

DPR9S2\1010

Protecting South Georgia's terrestrial communities from climate change-invasion synergies

South Georgia's unique terrestrial ecosystems are vulnerable to invasion by non-native plants and invertebrates that will benefit from climate change. Our project will generate information immediately applicable to conservation management in a warming climate by 1) recording colonisation of recently deglaciated areas by non-native species, 2) identifying 'winning' and 'losing' native and non-native plants under simulated warming, 3) mapping invasive carabid beetle and native invertebrate distribution and abundance, and 4) identifying high-risk potential future invaders from the Falkland Islands.

Section 1 - Contact Details

PRIMARY APPLICANT DETAILS

Name Wayne
Surname Dawson
Tel (Work) + [REDACTED]
Email (Work) [REDACTED]
Address [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

GMS ORGANISATION

Type	Organisation
Name	University of Durham
Phone	[REDACTED]
Email (Work)	[REDACTED]
Website	[REDACTED]
Address	[REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]

Section 2 - Title, Dates & Budget Summary

Q3a. Project title

Protecting South Georgia's terrestrial communities from climate change-invasion synergies

Q3b. What was your Stage 1 reference number? e.g. DPR9S1\10008

DPR9S1\1038

Q4. UKOT(s)

Which eligible UK Overseas Territory(ies) will your project be working in?

South Georgia and The South Sandwich Islands (SGSSI)

* if you have indicated a territory group with an asterisk, please give detail on which territories you are working on here:

No Response

Q4b. In addition to the UKOTs you have indicated, will your project directly benefit any other Territories or country(ies)?

Yes

Please list below.

Falkland Islands

Q5. Project dates

Start date:

01 July 2021

End date:

30 June 2024

Duration (e.g. 2 years, 3 months):

3 years

Q6. Budget summary

Year:	2021/22	2022/23	2023/24	2024/25	Total request
Darwin funding request (Apr - Mar)	£96,052.00	£137,079.00	£79,262.00	£11,387.00	£ 323,780.00

Q6a. Do you have proposed matched funding arrangements?

Yes

What matched funding arrangements are proposed?

Durham will contribute costs in-kind through-

i) use of climate chamber growth facilities, running costs and experiment materials (valued at £ [redacted])

ii) provision of GPS units (valued at £ [redacted])

iii) PDRA [redacted] staff overheads (£ [redacted])

iv) travel insurance costs for the Project Lead and PDRA (to the value of £ [redacted])

v) 1 x return flight to the Falkland Islands for Project Lead (£ [redacted])

vi) [redacted] staff time plus [redacted] overheads for W Dawson (£ [redacted])

Kew will contribute [redacted] staff overheads costs in-kind (£ [redacted])

BAS will contribute [redacted] staff overheads costs in-kind (£ [redacted])

Total matched funding = £ [redacted]

Q6b. Proposed matched funding as % of total project cost (total cost is the Darwin request plus other funding required to run the project).

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Section 3 - Project Summary and Conventions

Q7. Summary of Project

Please provide a brief summary of your project, its aims, and the key activities you plan to undertake. Please note that if you are successful, this working may be used by Defra in communications e.g. as a short description of the project on [GOV.UK](https://www.gov.uk).

Please write this summary for a non-technical audience.

South Georgia's unique terrestrial ecosystems are vulnerable to invasion by non-native plants and invertebrates that will benefit from climate change. Our project will generate information immediately applicable to conservation management in a warming climate by 1) recording colonisation of recently deglaciated areas by non-native species, 2) identifying 'winning' and 'losing' native and non-native plants under simulated warming, 3) mapping invasive carabid beetle and native invertebrate distribution and abundance, and 4) identifying high-risk potential future invaders from the Falkland Islands.

Q8. Biodiversity Conventions, Treaties and Agreements

Please detail how your project will contribute to the aims of the agreement(s) your project is targeting. What key OT Government priorities and themes will it address? You should refer to Articles or Programmes of Work here. You should also consider local, territory specific agreements and action plans here.

Under the Convention on Biological Diversity (CBD), the GSGSSI is committed to conserving biodiversity, including meeting Aichi Target 9: invasive species are prevented and controlled. However, climate change means this target is not static, but moving. Our project will contribute to the GSGSSI meeting this moving target, by explicitly focusing on how climate change and its impacts will affect the performance of non-native plant and invertebrate species.

The GSGSSI has a new Stewardship Framework for 2021-2025 ('Protect Sustain Inspire'), and our project will support this Framework in the following GSGSSI Priority Areas:

Biosecurity is a priority area in the Framework, consisting of pre-border prevention and post-border monitoring and response. Our project will contribute to pre-border prevention by identifying those plant and invertebrate species most likely to be introduced and become established under a future climate. Post-border monitoring and response requires knowing the current and likely future distribution, abundance and performance of non-native species. We will create the required evidence base on the distribution and abundance specifically of invasive carabid beetles and their native (including SG-endemic) prey, which face a very real threat of local extirpation. We will assess which environmental factors (vegetation) control invertebrate distributions, and we will identify which species of plant and invertebrate are most likely to be 'winners' and 'losers' under a changing climate.

Local Science, Global Impact. Under this priority area, the GSGSSI strategy will focus on how the responses of ecosystem function might be driven by climate change and its impacts, and how projections of future change can support territory management. Our project will support this priority area by characterising the newly forming plant and invertebrate communities in deglaciated areas (which may include non-natives). Overall, our project outputs will allow management responses to be targeted more effectively to the most vulnerable native species and habitats, and to those non-native species posing the greatest risks to SG's unique terrestrial ecosystem.

The GSGSSI's most recent National Biodiversity Action Plan (NBAP, 2016-2020) enacted the GSGSSI Environmental Charter. The GSGSSI has committed to continued management of invasive non-native species beyond this action plan and will continue to fund a comprehensive invasive plant management programme: our project's evidence base will support these commitments through these existing NBAP objectives:

#5: Enhance knowledge of the biodiversity and habitats of SGSSI through research, monitoring and review, including the establishment of scientific baselines from which to assess environmental change including the potential effects of climate change.

Our project will generate the baselines for developing communities in recently deglaciated areas, and the performance of native and non-native plants under a future climate.

#6: Effectively manage non-native species and work along the entire biosecurity continuum to implement best practice biosecurity protocols, post-border monitoring and emergency response measures.

Our project will generate the most up-to-date information on invasive carabid distributions and their impacts on native invertebrates, which is a prerequisite for prioritising areas for management and methods to be used. We will also enhance biosecurity by identifying species on high invasion risk in the future.

Section 4 - Lead Organisation Summary

Q9. Lead organisation summary

Has your organisation been awarded a Darwin Initiative award before (for the purposes of this question, being a partner does not count)?

No

If no, please provide the below information on the lead organisation.

What year was your organisation established/ incorporated/registered?	1832
What is the legal status of your organisation?	<input checked="" type="radio"/> University
How is your organisation currently funded?	Durham University has a diverse set of income sources, including primarily from tuition fees and education contracts (██████ of income), research grants and contracts (██████ funding council grants (██████ donations and endowments (██████ and investment income (██████ Research income sources are primarily the UK research councils, followed by EU and UK government bodies, and UK-based charities and industry (source: Durham University Annual Report and Financial Statements for the year ended 31 July 2020).

Describe briefly the aims, activities and achievements of your organisation. Large organisations please note that this should describe your unit or department.

Aims	Research and teaching at Durham's Biosciences Department address fundamentally important questions facing humankind, from food security to sustainability in industrial processes, mechanisms of antimicrobial resistance and the impact of climate change on life on earth.
Activities	Our research covers the breadth of the biological sciences, including cell and molecular biology in animals, plants, and microbes, and ecology, conservation and evolution. We often work at the interface with other disciplines, supported by outstanding research infrastructure in genomics, bioimaging and mass spectrometry, and plant and animal growth facilities.
Achievements	Durham is a Russell Group research-intensive university, is consistently ranked among the top 10 universities in the UK and in the top 100 universities worldwide (https://www.dur.ac.uk/about/rankings/). Durham's Biosciences Department is ranked 8th in the UK Complete University Guide 2021, and 12th in the Guardian University Guide 2021.

