Centre: Scotland's Centre of Expertise for Knowledge Exchange and Innovation (CKEI, known as SEFARI Gateway)

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Title of Impact Case Study: Using SEFARI Gateway research in natural capital, agriculture, food systems, biodiversity and the rural economy during 2022–2027: Impact from two flagship projects

Flagship project 1: Estimating the health and welling value of the natural capital of the NHS estates

Flagship project 2: Genetic Diversity Scorecard update

1. Summary of the Impact (100 words)	This section concisely summarises the impacts detailed in the case study SEFARI Gateway ("Gateway") connects the ENRA Strategic Research Portfolio — and wider UK expertise — with research users across government, agencies, industry and the community sector. Working in partnership with these users, Gateway delivers real-world impact, shaping policy and practice and generating economic, environmental, health and wellbeing benefits. To illustrate the scale and sustained impact of Gateway's work during 2022–2027, two flagship projects are highlighted: an £82M valuation that reframed NHS Scotland's outdoor estate across 14 Health Boards as a health asset (Flagship 1); and a world-first Genetic Scorecard embedded in Scotland's Biodiversity Strategy and international conservation practice (Flagship 2).
2. How has the Centre supported policy makers/stakeholders (500 words)	This section is used to outline how the Centre has supported policy makers/stakeholders this could be for example an evidence assessment of academic/grey literature, a workshop, stakeholder engagement or commissioning of new research. To qualify, the activities listed must have made a distinct and material contribution to the impacts outlined to the extent that the impacts would likely not have occurred otherwise. Gateway commissions research across natural capital, agriculture, food, biodiversity and the rural economy. To respond to users' needs for evidence-based decision-making, Gateway draws on expertise from the Scottish Environment, Food and Agriculture Research Institutes (SEFARI) -a consortium of globally renowned Scottish research institutes: Biomathematics and Statistics Scotland (BioSS), The James Hutton Institute (Hutton), Moredun Research Institute, Royal Botanic Garden Edinburgh (RBGE), The Rowett

Institute, and Scotland's Rural College (SRUC) - and the wider UK research base. Delivery is through Fellowships (embedding experts in research-user teams), Specialist Advisory Groups (answering evidence needs with users and inter- and trans-disciplinary expertise), and Innovative & Knowledge Exchange (IKE) projects to showcase the Portfolio's vital role in driving sustainable economic growth and improving lives in Scotland and beyond. This is complemented by accessible reporting, targeted dissemination, training and multi-stakeholder engagement.

2.1 Flagship project 1

Challenge

Public Health Scotland (PHS) and NatureScot identified a lack of credible, quantified evidence on how the public uses and values NHS Scotland's outdoor estate.

Co-design

The Fellowship was jointly developed by PHS, NatureScot and SEFARI Gateway, leading to an open call. Following appointment of University of Aberdeen specialists, remit and method were co-refined. Gateway coordinated expertise in natural capital, economics, and public health, shaping a methodology relevant to prevention, inequalities and the NHS Anchor narrative.

Rigour and evidence credibility

A nationally representative survey of Scottish adults provided robust data on visits to NHS Scotland sites and their outdoor spaces. The valuation applied Office for National Statistics (ONS) guidance and HM Treasury's Green Book, ensuring alignment with UK public-sector appraisal standards. It used the ONS exposure-based method, linking outdoor time to measurable health gains expressed in Quality-Adjusted Life Years (QALYs)—the recognised NHS and NICE metric for valuing health improvements. These choices ensured the analysis captured prevention-related benefits such as avoided ill-health and improved wellbeing, strengthening the case for the NHS outdoor estate as a health asset (Outputs 1 to 3). The method underwent RESAS economist scrutiny, institutional ethical approval, and soft academic peer review.

