increased waste streams, surface runoff increases, leading to chronic flooding along roads and properties and increasing vulnerability to natural hazards. This last point was highlighted during the September 2009 tsunami, which caused 34 deaths and destroyed nearly 250 homes and another 2,750 dwellings."[8] The increased population near the ocean certainly contributed to the catastrophic nature of this event.

Demographic trends reflect the growing population through a substantial young population and young median age. The 2010 Demographic Profile for American Samoa indicates that the median age is 22.4 and the highest population is those under five years of age (11.9 percent).[9] Those aged 0 to 19 make up 46.3 percent of the population, indicating a strong and growing youth population. Just 5.6 percent of the population is aged 62 or older emphasizing the population boom in recent decades. Average household size is 5.6 persons. Median household income (2009 dollars) was $23,892.

2.3.1 Education

Regarding education, 11.2 percent of the population is enrolled in college and most, 47.9 percent, are in elementary school. Eighty-two percent of the population is a high school graduate or higher. Just 3.9 percent of the population speaks English only at home. Samoan is the primary language spoken at home (88.6 percent). The table below summarizes the demographic data from the 2010 Census for the people of American Samoa. There are 18,300 individuals in the civilian labor forces (over 16 years of age, employed or seeking work; not in armed forces). Of these, 16,616 are employed and 1,684 (9 percent) are unemployed.

Table 4 Summary of Demographic Category, 2010 Data

	Demographic Category, 2010 Data	Demographic Value
1	Median Age	22.4
2	Population under 5 years old	11.9%
3	Population under 19 years old	46.3%
4	Population older than 62 years old	5.6%
5	Average household size	5.6 persons
6	Median household income	$23,892

[8] Section 309 Assessment and Strategy for the American Samoa Coastal Management Program. (2011). American Samoa Coastal Management Program. Retrieved August 8, 2014 from http://coastalmanagement.noaa.gov/mystate/docs/ as3092011.pdf

[9] The 2010 Demographic Profile for American Samoa. (2010). U.S. Census Bureau. Retrieved August 8, 2014 from http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t#non

	Demographic Category, 2010 Data	Demographic Value
7	College enrollment	11.2
8	Elementary school enrollment	47.0
9	Graduated from High School	82%
10	English speakers at home	3.9%
11	Samoan speakers at home	88.6

2.3.2 Health Care

American Samoa has one hospital and several small clinics. Although, several improvements have been made to prevent flooding at the LBJ Hospital, it is in a flood zone. A new hospital is needed but funding remains prohibitive. The hospital is understaffed for its 150 beds. As of July 2017, the hospital had only 57 physicians, when it should have 95, 73 registered nurses when it should have 110, 3 pharmacists when it should have 11.[10] Many people travel off island to Hawaii or the mainland for their medical needs. Many people in American Samoa suffer from obesity and diabetes. Environmental health is challenging forcing regular boil water advisories to avoid illness from e-coli. In addition, the incidence of disasters increases the mosquito population and creates vector-borne illnesses such as dengue, zika, chikungunya, and leptospirosis.[11]

2.4 Land Use

Land ownership is unique in American Samoa. According to American Samoa Department of Commerce (ASDOC), there are five categories of ownership:

1. freehold,
2. government-owned,
3. church-owned,
4. individually owned, or
5. communal/native owned.

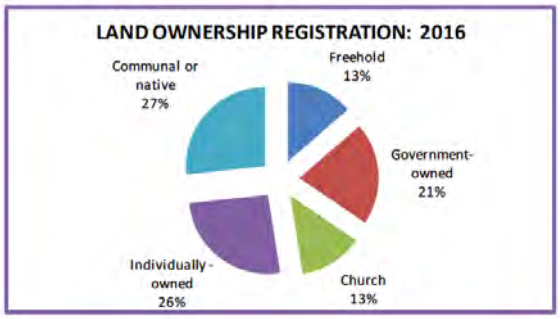

Figure 6 2016 Land Ownership.

