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## **ACE-NC Paper 4/2020**

***For discussion on 28 October 2020***

### **Management Plan for Monkeys**

#### **PURPOSE**

This paper briefs Members on the management measures taken by the Agriculture, Fisheries and Conservation (AFCD) to address monkey nuisances in Hong Kong.

#### **BACKGROUND**

2. The local monkey populations mainly comprise Rhesus Macaques (*Macaca mulatta*) and they are believed to be the descendants of those introduced to the Kowloon Hills area in the 1910s. Besides, a small number of Long-tailed Macaques (*M. fascicularis*) and Tibetan Macaques (*M. thibetana*) had been recorded along with the Rhesus Macaques in the past. At present, individuals carrying external features resembling these two species, which are believed to be their hybrids with Rhesus Macaques, can also be found in the local populations.

3. Rhesus Macaques are the most widely distributed non-human primates in the world, covering South, Central, and Southeast Asia. They thrive not only in a variety of natural habitats including shrubland, woodland and coastal environment but are also found close to human settlements. They are largely herbivorous but also consume small invertebrates. Rhesus Macaques can live up to 40 years in captivity.

4. Rhesus Macaques form troops of varying sizes. Though the gender ratio of a troop biases towards females, each troop is dominated by an alpha male. In Hong Kong, female Rhesus Macaques reach reproductive maturity at an average age of 6-7 years old, which is largely dependent upon food availability. The mating season lasts from October to February, and females give birth to a single newborn in most instances, usually between April and August, and nurse them for about one year.

Young adult females usually remain in the troop while males would disperse, joining other troops, becoming solitary individuals or forming a new periphery troop.

5. AFCD's territory-wide camera trap surveys on terrestrial mammals conducted since 2002 found that macaques were congregating mainly in Kam Shan, Shing Mun and Lion Rock Country Parks. A few scattered troops were recorded in other parts of the New Territories, including Sai Kung, Tai Po, Tai Po Kau Nature Reserve and Tai Lam Country Park (**Annex A**). In recent years, periphery troops residing near residential areas around country parks in Sham Shui Po, Sha Tin, Wong Tai Sin and Tsuen Wan were also found.

6. All non-human primates including Rhesus Macaques are protected under the Wild Animals Protection Ordinance (Cap. 170). No person shall, except in accordance with a special permit, hunt, wilfully disturb, possess, buy, sell, export or offer for sale or export any protected wild animal. Upon conviction, offenders are liable to a maximum fine of \$100,000 and an imprisonment of one year.

## **MANAGEMENT OF MACAQUES**

7. Due to intentional feeding, the number of macaques in country parks has increased dramatically. Through frequent contacts with human, some have lost their instinctive fear of humans. Some even become aggressive and can cause nuisances to country park visitors while some may stray into urban fringe areas to search for food, causing nuisances to the public (**Annex B**). Since 1999, AFCD has developed a multipronged approach including feeding ban, contraceptive programme and public education to abate the macaque nuisances.

### ***Feeding Ban***

8. Since 1999, the feeding of wild animals including macaques has been prohibited at areas specified in the "Prohibition of Feeding of Wild Animals Notice 1999" (Cap. 170B) (**Annex C**). Any person contravening the feeding ban is liable to a maximum fine of \$10,000 upon conviction. AFCD officers conduct regular patrol and enforcement operations in the feeding ban areas to deter illegal feeding activities with a view to helping wild animals to revert to their natural diets and feeding behaviours. To ensure a stable supply of natural food to the macaques, AFCD has planted over 300 000 fruit-bearing native trees in the concerned country parks.

9. Outside the feeding ban areas, AFCD has been working closely with the Food and Environmental Hygiene Department (FEHD) to reduce food attraction at

nuisance blackspots by removing food residue, improving public refuse collection facilities to prevent macaque access to food residue in the refuse and erecting banners and posters to remind the public not to feed macaques. FEHD may also issue fixed penalty notices under the Fixed Penalty (Public Cleanliness and Obstruction) Ordinance (Cap. 570) to persons found to have dirtied public areas while feeding wild animals.

### ***Contraceptive Programme***

#### Contraception

10. To control the population growth of macaques, AFCD began trials on chemical contraception of captured macaques in 2002. Female macaques were injected with an immuno-contraceptive vaccine and the males were treated by chemical vasectomy.

