Cormorants in Japan: Population development, conflicts and management

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Introduction

Cormorant numbers in Japan, as in many other countries, have increased in recent years. This has led to growing concerns about their impact on fisheries in particular, as well as about local damage to forests. A regulatory framework has been implemented to guide the management of cormorant populations in Japan, and various approaches have been adopted by different prefectures (analogous to states or provinces) in order to address the issue.

Cormorant population changes in Japan

There are four cormorant species in Japan, but only one - the Great Cormorant (Phalacrocorax carbo) - commonly frequents inland waters. Numbers of this species have fluctuated significantly in recent decades, declining in the 1960s to a low point in 1971 when fewer than 3000 birds were recorded. A number of factors are believed to have contributed to this decline, including water pollution, bioaccumulation of toxins (e.g. dioxins) through the food chain, land development around coastal and riverine areas and hunting/culling. From the late 1970s, when only five colonies remained in Japan, cormorant numbers started to increase again: new colonies were established and the species began to expand its range to the whole of Japan. Consequently, cormorant numbers increased (examples in Fig. 1). The reasons for this shift are thought to be protection of the remaining colonies, simplification of river structures, an increase in food resources by the release of fish, and dispersion facilitated by human shooting or dispelling of cormorants from their colonies. Currently there are estimated to be more than 100,000 Great Cormorants in Japan.
Conflicts between cormorants and fisheries

The main cormorant-fishery conflicts in Japan occur at inland recreational fisheries rather than at marine sites. Many inland fisheries have been altered significantly by man. For example, large numbers of river channels have been straightened and marginal vegetation has been removed for flood control purposes. This has reduced the carrying capacity of riverine ecosystems as well as affecting fish stocks. Between 1993 and 2003, the number of inland recreational fishermen in Japan decreased from 13.4 to 9.6 million and this was thought to reflect the deterioration in the quality of inland fisheries. In more recent years, however, river managers have been making progress in restoring river ecosystems and in improving connectivity (e.g. barrier removal) to aid fish passage. Cormorants are deemed a serious additional threat to inland fisheries, although there is considerable variability in the level of cormorant damage between different regions.

The ayu (or ayu sweetfish Plecoglossus altivelis) is one of the most popular species for commercial and recreational fisheries in Japan (Fig. 2). The ayu is a migratory species that spends part of its life in saltwater and part in fresh water. Each spring, ayu migrate from the sea into rivers. At the same time, hatchery-reared ayu are also stocked in most river basins to help enhance stocks. However, spring coincides with the breeding season of cormorants, and this gives rise to local conflicts (Fig. 3). The staff of fishery co-operative associations commonly try to scare cormorants away from fish-stocking sites, for example by using exploding rockets, stringing lines or nets across stretches of river, or through human patrols.

Figure 1. Changes in numbers of Great Cormorants recorded in three areas of Japan. At Lake Biwa the cormorants observed on the lake and at the colony were counted from boats once in the breeding season. However, from 2004 onwards the cormorants were counted from inside the colony and the change in counting method partly explains the sudden increase in numbers at Lake Biwa. Sources are given below.
Figure 2. Cast netting for the ayu in Fuji River (Photo: Akihiko Ashizawa).

Figure 3. Cormorants at the mouth of Ane River near Chikubu Island (Photo: Masanari Matsuda).

Regulatory framework

The Japanese Ministry of the Environment has developed a Wildlife Management Plan which requires that an adaptive resource management approach is applied to wildlife, so that actions are reviewed and reassessed on the basis of monitoring and feedback. Under this system, regional governors are expected to manage wildlife populations and their habitats as well as to prevent damage caused by wildlife. In addition to this regulatory framework, a number of regional consultative groups have been established in Japan to discuss cormorant issues. For example, such groups have operated in the Kanto region (around Tokyo) since 2005 and in the Chubu and Kinki regions (around Osaka) since 2006. Meetings have primarily been used to share monitoring data on cormorant numbers at roost sites and in relation to the effectiveness of new measures for reducing cormorant damage at fisheries.
Examples of cormorant population management

The Shiga Prefecture

Increasing numbers of cormorants around Lake Biwa have given rise to two types of problem in the Shiga Prefecture: damage to fisheries and damage to forests. The damage to fisheries primarily relates to the ayu fisheries in Lake Biwa, while damage to forests occurs at two large colonies where the guano (droppings) from the birds has degraded the scenic and sacred value of the forest.

