

THE ENVIRONMENTAL, FINANCIAL AND PUBLIC HEALTH IMPACT OF COMMUNITY CAT COLONIES

By
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A report submitted in partial fulfillment of the
requirements for the degree of MPH

First, a few thanks.....

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A little background first....

- Started as a study on vaccinating 8-week old kittens at the time of spay/neuter.
- Looked at the impact of feral cats and feral cat colony issues.
 - Environmental: hunting and disease.
 - Public health risks.
 - Trap-neuter-return programs and costs.
- Identified as a free-roaming cat problem.

In preparation

Coursework that assured success:

- DMP 815 Multidisciplinary Thought and Writing
- DMP 854 Intermediate Epidemiology (Disease Epidemiology)
- DMP 718 Veterinary Parasitology
- DMP 712 Veterinary Bacteriology and Mycology
- DMP 722 Veterinary Virology
- DMP 770 Fundamental Concepts in Emerging Pathological Diseases

Felis catus- A Brief History of Domestication

“In ancient times cats were worshipped as gods; they have not forgotten this.”

-Terry Pratchett, author.

Ancestors of the domestic cat

- Wild cats, *Felis silvestris*

 - 3 distinct subspecies:

 - Felis silvestris libyca* (African wild cats)

 - Felis silvestris silvestris* (European wild cats)

 - Felis silvestris ornata* (Asiatic wild cats)

- Other contenders:

 - Felis chaus*, ring-tailed jungle cat

 - Felis manul*, Pallas's cat

- DNA studies show a combination of several members of the *Felis* family contributed to the domestic cat.

F. s. libyca

- Most of the mummified cats in Egyptian tombs were *F. s. libyca*.
- Native to areas bordering the Mediterranean.
- Present day *F. s. libyca* will mate with domestic cats.
- Kittens can be tamed.



F. s. silvestris

- Its path into the domestic cat ancestry not clear.
- May have hunted around human settlements like *F. s. libyca*.
- May have interbred with Egyptian cats that were smuggled aboard ships.
- Usually not possible to tame, even as kittens.



F. s. ornata

- Several recent DNA studies have linked a few of the Asiatic Wild cats to the domestic cat
 - Central Asian wildcat
 - Chinese desert cat
 - Near Eastern wildcat



Chinese desert cat

Two other candidates:

Felis chaus

- Also found mummified in Egyptian tombs.
- Found in areas bordering Mediterranean.



Felis manul

- Known as the Pallas's cat.
- Native to central Asia.
- May have contributed longhair gene.



Earliest evidence?

- Commonly thought Egyptians were the earliest civilization to domesticate cats.
- New evidence points to a possible domestication over 9,500 years ago.
- Grave of a person and cat found in a Neolithic village on the island of Cypress.
 - Based on the proximity to one another, suggests they were buried together purposely.

The Egyptians

- Started appearing in Egyptian history around 3,000 years ago.
- In 1000 years, went from vermin hunter to religious icon.
- Worshipped deity depicted as a cat named Bastet or Pasht for ~1500 years.
- Forbidden to harm a cat in any way.



Other views on the cat

- Greeks associated cat with the goddess Venus.
- Roman army carried cats with them to protect food stores.
- Romans in Britain and Gaul kept large and small cats as pets.
- Chinese put cat statues outside of house and pictures inside to prevent poverty.



Japan and cats

- Protected silk farms from mice.
- People started keeping them as pets around 1000 AD.
- Soon silk industry threatened and Emperor has to intervene.



Don't disturb the cat....

-Mohammed and his cat Muezza.

-Dr. Albert Schweitzer and prescriptions.



Cats in the Middle Ages

- Kept as pets by monks and nuns.
- Canon law and cat pelts.
- The church, cats and the witch trials.



The New World....

- Aboard the Mayflower.
- 18th century.
- Most popular pet in the U.S.
 - ~93.6 million owned cats in the U.S.



Free Roaming Cats

- Population is unknown.
- Made up of stray and feral cats but can also consist of owned cats allowed to go outside.
- Form loose colonies around food, water and shelter areas.
- Pose health risks for humans and cats.
- Commonly referred to as “Community Cats.”



Definitions are important

- Feral cat: have not had human contact.
- Stray cat: lost or abandoned, have had human contact.
- New Zealand survey.



Environmental Impacts

- Hunting endangered and protected species.

 - Actual numbers.

 - Island issues.

 - Protection Acts.



- Cats are well developed for hunting.

 - Dietary requirements.

 - Auditory and visual skills.

A messy problem

- Fecal deposits.

 - 76.4 tons/year.

 - Bacterial concerns

 - E. coli*

 - Parasites

 - Toxoplasma gondii*

 - Toxoplasmosis*

 - Sea otter deaths.*



Noise, odors, etc.

- Noise made by cats fighting and mating.
- Territory marking by males.
- Cats getting into garbage cans.
- Damage done to buildings by cats seeking shelter.
- Decreased home values.



Public Health Concerns

-Toxoplasmosis:

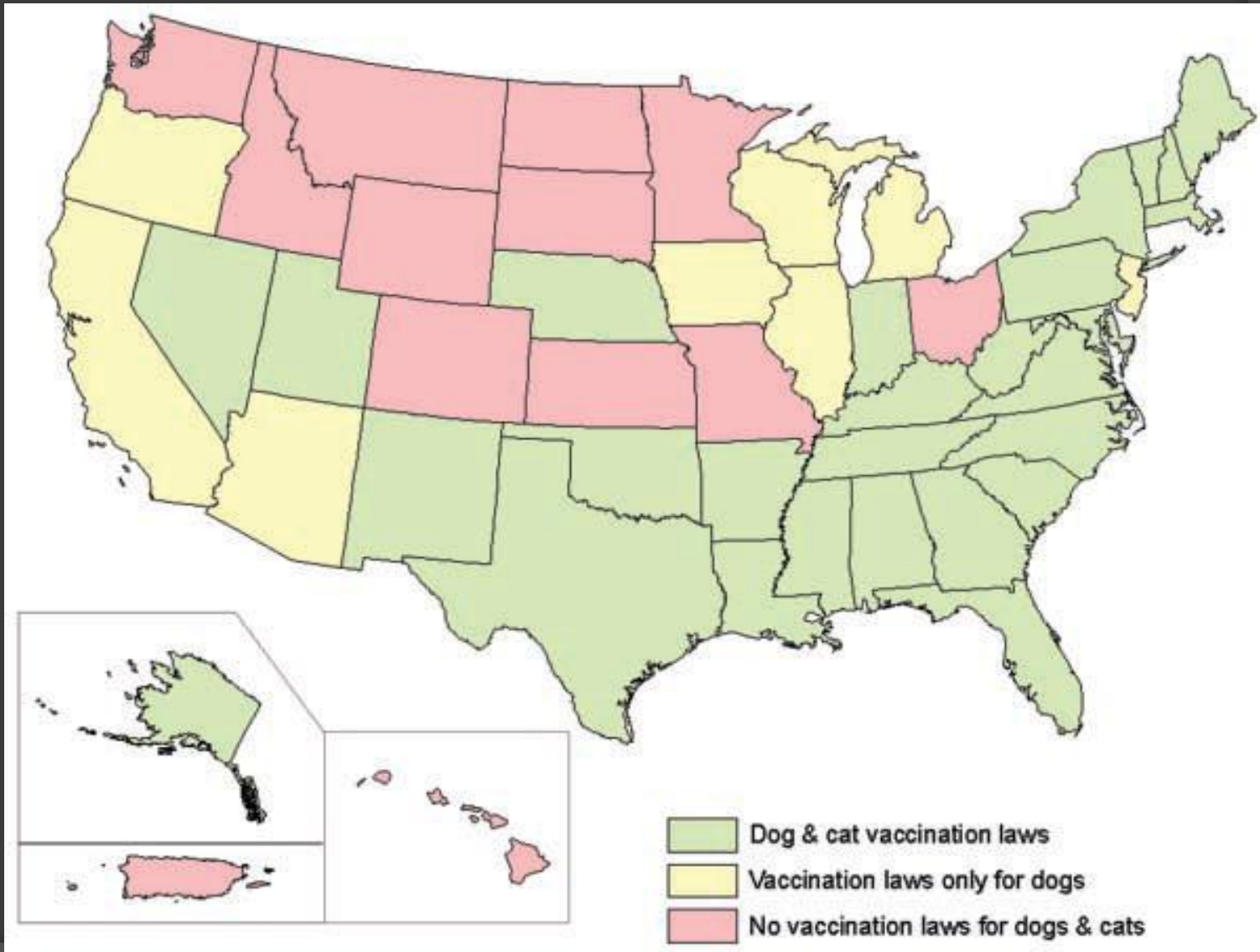
- Cats definitive host for *T. gondii*.
- Other animals are intermediate hosts.
- Can be infected by oocysts or tissue cysts.
- Pregnant women and immunodeficient people at most risk.

Rabies

- In U.S., cats most common domesticated animal infected with rabies.
- Only 38 states, the District of Columbia and New York City have state or district laws for rabies vaccinations.



States requiring rabies vaccination as of 2009



Post Exposure Prophylaxis (PEP)

- Given to an individual that has been exposed in some way to an animal suspected of and/or confirmed infected with rabies.
- Process:
 - wash wound,
 - shot of rabies immunoglobulin,
 - 4 shots of rabies vaccine.
- Expensive and can have adverse reactions.

Other human health concerns

-Cat scratch fever from *Bartonella* bacteria.

-H5N1?

-Cutaneous larva migrans
(CLM) caused by feline
hookworms,
-also causes muscle
and ocular infections.



One Health Initiative?



- A collaboration between all fields of medicine in order to promote the health of humans, animals and the environment.
- No findings of any warnings concerning feral cats and/or community cat colonies on the American Medical Association website.

Cat Health Issues

- Life outside is not easy.
- Average lifespan of free-roaming cat is 2-5 years.
- Don't die from old age.
- Trauma, disease, abuse.
- Common medical issues.



Texas Predator Posse



Roads and cats don't mix



Kitten Mortality

- Most cats born into community cat colonies die before they are 6 months old.
- Mortality rate is as high as 75%.



Trap-Neuter-Return: The Costs

- Best Friends Animal Society (BFAS) has created a TNR cost savings calculator.

