

We are the Environment Agency. It's our job to look after your environment and make it a better place – for you, and for future generations.

Your environment is the air you breathe, the water you drink and the ground you walk on. Working with business, Government and society as a whole, we are making your environment cleaner and healthier.

The Environment Agency. Out there, making your environment a better place.

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Foreword

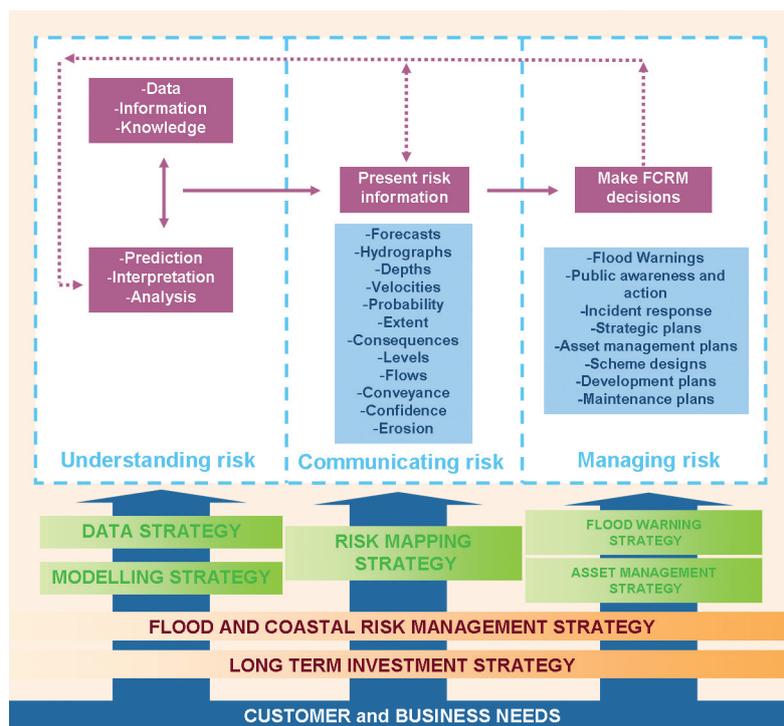
One in six properties in England and Wales is at risk of flooding. It is one of the most serious problems the country faces, and one that requires a strategic and evidence-based approach to tackling it.

Our data, modelling and mapping are the foundations on which effective management of flood and coastal risk depends. We are the national leader in flood and coastal risk information, and this information is the evidence base for our decision-making. And we use our data, models and maps to share information with our partners and communicate risk to the public.

Our Corporate Strategy, *Creating a Better Place*, and the Flood and Coastal Risk Management supporting strategy recognise that it is essential that we manage our risk information so that we have robust data, models and maps. To ensure a clear direction in this area, both for ourselves and for those we work with, we have produced three strategies that set out our approach to data, modelling and mapping over the next five years. They set out the actions required to deliver the outcomes contained in *Creating a Better Place: to recognise data, information and knowledge are assets and manage them accordingly; use environmental data to create compelling evidence that supports and informs our decisions and those of others and; we, our professional partners and the public will have a greater understanding of flood and coastal erosion risk.*

The three strategies are closely linked; you may benefit from reading them all. Our data is not only used in its own right, but also forms much of the basis for our modelling work. And we often communicate data and modelling outputs with maps.

Our strategic overview role in England, and our enhanced oversight role in Wales, is to guide, oversee and advise those partners taking on local flood risk management roles. The three strategies provide greater clarity for our partners about how we will use data, modelling and maps to provide information on risk from all sources of flooding.



