Pilot Impacts Portal Requirements Specification

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Prepared for: Fire & Rescue NSW

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0.1 – 0.3	September 2011	Initial versions
0.4	November 2011	Incorporate workshop feedback
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Distribution list

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1. INTRODUCTION

The Impact of Natural Disasters and Fire Emergencies Project, referred to as the Impacts Project, is a national initiative to better understand the economic, social, and environmental impacts on communities due to natural disasters and fire emergencies. The project will improve the availability of relevant data for the purposes of:

- informed discussion and decision making by governments and communities;

- policy development, planning and accountability for the emergency management sector.

The Impacts Project is divided into a number of deliverables:

Phase 1

    Part A

    Development of a framework for collecting and reporting the impacts and costs of natural disasters and fire emergencies.

    Part B

    Identification of existing sources of data to support (i.e. populate) the Impacts Framework (including a supporting glossary of terms and definitions and an agreement from the data owner to share the data in the online Framework).

    Part C

    The development of a nationally agreed directory of questions to measure household preparedness.

Phase 2

    Part A – Pilot Impacts Portal

    The establishment of a pilot online portal to publish the sourced data into the Impacts framework, including mechanisms for stakeholders to deliver, share, query and report data.

This specification contains the requirements for the Pilot Impacts Portal component of the Impacts Project: Phase 2 Part A above. The aim is to define the system from the perspective of users, the data handling requirements, and expected functionality. While this specification describes the complete functionality of the Pilot Impacts Portal system, the final implementation may deliver a subset due to project time constraints.

This specification is organised as follows. The introductory section defines the purpose of the report, its scope, the intended audience, definition of terms, the references used and the consultation undertaken. Section 2 contains a complete description of the Pilot Impacts Portal by describing a number of user stories. Section 3 provides an overview of the external application interfaces followed by a detailed description of the system features in Section 4. These are derived from the user stories and categorised by function in Section 5. A description of the remaining known non functional requirements is then given in Section 6. The appendices contain a glossary of terms, an overview of

the Impacts Framework, the service level agreement for the final portal system, a description of the software development methodology and a summary of the project workshop.

1.1 Purpose

The main purpose of the Requirements Specification is to define a common understanding of the system to be developed that is both complete and unambiguous. A clear definition of what is required is the best strategy to avoid 'feature creep'. This does not preclude revisiting the requirements as the common understanding of the system evolves. Such revision, however, must be accompanied by an iteration of priorities, resources, and schedule. A change request will be used to manage any additional changes.

1.2 Scope

The requirements describe what the system will do, not how it will be done. This can be used as an agreement between developers, owners, and users of the expected features and functionality of the application.

1.3 Audience

The main target audience is the internal CSIRO and FRNSW project teams. However, the Requirements Specification will also be distributed to stakeholder collaborators, notably the Steering Committee and Advisory Group. Some aspects of the content of the requirements specification, notably the user stories, will also be communicated in presentations and other documentation when discussing the requirements with potential users.

1.4 Abbreviations Used

CCD	Census Collection District
COTS	Commercial Off The Shelf
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSV	Comma Separated Values
ETL	Extract, Transform, Load
FRNSW	Fire and Rescue New South Wales
GIS	Geographical Information System
GUI	Graphical User Interface
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
IT	Information Technology
LGA	Local Government Area
NDMP	Natural Disaster Mitigation Programme
PDF	Portable Document Format

PPRR.	Prevention, Preparedness, Response and Recovery
RBAC	Role Based Access Control
RDBMS	Relational Database Management System
SES	State Emergency Service
SLA	Service Level Agreement
	Statistical Local Area
SQL	Structured Query Language
XLS	Microsoft Excel spreadsheet, from the 3 letter file extension used
XML	Extensible Markup Language

1.5   Consultation Undertaken

The initial versions of this specification, versions 0.1 – 0.3, were prepared from discussions between CSIRO and FRNSW staff and from background project information [1-9].

A national workshop was held in Canberra on 13 October to obtain feedback on the planned Pilot Impacts Portal from the project stakeholders listed in Table 1. The purpose of the workshop was to:

- Identify how workshop participants might use the Pilot Impacts Portal in their day to day activities.

- Present the developed requirements of the portal.

- Identify and establish relevant, available demographic and historical natural disaster data to support the portal.

- Identify the custodians of the relevant data sources.

- Define the criteria to evaluate the suitability of the data items for inclusion in the portal.

The feedback obtained during the workshop was integrated into this specification to produce versions 0.4 – 1.0. This is a project deliverable that requires approval by the Advisory Group and Steering Committee as part of the Impacts Project Phase 2 Part A, the Pilot Impacts Portal.

The October workshop helped shape the requirements as described in Appendix E. One of the main discussion points was around the time constraints of the project, and what could be implemented in this time. There was agreement by participants at the workshop that the Impacts Project should focus on one event from the 11 defined events across Australia to showcase the portal utility. Agreement on this approach will need to be provided by the Project Steering Committee.

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Michelle Bouvet	State Emergency Service	Teresa Lo Pilato	Department of Agriculture, Fisheries and Forestry
Cath Brinkley	Attorney-General's Department	Melissa London	Attorney-General's Department
Michelene Bruce	Australian Bureau of Statistics	Kate Mannion	Department of Agriculture, Fisheries and Forestry
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John Koole	Rural Fire Service	Faruk Yay	Attorney-General's Department
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Table 1: Workshop Attendees

1.6   Acknowledgements

1.7   References

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2. OVERALL DESCRIPTION

2.1 Perspective

The Pilot Impacts Portal will be a prototype system to demonstrate the utility of the Impacts Framework and data items for providing information about the impacts of natural disasters and fire emergencies. The aim of the system is to promote the Impacts Framework and related data items to the emergency management community and other users. It will be a platform to show the benefits of having a single point of access to a wide collection of data items that can be used for evidence based decision making.

The pilot system will encourage other data custodians to incorporate their existing data for use in the portal. The Pilot Impacts Portal is also intended to guide the generation of future data items concerning the impacts associated with natural disasters and fire emergencies.

2.2 Overview

An external view of the Pilot Impacts Portal component of the Impacts Project showing the system boundaries and the entities that interact with it is presented in Figure 1.
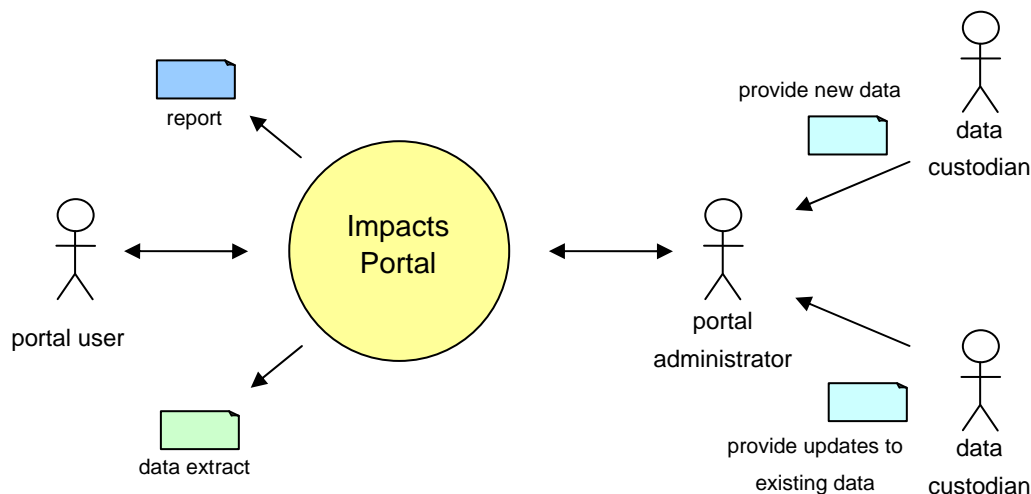
Figure 1: Pilot Impacts Portal Overview

The Pilot Impacts Portal system provides a user interface to the data items contained in the portal. This data is supplied by a *data custodian* who initially provides the new data to be included in the Pilot Impacts Portal by the *portal administrator*. This data may periodically be updated by the *portal administrator* using data supplied from the custodian. The *portal user* uses a web browser as the client interface to access the portal. These users may obtain extracts of data contained in the portal or produce a report as a data summary. The *portal administrator* is responsible for user

management (adding new users and delete inactive ones), monitoring the system performance and will coordinate the inclusion and updating of the data items.

There are three categories of actors for the Pilot Impacts Portal shown in Figure 1, the portal user, portal administrator and data custodian.

2.2.1 Portal User

The portal user represents a large collection of possible users ranging from emergency management personnel (people associated with fire fighters, ambulance officers, police, rescue personnel, SES, and so on), government (federal, state and local agencies), and community groups. These users will each have a particular objective when using the portal broadly defined as supporting:

> '…evidence based decision making on where best to allocate investment across the PPRR spectrum to increase community safety and reduce the costs and social effects of emergencies and disasters.' [4]

The portal users will interact with the system through three distinct scenarios:

1. Pre-event

2. During an event

3. Post-event

The outputs of these activities are collectively described as *reports* and are shown in Figure 1 as being produced by the Pilot Impacts Portal. These reports are generated by a user interacting with the system and may be a hard copy printout or saved in electronic format. The content and format of these reports are details that will be explored during the initial prototype development.

