

21. Land mammal, reptile & amphibian checklist for A. Samoa

Common and Samoan names	Scientific name	Origin ¹
LAND MAMMALS		
Bats		
Samoan fruit bat ² (<i>pe'a vao</i>)	<i>Pteropus samoensis</i>	N
White-naped fruit bat ^{2,3} (<i>pe'a fanua</i>)	<i>Pteropus tonganus</i>	N
Sheath-tailed bat ⁴ (<i>pe'ape'avai</i>)	<i>Emballonura semicaudata</i>	N
Rodents		
Polynesian rat (<i>isumu</i>)	<i>Rattus exulans</i>	PI
Roof rat (<i>isumu</i>)	<i>Rattus rattus</i>	MI
Norway rat (<i>isumu</i>)	<i>Rattus norvegicus</i>	MI
House mouse (<i>isumu</i>)	<i>Mus musculus</i>	MI
Others		
Pig (<i>pua'a</i>)	<i>Sus scrofa</i>	PI
Dogs	<i>Canis familiaris</i>	PI
Cats	<i>Felis domesticus</i>	MI
LAND REPTILES		
Geckos		
Pelagic gecko (<i>mo'o</i>)	<i>Cyrtodactylus pelagicus</i>	N
Polynesian gecko (<i>mo'o</i>)	<i>Gehyra oceanica</i>	N
Mourning gecko (<i>mo'o</i>)	<i>Lepidodactylus lugubris</i>	N
Stump-toed gecko (<i>mo'o</i>)	<i>Peropus mutilatus</i>	N
House gecko (<i>mo'o</i>)	<i>Hemidactylus frenatus</i>	MI
Skinks		
Snake-eyed skink (<i>pili</i>)	<i>Ablepharus boutonii</i>	N
Micronesian skink (<i>pili</i>)	<i>Emoia adspersa</i>	N
Azure-tailed skink (<i>pili</i>)	<i>Emoia cyanura</i>	N
Lawes skink (<i>pili oua</i>)	<i>Emoia lawesii</i>	N
Black skink (<i>pili uli</i>)	<i>Emoia nigra</i>	N
Samoan skink (<i>pili lape</i>)	<i>Emoia samoensis</i>	N
Moth skink (<i>pili</i>)	<i>Lipinia noctua</i>	N
Snakes		
Pacific boa ⁵ (<i>gata</i>)	<i>Candoia bibroni</i>	N
Blind burrowing snake ⁶	<i>Ramphotyphlops braminus</i>	MI
AMPHIBIANS		
Marine toad ⁶ (<i>lage</i>)	<i>Bufo marinus</i>	MI

¹ N = native, PI = Polynesian introduction, MI = modern introduction.

² Also known as flying foxes.

³ Also known as white-necked, Tongan or insular fruit bat.

⁴ Few found after cyclones in 1990 and 1991; perhaps locally extinct.

⁵ Ta'u Island; formerly present on Ofu Island (T. Malae, pers. com.) and Tutuila Island (Steadman, D., & G. Pregill. 2004. A prehistoric, non-cultural vertebrate assemblage from Tutuila Island. Pacific Science 58:615-624).

⁶ Tutuila Island.

Source: based primarily on Amerson et al. 1982. Wildlife and wildlife habitat of American Samoa. Vol.1. Environment and ecology. US Fish & Wildlife Service (Wash. DC). 119p.

22. Flying Foxes (fruit bats)

Large flying foxes, also known as fruit bats, are one of the more unusual animals in American Samoa, especially for visitors from areas where bats are small and rarely seen. Three species inhabit our islands – two large fruit bats (*Pteropus samoensis*, *P. tonganus*) and a small insect-eating bat (*Emballonura semicaudata*). These three are the only native mammals in the Samoan islands.



