**Independent Review of SFC's Research Pooling Initiative**

**Background:**

The Scottish Funding Council (SFC) has announced an independent review of Scottish research pooling. First established in 2004, research pools are multi-university research collaborations designed to make Scotland more globally competitive in attracting research talent and producing world-leading research. The Marine Alliance for Science and Technology for Scotland (MASTS) was one of the last SFC pools to be established (2009) and is now in its second phase of operation. MASTS has greatly enhanced the reputation of Scottish marine research including:

- Interdisciplinary and collaborative research and funding
- Advanced training through MASTS and SUPER Graduate Schools
- Representation of marine issues at Scottish, UK and international levels
- Improved support to government departments, policy and working with industry
- Supported internationalisation and challenge-led funding opportunities

Over the last 9 years, MASTS has exceeded expectations in the effective promotion of marine research excellence and improved policy support across Scotland. Membership of MASTS has grown and a national ethos of cooperation and trust has developed across Scotland that is the envy of other nations. This reflect the importance of state-of-the-art marine science to meet local, regional and global challenges of future food and energy security along with the ambitions of the United Nations sustainable development goals[1]. Membership has grown (17 members) and, given the current political, demographic and climate challenges, the role of MASTS in representing, researching and supporting the management of marine systems will become evermore significant. We envisage an important and bright future for MASTS. The outcome of the SFC review is key and there is the opportunity to enhance performance and address areas of project development, outreach and industrial liaison that are beyond our resources at present, despite their significance.

1: https://www.un.org/sustainabledevelopment/sustainable-development-goals/

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Scottish Funding Council
Promoting further and higher education

## Section 1: Initial research pooling initiative

***Q1a. What has been the impact of the initial research pooling initiative?***

1.1. **Has the pooling initiative met its objectives:**

- *MASTS has met its stated objectives and has recruited more than 40 staff (many international leaders) and trained more than 80 PhD students.*
- *Between 2009 and 2017 MASTS staff generated £48.7m pro rata grant income (£82m total) ~17% from industry and charitable bodies, ~18% EU & ~65% UK Research Councils.*
- *The SFC investment has also stimulated £30m of new infrastructure development including the new Gatty Marine Laboratory at the University of St Andrews and the Lyle Centre at Heriot Watt University.*
- *Using Pools Engagement in European Research funds (PEER) MASTS has allocated £52,760 to the development of EU proposals resulting in more than £15 million return from successful EU projects.*
- *Post Doctoral and Early Career Researcher Exchange (PECRE) funds of £169,366 have been committed to support 21 visiting early career researchers from 10 countries.*
- *A further 20 MASTS Visiting Fellowships worth £237,615 have also been awarded.*
- *MASTS has also awarded 118 Small Grants to the value of £100,657, and Theme/Forum Grants totalling £91,694, particularly targeting early career researchers.*
- *REF outcomes, and particularly, impacts case studies, have been greatly enhanced by MASTS support.*
- *Enhanced research quality in marine subjects was confirmed by independent external scientific review.*

**1.2. Examples of the ways that pooling has impacted on the relations between pooling partners and on how individual partners work with other external bodies.**

- *MASTS has created durable and productive collaborations and partnerships through projects and co-supervision of PhD students, and graduate internships.*
- *MASTS Themes and Forums have created a structure that encourages positive working relationships between researchers and other stakeholders including industry, regulators and Government. Marine Scotland Science were founding members of MASTS.*
- *Scottish Natural Heritage (SNH), the Scottish Environment Protection Agency (SEPA), the Joint Nature Conservation Committee (JNCC) and the British Geological Survey (BGS)*

*have now joined MASTS.*

- *MASTS created a web-based resource-map database of partners capabilities allowing sharing of resources (from equipment to statistical applications) and opportunities (ie. Ship berths) among partner to increase efficiency and avoid redundancy.*
- *This resource database is available to external parties.*
- *Our Scientific Advisory Board is comprised of leaders from industry and marine organizations (SEPA, SFSA, SNH etc).*

**1.3. Evidence that the partnerships associated with pooling have had broader impacts on Scottish HEIs.**

- *Marine impact studies from MASTS members was prominent in the last Research Excellence Framework assessment.*
- *MASTS related publications are above average impact in comparison to the marine average (source: WoS and external review of MASTS).*
- *The graduate school has enhanced research by placing 87 doctoral students amongst members and requiring joint supervision.*
- *MASTS Fora provide a showcase for the benefits of working closely with industry, regulators and Government.*
- *MASTS increased membership from its initial 11 founding members to 17.*
- *MASTS facilitates partners working with other pools such as SAGES and ETP and it works closely with the Innovation Centres; IBIOIC, SAIC, and DataLab.*
- *PEER and PECRE funding has supported excellent researchers (often early career) to spend time in Scotland.*

