



National Audit Office

**REPORT BY THE
COMPTROLLER AND
AUDITOR GENERAL**

**HC 1274
SESSION 2010–2012**

13 JULY 2011

Department for Environment, Food and Rural Affairs

Geographic information strategy

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National Audit Office

Department for Environment, Food and Rural Affairs

Geographic information strategy

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Amyas Morse
Comptroller and
Auditor General

National Audit Office

6 July 2011

This study examines whether the Department is getting value for money from its £39.3 million investment in its geographic information strategy and related activities.

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Contents

Key facts **4**

Summary **5**

Part One

Use of geographic information
in the Department and its
arm's length bodies **11**

Part Two

Policies, strategies and
governance **18**

Part Three

Operational uses and people **24**

Appendix One

Our sample of Department
policy teams and
arm's length bodies **33**

Appendix Two

Case studies **34**

Appendix Three

Methodology **36**

Endnotes **37**

The National Audit Office study team
consisted of:

Siân Jones, Sarah Sharp, Jayne Goble
and Jennifer Bayliss under the direction
of Sally Howes

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For further information about the
National Audit Office please contact:

National Audit Office
Press Office
157-197 Buckingham Palace Road
Victoria
London
SW1W 9SP

Tel: 020 7798 7400

Email: enquiries@nao.gsi.gov.uk

Website: www.nao.org.uk

Twitter: @NAOorguk

Key facts

£39.3m

The Department estimates it has spent on its geographic information strategy and activities since 2000.

These costs are estimates and do not include spending by arm's length bodies.

£9.1m

The Department estimates it has saved since 2000.

Many benefits are either unquantified or unrecorded. It is not a complete picture of benefits arising from these investments.

Costs

£27.9 million was spent on developing services

£13 million of the £27.9 million was spent on developing a data store

£10.7 million was spent on licensing

£0.7 million was spent on staff costs

Benefits

£7.5 million saved through central negotiation of data licenses between 2008 and 2010

£1.1 million or 22 staff years saved since 2002 by providing the public with an online mapping website

£0.5 million saved through its toolkit to date, launched in 2009

13,000 staff in the Department and arm's length bodies provided with access to infrastructure and applications which are business critical in delivering their everyday work

Summary

1 The Department for Environment, Food and Rural Affairs (the Department) has as its priorities to support and develop British farming and encourage sustainable food production; help enhance the environment and biodiversity to improve quality of life; and support a strong and sustainable green economy, which is resilient to climate change. The Department has major responsibilities to prepare for and manage animal and plant disease outbreaks and floods. Many of these priorities are delivered on behalf of the Department by its arm's length bodies.

2 Deciding on policy and legislation, delivering statutory responsibilities and keeping the public informed on environmental matters demands capabilities in disciplines such as land surveying, farmland and wildlife management, emergency management, environmental protection, impact assessments and overall environmental governance. Accurate and often real time **geographic information**, for example, mapping and other spatially referenced data, are fundamental to these disciplines. The Department has recognised this and has had a geographic information strategy since 2002.

3 The Department's strategy has sought to share geographic information between it and its arm's length bodies, as well as make best use of special software and hardware (known as **Geographic Information Systems**) and the skilled people needed to capture, store, edit, analyse, manage, display and apply these data. Appendix One highlights the main users of geographic information and systems across the Department and arm's length bodies with whom we consulted as part of our work.¹ These have been the target customers for the Department's strategy and for rationalisation of geographic information assets and systems.

4 Since 2000, the Department has spent at least £39.3 million on maintaining and implementing its geographic information strategy and activities. This includes the costs of coordinating geographic information and systems requirements between arm's length bodies, building and operating a range of services and negotiating licenses on behalf of arm's length bodies that are willing to participate. Participation has been entirely voluntary. Some arm's length bodies have chosen to collaborate and use the shared services. Others have pursued independent paths, investing in their own geographic information and systems and using their own IT suppliers to tailor solutions to their own requirements. Therefore, the £39.3 million does not include the additional costs incurred by arm's length bodies when investing in their own geographic information and systems.

5 This study examines whether the Department is getting value for money from its £39.3 million investment in its geographic information strategy and related activities. We have made geographic information our focus because it is a vital resource. The Department consider both it and its arm's length bodies could not have delivered a wide range of activities including policy making, decision-making, day-to-day operations and keeping the public informed without it.

6 We have structured our findings according to the NAO ICT framework² to provide a consistent view of the issues that affect value for money. The particular focus was on: policies and strategies, governance, operational uses and people.

Key findings

Policies and strategies

7 The Department has had a consistent geographic information strategy in place since 2002. The original strategy was stimulated by the Foot and Mouth outbreak in 2001. It was refreshed in 2009 by the Department working collaboratively with its policy teams and arm's length bodies and is based on five key principles: a federated business model³, data sharing, professional skills, technology adoption and collaboration. These principles reflect current government policies on sharing of data and systems. In addition, the Department has been closely involved in wider government initiatives on transparency and publication of information for public consumption.

8 The strategy has been largely driven by technology solutions and services that the Department can offer its arm's length bodies. It has not focused on cost reductions or quality improvements that could be achieved by collaboration and sharing of geographic information and systems, though it is recognised that this collaboration is likely to have delivered savings. Neither the 2002 nor 2009 strategies set targets for cost reduction or quantified the benefits of collaboration. Nor has the Department tried to systematically measure the benefits of geographic information over the nine years. Its technology-driven approach has had successes, but it has not offered sufficient business benefits to persuade its arm's length bodies to actively work together. Nor has there been any mandate from the Department to require compliance across its arm's length bodies. In addition, it has not encouraged senior decision-makers to engage fully with the potential of geographic information to deliver services differently or more efficiently, or to understand their dependence on it.

9 The Department cannot effectively measure its progress against its strategies because performance measures are not SMART (Specific, Measurable, Achievable, Realistic and Timebound).⁴ Whilst the Department's intention was to establish a federated business model which relied on arm's length bodies choosing to cooperate, it would have been more effective if the measures set out in both strategies were quantifiable, to assist the Department in assessing any progress it may have made. For example, one measure in the 2009 strategy was 'Management perception and understanding of the contribution geographic information can make to business goals'.

10 The Department recognises some of these weaknesses and in February 2011 began reviewing its strategic approach to focus more explicitly on how it could share costs and investment in geographic information and systems across its arm's length bodies.

Governance

11 The Department has put in place appropriate technical governance and has been successful in developing common data standards which aimed to improve consistency of data shared between the Department, its arm's length bodies and external organisations. However, strategic governance arrangements have been 'light touch' and have lacked impact. Technical governance has largely matched the applications the Department has delivered, reflecting its technology-driven approach. By 2010, there had been 12 governance groups in existence at different times that aimed to support the strategy and geographic information use. Some of these groups at the strategic level were not sufficiently focused or long-lasting enough to provide a consistent level of governance.

12 The 2009 strategy relied on the Department and its arm's length bodies to engage on a voluntary basis and participate in collective decision-making. This federated business model, whilst consistent with the Department's overall approach, did not work well in practice because of a lack of a strong mandate by the Department and because arm's length bodies chose to work independently. Therefore, the Department has missed opportunities to develop shared solutions across its arm's length bodies.

Operational use

13 At an operational level the Department has been successful in providing geographic information services to its teams, arm's length bodies and the public. The Department's environmental mapping website MAGIC (Multi-Agency Geographic Information for the Countryside) gives the public access to approximately 170 environmental data sets on interactive maps. Its main users are from the private sector, looking for conservation and site location information. Feedback from online users is positive, with over 60 per cent stating it meets their needs 'extremely well' or 'very well'. The Department's data store SPIRE (SPatial Information REpository), has assisted some of the Department's policy teams and arm's length bodies we consulted to save costs in data purchase and storage, but they had not quantified how much it had saved them. Its toolkit for non-specialists, SPIRIT (SPatial InfoRmatlon Toolkit), is widening access to geographic information across the Department and its arm's length bodies.

14 Many of the Department's services are critically reliant on geographic information and systems. However, it does not know the full extent of the costs and benefits of these across its arm's length bodies. The Department has limited data on benefits arising from its services. Only £9.1 million has been identified to date, but this is not a complete picture and is likely to be an underestimate. The Department does not know what proportion of its business (public services, regulatory commitments or policy setting) relies on or benefits from geographic information. This lack of measurement of benefits has meant it cannot make an assessment on whether it is achieving value for money. It also means that senior decision-makers have not fully understood the importance of geographic information to the Department's work.