Provide details of 3 contracts/projects held by the lead organisation that demonstrate your credibility as an organisation and provide a track record relevant to the project proposed. These contracts/awards should have been held in the last 5 years and be of a similar size to the grant requested in your Darwin application.

Contract/Project 1 Title	Wildfire disturbance-recovery dynamics in Southern Siberia
Contract Value/Project budget (include currency)	£ [REDACTED] UK Sterling
Duration (e.g. 2 years 3 months)	3 years
Role of organisation in project	Forest ecology measurements related to wildfires in Boreal Forest of SE Siberia, Russia. Co-Investigators alongside remote sensing observations by the University of Leicester.

Brief summary of the aims, objectives and outcomes of the project

Causes and consequences of recruitment failure (RF) post-fire in the taiga-steppe ecotone:
When and where does boreal RF occur? What are the factors that cause boreal RF? What climate feedbacks are likely to result from boreal RF? The project combined remote sensing from satellite, with ground-truthing of ecological parameters in forest patches post-wildfire. Outcomes: satellite-derived parameters can distinguish between pre- and post-burn states as well as trajectories of recovery dependent upon severity of burn and vegetation composition through successional series. Drought periods post-burn can lead to forest transitioning to steppe grasslands at the southern margins of the Russian boreal forest.

Client/independent reference contact details (Name, e-mail)

Natural Environment Research Council,
[REDACTED]

Contract/Project 2 Title

Adaptive Management of Barriers in European Rivers — AMBER

Contract Value/Project budget (include currency)

€ [REDACTED] to Durham (€ [REDACTED] to Durham Biosciences PI Dr M Lucas)

Duration (e.g. 2 years, 3 months)

4 years 4 months

Role of organisation in project

Co-produced inventory of barriers across European countries; evaluated ecological, hydrogeomorphological and socio-economic impacts and benefits of river barriers, developed tools to measure these; contributed to socio-economic analysis of barrier management decision tools, testing predictions of ecohydraulic tools; UK and cross-border case studies. Collaborated in knowledge dissemination and training activities.

Brief summary of the aims, objectives and outcomes of the project

To determine the effect of barriers on connectivity and natural capital value of fluvial ecosystems. The specific objectives are:
1. Develop a conceptual framework for estimating barrier effects on fluvial processes at different spatial scales, and under different scenarios of climate change
2. Assess the nature of barrier effects for a range of aquatic biota
3. Develop and field test a rapid barrier assessment toolkit for assessment of connectivity of multiple taxa
4. Quantify the impact of stream barriers on ecosystem services and the benefits of restoring connectivity for natural capital.

Outcomes: An Atlas of Barriers in European Rivers:
<https://amber.international/>

Client/independent reference contact details (Name, e-mail)

European Commission: Executive Agency for Small and Medium-sized Enterprises (EASME),

<https://ec.europa.eu/easme/en/contact>


Contract/Project 3 Title	Explaining and predicting the migration and phenology of European-African migratory birds
Contract Value/Project budget (include currency)	£ [REDACTED] UK Sterling
Duration (e.g. 2 years, 3 months)	4 years
Role of organisation in project	Lead organisation, though grant submitted jointly with the British Trust for Ornithology as co-lead. Conceived idea, wrote proposal, leading grant.
Brief summary of the aims, objectives and outcomes of the project.	There is an urgent need to understand the causes of recent declines in long-distance migratory passerine and near-passerine birds. The project is developing a state-dependent migration model, in which climate can affect individuals directly via impacts on energy demands, and both climate and other landscape characteristics can affect individuals indirectly, via effects on resource availability. Our aim is to simulate, for the first time, complex spatio-temporal avian migrations conditioned on real environmental data, and to apply the resultant models to contemporary and future scenarios to explore the primary threats to such species.
Client/independent reference contact details (Name, e-mail).	Natural Environment Research Council, [REDACTED]

Have you provided the requested signed audited/independently examined accounts? If you select "yes" you will be able to upload these. Note that this is not required from Government Agencies.


Yes

Please attach the requested signed audited/independently examined accounts.

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Section 5 - Project Partners

Q10. Project Partners

Please list all the partners involved (including the Lead Organisation) and explain their roles and responsibilities in the project. Describe the extent of their involvement at all stages, including project development.

This section should illustrate the capacity of partners to be involved in the project. Please provide

Letters of Support for the Lead Organisation and each partner or explain why this has not been included.

N.B: There is a file upload button at the bottom of this page for the upload of a cover letter (if applicable) and all letters of support.

Lead Organisation name:	University of Durham
Website address:	https://www.dur.ac.uk/
Details (including roles and responsibilities and capacity to engage with the project):	<p>Experience: Durham has an established track record of research and international collaboration in polar science: it is home to the Leverhulme Trust-funded Durham Arctic Research Centre for Training and Interdisciplinary Collaboration (Durham ARCTIC), and is the charter English member of the University of the Arctic network. Durham's Conservation Ecology Group has a strong track record in global change research, particularly invasive species and climate change (http://www.conservationecology.org/).</p> <p>Roles and Responsibilities: The lead applicant at Durham will be responsible for overall project coordination, and the Biosciences Department will be responsible for Output 2- the simulated warming growth chamber experiment. Durham will work with BAS, SAERI and GSGSSI to deliver Outputs 1, 3 and 4.</p> <p>Involvement and Capacity: Wayne Dawson is a staff member on the DPLUS080 project, which aims to secure South Georgia's native habitats following invasive species control. He has used this experience to lead the development of this project proposal. Durham is fully capable of engaging with the project- all plant growth facilities required are functional and available. PDRA office space and resources are available, as are central IT, technical, research and financial support staff. Research expertise is available to support the PDRA with academic training for research output production.</p>
Have you included a Letter of Support from this organisation?	<input checked="" type="radio"/> Yes
Have you provided a cover letter to address your Stage 1 feedback?	<input checked="" type="radio"/> Yes

Do you have partners involved in the Project?

Yes

1. Partner Name: Royal Botanic Gardens Kew (Kew)

Website address: <https://www.kew.org/>

Details (including roles and responsibilities and capacity to engage with the project):

Experience: Kew has a successful history of delivering Darwin Plus projects on time and within budget and actively supporting conservation initiatives and botanical research in the UKOTs for over 20 years. Rosemary Newton is an experienced seed scientist and was part of the team responsible for delivering the multi-million Euro EU funded NASSTEC project FP7-PEOPLE-2013-ITN (<https://nasstec.eu/home>).

Roles and responsibility: Rosemary Newton will be responsible for all project work at the Millennium Seed Bank (MSB) comprising native seed germination trials under different temperatures to fill current knowledge gaps and to identify species responses to climate warming.

Involvement: Kew was a partner on DPLUS015 which led to the successful delivery of the South Georgia Non-Native Plant Management Strategy 2016-2020 and the production of the Field Guide to the Introduced Flora of South Georgia. Rosemary Newton is currently project leader for the DPLUS080 project, the aims of which are to secure South Georgia's native habitats following invasive species control. This proposed project will support and build on these successes.

Capacity: Kew regularly manages and partakes in large, global multidisciplinary projects. The MSB is the largest wild plant species seed bank in the world with fully equipped laboratories for seed research.

Have you included a Letter of Support from this organisation? Yes

Do you have more than one partner involved in the Project?

Yes

2. Partner Name: British Antarctic Survey (BAS)

Website address: <https://www.bas.ac.uk/>

Details (including roles and responsibilities and capacity to engage with the project):

Experience and capacity: BAS (institute of UKRI-NERC) provides the mainstay for UK polar science. BAS scientists are responsible for undertaking strategic research that assists the GSGSSI in environmental management, terrestrial protected area planning and biosecurity. BAS plays a central role in biodiversity and invasive species research on SG, by hosting the South Georgia GIS (topographic, management and scientific data) on behalf of the GSGSSI, and the UK Antarctic herbarium.

