



**DEPARTMENT OF
ENVIRONMENT**
CAYMAN ISLANDS GOVERNMENT

Feral Cat Control in the Cayman Islands: Frequently Asked Questions

Table of Contents

| | |
|----------------------------------------------------------------------------------------------------------------------------------|---|
| 1. What is a feral cat? | 2 |
| 2. What is an invasive species? | 2 |
| 3. Why are feral cats a problem in the Cayman Islands? | 2 |
| 4. What is being done to address the risk to wildlife posed by feral cats? | 5 |
| 5. Will government authorities have access to private property to undertake feral cat trapping?..... | 5 |
| 6. Is feral cat control a threat to companion cats? | 5 |
| 7. What are the steps to be a responsible companion cat owner?..... | 5 |
| 8. Will feeding feral cats reduce the rate of predation? | 5 |
| 9. What if my cat kills a species protected by law? | 6 |
| 10. Are feral cats a danger to companion cats or people? | 6 |
| 11. Statistically, habitat loss and climate change are the biggest drivers of extinction globally, why focus on feral cats?..... | 6 |
| 12. If feral cats repopulate after a cull, what is the point of control?..... | 7 |
| 13. What about removing feral cats from the islands entirely?..... | 7 |
| 14. Is eradication on any of the islands possible? | 7 |
| 15. What about other invasive species such as dogs, rats, green iguanas and chickens? .. | 7 |
| 16. Will feral cat control lead to an increase in the rat population? | 8 |
| 17. If we spay/ neuter feral cats, will that stop the cycle of reproduction and lead to population decline by attrition? | 8 |
| 18. What is the goal of the Department of Environment? | 8 |
| References | 9 |

1. What is a feral cat?

A feral cat is a member of the domestic cat species (*Felis catus*) that does not have a person responsible for its care and exists with little to no dependency on humans, while remaining fearful and unaccustomed to human contact. Feral cats were either abandoned as kittens or come from a longer line of feral cats that were originally abandoned.

The sensitive period for kitten socialisation to humans is 2 to 7 weeks of age¹. Beyond this, it becomes increasingly difficult to teach a cat to be comfortable in a home environment. By fourteen weeks of age the cat will likely never be able to fully lose fear of humans^{xxxix}.

In contrast, a companion cat is a fully socialised cat that is comfortable in a home, has a named person responsible for its care and can be presented to a veterinarian at short notice.

2. What is an invasive species?

An invasive species is an organism that is alien to the ecosystem in question. The proliferation of the species causes negative changes in the new environment. This is different to native species which normally live and thrive in a particular ecosystem having evolved there over many millennia^{xxix}.

When a species is introduced into an ecosystem outside of its normal range, the natural balance of the recipient ecosystem may be disrupted. The introduced species can outcompete native species and take on a role which is not accommodated in that ecosystem. This results in negative effects to the normal functions of that ecosystem and the species reaches invasive status^{xxviii}.

Felis catus, the domestic cat, descended from *Felis silvestris* around early human agricultural settlements^{xix}. This genus of small cats is native to Europe, Asia and Africa. *Felis catus* has been recognised as a separate species because of its domestication^{xxii}. The entire family of cats is not native to the American continents and the domestic cat itself was artificially developed by humans within the last 10,000 years (a very short time compared to the natural pace of evolution of a species).

A native species is the opposite: it is a species within its natural range. Native species play an important role within their natural ecosystems, for instance pollinating or dispersing seeds, or maintaining predator-prey relationships. These relationships have developed over millennia, usually keeping each other in check with natural feedback loops.

3. Why are feral cats a problem in the Cayman Islands?

Domestic cats instinctively stalk, catch and play or eat prey animals. It is thought that domestic cat ancestors were initially attracted to agricultural settlements due to the presence of small rodents around food stores, creating an advantageous relationship for both cats and early Middle Eastern farmers^{xix}. When agricultural practices spread across the Mediterranean and Europe, so did the domestic cat and selective breeding soon took place^{xx}. Therefore predatory behaviour was never diminished, rather it was encouraged, during selection.

A study in the United States using remote cameras on cats revealed that 44% of companion cats actively hunted^{xxxviii}. Their prey consisted of reptiles, amphibians, small mammals, small birds and insects. Owners of the study cats were unsurprised by the variety of prey caught, but shocked at the unseen volume of casualties. The study found that only 23% of prey was brought back to the house, while 28% was eaten and 49% was killed purely by instinct, more for entertainment than any necessary reason.