15 The Department does not know the geographic information requirements of its arm's length bodies so it cannot make decisions as to how geographic information and services can be shared and rationalised to optimise current and future resources. For example, the Department only has partial information on the number and type of software licenses held by arm's length bodies, so it does not know whether access to these licences is proportionate to need.

People

16 The Department and its arm's length bodies have a good level of specialist skills. The Department has supported training for more sophisticated use of geographic information and aimed to create a community of interest to share best practice with the estimated 1,500 staff who use geographic information at a professional level. It has increased the number of staff who can access geographic information at a basic level. In March 2011, approximately 13,000 staff across the Department and its arm's length bodies could access geographic information tools through their desktops. It also has a strong relationship with its commercial suppliers of geographic information and systems.

17 These specialist skills are not always well integrated into the business or understood at the strategic level. Some specialist staff are in isolated and technical roles, rather than at higher levels in the Department or integrated into business management teams. This creates a risk that the benefits of geographic information will not be realised across the Department and may affect how it keeps up-to-date with new solutions that its commercial suppliers, and the market overall, can offer.

Conclusion on value for money

18 Whilst the Department has delivered some value from the £39.3 million it has spent on its geographic information strategy and activities since 2000, it did not set benefit targets or hold its arm's length bodies responsible for collaborating to deliver the strategy. It has not tracked the full cost of geographic information and systems to it or its arm's length bodies, or systematically measured benefits. The Department has only been able to identify savings of approximately £9 million. The figures for costs and benefits are both likely to be underestimates. This lack of financial information means we cannot determine that value for money has been achieved or indeed optimised.

Recommendations

19 The Department has recognised that it needs to improve its focus on demonstrating value for money and a review of its strategy has been initiated. It is in a good position to refresh its geographic information strategy, drawing on nine years of experience. Whilst its focus to date has been on developing technology, it must turn its attention to developing and driving delivery of a more business focused strategy, with measurable targets and defined business benefits. In addition, it should establish a 'comply or explain' regime across its arm's length bodies to enable these objectives to be met. The current cost reduction agenda across government creates an impetus for the Department and its arm's length bodies to work collaboratively in order to share information and systems where feasible to improve service quality whilst cutting costs.

20 We have formulated our recommendations to assist the Department in its efforts. In order to capitalise on an increased appetite for sharing of data and services, the Department should aim to revisit its strategy over the next six months, with a view to having its revised arrangements in place within the year.

Policies and strategies

- a** **The Department's strategies have been technology rather than business-driven.** The Department should revisit its strategy to assess how it can include more quantifiable and specific business targets. To develop this strategy, the Department should:
- develop a better understanding of the costs and benefits of geographic information across the Department and arm's length bodies and use this to establish the savings potential and where investment would bring the most benefits; and
 - identify where data, applications, systems and skilled professionals can be rationalised or better coordinated to improve service quality and reduce costs.

Governance

- b** **The Department's governance arrangements have not been able to support and drive it and its arm's length bodies towards a common geographic information approach.** To address this, the Department should:
- put stronger leadership and governance arrangements in place, which have a clear accountable structure with the Department at the head to apply a 'comply or explain' regime;
 - ensure its arm's length bodies are engaged at the right level so that delivery of the targets set in the strategy on a day-to-day basis is a shared responsibility, driven by the Department; and
 - ensure the strategy is driven not just by technical experts but by key business leaders that are responsible for service quality and cost reduction.

Operations

- c** **The Department has had some success in supplying services to its arm's length bodies, but these are at risk of being overtaken by new technologies and do not meet the needs of all.** With a new strategy in place, the Department should:
 - undertake a full options analysis, which would include consideration of whether the Department should continue the current operational services, design new shared services or look at whether services could be delivered by its arm's length bodies or a commercial supplier.

People

- d** **The Department has a good reputation for its technical skills but does not yet have sufficient focus on integrating these skills into business teams and higher management levels of the organisation.** The Department should:
 - develop and support its specialists to build better business awareness of the costs and benefits of geographic information and how it supports business requirements; and
 - use this awareness to drive better understanding of the business value of geographic information requirements throughout its arm's length bodies, to achieve more informed decision-making and a more flexible approach to what the market can offer.

Part One

Use of geographic information in the Department and its arm's length bodies

1.1 Geographic information is data that has a geographic or spatial reference, such as a postal address, map coordinate or agricultural field number. It includes maps, aerial photography and satellite imagery, which are essential to many tasks undertaken by the Department and its arm's length bodies. Special software and hardware, known as **Geographic Information Systems** are needed to capture, store, edit, analyse, manage, display and apply these data. Highly trained people, experienced in spatial analysis and skilled in using this software are essential to the effective use of these data.

1.2 Geographic Information Systems operate at many levels. Over recent years the growth in access to web mapping through websites such as Google Maps has given the public free access to geographic information and also to basic Geographic Information Systems functions, such as annotation and sharing of maps.⁵ However, at a professional level, these Systems offer more sophisticated spatial and statistical methods to analyse and model information to inform policy or operations, for example, in emergency response.

1.3 Geographic Information Systems have been stimulated by the growth of Location Based Services (LBS) and social networking. Increased integration of Global Positioning Systems (GPS) through mobile phones and laptops offers increasing potential and expectation for delivering public services in different and more cost-effective ways.

Geographic information plays an increasingly important role in public services

1.4 Government has been a major user of geographic information and systems and is increasingly taking advantage of new developments and services from the market.⁶ For example:

- The Digital Switchover, which involves converting every UK TV transmitter from analogue to digital. The BBC uses geographic information to predict coverage areas of transmitters across the UK and provides advice to consumers who might need to change their receiving aerials.
- HM Revenue and Customs have used geographic information to support decision-making when considering alternative office accommodation.

1.5 As of 2010, the Association for Geographic Information estimated that the level of investment in the UK geographic information market, both in the public and private sector, was between £650 million and £900 million per annum.⁷ A recent Local Government Association study suggested that every £1 spent on geographic information resulted in £2.50 worth of savings to local government over five years. The report estimated that in 2009 the Gross Domestic Product for England and Wales was £323 million higher because of geographic information use in local public services.⁸ It also reported on a survey of IT managers, which identified geographic information as the most useful technology for delivering better services.⁹

Geographic information is vital to the Department and its arm's length bodies

1.6 The priorities of the Department for Environment, Food and Rural Affairs (the Department) are to support and develop British farming and encourage sustainable food production; help enhance the environment and biodiversity to improve quality of life and support a strong and sustainable green economy, which is resilient to climate change. To deliver these priorities, the Department and its arm's length bodies rely on geographic information and systems for policy and decision-making, day-to-day operations and keeping the public informed. Appendix One highlights the main users of geographic information across the Department and its arm's length bodies that we consulted as part of our work.

1.7 The range of applications for geographic information is broad. For example, geographic information is used to manage flooding and animal disease, two of the 14 risks on the 2010 National Risk Register.¹⁰ The Animal Health and Veterinary Laboratories Agency needs map coordinates of farms to manage animal disease. The Environment Agency needs access to geographic information to predict areas at risk of flooding. The Department has categorised these applications into six levels of use:

a Data analysis, modelling and research

Geographic information and systems allow staff to analyse maps and other spatial information to determine trends. Forestry Commission England uses geographic information to identify the best locations for new tree planting. Spatial data is also used to help forest planners manage opportunities and risks of species selection and habitats within forests.

b Contingency and emergency response

During an emergency, geographic information and systems help make vital decisions. During the floods of summer 2007, it was used by the Environment Agency to provide maps of the affected areas. Along with a live weather feed, it helped the control room make real time decisions to protect key infrastructure.

c Asset and resource management

Geographic information and systems are used to record and monitor assets and resources that change condition over time. It is used by Natural England to map and monitor its Sites of Special Scientific Interest.

d Statutory and regulatory role

Geographic information is fundamental to fulfil statutory and regulatory commitments. It is used by the Marine Management Organisation to support a number of statutory operational activities, including its licensing role for marine activities such as offshore wind farms.

e Citizen engagement

Geographic information and systems are used to keep the public informed. The Environment Agency provides information to the public about flood warnings, flood risk and water quality through the ‘What’s in Your Backyard?’ website.¹¹

f Integrated business systems

Geographic information is used to strengthen management information. The Animal Health and Veterinary Laboratories Agency is integrating data from both its own systems and those of partner organisations into a Geographic Information System to provide users with a spatial view of the land making up a livestock holding. This is providing a single shared view of livestock holdings which had not previously been possible.

