

JNCC Comments to GSGSSI on the Proposed Rat Eradication Plan

GSGSSI responses (Darren Christie, Environment Officer)

SGHT responses (Tony Martin, Project Manager)

Thank you for sending us for comment copies of the EIA and Operational Plan for Phase 1 of the rodent eradication project at South Georgia. Firstly, we wish to commend the authors of the documents, the project team and all those involved in the development of these documents, which very clearly set out the background of the proposed project, the key issues and risks that need to be considered and how best to manage these. It is clear that a great deal of work and planning has been undertaken to inform the development of the plans, and ensure that they are based on the best available advice from experts with relevant experience in the field.

We support the use of a phased approach in the eradication programme, in which the monitoring results from the first phase will be used to inform the second phase of the operation. It is our understanding that monitoring will be undertaken to assess the efficacy of the baiting method, and to determine and understand the potential negative impacts, especially on pintails, before moving to the second phase in which the remainder of the island is baited.

It is not entirely clear from the documents how long monitoring will take place before initiating Phase 2 (should this go ahead). On page 63 of the EIA it is indicated that at minimum, visits to each treated zone will occur one year and two years after baiting. This seems to be a generic statement rather than dealing specifically with monitoring the success and impacts of the trial phase before proceeding to the second. It is our view that this monitoring phase is a critical component of the project, and should be implemented over a sufficient length of time to move to phase 2 with confidence that the methods are

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both effective and of no significant risk to non-target species. It isn't clear from the documents that this is the case.

SGHT: There are two key elements to the monitoring - impact on non-target species, and impact on target species. Evidence for the former will be collected within weeks of the bait drop. Collecting evidence for the latter is open-ended, unless and until it can be shown that one or more rodents has survived.

Advice from the IEAG is that the effectiveness of the search for surviving target species (in Phase 1 this will be rats) is a product of three things - the amount of effort expended, the effectiveness of the techniques used, and the length of time that the work is continued. All else being equal (for example, the availability of funds to proceed to Phase 2 in 2012) our intention is to reduce the time needed for monitoring by deploying substantial effort and a range of effective techniques in the summer following the Phase 1 bait drop, such that Phase 2 can commence in 2012 with high confidence that the techniques being used will lead to a successful outcome.

Similarly it would be useful to indicate more explicitly the details of the monitoring work that will be undertaken as part of Phase 2 of the operation to confirm the absence of rats (and mice) on the island. We suggest that it would be prudent to consider the project successful after three years of systematic monitoring confirming an absence of rats (and mice), rather than two.

SGHT: Five years would be better than one year, and 50 years would be better still, but every year that Phase 2 is delayed will diminish its chances of success, because of rapid glacier retreat. Our choice is therefore to move on rapidly, concentrating monitoring effort into a single year.

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The EIA indicates (on page 26) that the only known population of the House Mouse on South Georgia includes a rat-free area on Nunez Peninsula and along the coast from Shallop Cove to Cape Rosa. The recent observations (after the publication of the EIA) of mice elsewhere on South Georgia indicates that the distribution of mice is more extensive than previously considered, and that this is a critical area of uncertainty. We understand that it is the intention of the project to eradicate rats and mice simultaneously, but given the greater difficulty in eradicating mice, it would be useful for the EIA to consider the possible consequences of successfully eradicating rats but not mice. This has almost certainly been considered and discussed by the project team, but is not reflected in the document.

SGHT: I have answered this point in the response to others making it.

On page 40 of the EIA, the presence of reindeers is identified as a potential risk to the success of the project, in terms of the eradication of the target species and possible effects on non-target species. We suggest that it would be important for the GSGSSI to make a decision about the removal of reindeers before the rodent eradication project is initiated, and that the reindeer are indeed removed prior to the baiting of the areas where the reindeer herds presently occur.

GSGSSI - The Government have drafted a consultation document regarding management options for the reindeer, which will be made available for public comment in the very near future

It has come to our attention that the pest eradication programme on Macquarie Island recently encountered a problem when water was discovered in the helicopter fuel, a risk that certainly needs to be avoided in the South Georgia operation.

