

Strategic Review of the Antarctic Environmental Data Centre

**Summary Report to the British Antarctic
Survey**

September 2008

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Approved by: Stewart Brown Date: 29 September 2008
Associate Director

Executive Summary

1. SQW Consulting has been commissioned to undertake a strategic review of the Antarctic Environmental Data Centre (AEDC) to ensure that BAS is able to manage its data effectively and that the data management function is able to respond to new challenges from PSPE. As part of this review, a consultation programme has been undertaken with key stakeholders in order to examine current and future data management issues and implications for resourcing and structures within BAS.
2. Consultees were drawn from BAS, NERC (Research Institutes, Data Centres and central functions) together with stakeholders and other partners. This process has been supported by desk research into contextual documents and data relevant to the scientific mission and objectives of BAS, the Natural Environment Research Council and the broader polar community.
3. Following on from the consultations, the emerging findings were considered at a facilitated strategic workshop involving 22 individuals drawn from six organisations within NERC held at the Moller Centre in Cambridge in June to gain agreement on priorities and the way forward and also highlighted at the BAS Board Away Day in July 2008. Following these discussions, the emerging findings were considered by BAS staff at a senior implementation workshop in September 2008.
4. While BAS is seen as a leader in science and logistics, it was widely viewed by consultees as being “part of the pack” in relation to current data management activities. Data management was seen as exhibiting pockets of leading practice but with a long “tail”. It was felt that the current fragmented approach to data management adopted within BAS allows this to happen and, therefore, needs to change.
5. In the future it was felt that there will be a need to demonstrate more clearly both value for money and innovation in use of resources and assets which applied to data management in the same way as it does to BAS’ other activities. Allied to this was a need to more clearly articulate the business benefits arising from effective data management within BAS in relation to the delivery of good science and effective knowledge exchange with current and potential partners.
6. To support this it was felt that BAS needed a clearly identified senior leader for data management to champion and have formal responsibility for the activity and that AEDC could take on a broader role. This role would be characterised by a more ambitious, proactive and also opportunistic approach to exploit emerging policy and funding opportunities.
7. Future UK science policy was identified as offering a range of data management-related opportunities as it increasingly moves towards a bi-polar focus. Consultees noted that there is currently less co-ordination of UK Arctic science than Antarctic science. It was felt that this offers opportunities for BAS to occupy this “space” strategically in terms of general data management. In addition, two specific thematic areas were identified as particular opportunities, these being related to cryospheric data and palaeoclimatic data.

8. A number of resource and organisational implications were identified relevant to BAS' management of its current and future data needs, obligations and potential opportunities. There was some sense of a need for enhanced resources, ranging from one full time equivalent (FTE) upwards.
9. The present overall mixture of science and data management skills present within BAS' combined data management function (i.e. AEDC and within the Divisions) was considered to be beneficial, but the current structure did not provide an environment for ensuring that those skills are mutually reinforcing and shared. The majority of consultees felt that BAS' data management activities were being undertaken via a fragmented and uncoordinated structure which was lacking in "teeth". Consultees felt that more should be done to support a culture of proactive, effective data management within BAS.
10. Consultees felt that the wider developments and opportunities relating to arctic and bi-polar science and implications of the BAS Strategy '*Polar Science for Planet Earth*' (PSPE) made a compelling case for change and that preserving the *status quo* would not address BAS or the polar community's future needs.
11. A range of benefits and potential opportunities were identified through the development of a more effective and flexible model of data management. Such a model was considered both appropriately opportunistic and necessary due to the wider developments occurring within polar science and NERC.
12. Based upon these discussions and the outputs from consultations, a number of high level recommendations were put forward. These are summarised below:
 - that overall data management responsibility/championing is allocated to an individual at senior Board level within BAS¹
 - specific management responsibility for data management operations in BAS should be assigned at a more senior level (Band 4)
 - that current data management activities within BAS be drawn together as a coherent cross-cutting group to provide a more integrated central service in order to maximise the opportunities offered by PSPE
 - that the current AEDC be renamed to the UK Polar Data Centre (UKPDC) so that its external profile better reflects BAS' data management obligations to NERC and other stakeholders, plus the needs of PSPE and the increasing emphasis within the polar community on bi-polar and arctic science.

