



*Sveriges lantbruksuniversitet*

Fakulteten för veterinärmedicin och husdjursvetenskap

Institutionen för Kliniska Vetenskaper

# Pilot study: Influence of the Samoan dog population on visitors

Magnus Beckman

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Pilot study: Influence of the Samoan dog population on  
visitors

Pilotstudie: Hundpopulationens inverkan på besökare i  
Samoa

Magnus Beckman

*Handledare: Nils Fall, Institutionen för Kliniska Vetenskaper*

*Examinator: Ulf Emanuelson, Institutionen för Kliniska Vetenskaper*

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## **SUMMARY**

A range of public health and animal welfare problems has been shown to be associated with free-roaming dogs. With a high density of free-roaming dogs and with a major tourism industry, Samoan tourists are likely to be influenced by the presence of the dogs. The tourists are mainly from the Oceanic region; with New Zealand and Australia as the biggest contributors. The aim of this study was to examine the potential impacts of dogs on visitors to Samoa.

A questionnaire was handed out to 281 visitors all over Samoa, collecting opinions and information on visitors' experiences and behaviour regarding the Samoan dogs. The data were collected and analysed.

Almost all of the respondents in this study had seen free-roaming dogs in Samoa (269/274) and half of these respondents were negatively affected by the dogs' presence (137/211). A vast majority of respondents thought that dogs required better management in Samoa (222/274). A majority also thought there were too many strays in Samoa (188/277) and that they did not look well fed (180/274) or healthy (194/274). A vast majority of respondents had ever avoided contact with dogs (235/272). About a fourth of the respondents had witnessed inappropriate behaviour against dogs according to their own definition (66/262). More dogs were seen in Apia, the capital of Samoa, where dogs also were more commonly perceived as a problem. Respondents in this study showed a support for humane population management methods such as sterilisation and registration. A majority were supportive of humane euthanasia, but a vast majority were unsupportive of poisoning of strays.

Compared to similar studies in other tourist areas, respondents in this study showed a high concern of dogs. The greater problems with free-roaming dogs in Apia have earlier been shown in other urban areas.

Free-roaming dogs are a problem for the tourism industry in Samoa. The findings of this study, along with previous findings, present the need of improvement of the Samoan dog situation. The problem seems to be more urgent in Apia than in the rest of Samoa.

## SAMMANFATTNING

Förekomst av fristövande hundar ("free-roaming dogs") har associerats med en rad folkhälso- och djurvälståndspåverkan värden över. I Samoa, som har en omfattande population av fristövande hundar och även en betydande turistnäring, är det sannolikt att turister påverkas av hundarnas närvaro. Turisterna kommer till största delen från Oceanien, främst från Nya Zeeland och Australien. Syftet med den här studien var att undersöka hur hundarna påverkar besökare i Samoa.

En enkät som samlade uppgifter om åsikter, erfarenheter och beteende rörande de samoanska hundarna genomfördes med 281 utländska besökare runt om i Samoa. Data från enkäten sammanställdes och analyserades.

Nästan alla deltagare i studien hade sett friströvande hundar i Samoa (269/274), och hälften av dessa påverkades negativt av hundarnas närvaro (137/211). En bred majoritet av deltagarna ansåg att hundarna behövde bättre kontroll och skötsel i Samoa (222/274). En majoritet ansåg även att det fanns för mycket friströvande hundar (188/277) och att hundarna inte såg ut att vara välnärda (180/274) eller friska (194/274). En överväldigande majoritet hade någon gång undvikit kontakt med hundarna (235/272). Omkring en fjärdedel hade enligt egen definition bevittnat olämpligt beteende mot hundar (66/262). Fler hundar sågs iakttagas i Apia, Samoas huvudstad, där det också var vanligare att hundar upplevdes som ett problem. Deltagarna i den här studien stödde humana populationsåtgärdsmetoder som sterilisering och registrering. En majoritet av deltagarna stödde human eutanasi, men en bred majoritet var emot förgiftning av friströvande hundar.

Jämfört med liknande studier i andra turistområden visade deltagarna i den här studien en hög grad av omtanke för hundarna. Det större problemet med friströvande hundar i Apia har tidigare setts i andra urbaniserade områden.

Friströvande hundar är ett problem för turistindustrin i Samoa. Den här studien visar, tillsammans med tidigare studier, på behovet av förbättring av situationen för hundarna i Samoa. Problemet verkar vara mer akut i Apia än i resten av Samoa.

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## INTRODUCTION

### The concept of free-roaming dogs and related problems

The definition of a roaming dog, including both owned and unowned individuals, is “one that is not currently under direct control or is not currently restricted by a physical barrier” (ICAM Coalition, 2007). A range of problems associated with free-roaming dogs poses threats to animal welfare and public health (ICAM Coalition, 2007; Butcher, 2001; Slater, 2001). In other terms, similar concerns have been described as costs of overpopulation (Frank & Frank, 2006). Free-roaming dogs have also been associated with environmental pollution and noise, aspects that differ in importance between different settings (ICAM Coalition, 2007; Butcher, 2001; Slater *et al.* 2008; Fielding, 2008).

The problem with free-roaming dogs is global and occurring in countries of all degrees of economic development. Problems with bites and rabies as main concerns tend, however, to be greater in poor countries, with small towns and villages shown to be the most troubled areas (Dalla Villa *et al.* 2010).

### The Samoan dog population

The independent state of Samoa (Samoa), formerly known as Western Samoa, is situated in the southern pacific and consists of two main islands: Upolu, with the capital Apia, and Savaii (Figure 1). Nearly 80 % (SBS, 2010) of the population of nearly 188 000 (SBS, 2012) have declared that they own a dog or cat. The vast majority of dog owners, 79 %, state protection as reason for ownership, with a median number of 2 dogs per household (Farnworth *et al.* 2012).



Figure 1. Map of Samoa (Nations Online Project, undated).

The characteristics of a free-roaming dog population, including no restraint (i.e. no leash or fencing to confine the dog to a property) and a male-skewed sex ratio (Ortolani *et al.* 2009),

and low average age, as often described in dog populations in developing countries (Davlin & VonVille, 2012), are also shown in the Samoan dog population (*Figure 2*) (Farnworth *et al.* 2012; Carslake, 2011).

There are reasons to believe the vast majority of the Samoan dogs are owned, given the percentages of owned dogs in a Samoan sterilisation campaign (95 %) and an observation study in American Samoa (90 %) (Carslake *et al.* 2012; Krosch, 2008). In spite of this, for socio-economic reasons, a majority of Samoan dogs (72 %) have never been provided with veterinary care and only 50 % of the owners stated they would provide veterinary care if their animal was sick or injured (Farnworth *et al.* 2012). Currently, veterinary care for companion animals in Samoa is only provided by Animal Protection Society (APS) in Apia and only occasionally in some villages (APS, undated-a). Humane education is also run as an occasional community outreach program by the APS.



*Figure 2. Free-roaming dogs in a Samoan village. Photo: Magnus Beckman, 2012.*

### **Public health hazards associated with free-roaming dogs**

Even before the focus was set on animal welfare, free-roaming dogs have been considered a public health hazard in areas of pet overpopulation, involving problems with bites, traffic accidents, damage and pollution, and harbouring zoonotic diseases (Feldmann & Carding, 1973). Free-roaming dogs are seen as being a greater hazard than cats due to their tendency to chase, form packs and be more visible in regions where both species are found (Slater, 2001).

Dog bites and attacks represent one of the most important public health issues related to dogs and the threat of animal attacks is a huge medico-social problem all over the world (Dalla Villa *et al.* 2010; Mengistu *et al.* 2011). In a global perspective, rabies tend to be the focus when discussing problems regarding free-roaming dogs (Dalla Villa *et al.* 2010; Davlin & VonVille, 2012; Slater 2001; Mengistu *et al.* 2011), though the free-roaming dog populations also serve as reservoirs for other, primarily parasitic, important zoonoses (Carslake *et al.* 2012; Acosta-Jamett *et al.* 2010a; Lesshaft *et al.* 2012; Dalla Villa *et al.* 2010).

### **Animal welfare hazards associated with free-roaming dogs**

Animal welfare is to be considered as an interdisciplinary subject including physiology, veterinary science, ethology and comparative psychology, established as a science as recently as during the 21<sup>st</sup> century (Carenzi & Verga, 2009). Central defined concepts include “the five

freedoms” and environmental and physiological needs, where lack of freedom or unsatisfied needs may result in suffering. As a principle of animal welfare, owners have a duty of care requiring that they provide recourses for a dog to maintain an acceptable level of health and well being (ICAM Coalition, 2007). To achieve this, the five freedoms (freedom from thirst, hunger and malnutrition; freedom from discomfort; freedom from pain, injury and disease; freedom to express normal behaviour; freedom from fear and distress (Carenzi & Verga, 2009)) can serve as guidance.

Problems regarding animal welfare amongst free-roaming dogs comprise malnourishment, disease and injury due to traffic accidents, fighting or abuse (ICAM Coalition, 2007; Totton *et al.* 2012; Butcher, 2001). Concerns about animal welfare have been reported from various locations; a considerable concern have been seen in tourist areas with free-roaming dogs present (Ruiz-Izaguirre & Eilers, 2012; Plumridge & Fielding 2003) and factors like gender, education and pet ownership have been shown to be prognostic variables to determine whether a person will be concerned about animal welfare (Slater *et al.* 2008). Distribution and power balance between categories within these variables can differ between countries and cultures, resulting in society differences.