Another output produced by the user interacting with the Pilot Impacts Portal is a *data extract*. This is an electronic export of a subset of the data items managed by the Pilot Impacts Portal in a format suitable for easily importing into another system. For example, exporting data as a CSV file for loading into Microsoft Excel. Note that there may be licensing restrictions for some of the data items that prohibit them being exported in this manner.

2.2.2 Portal Administrator

The portal administrator is responsible for maintaining the Pilot Impacts Portal. The administrator will be the point of contact for user enquires (help desk), schedule maintenance (hardware and software upgrades), respond to unexpected outages, perform user management activities (add new users and delete inactive ones), monitor the system performance, and will coordinate the inclusion of new data items and data updates. The data management responsibilities will become clearer during the initial prototype development.

2.2.3   Data Custodian

The data custodian is the person or organisation who supplies, or makes available, the data items contained in the Pilot Impacts Portal. The Data Items component of the Impacts Project [6] is tasked with identifying and procuring relevant sources of data for inclusion into the Pilot Impacts Portal. This process will identify the data custodians. Note that the data supplied is integrated into the Pilot Impacts Portal by the administrator. There are no specific interfaces to the portal for the custodians.

2.3   Data Items

The data items available in the portal are categorised as follows:

- The Impacts Framework itself.

- Underlying demographic/baseline data.

- Historical natural disaster or fire emergency event data.

- Impacts data.
  The measured impacts resulting from a specific instance of a natural hazard or fire emergency event.

- Mitigation and Recovery
  The history of funds spent and actions performed in a region for disaster prevention or recovery.

These data items will be managed in a data repository as a component of the Pilot Impacts Portal.

2.4   Functions

The Pilot Impacts Portal is a repository of data items supporting the Impacts Framework available using a web interface. The interface will provide various access paths to this information allowing the portal user to:

1. **Explore the Impacts Framework.**
   The user interface will support a user exploring all aspects of the Impacts Framework. For example, a user may navigate the Impacts Framework in terms of the disaster category (bushfire, cyclone, flood, and so on), the event characteristics, the type of objects impacted by an event, the harm that results, and the economic, social and environmental impacts themselves, or a combination of these.

2. **Identify data items relevant to an event under investigation.**
   Explore the catalogue of available data items directly. This could be a hierarchical list of the data items grouped into categories.

3. **Discover data items geographically.**
For example by navigating a map of Australia using pan and zoom functions or by specifying a starting state or major city.

4. **Discover data items by disaster category.**
Navigate a data dictionary developed to categorise the available data items.

The user can generate reports from the web interface summarising the information they have obtained from the portal and export data extracts of the data items.

2.5   User Classes and Characteristics

The entities depicted in Figure 1 define the actors of the Pilot Impacts Portal system. These are the roles played by people and helps define how the system will be used. The actors are useful for placing the system in context. The tasks an actor performs are the user stories for the system, defining its behaviour from which the requirements are captured.

2.5.1   Portal User

The portal user can be characterised as:

- A policy maker involved in the emergency risk management sector, health sector, or climate change.

- Program and policy evaluators.

- Crisis management teams and operational front-line staff, and recovery teams.

- Researchers, standards and product developers, building science professionals.

- Governments (including local government councils) and regulators.

- Insurance companies and loss adjusters.

2.5.2   Portal Administrator

The portal administrator is an IT worker with experience in installing and managing software systems in an Internet environment. Their tasks are characterised as:

- Provide limited help desk support.

- Advise the user community of scheduled downtime.

- Respond to outages as they occur.

- Resolve availability issues as they arise.

- Manage user access.

- Load new data items when available.

2.5.3 Data Custodian

The data custodian will supply data items for use in the portal. The data items will be given to the administrator for inclusion in the portal. The custodian does not have a separate role to play in the operation of the portal. They will be given access to the system as a portal user, not an administrator.

2.6 Operating Environment

There are no specific constraints placed on the computing platform on which the Pilot Impacts Portal system is to be deployed. The computing platform must meet certain performance requirements as detailed in the Impacts Project – Portal Component contract [9] and described in Section 6.1. In summary:

- The system will support a small user community (less than 100) with few concurrent users (around 5) making at most 10 queries per second.

- The impact Data Items available in the repository is expected to require less than 1 gigabyte of storage with a data download rate of less than 1 megabyte per minute.

2.7 User Environment

The user will interact with the Pilot Impacts Portal using a standard web browser. The system will be tested using Internet Explorer version 8, Mozilla Firefox version 6, Google Chrome version 15 and Safari 5.1. The user is expected to be using a Microsoft Windows platform. The system will be tested using Windows XP Professional Version 2002 Service Pack 3 and Windows 7 Enterprise edition Service Pack 1 where both are 32 bit editions.

2.8 User Stories

A user story describes a task performed by a user to achieve a goal. The description is focused on the user's perspective of the system they are interacting with.

The tasks described below are high level in that they focus on the interactions between the external users (portal user, portal administrator, and data custodian) and the Pilot Impacts Portal system. They do not 'open the box' of the Impacts Portal component of Figure 1. The aim is to depict an emergency management scenario, describing the role of the user in order to enumerate the functional aspects of the Pilot Impacts Portal system for the task being profiled.

The requirements will focus on describing the different ways the portal is expected to be used based on who the user is (administrator, custodian or portal user), the categories of data available (the Framework, baseline, event, impact or funding) and

the user's perspective of an event: before, during and after. These descriptions can be considered user stories that briefly capture a description of what the user wants to achieve with the Pilot Impacts Portal. These descriptions are then used to define the portal features defined in Section 4.

2.8.1 User Story 1: Pre-event investigation

Natural disasters and fire emergencies are expected to occur infrequently. The information available in the portal can be used to plan 'what if' scenarios, such as disaster modelling and disaster risk mapping, to develop policy and to conduct land use analysis and risk assessments. The information could assist in informing disaster mitigation through preparedness and mitigation. This could be done, for example, by a member of a local council to explore the possible impacts that may occur in the event of an earthquake, bushfire and so on.

The following are examples of information that could be obtained from the Impacts Framework alone:

- For a specific event or hazard (one of bushfire, earthquake and so on), list each of the social, environmental and economic impacts that could result.

- Given a specific impact, list the events that could cause it.

- What are the impacts that are unique for a given event?

- What are the indirect impacts for a given direct impact?

The Pilot Impacts Portal will include data items described by the Impacts Framework. Examples are bridges, road signage, fencing, national park facilities (BBQs, shower blocks, tables and chairs, shelters, toilets), telephone poles, the electricity network, walking trails, fire towers, field crops and so on. This information is part of the *baseline* data which will provide context for the event and impact data items. Where possible the baseline data will be linked to the Impacts Framework. The baseline data includes location information allowing the data items to be represented on a map. These data items can be navigated by using pan and zoom operations typical of a GIS.

There will be additional information in the baseline data. For example:

- Demographics

- The built environment

- Local government boundaries

- Residential zoning

- Land use details

A portal user can navigate the baseline data, starting with a map of Australia, and performing pan and zoom operations to define an area of interest. As the zoom level

passes specific predefined thresholds new categories of baseline data become visible. These categories are termed layers. A user can choose whether the layer is displayed on not displayed on the map. A user can click on a specific feature of interest and be presented with information about it from the Impacts Framework.

The historical natural disaster and fire emergency events and impacts data can be similarly searched. When the user has navigated to a region of interest, the user can discover previous events that occurred in the region of interest. Similarly the data items that describe the impacts of specific events can also be determined.

In summary, a user can:

- Geographically navigate using pan and zoom to define a region of interest.

- Enable and disable layers of data items that have a location component.

- Link to the Impacts Framework from the data items displayed on the map.

- Discover instances of natural disaster and fire emergency events that have previously occurred in the region of interest.

- Discover details (impacts) of specific events.

The user will interact with the Pilot Impacts Portal tailoring their information need to their area of interest or business investigation. The user will be able to generate a report from the portal summarising the information presented, produce an image corresponding to the on screen display, and download a subset of the data items corresponding to the information presented on the on screen display.

2.8.2 User Story 2: During an event

The Impacts Portal could be used during an event to assist with planning and resource prioritization of front line staff. It could also be used during the recovery process to identify and focus on vulnerable and 'at-risk' community groups and infrastructure. The portal could also inform the development of safety programs during the event.

The Pilot Impacts Portal is expected to be useful in the following ways:

- For a specific event (such as a bushfire, earthquake and so on), what are the direct impacts defined in the Impacts Framework that should be considered.

- For an identified direct impact, list the corresponding indirect impacts that may consequently occur.