11. On top of chemical contraception, AFCD has also introduced a programme to sterilise macaques by endoscopic surgery since 2009 for long-term management of the macaque populations. The contractor of the programme, Ocean Park Conservation Foundation Hong Kong (OPCFHK), developed the use of endoscopic tubectomy for sterilising female macaques in 2009 and endoscopic vasectomy for male macaques in 2014 (**Annex D**). The trial of chemical contraception was discontinued in 2014 in favour of the permanent effects of the endoscopic surgery. Since 2018, the contraceptive programme was extended to cover the periphery troops with individuals causing nuisances to the residential areas.

12. The contraceptive programme is operated on an adaptive basis in which the target numbers to be achieved will be adjusted and effectiveness will be evaluated based on the results of the population survey programme mentioned in paragraphs 13 – 15 below. Since its commencement in 2009, more than 1 600 macaques have been surgically treated (**Annex D**).

#### Population Surveys

13. To facilitate the setting of target numbers for contraception and evaluation of the effectiveness of the contraceptive programme, AFCD has commissioned OPCFHK to conduct a population survey programme on the core troops in Kam Shan, Lion Rock and Shing Mun Country Parks since 2010 and on the periphery troops in the vicinity of country parks since 2017. Census walks<sup>1</sup> or direct counting of macaques in each troop would be conducted in the study area during the population surveys.

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<sup>1</sup> It is a survey technique in which census lines were walked and all sightings of macaques were recorded.

14. A total of 32 macaque troops have been recorded since the launch of the surveys. The majority of troops varies from 10 to 250 individuals in size. The contraceptive programme has significantly reduced the birth rate<sup>2</sup> of macaques in these troops from 59% in 2009 to about 33% in the past three years (**Annex E**). Likewise, the proportion of sub-adult macaques (infants and juveniles) considerably decreased from 54.6% in 2009 to 28% in the past three years (**Annex F**). The decline suggests that the contraceptive programme has reduced the recruitment of newborns, and would reduce macaque population size in the long run.

15. It was roughly estimated that the macaque population increased at an annual rate of 13% in early 1990s. After implementation of the endoscopic surgery, the size of the core troops experienced a mild decline since 2016, accounting for a total decrease of 12% over the period from 2016 to 2019. With the extension of the population surveys, the size of the periphery troops recorded ranged from 251 to 322 in 2016-2019 (**Annex G**). Findings of the population survey programme clearly indicate that the birth rate, population growth rate and population size of macaques in treated populations were decreasing after implementation of the contraceptive programme.

#### *Enhancement of the Contraceptive Programme*

16. Having reviewed the records of the captured macaques, it was found that macaques causing nuisances in residential areas are largely from peripheral troops, which stay closer to the residential areas than those of the core troops. To further address complaints about macaque nuisances in residential areas, AFCD has extended the population survey and the contraceptive programmes to cover these periphery troops since 2017 and 2018 respectively. Cage traps are set inside or near the nuisance blackspots to trap individuals of these troops. To improve capture effectiveness and efficiency of manpower deployment, monkey-proof real-time camera monitoring system is installed inside the trap.

17. Under this enhancement, 127 nuisance-causing macaques were captured with some received endoscopic surgery near Sham Shui Po, Sha Tin, Wong Tai Sin and Tsuen Wan between November 2018 and September 2020. The extended survey and trapping programmes are considered successful as reflected by a new low of 359 complaint cases in 2019 over the past eight years (**Annex B**).

18. To enhance the effectiveness of the contraceptive programme for long term population control, a population viability analyses (PVA) will be launched to assess

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<sup>2</sup> Number of newborns in a year divided by the total number adult females.

the demographic trajectory of the macaque populations under different scenarios. Results of the PVA will help optimise the target numbers of the contraceptive programme with scientific supports in the long term.

### ***Prompt Response to Nuisance***

19. AFCD is fully aware that the public affected by macaque nuisances expects the nuisances be handled as soon as possible. In this connection, a team of experienced and dedicated staff has been set up to handle wildlife conservation and management matters including monkey nuisances. Team members have developed special skills and a set of tools for managing macaque nuisances, including the trapping of solitary individuals which is often a challenge. AFCD has also commissioned security guards to patrol nuisance blackspots in Sha Tin, warn the passers-by and disperse the nuisance macaques since 2008. The guards would also help operate and monitor the macaque cage traps.