Involvement: Prof. Peter Convey has provided vital information on the knowns and unknowns of invertebrate ecology and distribution on SG. Thus, he has contributed to the development of project aims, methodology and planned outputs.

Roles and Responsibilities: Peter Convey is an established cross-disciplinary senior BAS researcher, with a considerable record in biodiversity and invasive species research across the sub-Antarctic and Antarctic (including on SG). Convey has direct experience of field research on SG that included work on native invertebrates and invasive carabid beetles concerning this proposal. He will provide expertise in design and execution of SG field invertebrate surveys and invertebrate identification (Outputs 1 and 3). Convey will assist in delivering the horizon-scanning exercise for invertebrate species (Output 4), will participate in project management group meetings and the final project workshop.

Have you included a Letter of Support from this organisation?

Yes

3. Partner Name:

South Atlantic Environmental Research Institute (SAERI)

Website address:

<https://www.south-atlantic-research.org/>

Details (including roles and responsibilities and capacity to engage with the project):

Experience and capacity: SAERI is a Charitable Incorporated Organisation, registered with the Charities Commission in England under number 1173105. SAERI is also recognised on the Register of Charities in the Falkland Islands under number C47. A Research Institute that conducts research in the South Atlantic from the tropics down to the ice in Antarctica. SAERI's remit includes the natural and physical sciences. It aims to conduct world-class research, teach students, and build capacity within and between the South Atlantic Overseas Territories. SAERI has had a great deal of experience operating in the Falkland Islands and South Georgia. SAERI has managed a number of large multidisciplinary projects including Darwin Plus grants and has the capacity to partner with this project.

Roles and responsibilities: SAERI will be responsible for logistics and specifically the provision of vegetation data and modelling expertise supporting Output 1 site location and Activity 3 invertebrate distribution modelling; information on FI resident invertebrates for Output 4.

Involvement: SAERI (Paul Brickle) has been engaged in the development of the project proposal since stage 1 of application, with key input on logistics and use of remotely sensed vegetation data for planning fieldwork.

Have you included a Letter of Support from this organisation?

Yes

4. Partner Name:

No Response

Website address:

No Response

Details (including roles and responsibilities and capacity to engage with the project):

No Response

Have you included a Letter of Support from this organisation?

Yes

No

5. Partner Name:

No Response

Website address:

No Response

Details (including roles and responsibilities and capacity to engage with the project):

No Response

Have you included a Letter of Support from this organisation? Yes No

6. Partner Name: *No Response*

Website address: *No Response*





Details (including roles and responsibilities and capacity to engage with the project): *No Response*





Have you included a Letter of Support from this organisation? Yes No

If you require more space to enter details regarding Partners involved in the Project, please use the text field below.

No Response

Please provide a cover letter responding to feedback received at Stage 1 if applicable and a combined PDF of all Letters of Support.

 [combined LoS Partners UKOT Govts](#)
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 [Response Letter](#)
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Section 6 - Project Staff

Q11. Project Staff

Please identify the core staff on this project, their role and what % of their time they will be working on the project. Further information on who should be classified as core staff can be found in the guidance.

Please provide 1 page CVs for these staff, or a 1 page job description or Terms of Reference for roles yet to be filled. These should match the names and roles in the budget spreadsheet. If your team is larger than 12 people please review if they are core staff, or whether you can merge roles (e.g. 'admin and finance support') below, but provide a full table based on this template in the PDF of CVs you provide.

Name (First name, Surname)	Role	% time on project	1 page CV or job description attached?
----------------------------	------	-------------------	--

Wayne Dawson	Project Leader	0	Checked
Rosemary Newton	Seed Scientist	20	Checked
Peter Convey	Polar/Sub-polar scientist/entemologist	10	Checked
Paul Brickle	Environmental data analyst	10	Checked





Do you require more fields?

Yes

Name (First name, Surname)	Role	% time on project	1 page CV or job description attached?
Postdoctoral Research Assistant	Field/Experimental/Desk-based researcher	100	Checked
Field Assistant	Fieldwork in 2 field campaigns	12	Checked
<i>No Response</i>	<i>No Response</i>	0	Unchecked
<i>No Response</i>	<i>No Response</i>	0	Unchecked
<i>No Response</i>	<i>No Response</i>	0	Unchecked
<i>No Response</i>	<i>No Response</i>	0	Unchecked
<i>No Response</i>	<i>No Response</i>	0	Unchecked
<i>No Response</i>	<i>No Response</i>	0	Unchecked

Please provide 1 page CVs (or job description if yet to be recruited) for the Project staff listed above as a combined PDF.

Ensure the file is named clearly, consistent with the named individual and role above.

-  [DPLUS CVs](#)
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Have you attached all Project staff CVs?

Yes

Section 7 - Background & Methodology

Q12. Problems the project is trying to address

Please describe the problem your project is trying to address in terms of environment and climate issues in the UKOTs.

For example, what are the specific threats to the environment that the project will attempt to address? Why are they relevant, for whom? How did you identify these problems? How will your proposed project help?

Please cite the evidence you are using to support your assessment of the problem (references can be listed in your additional attached PDF document which can be uploaded at the bottom of the page).

Climate change effects are marked on South Georgia (SG), with rapid glacial retreat. As warming continues, the island's unique terrestrial communities will respond more dynamically. SG continues to harbour non-native invasive plants and invertebrates, with some now so widespread that eradication is impracticable, and posing the risk that changing communities will become dominated by non-native species. Eight invasive plant species will require longer term management to limit further spread. Invasive invertebrates include two novel predatory carabid beetle species, but their current distributions and magnitude of impacts on SG's invertebrate-dominated fauna are unknown. In addition to current threats, future introductions of non-native species may pose a greater risk in a warmer climate; the Falkland Islands (FI), through which most traffic to/from SG is routed, is recognised as the most likely source of current high-risk invasive species. There is a pressing need to study how plant and invertebrate communities are changing with climate warming, and to understand how interactions between native and non-native species may impact future communities. We will address this by 1) generating baseline data on non-native colonisation of plant and invertebrate communities in deglaciated areas and at vegetation fronts, 2) identifying 'winners' and 'losers' among native and non-native plant species under simulated climate change, 3) establishing non-native invertebrate distributions and associations with native invertebrates and vegetation, and 4) identifying high-risk species to SG under future climate change originating from FI. The GSGSSI support this project, because it will assist in meeting several objectives of the current biodiversity action plan: enhancing knowledge of SGSSI biodiversity and habitats, effectively managing non-native species, and evidence-based management. The GSGSSI has committed to continued management of invasive species beyond its current action plan and Non-Native Plant Management Strategy. Our project outputs will support future strategy development and joint biosecurity efforts between FI and SGSSI.

Q13. Methodology

Describe the methods and approach you will use to achieve your intended Outcome and Impact. Provide information on:

- How you have analysed historical and existing initiatives and are building on or taking work already done into account in project design. Please cite evidence where appropriate.
- The rationale for carrying out this work and a justification of your proposed methodology.
- How you will undertake the work (materials and methods).
- How you will manage the work (role and responsibilities, project management tools etc.)

Please make sure you read the [Guidance Notes](#) before answering this question.

(This may be a repeat from Stage 1 but you may update or refine as necessary)

Previous work on SG has aimed to identify the current risks posed to its unique terrestrial ecosystems by invasive species, including plants and invertebrates. However, management of SG will need to account for the impacts of climate change on invasion risk, both for non-native species currently on SG, and those not yet introduced.

We will deliver the information needed to understand the risks posed by climate change and invasive plants and invertebrates combined through the following:

Year 1: Use SAERI's World View data to locate accessible recently exposed sites inland, and previously bare ground upslope near King Edward Point where vegetation is most likely developing. At each site, 2 x 2 m vegetation plots will be sampled every 5 m along at least one 50 m-long transect, recording species presence/% cover. Pitfall traps and soil/vegetation cores in the plots will be used to sample invertebrate communities, supplemented with hand searching. Unidentified plant samples will be collected for identification at Kew.

