

# Exploring the Bond

## Characteristics of free-roaming cats and their caretakers

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**Objectives**—To describe the characteristics of unowned, free-roaming cats and their caretakers who participated in a trap-neuter-return (TNR) program and to determine the effect of the program on free-roaming cat colonies.

**Design**—Prospective study.

**Sample Population**—101 caretakers of 920 unowned, free-roaming cats in 132 colonies in north central Florida.

**Results**—Most (85/101; 84%) caretakers were female. The median age was 45 years (range, 19 to 74 years). Most (89/101; 88%) caretakers owned pets and of those, most (67/101; 66%) owned cats. The major reasons for feeding free-roaming cats were sympathy and love of animals. Most caretakers reported that the cats they cared for were too wild to be adopted, but many also reported that they considered the cats to be like pets. The total surveyed cat population was 920 before participation in TNR and 678 after TNR. Mean colony size was 7 cats before TNR and 5.1 cats after TNR. Most cats lived on the caretaker's property. At the time of the survey, 70% (644/920) of the cats had been neutered.

**Conclusions and Clinical Relevance**—The decrease in the surveyed free-roaming cat population was attributed to a reduction in births of new kittens, adoptions, deaths, and disappearances. Recognition of the human-animal bond that exists between caretakers and the feral cats they feed may facilitate the development of effective control programs for feral cat populations. (*J Am Vet Med Assoc* 2002;220:1627-1633)

It is difficult to accurately estimate the number of free-roaming cats in the United States because of the lack of comprehensive surveys and a central data collection point. However, some experts estimate that up to 25 to 60 million free-roaming cats live in the United States today.<sup>1,2</sup> Stray and feral cats are estimated to account for 35 to 45% of the entire known cat population,<sup>3,a</sup> and the total number of free-roaming cats, including those without human contact, may actually exceed the number of owned cats.<sup>4</sup> Although the number of animals euthanatized in US animal shelters is also not available, most estimates agree that millions of

stray and feral cats are euthanatized in the United States every year.<sup>5</sup> For example, the American Humane Association<sup>6</sup> estimated that 5 to 7 million cats were euthanatized in US animal shelters in 1993, and the Humane Society of the United States<sup>7</sup> estimates that 4 to 5 million cats and dogs are euthanatized by US shelters each year.

Despite the large numbers of free-roaming cats, the main target of population control by neutering has been the owned pet cat, not unowned cats. A clear understanding of the interactions between stray and feral cats and the caretakers who feed or look after them would be useful to plan effective public animal control programs. In addition, understanding free-roaming cat populations and the people who care for them are relevant to private practitioners for several reasons. Free-roaming cats, especially socialized ones being fed by people who already own pets, represent an underserved market that could be targeted for practice growth. Recognition of public health risks of unvaccinated free-roaming cats has increased the demand for control of feral cat colonies. Veterinarians are playing an increasingly central role in feral cat control via neutering programs. In 1999, the California Veterinary Medical Association began a Feral Cat Altering Program sponsored by Maddie's Fund, which awarded California veterinarians more than \$7 million to spay and castrate more than 150,000 free-roaming cats.<sup>8</sup> In 1996, the AVMA Executive Board approved a position statement on abandoned and feral cats that "encourages and supports actions to eliminate the problem of abandoned and/or feral cats," including humane capture of cats in "managed colonies" to allow for neutering, animal identification, adoption of kittens or socialized adult cats, or a return to the colony for those cats that cannot be socialized.<sup>9</sup>

The lines between loosely owned outdoor cats, stray cats, and feral cats are often blurred. Stray cats may be defined as homeless cats that have been abandoned or become lost but are still friendly to humans. Feral cats are untamed and evasive. They are either born in the wild and lack socialization or are returned to the wild and become untrusting of humans. Owned outdoor cats who wander or become lost may become stray cats. Stray cats who have lived in the wild for an extended time may become feral. Thus, individual cats may be included in each of these categories at various stages of their lives. The stray and feral cats in this study were

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carefully screened to ensure that, to the best knowledge of the caretakers, these cats were indeed unowned. Therefore, for the purposes of this study, the term free-roaming cats was used to include cats that were judged by the caretakers to be unowned strays and feral cats.