- Located on their website:

<http://network.bestfriends.org/initiatives/cats/14699/news.aspx>.

- Pick your state, county and/or city to determine costs of TNR program

Kansas estimated costs, Part I

Estimated costs associated with alteration and return per cat in Kansas:

Trap/Fieldwork-\$50

Neuter/Spay-\$30

Physical Exams-\$40

Vaccinations-\$30

Estimated Cost of TNR in **Kansas** per cat-\$150

Kansas Estimated Costs, Part II

Estimated costs associated with
discounted packaged alteration and
return per cat in Kansas:

Trap/Fieldwork-\$50

Packaged TNR Procedure-\$20

Estimated Cost of TNR in Kansas per cat-
\$70

Kansas Estimated Costs, Part III

Estimated costs associated with feline eradication per cat in Kansas.

Trap/Enforcement-\$50

Sheltering-\$40

Food/Supplies-\$40

Laboratory tests-\$10

Eradication / Euthanization-\$40

Estimated Cost of eradication in **Kansas** per cat-\$170

Issues with estimations....

- Relies heavily on veterinary donations.
- Veterinarians feel stressed to contribute.
- Still does not prove that TNR is effective.



Immeasurable costs

- Hard to measure costs to environment
 - Loss of birds, small mammals and reptiles to predation.
 - Loss of animals due to toxoplasmosis and other diseases.
- Medical costs
 - Treatments associated with toxoplasmosis.
 - Cost of rabies PEP's.



Vials of rabies vaccine
Photo courtesy of CDC

Community Cat Solutions

- TNR: How it works....
 - trap cat and transport to clinic,
 - examine cat, test for FeLV & FIV
 - anesthetize and perform spay/neuter, cut ear tip,
 - vaccinate for rabies,
 - observe ~1 day,
 - socialized cats up for adoption
 - feral cats returned to colony.



TNR Pros

TNR proponents claim the following:

- Maintenance of non-breeding population.
- No mesopredator release.
- Decrease in diseases such as FIV

TNR Cons

Opponents to TNR claim:



- No solid proof that TNR really controls populations.
- Returning a cat is reabandonment.
- Still have core problems of hunting, fecal contamination and diseases.
- Welfare of cats not addressed.

Contraceptive vaccines

- Tried before without much success.
- New vaccines based on GnRH.
- Keeps hormones regulated.



Hysterectomy

- Was performed every 6 months on intact female cats, 6 months or older.
- Documented decline in population.
- Kept males intact.
- Maintained social structure in colony.
- Can not be utilized in neighborhoods.

Lethal means of control

- In New Zealand, feral cats hunted and poisoned.
- Wisconsin's attempt.
- Bird lovers trial.



Make them work

- Voice for the Animals Foundation
- Supplies feral cats to areas to control vermin.
- Used for Los Angeles Police Department.
- Has ~175 feral cats working at 20 sites.
- Studies concerning using cats for rodent control.



Organizational Policies

- American Association of Feline Practitioners
- National Association of State Public Health Veterinarians
- American Veterinary Medical Association
- American Society for the Prevention of Cruelty to Animals
- National Animal Control Association
- American Bird Conservancy
- Humane Association of the United States

Feral Cat Laws

- United States only has 13 states and the District of Columbia that even mention feral cats in laws.
- Italy has a no-kill policy.
 - Colonies are registered.
- New Zealand labels feral cats as pests.
 - Animal Welfare Act.

Community Cat Advocates

National Groups:

- Alley Cat Allies

 - Sponsors National Feral Cat Day.

- National Feral Cat Resource

- Many local and state groups also claim feral rescue and TNR programs.



The Survey

- To determine the level of knowledge concerning feral cat issues among mid-Western veterinarians and other animal welfare and public health oriented individuals located nationwide.

- 24 questions, 126 responded.

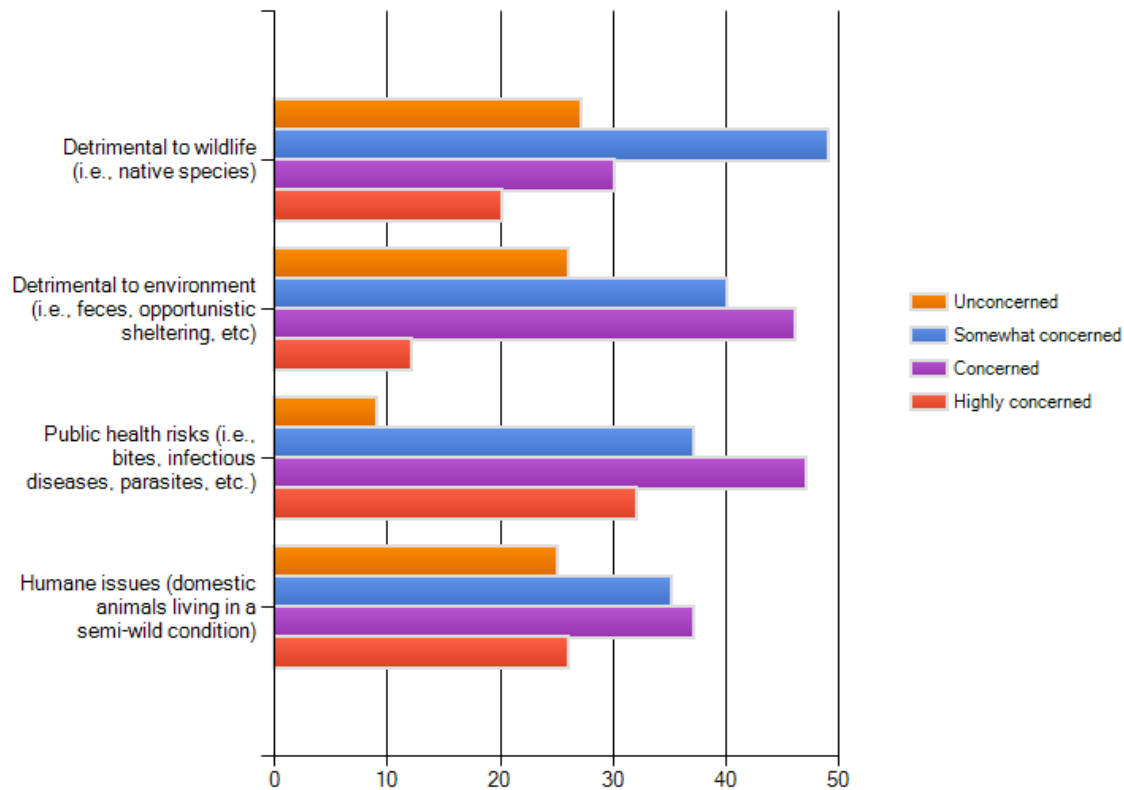
- $p < 0.01$

Organizations selected:

- Kansas Veterinary Medical Association
- Nebraska Veterinary Medical Association
- Missouri Veterinary Medical Association
- Oklahoma Veterinary Medical Association
- Colorado Veterinary Medical Association
- National Animal Control Association
- National Association of State Public Health Veterinarians
- The Animal Society for the Prevention of Cruelty to Animals
- Kansas Humane Association

Results: Question 1

Please rate your level of concern about the following potential issues related to feral cat colonies.

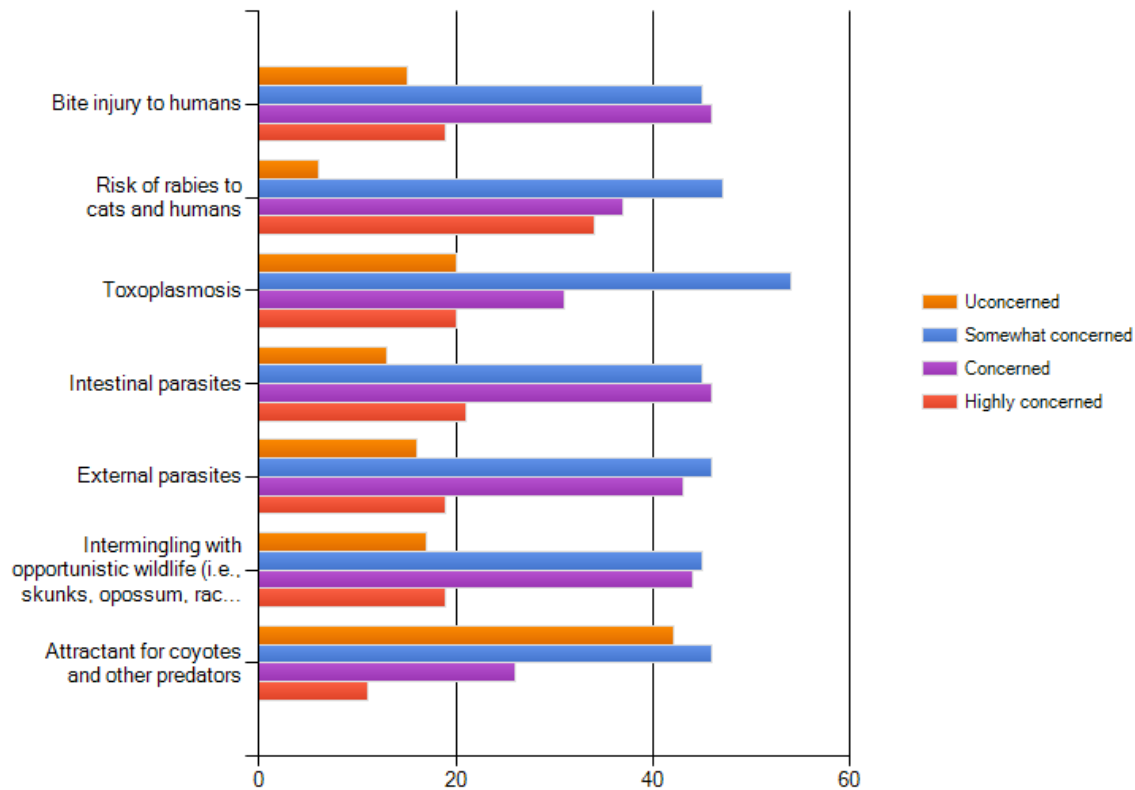


Question 1, other comments

- “To the good, I think feral cats control rodent populations.”
- “Zoonosis.”
- “I would suspect that wild colonies are like they were when I was a kid - they are self-limiting in size due to disease. If we intervene and provide too much care they will not prosper very well.”
- “Animal rights issue.”
- “Disease and nutrition (leuk/fiv).”