**1.4. Examples of other outcomes of research pooling, and how they have impacted on the Scottish research landscape.**

- *The MASTS Annual Science Meeting is now the largest UK marine science gathering attracting more than 450 delegates from academia, government, industry and other stakeholders.*
- *The pools have facilitated engagement between the academic research community and the wider community through applied solutions based projects and public outreach.*
- *The pools have engendered an ethos of cooperation within HEIs moving them from being destructively competitive to a collaborative and more interdisciplinary mode of operation.*
- *MASTS web-based resource-map increases efficiency and avoids redundancy.*
- *Researchers from the MASTS graduate school have gained places in research institutions, governmental departments and industry. Without MASTS, and due to the changes to NERC graduate funding, this home grown talent would have been lost.*

**1.5. Have pools made an impact on Scotland's reputation? What are the national (Scotland/UK) and international perceptions of pools?**

- *The pools (and MASTS specifically) have raised the profile and reputation of Scottish marine science at UK, EU and wider international level.*
- *MASTS represents Scottish marine science at a national level on the UK Marine Science Co-ordination Committee, the Marine Management Organization and National Oceanography Centre Association.*
- *MASTS represents Scottish marine science internationally as a member of the European Marine Board, and currently chairs the European Marine Biological Resources Centre.*
- *MASTS is recognised as a key point of contact for the UK Science and Innovation Network.*
- *MASTS has signed a number if MoUs with international organizations (e.g. MEOPAR Canada, University of Nagasaki, Japan).*
- *MASTS is used as an exemplar for the formation of similar marine organizations in other countries (e.g. Norway).*
- *The MASTS resource map database concept was replicated by the National Oceanographic Centre.*

**1.6. What aspects of pooling have attracted most interest from out with Scotland/ academia and have they impacted on developments elsewhere? Can you give examples of this?**

- *MASTS is one of only three Member State representative bodies for the UK on the European Marine Board (EMB).*
- *MASTS led the formation of the Universities Consortium Panel of the EMB and shares "pooling" best practice with EMB members who are developing university consortia.*
- *Other HEIs outside Scotland are keen to learn how MASTS and other pools operate as they see this as model to improve collaboration within their own subject related cohorts.*
- *Also see responses under 1.5.*

**1.7. What has happened that would not have happened without research pooling? Please give examples.**

- *The development of subject area (marine) related PhD training cohorts after withdrawal of most NERC funding.*
- *Attraction of a new £5 million Doctoral Training Partnership (DTP) program "The Scottish Universities Partnership for Environmental Research" (SUPER) to Scotland.*
- *The attraction of EU funding through collaborative programs (cf £15 million).*
- *Pooling has demonstrably fostered collaboration, co-operation and co-ordination between HEIs and other related stakeholders that was absent before the formation of the pools.*
- *Scottish marine science would not have the national and international profile that it now enjoys without achieving the critical mass and level of organization that pooling has allowed us to create.*
- *A strong ethos of cooperation among marine HEIs.*

**1.8. What has been the impact of pooling outside of the academic sector, on policy and industry? Can you provide examples of this?**

- *Increasing and positive interaction with Scottish Government, regulators and industry has to a large extent been driven by the Pools.*
- *MASTS helps to administer the Centre of Research Expertise for Waters (CREW) for the James Hutton Institute.*
- *MASTS played a pivotal role in setting up Fisheries Innovation Scotland on behalf of Scottish Government and the fishing industry.*
- *The development of an axis between pools and the Innovation Centres.*
- *MASTS collaborates with MS, SNH, SEPA, JNCC and BGS are all now formally MASTS members.*
- *MASTS has formed an independent company (MAST-S) as an additional opportunity to work with stakeholders.*
- *MASTS closely collaborates with the Institute of Marine Engineering, Science and Technology (IMarEST), the Society for Underwater Technology (SUT), and Decom North Sea.*
- *MASTS has a strong working relationship with the Industrial Biotechnology Innovation Centre (IBIOIC), DataLab and the Scottish Aquaculture Innovation Centre (SAIC) with co-sponsorship of studentships.*
- *The Offshore Renewable Joint Industry Partnership (ORJIP) also works closely with the MASTS Marine Renewables Energy Forum.*
- *MASTS is developing a working relationship with the new National Decommissioning Centre (Aberdeen).*

**1.9. Have there been missed opportunities, where pooling could have had an impact but didn't?**

- *The development of the UK's and Scotland's strategic international research agenda would benefit from closer interaction with the pools and the Innovation Centres. The current approach is fragmented and fails to promote UK and Scottish research and innovation at an appropriate level.*
- *The pools also have limited resources to commit to collective outreach and dissemination. Further investment in this area is needed if we are to engage the public, opinion formers and decision makers with research and help to drive the behavioural changes urgently needed to address climate change for example.*

