

AMERICAN SAMOA CORAL REEF EDUCATIONAL
MATERIALS

AMERICAN SAMOA DEPARTMENT OF COMMERCE

CORAL REEF ADVISORY GROUP
<https://www.facebook.com/AS.CRAG>

NOAA CORAL REEF CONSERVATION GRANT
#NA11NOS4820008

FISCAL YEARS 2011-2012

AMERICAN SAMOA GO GREEN: BUILDING LOCAL CAPACITY AND AWARENESS FOR A SUSTAINABLE ENVIRONMENT

Village communities in American Samoa have for many years managed their reef areas and watersheds with strong enforcement. As a tradition, villagers will practice their traditional fishing methods when utilizing their reef areas. Safe and effective fishing practices were often used and the results were plenty of fish and shellfish caught for family consumption. Effective management in the early days was well practiced and enforced by villages. As the years passed by, American Samoa has gone through major changes over the century, as change is inevitable. These changes include new technologies and advance methods that have altered the approaches and perceptions of the local people on how to earn more and live better.

In American Samoa, an inter-governmental resource agencies education group called Le Tausagi has been in existence for over 15 years providing education and outreach programs to communities. These programs include an annual summer environment camp for students from ages 8-13, teachers' workshops, presentations to schools and villages, and coordinated outreaches to support an ongoing management program. Le Tausagi has been implementing and facilitating education and awareness campaigns to build local community capacity to improve the management of coral reefs and watersheds in American Samoa.

Author: Trevor Kaituu

Registration number: 20140306-0001



American Samoa
**CORAL
REEF**



CLIMATE CHANGE IN AMERICAN SAMOA

What is Climate Change?

Climate change is a significant and lasting change in the distribution of weather patterns over periods ranging from decades to millions of years.

Climate change will impact American Samoa through:

- Higher Air Temperature
- Higher Sea Temperature
- Sea Level Rise
- Coral Reef Bleaching
- Ocean Acidification
- Extreme Weather

What is causing climate change?

Human Activities that increase Carbon Dioxide in the atmosphere, including,

- Burning of fossil fuels
- Pollution
- Deforestation

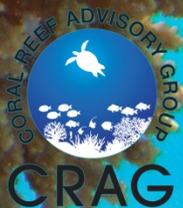
What are we doing?

Through the Territorial Climate Change Adaptation Framework, American Samoa is working to adapt to climate change by:

- Increasing the knowledge and awareness of climate change.
- Improving the planning and management of natural resources.
- Prioritizing actions and collaboration to better adapt to climate change

For more information about climate change and American Samoa's efforts, please contact the Coral Reef Advisory Group at 633-4456 or info@crag.as

Photo Credit: Trevor Kaituu



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www.crag.as



American Samoa GO GREEN:

Building Local Capacity & Awareness For A Sustainable Environment

Presenters: Filima Samafu-Leau (NOAA - PIRO), Solalofa Tuamua-Afoa (DOC - ASCZMP), Trevor Teghope Kaitia (CRAG)

Le Tausagi is an environmental educators group comprised of representatives from various governmental departments that works to educate the general public that includes schools, village communities and church organizations on the importance of protecting, preserving and restoring our natural environment and its limited resources. (ASCC-Land Grant, AS-EPA, CZMP, DOC, DNWR, DWYA, NRCS, NOAA PIRO, NPS, NMSAS, UH Sea Grant Ext. Service)

Vision: Communities that are knowledgeable about environmental issues and a healthy environment while maintaining culture and tradition.

Goals & Objectives:

- Building environmental awareness, comfort in the natural environment and empathy for the environment.
- Teaching traditional knowledge and skills to young people.
- Teaching environmentally friendly practices for agriculture, fisheries or forestry.
- Increasing responsible participation in environmental practices.
- Building positive attitudes towards the environment.

Methodology:

- Le Tausagi monthly meetings.
- Coordination of monthly outreach events.
- Compile a Journal for the camps
- Analyze the survey and write up reports to make improvements on the next camps.

TYPES OF ACTIVITIES:

Ocean Lessons

- Coral presentation/ Snorkeling
- Fish ID
- Reef Resilience activity
- Ridge to Reef Watershed Lesson
- GIS mapping activity
- Beach Cleanups
- Watershed presentations/ activities

Land Lessons

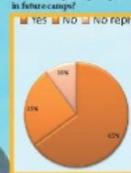
- Land & Beach Cleanups (Record & analyze data)
- Wetlands
- Skits and role play environmental scenarios
- Hiking & Treasure Hunt
- Climate Change & Population pressure activities
- Art activity (painting reusable bags to promote Go Green efforts)
- Field Trips to National Park and ASCC/Land Grant

Results: Based on the 2012 Aunu'u summer camps, where 60 students attended the camp.

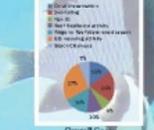
How did you hear about this program?



Interested in participating in future camps?



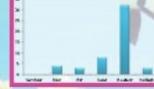
Percentage of students who participated



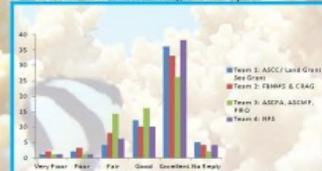
Did the program content meet your expectations?



