position

The Australasian magazine of surveying, mapping & geo-information

TAKE CONTROL

with industry-grade RPAS
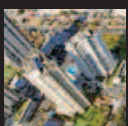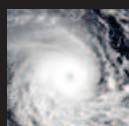
inside ➤

Federating all data, for all to use

FEDERATION UNIVERSITY'S CENTRE FOR ERESEARCH AND DIGITAL IN NOVATION FREE UP SPATIAL DATA ACROSS REGIONAL VICTORIA.

The Corangamite Soil Health Knowledge Base was recognised at the 2016 APSEA awards for its expertise in solving complex environment and sustainability issues. This article highlights how this winning project is just one of many impressive initiatives taking places across rural Victoria.

Developed in cooperation between Federation University's Centre for eResearch and Digital Innovation (CeRDI), and the Corangamite Catchment Management Authority, the *Corangamite Soil Health Knowledge Base* offers essential background information and knowledge required to implement the *South West Agricultural Soils Plan* across fifteen distinct landscape zones.

As a result, the team has established a comprehensive knowledge base of soil health information that is assisting the broader community to implement local catchment plans across the entire Corangamite region.

Through this project, a repository of soil health knowledge is readily available to the community in a way that makes it informative, relevant and useful to the needs of land managers. It includes reports, research papers, maps, soil profile descriptions, soil test data, digital soil maps, land capability maps, geohazard maps, hazard susceptibility maps, images and much more.

In commenting on the project, Mr Bret Ryan, Land Health Manager for Corangamite Catchment Management Authority, said that the *Soil Health Knowledge Base* "provides soil health information to farmers to encourage management practice change to create an enhanced sustainable agriculture sector in south-west Victoria".

The *Soil Health Knowledge Base* comprises two main components: an eLibrary of digital documents, webpages, images and multimedia that is easily searchable; and an interactive map portal to discover spatial soil data. The map portal is based on spatial data infrastructure (SDI) that has been developed and deployed to federate soils data from disparate database sources into a single web portal thereby making data more easily discoverable. Where possible, the portal offers real-time access to remote authoritative databases by integrating the interoperable web services they each provide. In cases where the data already exists in other web locations, linked data technologies are used to connect to that remote resource.
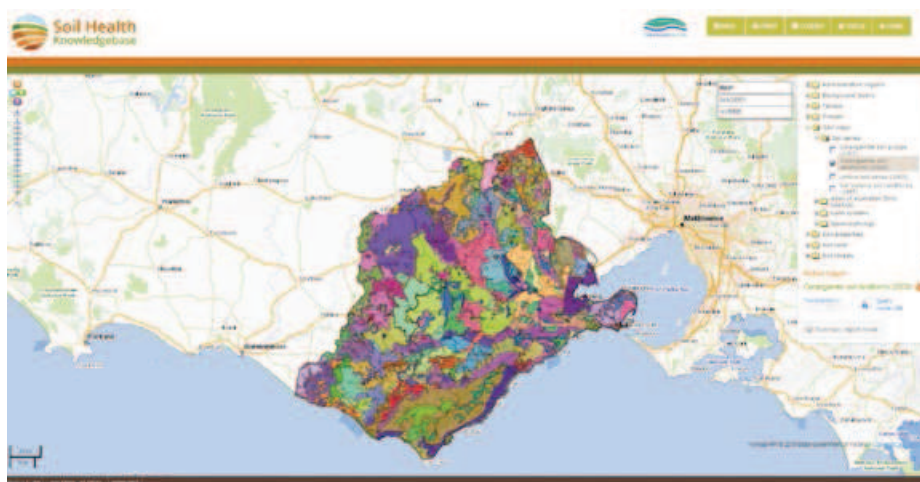
The SDI for the *Soil Health Knowledge Base* project builds upon software projects fostered and supported by the Open Source Geospatial Foundation (www. osgeo.org). Delivery is primarily via a web-browser, the portal interface having been built to bespoke requirements upon the foundations of the OpenLayers (openlayers.org) JavaScript library. Other JavaScript libraries like jQuery, jQueryUI and DHTMLX Tree have been leveraged to provide additional user-interface components and functionality.

Many of the datasets used have been sourced from legacy information held by government agencies, such as the former Victorian Soil Conservation Authority and Department of Agriculture. More modern data is available via web services, such as landscape-water data from Geoscience Australia and CSIRO's Soil and Landscape Grid of Australia. In addition, community contributed soil data is included in the form of more than a hundred farm soil test data locations which may eventually provide a time-series of soil health indicators. Academic research data is also included, including fine resolution digital soil maps from a recently completed PhD research project.