- For an identified event in a specific region, list the baseline information recorded in the Pilot Impacts Portal, for example:

  o Identify the major roads in the region of interest.

  o Show the age distribution of the local population and communities.

- o Show the various local government jurisdictions.

- o Highlight the different planning zones (industrial, residential) and identify infrastructure.

- o Determine the age profile for residential houses.

- o Show the proximity to national parks, native forests, and farming areas.

- For an identified event in a specific region, find information about similar previous events.

- For these previous events, find information about the impacts (direct and indirect) that resulted.

2.8.3   User Story 3: Post event analysis

The Pilot Impacts Portal may be used after an event has occurred to obtain information about the impacts that resulted. Such analysis requires the impacts data items for the event to have been made available in the portal. The portal will be used to discover the impacts information in ways described previously: by navigating a map of Australia (pan and zoom) to define a region of interest and then discover the events and impacts recorded in the region; or via a keyword search.

The information obtained from the portal can be a complete summary of the impacts data available or a subset as defined by the user to assist with policy development, formulation of programs, strategies and recommendations and to highlight lessons learned. The subset of information can be determined by using the Impacts Framework to identify the required data of interest. For example:

- For a specific bushfire event, list the direct economic impacts caused by heat on residential properties.

- For a specific flood event, list the indirect social impacts caused by inundation on the natural environment.

- For a specific cyclone event, list all impacts caused by wind.

The above are examples of information a user can obtain for a specific natural disaster or fire emergency event when navigating the information from the perspective of the Impacts Framework and where historical data is available.

The Pilot Impacts Portal may also be useful for post event analysis in the following ways:

- Compare specific data items in a region of interest before and after an event.

- Compare the impacts from different events.

2.8.4   User Story 4: Custodian supplies new data

The data custodian is the person or organisation who supplies, or makes available, the data items contained in the Pilot Impacts Portal. The Data Items component of the Impacts Project [6] is tasked with identifying relevant sources and procuring the data for inclusion into the Pilot Impacts Portal. The data identified and obtained will be made available in the portal as part of the delivered system.

The process of including a new data item into the portal will be performed by the portal administrator. The data custodian simply makes the data available. The following metadata should also be supplied and made available to the portal user:

- A brief description of what the data is and how it was produced.

- The point of contact (email address and/or phone number) of the custodian.

- A metadata description of the data item content, including:

    o   The geographic extent of the data.

    o   The time period for which it relates.

    o   A description of the contents, for example, field names and the data types used.

- A data quality description.

- The licensing terms detailing the conditions of use for the data in the portal.

2.8.5   User Story 5: Administrator loads data

The process of loading data into the portal will require a number of steps:

- **Registration.**
  This is the process to make the data available to the portal. For example, the data item may appear as a new geographic layer available in the interface of the portal or as a drop down list of available data items that can be accessed.

- **Transformation.**
  There will be software available to load data into the portal. This software will assume a specific file format and content. The new data item will need to be transformed into the format required to make use of the load tools.

- **Mapping.**
  This is the process of mapping of the fields in the data item to the concepts of the Impacts Framework. This is the process of linking the data item to the Impacts Framework.

These tasks will be performed by the portal administrator who will have a good understanding of the tasks required. The administrator may have to liaise closely with

the custodian in order to understand how the supplied data can be related to the Impacts Framework.

2.8.6   User Story 6: Custodian views own portal data

The data custodian will be given user access to the portal in order to see how their data is used within the system. It is expected that the custodian will want to ensure their data has been incorporated into the Pilot Impacts Portal correctly.

2.8.7   User Story 7: Custodian supplies data update

The data items included into the portal are assumed to be mostly static in that the data is loaded once and not regularly updated. There may however be infrequent data updates to existing data included in the Pilot Impacts Portal.

The best option, replace or have both, will be determined on a case by case basis. For example, new demographic data will become available in time as a result of the 2011 census. Previous demographic data should still be available in the portal since this may be more relevant when exploring the impacts due to historical events. Alternatively, a custodian may provide a data update to rectify errors in the data previously provided. In this case, the new data item should replace the previous copy.

2.8.8   User Story 8: Portal Administrator Tasks

The portal administrator is responsible for user management (adding new users and deleting inactive ones), monitoring the system performance, fixing issues as they arise and will coordinate the inclusion of new data and applying data updates. Some examples of the specific tasks expected of the administrator are:

- Create a user account to allow access to the portal.

- Extend the lifetime of a user account when it has expired.

- Force the user password to be reset.

- Remove a user account so it can no longer be used to access the portal.

- Determine the number of active users at a given time.

- Produce a summary of portal activity for a given time period, for example a monthly report, including:

    o   A list of the users who connected.

    o   How long they remained active on the system.

    o   The data they downloaded.

- Notify all registered users of scheduled downtime of the portal.

- Include new data into the portal.

- Carry out scheduled maintenance, for example hardware and software upgrades.

2.9   Assumptions

The following assumptions are made about the Pilot Impacts Portal system:

- The Impacts Framework will not be modified during the course of the project.

- The Impacts Framework will be used to define most of the data items to be included.

- Criteria are to be developed to assess the suitability of identified data items to be included into the portal.

- Only data items that meet the criteria will be included into the Portal.

- Only existing data items will be obtained for inclusion into the Portal.

- The data included in the Portal will not be sensitive. Privacy issues will not be considered.

- No new baseline data items will be included in the Portal after the go-live date.

- The portal user cannot add new data items or update data items.

- There is no user session management. That is, the 'state' of a user's interaction with the Portal cannot be saved and resumed at a later time.

- The information available from the portal will be self contained; the portal will not access 'live' data from other external systems.

- There will be no further software development on the Pilot Impacts Portal after go–live, 22 June 2012, apart from minor bug fixes.

- The Pilot Impacts Portal will be operated by users in an office environment. It will not be used in the field or using mobile devices.

- Authentication will be used to identify the government agency a user is from.

- There is no Role Based Access Control (RBAC). Successfully authenticating to the system allows the user to access all the data items available in the portal.

- The portal will present information to the user and the user is expected to infer conclusions from the data. The system does not include functions specific to the tasks performed by an emergency management officer in response to a natural disaster or fire emergency.

- The following assumptions are made about the Pilot Impacts Portal user:

  o The user may not have a high level of domain knowledge of the Impacts Framework.

  o The user may want access to the portal outside of standard business hours.

  o The portal user is not expected to have computer literacy beyond that required to manage simple personal computer applications, for example an email program or web browser.

  o The user will not train on the Pilot Impacts Portal and expects the system to be self explanatory.

  o Not a member of the general public.

  o Will have a login to access the portal.

2.10   Dependencies

The successful development of the Pilot Impacts Portal will be dependent on the following:

- Existing data items for inclusion in the portal.

- Access to representative users in the emergency management community to explore and refine the portal features.

- Effective communication between CSIRO and FRNSW.

- Timely feedback to CSIRO from FRNSW and subject matter experts as the project progresses.

2.11   Design and Implementation Constraints

The following constraints and issues about the system are noted. These are areas that will need to be investigated during the course of the project.

- Are there common terms and definitions used throughout Australia to describe natural disasters and fire emergencies?

- How will portal user feedback be managed and by who?

- The portal will not be linked to real-time 'live' impacts or event information available from other systems.

3. EXTERNAL REQUIREMENTS

3.1 User Interfaces

There will be three primary modes of interaction with the system: map based, impacts data based and Impacts Framework based. The map based interface will feature a map of Australia to orientate the user. The view presented by the map can be navigated in numerous ways: by panning and zooming, providing coordinates to navigate to, or supplying location information such as a town name or suburb. A specific natural disaster or fire emergency event may also be used to render the map to the corresponding location. There will be layers of baseline (context) information that can be turned on or off. The level of detail presented will depend on the zoom level the user is at.

The event and impacts data can be searched also. A search interface will allow a user to discover natural disaster or fire emergency event information that occurred in a specific time period, in a given location or by the event category.

The Impacts Framework based interface will allow the user to navigate the content of the Impacts Framework. This interface will allow the user to explore the Impacts Framework in various ways, similar to that currently available when using Microsoft Excel, but also include novel ways that cannot currently be done.

3.2 Deployment

The Pilot Impacts Portal will be deployed on CSIRO systems for twelve months after the go-live date, concluding at the end of June 2013. The portal will be deployed in a data centre with the specific hardware details noted in the final documentation.

3.3 Third Party Tools

Various third party software libraries will be used for the software development and portal hosting. A complete list detailing the licensing conditions will be available prior to the portal go-live. The software used will likely include a web server, a database management system, and the Java Runtime and Development Environments.

3.4 Communication Protocols and Interfaces

Access to the Portal will require an Internet connection. HTTP and HTTPS will be used as the communication protocol. HTML and JavaScript will be used for the client side content of the user interface.