¹ The suggestion was Head of Science Coordination

1: Introduction

- 1.1 SQW Consulting (SQWC) was commissioned by the British Antarctic Survey (BAS) to undertake a strategic review of the Antarctic Environmental Data Centre (AEDC). This work builds upon SQW's previous interactions with BAS developed through a previous study undertaken for NERC².
- 1.2 From a BAS perspective, there were three drivers for this work namely:
 - to ensure that BAS is able to manage its data effectively to serve immediate scientific needs and meet long-term obligations
 - to ensure that BAS can meet its data management obligations to NERC and other stakeholders in an effective and efficient way
 - to ensure that the data management function in BAS is able to meet new challenges and the requirements of the new NERC Strategy, such as those relating to the Arctic and cryospheric data.

Methodology

- 1.3 The methodology adopted in this study included:
 - desk research into contextual documents and data relevant to the scientific mission and objectives of BAS, the Natural Environment Research Council and the broader polar community
 - desk research on “interesting/ leading practice” in relation to data management within the scientific and research arena
 - a programme of consultations with a range of individuals drawn from BAS, NERC (Research Institutes, Data Centres and central functions) together with stakeholders and other partners including
 - 14 face-to-face meetings
 - 9 telephone consultations
 - one facilitated strategic workshop held with 22 individuals drawn from six organisations within NERC held at the Moller Centre in Cambridge with further discussions with BAS senior staff at an Implementation Workshop, prior to a presentation to the BAS Board at the completion of the project.

Structure of the report

- 1.4 The report has the following structure:

² Market Research study into NERC data holding and the commercialisation opportunities, SQW September 2007

- Chapter 2 describes the emerging findings from the consultation process
- Chapter 3 outlines the high level recommendations agreed at the AEDC Strategic Workshop by the attendees
- Chapter 4 outlines the next steps.

Annex A details the individuals and organisations consulted during the project.

2: Emerging findings from the consultation process

- 2.1 This section of the report summarises the emerging findings arising from the consultation process outlined in Chapter One.
- 2.2 The findings were grouped around three distinct areas:

Current interactions

- 2.3 At present, the interactions between consultees and BAS/AEDC in respect of data vary considerably, dependant upon the organisation/individual. These interactions can be grouped into three broad categories:
 - data generator
 - data user
 - oversight/co-ordination/strategic.
- 2.4 In addition to interactions with AEDC, the majority of individuals contacted were familiar with, and worked with, other Data Centres and data sets. Examples quoted included NERC Data Centres such as the British Oceanographic Data Centre (BODC), British Atmospheric Data Centre (BADC) and National Oceanographic Centre (NOC). Other examples quoted included the Environment Agency (EA), Defra and the Natural History Museum, together with the University of Maine and Russian derived and managed data sets.

Views on current interactions

- 2.5 Based upon these interactions, the broad view expressed by consultees was that in relation to its *overall activities*, BAS could be regarded as exemplar in terms of research intensive science and Public Relations. However, in relation to *data management*, it was widely viewed as being “part of the pack”.
- 2.6 In this context, data management within BAS was not considered to be lagging behind, but equally it was not seen as an exemplar – examples were given of what were viewed as good as well as some not so good practices. Overall, data management was felt to be reactive and somewhat haphazard: one consultee offered a “score” for the function – 7/10.
- 2.7 A further observation offered by consultees related to the public face of data holdings within BAS. Contrasts were drawn with what was felt to be greater accessibility and higher profile of data holdings within BGS, CEH and POL. Some consultees expressed surprise as to this situation given the maturity of BAS as an organisation and were of the opinion that BAS’ approach in relation to data management needed to be more user-driven.
- 2.8 Other suggestions and observations offered by consultees (both within BAS and external to BAS) were that AEDC was seen as a relatively unsophisticated, and that more could be done

to provide a “value added service”. Partly as a consequence of this, interactions with AEDC were seen as a cost, with no clear articulation of the benefits arising from such interactions. Within BAS some consultees noted that staff could derive all the benefits of data interaction through working “round the system”. It was also suggested that, at present, there was no meaningful comeback for those within BAS who do not conform to data management requirements.