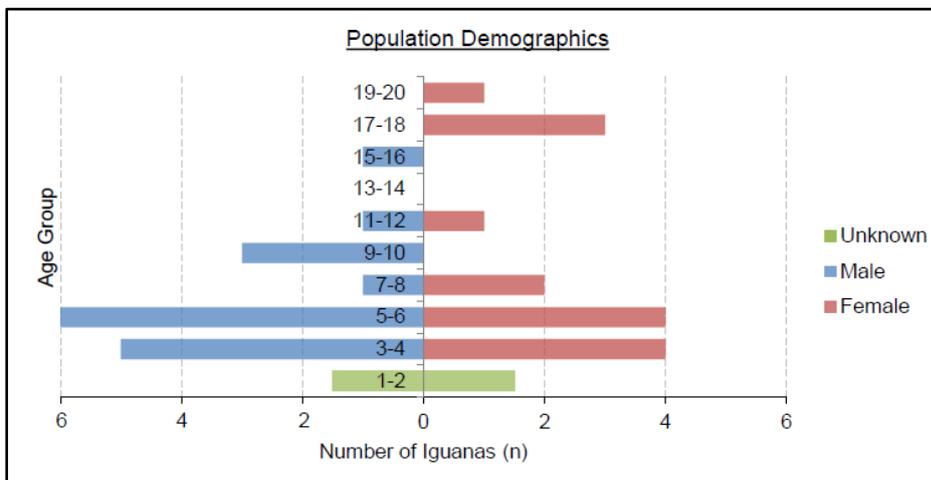
When this is generalised, the rate of destruction on wildlife is astounding. Estimates have been published that 1.3 – 4 billion birds and 6.3 – 22.3 billion mammals are killed annually in the United States^{xxxvi} where domestic cats are not native. The study provided an average figure of 483 million reptiles and 173 million amphibians killed in a year, but notes that data on predation rates was lacking. This is also reflected in what is seen in wildlife rescue centres. Over 10 months, 30.3% of bird

admissions to the Lindsay Museum of Walnut Creek, USA, were due to cat predation^{xxx}. Many animal patients with cat related injuries are not treatable.

In the Cayman Islands, we have a wide variety of unique wildlife found nowhere else in the world, existing in this small land mass. The iconic species of the Cayman Islands, such as the blue iguana and Sister Islands rock iguana were the largest land animal before humans arrived. They evolved without any predator pressure and are left incredibly vulnerable to dogs, cats and cars. While roaming dogs and speeding are at least potentially enforceable, feral cat populations have proliferated on all three Cayman Islands with no control or mediation. A study in 2017 tracked hatchling iguanas in Little Cayman that had just emerged from their nest. 28 transmitters were deployed, and after following for an average of 19 days, the fate of 18 was known. Of these 18, two died from cat predation during the tracking period^{xl}. More could have fallen to cat predation, given the 10 transmitters that could not be recovered. Rock iguanas are not safe from cat predation until they are large enough to not be seen as prey at around two years of age: in other words, these iguanas are still vulnerable for a lot longer than this study ran for. Population survey results of both blue iguanas and rock iguanas also reiterate the same message that the youngest generation are vanishing soon after hatchling, not able to reach maturity^{xv, xii, xiii}. While iguanas are long-lived, if there is no younger generation able to replace the breeding adults, the cycle will break and the species will become extinct.



Feral Cat killing a Sister Islands Rock Iguana on Little Cayman. The rock iguana is approximately a year old. Little Cayman 2019.



Population demographics from 2019 blue iguana census of the Queen Elizabeth II Botanic Park. Iguanas resident in the park are separated by age and sex (where known). Young iguanas 1-2 years old should be more numerous than 3-4 years old to replace the previous generation. Currently, the new generation would be less numerous than the last.

The Cayman Islands' resident colonies of breeding seabirds are also at risk. Seabirds are in decline globally with a notable issue being invasive mammal predation at nesting sites, when the birds are particularly vulnerable^{xviii}. Seabirds prefer safe, small islands or stacks that are isolated from predators or disturbance. In Cayman Brac, the brown boobies are ground nesters and in Little Cayman the frigates and red-footed boobies nest in low-lying mangroves. The seabird chicks are completely exposed to predation. In Cayman Brac, occasionally a whole family can be exterminated as the parents are attacked while brooding or feeding the chick. In 2018, approximately 10% of the brown booby nesting population fell to cat predation^{xiv}. Local extinction is likely if this pressure is not reduced.