4. SYSTEM FEATURES

The high level description of the Pilot Impacts Portal provided in Section 2 includes a number of examples of how the system is expected to be used. The following

discussion is focused on specific features to be included in the system. For each feature a brief description is provided along with a list of the associated functional requirements. Note that this summary is sometimes a repeat of the general discussion previously presented. A summary of the list of requirements is then presented in Section 5, linking it to the relevant user story, allocating a measure of complexity and implementation priority.

4.1   Navigate the Impacts Framework

The Pilot Impacts Portal will allow a user to explore the content of the Impacts Framework by navigating it in terms of the disaster category (bushfire, cyclone, flood, and so on), the event characteristics, the type of objects impacted by an event, the harm that results, and the economic, social and environmental impacts themselves.

The navigation will be enabled using predefined access paths to the Impacts Framework content with the user selecting from predefined choices. These choices are determined by the content of the Impacts Framework. For example, a user can select from the predefined collection of 11 natural disaster and fire emergency events; for a storm event, the user can select from the four associated event characteristics (hail, lightning, rain or wind) and so on.

These methods of accessing the Impacts Framework content are closely aligned with how the content is managed in the data repository of the portal. While this is an implementation decision, a preliminary data model has been defined as described in Appendix B. This model will be used to describe how the Impacts Framework content can be accessed by the user.

The user will not be given direct access to the Impacts Framework content in the data repository. For example, if the content is loaded into an RDBMS, then the user will not have direct SQL query access to it.

4.1.1   Functional Requirements

NAV-Req1   Allow the user to access the Impacts Framework content using predefined access paths. The collection of these access paths will be predefined in consultation with FRNSW. Examples are:

    a. Find all impacts resulting from a specific user provided event.

    b. Find all impacts resulting from a specific user provided event characteristic.

    c. Find all objects impacted by a specific user provided event characteristic

NAV-Req2   Allow the user to restrict the information returned using the predefined access paths. For example, only return environmental impacts, not all impacts.

NAV-Req3   Provide an advanced query interface allowing a user to generate arbitrary access paths using a query builder facility.

4.2   Provide a Geographical User Interface

The Pilot Impacts Portal will include a map based interface to allow the user to navigate to an area of interest. As the zoom level passes a predefined level, new geographic data layers will become visible to the user. These layers can then be enabled or disabled by the user and are again removed from view when the zoom level threshold is again passed. The geographic data items may be linked to the corresponding elements of the Impacts Framework.

4.2.1   Functional Requirements

GUI-Req1   The map will be navigable using pan and zoom operations.

GUI-Req2   The map will be navigable by the user providing location information, such as a town, suburb, or postcode.

GUI-Req3   The map will include geographic layers of baseline data items.

GUI-Req4   Data layers will be enabled and disabled depending on the zoom level.

GUI-Req5   The threshold for layers to be enabled or disabled is predefined and configurable by the portal administrator, not the user.

GUI-Req6   An enabled layer can be disabled by the user.

GUI-Req7   The ordering of layers on the map can be specified by the user.

GUI-Req8   The user can find associated information from the Impacts Framework by selecting a data item on the map.

4.3   Link from the Impacts Framework to related Data Items

The linkage from the data items to the Impacts Framework needs to be bi-directional. The user can navigate the map to discover geographic data items and then link to the Impacts Framework content. The reverse will be possible also: from the Impacts Framework, link to related data items. This link may be to the metadata description of the data items or allow the user to select instances of the data items by indicating a geographic region of interest, for example using a gazetteer, a local government area (LGA), statistical local area (SLA) or a census collection district (CCD).

4.3.1   Functional Requirements

LNK-Req1   The user can find associated metadata of relevant data items while navigating the Impacts Framework.

LNK-Req2   The user can find associated relevant data item instances while
navigating the Impacts Framework by providing a location of interest (for
example using place name from a gazetteer, LGA, SLA or CCD).

4.4   Explore the Available Data Items

A list of the data items contained in the Pilot Impacts Portal will be available for the
user to browse. This will be static content updated by the portal administrator when
new data items are included. The available data items can be searched by date and
geographic region where applicable.

4.4.1   Functional Requirements

EXP-Req1   Provide a list of the data items included in the portal for the user to
browse.

EXP-Req2   Allow a user to obtain a complete metadata description for a given data
item.

EXP-Req3   Show any linkages from the data item to the Impacts Framework.

EXP-Req4   Search baseline, event and impacts data items using a date range.

EXP-Req5   Search baseline, event and impacts data using geographic extent.

EXP-Req6   Search baseline, event and impacts data items only for the most recent,
excluding historic, results.

4.5   Produce Reports

A report is a summary of the information obtained by the user when using the portal.
This will be a hard copy print out or saved in electronic format, such as a simple text
file, XML, PDF or an image file similar to that which would result from performing a
'print screen' operation. The content and format of the report are details that are yet to
be resolved. This information is expected to provide evidence for the user to support
their investigation. This feature will only be available for data where the terms and
conditions allow it.

4.5.1   Functional Requirements

RPT-Req1   A report can be produced from the Pilot Impacts Portal system. The report
content will correspond to the information being displayed to the user.

RPT-Req2   The report can be saved as a file in a format yet to be decided; for
example as plain text, XML, PDF, CSV or an image file (similar to a print
screen operation).

RPT-Req3   A report will contain the details of when it was created, the user connected to the portal who created it, and describe how to re-create the same information when using the portal.

4.6   Extract Data Items

A data extract is a subset of the data items available in the portal. The user may want to use the data in another application to reformat it in various ways. For example, export data as a CSV to be loaded into Microsoft Excel for formatting beyond the capability of the Pilot Impacts Portal. This feature is not expected to allow the user to make a complete extract of all data, but rather to extract subsets only. This feature will only be available for data where the terms and conditions allow it.

4.6.1   Functional Requirements

EXT-Req1   Extract a subset of the Impacts Framework as a CSV or XML file. The subset will be described by the method of accessing the Impacts Framework content using the portal, see Section 4.1.

EXT-Req2   Extract a subset of the baseline data items corresponding to the region of interest currently on the user's display.

EXT-Req3   Extract the available event data corresponding to the region of interest currently on the user's display.

EXT-Req4   Extract the available impacts data corresponding to the region of interest currently on the user's display.

EXT-Req5   Do not export ANY data in which the licensing terms and conditions do not allow it.

4.7   Include New Data Item

The Pilot Impacts Portal will include mechanisms to support data loading. This is referred to as data integration or data maintenance. The process of exporting data from one system and loading into another is often referred to as ETL which stands for:

- **Extract.**
  Export the data from an external system or source.

- **Transform.**
  Convert the data into a format suitable for the target system. This may involve quality checks to determine the fitness for purpose of the data.

- **Load.**
  Import the data into the target system, usually an RDBMS, data warehouse or data repository.

The transform step for the Pilot Impacts Portal will involve mapping the content of the original data onto elements described by the Impacts Framework. This will define the relationship between the imported data and the Impacts Framework allowing the data to be discovered and queried appropriately in the portal.

The data integration or maintenance process results in the data items being loaded into a data repository for use by the portal. The data repository may be implemented using an RDBMS, a document archive with search facilities, or a combination of both. The data loading process will target specific data formats so that the same process can be reused through customisation for new data items as they are obtained. The target data formats are CSV and XML.

Figure 2 below details an example of the expected client/server roles of the user interface and portal server.

The data items are processed by the data maintenance module which performs the transform and loading steps to populate the data repository.

user
interface

portal
server

data
repository

data
maintenance
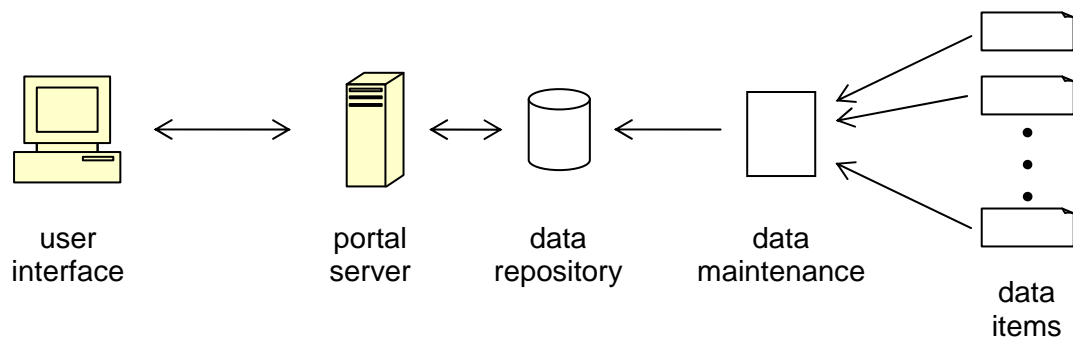
data
items

Figure 2: Including a new data item into the Pilot Impacts Portal.

4.7.1   Functional Requirements

NEW-Req1   Load a data item into the repository.

NEW-Req2   Link a data item to the appropriate content of the Impacts Framework.