- 2.9 In addition, there appeared to be little knowledge of what approaches to gathering data were adopted within BAS Divisions. The perceived consequence of this was that opportunities to enable BAS overall to do things better was lost
- 2.10 Some of these observations may be explained by the way in which data appear to be viewed within BAS. It was suggested that, in comparison to other organisations with data assets, they are not as highly valued as elsewhere and in particular, are not seen as crucial underpinning elements to sustain the science role.
- 2.11 When undertaken, data management is viewed as often being planned in a way which does not embrace a “cradle to grave” approach and as a result is only adequate for immediate scientific needs. In addition, it was suggested that data collection and management is on occasion not standards compliant and rapidly becomes obsolescent.
- 2.12 Consultees from BAS, the broader NERC community and external peers also observed that data management as an *activity* does not appear to be as valued as elsewhere. Similarly it was felt by a number of consultees that data management as a *function* is not as well recognised or valued as elsewhere. Comparisons were drawn between the status of data management within BAS and within comparators/peers in the UK and abroad. In the case of BAS data management it was felt that the status is relatively low compared with other organisations such as BGS, POL and the AADC.
- 2.13 In summary, data management within BAS demonstrates pockets of leading practice but with a long “tail”. Currently, the approach to data management adopted within BAS allows this to happen.

Future requirements

Generic requirements

- 2.14 A range of generic challenges relevant to data management within BAS were identified.
- 2.15 Across the environmental sector, and relevant to BAS, there was a recognition of the increasing requirements for, and expectations of, access to data holdings. Associated with this, consultees identified the issue of inter-operability as being particularly relevant and increasing in significance. Consultees also pointed to the need for AEDC to increase its interactions with other NERC Data Centres as environmental science becomes more multi-

disciplinary in nature and NERC's thematic science priorities require increasingly collaborative approaches³.

- 2.16 Similarly, consultees pointed to the trend of developing standards, especially for meta-data, as being of significance to BAS. Allied to this, the increasing complexity of scientific collaboration characterised by multi-partner, multi-national and multi-thematic research was seen as presenting particular challenges (and opportunities) for BAS in the future.
- 2.17 Consultees noted the increasing volumes of data being generated by Antarctic research and the need to deal with and transmit data ever quicker. The need to demonstrate reproducibility together with increasing requirement from Scientific Journals to store data to enable third party testing of models and conclusions drawn from data manipulation were also highlighted.
- 2.18 Alongside these specific issues, the majority of consultees felt that there was an increasing need to demonstrate both value for money and innovation in use of resources and assets which applied to data management in the same way as it did to BAS's other activities.

Institutional requirements

- 2.19 In addition to a number of data management issues which were recognised as being applicable to many scientific and research led organisations, a number of specific issues and challenges relevant to BAS were identified.
- 2.20 Firstly it was felt that there needed to be a much clearer articulation of the business benefits arising from effective data management within BAS to address the issue of the activity being seen as a net cost by some within the organisation. To support this it was felt that BAS needed a clearly identified senior leader for data management to champion and have formal responsibility for the activity.
- 2.21 Effective data management was viewed by consultees as a function which should be integral to the majority of BAS staff's jobs. This in turn would help ensure a higher profile for data assets and management important internally and externally.
- 2.22 With regard to the AEDC, it was felt that there was an opportunity for the Centre to take on a broader role. It was felt that through adopting a more ambitious, proactive and opportunistic approach in relation to emerging policy, the AEDC could potentially secure additional funding and raise its profile. Linked to these activities, there was the suggestion that the AEDC would need to do more to offer expert guidance as to the location, usefulness and quality of relevant data sets particularly as data mining and data mash-ups become more important.
- 2.23 Associated with this, it was suggested that data management structures within BAS would need to be more effectively structured to enable and facilitate more cross-cutting coordination of data management activities to ensure that BAS's data assets were "sweated" most effectively.

³ The significance of effective data management within a scientific context has also been highlighted in a recent paper in Nature: "Big data: the future of biocuration", Howe et al, Nature, 455, 2008

- 2.24 In addition to the larger data holdings relevant to Antarctic science, the opportunities offered by access to small data sets held by individual scientists - referred to as the “dark matter” by some consultees - was remarked upon by a number of those interviewed. Whilst it was recognised that some of these data sets may be of little long-term value, there was a view that the data management function within BAS should have a responsibility for knowing what data sets are available and who holds them.
- 2.25 Consultees from outside BAS also noted that there was an increasing need for data storage and management to be an integral part of any science plan and that some organisations were making increasing use of performance indicators for data centre activity, with a range of metrics being utilised.