Recent efforts of animal advocates, veterinarians, and public officials have focused on **trap-neuter-return (TNR)** programs as a means of reducing free-roaming cat populations. Trap-neuter-return programs generally target unowned cats that are being fed by caretakers. The cats are trapped, transported to a clinic to be spayed or castrated, and then returned to the colony where they have been living. While various other services including vaccination, parasite control, retroviral testing, and treatment of injuries or illness may also be provided, there is no generally accepted standard for TNR within the United States or around the world. The provision of rabies vaccination at the time of neutering varies among programs and often correlates with the rate of regional rabies prevalence. For example, 1 program provides rabies vaccinations for all cats admitted to its TNR clinics in North Carolina and Florida, which both have ongoing rabies endemics. In contrast, a program in California, a state that has a much lower rate of rabies, does not mandate rabies vaccination. Aftercare of the cats following release also varies, with some programs requiring registration of colonies and defined daily care and others focusing solely on neutering.

Trap-neuter-release programs are increasingly accepted by humane organizations (Alley Cat Allies, Maddie's Fund, American Society for the Prevention of Cruelty to Animals, Humane Society of the United States, Massachusetts Society for the Prevention of Cruelty to Animals, San Francisco Society for the Prevention of Cruelty to Animals, National Humane Education Society, the Hawaii Humane Society), public officials (Orange County [Florida] Animal Services), veterinary organizations (AVMA, California Veterinary Medical Association), and veterinary colleges (University of Florida, North Carolina State University, Texas A&M University, University of California, Davis) as an alternative to lethal methods of cat population control.

Operation Catnip is 1 such TNR program. The volunteer organization began operating monthly spay and neuter clinics for free-roaming cats in Raleigh, NC, in 1997 and in Gainesville, Fla, in 1998. The Florida program was the site used for this study. Clinics are open, free to the public, and held at the University of Florida's College of Veterinary Medicine, where 5 to 10 volunteer veterinarians and 30 to 50 other volunteers neuter up to 165 cats in 1 day. Each cat, in addition to being neutered, is vaccinated against rabies, feline leukemia, panleukopenia, herpes virus, and calicivirus and receives ivermectin or selamectin for treatment of parasites. The top of the left ear is tipped to permanently identify neutered cats.

The purposes of the study reported here were to create a profile of free-roaming cats living in colonies managed by caretakers who brought them to a TNR program, create a profile of these caretakers, describe the relationship between these cats and their caretakers, and determine what effect participation in a TNR program has had on these free-roaming cat colonies.

## Materials and Methods

A written survey was created for caretakers who had previously brought free-roaming cats to be neutered during the first 9 months of Operation Catnip. Caretakers were either contacted by telephone and mailed a copy of the survey if they agreed to complete it or they were approached at an Operation Catnip clinic and given a survey if they agreed to complete it. Respondents were given the choice of including their name and address or remaining anonymous. The survey was 2 pages and consisted of 37 questions, 17 of which addressed characteristics of the cats, and 20 addressed characteristics of the caretakers themselves. Survey questions were grouped into the following categories: characteristics of caretakers, services provided by caretakers, motivations of caretakers, conceptual differences of pets versus strays, satisfaction of caretakers with the TNR program, size of free-roaming cat colonies, characteristics of free-roaming cats, free-roaming cat habitats and locations, origin of free-roaming cat colonies, quality of life of free-roaming cats, and impact of neutering on free-roaming cat colonies.

Thirteen of the questions were multiple choice, 9 were short answer, and 15 were completed with a number. Several of the questions, such as those concerning colony location or quality of life, elicited results based on broad subjective definitions. For example, caretakers were asked to characterize the location of the colonies as rural, small town, suburban, or urban. The description of the location, therefore, depended on how each individual perceived or defined the terms rural, small town, suburban, or urban.

## Results

Between February and May of 1999, telephone contact was attempted with all 200 caretakers who had brought cats to be neutered at Operation Catnip during the period of July to December 1998. In addition, 20 caretakers who had brought cats to be neutered during the period of January to March 1999 were approached in person at 1 of the clinics. Seventy-three caretakers were not able to be reached by telephone after 2 attempts. A total of 147 caretakers were contacted by telephone or approached in person, and all of them agreed to complete a written survey. Most of the caretakers knew 1 of the authors (LAC), the person who made the telephone calls, from her volunteer involvement with Operation Catnip. A follow-up telephone call was made to caretakers who had not returned the survey within 1 month of it being mailed or given to them. A total of 101 (69%) completed surveys were returned by Jun 1, 1999. These surveys reflected information from 101 individuals or couples who cared for 132 colonies of free-roaming cats in north central Florida. A colony was defined as 1 or more free-roaming cats living in a distinct location; therefore, it was possible for a caretaker to feed more than 1 colony if each colony was located in a different location. Nearly all (92%) of the caretakers voluntarily identified their name, address, and phone number on the survey.

