

北海道を事例にした日本の野生動物管理の実践における保全医学の役割

The role of conservation medicine in wildlife management in Japan based on a case study in Hokkaido

Meghan O'Connell* 深町加津枝** 渡辺綱男***

Meghan O'Connell Katsue FUKAMACHI Tsunao WATANABE

Abstract: Conservation medicine actively incorporates the work of veterinary medical practices into wildlife management plans. It is especially relevant in today's human-modified landscapes, where habitat destruction and conflict situations between humans and wildlife are increasing. Our research highlighted a case study in northeastern Hokkaido where rescue, rehabilitation, and reintroduction to the wild are used to help conserve and manage a viable population for three threatened raptor species in Japan-Blakiston's Fish Owl, Steller's Sea Eagles and White Tailed Eagles. The first part of this research examined the current practices and future application of conservation medicine in Japanese wildlife management practices. The sources for data were members of the Japanese Ministry of the Environment and others. This research suggested that the respondents are supportive of and see importance in the practices of conservation medicine as a preventative measure aiming at connecting 'good ecological health' with the well being of terrestrial wildlife. The case study examined the work of the IRBJ at the Kushiro Wildlife Conservation Center, located in Hokkaido. The veterinarians conducted a variety of practices from direct medical treatment to the final release of the birds back to the wild.

Keywords: *conservation medicine, wildlife rehabilitation, veterinarian, Raptores*

キーワード：保全医学，野生生物リハビリテーション，獣医，猛禽類

1. Introduction

In today's society, wildlife conservation and management must be looked at from a holistic perspective. Conservation medicine is a multidisciplinary field that aims to protect the complex interactions between animal health, human health and ecosystem health⁵. It is emerging as a core conservation discipline that can protect animal species on an individual level, as well as help the global biodiversity crisis⁴. Veterinarians are considered leaders in conservation medicine because of their skills and knowledge which will help anticipate, prevent, and overcome the anthropogenic effects on ecosystems and wildlife². Three key areas are covered within the scope of conservation medicine which highlight the links between conservation biology and veterinary medicine: wildlife conservation and protected area management; management of free-ranging wildlife; management and rehabilitation of captive wildlife⁶. Countries such as the United States and the U.K have been frontrunners in the field of animal welfare and conservation medicine, particularly with wildlife rescue and rehabilitation¹. These countries have rehabilitation centers for endangered avian species, common terrestrial species, and marine mammals.

Currently, conservation medicine is not a well known field in Japan, but it is especially relevant in today's human-modified landscapes, where habitat destruction and degradation and episodes of human and wildlife conflicts are increasing. It is necessary to develop this field in accordance with the characteristics of Japan, taking into account such things like the Japanese perspectives of nature and Japanese people's relationship with wildlife. Wildlife rehabilitation centers in Japan are in a unique position to observe the consequences of ecological changes and anthropogenic activities on wildlife. The Ministry of the Environment has established 8 conservation centers in Japan. Three centers among them have responsibility to rehabilitate injured endangered species using modern veterinary practices, and then reintroduce the animals back into the wild.

They are located in Hokkaido, Nagasaki, and Okinawa.

In Hokkaido, the northernmost island of Japan, the conservation of three threatened raptor species: Blakiston's Fish Owl (*Ketupa blakistoni blakistoni*), Steller's Sea Eagles (*Haliaeetus pelagicus pelagicus*), and White Tailed Eagles (*H. albicilla albicilla*) is of utmost priority. These birds are ecologically and culturally valued, but face a number of threats such as traffic collisions with cars and trains, and lead poisoning from discarded deer carcass⁷. In addition to protection measures put in place to conserve their habitat, the Institute of Raptor Biomedicine Japan (IRBJ) was established to rescue and rehabilitate injured raptors, and then reintroduce the healthy birds back into the wild. This example of conservation medicine works on the species level to sustain a viable raptor population in Hokkaido, and also on an ecosystem level to ensure that local habitat remains healthy. In wildlife management, when it comes to manage rare endangered wild animals, regulation of capturing and injuring, conservation and amelioration of habitats, and elimination or improvement of factors that have a negative impact on habitats or on breeding must go hand in hand with the rescue, cure, treatment, and rehabilitation of injured or sick individuals, up to their release into the wild. Moreover, it is important that management is conducted in a holistic way and in close connection with a range of related activities in the field of wildlife veterinary care such as autopsy of dead animal bodies, and monitoring of state of health and of infectious diseases.