Question 2

Please rate your level of concern about each of the following public health issues with regard to feral cat colonies:

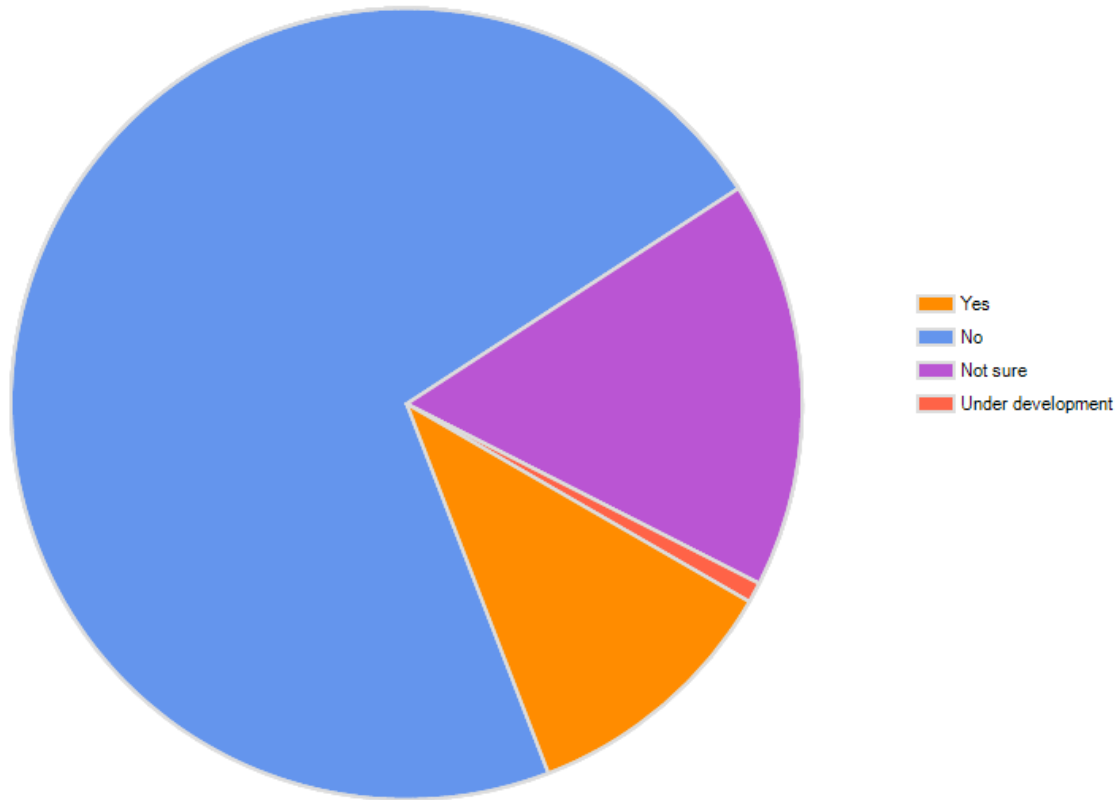


Question 3

- 3. If you have any other public health concerns/issues, please list them below.
- “I believe there is a greater risk of feral cats not being altered rather than ignoring the situation. I also believe that we humans have created the feral cat problems and it is our responsibility to this planet to ensure their right to live yet perform control mechanisms because of our inactions for decades by means of sterilization rather than euthanasia.”
- “Again, I think they can be helpful in controlling rodents.”
- “It seems that a lot of people that want to help "rescue or maintain" these colonies are not well educated to the risk to themselves or others they solicit to help with the cats. We also see a lot of these cats with FIP, FELV and FIV.”
- “Exposure to owned pets and spread of disease including parasites and rabies.”
- “If we intervene and try to "help" any more than trapping and euthanasia we are creating a much bigger problem.”
- “Maintenance and spread of FIV, FeLV, and other feline diseases to owned cats that are free roaming.”
- “Becoming established as a harbor or intermediate host for viral and bacterial zoonotic diseases more so than now.”
- “Many populations of feral cats remain in very close proximity to the human population, which allows a serious potential for zoonotic disease transmission.”
- ”Mainly rabies and bites.”
- “Spread of diseases like FeLV, FIP, FIV to other cats.”

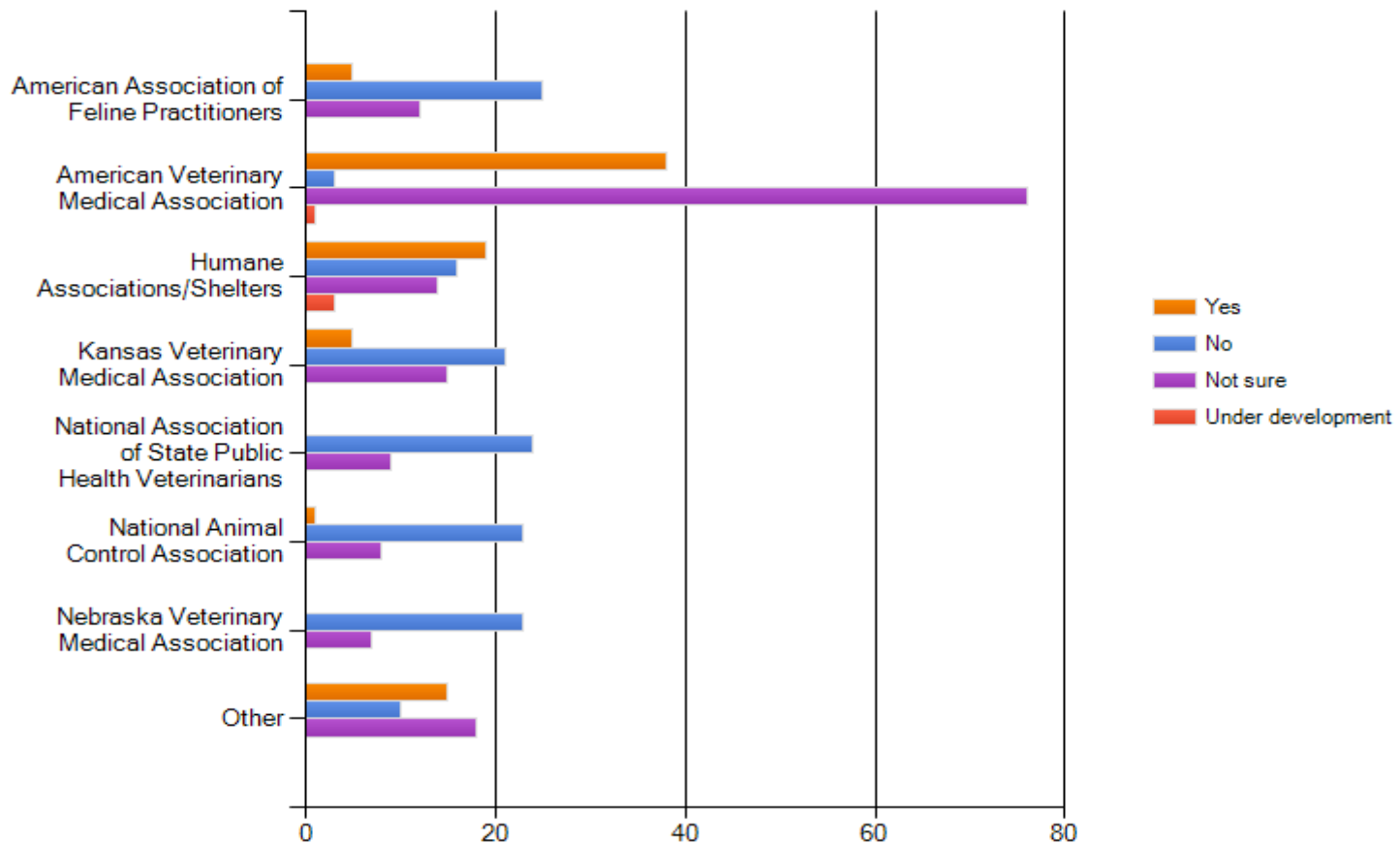
Question 4

Does your employer have a policy statement, rules or regulations in regard to feral cat colonies?