**Caretaker demographics**—The demographics of the survey respondents were summarized (Table 1). The caretakers resided in 34 cities and towns in 12 counties, but most lived in Alachua County, the county in which the TNR program operated. Most caretakers who responded to the survey were female. The median age of caretakers was 45 years (range, 19 to 74

Table 1—Characteristics of caretakers of free-roaming cats (n = 101)

Variable	No. (%)
County of residence (n = 98)	
Alachua (Gainesville only)	37 (37.8%)
Alachua (outside Gainesville)	20 (20.4%)
Levy	14 (14.3%)
Clay	7 (7.1%)
Putnam	5 (5.1%)
Columbia	4 (4.1%)
Gilchrist	3 (3.1%)
Marion	3 (3.1%)
Others	5 (5.1%)
Sex (n = 104)	
Female	88 (84.6%)
Male	16 (15.4%)
Age (n = 97)	
19–29 y	15 (15.5%)
30–39 y	15 (15.5%)
40–49 y	25 (25.8%)
50–59 y	25 (25.8%)
60–74 y	17 (17.8%)
Number of people in household (n = 93)	
1	19 (20.4%)
2	40 (43.0%)
3–4	25 (26.9%)
5–7	9 (9.7%)
Household annual income (n = 91)	
Less than \$12,000	18 (19.8%)
\$12,000–20,000	22 (24.2%)
\$20,000–40,000	28 (30.8%)
\$40,000–75,000	18 (19.8%)
\$75,000–100,000	3 (3.3%)
More than \$100,000	2 (2.2%)
Marital status (n = 97)	
Married	51 (52.6%)
Single	22 (22.7%)
Divorced	16 (16.5%)
Widowed	5 (5.2%)
Co-habitating	3 (3.1%)
Student status (n = 94)	
Not student	77 (81.9%)
Undergraduate	8 (8.5%)
Graduate/professional school	7 (7.4%)
Veterinary school	1 (1.1%)
Technical program	1 (1.1%)
Friends/family who help care for cats (n = 101)	
No one	40 (39.6%)
Spouse/partner	27 (26.7%)
Other family member	24 (23.8%)
Neighbor	11 (10.9%)
Friend	9 (8.9%)
Co-worker	3 (3.0%)

years). The median household size of the caretaker was 2 people (range, 1 to 7 people), and the median household income range was \$20,000 to \$40,000/y. Most caretakers were married. Eighteen percent of caretakers were college students, similar to the 25% of residents of Alachua County that attend college.

Most caretakers were assisted by someone familiar to them in caring for free-roaming cats. Many were helped by a spouse or partner or other family member. Of married caretakers, half were assisted in caring for free-roaming cats by their spouses.

**Pet ownership by free-roaming cat caretakers—**Most caretakers who responded to the survey owned pets, and most had pet cats (Table 2). Pet-owning caretakers had a median of 3 animals/household, and cat-owning caretakers had a median of 2 pet cats. Most cat owners reported that all of their pet cats were neutered.

Table 2—Pet ownership of caretakers of free-roaming cats

Variable	No. (%)
Pet ownership by species of pets (n = 97)	
No pets	12 (12.4%)
Cats	64 (66.0%)
Dogs	55 (56.7%)
Horses	12 (12.4%)
Birds	6 (6.2%)
Other	9 (9.3%)
Zoo	1 (1.0%)
Pet ownership by number of pets (n = 95)	
0	12 (12.6%)
1	19 (20.0%)
2	20 (21.1%)
3–5	15 (15.8%)
6–10	15 (15.8%)
11–20	6 (6.3%)
21–30	1 (1.1%)
31–40	5 (5.3%)
More than 40	2 (2.1%)
Cat ownership (n = 97)	
0	33 (34.0%)
1	18 (18.6%)
2	18 (18.6%)
3	9 (9.3%)
4–5	9 (9.3%)
6–9	5 (5.2%)
10–12	4 (4.1%)
More than 12	1 (1.0%)
Pet cat neutering rates (n = 63)	
All neutered	55 (87.3%)
Some neutered	7 (11.1%)
None neutered	1 (1.6%)

**Services provided by caretakers—**The services provided by the caretakers were also evaluated (Table 3). Most caretakers fed a single colony and had been taking care of free-roaming cats for a median of 18 months. Nearly all caretakers provided food for the free-roaming cats. Of those that fed cats, nearly all fed the cats at least daily, and nearly all caretakers fed cat food, usually supplemented with table scraps or “people food.” Only 2% of caretakers fed the cats dog food, even though 24% of the caretakers had pet dogs but not pet cats.