Lone brown booby parent with chick after its mate was killed in a cat attack. Cayman Brac, 2018.

The seabirds on Little Cayman also face increasing pressure with an ever expanding feral cat population. Camera traps placed in the mangroves of the booby pond to investigate threats revealed a series of cats regularly commuting and hunting around the seabird colony.



A cat consuming the carcass of a magnificent frigatebird caught on a camera trap. Two further cats were observed opportunistically feeding on this carcass until there was no more available meat. Little Cayman, 2017.

Cats do predate other wildlife in Cayman, including sea turtle hatchlings, blue throated anoles, curly tail lizards, bats and small birds such as yellow warblers. There is currently no quantitative data available in Cayman on the remainder of vulnerable wildlife, however cases are continually reported to the Department of Environment and local veterinary clinics.

4. What is being done to address the risk to wildlife posed by feral cats?

The Department of Environment and the Department of Agriculture have coordinated an invasive species plan for feral cats. Stage one is to register all companion cats in the target area, providing a microchip free of charge and taking any data on the cat and its owner. Stage two is widespread trapping of feral cats, primarily in ecologically sensitive areas and source populations that would quickly migrate. Traps are monitored regularly, replacing any triggered traps. Collected cats are kept in a safe area and checked for microchips. If the cat has a microchip, it is checked against the companion cat database and returned to the owner promptly. Cats without a microchip are euthanised via injection by a veterinarian.

5. Will government authorities have access to private property to undertake feral cat trapping?

Only when access is permitted.

6. Is feral cat control a threat to companion cats?

All options considered for feral cat control have safe guards built-in to eliminate the possibilities of collateral on legitimate companion cats. The Department of Environment does not want to stop the public from responsibly owning cats, but work with owners to safe guard wildlife.

Companion cat owners can help by following guidance to be a responsible cat owner (see question 7) and following official guidance from the Department of Environment and Department of Agriculture during feral cat control procedures. Official guidance will be delivered in person (such as in target areas) or if necessary to widely distribute, will be available online and in veterinary clinics.

7. What are the steps to be a responsible companion cat owner?

- a. **Spay/neuter.** This is a necessary step to do your part in reducing both the pet overpopulation crisis and the feral cat population. Any vet on Grand Cayman can offer this service. On the Sister Islands, some veterinary clinics work with Cayman Airways Cargo, receiving the pet in Grand Cayman and contacting you throughout until the pet is fit to travel back and dropped off again.
- b. **Vet visits, vaccination & medicine.** Diseases can spread between cats, wildlife and occasionally humans. Ensuring your cat is healthy and immunised helps stop the spread of disease as well as improve the welfare of your cat. On Cayman Brac there are regularly scheduled visits by certain veterinary clinics that can assist. On Little Cayman, the pet owner community organises a veterinarian visit to complete annual vaccinations and check-ups.
- c. **Microchip & collar.** It is important to clearly identify your cat as a companion cat in the event of escape. Quick-break collars are available to avoid accidents in case of snagging. Having a microchip ensures back-up identification.
- d. **Keep indoors.** Provide indoor stimulation, build “cacios” or walk on a leash. This is not only the best way to prevent predation of vulnerable wildlife, but to avoid dog attacks, road accidents, fights with other cats, disease transmission or even theft of your cat.

8. Will feeding feral cats reduce the rate of predation?

Feeding feral cats does not reduce predatory behaviour. The ‘Kitty Cam’ project, from National Geographic and University of Georgia, revealed that 44% of well-fed companion cats exhibited hunting behaviour^{xxxviii}. In another shock to the owners, only 25% of the prey items were brought home, leaving 3 times more casualties unseen. Recently the study has been repeated on a ‘colony’ of feral cats that

are fed daily, finding 88% of these cats exhibited hunting behaviour^{xxiv}. Feral cats will still hunt, even when fed, at twice the rate of companion cats.

9. What if my cat kills a species protected by law?

Under the National Conservation Act (2013), 'take' of a protected species includes deliberately letting your companion animal (whether it is a dog or cat) hunt a protected species (§2). 'Deliberate' would involve having a companion animal outside of private property, uncontrolled, clearly preying on a protected species. At the time of writing, there has not been a charge of this specific type brought against a party. If members of the public have such evidence, it can be passed or reported to the [Department of Environment](#). Uncontrolled dogs that are at risk of preying on protected wildlife, but not actively doing so, can be reported to the [Department of Agriculture](#) as this is an offence under the Animals Act (2015) (§26).