In this study, we report on a case study that we conducted at the IRBJ, which applies modern practices from the above-mentioned viewpoint regarding wildlife in eastern Hokkaido. The report on the case study is preceded by an analysis of the results of interviews and questionnaires that we conducted with staff from Ministry of the Environment and other wildlife specialists who are currently in charge of wildlife management.

Based on the answers to our interviews and questionnaires by wildlife specialists in Japan, and using the insights we gained from the case study,

*元京都大学大学院地球環境学堂

**京都大学大学院地球環境学堂

***国連大学・自然環境研究センター

we analyzed current problems and issues, clarified in particular how the current state of conservation medicine in Japan is related to habitat conservation and how the Japanese people relate to wildlife, and finally discussed possible future developments that may allocate a more important place to conservation medicine in Japan.

2. Methodology

This study follows a mainly qualitative approach, with quantitative support from a questionnaire. The first part of the research examines the current practices and future application of conservation medicine in Japanese wildlife management practices through a questionnaire format.

Questionnaires were sent to 16 staff members at the headquarters of the Ministry of the Environment who are in charge of policy-making and projects for wildlife management in Japan, to 3 staff members of the local branch office of the Ministry of the Environment in charge of wildlife management in eastern Hokkaido, and to 7 wildlife specialists belonging to NGOs or local governments who are mostly engaged in practical aspects of wildlife management in eastern Hokkaido. The Ministry of the Environment was chosen as it is the leading agency for wildlife conservation in Japan, as well as environmental policy as a whole. While the number of respondents in the investigation is limited, they represent both, those who establish Japan's wildlife management policies and projects, and those who are practicing wildlife management as pioneers in eastern Hokkaido. An analysis of the responses by these specialists was thought to bring forward new insights for this paper.

The questionnaire consisted of 9 questions such as "What is the most significant challenge threatening wildlife in Japan today?", "From your experience, has wildlife conservation in Japan been more successful using a habitat based approach (conserving species via protection of the entire habitat or ecosystem) or a single species approach (direct preservation of a certain species) ? Why?", "What is the most desired outcome of current wildlife rehabilitation practices?", "Please rate the statements about the future of conservation medicine", "Please rate the statements about the future of veterinary based wildlife rehabilitation/conservation centers?", "What new obstacles/advances do you see in the next 10 years in the field of wildlife conservation?". They include ranking statements (rank ordering), rating statements (Likert-type scale), and open ended questions.

The second part of the research is a detailed case study of the work of IRBJ, a private research laboratory that was entrusted with rescue and rehabilitation programs by the Ministry of the Environment at the Kushiro Wetlands Wildlife Conservation Center that is known for its strong programs in the field. Specifically, the practices of rescue, rehabilitation, and reintroduction to the wild are used to help conserve and manage a viable population for two threatened raptor species breeding in Japan: Blakiston's Fish Owls and White Tailed Eagles, and generally Stellar Sea Eagles. Direct observational research was conducted at the Kushiro Wildlife Conservation Center from May 14-24, 2012, and participatory research in the field on May 28 and 29, 2012. In addition, a follow up personal interview was conducted with one of the IRBJ veterinarians.

3. Results

(1) Questionnaire

Out of the respondents, 62% said that it is important to include conservation medicine in wildlife management in Japan in an integrated approach. On a scale ranging from very important to not important, 19% said they were neutral, 15% said "very important," and 4% said "somewhat important." Answers from respondents who chose "very

important" included the following: "For rare wildlife species management, it is imperative to set up total conservation measures." "It's important for the health of the animal, maintaining constant breeding, and successful release. Veterinary knowledge is mandatory, especially when determining the magnitude of threats like infectious diseases." Those who responded "important" gave reasons such as these: "Regarding endangered species, it is necessary to have a help system based on individual protection of wounded animals or artificial breeding. Knowledge of conservation medicine is very important for this." "For the protection of wildlife it is vital to have expertise of conservation medicine. However, it is necessary to share and explain it simply for the general public in order to get as many supporters/advocates as possible." Finally, people who chose "neutral" gave reasons such as these: "Veterinary efforts for rare species are emergency treatments only. Veterinary medicine is responsible for preserving local ecology, as well as rare species, and a wide variety of research and study. It would be ideal to preserve a wide range of habitats for rare species, but we must coordinate with a sociological and economic approach." "If there is a very high risk of extinction for rare wildlife, it is necessary to protect the whole population, including individual animals. In that sense, conservation medicine is very important. However, it is particularly effective for birds and mammals. It is not suitable for plants and fish which account for a large percentage of rare wildlife species."