### **Why is a study relevant in Samoa?**

In lack of known recent outbreaks, Samoa is considered to pose a low risk of rabies and presumed rabies free (HPA, 2012, 2009). However, it should be noted that surveillance information is insufficient, and travellers are advised to be cautious (CDC, 2012; HPA 2009). Other infective agents like *Ehrlichia canis*, *Borrelia burgdorferi* and *Leishmania infantum* have also been shown not likely to be present, but a range of diseases, some of which are zoonoses, have been confirmed to exist (Carslake *et al.* 2012). High prevalences for internal and external parasites, e.g. hookworm (prevalence over 90 %), fleas (prevalence over 80 %), heartworm and ticks (both with a prevalence over 40 %), *Giardia spp.* (prevalence nearly 15 %) and *Anaplasma phagocytophilum* (shown prevalence 8.4 %) have been shown, and are therefore not only an animal welfare problem but in some cases also a considerable public health issue. Further, the prevalences of many contagious diseases are still unknown and the role of present ectoparasites as vectors is not fully understood. In addition to this, injuries caused by dog bites are a great concern with high numbers presented in both Samoa and American Samoa (Farnworth *et al.* 2012; Vargo *et al.* 2012). As well as being a burden for healthcare and a public health issue for locals and tourists, the risk of being attacked by dogs also intrudes on people’s freedom to be around in public areas. Furthermore, as a consequence of bites and dogs considered a nuisance, locals may abuse them, which is to be considered as a welfare problem (Farnworth *et al.* 2012). These potential hazards are amplified as Samoa, compared with other countries, has one of the world’s highest recorded household dog ownerships (88 %) (Farnworth *et al.* 2012; Davlin & Vonville, 2012).

### **Samoa tourism and tourist perspectives**

Tourism is a major industry with close to 130 000 visitors annually 2009 and 2010 (SBS, undated), of whom nearly half were New Zealanders, with other common nationalities being Australians, US Americans and American Samoans. Studies regarding the canine population in Samoa and related topics have been conducted earlier both in Samoa (Carslake *et al.* 2012;

Farnworth *et al.* 2012) and in American Samoa (Vargo *et al.* 2012; Krosch, 2008). Attitudes and behaviour amongst tourists has until now not yet been investigated, although dogs come in close proximity to tourists (Carslake *et al.* 2012). Responses of village dogs towards approaching strangers have been proven to differ widely depending on location and social setting of the dog (Ortolani *et al.* 2009). There are also differences in the perception of dogs between different cultures, regarding both affection and utility (Serpell, 2004), which suggests that tourists in Samoa may regard the dog population differently than the native population. Earlier findings also suggest that knowledge of cultural differences is essential in order to successfully prevent incidents (de Keuster & Butcher, 2008). In general, tourists in Samoa believe they are responsible to make an effort to better understand the Samoan culture, but are depending on the Samoan Tourism Authority and the tourism industry to provide them with information to help them be conscientious visitors (Kline, 2012).

### **Aim of study**

The aim of the present study was to examine the potential impacts of dogs on Samoan tourism and establish attitudes and behaviour among visitors regarding this matter. The extent of visitors' support for different methods of management was also investigated. In combination with previous studies of current canine health and zoonoses present in the Samoan canine population, information on visitors' experiences and behaviour found in this study could help build profiles on risk factors. Knowledge of tourist attitudes could also identify focus areas for allocation of governmental and charity resources, as well as identify solutions that are considered as acceptable by both tourists and Samoans. In the long run, this could hopefully lead to improvement regarding canine welfare and public health in Samoa, along with improving conditions for the tourism industry.

### **MATERIAL & METHODS**

An anonymous questionnaire concerning behaviour around and attitudes towards dogs was handed out to visitors in Samoa. Collection of questionnaires was done in Apia and in villages all over Samoa. The main tourist areas of Samoa were identified (Apia including surroundings, south coast of Upolu and east and north coast of Savaii) and the questionnaire collection was done primarily in those regions. Selection of those areas was done after contacts with the Animal Protection Society and the Tourist Information Centre in Apia, in addition to information given in tourist brochures and impressions gathered from travel around the islands.

### **Ethical approval**

This project has been evaluated by peer review and judged to be low risk by Professor John O'Neill, Director (Research Ethics). Consequently, it has not been reviewed by one of the Massey University's Human Ethics Committees. The researchers (Magnus Beckman, SLU, Sweden; Dr Els Acke, Massey University, New Zealand; Mark Farnworth, Unitec, New Zealand) are responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you wish to raise with someone other than the researchers, please contact Professor John O'Neill, Director (Research Ethics), telephone: +64 6 350 52 49, e-mail: [humanethics@massey.ac.nz](mailto:humanethics@massey.ac.nz).

## **Sample selection**

As an inclusion criterion, respondents had to have spent at least two days in Samoa.

Different methods were used in the gathering of questionnaires. Where tourists could be encountered in public areas people were approached and asked if they were from overseas and had been in Samoa for a minimum of two days. Areas regarded as public were in downtown Apia and around the harbour, on the beaches of southern Upolu and northern Savaii, and also at the airport and the tourist information centre. If the inclusion criteria were fulfilled, people were asked if they would want to participate in a short survey regarding dogs in Samoa and along with this they were given written introduction to the survey. In more crowded areas every third person was asked, while in less crowded areas every other person was asked. In non-crowded areas every person was asked. If a person declined participation, the next person was asked until participation was accepted.

Another strategy in gathering questionnaires was handing it out to hotels, resorts and budget accommodation around Samoa. The aims of the study were explained to the receptionists who, if they accepted, were asked to hand it out to their guest, for example when checking out. The hotels were also asked if interviewing inside or in close relation to the hotel was acceptable. In hotels where it was accepted, the same strategy for gathering questionnaires as in public areas was adapted. Out of 50 hotels, interviewing or questionnaires left in reception was accepted in 49 hotels. Out of those 49 hotels, questionnaires were left at the reception in 35 hotels and interviewing was performed in 23 hotels. Out of all hotels asked 15 were situated in or in close relation to Apia, 15 situated in the rest of Upolu and 20 situated in Savaii.

## **Questionnaire design**

A brief written introduction was given as part of the questionnaire, describing aims, consent and confidentiality. The questionnaire consisted of five sections; the first gathered the respondents' details, the second gathered attitudes towards dogs and related issues, both in general and in Samoa, the third section gathered information on the respondents' behaviour and experiences around dogs in Samoa, the fourth section addressed the overall experience, and the last section assembled attitudes towards dog population management. Finally, the respondents had a possibility to make comments of their own choice.

Information on gender, age, dog ownership status, country of residence and length of their stay in Samoa so far was gathered from the respondents.

For the second and fifth section a Likert scale (Jamieson, 2004) was used with alternatives ranging from "absolutely agree" to "absolutely disagree" and also a "don't know" option. For the third section, the alternatives possible were "yes", "no" and "sometimes", only asking the respondent to specify what they considered inappropriate if they had witnessed inappropriate behaviour against dogs in Samoa. In the fourth section respondents were asked to sum up their overall experience by grading their experience and define whether it was positive or negative. In this section, the respondents were also asked also where they had spent most time

in Samoa, if they thought dogs were a problem in this area and how many dogs they had seen around their accommodation.

The full questionnaire can be found in *Appendix 1*.

## Data analysis

Analysis of data were performed with Microsoft® Excel 2002 and R version 2.15.1. Data were entered into an Excel spreadsheet, from which calculations could be made. Import to R was done to perform descriptive data analysis and also bivariate analysis using the appropriate test of Fisher's Exact Test for Count Data (Fisher's exact test) and Pearson's Chi-squared test ( $\chi^2$ ). Respondent details and yes/no-questions were labelled as factors, while answers to Likert scale questions were labelled as integers. Only questionnaires where a specific question was answered were included in the statistical analysis, with the rest being recorded as non-answered.  $P \leq 0.05$  was regarded as significant.

## RESULTS

### Demographics of respondents

There was a good spread of age groups and a near even spread of gender in this study and approximately a third of the respondents owned a dog. Major countries of residence were New Zealand and Australia, and though most of the respondents had been in Samoa for no longer than a week, yet quite a few respondents had stayed for longer. Respondent details can be seen in *Table 1*.

*Table 1. Respondents' details of a questionnaire on attitudes, experiences and behaviour around Samoan dogs handed out to 281<sup>a</sup> visitors in Samoa. (N (%))*

Detail						Total
Gender:	<i>Male</i>			<i>Female</i>		
		128 (46)		151 (54)		279
Age (years):	<i>18-20</i>	<i>21-40</i>	<i>41-60</i>	<i>61-80</i>	<i>80+</i>	
	11 (4)	133 (47)	101 (36)	33 (12)	3 (1)	281
Dog owner?	<i>Yes</i>			<i>No</i>		
		90 (32)		189 (68)		279
What kind:	<i>Pet</i>	<i>Guard</i>	<i>Working dog</i>			
	55 (86)	4 (6)	5 (8)			64
Residence:	<i>New Zealand</i>	<i>Australia</i>	<i>Europe</i>	<i>USA</i>	<i>Other*</i>	
	153 (55)	67 (24)	36 (13)	11 (4)	9 (3)	276
Days in Samoa?	<i>2-4</i>	<i>5-7</i>	<i>8-14</i>	<i>15-30</i>	<i>31+</i>	
	83 (30)	102 (36)	60 (21)	14 (5)	21 (8)	280

*Percentages in table represent the number of respondents that chose a specific alternative divided by the number of respondents to that question. <sup>a</sup>=totals in table are the number of respondents to a specific question. \* = Fiji, Mexico, Wallis – 2; Argentina, Uruguay, Japan – 1.*

## Opinions on dogs

### General opinions

A majority of respondents regarded themselves as dog lovers and did not think dogs in general were a nuisance or dangerous. A strong majority also considered violence against dogs unacceptable. General opinions on dogs can be seen in *Table 2*.