***Q1b. What lessons can be learnt from the research pooling initiative?***

**1.10. What lessons can be learnt about making collaborations work effectively?**

- *Time is required to develop trust based on transparency, fairness and impartial leadership of the Pools and is vital to underpinning effective collaborations.*

- *Once gained, more effective cooperation can be established with partners confident that their interests will be properly consider and protected.*
- *Involvement, communications and a mandate from the researchers is essential. The election of group (Forum) leaders has proved a success in MASTS.*

**1.11. Have particular pooling models been shown to work well/badly, in all cases/in specific contexts?**

- *MASTS adopted the Scottish Marine Science Strategy as a clear framework from which to develop the MASTS science structure. This has provided an excellent foundation.*
- *Whilst promoting and supporting science excellence, MASTS has retained a strong focus on delivering research and innovation to inform, policy, regulation and sustainable economic development.*
- *Adopting a representational capacity on behalf of its Member organizations, MASTS has been able to raise the profile and enhance the reputation of Scottish marine science.*
- *MASTS has established itself as a legal not for profit guarantee company with charitable status. This status allows MASTS – through MAST-Scotland to enter into legal agreements, lead projects and handle funding in more flexible and cost effective ways.*

**1.12 Were particular elements of pooling more effective than others?**

- *Development of collaborative working – ethos, process and practice.*
- *Developing sufficient critical mass and reputation to be regarded as being representative of marine science both nationally and internationally.*
- *Providing cohort based postgraduate training opportunities across institutions and disciplines.*
- *Creating a sense of community, purpose and pride in the collective achievements of the pool.*

**1.13 From your perspective what evidence can you give regarding what worked well, or didn't? Why?**

- *Much of the evidence is presented above.*

**1.14 You may wish to consider: academic posts; improved facilities and equipment; graduate schools and studentships.**

- *See section 1.1*

**1.15 Are there lessons to learn from the range of pools supported?**

- *The pools were supported sequentially over a number of years and there has clearly been an evolution in their modes of operation and remits.*
- *The early pools were largely focused on raising academic and research metrics. The*

*later pools, including MASTS, were seen as opportunities to address wider, social, political, economic and environmental agendas.*

- *The light touch SFC approach of allowing different pools to develop in different ways was sensible and allowed organizations to evolve in support of their specific constituency.*

**1.16 Were the disciplines covered by pools the right ones?**

- *As noted above, the pools were established sequentially and responded to the emerging challenges at the time they were funded. All have subsequently evolved. Most research is now predicated on interdisciplinary, multi institutional approaches. Most pools are well placed to meet this requirement.*

**1.17 Were there missed opportunities in other areas? What happened in those areas?**

- *Pooling appears to be a broad enough church to embrace most of the key areas.*
- *In combination with the Innovation Centres, the Pools provide Scotland with a powerful research and innovation platform – which in some areas is world leading.*

**1.18 Are you aware of examples of location impacting on or limiting institutions' involvement in research pooling and/or of examples that overcame any limitation?**

- *For MASTS there has been no limitation. There are currently only two HEIs in Scotland that are not MASTS members and there is no barrier to them becoming members.*
- *MASTS has received inquiries from HEIs in England and Wales who have or are considering becoming members subject to the approval of the MASTS Governing Council.*

**1.19 What lessons can SFC learn from the initiative on how we design/ implement/ manage projects?**

- *The SFC should engage with Government, industry and wider civil society to ensure that strategic investments in research and innovation are not driven only by HEI centric agendas.*
- *As public funding becomes more constrained coupled to a need to increase our international competitiveness, there needs to be much closer alignment between funding agencies.*
- *There is likely to be an increasing emphasis on outputs and outcomes from investment in research and innovation and there will need to be both structural and cultural change to meet this requirement.*
- *Communication between the pools and the SFC can be improved.*

**Section 2: Pooling now and in the future**

***Q2a. In the current research landscape, what is the perception of, and role for, the pools?***

**2.1. Has the changing landscape and funding environment affected evolution of the research pools?**

- *Reduced research funding and lack of training opportunities for potential doctoral students has made the pools more important as they have become adept at maximizing the use of limited funds and securing larger cooperative funding opportunities.*
- *The pools initially had, what seems in retrospect, generous funding. A much less generous second phase of "maintenance" funding has meant reduction of ambition and a focus on fewer key deliverables among the pools, often focusing on the graduate Schools at the expense of other equally important areas of development such as post-doctoral and early career researcher opportunities.*
- *It was clear that pools have to adopt an interdisciplinary, challenge-led research and innovation agenda. The policy agenda has become ever more prominent (especially under BREXT) and MASTS was formally referenced in the Scottish Marine Science Strategy, which is founded upon the principles of research to support: Clean, healthy, safe, biologically diverse and productive seas, managed for the benefit of people and nature. MASTS has, from the outset, worked closely with Government, regulators, industry and other relevant stakeholders.*

