# Difficulties in Coexistence with Wild Animals:

# A Brief Discussion on Future Possibilities

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**Abstract**

The purpose of this paper is to introduce the current situation of hunting animals and to invoke wider attention and discussions associated with this issue in Japan. Game hunting and game meats are no longer attractive for most Japanese people. Under these conditions, the most important issue when coexisting with wildlife in Japan is the lack of effective methods to manage them. In fact, severe vegetation, agriculture, forestry damage, and traffic accidents occur across the entire territory. I introduce examples from Mt. Ohdaigahara in Nara prefecture, the Shiretoko Peninsular, and several data from Hokkaido. I also introduce one relatively easy and cheap method for damage protection from Kyoto, which aims to prevent forest damage by ungulates. Finally, I propose to divide mountainous regions—where agricultural activities have continued, but have recently been decreasing—into two groups: some regions should be maintained or reinvigorated but others can be allowed to remain in their natural state. In addition, we can also reduce human control of these newly created habitats for wild animals as much as possible. This is because these practices enhance the self-regulation of an ecosystem, and we can reduce associated costs of managing nature.

## 1. Introduction

The purpose of this paper is to introduce the current situation of hunting animals and to invoke wider attention and discussions associated with it in Japan. As I have already shown in Kawata (2011), Petty-Clark's law, which states that as the economy of a country develops, the weight of industry shifts from primary industry to secondary and tertiary industries, is not necessarily applicable for wildlife hunting. There are several sub-factors that mean Petty-Clark's law is not satisfied or successfully applied in wildlife hunting. The first is the existence of sport hunting, although sport hunting is amusement rather than a branch of primary industry. The second is the substitutes (e.g. domestic animal products). The third is the knowledge of citizens regarding the quality of game meats. It is often the case that game

meats are less affected by artificial food additives, and animals have grown under healthier conditions. The fourth is the existence of traditional foods, which utilize game meats.

However, in the case of Japan, Petty-Clark's law is applicable due to the following sub-factors: sport hunting is not popular, there exist plenty of substitutes for game meats, the quality of game meats is not widely recognized, and there are no major traditional meals that use game meats.

The above facts also imply that game hunting and game meats are not attractive for most Japanese people any more. In fact, on the one hand, the number of hunters in Japan has decreased (531,000 and 210,000 hunters in 1970 and 2000, respectively) and the average age of remaining hunters has increased every year (In their 50s or older: 10% and 39% in 1970 and 2000, respectively) (Ministry of Environment, 2011). On the other hand, estimated agricultural damage by wild animals has increased: it reached 21.3 billion yen in 2009 (Ministry of Agriculture, 2011). It is true that there have been many exhausting efforts by local residents to enhance the consumption of game meats. This seems relatively successful for some species such as the wild boar (*Sus scrofa*), in terms of utilizing its meat, because of its taste and continuous uses in some regions. However, in many cases it is difficult to enhance consumption: one of the most serious cases is carcasses of the sika deer (*Cervus nippon*). In some cases, it is almost impossible to generate consumption. The typical example might be the monkey (*Macaca fuscata*), although it was traditionally used as medicine and to ward off evil spirits in Japan.

The most important issue when coexisting with wildlife in Japan is the lack of promising management methods. Until a decade after the end of the World War II, local residents in Japan utilized game meats to survive food shortages. Several factors, including high economic growth and an increase in the supply of domestic animal meats, among others, have diminished the demand for game meats. It follows that the amount of hunting has decreased. Moreover, there are no effective predators for ungulates (e.g. sika deer and wild boar). It is true there are brown bear in Hokkaido and wild dogs (*Canis lupus familiaris*) in some parts of Japan. However, the brown bear seems to be an opportunist for particularly vulnerable ungulates who make easy prey: such a small number of attacks is not enough to control ungulate population (in other words, the prey-predator relationship is not balanced between the brown bear and some ungulates). The wild dog might be more aggressive in attacking ungulates, but the population size of wild dogs is too small to be influential. Because of the absence of large carnivores (or predators) for controlling ungulate population and a reduced hunting pressure by human hunters, the population of ungulates seem to have increased.

The increase in the population of ungulates has brought with it several crucial issues. In this

short paper, I would like to introduce the following topics.
(1) Damage caused by the increase in ungulate populations.
(e.g. vegetation, agricultural and forestry damage, traffic accidents)
(2) How to protect from damage.
(e.g. feasible alternatives to hunting by humans. Efficient methods of damage protection)
(3) How to coexist with wildlife.
(e.g. inversion of wildlife into urban areas. Maintenance of buffer zone)

## 2. Damage caused by increased population of ungulates

### 2.1. Vegetation damage

There have been several incidents of serious vegetation damage. The first example is from Mt. Ohdaigahara in Nara prefecture, Japan [Picture 1], where the spruce (*Picea jezoensis* var. *hondoensis*) forest has been substantially destroyed within past few decades and the sika deer is regarded to be one of the main causes of this drastic change.