The two flying foxes are especially distinctive: they are renowned for being large (with a wing span up to 3 feet wide) and active both day and night. *Pteropus samoensis* (*pe'a vao*) is commonly called the Samoan flying fox. It is presently found only in the Samoan Archipelago and Fiji. It once occurred in Tonga but is now extinct there. The other flying fox, *Pteropus tonganus* (*pe'a fanua*), has several common names such as the Insular, White-naped, White-necked or Tongan fruit bat. It has a wider distribution in the Pacific, ranging from islands off Papua New Guinea to the Cook Islands.

In American Samoa, flying foxes can be seen flying, soaring, feeding, or just hanging in trees. Although individuals of the two species overlap in size (adults weigh 300-600 grams), there are ways to differentiate them from a distance. When silhouetted against the sky, the *pe'a vao* has a more triangular shape, with wings that are slightly scalloped and relatively dark and opaque. Their flight appears more relaxed, usually with slower wing beats and deeper wing strokes. It is not unusual to observe them soaring in the air in the day, taking advantage of rising currents of warm air (thermals) to seemingly float up and about without flapping their wings.

In contrast, *pe'a fanua* has a more cross-like appearance: the neck and head appear more pronounced, the wings are narrower and more scalloped, and the hind legs stretch out like a tail. In flight, *pe'a fanua* tend to have faster wing beats and shallower wing strokes. They are less likely to soar in thermals and generally take a directional route to and from roosting sites at dawn or dusk.



White-naped flying fox (*pe'a fanua*)



Samoan flying fox (*pe'a vao*)

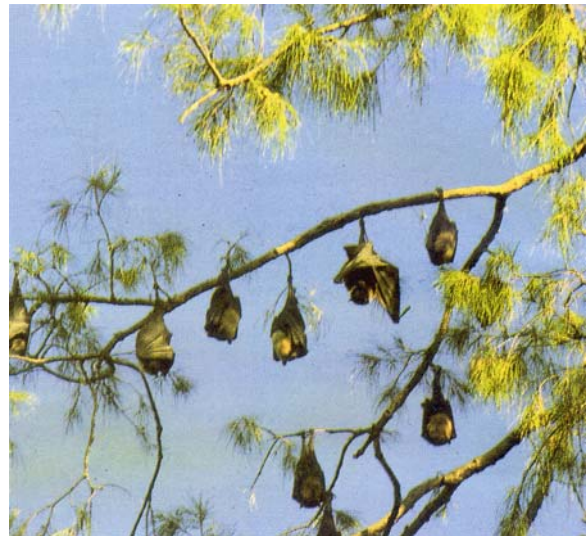
Despite these differences, it takes keen eye to distinguish the two species from a distance. Close up, the *pe'a vao* may sport a white to yellowish triangular patch that starts from the forehead and extends to the back of its head, or it may simply exhibit a generally grayish head with or without flecks of white hair

(much like a graying man). Its neck and shoulder areas are a beautiful russet brown, while the rest of the body has a dusty black appearance. The *pe'a fanua*, on the other hand, has a basically black head and body. These black areas serve to set off a distinctive band of creamy yellow on the back of the neck and which extends slightly below its shoulders as if in a cape. This explains why they are called white-naped fruit bats although the color is not really white.

The two species have quite different social behaviors. During the daytime, *pe'a fanua* form large roosting groups or colonies of hundreds to thousands of bats. These colonies are generally organized according to their reproductive status and may be composed of bachelor males, clusters of females defended by an adult male (suggesting a harem mating system), or groups of females and their young. In any case, individuals appear to be relatively “faithful” to their roosts, usually returning to their respective colonies following foraging flights.

But the *pe'a vao* does not do this. Instead, these bats usually roost singly on branches, or as pairs of males and females (suggesting a monogamous mating system), or as a female with its young. When roosting, *pe'a vao* males tend to hang from exposed or dead branches of trees on ridge tops while females roost in more covered positions on forest slopes.

