

# **Implementing a post-fire community based water quality monitoring program in the Grampians region**

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**ABSTRACT:** There has been an increasing focus in the media and scientific community on issues related to bushfire frequency due to drought conditions and global warming, yet there is little research in how this will affect water quality and freshwater aquatic systems. This paper examines a water quality monitoring project that has been undertaken in the Grampians Region after the fires of January / February 2006. It looks at the processes involved, some of the challenges that have taken place, the opportunities that arose, and considers some of the successes and some of the failures.

The project was undertaken by the Wimmera Catchment Management Authority's Waterwatch Program in partnership with Parks Victoria. There has been a mutual benefit from this arrangement and it has assisted in developing a closer working relationship between these organisations. The data collected from this project has been used to educate the community through various newsletters, media releases and public displays. It has also greatly contributed to regional water quality data for both Parks Victoria and the Wimmera CMA. The community engagement aspect of this project has been a focus involving individuals and community groups in the collection of data including turbidity, temperature, hardness, reactive phosphorus, pH, electrical conductivity, depth, sediment movement, photo point monitoring and macro-invertebrate sampling.

This paper looks at all the steps involved in this process including gaining inter-agency support, site selection, monitoring program design, volunteer recruitment, occupational health and safety, training, data interpretation and distribution, attracting media attention, volunteer recognition, and project evaluation. There is much to be learned from this reflection of the project's successes, failures and challenges that would be of great benefit to anyone interested in undertaking such a project.

## **INTRODUCTION**

During January and February 2006, bushfires burnt throughout the Grampians Region threatening a large number of communities and townships including Stawell, Dunkeld, Halls Gap, Willaura, Pomonal, Moyston, Great Western and Wartook. These fires burnt over 140,000ha of private and public land, causing massive losses including 2 lives, 77 houses, 35 woolsheds, 272 sheds, 2,294 km of fencing, 65,000 head of sheep and cattle and a huge amount of National Park infrastructure.

The full environmental impact caused from an event of this magnitude is unknown and it has been important to study a range of aspects to assist in this understanding.

This project focused on the water quality implications from the fires and used the community to collect this data. It looks at the steps undertaken from inception to implementation and considers some of the improvements that could be made given the benefit of hindsight and increased resources.

## **PROJECT OBJECTIVES**

The objectives of this project were to;

1. Improve understanding of waterway recovery processes from the effects of wildfire within the upper reaches of the Mt William Creek Catchment
2. To involve the local community in water quality monitoring
3. Develop relationships between agencies and community groups

Although this project had three clear objectives there were also more specific outcomes that were hoping to be achieved as a result of this project such as;

- Increasing the number of volunteers collecting water quality data in the upper catchment
- Increasing the number of data sets from streams within the upper catchment
- Increase the interest in waterway health throughout the community
- Provide a means for local communities to get involved in post-fire recovery work
- Provide a networking opportunity for local people to meet others who share their traumatic fire experiences
- Increase the presence of the Waterwatch Program in the upper catchment
- Assist the CMA in developing interagency relationships with Parks Victoria, DSE and Grampians Wimmera-Mallee Water

## **PLANNING**

Discussions were undertaken with GWM Water, Ballarat University, Parks Victoria, DSE, EPA and other programs within the CMA. Most of the interest in this project came from Parks Victoria and other agencies were either not that interested or were focused on their own projects and objectives. After Parks Victoria showing an initial interest in the project this interest slowly wore off due to the enormity of the demands that were placed upon them after the fires.

A list of proposed monitoring sites was developed based on existing pre-fire data, area burnt and vehicle or foot access.

Discussions were undertaken with Canberra Waterwatch who were involved in a community based water quality monitoring project after the 2002 bushfires. Their project was called 'CAMPFIRE' and many aspects of this project (including the name) was used to assist in setting up the GRAMPFIRE project.

The phys/chem parameters that were decided to be tested included pH, Phosphorus, Electrical Conductivity, Hardness, temperature and turbidity. This decision was mainly based on equipment available, and budget constraints. A concern was the difficulty to measure sediment movement, so to keep things simple we chose to use photo point monitoring at sites within the National Park and use a star picket with 10cm markings in streams outside the park. In combination with this volunteers were asked if they could monitor after big rain events to try and pick up some of the moving sediment in their turbidity tests.

## **RECRUITING VOLUNTEERS**

Because there were so many losses due to the fires it was important to be particularly sensitive and not be too aggressive in recruiting for this project. The following tasks were undertaken in order to get some interest in the project.

- Development of an information flier and posters
- Attendance at public meetings relating to fires
- Display of poster at community notice boards in fire effected areas
- Media Release for newspapers and radio
- Article in community newsletters
- Fliers distributed to the recovery Task force and Parks Victoria, and local shops

The posters and fliers invited interested people to get in touch or simply turn up to an information and training evening. We had 20 people turn up and about 5 others who were interested, but could not attend.