[Picture 1] Damages to the spruce in Ohdaigahara, Nara prefecture (by Kawata on 19 September 2002)

The second example is from the Shiretoko Peninsular, which was declared a World Heritage site in 2005. Management of the sika deer was one of the requirements for it to be approved as a World Heritage site and a management plan has been implemented in this regard. The

problem seems to be lower hunting pressure, which means that deer have less fear towards human beings. The sika deer appear by roadsides and graze and browse grass and shrubs with no special caution while cars are passing by [Picture 2]. The situation is almost the same in some sightseeing areas, where you can see many sika deer and their droppings scattered around footpaths [Picture 3, 4].

[Picture 2] Sika deer grazing grass by a roadside in Shiretoko (by Kawata on 4 May 2009)

[Picture 3] Sika deer grazing grass in a sightseeing area in Shiretoko (by Kawata on 4 May 2009)

[Picture 4] Scattered droppings of the sika deer in the sightseeing area in Shiretoko (by Kawata on 4 May 2009)

### 2.2. Agriculture/forestry damages and traffic accidents

The number of car accidents involving the sika deer in 2010 in Hokkaido was 1,727 cases, of which 83.7% (or 1,446 cases) occurred during the night. The number of train accidents involving the sika deer (including cases where the sika deer prevented trains from passing) in 2007 in Hokkaido was 1,474. The total agriculture and forestry damage caused by the sika deer in Hokkaido in 2010 was 5.9 billion yen (Hokkaido government, 2011).

## 3. A new method to protect damage

I introduce one efficient method for damage protection from Kyoto, Japan, which is relatively easy and cheap. This method was first invented by one of my colleagues (Mr. Hatanaka) and has been already introduced in some forests (Kawata, Hatanaka and Mikita, 2010), although it is still under investigation. The main target of this method is the sika deer: The method is applied to keep the sika deer outside the surrounding area. It is particularly efficient when there are enough potential foods for a functional deer habitat. The following is the background for the implementation of this method: the sika deer select foods for eating when the benefit (calorie obtained) of foods is far larger than the cost (calories consumed) of consuming them. If so, then if we increase the cost of consumption so that it is higher than the benefit of consumption, it is expected that the sika deer will avoid such protected plants and/or trees.

One of the most successful practices is depicted in Picture 5, where the Japanese horse chestnut (*Aesculus turbinate*) has been protected. In this region, chestnuts have been collected to produce traditional foods. Owing to the application of our method and appropriate maintenance there seems no damage by the sika deer in the protected area in the summer of 2011. Moreover, beniyamazakura [Picture 6], which is a kind of yamazakura (*Prunus jamasakura*), and protected by the ordinance of the Kyoto prefecture, has come up again. This is a secondary effect of the application of our method because local residents, who adopted our method, had no intention to protect this plant. [Information in this paragraph is mainly based on a mutual communication with Mr. Hatanaka].

[Picture 5] Our method applied to the horse chestnut in Kyoto prefecture (by Kawata on 17 September 2011)

[Picture 6] Beniyamazakura (by Kawata on 17 September 17 2011)

## 4. Coexistence with wildlife

### 4.1. Three options

In this section, I present a brief discussion. Because of the decrease in hunting of game animals and the possible increase in their population, Japanese citizens are now faced with the following options.

1) For humans to control the wild animal populations in some way (option 1).
2) To return to the past conditions, when there were fewer problems (option 2).
3) To transit to new conditions (option 3).
4) To do nothing (option 4).

Option 1 is usually difficult to rely on because the number of active hunters has decreased and the average age of remaining hunters is high. It can be pointed out, in lighter vein, that human hunters are the last hunters of ungulates in Japan and they are now an endangered species.

Option 2 seems to be difficult to implement for several reasons. First, there are no criteria for how we should select the best conditions of the past. The best conditions of the past might depend on how different people valued nature. For example, some people find it appropriate to go back to ancient conditions, but others find it best to go back to the conditions of middle ages. Second, even if we could select some favourable conditions of the past, there is no guarantee that we can revert to them. For example, habitat conditions such as forest cover area, vegetation, human population, and others have changed and it might be impossible to return to the conditions of the past.