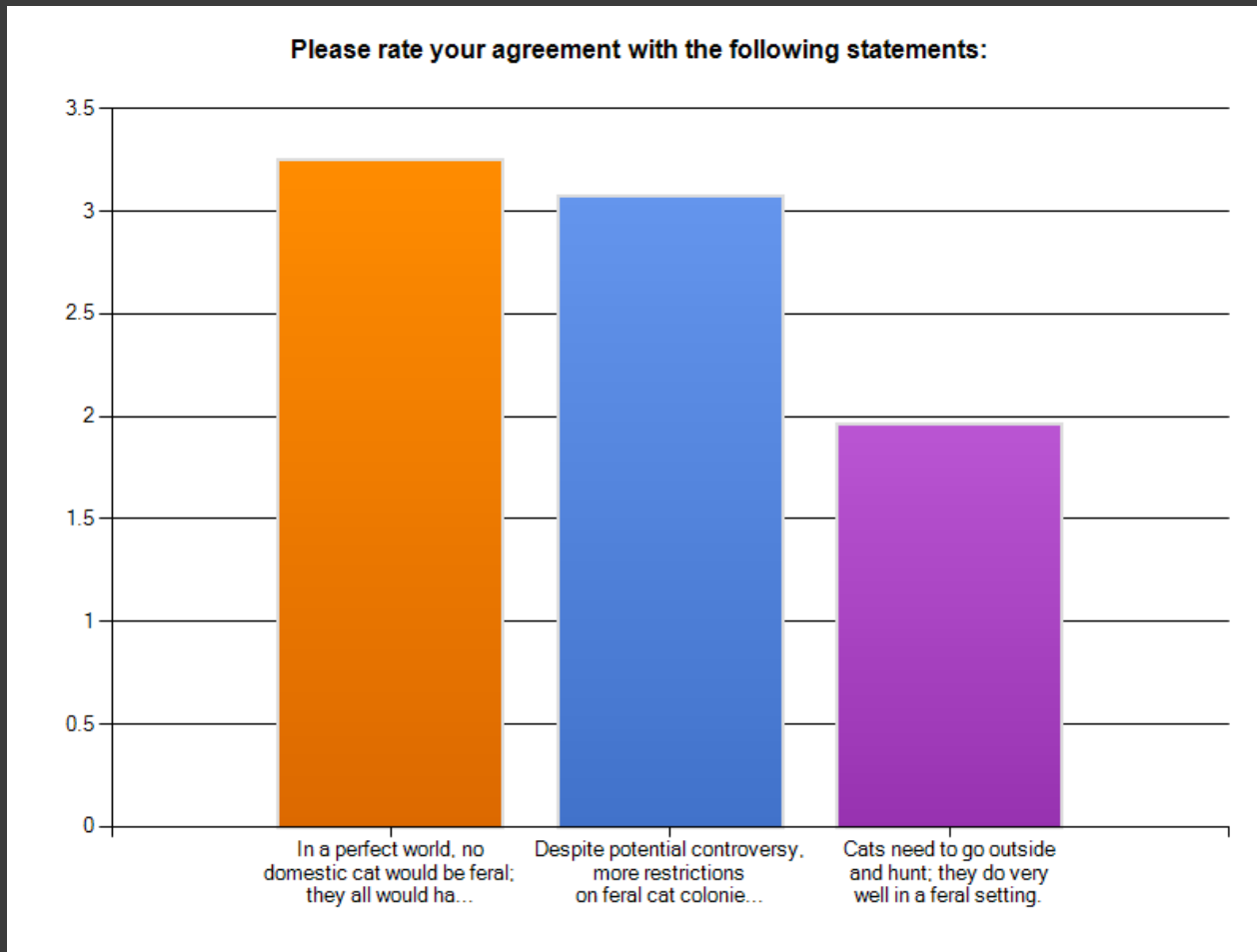


Question 5

Which entity are you associated with and do they have a policy statement, rules or regulations in regard to feral cat colonies? Please check all that apply.

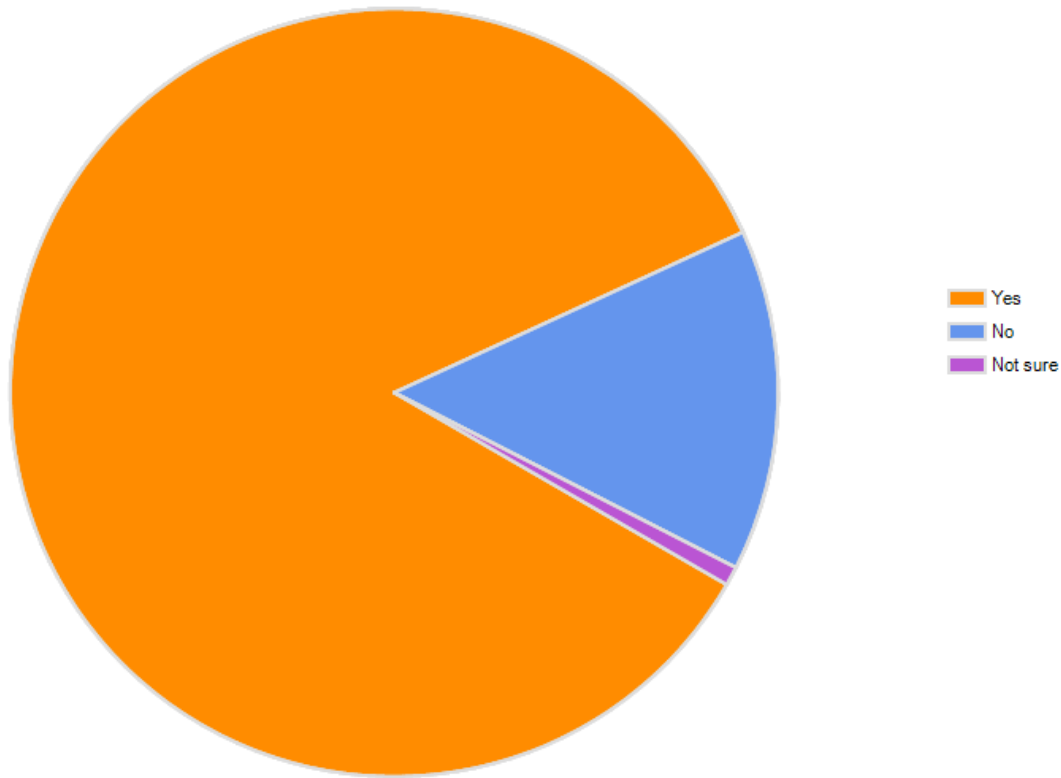


Question 7



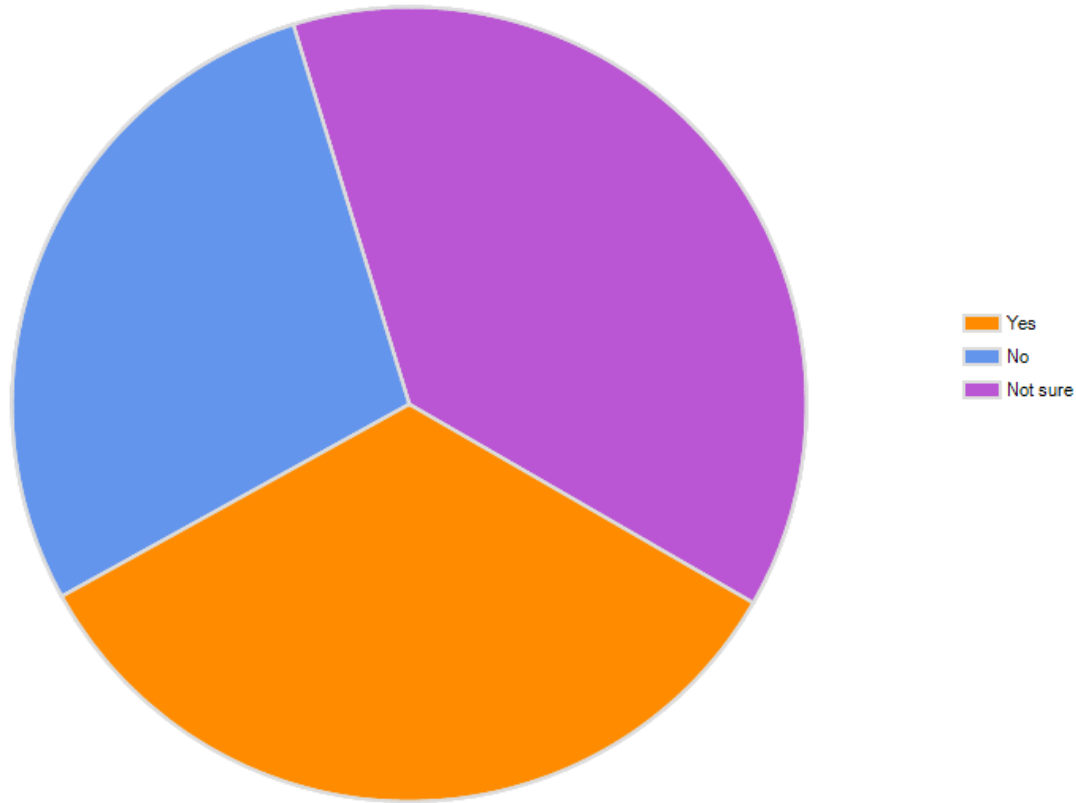
Question 8

Are you familiar with the different programs for dealing with feral cat colonies such as: Trap-Neuter-Vaccinate-Release (TNVR) or Trap-Test-Vaccinate-Alter-and-Release (TTVAR)?

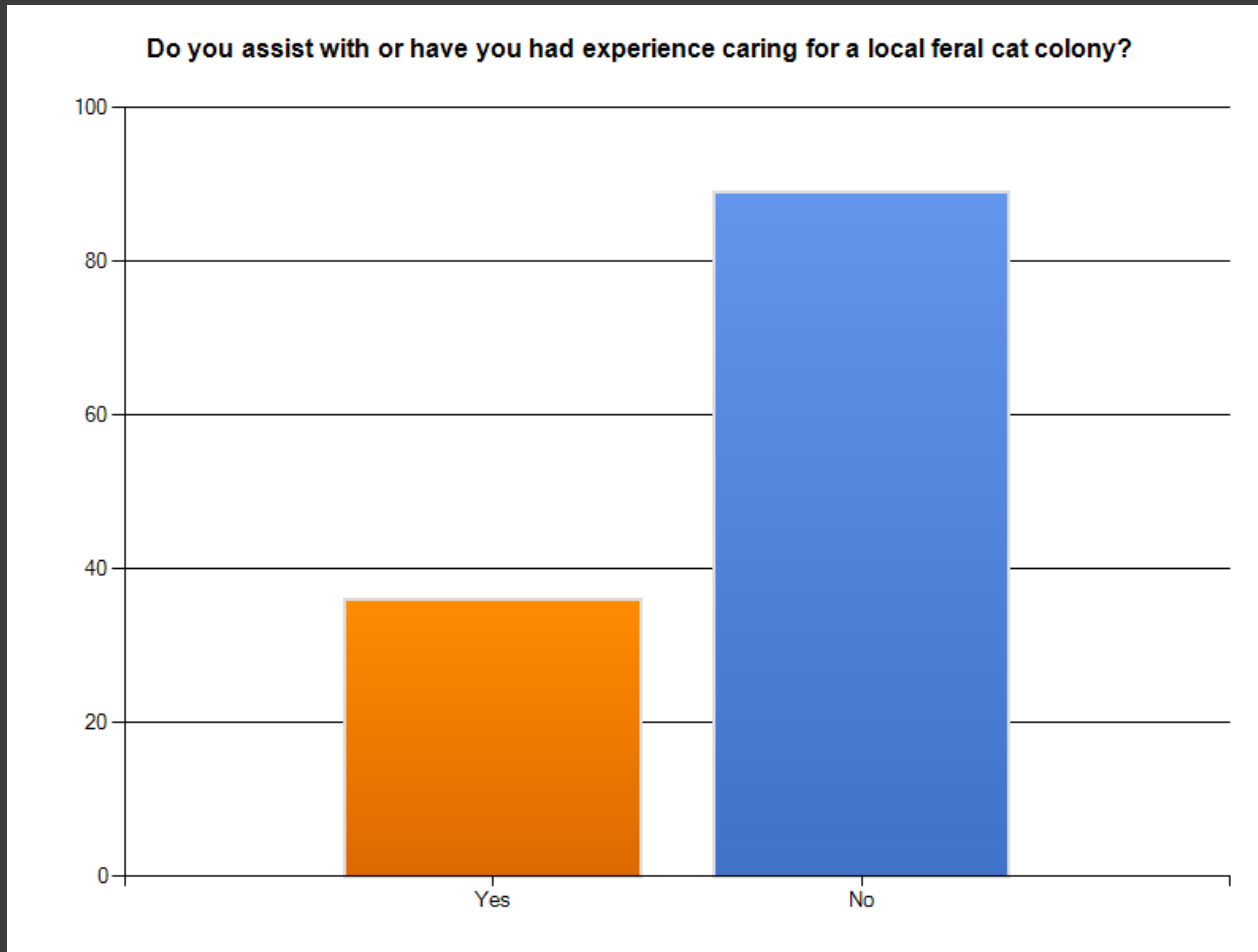


Question 9

If you are familiar with TNVR or TTAVR, do you think these programs are successful in keeping feral cat colony populations stable?