Overall Camp



Number of Students vs Level of knowledge and skills applied



Success:

- An evaluation was conducted in 2012 summer camps shows that majority of the participants has gained knowledge and are aware of the importance of our natural resources and the need to support the Go Green efforts at their homes, schools, and environment.

Le Tausagi has been able to accomplish a lot over the years, through collaborative planning and leveraging limited funding, such as:

- Organized and facilitated two annual summer camps in both Tutuila and Manu'a islands targeting students of ages 8-13.
- Provided outreach events

to schools, village communities and church youth groups to improve awareness of the importance of protecting our natural resources for future generations.

- Facilitated teacher's workshop for private and public schools.
- Provided continuous assistance and support to partner agencies in events, such as clean ups, fairs, workshops, trainings, community work, and field trips.

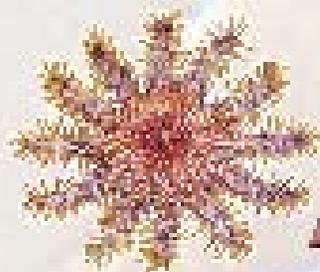
Performance Measures:

- 120+ students ranges from the ages of 8-12 were targeted.
- 2 different camps at 2 different sites.
- 15 Junior counselors (volunteers from 14 - 18 years of age)
- Activity books and lesson plans for teachers to use in the following school year

Challenges: Time, funding, planning, resources and weather.



Photo credit: NOAA_CRED Team, Trevor Kaitia_CRAG, Filima Samafu-Leau (NOAA - PIRO), Solalofa Tuamua-Afoa (DOC - ASCZMP)



Crown-of-Thorns (COTS) Starfish

ALAMEA

What are COTS? COTS are large greenish brown starfish with up to 23 arms. They can grow to over 35 cm and are covered with sharp toxic spines up to 5 cm long. They occur naturally on coral reefs throughout the Pacific Region.

Where do they live? COTS prefer sheltered areas in lagoons and the deeper reef areas.

What do they eat? They move around the reef using their tube feet, feeding on corals. They leave behind white patches of dead coral skeleton after feeding. They usually feed alone, but during outbreaks they move around in large groups.

Why are they a problem? COTS eat coral. We are experiencing population outbreaks around Tutuila, and large areas of our coral reefs have died. COTS are a major threat to our coral reef ecosystems, which support our fish populations.

Management measures: A very large population or 'outbreak' of COTS will damage large areas of coral. These outbreaks can occur naturally but may also be caused by human activities — such as by allowing sewage to enter the sea and by catching too many of their predators.

What Can We do?

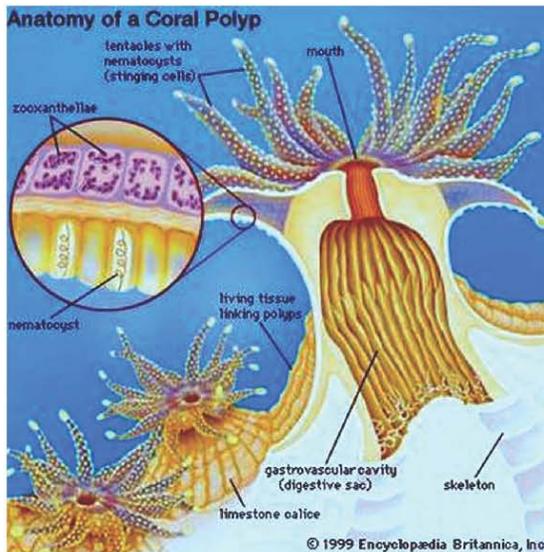
COTS have poisonous spines, so please be very careful if you encounter them in the ocean. If you see Alamea, please report it to the DMWR office on 633-4456.