Communal land ownership is the traditional land tenure system and under the direct authority of the Samoan chiefs known as “matais.” Within this system, traditional land cannot be purchased or sold and the current reigning chief from within the family unit has final say over the disposition of a family’s holdings. This system ensures the passage of assets to future generations and serves to preserve the Samoan culture and the Samoan land value system.[12] The graphic to the right shows land ownership in 2016. [13]

[10] Advance Evaluation Team Report, FEMA-4357-AS, May 24, 2018. p.14.
[11] Advance Evaluation Team Report, FEMA-4357-AS, May 24, 2018. p.16.
[12] American Samoa Government (2003). Retrieved August 8, 2014 from http://www.asg-gov.com/islandinfo.htm.
[13] American Samoa Statistical Yearbook, 2016, p. 84.

The table below shows how land ownership is divided by ownership type among 7,911 acres. This information comes from the ASDOC 2016 Statistical Yearbook.[14] It should be noted that there are about 48,767 acres of land but nearly two-thirds of that land is unbuildable due to steep slope. However, some of the undevelopable land is registered annually (including 12 new acres in 2012).

Table 5 Acreage Aggregated by Ownership Type

	Land Ownership Type						
		Freehold	**Government**	**Church**	**Individual**	**Communal**	**Total**
Acres/Year	2016	1,072	1,651	1,031	2,042	2,115	7,911
	2015	1,072	1,651	1,031	2,035	2,113	7,902
	2014	1,072	1,651	1,031	2,030	2,113	7,896
	2013	1,072	1,651	1,030	2,029	2,106	7,888
	2012	1,072	1,651	1,030	2,027	2,095	7,875
	2011	1,072	1,651	1,030	2,016	2,094	7,873
	2010	1,072	1,651	1,030	2,015	2,093	7,862
	2009	1,018	1,651	1,028	2,006	2,091	7,794
	2008	1,018	1,651	1,018	1,971	2,088	7,746
	2007	1,018	1,651	1,013	1,962	2,061	7,705
	2006	1,018	1,651	1,013	1,955	2,056	7,693
	2005	1,018	1,651	1,013	1,942	2,046	7,670
	2004	1,019	1,651	1,005	1,935	2,039	7,649
	2003	1,019	1,651	1,004	1,903	2,034	7,611
	2002	1,014	1,651	1,003	1,899	1,991	7,500

Information from the Statistical Yearbook indicates that of 9,688 structures on-island built between pre-1939 and March 2010, a majority of structures (5,121) were built between 1990 and 2008. An additional 2,117 structures were built between 1980 and 1989. Of the total structures built, a majority of buildings were built in Tualauta County (3,063 new structures) and Ma'oputasi County (1,160 new structures). However, these statistics likely do not account for the rebuilding that occurred in 2009-2010 due to the devastating tsunami in September 2009.

To address potential rebuilding from the tsunami, the statistical Yearbook also lists "number of building permits issued" (the table below shows Building Permits Issued (2002-2012), including those for new structures, between 2002 and 2012. The spike in 2010 is likely due to tsunami repairs and rebuilding. A spike is also evident in 2003 and 2004. There were federal disaster declarations in each of these years – flooding and landslides in 2003 and Tropical Cyclone Heta in 2004.

Table 6 Building Permits Issued (2002-2012)

Building Permits Issued (2002-2012)

	New Structure Permits	Other Permits (repairs, etc.)	Total Permits Issued

[14] American Samoa Statistical Yearbook 2012. (2012). Department of Commerce Statistic Division. Retrieved August 8, 2014 from http://www.doc.as/wp-content/uploads/2011/06/2012-Statistical-Yearbook-1.pdf

2002	126	470	596
2003	139	812	951
2004	238	1,098	1,336
2005	183	625	808
2006	158	534	692
2007	118	460	578
2008	111	540	651
2009	133	705	838
2010	243	798	1,041
2011	132	579	711
2012	135	557	692

The number of building permits issued increased to 547 in 2016. Permits issued for new structures increased to 144 in 2016. Permits for extension, repair and alteration also increased in 2016 with 403 permits issued. The estimated value of construction went up to $15.4 million in 2016.[15]

According to the Economic Forecast Analysis government spending grew in 2018 after Tropical Storm Gita by 11%. "Damage to private and public property was evaluated over the following months, and more than $20 million was distributed to individuals and families through the FEMA Individual Assistance program."[16] Twelve million additional dollars were expected to be approved for rebuilding and repairing public property and infrastructure through FEMA's Public Assistance programs. The table below indicates government buildings built between 2015-2020. The table is sorted by department and then location. The two Department of Health (DOH) buildings are a direct result of the Covid-19 pandemic.