10. Are feral cats a danger to companion cats or people?

Occasionally the risks posed to humans have been overstated, although it is untrue to state the risk is absent. In the worst case scenarios feral cats can be reservoirs of rabies^{xliii}, which is not documented in the Cayman Islands, but other diseases such as Toxoplasmosis, cutaneous larval migrans, tularemia and plague are more common^{xxii}. Toxoplasmosis is spread through faecal matter, which infects soil and water for a long time. Playgrounds, sand boxes and gardens with feral cats near are at a higher risk for contamination.

Feral cats do pose an increased threat to companion cats. Feline Immunodeficiency Virus (FIV) has been transmitted between feral cats and companion cats in the Cayman Islands. It is usually transmitted by bites from fighting and gradually weakens the recipient cat's immune system. Companion cats can live a regular lifespan with FIV, however they should be kept isolated from other cats, fed a carefully balanced diet and be carefully monitored (including more frequent vet visits) to manage the disease^{xvii}. If a cat also contracts Feline Leukaemia Virus (FeLV), which is transmitted through bite wounds and saliva, then the life span will be shortened^{xvi}. Toxoplasmosis, ringworm and bartonellosis can also be transmitted between feral and companion cats, providing an easy disease transmission pathway between feral cats and humans^{xxiii, xxii}.

11. Statistically, habitat loss and climate change are the biggest drivers of extinction globally, why focus on feral cats?

Even though there are other threats, feral cats are still a major driver of extinction. It is important to address habitat loss and climate change, but feral cats are too high of a threat to ignore. Islands are particularly vulnerable to extinction events.

Species on islands make up a large proportion of animals threatened by invasive species. The isolated nature of islands leads to a high rate of speciation (the evolutionary process by which species separate and become distinct). Lots of unique wildlife occurs on islands. The small land mass of islands also means that these unique populations of wildlife do not occur in large numbers. The end result is ecosystems with lots of endemic species in small numbers. Therefore it is much more probable for an extinction event to occur on an island^{xlvi}.

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services' report on the global state of nature in 2019 documented that 1 million species were at risk of extinction and one of the five largest drivers was invasive species^{xxvi}. Islands make up only 5.3% of the earth's landmass, however 75% of recorded extinctions have happened in these environments^{xlviii}. 86% of global extinctions from invasive species have occurred on islands^{iv}.

The ecosystems of all three Cayman Islands are no exception and are highly vulnerable to invasive species. To prevent unique species across the Cayman Islands from becoming extinction statistics, the

Department of Environment has been working to secure more protected natural areas ^{viii}, implement Environmental Impact Reviews and Assessments^x, address carbon emissions^{xlix} and undertake invasive species control initiatives^{ix}. An initiative to control feral cats is just one part of a necessary, multi-approach plan to secure the survival of native, endangered wildlife in the Cayman Islands.

12. If feral cats repopulate after a cull, what is the point of control?

Simply, without control, the situation would continue to get worse until extinction of the blue iguanas and sister islands rock iguanas results, along with the local extinction of frigate birds, brown boobies and red-footed boobies. When control is implemented, especially in target areas, there is immediate reduction in the number of feral cats and immediate relief for vulnerable wildlife^{xxv}. Given the consideration and lengthy planning process for an eradication project (see questions 13 and 14), control measures are proposed as part of regular functioning of the Department of Environment and Department of Agriculture.

13. What about removing feral cats from the islands entirely?

Eradication is the process of removing the target species from the islands entirely. These are large projects requiring funding, extra personnel and several years to implement and confirm success or re-evaluate the strategy. While there have been successful cat eradication projects elsewhere, all have been on small islands with different topography, vegetation cover, non-target species and sparsely populated^{xliii}. An eradication approach for the Cayman Islands would require an adjustment of previous strategies, multiple methods and adaptive management.

Before an eradication project is considered, however, enhanced biosecurity measures must be in place. This is necessary to control any re-population of the target species after eradication. These enhanced biosecurity measures for domestic cats would affect pet owners' current status quo. These measures could include mandatory companion cat registration, breeder licences and mandatory sterilisation before adoption, purchase or importation. If there is no enhanced biosecurity, an eradication project cannot be effective.

