AGJV Position Statement Regarding Overabundant Light Geese*
February 19, 2015

1. The growth in some populations of snow geese has been damaging ecosystems and other wildlife found there.
2. Major actions were undertaken in 1999 to reduce most populations of snow geese and their impacts on the ecosystems.
3. These actions were to enable hunters to contribute to increasing the goose harvest in hope of reducing the population.
4. The number of geese taken by hunters has indeed increased, but the population has not declined, and habitat damage persists.
5. Studies continue into how much damage has occurred in various locations, what impacts the damage is having on other wildlife, and whether additional action might be taken to alleviate the damage and allow the ecosystems to recover.
6. Although we feel a sense of urgency, the necessity, cost and public concern over using direct control to reduce snow geese populations is such that the AGJV Management Board is not recommending broad-scale direct control actions at this time.
7. We are exploring additional actions which utilize the geese and may evaluate their feasibility on a small scale on the Arctic breeding grounds.
8. In the meantime, we are continuing efforts to:
   a. Enable hunters to harvest as many snow geese as possible through hunting seasons and the special conservation orders; and
   b. Communicate the importance of this issue to the people who care about these resources.

* Text refers to snow geese, but also applies to overabundant Ross's geese

BACKGROUND

Foraging by snow geese can result in significant alteration of plant communities in arctic and subarctic staging and nesting areas. This has led to reductions in ground cover and biomass of their preferred forage plant species and other plant species in the community, as well as secondary effects on soil characteristics. These changes have been associated with subsequent changes in abundance of some other animal species occupying the same habitats. The amount of habitat affected by foraging geese has increased as the population has grown, and there are concerns that continued expansion of the area affected by geese eventually could lead to significant additional loss of ecosystem function or impacts on other species.

Concern over potential impacts of widespread habitat alteration prompted managers to undertake measures to reduce the population size of midcontinent snow geese in 1999. This was done through liberalization of hunting regulations, and amendments to migratory bird regulations in Canada and the United States to allow harvests to occur outside of normal

hunting seasons and to allow special hunting methods (use of electronic calls, unplugged shotguns, extended shooting hours, no limits). Reducing adult snow goose survival rates through increased harvest was, and is, considered the most efficient means of reducing population size, and kill by hunters ensures maximum use of harvested birds.

Snow goose harvests increased by about 150% during the first decade of liberalized harvest compared to the preceding decade, but after initial increases in harvest, the kill by hunters began to decline. The reason for the decline in harvest is unknown, but could be due to behavioral adjustments of the birds to increased hunting pressure, or possibly hunter satiation. Harvest rate (i.e., the proportion of the population that is harvested annually) has also declined since the inception of special harvest measures, indicating that increased harvest has not kept pace with increases in population size. Adult survival rate did not decline despite the increase in harvest, and remained well above levels needed to reduce the population. Nonetheless, recent evaluations suggested that the rate of population growth had begun to decline by 2006 (Alisauskas et al. 2011; Leafloor et al. 2012; Figure 1). Harvest age ratios in both Canada and the United States have declined over the long term period of population growth (Figure 2). Reduced growth rate and lower age ratios in the population may be an indication that density-dependent mechanisms are beginning to affect the recruitment rate.

Actions aimed at reducing the size of the midcontinent population of lesser snow geese and Ross's geese were based on concerns that ever-increasing levels of damage to arctic and subarctic habitats could be irreversible, and could result in ecosystem dysfunction that would negatively affect the geese as well as other species. The 1997 *Ecosystems in Peril* report stated that 'most damage to vegetation, so far recorded, has occurred in habitats along the western and southern coasts of Hudson Bay and in James Bay' and that 'most areas of extensive salt marsh capable of sustaining large colonies are now occupied' (Batt 1997). The report went on to say that 'in general, there does not appear to be the level of damage in the high arctic that characterizes the coastal areas of the subarctic Hudson Bay lowland' and that the 'scale of the problem and associated level of risk to the broader populations requires intensive study, including some calculation of the proportion of the total range of the species affected by goose damage'. While some studies have been conducted to address these important information needs, additional efforts to address these issues are needed.