Contents

1. Introduction	3
2. Reasons for change	6
3. Where we will be in five years	7
Principle 1: All data has data custodians	7
Principle 2: Data quality is maintained, measured and reported	7
Principle 3: Data is protected	8
Principle 4: Access to data and information is generally permitted	8
Principle 5: Data is available to the whole Environment Agency	9
Principle 6: A data audit trail is maintained	9
Principle 7: Data definitions are consistent and standardised	10
Principle 8: Data and information must be actively managed	10
4. Next steps	12
Appendix 1: Indicative performance measures	13

1. Introduction

1.1 Background

We invest approximately £17 million per year in modelling and mapping and an additional £15 million in gathering and processing data to support flood and coastal risk management. This data, modelling and mapping underpins all the decisions we make in Flood and Coastal Risk Management, including significant investment decisions.

Our Corporate Strategy 2010–2015 states, under the theme *'be the best we can'*, that we will:

'Use environmental data to create compelling evidence that supports and informs our decisions and those of others'

To achieve these we will:

'Recognise data, information and knowledge are assets and manage them accordingly'

Success can only be achieved by working with our partners and customers, and the key to this is sharing data. The recommendations from *The Pitt Review: Learning lessons from the 2007 floods* support the approach of sharing information.

The *Flood and Coastal Risk Management Data Strategy 2010–2015* describes why and how we will establish and manage flood and coastal risk management (FCRM) data. It includes opportunities to improve the way we share data with other organisations (including receiving data). This will help to ensure that we have quality data available at the right time to make evidence-based decisions.

This data strategy will:

- embed a culture of personal commitment to the management of data;
- provide a framework for the way we manage our data that is based on risk and focused on results;
- identify what is needed to support effective data management;
- allow us to identify and reduce inefficiencies in the way we deal with our data.

Implementing this strategy will help resolve problems that occasionally arise as a result of:

- piecemeal solutions
- conflicting data
- duplication of effort
- an inability to share
- departments or individuals developing their own systems.

1.2 Why is data important?

Data is fundamental to evidence-based decision-making. Data that is managed in the right way provides us with the ability to present powerful arguments and make the right investment decisions.

Our vision:

- Our data improves decision-making for ourselves, our partners and our customers.**
- All the data that we create and maintain is valued as an asset by ourselves, our partners and our customers.**
- We have integrated data acquisition plans in place which take account of existing data and the needs of our partners, and are underpinned by recognised data standards.**

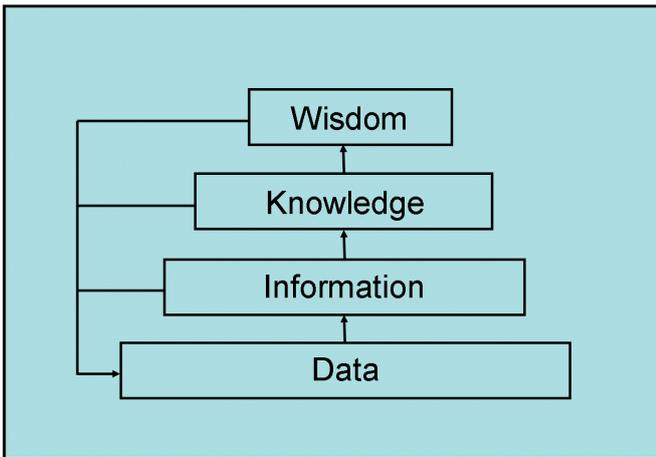


Figure 1: How does data become useful to us?

1.3 What data is covered by this strategy?

The meaning of ‘data’ includes, but is not limited to:

- electronic and written media
- measurements
- calculations
- geographical spatial data
- numbers, facts and figures
- files
- images (including photos and videos)
- reports and records.

In practical terms, FCRM data is any data associated with the management of flood and coastal risk, ranging from a spot level on a property showing actual flood depth, through to the Flood Map, which shows the risk of river and coastal flooding across England and Wales.

Typical FCRM data includes:

- base mapping
- flood and coastal asset data
- model input and output data
- model calibration data
- topographic surveys

- infrastructure
- social data
- flood mapping and visualisations
- economic data
- property and address data
- financial/programme data
- environmental data
- scheme design
- maintenance schedules.