*Table 2. Opinions on dogs in general stated by 281<sup>a</sup> responding visitors in Samoa in a questionnaire on attitudes, experiences and behaviour around Samoan dogs. (N (%))*

Statement	Absolutely agree or Agree	Neither agree nor disagree or Don't know	Disagree or Absolutely disagree	Total
I am a dog lover	<b>188 (68.4)</b>	61 (22.2)	26 (9.5)	275
In general dogs spread disease	64 (23.4)	124 (45.4)	85 (31.1)	273
In general dogs are dangerous animals	24 (8.6)	69 (24.6)	<b>187 (66.8)</b>	280
The use of violence against dogs is acceptable	23 (8.3)	40 (14.5)	<b>213 (77.2)</b>	276

*Numbers in bold indicate a majority of the respondents to a question. Percentages in table represent the number of respondents that chose a specific alternative divided by the number of respondents to that question. <sup>a</sup>=totals in table are the number of respondents to a specific question.*

### Opinions on dogs in Samoa

A vast majority responded that dogs require better management in Samoa. A majority also thought there were too many strays in Samoa and that they did not look well fed or healthy. Opinions on Samoan dogs can be seen in *Table 3*.

Non-dog owners and respondents above 40 years of age more often thought that dogs were a nuisance, both in general (Fisher's exact test:  $p < 0.05$ ; Fisher's exact test:  $p < 0.05$ ) and in Samoa (Fisher's exact test:  $p < 0.05$ ; Fisher's exact test:  $p < 0.005$ ). This matter was not affected by gender, region of residence or length of stay. No significant differences could be found between categories of respondents regarding if they felt sorry for dogs in Samoa.

Table 3. Opinions on dogs in Samoa stated by 281<sup>a</sup> responding visitors in Samoa in a questionnaire on attitudes, experiences and behaviour around Samoan dogs. (N (%))

Statement	Absolutely agree or Agree	Neither agree nor disagree or Don't know	Disagree or Absolutely disagree	Total
Dogs require better management here	<b>222 (81.0)</b>	33 (12.0)	19 (6.9)	274
There are too many stray dogs here	<b>188 (67.9)</b>	57 (20.6)	32 (11.6)	277
I feel sorry for dogs here	<b>153 (55.2)</b>	63 (22.7)	61 (22.0)	277
Dog poo should be cleaned up more often here	109 (39.8)	115 (42.0)	50 (18.2)	274
I feel safe around dogs here	96 (35.2)	85 (31.1)	92 (33.7)	273
Dogs here are well fed	16 (5.8)	74 (27.0)	<b>180 (65.7)</b>	274
Dogs clearly have owners here	18 (6.6)	64 (23.4)	<b>191 (70.0)</b>	273
Dogs here look healthy	28 (10.2)	52 (19.0)	<b>194 (70.8)</b>	274
These dogs are like those in my home country	15 (5.5)	28 (10.2)	<b>231 (84.3)</b>	274

Numbers in bold indicate a majority of the respondents to a question. Percentages in table represent the number of respondents that chose a specific alternative divided by the number of respondents to that question. <sup>a</sup>=totals in table are the number of respondents to a specific question.

A significant difference could be seen between the opinions on whether dogs were a nuisance in general and whether they were a nuisance “here” i.e. in Samoa (Fisher’s exact test:  $p < 0.0001$ ). This difference is illustrated in Figure 3.

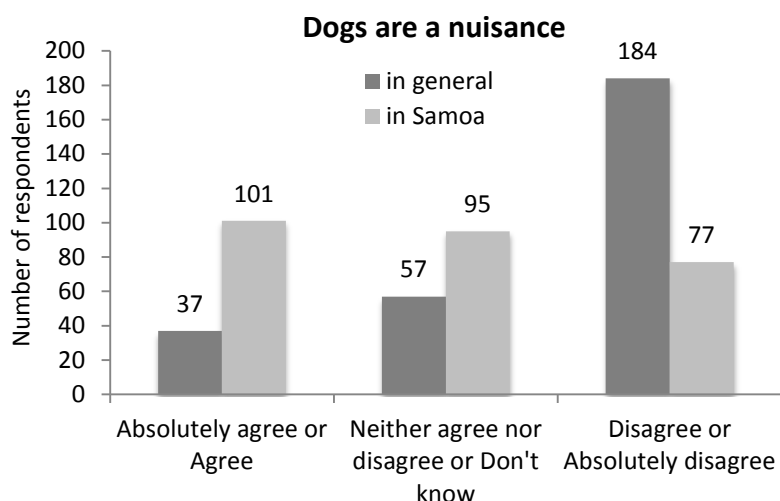


Figure 3. Opinions on whether dogs are a nuisance in general and in Samoa as stated by 272 responding visitors in Samoa in a questionnaire on attitudes, experiences and behaviour around Samoan dogs.



### Opinions on dog management

Of the methods for dog management mentioned in this study, the strongest support was earned by voluntary sterilisation, closed followed by compulsory collars and ID tags and compulsory registration. All methods suggested in this study were acceptable for a majority of the respondents, except poisoning of strays, which was regarded as unacceptable for the vast majority. All opinions on dog management are presented in *Table 4*.

*Table 4. Methods for management of dog populations stated by 281<sup>a</sup> responding visitors in Samoa in a questionnaire on attitudes, experiences and behaviour around Samoan dogs. (N (%))*

Management method	Absolutely acceptable or Acceptable	Neither acceptable nor unacceptable or Don't know	Unacceptable or Absolutely unacceptable	Total
Voluntary sterilisation	<b>240 (89.9)</b>	12 (4.5)	15 (5.6)	267
Compulsory Collars and ID tags	<b>231 (84.9)</b>	26 (9.6)	15 (5.5)	272
Compulsory registration	<b>229 (84.8)</b>	31 (11.5)	10 (3.7)	270
Voluntary registration	<b>193 (75.4)</b>	30 (11.7)	33 (12.9)	256
Compulsory sterilisation	<b>202 (74.3)</b>	36 (13.2)	34 (12.5)	272
Fencing to prevent dogs wandering	<b>182 (67.2)</b>	57 (21.0)	32 (11.8)	271
Humane Euthanasia of strays	<b>174 (64.0)</b>	42 (15.4)	56 (20.6)	272
Humane euthanasia of unwanted puppies	<b>167 (60.7)</b>	45 (16.4)	63 (22.9)	275
Poisoning of strays	37 (13.7)	26 (9.6)	<b>208 (76.8)</b>	271

*Numbers in bold indicate a majority of the respondents to a question. Percentages in table represent the number of respondents that chose a specific alternative divided by the number of respondents to that question. <sup>a</sup>=totals in table are the number of respondents to a specific question.*

### Experiences and behaviour

Though most of the respondents in this study felt that Samoan dogs were friendly, they felt threatened when a dog approached them. Dogs seemed to avoid human contact, with an exception when begging for food. The respondents' experiences of Samoan dogs can be seen in *Table 5*.

Table 5. Experiences of dogs in Samoa stated by 281<sup>a</sup> responding visitors in Samoa in a questionnaire on attitudes, experiences and behaviour around Samoan dogs. (N (%))

Question	Yes, always or Sometimes	No, not at all	Total
Do you feel dogs are friendly here?	<b>210 (79.5)</b>	54 (20.5)	264
Do dogs here seem frightened and avoid human contact when approached?	<b>180 (66.7)</b>	90 (33.3)	270
Do dogs here beg for food?	<b>178 (66.2)</b>	91 (33.8)	269
Do you feel threatened when a dog approaches you here?	<b>171 (63.8)</b>	97 (36.2)	268

Numbers in bold indicate a majority of the respondents to a question. Percentages in table represent the number of respondents that chose a specific alternative divided by the number of respondents to that question. <sup>a</sup>=totals in table are the number of respondents to a specific question.

Details about behaviour around Samoan dogs and other behaviour involving potential zoonotic hazards can be seen in Table 6.

Table 6. Hygiene habits with regard to dog contact stated by 281<sup>a</sup> responding visitors in Samoa in a questionnaire on attitudes, experiences and behaviour around Samoan dogs. (N (%))

Question	Yes, always or Sometimes	No, not at all	Total
Do you wash your hands before a meal?	<b>271 (98.9)</b>	3 (1.1)	274
Do you wash your hands after contact with a dog?	<b>233 (92.1)</b>	20 (7.9)	253
Do you avoid contact with dogs here?	<b>235 (86.4)</b>	37 (13.6)	272
Do you wear shoes or sandals on the beach?	<b>208 (76.5)</b>	64 (23.5)	272
Do you feed the dogs here?	67 (24.6)	<b>205 (75.4)</b>	272

Numbers in bold indicate a majority of the respondents to a question. Percentages in table represent the number of respondents that chose a specific alternative divided by the number of respondents to that question. <sup>a</sup>=totals in table are the number of respondents to a specific question.

There was a difference in acting between respondent age groups regarding experience and behaviour around dogs, showing young people (under 41 years) were less likely to avoid contact with dogs ( $\chi^2$ :  $p < 0.005$ ), more likely to feel that dogs were friendly ( $\chi^2$ :  $p < 0.01$ ) and also more likely to feed them ( $\chi^2$ :  $p < 0.05$ ). There was no difference between a shorter or a longer stay regarding avoidance of dogs or perceive them as friendly, but respondents who had spent more time in Samoa (over 2 weeks) were more prone to feed the dogs (Fisher's exact test:  $p < 0.05$ ). There was no difference in acting between genders, regions of residence or between dog owners and non-dog owners when it came to avoiding dogs or feeding them, nor was there a difference between these parameters regarding the experienced friendliness of the dogs.

### ***Inappropriate behaviour against dogs***

A fourth of the respondents had witnessed inappropriate behaviour against dogs according to their own definition (25.5 %, 66/262), and of these 43 chose to define inappropriate. Most commonly the respondents mentioned physical abuse (65.1 %, 28/43). Some mentioned neglect/lack of care (16.3 %, 7/43) and some mentioned that they had witnessed both physical abuse and neglect/lack of care (18.6 %, 8/43). Specific behaviour mentioned can be seen in *Table 7*.