There is little information on how long flying foxes live, although some held in captivity have lived 20 years. We assume that they live shorter lives in the wild, because natural catastrophes like tropical cyclones may periodically reduce their numbers, as occurred in the early 1990s. With proper management and protection from hunting, the populations will generally bounce back but this requires a number of years, because females of both species probably have only one young per year and we do not know how many of their young survive to adulthood.



The care and energy that both bat species put into their young is remarkable. Pregnancy lasts approximately 5 months in both species, and once the young are born, it takes at least another 3 months before they are weaned. Even after they are capable of flight, the young continue to receive parental care, perhaps until they reach adult size or become reproductively active themselves. We know this from observations of pairs of individuals seen to alight independently on the same tree and subsequently come together with one individual (presumably the juvenile) being wrapped up in the other's wings as they settle down to roost. Sightings of pregnant females and individuals carrying young in flight indicate that *pe'a vao* give birth mostly between April and June. *Pe'a fanua* births appear to occur year-round but are more common in January and June to August.

Although their name indicates that they are fruit-eaters, both species also eat nectar, pollen, leaves, and sap. They tend to consume only the “juice” of fruits and leaves. To do this, a bat will carefully chew on food (usually eating around large seeds), press the pulp against the roof of its mouth with its tongue, squeeze and suck in the juice, then spit out most of the pulp in pellets called “ejecta.” These ejecta are especially abundant under breadfruit trees (*ulu*) where the bats have been feeding overnight. Among the splatter of mushy bits of the fruit, you can find these pellets of drier material that sometimes show tooth and palatal (roof of the mouth) impressions, much like a dental cast produced at a dentist’s clinic. Ejecta pellets help us to identify food items that bats eat even when we do not directly observe them feeding. In addition to direct observations and analysis of ejecta, their diets are also determined through

pollen present in facial hair and in feces. These data help scientists determine which plants are important because they are preferred, nutritious and/or available year-round.

At least 42 plant species provide food for the *pe'a vao* and *pe'a fanua* in American Samoa. These consist mostly of forest tree species, such as *aoa* (*Ficus prolixa* and *Ficus obliqua*), *asi* (*Syzigium inophylloides*), *a'amati'e* (*Elaeocarpus ulianus*), *ifi* (*Inocarpus fagifer*), *fetau* (*Callophyllum inophyllum*), *mamalava* (*Planchonella samoensis*), and *tava* (*Pometia pinnata*). The bats also eat fruits grown by man such as mango (*Mangifera indica*) and *ulu* (*Artocarpus altilis*), but damage to crops is limited if fruits are harvested before they ripen on the tree. Also, when you hear the bats squealing in banana patches at night, it's usually because they are fighting over the banana flowers, not the fruits. Despite the broad similarity in their diets, *pe'a fanua* exploit flower resources and feed on trees (especially domestic ones) closer to human habitations more often than do *pe'a vao*.



The rewards of the interaction between flying foxes and plants are certainly not one-sided, because the plants and forest also benefit from being visited by bats. When the *pe'a fanua* visit patches of *vavae* flowers (*Ceiba pentandra*), for example, they help transfer pollen from one tree to another and that, in turn, enhances fruit formation and production. Flying foxes are also important for seed dispersal. When they consume fruits with small seeds (such as *aoa*), some seeds that get swallowed do not get digested but are carried and deposited away from the tree source. In American Samoa, flying foxes are the only animals that can carry fruits with large seeds, such as *ifi*, over distances and uphill. Studies of bat movements on Tutuila reveal that bats may commute between feeding areas up to 40 km apart during a single night. Seeds that are transported can colonize naturally bare or cleared areas and aid in the revegetation of gaps in forests where trees may have fallen from disease, age, or bad weather.

It may bother us that flying foxes eat some of the fruit that we grow for ourselves, but these bats are tireless workers that help maintain the health of our rainforest, and they are fun to watch.

Ruth C. B. Utzurrum
DMWR



Bats flying above their daytime roost.