NEW-Req3   Provide metadata for the new data item.

NEW-Req4   Update the portal's registry to include the new data item.

NEW-Req5   Make the data item available to the Pilot Impacts Portal.

4.8   Update Existing Data Item

Data updates of existing data items are expected to be rare. The updates will occur for two reasons:

1. Rectify errors in the data previously provided.

2. A complete new version of the data has been created.

In the first case, the new data should simply replace the current data. In the second, a new data item should be created so that both data items are available.

In all cases, the metadata should be updated accordingly.

4.8.1 Functional Requirements

UPD-Req1   Replace a data item in the data repository with a new copy. Update the metadata accordingly.

UPD-Req2   Create a new data item in the data repository. The related data items should be managed such that it is obvious to the user how the data items are related. For example, include version numbers or years in the names of the data items to distinguish them (demographics 2001 and demographics 2006).

4.9   Portal Access and User Management

User management is concerned with providing authorised access to the Pilot Impacts Portal. These tasks are performed by the portal administrator. Note there is no Role Based Access Control.

Access to the Pilot Impacts Portal is restricted to authorised users. Note that the Impacts Framework is currently publically available [2] and this content will also be available using the portal without requiring a user login. This would only contain the Impacts Framework content and not the other data items. This will be useful in promoting the Impacts Framework to the wider emergency management community. A username is required to access the 'full' portal in order to restrict access to the system which will keep the operational load to the performance metrics identified in Section 6.1.

4.9.1   Functional Requirements

USR-Req1   Include a terms and conditions statement for using the Pilot Impacts Portal.

USR-Req2   Access to the Impacts Framework data item component of the portal does not require a user to login.

USR-Req3   The user must agree to the terms and conditions before being allocated a username.

USR-Req4   Access to the content of the Pilot Impacts Portal requires the user to login using their allocated username.

USR-Req5   Allow the portal administrator to create a new user account to have access to the Pilot Impacts Portal.

USR-Req6   Notify the portal administrator and the user when a user account is soon to expire.

USR-Req7   Allow the portal administrator to extend the lifetime of a user account when it has expired.

USR-Req8   Allow the portal administrator to force the user password to be reset.

USR-Req9   Allow the portal administrator to disable an existing user from having access to the portal.

USR-Req10 Allow the portal administrator to remove a user account so it can no longer be used to access the portal.

USR-Req11 Provide a web form to allow a potential new user to request a user account to access the portal. All user accounts to be managed by the portal administrator, but vetting of new users is to be coordinated with FRNSW.

4.10   Pilot Impacts Portal Monitoring

The Pilot Impacts Portal system will require monitoring. The service level agreement (contained in the Portal component contract [9]) describes the expected level of support to be provided by CSIRO to manage the portal, see Appendix C for a summary. The portal software should provide self monitoring capabilities, alert the administrator when something is wrong, and attempt to fix itself when possible. The software should also record user access and a profile of their activity while connected.

4.10.1 Functional Requirements

MON-Req1 Provide an audit trail of user access to the portal.

MON-Req2 Provide a summary of portal availability noting unscheduled downtime.

MON-Req3 Determine the number of active users of the portal at a given time.

MON-Req4 Notify the portal administrator when the portal server is not available.

MON-Req5 The portal server should attempt to restart itself when unavailable.

MON-Req6 Notify all registered users of scheduled downtime of the portal.

MON-Req7 Produce a summary of portal activity for a given time period, for example a monthly report, including:

- A list of the users who connected.

- How long they remained active on the system.

- The data they downloaded.

MON-Req8   Stop the portal.

MON-Req9   Start the portal.

4.11   Miscellaneous

There have been a number of ideas discussed during the initial phases of requirements gathering that do not fit neatly into a user story or related system feature. These are captured below.

4.11.1   Functional Requirements

MSC-Req1   Provide online user documentation.

MSC-Req2   Agree on a meaningful and available domain name for the Pilot Impacts Portal. Acquire the domain name and use it for the Pilot Impacts Portal. Possible examples are:

- www.fend.org.au

- www.impacts.org.au

- www.ndfe.org.au

- www.ndfeimpacts.org.au

MSC-Req3   Include a disclaimer on the Pilot Impacts Portal indicating that the contents are made available from various data custodians and that this information may be incomplete or inaccurate.

MSC-Req4   Allow a user to provide a comment on their experience of using the portal, or pose a question. For example:

- The comments are not moderated.

- The user should be identified by their Agency username when posting a comment.

- Users cannot communicate with each other via the portal. The comments are sent to the portal administrator.

5.   DEVELOPMENT PRIORITIES

A summary of the list of requirements developed in Section 4 is presented below, linking each requirement to the corresponding user stories, allocating a measure of complexity and implementation priority. The anticipated implementation complexity uses a rating scale of High, Medium, and Low and there are three priorities: 1, 2 and 3.

Priority 1 requirements provide the focus for the initial prototype of the Pilot Impacts Portal (end of calendar year 2011). Priority 1 and 2 features will be present in the final system while those with Priority 3 are considered nice to have, but are not necessary to demonstrate the core functionality of the system and won't be present in the delivered system. The result is shown in Table 2.

Requirement #	Description	User Story	Complexity	Priority
Navigate the Impacts Framework (IF)				
NAV-Req1	Predefined access to the IF	US1-3	Medium	P1
NAV-Req2	Restrict results from the IF	US1-3	Medium	P2
NAV-Req3	General access to the IF	US1-3	High	P3
Provide a Geographical User Interface				
GUI-Req1	Pan and zoom the map	US1-3	Medium	P1
GUI-Req2	Zoom to known location	US1-3	Medium	P1
GUI-Req3	Geographic baseline layers	US1-3	Medium	P2
GUI-Req4	Zoom level to enable layers	US1-3	Medium	P2
GUI-Req5	Define layer thresholds	US1-3	Medium	P2
GUI-Req6	Turn layers on or off	US1-3	Medium	P2
GUI-Req7	Reorder layers	US1-3	High	P3
GUI-Req8	Display layer data from the IF	US1-3	High	P2
Link from the Impacts Framework to related Data Items				
LNK-Req1	Discover metadata linked to the IF	US1-3	Low	P1
LNK-Req2	Discover data linked to the IF	US1-3	Medium	P2
Explore the Available Data Items				
EXP-Req1	List available data items	US1-3	Low	P1
EXP-Req2	Show metadata for a data item	US1-3	Low	P1
EXP-Req3	Show linkage from data item to IF	US1-3	Medium	P2

EXP-Req4	Search data items using date range	US1-3	Medium	P3
EXP-Req5	Search data items using region	US1-3	Medium	P3
EXP-Req6	Search the most recent data items	US-13	Medium	P3
Produce Reports				
RPT-Req1	Generate report	US1-3	Medium	P2
RPT-Req2	Save report	US1-3	Medium	P2
RPT-Req3	Report metadata	US1-3	Medium	P2
Extract Data Items				
EXT-Req1	Extract IF subset	US1-3	Medium	P1
EXT-Req2	Extract baseline data subset	US1-3	Medium	P2
EXT-Req3	Extract event data subset	US1-3	Medium	P2
EXT-Req4	Extract impact data subset	US1-3	Medium	P2
EXT-Req5	Obey data licensing conditions	US1-3	Low	P1
Include New Data Item				
NEW-Req1	Load new data item	US4,5	Medium	P1
NEW-Req2	Link data item to the IF	US4,5	High	P2
NEW-Req3	Include data item metadata	US4,5	Low	P1
NEW-Req4	Update registry for the new data	US4,5	Low	P1
NEW-Req5	Make data item available to portal	US5	Medium	P1
Update Existing Data Item				
UPD-Req1	Replace data item and metadata	US7	Low	P2
UPD-Req2	Include new version of data item	US7	Low	P2
Portal Access and User Management				
USR-Req1	Display portal terms and conditions	US1-3	Low	P1
USR-Req2	Access IF content without login	US1-3	Low	P1

USR-Req3	User accepts terms and conditions	US1-3	Low	P1
USR-Req4	Authentication for the portal	US1-3	Medium	P1
USR-Req5	Create new user	US8	Medium	P1
USR-Req6	Notify before account expires	US8	Medium	P2
USR-Req7	Extend user account lifetime	US8	Low	P2
USR-Req8	Force password reset	US8	Low	P2
USR-Req9	Disable user account	US8	Low	P2
USR-Req10	Delete user account	US8	Low	P2
USR-Req11	Web form to request user account	US8	Low	P2
Pilot Impacts Portal Monitoring				
MON-Req1	Audit trail of user access	US8	Medium	P2
MON-Req2	Summary of portal availability	US8	Medium	P2
MON-Req3	Determine who is accessing portal	US8	Medium	P2
MON-Req4	Notify when portal is down	US8	High	P2
MON-Req5	Portal restarts itself	US8	High	P2
MON-Req6	Notify users of scheduled downtime	US8	Low	P2
MON-Req7	Produce portal activity reports	US8	Medium	P2
MON-Req8	Stop portal	US8	Low	P1
MON-Req9	Start portal	US8	Low	P1
Miscellaneous				
MSC-Req1	Online user documentation	-	Low	P2
MSC-Req2	Domain name	-	Low	P2
MSC-Req3	Disclaimer	-	Low	P2
MSC-Req4	User comments and feedback	-	Low	P3

Table 2: Requirements Summary

6. OTHER NON-FUNCTIONAL REQUIREMENTS

6.1 Performance Requirements

The implementation will be engineered to allow flexible operation of the user interface to explore the Impacts Framework and associated datasets while restricting certain functionality to ensure adequate performance. For example, some data layers on the geographical interface will not be available when the user is at a coarse zoom level and data extracts will only be allowed for data subsets – not a complete export of the data items.