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SGHT: We will be vigilant to this risk, and are obtaining our fuel from a reliable source.

The last paragraph of page 27 of the EIA should include the Light-mantled Sooty Albatross as one of the seven ACAP species.

SGHT: So noted, thanks.

The removal of rodents from South Georgia will certainly have a significant positive impact on the terrestrial environment of the island. The project is an ambitious one, which requires rigorous planning and adaptive management, principles which have in our opinion been adopted in the EIA and Phase 1 Operational Plan. We hope that our comments are considered useful. We would like to remain engaged in the project, and assist wherever possible.

SGHT: Many thanks for this vote of confidence, and the helpful and constructive comments. We appreciate and welcome the kind offer of further assistance, and will be sure to keep the JNCC informed and engaged as this huge and challenging project develops over the next few years.

IAATO Comments to GSGSSI on the Proposed Rat Eradication Plan

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General Comments:

1. In general, we appreciate the opportunity for consultation on documents such as this as in line with Article 4 of the Environmental Charter of South Georgia but would request in future that this be a minimum of 6 weeks and preferably 3 months as this allows for a more in-depth review and greater consultation within our own group;

GSGSSI - we will always attempt to provide consultation documents at the earliest opportunity, and allow as much time for comment as possible, particularly for complex documents or issues. However, timeframes are often dictated by factors outside of our control.

2. In addition, noting the planning phase in Table 2, Section 3 of the Ops Plan, it seems that much of the decision making process had already taken place prior to this consultation (particularly given the intention to start the eradication in 10 months time). Is it the intention of the GSGSSI to only invite comments in the later stage of project development?

GSGSSI -The eradication of rats has been a policy objective for a number of years. The consultation concerns the methodology. Whilst planning has been on-going for a number of years, it is unrealistic to engage in a consultation until the plans are sufficiently developed. Rodent eradication is a highly technical undertaking, where methodology is often dictated by operational constraints. The Operational Plan in turn affects the outcomes of the Environmental Impact Assessment. It would have been very difficult to start a public consultation without a well-developed plan to evaluate. GSGSSI greatly values the views of stakeholders and the public, which have been

sought at a time where they still have the opportunity to influence the project.

3. We may be misreading Table 2, Section 3 of the Ops Plan, as it does not seem to be consistently chronological, but it also appears that the planning phase of the project has been considerably shorter compared with those at other sites (e.g. Macquarie which allowed a 4-year planning phase prior to the eradication). Is the GSGSSI confident that planning has been sufficiently thorough?

SGHT: the planning phase has been shorter than for Macquarie, for two important reasons. Firstly, the Macquarie project is dealing with rabbits, and we are not. Secondly, the very research and testing that extended the planning phase for Macquarie is valid also for SG, so has shortened our preparation phase.

GSGSSI – The Government will only approve the project if it is content that the planning has been sufficiently thorough. Any approval will be conditional on seeing satisfactory documentation.

4. Please may we get a copy of Appendix 6 to the EIA? (Baiting Zones and Operating Sites);

GSGSSI – this has now been made available via the GSGSSI website, and stakeholders informed.

5. The EIA appears to cover the full extent of the project, but the operational plan is only Phase 1. While it is understood that phase 1 is perceived as a test run, it would be useful to have the context of a whole operational plan within which phase 1 can be set in detail.

SGHT: the objective of the whole project - to eradicate rats entirely from SG - is set out in the O.P. for Phase 1. The O.P. for Phase 2 will be completed, and made available for comment, later this year.

6. One such example of this is that it appears from the EIA that ultimately the success of this rodent eradication is contingent on the eradication of reindeer. But to the best of our knowledge an EIA or Ops Plan for that eradication has not been circulated. We may have missed that, but it makes it difficult to evaluate and assess the project in detail without the fuller context of the eradication plan.