23. Banyan trees -- lifeline for Samoa's wildlife

In the complex world of the Samoan rainforest, each of our native plants and wildlife contributes a unique and essential part. Just as the beauty of a hymn would be less without the harmonies of different voices, so the beauty of the Samoan forests would be less if any of our plants or animals were lost. And yet, as in a choir, there are a few natural “voices” that sing out above the rest. These are the plants and animals most important for the harmony of Samoa's natural world. Foremost among these are the *aoa*, or banyan trees.

Banyans are fascinating plants. Now, a lot of people don't think of plants as “fascinating”. After all, they just sit there, right? Well, not banyans. Although banyans give life to countless animals by feeding them with their fruit, all banyans start out as killers -- stranglers, to be exact. Another name for the banyan is “strangler fig”.

The *aoa* is a member of the fig family. They earn the other part of their name by their strange way of growing. Most plants, of course, sprout from seeds that have fallen to the ground, and grow up toward the sun. Banyans usually do the opposite: they sprout from seeds that have been left by birds high in a tree, and grow down toward the ground.

The seedling first anchors itself by sending roots into the little pocket of decaying leaves or moss where it has sprouted, then it wraps more and more roots around the tree that supports it, called the “host” tree. Soon the banyan's roots are spreading down the trunk, and finally they reach all the way to the ground. By then the fate of the host tree is sealed. It is literally buried beneath the growing banyan -- strangled to death. Eventually the body of the host tree decays away, leaving no trace behind, except sometimes a long hollow extending up inside the middle of the full-grown banyan. Because banyans will start life on almost any type of host tree, they kill very few of any particular kind, and so are no threat to other plant species. Still, they're rather...fascinating, don't you think?



In Samoa, we have two different kinds of native banyan trees, both called *aoa*. One kind (*Ficus prolixa*) becomes a huge tree, with an enormous spreading trunk that seems to be a twisted net of many smaller trunks. This kind of banyan has green fruit. The stronghold of this kind of banyan in American Samoa was the Tafuna Plain, where hundreds of the huge trees used to grow. Today, only a small fraction remain. Most have been cut down to make room for the uncontrolled development in this part of Tutuila. Fortunately, a few magnificent trees still survive.

The other kind of *aoa* (*Ficus obliqua*) is usually much smaller and does not have such a spreading form. Its trunk usually looks more “normal”, though it may have a hollow inside. This type of banyan seems to favor cliffs and steep slopes, although it can also be found on flat land. It doesn't always start life as a strangler, but sometimes grows up by itself. The easiest way to recognize this kind of *aoa* is its fruit, which is orange or red when ripe.

There is also an introduced kind of banyan tree in Samoa, the *pulu*. This tree, originally from Asia, is usually planted along the coast in villages; a large one grows next to the public market in Fagatogo. *Pulu* trees differ from *aoa* trees by their much larger leaves and larger, fuzzy red fruit. Although *pulu* are handsome trees that are useful for stabilizing our coasts, their fruits are not favored by wildlife, and so they do not play an important role in Samoa's natural symphony.

24. Natural foods for wildlife

An animal's place in its environment is determined, more than anything else, by what it eats. By studying what the birds and bats of American Samoa eat, and when those different foods are available, we are better able to develop plans to manage and conserve our wildlife and to help these animals in a crisis, such as after a tropical cyclone.

Most animals can be grouped by what and how many kinds of foods they eat. Animals that eat many different things are called generalists, while those that eat only one or a few foods are called specialists. True specialization is often a two-way dependency: an animal depends on a plant for food, and the plant depends on that animal to help it disperse its seeds. On remote islands like American Samoa, there is often not that much of any one kind of food, and cyclones can cause serious shortages of the foods that are available, so it is usually not a good idea for either a plant or an animal to rely on only one other creature. We have few bird or bat species that are specialists in American Samoa.