As seen in Table-1, the respondents generally agreed with statements about conservation medicine being able to maintain good ecological health, affecting law and policy, and acting as a preventative measure. They generally disagreed that conservation medical practices could be beneficial to marine mammal conservation. There was negligible difference between the ranks given from the Ministry of the Environment and other respondents.

Respondents were asked to rank the threats to wildlife from 1-8, 8 being the greatest threat and 1 being the least. The mean value of each rank is represented in Fig.-1. Habitat destruction and fragmentation was ranked as the greatest threat. Invasive species came next, followed by environmental pollution. Over-exploitation of resources was close to climate change. Natural disasters were ranked lowest.

Out of the respondents, 46% said that a single species approach was more appropriate for wildlife conservation in Japan. Some reasons for the single species approach are as follows: "Species conservation is easier to

Table-1 Statements regarding the use of Conservation Medicine

Statement	Average Rank (out of 5)
Conservation medicine can help maintain good ecological health	3.80
Knowledge learned from conservation medicine can affect future law and policy	3.64
Conservation medicine should be used as a preventative measure, rather than just a diagnostic measure	3.64
Conservation medical practices could be beneficial to marine mammal conservation	2.80

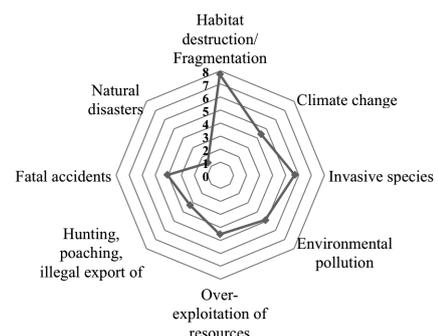


Fig.-1 Great threat to wildlife in Japan

Table-2 Statements regarding rescue and rehabilitation centers

Statement	Average Rank (out of 5)
Centers can be effective for conserving near-threatened and threatened species populations	4.12
Centers can be important for ongoing research regarding wildlife species' behavior and health	4.04
Centers should play a direct role at educating the public about wildlife issues	4.00
Establishing centers could create a loophole for unlawful possession of wildlife	1.88
Centers can be effective for conserving the non-threatened species populations	2.68

Table-3 The top five challenges (left) and advances (right) to wildlife conservation in Japan within the next 10 years

Challenges to wildlife conservation	Advances to wildlife conservation
Budget and resource management	Communication
Impact of invasive species on ecosystems	Research and technology
Radioactive contamination	Community Involvement
Insufficient management of rural environment by residents because of depopulation and aging society	Education and awareness-raising
Attitudes and values towards wildlife	Possibilities for more collaboration with multiple stakeholders

Table-4 Number of raptors rehabilitated and reintroduced each year by IRBJ

Species	Approximate # of individual birds treated per year	Approximate # of individual birds released per year
Steller's Sea Eagles	10	4
White Tailed Eagles	20	9
Blakiston's Fish Owl	10	3

Source: Institute of Raptor Biomedicine Japan (IRBJ)

understand than ecosystem conservation. Although the land area of protected areas is rather high in Japan, those areas are not necessarily set up to conserve wildlife, an exception being Shiretoko, where there is a wildlife protection zone. Since the land is so limited in Japan and almost all the land is used, it is difficult to change land use. It is easier to ask local residents to cooperate for protection of species rather than habitat.” “The success stories in Japan are just a commitment to a single species. Cranes and white tailed eagles are an iconic example of a habitat where populations are growing.” Conversely, 23% of respondents said that a habitat based approach is more desirable. Some statements that support this viewpoint are as follows: “We should aim to restore the habitat and ecosystem. I will use the example of the Blakiston's Fish Owl- although the population has been increasing significantly from 20 years ago, there is also an increased number of accidents. It is not possible to reduce the number of accidents, so the forest and rivers where they live has to be restored.” Lastly, 31% said that ideally the most desired approach would be a mixed single species and habitat based approach. Some reasons are as follows: “The situation now is a single type approach, but in order to have more success and avoid extinction, it is necessary to expand efforts rooted in the habitat. The population of cranes had plummeted to a dozen, but with help from people, such as feeding them and treating them with love, the population rose to over 1,000. On the other hand, improvements to the environment and wetlands are still performed to provide suitable breeding grounds because the original ones have been lost.”