Most caretakers provided some form of shelter for the free-roaming cats. Usually this habitat was a porch or covered walkway, shed, or barn. Several caretakers admitted that they sometimes let free-roaming cats into their homes, and 1 installed a cat door at her workplace so that the cats could come inside for shelter.

More than a third of the caretakers reported that they had provided some kind of veterinary care (not including being neutered at the TNR clinic) for the cats in the past or would provide veterinary care if it was necessary in the future. This type of care included booster vaccinations, parasite control, antibiotic treatment, ear medication, veterinary examinations, and emergency treatment.

Caretakers reported spending a median of \$5/week on free-roaming cats, with a maximum of \$50/week. A few caretakers reported that they did not spend any money on free-roaming cats because these cats ate the food provided for the caretakers’ own outdoor pets.

**Motivations of caretakers—**The major reason people began feeding free-roaming cats was sympathy or pity for a hungry, injured, or unhealthy free-roaming cat (Table 4). Others cared for free-roaming cats out of affection for cats or animals in general.

Table 3—Services provided by free-roaming cat caretakers

Variable	No. (%)
Number of cat colonies fed by caretakers (n = 100)	
1	79 (79.0%)
2	12 (12.0%)
3	8 (8.0%)
4	0 (0%)
5	1 (1.0%)
Duration of feeding (n = 114) <sup>a</sup>	
0–3 mo	5 (4.4%)
4–6 mo	9 (7.9%)
7–12 mo	37 (32.5%)
1–2 y	33 (28.9%)
3–4 y	23 (20.2%)
5–10 y	5 (4.4%)
More than 10 y	2 (1.8%)
Type of care provided (n = 100) <sup>b</sup>	
Food	96 (96.0%)
Shelter	75 (75.0%)
Veterinary care (other than neuter)	37 (37.0%)
Frequency of feeding (n=85)	
At least daily	48 (56.5%)
Twice daily	33 (38.8%)
Three times daily	2 (2.4%)
Every other day	2 (2.4%)
Type of food offered (n = 84) <sup>b</sup>	
Cat food	83 (98.8%)
Table scraps	81 (96.4%)
Fish	14 (16.7%)
Meat	4 (4.8%)
Dog food	2 (2.4%)
Cats eat from garbage	2 (2.4%)
Milk	1 (1.2%)
Eggs	1 (1.2%)
Type of shelter provided (n = 65) <sup>b</sup>	
Porch/deck/covered walkway	26 (40.0%)
Shed	21 (32.3%)
Barn	11 (16.9%)
Caretaker's home	5 (7.7%)
Garage/carport	5 (7.7%)
Pet carrier/plastic kennel/dog house	4 (6.2%)
Tree house	1 (1.5%)
Workplace	1 (1.5%)
Type of veterinary care provided (n = 31)	
Vaccinations	8 (25.8%)
Deworming	8 (25.8%)
Antibiotic	6 (19.4%)
Ear medication	6 (19.4%)
Flea treatment	6 (19.4%)
Emergency treatment	4 (12.9%)
Veterinary examination	4 (12.9%)
Amount of money spent per week on colonies (n = 89)	
No money spent	5 (5.6%)
\$1–2	12 (13.5%)
\$3–5	39 (43.8%)
\$6–10	21 (23.6%)
\$11–15	6 (6.7%)
\$16–20	2 (2.2%)
\$21–25	2 (2.2%)
\$26–50	2 (2.2%)

<sup>a</sup>n > 101 because some caretakers fed more than 1 colony.  
<sup>b</sup>Percentages total > 100%, because caretakers indicated more than 1 response.

Most caretakers first learned about the colonies that they fed when the cats actively approached the caretaker or were living or appeared near the caretaker's home. Some of the free-roaming cats were already present when the caretaker moved into the residence, but several of these caretakers attracted the cats by feeding their own pet cats outside.

