Natural Resource Information Management at State Government Level

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INTRODUCTION

Spatial information management (SIM), which includes utilization of geographical information systems (GIS), is used in a wide variety of information resource applications.

GIS applications have been able to make use of the extraordinary expansion in available data from remote sensing operations such as satellite imagery. SIM has been able to build upon these systems using software support for spatial databases and interactive mapping applications. Private sector applications tend to be specific to sectors of interest, whereas public sector systems have wide application across sectors.

The information management that is applied has a technical dimension facilitated by GIS. It also has analytical and strategic dimensions that require detailed investigation and planning for the corporate context in which the SIM is undertaken.

This contribution provides a brief overview of some of the contextual influences on SIM, and then details a case study of a particular application to natural resource information management in a government department.

NATURAL RESOURCES APPLICATIONS: BACKGROUND

Standards and Coordination

Governments have been concerned to coordinate information within national frameworks that can be applied at local levels. For example, in Australia and New Zealand, there is the Australia New Zealand Land Information Council (ANZLIC) that manages a national strategy for land and geographic information. In Australia's case this is directed towards an Australian Spatial Data Infrastructure (ASDI) operating at federal and state level (ANZLIC, 2004).

ASDI aspires to foster a distributed data network incorporating validated core data sets with associated products and services to support economic, ecological, and social development. Its agenda is also to ensure archiving of data for future use, avoid duplication of datasets, and provide best practice quality assurance.

Included among the guidance provided by ANZLIC is an information management toolkit (National Land and Water Resources Audit & ANZLIC, 2003). This toolkit, among other things outlines data management principles; compliance; approaches to interpretation and visualization of data; data discovery and access; guidelines for software selection; map production; global positioning systems (GPS) practice and guidelines; and project management.

The national frameworks in turn may be responsive to international efforts in the same direction. For example, the large number of datasets of different types that are employed in SIM has led to attempts to standardize and coordinate the description of data within these datasets. This so-called metadata is now standardized as an international standard ISO 19115 (International Standards Organization, 2003).

The standard defines hundreds of data elements all within a broadly based thematic classification involving 19 categories. Eight of these: atmosphere, biodiversity, environment, farming, geoscience, inland waters, oceans, and planning (for future use of land) are of particular concern in the natural resources area. However, other categories such as boundaries and location (positional information) are also of interest.

Infrastructure

Although ASDI provides a national framework in Australia, there are normally State-based mechanisms for ensur-

ing development and delivery. At this level in Australia, examples include:

- Queensland Spatial Information Infrastructure Strategy (QSIIS). A key delivery initiative is Information Queensland (IQ)
- Western Australian Land Information System (WALIS). A key delivery initiative is the Shared Land Information Platform (SLIP)
- New South Wales Natural Resources Information Management Strategy (NRIMS). A key delivery initiative is the Community Access to Natural Resource Information (CANRI, 2004)
- Northern Territory Land Information Management Coordination Group (LIMCG). A key delivery initiative is the Northern Territory Land Information System (NTLIS).

Each of these initiatives requires cooperation and participation between three tiers of government, the private sector, and the community, each of which has roles and responsibilities in the development of the spatial information industry at the state level. These initiatives assist easy access to relevant and reliable integrated spatial information in each State and provide a supporting infrastructure which enables jurisdictions to improve productivity and efficiency, make lifestyle and community choices and manage each state's resources.

Research in spatial information system design and data infrastructure at a national level is being undertaken through mechanisms such as the Cooperative Research Center for Spatial Information. The research outcomes of this project will provide a foundation for identifying best practice and key performance indicators to aid in implementing a virtual Australia.

NATURAL RESOURCE INFORMATION INTEGRATION: CASE STUDY

A State Level Government Department

The Queensland Department of Natural Resources and Mines (NR&M) has lead-agency responsibility for the management of land, water, native vegetation, and mines in that State. Through planning and management responsibilities for these natural resources, it has a vision for "enhanced community benefit through sustainable natural resource management" (Queensland Department of Natural Resources & Mines, 2004). NR&M holds an array of data and information about these resources, gathered by various means over many years, with a replacement value estimated to be around A$5 billion. Ready availability and access to data and information is critical to delivering business outcomes and responding to emerging natural resource management issues.

Machinery-of-government changes over the last decade brought together several agencies into NR&M. With these came a legacy of disparate information systems with an equally disparate approach to the management of the data and information contained in them. It was apparent that issues such as salinity and water quality, water resource planning, vegetation management, greenhouse gas emissions, and erosion relied on an integrated response from more than just one business area—they required a "whole of landscape" approach to solving these topical issues. Another consideration was that much of the data had previously been captured for specific and somewhat isolated projects with differing requirements. This contributed to ad hoc information management (IM) processes throughout the organization resulting in such anomalies as pockets of data with differing scales, and attributes captured to various standards.

In 2000, senior management commissioned a business case to analyze the existing practices and provide a blueprint to create an environment where any required natural resource information could be easily integrated for rapid answers to issues arising. This Environment for Natural Resource Information Integration (ENRII) initiative stated that:

The main focus is the data and information management processes needed to support the delivery of the department's integrated resource management outputs. The aim is to ensure data are accessible, well structured, of suitable quality and consistency, available for use efficiently and in a timely manner, and protect the value of the department's corporate natural resource data holdings, for now and the future. (Queensland Department of Natural Resources and Mines, 2001, p. 9)

This case stimulated senior management to embark on a journey of cultural change from the former "silo mentality" of managing individual business-specific data stores, to a corporate approach with much broader benefit.

ENRII Concept

The ENRII concept is to bring about a change in the organization to improve the management of data and information needed for natural resource management activities through:

- A framework of standards, specifications, and operational level guidelines