14. Is eradication on any of the islands possible?

Beyond funding, logistics and needed enhanced biosecurity (see question 13) eradication on Grand Cayman and Cayman Brac would prove difficult due to the size, vegetation cover and the large number of companion cats. New strategies would need to be utilised. New Zealand and Australia are currently the global leaders with initiatives such as 'Predator Free 2050' and many innovative techniques are being trialled. The Department of Environment regularly reads the latest research and maintains external relationships to not miss any novel techniques that may be successful in the Cayman Islands.

Little Cayman was shortlisted in one study for eradication efforts. Due to its small size and population, Little Cayman fits the criteria where previous eradication measures have worked^{xliii}. All successful eradication efforts have utilised multiple methods^{xlv} so more than the currently proposed techniques would need approval. Strong biosecurity measures, especially preventing reinvasion of cats from Cayman Brac, would need to be in place before considering such an initiative.

15. What about other invasive species such as dogs, rats, green iguanas and chickens?

Dogs: Uncontrolled dogs are a serious threat to the endemic iguanas of the Cayman Islands due to their innate hunting behaviour^{vii}. Excitable dogs also disturb brown booby nests in Cayman Brac. Uncontrolled, aggressive dogs are also a threat to humans, and so the Cayman Islands Animals Act (2015 revision) decrees that all dogs must be registered and controlled at all times (§24, 26). The Department of Agriculture has the authority to confiscate any dog in contravention of the Animals Act (§47). Therefore there is not a situation of a free and growing feral dog population in the Cayman Islands so long as this remains properly enforced.

Rats: Rats are controlled by the Department of Environmental Health. Eradication efforts for rats have not been successful on tropical islands of similar sizes to Little Cayman, Cayman Brac or Grand Cayman at the time of writing.

Green Iguanas: Green iguanas are not highly predatory, however their exponential growth (from an estimated 250,000 in 2014 to 1.3 million in 2018 on Grand Cayman)^{xiv} has led them to be a serious environmental and public health threat. The Department of Environment has been working across all three islands to address the green iguana threat and control the invasive populations^x.

Chickens: Chickens are currently controlled only in specific areas, by the Department of Agriculture.

16. Will feral cat control lead to an increase in the rat population?

There is currently no evidence that feral cats have a major role in suppressing rat populations. The stomach contents of 24 feral cats in Little Cayman were analysed to determine the most recent meal. No mammal remains were found in any cats but there were 4 cats with bird remains and 1 with reptile remains^{xi}.

Along with the Department of Environment's monitoring of protected species and cat populations, rat populations will also be monitored to collect evidence on any positive or negative knock-on effects of feral cat control. If there is any proven correlation, appropriate action can be taken.

17. If we spay/ neuter feral cats, will that stop the cycle of reproduction and lead to population decline by attrition?

Some special interest groups promote 'Trap-Neuter-Release' (TNR), or a similar strategy, to avoid euthanising the cats. Firstly, the purposeful releasing of an invasive predator into a vulnerable ecosystem must be addressed. The American and Canadian Veterinary Associations have issued guidelines explicitly saying that feral cats should **not** be released anywhere near ecologically sensitive areas^{iv}. All three Cayman Islands are naturally vulnerable ecosystems as small island masses (see question 3). Any released cats, whether sterilised or not, will continue to predate wildlife (see question 8). Even just one cat has the ability to be completely devastating to a seabird colonyⁱⁱⁱ.

TNR is predominantly supported by only three case studies^{xli, xlvii, xxxiii}. There are many more case studies, literature reviews and population modelling papers concluding that in reality the ultimate goal of reducing the population by sterilisation and attrition is not realistic^{ii, xlv, xxi, xxxv, xxxvii, xlv}. The main factors failing TNR strategies are not addressing source populations outside TNR zones, continued abandoning of kittens from unsterilised pets and insufficient sterilisation rates^{xli, xxxiv}. Any purported results from TNR campaigns have taken over 10 years to attain and/or used an overwhelming adoption (removal) effort of more than 50% of trapped cats.

The natural environment of the Cayman Islands does not allow an easy existence for domestic cats. This is true for all feral cats, although the karstic landscape and dangerous vegetation make the Cayman Islands relatively more difficult to survive in. Out of 24 feral cats trapped on Little Cayman in a single control session, 95% were 2 years or under in age, implying a very short life span for individuals in this population. 75% had parasites (tape worms, round worms or both) and 12% had obvious wounds or abrasions^{xi}. Domestic cats have their life expectancy halved when left to survive in the elements^{xxx}. Some countries see TNR as abandonment of domestic cats and is illegal due to the bad welfare of released feral animals.