A climate-warming competition experiment (Durham) and native germination trials (Kew) under different temperatures to fill current knowledge gaps, using SG-sourced seeds. Eight invasive plant species known to be widespread on SG will be grown in competition for 3 months with native plants most likely to colonise bare-ground areas (using dispersal and SAERI vegetation data). Plant growth will be compared at current versus predicted year 2060 climates.

Year 2: Update the distribution of invasive and native beetle species and establish associations between them and vegetation, using proven carabid transect-survey methods of fixed-period hand-searching, stratified among vegetation types identified from remotely-sensed data. We will also record native beetles, including the endemics *Hydromedion sparsutum* and *Perimylops antarcticus* (invasive carabid prey) and other invertebrates. Survey areas will be within known distribution limits of carabids in the late 2000s (Grytviken, King Edward Cove, Cumberland West Bay), and beyond, along the coast and inland. Pitfall trap and vegetation/soil sampling will capture invertebrate community composition of carabid-invaded and uninvaded areas, and invaded and uninvaded vegetation.

Year 3: Conduct horizon-scanning exercise to identify high-risk species originating from FI under a 2040-2060 future climate scenario, supported by species distribution modelling and information on trade and transport links, using known global species occurrences and future climate predictions under multiple socioeconomic pathway scenarios.

A project management group (project partner staff and key stakeholder GSGSSI) will monitor and evaluate progress with virtual meetings every six months. A key meeting before the first field season in FI (GSGSSI, PDRA, SAERI in-person; Durham, Kew, BAS virtually) to finalise project plans and organisation. Evidence from all outputs will feed into a final biosecurity and management workshop in FI identifying priority species for continued monitoring and control, pre- and post-border, under future climate scenarios. This provides a pathway for integrating evidence into future management strategies and biosecurity policy for SG. Throughout the project, we will raise global awareness of invasive species and climate change impacts on SG, through a webpage hosted by Durham's Conservation Ecology Group, project promotion on social media (Twitter) and an annual webinar.

If necessary, please provide supporting documentation e.g. maps, diagrams, and references etc., as a PDF using the File Upload below.

Section 8 - Stakeholders and Beneficiaries

Q14. Project Stakeholders

Who are the stakeholders for this project and how have they been consulted (include local or host government support/engagement where relevant)? Briefly describe what support they will provide and how the project will engage with them.

The GSGSSI were provided with the stage 1 application, an outline of the project rationale and planned activities, and a statement of required support and resources. The GSGSSI approved of the project based on these documents and will continue to support the project as collaborators, assisting in the application process through providing a letter of support and supporting the development of planned project activities. In particular, the environmental officer of the GSGSSI will provide further support when preparing permit applications for fieldwork on SG. We will have project management group meetings every six months to ensure the project progresses smoothly. We will invite a member of the GSGSSI to those (virtual) meetings as well as the kick-off meeting at the start of the project. The GSGSSI will be engaged in the end-of-project workshop in Stanley (FI), when project findings will be presented. Pathways for integrating those findings into the GSGSSI management and biosecurity strategies will be discussed.

The most important potential source of non-native species at risk of introduction to SG is the FI; the FI government is therefore also a project stakeholder. The FI Environment Office have already been contacted, are keen to support the horizon-scanning exercise and participate in the end-of-project workshop and will provide a letter of support. Information on the top 10 high-risk plant and invertebrate species under future climate change (see logframe) will be shared with the FI Environment Office, so that joint biosecurity strategies accounting for future risks can be developed with the GSGSSI.

Q15. Institutional Capacity

Describe the lead organisation's capacity (and that of partner organisations where relevant) to deliver the project.

The University of Durham, and the Biosciences Department specifically, has a wealth of experience in managing projects and all the necessary support infrastructure available to deliver the project successfully. Durham has dedicated Finance and Purchase Office, Legal Office, IT services and technical support staff who are well-equipped and qualified to be called upon for assistance throughout the lifetime of the project, and to assist in production of the project webpage and webinars. The Biosciences Department has all the plant growth and ancillary experimental facilities required to complete the ex-situ experimental activity of the project. Moreover, space and resources are available for the PDRA to be based at Durham with an office, computer and standard consumables for desk-based work. The university also has a dedicated Research and Innovation Service and Media Communications staff who can assist with publicity, outreach activities and promotion of research impacts. Kew has fully-equipped laboratory facilities and technical expertise required to conduct seed germination trials and provide seeds for use in experiments. Kew, BAS and SAERI have their own finance offices and staff that can handle project staff and consumables costs. Durham, Kew, SAERI and BAS all have computing and data storage facilities which will allow all data

generated from the project to be safely stored. The participating institutions and personnel have unrivalled experience of organising and delivering remote fieldwork in difficult environments, both within our target study region and globally.

Q16. Project beneficiaries

Who will your project benefit? You should consider the direct benefits as a result of your project as well as the broader indirect benefits which may come about as a result of your project achieving its Outputs and Outcome. The measurement of any benefits should be included in your project logframe.

The GSGSSI will benefit through i) baseline data on the distribution and abundance of key invertebrate species on SG (Means of Verification [MoV] 3.5) and composition of newly developing communities (MoV 1.4), ii) assessment of invasion risk to SG's unique terrestrial communities under climate change (MoV 2.2, 2.5, 4.1), and iii) targeted management and biosecurity recommendations to mitigate those future invasion risks (all outputs).

The Scientific Committee on Antarctic Research represents the wider (sub)-Antarctic research community. They will benefit from increased knowledge of native and non-native species ecology on SG (MoV 1.4, 2.2, 2.5, 3.5, 4.3, 5.1-5.5). Information on 'winners' and 'losers' of climate change (MoV 2.5), and future high-risk species (MoV 4.1) will be invaluable for the administrations of other sub-Antarctic islands hosting these or analogous species. The ecological research community focusing on invasions and climate change in general will benefit from research publications (MoV 1.4, 2.5, 3.5, 4.3).

The FI Government, tourism industry (through IAATO - International Association of Antarctica Tour Operators) and British military will benefit through information on future species biosecurity risks (MoV 4.1, 5.1-5.5). Our project findings will enable them to operate in a 'biosecure' manner, a key priority for both GSGSSI and FI Governments.

Section 9 - Gender and Change Expected

Q17. Gender (optional)

How is your project working to reduce inequality between persons of different gender? At the very least, you should be able to provide reassurance that your proposed work is not increasing inequality. Have you analysed the context in which you are working to see how gender and other aspects of social inclusion might interact with the work you are proposing?

The project PDRA will be recruited through a fully open advertisement of the position, which will adhere to the University of Durham's policy on equality, diversity and inclusion. In recognition of the existing gender and race inequality in STEM, we will encourage applicants who are women and/or from underrepresented minorities to apply for the position within the advertisement by reaching out to potential PDRA candidates through the Diversify Ecology and Evolutionary Biology (www.diversifyeeb.com) and 500 Women Scientists (<https://500womenscientists.org/>) platforms. In addition, we will advertise widely via social media (Twitter) using relevant handles to reach a representative pool of potential applicants (e.g. @BlackAFinSTEM @LGBTSTEM @MinoritySTEM). In candidate interviews, an independent member of HR staff will attend, to ensure university interview guidelines and principles on equality and diversity are upheld.

The PRIDE in polar research initiative is a new network formed by the Scientific Committee in Antarctic Research and International Arctic Science Committee researchers to bring together the LGBTIQ+ community and Allies (friends and supporters of the LGBTIQ+ community) to celebrate diversity and

inclusivity in polar research. We will connect with this network and advertise the PDRA position through it.

Q18. Change expected

Detail the expected changes this work will deliver. You should identify what will change and who will benefit a) in short-term (i.e. during the life of the project) and b) in the long-term (after the project has ended). Please describe the changes for the environment and, where relevant, for people in the OTs, and how they are linked.

