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Lead poisoning in Steller's Sea Eagles and White-tailed Sea Eagles

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Lead poisoning in waterfowl has been known in Europe and the United States for a long time (Anderson 1975, Guitart *et al.* 1994). And is caused by the consumption of lead left in the environment as the result of hunting activities. In Japan, the problem became widely known in 1989 when many Whooper Swans *Cygnus cygnus* suffered from lead poisoning in Miyajima Numa (Jin *et al*. 1989). Apart from this direct poisoning of waterfowl from ingesting lead pellets, secondary poisoning occurs. In North America more than 300 Bald Eagles *Haliaeetus leucocephalus* died when they fed upon waterfowl that had been shot or had ingested lead pellets (Elliott *et al*. 1992, Locke *et al*. 1992). Similar cases of lead poisoning caused by ingesting contaminated waterfowl have been found in Japan in Steller's Sea Eagles *H. pelagicus* in 1988 (R. Shimura unpublished) and 1996 (K. Saito unpublished).

Recently, researchers have found a new source of lead poisoning in eagles in Hokkaido, Japan, when lead bullet fragments in the remains of deer are consumed by scavenging eagles.

According to records kept by the Kushiro Zoo, seven Steller's Sea Eagles and one White-tailed Sea Eagle *H. albicilla* were brought to the zoo, dead or emaciated in winter 1994-95. Records show that most of these eagles were found in inland areas, away from their 'typical' habitat on the coast and along the lower reaches of big rivers. There had been no precedent for this level of mortality, and at that point in time lead poisoning was not known to be a major cause of sea eagle mortality. In winter 1995-96, five Steller's Sea Eagles and one White-tailed Sea Eagle were brought to the zoo (Kushiro Zoo 1996). In the search for the causes of these mortalities, the blood of one bird was examined, and it was found to be suffering from lead poisoning (R. Shimura unpublished).

In 1997, K. Saito (DVM) and Y. Masuda (DVM) independently examined the cause of death of six eagles that died in the winter of 1996-97. Both veterinarians found that eagles died from eating lead fragments from rifle bullets in the carcasses of Sika Deer *Cervus nippon.* They advised the Environment Agency of Japan to take immediate steps toward resolving this problem. In total, five Steller's and three White-tailed Sea Eagles were found to have died of lead poisoning in that winter.

The number of eagle victims increased during the winter of 1997-98, when 19 birds (16 Steller's Sea Eagles and three White-tailed Sea Eagles) were found from December to May.

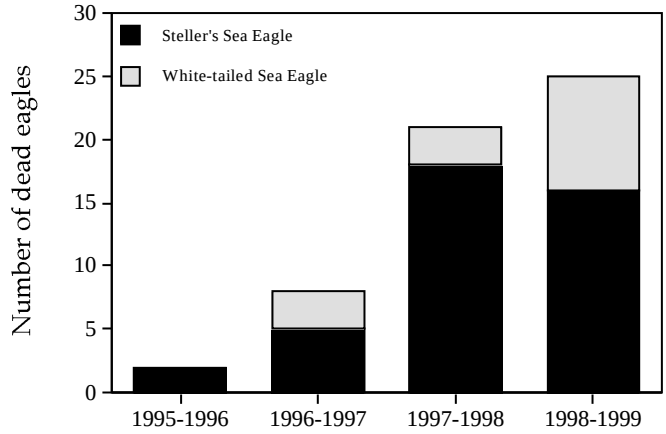

Fig. 1. The number of Steller's and White-tailed Sea Eagles that died of lead poisoning each winter in Hokkaido.

Two more Steller's Sea Eagles were found afterward and as of July 1999 the total known mortality of eagles during that winter is 21. Furthermore, 16 Steller's Sea Eagles and nine White-tailed Sea Eagles were found to have died of lead poisoning in winter 1998-99 (Fig. 1).

Historically, most sea eagles that wintered in Japan gathered on the coast of the Shiretoko peninsula, attracted by an abundance of Walleye Pollack *Theragra chalcogramma* discarded by fishermen this situation persisted until 1990 (WGWS 1996). Because of the recent decline in the fishery, many eagles moved to inland areas in search of more plentiful food (WGWS 1996). Concurrently, the number of Sika Deer has greatly increased and the Hokkaido Government has encouraged people to hunt more deer in order to lessen agricultural damage. This increase in hunting has resulted in more deer carrion being available to eagles. Because a whole deer carcass is heavy, many deer hunters leave some portion of the carcass in the field and take away only the choice parts. Also, some injured deer die in the field, unfound by hunters. Because almost all deer are shot using lead bullets, and these bullets usually fragment in the deer body (Hokkaido Government unpublished), eagles are exposed to the threat of lead poisoning.

Of 30 eagle carcasses retrieved last winter (1997-98), 21 were identified as being lead poisoned. If this rate of mortality (70%) is an accurate measure of lead poisoning's overall contribution to mortality, then it has caused more than 3-fold increase in known yearly eagle mortality in Hokkaido. The increase of mortality due to starvation seems to affect younger eagles more, presumably because they are less efficient hunters/scavengers. However, mortality caused by lead poisoning affects all age classes equally. As the death of adult raptors usually has a larger influence on the population, a high rate of mortality in eagles due to lead poisoning might cause declines in their population (Ueta & Masterov 2000).

The Lead Poisoning Network started a study of the distribution and behavior of eagles in

Eastern Hokkaido in winter of 1998-99. The Network found that at least 214 eagles are dependent upon deer carcasses in inland areas through the winter, and that another 400 eagles have access to deer carcasses in inland areas, although they were found in coastal areas (LPNE 1999). The Wild Bird Society of Japan also reported that some eagles moved to inland area from coastal area in spring to eat deer carcasses (Ueta 1998).

Reports of lead poisoning are occurring more regularly, and effective measures to control this source of additional eagle mortality should be taken immediately. It is important that the complete carcasses of deer shot by hunters should be removed. It is likely that the most effective measure in controlling lead contamination of carcasses would be to use lead-free or copper bullets. At present only about 3% of deer hunters use copper ammunition. If this situation continues, then one has to worry about the fate of eagles wintering in Japan. The Environment Agency of Japan is planning a ban on the use of lead bullets for deer hunting by 2001 at the latest.

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