

# POST-TSUNAMI COASTAL RESOURCE DAMAGE ASSESSMENT

TUTUILA, AMERICAN SAMOA

OCTOBER, 2009

*PREPARED BY THE GOVERNOR'S CORAL REEF ADVISORY GROUP*





This report documents a rapid coastal resource assessment of Tutuila in the days immediately following the earthquake and tsunami on September 29, 2009. The main focus of the assessment was on coastal and marine debris that could impact territorial coastal resources as well as on environmental health issues such as oil spills, septic systems and piggeries.

**Survey Team:**

Jeremy Goldberg (DOC), Doug Harper (DOC), Kevin Grant (FBNMS), Doug Juergens (DOC), Brian Rippey (AS-EPA), Phil Wiles (AS-EPA), Meghan Gombos (NOAA), Kathy Chaston (NOAA), Trina Leberer (TNC), Umi Sengebau (TNC)

**Summary and Recommendations:**

Overall, it appears that there are no urgent environmental health concerns although a number of items will require significant attention during the coming weeks to ensure that ecological impacts are minimized. The most severe damage was found at Poloa, Amanave, Leone, Pago Pago, Alao, and Tula although widespread damage was also reported from Masefau, Vatia, Amaluia, and Asili.

Marine and coastal debris is going to need extensive manual labor to assist with removal. Ideally, SCUBA divers would be used to check for sunken debris in deeper water, such as pieces of tin roof, as the longer the debris is left in the environment, the more likely coral reef damage is going to occur. Additionally, surveys are currently underway to assess general damage to reefs from the force of the wave although existing staff and equipment is minimal. No severe impacts to wildlife were noted from land other than small to moderate numbers of reef fish washed ashore in certain locations. Nearly all affected coastlines are suitable for staging areas.

Oil spills were noted in Pago Harbor, yet most marine areas seemed to be flushing with wave action or currents. Numerous piles of debris have accumulated along streams and shorelines and there is the potential for great harm to coral reefs should they may allowed to flush onto reef areas. These debris piles need to be cleaned up quickly and efficiently. Additionally, toxic and/or harmful contaminants from these debris piles have yet to be assessed and several small pieces of debris may include chemicals and other potentially hazardous materials. For example, items such as plastic oil bottles, oil drums, car batteries, cars and air conditioning units were noted along several shorelines. Additionally several small boats and vehicles were noted in or adjacent to shoreline areas and it remains unclear if any are leaking contaminants.

In order to consistently quantify the damage at various village sites, a simple Marine Debris Scale was devised with the following descriptions: 1 = none; 2 = very patchy; 3 = larger patches of debris interspersed with sparse areas; 4 = extensive debris but with a few sparser areas; 5 = heavily covered in debris.

# Poloa

Poloa received a direct impact from the tsunami wave and suffered tremendous destruction. Approximately 90% of buildings were completely destroyed: only one church and one home are left standing. The shoreline along Poloa consists of a high rocky shore along a large open bay. There is a man made seawall in place but this is now damaged and knocked down in certain sections. A reef flat and stream habitat and severe amounts of marine debris present, mostly tin roofs and household good and materials such as refrigerators, mattresses, and tin building material. The approximate inundation level was 300 feet and there is good accessibility. Village homes along shoreline were severely damaged and marine debris on the coastline is extreme. Taro and bananas patches further upland were not impacted. One site has multiple cars leaking fluids.

Marine debris scale: 4



# Amanave

The shoreline along Amanave consists of a sandy bay/cove which is relatively exposed to ocean conditions. A manmade seawall exists in front of the village. The main habitat type is a reef flat and a sediment plume was present approximately 30 ft in the center of the bay next to outcropping. Marine debris is severe in places but several pieces were stopped from entering the ocean due to a line of trees between the village and the water. A severe amount of marine debris is visible on the reef including one vehicle. Coastal debris is mostly household goods, plastic tables, chairs, roofing, wood, and other miscellaneous small items. The inundation is approximately 1,000 feet and there is good accessibility to the coastline. Vegetation up to 30 feet along the sides of the bay is cleared. It is unclear how much erosion is due to the event but there is a steep drop from the tree line down to the beach. Banana trees were wiped out on western edge of the village and there is a bus in vegetation on eastern side of the bay. Numerous refrigerators and air conditioning units were on the beach, and several cesspools and at least six septic tanks were damaged.

Marine Debris Scale: 5



# Fa'ilolo

The rocky shoreline and sandy beach along Fa'ilolo are very exposed to the open ocean conditions. The dominant coastal habitat is a reef flat and a 20 foot wide sediment plume was seen along the shoreline. Coastal debris is patchy and consists mostly of small items (tin, bottles, cans, etc...). The debris appears to be concentrated along the eastern end of the bay, and marine debris appears to seem less than in other villages. However, there is a vehicle in the water which may be leaching contaminants. The inundation is approximately 100 feet and landslides on the eastern end of the bay are visible.