18. What is the goal of the Department of Environment?

"The Mission of the Department of Environment is to facilitate responsible management and sustainable use of the natural environment and the natural resources of the Cayman Islands; through environmental protection and conservation, wise use, scientific research and public education."

This envisions that the wildlife, plants and marine life will be here for generations to come. A healthy natural environment benefits everyone in the Cayman Islands, not just those who rely on it directly.

Invasive species threaten the regular functioning of the natural environment, causing both predictable and unpredictable knock-on effects. The Department of Environment is committed to maintaining healthy, functional and sustainable natural environments. This involves addressing these threats before irreversible change is made to the current way of life.

Our endemic iguanas are important seed dispersersⁱ, grazers and a tourist favourite. Seabirds on the Sister Islands are part of the sky landscape, another tourist highlight and have recently been shown to protect coral reefs and increase fish stock capacity around their breeding coloniesⁱⁱ. Safeguarding these populations from the serious feral cat threat is a priority for the Department of Environment.

References

- i. American Veterinary Medical Association, 2016. Policies: Free-roaming abandoned and feral cats. Viewed 27 March 2020. <<https://www.avma.org/policies/free-roaming-abandoned-and-feral-cats>>
- ii. Andersen, M.C., Martin, B.J. and Roemer, G.W., 2004. Use of matrix population models to estimate the efficacy of euthanasia versus trap-neuter-return for management of free-roaming cats. *Journal of the American Veterinary Medical Association*, 225(12), pp.1871-1876.
- iii. Australian Geographic, 2019. A single cat wiped out an entire colony of fairy terns. Viewed 27 March 2020. <<https://www.australiangeographic.com.au/topics/wildlife/2019/08/a-single-cat-wiped-out-an-entire-colony-of-fairy-terns/>>
- iv. Bellard, C., Cassey, P. and Blackburn, T.M., 2016. Alien species as a driver of recent extinctions. *Biology letters*, 12(2), p.20150623.
- v. Canadian Veterinary Medical Association, 2014. Free-roaming, abandoned and feral cats – position statement. Viewed 27 March 2020. <<https://www.canadianveterinarians.net/documents/free-roaming-abandoned-feral-cats-position-statement>>
- vi. Castillo, D. and Clarke, A.L., 2003. Trap/neuter/release methods ineffective in controlling domestic cat "colonies" on public lands. *Natural Areas Journal*, 23(3), pp.247-253.
- vii. Cayman Compass, 2015. Blue iguana killed in dog attack. Viewed 23 March 2020. <<https://www.caymancompass.com/2015/06/23/blue-iguana-killed-in-dog-attack/>>
- viii. Cayman Compass, 2017. Cayman's first protected areas approved by Conservation Council, *Cayman Compass*, viewed 18 March 2020, <<https://www.caymancompass.com/2017/05/04/caymans-first-protected-areas-approved-by-conservation-council/>>
- ix. Cayman Compass, 2019. 1 million green iguanas culled, *Cayman Compass*, viewed 19 March 2020. <<https://www.caymancompass.com/2019/10/24/1-million-green-iguanas-culled/>>
- x. Cayman Compass, 2019. The issue explained: Report outlines likely environmental impacts of port. Viewed 19 March 2020. <<https://www.caymancompass.com/2019/11/17/the-issue-explained-report-outlines-likely-environmental-impacts-of-port/>>
- xi. Cayman Islands Department of Environment & Cayman Islands Department of Agriculture, 2018. Report on commencement of feral cat control operations on Little Cayman: January, 2018. *Unpublished*.
- xii. Cayman Islands Department of Environment (2019), Blue Iguana Survey 2019: Queen Elizabeth II Botanic Park. *Unpublished report*.
- xiii. Cayman Islands Department of Environment (2020), Sister Islands Rock Iguana (*Cyclura nubila caymanensis*) Population Assessment. *Unpublished report*.