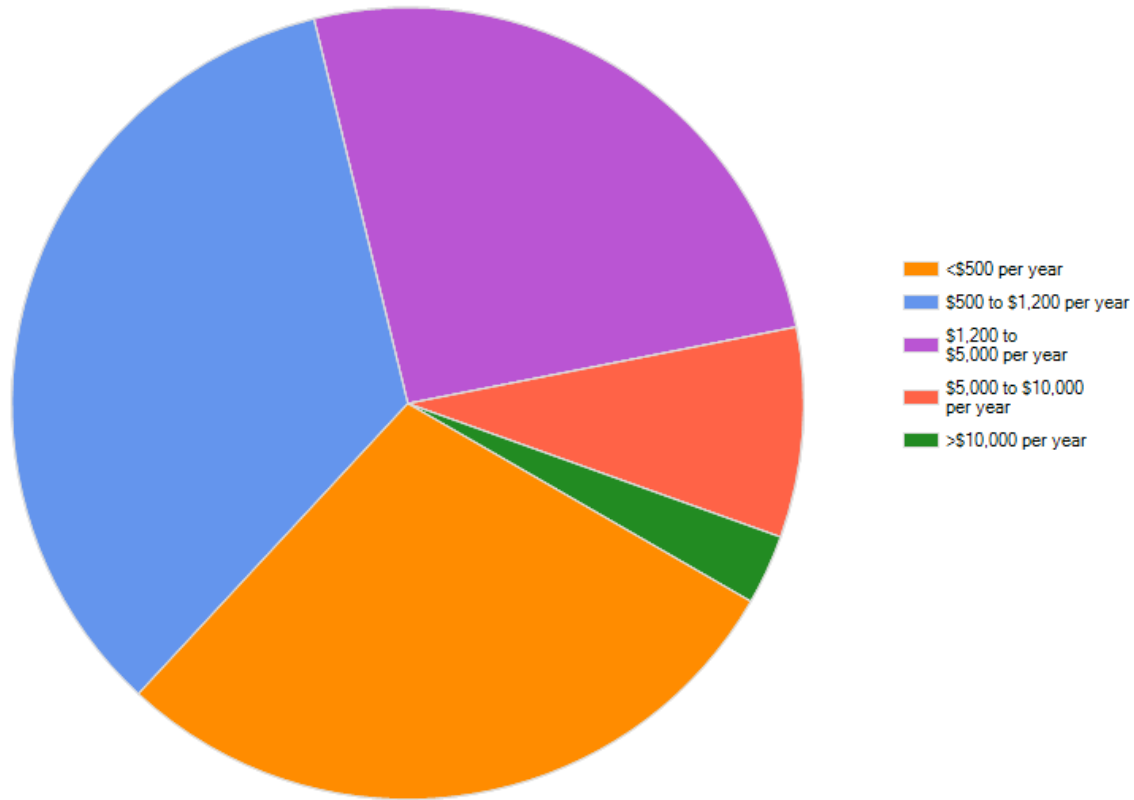


Question 10

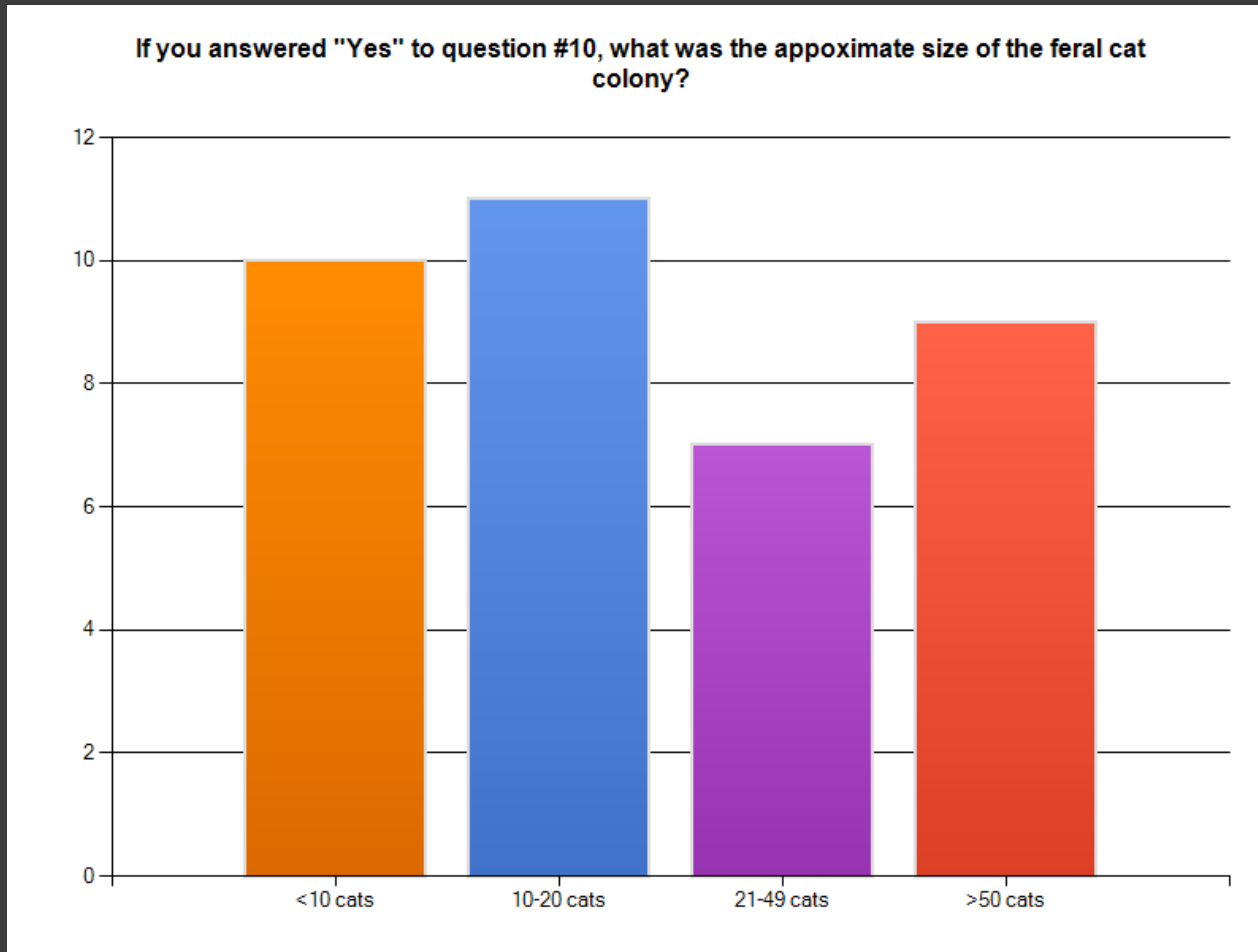


Question 11

If you answered "Yes" to question #10, what were the approximate annual costs required to support the feral cat colony?