GSGSSI – Reindeer will become a factor in the rodent eradication project during later phases of the eradication. In the “Plan for Progress” GSGSSI policy was to eradicate the Busen herd. This has not happened, but GSGSSI have drafted a consultation document regarding management options for the reindeer, which will be made available for public comment in the very near future.

7. Equally since visitors to South Georgia have the potential to contribute to the financial backing of the project a clear outline of the total costs, monies raised and monies needed would be useful. We note that this is touched on briefly in the FAQ sheet but to help raise money it might be useful to have targets outlined to complete phases.

SGHT: the funding is a separate issue, and will be described to IAATO at its meeting in Turin in June.

8. IAATO agrees with the EIA conclusion that it is preferable to eradicate rather than ‘control’ South Georgia’s rodent populations. And we note that eradication programs are only successful if they achieve a 100% kill rate. We understand that the program is expensive and it may be difficult to raise funds for future campaigns if this full eradication plan is unsuccessful. Accordingly, we strongly encourage the need to ‘plan for success’ and overall would advocate the principle of only commencing baiting when the resources and risk management strategies necessary to ensure a 100% kill rate are in place.

SGHT: agreed, but unfortunately if we delayed starting until all the money was raised, the project would probably never be undertaken at all. Complete up-front funding might be possible if the project was Government financed, but it's not. The chances of raising such a huge amount of money from private sources without proof of success on a smaller scale are small. We hope and trust that success will breed success - that the accomplishment of Phase 1 will stimulate funding for Phase 2.

GSGSSI: It has been acknowledged from an early stage that the cost of the rat eradication was considerably beyond the financial resources of GSGSSI. It is clearly important to ensure a 100% kill. A considerable amount will be learned from the first trial phase, which will assist in fine-tuning the methodology for the rest of the island. It is envisaged that, during Phase 1, additional research will be undertaken on other parts of the island in preparation for Phase 2.

Tourism

9. Can the GSGSSI clarify how tourist visits will be handled in line with the baiting operation? In the Ops Plan and the emails exchanged 17-19 March, it appeared that visits could still take place, noting that there may be some disturbance, but in the EIA it says that visitation will not take place while the baiting is going on. Understanding the need to prioritise and the implications of weather restrictions on the baiting operation, is it possible to clarify how decisions regarding visitation will take place? In particular if circumstances prevailed such that a passenger vessel is unable to clear into KEP during a visit due to baiting work, will the passenger vessel still be allowed to proceed?

SGHT: there will be no need for any cancellation of visits, and access will be open to everywhere except a refuelling area on the south side of Grytviken.

GSGSSI: Assuming Phase 1 includes the Thatcher Peninsula, the impacted tourist activity would be extended walks around Grytviken (possibly the

Maiviken walk). That being the case it may be possible for the eradication operations team to try and avoid any conflict with visits.

In subsequent seasons, vessel operators will be advised at the IAATO meeting (and by written notification) of the operational areas / baiting zones for the coming year. As vessels approach South Georgia daily contact will be established with the GO to ascertain the projected flying programme for the coming days and specific daily information for the following 24hours.

Expedition leaders can either opt to avoid entirely the intended baiting zones for that period of the season from the outset, or remain flexible to adapt itineraries on arrival subject to operational programmes. Yachts lacking the ability to receive emails may need to avoid active baiting zones entirely.

At this stage GSGSSI cannot provide any earlier notification of the order of baiting zones selected for subsequent years

10. What is the likelihood of visitors not being able to access either the museum or the church during the baiting process?

SGHT: none - both will have unrestricted access.

11. We note the intention to produce a flyer (based on the FAQ's) and presentation for visitors to explain the work that is being undertaken – will it be possible to see drafts of these? We would like to support the work here and may be able to assist in terms of supporting the message.

SGHT: yes, fine, and welcomed.