### ***Wildlife-resistant rubbish bins***

20. In recent years, nuisances due to monkeys and wild pigs raiding rubbish bins or refuse collection points in urban fringe areas have been proliferating. AFCD has therefore commissioned a study, in collaboration with the Environmental Protection Department and FEHD, to design wildlife-resistant rubbish bins. Three designs have been devised and two of them adopting foot pedal mechanisms are tailor-made for monkey nuisance blackspots (**Annex H**). Their effectiveness in preventing raids of wild animals has been proven by field trials at some 40 sites over 10 districts. Wildlife resistant bins will be deployed for use in monkey nuisance blackspots after the design is finalised in late 2020.

### ***Education and Publicity***

21. Macaque nuisances in urban area are strongly related to intentional feeding. Apart from the population control measures, it is equally if not more important to raise public awareness of the negative impacts of feeding wild animals and bring about behaviour changes of the general public through education.

22. AFCD has strived to strengthen the public awareness of the negative impacts of feeding wild animals by launching an education programme, namely “Don’t Feed Wild Animals” since 2018. Education booth, guided tours and school talks have been organised in feeding ban and blackspot areas, with a view to enhancing public knowledge and spreading the message of not feeding wild animals, and to further disseminating the message of prevention of wildlife nuisances.

23. AFCD has also conducted a series of publicity programmes targeting the wider public, which include promotion on TV, radio, public transportation, thematic websites as well as organisation of fun days, roving exhibitions, public lectures and visits, to publicise the negative impacts of feeding wild animals.

24. Public perception and understanding are pivotal to the success of wildlife management. A more comprehensive and community-based education programme for blackspot areas such as Sha Tin and Wong Tai Sin is being formulated.

## **WAY FORWARD**

25. Over the past two decades, AFCD has been adopting a multipronged approach for the management of macaque nuisances. The non-lethal control of macaque population by endoscopic surgery in the field was the world's first successful attempt among many other novel inventions and strategies AFCD and OPCFHK have developed. The management programme has won international recognition and attracted government agencies facing the same problem and primate researchers worldwide to visit us for experience sharing. The birth rate of macaque population is significantly reduced and the population size is under control. Targeted management of periphery troops also helps minimise nuisances to the public and the number of complaint cases.

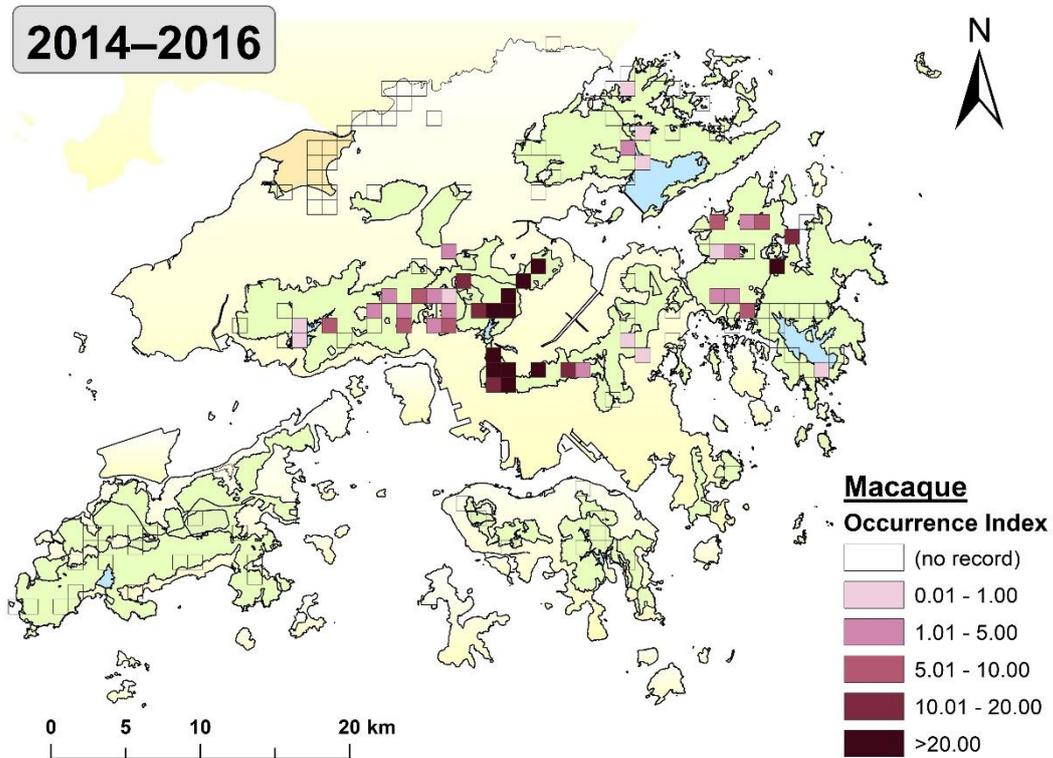
26. The Government will continue the management and public education measures mentioned in paragraphs 9 to 24 above, and regularly review their effectiveness and explore new measures to tackle macaque nuisances. An advisory group comprising local and overseas experts in the fields of ecology, wildlife management, veterinary medicine, etc., will be established to advise on the implementation and review of the management and public education measures.