- xiv. Cayman Islands Department of Environment and Cayman Brac Wildlife Rescue (2019), Brown booby (*Sula leucogaster*) nest monitoring data. *Unpublished data*.
- xv. Cayman Islands Department of Environment, Blue Iguana Recovery Programme, Riviera-Milan, F. F. (2018), Blue iguana (*Cyclura lewisi*) reserves population survey data. *Unpublished data*.
- xvi. Cornell University College of Veterinary Medicine, 2016. Feline Leukeimia Virus, *Cornell University*, viewed 7 April 2020, <<https://www.vet.cornell.edu/departments-centers-and-institutes/cornell-feline-health-center/health-information/feline-health-topics/feline-leukemia-virus>>
- xvii. Cornell University College of Veterinary Medicine, 2019. Feline Immunodeficiency Virus, *Cornell University*, viewed 7 April 2020, <<https://www.vet.cornell.edu/departments-centers-and-institutes/cornell-feline-health-center/health-information/feline-health-topics/feline-immunodeficiency-virus>>
- xviii. Croxall, J.P., Butchart, S.H., Lascelles, B.E.N., Stattersfield, A.J., Sullivan, B.E.N., Symes, A. and Taylor, P.H.I.L., 2012. Seabird conservation status, threats and priority actions: a global assessment. *Bird Conservation International*, 22(1), pp.1-34.
- xix. Driscoll, C.A., Clutton-Brock, J., Kitchener, A.C. and O'Brien, S.J., 2009. The taming of the cat. *Scientific American*, 300(6), p.68.
- xx. Faure, E. and Kitchener, A.C., 2009. An archaeological and historical review of the relationships between felids and people. *Anthrozoös*, 22(3), pp.221-238.
- xxi. Foley, P., Foley, J.E., Levy, J.K. and Paik, T., 2005. Analysis of the impact of trap-neuter-return programs on populations of feral cats. *Journal of the American Veterinary Medical Association*, 227(11), pp.1775-1781.
- xxii. Gerhold, R.W. and Jessup, D.A., 2013. Zoonotic diseases associated with free-roaming cats. *Zoonoses and public health*, 60(3), pp.189-195.
- xxiii. Heller, R., Artois, M., Xemar, V., De Briel, D.O.M.I.N.I.Q.U.E., Gehin, H., Jaulhac, B., Monteil, H. and Piemont, Y., 1997. Prevalence of Bartonella henselae and Bartonella clarridgeiae in stray cats. *Journal of Clinical Microbiology*, 35(6), pp.1327-1331.
- xxiv. Hernandez, S.M., Loyd, K.A.T., Newton, A.N., Carswell, B.L. and Abernathy, K.J., 2018. The use of point-of-view cameras (Kittycams) to quantify predation by colony cats (*Felis catus*) on wildlife. *Wildlife Research*, 45(4), pp.357-365.
- xxv. Hodges, C.S.N. and Nagata, R.J., 2001. Effects of predator control on the survival and breeding success of the endangered Hawaiian Dark-rumped Petrel. *Studies in Avian Biology*, 22, pp.308-318.
- xxvi. IPBES, 2019. Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. *IPBES secretariat*, ISBN No: 978-3-947851-13-3.
- xxvii. IUCN & UNEP-WCMC, 2015. The world database on protected areas. *IUCN*.
- xxviii. IUCN/ISSG, 2008. About Invasive Species: What are Their Impacts? *ISSG*, viewed 15 January 2020, <http://www.issg.org/is_what_are_their_impacts.htm>
- xxix. IUCN/ISSG, 2008. About Invasive Species: What are They? *ISSG*, viewed 15 January 2020, <http://www.issg.org/is_what_are_they.htm>
- xxx. Jessup, D.A., 2004. The welfare of feral cats and wildlife. *Journal of the American Veterinary Medical Association*, 225(9), pp.1377-1383.
- xxxi. Jones, A.L. and Downs, C.T., 2011. Managing feral cats on a university's campuses: how many are there and is sterilization having an effect? *Journal of applied animal welfare science*, 14(4), pp.304-320.
- xxxii. Kitchener, A.C., Breitenmoser-Würsten, C.H., Eizirik, E., Gentry, A., Werdelin, L., Wilting, A., Yamaguchi, N., Abramov, A.V., Christiansen, P., Driscoll, C. and Duckworth, J.W., 2017. A revised taxonomy of the Felidae: The final report of the Cat Classification Task Force of the IUCN Cat Specialist Group. *Cat News*.

