Notes on predatory gulls, primarily Southern Black-backed gulls (February 2018)

Breeding/population/culling

1970 Wellington [1]

- Stomach content in Wellington 1961-62: 86% offal and refuse
- Largest colonies not predated by mammalian predators
- Losses of chicks associated with flooding and from breeding adults
- Losses of chicks inversely associated with local food availability

1992 Tasman Bay[2]

- Ten year synopsis
- Closure of several rubbish dumps and fish offal dumping sites in 1987 led to no apparent difference in clutch sizes, but breeding success declined:

"Results indicate that strong pair bonding occurs, and nest site fidelity is developed equally strongly after advantageous sites within the colony have been gained. There is a hierarchy within the nesting colonies with a gradient of increasing breeding success from the outer perimeter of the site toward the epi-centre of the colony. Nest density plays an important part in breeding success and densities in excess of 350 nest/ha initiate a tension factor within nesting colonies, which leads to parasitism and other behaviour inimical to breeding success. It is high nest densities which may eventually lead to colony abandonment…
"Eggs can survive temperatures in excess of 40 degrees C and low temperatures of 20 degrees C during the incubation period and still produce healthy chicks….
"I conclude that the local population of Dominican Gulls is behaving in a similar way to that hypothesised by Wynne-Edwards (1962), whereby animals attain a homeostatic state and regulate their own population numbers in order not to over-exploit the local food resource. High nest densities, infertility in eggs, and high levels of predation of both eggs and fledglings are the probable factors which have most effect on population density and breeding success, whereas food resources do not appear to have an immediate limiting effect."

1998 – Isle of May (Scotland) removing SBBG effect on Oystercatchers[3]

"…Immediately following the start of gull control, the number of oystercatcher breeding territories rose and the increase continued throughout the period of control, with the rate of increase being above the British average over the same period. Prior to the cull, oystercatcher breeding success was extremely low with most losses of eggs and chicks attributable to gull predation. However, even after gull numbers had been reduced, breeding success remained low and gulls were the main cause of failure. The increase in numbers of oystercatchers could not have been sustained without substantial immigration. Thus, although the reduction in gull numbers had made the Isle of May more attractive to oyster-catchers, breeding conditions were not improved markedly." (p167)

1998 - Argentine coast[4]

- Covers background research on the potential and actual negative effect of increasing population on other wildlife:

"Studies have shown that breeding success of many birds can be adversely affected by gull predation (Thomas 1972) and kleptopara- sitism (Furness 1987). Similarly, gulls have been reported to take over former breeding sites of other species, particularly terns (Thomas 1972, Burger & Shisler 1978, Burger 1985b)."

"The effects on coastal wildlife are not only confined to seabirds and shorebirds. Thomas (1988) has reported Kelp Gulls feeding on flesh of live Southern Right Whales *Eubalaena australis* breeding at Península Valdés. Behavioural observations suggest that the whales are harmed (Rowntree *et al*. 1998, Thomas 1988). This has led some researchers to suggest that spatial distribution of breeding whales might be altered due to this interaction and, as a result, the whale-watching industry might be affected (Rowntree *et al*. 1998)."

- **Considered all colonies less than 2km apart, to be the one colony**
- Population increased significantly in the last decades

2000 Scotland - Effect of culling SBBG[5]

- "1992 -1996, over 25000 adults killed in the Medes Islands colony, reducing its size by more than 40%. The cull was similar in intensity to that performed on the Isle of May, Scotland, during the first years of culling (Duncan 1978; Coulson 1991)

  "In…Scotland increases in egg size, body size and body condition of adults, and a reduction in the age at recruitment, were observed following culls of breeding adults (Duncan 1978; Coulson, Duncan & Thomas 1982). In addition, culling a single gullery has unpredictable e ects at the metapopulation level because it may influence immigration and emigration rates between colonies (Coulson 1991; Defous du Rau 1995). Culling may be neutralized once it is discontinued (Spaans et al. 1991).

- In some instances, culling may improve breeding performance and better adult condition (due to reduced completion for food sources
- Finding elsewhere are inconsistent with this.

- Conclusions (p382):
  "Feare (1991) concluded that in the long term culling fails to reduce metapopulation size because of immigration into areas where birds are not killed together with the compensatory changes in production, survival and recruitment. Consequently, as long as the factors that cause a superabundance of gulls continue to operate, their impact on some bird and human populations

is likely to persist (Spaans & Blokpoel 1991).