**TOGETHER WE CAN SAVE
&
PROTECT OUR REEFS**

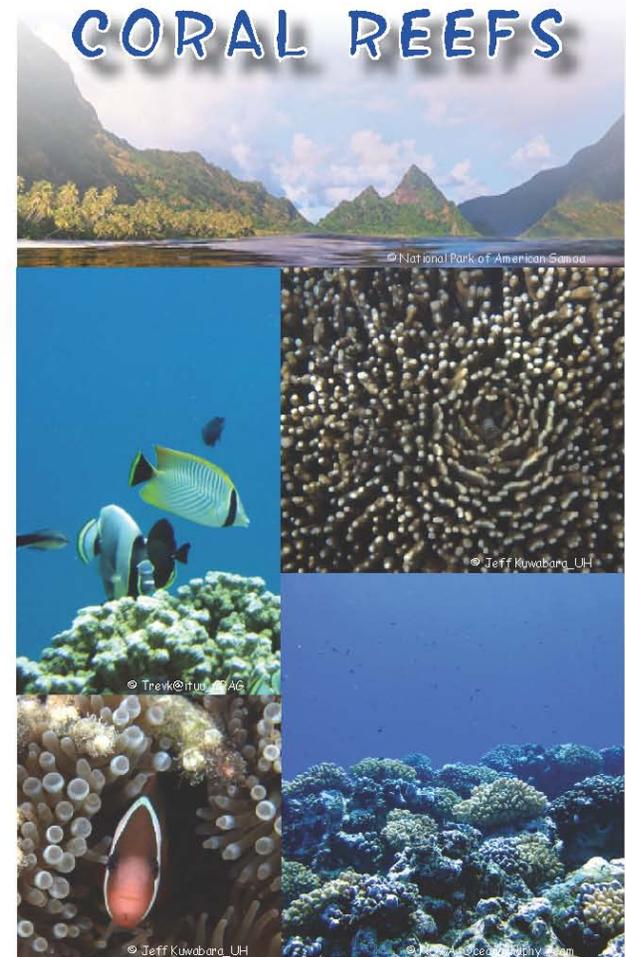
Importance of Coral Reefs

- Source of food (fish and shellfish) for people
- Economic value (fishing, tourism, etc)
- Protection against coastal erosion
- Medicinal benefits - some anti-cancer drugs and painkillers come from reefs and a lot of other animals
- Provide food and shelter for various reef fishes and other marine animals.
- A good sign of ocean water quality: Healthy reefs = Healthy water



Threats to Coral Reefs

- **Crown of Thorns:** COTs feed on coral polyps, and an outbreak of COTs can eat up the entire coral reef within a few days or weeks.
- **Climate Change:** Increasing sea temperature causes corals to bleach. Ocean acidification is also threatening corals.
- **Pollution:** Suspended trash and particles will prevent sunlight from reaching the coral reefs.
- **Overfishing:** Removal of the herbivorous fishes will allow algae to grow and compete with the corals for space and sunlight.
- **Population Pressure:** More people on island will put more pressure on our natural resources.



Coral reefs are one of the most complex and colorful tropical ecosystems. Corals build massive & complex physical structures that are home to fascinating plants and animals.

What is a Coral Reef?

Coral reefs are massive structures made of calcium carbonate (limestone) deposited by coral animals which form the base of a complex reef ecosystem. Coral reefs are home to over 4,000 different species of fish, 700 species of coral and thousands of other plants and animals.



What is a Coral?

Coral is a tiny, fragile, spineless animal.

What is a coral polyp?

- A polyp has a sac-like body and a single opening or mouth encircled by stinging tentacles.
- The polyp of a hard coral uses calcium carbonate from seawater to build itself a hard, cup-shaped skeleton. This limestone skeleton protects the soft, delicate body of the polyp and makes the coral appear rock-like.

When and how do corals feed?

- Corals feed during day and night time.
- During day time they utilize tiny single-celled algae called **zooxanthellae** that lives in their tissues.
- These algae cells use the sunlight to make their own food, just like plants on land do.
- At night polyps extend their tentacles out to feed on tiny micro-organisms such as **plankton**.
- Pigments produced by the zooxanthellae are visible through the clear body of the polyp and give the coral its beautiful color.



Polyp © Scott Santos; State University of NY Buffalo



Zooxanthellae © Scott Santos; State University of NY Buffalo

Mutual Relationship - the polyp provides shelter for the Zooxanthellae and in return the zooxanthellae provide food for the polyp through the process of photosynthesis.

Coral growth.

- In general corals grow very slow about 1 to 2 inches per year.
- Corals grow at different rates depending on sunlight. Sunlight plays an important role in coral.
- Water temperature (70-85°F), salinity, turbulence, and the availability of food are important factors influencing the growth of corals.
- Since hard corals depend on the zooxanthellae (algae) that live inside of them and this algae needs sunlight to survive, corals too need sunlight to survive.
- Therefore, hard corals rarely develop deeper than 50 meters (164 feet).

CLIMATE CHANGE

The Climate Change Local Action Strategy and Working Group aim to “Sustain healthy coral reef ecosystems and build related socio-economic conditions which are resilient to climate change” by:

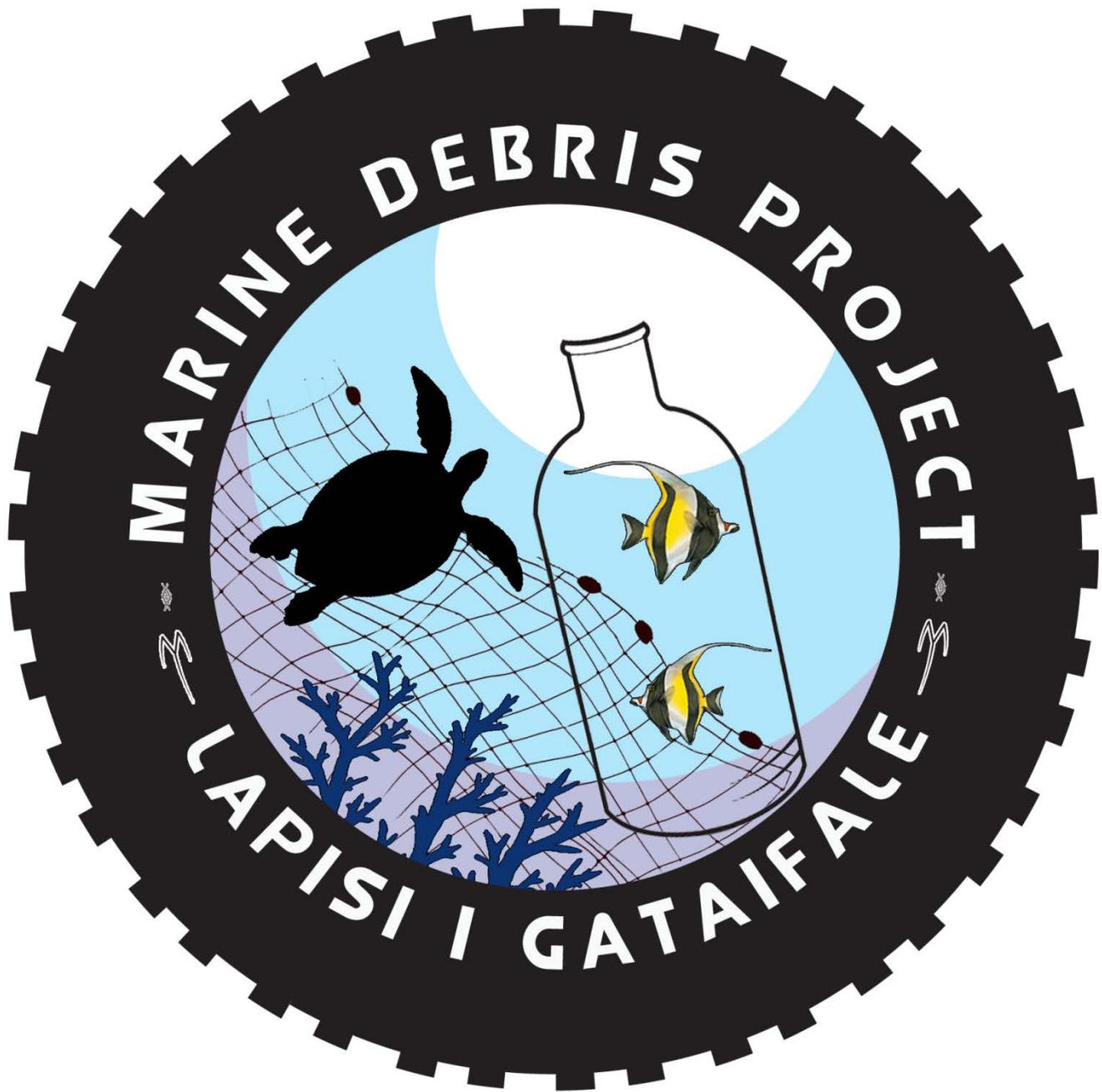
- Increasing scientific knowledge of climate change causes and effects*
- Working to maximize coral reef ecosystem resilience*
- Improving human communities’ resilience to climate change*
- Reducing American Samoa’s greenhouse gas contributions*

Coral reefs provide a variety of goods and services for our local communities, including protection from storms and waves, recreational areas, and fish for us to eat. These fragile ecosystems are severely threatened by impending impacts of climate change. Changes in ocean chemistry and temperature may forever alter the state of our coral reefs and the goods and services they provide; we must take action now to preserve them for the future.



Contact the Coral Reef Advisory Group
at 684 633 4456 to learn more and get involved..!





FISHERIES MANAGEMENT

The Coral Reef Fishery Management LAS vision is “to promote and ensure a healthy marine ecosystem with sustainable fisheries to support the people and future generations of the Samoa archipelago”, and it is supported by the following 4 key goals:

Goal 1: Biological- Aiming to achieve a healthy marine ecosystem for the Samoan archipelago by identifying factors impacting coral reefs.

Goal 2: Social - Aiming to develop social, cultural and economic initiatives that enhance opportunities for American Samoa’s communities to participate in management and conservation activities, thereby encouraging a communal “sense of guardianship” of the environment.

Goal 3: Fishery- Aiming to maintain and, where necessary, improve the status of fish stocks through protection and sustainable use.

Goal 4: Management - Aiming to ensure collaborative management to effectively protect coral resources by focusing CRAG’s efforts and attention on priority threats and actions.



Contact the Coral Reef Advisory Group
at 684 633 4456 to learn more and get involved..!





FISHING REGULATIONS IN AMERICAN SAMOA

ALL COMMERCIAL HARVESTING REQUIRES PERMITS & LICENCES

AMERICAN SAMOA FISHING REGULATIONS LIMIT TAKING, POSSESSING, OR SELLING THE FOLLOWING:

CORAL (AMU)

It is illegal to disturb living coral in water less than 60 feet deep.

GIANT CLAMS (FAISUA)

Tridacnid clams must be 6 inches or larger to harvest and 7 inches or larger to sell. Clams are measured across the widest part of the shell. All clams offered for sale must be in whole condition (meat attached to shell).

SEA TURTLES & MARINE MAMMALS

It is illegal to harvest sea turtles or their eggs, marine mammals (whales, dolphins, and porpoises), or any product of these species.