## **ADVICE SOUGHT**

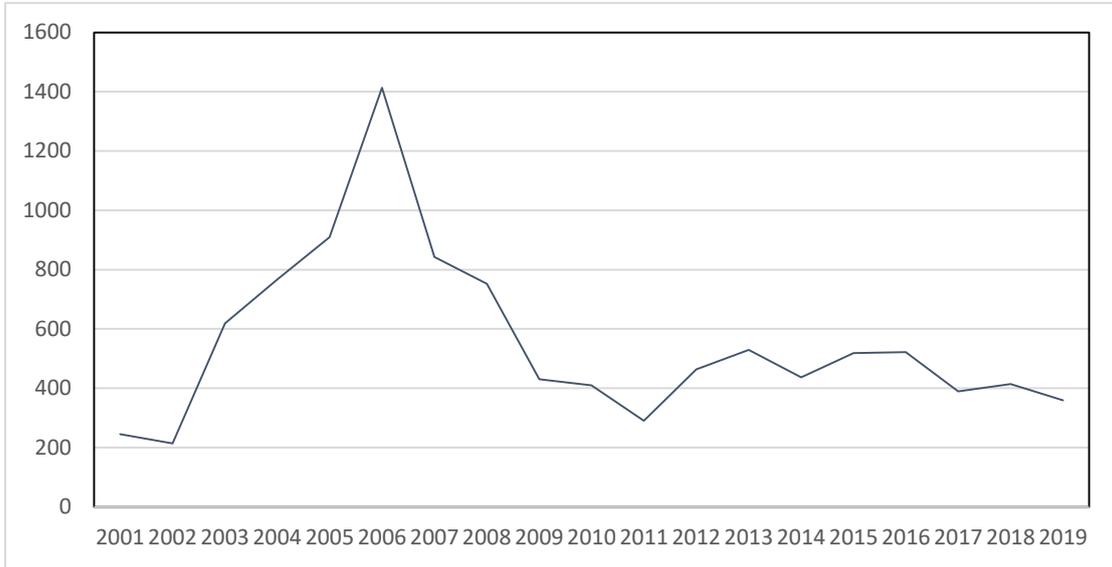
27. Members are invited to note and comment on the management measures for monkeys as set out in this paper.