Many of these types of data are created using other data that is managed by third parties or other Environment Agency departments (for example, hydrometry data). We need to recognise that this strategy impacts on all data sources:

- data products supplied by third parties;
- third party data used in Environment Agency products;
- data created or gathered by the Environment Agency;
- collaborative data.

1.4 Who is this data strategy for?

This strategy is for everyone who acquires, creates, supplies or uses flood and coastal risk management data. This includes directors, executive managers, office-based staff and field-based staff.

Our collective responsibilities for data range from capturing, inputting and storing data through to presenting powerful statements to the organisations we work with. For example, at one end of this range we record the condition of individual flood defence assets, while at the other our data is the basis for our long-term investment strategies for managing flood and coastal risk in England and Wales. We all need to play our part in taking responsibility for each bit of data.

For the Environment Agency, data custodians at every level have a pivotal and leadership role as we move forward into implementation:

- Local Data Custodians look after data at a regional or area level, sort out queries or errors in records, and advise people on the use of the data within the region or area.
- National Data Custodians deal with issues that cut across all local instances of the data, such as dealing with alterations to its structure and making sure data is fit for purpose nationally.
- Executive Data Custodians take a more strategic and less technical view, and have ultimate accountability for data quality. They provide an executive management lead, including providing sufficient resources to manage data effectively.

The Environment Agency's strategic overview role in England, and our enhanced oversight role in Wales, is to guide, oversee and advise. As part of that role, we will try to ensure that those we work with also understand and adopt these principles, where appropriate, in dealing with their flood and coastal risk data. This includes:

- local authorities
- Internal Drainage Boards
- water companies.

2. Reasons for change

Our Corporate Strategy *Creating a Better Place 2010-2015* clearly identifies the value of our data and information. Specifically it states the need to value our data as an asset and the need to provide evidence based advice. We also need to better communicate risk to the public and our partners. Together these call for a high level of confidence in our data and information based products.

We have a corporate risk to our reputation because the confidence level we can have in our information and data outputs that we depend on for decisions, for reporting and income is sometimes lower than that required.

The need to deliver these outcomes is the primary driver for change

We have identified two illustrative critical risks to achieving our data strategy vision for FCRM.

2.1 We need to understand what data we need (and what we don't)

We invest approximately £17 million per year in modelling and mapping and an additional £15 million in gathering and processing data to support flood and coastal risk management. But we don't have:

- a comprehensive data model which details the information to be stored;
- complete data quality standards;
- a complete picture of data coverage;
- quality reporting;
- proactive data acquisition plans.

This means that there are inefficiencies within FCRM; for example, it takes us three months to produce the quarterly update of the Flood Map where it should take considerably less time.

In the future:

- We will develop a data model that details how flood and coastal risk management data fits together, and document the quality standards needed. This will include our partners' and suppliers' data.

- To enable data-sharing, we will work towards compliance with INSPIRE, the EU Directive to implement a Europe-wide infrastructure for spatial information; and we will encourage others to make their data compliant too.
- We will develop outcome based and proactive data acquisition plans, integrated with those of our partners, to ensure that we have the data we need and don't collect data we don't need.

2.2 We need to be able to store, maintain and distribute our data securely

We are creating several high-profile national datasets. For example:

- coastal erosion data;
- incident management visualisation;
- National Flood Risk Assessment;
- areas susceptible to surface water flooding;
- reservoir flood mapping;
- national receptors dataset.

But we do not have a consistent or central means for storing, maintaining, interrogating or distributing data, either within the Environment Agency or to our partners. This means that it takes time and effort to ensure the data does not become inconsistent, incompatible or out of date; and distribution is ad-hoc.

We are using new techniques to understand and visualise flood risk. But we are doing so on unsupported IT applications (for example 2d flood model software); and the input and output data, which has high commercial value, is often stored on unsupported and unsecured portable hard drives. We are running the risk of losing data and failing to meet data security standards.