Respondents who had been in Samoa over 2 weeks were significantly more likely to have witnessed inappropriate behaviour against dogs (Fisher's exact test:  $p < 0.0001$ ). Witnessing inappropriate behaviour was also associated with the dogs having a higher impact on respondents, meaning they were more affected (Fisher's exact test:  $p < 0.005$ ).

*Table 7. Inappropriate behaviour according to their own definition seen by 43 responding visitors in Samoa stated in a questionnaire on attitudes, experiences and behaviour around Samoan dogs.*

Definition of inappropriate behaviour seen*	N
rock throwing	21
kicking	9
poor feeding	8
beating	7
lack of care for injuries and disease	5
hitting with objects	4
neglect	4
abuse	3
negative attitude	2
hit by car	1
threaten with object	1

*\*=multiple definitions possible*

### **Comments**

About half of the respondents chose to leave additional comments of any kind (53.0 % 149/281). Most commonly respondents mentioned one or more existing problems or that a change was needed (51.7 %, 77/149), with quotes like "Quite a big problem. Better control would be nice." and "It is a problem that needs to be addressed, many injured dogs are wandering around and need help and many extra thin dogs and cats."

A few respondents mentioned that they had been chased by dogs or that dogs were a road problem (13.4 %, 20/149), with comments like "The dogs chase the cars and are a nuisance on the roads as they don't move so can easily be hit.", "Problem when driving around when trying to avoid dogs nearly hit another car." and "Attacked and bitten by dog while walking on road side on first day of visit - in day light. Hotel doorman/driver - badly bitten next day under similar circumstances - in daylight. We were warned twice during the first of days of our stay that packs of dogs were a threat to people walking at night."

A few mentioned they experienced the dog free situation in the villages of Fagamalo and Manase as good (6.0 %, 9/149), with comments like “Our village is “dog free”, lucky us.” and “Dogs look happy but it is not a good idea to have so many strays. In Manase there are no dogs which is good.”

Equally as many commented that the situation in a dog allowed area was good or had improved compared to earlier visits, e.g. “The dogs here did not bother me at all. I just accepted them as part of the culture and I haven’t had any negative experiences with them.” and “From previous visits it would appear there are less dogs, and those seem better fed.”

Yet a few they mentioned had a personal connection to a person bitten by a dog or had been bitten themselves (5.4 %, 8/149) with direct quotes such as “Husband bitten when riding bike.” and “I know one person bitten a few years ago (child on the face) and met a traveller this time who was bitten on the leg in Apia. I also heard many people speaking about being scared and a group who were chased.”

A small number of the respondents also mentioned barking noise at night as a specific problem (4.7 %, 7/149), with quotations like “Many, many dogs barking at night totally unacceptable. Bad in Apia.” and “The barking howling and fighting at night can be extremely annoying.”

A few of the respondents commented on possible solutions, including registration, sterilisation and adoption as well as banning and euthanasia as a last option. Some mentioned the need of education regarding dogs in Samoa (4.0 %, 6/149), with quotes like “Hard to change situation, cultural. Need education.”, and equally as many mentioned that fencing was an impractical management method in Samoa.

For a total account for comments given, see *Appendix 2 - Comments*.

## **Area differences**

More dogs were seen around the accommodations in Apia compared to the rest of Upolu (Fisher’s exact test:  $p < 0.005$ ), and fewer dogs were seen around accommodation in a dog free village in Savaii compared to the rest of Savaii (Fisher’s exact test:  $p < 0.005$ ), both illustrated in *Figure 4*.

In addition to this there is a significant difference between different parts of Samoa where respondents had spent most time during their holiday and whether respondents perceived the dogs to be a problem or not. In Apia compared to the rest of Upolu, dogs were more commonly perceived as a problem ( $\chi^2$ :  $p < 0.0001$ ), and inappropriate behaviour against dogs was more commonly seen ( $\chi^2$ :  $p < 0.005$ ). Dogs were also significantly considered less of a problem in dog free villages in Savaii compared with villages with dogs (Fisher’s exact test:  $p < 0.05$ ). No significant differences could be seen between different regions in Samoa and if dogs made their holiday experience positive or negative, nor was there a difference in impact between different regions.

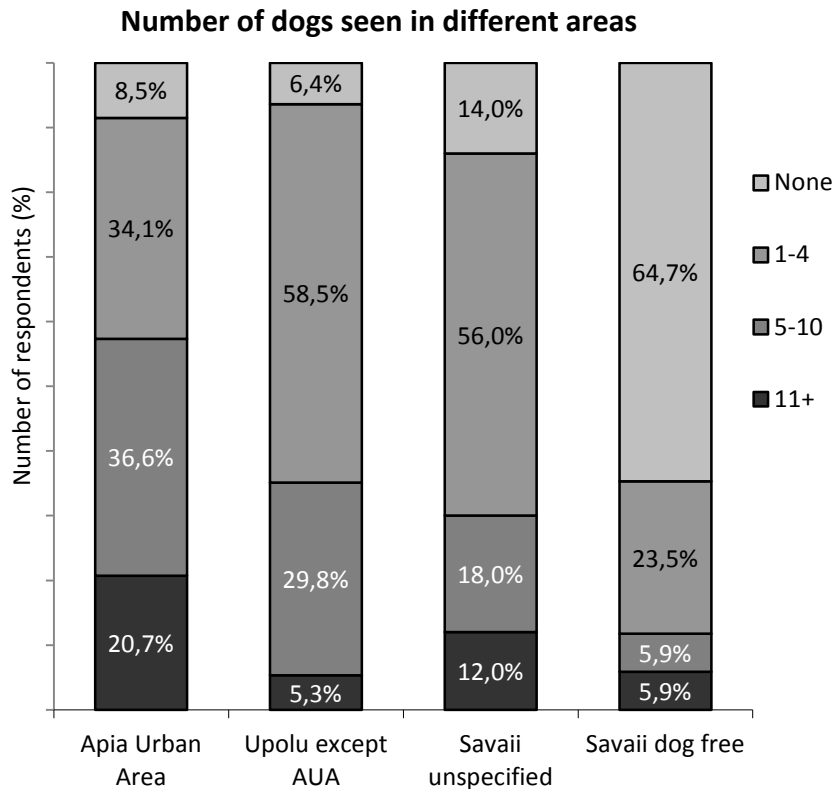


Figure 4. Frequency of number of different dogs seen around the accommodation as stated by 243<sup>a</sup> responding visitors in Samoa in a questionnaire on attitudes, experiences and behaviour around Samoan dogs. <sup>a</sup>=Number of respondents in different areas - Apia Urban Area (AUA): 82, Upolu except AUA: 94, Savaii unspecified: 50, Savaii dog free village: 17.

### Overall experience

Almost all of the respondents had seen free-roaming dogs in Samoa (98.2 %, 269/274). Nearly twice as many of the respondents were negatively affected by the dogs' presence (64.9 %, 137/211), and thought the dogs made their holiday worse, as respondents that thought the dogs' presence improved their holiday (35.1 %, 74/211). Though most of the respondents stated that the dogs had a low impact (1-3) on their stay in Samoa (68.0 %, 187/275), quite a few stated the dogs had a medium impact (4-7) (23.6 %, 65/275) and a few respondents even that the dogs had a high impact (8-10) on their stay (8.4 %, 23/275). Respondents above 40 years of age were more prone to experience that the dogs had a negative effect on their stay in Samoa ( $\chi^2$ :  $p < 0.05$ ) and were more affected by them ( $\chi^2$ :  $p < 0.05$ ). No significant differences could be seen between genders, dog ownership status, regions of residence or length of stay regarding effect or impact.

Whether respondents had a positive or negative overall experience and how much the dogs affected them was strongly influenced by the perception of dogs being a problem in the area where respondents had spent most time during their holiday, and also how many dogs there were in this area. The perception of dogs being a problem in the part of Samoa where respondents had spent most time during their holiday was associated with both higher impact ( $\chi^2$ :  $p < 0.0005$ ) and a negative experience ( $\chi^2$ :  $p < 0.0001$ ). A greater number of dogs seen by respondents around their accommodation were also associated with a negative experience as

well as a higher impact of the dogs on the respondents (Fisher's exact test:  $p < 0.05$ ). Furthermore, how much the dogs affected the respondents' holiday influenced if this effect was perceived as positive or negative, where a strong association could be seen between a negative experience a higher impact (Fisher's exact test:  $p < 0.0001$ ).

## **DISCUSSION**

Almost all of the respondents had seen free-roaming dogs, and in spite of that only a small part stated that they did not like dogs, twice as many respondents were negatively affected as were positively affected. Two thirds of the respondents thought there were too many stray dogs in Samoa, and the higher number of dogs around their accommodation, the more likely they were thought of as a problem affecting respondents stronger and more negatively. Dogs were significantly regarded more of a nuisance in Samoa than in general, and over 80 % thought that dogs required better management in Samoa. Thereby it should be clear that free-roaming dogs are a major concern for the tourism industry in Samoa, and that action should be taken on many levels to deal with the problem. It should be noted that a majority of the tourists regard themselves as dog lovers and feel sorry for the dogs, and that they disagree strongly to the inhumane management method of poisoning mentioned in this study. To earn the support from visitors should therefore any action that is taken be humane and considerate about the dogs.

### **Attitude comparison with locals and other tourist area studies**

A strong majority of the locals in Samoa reportedly likes dogs and regard them as part of family (Farnworth *et al.* 2012). In spite of this, a majority of the locals in Samoa also thinks that dogs are a nuisance and a vast majority that numbers needs to be controlled. Along with the findings above this further consolidates the shown need for action regarding this matter.