The technical word for the generalist, “omnivore”, literally means “eats everything”. Humans probably have the broadest diet of any animal -- we happily eat meat, leaves, seeds, fruit, and fungus -- not to mention Bongos. Animals that are most likely to survive in new environments, like when they first arrived on Tutuila, are often omnivores. A good example is the rat (*isumu*), which can eat fruit, eggs, crabs, fungi and probably many other things.

“Carnivores” are those species that eat almost exclusively other animals. We usually think of carnivores as fierce hunters, like wolves or lions, but actually any animal that eats other animals is a carnivore. The Barn Owl, or *lulu*, is the only Samoan animal that hunts other birds and mammals, but we have lots of other carnivores, including all our fish-eating birds and even our many animals that eat insects.

“Herbivore” is a description of those animals that eat only plants. This is a very general term, so it is better to specify what part of a plant is eaten, whether leaves, fruits, or nectar. Each kind of animal usually is good at eating only one, or at most two, of these parts of a plant, because they are so different. For example, to rely on leaves, you need strong teeth to grind up the tough fibers, and a big stomach to process all that material. Cows and horses are well equipped for the job. At the other extreme, to rely on nectar (the sweet liquid inside of flowers), you need to be able to zip between lots of flowers and reach inside to suck up the small amount of juice in each one. Nectar-feeders tend to be small and energetic, with long beaks or tongues to reach inside flowers. Finally, to eat fruit, you need to be able to travel long distances, since trees with fruit are often hard to find.

There are no native Samoan animals that are specialized for eating leaves (except insects and snails). However, leaves are regular parts of the diet of fruit bats (*pe'a*) and Pacific Pigeon (*lupe*). Perhaps the leaves contain a nutrient that can't be found in fruit, or maybe they help to fill up a hungry animal when there is little other food available.

Nectar is a very important food for many of our local animals.

The beautiful red and black Cardinal Honeyeater (*segasegamau'u*) is our most specialized nectar-eater. Its long bill and tongue enable it to reach deep into flowers, and its small size allows it to perch on even the tiniest twigs to reach the blossoms. Other birds that eat lots of nectar are the Wattled Honeyeater



In contrast, both kinds of *aoa* are very important for wildlife. In fact, a good case can be made that they are the most important tree species for the fruit-eating birds and bats of Samoa. There are two reasons why they are so important. First, they produce enormous amounts of fruit. When one of the huge banyans has crop of fruit, its spreading crown has room for a whole army of hungry fruit-eaters. In a single tree, I have seen three *lupe* (Pacific Pigeons), eight *manutagi* (Purple-capped Fruit-Doves), four *manuma* (Many-colored Fruit-Doves), a dozen *fuiia* (Samoan Starling), scattered *iao* (Wattled Honeyeaters) and *miti vao* (Polynesian Starlings) -- all at the same time. No other Samoan trees provide such a feast. The second reason why banyans are so important is that they fruit at all times of year. Most kinds of large forest trees have a definite fruiting season: for example, *asi* tends to fruit from April to July, but some banyans have ripe fruit every month of the year. Between 10-30% of banyan trees have ripe fruit in any given month. This means that a fruit-eater can always find banyan fruit, even if all other fruits were out of season.

One Samoan bird has come to depend on the reliable banyan. This is the *manuma*, or Many-colored Fruit-Dove, one of the rarest birds on Tutuila. In two years of observation, I have recorded *manuma* eating fruit on 99 occasions. In 98 of these 99 times, the *manuma* were eating banyan fruit (the one exception was berries of the *soga* bush). One probable reason why the *manuma* is so rare today is the loss of many banyan trees, particularly in the Tafuna Plain. If this bird is to survive here, it is essential that banyan trees be protected, and, if possible, increased in number.



Manuma

In addition to their important role in feeding wildlife, *aoa* trees also provide homes for many animals. *Lulu* (Barn Owls) frequently sleep and nest in the hollow trunks. *Tava'e* (tropicbirds) find large nesting shelters, and *fuiia* (Samoan Starlings) and *ti'otala* (White-collared Kingfisher) find protected nest holes. From its open, sheltered base to its spreading, fruit-laden crown, a banyan tree is a haven for wildlife.