2001 Quebec - Does culling SBBG enhance tern numbers?[6]

- "The rate of chick [*Sterna hirundo*] disappearance was lower and the life span of tern broods was higher in 1994 when the culling was conducted, compared with 1993 and 1995. As a result, the productivity of the tern colony was zero in 1993 and 1995, but positive in 1994 (0·33 chicks pair^{-1}). Measurements of chick mass in 1993 and 1994 showed that growth was normal, indicating that poor feeding conditions or disease were not the cause of chick disappearance.

  "Predation rates differed markedly amongst specialist predatory gulls, with one individual accounting for 85% of all successful attempts made during the baseline period. Once that gull was removed, the remaining predators increased their predation rate in a manner suggestive of a despotic system. Observations conducted in 1995 showed that the predation rate was almost zero at the beginning of the season but increased dramatically later in the summer, with two gulls together making about 60% of the captures. " (p1)

2007 - Gulf of Maine[7]

- Increased gull numbers corresponded to reduction in terns
- Gulls took up to 70% of some species eggs, at lease one colony of terns abandoned the following year
- Gull control programmes include poisoning, shooting, and harassment
- Resulting tern population breeding success 95%
- Shooting individual gulls observed to predate on tern nests has been undertaken in preference to removing all gulls
- Higher mortality amongst tern species that nested on sparse to nil vegetation
- Density of colonies a factor:
  "The strong positive correlation between the number of gull intrusions in a block and the number of tern nests in that block suggests that predatory gulls were attracted to concentrations of prey…. Patches of substrate lacking vegetation and with flat rock surfaces provided good landing sites for Herring and Great Black-backed gulls entering the tern colony, and nests bordering these areas produced few fledglings

- Recommends shooting less effective than harassment, pyrotechnics, egg removal

2006 Spain (yellow-legged gull)[8]

- Assumes prey species have developed defence mechanisms against gulls
- Addressing the reason for gull population explosion (rubbish dumps, fish dumps etc) will likely restore ecological balance more cost effectively:
  "As a final corollary, massive culling programs of yellow-legged gulls (and probably of other large gulls) are not justified on the basis of the knowledge cumulated so far, at least for protecting other bird species. Other conservation

actions, such as the promotion of habitat restoration at large spatial scales, should have greater benefit for the whole community. In the Mediterranean, there is a dramatic loss of suitable habitat in coastal areas due to very ancient human occupation and development. This problem should concentrate most on conservation efforts…"

2011 Northern Patagonia[9]

- Most abundant species of gull in Patagonia
- Overall population increase 37% from 1994-2008

2015 Rangitoto Island[10]

- Accorded a "super-abundant" status (throughout NZ) (Miskelly 2013)
- The Auckland black-backed gull population has mirrored the global pattern (of super-abundance due to anthropogenic food supply).
- Eight colonies were recorded in the 1970s (Oliver 1973), although these were unlikely to represent discrete stable units as individuals birds move between colonies (Coulson 2002).
- Rangitoto population grew markedly between the 1920s and 1970s… considered to be associated with the increased availability of anthropogenic food sources.
- Removal of food sources appears to have affected numbers overall, but some colonies have moved elsewhere (off-island
- Pests (rats. Mustelids, hendgehogs) seems to have had little impact
- Are also predated by Australasian harrier

"Intraspecies predation on breeding colonies is documented in the black-backed gull (Fordham & Cormack 1970; Higgins & Davies 1996). On Rangitoto, Oliver (1973) recorded that chick deaths as a result of predation by adults at 7-12% of all mortality causes, and noted that this was low compared to other gull studies. The attacks on juveniles that did occur were interpreted as probably territorial in nature, however it was acknowledged that the proportion of intraspecies mortality may increase in years of reduced food supply as reported by Fordham & Cormack (1970).

"The close proximity of birds in a colony may aid the transfer of microbes and parasites (Coulson 2001). However, there are no reports of disease or parasites affecting the individual black-backed gulls at the Rangitoto colonies." (p198)

Poisoning

1994 - Bird control using Alpha-Chloralose and DRC1339[11]

"Pre-feed the area of concern in the late afternoon with small squares of bread and lard/margarine. Once there is a high acceptance of the prefeed, replace with toxic bread and lard/margarine. Gulls require between 4% and 8% alpha-chloralose to have an effect. Check the area at daylight the next morning to remove the dead birds. If the gulls are nesting then bread can be laid at all nest sites late in the

afternoon or early evening, and the next morning the dead birds are removed off the nest with many of the chicks also being dead. All eggs and surviving chicks are destroyed at this visit.

