

REVIEWER 1

1. Are adequate biosecurity measures in place to reduce the risk of introduction and spread of non-native species and diseases to South Georgia?

Section 2.2 refers to animal health- Jane previously emailed the details regarding requirements for the Falklands and I am satisfied that all measures are in place. As discussed previously I would suggest best practice would be to remove faeces from the island.

2. Have adequate measures been put in place to minimise disturbance to wildlife (including seals, sea birds and burrowing birds) and damage to habitats?

We have been provided with information previously that the dogs will both free search and work on leash.

In the event of a 'breakaway' (although it is noted there have been none recorded in NZ) I feel that further mitigation is needed.

A dog potentially running amok at a site such as St Andrews and a short period of time by one animal could feasibly devastate a huge proportion of the colony, the smaller colonies could just as easily be affected and this would potentially counter the benefits of the dog deployment

It would be worth considering the use of remote optical devices for investigating burrows to minimise disturbance to nesting birds.

3. Are there any other hazards or impacts which should be included in the EIA which are not currently covered?

I would advise the use of caution in relation to the dogs and exposure to Asbestos. I have discussed this in detail and while there be no potential adverse effect on the health of a dog, (although there is no data relating to canine/asbestos diseases etc. we are basing this upon human data) there is potential for negative publicity should any images etc. ever be taken and find their way in to the public domain. There are measures which could counter this such as presence of Govt. Officer etc. during deployments.

One potential matter also relating to whaling stations is drawn from the operational plan, page 12 'Operating in and near whaling stations'.

The first paragraph states 'great value within whaling stations, because they can enter spaces and buildings that would be inaccessible to humans'.

In relation to this I would question several aspects:

- If the dog indicates the presence of a rodent how will the handler be aware if access cannot be gained to investigate and deal with the potential find
- Potential injury to dog owing to voids, debris and animals (seals potentially in areas)
- Injury caused to handler by potentially trying to follow/join/rescue dog or from dog disturbing materials such as flooring/asbestos

These could be mitigated by technological means if deemed necessary for the dogs to enter or by use of remote visual aids.

4 Is the specification and training of the dog and handler appropriate for safe operation and reliable rodent detection in the site specific conditions on South Georgia?

It is noted that the dogs are trained and licensed to a high standard in New Zealand. We have been provided with the licensing standards used but have not as yet seen documents for individual dogs that will be used. Also the person assessing/licensing the dog should be impartial and not involved with the SGHT operation.

A method of trial should be used before deployment to SG and in consultation with the Falkland Islands Government to achieve this whereby the dogs could be assessed and observed, this should be conducted independently of persons from SGHT.

My recommendation in addition to the above is that in order to maintain objective observation and compliance with permit conditions a representative from GSGSSI be deployed with the dogs to verify effectiveness of search and wildlife disturbance.

5. Have operational considerations been fully accounted for?

All matters other than those raised above appear to have been covered by the documents provided.

REVIEWER 2

1. Are adequate biosecurity measures in place to reduce the risk of introduction and spread of non-native species and disease to South Georgia?

Yes, adequate biosecurity measures are in place.

2. Have adequate measures been put in place to minimise disturbance to wildlife (including seals, sea birds and burrowing birds) and damage to habitats?

Yes, adequate measures have been put in place to minimise disturbances to wildlife. Dog handlers should be aware that they may encounter white-chinned petrels *Procellaria aequinoctialis* on the ground. White-chinned petrels are diurnally active, coming to and going from burrows and resting on the surface beneath vegetation. White-chinned petrels on the ground during the day are likely to move away from people or dogs.

It is recommended that no digging by dogs is permitted in seabird burrowed areas as these areas can be delicate, and it takes a considerable length of time for a burrowing petrel to excavate a burrow.

Although muzzled, if they are able to barking by dogs should be minimised as this may disturb wildlife.

Northern and southern giant petrels *Macronectes halli* and *M. giganteus* are reportedly prone to disturbance at some breeding localities. Brooding adults or chicks on nests should be given as wide a berth as possible. Young giant petrel chicks are prone to vomit if approached closely so should be avoided.

The size and extent of Kerguelen petrels *Lugensa brevirostris* on South Georgia is unknown, the species is only reported from the Shallop Cove area of the Nunez Peninsula (Black et al 2013). Efforts should be made to minimise the impact of ground surveys on petrel burrows in this area.

South Georgia pin tail ducks *Anas georgica* are most active in the area where rats were caught (Black et al. 2012) and care should be taken to avoid separating young chicks from parents as the chicks may be flushed into areas they are vulnerable to skua attack.

3. Are there any hazards or impacts which should be included in the EIA which are not currently covered?

Although the dogs are trained to ignore non-target species handlers should be aware there may be a number of skua killed petrels corpses in various stages of decomposition that could attract dogs.

No further hazards relating to the use of dogs interacting with seabirds and seabird habitats are noted.

4. Is the specification and training of the dog and handler appropriate for safe operation and reliable rodent detection in the site specific conditions on South Georgia?

Yes, the DOC NZ standard is appropriate for South Georgia. The combined experience of both Macquarie and Campbell Islands well prepares the dog team for work on South Georgia.