**Agriculture, Fisheries and Conservation Department**  
**October 2020**

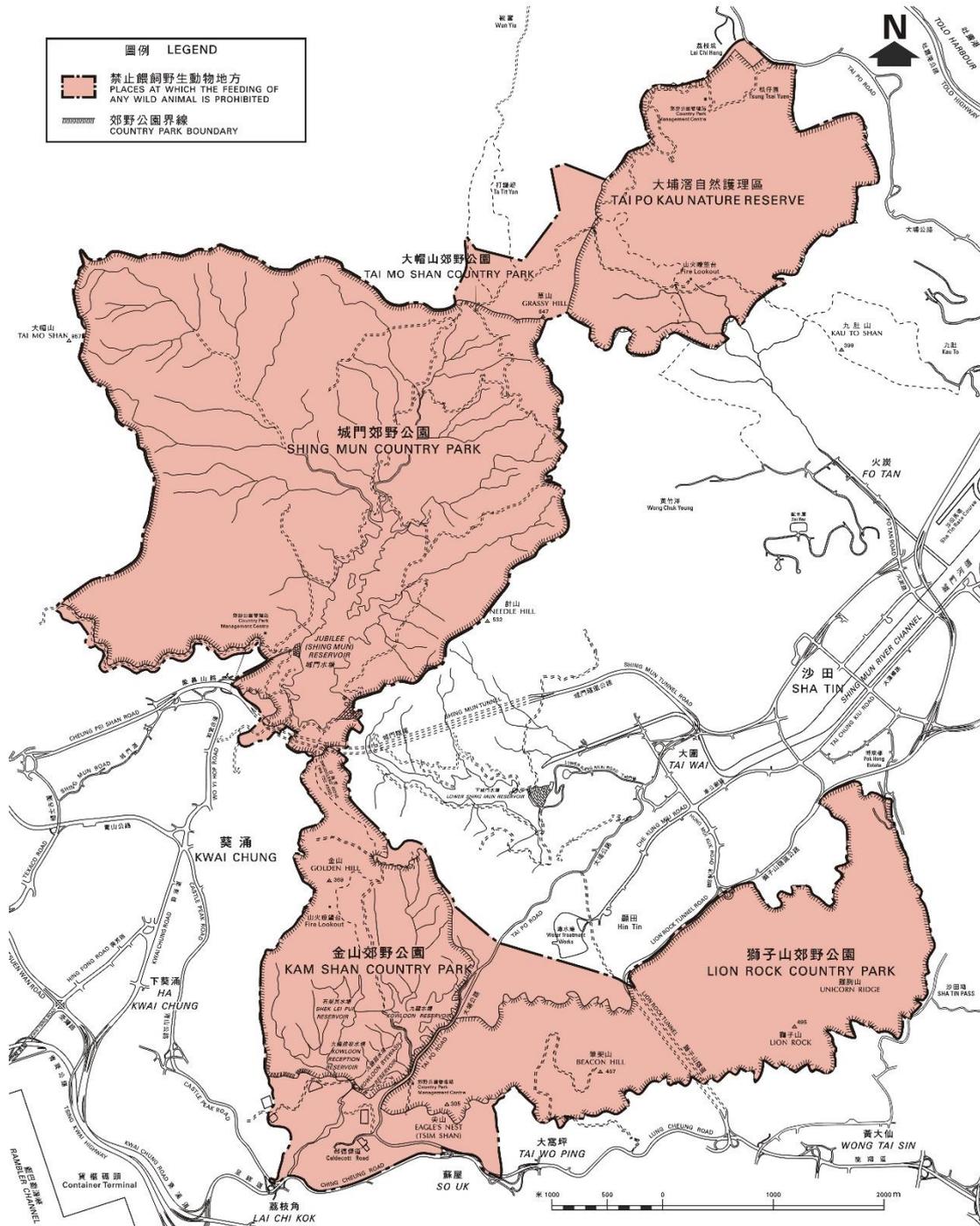
**Occurrence Index and Distribution of Rhesus Macaque at Surveyed Sites in Hong Kong**