Table 7 New Buildings Built between 2015-2020

Department	Location	Function
DOE	Alataua II	Playground
DOE	Alataua II	Classroom
DOE	Alataua II	Classroom
DOE	Alataua II	Classroom block
DOE	Manulele Tausala Elem School, Nuuuli	7 Classroom & Restroom building
DOE	Manulele Tausala Elem School, Nuuuli	Bus Shelter
DOE	Midkiff Elem School, Leone	Classroom block
DOE	Nuuuli Poly Tech, Nuuuli	Classroom/Restroom
DOE	Pago Pago Elem School	8 Classroom building
DOE	Pavai'ai Elem School	Restroom Block
DOE	Pavai'ai Elem School	Classrooms

[15] American Samoa Statistical Yearbook, 2016, p. 83.
[16] American Samoa Economic Forecast 2019, p.26-27.

Department	Location	Function
DOE	Pavai'ai Elem School	ECE Classroom Block
DOE	Samoana High School, Utulei	Math Dept building
DOE	Samoana High School, Utulei	10 Classroom building
DOE	Tafuna Elem School	Classroom/Administration building
DOE	Tafuna Elem School	Classrooms
DOE	Tafuna High School	Cafeteria
DOE	Masefau Elem School	Main Office
DOE	Faga'itua High School	Classroom Block
DOE	Faga'itua High School	3 Classrooms/Cafeteria/Bathroom building
DOE	Matafao Elementary School	Gym
DOE	Aua Consolidated School	Gym
DOE	Aua Consolidated School	4 Classrooms building
DOE	Aua Consolidated School	5 Classrooms/Kitchen/Café
DPS	Fagatogo	Public Safety building 1 story
DPS	Fagatogo	Fire Station
FONO	Fagatogo Downtown	2 Story building
GOV	Fagatogo Downtown	Museum
GOV	Satala	Shipyard Main Office
DOH	Fagaalu	Testing Facility - To be completed May 2020
DOH	Fagaalu	Patient Quarantine - To be completed May 2020

The graphic below shows revenue from US Federal grants and local sources shows spikes following disaster declarations. The largest increase follows the 2009 Earthquake and Tsunami, and the 2014 severe storms, flooding and landslides. It can be predicted when the chart below extends through 2021, we will see spikes in grant dollars following Tropical Storm Gita in 2018 and the Covid-19 pandemic in 2020.