Specific comments on the EIA & Ops Plan specific

12. There seems to be some variation between the baiting density between the EIA and the Ops plan, but in general it seems to be lower than that used

elsewhere. Given the importance of getting this right, the difficulty of rodents in low densities possibly established at depth under buildings, in talus or in deep vegetation, and the expense of the related logistics is there full confidence in the level of saturation of baiting planned?

GSGSSI – The Government does not have in-house expertise with which to assess the merit of the baiting density proposed. GSGSSI are content that experts have independently scrutinized the methodology, and consider it to have a high probability of success.

SGHT: the baiting regime has been carefully considered by experts, including the acknowledged industry leaders - the IEAG. Bait density in vegetated areas will equal that which provided success on Campbell Island. In areas of scree and rock, where rat densities are much lower, the density of bait is similarly reduced, but should still be substantially more than necessary to allow every rat to obtain a lethal dose.

13. If the project were delayed one season, would this allow testing of the bait degeneration and potential contamination in the conditions encountered in South Georgia (given that these conditions are different from those experienced at other eradication sites)?

SGHT: the conditions on South Georgia are similar to those on Macquarie and Campbell islands, where ample testing was carried out. The costs of a delay are, in our view, not justified by this.

14. We note that the bait is unlikely to pollute the water column unless dumped accidentally in a large load (similar to the truck), and note that precautionary measures – largely to deal with perceived risk rather than actual risk – have been listed in the operations plan. But what contingency plans are in place if an accidental large amount of bait was dropped into a watercourse or tarn?

SGHT: in that case we would fish out what we could. Watercourses on South Georgia, including the one feeding the water supply to KEP, are small, so bait recovery would be very effective. In a lake the bait would likely not be recoverable, but it would sink into the sediment and break down into harmless elements with time.

15. Noting that the bait needs to be fresh to keep the number of rats that find it unpalatable to a minimum (which seems to have been key to successful eradication in other areas), is there sufficient confidence that sea transport disruption and delays will not put the project at risk?

SGHT: we will use routes and methods of transportation that offer the lowest risk of this.

16. Equally, in addition to the procedures outlined in section 8.4 of the Operational Plan to protect the bait, would there be value in considering the use of weatherproof storage pods (similar to those designed for use by Parks Tasmania)?

SGHT: these pods will be used in Phase 2, but should not be necessary for Phase 1 because bait can be stored until use in a dry building.

17. Would it be possible to have Table 2, Section 3 of the Ops Plan listed chronologically? It is a little confusing currently, and not clear why the bait would be ordered in August 2010 when the final decision to proceed would be decided the end September 2010 (particularly given the short shelf life of the bait). (Equally, it would perhaps be more cautious to do the media release after the assessment on the fate of the ducks).

SGHT: the timeline of key tasks and milestones has to remain dynamic and flexible to take account of constant changes in such things as shipping schedules, so a snapshot of the itinerary can be misleading. Plans will be

kept under constant review to ensure consistency and avoid logistical malfunctions.

18. Is there sufficient confidence in freezing 20 rats for later DNA work? Perhaps 50 would provide a better specimen base.

SGHT: 20 would be a minimum. 50 (or 500) would be better, but the law of diminishing returns applies. As in almost all elements of this project, we have to compromise between the ideal and the affordable, but without cutting crucial corners.

19. Regarding the proposed eradication of the reindeer: as noted above we have not seen an EIA or Ops Plan for that, is it possible to receive a copy? We are interested in all aspects of that proposed eradication and would appreciate the opportunity to comment.

GSGSSI - No decisions have yet been made with regards to reindeer. GSGSSI have drafted a consultation document regarding management options for the reindeer, which will be made available for public comment in the very near future.

20. Is it possible to clarify in the EIA if the proposed regeneration of native vegetation resulting from the rat and mouse eradication is due to the eradication of the rats or the reindeer?

SGHT: Both

21. We note the potential poisoning of the pintail and speckled teal ducks and the intention to monitor 15 individuals during this next season. While it is understood that the perceived risk noted in Table 7 of the EIA is subjective, we would seek reassurance, having read the EIA and Appendix 5 closely, that the GSGSSI are confident that the risk of primary poisoning is 'medium'.