5. Have operational considerations been fully accounted for?

As SGHT states, if rat sign is found it is unlikely the detection team could exterminate a rodent population. Given this we recommend if a dog detects rodent sign in multiple seabird burrows in a single burrowed area, prior to excavating multiple burrows consideration be given to first:

- Use a small digital camera at arms full length to better identify the burrow depth and contents. Note if a petrel burrow is excavated it should be repaired if possible.
- Deploying auditing devices in the area and returning to inspect them as many days later as is possible. e.g. wax tags, tracking tunnels

REVIEWER 3

Operational Plan

In reviewing the Operational Plan, it is quite basic in outline but provides enough detail to establish how the team will go about the work of assessing baited blocks for residual rodent activity.

A fair bit of detail is left to the Expedition Leader and the Vessel Master, which is good on one hand as it allows the experience of those individuals to determine progress as they deal with both weather and determine the timing required to assess the blocks that are visited. On the other hand, it does leave some questions as to the prescription of visits and what the priority of blocks are should lack of progress or poor weather hold up work to the point that not all blocks can be visited, or that some only get a rudimentary inspection (although I note that a list of target sites will be included in a subsequent draft of the operational plan after GSGSSI input). In that event, it would be good for the expedition report to note the time spent in each block and the extent to which the survey team feel the terrain has been covered satisfactorily.

It is clear from the plan that due to the extensive length of coastline of the blocks baited in Phase 2 and 3, that only a fairly cursory inspection will be possible, but that will still provide valuable information towards the objective of determining the rodent-free status of the island.

The survey methods are adequately outlined as is the timeframe for deployment of devices and the subsequent voyage to deploy dogs and retrieve devices.

Consistency of terms in the plan would remove potential confusion – e.g. reference to the Expedition Leader (EL) is assumed to be the same person as the ‘senior SGHT field officer’ in which case just one term should be used throughout.

Under Methods (p.11) there is reference to investigating burrows where dogs have indicated rodent scent. Another tool that could be used for this before digging up is a burrow scope, if one can be begged or borrowed for the expedition.

In the event that rodent sign is discovered and communicated for a decision on response by the SC Chair (p.11) – as their any existing incursion response plan that the SC chair has available to guide a response, or would this be a matter of discussion with SGHT and GSGSSI staff as to the best way to counter a remnant rodent population?

The note in Appendix 2 that the team may not have much experience in determining rodent sign is a concern – given the cost of the expedition and the need to get the best result possible to be as confident as possible of rodent eradication – team members with appropriate experience are recommended. A clear strength of the plan and the expedition is the inclusion of two very experienced rodent detection dog handlers with their three dogs, and while this forms an invaluable core of experience, other team members should ideally have prior experience in rodent detection surveys

(preferable extensive) as well....a more reliable outcome can be anticipated from this (and equally applies to the deployment of devices in the November-December voyage, as experienced rodent detection workers will have a better eye for rat habitat/habits to inform specific placement of devices.)

One weakness in the operational plan in my view is that there doesn't seem to be an imperative for the device deployment team (in *Pharos SG*) to have an experienced rodent monitoring person within the team. I think this is critical because the quality of the outcome is partly determined by the quality of the input and people who do not understand rodent behaviour and movement are less likely to place rodent detection devices in the most likely places to encounter rodents, compared to someone who has done this work before. In short, the more experienced staff there are in the team, the better the results of the expedition are likely to be. Other than the dog handlers, nor does the retrieval team specify experience in rodent monitoring. On the plus side, one clear strength of the team is that both Miriam Ritchie and Jane Tansell have extensive experience at handling dogs in remote locations on predator-detection work. Miriam in particular has focused on rodents and has worked from Campbell Island (sub-Antarctic) to Raoul Island (sub-tropics) and most major islands around New Zealand undertaking rodent surveillance work. Both Jane and Miriam were selected for roles as dog handlers on Macquarie Island, Jane handling dogs for rabbit detection and Miriam selected with her dogs on the rodent monitoring team, a role she was unable to take up.

Environmental Impact Assessment

The EIA is comprehensive and addresses the various potential risks and mitigations foreseeable in operating rodent detection dogs on South Georgia.

The precautions around treatment for parasites etc., as well as the required vaccinations prior to international travel, should ensure there is no risk of organisms/disease transmission to native wildlife.

Importantly, and the consideration that should provide most confidence for GSGSSI, is that a) the dogs have done similar work already and know what is expected of them with regards to both target and non-target species; b) that they have undergone an assessment against specific and rigorous criteria in their training and have passed those assessments and been awarded a certificate allowing them to operate in conservation land and c) that the handlers are both experienced in their task and have both operated with these and previous dogs on islands with extensive wildlife, including in sub-Antarctic island conditions.

It is worth noting that the certification process is a two-stage one. The 'interim certificate' assessment primarily assesses obedience and the relationship between handler and dog, and the dog's ability and willingness to learn. The second stage is more complex and oriented toward non-target aversion and target species focus, while stepping up the criterion of obedience and responsiveness to handler commands. Achieving the full certification, plus the prior experience of dogs and handlers, is the surest way of being confident of minimising the environmental impacts from working on South Georgia.