**2.2. Do institutions remain committed to individual pools and the concept of pooling more widely?**

- *MASTS has expanded its membership with three additional HEIs and three governmental bodies. The fact that these members contribute more than 50% of the operational costs of MASTS annually in cash confirms this level of commitment.*
- *Institutional commitment is likely to waiver if rising costs mean that the pools have insufficient funds to provide tangible benefits to the partners.*

**2.3. How does pooling fit with the current focus on interdisciplinarity and challenge led research?**

- *Pooling itself brings institutions together in many ways. For MASTS, meetings, seminars workshops, training events etc are organized by MASTS fora.*
- *This foundation of collaboration and co-ordination facilitates interdisciplinary and challenge-led research and there are many examples of success (TERAWATT, ECOWATT, SIFIDS, ATLAS, fishPi and fishPi$^2$ etc).*

**2.4. What is the current role of pools and how has that changed since the initial phase? Is the current model right?**

- *MASTS has evolved its structure becoming more streamlined and cost effective.*

- *MASTS has responded to political, demographic and climate change agenda, recognizing emerging threats (e.g. multiple stressors and plastics etc) and challenges (green energy, food security). This flexibility to respond to emergent threats has been part of the evolution.*
- *All pools operate in different ways. MASTS is well adapted and set up to respond to changing research agendas and demonstrably addresses current research and innovation requirements across the spectrum of marine science.*
- *The pools support internationalization and grand challenge approaches*
- *The role of pools in graduate training has been transformational to doctor programs in Scotland.*
- *Pools strongly support early career researchers and diversity in Scottish sciences.*

**2.5. How do pools interact with other SFC investments such as Innovation Centres (ICs)?**

- *Pools interact with the ICs in a variety of ways.*
- *MASTS liaises with all the ICs relevant to its marine focus.*
- *MASTS has joint studentship and training arrangements with IBIOIC, DataLab and SAIC.*
- *MASTS has also written these ICs together with CENSIS into other grant proposals as collaborating partners including a major GCRF Hub proposal and the successful SUPER DTP.*

***Q2b. Should research pools have a continuing role in the Scottish research base?***

**2.6. Will the concept of research pooling remain relevant in the developing research landscape? How can/should the model evolve to fit that landscape?**

- *Given political, demographic and climate challenges, the role of MASTS in representing, researching and supporting the management of marine system will become evermore significant.*
- *Pooling should facilitate collaborative, interdisciplinary research and innovation. Sustaining and further enhancing the critical mass and momentum generated through the initial and subsequent funding of the pools can be maintained with relatively modest ongoing funding.*
- *Failing to capitalize on pools success would represent a significant loss to Scotland and the UK.*

**2.7. What happens when the five years continuation funding comes to an end?**

- *A judgment must be made with respect to whether pooling is providing "value for money" and that the benefits are worth the modest amount of investment.*
- *Continuation funding is essential to help support the operation of pools..*
- *HEIs and other stakeholders who secure value from the pools should also be required to contribute to their operation and evolution.*
- *However, a member subscription only model is unlikely to provide sufficient funds to sustain core operational functions required to make a pool successful.*

- *In the absence of core operational funding support from the SFC or an equivalent public body, coupled to realistic contributions from pool members, it is unlikely that the structure and benefits of pooling can be maintained.*
- *The level of funding will determine the potential return and societal benefit. An investment of £1-2 million would transform the pooling ambition and £3-5 million promote Scottish Marine Science toward the top of international achievement (per capita).*

**Section 3: Anything else**

**3. Any further perspectives on the introduction, implementation and impact of research pooling are welcome.**

- *See introduction*
- *The pooling model is variable and reflected differently in each pool. It is difficult to judge all pools with the same metrics. MASTS is much more grounded in policy than many others.*
- *MASTS as the last and the largest of the pools to be funded has demonstrated its value and potential and lack of further support would remove what has become an exemplar of national organization which is also recognised internationally.*
- *SFC continuation phase funding is modest, at best, and the future sustainability and performance of the pools would be secured by a more realistic level of support, recognizing the national and international success of pooling.*
- *Continued funding of the Scottish pools capitalize on the progress made to-date and insures the reputation of Scottish research continues to grow.*
- *Many of the benefits of pooling are hard to express. These intangible benefits include a sense of greater belonging, new interdisciplinary partnerships forged over workshop coffee breaks, graduate students feeling part of a greater whole, researchers able to seek support across institutions, and an ethos of cooperation rather than competition. These intangible benefits are irreplaceable and an essential element of pooling that makes it effective and the envy of other nations.*