SGHT: not sure what more to say here, beyond what's in the EIA/OP. The point is that we have done our best to assess risk objectively, have carried out a trial which indicates risk to be low, and will proceed with a limited, monitored trial. Worst case scenario is that we kill all the pintails in the baited area, but even that impact would be easily sustainable by the island-wide population and recovery would likely be rapid.

22. Is it possible to delay the project one season and test the likelihood of the ducks taking the bait during the 2010-11 season?

SGHT: possible, yes, but of doubtful justifiability. How would this be tested, other than by taking birds into captivity (to exclude other fauna from taking the bait and rendering the test meaningless)? And captive trials have already been done.

23. With respect to the 15 radio tracked ducks: is it possible to control those selected for tracking so that they represent the population evenly (equal sex ratio, adult and sub-adult birds)

SGHT: yes, that's the intention.

24. What is the confidence level in the radio-transmitters? (e.g is there confidence that 15 devices will mean 15 data points, or is the expectation for say 12 to be operational out of the 15?).

SGHT: trials on captive birds should indicate the answer to this question.

25. Is it possible to radio-track the ducks pre-baiting to see where they live during daylight and how easy the devices are to detect when legs/antennas are not so exposed. Measuring the size of individual's home-range might be ambitious but any pre-baiting data would be useful later on.

SGHT: yes, the intention is to locate birds both before and after the bait drop. Any significant difference between the two would trigger an intense search for missing transmitters and also for unmarked birds dead or alive.

26. Would consideration be given to trapping and husbandry of the speckled teal in particular given their low population numbers?

SGHT: the speckled teal is now so low in numbers that the existence of a self-sustaining population must be very doubtful. Catching at night might be feasible, but would be very labour-intensive and unlikely to yield more than a few birds. Captive care would be expensive, and might well lead to mortality, since the birds would be adults. Doubtful if this procedure would receive much support.

27. Furthermore while aware of the implications regarding weather and daylight hours, we would question why it would not be possible to delay the baiting work until mid March through April so as to be outside of the ducks' susceptible moulting period. This would still allow a 45-day period for the proposed 8 days of flying in phase 1.

SGHT: two reasons why this might not be a good idea. First, in 2009 and 2010 heavy snow falls occurred on SG in mid-April, and any flying after this time might well be at risk. Second, it's hard to be sure at this stage, but the flightlessness of many adults may be beneficial, in that they cannot move into a baited zone from outside. In the worst-case scenario (God forbid) that every bird in a baited zone is killed, the damage would then be limited and recoverable by later immigration.

28. With respect to the estimated impact on skuas, is there a conflict in EIA entry under Table 7 and Section 5.11 Negative ecosystem effects?

SGHT: I'm unclear about this comment. Table 7 refers to the possible primary and secondary poisoning of birds, and I don't see that section 5.11

refers to this aspect of the project. The only possible explanation I have is perhaps that column 4 of table 7 was interpreted to refer to all potential medium-term consequences of the project, rather than just the potential consequences of the poisoning (described in columns 2 & 3). The latter is correct.

29. Our most significant concern however is with respect to safe operations and the intended use of only one helicopter in phase 1. The phrase '*one helicopter is no helicopter*' is often used in remote regions. This concern stems not only from the perspective of the potential disruption to work from mechanical issues, but also from a safety perspective. Even though it is understood that this is a relatively small area of operation, close to sea access and within the reaches of reasonable mountaineers, it is often the case that accidents occur outside the intended area and conditions of operation. This is such an important project that it would be unfortunate if it failed due to a desire to proceed undermining a 'belt and braces' principle.

SGHT: we would also prefer a second helicopter, but the expense of it is beyond the available budget. The Chief Pilot and UK CAA are content with the use of a single machine, and the risk of unfixable breakdown or crash is very, very small.