HUMPHEAD WRASSE (LALAFI/TAGAFA/ MALAKEA), BUMPHEAD PARROTFISH (ULUMAKO), SHARKS (MALIE), & GIANT GROUPE (GATALA)

These species are illegal to harvest, possess, or sell.

MANGROVE CRAB (PA'ALEMAGO)

Must measure at least 6 inches across the widest part of the back. It is illegal to harvest egg-bearing females.

COCONUT CRAB (UU)

Must measure at least 3 inches across the widest portion of the back. It is also illegal to harvest any egg-bearing female or interfere with a crab releasing larvae.

SPINY LOBSTER (ULA)

Must measure at least 3 1/8 inches in carapace length, measured between the horns from front to rear edge of carapace. It is illegal to harvest egg-bearing females and all lobsters must remain whole until processed.

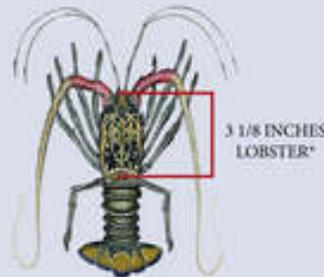
SLIPPER LOBSTER (PAPATA)

Slipper lobsters are illegal to collect using spear or snagging devices. It is illegal to harvest egg-bearing females.

AQUARIUM FISH & ORNAMENTAL SHELLS

Harvesting of aquarium fish and commercial harvesting of ornamental shells require special permits.

LEGAL SIZE LIMITS



3 1/8 INCHES
LOBSTER*



GIANT CLAM

6 INCHES—PERSONAL USE
7 INCHES—COMMERCIAL USE



6 INCHES
MANGROVE CRAB*



3 INCHES
COCONUT CRAB*

*No egg bearing females

BANNED SPECIES IN THE TERRITORY:

Unlawful to collect or possess any of the following species



Humphead Wrasse "Lalafi"



Bumphead parrotfish "Ulumako"



Giant Grouper "Gatala"



All Shark "Malie" Species

For more information on Illegal Fishing Methods, Gear Restrictions, Rose Atoll Wildlife Refuge, Enforcement & Penalties, please visit the Enforcement office at DMWR, Fagatogo or

call + 684 633 4456, 731-0729 or 733 9866.



Economic Benefit of Coral Reefs in American Samoa



Background:

Healthy coral reefs are among the most biological diverse and economically valuable ecosystems on earth, providing hundreds of billions of dollars in food, jobs, recreational opportunities, coastal protection, and other important services. For instance, American Samoa coral reefs are one of the Territory's most valuable resources, having provided benefits to our ancestor's survival and the practice of culture, language, and the "Fa'a Samoa" or "the Samoan way of life." This valuable asset continues to supply enormous services to the people of American Samoa and benefiting local economy. In fact, an economic valuation report of the territories coral resources was conducted by Jacobs Inc. in 2006 highlights their importance and economic value as follow:

Importance:

- **Healthy coral reefs support commercial and subsistence fisheries (NOAA National Marine Fisheries estimates the commercial value of the U.S coral reefs is over \$100 million)**

**American Samoa coral reef fisheries estimated value per year \$689,000*

**Bottom fishing is about \$70,000/yr*

- **Coral reefs provide jobs and businesses through tourism and recreation.**

**Recreational uses is estimated at \$73,000/yr*

- **Coral reefs in general are the islands natural boundary against high-wave action preventing coastal erosion. This natural forefront barrier prevents damages to coastal developments and infrastructure. (saving money from building seawalls)**

**Shoreline protection provided by the reefs \$447,000/yr*

- **Total benefits of coral reefs to American Samoa residents and visitors**

**Are estimated to be worth around US\$ 5.1 million/year*

- **When potential non-use benefits accruing to US citizens are included, overall**

**Benefits could be in the order of US\$ 10 million/year*

The health and survival of American Samoa's coral reefs are vulnerable to the growing demand of an increasing population. In the last few decades the territories coral reefs have encountered unprecedented pressures from habitat loss, overfishing, climate change, and pollution. The decline and loss of coral reef ecosystems have significant social, cultural, economic, and ecological impacts on people and communities. However, with effective leadership and management, healthy, resilient coral reef ecosystems can continue to provide these valuable services to current and future generations of American Samoa.



Artisanal Fisheries in the Manua Islands



AMERICAN SAMOA ENVIRONMENTAL EDUCATION GROUP

Le Tausagi

Vision: Communities that are knowledgeable about environmental issues and a healthy environment while maintaining culture and tradition

What is it?

An environmental educators group comprised of representatives from various non government and governmental departments.

What does it do?

Works to educate the general public that includes schools, village communities and church organizations.

About what?

On the importance of protecting, preserving and restoring our natural environment and its limited resources.

Who is involved?

- ASCC-Land Grant
- AS-EPA
- CZMP
- DOC
- DMWR
- DWYA
- NRCS
- NOAA PIRO
- NPS
- NMSAS
- UH-Sea Grant

What we can provide?