Sadly, banyans today are under threat in American Samoa. Many were severely damaged by cyclones in 1990-91. Many others have been cut down, and more are threatened by continued development, particularly in the Tafuna Plain. Some of the most magnificent banyans that still stand have been made into gigantic trash barrels, their hollow trunks filled with mounds of used diapers and rusting cans. This garbage is sometimes burned, which can kill the banyan even if that is not intended.

What can you do? Give banyans the respect and protection they deserve. If your family is lucky enough to have an *aoa* on your land, please take care of it. Don't cut it, burn it, or use it as a garbage dump. If you notice a young banyan getting started, help it along by clearing away vines. If you know someone who has a banyan on their land, talk to them about its importance for wildlife. The banyan is a living testimony to the bounty and riches of Samoan nature, and is a lifeline for our wildlife.

Pepper Trail
DMWR



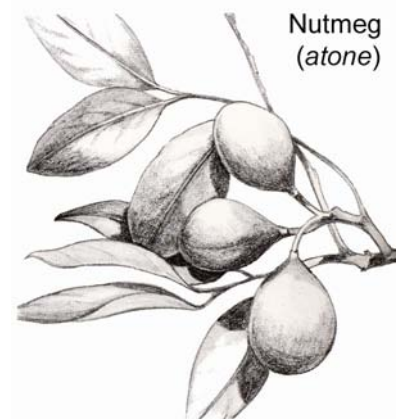
(*iao*), and the pretty little parrot (*segavao*) found in Manu'a. It may come as a surprise that fruit bats also eat a lot of nectar. Bats eat flowers from many different kinds of plants, from those with large flowers (such as *gatae* and *futu*), medium sized flowers (such as *fa'i*), to those with large numbers of smaller flowers (such as *asi*, *maota*, and *a'amati'e*). The bats lick flowers using their long tongues, or sometimes take a shortcut and eat the entire flower.



Fruit is the most common item in the diet of the Samoan Starling (*fui'a*), Pacific Pigeon (*lupe*), Purple-capped Fruit Dove (*manutagi*), and fruit bats (*pe'a*). Though all these animals share many of the same foods, each has its favorites. Differences in what each species eats are partly caused by the different ways they feed and by their different sizes. Since *lupe* and *manutagi* swallow fruits whole, this limits the size of fruit they can eat. *Manutagi* seem to eat no fruits larger than *moso'oi*, but *lupe* are not as limited because they have really big mouths and can eat all but the largest fruits. Although *fui'a* are smaller than *lupe*, they have stronger bills. This allows them to pry open tough husks, and to poke into very large fruits like *esi*. *Pe'a* can eat the largest and hardest fruits because of their strong jaws and sharp teeth. They have a very unique way of feeding: they take a bite from a fruit, but don't really swallow it. Instead, each bite is squeezed in the mouth, the *pe'a* swallows the juice and pulp, then flicks its head and spits out a flattened mass of leftover fruit called an 'ejecta'.

The white-naped fruit bats (*pe'a fanua*) seem to especially like fruits from plantations such as mangos, and those from coastal trees such as *fetau*, although maybe they really like flowers best. Samoan fruit bats (*pe'a vao*) generally prefer fruits found in the forest, both from non-native trees like *ifi* and native species such as *a'amati'e*, *asi* and *gasu*. Both bats like figs, especially the green-fruited kind of *aoa*, and perhaps most of all, *ulu* (breadfruit). But if you see bats in your *ulu*, you needn't worry that they are taking food from your mouth -- they like the overripe fruit that has been left on the tree so long that people wouldn't eat it anyway.