Respondents generally agreed that wildlife rescue and rehabilitation centers can be effective for conserving near-threatened and threatened species populations, ongoing research, and education (Table-2). Respondents generally disagreed that rescue and rehabilitation centers could create a loophole for unlawful possession of wildlife or could be effective for conserving non-threatened species populations. 84% of respondents ranked biodiversity conservation as the most desired outcome of current wildlife rehabilitation practices in Japan. The

responses to the questions about both the challenges and advances to wildlife conservation in Japan within the next ten years were quite varied. Some respondents went into great detail in their answers, while others only wrote a couple of words. The most common responses are compiled in Table-3. Many of the challenges are anthropogenic obstacles, such as budget, resources, and values, and understanding towards wildlife from the public. The comments suggest that the needs of people and their limitations are being given as impediments to successful proliferation of wildlife rehabilitation. As for the advances, seven out of the eleven comments listed are all communication issues, suggesting that this topic is one that should be talked about more, both within various profession fields, as well as with the public.

(2) Case study

IRBJ rehabilitates approximately 40 raptors each year (Table-4) using modern veterinary practices, and then reintroduces them back into the wild. The most common accidents that all three raptor species face are traffic accidents. These mainly occur when Steller's Sea Eagles or White Tailed Eagles collide with trains or passing cars while they feed on deer carcasses. The main cause of Blakiston's Fish Owl accidents are from car collisions while the owls are on the road feeding on frogs, or while flying across bridges. Other common accidents include electrocution from power lines, lead poisoning, and collisions with wind mills (bird strike).

The length of rehabilitation for these birds varies depending on the type of their injury or illness. Birds that have been involved in a light traffic collision or have been affected with food poisoning can be rehabilitated within 1-2 months. Birds that have been involved in a more serious traffic collision and have bone fractures or are suffering from lead poisoning usually stay more than 3 months. Wing injuries are the most common, but some of the birds have leg or beak injuries. The goal of the center is to rehabilitate the birds so that they can survive in the wild. The greatest challenge is recovering their ability to hunt. Food is given to them erratically to mimic real conditions in the wild and to increase their motivation to eat food when it is available to them. They must be competent at using their talons and beaks to catch their own food. Throughout all the outdoor pens there are cameras in place so the veterinarians can monitor the birds at any time.

The veterinarians conduct a variety of practices from direct medical treatment to the final release of the birds back to the wild, including: Clinical examination, Surgery, Rehabilitation, Autopsy, Feeding, Housing and handling, Captive breeding, Bird banding, Tracing survey using transmitter, Nutritional status assessment (of nestling), Genetic analysis for sex determination, Diversity assessment, Viral analysis, Research on lead poisoning, Public awareness. Wildlife rehabilitation centers are a source of crucial information on species morbidity and mortality. Analyzing and sharing information between centers, both nationally and internationally, can be useful for assessing and improving rehabilitation techniques. Also, wildlife admitted to rehabilitation centers may act as sentinels of ecosystem health. Therefore, the knowledge ascertained from rehabilitation centers is useful not only for the specific wildlife it cares for, but also in a broader context.

The range of activities conducted by veterinarians plays a crucial role in the comprehensive implementation of conservation of endangered species and in monitoring, for example when sick or injured Blakiston's Fish Owls are rescued and rehabilitated, and later used for new pairing in the wild with the aim to restore distribution of the species in former habitats. Conservation medicine is indispensable in efforts to conserve endangered species.

Over the past 20 years, the number of individual Blakiston's Fish Owls and White Tailed Eagles in Hokkaido has been increasing. The cause of the increase in population is due not only to rehabilitation efforts, but also to the increase of artificial food, such as leftover meat from fishing or hunting. If the population is small, rehabilitation works at an individual level to increase population size. Rehabilitation is able to save the individual animal and in the case of a female, her unborn young.

4. Discussion

Based on the questionnaires and interviews in this study and the results of the case study in Kushiro, we have concluded that in addition to pursuing comprehensive conservation measures in response to various threats faced by rare wildlife species, it is necessary to include conservation medicine conducted by professional wildlife veterinarians into an integrated conservation program.

The Ministry of the Environment, local government officials, and those in the field of veterinary medicine are supportive of the practices of conservation medicine and wildlife rehabilitation, especially when pertaining to threatened species. There was general consensus that conservation medicine should be used as a preventative measure aiming at connecting 'good ecological health' with the well being of terrestrial wildlife. Conservation medicine will become more important, and with the cooperative efforts by a variety of fields, it may become more widespread in Japan.