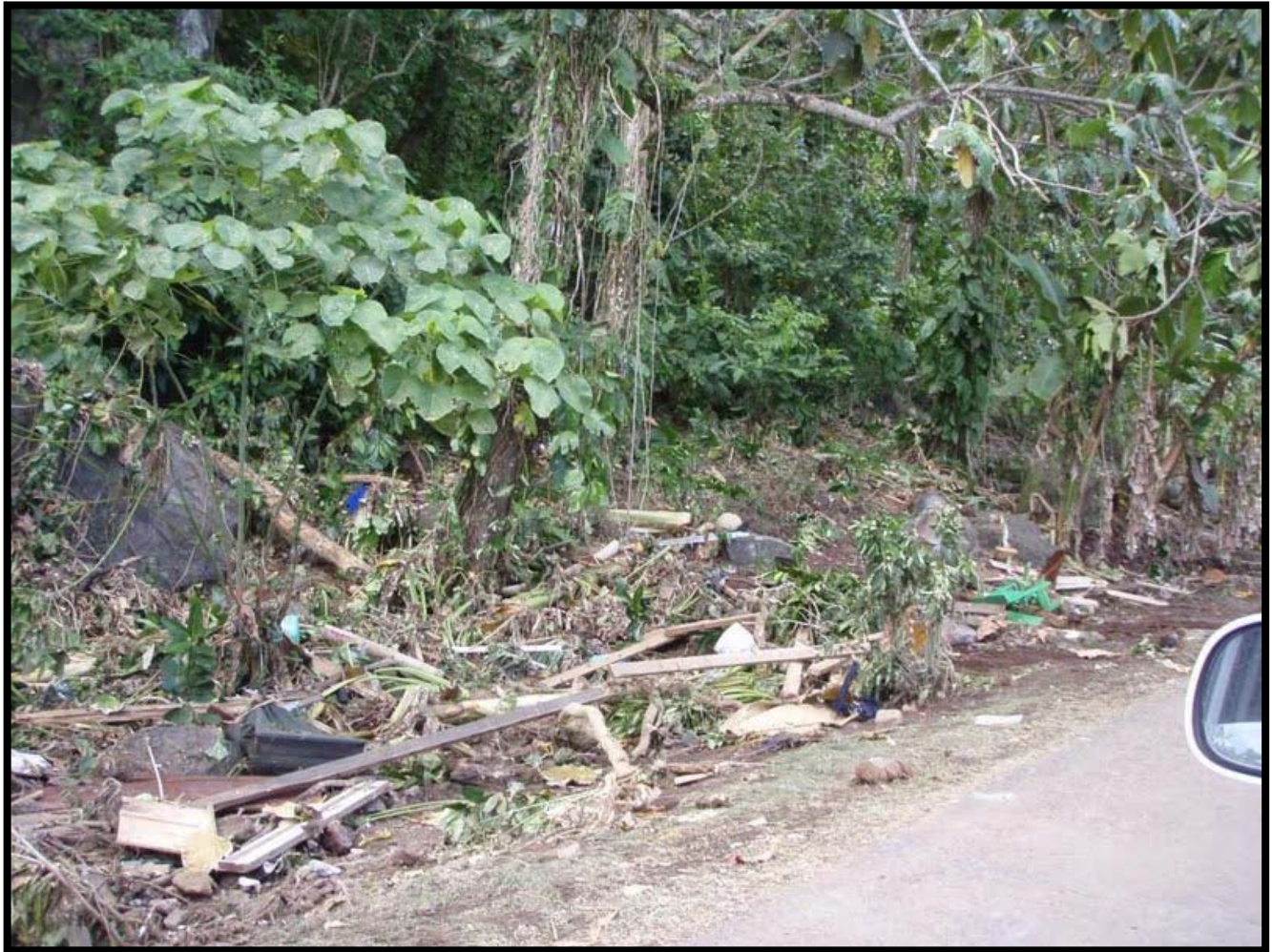
Marine Debris Scale: 2



# Agugulu

A rocky shore and sandy beach make way for a large reef flat along the village of Agugulu. There is a man made seawall and marine debris is concentrated in patches along the western end of the bay. The approximate inundation level is 60 feet, there is good accessibility to the site, and a small amount of property damage is visible.

Marine Debris Scale: 2.5



## Utumea, Se'etaga, Nua and Afao

Each of these villages has a sandy beach along with a rocky shoreline, steep embankments and large man made seawalls. The inundation level was only approximately 100 feet inland. All four villages are easily accessible and are adequate for staging areas. A fifty foot wide sediment plume was visible along the Utumea coastline along the eastern side of the bay. A car is on the beach and may be leaking contaminants. Large amounts of floating debris is present and a severe amount exists in stream beds, including housing materials such as tin roofs. A refrigerator was seen along the coastline of Afao.

Marine Debris Scale: 2.5

**Need PHOTOS.**



# Asili

A steep 15 foot embankment gives way to a small protected rocky beach and a substantial stream system along Asili. Shoreline erosion is present and a reef flat exists just offshore. The debris appears to be concentrated on the eastern end of the bay and consists of mostly household goods and building materials. There is extensive debris in the stream mouth, including multiple vehicles leaking fluids, and a significant amount along the shore. There is good site accessibility and the inundation level is approximately 1,000 feet. There is damage throughout the village and there are piles of debris everywhere. Multiple septic tanks and cesspools were damaged and there is a large amount of debris resting in standing water under the bridge.