The Department’s geographic information responsibilities

1.8 The Department has two areas of responsibility:

- It is the cross-government lead for the UK Location Programme, set up to deliver the EU INSPIRE Directive, which aims to create a European Union (EU) infrastructure¹² to share environmental geographic information and facilitate public access to spatial information across Europe.¹³
- It has a central role in coordinating how effectively geographic information and systems are used across the Department and its arm’s length bodies. Since 2008, it has delivered this responsibility through its Data Sharing Programme, which:
 - acts as the custodian of the geographic information strategy;
 - delivers geographic information services to its arm’s length bodies (**Figure 1** overleaf), provides training and develops data standards; and
 - leads on the negotiation of data and software licenses for use across the Department and its arm’s length bodies.

The Department has faced challenges in coordinating geographic information because of its delivery model

1.9 Since its creation in 2001, the Department's role has evolved from service delivery to being primarily policy-focused, with its arm's length bodies responsible for delivering a wide range of services on its behalf. By 2008, Machinery of Government change resulted in smaller bodies merging to create larger ones, including Natural England in 2006 and Animal Health in 2007. As of June 2010, the Department had approximately 53 delivery bodies.¹⁴ Recent changes have included the merger of Animal Health and the Veterinary Laboratories Agency in April 2011 and the announced abolition of the Commission for Rural Communities. As the number of bodies has grown, the Department has faced challenges in coordinating its geographic information strategy and services.

Figure 1

The Department's geographic information services

Name	Description
SPIRE (SPatial Information REpository)	A central data store which holds over 400 spatial data sets, accessed by around 30 different organisations within and outside arm's length bodies. ¹ The Veterinary Imports, Policy, Evidence, Risk and Surveillance team use SPIRE to support its work on disease outbreaks.
SPIRIT (SPatial InfoRmation Toolkit)	A toolkit application to allow non-specialists to view and manipulate map-based information, drawing on SPIRE data. The Marine Management Organisation uses SPIRIT to support statutory marine plans.
CLAD (Customer and LAnd Database)	A data warehouse that provides customer and land data. Forestry Commission England use CLAD to validate payments under the English Woodland Grant Scheme and to monitor land parcel registration and change.
MAGIC (Multi-Agency Geographic Information for the Countryside)	A public facing environmental mapping website, providing access to 170 data sets (http://magic.defra.gov.uk/). Its main users are from the private sector, looking for conservation and site location information.
Central procurement of software, data licensing and training	The Department procures software, data licenses and training packages on behalf of its policy teams and arm's length bodies.

NOTE

¹ The Department has also made SPIRE available to other Departments and agencies, such as the Department for Communities and Local Government and the Welsh Assembly Government, on a zero cost basis.

Source: *The Department*

The Department does not know the full extent of geographic information costs and benefits

1.10 The Department does not know how much it or its arm's length bodies spend in total on geographic information and systems. It does not know what proportion of its business (public services, regulatory commitments or policy setting) relies on or benefits from it. Without this knowledge, the Department cannot fully exploit the potential benefits and cost savings that come from sharing geographic information and systems.

1.11 **Figure 2** shows what the Department does know about the costs of its geographic information strategy and activities. It has spent at least £39.3 million since 2000 which includes staff costs where available, the purchase of data and software licenses, and developing technology services. This amount does not include how much has been spent by its arm's length bodies, which is likely to be significant. For example, the Environment Agency has spent £9.6 million since 2002 on developing its Geographic Information Systems.

Figure 2

The Department's expenditure on geographic information 2000 to 2011 (£000s)

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	Total
Staff costs	45	The Department has no data for this period			16	16	16	16	16	268	277	670
Licensing		Coordinated Data Licensing did not begin until 2008-09							3,235	3,839	3,630	10,704
Services	68	144	205	159	2,759	4,059	4,059	4,059	4,072	4,634	3,711	27,929
Total	113	144	205	159	2,775	4,075	4,075	4,075	7,323	8,741	7,618	39,303

NOTES

- Figures shown are actuals. The rise in staff costs between 2008-09 and 2009-10 is due to an increase in staff allocated to the newly formed Data Sharing Programme in 2008. Staff costs for 2010-11 are staff who spent 25 per cent or more of their time on geographic information activities.
- 'Services' includes development and running costs of the four applications and the listed services in Figure 1. It also includes £100,000 spent on CLAID in 2008-09. CLAID was a strategic initiative which delivered a customer and land identification strategy and standards.

Source: The Department

Our scope and evaluative approach

1.12 This report evaluates whether the Department is achieving value for money from its geographic information strategy and activities. We have not examined how the Department is leading the UK Location Programme.

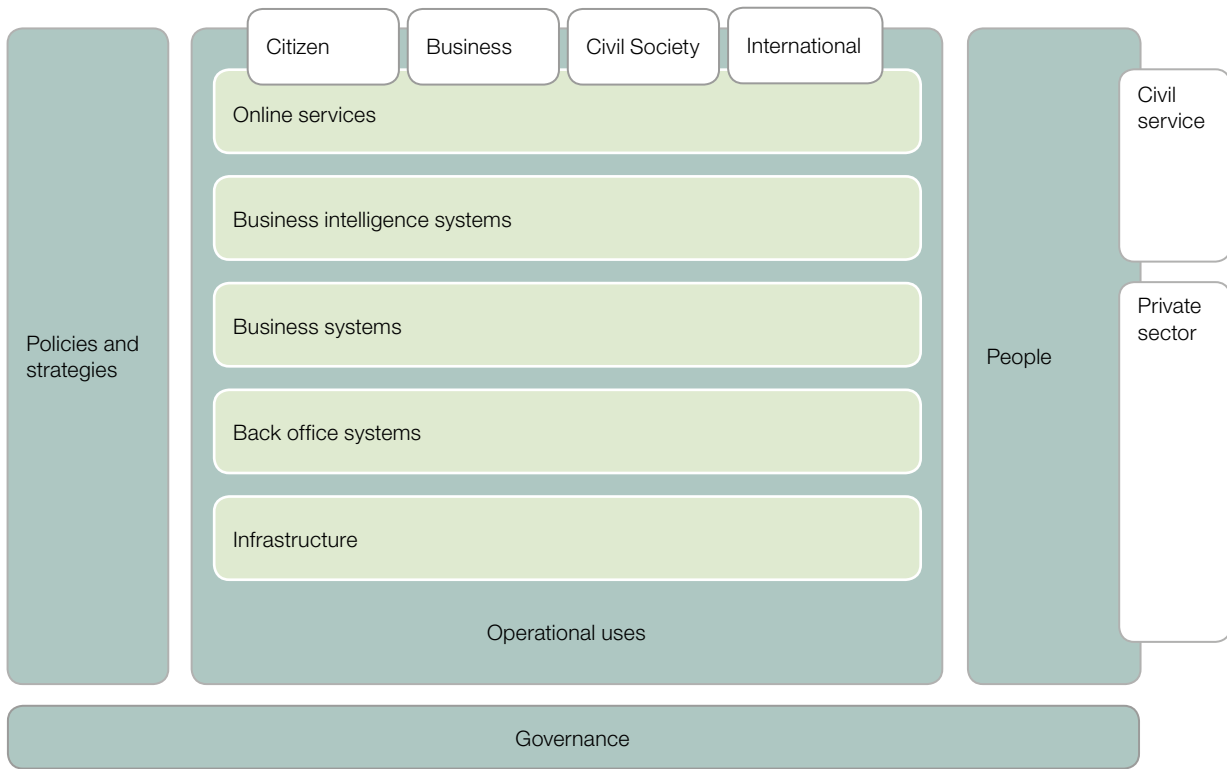
1.13 We have used our ICT framework¹⁵ to structure our analysis and present our findings (**Figure 3**). It has focused our evaluation on the four main influences on value for money: policies and strategies, governance, operational uses and people. Where the Department could not provide evidence, we have compared its performance to established management norms and principles.