Caretakers were asked why they chose to bring cats to be neutered at Operation Catnip rather than take the cats to the local animal control facility, ignore the cats,

Table 4—Motivations of caretakers of free-roaming cats

Variable	No. (%)
Reason caretaker began feeding colony (n = 92) <sup>a</sup>	
Sympathy/ethical concern	60 (65.2%)
Love cats/animals	25 (27.2%)
Eating pet cat's food	5 (5.4%)
Kittens were born	5 (5.4%)
Helping someone else	4 (4.3%)
How caretaker learned about colony (n = 74)	
Lives on caretaker's property	46 (62.1%)
Lives near caretaker's home	21 (28.4%)
Lives at workplace	4 (5.4%)
Someone told caretaker	2 (2.7%)
Progeny of former pet	1 (1.4%)
Reason for choosing Operation Catnip (n = 94)	
Didn't want cats killed	72 (76.6%)
Sounded like good idea	8 (8.5%)
Referral	5 (5.3%)
Affordable	4 (4.3%)
Cats not adoptable	3 (3.2%)
Volunteer for Operation Catnip	2 (2.1%)
Why strays have not become pets (n = 89) <sup>b</sup>	
Too wild	48 (53.9%)
Consider them "like pets" or adopted	26 (29.2%)
Do not have room	16 (18.0%)
Cannot afford another pet	11 (12.4%)
Do not like cats, just feel sorry	10 (11.2%)
Do not have time	6 (6.7%)
Spouse/house mate does not approve	6 (6.7%)
Allergic to cats	4 (4.5%)
Current pets would not accept them	3 (3.4%)
Adopted by someone else	1 (1.1%)
They enjoy their lives as strays	1 (1.1%)
Referrals to Operation Catnip (n = 98) <sup>b</sup>	
Newspaper	29 (29.6%)
Friend/family member	27 (27.6%)
Veterinarian	15 (15.3%)
Poster/flyer	8 (8.2%)
University community	8 (8.2%)
Television	7 (7.1%)
Animal organization	4 (4.1%)
Community newsletter	3 (3.1%)
Radio	1 (1.0%)
Bumper sticker	1 (1.0%)
Satisfaction with Operation Catnip (n = 99)	
Very satisfied	91 (91.9%)
Satisfied	7 (7.1%)
Not satisfied	1 (1.0%)

See Table 3 for key.

or deal with the cats in some other way. The majority of caretakers did not want the cats to be euthanized. Some caretakers chose TNR because it seemed like a good approach to them, because they believed that other methods to control the free-roaming cat population had not worked, or because someone had referred them to the program. Other caretakers chose TNR because they enjoyed having the cats around or believed that the cats were useful for rodent control.

**Pets versus strays**—Survey respondents were asked to list 1 or more reasons why the free-roaming cats they cared for had not become their pets. Most people reported that the cats were too wild to be adopted. Nearly a third of caretakers reported that they had found a home for at least 1 of the free-roaming cats they fed, had adopted at least 1 of the cats themselves, or that they considered these cats to be "like pets."

**Referrals to TNR program**—Caretakers learned about Operation Catnip from a variety of sources. The largest group learned about it from a newspaper adver-

Table 5—Characteristics of free-roaming cat colonies

Variable	No. (%)
<b>Sex of free-roaming cats (n = 785)</b>	
Sex unknown	280 (35.7%)
Sex known	505 (64.3%)
Known females	277 (54.9%)
Known males	228 (45.1%)
<b>Age of free-roaming cats (n = 727)</b>	
Less than 3 months	66 (9.1%)
3-6 months	64 (8.8%)
6-12 months	185 (25.4%)
More than 1 year	412 (56.7%)
<b>Location of colony (n = 129)</b>	
Caretaker's property	81 (62.8%)
Not caretaker's property	48 (37.2%)
Apartment	10 (7.8%)
Public property	4 (3.1%)
Other private property	29 (22.5%)
No category noted	5 (3.9%)
<b>Habitat of colony (n = 129)<sup>a</sup></b>	
Rural or small town	89 (69.0%)
Suburban or urban	40 (31.0%)
Wooded area	63 (48.8%)
<b>Caretakers' perception of quality of life of free-roaming cats (n = 98)</b>	
Excellent	29 (29.6%)
Good	56 (57.1%)
Fair	9 (9.2%)
Poor	4 (4.1%)

*See Table 3 for key.*

tisement or article. Another large group heard about the program from a friend, family member, or veterinarian.