Polar Science related requirements

- 2.26 A number of specific polar science related requirements were also identified.
- 2.27 Under Article III (1) c of the Antarctic Treaty, BAS is obliged to promote international co-operation in scientific investigation by exchanging, and making freely available, scientific observations and results from Antarctica. Resolution 4 (1998) of ATCM XXII held in Tromso recognises that national data management systems have a key role to play in ensuring that this requirement for freedom of access to scientific information is met, and therefore recommended the establishment of National Antarctic Data Centres.
- 2.28 Within the polar science community, there is an increasing emphasis on common data standards e.g. the Joint Committee on Antarctic Data Management (JCADM) Strategy. Within the UK, NERC’s Science Strategy (2007-2012)⁴ recognises the importance of the polar regions.
- 2.29 Similarly the recommendations of the Polar Science Working Group⁵ were highlighted: “*We recommend that the NERC Strategy and the UK national interest favour an increase in NERC Arctic Science*”.
- 2.30 Overall, there was recognition that NERC polar strategic science is currently weighted towards the southern hemisphere, but that future activities are likely to be characterised by an increasing focus on the Arctic. This changing situation was one that BAS would have to respond to and which would have implications for its data management activities.
- 2.31 Consultees noted that the International Polar Year has highlighted the need for a more co-ordinated polar remit, but also that there is currently less co-ordination of UK Arctic science than Antarctic science. It was felt that this had the potential to offer opportunities for BAS to occupy this “space” strategically in terms of general data management. In addition, two specific thematic areas were identified as particular opportunities, these being related to cryospheric data and palaeoclimatic data.
- 2.32 Within BAS, consultees noted that the implications of the new NERC strategy had already been noted as evidenced by recent internal presentations on ‘*Polar Science for Planet Earth*’⁶ and the opportunities it presented for arctic and polar science.

⁴ Next Generation Science for Planet Earth, 2007-2012; NERC 2007

⁵ NERC Polar Science Working Group Report; November 2007

- 2.33 In summary, there are a number of generic challenges for data management in the future. Future UK science policy will increasingly move towards a bi-polar focus and opportunities. BAS' response to this, '*Polar Science for Planet Earth*', presents challenges and identifies significant opportunities that will require different approaches to research and programme management.
- 2.34 Data management within BAS will need to respond to these challenges. Consultees suggested a number of areas in which it was felt that data management within BAS could be improved in order to better address current obligations and 'future proof' activities. These are outlined in more detail in the preceding paragraphs, but include amongst others: the need for clear senior strategic leadership and the need to demonstrate that BAS' data are viewed as an asset rather than a liability. The business benefit that effective data management brings to BAS as an organisation was articulated in terms of delivering good science and supporting knowledge exchange and outreach activities.

Resourcing and organisational implications

- 2.35 The final element of the consultation process investigated the resourcing and organisational implications of current and likely future data management requirements within BAS.
- 2.36 In relation to staff resourcing, based upon the feedback of consultees, there was some sense of a need for enhanced resources, ranging from one full time equivalent (FTE) upwards. The present overall mixture of science and data management skills present within BAS' combined data management function (i.e. AEDC and within the Divisions) was felt to be beneficial if those skills are mutually reinforcing and shared.
- 2.37 However, a number of those consulted (both within and outwith BAS) felt that the current structures for data management were unnecessarily fragmented. Similarly a large number of consultees felt that the data management function within BAS needs "teeth" and a greater ability to enforce standards and procedures.
- 2.38 It was suggested that more could and should be done to encourage a culture where good data management is recognised and rewarded, including a mandatory requirement for data input and curation – perhaps enforced through the staff appraisal process.
- 2.39 Other organisational improvements suggested included more communication and sharing of good practice across current Divisions at a senior level; the introduction of a data management culture similar to that for Health and Safety; together with a greater focus on data management for scientific staff at induction.
- 2.40 In summary, the majority of consultees felt that BAS' data management activities were being undertaken via a fragmented structure which was lacking in "teeth". Consultees felt that more could be done to support a culture of proactive, effective data management within BAS.
- 2.41 Consultees felt that the wider developments and opportunities relating to arctic and bi-polar science and implications of PSPE made a compelling case for change and that preserving the status quo would not address BAS or the polar community's future needs.

⁶ Polar Science for Planet Earth: Presentation by Nick Owens; March 2008

- 2.42 A range of benefits and potential opportunities were identified through the development of a more effective and flexible model of data management. Such a model was considered both appropriately opportunistic and necessary due to the wider developments occurring within polar science and NERC.