1.14 This report sets out our findings on:

- Policies, strategies and governance (Part Two)
- Operational uses and people (Part Three)

1.15 Our methodology is summarised at Appendix Three. A detailed methodology can be found on our website.

Figure 3
ICT framework



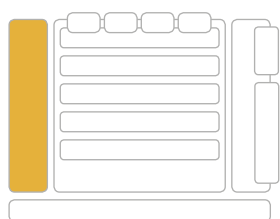
NOTE

1 The context of the framework and information on its components can be found in Comptroller and Auditor General, *Information and Communications Technology in Government: Landscape Review*, Session 2010-11, HC 757, National Audit Office, February 2011. http://www.nao.org.uk/publications/1011/ict_in_government.aspx.

Source: National Audit Office

Part Two

Policies, strategies and governance



Policies and strategies

The Department developed its first geographic information strategy in response to the Foot and Mouth outbreak in 2001

2.1 The 2002 Anderson report, commissioned after the Foot and Mouth outbreak in 2001, found that the crisis was exacerbated by difficulties in obtaining robust and reliable management data.¹⁶ In particular, the report found that geographic information was frequently out of date. The report made 80 recommendations, five of which were on data handling and information management, including one on improving geographic information by incorporating it further into other data systems.

2.2 Following the Anderson report, the Department recognised that there was little corporate control or governance and a limited sharing of data across its arm's length bodies. Geographic information applications were fragmented and there was duplication of storage, management and purchasing of data. The Department created a core geographic information unit in 2002 to deliver a single geographic information strategy and coordinate geographic information development.

2.3 The first strategy was published in 2002. The Department's strategic intent was to use geographic information to underpin service delivery, manage data sets effectively and develop a leading role in government in the use of geographic information.

In 2009, the Department refreshed its strategy

2.4 In 2009, the Department refreshed its strategy to reflect the changing Machinery of Government and the growing importance of geographic information. The 2009 strategy had five key principles:

- **A federated business model** – to agree standards for data sharing and applications across the Department and arm's length bodies and create, maintain and publish data and applications according to business need.
- **Data sharing** – to manage data once but use it many times across the Department and its arm's length bodies.

- **Professional skills** – to develop a network of specialists and provide access to training and support to non-specialist users.
- **Technology** – to use a common approach to develop Geographic Information Systems and make these available for reuse.
- **Collaboration** – to identify opportunities for shared geographic information services.

Our analysis

From our analysis we drew some positive conclusions:

2.5 The Department has had a consistent and evolving geographic information strategy in place for nine years. The 2002 strategy demonstrated that the Department recognised the need for a coordinated approach and was responsive to the findings on data management and geographic information following the Foot and Mouth outbreak. The updated strategy in 2009 was a logical development.

2.6 The key principles of the strategy align closely with current government policy on information. With an emphasis on transparency (data sharing) and cost reduction (through common data standards, technology and collaboration) the Department's strategy was in some respects ahead of its time and fits well within today's policy framework.

2.7 The Department worked with its policy teams and arm's length bodies to make sure the strategy was a collaborative effort. Eight of the ten policy teams and arm's length bodies we consulted¹⁷ told us that they had been engaged in the development of the 2009 strategy to some extent.¹⁸

While the Department's strategic intent has been strong, we identified some weaknesses in delivery:

2.8 Since 2002, the Department has missed opportunities to lead its arm's length bodies in delivering the strategy. Although a strategy and unit were created in 2002, the Department did not take a firm line on collection, storage and sharing of geographic information data or selection of Geographic Information Systems products. As arm's length bodies have been created, they have largely made independent choices that have created duplication and the opportunities to standardise have reduced as time has passed. The Department recognises that it has missed opportunities to take a more proactive leadership role.

2.9 In addition, the Department did not succeed in encouraging its policy teams and arm's length bodies to actively participate in delivery of the 2009 strategy.

None of the ten policy teams and arm's length bodies we consulted mentioned any involvement in delivering the 2009 strategy. Four policy teams and bodies explicitly told us they had little involvement or engagement. A number of reasons were cited for this, including resourcing constraints, lack of awareness of the strategy, changes in personnel and a focus on developing their own geographic information capabilities. One body considered the strategy had difficulties because there needed to be sufficient commonalities to meet needs. Another considered that the strategy was written at a very generic level and there was no obligation to adhere to its principles. The 2009 strategy did not offer sufficiently convincing benefits, practical solutions to reducing costs or new ways of delivering services to attract these bodies to participate.

We also identified weaknesses in the Department's monitoring of progress against its strategy. In particular:

2.10 The performance measures in the 2002 strategy were not SMART (Specific, Measurable, Achievable, Realistic and Timebound).

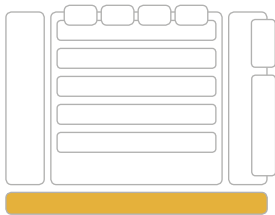
The Department did not set out quantifiable targets that it wanted to achieve. Therefore it cannot meaningfully assess progress. As part of the 2009 strategy, the Department attempted to assess whether actions in the 2002 strategy had been achieved. It concluded that only one of the 13 actions: to 'create a geographic information unit' had been fully implemented, nine had been partially implemented and three had not been implemented at all.

2.11 The Department does not know how it is progressing against the 2009 strategy. Similar to the 2002 strategy, the measures set out in the 2009 strategy are not SMART, so the Department does not know how it is progressing against it. The measures cannot be monitored or measured effectively; for example, one was 'Management perception and understanding of the contribution geographic information can make to business goals' which is not measurable as it does not have quantifiable aims.

2.12 Both strategies have been technology-driven. The Department has focused on developing geographic information and systems, services and solutions. This drive was understandable for the 2002 strategy, as the Department needed to develop common services to share with its arm's length bodies. By 2009, however, this technology-driven approach should have evolved into more specific business targets. For example, the Department and its arm's length bodies should have had target savings through rationalisation of geographic information and systems as well as optimising the utilisation of qualified staff and suppliers. The Department's focus on what technology can offer, rather than promoting the benefits at a strategic level, has not encouraged senior decision-makers to engage fully with the potential that geographic information offers to deliver public services differently or more efficiently, or to understand their dependency on it.

2.13 In October 2010, the Department published a Data Sharing Strategic Review to ‘examine the current state of data sharing and management across Defra and make recommendations for improving its efficiency and effectiveness’.¹⁹ It concluded that the Department needed a common data strategy which included geographic information, so it could better coordinate resources and investment decisions. The review envisaged ‘moving forward from the current situation where data is seen as a technical subject ... not of significance, to one where it is seen as a valuable business asset’.

2.14 In February 2011, the Department began a further review of its strategy to focus more on sharing costs and investment in geographic information and systems across its arm’s length bodies. Its focus is on how it can streamline operations and how rationalisation can reduce costs. Budgetary pressures mean that arm’s length bodies have an increased appetite for collaboration. The Department is also taking account of new government policy on the storing²⁰ and sharing of data²¹ and the new Government ICT strategy.²²



