FLOOD INFORMATION SYSTEM ENHANCING EMERGENCY MANAGEMENT IN SOUTH AUSTRALIA

A Blasch
South Australian State Emergency Service, Adelaide, SA

Introduction

In South Australia there are hundreds of water level and rain gauges located across the state. The networks of gauges are owned, operated and maintained by a number of different authorities with the owners storing their data in separate databases. Most authorities have the data available to the public on their own websites, however the time from data being recorded to being available to view was in some cases hours. The data was not easily customizable and was dictated by website it was being viewed on.

It was extremely difficult to collectively view and analyse real time rainfall and water level data from multiple networks in order to develop a common operating picture of any unfolding flood events. There was not an efficient manner in which to view rainfall data older than 24 hours. Water level data was mainly available on a 4-day hydrograph, and real-time information was a luxury that could only be dreamed of.

In 2013 the above was identified as a risk by the South Australian Flood Reform Taskforce who directed the state flood hazard leader, the Department for Environment and Water (DEW), and flood control agency, the SA State Emergency Service (SASES), to begin working on improving the state’s flood hazard management. A key outcome of the Taskforce was to recommend the implementation of a state-wide flood information system.

A procurement process began in 2015 and in 2016 FloodMon, developed by and copyrighted to Reliant Systems, was selected as the preferred flood information system for South Australia.

System capabilities and impacts on flood response

FloodMon ingests and displays data in near real-time from 248 rain gauges and 239 water level gauges from all over South Australia. Over the course of 12 months SASES and DEW worked to identify the gauge networks and establish data sharing agreements. Reliant Systems, working with SASES and DEW developed bespoke data capture programs for each of the databases that held the gauge data and to customize the system to South Australia’s needs. The system was trialed internally to SASES and DEW for 6 months before going operational and made available to all SASES staff and volunteers.
Being able to use data from a variety of sources has allowed FloodMon to make use of gauges that were not intended for flood monitoring, but rather water quality and water monitoring purposes.

The system is web based and cloud hosted with the authentication of users performed using their current credentials for the SASES Volunteer Portal. To make the system highly available, scalable and without the barrier of “another password” was important to ensure that there would be a high level of take up by SASES volunteers and staff.

Users are assigned a to specific role. Roles in the system are assigned permissions to specific pages. Users are only able to access the information that they need with the intention of keeping clutter and distractions to a minimum.

The system is designed to be easily used by users with varying levels of computer literacy and subject specific knowledge. For varying needs, from first responders to specialised Flood Behaviour Analysts working in an Incident Management Team or State Control Centre the menu options available to each user are set on their predetermined needs.

Near real-time rainfall and water level data can be displayed either on a map or a graph. This allows users with little to no specific system training to monitor conditions that are relevant to them. A first responder who is operating outside of their usual response area can quickly become familiar with the information available and view the relevant data.

Rainfall forecast data from Australian Digital Forecast Database is displayed spatially as a map overlay in a gridded format and can also be displayed as point data. Users can combine the recorded rainfall data on the same graph as the selected rainfall forecast. This allows users to be able to better anticipate when conditions may change allowing for resources to be released or deployed to other areas of potential impact.

The ability to set and monitor predetermined flood levels has allowed the SASES to preempt response actions such as road closures.

The system allows for many areas of concern to be monitored on a single computer. A Flood Behavior Analyst is able to perform high quality data analysis that leads to Incident Controllers being able to allocate and manage limited resources more efficiently.

The system uses maps to primarily display information. This means that information relevant to the flood event can easily be incorporated in the Common Operating Picture.

Automated alerts have been set around the greater Adelaide area where the density of gauges is highest. The alerts are set on predetermined rainfall and or water levels. When an alert is triggered, the relevant SASES Duty Officer is directed to the system to ensure that the information can be validated. After the validation the Duty Officer then enacts a procedure that sets Volunteer members into action. Alerts are an integral feature of FloodMon for the SASES, both for system health and monitoring of conditions that could lead to Volunteers being tasked to flood response.

As the volunteer members of the SASES are being engaged with in relation to the system, they are being educated on flood hazards in their local response areas. Volunteer members are being exposed to and educated on flood terminology and being empowered to ask questions with confidence.

As a result of the implementation of FloodMon, the SES has focused attention and resources on flood education and response planning. There is cultural change afoot that is seeing the hazard of flood, particularly flash flood being addressed with more consultation and consideration.