While some of this data is consumed via interoperable services, there are a number of datasets hosted and delivered by the *Soil Health Knowledge Base*. Spatial data engines Mapserver (www.mapserver. org) and Geoserver (geoserver.org) are used for the Geospatial processing and service delivery using Open Geospatial Consortium (www.opengeospatial.org) standards. Vector data is commonly stored within a MySQL or PostGIS database and raster data is dynamically processed from its native format.

CeRDI's expertise in spatial mapping and digital technologies has also led to project partnerships with local government. For example CeRDI has partnered with the Colac Otway Shire

CeRDI's *Corangamite Soil Health Knowledge Base* won the APSEA award after receiving a Victorian Spatial Excellence Award 2015 in the Environment and Sustainability category. CeRDI's partners on the project include the Corangamite Catchment Management Authority (CMA) and Corangamite CMA Land Health Program Steering Committee.

(COS) and Emergency Management Victoria to establish the *Colac Otway Shire Mapping Portal*.

Based on the same SDI as the *Soil Health Knowledge Base*, the *COS Mapping Portal* is easily accessible and intuitive-to-use, having been specifically designed to empower decision-making for a broad range of stakeholders including community groups, government departments and agencies. The portal is also a valuable resource for residents, businesses, regional authorities, emergency services researchers and other municipalities.

Since January 2016 the *COS Mapping Portal* has been extended to assist stakeholders in sharing comprehensive information and mobilisation for recovery priorities following the Wye River- Jameson's Creek Bushfire in December 2015. Extensive additional information resources including aerial photography, reports and datasets are available to involved groups via secure password-protected logins.

Extensive engagement with regional stakeholders has been a key success factor for this project, with improved decision making achieved through the redevelopment of the *Colac Otway Shire Municipal Emergency Management Plan* (MEMP). The MEMP document was developed using Single Source Publishing technology supporting publication in multiple formats including web-based, eBook and via syndication. Notably, the web published MEMP is linked to live data via the COS Mapping Portal. This is a significant achievement revolutionising the traditional publishing process and offering digital support solutions to the community.
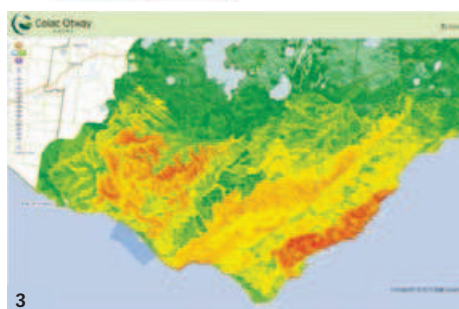
The *Corangamite CMA Soil Knowledge Base* and *COS Mapping Portal* highlight the innovation and data interoperability capabilities of CeRDI. Located at the Mt Helen campus of Federation University Australia, CeRDI has an extensive history of embracing opportunities with our project partners that leverage the benefits and opportunities of digital technologies.
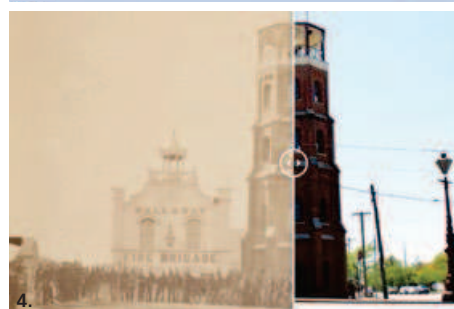
CeRDI's experience in interoperable spatial information systems is also evident through its work on the *Barwon South West Interoperable Spatial Knowledge Base*, in collaboration with Barwon South West Regional Strategic Fire Management Planning Committee and Emergency Management Victoria. This knowledge base supports regional communities in developing integrated local and regional fire management plans.

With the Victorian Institute of Strategic Economic Studies at Victoria University, CeRDI have collaborated on a CRC for Bushfires and Natural Hazards project to build an economic geography from spatial data linked to a range of economic, social and environmental values creating maps of values at risk. While the initial focus was Victoria it is expected that this will expand nationally as the project evolves.

Visualising Ballarat and the *Ballarat Historic Urban Landscapes*, also an APSEA finalist, provides insights into Ballarat's past, present and future through innovative spatial mapping and knowledge management tools. By engaging the community and enabling users to access authoritative and credible information this portal are empowering community members and local organisations to contribute to the management of Ballarat's unique historic urban landscape. CeRDI collaborated with the City of Ballarat on this project.

CeRDI's commitment to measuring research impact is demonstrated through longitudinal research focused on understanding how eResearch and digital innovation achieve practice change, build capacity and empower communities and industries.

For further information about the Federation University Australia's Centre for eResearch and Digital Innovation visit: www.cerdi.edu.au ∎