2.2 Flagship project 2

Challenge

NatureScot and the Scottish Government identified the need for a method to monitor genetic diversity across Scotland's species -

	evidence required for statutory biodiversity reporting, species-management decisions and Scotland's commitments under the Global Biodiversity Framework (GBF). The ENRA 2016–2021 Scorecard, co-constructed and supported by SEFARI Gateway in 2017-2021 (Output 4), demonstrated feasibility for terrestrial species. Gateway commissioned a SAG in ENRA 2022–2027 to expand the methodology across a wider range of taxa, including marine species. **Co-design** Collaboration across SAG partners, including SEFARI, NatureScot, the Scottish Government, JNCC, the University of Edinburgh, Scottish Association of Marine Sciences (SAMS), Nord University (Norway), University of the Islands and Highlands (UHI) and the Roslin Institute, shaped species selection, scoring thresholds, evidence rules and communication formats. Gateway coordinated expertise in conservation genetics, ecology and species management, supporting iterative development of the national methodology through workshops and alignment with monitoring reforms and the Natural Environment (Scotland) Bill (2025). **Rigour and evidence credibility** The SAG used international guidance and applied GBF indicators, including Ne500 (whether populations are large enough to retain genetic variation) and PM (whether species are retaining their distribution and population diversity), ensuring alignment with global standards. Regular co-production (workshops) ensured transparent selection of data sources and treatment of uncertainty, and supported consistency across taxa, reflected in Outputs 5 and 6.
3. Details of the key outputs (up to six references)	Details of the key outputs referred to in the previous section are listed here. All outputs listed (where appropriate) must be available to the CSA and the ENRA SAB on request. Typically, the work presented in this section will have been produced within the current 2022-2027 or previous ENRA RP programmes i.e. (2016-2021). 3.1 Flagship project 1 Gateway supported partners in preparing accessible reports (Output 1), summaries and briefing materials to aid effective dissemination across Health Boards. Public Health Scotland delivered a national webinar to all 14 NHS Boards (Output 2), and findings from the report have informed two submissions to international peer-reviewed journals (Output 3).

1. Loria-Rebolledo, L.E., Boyers, D., Watson, V., Antunes, M., & Chalmers, N. (2025). Valuing the health and wellbeing value of NHS Scotland's outdoor estate: How are NHS Scotland open spaces used and what is their value to the Scottish population. SEFARI Gateway Research Report. Available at: https://doi.org/10.57064/2164/25103. (Accessed: 24 November 2025).
2. Public Health Scotland (2024) *Valuing, Protecting and Managing the NHS Scotland Outdoor Estate Webinar*. Available at: https://www.youtube.com/watch?v=xQ-KZb-u2HI. (Accessed: 24 November 2025).
3. Loria-Rebolledo, L.E., Boyers, D., Watson, V., Antunes, M., & Chalmers, N. (2025). *Creating sustainable health and social care pathways. Oral presentation at the* Net Zero NHS Scotland 2025 Conference. Available at: https://healthindustryleaders.com/(8)%20LoriaRebolledo%20300925.pdf (accessed: 25 November 2025).

3.2 Flagship project 2

Gateway disseminated the Genetic Scorecard Phase 1 report (Output 5) through ENRA partner networks, and NatureScot presented findings internationally at a keynote conference (Output 6), supporting policy uptake in Scotland and generating global interest.

4. Hollingsworth, P. (2020). Developing a "Genetic Scorecard": A world-first for Scotland. Case study supported by SEFARI Gateway in ENRA 2016–2021. Available at: https://sefari.scot/research/developing-agenetic-scorecard-world-first-scotland (Accessed: 24 November 2025).
5. Hollingsworth, P. and O'Brien, D. (2025) Biodiversity monitoring in Scotland 2025: The evolution of the genetic diversity scorecard to include marine habitats. Blog supported by SEFARI Gateway in ENRA 2022-2027. Available at: https://sefari.scot/blog/2025/01/17/biodiversity-monitoring-scotland-evolution-genetic-diversity-scorecard-include (Accessed: 24 November 2025).
6. Hollingsworth, P., O'Brien, D., Ogden, R., Pinn, E., Smith, E-L. and Meeprom, N. (2025) Genetic Scorecard Phase 1 Report. Report supported by SEFARI Gateway in ENRA 2022-2027. Available at: https://sefari.scot/sites/www.sefari.scot/files/2025-