3: Recommendations arising from the AEDC Workshop

- 3.1 Data management within BAS must support its current and strategic priorities and obligations. It must also function in a way that enables BAS to interact with its stakeholders in an effective and efficient way.
- 3.2 Based upon the feedback received from consultees, the Strategic Workshop held with BAS and NERC staff in the June 2008 Workshop offered valuable insight and advice relating to how BAS could best meet these obligations and requirements.
- 3.3 A range of generic challenges relating to issues associated with increasing demands for access, inter-operability and reproducibility were identified as likely to be of increasing importance. In addition, a number of specific polar challenges were identified and discussed. These challenges included an increasing emphasis on common data standards, the recognition of the importance of the poles within NERC's Science Strategy (2007-2012) and the recommendations of the Polar Science Working Group.
- 3.4 These future challenges would also present a range of opportunities amongst which cryospheric data were considered to be of particular relevance to BAS. It was noted that there is an opportunity for BAS to take the leadership role in the curation of cryospheric data on behalf of the UK environmental scientific community. It was agreed that this should be taken forward as a project after the formation of the UKPDC, to scope the issues, develop a fuller understanding of cryospheric data holdings and define requirements. In addition, it was noted that IPY has highlighted the need for a more co-ordinated polar remit.
- 3.5 The importance of arctic & bi-polar science was also identified as a significant opportunity for BAS. The contribution that data-related activities could make to PSPE's contribution to the NERC strategy was recognised. Consultees felt strongly that PSPE presents both challenges and as well as significant opportunities. It would also require different approaches to data management to support effectively and strategically future research and programme management within the polar community
- 3.6 Based upon these discussions and the outputs from consultations, a number of high level recommendations were put forward. These are summarised below:
 - that overall data management responsibility/championing is allocated to an individual at senior Board level within BAS⁷
 - specific management responsibility for data management operations in BAS should be assigned at a more senior level (Band 4)
 - that current data management activities within BAS be drawn together as a coherent cross-cutting group to provide a more integrated central service in order to maximise the opportunities offered by PSPE

⁷ The suggestion was Head of Science Coordination

- that the current AEDC be renamed to the UK Polar Data Centre (UKPDC) so that its external profile better reflects BAS' data management obligations to NERC and other stakeholders, plus the needs of PSPE and the increasing emphasis within the polar community on bi-polar and arctic science.

4: Next steps

- 4.1 Data Management and progress of the AEDC Review were highlighted at the BAS Board Away Days on 22nd and 23rd July, and at the BAS Board Meeting on 29th July.
- 4.2 The outputs of the study have been discussed with senior staff from BAS at an implementation workshop in September 2008. In addition, the vision, mission and scope of the UKPDC were agreed at the implementation workshop following consultation with stakeholders (See Annexes B & C). The recommendations have been finalised and it has been proposed that formation of the UKPDC should be taken forward by an implementation group until the Head of the UKPDC is in post. The implementation group should draw on the support offered by other NERC Data Centres, and involve the BAS change facilitators. It was agreed that the Head of the Data Centre should be appointed as soon as is practicable to ensure that he/she has ownership of decisions taken during formation of the Data Centre.
- 4.3 A presentation will be made to the BAS Board on the project in October 2008.

Annex A: Consultees

Table A- 1 Consultees

Name	Organisation
Nick Owens	Director, BAS
John Pye	BAS
Alan Vaughan	Principal Investigator, GEACEP BAS
John Turner	Project Leader, BAS
Jonathan Watkins	Head of Ecosystems Dynamics & Management Group, BAS
Alan Rodger	Head of Science Coordination, BAS
Alastair Crame	Head of Geological Sciences Division & Joint Leader for Long Term Monitoring & Survey, BAS
Helen Campbell	AEDC Manager, BAS
David Hyett	Head of Information & Records Management, BAS
Nathan Cunningham, Helen Peat, Alex Tate, Peter Kirsch	BAS Divisional Data Managers
Attendees	DMAG 40
Mike Pinnock	Head of Physical Sciences Division , BAS
John Shears	Head of Environment and Information Division, BAS
Andy Wood	Senior Systems Consultant, Biological Sciences Division, BAS
Joanna Rae	Assistant Archivist, BAS
Andrew Fleming	Remote Sensing Data Coordinator, BAS
Mervyn Freeman	Principal Investigator (NCP), BAS
Kim Finney	Australian Antarctic Data Centre (SCAR JCADM Representative)
Taco de Bruin	JCADM Chief Officer NIOZ
Mark Parsons	Leading data management activities in IPY and eGY National Snow & Ice Data Centre
Jane Francis	Chair of AFI Moderating Panel