Conservation medical practices performed at rescue and rehabilitation centers are effective for threatened species, as seen in the case study in Hokkaido, but generally considered to be not so effective for non-threatened species. However, whether rehabilitation is successful or not, a wild animal presents opportunities to gain new knowledge, and treating a common species may give crucial knowledge that is useful when treating a threatened species⁸⁾. Rehabilitation, regardless of population size, has positively influenced the well being of individual animals, which is important from an ethical point of view, because these animals are being injured by human related accidents and not natural causes. From a scientific point of view, the rehabilitation of these animals is important because they represent irreplaceable genetic potential. It is important whenever possible to return rehabilitated wild animals to the wild and repopulate the wild gene pool. Lastly, their rehabilitation has affected policy in Japan regarding the ban of lead hunting bullets due to the consequences of numerous birds dying from lead poisoning.

Respondents generally agreed that conservation medical practices are not beneficial to marine mammal conservation, and that 'wildlife' should mainly refer to wild mammals and birds, which is a different view from that in many western countries such as the United States and Canada. This implies that there are cultural variations on how conservation medicine is perceived, regarding the type of species and their environment, be it aquatic or terrestrial.

Various respondents shared the opinion that the term "conservation medicine" is not popular in Japan and not many people know the meaning. Our study showed that there is a need to deepen the understanding of conservation medicine in the general public, and that efforts should be made so that the

insights and know-how gained in Kushiro can be practiced in the whole country. There was general consensus among the respondents, particularly from the individual interviews, about the importance of education and awareness raising.

It can be expected that in the future, the role of wildlife conservation centers as institutions that educate the public and spread knowledge will gain in importance, and that wildlife conservation in Japan will be based on a broader approach, which will also include aquatic animals and common species. However, as for now, the lack of a proper budget and skilled labor means that it is not possible to conduct sufficient activities.

Wildlife management in Japan has to take into consideration the relationship between the wildlife view of the Japanese, and conservation medicine. It is said that the Japanese public has a strong emotional attachment to particular aspects of the environment, and affection for individual animals or single species with anthropomorphic association³⁾. In the results of the questionnaires, this tendency could be seen. Respondents who thought that the single species approach was more successful in Japan than the habitat based approach outnumbered those who thought otherwise by far, and some mentioned that local citizens are often very dedicated to certain single wildlife species such as owls, and lovingly care for them or feed them. On the other hand, it is also important to acknowledge that the perception of animals by the modern Japanese is not a fixed concept, but that the way in which animals are seen and appreciated changes constantly⁹⁾.

Collaboration and communication between the government, the public, and specialists will be necessary to strengthen the place of conservation medicine in Japan. In future policy-making, conservation medicine should be given a specific role as a scientific support system that links society and nature in local communities. Policies should seek to give equal importance to the single species approach and the habitat based approach, and collaborative projects should be conducted under due consideration of the relationship between people and wildlife.

References

- 1) Asakawa, M. (2008): Present status of conservation medical education. *J. Rakuno Gakuen Univ.*, 32(2): 169-178
- 2) Deem, S. L., William, B. K., Wendy W. (2001): Putting Theory into practice: wildlife health in conservation. *Conservation Biology*, Vol. 15 No. 5.
- 3) Kellert, S. R. (1991): Japanese perceptions of wildlife. *Conservation Biology*, Vol 5, No. 3.
- 4) Lanfranchi, P., E. et al. (2003): Wildlife Veterinarian, Conservation and Public Health. *Veterinary Research Communications*, 27 Suppl. 1, 567-574
- 5) Murata, K. (2009): The role of veterinarian for conservation medicine ~ One World, One Health~, *The journal of the Japan veterinary medical association* 62: 666-669
- 6) Nielse, N. Ole. (1992): Ecosystem health and veterinary medicine. *Can Vet J*, volume 33.
- 7) Saito, K. (2009): Lead poisoning of Steller's Sea Eagle (*Haliaeetus pelagicus*) and White Tailed Eagle (*Haliaeetus albicilla*) caused by the ingestion of lead bullets and slugs, in Hokkaido, Japan. In R. T. Watson, M. Fuller, M. Pokras, and W. G. Hunt (Eds.). *Ingestion of Lead from Spent Ammunition: Implications for Wildlife and Humans*. The Peregrine Fund, Boise, Idaho, USA. DOI 10.4080/ilsa
- 8) Stauber, E. (2002): The value of wildlife rehabilitation- Opportunities for medical training, Research, Education, Conservation. *Japanese Society of Zoo and Wildlife Medicine*, 7(1):1-4
- 9) Ishida, O., Hamano, S., Hanazono, M., Setoguchi, A. (2013): *Japanese Attitudes Toward Animals: A History of Human-Animal Relations in Japan*. University of Tokyo Press.