- Lesson plans/Hands on activities
- Class Presentations
- Environmental Workshops

**FOR MORE INFORMATION
CALL CRAG OFFICE
AT 633 4456.**





AMERICAN SAMOA SOIL & WATER CONSERVATION DISTRICT

GOT WOOD CHIPS?

For more information call AS-SWCD office at 633-1031 ext.131 or email Joe Uiagalelei at joeuiagaleleiswcd@gmail.com

Before Scheduling the Wood Chipper:

- Wood MUST be Dry.
- No Soft and rotten wood.
- Wood MUST be 6 inches or less in diameter.
- You must have a place to store your wood chips. Preferably dry in-house storage or tarp.
- Make sure there is space for the truck to load/unload where the wood chips will be stored.
- Neatly stack or organize your woods near the storage location.

Fees:

Operation Fee: \$10.00 an hour.

Transportation Surcharge: All clients will pay this charge to haul out the wood chipper to their facility. (refer to the map)

Maintenance Fee: \$5.00.

Available Services

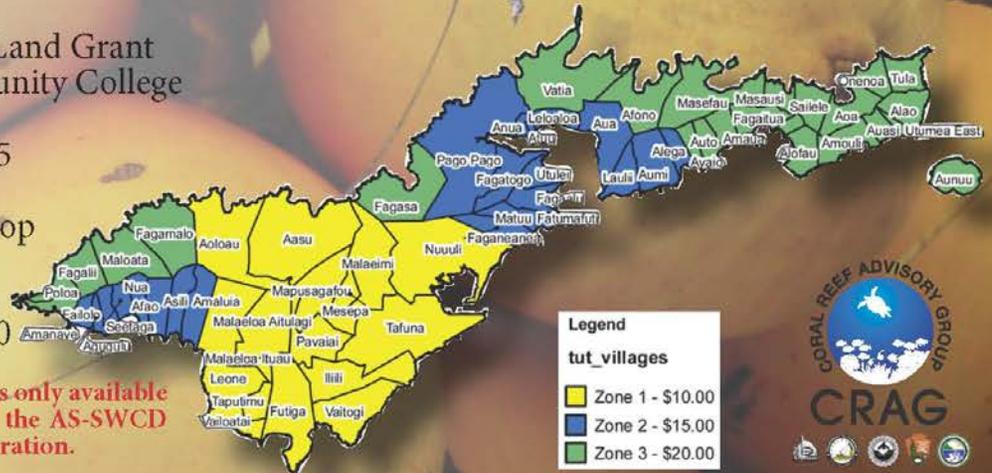
Provider: Sopoaga Sagaga
Location: Tafuna
Contact: 622-7815/733-5326/258-3408

Provider: AS Department of Agriculture
Location: Tafuna Industrial Park
Contact: 699-9272/699-1290/699-1327

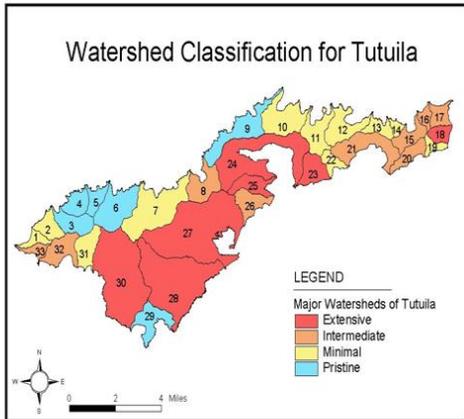
Provider: ASCC Land Grant
Location: Community College (Malaeimi)
Contact: 699-1575

Provider: Tool Shop
Location: Tafuna Industrial Park
Contact: 699-2420

AS-SWCD Wood Chipper Service is only available to Dry Litter Piggery Owners and the AS-SWCD does not make profit from this operation.



Faga'alu Watershed



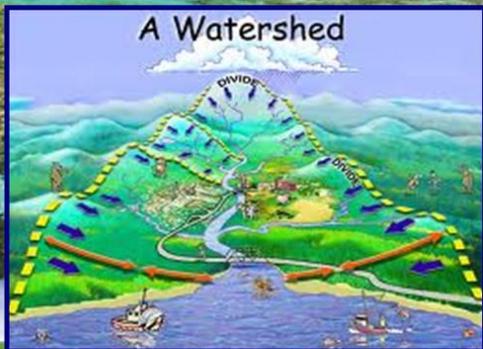
What is a Watershed?

A watershed is the area of land where all of the water that falls on it goes into the same place. "that area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community." Everything between the hills and the ocean is considered part of the watershed. (trees, streams, animals, people, houses, farms etc.)

WHAT NUMBER IS FAGA'ALU ON THE WATERSHED CLASSIFICATION?

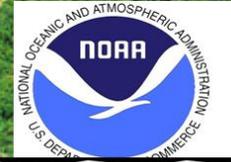
Water Quality is based on how clean and pure water is. The quality of water in the watershed directly affects everything that lives there. Plants, animals and people all use water from the watershed. If the water is contaminated everyone feels the effect. Plants animals and humans can get sick and in extreme cases they may even die.