Figures from Samoa can be compared to findings from a rural coastal region of Mexico, where approximately half the locals and only a third of the tourist thought there were too many dogs (Ruiz-Izaguirre & Eilers, 2012). Findings from other island nations include the Bahamas, where dogs were perceived as a nuisance in at least one aspect by over 80 % (Fielding, 2008), but less than a fourth of the 45 % of the tourists that had seen free-roaming dogs thought there was a roaming dog problem (Plumridge & Fielding, 2003). The high concern amongst both tourists and locals in Samoa, also in comparison to other studies, demonstrates further the extent of the problem on the islands.

### **Spatial differences**

In developing countries at large, small towns and villages are reportedly the areas with most concern regarding free-roaming dogs (Dalla Villa *et al.* 2010). In this study, respondents in Apia saw significantly more dogs and perceived them more of problem compared to the rest of Samoa, and more often was inappropriate behaviour seen. In comparison over 90 % of the locals thought there was a stray dog problem in Roseau, Dominica (Alie *et al.* 2007). Similar to what has earlier been concluded regarding Taiwan, attitudes towards dogs in Apia may still be rural and detached, and thus, unsuitable regarding dogs in the urban area (Hsu *et al.* 2003). It could also be suggested that the perceived problem is bigger in Apia because of dogs barking, especially at night, which has been reported as the most frequent of neighbourhood

nuisances in New Providence, the Bahamas, where dogs roaming on property also is a common nuisance (Fielding, 2008). It has also earlier been suggested that free-roaming dog populations in urban areas serve as reservoirs of pathogenic infections even more than dogs in rural areas, especially if the dogs are allowed to roam freely and are not vaccinated, as urban populations are often larger and denser with higher turnover and growth rates (Acosta-Jamett et al. 2010b).

### **Views on dogs and animal welfare**

Only a small percentage in this study believed that it was clear that dogs in Samoa have owners and that Samoan dogs are like the dogs in their home country. Only a third of the respondents stated that they owned a dog (the vast majority kept as pets) compared with a dog ownership of 88 % of households in Samoa with a median number of two dogs per household, where the vast majority was stated to be kept for protection, i.e. as guarding dogs (Farnworth *et al.* 2012). These findings represent a cultural difference between tourists and Samoans. This is supposedly to a wide extent behavioural, since large discrepancies between attitude and behaviour has been shown among Samoans regarding e.g. restraint, health care and sterilisation (Farnworth *et al.* 2012). Nevertheless, as long as these parameters remains ignored to a large extent it will result in related problems. As previously expressed, a lack of effective legislation in Samoa may undermine the will to change (Farnworth *et al.* 2012).

About two thirds of the respondents in this study did not think dogs in Samoa were well fed, nor that they looked healthy, and a majority felt sorry for them. This could be attributed to both a difference in attitudes between cultures as mentioned above, as well as to earlier findings on animal health in Samoa. Recent research has found that almost all of the dogs from all over Samoa showing up for sterilisation (i.e. not seeking veterinary attention due to disease) conducted by Animal Protection Society were infested with internal and external parasites (Carslake *et al.* 2012), supposedly contributing both to disease and malnourishment. As previously mentioned the most prevalent parasites found in Samoan dogs are hookworm (over 90 %), fleas (over 80 %), lungworm and ticks (both over 40 %), with several other parasites both internal and external parasites found. This may not be surprising considering that only 20 % of the Samoan dogs have ever been taken to a veterinarian, with only half of the locals stating they would seek veterinary attention if their dog was sick or injured (Farnworth *et al.* 2012).

In addition to the poor general health and body condition among the dogs perceived by visitors, a fourth of the respondents in this study had witnessed inappropriate behaviour against dogs according to their own definition, where most of them defined some sort of physical abuse. This could be related to figures of the local population, where a fourth of the respondents thought it was a good thing for Samoan society if people inflict harm on or kill dogs (Farnworth *et al.* 2012), which could be compared to less than 10 % of respondents in this study thinking the use of violence against dogs is acceptable, with a few respondents mentioning defence or protection. According to findings in Mexico, where significantly more villagers in tourists villages were concerned about dog welfare problems than villagers in a farming village and also mentioned companionship as a reason for keeping a dog more often

(Ruiz-Izaguirre & Eilers, 2012), it could be suggested that the presence of tourists influence and could help improve the local perception of dog welfare.

Half of the tourists and less than a third of the locals were concerned about dog welfare in rural Mexico (Ruiz-Izaguirre & Eilers, 2012). In the Bahamas, feeling sorry for the dogs was the main reaction of a fourth of the American tourists that had seen free-roaming dogs and as many as two thirds thought it was cruel to allow dogs to roam (Plumridge & Fielding, 2003). In Italy, nearly half of the residents experienced an animal welfare problem with free-roaming dogs (Slater *et al.* 2008).

In this study, presence of free-roaming dogs affected older people more and this effect was more negative than that experienced by younger people. No differences could be found between categories of respondents in this study regarding if they felt sorry for dogs, though dog owners and young people (40 and below), experience dogs as less of a nuisance. This could be compared with an Italian study, where women, young people and dog owners were more prone to be concerned of animal welfare (Slater *et al.* 2008).

### **Public health issues**

Nearly two thirds of the respondents in this study had ever felt threatened by dogs in Samoa, and some respondents mentioned a personal connection to dog bites. A study among residents in Italy has reported similar results, where personal safety was the most common cited problem (60 %), and a third of the respondents were directly concerned about public health (Slater *et al.* 2008).

The high degree of threat perceived in this study may reflect in the high numbers of reported dog bites in both Samoa and American Samoa (Farnworth *et al.* 2012; Vargo *et al.* 2012). Young people (40 and below) were shown to be less evasive and fed the dogs to a larger extent, which could be considered risk behaviour, but they also experienced the dogs as more friendly. Substantial lower numbers of threat/scare have been reported by tourists elsewhere. In the Bahamas, only 5 % of tourists that had seen free-roaming dogs (45 %) stated that they had ever been scared or threatened by the dogs.

Almost all of the respondents in this study answered that they washed their hands after contact with a dog and before a meal; a good way of preventing faecal-oral zoonotic disease, such as internal parasites (Carslake *et al.* 2012). The vast majority also stated that they had ever avoided dogs, which does not only reduce the risk of being bitten but also related diseases such as rabies. However, a fourth of the respondents declare that they had ever fed the dogs, a behaviour that increases the risk of mishap. Despite the fact that high numbers of dog bites are a concern for Samoa, the country is regarded as a low risk country for rabies due to lack of recent outbreaks (HPA, 2009, 2012). In absence of sufficient surveillance a total clearance cannot be declared.

Nearly a fourth of the respondents stated that they would walk barefoot on the beach, a behaviour that most likely increases the risk of hookworm-related cutaneous larva migrans (Lesshafft *et al.* 2012). Considering the high prevalence of hookworms among the Samoan dogs (Carslake *et al.* 2012) this must be considered a high-risk behaviour. Furthermore, 13 %



of respondents that chose to leave additional comments mentioned being chased by dogs or that dogs are a road problem, which means they are a danger for both themselves and for people, and it could be suggested that there is an increased danger for unprotected road-users.

### **Dog population management**

Prevention of dogs from becoming free roaming and what to do with currently free-roaming individuals has been raised earlier as the two vital components in a handling plan (Slater *et al.* 2008). These key parameters may however not be equally viewed in Samoa, as dogs are naturally kept free roaming. In our study, all non-lethal methods of management were preferred to the lethal methods. Voluntary sterilisation earned the biggest support with nearly 90 % of respondents regarding this method as acceptable for dog population management. In population management modelling, sterilisation has been shown to be the most efficient way in which to tackle an overpopulation problem (Frank, 2004). It has also been found that sterilised free-roaming dogs in India had a higher body condition score than intact dogs in the same area (Totton *et al.* 2010). Unluckily, the same study showed a higher prevalence of skin conditions among the sterilised dogs, implying appropriate hygiene routines at the veterinary clinics used is key. If this is taken into account, spaying has been shown to be medically justified in bitches (McKenzie, 2010). With the gender skew seen in the population, spaying of bitches should even more benefit a menacing overpopulation problem, since sterilisation of a bitch usually means at least one litter of puppies less, and also as male dogs will not roam to find bitches on heat to the extent that can be seen now (APS, undated-b). During the community outreach desexing programs carried out occasionally by the Animal Protection Society, males and females of all ages are sterilised (*Figure 5*).



*Figure 5. Sterilisation of a pregnant bitch during an APS village visit. Photo: Magnus Beckman, 2012.*

Among the lethal management methods, a majority supported humane euthanasia. Not surprisingly, a strong majority regarded the inhumane method poisoning of strays as unacceptable.

## **Educational aspects**

Science has been discussed as a cultural modifier of human attitudes towards animals (Serpell, 2004). Even with a few, relatively short lessons, education has been proved to be an effective tool to enhance knowledge, perception and responsibility for animals among school children in Italy (Mariti *et al.* 2011). In rural Sri Lanka, information campaigns have been suggested to further enhance practices dealing with canine population control, and knowledge and attitudes have been found to already be adequate (Matibag *et al.* 2009). Undoubtedly, information campaigns directed towards both children and adults would be most favourable for the Samoan society. An implementation of animal care lessons in Samoan schools and more focus on these matters in existing media, such as radio, television and newspapers, could work as a complement to the community humane education outreach program already conducted by Animal Protection Society in Apia (APS, undated-a). In order to provide a better experience for tourists, Samoan Tourism Authority (STA) educates Samoans via manuals and radio, e.g. by advising the community to keep an eye on their dogs (Kline, 2012).