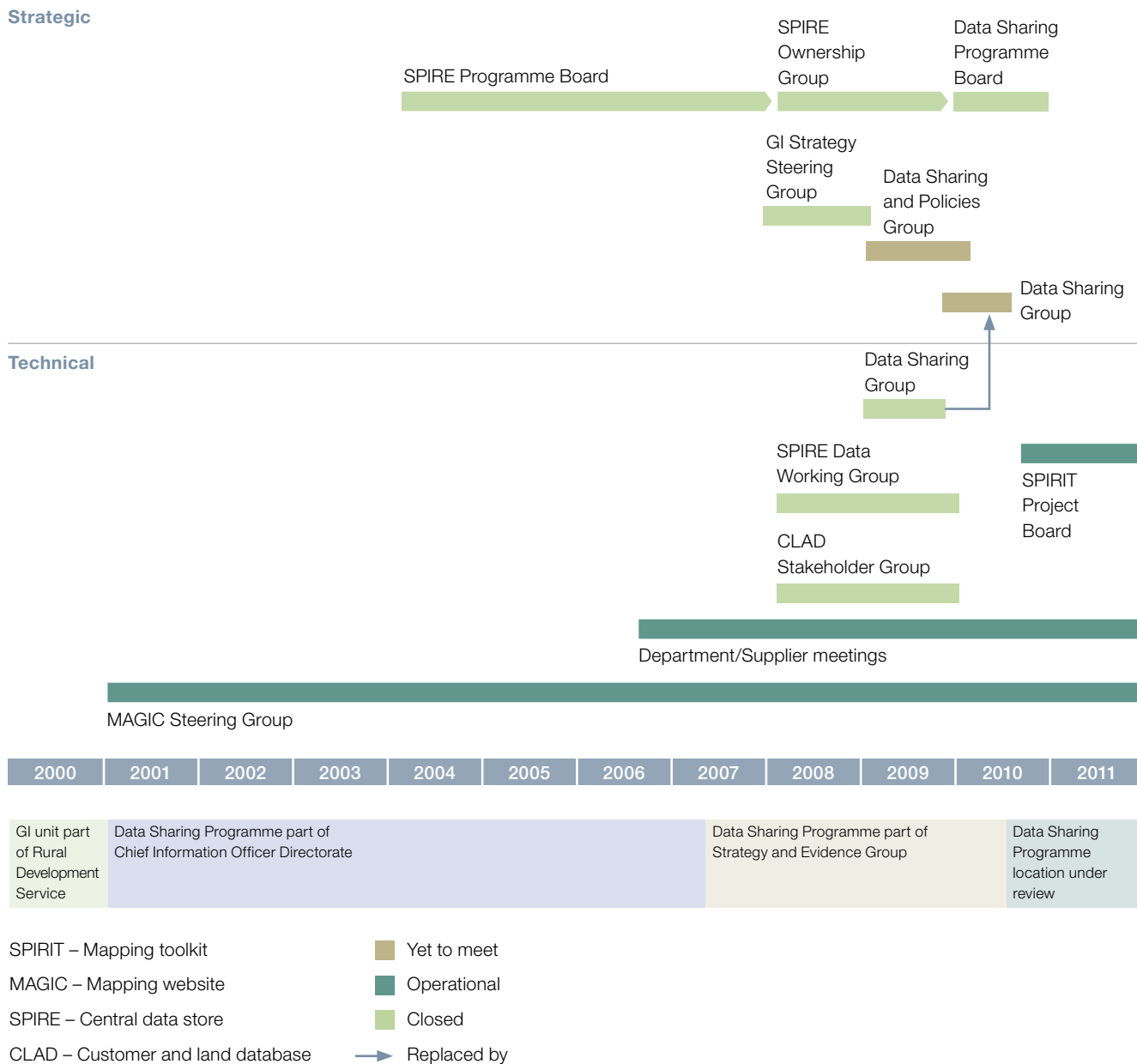
Governance

2.15 Figure 4 overleaf shows that the Department’s governance arrangements – designed to oversee the strategy in a structured and coherent way – have become more complex over time. In 2002, there was one steering group in existence. As at 2010, there had been 12 governance groups in existence at different times, though some of these cover broader data sharing issues as well as geographic information specifically.

2.16 The Data Sharing Group and Data Sharing Programme Board were the key governance groups driving data sharing and development of geographic information applications across the Department and its arm’s length bodies. The former has not met since October 2009 and the latter was disbanded in October 2010. As of February 2011, there were no formal governance arrangements for the strategy, although the Department aims to form a Data Action Group to govern it alongside wider data management activities.

2.17 The Department’s governance arrangements for decisions about investments in IT architecture, including geographic information and systems, are discussed and agreed at the Network Architecture Design Board. However, a member of the Data Sharing Programme team has only attended this Board to advise on investment decisions since January 2011.

Figure 4
The Department's governance landscape timeline



Source: National Audit Office analysis of information from the Department

Our analysis

From our analysis of governance, we drew some positive conclusions:

2.18 The Department has put in place appropriate governance to oversee the delivery of its IT applications. Each of the applications that the Department has developed has been overseen by a working group, reflecting the Department's technology-driven approach. The Department with its arm's length bodies was also successful in developing common geographic information data standards. These standards were linked to the International Standardization Organisation (ISO) and aimed to improve the consistency of data from a range of Department policy teams, arm's length bodies and external sources. In 2007, the Department published these data standards and in 2008, introduced a 'Spatial Validation' toolkit to assist its arm's length bodies to check their data for compliance.

The Department recognises its strategic governance could have been more effective. We have identified three areas of weakness:

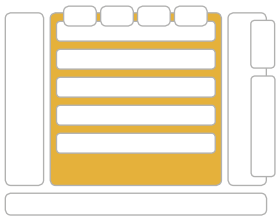
2.19 The Department's strategic governance arrangements have lacked impact, consistency and longevity. Although a Department and arm's length bodies-wide Geographic Information Strategy Group existed, it was disbanded on publication of the 2009 strategy. Two governance groups were created but did not meet regularly, reducing opportunities to bring the Department and arm's length bodies together and drive the strategy forward. For example, the Data Sharing Group has not met since October 2009 – it later became a strategic level group but it has never met in this guise. The Data Sharing Programme Board began in February 2010 and was disbanded in October of the same year.

2.20 The federated business model for the strategy was ambitious because it relied on voluntary participation by arm's length bodies, and did not work well in practice. The approach relied on the Department and arm's length bodies sharing responsibility for the strategy's governance by engaging and participating in collective business decisions. The model did not work well partly due to a lack of strong drive by the Department and because arm's length bodies chose to work independently. The Department's 'light touch' approach to governance has meant that progress in implementing the strategy is largely due to personal networks and 'a coalition of the willing'.

2.21 The Department has not had sufficient oversight to implement rationalisation of geographic information and systems. Not all investment approvals have been seen by the Data Sharing Programme team before being approved. Consequently, some arm's length bodies have developed their own solutions, and opportunities to develop collaborative solutions have been missed. Now that a member of the Data Sharing Programme attends the Network Architecture Design Board to advise on investment decisions, a more joined-up approach should occur in the future.

Part Three

Operational uses and people



Operational uses

3.1 The Department delivers five key geographic information services to its policy teams and arm's length bodies. These services are providing four applications: SPIRE, SPIRIT, CLAD and MAGIC (Figure 1), negotiating data licenses and coordinating training. **Figure 5** outlines the cost of developing and operating these services. SPIRE and SPIRIT have been developed and are maintained by IBM and Esri; CLAD was developed in-house and is maintained by IBM.

3.2 MAGIC²³ cost £416,000 to develop between 2000 and 2003, and is run by Natural England on behalf of the Department.²⁴ As of March 2011, it had cost £1.3 million to run. It gives the public access to approximately 170 environmental data sets, such as bathing water quality from 22 different suppliers. As of April 2011, the Department is considering how to take MAGIC forward, as the technology is ageing, becoming problematic to support and needs to be updated.

3.3 **Figure 6** on page 26 shows the timeline for developing these services. In 2004, the Department began developing SPIRE. In February 2011, the data store held approximately two terabytes of data and over 400 data sets contributed from arm's length bodies and purchased from suppliers including the Ordnance Survey and Next Perspectives.²⁵ Data can range from hundreds of gigabytes to just a couple of megabytes. SPIRE became operational in 2007, with a development cost of approximately £13 million. As of March 2011, it had cost £8.6 million to maintain.

3.4 In 2009, the Department began to develop SPIRIT, a basic toolkit to enable non-specialists to use geographic information. It draws on data from SPIRE and presents it in a browser where the user can view and manipulate data easily. In April 2010, the Department had developed three different versions of the toolkit at a total cost of £2.4 million; a standard version for its policy teams and arm's length bodies and tailored toolkits for the Marine Management Organisation and the Food and Environment Research Agency. A fourth version for the Animal Health and Veterinary Laboratories Agency is currently in development. The Department only began to monitor utilisation data in December 2010 for the standard version of SPIRIT. For that month there were 307 unique visitors who made 789 visits.