Marine Debris Scale: 5



# Amaluia

Amaluia has a rocky shoreline with a relatively steep embankment, a man made seawall and a fairly large stream drainage. A reef flat exists just offshore and a sediment plume approximately 10 feet wide was visible. Debris appeared to be concentrated on the east end of the bay and there was a tremendous amount of debris in the stream. The inundation level is approximately 100 feet and there is good accessibility along a steep embankment. Several cesspools are damaged and approximately 3-5 septic tanks ruptured.

Marine Debris Scale: 4



# Leone

Leone has one of the few remaining extensive mangrove lagoons on the island as well as a reef flat just offshore. It received a direct impact from the tsunami and is one of the most devastated villages on Tutuila. There are extensive piles of debris immediately adjacent to the shoreline. The wetland area is entirely covered with debris yet the shoreline debris is patchy and not as severe. The inundation is at least 1,000 feet. The shore has a shallow embankment and is easily accessible. However, the wetland is behind the destroyed village and is now difficult to access. Multiple damaged vehicles are leaking fluids, a damaged gas station may be leaking fuel, and there are several damaged and exposed cesspools and septic tanks.

Marine Debris Scale: 5



# Pago Pago

Pago Pago was ground zero for the tsunami and received the most significant large scale damage in American Samoa. Entire buildings were completely destroyed, buses were flipped over, boats were lifted onto the roads, and cars and debris entirely fill several streams. The inner section of Pago Pago Harbor is severely polluted and will require an extensive clean up program with a significant amount of man power. The destruction is everywhere. An oil spill approximately 40 feet in width was seen in the mouth of the harbor and fuel drums were seen washed up along shore. Approximately one dozen cars have been destroyed and are leaking fluids. Several air conditioning units were damaged and may be leaking. There is undoubtedly a significant amount of debris that washed into the harbor and water quality is severely impaired.

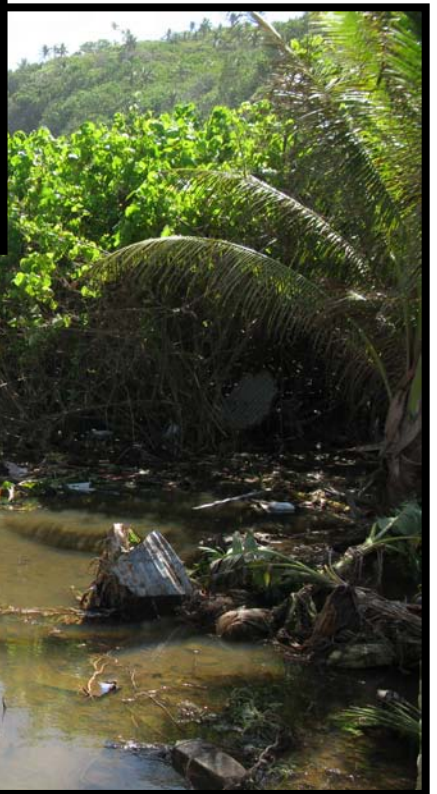
Marine Debris Scale: 5



# Alao

Alao has experienced significant damage which, although not as physically devastating to the homes as Leone or Tula, may significantly impact the environment and community as well. The slope of the main road has caused seawater to remain standing behind the surrounding homes closer to the wetlands, approximately 500 feet inland. Trash is floating on the water and a number of the homes have experienced broken septic tanks (GPS: 0547193x8423542 (#15), 0547215x8423516 (#16 – 2 septic breaks), 0547191x8423468 (#17), 0547165x8423434 (#18), and 0547137x8423416 (#19)). Several of the broken tanks appear to have leaked and there is a large number of dead fish in the water. The wetlands behind the village were inaccessible due to the standing water but it would appear that the wetlands are being moderately to severely impacted by the standing, polluted water. For future communication with Alao, the mayor is very particular that he be contacted. His name is Moses and he can be reached at: 252.0077.

Marine Debris Scale: 4



# Tula

Parts of Tula village were completely decimated by the tsunami and there are collapsed homes and debris over the entire village grounds. The majority of the debris are home effects, such as beds, clothes, electronics, and parts of the building structure. The mangroves and wetlands cover an extensive area and appear to have sustained moderate damage and the stream separating the wetlands/mangroves from the village is completely clogged with large debris including building materials, tin roofs, cabinets, etc... Several car batteries were seen along the stream area. The coastal debris is more sparse and mainly includes smaller items. However, the close proximity to the reef flat indicates a high probability that significant amounts of debris washed out onto the coral reef. There is also a car on the beach that may be leaking hazardous fluids (GPS: 0546992x8424168; #14). There were also a number of broken septic tanks although none appeared to be leaking (GPS: 0546913x8424426 (#10), 0546894x8424422 (#11), and 0546934x8424468 (#12 – there is a propane tank here as well)). There is good access to this site and inundation levels are approximately 700 feet.

Marine Debris Scale: 5