Our most common Columbiformes (*lupe* and *manutagi*) all love the fruit of *moso'oi*. It's funny to watch a little *manutagi* struggling to choke down a big *moso'oi* fruit -- but they get it down every time. Another large fruit favored by *lupe* (and sometimes eaten by *manutagi*) is the nutmeg (*atone*). This is an interesting 'fruit', since what the birds eat is almost entirely indigestible seed -- the useful part is just a thin, brightly colored network (red or orange depending on the species of *atone*) that covers the seed. This colored part is very fatty and is a good food for birds even if there is not much on each fruit. Apparently this is a successful way to disperse seeds, since *atone* is the most common tree in the mature forests of Tutuila.



Fruits preferred by *manutagi* include *aoa*, *mati*, the white berries of *soga*, and the seeds inside *maota* and *mamala* fruits. *Lupe* eat many of the same fruits, but are able to eat a greater variety because they are a big bird. They also eat the large fruits of *mamalava*, *mamalupe*, *a'amati'e* and *ala'a*. *Mamalupe* literally means 'pigeon's mouthful': one *lupe* once took a full 30 seconds to swallow a single *mamalupe* fruit!

Nectar feeders and fruit eaters don't just use their food plants -- they can help them as well by fertilizing their flowers. This happens when pollen from one flower sticks to a bird's feathers or the fur of a *pe'a*, and then rubs off when the animal visits another flower. Fruit eaters also help plants. Most of the time this happens when they eat the fruit but don't completely digest the seeds; when the animal defecates, the seeds may have been moved far from the parent tree where they have a better chance to grow. Many plants actually count on animals eating their fruits, and so they coat their seeds with a substance that makes them hard to digest. In this way, immobile trees accomplish their most difficult task -- dispersing (spreading) their seeds. When a tree species has no seed dispersers, its spread to new areas will be limited, it can become restricted to only a few places, and it is vulnerable to extinction from cyclones, diseases, or cutting by people. A good example of such a tree is *ifilele*, which tends to occur in only a few areas on the north side of Tutuila.

Probably the most important disperser of fruits in American Samoa is the *fui'a*, since it eats a very wide variety of fruits. It is particularly important in regenerating (converting back to forest) areas that have been cleared for plantations or by cyclones. You can see this by noting how quickly a cleared area will become covered with *lau pata*, *maota*, and *masame*, or how *nonu* or *pualulu* begin sprouting in a clearing deep in the forest. Once an area has these initial forest tree species, the area becomes more suitable for tree species that prefer mature forests, like *mamalava* or *asi*.



Samoan
starling
(fui'a)

You can play an important role in helping the wildlife on our islands by helping our native trees. First, avoid cutting down or burning native trees, especially slower growing species such as *au'auli* or important coastal species such as *fetau*. Other trees are so rare or important that they simply should never be cut, including *aoa*, *tava*, and *togo*. Some plantations illustrate a good compromise between the needs of people and the needs of the forest. As the plantation is cleared, smaller, fast growing trees like *lau pata* or *atone* are cut, but larger trees are avoided, or only their limbs are pruned (cut off). In this way crops like *talo* (taro) get the sunlight they need, but it does not kill large trees that are adapted to recovering from cyclone damage. Such trees may resprout leaves and branches, probably about the time a farmer is done harvesting the crops from the plantation.

Second, help native trees by planting them. You can request seedlings of native species from the Land Grant at the Community College. Always plant native trees instead of exotic (foreign) trees unless needed for their fruit. For example, *aoa* should be planted instead of *pulu* trees. Flame trees, *vaepovi* and African tulip trees may look attractive to people, but these trees benefit fewer wildlife species than our own native trees. For areas such as lawns where large trees are not wanted, tree ferns (*olioli*) are an attractive native option, while the various kinds of *mati* are good choices for wildlife. In places where too much shade is undesirable, *filimoto* is a good choice.

Joshua Seamon, Pepper Trail
DWMR

[Some Samoan plant
names are listed
in the appendix.]