**Satisfaction of caretakers with TNR program services**—The vast majority of survey respondents reported that they were “very satisfied” with the services Operation Catnip provided. Only 1 person reported that she was not satisfied with the program, on the basis that the ear tipping, which indicated that the cat had been neutered, was too severe.

**Size of free-roaming cat colonies**—The demographics of the free-roaming cat colonies and characteristics of the cats themselves were evaluated (Table 5). The 132 colonies identified in the survey initially contained 920 cats when the caretakers first began feeding the colonies. At the time of completing the survey, when at least 1 member of the colony had been neutered, the colonies contained 678 cats. The mean colony size before any neutering was 7 cats, with the largest colony containing 89 cats. The mean colony size at the time of the survey (after beginning neutering) was 5.1 cats, and the largest colony was reduced from 89 to 42 cats. Since caretakers began having cats neutered 1 to 9 months prior to completing the survey, there was a 27% decrease in mean colony size within less than 1 year of beginning neutering. Of the original colonies, most consisted of 1 to 5 cats. A typical colony was often described by caretakers as a mother cat with several kittens and sometimes 1 or 2 tomcats roaming the area.

During the 1- to 9-month period between initial participation in the TNR program and completion of the survey, caretakers reported a total of 151 deaths, 149 disappearances, and 238 adoptions from the colonies. They also reported a total of 498 births and 103 immigrations into the colonies (Table 6).

Table 6—Cat colony characteristics before and after involvement in a trap-neuter-release (TNR) program

Variable	No.	Mean no. cats/colony	Median no. cats/colony
Cats before starting TNR	920	7.0	4.0 (range, 1–89)
Cats after starting TNR	678	5.1	3.0 (range, 0–42)
Cats neutered by Operation Catnip	512	3.9	2.0 (range, 1–48)
Cats neutered elsewhere	131	1.3	0.0 (range, 0–40)
Deaths	151	1.2	0.0 (range, 0–20)
Adoptions	238	1.9	0.0 (range, 0–47)
Disappearances	149	1.2	0.0 (range, 0–24)
Births	498	4.4	0.0 (range, 0–100)
Immigrations	103	0.9	0.0 (range, 0–16)

**Characteristics of free-roaming cats**—Caretakers identified the sex of 64% of the cats sampled in this survey. Of those cats, slightly more than half were believed to be female. This approximates the population of 1,043 cats brought to Operation Catnip during the survey period, which were 61% female and 39% male. Of the cats in which ages were known, slightly more than half were cats > 1 year old.

**Free-roaming cat habitats**—Most of the colonies lived on the caretaker's own property, including 3 colonies living in and around a private zoo. Other colonies were located at apartment complexes or on private property that belonged to someone other than the caretaker. Of the 4 colonies located on public property, 1 was at a police station, 1 was at an elementary school, 1 was at a hospital, and 1 was in a wooded area on county property. No colonies were identified as living on parks or wildlife preservation areas. Most colonies were in a rural area or small town, and almost half lived in a wooded area.

**Origin of free-roaming cat colonies**—Less than a third of survey respondents knew the source of the original cats in the colony. Of these, most were believed to be abandoned in the caretaker's area.

**Quality of life and impact of neutering on free-roaming cat colonies**—Most of the caretakers surveyed believed that the colonies they fed had an excellent or good quality of life. Of the original 920 cats, 238 (26%) were adopted, and many caretakers said they treated the free-roaming cats “like pets.” Of the 920 cats originally in these 132 colonies, 70% were neutered at the time of the survey; 512 were neutered by Operation Catnip, and 131 were neutered elsewhere. Less than a third of the original cats were not yet neutered because of factors including young age, inability to trap, disappearance, or death.

Most (82%) caretakers believed that neutering improved the quality of life for the free-roaming cats they fed. Only 1 caretaker believed that neutering worsened a cat's quality of life. This person stated that the cat seemed “a little crazy” and “less able to cope (in the wild) since being spayed.” The other caretakers (17%) said that neutering had no change on the cats' quality of life or didn't know what kind of impact it had made.

## Discussion

Previous surveys of feral cat feeders indicate that 9 to 25% of all households feed free-roaming cats, suggesting that feeding unowned cats is a common activity.<sup>1,3</sup> A 1999 survey<sup>a</sup> of pet ownership in the county where this TNR program is operated indicated that 12% of county households fed at least 1 free-roaming cat that was not owned by the household. The wide range in ages, incomes, and marital status reported in this survey and others indicates that caretakers of free-roaming cats are a diverse group. Caretakers of free-roaming cats are typically not isolated individuals, as most (60%) were supported in caring for the cats by their families or friends.