As previously mentioned, tourists are depending on the STA and the tourism industry to provide them with information to help them be conscientious visitors (Kline, 2012). Such information should include information on dog prevalence and problems in different parts of Samoa, as well as recommendations on appropriate behaviour to prevent incidents and disease. According to the same study, tourists also believe that they are responsible to make an effort to better understand the Samoan culture, which could mean that some may embrace the free-roaming dogs as a part of that culture, and thereby less prone to think that a change is needed.

## **Accuracy of sample**

With a relatively even distribution between sexes and age groups, it could be hypothesised that the respondents represent an accurate sample of Samoan tourists. According to immigration figures for 2010 a majority of visitors on holiday in Samoa were from New Zealand, with Australians being another large visitors group, and smaller percentages of visitors from the USA and Europe (SBS, undated). These figures match the distribution found in this study, excluding visitors from American Samoa.

The length of stay of the respondents does not reflect their total length of stay, which makes these figures hard to match with immigration data. As visitors in Samoa tend to travel around to different locations around the islands, it is also hard to match the figures from different areas to “true” values of area distribution, though effort was made to sample all areas with emphasis on tourist spots.

## Conclusions

Free-roaming dogs constitute a problem for the tourism industry in Samoa. The findings of this study, along with previous findings (Farnworth *et al.* 2012; Carslake *et al.* 2012) elucidate the need of improvement of the Samoan dog situation. The problem seems to be more urgent in Apia than in the rest of Samoa. Visitors agree with literature findings that sterilisation being the best solution.

## Implications

This study identifies what areas should be focused on when allocating resources to solve the Samoan dog problem. Increased funding for veterinary care facilities that provide sterilisation clinics on both of the main islands is recommended (*Figure 6*). Additionally, education for locals, in school as well as in campaigns targeting adults, and tourist information are suggested. Implementation of appropriate legislation regarding dog keeping could also part of the solution. By addressing this problem, hopefully welfare amongst the dogs in Samoa as well as public health can be increased.



*Figure 6. Animal Protection Society on one of its free community outreach programs – a village visit with a desexing clinic. Photo: Magnus Beckman, 2012.*

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## REFERENCES

- APS, Animal Protection Society. Frontpage. [online] (undated). Available: [www.apssamoa.org](http://www.apssamoa.org) [2012-11-01].
- APS, Animal Protection Society. The Dog Problem. [online] (undated). Available: [http://www.apssamoa.org/index.php?option=com\\_content&view=article&id=47&Itemid=64](http://www.apssamoa.org/index.php?option=com_content&view=article&id=47&Itemid=64) [2012-11-01].
- Acosta-Jamett, G., Cleaveland, S., Bronsvoort, B.M.deC., Cunningham, A.A., Bradshaw, H. & Craig, P.S. (2010) *Echinococcus granulosus* infection in domestic dogs in urban and rural areas of the Coquimbo region, north-central Chile. *Veterinary Parasitology*, 169, 117–122.
- Acosta-Jamett, G., Cleaveland, S., Cunningham, A.A. & Bronsvoort, B.M.deC. (2010) Demography of domestic dogs in rural and urban areas of the Coquimbo region of Chile and implications for disease transmission. *Preventive Veterinary Medicine*, 94, 272–281.
- Butcher, R. (2001) Challenges in companion animal welfare. *Journal of Small Animal Practice*, 42, 206-210.
- Carenzi, C. & Verga, M. (2009) Animal welfare: review of the scientific concept and definition. *Italian Journal of Animal Science*, 8, 21-30.
- Carslake, R.J., Hill, K.E., Sjolander, K., Prattley, D., & Acke, E. (2012). Prevalence of selected infectious diseases in Samoan dogs. *Journal of Veterinary Internal Medicine*, 26, 788.
- CDC, Centers for disease control and prevention, Health Information for Travelers to Samoa [online] (2012-09-21) Available: <http://wwwnc.cdc.gov/travel/destinations/samoa.htm> [2012-11-01]
- Dalla Villa, P., Kahn, S., Iannetti, L.A., Di Nardo, A. & Serpell, J.A. (2010) Free-roaming dog control among OIE-member countries. *Preventive Veterinary Medicine*, 97, 58-63.
- Davlin, S.L. & VonVille, H.M. (2012) Canine rabies vaccination and domestic dog population characteristics in the developing world: A systematic review. *Vaccine*, 30, 3492– 3502.
- Feldmann, B.M. & Carding T.H. (1973) Free-Roaming Urban Pets. *Health Services Reports*, 88, 956-962.
- Farnworth, M.J., Blaszak, K., Hiby, E.F. & Waran, N.K., (2012) Incidence of dog bites and public attitudes towards dog care and management in Samoa. *Animal Welfare*, 21: 477-486.
- Fielding, W.J. (2008) Dogs: A Continuing and Common Neighborhood Nuisance of New Providence, The Bahamas. *Society & Animals*, 16, 61-73.
- Frank, J.M. & Carlisle-Frank, P.L. (2006) Analysis of programs to reduce overpopulation of companion animals: Do adoption and low-cost spay/neuter programs merely cause substitution of sources? *Ecological Economics*, 62, 740-746.
- Frank, J.M. (2004) An Interactive Model of Human and Companion Animal Dynamics: The Ecology and Economics of Dog Overpopulation and the Human Costs of Addressing the Problem. *Human Ecology*, 32, 107-130.
- HPA, Health Protection Agency UK, Rabies risk by country [online] (2012-10-23) Available: <http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Rabies/Guidelines/rababiescountryrisks/> [2012-11-01]
- HPA, Health Protection Agency UK, Rabies: Geographical Risk by Country [online] (2009-08-27) Available: <http://www.hpa.org.uk/servlet/Satellite?c=Page&childpagename=HPAweb%2FPage%2FHPAweb>

AutoListName&cid=1153999752025&p=1153999752025&pagename=HPAwebWrapper&search mode=simple&searchterm=samoa&go=Search [2012-11-01]

ICAM Coalition, International Companion Animal Management Coalition. Humane Dog Population Management Guidance,[online] (2007) Available: <http://icam-coalition.org/> [2012-11-01]

Jamieson, S. (2004) Likert scales: how to (ab)use them. *Medical Education*, 38, 1217-1218.

de Keuster, T., & Butcher, R (2008) Preventing dog bites: Risk factors in different cultural settings. *The Veterinary Journal*, 177, 155–156.

Kline, T. (2012) Responsible Tourism in Samoa: An Exploration of Attitudes in Samoa Towards Responsibility in Tourism. *Independent Study Project (ISP) Collection*. Paper 1283. [http://digitalcollections.sit.edu/isp\\_collection/1283](http://digitalcollections.sit.edu/isp_collection/1283)

Krosch, S. Canine population study for Tutuila Island, American Samoa. [online] (2008) Available: <http://www.ashumanesociety.org/popstudy.pdf> [2012-11-01]

Lesshafft, H., Schuster, A., Reichert, F., Talhari, S., Ignatius, R. & Feldmeier, H. (2012) Knowledge, attitudes, perceptions, and practices regarding cutaneous larva migrans in deprived communities in Manaus, Brazil. *Journal of Infection in Developing Countries*, 6, 422-429.

Mengistu, F., Hussen, K., Ali, A., Getahun, G. & Sifer, D. (2011) Dog bite as a public health concern in Addis Ababa. *Ethiopian Journal of Health Development*, 25, 58-60.

McKenzie, B. (2010) Evaluating the benefits and risks of neutering dogs and cats. *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources*. 5, No. 045. [online] Available: <http://www.cabi.org/cabreviews> [2012-11-01]

Nations Online Project. Samoa administrative map [online] (undated) Available: <http://www.nationsonline.org/oneworld/map/samoa-administrative-map.htm> [2012-11-01]

Ortolani, A., Vernooij, H. & Coppinger, R. (2009) Ethiopian village dogs: behavioural responses to a stranger's approach. *Applied Animal Behaviour Science*, 119, 210-218.

Plumridge, S. & Fielding, W.J. (2003) Reactions of American tourists to roaming dogs in New Providence, The Bahamas. *Anthrozoös*, 16, 360-366

R Core Team (2012). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0, URL <http://www.R-project.org/>.

Ruiz-Izaguirre, E. & Eilers, C.H.A.M. (2012) Perceptions of Village Dogs by Villagers and Tourists in the Coastal Region of Rural Oaxaca, Mexico. *Anthrozoös*, 25, 75-91.

Serpell, J.A. (2004) Factors influencing human attitudes to animals and their welfare. *Animal Welfare*, 13, 145-151.

SBS, Samoa Bureau of Statistics, Government of Samoa. Population and Housing Census 2011 Analytical Report [online] (2012-10) Available: <http://www.sbs.gov.ws/index.php/population-demography-and-vital-statistics/census> [2012-11-01]

SBS, Samoa Bureau of Statistics, Government of Samoa. Annual International Migration Statistics 2010 [online] (undated) Available: [http://www.sbs.gov.ws/index.php/population-demography-and-vital-statistics/migration-arrivalsdepartures/cat\\_view/24-migration-and-visitors/39-2010](http://www.sbs.gov.ws/index.php/population-demography-and-vital-statistics/migration-arrivalsdepartures/cat_view/24-migration-and-visitors/39-2010) [2012-11-01]

SBS, Samoa Bureau of Statistics, Government of Samoa. Samoa Demographic and Health Survey 2009[online] (2010-06) Available: <http://www.health.gov.ws/Portals/189/Publications/2009%20SDHS.pdf> [2012-11-01]

- Slater, M.R., Di Nardo, A., Pediconi, O., Villa, P.D., Candeloro, L., Alessandrini, B. & Del Papa, S. (2008) Free-roaming dogs and cats in central Italy: Public perceptions of the problem. *Preventive Veterinary Medicine*, 85, 27-47.
- Slater, M.R. (2001) The role of veterinary epidemiology in the study of free-roaming dogs and cats. *Preventive Veterinary Medicine*, 48, 273-286.
- Totton, S.C., Wandeler, A.I., Ribble, C.S., Rosatte, R.C. & McEwen, S.A. (2011) Stray dog population health in Jodhpur, India in the wake of an animal birth control (ABC) program. *Preventive Veterinary Medicine*, 98, 215–220.
- Vargo, D., DePasquale, J.M. & Vargo, A.M. (2012) Incidence of Dog Bite Injuries in American Samoa and Their Impact on Society. *Hawai'i Journal of Medicine & Public Health*, 71, 6-12.