In the future, we will ensure that all our data is consistently and securely stored, maintained and distributed.

3. Where we will be in five years

3.1 How will we achieve our vision?

The *Data and Information Strategy for the Environment Agency* lists eight Principles:

- All data has data custodians.
- Data quality is maintained, measured and reported.
- Data is protected.
- Access to data and information is generally permitted.
- Data is available to the whole Environment Agency.
- A data audit trail is maintained.
- Data definitions are consistent and standardised.
- Data and information must be actively managed.

To achieve these principles, we will shift our cultural approach to data by recognising and valuing our data as an asset. We will:

- manage our data strategically;
- converge our data to have a single understanding of risk;
- share our data;
- exploit our data to maximise its value;
- value our intellectual property as an asset.

The following pages detail what needs to be done to achieve the Principles.

Principle 1: All data has data custodians

All data and information have a set of custodians who are accountable and responsible for managing all aspects of the data's lifecycle. Custodians shall have a level of business authority appropriate to their accountability. Custodians may delegate their responsibilities while remaining accountable.

Current position:

- Data is often an after-thought or considered to be someone else's responsibility or problem.
- At the Environment Agency we have assigned data custodians to our datasets. But many custodians are unaware of their responsibilities and have not had adequate training or access to the right tools to carry out their custodian role effectively.

We will:

- A1.1 re-emphasise to our staff that everyone has responsibility for data. In particular we will again communicate the role of Local, National and Executive data custodians and intellectual property owner roles and responsibilities. We will require these staff to undergo training for these roles;
- A1.2 on an annual basis, data custodians will be required to produce reports for the data for which they have responsibility. These reports will identify good practice, difficulties and solutions. A summary report will be presented to the Mapping and Modelling Programme Board and exceptions reported to the Director of Flood and Coastal Risk Management;
- A1.3 appoint data custodians at Executive, National and Local levels for all new datasets before they are created.

Principle 2: Data quality is maintained, measured and reported

The quality of all data and information is maintained, measured and reported. The level of data quality shall be sufficient to ensure fitness for purpose. Multiple versions of data are avoided. Where more than one version of data is maintained, one version is designated the master.

Current position:

- We don't have a complete data model for flood and coastal risk management that describes what data we need and what quality it should be. As a result we have lots of data, but not necessarily the right data or of the right quality or appropriate currency (updated too often or not often enough).
- We have some datasets which take too long to produce, for example, it took us two years to complete our Summer 2007 flood event outlines in the National Flood and Coastal Defence Database.

- We have datasets with poor, missing or incorrect attributes; for example modelled flood outlines and modelled water levels.
- We have spatial data that does not meet corporate spatial data standards; for example, National Flood and Coastal Defence Database spatial data.

We will:

- A2.1 produce an outcome based data acquisition plan including a data model for all flood and coastal risk management data so we know what data we need (including what our partners and customers need) and what its quality should be. The data model work should include defining a data schema with fixed rules for associated attributes, a logical flow chart showing the links between the data, and a quality grading system to define accuracy and appropriate use. The data model will include links to any legacy data. This will expand upon the work already done by our Asset Management team;
- A2.2 produce database and GIS systems that will only allow users to enter data that is of the right quality (for example, spatial data) and require users to flag the quality of the data (for example, data suitable for national, catchment or system-scale decision-making);
- A2.3 produce regular management reports that show whether or not our data quality is being maintained. This will provide the data custodians with the information they need to manage their data.

Principle 3: Data is protected

Data is protected from unauthorised use, disclosure, change or loss.

Current position:

- On the whole, data supplied by the Environment Agency to third parties is appropriately licensed, and protectively marked data is transferred with appropriate security arrangements in place.
- A vast amount of data (tens of terabytes worth tens of million pounds) sits in Environment Agency Area offices on portable hard drives. Typically this data is flood modelling input and output data from 2d flood mapping projects. The data exists in a wide variety of formats and can only be edited and viewed in unsupported applications.