**Number of Macaque Nuisance Cases Received by AFCD in 2001 – 2019**



**Feeding Ban Areas under Cap. 170B**

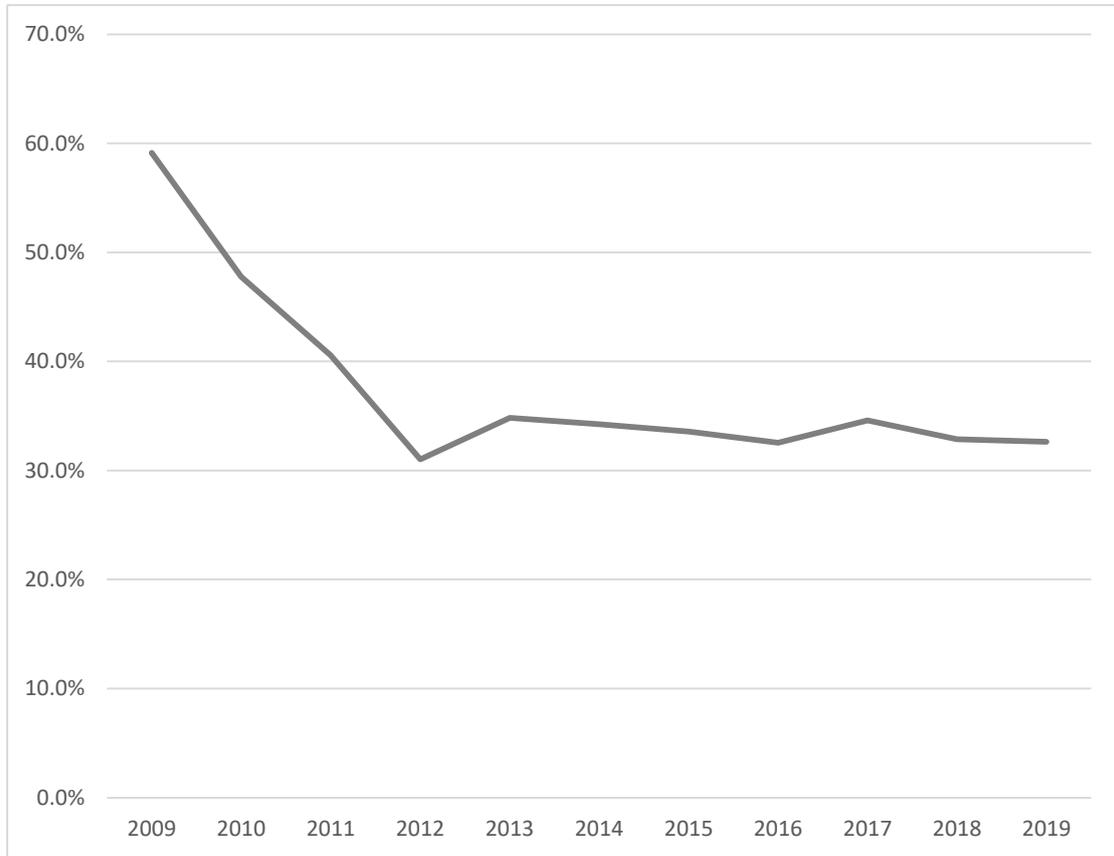


**Annex D**

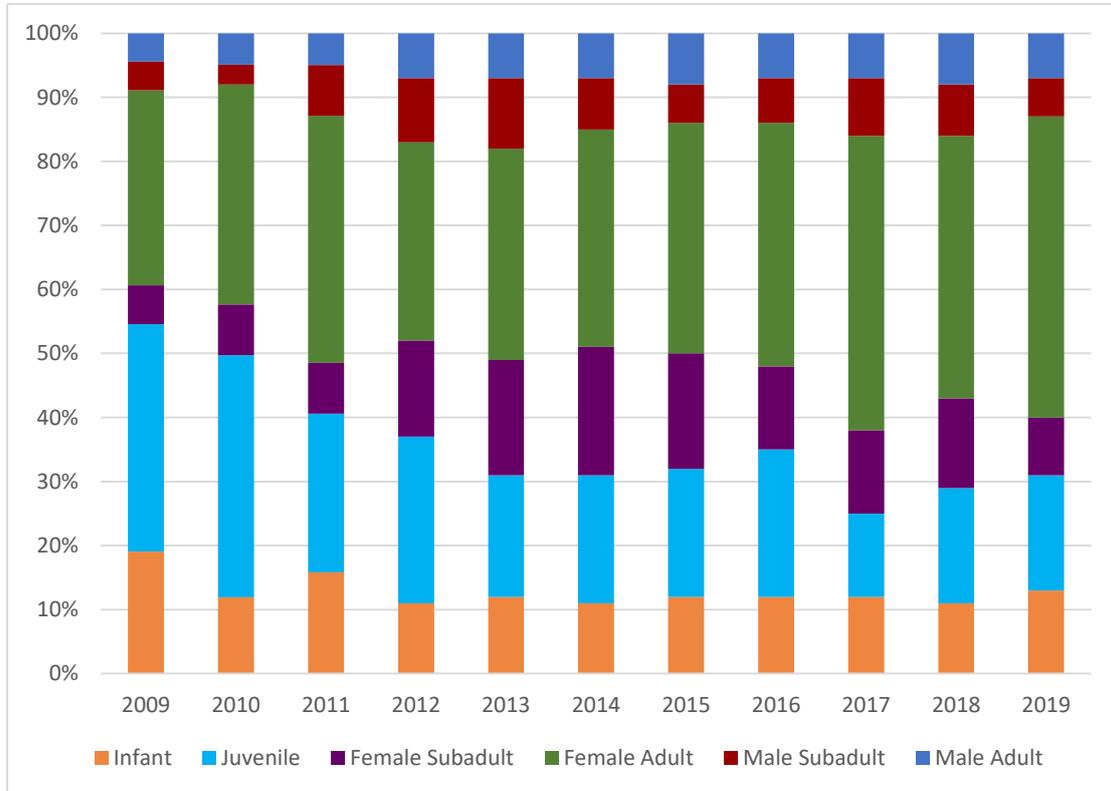
**Number of Macaques Treated in the Contraceptive Programme**