When the *Ecosystems in Peril* report was published in 1997, damage to subarctic intertidal marsh habitats along the James Bay/Hudson Bay coast was already extensive. The intertidal marshes of James Bay/Hudson Bay showed signs of degradation at least as far back as the early 1980s, long before snow goose populations reached their current levels, and represent a narrow tract of habitat that continues to be used (in addition to adjacent freshwater habitats that are more extensive) by large numbers of migrating and nesting geese. Much of this damage was caused by grubbing, a method of below-ground foraging for carbohydrate-rich roots and rhizomes that mainly occurs during spring migration. Removal of below-ground portions of intertidal marsh vegetation, by both summer residents and spring migrants, results in increased erosion from spring run-off, and also causes changes to soil characteristics (e.g., increased salinity) that make recovery of the original intertidal vegetation communities unlikely

or impossible. The damage is cumulative, increasing in extent year after year, as long as snow geese continue to use the same habitats during migration. Later in the summer, these same coastal marshes are intensively grazed by geese that nest near them. There has been little evidence of recovery of these habitats up to 2014. Thus, it is likely that degradation of subarctic coastal habitats will continue, even if the population is reduced to previous levels. It is clear that recovery of impacted habitats is a long-term proposition.

Coastal intertidal and salt marsh habitats are important to snow geese and other migratory birds, but represent only a small fraction of the habitats used by snow geese during the summer months. Most midcontinent snow geese (~90% of the population) nest north of the damaged James Bay/Hudson Bay coastal marshes and mainly use freshwater habitats from late May through September. Snow geese can also negatively affect freshwater habitats by their foraging activities, but these habitats are much more extensive than are intertidal marshes. Foraging by snow geese in freshwater habitats involves both grubbing and shoot pulling during spring and early summer, and gives way to grazing in summer. As in intertidal marshes, intensive foraging by large numbers of geese can lead to alteration of freshwater habitats that can result in reduction of forage plant availability. However, the proportion of total available freshwater habitat across the Arctic that has been affected is difficult to quantify, and the ability of these freshwater habitats to recover over time requires further study.

Our knowledge remains incomplete about: (1) areas of high use during the migration, nesting, and post-breeding periods; (2) the proportion of available habitat that has been negatively impacted by geese; (3) impacts of habitat alteration on other species, and; (4) carrying capacity of Arctic lowland habitats. Research is continuing to document habitat use by staging, nesting, and post-breeding snow and Ross's geese, the extent of cumulative habitat alteration by the geese, availability and sustainability of Arctic and subarctic freshwater habitats, and impacts, both current and potential, on sympatric species.

Although we feel a sense of urgency, additional efforts to reduce snow goose population will likely be expensive and face public concerns, and it is not clear that the cumulative impacts to Arctic and subarctic habitats used by geese represent an impending large-scale ecological disaster, or to what degree the impacts on sympatric species constitute a large scale issue. While we search for additional answers to the questions above, we encourage and continue to explore additional actions to take and use snow geese. In the meantime, the population will continue to be monitored. It is clear that much additional harvest could be sustained by the midcontinent populations of lesser snow geese and Ross's geese, and any additional options for take that make use of harvested birds will continue to be explored.