Figure 5

Cost of geographic information services delivered by the Department

Name	Description	Total development cost (£)	Cumulative running costs (as of March 2011) (£)
SPIRE (SPatial Information REpository)	A central data store with over 400 spatial data sets accessed by around 30 different organisations (within and outside the Department and arm's length bodies). In operation since 2007, it was developed and is maintained by IBM	13m	8.6m
SPIRIT (SPatial InfoRmation Toolkit)	A toolkit application allowing non-specialists to view and manipulate map-based information, drawing data from SPIRE. In operation since 2010, it was developed by Esri and IBM and maintained by IBM	2.4m	275,000
CLAD (Customer and LAnd Database)	A data warehouse providing customer and land data from the Rural Payments Agency, Forestry Commission England and the Welsh Assembly Government. In operation since 2008, it was developed in-house and maintained by IBM	1.1m	836,000
MAGIC (Multi-Agency Geographic Information for the Countryside)	Public facing environmental mapping website, providing access to 170 data sets. Online since 2002	416,000	1.3m
Central procurement of software, data licensing and training	The Department procures software, data licenses and training packages on behalf of its policy teams and arm's length bodies		10.7m

Source: National Audit Office analysis of information from the Department

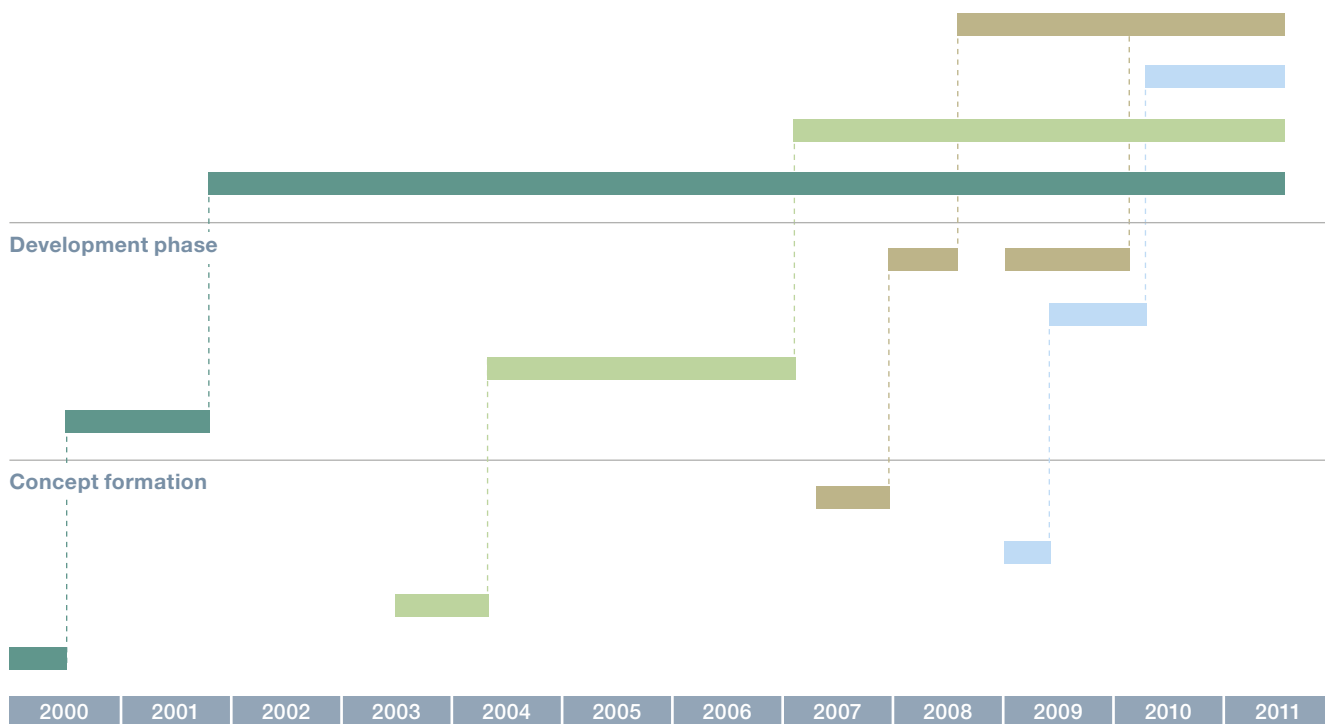
3.5 The Department also delivers CLAD which has been operational since 2008. CLAD provides live customer and land data from the Rural Payments Agency, and is used, for example, by Forestry Commission England which validates payments under the English Woodland Grant Scheme against the data. CLAD cost £1.1 million to develop and as of March 2011 had cost £836,000 to run.

3.6 In addition to the four applications, the Department procures services, software and data licenses on behalf of some of its arm's length bodies. It also negotiates and agrees joint license agreements. In 2003, the Department led the Pan Government Agreement license agreement. This provides access to a wide range of data including Ordnance Survey, aerial mapping data, marine data from SeaZone Solutions Limited²⁶ and postcode files from Royal Mail. The Department also negotiates the purchase of other data sets on behalf of its arm's length bodies.²⁷

Figure 6

The Department's technical geographic information services timeline

Operational



- MAGIC – Mapping website
- SPIRE – Central data store
- CLAD – Customer and land database
- SPIRIT – Mapping toolkit

Source: National Audit Office analysis of information from the Department

Our analysis

From our evaluation we drew some positive conclusions:

3.7 We received some positive feedback on SPIRE and SPIRE data sets. Of the eight Department policy teams and arm's length bodies we consulted that have access to SPIRE and SPIRE datasets, three provided positive feedback, with one describing it as 'an excellent source of the most up-to-date datasets', another as a 'useful, easily accessible mechanism' and a third as 'a step in the right direction'. Two of these considered it had helped to save costs by reducing the need to purchase, manage and store data independently, although they had not calculated how much it had saved them. In addition, one body considered that its ability to undertake its statutory activities was 'critically dependent on the spatial datasets provided by Defra'. The Department for Communities and Local Government, which has access to SPIRE, told us it considers it to be beneficial to its business. It estimates that SPIRE has reduced its annual geographic information and systems spend from approximately £107,000 in 2009 to £34,000, a saving of £73,000 per annum.

3.8 The SPIRIT toolkit is widening access to geographic information across the Department and arm's length bodies as well as increasing data sharing through access to SPIRE data. Each SPIRIT toolkit is developed through reusing data and programming, creating economies of scale and a common approach to geographic information. The Department has calculated that developing three toolkits together saved it £500,000 in development costs, based on an IBM calculation of cost if each had been developed separately. The Department has also estimated that the toolkit will save £160,000 every time a new version of the toolkit is rolled-out but it is too early to say whether it will achieve the full extent of its predicted impact, as only four of 26 potential versions of SPIRIT have been developed so far.²⁸

3.9 The Department has had positive feedback on its MAGIC service. The Department has sought feedback from online users. Some 60 per cent consider that MAGIC meets their needs 'extremely well' or 'very well'. Its main users are from the private sector, looking for conservation and site location information. Since its launch in 2002, the number of user sessions per day has risen from around 500 to 5,000 and on average there are 500 data downloads per month. The Department estimates that every data set that is downloaded saves one hour of time dealing with an information request, the equivalent of 22 staff years or £1.1 million between 2002 and 2010. The Department has also realised savings through its role as license negotiator. By being a member of the Pan Government Agreement, the Department estimates this has resulted in a 65 per cent saving, or around £2.5 million per year since 2008.²⁹

3.10 Given the diversity of applications and varying levels of maturity in geographic information across the Department and arm's length bodies, the Department has made sensible choices in its selection of common services.

Our consultation with Department teams and arm's length bodies highlighted a general appreciation of the Department's services by smaller teams or bodies and rather less mature users of geographic information. **Figure 7** shows those arm's length bodies that have access to the Department's services. The Environment Agency decided to pursue its own solutions for a number of reasons: SPIRE does not have the capacity to accommodate the large number of users within the Agency; it already had its own strategy and solutions in place prior to the development of SPIRE and neither SPIRE and SPIRIT meet many of the Agency's requirements for mapping and data reporting. Animal Health told us that SPIRE's monthly update is often not sufficient to give it the up-to-date information it needs and has addressed this through more regular updates of data from its own systems. In addition, although the Rural Payments Agency has access to SPIRE, it told us that this is limited to just a few users. Like the Environment Agency, it has developed its own solutions that match its unique needs.

While the Department has had success at an operational level, we identified several weaknesses:

3.11 The Department does not know if SPIRE has realised any cost savings because it has not attempted to calculate them, despite it being in operation since 2007 and costing £13 million to develop. The Department considers that SPIRE has helped deliver real savings and has drafted a number of business cases which outline potential improvements and benefits but it appears that not all these cases were approved, and not all the actions were delivered. It has not attempted to calculate these savings, and does not collect utilisation or performance data on SPIRE, so we cannot assess its effectiveness.