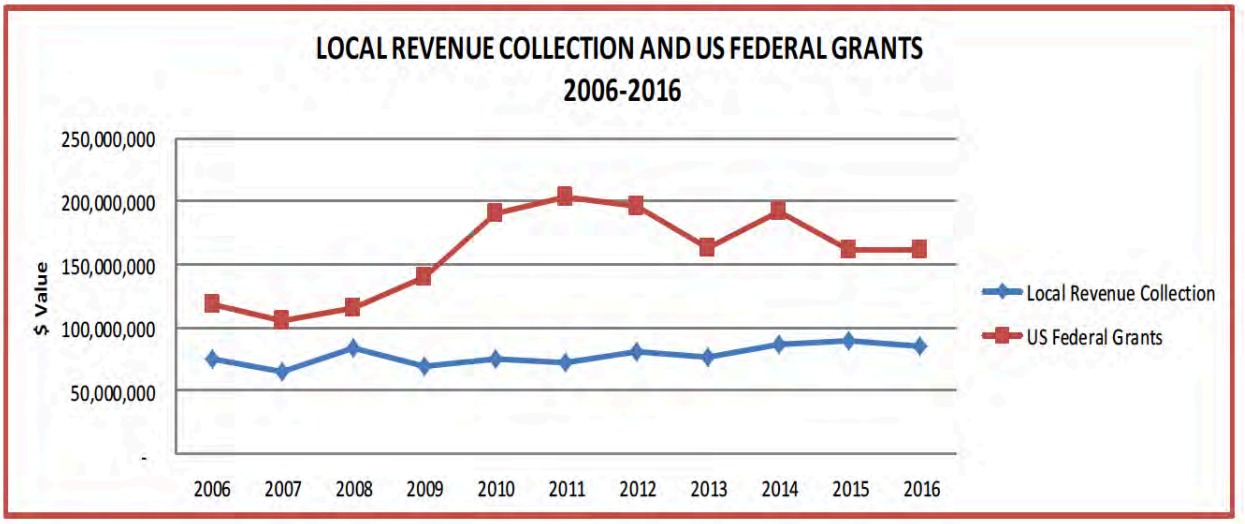

Figure 7 Local Revnue Collection and US Federal Grants 2007-2016[17]

With the exception of hurricane construction, approximately 200 residential homes are built annually. Villages continue to grow in size and limited agricultural land is fast being converted to residential lands to accommodate such expansion. As population increases, greater numbers of people become potentially at risk from natural hazards. Assessing risk becomes a significant factor in planning and policy making for future development and hazard mitigation.

2.5 Economy

Economic activity in American Samoa is strongly linked to the United States mainland, with which American Samoa conducts the great bulk of its trade. Similar to many south pacific economies, fish-related industry is a major portion of the economy. Tuna fishing and canning plants are the backbone of the private sector, with canned tuna being the primary export. Transfers from the United States government add substantially to American Samoa's economic wellbeing. Attempts by the government to develop a larger and broader economy are constrained by American Samoa's remote location, its limited transportation, and limited land that is not prone to flooding, landslide, and tsunami hazards.

Figure 8 Charlie the Tuna, Mascot for Starkist

The Fiscal year is 1 October - 30 September, and the US dollar is the local currency. For 2016 year (latest available), the Territory recorded a "trade surplus of $151.3 million. Imports include government purchases, value of fish brought in for processing for the canneries, and value of commercial merchandise brought in for resale. Trade data is still considered incomplete because of the absence of the Post Exchange (PX) data from the import series. The value of exports is made up

[17] American Samoa Statistical Yearbook, 2016, p.119.

primarily of canned tuna and by-products."[18] This is an increase from 2010 and 2011 but still down from years prior to that, likely a result in recession impacts. The table below shows balance of trade from 2007-2012.[19] These statistics will be updated for the 2025 plan.

Table 8 Balance of Trade 2007-2012

	Exports ($)			Imports	Trade Balance
Annually	Domestic	Re-exports	Total	Imports CIF	Surplus(+) / Deficit(-)
2012	418,047,313	2,876,129	420,923,442	269,614,159	151,309,283
2011	278,288,152	2,825,627	281,113,779	207,387,800	73,725,979
2010	315,570,103	3,342,454	318,912,557	239,163,212	79,749,345
2009	491,239,242	2,748,124	493,987,366	311,374,752	182,612,614
2008	592,466,782	3,101,098	595,567,880	331,623,182	263,944,698
2007	463,120,592	2,940,532	466,061,124	232,201,560	233,859,564

In 2012, $269.6 million dollars in imports were reported, an increase from the previous fiscal year. The top three principal imports (by percentage) include live animals (38%), vehicles, aircraft and associated transport equipment (18%), and prepared foods including spirits, beverages and tobacco (8%). Canned tuna, by far, leads the export market, accounting for $415 million out of $420 million in total exports. Exports totaled $446 million (2004) and are largely canned tuna (93%) and fresh produce.

American Samoa's annual Gross Domestics Product (GDP) was $648 million in 2011 and $725 million in 2012. GDP last peaked at $725 million in 2009 and has been in decline until 2012, likely a result of the recession.