30. Noting the bait is best spread at an altitude of 300-500ft but that it is possible to spread the bait from a higher altitude when there is little or no wind - and given the prevailing weather conditions - is it possible to test behavioural responses by birds to helicopters at 300-500ft altitude prior to the eradication work rather than setting a blanket minimum height of 500 which might preclude the success of the operation?

SGHT: behavioural tests on vulnerable birds have been undertaken on Macquarie island, and will be repeated on SG for confirmation. Subject to avoiding damaging disturbance, bait will be sown at heights most suitable for the terrain and weather conditions.

31. Given that the weather will no doubt disrupt a lot of planned flights, and that rats which are living in talus at low densities will need special attention, would there be value in doing the second set of runs at 90 degree angle for each pass? (We note the current intent to only overlay bait on Pass 2 and not Pass 1 – will this be sufficient to avoid sub-lethal doses?)

SGHT: the amount of bait delivered on each drop should be ample to provide a lethal dose for every rat. The second drop is 'insurance' should rat density be extraordinarily high or should mice be in the area too (and be excluded from the first drop of bait by competition with rats). Any animal surviving the first drop should be killed by the second. That said, perpendicular paths for drop 2 compared to drop 1 will be used whenever feasible and adequately efficient in terms of rate of land coverage.

32. Can clarification be given regarding contingency plans for fuel spills?

GSGSSI – Government approval of the project is conditional on an adequate plan being in place prior to operations commencing.

SGHT: adequate equipment will be available to contain and clean up any fuel spill. Refuelling in phase 1 will be on a concrete pad with a lip, anyway.

33. The success of the program depends on South Georgia's physical barriers preventing re-invasion as each sub-population is eradicated. It is important that an *intensive search for rat sign* (see section 12.4 of the Operational Plan) be completed before proceeding to the next phase. According to section 12.4 a 'specially-trained dog' will 'probably' be used as an aid in such a search. The importance of ensuring (a) all rats have been killed, and (b) the island's topography is an effective barrier against re-invasion justifies a significant investment in monitoring programs – this may include the use of at least one special purpose dog. (For example, Parks Tasmania is employing about a dozen specialist dogs and their handlers for this purpose).

SGHT: the intention is to use one or two trained rat dogs, but this is dependent on the availability of such animals at the appropriate time. Dogs on Macquarie are being used to detect a substantial number of rabbits that are expected to survive the baiting - that's very different from the situation on SG, where the probability is that no rodents will survive.

34. Is there an intent to measure pre- versus post-baiting rat population at specific areas (e.g through hair traps)?

SGHT: we are not too interested in the density of rats before baiting, but we are extremely keen to know if the density of rats after baiting is anything other than zero. That is where the effort (and considerable expense) will be invested.

In summary, we are pleased to support this work in any way we can, but would seek reassurance that haste is not compromising preparation and planning. In general, we would advocate a step-by-step approach, which would include clarity on the overall plan, additional testing and experimentation, and consideration of setting back the period of baiting by 4-6 weeks to avoid the key pintail moulting period.

SGHT: we are delighted to have the backing of IAATO, in principle, for the operation. Research and planning for this project have been underway for more than 2 years, so undue haste is not an issue, although the extremely rapid ablation of glaciers means that success of the work becomes less predictable with each passing year. Additional testing and experimentation would have been necessary had the Macquarie Island project not carried out (at very substantial expense) the very research that would have been needed at SG. Our operation is benefitting hugely from the experience of the Campbell and Macquarie island operations, and will be further informed by the experience gained during the Macquarie Island eradication itself, which is underway right now.