## APPENDIX 1 – QUESTIONNAIRE

### Information for participants

#### Tourist attitudes towards and behaviour around dogs in Samoa

##### Greetings

This questionnaire will gather facts about dogs in Samoa and your attitudes and behaviour towards them. This project aims to find out what factors have an effect on tourists' responses to dogs and opinions about their care and management.

##### What this means for you

By taking time to fill out and return this questionnaire you let us know common factors which influence tourists' opinions about dogs.

This information is not known for the Pacific region, gathering it will allow conclusions to be made. These conclusions may be used to find and get funding for educational campaigns and veterinary services.

##### What will be done with this?

Information gathered will be put together and analysed. It will be sent to all participating organisations in New Zealand. Unitec Institute of Technology and Massey University also reserve the right to present and publish the work where appropriate.

##### Consent

Participation in the survey is taken to indicate informed consent. Ethical approval for this study has been confirmed by Massey University, New Zealand.

##### Confidentiality

All participants will remain anonymous and the hard copy of all data collected will be placed in a password protected file, or locked cabinet, and kept for five years.

#### Section One: Respondent's details

This section is to get some background data. Please answer all questions by ticking the appropriate box

- |                                     |   |                                 |
|-------------------------------------|---|---------------------------------|
| 1) Gender of respondent             | <input type="checkbox"/> Male   | <input type="checkbox"/> Female |
| 2) Age group of respondent          | <input type="checkbox"/> 0-20   | <input type="checkbox"/> 21-40  |
|                                     | <input type="checkbox"/> 41-60  | <input type="checkbox"/> 61-80  |
|                                     | <input type="checkbox"/> 80+  |                                 |
| 3) Do you own a dog?                | <input type="checkbox"/> Yes: pet – guard - working dog (please circle) |                                 |
|                                     | <input type="checkbox"/> No   |                                 |
| 4) Country of residence             | _____   |                                 |
| 5) How long have you been in Samoa? | _____   |                                 |

## Section Two: Your opinions on dogs.

**Please read each of the statements below and tick relevant box**

	<b>Absolutely agree</b>	<b>Agree</b>	<b>Neither agree nor disagree</b>	<b>Disagree</b>	<b>Absolutely disagree</b>	<b>Don't Know</b>
<b>In general dogs are dangerous animals</b>						
<b>In general dogs are a nuisance</b>						
<b>I am a dog lover</b>						
<b>I feel safe around dogs here</b>						
<b>Dogs clearly have owners here</b>						
<b>Dogs here are well fed</b>						
<b>These dogs are like those in my home country</b>						
<b>Dogs here look healthy</b>						
<b>I feel sorry for dogs here</b>						
<b>Dogs are a nuisance here</b>						
<b>There are too many stray dogs here</b>						
<b>Dog poo should be cleaned up more often here</b>						
<b>In general dogs spread disease</b>						
<b>Dogs require better management here</b>						
<b>The use of violence against dogs is acceptable</b>						



### Section Three: Experiences with and behaviour around Dogs in Samoa

Please answer each question by ticking the appropriate box.

	Yes, always	No, not at all	Sometimes
Do you avoid contact with dogs here?			
Have you seen free-roaming dogs in Samoa?			
Do dogs here beg for food?			
Do you feed the dogs here?			
Do you wash your hands after contact with a dog?			
Do you feel dogs are friendly here?			
Do you feel threatened when a dog approaches you here?			
Do dogs here seem frightened and avoid human contact when approached?			
Do you wash your hands before a meal?			
Do you wear shoes or sandals on the beach?			
Have you witnessed inappropriate behaviour against dogs in Samoa and define inappropriate:  .....			

### Section Four: Overall experience

On a scale of 1-10 how much have the dogs affected your holiday where 1 = “not at all” and 10 = “very serious impact”

Please circle:      1      2      3      4      5      6      7      8      9      10

Was this effect POSITIVE (the dogs improved your holiday) or NEGATIVE (the dogs made your holiday worse).

Please circle:                                      POSITIVE                                      NEGATIVE

In which part of Samoa did you spend most time during this holiday?.....

Do you feel free-roaming dogs in this area are a problem?                                      YES / NO

How would you describe the number of different dogs you saw around your accommodation? Please circle:

None              A small number (1-4)              Quite a lot (5-10)              Large numbers (11+)

## Section Five: Dog Management

How acceptable do you consider the following methods of dog population management? Please mark the appropriate box.

	Absolutely acceptable	Somewhat acceptable	Neither acceptable nor unacceptable	Somewhat unacceptable	Absolutely unacceptable	Don't Know
<b><u>Voluntary sterilisation</u></b>						
<b><u>Compulsory sterilisation</u></b>						
<b><u>Voluntary registration</u></b>						
<b><u>Compulsory registration</u></b>						
<b>Humane Euthanasia of strays</b>						
<b>Humane euthanasia of unwanted puppies</b>						
<b>Compulsory Collars and ID tags</b>						
<b>Poisoning of strays</b>						
<b>Fencing to prevent dogs wandering</b>						

**YOUR COMMENTS:**

**LOCATION:**..... **DATE**.....

Thanks for filling out our survey. We hope you enjoy your holiday and have a safe trip home.

## APPENDIX 2 – COMMENTS

Additional comments given by respondents who answered the questionnaire “Tourist attitudes towards and behaviour around dogs in Samoa”. Writing that could not be interpreted has been left out like “[?]”.

- Dogs in general in good condition and control.
- Something should be done.
- Dogs should be confined to the property where they belong at night in tourist area.
- Hard to comment, know little after 3 days. Better here than Tonga.
- Good project, awareness of the problem is good. Hard to change situation, cultural. Need education.
- Quite a big problem. Better control would be nice.
- Good job managing the problem since last time (five years ago)
- I perceive that the situation has improved, this is my third visit. Free-roaming dogs are a problem for their own well-being. Thank you. Kia Kaha.
- Impractical with fencing.
- Good that someone thinks of the animals.
- It would be encouraging to see the result of this survey used to bring about a favourable solution to what I perceive as an ugly problem and barrier to increasing visitor numbers to Samoa.
- Stray dogs are a major problem.
- Owners should be responsible for their dogs.
- Like to see positive action on management of the dogs in the villages.
- I don't like dogs at all.
- With small children, wandering dogs are a concern.
- Big problem guys, get the locals on it.
- From previous visits it would appear there are less dogs, and those seem better fed.
- A little negative effect, as I felt sorry for the dogs. Didn't approach or get approached. There were cats begging at our resort.
- Dog can be very important animals in society, but should be treated humanly.
- Prefer dogs not to be around hotels (noise).
- Too many dogs altogether in Samoa.
- Just ban ALL dogs like Manonuta.
- A dog has visited our fale 2-3 times, looking for food...
- The dog culture in Samoa is completely different to New Zealand - stay the same though maybe watch the health of strays.
- If no clear owner, the dogs should be killed or sterilised. A dog chased a biker.
- Compulsory registration/microchip and collar + compulsory sterilisation will reduce puppy population + identify strays. Dog owners must take responsibility for their animals.
- Please do compulsory sterilisation.
- Dogs should be controlled.
- (Dogs should be [?])
- We have had difficulty sleeping at night because of dogs barking & fighting 24/7. Too much

noise.

- Samoa Government needs to address the STRAY DOG situation before it seriously affects your tourism industry.
- I have no opinion on the above.
- Generally dogs did not bother our holiday. But one night we had a dog come in our fale and steal our loaf of bread.
- Dogs are much more controlled in Australia. This is a wonderful country (Samoa).
- Wouldn't fence the dogs coz they wouldn't eat, doubt people would feed them anyway.
- Personally strays don't bother me too much, it seems that people feed them, but you don't think it's acceptable for strays to be everywhere.
- I don't see dogs as having much impact on Samoan society.
- Chased by dogs on bikes: not acceptable, owners should be looking after them.
- The dogs here did not bother me at all. I just accepted them as part of the culture and I haven't had any negative experiences with them.
- At this stage I think the dog population in Savaii is not a problem from my experience. However I think if left unmanaged it may get out of hand. I strongly believe euthanasia and poisoning methods are absolutely unacceptable however I think compulsory desexing will help to manage the population.
- We have not found dogs here to be an obvious nuisance to us - but some are clearly not well and do not seem well cared for.
- The only negative incident was when we were approached by a snarling dog in the bush along the beach, but he was protecting his owner I believe. The owner immediately called the dog back.
- When I lived and worked in a village in Upolu 20 years ago, dogs were definitely problematic for me - one bit my colleague [?] many strays. I was very unsure especially at night. Dogs have not been a problem at this accommodation at all. My only encounters have been when walking through the village - once. So my replies reflect this. Fencing would frame the Samoan way of life as a convenience for tourists. I do not support such actions.
- Dogs are a nuisance no more than pigs. Should be spayed.
- The dogs around Apia upset me as they seemed in poor condition and looked hungry
- Dogs look happy but it is not a good idea to have so many strays. In Manase there are no dogs which is good.
- Cows=Animals=food, Dogs=Animals... Fencing depends on fences.
- Dogs can be annoying, but they don't seem very threatening
- Feel safe walking in Manase with no dogs. Visited many times, lived here 1972-1973, saw then inappropriate behaviour: rocks thrown.
- Manase is great with no dogs allowed. Regulation of [?] dogs a good idea if not costly for the owner. It is not acceptable the number of stray dogs in some villages.
- The dogs chase the cars and are a nuisance on the roads as they don't move so can easily be hit.
- Only dangerous aspect of dogs is when they chase cars.
- Dogs are a bit of a nuisance on the road and a little bit unsightly when they are thin and malnourished but do not really affect your ability to relax and holiday.
- Upolu is worse for dogs.
- Animal care and responsibility education maybe effective as well.
- Stayed in Fagamalo, which is a dog free village so observations are based on what I saw in

Salelologa. Fences acceptable if they are looked after.