Name	Organisation
	School of Earth Sciences, University of Leeds
Ned Garnett	Science & Innovation Manager, Atmospheric & Polar Science NERC
Ian Jackson	NERC Information Champion BGS
Richard Hughes	Director of Information & Knowledge Exchange, BGS
Juan Brown	Director of BODC & Chair of DMAG
Bryan Lawrence	Director – Centre for Environmental Data Archival and Head of BADC
Jeremy Giles	NGDC Manager, BGS
Mark Thorley	NERC Data Management Coordinator

Source: SQW

Annex B: UKPDC Vision & Mission (draft)

The UKPDC's Vision

The UKPDC is committed to becoming a leading international centre for the management, dissemination, and curation of polar data and information.

The UKPDC's Mission

The Mission of the UKPDC is to manage, disseminate and curate the UK's polar data and information resources, to enable the scientific community, stakeholders and the wider community to use them effectively and to their full potential, both now and in the future.

The guiding principles of this mission, are that the UKPDC must:

- Support delivery of the strategic goals of NERC
- Meet the legal requirements of the Antarctic Treaty (Article III.1.c), and relevant resolutions of the Antarctic Treaty Consultative Meetings (ATCM)
- Encourage effective collaboration between NERC and its stakeholders
- Support the development of integrated research communities
- Support knowledge exchange for the benefit of the economy and society
- Demonstrate efficiency, flexibility, effectiveness, and value for money
- Support delivery of more productive and timely research
- Curate important products for the long term
- Comply with the NERC Data Policy, and other polar data policies and strategies in which NERC operate, such as those of SCAR and IASC
- Actively raise the profile of the UKPDC within BAS, nationally and internationally, by ensuring that its data management activities add value for science and stakeholders, and promote stimulating opportunities for staff development

We will know we have succeeded when the data and data services provided by the UKPDC are actively used, valued and relied upon by scientists, stakeholders and the wider community.

Annex C: UKPDC remit (draft)

The UKPDC, based within the British Antarctic Survey, is responsible for delivering its mission and vision through:

- a) Ingesting data into long term data management systems. This requires:
 - Data documentation - ensuring that the context within which it was collected is clear
 - Data standards - ensuring conformance of data to format and documentation standards, and migrating of formats, documentation and services to meet the requirements of both reliable persistence and community relevance (this activity gives both interoperability between communities and scalability of data management tasks in the long term)
 - Appraisal - Actively appraising data and information resources for long-term value and importance
- b) Providing efficient and effective access to polar data and information resources. This requires:
 - Data services - deploying user-focussed services to ensure that prospective users can efficiently and effectively find, interpret and use NERC's polar data and information resources, and link and interpret data from different sources, disciplines and institutions
 - Legislation – Meeting UK, European and International legislative requirements for access to, and sharing of environmental data and information
 - Knowledge exchange and access to information - facilitating knowledge exchange with stakeholders, and providing interfaces to other relevant data centres and services, including the Antarctic Treaty annual exchange of information requirements
 - Protecting and exploiting Intellectual Property Rights - Ensuring providers of data have their interests and rights protected, and that NERC's Intellectual Property is protected and exploited
- c) Delivering holistic, end-to-end data management and data services, providing maximum efficiency to science. This requires:
 - Data management lifecycle - working with science programmes to plan and manage the whole of the data management lifecycle, thereby ensuring that data is efficiently and coherently collected, documented and managed from project initiation to data curation
 - Data synthesis - adding value to NERC Polar Sciences through facilitating synthesis of disparate data, enabling distributed and diverse communities to actively share data and information
 - Data helpdesk – providing a central source of information as to the value and availability of data sets both within the UKPDC and other Data Centres
 - Adding-value - proactively seeking and exploiting emerging data management policy and funding opportunities for the benefit of NERC and its stakeholders
 - Profile raising - Actively raising the profile of the UKPDC within BAS, nationally and internationally, ensuring that its data management activities add value for science and stakeholders, and promote stimulating opportunities for staff development