I note that a number of parallels are drawn with the Macquarie Island eradication project, where dogs were used extensively, and on that project dogs traversed along the coastal areas where seals and large penguin colonies were located, on an almost daily basis for three years (so potentially close to 1,000 times right around the island, given the number of dogs used). In comparison, the transit of search areas on South Georgia is likely to be once or twice only, so a far lesser degree of potential disturbance exists. The fur seals on Macquarie are less numerous than South Georgia, but the penguin colonies probably greater; and it was evident that the dogs showed either no interest or mild apprehension when transiting these areas, whilst being under tight (verbal) control by the handlers (but not leashed as this was unnecessary). The main difference on South Georgia is likely to be the greater occurrence of fur seals which I would expect to be well managed by the handlers.

Protocols for prevention of seeds between landing sites are well thought through although some minor changes could be made (for example brushing dogs between landings rather than washing, to remove seeds/soil). I would also query whether it is necessary to wash dogs with detergent following whaling station checks, as opposed to swimming them (to wash them) as detergents will also remove oils from their coats. The handlers may have views on this aspect.

I have a number of minor observations in both the operational plan and Environmental Impact Assessment and these have been annotated as comments in the respective documents, attached.

1. Are adequate biosecurity measures in place to reduce the risk of introduction and spread of non-native species and disease to South Georgia?

I consider that the proposed measures to reduce the risk of introducing non-native species to South Georgia are adequate. In addition, precautions for transferring non-native species intra-island are also addressed, noting that the risk of this is small compared to that posed by birds and seals as they move around the island.

2. Have adequate measures been put in place to minimise disturbance to wildlife (including seals, sea birds and burrowing birds) and damage to habitats?

The risk of damage to habitats is, in my view – negligible to none – the passage of dogs and handlers walking over vegetation or soils once or twice (they are not going to have time for more) is not going to cause noticeable trampling. The primary to ensure disturbance to wildlife is minimised is the experience of the two handlers, who are already used to working around sensitive wildlife species with their dogs and who will I am sure be well briefed. A burrow-scope could be considered for inclusion in the equipment taken. This may be of use when wanting to inspect the interior of burrows that dogs indicate at, without excavating the burrow. However consideration also needs to be given to the weight of these units when they would need to be carried all day in the field.

I can't think of additional practical measures to protect South Georgia wildlife.

The risk of dogs being injured by seals is a real one given the sheer number and mobility of seals and their presence well inland in vegetated areas that the handlers will need to work their dogs, being also prime rat habitat. Again the working relationship between handler and dog and the obedience levels of the dog (plus their natural agility) should suffice to protect the dogs from harm – they are much smaller than the seals and can move quicker when they need to. Search guidelines do address this concern but in reality the search patterns will be largely left to the dog handlers to plan when they arrive at a landing and get a feel for the concentrations of seals.

3. Are there any hazards or impacts which should be included in the EIA which are not currently covered?

Could add that whaling stations only be inspected during calm or low wind conditions.

4. Is the specification and training of the dog and handler appropriate for safe operation and reliable rodent detection in the site specific conditions on South Georgia?

Not only do I consider the dog training (and assessments for certification) suitable for the site specific conditions of South Georgia, I can't think of any other programme in the world where the certification is based on concerns similar to those held for South Georgia in detecting rodents, and the outcome of the training and assessment is a certificate of achievement. This means the GSGSSI does not have take the word of the handlers that the dogs have reached a certain standard (especially as regards both efficacy in rodent detection and aversion to wildlife) as they would with pretty much any other dog proposed, and can start with a high degree of confidence in the ability of the dogs to work on South Georgia. In terms of climate the dogs will be fine, and in terms of being trained to avoid impacting wildlife they are also reliable. Because the handlers have put years of training effort into the dogs, you can be assured that the handlers will have the dogs' welfare at front of mind when operating on the island. I believe that the quality control assurances inherent in the certification of the dogs, and the experience of the handlers is sufficient to address concerns on how they will operate and potentially impact the South Georgia environment. Equally the handlers' specification and training will be equal to the task, and in Miriam Ritchie especially you have one of the most experienced people in the world at this specific task.

5. Have operational considerations been fully accounted for?

There are some discrepancies between the Operational Plan and the EIA as to how and when the dogs and handlers (and other team members) will be deployed to South Georgia from the Falkland Islands and where they will first work. This may reflect changing planning outcomes between the preparation of the two documents, but these aspects should be consistent between the two. Other than that there is sufficient detail to inform and plan the work required on the island.

There is mention that the dog handlers will follow planned routes at each landing site which does give me some concern as the handlers are probably best placed to plan

their search patterns once ashore at each site and see the vegetation extent, natural features such as caves or overhangs, and where wildlife concentrations are. Some broad guidelines would be useful especially if there is existing knowledge of wildlife concentrations or geographical features of interest that may be attractive rodent habitat, but in general the handlers will need a high degree of flexibility in order to discharge their duties most effectively.