Short-term, the project will increase knowledge of native and non-native species and community ecology on SG, and of successional processes occurring in association with climate change. Invasive plants posing the greatest risk to these developing communities will be identified, as will native species that are likely to be successful. The current distribution of invasive and native endemic beetle and other invertebrate species will be documented, along with impacts of the invasive carabids on native fauna, and associations with native/non-native vegetation types will be established. This will benefit the scientific community studying SG and the (sub-)Antarctic region more broadly, as many of the species on SG, or close analogues, are present elsewhere in the region.

Longer term, the GSGSSI will benefit, as our project will provide baseline data on succession of communities that will continue developing with climate change. These can be used to initiate and inform longer-term monitoring and conservation planning. The GSGSSI aims to make management evidence-based, and our project will provide evidence that will enable the GSGSSI to refine future management strategies by targeting the remaining non-native species and populations that pose the greatest risk of 'hijacking' communities under climate change. Information on the distribution of invasive carabids and the native endemic beetles *Hydromedion sparsutum* and *Perimylops antarcticus* (Promecheilidae) will allow the GSGSSI to draw up targeted management plans which secure the future of these species, while also reducing the spread and impact of the invasive carabids. These management plans could be used by other sub-Antarctic islands (Iles Kerguelen) and other locations that have been invaded by these or similar beetle species. Finally, both the FI and GSGSSI will benefit from developing an adaptive, climate change-proof, joint biosecurity strategy. Overall, the project outputs will benefit global biodiversity, by helping to conserve the unique sub-Antarctic terrestrial ecosystem of SG.

Q19. Pathway to change

Please outline your project's expected pathway to change. This should be an overview of the overall project logic and outline how you expect your Outputs to contribute towards your overall Outcome, and, longer term, your expected Impact.

Protecting SG's unique terrestrial communities from invasive non-native plants and invertebrates under climate change can only be achieved through evidence-based management and biosecurity. Our project will improve SG's evidence base by identifying those species posing the highest risk, both pre- and post-introduction under a future climate, with four outputs:

- 1) Identification of plant and invertebrate species present (including non-native) in areas of glacial retreat and vegetation fronts
- 2) Identification of the 'winners' and 'losers' of competition between non-native plant species and native plant communities under climate change (ex-situ experiment)
- 3) Establishment of the distribution of invasive carabid beetles, native prey (herbivorous beetles and other invertebrates) and association with vegetation types

4) Identification of non-native terrestrial species from FI that pose greatest invasion risk to SG under a future climate

The GSGSSI will be connected to the project throughout with representation at our six-monthly project management group (virtual) meetings, and the final-year workshop on FI will provide an opportunity for project outputs to inform management strategies, including joint FI-GSGSSI biosecurity adaptation (see Letters of Support) to monitor and prevent introduction of future high-risk species.

Finally, our project findings will inform a wider international audience through our 5th output of online resources.

Q20. Exit strategy

State how the project will reach a stable and sustainable end point, and explain how the outcomes will be sustained, either through a continuation of activities, funding and support from other sources or because the activities will be mainstreamed in to “business as usual”. Where individuals receive advanced training, for example, what will happen should that individual leave?

The end-of-project workshop is key to sustaining the outcomes and ensuring project findings are applied to future SG biosecurity and management strategies. This workshop will use the newly published SG management plan for 2021-2025 as a starting point. Priority sites and non-native species will be identified and communicated to the GSGSSI as targets for ongoing monitoring and management. In our final project workshop, the FI government will also be alerted to non-native species currently in FI that pose a high invasion risk to SG under future climate change, enabling coordination of joint biosecurity strategies with GSGSSI. All data from the project will be made open-access, with germination data stored in Kew's seed information database (<https://data.kew.org/sid/>), and data on plant and invertebrate distributions stored in the UK Polar Data Centre (<https://www.bas.ac.uk/data/uk-pdc/>) and at SAERI. The PDRA and field assistant will be equipped with valuable research expertise on invasions and climate change, and fieldwork experience in a sub-Antarctic terrestrial environment during the project. Thus, the hired staff will be uniquely positioned to continue working in this internationally important field. Finally, our 5th output of online resources will continue to raise awareness of invasive species and climate change impacts after project completion.

Section 10 - Funding and Budget

Q21. Budget


Please complete the appropriate Excel spreadsheet, which provides the Budget for this application. Some of the questions earlier and below refer to the information in this spreadsheet. Note that there are different templates for projects requesting over and under £100,000 from the Darwin Plus budget.

- [R9 D+ Budget form for projects under £100,000](#)
- [R9 D+ Budget form for projects over £100,000](#)


Please refer to the [Finance Guidance for Darwin/IWT](#) for more information.

N.B: Please state all costs by financial year (1 April to 31 March) and in GBP. Darwin Plus cannot agree any increase in grants once awarded.

Budgets submitted in other currencies will not be accepted. Use current prices – and include anticipated inflation, as appropriate, up to 3% per annum. The Darwin Initiative cannot agree any increase in grants once awarded.

 [Budget over 100K May 2020 FINAL](#)

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Q22. Funding

Q22a. Is this a new initiative or a development of existing work (funded through any source)?

New initiative

Please provide details:

Uniquely, this project focuses on understanding how invasion risks posed by non-native plants and invertebrates will shift under an altered climate. This is an important knowledge gap left by previous work conducted on SG. Work by GSGSSI has led to reduction and eradication of multiple non-native plant populations on SG (Darwin+ DPLUS015). Work being led by Kew (Darwin+ DPLUS080) is identifying which remaining non-native plant species are likely to persist in seed banks, disperse to deglaciated areas, and has determined germination requirements for native and non-native species, but did not assess how a warming climate will affect competition and plant communities. Work led by SAERI has mapped vegetation on SG at fine scale resolutions (Darwin+ DPLUS065), and work on sub-Antarctic islands by BAS and collaborators has identified potential impacts of invasive carabid beetles, but no research has considered interactions between non-native plants and invertebrates. Work by the GB Non-Native Species Secretariat has identified non-native species that pose a current threat to SG but does not consider future threats under climate change. Our project will take invasive species and climate change research on SG in a new and important direction, with direct benefits to management of both forms of environmental change.

Q22b. Are you aware of any other individuals/organisations/projects carrying out or applying for funding for similar work?

Yes

If yes, please give details explaining similarities and differences, and explaining how your work will be additional and what attempts have been/will be made to co-operate with and learn lessons from such work for mutual benefits.

As climate change and invasive species are obviously global issues, there are various researchers internationally who are applying increasingly complex species distribution modelling approaches to forecast distributions of native and non-native species. The Project Lead has and is conducting research of this type in other systems (Brazil, Norway), and project partner Convey is collaborating on an EU Biodiversa-funded project that aims to forecast invasive species impacts in extreme environments globally (led by Prof. David Renault, University of Rennes) and with Chilean (Dr Tamara Contador, University of Magallanes) and Spanish (Dr Luis Pertierra, Madrid) colleagues in projects modelling invasive and native species distributions in the Antarctic Peninsula.

This proposal will benefit from work elsewhere through adopting tried-and-tested best-practice for data use and modelling methods. It differs strongly in that it will directly link future climate suitability and likelihood of introduction for species not yet present on SG through the horizon-scanning exercise (Output 4). Uniquely, the outcomes of this work will have a direct pathway to integration into the existing SG biosecurity strategy.

Q23. Co-financing

Are you proposing co-financing?

Yes

Q23a. Secured

Provide details of all funding successfully levered (and identified in the Budget) towards the costs of the project, including any income from other public bodies, private sponsorship, donations, trusts, fees or trading activity, as well as any your own organisation(s) will be committing.

(See [Finance for Darwin/IWT](#) and [Guidance Notes](#))

Donor organisation	Amount	Currency code	Comments
University of Durham	██████	£	██████ staff time costs (plus ██████ overheads) in-kind for W Dawson; Return flight to FI; travel insurance; GPS device, running costs of plant growth facilities; PDRA overheads (██████)
Kew	██████	<i>No Response</i>	██████ staff overheads costs in-kind; pro rata core facilities costs in-kind
BAS	██████	£	Overheads (██████ of staff costs)
<i>No Response</i>	0	<i>No Response</i>	<i>No Response</i>

Q23b. Unsecured

Provide details of any matched funding where an application has been submitted, or that you intend applying for during the course of the project. This could include matched funding from the private sector, charitable organisations or other public sector schemes. This should also include any additional funds required where a donor has not yet been identified.