In response to these concerns, the Shiga Prefectural Government drew up a Specified Shiga Wildlife Management Plan for cormorants in line with the Ministry requirements. This plan placed an emphasis on cormorant population control, and intensive culling (‘sharpshooting’) by skilled professionals was started in the main breeding colonies in 2009 (Kameda 2012). The sharpshooting took place during the early and mid-part of the breeding season. Sharpshooting was named by Dr. A.J. DeNicola (1997) and introduced in relation to deer management programs in the U.S. In the years prior to sharpshooting (i.e. 2004-2007), cormorant shooting (inside as well as outside colonies) was conducted only by sports hunters paid by the government.

Figure 4. Numbers of Great Cormorants counted in the breeding colonies at Lake Biwa in May and the annual number of birds shot by hunters (2004-2007) and sharpshooters and hunters (2009-2012). During annual September counts in 1999-2012 up to 8,500-42,900 cormorants were counted, except for 2008, when up to 74,700 cormorants were recorded in the lake; no shooting took place in 2008. Sources given below.

The shooting by sports hunters inside the colonies continued after 2007 but only during the late phase of the breeding season. The sharpshooting resulted in a decrease in the number of cormorants counted in the breeding colonies in Lake Biwa: From 32,063 birds in May 2009 to 9,649 in May 2012 (Fig. 4). In turn, this has now reduced the number of cormorants foraging at many fisheries, and the vegetation in the colonies has started to recover.
Future plans to control the cormorant population in and around Lake Biwa will continue to permit culling in large colonies and to prevent the establishment of new colonies and roosts through rapid action as these are discovered. The culling will be carried out by professional cullers (sharpshooters), and the effects will be monitored annually.

The Yamanashi Prefecture
In the Yamanashi Prefecture, a different approach has been adopted. Here, the staff of the Yamanashi Prefectural Fisheries Technology Center have developed a technique for removing newly established roosts and breeding colonies through the use of plastic tape. Plastic tapes are hung up in trees where the wind causes them to produce vibratory motion and sound. This seems to be an effective approach in scaring cormorants away, as it has been possible to limit the cormorants to using only a single site for both breeding and roosting. Having all birds breeding in one colony or roosting at one roost (rather than in a number of colonies and roosts dispersed over a larger area) also reduces conflicts. Thus the birds’ choices of foraging sites are apparently constrained by the energetic costs of flying to distant foraging sites. Furthermore, bird numbers in the single colony or at a single roost are likely to become constrained by food availability in the wetlands within a certain distance from the colony/roost.

In addition to preventing further roost and colony establishment, efforts have been made since 2005 to reduce the fledging success of the birds within the remaining colony and ‘Shimosone’ roost. From 2006 to 2011, eggs in almost all clutches were replaced with fake eggs made of gypsum or were frozen using dry ice. This resulted in a reduction in fledging success as well as a 30% decline in the number of breeding birds from 2005 to 2007 and numbers have stayed low in the years following 2007 (Tsuboi & Ashizawa 2012).

Traditional uses of cormorants in Japan
Although the current image of cormorants in Japan is negative due to the conflicts with human interests (fisheries and forests), many parts of the country have a long tradition of positive association between cormorants and man. Two examples: trained cormorants have traditionally been used for fishing over most of Japan. Currently only the Japanese Cormorant (Phalacrocorax capillatus) is used for such purpose, but people also used the Great Cormorant for fishing in inland areas in the past. Another beneficial relationship between people and cormorants has been the utilization of guano deposits. Cormorants transport nutrients, such as nitrogen and phosphorous, from water to land by eating fish and subsequently dropping their waste under roosts. In one of the oldest Great Cormorant colonies in Japan, Unoyana in the Aichi Prefecture, local people have traditionally collected guano and used it to fertilize agricultural fields in the village. Cormorants here were protected and trees were planted in order to retain the birds in Unoyama forest. Unoyama was designated as a site of special conservation interest in 1934 because of the cormorant colony. Although local people do not collect guano anymore, they still have a positive impression of cormorants, and the bird is a symbol of the village.
References


Data sources


Data from Aichi after 2006: Natural Environment Division, Department of the Environment of Aichi Prefecture.

Data from Kanto after 2005: Consultative Council of Kanto Region, except for the data of Ibaraki Pref. in 2011 and 2012 which were provided by Bird Research.