However, it might be possible not to revert completely to the past conditions: some conditions could be returned to what they were in the past but others could be maintained as they are now or transited to new conditions. One of the best examples of this could be the reintroduction of a large carnivore, which is now extinct in the region. In this case, we would have to ensure the creation of past conditions such as habitat (e.g. forest area) and prey conditions to a certain extent. However, we would also have to eliminate the factors that caused the carnivore to become extinct.

Option 3 might be the most promising because of lesser restrictions. Our method introduced in section 3 can be categorized as a version of option 3.

Option 4 is out of the question. However, this option might be selected by default if the number of ‘green people’ is larger than that of conservationists. Here, ‘green people’ is used to indicate those who insist on not killing wild animals, whereas conservationists are those

who find it appropriate to control the number of wild animals. The fourth option would also be selected if most of the general public has little interest in the conservation of wild animals. It is expected that the general public will do nothing until some issues become serious and influence them in some manner.

### 4.2. Comparisons of three options

Measures for preventing wildlife damage include three main components: damage control, population control, and habitat control. As tabulated in Table 1, option 1 is effective for both damage and population control in case of appropriate hunting. Option 2 is effective for population control in case of the reintroduction of a large carnivore. Option 3 is effective for damage in case of cheap methods (e.g. the method presented in this paper). These options are not directly effective for habitat management.

**Table 1. Effectiveness of options 1 to 3 for damage control, population control, and habitat control**

| | Option 1 (e.g. hunting) | Option 2 (e.g. reintroduction) | Option 3 (e.g. cheap methods) |
|---|---|---|---|
| Damage control | **Effective** | Indirect effects | **Effective** |
| Population control | **Effective** | **Effective** | Slightly effective |
| Habitat control | Indirect effects | Indirect effects | Indirect effects |

I believe that I can be considered to be a conservationist. However, I also find something wrong in the current situation of the sika deer in Hokkaido, as I will explain. As the population of sika deer has increased, attempts have been made to promote sika deer hunting. Because this resulted in an increase in the number of real hunts, the question of the efficient use of carcasses is being considered. This series of correspondence seems to be inappropriate for the following reasons. 1) Demand for venison (sika deer meats) is less than its supply and 2) therefore, this reverses the natural order: it should be that people hunt because there is a high demand for venison. However, in reality, they try to create demand because they hunt. When considering the social situation and efficiency, hunting (option 1) is not the best solution. There are some demerits for options 2 and 3, as mentioned above.

I would like to provide another proposal from somewhat different angle. My proposal is to divide mountainous regions into two groups. Generally speaking, mountainous regions in Japan, where they have previously continued agricultural activities but now are beginning to abandon them, have gradually increased in number and area and it is impossible to

reinvigorate all these regions. Some regions should be maintained or reinvigorated, but others can be left to remain in their natural state. In addition, we can also abandon control of these newly created habitats for wild animals as much as possible.

This proposal has several merits. First, we can concentrate on certain specific regions, which will help to save on maintenance costs and increases the possibility of successful maintenance of selected mountainous regions on the basis of options 1 to 3. Second, earlier, some ungulates such as sika deer used to range in the plain areas. By abandoning some regions, we can recreate their original habitat. Third, creating new habitat may be a solution for the following difficult issue. As pointed out above, the most difficult wild animals are those whose carcasses are currently of no use. For example, carcasses of the sika deer can be utilized: skin, antlers, and meat to some extent. However, people have little use for the carcass of a monkey. Therefore, the number of monkeys seems to have increased. Some citizens might wonder if it is appropriate to kill monkeys, although there is no demand for them. If we create a new habitat and rely on the ecosystem for its control to a certain extent, the above-mentioned monkey issue will be less problematic.

It might be the responsibility of human beings to manage wildlife because humans prevented wildlife from using their habitats and ecosystems. One possible criterion is to permit fluctuation when there is no strong influence by human beings. This is because an ecosystem is a dynamic process and some changes in an ecosystem are necessary and natural. However, there is a possibility that the resilience of the ecosystem weakens because of human influence. If so, human intervention might be appropriate to prevent substantial changes in the ecosystem. Otherwise, it might be better to minimize human intervention, which would increase the self-regulation of the ecosystem. In addition, we can reduce the associated costs of managing nature.

Finally, I point out several remaining issues in the above proposal. The first is how to create and/or maintain buffer zones. The second is how to monitor wildlife. The third is how to maintain a small number of hunters. This is because there will be cases where we ask hunters to shoot wild animals with guns or tranquilizer guns.

**References**

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