Date applied for	Donor organisation	Amount	Currency code	Comments
No Response	No Response	0	No Response	No Response
No Response	No Response	0	No Response	No Response
No Response	No Response	0	No Response	No Response
No Response	No Response	0	No Response	No Response

Do you require more fields?

No

Section 11 - Finance

Q24. Financial Controls

Please demonstrate your capacity to manage the level of funds you are requesting. Who is responsible for managing the funds? What experience do they have? What arrangements are in place for auditing expenditure?

Durham had a total income of £[REDACTED] in the year ending August 2020, of this £[REDACTED] was Research Grants and Contracts administered by the Research and Innovation Services Directorate. This team supports academics alongside the Central Finance Division and departmental finance administrators ensuring good use of funds within University Regulations and Funder terms and conditions. University and project accounts are audited each year by external auditors. We also have a strong team of internal auditors and regularly have funders audit individual projects.

The Project Lead has secure login access to project grant codes through an online system, enabling ordering and purchasing of consumables, travel and accommodation in a fully transparent and audited manner. The departmental purchasing office has dedicated support staff who oversee and approve purchases from grant codes, and they can easily generate reports on expenditure. Project partners have equivalent staff and systems in place for managing their funds.

Q25. Financial Management Risk

This question considers the financial risks to the project. Explain how you have considered the risks and threats that may be relevant to the successful financial delivery of this project. This includes risks such as fraud or bribery, but may also include the risk of fluctuating foreign exchange and internal financial processes such as storage of financial data.

As SG has no permanent human population, and with a limited number of project partners and collaborators, there is a minimal level of financial risk including fraud or bribery to the project. Durham and partner institutions have fully secure finance offices that operate with standard procedures, anti-bribery policies, and transparent auditing of financial transactions. The partners on this project have long running

relationships with the Project Lead and Durham University reducing the financial delivery risk to this project. Each institution will mitigate the risk of fraud / bribery through their own fiscal control mechanisms (procurement systems, travel policies, etc.) and Durham, as Lead, will note reporting and expenditure evidencing requirements through a collaboration agreement.

The Durham Biosciences Department has its own purchasing office, and clear guidelines and regulations on project grant spending. Project leaders have secure access to their own project spending accounts, with audited purchases for individual grant codes. Purchasing of travel and accommodation can only be completed through the departmental purchasing office and via the university's partner travel agent. Travel insurance for Durham staff can be applied for and provided by the university. There is no foreign exchange risk to this project.

Q26. Balance of budget spend

Explain the thinking behind your budget in terms of where funds will be spent. What benefits will the Territory see from your budget? What level of the award to you expect will be spent locally? Please explain the decisions behind any funding that will not be spent locally and how those costs are important for the project.

The bulk of budget spend is on staff and SG fieldwork costs. Due to its remoteness, weather and terrain, SG fieldwork has a high monetary and time cost. An additional FI-based field assistant is essential for fieldwork health and safety. The PDRA will need qualifications and expertise essential for safe and successful fieldwork campaigns, overseeing plant growth and germination experiments, data analyses and research publications. Spend on additional staff time of project partners is essential for access to facilities and expertise at BAS, Kew and SAERI to ensure project aims are achieved. Staff spend is essential to obtain the unique datasets required to fulfil the project aims and better inform invasive species management on SG under climate change. The GSGSSI will receive payments for fieldwork-related costs on-island, and accommodation spend in Stanley will benefit FI.

The lack of a resident population on SG limits outreach/education potential, but King Edward Point station staff, SG Museum staff and GSGSSI officers will be briefed, and there is public engagement opportunity through IAATO on cruise vessels in FI and SG. We will raise public awareness of invasive species and climate change at no extra cost through creation of online material using Durham's IT resources.

Q27. Capital Items

If you plan to purchase capital items with Darwin Plus funding, please indicate what you anticipate will happen to the items following project end. If you are requesting more than 10% capital costs, please provide your justification here.

We plan to purchase a laptop for fieldwork purposes (£■■■■) an iridium satellite phone with built-in solar panel charger (£■■■■) VHF radios (£■■■■) and a separate portable solar panel charger (£■■■■). The last three items have been recommended as required communications gear for remote fieldwork by BAS. All capital items listed will be purchased through SAERI, and will remain on the FI for use by SAERI or the GSGSSI after the project.

Q28. Value for Money

Please describe why you consider your application to be good value for money including justification of why the measures you will adopt will secure value for money.

A key aim of this project is to identify the emerging invasion risks under future climate change on SG, both from plant and invertebrate species already introduced to the island, and from further species that could be introduced from FI. In both cases, it is well understood that early identification and prioritised management of high-risk species is a far more cost-effective approach to dealing with invasions than waiting until they become widespread and beyond control. There is now a narrow window of opportunity to obtain unique data on the status of non-native plants and invertebrates on SG, and to assess the future risks posed under climate change by these species and others that have not yet been introduced. By taking this window of opportunity now, our project will enable early response of invasive species management in a targeted way that maximises benefits to conservation and minimises economic and ecological costs.

The project also represents value for money through generous matched funding from the lead organisation through access and running costs of plant growth facilities, staff time and overheads (the Lead Applicant), provision of IT and office resources, and in-house training for the PDRA. The project partners will also make an in-kind contribution through overheads, and laboratory running costs and provision of seed from the Millennium Seed Bank (Kew). Finally, the project involves a team of partners with a wealth of experience and expertise which together will ensure smooth running of the project and a minimal chance of wasted resource.

Q29. Outputs of the project and Open Access

All outputs from Darwin Plus projects should be made available on-line and free to users whenever possible. Please outline how you will achieve this and detail any specific costs you are seeking from Darwin Plus to fund this.

Corresponding to the Monitoring and Evaluation Plan, the project management group will produce annual reports on project progress (in addition to those required by Darwin) that will detail the most recent findings of the project. These reports will be published online and will be free to download on the GSGSSI website, and on ResearchGate. Accepted manuscripts of peer-reviewed publications from Outputs 1-4 will be uploaded and freely available from Durham's 'Durham Research Online' database. Publications will include open-access deposition of data and coding used to conduct analyses, in linked online repositories (e.g. Data Dryad; GitHub) or as supplementary information to the publication. The webinars in Output 5 will be free to view, both live and on-demand.

Any molecular data arising from the project (e.g. rbcL/matK sequences to identify specimens) will be uploaded to the GenBank database, and seed germination data will be made available through Kew's Seed Information Database. Finally, all raw data and metadata will be deposited in the UK Polar Data Centre via BAS, and in SAERI's own database.

Section 12 - Safeguarding

Q30. Safeguarding

Projects funded through Darwin Plus must fully protect vulnerable people all of the time, wherever they work. In order to provide assurance of this, projects are required to have appropriate safeguarding policies in place. Please confirm the lead organisation has the following policies in place and that these are available on request:

We have a safeguarding policy, which includes a statement of our commitment to safeguarding and a zero tolerance statement on bullying, harassment and sexual exploitation and abuse	Checked
We have attached a copy of our safeguarding policy to this application	Checked
We keep a detailed register of safeguarding issues raised and how they were dealt with	Checked
We have clear investigation and disciplinary procedures to use when allegations and complaints are made, and have clear processes in place for when a disclosure is made	Checked
We share our safeguarding policy with downstream partners	Checked
We have a whistle-blowing policy which protects whistle-blowers from reprisals and includes clear processes for dealing with concerns raised	Checked
We have a Code of Conduct in place for staff and volunteers that sets out clear expectations of behaviors - inside and outside of the work place - and make clear what will happen in the event of non-compliance or breach of these standards	Checked

Please outline how you will implement your policies in practice and ensure that downstream partners apply the same standards as the lead organisation.