	06/Genetic%20Scorecard%20Phase%201%20Report.pdf (Accessed: 24 November 2025).
4. Details of the Impact (750 words)	This is the key section of the case study that details the changes that have occurred due to the Centres activities/outputs, whilst citing evidence to support the claims, in section 5. Authors should outline how the Centres activities and output has led to impact, who the beneficiaries of the impact are, and how they have specifically benefited from the changes. Any impacts included must have occurred within the current ENRA RP period i.e. 2022-present but can include research from earlier programmes. SEFARI Gateway's impact strategy begins with co-production: the approach described in Section 2 ensures users own and apply the research results. Gateway documents how research informs decision-making through blogs, impact case studies, a Newsletter (The SPARK) and reports linked to users' own platforms and publications. The strategy evaluates how research generates change for users—policy teams, analysts and practitioners who apply the evidence—and for beneficiaries, the people, species and sectors who experience longer-term benefits. Most impacts to date sit at user level, and fall into three dimensions: (1) reframing and capacity building; (2) embedded in policy and practice; and (3) cross-sector and, also, international influence. These impacts lay the groundwork for beneficiary-level change. 4.1 Flagship project 1 Users include PHS, Health Boards, NHS estate and sustainability teams, NatureScot and Scottish Government analysts. Beneficiaries include people using NHS outdoor spaces, NHS staff and communities across all 14 Health Boards. **4.1.1 Reframing NHS Scotland's Outdoor Estate Value** The Fellowship created a step-change in understanding. PHS commented on closing the gap: "*We simply didn't know how people were using the NHS estate — now we have something concrete*." Source 1 Scottish Government highlighted the influence of economic figures making the valuation a powerful policy tool[Source 2]. NatureScot described the reframing effect: "*The NHS estate has always been described as a liability. The fellowship showed it is a*

health asset, and this gives us a more nuanced understanding of what the estate is for." Source 3

The valuation in Output 1 also positioned NHS greenspace as part of prevention and upstream investment[Source 1].

The research approach strengthened NHS and PHS capability and enabled clearer communication across estates, finance and public-health teams: "*Now we can go into a meeting with finance and talk about this in a way they use*." Source 1

4.1.2 Embedded in Policy and Practice

Outputs 1 and 2 supported practical changes in advice to Health Boards and informed discussions across senior leadership teams.

Outputs 2 and 3 prompted behavioural and procedural change: "*The webinar and presentation by the project team reached all 14 Health Boards — you could see the appetite for this evidence. After the webinar, we [PHS] then had dialogue with NHS Lothian regarding their community asset transfer work.*"[Source 1]

NHS Lothian Greenspace and Health Programme Manager explained that: "*NHS Lothian was the first board in Scotland to publish a natural capital account of its estate in March 2021. At the time this was an emerging field and our work was seen as novel. Since then research such as the PHS commissioned research has helped mainstream this conversation and demonstrate the value of the estate beyond its capital value.*"[Source 4]

The work influenced wider policy through its citation in AECOM's report for Scottish Government consideration, '*Making the Case for Nature*'[Source 5].

4.1.3 Cross-sectoral and International Influence

Methods and findings were shared internationally through a EUROPARC Federation webinar exploring economic tools that help park managers assess how National Parks and Protected Areas support health outcome. NatureScot reflected on the wider interest generated at this event: "*There's real international curiosity in how the NHS Scotland is valuing its greenspace — people haven't seen this done at this scale*."[Source 3]

4.2 Flagship project 2

Users include NatureScot, Scottish Government, JNCC, the 4 Countries Biodiversity Group and conservation practitioners. Beneficiaries include site managers, international practitioners developing GBF-aligned indicators, and sectors dependent on genetic diversity.

4.2.1 Reframing and Capacity Building

The Scorecard addressed a longstanding gap in biodiversity monitoring by creating Scotland's first operational method for assessing genetic diversity. The methodology strengthened understanding of species' resilience to climate change, habitat fragmentation and disease[Source 6]. The Scorecard built capability within NatureScot, providing a practical and scalable template for assembling Scotland's biodiversity indicator package and integrating genetic diversity proxies into statutory reporting[Source 6].