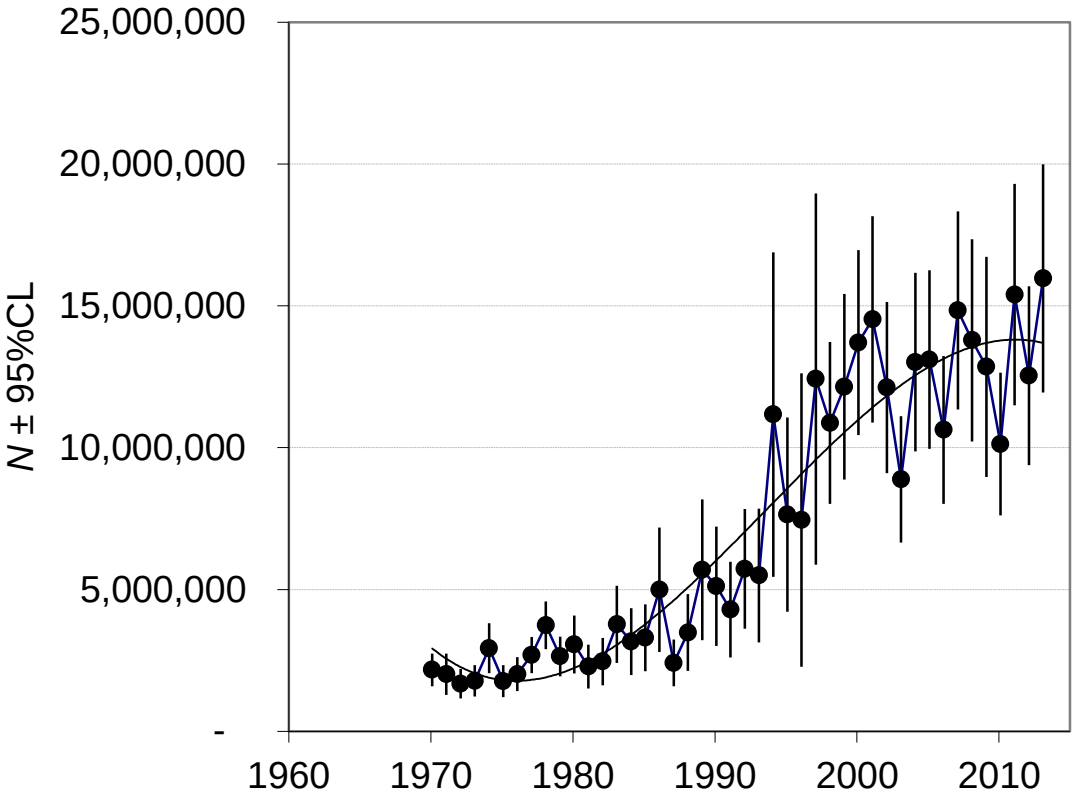

Figure 1. Lincoln estimates of August population size for adult midcontinent snow geese, 1970-2013 (R. Alisauskas, Environment Canada).

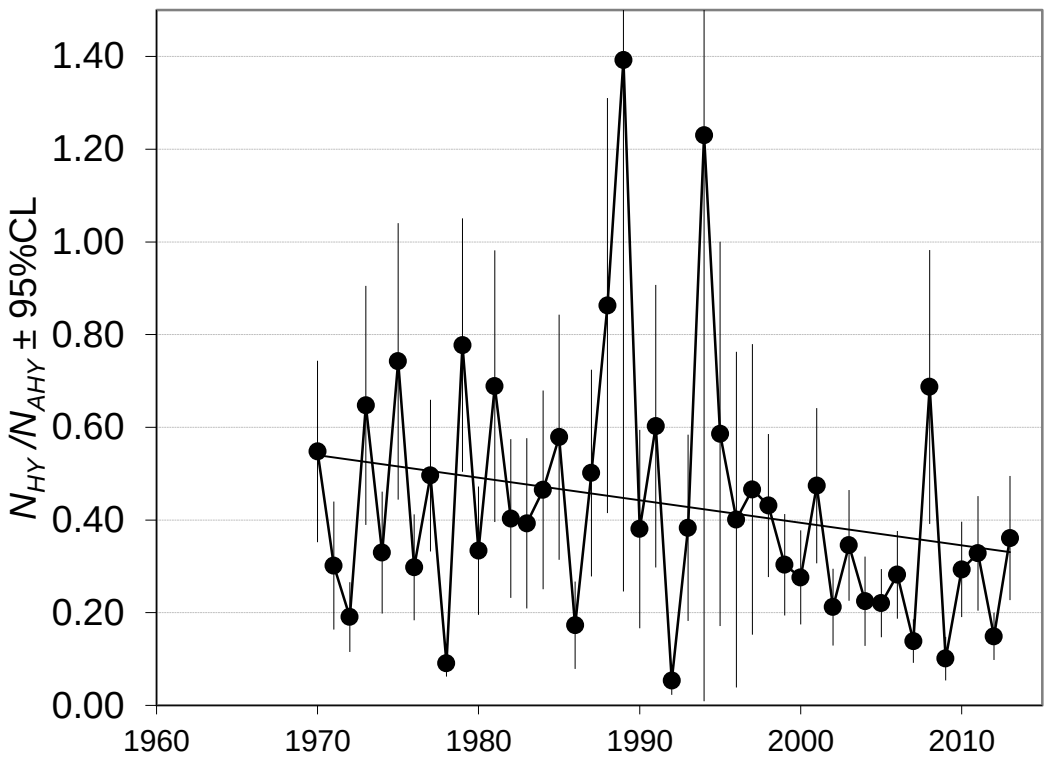

Figure 2. August age ratios of midcontinent lesser snow geese based on Lincoln estimates of adult and juvenile population sizes in August (R. Alisauskas, Environment Canada).

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