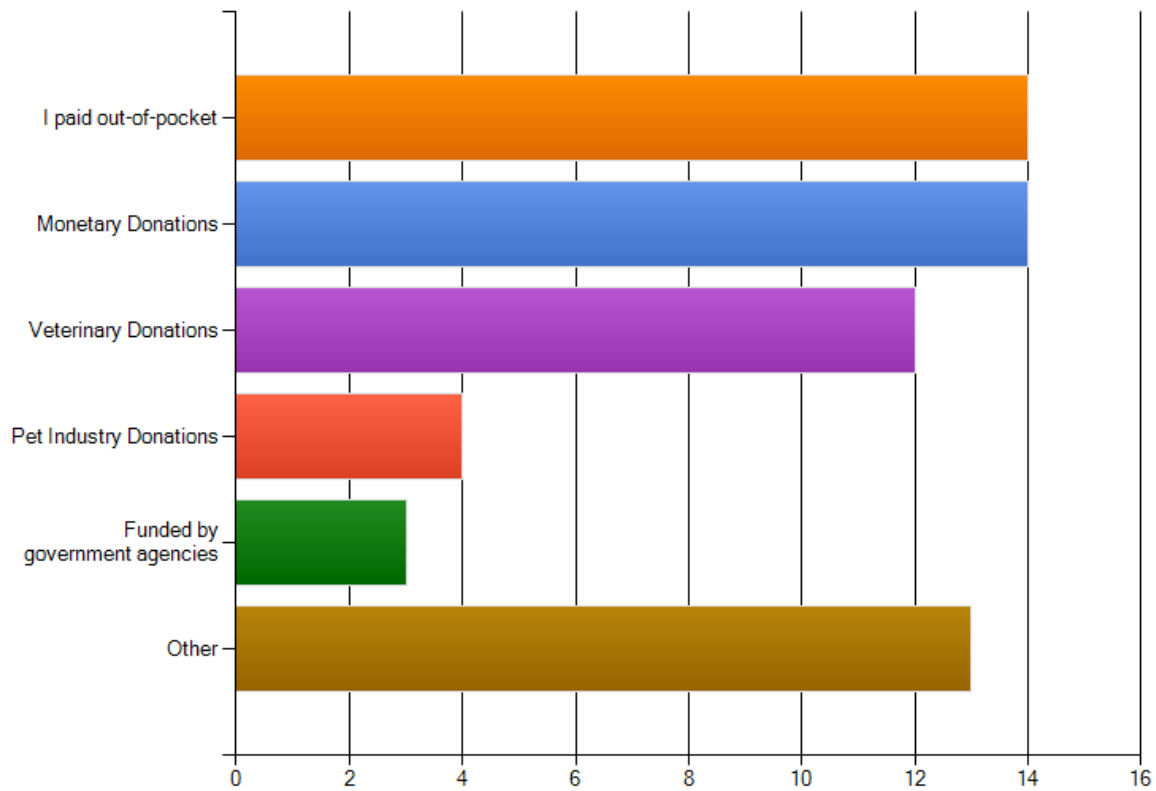


Question 12



Question 13

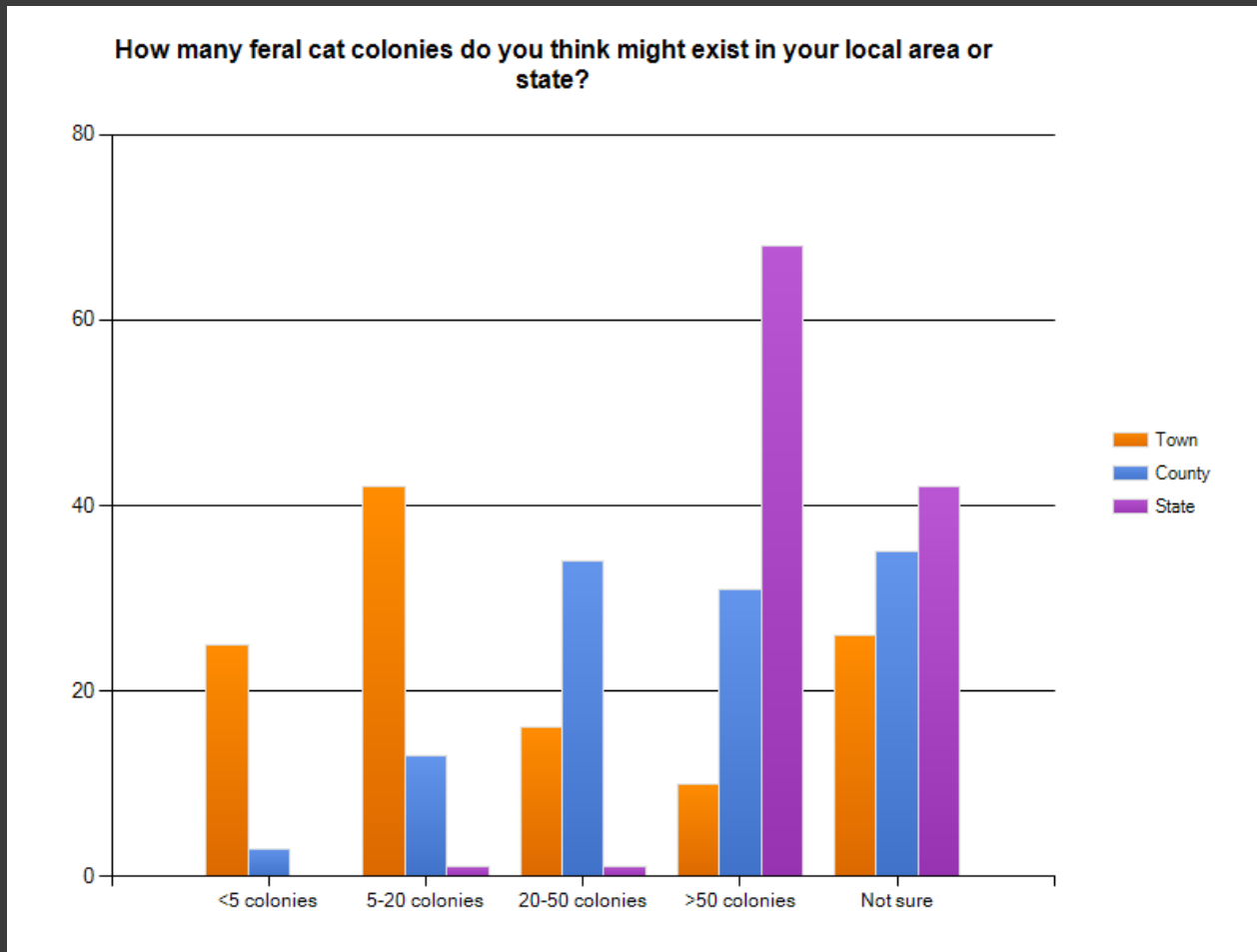
If you answered yes to question #10, how was the funding obtained to care for the feral cat colony? Please check all that apply.



Question 14 other comments

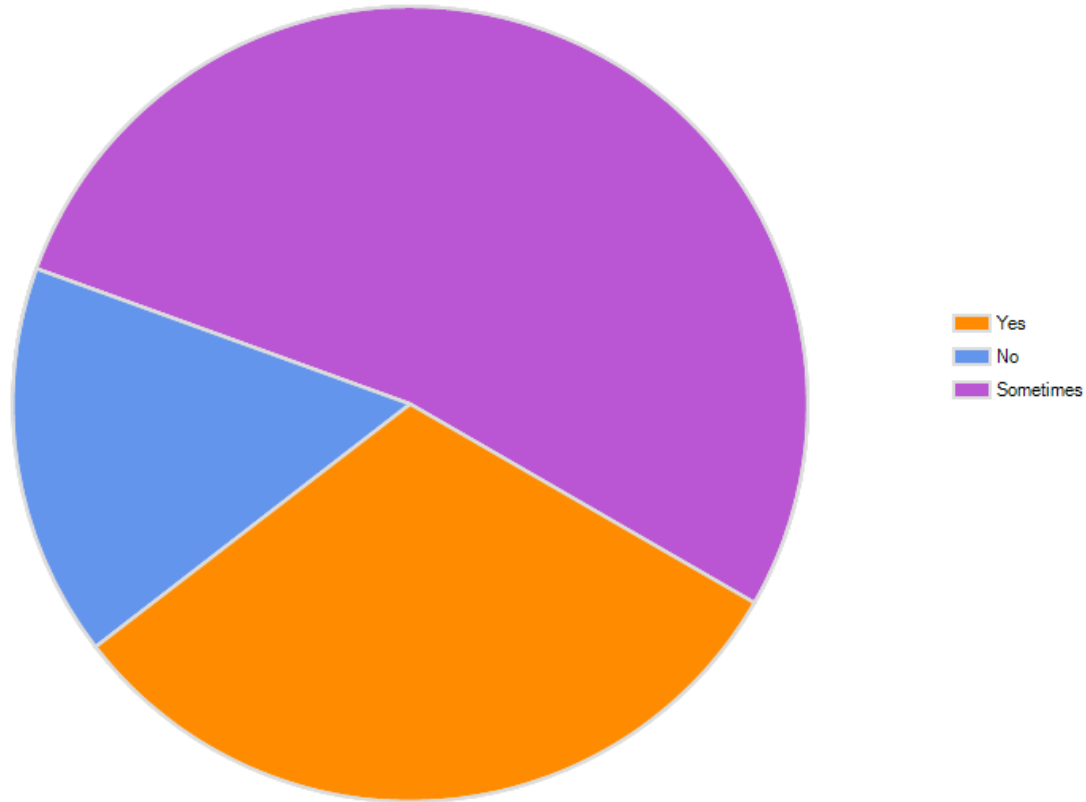
- “Fundraising events.”
- “Pawprints on the Heartland did the spays & neuters.”
- “Our humane society reimburses me a small fee to help with tnr cats- only \$15 per cat to test vx and spay/neuter and revolution.”
- “Concerned citizens in neighborhood, bring in for spay/neuter.”
- “Clients paid for them.”
- “Private citizen.”
- “Client traps cats and brings them to me and pays a discounted price to have them neutered and vaccinated.”
- “Private individual.”
- “Supporter of the colony paid for some vet services.”
- “Individual personal funding.”
- “Private individuals sometimes bring them to me for car and pay for them personally.”
- “A lesser fee was established for the group supporting the feral cat population.”
- “Grant money from charitable foundations.”

Question 15



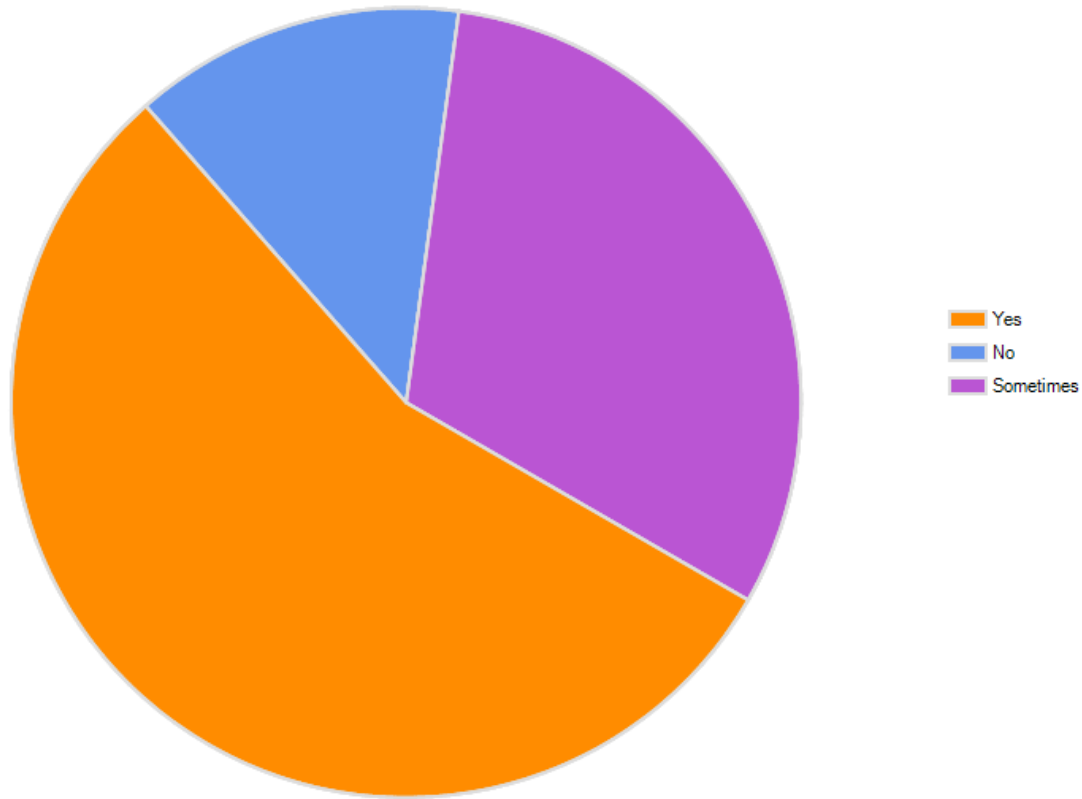
Question 16

Do you think adoption or placement of cats that can be socialized is a viable option for dealing with feral cat colonies?