We will:

- A3.1 carry out an audit to check our compliance with data licensing, data security and intellectual property standards. This will include our National Customer Contact Centre, Area External Relations teams and the National Capital Programme Management Service. We will also formulate an on-going improvement programme and follow-up audit programmes;
- A3.2 assess how we currently store data and quantify our exposure to financial and reputational risks. We will then develop a strategic data storage solution to ensure our data is properly protected;
- A3.3 work out what legal protection is available for data (for example, Intellectual Property Rights) and ensure that the contracts we award assert these rights with our consultants and contractors;
- A3.4 ensure there are clear communication lines with data custodians for timely advice on data protection issues, including sending protectively marked data between organisations;
- A3.5 identify what unsupported software is regularly used, evaluate what is needed and then work with our information systems department to ensure that essential software is properly maintained and supported.

Principle 4: Access to data and information is generally permitted

Access to data and information is restricted only where necessary. Access to data and information shall otherwise be permitted and enabled, subject to appropriate restrictions and controls on its use.

Current position:

- Requests for our data are not always handled as effectively or efficiently as they could be, particularly where automated or manual data retrieval and consolidation is required.
- We provide internet access to our Flood Map and National Flood Risk Assessment data, which is our 'shop front' for raising awareness of flooding.
- We are in the process of putting river level information on the internet.

We will:

- A4.1 get the greatest possible value from our data. With the help of our Commercial Services Team, we will establish what flood and coastal risk management data is being requested, what income is being generated from these requests, and what opportunities there may be to increase this income. We will set up a project to create off-the-shelf products for frequently requested data. We will also help national data teams to ensure they have clear communication lines to provide timely advice and help;
- A4.2 identify data that have inconsistencies, and then gather together consistent and known quality datasets which may be accessed automatically. We will work with our colleagues in the Evidence Directorate to develop a web-based data shop. We will work out the correct use and application of our data and advise our partners and customers;
- A4.3 check that our consultants, contractors and other third parties using our data under licence are adhering to the data licence, data security and data protection requirements;
- A4.4 ensure that intellectual property rights in newly created data permit us to do what we need to with that data;
- A4.5 not sign up to licences and contracts for existing data that prevent us doing what we need to with that data;
- A4.6 record the investment made in data products in our metadata (which includes a 'cost to create' field). Staff will be able to access all metadata records from our Information Asset Register.

Principle 5: Data is available to the whole Environment Agency

Systems shall be designed so that the data they manage is available for use by the whole business. Data storage systems shall be designed to support agreed availability levels.

Current position:

- At present, only around a quarter of our flood and coastal risk management datasets are available to the whole of the Environment Agency through the Central Data Store, which is used to store national datasets accessible through Easimap (an application

for displaying spatial data). For example the Flood Map and Historic Flood Map are held in the Central Data Store, but important national datasets like Rapid Response Catchments and the Medium-Term Capital Investment Plan data are not.

- The National Flood and Coastal Defence Database does not conform to Central Data Store corporate data standards, which results in data compatibility problems. We need to be able to edit Geographical Information System (GIS) data to a single set of standards.
- There are unquantified long-term risks associated with some datasets that we own but which are held and managed externally; for example, the National Flood Risk Assessment and coastal erosion data.

We will:

- A5.1 increase the number of FCRM datasets that are loaded to the Central Data Store and made available via Easimap to our staff. We will continue to support the development of corporate GIS systems that will allow data to be edited, and we will look for opportunities to accelerate this work and build in flexibility to enable systems to meet future business needs;
- A5.2 identify which of our datasets are held externally and work out how best to manage the long-term risks of having our data (including expert knowledge) managed and hosted externally;
- A5.3 make sure our data is easily accessible by putting in place effective systems, training and support.