The American Samoa Balance of Trade in fiscal year 2012 recorded a surplus of $151.3 million. Imports include government purchases, value of fish brought in for processing for the canneries, and value of commercial merchandise brought in for resale. Trade data is still considered incomplete because of the absence of the Post Exchange (PX) data from the import series. The value of exports is made up primarily of canned tuna and by-products. "Imports brought in through Customs Regulations for commercial use and resale are valued at $269.6 million, which is an increase from FY2011 reported value. The United States continued to be American Samoa's leading trade partner, followed by Fiji, New Zealand, Korea and Taiwan."[20]

[18] American Samoa Statistical Yearbook 2012. (2012). Department of Commerce Statistic Division. Retrieved August 8, 2014 from http://www.doc.as/wp-content/uploads/2011/06/2012-Statistical-Yearbook-1.pdf
[19] American Samoa Statistical Yearbook 2012. (2012). Department of Commerce Statistic Division. Retrieved August 8, 2014 from http://www.doc.as/wp-content/uploads/2011/06/2012-Statistical-Yearbook-1.pdf
[20] American Samoa Statistical Yearbook 2012. (2012). Department of Commerce Statistic Division. Retrieved August 8, 2014 from http://www.doc.as/wp-content/uploads/2011/06/2012-Statistical-Yearbook-1.pdf

The American Samoa Statistical Yearbook, 2012 notes that major improvements are needed at the Customs Office for the collection of trade statistics, especially in regard to the right Country of Origin and the correct value of imported goods. Any and all goods crossing American Samoa border should be accounted for regardless of purpose or user.

Valuation of goods (FOB and CIF) must be applied. Automation and standard commodity classification of all goods should be adopted. Differentiation between intermediate goods and final consumption goods need major improvements."[21]

The Comprehensive Economic Development Strategy (CEDS) 2018-2022 includes a strategy for the Government to continue to invest in infrastructure that support industry development. Action #4 for this strategy states "Invest in improved access and access roads to rural areas, including Manu'a and swains Islands, for agribusiness and aqua business development.[22] Several other strategies in this document name the same growth priorities for these remote islands. The American Samoa Government has made a consistent effort to include these outer islands in government activities.

Tuna fishing and tuna processing canneries account for 13.1% of the territory's employment in 2013 and about 12.4% of gross domestic product (GDP). They account for almost 100% of American Samoa's exports. The government sector employs the largest segment of the 16,090-labor force, employing more than 38% of eligible workers in the Territory. Cyclones, such as Gita, present a huge impact to the Territory's economy which already suffers from high rates of unemployment.[23]

2.6 Government Structure

The government in American Samoa is comprised of three branches, the Executive, the Legislative, and the Judiciary. The Governor and Lieutenant Governor lead the executive branch. The Governor appoints the directors of American Samoa Power Authority (ASPA), American Samoa Development Bank, American Samoa Hospital Authority, American Samoa Telecommunications Authority (ASTCA), American Samoa Economic Development Authority (ASEDA), and the American Samoa Community College. The Lieutenant Governor serves as the Governor's Authorized Representative (GAR) and heads the American Samoa Hazard Mitigation Council, which meets and has authorities according to formal by-laws. The legislative branch, referred to as the Fono, is comprised of senators and representatives. The judiciary branch is led by a Chief Justice who is appointed by the Secretary of the Interior. The judiciary branch has three courts, high court, district court, and village courts.

[21] American Samoa Statistical Yearbook 2012. (2012). Department of Commerce Statistic Division. Retrieved August 8, 2014 from http://www.doc.as/wp-content/uploads/2011/06/2012-Statistical-Yearbook-1.pdf
[22] CEDS, p. 51.
[23] Advance Evaluation Report, FEMA-4357-AS, May 24, 2018, p.12.

2.7 Infrastructure and Utilities

2.7.1 Airport/Seaports

American Samoa relies on the airport and the seaports to bring goods, services and fuel. Pago Pago harbor is the main harbor. Tutuila has two small boat harbors and the Manu'a Islands have three small boat harbors. The Pago Pago International Airport is located in the Tafuna area of Tutuila. Flights to the United States are bi-weekly to Honolulu, Hawaii.

2.7.2 Highways and Roads

American Samoa has a main highway that runs east-west on Tutuila. It runs along the coast and several areas have been hardened. There are also two highways that cross the island from north to south. These tend to be through very steep sections of the island and may experience debris from landslides.

2.7.3 Communications

The American Samoa Telecommunications Authority (ASTCA) is responsible for cell service. They have a 3G network with plans to improve it. They also maintain overhead lines and have replaced many wooden poles with steel poles.