SG is not permanently inhabited and the project work does not include any interaction with vulnerable people.

Project lead Durham has multiple relevant safeguarding policies that are publicly available and collectively form the university's code of practice for staff. Of note are the following policies:


- Respect at Work: Harassment and Bullying Policy and Procedures for Staff (<https://www.dur.ac.uk/hr/policies/respectatwork/>). This Policy clearly explains the procedures for complaints, investigations and disciplinary procedures with respect to harassment and bullying.
- Equality, Diversity and Inclusion Policy (<https://www.dur.ac.uk/equality.diversity/positiveworking/policies/eanddpolicy/>). The procedure for making EDI-related complaints under this policy is described. In addition, all staff at Durham are required to undertake EDI and unconscious bias training as part of their induction.
- Sexual Misconduct and Violence Policy and procedure for prevention and response (<https://www.dur.ac.uk/sexualviolence/>). Includes information on principles, reporting an incident, and procedures for staff for managing and responding to allegations, reports and disclosures. Awareness, disclosure and investigations training is available for staff.
- Whistleblowing Policy (<https://www.dur.ac.uk/resources/business.assurance/WhistleblowingPolicy.pdf>)


All staff on the project will be referred to these policy documents when starting work on the project, and adherence to the university's policies relating to staff code of practice will be covered by the project's memorandum of collaboration.

Please upload the Lead Organisation's Safeguarding Policy as a PDF

 [Durham Safeguarding Policies](#)

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Section 13 - Logical Framework

Q31. Logical Framework


Darwin Plus projects will be required to monitor (and report against) their progress towards their expected Outputs and Outcome. This section sets out the expected Outputs and Outcome of your project, how you expect to measure progress against these and how we can verify this.


- [Stage 2 Logframe Template](#)

Please complete your full logframe in the separate Word template and upload as a PDF using the file upload below. Copy your Impact, Outcome and Output statements and your activities below - these should be the same as in your uploaded logframe.

Please upload your logframe as a PDF document.

 [R9 DPlus St2 Logical Framework Template WD
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Impact:

South Georgia's dynamic terrestrial communities are protected from invasion by non-native plants and invertebrates

Outcome:

South Georgia's evidence-based management of invasive species will be improved by identifying which non-native species pose the greatest risk to SG (pre- and post-introduction) in a future climate

Project Outputs

Output 1:

Presence of plant and invertebrate species (including non-natives) in areas of glacial retreat and vegetation fronts established

Output 2:

'Winners' and 'losers' of competition between non-native plant species and native plant communities under climate change (ex-situ experiment) identified

Output 3:

Distribution of invasive carabid beetles, native herbivorous beetles and association with each other and vegetation types established

Output 4:

Non-native terrestrial species from FI that pose greatest invasion risk to SG under a future climate identified

Output 5:

Increased awareness of invasive species and climate change impacts on SG

Do you require more Output fields?

It is advised to have less than 6 Outputs since this level of detail can be provided at the Activity level.

No

Activities

Each activity is numbered according to the Output that it will contribute towards, for example 1.1, 1.2 and 1.3 are contributing to Output 1.

Output 1

- 1.1 Project Management Group Meeting [PMGM] 1 (online)
- 1.2 Recruit PDRA and Field Assistant
- 1.3 Draw up Memorandum of Collaboration between Project Partners
- 1.4 Select at least 5 sites suitable for plant and invertebrate communities in areas of glacier retreat and vegetation fronts
- 1.5 UK-based project partners meet at BAS (Cambridge) for fieldwork planning; PDRA to obtain plant and invertebrate ID information
- 1.6 Produce fieldwork protocols for first field season, including details of survey sites
- 1.7 Apply for SG fieldwork permits
- 1.8 Organise logistics for first field season (PDRA travel to FI, onward transport to SG, SG accommodation, purchase and transport of field kit, on-island boat transport)
- 1.9 Project meeting in Stanley, FI prior to first field season (WD, PC and RN to join online, for PMGM 2)
- 1.10 PDRA/Field Assistant first field season on SG: Plant and invertebrate communities surveyed, collection of unidentifiable plant samples, collections of seeds for experiments where possible
- 1.11 PDRA and plant samples return to UK: plant samples stored for molecular analysis at Kew
- 1.12 Plant DNA extracted and sequenced to verify species ID of unidentified samples (Kew)
- 1.13 Plant and invertebrate community data compilation and analysis after PDRA return to UK
- 1.14 Project Management Group Meeting 3 (online)
- 1.15 Write up and submit plant and invertebrate community manuscript for peer-reviewed publication

Output 2

- 2.1 Select native and invasive plant species for climate experiment and germination trials
- 2.2 Durham and Kew-based project partners meet online, to draw up experiment/trial plans; obtain seeds from Kew if required
- 2.3 Order materials required for experiment/germination trials
- 2.4 Identify current and future (year 2060) climate and light regimes for realistic experimental treatments and germination trial conditions
- 2.5 Durham and Kew: Apply any germination pre-treatments to seeds prior to sowing, as required, and sow
- 2.6 Durham: Set up and conduct climate experiment
- 2.7 Durham: Terminate experiment, harvest biomass, weigh and collate data
- 2.8 Kew: Conduct germination trials in incubators at current and future climates
- 2.9 Kew: Terminate germination trials, collate data and publish in Kew's seed information database
- 2.10 Durham: Data compilation and analysis from climate experiment

2.11 Write up and submit manuscript for Durham climate experiment and germination trials for peer-reviewed publication

2.12 Write up and publish year report online, combining key results and progress for Outputs 1 and 2

2.13 Project Management Group Meeting 4 (online)

2.14 Analyse and write up results of seed germination trials

Output 3

3.1 Identify at least 10 sites for invertebrate survey work on SG, across vegetation types

3.2 UK-based project partners meet at Durham, plan surveys for 2nd SG fieldwork season, and produce fieldwork protocols

3.3 Reapply/update permits for fieldwork on SG as necessary

3.4 Purchase materials required for survey fieldwork

3.5 Organise transport and accommodation logistics for 2nd fieldwork season

3.6 PDRA travels to FI, and then on to SG for 2nd fieldwork season: survey 10 sites for invasive and native invertebrate species presence and abundance

3.7 Compilation and analysis of invertebrate survey data

3.8 Write up and publish year report on field season and results online

3.9 Project Management Group Meeting 5 (online)

3.10 Write up and submit manuscript of analyses assessing relationship between invasive and native vertebrate distributions for peer-reviewed publication

Output 4

4.1 Plan remote horizon-scanning exercise details and invite beneficiaries representatives as well as project partner organisations to participate. Exercise will be done virtually, using Zoom and Slack platforms

4.2 Identify at least 50 species of plants and invertebrate present on FI but not yet on SG (distinguish whether native or non-native to FI)

4.3 Model species distributions and project resulting models onto SG to quantify and rank climate suitability under year 2060 climate for best, medium and worst-case socioeconomic pathway scenarios

4.4 Disseminate list of species screened for climate suitability to participants for opinion on the invasion risk of each species focusing on entry, establishment, spread and impact risk

4.5 Gather participant opinions and categorise species according to perceived risk across participants. Present categorised list to stakeholders and elicit feedback

4.6 Adjust risk-categorised list of species based on (dis-)agreements until a consensus list is reached, and top-10 high-risk species under a future climate are identified

4.7 Plan final workshop in Stanley, FI: invite attendees from FI-based beneficiaries, organise travel and accommodation, secure venue and organise materials

4.8 Project Management Group Meeting 6 (online)

4.9 Prepare delivery of workshop

4.10 Write up final year project report, including outcome of horizon-scanning exercise

4.11 Hold project final workshop in FI: present findings; discuss horizon-scanning exercise outcome; discuss how project findings can best inform GSGSSI management strategy

4.12 Project Management Group Meeting 7 (online)

4.13 Submit analyses of horizon-scanning exercise for peer-reviewed publication

Output 5

5.1 Create and launch project webpage, promote on Twitter and partner websites

5.2 Advertise 1st project webinar on Twitter/through Scientific Committee on Antarctic Research and its Integrated Science for the Sub-Antarctic sub-group (SCAR/ISSA), IAATO, SGHT; collect registration