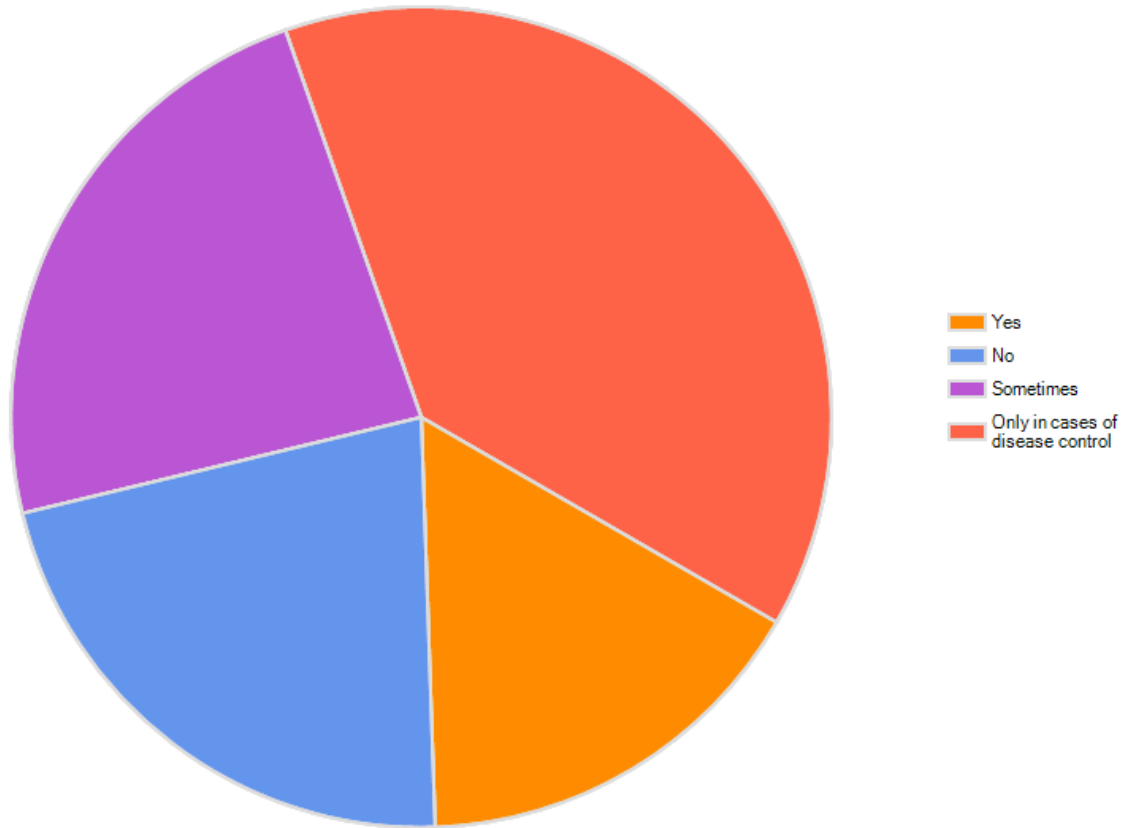
Question 17

Do you think humane euthanaia of non-socialized adult cats is a viable option for dealing with feral cat colonies?



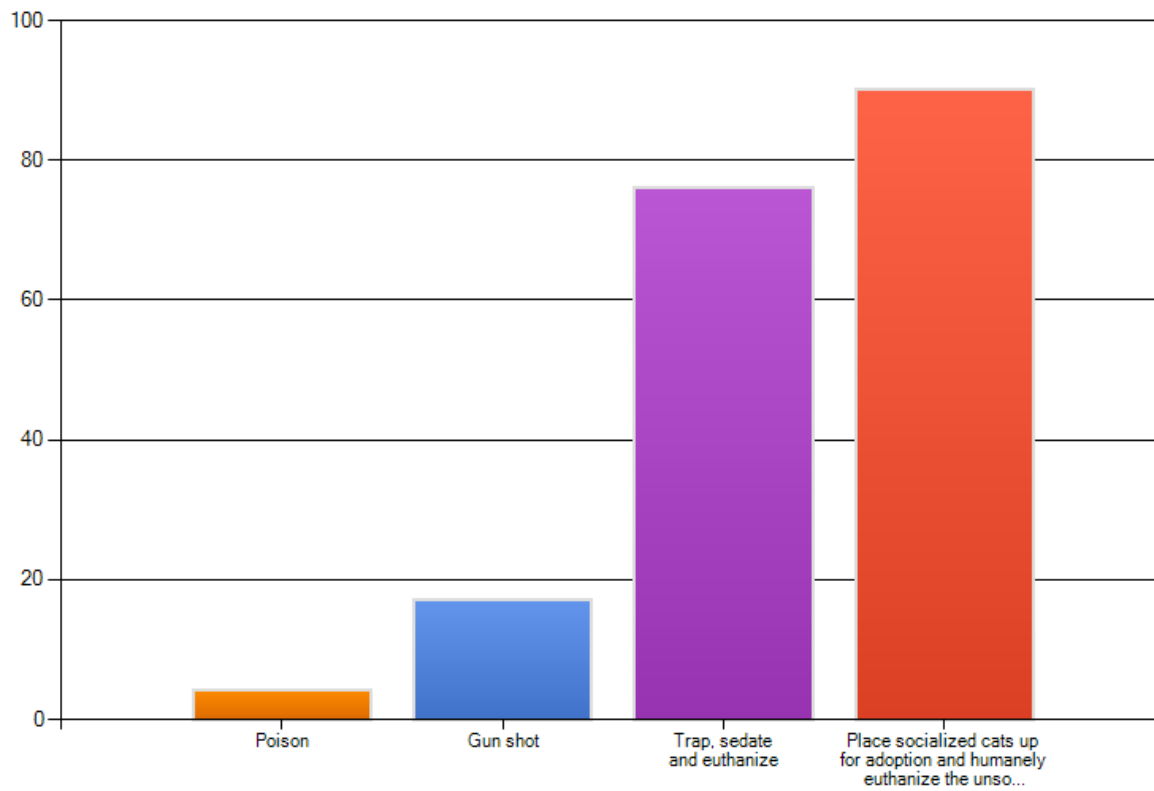
Question 18

Do you think that feral cat colonies should be immediately eliminated?



Question 19

In regard to Question 15, through what means should a feral cat colony be eliminated?
Check all that you support.



Respondent data:

Gender:

Female-74

Males-48

Age:

25-39 years: 47

40-55 years: 37

56-65 years: 22

<25 years: 11

>66 years: 6

Region:

Midwest-108

Southwest-13

Northeast-2

Southeast-2

Occupational Title:

DVM-94

Veterinary

student-20

Shelter director-1

Conclusion

- TNR may not reduce populations.
- One solution may not work for all colonies.
- Each colony has to be examined in regards to cat welfare, environment, and health risks.
- Do not return any other feral animal to the wild.

Veterinarian's Dilemma

Veterinarian Oath-

“Being admitted to the profession of veterinary medicine, I solemnly swear to use my scientific knowledge and skills for the ***benefit of society through the protection of animal health and welfare, the prevention and relief of animal suffering, the conservation of animal resources, the promotion of public health,*** and the advancement of medical knowledge.

I will practice my profession conscientiously, with dignity, and in keeping with the principles of veterinary medical ethics.

I accept as a lifelong obligation the continual improvement of my professional knowledge and competence”

References

Ackerman, D. L. (2010). Thoughts on feral cat control. *JAVMA*, 234, 1, 26.

Ako, D. (2007). *Feral chicken problem invades Oahu*. Retrieved July 24, 2011, from Hawaii News Now website: <http://www.hawaiinewsnow.com/story/6273414/feral-chicken-problem-invades-oahu?redirected=true>.

Alley Cat Allies (ACA). (2011). *National Feral Cat Day*. Retrieved June 30, 2011, from the ACA website: <http://www.alleycat.org/Page.aspx?pid=388>.

American Bird Conservancy (ABC). (2010). *Cats Indoors*. Retrieved June 28, 2011, from the ABC website: <http://www.abcbirds.org/abcprograms/policy/cats/index.html>.

American Medical Association (AMA). (2004). *Foodborne Illnesses Table: Parasitic Agents*. Retrieved June 29, 2011, from the AMA website: http://www.ama-assn.org/resources/doc/infectious-disease/2004_food_table_para.pdf.

American Association of Feline Practitioners, (AAFP). (2007). *Statement on Feral Cats*. Retrieved June 28, 2011, from the AAFP website: <http://www.catvets.com/professionals/guidelines/position/index.aspx?id=292>.

American Society for the Prevention of Cruelty to Animals (ASPCA). (2011). *Position statement on feral cat management*. Retrieved March 21, 2011, from <http://www.asPCA.org/about-us/policy-positions/feral-cat-management.aspx>.

American Veterinary Medical Association, (AVMA). (2009). *Free-Roaming Abandoned and Feral Cats Policy*. Retrieved June 28, 2011, from: http://www.avma.org/issues/policy/animal_welfare/feral_cats.asp.