Scottish Government highlighted its significance: "*The scorecard gives us a consistent approach to measuring genetic diversity*."[Source 7]

4.2.2 Embedded in Policy and Practice

The Genetic Scorecard supports NatureScot's current work and decisions[Source 6]. It was selected as the proposed statutory genetic diversity indicator under the Natural Environment (Scotland) Bill (2025)[Source 8a]. It is already embedded in the Scottish Biodiversity Strategy [Source 6] [Source 8b] and is used to expand gene conservation units (GCUs) in Scotland to 50 units by 2030[Source 6].

The Scorecard informs restoration and species-management decisions across marine and terrestrial habitats, including farmer-led restoration[Source 6].

The Scorecard gained political visibility through reference by Scotland's First Minister at a Regions4 event[Source 9].

4.2.3 Cross-sectoral and International Influence

The Scorecard is recognised as a complementary indicator under the GBF and included in International Union for Conservation of Nature (IUCN) guidance [Source 6].

"*The Scorecard has already been discussed internationally across many countries as different as Mexico, Libya, and Australia — mostly because practitioners see the method in presentations and say 'we can use this'*."[Source 6]

	Libya is currently developing its own scorecard using Scotland's model[Source 9]. Conservation geneticists in southern Africa are already using the Scorecard to update management guidelines: "*The Scorecard makes species conservation requirements clearer and strengthens decision-making*." Source 10
5. Sources to Corroborate the Impact (up to 10 references)	Case studies are expected to include evidence to corroborate any changes that have been outlined in the document. Evidence types can include testimonials from external, non-academic partners corroborating the contribution of the Centre's outputs to specific changes, official reports that cite the research and link to change, URL links to websites containing relevant information, download data and links to official statistics demonstrating the impact achieved. 5.1 Flagship project 1 1. Interview – Neil Chalmers, Public Health Scotland (7 November 2025) 2. Interview – (6 November 2025) • Georgia Lee-Smith, economist in Rural & Environment Science and Analytical Services (RESAS).and • Ross Johnston, Scottish Government Natural Capital Policy 3. Interview – Peter Rawcliffe, NatureScot (11 November 2025) 4. Testimonial – NHS Lothian, Greenspace and Health Programme (2025) 5. Lockhead, R. (2024). Making the Case for Nature: Insights from Scotland's Natural Capital Analyses. AECOM Report for the Scottish Government. Available at: https://www.gov.scot/publications/making-case-nature-insights-scotlands-natural-capital-analyses/documents/. (Accessed: 24 November 2025) 5.2 Flagship project 2 6. Interview – David O'Brien & Eunice Pinn, NatureScot (10 November 2025) 7. Interview – Jack Bloodworth, Scottish Government Biodiversity Division (11 November 2025)

	8. Embedded in Policy a. Scottish Government (2025) Annex A: Advice from the Biodiversity Programme Advisory Group (PAG) on target topics for setting statutory targets for improving biodiversity. In: Letter from the Cabinet Secretary for Climate Action and Energy to the Rural Affairs and Islands Committee on the Natural Environment (Scotland) Bill, 26 June. Edinburgh: Scottish Parliament. Available at: https://www.parliament.scot/-/media/files/committees/rural-affairs-and-islands-committee/correspondence/2025/natural-environment-bill-from-cabinet-secretary-for-climate-action-and-energy.pdf. (Accessed: 24 November 2025). b. Scottish Government (2024) *Scottish Biodiversity Delivery Plan 2024–2030*. Edinburgh: Scottish Government. Available at: https://www.gov.scot/publications/scottish-biodiversity-delivery-plan-20242030/ (Accessed: 24 November 2025). 9. NatureScot & Royal Botanic Garden Edinburgh (2024) Maintaining the genetic diversity of wild species in Scotland. Regions4, Case Study Database. Available at: Maintaining the genetic diversity of wild species in Scotland – Regions4. (Accessed: 24 November 2025). 10. Testimonial – Isa-Rita Russo, School of Biosciences, Cardiff University / Co-coordinator, African node, IUCN Conservation Genetics Specialist Group (2025) – e-mail (20 November 2025)
6. Expected Timeline for impacts or future expected impact.	It is understood that while the outputs and outcomes of the Centre activities will have delivered a significant impact from 2022 to 2027, it is anticipated that longer term benefits will also accumulate, into the future. These longer-term cumulative impacts will take time to develop, however the outputs and outcomes in the ENRA RP 2027-2032 will lay the foundations for these to happen. This section provides the opportunity to highlight where impact has occurred in the impact pathway/or is expected to occur sometime period after the project has completed.