The Pilot Impacts Portal contract states the expected usage characteristics of the Pilot Impacts Portal, shown in Table 3.

Expected number of data custodians	3-6
Expected user community size	5-100
Expected maximum number of concurrent users	5
Expected maximum portal query rate	0.1 queries per second
Expected maximum data download rate	1 MB per second
Expected total data storage needs for impacts data	1 GB

Table 3: Performance Characteristics, from [9]

6.2 Safety Requirements

None.

6.3 Security Requirements

Access to the Pilot Impacts Portal will require a username/password for authentication. There will be unrestricted access to some elements, notably the Impacts Framework content. The use of a username/password over HTTP is insecure and so HTTPS will be used.

6.4 Software Quality Attributes

Software Quality Attributes are used to manage the quality, cost and schedule of a project. Attribute examples are: efficiency, functionality, maintainability, portability, reliability, correctness, and usability. Such measures are effective in large scale software engineering projects with detailed system specifications developed that requires formal software metrics to be captured during the software lifecycle. This will not be used for developing the Pilot Impacts Portal.

The software will be developed using the methodology described in Appendix D. The following software engineering tools and procedures will be adopted:

- The Subversion version control system will be used to manage the implementation.

- A software build tool will be used to control the software compilation.

- The system will be tested using a collection of User Acceptance Tests.

6.5　Project Documentation

The project has progressed through various stages within FRNSW to initially develop the Impacts Framework [2,3] and produce the project plan [4]. The CSIRO involvement in the project is managed through two contracts corresponding to two separate projects:

1. **Data Items**
   The identification and procurement of existing data sources described by the Impacts Framework [8].

2. **Pilot Impacts Portal**
   A web accessible user interface to the Impacts Framework and supporting data sources [9].

These two projects are closely related and the CSIRO project team members involved in both will collaborate closely. There is a single project wiki site [5] used to record the project progress, record the minutes of the weekly meetings and is the repository for all project outputs.

The developed software will include inline JavaDoc comments and a high level report describing the code targeted at software developers.

6.6　User Documentation

There will be minimal user documentation since the system will be designed to be intuitive to use. The Pilot Impacts Portal web site will include instructions as web pages and include a link to a basic user guide as a PDF report.

Concise deployment and operating instructions targeted at the portal administrator will be delivered at project completion before the portal go-live date. They will describe the main deployment and operating procedures. These instructions will be delivered as concise 'README' text files as part of the software distribution as well as full system guides as Microsoft word documents. The documentation will include the following:

- The hardware and software specifications for application and database installation.

- Instructions for re-installation.

- Basic System Administration Guide (including managing of user accounts and administration of any third part integration or data upload facilities).

- The database schema diagram.

7.   OTHER REQUIREMENTS

A basic end user guide should be developed, available as a PDF document or HTML pages from the portal.

APPENDIX A: GLOSSARY OF TERMS

Term	Definition
Baseline data	Data that provides context for an event relevant to the Impacts Framework. This data includes geographic information describing the built environment, local government boundaries, residential zoning, land use details and demographics as well as information described by the Impacts Framework such as bridges, road signage, fencing, national park facilities (BBQs, shower blocks, tables and chairs, shelters, toilets), telephone poles, the electricity network, walking trails, fire towers, field crops and so on.
Built environment	Human made buildings and infrastructure.
Data item	A dataset available in the Pilot Impacts Portal. The dataset will be relevant to natural disasters and fire emergencies (event and impacts data) or be baseline data.
Dataset	An electronic collection of data.
Direct impact[*]	Impacts that result from direct contact with the event.
Event[*]	An incident or situation that occurs in a particular place during a particular interval of time. The Impacts Framework in concerned with the following events: bushfire, cyclone, earthquake, fire emergency, flood, landslide, meteorite strike, storm, storm surge, tornado, tsunami.
Event Characteristic[*]	The physical features produced by an event. These are defined for each event in the Impacts Framework.
Event data	The measurements associated with an event, for example wind speed, flame intensity, flood height.
GIS	An electronic information system that manages geographic data.
Harm[*]	The initial impact on an object, categorised as destroyed, damaged or not harmed for inanimate objects, and fatality, major injury, minor injury and not harmed for people and fauna.
Impact[*]	Is the broadest term and includes both market-based (i.e. tangible) and non-market (i.e. intangible) effects. Individual impacts can be negative or positive.
Impacts	A Microsoft Excel spreadsheet [2] with supporting documentation [3]

Framework	that encapsulates the process used to determine the economic, social, and environmental impacts, loses and benefits resulting from a natural disaster or fire emergency.
Indirect impact[*]	Impacts that arise as a consequence of the impacts of the event. For example, disruption to the flow of goods and services in and out of the affected area.
Layer	A single geographic dataset. A user interface will display multiple layers on top of each other.
Mitigation and Recovery data	The history of funds spent and actions performed in a region for disaster prevention or recovery.
Pilot Impacts Portal	A web accessible interface to the Impacts Framework and accompanying data items.
User story	A brief informal description of what a user wants to achieve.

Table 4: Glossary of Terms

Note a '[*]' indicates the term is defined in the Impacts Framework [3].

APPENDIX B: THE IMPACTS FRAMEWORK

The Impacts Framework, depicted in Figure 3, encapsulates the process used to determine the economic, social, and environmental impacts, loses and benefits resulting from a natural disaster or fire emergency. The framework is used as a guide to determine and measure the impacts resulting from an event.
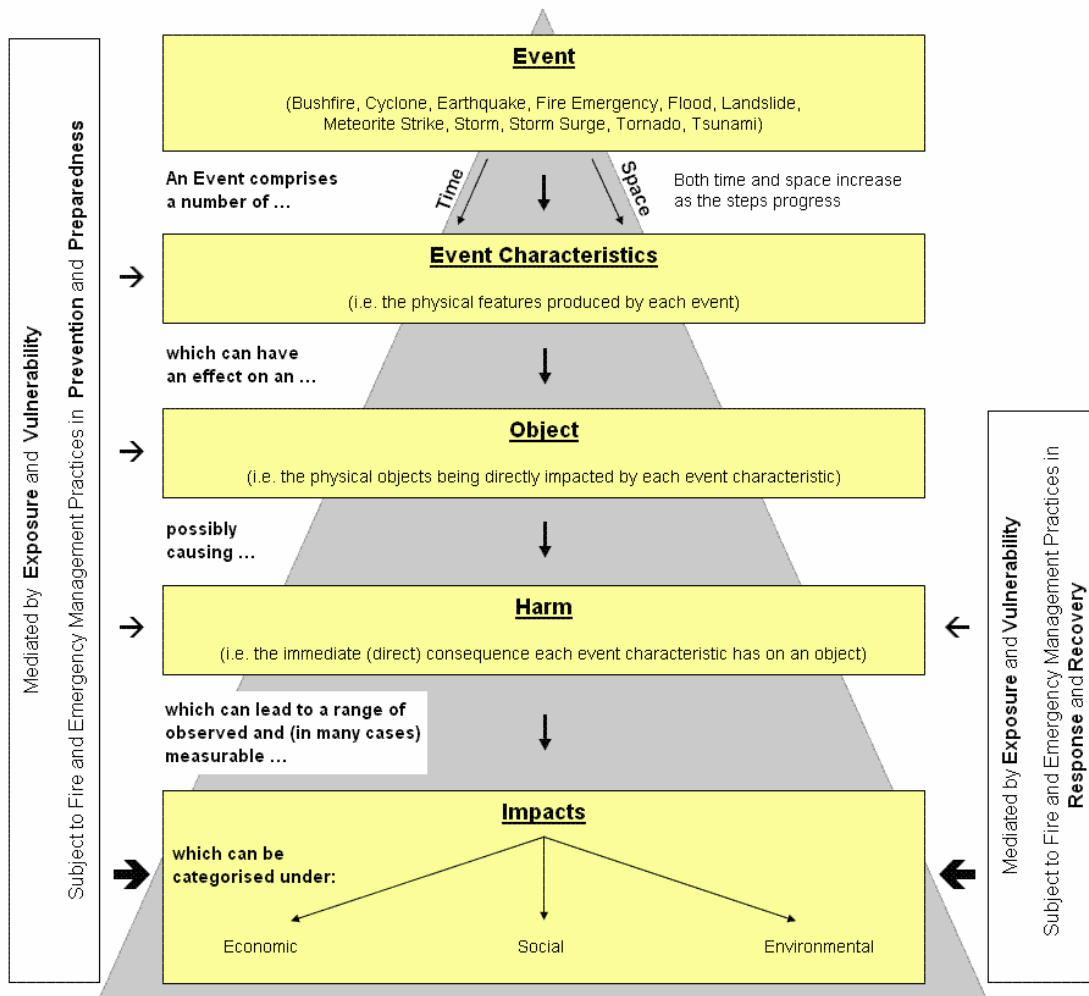

Figure 3: Impacts Framework Diagram, from [3]

The Impacts Framework is a fundamental data item to be included in the Pilot Impacts Portal. The Framework will be one of the mechanisms for portal users to navigate the repository of available data items. The data items in the repository will be linked to the Impacts Framework. In this regard, the Impacts Framework can be considered metadata describing the data items or a thesaurus categorising the data items which are included in the repository.