2001 Rabbits – Secondary poisoning [including SBBG][12]

- Poison used on three islands to eradicate rabbits
- First generation anticoagulant, chlorophacinone (0.05 g kg –1) on wheat bait
- Inadvertent poisoning of non-target species mainly involved two species of native birds (Larus dominicanus, Anas eatoni), mouse (Mus musculus) and cat

2007 sub-Antarctic Islands myxoma virus and rabbit haemorrhagic virus[13]

- Risks of direct and secondary poising of SBBG are identified

2017 Rodencide secondary poisoning[14]

- "Differences in species sensitivity are inconsistent among compounds. Numerous studies have compared mortality rate of predators fed prey or tissue containing anticoagulant rodenticides. In secondary exposure studies in birds [including Buller's gull], brodifacoum appears to pose the greatest risk, with bromadiolone, difenacoum, flocoumafen and difethialone being less hazardous than brodifacoum, and warfarin, coumatetralyl, coumafuryl, chlorophacinone and diphacinone being even less hazardous. In contrast, substantial mortality was noted in secondary exposure studies in mammals ingesting prey or tissue diets containing either second- or intermediate-generation compounds."

References

[1] Fordham, R.A. and R. M. Cormack (1970), Mortality and Population Change of Dominican Gulls in Wellington, New Zealand: With a Statistical Appendix *Journal of Animal Ecology* Vol. 39, No. 1 (Feb., 1970), pp. 13-27 DOI: 10.2307/2887

[2] Wilkinson, G.B .(1992) PhD thesis, University of Canterbury; 'Some aspects of the breeding biology of the Dominican gull *Larus dominicanus* (Lichtenstein 1823) in Nelson province, New Zealand'.

[3] Harris, M. & S. Wanless (1997) The effect of removing large numbers of gulls *Larus spp*. on an island population of oystercatchers *Haematopus ostralegus*: implications for management. *Biological Conservation* 82 (1997) 167-171

[4] Yorio, P. et al (1998) Kelp Gulls *Larus* Dominicans breeding on the Argentine Coast: population status and relationship with coastal management and conservation *Fundación Patagonia Natural and Wildlife Conservation Society*, M. A. Zar 760, 9120 Puerto Madryn, Chubut, Argentina.

[5] Bosch, M. et al (2000) Short-term effects of culling on the ecology and population dynamics of the yell-legged gull. British Ecological Society *Journal of Applied Ecology*, 37

[6] Guillemette, M & P Brousseau (2001) Does culling predatory gulls enhance the productivity of breeding common terns? *Journal of Applied Ecology* 2001 38, 1–8

[7] Donehoer et al, (2007) Effect of Gull Predation and Predator Contril on Tern Nesting Success at Eastern Egg Rock, Maine. *Waterbirds* 30(1): 29-39, 2007

[8] Oro, D. & A. Martinez-Abrain (2007) Deconstructing myths on large gulls and their impact on threatened sympatric waterbirds *Animal Conservation* 10 (2007) 117–126

[9] Lisnizer, N.A. et al (2011), Spatial and temporal variation in population trends of Kelp Gulls in northern Patagonia, Argentina; *Emu* 111(3) 259-267 https://doi.org/10.1071/MU11001

[10] Galbraith, M. et al (2015) Changes in the breeding status of the southern black-backed gull (*Larus dominicanus*) colonies on Rangitoto Island, Hauraki Gulf, New Zealand. *Notornis, 2015, Vol. 62: 192-201*

[11] Nelson, P. Bird (1994) Control in New Zealand using Alpha-Chloralose and DRC1339. *Proceedings of the Sixteenth Vertebrate Pest Conference* (1994). 40. http://digitalcommons.unl.edu/vpc16/40

[12] Chapuis, et al. (2001) Eradication of rabbits (*Oryctolagus cuniculus*) by poisoning on three islands of the subantarctic Kerguelen Archipelago, *Wildlife Research* 28(3) 323 – 331, https://doi.org/10.1071/WR00042

[13] Cooke et al (2004) Potential use of myxoma virus and rabbit haemorrhagic diseas virus to control feral rabbits in the Kerguelen Archipelago. CSIRO Wildlife Research 03084 2007 http://www.publish.csiro.au/journals/wr

[14] Rattner, BA, and FN Mastrota (2017) Anticoagulant Rodenticide Toxicity to Non-target Wildlife Under Controlled Exposure Conditions *Anticoagulant Rodenticides and Wildlife* pp 45-86 https://link.springer.com/chapter/10.1007/978-3-319-64377-9_3