In general, the typical caretaker of free-roaming cats is a middle-aged, middle class, married, pet-owning woman living in a household of 2 to 3 people. This is consistent with findings from other surveys<sup>1,10</sup> of feral cat caretakers, which indicate that 84 to 92% of caretakers were women, and 56 to 58% were married or living with a companion.

The typical caretaker of free-roaming cats is a person who is devoted to animals. Caretakers are more likely to be pet owners and cat owners than the general public. Most (88%) surveyed caretakers were pet owners, and most (66%) owned cats, in contrast to the general population of Alachua County, in which only 49% of households owned pets in general, and only 28% specifically owned cats.<sup>b</sup> Most (91%) caretakers fed or cared for free-roaming cats out of sympathy, affection, or a sense of responsibility for hungry or injured animals. Most caretakers opted for a TNR program rather than taking the cats to a local animal control facility, because they knew the cats would probably be euthanatized there, and they wanted to reduce the free-roaming cat population without euthanatizing the cats. Most caretakers in a previous survey<sup>10</sup> were motivated by love of cats, opportunity for nurturing, and enhanced feelings of self-esteem.

Of the caretakers in this survey who had pet cats, 87% had all of their pet cats neutered. These data are consistent with a 1999 survey<sup>a</sup> of Alachua County residents that reported that 82% of households that feed free-roaming cats had neutered their pet cats. Other studies<sup>3,11-13</sup> in California, Nevada, and Massachusetts also reported that 85 to 92% of owned cats were neutered.

Caretakers spent time and money caring for free-roaming cats. Although the median household income range for caretakers was \$20,000 to \$40,000/y, caretakers reported spending up to \$2,400/y on free-roaming cats (median, \$260/y [\$5/wk]). This is consistent with previous surveys that reported that most caretakers spent less than \$13/wk on food for the cats.<sup>1,10,14</sup>

Similar to previous surveys, the average caretaker fed or cared for a single colony of < 10 cats. Most (63%) caretakers fed free-roaming cats on their own property, which is similar to results of a national survey<sup>1</sup> of caretakers that reported 71% of caretakers fed homeless cats on their doorstep, as well as a survey in Hawaii<sup>10</sup> in which half of all colonies were located at or near the caretaker's home. Only 3% of the colonies in this study were on public property, which was substan-

tially different than the 31% of national survey<sup>1</sup> respondents who fed cats in and around a public building. In our survey, 70% of the colonies were in a rural area or small town, and 30% were in a suburban or urban area. This contrasts with the national survey<sup>1</sup> that reported only 20% of the homeless cats occupied rural habitat and the Hawaii survey<sup>10</sup> that reported 28% of colonies were in a semi-rural or rural area. Almost half of our survey respondents reported that the colonies were located in a wooded area (regardless of urban or rural location), whereas the national survey<sup>1</sup> reported only 23% of homeless cats in wooded areas. These differences may be because of the fact that the national survey reflects national human populations (27% rural, 73% urban), and the Hawaii survey was conducted on an island and is not directly comparable to mainland populations. This survey only included residents of north central Florida, which is a more rural and less populated area of the United States. Despite the differences in colony environments, colony sizes and cat ages and sexes remained remarkably similar between surveys. This implies that free-roaming cats adapt to their circumstances, but their basic colony structure remains constant. Likewise, the motivation of caretakers was similar between surveys. These surveys specifically selected caretakers who were attempting to manage colonies by neutering and sheltering cats versus just feeding them.

Nearly all of the caretakers provided the cats with a diet consisting mostly of cat food. Although 24% of the caretakers had pet dogs but not pet cats, only 2 caretakers fed the cats dog food rather than cat food, indicating that most dog owners bought cat food specifically for the purpose of feeding free-roaming cats.