<b>Year</b>	<b>Female – Endoscopy tubectomy</b>	<b>Male – Endoscopic vasectomy</b>	<b>Total</b>
2009	6	NA	6
2010	284	NA	284
2011	219	NA	219
2012	231	NA	231
2013	184	NA	184
2014 <sup>^</sup>	115	38	153
2015	78	59	137
2016	67	62	129
2017	79	38	117
2018	44	34	78
2019	39	29	68
2020 (up to Feb)	13	9	22
<b>Total</b>	<b>1359</b>	<b>269</b>	<b>1628</b>

**Birth Rate of Surveyed Macaque Troops in 2009 - 2019**



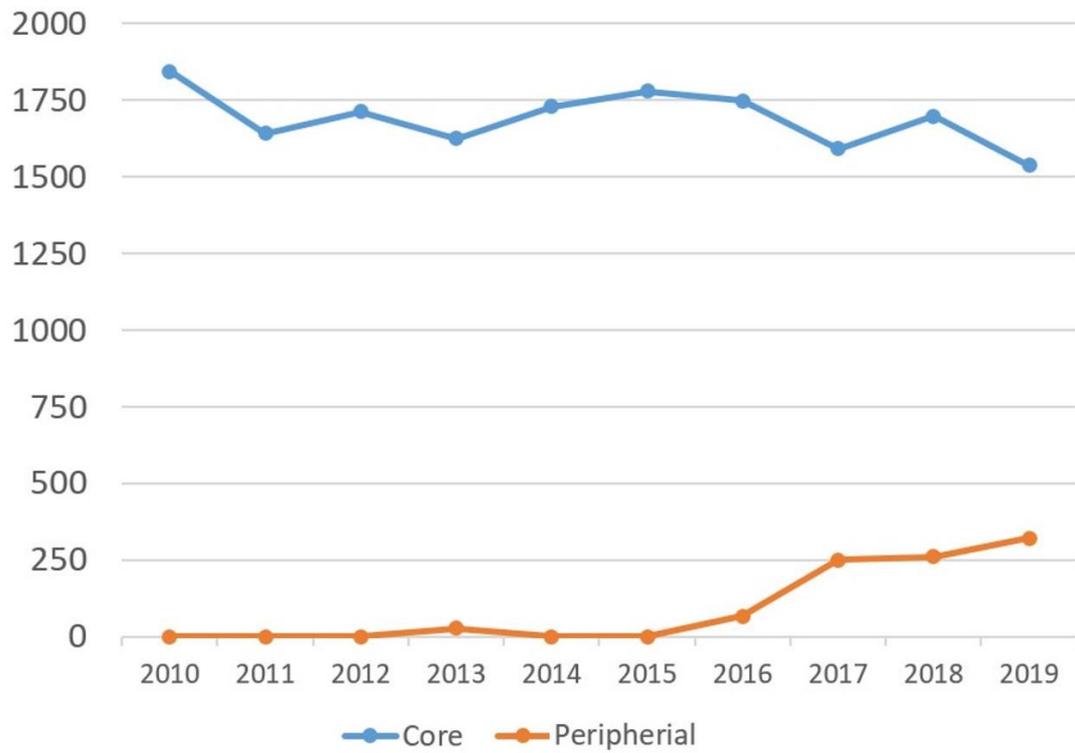
**Age Structure of Surveyed Macaque Troops in 2009 - 2019**



**Remarks**

- **Infants**: newborn up to a year old and frequently carried by their mothers.
- **Juvenile**: aged from 1 to 3 years old, weaned but small in body sizes and showed little sexual development.
- **Subadults**: male and female of 4 to 6 years old and not fully developed sexually.
- **Adults**: fully grown and sexually mature male and female individuals which are typically over 6 years old.

**Number of Macaques in 2010 - 2019**



**Three designs of wildlife-resistant rubbish bins**