3.12 The Department does not know its arm's length bodies' geographic information business requirements so economies of scale are not being properly exploited. For example, the Department knows the number and type of geographic information software licenses held by arm's length bodies that are part of the Enterprise License Agreement.³⁰ However, the Department does not know about licenses in the bodies which sit outside of the Agreement. The Department therefore cannot make an informed judgement on which of the bodies' requirements can be best served by a shared approach, versus what solutions need to be developed to meet more unique requirements.

3.13 The Department has only recently begun a review of which arm's length bodies hold geographic information application licenses that are proportionate to business need. The early reviews of this data by the Department suggest that some teams may have licenses for the most technical software when they need a less sophisticated and less costly version. As this work is ongoing, the Department is unable to identify how much will be saved.

Figure 7

Access to the Department's services by our sample of policy teams and arm's length bodies

	SPatial Information REpository	SPatial InfoRmation Toolkit	Customer and LAnd Database	Online training package
Department's policy teams				
Food and Farming Group Statisticians	✓	✓	✓	✓
Inshore Fisheries and Conservation Authorities Implementation team ²		✓		
Veterinary Imports, Policy, Evidence, Risk and Surveillance team ¹	✓	✓	✓	✓
Arm's length bodies				
Animal Health ⁵	✓	✓ ⁴	✓	✓
Environment Agency				
Food and Environment Research Agency	✓ ³	✓ ⁴		
Forestry Commission England	✓ ³		✓	
Marine Management Organisation	✓	✓ ⁴		✓
Natural England	✓			✓
Rural Payments Agency	✓	✓	✓	

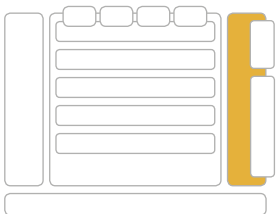
NOTES

- 1 The Veterinary Imports, Policy, Evidence, Risk and Surveillance team were a Departmental policy team when we consulted with them in January 2011. They became part of the Animal Health and Veterinary Laboratories Agency in April 2011.
- 2 The Inshore Fisheries and Conservation Authorities Implementation team was disbanded in March 2011.
- 3 The Food and Environment Research Agency and Forestry Commission England have access to SPIRE data but not directly through the SPIRE portal.
- 4 The Animal Health and Veterinary Laboratories Agency, the Food and Environment Research Agency and the Marine Management Organisation have a tailored SPIRIT toolkit. The other policy teams and arm's length bodies with ticks have access to a generic version.
- 5 As outlined in paragraph 1.9, Animal Health merged with the Veterinary Laboratories Agency in April 2011. However, we consulted with Animal Health prior to this merger, so any reference to this consultation refers to Animal Health only.

Source: National Audit Office analysis of information from the Department

3.14 The Department's lack of data on the costs and benefits of sharing geographic information has hindered it in 'selling' the benefits to its arm's length bodies as well as at a strategic level. The Department has not undertaken any formal benefits realisation exercise so, as stated in paragraph 1.10, does not know the true extent of what geographic information costs or what it is worth across it and its arm's length bodies. The Department therefore does not know the full extent of the business benefits – it has estimated benefits of approximately £9.1 million arising from its MAGIC and SPIRE services (£1.1 million and £0.5 million respectively) and its role as licence negotiator (£7.5 million between 2008 and 2010) to date but this is not a complete picture. There has also been a lack of awareness of the importance of geographic information among decision-makers, which may have prevented some investment. If the Department aims to drive geographic information through a business-led approach, it is important that it engages with senior decision-makers and articulates the value of geographic information to them.

3.15 The drive to share geographic information data across the Department and arm's length bodies is hampered by wider data sharing issues. The Department recognises the way data is managed and shared across arm's length bodies is not coherent and needs to be improved. The Department's recent review³¹ cited SPIRE and MAGIC as examples of good practice but found that organisational and technical barriers were preventing their wider use. For example, the Environment Agency is not part of the Government Secure intranet (GSI)³² so cannot share or receive information as easily as those who are part of GSI. Both Animal Health and the Marine Management Organisation raised issues about bandwidth restricting data downloads from SPIRE.



People

3.16 The Department's Data Sharing Programme team, which consists of seven staff, has a key role coordinating geographic information across its policy teams and arm's length bodies. The team act as the custodian of the strategy; deliver services to its arm's length bodies; facilitate training and lead on the negotiation of data and software licenses.

3.17 The Department uses commercial suppliers to develop and maintain its services. In 2004, the Department selected IBM as its preferred supplier of ICT solutions and IBM subcontracts with Esri for software development and Astrium GEO-Information Services to deliver geographic information solutions and data management. The Department has an Enterprise License Agreement with Esri, through IBM, to provide software. Six of the policy teams and arm's length bodies we consulted are part of this Agreement, although the Food and Environment Research Agency and the Rural Payments Agency use both IBM and other suppliers to support their IT needs. Two bodies we consulted, the Environment Agency and Forestry Commission England, are not part of the Agreement and have separate contracts with Esri to provide software. In 2010, the Department renewed its contract with IBM.

Our analysis

From our analysis we drew five key positive conclusions:

3.18 The Department is increasing the user base of geographic information.

The 2009 strategy aimed to provide all staff access to online tools to get the most benefit from SPIRE. The development of SPIRIT toolkits has supported this aim. We estimate that by the end of March 2011, 13,000 staff can access basic data and tools from their desktops through SPIRIT.³³ Within this, we estimate that there are approximately 800 staff across Department policy teams and arm's length bodies that are more advanced geographic information users. In addition, the Environment Agency estimates there are 700 staff that are advanced users, making approximately 1,500 staff in all using geographic information at this level.³⁴ The availability of geographic information and systems to both advanced and casual users is helping to embed it into mainstream delivery across the Department and its arm's length bodies.

3.19 The Department has supported the development of professional skills in some of its policy teams and arm's length bodies. The 2009 strategy also aimed to develop a network of staff with geographic information skills. In 2009, the Department negotiated a license for online training, available to arm's length bodies through the Department's IBM IT contract. Of the five bodies who told us they had accessed it, three told us they found it useful and cost-effective, reducing the need for them to buy in training themselves. Animal Health consider all staff who needed training in this package have received it. The training package cost £3,600 in 2010 which is equivalent to the cost of training six members of staff on a classroom based introductory geographic information course. It allows unlimited access for staff on the Department's IT Network (around 13,000 staff).³⁵

3.20 The Department is starting to join up its IT and geographic information functions in a more formalised way to make more informed investment decisions.

In 2010, the Department published a Memorandum of Understanding between the Data Sharing Programme and Information Services. It recognised that close dependencies exist between technology solutions and the geographic information strategy and that these need to be developed together to obtain good value for money from future investment decisions. To help secure this, as outlined in paragraph 2.17, a geographic information specialist from the Data Sharing Programme has joined the Information Services Network Architecture Design Board.

3.21 The Department has attempted to develop a geographic information community through road shows, events, newsletters and training materials.³⁶

During development of the 2009 strategy, practitioners from across the Department and arm's length bodies met often and this was considered a useful professional forum. However, as the group was focused on developing the strategy, it stopped meeting following its publication. In our consultation, two arm's length bodies suggested sharing information through a 'virtual' online community and one suggested sharing contacts across the Department and arm's length bodies.

3.22 The Department also has a strong relationship with its commercial suppliers. We found during our consultation that the Department was well respected by its commercial suppliers, who considered that the Department has a good level of capability. Suppliers also considered that the Department was flexible when considering new solutions and willing to engage in open and honest dialogue.

While the Department and its arm's length bodies have a good level of capability, we identified two weaknesses:

3.23 The Department does not have a full understanding of the capability and capacity of its policy teams and arm's length bodies to embed geographic information into their businesses. While we considered that the Department and arm's length bodies had a good range of skills and capacity, these were often in isolated and highly technical roles. This creates a risk that geographic information remains a specialist subject and broader benefits to services are not captured.

3.24 The Department risks not taking full advantage of the expertise or innovation that their commercial suppliers can offer. Given the pace of technology development in Geographic Information Systems, the Department needs to work with its commercial suppliers to make sure the way it delivers geographic information services keeps pace with the best deals that the market can offer, so that its capacity remains fit for purpose and meets requirements.