- I have not noticed dogs in this area, therefore not a problem.
  - I don't like dogs. Tanu Beach no dogs.
  - Grateful for zero tolerance of dogs at Tanu Beach.
  - Dog control around Manase, especially Tanu Beach Fales was very good and much appreciated. Some tourists apparently feed dogs - this is bad!
  - Fencing of dogs is obviously not something that can be realistically achieved.
  - I like dogs that I know and are calm, but I don't like the ones I don't know.
  - When driving, especially after dark, stray dogs are a big problem when it comes to safety.
  - Physical encounters: OK. When driving they are a risk; you have to drive really cautiously.
  - In general I think the dogs make the place a bit more charming.
  - I feel the problem with stray dogs greatly impact on the tourists' view of Samoa. The problem needs to be dealt with immediately before Samoa becomes another Bali.
- 
- I understand that Manase bans dogs - this pleased me a lot. I had heard of a tourist being bitten in Apia. Dogs barking at night were really annoying in Apia. I also worry about my children.
  - Some of my responses based on what I have been told of the dog "problem" around Apia especially - some responses are purely based on my limited experience.
  - Was saddened to see many injured and underfed dogs roaming around Samoa.
  - I was quite appalled to see most of the stray dogs sick, maimed and in need of care.
  - Many dogs appear underfed (or have intestinal worms) appear very cautious of humans and have injuries or scarring.
  - It is a problem that needs to be addressed; many injured dogs are wandering around and need help and many extra thin dogs and cats.
  - I feel something needs to be done to control the dog population. The people need to be educated about this problem. Need to seek vet when dogs get hit by cars. Do a survey on cats too.
  - Cats? Looked after, sterilised?
  - Adequate measures may eliminate any determined dog problem.
  - Dogs need to be fed, and looked after as there are a few that are injured and need of food.
  - Very interesting questionnaire.
  - Husband bitten when riding bike.
  - Saw strays mostly around the ferry terminals, which were fighting, not nice.
  - Stayed in resort most of the time, no problem there.
  - Dogs were a bigger problem when travelling around the island.
  - Too many strays in town and too intimidating, too much shit!!
  - Mostly we avoided dogs but I wanted to interact. I know one person bitten a few years ago (child on the face) and met a traveller this time who was bitten on the leg in Apia. I also heard many people speaking about being scared and a group who were chased. Negative experience because at times I was scared and 3 dogs chased our car.
  - Some of the dogs here barked and ran towards us, my friend and I were fine with that, but I can see how other people not comfortable with dogs would be afraid or threatened. If one attacked me I'm confident that I could defend myself with an object of some sort (a stick).

- I think dogs in Samoa are not yet a problem, there are not that many anyways. It is important to ask SAMOANS what they think as the Europeans can't make decisions on their behalf.
- We have had very little contact with dogs but they have all seemed friendly and unthreatening.
- So far my holiday has not been effected by stray dogs but driving around the island I have seen a lot of them lying on the road and running out in front of our car.
- Feel very sorry for the dogs, they are badly treated, not fed, have sores on their bodies which are not treated.
- Regarding the last question: Fencing would be a waste of time as the majority are large and can jump.
- Dogs are a problem when walking at night by yourself.
- Thanks.
- Friend live in Apia, keep dogs, can't visit without owner restraining otherwise may bite. Wished to walk around during holiday but not possible with dogs. Fencing no point.
- I have found that lots of dogs are on the roads and lots look malnourished.
- Been here before approx 3 years ago.
- I love this country! Don't change it please:)
- Euthanizing dogs should only occur if effective management such as sterilisation is in plan.
- Some dogs are controlled and well looked after, but stray non-owner dogs a problem. Been here 4 times before.
- This is my third 2nd trip to Samoa, dogs are a nuisance on the roads, bark at night and can be threatening.
- Opinion based on written info + driving around
- Most dogs I have seen here are pets or local strays but very friendly. Although I would not fully trust them as they are generally treated like pests by the locals.
- Met another tourist that got bitten, unprovoked in Apia. Went to hospital.
- Met another tourist that got bitten in Apia, unprovoked.
- My heart breaks for these stray dogs. I love dogs and seeing them malnourished is very upsetting.
- I am not a pet (dog) person but I still want them treated the same way I want others treat me.
- Feel sorry for the dogs here. Would love to open a shelter here for stray/unwanted animals.
- Dogs here aren't treated how they should be. Dogs are a man's best friend.
- Samoa needs to educate its people about keeping their dogs healthy, as well as changing their attitudes towards dogs.
- Ideally euthanasia is a solution of last option.
- Overall the dogs have surprised me in how healthy and harmless they are. I have travelled to Asia and my experiences have been much worse there. Chased on scooter.
- The dogs are plentiful, however the locals here accept them as part of their life and killing them is not OK. Chased on scooter.
- Most dogs here in Samoa have a hard life. That is just the way it is, not all dogs have it hard as some people care, love them just like you and I do. What they need is to slow dog numbers down and do something with stray dogs.
- Management is something for Samoan people to decide.
- Have had very little to do with Samoan dogs.
- I felt the dogs here are well behaved compared to dogs from New Zealand, but I feel they are not looked after and fed properly and I would advice compulsory registration.

- Thank you for taking care of men's best friend.
- I like dogs, but because my favourite sport is cycling, I am very much disturbed by dogs running behind cyclists and sometime biting them.
- I would like to walk around in rural areas but too many dogs on roads - husband was [?] bitten by dogs so we are reluctant to go anywhere where they are.
- In general dogs are friendly animal but you may not know what is on its mind even if you approach them friendly way.
- I love dogs, and what their life is like depends on us, the humans.
- I am a foreign worker, not a tourist.
- Attacked and bitten by dog while walking on roadside on first day of visit - in daylight. Hotel doorman/driver - badly bitten next day under similar circumstances - in daylight. We were warned twice during the first of days of our stay that packs of dogs were a threat to people walking at night. Some dogs are dangerous; most are not a nuisance except in fouling footpaths.
- Everyone that comes to Samoa talks about stray dogs, particularly Apia. Some of my friends wont come because they don't like dogs. Dogs get aggressive if they aren't looked after. Registration and compulsory collars and ID tags are not going to happen. Wrong people will be penalised. My fifth time in Samoa.
- Fencing won't happen
- It specially affected my stay during the evenings. Everybody advised me to go out with a stone in my hands, but after I just stayed in my accommodation to stay safe. Don't forget I'm really a dog lover, but I couldn't trust these dogs here, most of them didn't wiggle their tales so you never know what they're up to. Especially at night.
- Many, many dogs barking at night totally unacceptable. Bad in Apia.
- Violence against dogs is acceptable if necessary for protection.
- The dog neither made a positive or negative affect on my holiday. Inappropriate that dogs are on the road.
- Noisy dogs disrupt sleep!
- Very noisy dogs throughout night making sleep very difficult.
- Generally dogs keep out of your way. Been warned.
- Dogs should be put up for adoption before euthanizing them.
- I like the sterilisation option as a first option as this would automatically lower the population. Compulsory sterilisation acceptable if no one owns them. Humane euthanasia seems too cruel for a puppy.
- I think about the Euthanasia part. It is ok, but I am interested in what steps are taken to find the animal an owner before that happens. Like the New Zealand SPCA, takes steps before putting the animal down. And also I'm not sure here which dogs are stray or owned.
- Dog management section answered with a Samoan economic and cultural perspective. Seventh trip. Compulsory registration maybe in 20 years.
- I feel sorry for the dogs as I think they are not personally responsible.
- Problem when driving around when trying to avoid dogs nearly hit another car.
- Potential problem to become larger.
- Dogs are not pets here like they are in developed countries. They are what nature intended them to be here which are true scavengers.
- Need to work on methods to get rid of stray dogs to avoid spread of dog diseases.
- Government should work together with APS and private sector to remedy the current situation.

- Educate dog owners here.
- The humane society really needs to enforce their dogs. We need patrols to gather the strays cause some are very ferocious.
- Dogs react to the treatment they receive from humans. We need to look after them better and they will behave well.
- Guiding some thousands of tourists around Savaii since 1990, very few have ever complained of being attacked or bitten. Local villagers do occasionally get bitten - but usually only by one dog. They are territorial. We don't see packs of stray dogs as in Apia. Most village families keep dogs. The barking howling and fighting at night can be extremely annoying. Some villages ban dogs, particularly those that host tourists. Savaii does not have a permanent vet service for small animals - we need one. Dog poo never cleaned up. Fencing impractical in Savaii.
- To have any success with the above methods you will need more awareness and education. Otherwise you will be running around in circles as dogs will continue to breed while their masters remain ignorant.
- I have lived in Samoa for almost 20 months, our village is "dog free" lucky us. Apia and surrounding villages most certainly have dog problems. Many of our guests complain to us about the dogs in Apia and around the wharfs.
- The culture and financial constraints regarding the keeping of dogs as pets here in Samoa does not justify the number of dogs present. 90% of all dogs should be euthanized in Samoa.
- The dogs here in Savaii are quite nice they just as hungry as us. I just think they shouldn't wonder free too much.