Protecting your watershed is very important and needs your help. All the land use activities within watersheds impact the water quality of downstream bodies of water. In addition, any waste and debris gets carried by waterways or streams, eventually ending up in the ocean and impacting our reefs.



Protecting Faga'alu Watershed

1. Pick up litter and throw in trash bins.
2. Don't pour toxic household chemicals down the drain. Take them to a local hazardous waste collection center instead.
3. Use hardy plants that require little or no watering, fertilizers or pesticides in your yard.
4. Recycle yard waste in a compost pile and use a mulching mower to leave grass clippings on the lawn.
5. Minimize use of plastic bags and bottles. Re-use existing bags and fill up reusable water bottles.
6. Never pour used oil or antifreeze into the storm drain or the street. Visit www.earth911.org to find out where you can go to dispose of hazardous wastes properly.
7. Make sure the waste from your houses goes into a septic or sewer.
8. Become a watershed steward and Adopt your watershed! Learn more at www.epa.gov/adopt.
9. Plant more trees.
10. Develop a watershed approach that will provide a plan to help manage your village watershed.



CONTACT US AT:

- AS - EPA - 633-2304
- ASCC LAND GRANT - 699- 1575
- DEPARTMENT OF COMMERCE 633- 5155
- MARINE & WILDLIFE RESOURCES 633- 4456
- CORAL REEF ADVISORY GROUP - 633- 5155
- NOAA Fisheries-PIRO - 633-5326
- NOAA PIRO FISHERIES 633- 5326



On the Edge

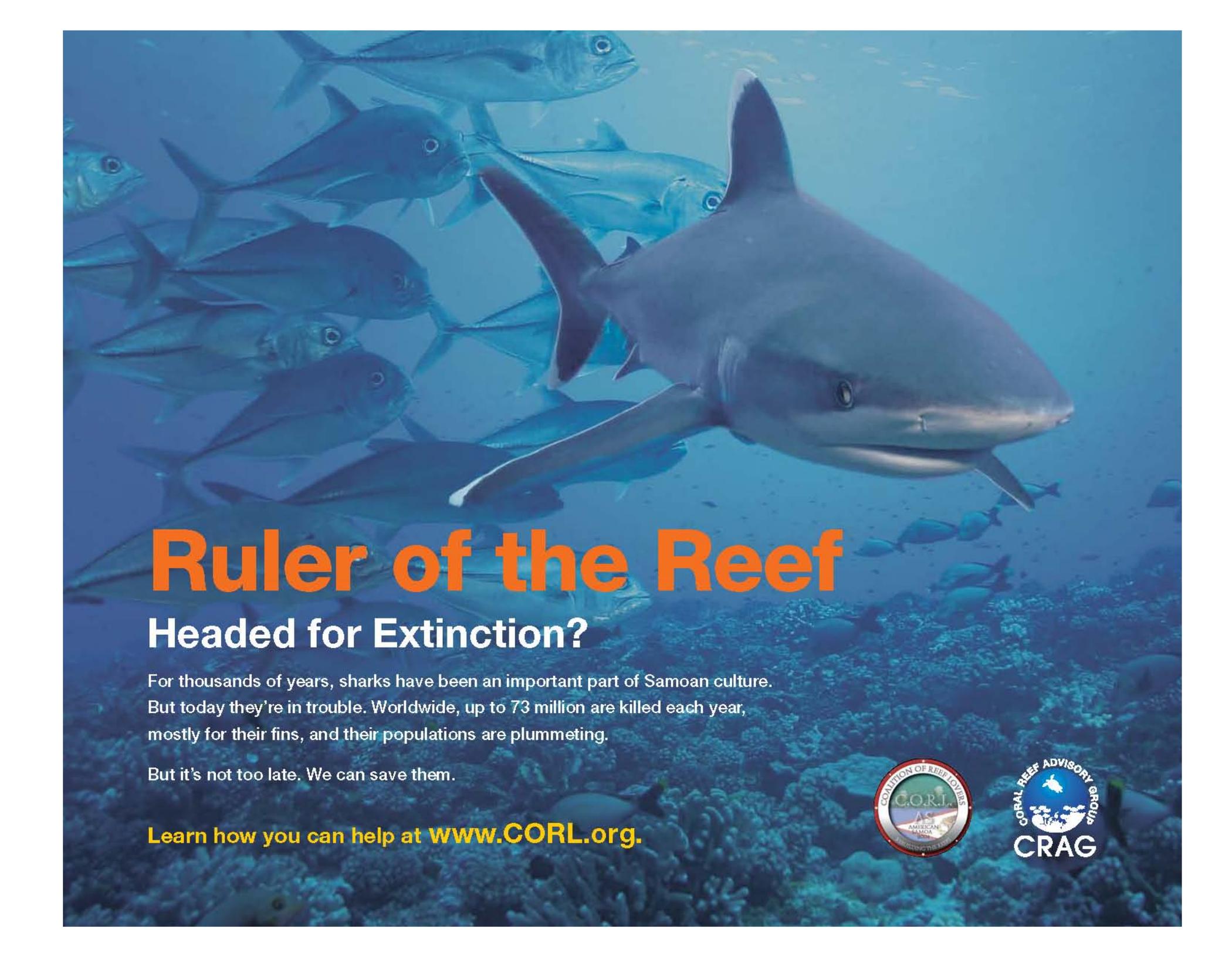
Our sharks are in trouble.