References continued:

- American Veterinary Medical Association, (AVMA). (2010). *Feral Cats*. Retrieved January 7, 2011 from http://www.avma.org/avmacollections/feral_cats/summary.asp.
- American Veterinary Medical Association (AVMA). (2010). *Veterinarian's Oath*. Retrieved July 12, 2011, from the AVMA website: http://www.avma.org/about_avma/howweare/oath.asp.
- Barcott, B. (2007). *Kill the cat that kills the bird?* Retrieved June 28, 2011, from the New York Times website: <http://www.nytimes.com/2007/12/02/magazine/02cats-v--birds-t.html>.
- Best Friends Animal Society, (BFAS). (2010). *Trap, Neuter and Return Cost Savings Calculator*. Retrieved June 28, 2011, from the Best Friends Animal Society website: <http://www.guerrillaeconomics.biz/communitycats/>.
- Blanton, J. D., Palmer, D., & Rupprecht, C. E. (2010). Rabies surveillance in the United States during 2009. *JAVMA*, 237, 6, 646-657.
- Centers for Disease Control and Prevention, (CDC). (2008). Human Rabies Prevention, United States, 2008, early release. *Morbidity and Mortality Weekly Report (MMWR)*, 57, 1-28.
- Dabritz, H. A., Atwill, E. R., Gardner, I. A., Miller, M. A. & Conrad, P. A. (2006). Outdoor fecal deposition by free-roaming cats and attitudes of cat owners and nonowners toward stray pets, wildlife, and water pollution. *JAVMA*, 229, 1, 74-81.
- Dunham, J. (2010). *The Fiscal Impact of Trap, Neuter and Return Policies in Controlling Feral Cat Populations in the United States*. Retrieved June 28, 2011, from the Best Friends Animal Society website: <http://www.guerrillaeconomics.biz/communitycats/methodology.pdf>.

References continued:

Farnworth, M. J., Campbell, J., & Adams, N. J. (2010). Public awareness in New Zealand of animal welfare legislation relating to cats. *New Zealand Veterinary Journal*, 58,4, 213-217.

Farnworth, M. J., Campbell, J., & Adams, N. J. (2011). What's in a Name? Perceptions of Stray and Feral Cat Welfare and Control in Aotearoa, New Zealand. *Journal of Applied Animal Welfare Science*, 14, 59-74.

Fitzgerald, B. M. & Turner, D. C. (2000). Hunting behavior of domestic cats and their impact on prey populations. In D. C. Turner and P. Bateson (Ed.), *The Domestic Cat: The Biology of its Behavior* (pp. 152-175). Cambridge: Cambridge University Press.

Foley, P., Foley, J. E., Levy, J. K., & Paik, T. (2005). Analysis of the impact of trap-neuter-return programs on populations of feral cats. *JAVMA*, 227, 11, 1775-1781.

Fredebaugh, S. L., Mateus-Panilla, N. E., McAllister, M., Warner, R. E., & Weng, H. Y. (2011). Prevalence of antibody to *Toxoplasma gondii* in terrestrial wildlife in a natural area. *Journal of Wildlife Diseases*, 47, 2, 381-392.

Fry, D. (2010). *Detailed Discussion of Feral Cat Legal Issues*. Retrieved July 17, 2011, from the Animal Legal and Historical Center website: <http://animallaw.info/articles/ddusferalcat2010.htm>.

Gerhold, R. (2011). Cats as carriers of disease. *The Wildlife Professional*, Spring, 58-61.

Hensley, J. A. (1998). Potential rabies exposures in a Virginia County. *Public Health Reports*, 113, 258-262.

Humane Society of the United States, (HSUS). (2009). *U.S. Pet Ownership Statistics*. Retrieved June 26, 2011, from http://www.humanesociety.org/issues/pet_overpopulation/facts/pet_ownership_statistics.html

References continued:

Humane Society of the United States, (HSUS). (2009). *The HSUS' Position on Trap Neuter Return (TNR)*. Retrieved June 26, 2011, from

http://www.humanesociety.org/issues/feral_cats/facts/TNR_statement.html.

Humane Society of the United States, (HSUS). (2010). *Feral Cats: Frequently Asked Questions*. Retrieved January 7, 2011 from http://www.humanesociety.org/issues/feral_cats/qa/feral_cat_FAQs.html.

Humane Society of the United States, (HSUS). (2011). *Feral Cat Organizations*. Retrieved January 13, 2011 from http://www.humanesociety.org/issues/feral_cats/tips/feral_cat_organizations.html.

Jessup, D. A. (2004). The Welfare of feral cats and wildlife. *JAVMA*, 225, 9, 1377-1383.

Jessup, D. A. (2006). The debate on feral cats continues. *JAVMA*, 228, 5, 683.

Keyes, M. (2010). Additional views on the costs of feral cat control. *JAVMA*, 237, 3, 257.

Kollus, B. (2010). Will work for food. *Cat Fancy*, July 2010, 43-45.

Lee, J. (2011). *Newcastle Disease: Protecting Poultry Farmers on Two Fronts*. Retrieved July 24, 2011, from United States Department of Agriculture (USDA) website: <http://www.ars.usda.gov/is/AR/archive/oct99/front1099.htm>.

Levy, J. K. (2011). Contraceptive Vaccines for the Humane Control of Community Cat Populations. *AJRI*, 66, 63-70.

References continued:

- Levy, J. K., Gale, D. W., & Gale, L. A. (2003). Evaluation of the effect of a long-term trap-neuter-return and adoption program on a free-roaming cat population. *JAVMA*, 222, 1, 42-46.
- Nutter, F. B., Levine, J. F., & Stoskopf, M. K. (2004). Reproductive capacity of free-roaming domestic cats and kitten survival rate. *JAVMA*, 225, 9, 1399-1402.
- Martin, B. (2010). Additional views on the costs of feral cat control. *JAVMA*, 237, 3, 257.
- Mendes-de-Almeida, F., Remy, G. L., Gershony, L.C., Rodriques, D.P., Chame, M., & Labarthe, N.V. (2011). Reduction of Feral Cat (*Felis catus* Linnaeus 1758) Colony Size Following Hysterectomy of Adult Female Cats. *Journal of Feline Medicine and Surgery*, 13, 436-440.
- Mendes-de-Almeida, F., Labarthe, N.V., Guerrero J., Faria, M. C. F., Branco, A. S., Pereira, C. D., Barrerira, J. D., & Pereira, M. J. S. (2007). Follow-up of the health conditions of an urban colony of free-roaming cats (*Felis catus* Linnaeus, 1758) in the city of Rio de Janeiro, Brazil. *Veterinary Parasitology*, 147, 9-15.
- Moore, D. A., Sisco, W. M., Hunter, A., & Miles, T. (2000). Animal bite epidemiology and surveillance for rabies postexposure prophylaxis. *JAVMA*, 217, 2, 190-194.
- Mott, M. (2003). *U.S. Facing Feral-Dog Crisis*. Retrieved July 11, 2011, from the National Geographic website: <http://news.nationalgeographic.com/news/pf/34706631.html>.
- Mutinelli, F. (2011). Rabies and feral cat colonies in Italy. *Veterinary Record*, 166, 537-538.
- National Animal Control Association (NACA). (2008). *Extended Animal Control Concerns-Community Cat Management*. Retrieved April 11, 2011, from the NACA website: <http://www.nacanet.org/guidelines/Guidelines%20Community%20Cat%20Management.pdf>.

References continued:

National Association of State Public Health Veterinarians, Inc. (NASPHV). (2011). *Compendium of Animal Rabies Prevention and Control, 2011*. Retrieved June 30, 2011 from the NASPHV website:

<http://www.nasphv.org/Documents/RabiesCompendium.pdf>.

Natoli, E., Maragliano, L., Cariola, G., Faini, A., Bonanni, R., Cafazzo, S. & Fantini, C. (2006). Management of Feral Domestic Cats in the Urban Environment of Rome (Italy). *Preventative Veterinary Medicine*, 77, 180-185.

Newsome, A. (1990). The Control of Vertebrate Pests by Vertebrate Predators. *TREE*, 5, 6, 187-191.

Nolen, R. S. (2010). Economic Study Estimates Costs of Feral Cat Control. *JAVMA*, 6, 11: 1162.

Patronek G. J. (1998). Free-roaming and Feral Cats-Their Impact on Wildlife and Human Beings. *JAVMA*, 212, 2, 218-226.

Pickrell J. (2004). *Oldest Known Pet Cat? 9,500-Year-Old Burial Found on Cyprus*. Retrieved June 25, 2011, from National Geographic News web site:

http://news.nationalgeographic.com/news/2004/04/0408_040408_oldestpetcat.html.

Pollard M. (1999). *The Encyclopedia of the Cat*. Bath: Parragon Publishing.

Richards, J. R. (2004). The 2004 American Association of Feline Practitioners Position Statement on Free-Roaming Abandoned and Feral Cats. *Journal of Feline Medicine and Surgery*, 6, vii-ix.

References continued:

- Rottenberg, J. (2010). More on the economics behind feral cat control. *JAVMA*, 237, 8, 899.
- Salwey, M. K. (2009). *Feral Pigs*. Retrieved July 24, 2011, from the Wisconsin Department of Natural Resources website: <http://www.dnr.state.wi.us/org/land/wildlife/PUBL/wlnotebook/Pig.htm#mana>.
- Serpell J. A. (2000). Domestication and history of the cat. In D. C. Turner and P. Bateson (Ed.), *The Domestic Cat: The Biology of its Behavior* (pp. 179-192). Cambridge: Cambridge University Press.
- Skaer, W. C. (2006). Thoughts on feral cats' role in public health. *JAVMA*, 228, 8, 1186.
- Slater, M. (2004). Understanding issues and solutions for unowned, free-roaming cat populations. *JAVMA*, 225, 9, 1350-1354.
- Slater, M. R., Miller, K. A., Weiss, E., Makolinski, K. V., & Weisbrot, L. A. M. (2010). A Survey of the Methods Used in Shelter and Rescue Programs to Identify Feral and Frightened Pet Cats. *Journal of Feline Medicine and Surgery*, 12, 592-600.
- Stat Trek*. (2011). AP Statistics Tutorial. Retrieved August 1, 2011, from <http://stattrek.com/ap-statistics-4/independence.aspx>.
- Stoskopf, M. K., & Nutter, F. B. (2004). Analyzing approaches to feral cat management-one size does not fit all. *JAVMA*, 225, 9, 1361-1364.
- Wodzicki, K. (1973). Prospects for biological control of rodent populations. *Bull. Wild Hlth Org*, 48, 461-467.

The end.....questions?