Appendix One

Our sample of Department policy teams and arm's length bodies

The Department policy teams

- Food and Farming Group
- Inshore Fisheries and Conservation Authorities Implementation team
- Veterinary Imports, Policy, Evidence, Risk and Surveillance team

Arm's length bodies

- Animal Health
- Environment Agency
- Food and Environment Research Agency
- Forestry Commission England
- Marine Management Organisation
- Natural England
- Rural Payments Agency

Appendix Two

Case studies

The Environment Agency

The Environment Agency, created in 1996, moved to be part of the newly created Department in 2001. In 2002, the Agency published its own geographic information Strategic Review, which set out a five-year plan for geographic information use.

Between 2002 and 2007, the Agency developed its geographic information capability to improve the Agency's ability to meet its objectives. For example, in July 2007, when serious flooding occurred in some parts of the UK, the Agency used it in its National Incident Room to monitor situations and to inform decision-making.

Since 2002, the Agency has spent £9.6 million on developing its Geographic Information Systems. It estimates that benefits of £5 million per annum are being realised from this investment, including staff efficiency savings, revenue and cost avoidance.

Since 2007, staff have become increasingly reliant on geographic information and systems. The Agency's in-house tool is available to 10,000 staff in 110 offices and approximately 2,500 staff use the tool every day.

Geographic information and systems have changed the way in which the Agency issues environmental permits. In 2007, it began using it to streamline and speed up the process reducing average permit handling times.

The Agency also uses geographic information to provide information to the public. It receives 50,000 requests for information from the public every year. In 2008, it launched its 'What's in Your Backyard?' website as a way to inform the public about environmental issues such as flood warnings, flood risk and water quality that is affecting local areas. This is a popular website and at peak times has over 25,000 concurrent users.

Geographic information and systems are highly embedded in the Agency. Its Corporate Strategy 2010-2015, *Creating a Better Place* and its Flood and Coastal Risk Management supporting strategy sets out plans to ensure the Agency has robust data, models and maps. To deliver this goal, the Agency in 2010 published three strategies setting out a future approach to data, modelling and mapping.

Source: National Audit Office analysis of information from the Environment Agency

The Marine Management Organisation

The Marine Management Organisation was created in April 2010 from the Marine Fisheries Agency and took on work previously completed by the Department of Energy and Climate Change and the Department for Transport. In 2011, the Organisation published a four-year corporate plan, which includes two strategic outcomes related to decision-making and dissemination of evidence. These focus on increasing the use of technology to speed up the time between collection of data and its use in informing evidenced-based decisions.

Although the Organisation does not have a geographic information strategy, as of 2011 it is in the early stages of developing its internal capacity. The key focus for the Organisation is to develop a data store to hold a range of datasets essential to the delivery of services such as vessel monitoring, marine planning and licensing, marine nature conservation, fisheries management and marine emergencies.

The Organisation realises it has a big task ahead and is looking to the Department to help develop and maintain a new mapping tool to make available fit-for-purpose datasets.

Since its creation, the Organisation has committed £400,000 in its own SPIRIT toolkit to allow its workforce of 200 to access geographic information and systems as part of their day-to-day job. The Organisation also accesses SPIRE and uses the online training package provided centrally by the Department.

Source: National Audit Office analysis of information from the Marine Management Organisation

Appendix Three

Methodology

Method	Purpose
Call for evidence from Department policy teams and arm's length bodies.	To establish perceptions of the Department's strategy and services.
Case study visits to the Environment Agency and the Marine Management Organisation.	To understand how geographic information is used.
Document review.	To assess delivery of the strategy including its costs and benefits.
Interviews with the Department, commercial suppliers and external stakeholders.	To understand the history, delivery and coordination of the strategy and the wider significance of geographic information.
Technology review.	To review the technical services the Department delivered as part of the strategy.

Source: National Audit Office

Endnotes

- 1 By arm's length bodies we mean members of the Department's delivery network.
- 2 Comptroller and Auditor General, *Information and Communications Technology in Government: Landscape Review*, Session 2010-11, HC 757, National Audit Office, February 2011.
- 3 A federated business model is where the Department and its arm's length bodies aim to pool resources to meet any common requirements and agree policies and standards that will provide a framework for using geographic information.
- 4 The SMART acronym is a widely accepted good practice technique to ensure performance measures are robust.
- 5 Annotation is the ability to edit, manipulate and display information layers on a map.
- 6 These case examples and others are covered in greater detail at the Intra-Governmental Group on Geographic Information (IGGI) website at <http://www.iggi.gov.uk/caseStudies.php>
- 7 www.agi.org.uk. The £650 million is a per annum 'supply-side' estimate, published in early 2009 by Consulting Where. The Consulting Where estimate for 2010 is nearer £750 million with a large part of this growth from search or social networking. The £900 million figure was published in December 2009 by the Department for Communities and Local Government in its consultation document *Policy options for geographic information from Ordnance Survey*. We have not validated these savings.
- 8 Coote and Smart, 2010, *The value of geospatial information in local public service delivery in England and Wales* for the Local Government Association. We have not validated these savings.
- 9 SocITM, 2010 – *IT Trends*.
- 10 These two risks are the only ones owned by the Department. <http://www.cabinetoffice.gov.uk/resource-library/national-risk-register>.
- 11 <http://maps.environment-agency.gov.uk/wiyby>
- 12 The phrase 'spatial data infrastructure' was coined in 1993 by the U.S. National Research Council to denote a framework of technologies, policies, and institutional arrangements that together facilitate the creation, exchange, and use of geospatial data and related information resources across an information sharing community. <http://www.esri.com/library/bestpractices/spatial-data-infrastructure.pdf>

- 13 <http://inspire.jrc.ec.europa.eu/index.cfm/pageid/48>
- 14 National Audit Office, *A Short guide to the National Audit Office's work on the Department for Environment, Food and Rural Affairs*, 2010.
- 15 Comptroller and Auditor General, *Information and Communications Technology in Government: Landscape Review*, Session 2010-11, HC 757, National Audit Office, February 2011.
- 16 Anderson, I, *Foot and Mouth Disease 2001: Lessons to be Learned Inquiry Report*, Session 2001-02, HC 888.
- 17 The Department policy teams and arm's length bodies we consulted are outlined in Appendix One.
- 18 The Marine Management Organisation, created in April 2010, was not in existence when the strategy was created, but confirmed that it retrospectively agreed with its aims.
- 19 *Defra Network Data Sharing Strategic Review*, October 2010.
- 20 G-cloud, or government cloud, describes a potential shared online area where all government data is stored, as opposed to being held in servers located across Departments.
- 21 data.gov.uk, which went live in 2010, makes government data available to the public. The proposed Public Data Corporation aims to bring together government bodies and data into one organisation and provide the public, where possible, free and easy access to it.
- 22 Cabinet Office, *Government ICT Strategy*, March 2011.
- 23 <http://magic.defra.gov.uk/>
- 24 The Department continues to pay the maintenance costs that are part of the 'Services' cost in Figure 2.
- 25 Next Perspectives is a consortium which provided aerial photography and height data for the Pan Government Agreement.
- 26 SeaZone Solutions Limited provide marine geographic data. They were part of the UK Hydrographic Office until March 2010.
- 27 In April 2011, the Pan Government Agreement was replaced by the Public Sector Mapping Agreement which now extends licenses for geographic information to the whole of the public sector under one agreement.
- 28 The fourth toolkit is for the Animal Health and Veterinary Laboratories Agency. It has not realised savings as yet.

- 29 This saving is based on a reduction in the list price for Ordnance Survey data.
- 30 The Department has an Enterprise License Agreement with commercial supplier Esri, through its main ICT contract with IBM, to provide geographic information software.
- 31 *Defra Network Data Sharing Strategic Review*, October 2010.
- 32 Government Secure intranet (GSI) is the UK government-wide area network, whose main purpose is to enable connected organisations to communicate electronically and securely.
- 33 Figure is based on all staff with access to the Department's IT Network including the Rural Payments Agency, the Food and Environment Research Agency, the Department itself, the Marine Management Organisation and Animal Health.
- 34 1,500 staff is based on the Department's estimate of 800 users within the core Department and arm's length bodies and 700 users in the Environment Agency. Both numbers are based on approximate license numbers.
- 35 Some arm's length bodies have their own training in addition to the Department's online training package.
- 36 The Department told us that it stopped producing the newsletter in 2009 due to lack of input from its policy teams and arm's length bodies.



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