2.7.4 Water, Electricity and Petroleum

American Samoa uses wells to capture clean drinking water. These wells are sometimes contaminated by stormwater causes a boil water notice to be made. Electricity in American Samoa is generated by fossil fuels it imports and renewable energy. Petroleum is imported and used for transportation, drinking and wastewater treatment and electric power generation.[24]

"American Samoa does not produce or refine petroleum. Petroleum products are imported in tankers, which unload at a terminal and tank farm adjacent to the main harbor at Pago Pago. The territory imports distillates, mainly low-sulfur diesel fuel, high-sulfur marine fuel, jet fuel, and motor gasoline. Except for a period following the 2009 tsunami, American Samoans typically consume about one-tenth more petroleum per capita than the U.S. average."[25]

The territory lacks conventional energy resources and depends on imported petroleum products to meet most energy needs. High petroleum product prices are a major concern for the islands' economy, which typically has been more than twice as energy intensive as that of the United States, though per capita energy consumption runs about one-half of the U.S. average. Energy consumption dropped sharply after 2009, when an earthquake and tsunami devastated the island just as one of two canneries

[24] https://www.eia.gov/state/?sid=AQ

[25] American Samoa: Territory Profile and Energy Estimates. (2013). Retrieved August 8, 2014 from http://www.eia.gov/state/ analysis.cfm?sid=AQ

was closing, throwing one in five island employees out of work. Since then, the economy and energy consumption have been slowly recovering.[26]

Pacific Energy Marketing is the supplier of petroleum products. There are 11 retail gasoline stations on Tutuila. Most have 5,000-gallon tanks while the largest gasoline station on the island in Utulei has 50,000 gallons of gasoline storage capacity."[27]

2.7.4.1 American Samoa Power Authority (ASPA)

"Nearly all of American Samoa's electricity is supplied by generators consuming No. 2 diesel fuel. The American Samoa Power Authority (ASPA), a government corporation, owns and operates two generating plants and the electric grid on Tutuila and two other small generating plants and grids serving the Manu'a group. Total generating capacity is about 40 megawatts, most of it from the Tafuna and Satala plants on Tutuila. ASPA also provides drinking water and wastewater treatment. Pumping, treating, distributing, and collecting water consume a significant share of ASPA's electricity generation. In September 2009, an earthquake and tsunami destroyed the Satala generating plant."[28] That halved the electricity-generating capacity on Tutuila. Generators burning ultra-low-sulfur diesel replaced those destroyed in 2009, which had used high-sulfur diesel fuel. The Satala Power Plant has been rebuilt and restored and ASPA no longer uses temporary generators.

"The residential sector is the largest electricity consumer, using nearly one-third of all power. It is closely followed by the commercial sector. The government consumes nearly one-fifth of electricity generated on the islands. Per capita consumption is only about one-fourth of U.S. per capita consumption. Electricity cost varies with a fuel surcharge linked to world oil prices. In early 2012, that surcharge brought the average electricity price in American Samoa to about five times the average U.S. price."[29]

2.7.4.2 Utulei Tank Farm

The Utulei Tank Farm is located in Pago Pago Harbor along the main raid in the village of Utulei. Due to the location of the Tank Farm it is vulnerable to storm surge, sea level rise and tsunami flood waters. The current operator, Pacific Energy, South-West Pacific, Ltd. stores oil & operates the tank farm terminal. This facility started to store oil in 1941 and has been upgraded several times. Currently, the oldest tanks were installed in the 1980's. The facility is primarily engaged in the wholesale distribution of petroleum products from bulk liquid storage terminals.