SEFARI Gateway's follow-up interviews upon completion of a project with users and experts show-Gateway's model—bringing the right expertise together early, involving users directly in commissioning, and maintaining methodological rigour through co-design and co-production—enables outcomes that become embedded in policy frameworks and practice and reach beneficiaries. The long-term impact of the two project case studies is already visible and continues to grow.

6.1 Flagship project 1

The £82 million valuation and its Green Book–aligned methodology are now informing NHS and PHS strategic planning. Stakeholders anticipate a sustained role as the NHS strengthens its focus on prevention, population health, estate planning and climate-health integration.

6.1.1 Embedding natural capital in estate planning

The valuation provides a defensible business case for greenspace investment across Health Boards. PHS and SG analysts confirmed it enables Boards to justify retaining and enhancing outdoor estate areas, using robust economic evidence rather than assumptions.

6.1.2 Strengthening the NHS Anchor narrative

Interviews show the work has strengthened momentum behind the Anchor narrative, with the evidence now supporting prevention frameworks, community-health priorities and population-level indicators.

6.1.3 Routine monitoring and dashboard integration

PHS will launch a dashboard presenting valuation data at Health Board level, enabling routine tracking of estate use and wellbeing value. Discussions are underway to make the survey a recurrent national dataset (every 2–5 years), embedding this approach beyond the ENRA 2022–2027 cycle. There is also potential for more disaggregated data to support natural capital accounting on behalf of

the Scottish Government, building on the AECOM report (Section 4, Source 5).

6.1.4 Alignment with national frameworks and strategy

PHS highlighted alignment with Scotland's Population Health Framework (2025), especially prevention and research & innovation. The evidence is expected to integrate into the forthcoming NHS Climate & Sustainability Strategy, ensuring ongoing relevance to national health and climate priorities.

6.1.5 Method transfer and wider application

A Phase 2 of the current project—focusing on a national staff-wellbeing survey—is underway and will inform service-design and estate-management decisions. Additional applications are being explored, including blue-space valuation (with Greenspace Scotland) and potential use across other public-sector estates.

6.2 Flagship project 2

6.2.1 Statutory monitoring and national re-assessment

The Scorecard methodology is the Scottish Government's proposed statutory indicator for genetic diversity under the Natural Environment (Scotland) Bill 2025. Its future impact is, therefore, structurally embedded. Once enacted, the legislation will require regular national reassessments of species' genetic diversity. These assessments will identify species at genetic risk, informing conservation action and resource allocation.

6.2.2 Expansion of GCUs

NatureScot will use the Scorecard to guide the planned expansion to 50 GCUs by 2030, prioritising species with the highest genetic risk.

6.2.3 Climate adaptation and resilient restoration

	The methodology informs decisions about restoring or introducing populations with stronger genetic resilience (e.g., disease-tolerant or climate-resilient lineages), shaping site-level management, Nature Networks and restoration programmes. **6.2.4 Integration into Scotland's long-term biodiversity monitoring framework** The Scorecard is positioned to influence Scotland's indicator refresh, statutory reporting, biodiversity strategy reviews and long-term monitoring reforms. **6.2.5 International adoption and GBF alignment** Recognised as a complementary indicator under the GBF, the Scorecard is being adopted internationally (e.g., Libya, southern Africa). Its citation in a 2025 analysis of the EU Nature Restoration Law demonstrates its emerging role in shaping global approaches to the monitoring of genetic diversity. Researchers at the University of Benghazi have translated the Scorecard into Arabic and applied it to three threatened native tree species. Adoption by Libyan authorities as a national report is now being explored—potentially opening a pathway for wider uptake across the Arabic-speaking world.