Anonymous Comments to GSGSSI on the Proposed Rat Eradication Plan

GSGSSI responses (Darren Christie, Environment Officer)

SGHT responses (Tony Martin, Project Manager)

I've just finished going through the relevant documents. There certainly has been a great deal of consideration given to the various logistical issues and risks associated with this very worthwhile project. However, I still have reservations regarding aerial broadcasting of brodifacoum baits. Brodifacoum is highly toxic, which of course is the main advantage of this active ingredient, and reasonably palatable at the concentration proposed, but the compound is also highly persistent, and toxic to all vertebrates to varying degrees. Hence there are several points that I think should possibly be given further consideration;

1 In the UK, the use of brodifacoum is registered to indoor use only - because of the significant risks associated with consumption, either directly or indirectly, by non-target species. I assume UK legislation on this does not apply in South Georgia, otherwise aerial broadcasting of brodifacoum would contravene the Control of Pesticide Regulations, unless a specific exemption had been given by the Health and Safety Executive.

GSGSSI – soon to be enacted legislation would mean that South Georgia is dis-applied from these regulations. Brodifacoum is licensed for aerial broadcast in New Zealand, where it is regularly used for eradications, including on sub-Antarctic islands similar to South Georgia. The proposed Operational Plan follows best practice guidelines developed for these comparable operations. There is of course a substantial difference in the use of a toxin for control purposes, as in the UK, and for a one-off eradication such as this.

2 It is not clear that adequate consideration has been given to the possibility of using other, less toxic, second generation rodenticides such as bromadiolone or coumatetralyl. The EIA mentions that the only active ingredient registered for aerial broadcasting is brodifacoum, but if the UK restrictions regarding outdoor use of brodifacoum do not apply in South Georgia, then under

what legislation is aerial broadcasting of alternative anticoagulants restricted? As well as being less persistent in biological tissues and soil, less toxic anticoagulants such as bromadiolone are still likely to be fully effective on SG given that resistance is unlikely to be an issue in rats that have not previously been exposed to anticoagulants. Norway rats were successfully eradicated from the island of Canna recently using diphacinone, a first generation anticoagulant.

SGHT: Although other rodenticides may work in these circumstances (aerial spreading on a sub-Antarctic island), there is no evidence that they will. If another compound was used, and it failed to kill every single rodent within the treated area, then something over £1m and many person-years will have been wasted. Furthermore, the failure would likely lead to a loss of confidence and funding, resulting in the cancellation of the entire project. In these circumstances, and without overwhelming evidence of much worse environmental damage from the use of Brodifacoum, the use of another rodenticide is very hard to justify.

3 I agree that brodifacoum, as well as the other anticoagulants do not dissolve well in water, and hence the risk of contamination of water sources from dissolved material is low. However depending on the formulation (wax content), the pellets could possibly break up and particles could travel long distances in water, depending on the flow rate, or become incorporated in the sediment where residues could remain for substantial periods. The filtration measures proposed could be adequate, but given that full breakdown of bromadiolone may take up to two years, is it possible that residues may remain in sediments for longer than the proposed period of filtration/monitoring and become dislodged and biologically available at a later stage, perhaps after heavy rainfall?

SGHT: Calculations carried out by the medical staff at the Australian Antarctic Division in advance of the Brodifacoum bait drop on Macquarie Island (underway as I write this) demonstrate that the amount of contaminated water needing to be consumed to cause health problems in

humans are so huge that such poisoning is implausible. If Brodifacoum does enter the sediment, it will slowly disintegrate there and should not cause problems to either humans or wildlife while this occurs.

4 What happens to the bait that is not consumed by rodents (or other wildlife)? Will any efforts be made to retrieve uneaten bait?

SGHT: Uneaten bait will only be collected in or near the watercourse feeding the human water supply at KEP/Grytviken. Doing so elsewhere is simply not feasible.

5 The documents suggest that the risks of secondary (indirect) poisoning of non-target species is low. I did not see any mention of raptors, which are particularly vulnerable to secondary poisoning due to their dietary habits, low population densities and low breeding output. Are there no raptors on SG, or migratory species, or raptors visiting SG from other nearby regions? Does the Striated Caracara for example, a species which has declined considerably in the Falklands and potentially vulnerable, breed on, or visit SG?

SGHT: There are no resident raptors on SG, and migrant vultures are very rare indeed.