Because the majority of cats lived on the caretaker's property, it is not surprising that most (75%) caretakers provided shelter for the cats, and many (37%) also provided or were willing to provide veterinary care other than neutering. This is similar to results of the Hawaii survey<sup>10</sup> that reported 51% of the free-roaming cats had received treatment for illness or injury in addition to neutering and vaccinations and to another study<sup>11</sup> conducted in Massachusetts in 1994 to 1995, in which almost a quarter of caretakers reported that they had taken a free-roaming cat to a veterinarian. Some caretakers in this and other surveys<sup>11</sup> reported that the "unowned" cats had spent time inside their homes. This begs the question as to what pet ownership means. Although most (54%) caretakers reported that at least 1 cat in the colony was too wild to be adopted, only 26% said this was the only reason why the cats had not become their pets. Whether the free-roaming cats were wild or tame, many caretakers reported that they considered the free-roaming cats they fed to be "like pets." Similarly, the Hawaii study<sup>10</sup> reported that 64% of caretakers considered the free-roaming cats to be "theirs," and the Massachusetts study<sup>11</sup> reported that half of the caretakers felt like the cats were their own. Despite feeling that the cats were "like pets", most caretakers did not attempt to have free-roaming cats neutered prior to the availability of a free TNR program. Only 131 of the original 920 (14%) cats in our survey were neutered somewhere other than the TNR

program. Overall in Alachua County, only 11% of free-roaming cat caretakers surveyed had attempted to have the free-roaming cats they fed neutered.<sup>a</sup>

The total number of cats (920) minus deaths (151), disappearances (149), and adoptions (238), plus births (498) and immigrations (103) does not equal the number of cats currently living in the colonies (678). The fact that the numbers do not add up is attributable to fluctuations in colony members and the fact that these numbers were estimates based on the recollections of individual caretakers. These numbers should not be interpreted as precise data based on accurate record keeping. In addition, caretakers may have reported cats twice, both as original colony members and again as births or new immigrants or as adopted but still remaining in the colony.

Implementation of a neutering program was associated with decreased colony size and overall cat numbers, even though the follow-up time was short (1 to 9 months). The mean size of cat colonies decreased by 27%, from 7 cats before neutering efforts to 5.1 cats after neutering efforts (in which at least 1 cat in the colony had been neutered). In addition, after neutering efforts began, the total number of cats (678) had decreased by 26% from the number of cats before neutering efforts (920). The period from when the caretaker began feeding or caring for the cats to when the caretaker completed the survey ranged from 2 weeks to 15 years (median, 18 months). Therefore, there was a 26% decrease in the overall cat population over a median period of 18 months. Many caretakers reported that at least some of the cats in the colony were adopted after being neutered.

Most (87%) of the caretakers surveyed believed that the colonies they fed had an excellent or good quality of life, which is similar to results of the Hawaii survey<sup>10</sup> that reported 78% of caretakers believed the cats had a good life. This is a subjective evaluation and is countered by the fact that caretakers also described a high rate of disappearances and deaths of cats. Of the 920 original cats, caretakers reported a 33% death or disappearance rate for these cats. Since the caretakers had been feeding a colony for a median period of 18 months, this implies that 1 of 3 free-roaming cats died or disappeared within < 2 years. Suspected reasons for disappearance included the cats being frightened away, dogs chased them away, too many cats lived in an area, construction, neighbors killed them or removed them, and cats were taken to an animal control facility.

Most (61%) cat colonies consisted of a small group of 3 to 10 cats, and the mean colony size (before being neutered) was 7 cats, usually described as a female with kittens and an occasional wandering male. This is consistent with results of the national survey,<sup>1</sup> which reported a mean colony size of 4 to 12 cats, and those of the Hawaii survey,<sup>10</sup> which reported that 65% of the colonies consisted of 1 to 10 cats.

In conclusion, caretakers have a strong bond with the free-roaming cats they care for, even though they do not consider these cats to be their pets. However, this is different from the traditional image of the human-animal bond, as many of these cats cannot be touched or held and do not live indoors with the caretaker. Nevertheless, it is a close relationship in which caretakers make great efforts to feed, shelter, neuter, and provide health care for the cats. This type of human-animal bond may be a reason for the failure of large-scale euthanasia programs to decrease the free-roaming cat population, since caretakers are not willing to have the cats euthanatized. If a humane alternative to euthanasia of homeless cats is to be found and implemented, the cooperation of stray and feral cat caretakers is critical and their bond to free-roaming cats should be recognized.

<sup>a</sup>Woods JE, Levy JK. Human interactions with free-roaming cats in Alachua County, Florida (abstr), in *Proceedings*. Coll Vet Med Res Presentation Day, Gainesville, Fla, 2000.

<sup>b</sup>Strohl S. Analysis of the pet cat population in Alachua County, Florida (abstr), in *Proceedings*. Coll Vet Med Res Presentation Day, Gainesville, Fla, 1999.

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