[26] American Samoa: Territory Profile and Energy Estimates. (2013). Retrieved August 8, 2014 from http://www.eia.gov/state/ analysis.cfm?sid=AQ
[27] Energy Assurance Plan. (2014) American Samoa Power Authority. Retrieved August 8, 2014 from http://www.aspower. com/aspaweb/Downloads/ASREC/DRAFT%20Energy%20Assurance%20Plan.pdf
[28] American Samoa: Territory Profile and Energy Estimates. (2013). Retrieved August 8, 2014 from http://www.eia.gov/state/ analysis.cfm?sid=AQ
[29] American Samoa: Territory Profile and Energy Estimates. (2013). Retrieved August 8, 2014 from http://www.eia.gov/state/ analysis.cfm?sid=AQ

Figure 9 Utulei Tank Farm

The main office and primary storage are located in the village of Utulei, on the west side of Pago Pago Harbor. It is owned by the American Samoa Government and operated by BP South West Pacific Limited. The fuel dock is located south of the Commercial Container pier, adjacent to the Rainmaker Hotel, on the west rim of Pago Pago Harbor. The Airport Tank Farm Satellite is located on the west end of the Pago Pago International Airport parking lot.

The petroleum storage area at the Utulei Tank Farm contains 10 above ground storage tanks with a total storage capacity of 29,512 barrels. The Airport Tank Farm contains 6 horizontal bullet tanks with a total storage capacity of 3,048 barrels. All of the tanks are contained within dike (secondary containment) areas. The Utulei Tank Farm was further protected using Hazard Mitigation Grant Program funds as one of the Territory's first projects in the early 1990s. The wall built around the Tank Farm in 2001 was designed to contain an oil spill and to withstand 135 mph winds and an 8.4 magnitude earthquake, however it is not designed to withstand the outer force from a major tsunami, storm surge or sea level rise event. 27 The fuel dock is connected to the storage area by three petroleum pipelines.

2.7.4.3 American Samoa Renewable Energy Committee (ASREC)

The American Samoa Renewable Energy Committee (ASREC) established by executive order, adopted a charter outlining the purpose, mission, organization, staffing, directive, and duration. Succinctly, ASREC must develop a long-term strategic energy plan that creates a sustainable energy future for American Samoa with input from various sectors and stakeholders.[30]

ASREC's Mission is to "enhance the well-being of our citizenry, ensure energy and economic security through energy independence and diversification, and improve environmental quality. Educate all stakeholders on the importance of our vision by embracing conservation, energy efficiency and alternative energy. The ASREC is a forum for considering options and offering guidance related to the achievement of its energy goals through policy, projects and programs.[31]

[30] American Samoa Renewable Energy Committee. (2014). Retrieved August 8, 2014 from http://www.asrec.net

[31] American Samoa Renewable Energy Committee. (2014). Retrieved August 8, 2014 from http://www.asrec.net

"With American Samoa's high cost of electricity and geographic isolation, the government has established a Renewable Energy Committee to work with federal experts to bring sustainable renewable energy to the islands. Potential renewable energy resources include solar, wind, and biomass. In 2008, American Samoa adopted a net metering law that allows owners of small solar or wind facilities installed primarily for the consumer's use to receive credit for excess power sent to the grid. More than 20 government and commercial customers use net metering and account for more than 0.5 megawatt of total load. American Samoa's renewable energy program includes a 1.75-megawatt solar photovoltaic (PV) array near the Tafuna power station, 24 smaller arrays on rooftops of government buildings, and solar hot water heating for Tutuila's LBJ Tropical Medical Center. Assistance for residential weatherization is also being offered. Because it is near the equator, American Samoa has substantial potential to expand both solar hot water heating and solar PV applications. See Appendix A for three articles related to solar installations.

No commercial-scale wind turbines have been installed in American Samoa, but ASPA has set up measuring stations around the islands to assess wind speeds. Earlier measurements indicated limited wind resources around the main island of Tutuila but more potential in the Manu'a islands. Challenges for wind energy include typhoons, social acceptance, and grid stability. To ensure reliability on its small island grids, ASPA is limiting renewable power to 20% of peak demand capacity. American Samoa's communal land ownership structure also makes long term leasing for larger scale projects a potential hurdle for development.

ASPA is using organic Rankine cycle technology to generate additional electricity from waste heat emitted by diesel generators at its Tafuna plant. Preliminary studies indicate potential for generating electricity with municipal solid waste on Tutuila and for displacing petroleum-based diesel fuel with biodiesel, although the mountainous terrain limits land available for raising biodiesel feedstocks."[32]

[32] American Samoa: Territory Profile and Energy Estimates. (2013). Retrieved August 8, 2014 from http://www.eia.gov/state/ analysis.cfm?sid=AQ