- xxxiii. Levy, J.K., Gale, D.W. and Gale, L.A., 2003. Evaluation of the effect of a long-term trap-neuter-return and adoption program on a free-roaming cat population. *Journal of the American Veterinary Medical Association*, 222(1), pp.42-46.
- xxxiv. Lohr, C.A., Cox, L.J. and Lepczyk, C.A., 2013. Costs and benefits of trap-neuter-release and euthanasia for removal of urban cats in Oahu, Hawaii. *Conservation Biology*, 27(1), pp.64-73.
- xxxv. Longcore, T., Rich, C. and Sullivan, L.M., 2009. Critical assessment of claims regarding management of feral cats by trap–neuter–return. *Conservation biology*, 23(4), pp.887-894.
- xxxvi. Loss, S.R., Will, T. and Marra, P.P., 2013. The impact of free-ranging domestic cats on wildlife of the United States. *Nature communications*, 4, p.1396.
- xxxvii. Loyd, K.A.T. and DeVore, J.L., 2010. An evaluation of feral cat management options using a decision analysis network. *Ecology and Society*, 15(4).
- xxxviii. Loyd, K.A.T., Hernandez, S.M., Carroll, J.P., Abernathy, K.J. and Marshall, G.J., 2013. Quantifying free-roaming domestic cat predation using animal-borne video cameras. *Biological Conservation*, 160, pp.183-189.
- xxxix. Martin, K., 2017. The Keys to Kitten Socialization. *American Veterinarian*, February, pp. 18-19
- xl. Moss, J. B, Gerber, G. P., Goetz, M., Haakonsson, J. E., Harvey, J. C., Laaser, T., Welch, M. E. (2019). Contrasting patterns of movement across life stages in an insular iguana population. *Journal of Herpetology*.
- xli. Natoli, E., Maragliano, L., Cariola, G., Faini, A., Bonanni, R., Cafazzo, S. and Fantini, C., 2006. Management of feral domestic cats in the urban environment of Rome (Italy). *Preventive veterinary medicine*, 77(3-4), pp.180-185.
- xl.ii. NBC Connecticut, 2020. Feral Cat Found in Griswold Was Rabid, *NBC*, viewed 20 February 2020, <<https://www.nbcconnecticut.com/news/local/feral-cat-found-in-griswold-was-rabid/2208235/>>
- xl.iii. Nogales, M., Vidal, E., Medina, F.M., Bonnaud, E., Tershy, B.R., Campbell, K.J. and Zavaleta, E.S., 2013. Feral cats and biodiversity conservation: the urgent prioritization of island management. *Bioscience*, 63(10), pp.804-810
- xl.ii.v. Rivera-Milán, F.F. and Haakonsson, J., 2020. Monitoring, modeling and harvest management of non-native invasive green iguanas on Grand Cayman, Cayman Islands. *Biological Invasions*, pp.1-10.
- xl.ii.vi. Schmidt, P.M., Swannack, T.M., Lopez, R.R. and Slater, M.R., 2009. Evaluation of euthanasia and trap–neuter–return (TNR) programs in managing free-roaming cat populations. *Wildlife Research*, 36(2), pp.117-125.
- xl.ii.vii. Spatz, D.R., Zilliacus, K.M., Holmes, N.D., Butchart, S.H., Genovesi, P., Ceballos, G., Tershy, B.R. and Croll, D.A., 2017. Globally threatened vertebrates on islands with invasive species. *Science Advances*, 3(10), p.e1603080.
- xl.ii.viii. Stoskopf, M.K. and Nutter, F.B., 2004. Analyzing approaches to feral cat management—one size does not fit all. *Journal of the American Veterinary Medical Association*, 225(9), pp.1361-1964.
- xl.ii.ix. Tershy, B.R., Shen, K.W., Newton, K.M., Holmes, N.D. and Croll, D.A., 2015. The importance of islands for the protection of biological and linguistic diversity. *Bioscience*, 65(6), pp.592-597.
- xl.ii.x. The National Energy Policy Committee, 2017. National Energy Policy 2017-2037.
- xl.ii.xi. Turner, D.C., 2000. 10 The human-cat relationship. *The domestic cat: the biology of its behaviour*, p.193.
- xl.ii.xii. Valido, A. and Olesen, J.M., 2007. The importance of lizards as frugivores and seed dispersers. *Seed dispersal: theory and its application in a changing world*. Wallingford, UK: CAB International, pp.124-147.
- xl.ii.xiii. Wilson, S.K., Graham, N.A., Carr, P., Hoey, A.S., Jennings, S. and MacNeil, M.A., 2018. Seabirds enhance coral reef productivity and functioning in the absence of invasive rats. *Nature*, 559(7713), pp.250-253.