Principle 6: A data audit trail is maintained

An audit trail shall be maintained for the full lifecycle of data and information, allowing compliance with applicable laws and regulations as well as other requirements determined by the data custodian. The audit trail shall be sufficient to establish the lineage of the data.

Current position:

- Our metadata records at national, regional and area levels are typically either incomplete or missing. However, there are some teams with high compliance – that is, they have complete and up-to-date metadata records uploaded onto our Information Asset Register.

Note: Metadata is data about data; it includes information on who owns the data, where it is stored, what its quality is, and who has the intellectual property rights.

We will:

- A6.1 complete our metadata for all our business critical data and information assets by the end of 2010 and publish it in the Information Asset Register;
- A6.2 investigate the feasibility of developing a GIS metadata capability to enable searching by geographic area; for example, to see what flood models or topographic survey data exists in a specific area;
- A6.3 check the quality of the metadata being recorded. It should, for example record contract details and methods of data creation (especially if composite and/or processed data), so we can understand lineage and any resulting data licensing opportunities;
- A6.4 ensure we have retention schedules in place for our data and that our staff comply with them;
- A6.5 record data dependencies; for example, where we have created new data products using data licensed from third parties. We will understand the implications should the third party data licence be withdrawn.

Principle 7: Data definitions are consistent and standardised

Data is defined consistently across the organisation and in accordance with appropriate external and agreed internal standards. Data is classified according to a business-wide framework. Data definitions and classifications shall be documented and made available to all users in an easily understandable form.

Current position:

- There is no flood and coastal risk management data framework, which means that data sharing is either not possible or, if it is, data is often supplied to differing standards or is late.

- Data that is transferred between organisations is typically in a wide variety of formats. This makes consolidation very difficult. Examples include Flood Risk Assessments, Flood Consequence Assessments, Strategic Flood Risk Assessments, Strategic Flood Consequence Assessments, Shoreline Management Plans, Surface Water Management Plans and asset management data from Local Authorities and Internal Drainage Boards.

We will:

- A7.1 develop and implement a data framework including recognised data standards (building on corporate standards which comply with UK, European and other international standards). As part of this action, we will work out how in future to make the most of creating spatial data once and using it many times;
- A7.2 identify important data that is transferred between organisations and establish consistent and standardised data definitions and metadata. As part of our strategic overview role in England, and our enhanced oversight role in Wales, we will work out how best to develop and implement these standards. (See also A8.4.)

Principle 8: Data and information must be actively managed

Good data and information management depends on good business processes. These will only be effective when they are embedded into the day jobs of those who are responsible for data and can be demonstrated through measurements against established baselines.

Current position:

- Once data is produced, it is not actively managed; for example the handover of data from projects to data custodians is not always comprehensive, efficient or timely.
- Metadata is incomplete at national, regional and area level.
- It is often difficult and time consuming to interrogate spatial and non-spatial data to produce management-style statistics and reports.

We will:

- A8.1 improve the way data is transferred between systems and teams and ensure clear and seamless accountability for the data;
- A8.2 set up and establish an outcome based data acquisition plan which assesses whether existing datasets need updating or archiving and seeks to make best use of existing data held by others;
- A8.3 undertake a review to determine whether we have the right data-sharing memoranda of understanding in place, and whether we are making best use of them;
- A8.4 work towards having our data compliant with INSPIRE, the EU Directive to implement a Europe-wide infrastructure for spatial information; and we will report on our progress with this;
- A8.5 provide better and consistent methods to enable management-style statistics and reports to be generated from spatial and non-spatial data.

4. Next steps

4.1 High-level plan

We will produce a high-level plan packaging together the actions in this strategy into a manageable number of coherent and prioritised work streams, with outline costs. We will identify any risks to achieving the actions and what can be done to guard against these risks. We will also identify any dependencies and related work led by other departments.