For thousands of years, sharks have been an important part of Samoan culture. But today they're in trouble. Worldwide, up to 73 million are killed each year, mostly for their fins, and their populations are plummeting.

But it's not too late. We can save them.



Learn how you can help at
www.CORL.org.



Ruler of the Reef

Headed for Extinction?

For thousands of years, sharks have been an important part of Samoan culture. But today they're in trouble. Worldwide, up to 73 million are killed each year, mostly for their fins, and their populations are plummeting.

But it's not too late. We can save them.

Learn how you can help at www.CORL.org.



MORATORIUM ON TAKING AND REMOVING SEA CUCUMBERS

Section 1. Authority

This Executive Order is issued under the authority granted to the Governor in Article IV, Sections 6 and 7 of the Revised Constitution of American Samoa and the American Samoa Code Annotated Section 4.011 and Section 24.0304.

Section 2. Moratorium on Taking and Removing Sea Cucumbers.

- a. For the purposes of this Order, "moratorium" means the cessation of all acts that are in any way related to a prohibited activity for a prescribed period of time.
- b. There will be a moratorium on the taking and removing of sea cucumbers in American Samoa and its Exclusive Economic Zone for a period of six (6) months.
- c. This moratorium applies to all individuals, boats, vessels, corporations, organizations and any other public or private entities with the sole exception of DMWR to carry out its duties and responsibilities described in Section 2 below.

Section 3. Duties and Responsibilities of DMWR during Moratorium.

- a. During this moratorium, DMWR shall conduct surveys to investigate the population size and density of sea cucumber species that inhabit American Samoa and its Exclusive Economic Zone. These surveys must be conducted to determine whether it is necessary to regulate the harvest of sea cucumbers for conservation purposes.
- b. Upon the completion of these surveys, DMWR shall provide the Governor with a report regarding their findings and, if necessary, propose regulations regarding the harvest of sea cucumbers.
- c. If DMWR fails to complete its surveys within this 6 month period, it may request an extension of this moratorium from the Governor.

Section 4. Penalties.

- a. A violation of this order will be treated as a violation of the American Samoa Fishing Regulations, A.S.A.C. section 24.0901 et seq., and shall be subject to the fines and penalties listed in A.S.C.A. section 24.0312.h. Any sea cucumbers discovered in violation of this Order shall be confiscated by the government and shall be delivered to DMWR.

Section 5. Effective Date and Expiry.

This Executive Order shall be effective immediately and unless extended will expire six (6) months from the date provided below.

Dated: December 04 1 2013

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LOLO MATALASI MOLIGA Governor of American Samoa

SEA CUCUMBERS in AMERICAN SAMOA



Redfish – Mama'o
Actinopyga mauritiana



Greenfish – Maisu
Stichopus chloronotus



Lollyfish – Loli
Holothuria atra



White teatfish – Susuvalu pa'epa'e
Holothuria fuscogilva



Leopardfish – Ulutunu fugafuga gatae
Holothuria whitmaei

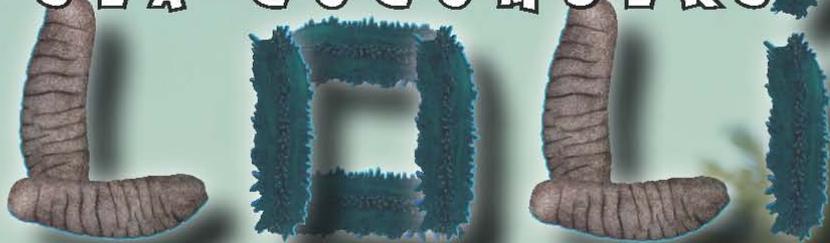


Dragonfish – Sea
Stichopus horrens

For more information please do contact Alice Lawrence at 633 4456



SEA CUCUMBERS



Sea Cucumbers species found on our reefs.



Ulutunu fugafuga gatae



Loli



Pa'ulu



Susu valu pa'epa'e



Mama'o



Maisu

Report all illegal activities to DMWR enforcement at 731-0729, 733-9866 or 633-4456

What are Sea Cucumbers? They are marine animals that have soft, worm-like body with leathery skin.

Where do they live? They live on the bottom of the ocean. Some are found in shallow lagoons, on seagrass beds and reef flats, while others prefer wave-exposed areas and deep waters.

What do they eat? Sea cucumbers move very slowly, feeding on dead plant and animal material in the sand. The sand is taken in, the waste digested and the clean sand passed out behind them.



Why are they important? They are like the vacuum cleaners of the ocean, cleaning and turning over sand on the sea floor. They also help to recycle nutrients and release calcium carbonate into the water, which helps to increase the alkalinity (the pH) and reduce the acidity in the water.

Management measures: Subsistence/traditional harvesting is allowed but not commercial fishing.