5.3 Hold 1st project webinar, embed recording on project webpage, promote on Twitter

5.4 Write blog about first field season on project web-page, promote on Twitter

5.5 Advertise 2nd project webinar on Twitter/through SCAR/ISSA, IAATO, SGHT; collect registration

5.6 Hold 2nd project webinar, embed recording on project webpage, promote on Twitter

5.7 Write blog about Output 2 experiments on project web-page, promote on Twitter

5.8 Advertise 3rd project webinar on Twitter/through SCAR/ISSA, IAATO, SGHT; collect registration

5.9 Hold 3rd project webinar, embed recording on project webpage, promote on Twitter

- 5.10 Write blog about second field season on project web-page, promote on Twitter
- 5.11 Advertise 4th project webinar on Twitter/through SCAR/ISSA, IAATO, SGHT; collect registration
- 5.12 Hold 4th project webinar, embed recording on project webpage, promote on Twitter
- 5.13 Write blog about Output 4 and final project workshop on project web-page, promote on Twitter

Section 14 - Implementation Timetable

Q32. Provide a project implementation timetable that shows the key milestones in project activities

Provide a project implementation timetable that shows the key milestones in project activities. Complete the Excel spreadsheet template as appropriate to describe the intended workplan for your project.

[Implementation Timetable Template](#)

Please add/remove columns to reflect the length of your project. For each activity (add/remove rows as appropriate) indicate the number of months it will last, and fill/shade only the quarters in which an activity will be carried out.

📎 [R9 DPlus Implementation Timetable Template](#)
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Section 15 - Monitoring and Evaluation

Q33. Monitoring and evaluation (M&E)

Describe, referring to the Indicators above, how the progress of the project will be monitored and evaluated, making reference to who is responsible for the project's M&E.

Darwin Initiative projects are expected to be adaptive and you should detail how the monitoring and evaluation will feed into the delivery of the project including its management. M&E is expected to be built into the project and not an 'add' on. It is as important to measure for negative impacts as it is for positive impact. Additionally, please indicate an approximate budget and level of effort (person days) to be spent on M&E (see [Finance Guidance for Darwin/IWT](#)).

The University of Durham and the Project Lead in particular will be responsible for the project's M&E, with inputs from the PDRA and project partners, and will report to the project's management group in meetings every six months. These meetings will give all project partners a regular opportunity to gauge progress by referring to the measurable indicators in the logframe and will allow the project to be adjusted according to the group's feedback. After recruitment, the PDRA will be tasked with presenting progress and results in these project management group meetings. Two planning meetings will take place in the UK, timed with enough lead-in before field-based work (Outputs 1 and 3) in the project, so that plans can be refined where necessary. This includes one meeting with the PDRA and UK-based staff members at BAS Cambridge in

year 1, allowing plant and invertebrate specimens to be viewed and survey methods to be finalised before the first fieldwork campaign (Output 1). Paul Brickle (SAERI) and a member of GSGSSI will join online. The second meeting will be in Durham before the second fieldwork campaign (Output 3).

For the end of each project year (June), a project progress report detailing results so far, milestones reached and successes and problems arising will be written up and circulated by the Project Lead to the project management group. These reports will include reference to the Output-specific means of verification in the logframe. Reports will be shared freely online via the GSGSSI website and ResearchGate.

A first meeting of the management group will take place at the very start of the project (July 2021, online), to develop and agree on a detailed 3-year plan, develop a memorandum of collaboration among project partners, and to initiate the process of applying for permits to conduct research on SG and organise logistics with the environment officer of the GSGSSI (activities under Output 1). This meeting will also allow us to finalise PDRA position criteria and advertisements for recruitment.

Six months into the project (December 2021), after the PDRA has been recruited and all logistical details are organised, the project partners and PDRA will have a part virtual (Lead, Kew, BAS joining online), part physical (SAERI, PDRA and GSGSSI in person) meeting in Stanley prior to the first field season. The PDRA to meet with and discuss the project with the GSGSSI in person, and to deal with any unforeseen complications before departing for SG. It will also give us an opportunity to discuss further involvement of the FI Government's Environment Office in Output 4 of the project.

The final project management group meeting will follow the final workshop of Output 4. The workshop will facilitate further discussion with the FI and GSGSSI government on securing the project's exit strategy and planning for final reports and publications on the project activities. The final project meeting and report will assess the project against the Outcome means of verification in the logframe.

Total project budget for M&E in GBP (this may include Staff, Travel and Subsistence costs)	£ [REDACTED]
Number of days planned for M&E	89.00
Percentage of total project budget set aside for M&E (%)	[REDACTED]

Section 16 - Certification

Certification

On behalf of the

trustees

of

The University of Durham

I apply for a grant of

£323,780.00





I certify that, to the best of our knowledge and belief, the statements made by us in this application are

true and the information provided is correct. I am aware that this application form will form the basis of the project schedule should this application be successful.

(This form should be signed by an individual authorised by the applicant institution to submit applications and sign contracts on their behalf.)

- I have enclosed CVs for project key project personnel, letters of support, budget and project implementation timetable (uploaded at appropriate points in application).
- Our last two sets of signed audited/independently verified accounts and annual report are also enclosed.

Checked

Name	Wayne Dawson
Position in the organisation	Associate Professor, Department of Biosciences
Signature (please upload e-signature)	 signature  02/02/2021  12:28:14  pdf 80.73 KB
Date	02 February 2021

Section 17 - Submission Checklist

Checklist for submission

	Check
I have read the Guidance documents, including the "Guidance Notes for Applicants" and "Finance Guidance".	Checked
I have read, and can meet, the current Terms and Conditions for this fund.	Checked
I have provided actual start and end dates for this proposed project.	Checked
I have provided a budget based on UK government financial years i.e. 1 April – 31 March and in GBP.	Checked
I have checked that the budget is complete, correctly adds up and I have included the correct final total at the start of the application.	Checked
The application has been signed by a suitably authorised individual (clear electronic or scanned signatures are acceptable).	Checked
I have attached my completed logframe and timeline as a PDF using the templates provided.	Checked

I have included a 1 page CV or job description for all the Project staff identified at Question 11, including the Project Leader, or provided an explanation of why not.	Checked
I have included a letter of support from the Lead Organisation and main partner organisation(s) identified at Question 10, or an explanation of why not.	Checked
I have included a cover letter from the Lead Organisation, outlining how any feedback at Stage 1 has been addressed where relevant.	Checked
I have included a signed copy of the last 2 years annual report and accounts for the Lead Organisation, or provided an explanation if not.	Checked
I have checked the Darwin Plus website immediately prior to submission to ensure there are no late updates.	Checked
I have read and understood the Privacy Notice on GOV.UK.	Checked

We would like to keep in touch!

Please check this box if you would be happy for the lead applicant (Flexi-Grant Account Holder) and project leader (if different) to be added to our mailing list. Through our mailing list we share updates on upcoming and current application rounds under the Darwin Initiative, Darwin Plus and our sister grant scheme, the IWT Challenge Fund. We also provide occasional updates on other UK Government activities related to biodiversity conservation and share our quarterly project newsletter. You are free to unsubscribe at any time.

Checked

Data protection and use of personal data

Information supplied in this application form, including personal data, will be used by Defra as set out in the latest copy of the Privacy Notice for Darwin, Darwin Plus and the Illegal Wildlife Trade Challenge Fund available [here](#). This Privacy Notice must be provided to all individuals whose personal data is supplied in the application form. Some information, but not personal data, may be used when publicising the Darwin Initiative including project details (usually title, lead organisation, location, and total grant value) on the GOV.UK and other websites.

Information relating to the project or its results may also be released on request, including under the 2004 Environmental Information Regulations and the Freedom of Information Act 2000. However, Defra will not permit any unwarranted breach of confidentiality nor will we act in contravention of our obligations under the General Data Protection Regulation (Regulation (EU) 2016/679).