Our head office Mapping and Modelling team will own the high-level plan. Major projects will be carried out in partnership with our FRCM, Evidence and Operations Directorates; with Corporate Information Services (our IT department); and with external partners, such as local authorities.

The high-level plan will be used to inform internal service levels, which will detail specific actions required of local data custodians. The high-level plan will also describe Area Flood Risk Mapping and Data Management teams' leadership role in supporting and advising other regional and area teams.

The plan will link with other strategies and initiatives, for example:

Environment Agency

- Corporate Strategy
- FCRM Supporting Strategy
- Data and Information Strategy
- Flood Response Strategy
- Risk Mapping Strategy
- Modelling Strategy
- Better Tools for Incident Management
- Hydrometry and Telemetry Strategy
- Skills Strategy
- GIS Strategy
- Data and Information IT Framework
- A strategy for Hydrology.

Legislative

- Flood and Water Management Bill
- EU Floods Directive/Flood Risk Regulations 2009
- EU Water Framework Directive
- EU INSPIRE Directive.

Others

- *Future Water* (Defra)
- Location Programme (Defra)
- *The Pitt Review: Learning lessons from the 2007 floods*
- National Resilience Extranet (Cabinet Office)
- Atlantis (collaborative data integration).

The high-level plan will also detail whom we need to work with to achieve the actions within this strategy, and will include:

- Local Authorities
- Internal Drainage Boards
- Emergency services
- Water companies
- Government departments and agencies
- Suppliers of data to us (for example, Ordnance Survey, Met Office)
- Receivers of data from us (for example, Association of British Insurers, value-added resellers).

4.2 How will we measure our success?

We will assess the success of this strategy by monitoring progress against a number of relevant measures. We have developed indicative draft measures (see Appendix 1) which will be finalised in the high-level plan.

The measures will be reported as a standing agenda item at the Mapping, Modelling and Data (MMD) Programme Board, which is chaired by the Senior Responsible Officer for Mapping, Modelling and Data. The measures and corrective actions put in place will be made readily available.

We will, over the duration of the strategy, develop further, outward-looking measures to help us understand how well we are working with our partners; and internal measures of service levels in our regions and areas.

Appendix 1

Indicative performance measures

D1: More for the environment – data quality

Description: Better quality of flood and coastal risk assessment data.

Measure: The proportion of catchment areas for which manual changes are made to the automated output data from our National Flood Risk Assessment work.

Target: For new Nafra updates reduce to zero for changes due to input data quality over the lifetime of this strategy.

D2: Better – data ownership

Description: Increased ownership by data custodians of the data for which they are responsible.

Measure: The proportion of data custodians who are aware of their responsibilities for the data of which they are custodian.

Target: 100% within six months of publication.

D3: Better – data management

Description: Metrics allow monitoring and active management of data coverage and quality.

Measure: Proportion of national business critical data sets with metrics in place.

Target: 100% by end 2010/11.

D4: Faster – data knowledge

Description: Increased knowledge and understanding of the data and maps that we possess, the restrictions on their use and the purposes for which they may be employed.

Measure (i): Percentage completion of Metadata recorded in the Information Asset Register against all of the national products.

Target (i): 100% by end of 20010/11 and then maintain at 100%.

Measure (ii): Percentage of national products that have been assessed for access.

Target (ii): 100% by end of 20010/11 and then maintain at 100%.

D5: For less – reduced systems

Description: Greater rationalisation of systems to improve the accessibility of data to Environment Agency staff.

Measure: The percentage of national datasets on central data store (versus those not on central data store).

Target: All appropriate national spatial datasets (100%) over the lifetime of this strategy.

D6: Looking out not in – data sharing with organisations we work with

Description: Easier access to data and maps.

Measure: Number of Flood Map data requests (from organisations assessed as having free access) through automated electronic distribution methods (percentage of actual versus expected).

Target: 100% over the lifetime of this strategy.

Notes

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