## **TRAINING**

The information and training session contained the following information;

- A general overview of the fires (given by Parks Victoria Staff)
- An overview of the Waterwatch Program and water quality monitoring undertaken by Wimmera CMA
- An overview of the parameters to monitor and how they might be effected by fire
- Training of equipment
- Occupation Health and Safety Issues
- Quality control and data confidence issues
- Matching up of volunteers to work together and assigning sites to be monitored.

A time was set up with each team, where we visited their monitoring sites, took a GPS reading and undertook a sample collection and testing

## **ONGOING SUPPORT**

An important aspect of this project has been to provide ongoing support to volunteers. This has been in the form of regular on-site visits, regular maintenance of equipment, annual data reports, inclusion in the existing waterwatch network including newsletters, field trips, QA/QC events and inclusion in 6 monthly macro-invertebrate sampling.

## **DATA INTERPRETATION**

Annual data interpretation has been provided and mailed to all volunteers involved in the project and parts of this have been included in the quarterly Wimmera Waterwatch newsletter.

Displaying the information collected at local events has also been a good demonstration that their data is being used and an excellent means in getting other members of the community interested in waterway health and the impacts of wildfire. The data has been displayed at events all

throughout the Wimmera Catchment and focused on events in the local area. Some of these events include a month long post-fire science exhibition, Halls Gap Wildflower and Arts Show 2006 and 2007 and the Stawell Environment Festival.

## **LESSONS LEARNED**

There were many lessons learned from this experience that I would do differently if I was in the same situation again. I have listed some of these below.

### **Partnerships with agencies**

Developing partnerships with other agencies was not very successful in this instance and on looking back a lot of work needed to be put into it to make this happen. At the beginning I had plans of sharing information and compiling data into a report that could be shared among interested agencies. Groups seemed to be more focused on their individual data requirements and I struggled to find the resources and patience to bring it all together. The GRAMPFIRE project and its reports turned out to be only focused on the data that was collected by the volunteers through the waterwatch program.

Looking back I think that there would be value in undertaking such a project where all post-fire water quality data was brought together, but it would be important that enough resources were allocated for such an endeavor.

### **Start Early**

In the weeks following the fires lead agencies in the recovery processes such as DSE, Parks Victoria and the Northern Grampians Shire were extremely busy and resources were stretched across various demands. I was mindful of this and tried not to increase these demands with getting the GRAMPFIRE project underway immediately. Instead I worked on recruitment of volunteers, preparation for training and organizing equipment, so that when things settled down a bit I was ready to go. I didn't select sites at the beginning because I was unsure what the community response was going to be and what the timelines for road and walking track openings were. In retrospect I would have tried harder to gain access to sites by getting permission from Parks and started monitoring myself until I could get some volunteers on board to take over these sites. As a result we now have a number of monthly monitored sites with the first four or five months of data missing. These datasets are still very useful, but would be more complete with the first months included.

### **Photo Point Monitoring**

An improvement to this project would be to have better quality photo point monitoring. Some sites are very good where volunteers have taken photos that can be easily compared over time. Other sites have photos that it is hard to tell that the photos are of the same site. Upon training the volunteers I obviously didn't spend enough time discussing how to take photos for comparison over time. From a community perspective the photo point monitoring has been one of the most interesting aspects of this projects, and if I did it again I would ensure that all the volunteers were properly training in taking quality photo point monitoring pictures.

### **Volunteers working in pairs**

It was decided that volunteers need to work in pairs due to occupational health and safety considerations. This turned out to be a big success, not only to minimise the risk of a serious injury, but for other reasons stated below;

- Relationships between individuals have been strengthened as a result of going out on a monthly basis to collect data. It has given them an opportunity to share the experience of observing the environment recover from the fires.
- Trained volunteers have recruited assistants to help them when one of the partners has not been available.
- Assisting with quality control by checking each other techniques and results.

### **Measuring Sediment Movement**

It doesn't seem like there was enough big rain events to move large amount of sediments which was one of the predicted impacts from the fires. To assist in measuring this movement volunteers were encouraged to get out after a big rain event and check turbidity. This was referred to as event monitoring. In retrospect I would have only encouraged event monitoring if this would not take place of regular monitoring. Many of the water quality impacts from the fires was hugely impacted from recent rain, such as a raise in pH. When interpreting results it was difficult to distinguish between what was the 'average' change in time, or what was a change due to a rain event.

### **Data Interpretation**

If resources permitted I would have liked to have provided shorter quarterly data interpretation reports and then a larger annual report including macro-invertebrate data. It would also have been of benefit to make this information available on the internet for others to access. I would also suggest included information relating to rainfall as this seems to have big implications for phys/chem data post-fire.

## **CONCLUSION**

This project has been an excellent means to collect water quality data and raise awareness of water quality issues within the community. All resources used for this project fit into existing projects and no additional funds were necessary to make this project happen. This project would have been improved if specific funds were allocated to it, allowing for the flexibility of more resources, such as staff time and monitoring equipment. The next step forward for this project is to increase the exposure of the data and continue to motivate the volunteers involved.