The Impacts Framework is currently a Microsoft Excel spreadsheet [2] with supporting documentation [3]. One of the aims of the Pilot Impacts Portal is to promote the Impacts Framework to the emergency management community. For this reason, the

Pilot Impacts Portal needs to provide an advanced user interface to the content of the Impacts Framework Excel spreadsheet contents. As such, the current Microsoft Excel spreadsheet will be loaded into a database for access by the Pilot Impacts Portal.

Impacts Framework Diagram

Figure 3 depicts the Impacts Framework. This can be interpreted from top to bottom using the text below each yellow box to explain the process of identifying an impact. Doing so reveals the following: an *event* comprises a number of *event characteristics* which have an effect on an *object* possibly causing *harm* which can lead to a range of observed and (in many cases) measurable *impacts*, which can be categorised as being *economic*, *social* or *environmental*.

Impacts Framework Data Model

The information contained in Figure 3, the supporting documentation and the Microsoft Excel spreadsheet have been used to infer the data model shown in Figure 4.
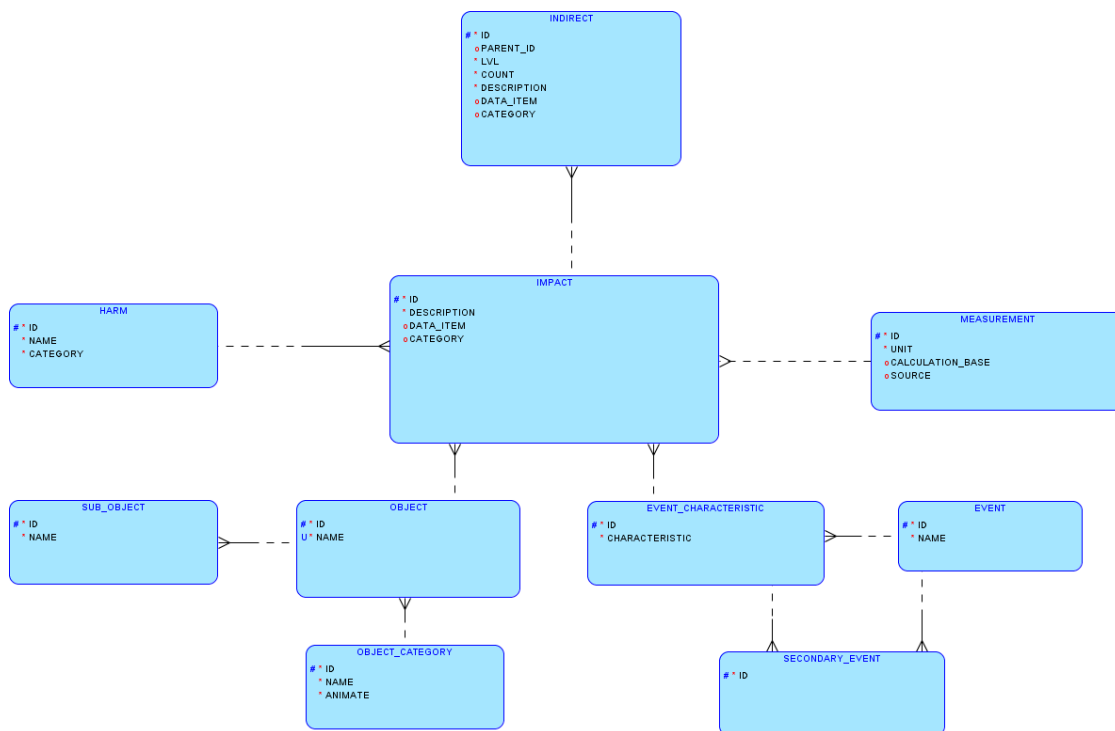
Figure 4: Example Impacts Framework Data Model

The Impacts Framework diagram of Figure 3 follows a top down approach to describe how to arrive at an impact starting from an event, the particular characteristic, interacting with an object, causing harm resulting in an impact.

The spreadsheet has a lot of detail and presents it as large table (worksheet) for each event. Each worksheet includes the result of the event characteristics interacting with a predefined list (or category) of 16 data objects, where the interaction is classified in

terms of the harm that is caused (destroyed, damaged, no harm for inanimate objects and fatal, major injury, minor injury, no harm for animate objects). The harm that is caused is the impact. There can be multiple impacts that result and for each there are flow-on impacts called indirect impacts (up to a maximum of five).

The data model presented in Figure 4 is a normalisation of the single worksheet. The central feature of the model is the *impact*. As similarly described above, an impact occurs when three things happen: an *event* (more specifically, the *event characteristic*) meets an *object* causing *harm*. An object belongs to one of the 16 predefined *object categories* (commercial property, memorabilia, vehicles and so on) and objects are often further divided into *sub-objects* (for example facilities includes BBQs, shower blocks, shelters, tables/seats, toilets). *Measurement* refers to how the impacts are measured (see Appendix 2 of the Impacts Framework report [3]) and *indirect* impacts are associated with their causing impact.

The data model of Figure 4 shows the features of interest as named boxes which have descriptive fields to describe the feature instances. The lines between boxes show the 'many-to-one' relationships with the 'crows feet' indicating the feature with many instances. For example, there are many objects belonging to a single object category and many sub-objects belonging to an object. The data model has been implemented as a database schema in Oracle, Figure 5.
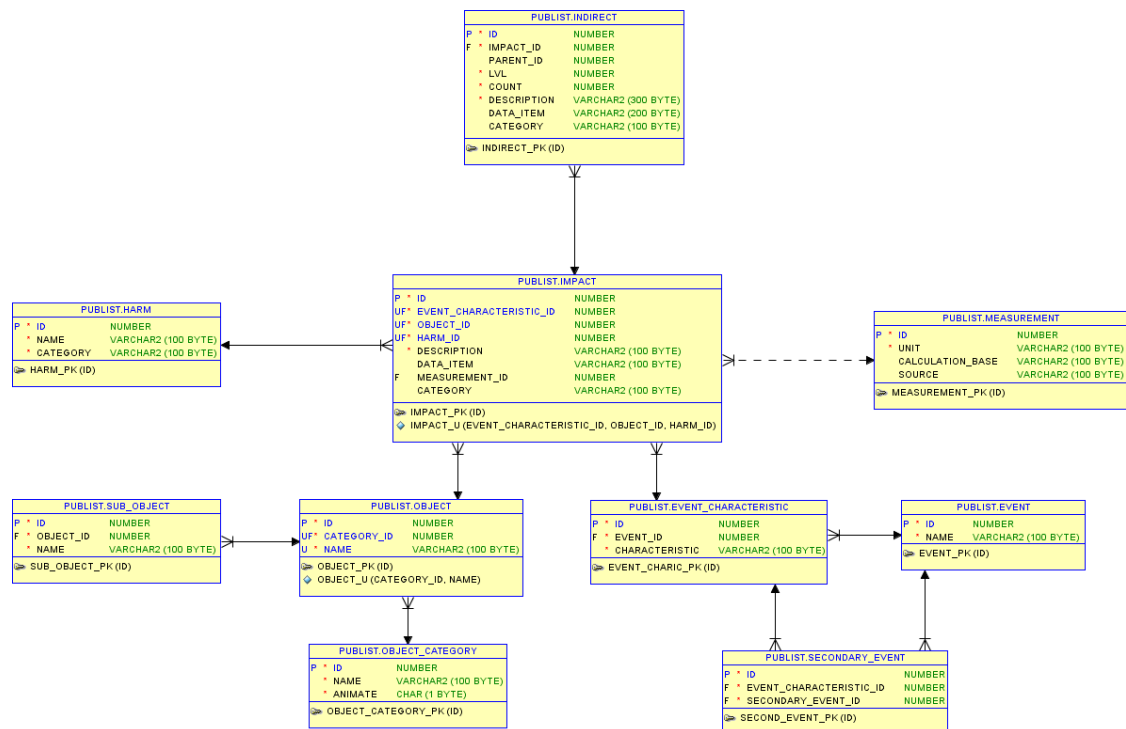

Figure 5: Example Impacts Framework Database Schema

The schema above shows the tables (as boxes, table name in the first section), columns (middle section of the boxes) and constraints in the lower section. The constraints are primary keys (column names with a 'P' prefix), unique columns (column

names with a 'U' prefix), and foreign key relationships (column name with an 'F' prefix). The lines between boxes (tables) show the foreign key relationships. The solid lines are mandatory (an object must belong to an object category) while the dashed lines are optional (an event characteristic may have a secondary event).

The schema includes database specific details, notably the use of ID values as primary keys.

APPENDIX C: SERVICE LEVEL AGREEMENT

The Pilot Impacts Portal will be available for use by the identified emergency services user community for a period of 12 months, July 2012 – June 2013. The Impacts Project – portal component contract [9] defines the service level agreement (SLA) for the portal during this period. This is shown in below.

Service Level Attribute	Expectation	Key Service Level
Help Desk	First point of contact for portal issues post go live and during the 12 month pilot period.	CSIRO will provide contact details on the portal site for Users to contact to make support requests.
Availability	Suitable hours for portal availability prime functions.	24hr 7day per week basis at least 99% of the time.
CSIRO Initiated Service Disruption Notifications	Advanced warning of anticipated/planned service disruption.	Notification given between 5 minutes and 72hrs ahead of CSIRO planned disruptions.
FRNSW Initiated Non-functioning Service Notifications	Notification from FRNSW to CSIRO that the portal service is non-functional, outside of anticipated/planned service disruptions.	CSIRO respond to the notification within the timeframes identified in "Responsiveness" below. CSIRO initiate their "Service Disruption Investigation Process" and advise FRNSW of progress and or outcome.
Responsiveness	Prompt attention by CSIRO to unavailability of service.	CSIRO acknowledge notification within normal business hours 9am-4:51pm on work days (generally Monday-Friday, excluding public holidays in ACT or NSW).
Service Disruption Investigation Process	The process template that CSIRO will use to resolve unanticipated service disruptions notified by	The service disruption investigation process occurs during normal business hours 9am-4:51pm on work days (generally Monday-Friday,

	FRNSW.	excluding public holidays in ACT or NSW). CSIRO undertakes activities aiming to identify root cause of disruption. CSIRO advises FRNSW by e-mail of disruption root cause within working 3 days.
Service Disruption Rectification Process	The process template that CSIRO will use to rectify service disruptions.	The service disruption rectification process occurs during normal business hours 9am-4:51pm on work days (generally Monday-Friday, excluding public holidays in ACT or NSW). CSIRO undertakes activities aiming to rectify disruption if it is within our control to do so, up to the limit of post implementation maintenance support of 0.1 FTE (this is discussed in maintenance below). CSIRO advises FRNSW of activities undertaken and informs FRNSW of remaining post implementation maintenance support.

Table 5: Pilot Impacts Portal Service Level Agreement, from [9].

The 'availability' service level attribute is an aspirational goal. Meeting this target may be beyond the control of CSIRO due to unforeseen circumstances. For example, if the CSIRO Internet connection is lost or the hosting data centre is offline.

APPENDIX D: SOFTWARE DEVELOPMENT METHODOLOGY

The Pilot Impacts Portal application will be developed using the following aspects of software development methodologies:

- Component based approach.
  The benefits of decomposing a software system into components include:

  - Internal component details are ignored, only the details of interactions between components are relevant.

  - Components can be reused.

  - Individual components are easier to understand.

  - A component may be replaced without affecting the rest of the system.

  A component is defined by its interface. The interface should be defined rigorously with the internals deferred as an implementation issue. Components are a higher level of abstraction than objects since they do not share state and only interact via their interface through the exchange of messages.

- Loosely coupled.
  Coupling refers to the level of interaction and reliance between components. A loosely, or low, coupled system is characterised by a stable interface with a clean separation of concerns (well defined component functionality with little overlap).

- Minimise component interactions.
  Minimising component interactions makes it easier to define the interfaces and to achieve loose coupling.

- Adopt, adapt, build.
  Where possible, adopt existing solutions, adapt to suit needs, and build only when necessary.

- Iterative development.
  Proceed in well defined iterations allowing adaptable development as a shared understanding of the system evolves.

- End user engagement.
  The users are members of the wider emergency management community who have high domain knowledge of PPRR activities but low knowledge of the Impacts Framework. The Pilot Impacts Portal will be developed in close consultation with key FRNSW staff to ensure the developed system meets expectations.

- Technologies.
  The technologies used to implement the Pilot Impacts Portal will be confirmed

with FRNSW during the technical design phase of the project. Preference is given to the use of open source software where possible and appropriate. Commercial-off-the-shelf (COTS) solutions may be used being mindful of the preference for a loosely coupled component architecture.

APPENDIX E: WORKSHOP SUMMARY

Introduction

An Impacts Project workshop was held in Canberra at Rydges Eagle Hawk on Thursday the 13th of October consisting of 33 participants from stakeholder agencies. The purpose of the workshop was to discuss:

- the online portal to communicate the previously developed Impacts Framework;

- the identification of existing data (relating to demographics and historic natural disasters) to populate the portal.

The following is an overview of the workshop, the highlights recorded by the organisers (CSIRO and FRNSW), the actions arising and a list of the participants who attended.

Overview

The day was divided into four sessions.

The first session presented background information about the project, the Impacts Framework, the Pilot Impacts Portal and concluded with demonstrations of the work done so far.

The second session focused on discussing the user stories which were distributed to the participants prior to the workshop. A user story describes a task performed by a user to achieve a goal. The description for the Impacts Project is focused on the perspective of the portal user interacting with the proposed Pilot Impacts Portal system. There were three user stories discussed: a pre-event investigation, during an event, and post event analysis.

The third session considered the data items required to be available in the portal to support the previously discussed user stories. The aim was to determine what data currently exists, which agency is the custodian, how it can be obtained, and who the relevant contact person for it is.

The fourth session considered how to assess the identified data items for suitability in the portal.

The workshop concluded with a general discussion about the Pilot Impacts Portal: what it should and should not be, what its purpose is, the risks, what data should be available, what user story scenarios should be supported, the users, and the potential sensitive nature of some of the data items.

Highlights

Gathering together a large group of project stakeholders with a varied perspective of how the Pilot Impacts Portal could be used was a good opportunity to obtain feedback on the current vision of the project. The following aspects were discussed by the participants during the workshop and noted by the organisers as being important contributions:

- Need to capture the Prevention, Preparedness, Response and Recovery (PPRR) history in terms of money spent in a region. This is a new data item category not previously considered.

- The granularity of information recorded is important. The current use of the ABS Statistical Local Area (SLA) may be too coarse and Census Collection District (CCD) is preferable where available.

- Creating a new boundary for a disaster zone is important for analysis. The current approach relies on predefined regions (SLAs or CCDs).

- There are many data considerations that were raised by the participants:

    o Security.
    The information is appropriate for the emergency management sector, but in the wrong hands could be potentially dangerous.

    o Timeliness.
    18 month old Google Maps are not good enough for emergency response.

    o Relevance.
    Define the user stories, then find the data that supports them.

    o Metadata.
    The data items need to be documented in terms of the above and describe where the data comes from and includes links to the custodian and the original source.

- The portal should contain a repository of relevant reports that can be searched.

- The portal should contain a registry of URL links of related systems and data available elsewhere.

- Real time data is needed for decision making during an event. Given the project time frame this would not be possible. The Portal will not be used as a tactical tool

- There were some participants who thought the portal would not be used during an event. However, others considered there will be a lot of useful data in the portal which would be relevant during an event. One idea was to generate a report from a template after the user supplies event information to "focus" the portal's report generator.

Actions

The Pilot Impacts Portal will not be "all things to all users". There was agreement by the participants that the Impacts Project should focus on one hazard to showcase the portal utility. This is necessary due to the project time and resource constraints. The target event should be a national one and not be restricted to a single state. This will demonstrate the value add of the portal over existing state based systems. However, there needs to be sufficient data available relevant to the target hazard for use in the portal.

The current user stories need to be clarified through discussion with example users familiar with the target event. These users will be identified from the workshop attendees. The discussions will clarify the specific data items needed for use in the Pilot Impacts Portal for the target event.

There were comments by some of the workshop participants that the function of the portal has overlaps with existing systems. The capabilities of the Pilot Impacts Portal that differentiates it from these existing systems needs to be clearly identified and articulated. This is currently defined as:

- Online.
  The Pilot Impacts Portal will be a secure web accessible system available 24/7 for authorised users.

- National.
  The content will cover the whole of Australia Impacts Framework based.

- Impacts Framework based.
  The content will be based on and linked to the Impacts Framework.