

# Monitoring Plan

## ***CAMPFIRE***

***Community Assessment Monitoring Program  
for Fire Affected River Ecology***

Prepared by  
Nigel Philpot  
Rachelle McConville  
Peter Liston

*April 2003*



# ***CAMPFIRE*** Monitoring Plan

## **Introduction**

### **What has happened?**

In early January, 2003 a “dry” thunderstorm occurred across the highlands of the ACT, NSW and Victoria, leading to many lightning strikes and forest fires in mountainous country. In the ACT there were initially 3 fires, with others just across the border in NSW.

Fire fighting forces were immediately organised to combat these fires whilst they were still relatively small. Regrettably, the rugged terrain, difficult access and very dry conditions meant that even after some eight days of continuous effort were not able to contain these fires.

Then, on Thursday 16<sup>th</sup> and Friday 17<sup>th</sup> of January 2003, the fires began to expand very significantly. On Saturday 18<sup>th</sup> January, the incredibly strong winds and high temperatures brought the fires right into the urban area of Canberra, with loss of life and loss of housing and other property.

Effectively, all the original fires combined into one huge fire, which blackened over 70% of the ACT and impacted huge areas across the Murrumbidgee catchment.

### **What are the expected water quality and ecological effects of these fires?**

Fire removes vegetation cover, exposes soil and consequently reduces evapotranspiration. Consequently, the catchment will respond much more quickly to rainfall and produce more runoff initially. Once vegetation begins to establish and is growing quickly, catchment response and runoff may be reduced below pre-fire levels. Where riparian zones have been burnt, there will be reduced buffering of runoff. Stream temperatures will be greater and more light will reach the water surface. While the understorey has been removed over large areas, many trees still have their leaves, although they may be scorched and dead. There will be a significantly increased input of leaves, other organic debris, ash and sediment into the stream.

The severity of fire effects may ultimately depend on post fire rainfall, amount and timing, combined with the catchment geology. Heavy rain on bare soils and an impermeable catchment will result in substantial sediment carbon and nutrient transport into the river. The sediment may accumulate in local storage areas, such as pools, dependent on discharges and stream power. Where the carbon is deposited in similar areas it will undergo bacterial breakdown, lowering dissolved oxygen concentrations in the water column and releasing nutrients. Algal and phytoplankton growth will potentially be enhanced with the increased light and nutrient supply. In urban catchments there may be toxicants such as heavy metals or hydrocarbons from household appliances or material that have been mobilised as a result of fire.

## **Community Monitoring Program**

As a response to these events Waterwatch in collaboration with the Cooperative Research Centre for Freshwater Ecology (CRCFE) is initiating a community Waterwatch monitoring program that aims to monitor the affects of bushfires on our waterways.

This program is to be known as (*CAMPFIRE*). Community Assessment Monitoring Program for Fire Impacted River Ecology.

Campfire is a network of existing and new community monitoring groups that will work in partnership to monitor the ecological affects of the bushfires on our waterways and catchments.



# ***CAMPFIRE* Monitoring Plan**

## **1. Why Are We Monitoring?**

**Aim:** “To monitor the ecological affects of bushfires on our waterways”:

**Objectives:**

- 1. To assess how urban and rural streams have been affected by fire in their catchments;**
- 2. To monitor how long will it take for streams to recover from such impacts:**
- 3. What are the implications for stream ecology:**
- 4. What are the implications for human uses:**
- 5. What are the implications for stream rehabilitation?**

## **2. Who Will Use Our Data?**

<b>Main User</b>	<b>CAMPFIRE participants including Waterwatch, Parkcare, Landcare, Bushcare and school institutions in the ACT.</b>
<b>Secondary Users</b>	<b>ACT Government Agencies and Natural Resource managers including Environment ACT, CUPP, ActewAGL.</b>
	<b>Regional Government Agencies (Eg. Murrumbidgee Catchment Management Authority</b>
	<b>Other ACT Waterwatch and Landcare Groups</b>
	<b>Other community groups and “general public”</b>

# ***CAMPFIRE* Monitoring Plan**

## **3. How Will The Data Be Used?**

- The data is to be used to assist and guide Catchment, Landcare, Parkcare, Friends and NRM groups to rehabilitate streams and catchments.
- Monitoring data will be used to raise awareness of catchments, their recovery following the fire and promote the protection and conservation of these significant waterways.
- Results will be used as part of Waterwatch education and awareness programs to help protect and conserve water and a natural and vital resource.
- Provide feedback to asset managers on human health issues such as algae.

## **4. What Will We Monitor?**

<b>Indicator / Parameter</b>	<b>2003 Dates of testing</b>	<b>Sampling</b>
pH, Electrical Conductivity, Turbidity, Orthophosphat, Dissolved Oxygen, Water/Air Temperature, Presence of rubbish & algae	Once a month, ideally the third Saturday morning of each month	Long term Effect & Event Sampling
Photographic Pictorial	Once a month, ideally the third Saturday morning of each month	Medium term Effect & Event Sampling
Macro-invertebrate snapshots	April & October	Long term Effect & Event Sampling
Riparian Vegetation Surveys	April, July, October, January	Long term Effect & Event Sampling
Frogwatch	March, October	Long term Effect & Event Sampling

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## 5. What Data Quality Do We Want?

Parameter	Accuracy: Tolerable Error Range (TER)	QA/QC testing	Sensitivity of equipment	Range of equipment
pH	Plus or minus 0.5 pH units (in the 5 - 9 range)	Participant mystery solution testing twice a year	0.1 pH units	0 - 14
Electrical Conductivity	Plus or minus 15% of the true value.	Participant mystery solution testing twice a year	10 ppm / uS/cm	0 - 1000 ppm & 0 - 1990 uS/cm
Dissolved Oxygen	Plus or minus 0.4 mg/L in the ranges 0-3 and 8-10 mg/L. Plus or minus 0.4 mg/L in the range of 5-7 mg/L.	Participant mystery solution testing twice a year	0.1 mg/L	0.0 - 12.5 mg/L
Turbidity	Plus or minus 15% of the true value.	Participant mystery solution testing twice a year	10 NTU	0 - >400 NTU
Ortho-phosphates	Plus or minus 10% of the true value	Participant mystery solution testing twice a year	0.01 mg/I P	0 - 1.0 mg/I P
Temperature	Plus or minus 2.0 degrees C	Participant mystery solution testing twice a year	0.5 degrees C	0 - 40 degrees C
Water level, flow and Rainfall	Qualitative	Qualitative	-	-
Weather	Qualitative	Qualitative	-	-
Macro-invertebrates	90% identification success rate to order level	Mystery Bug samples	-	-
Frogwatch		Audio recording	-	-

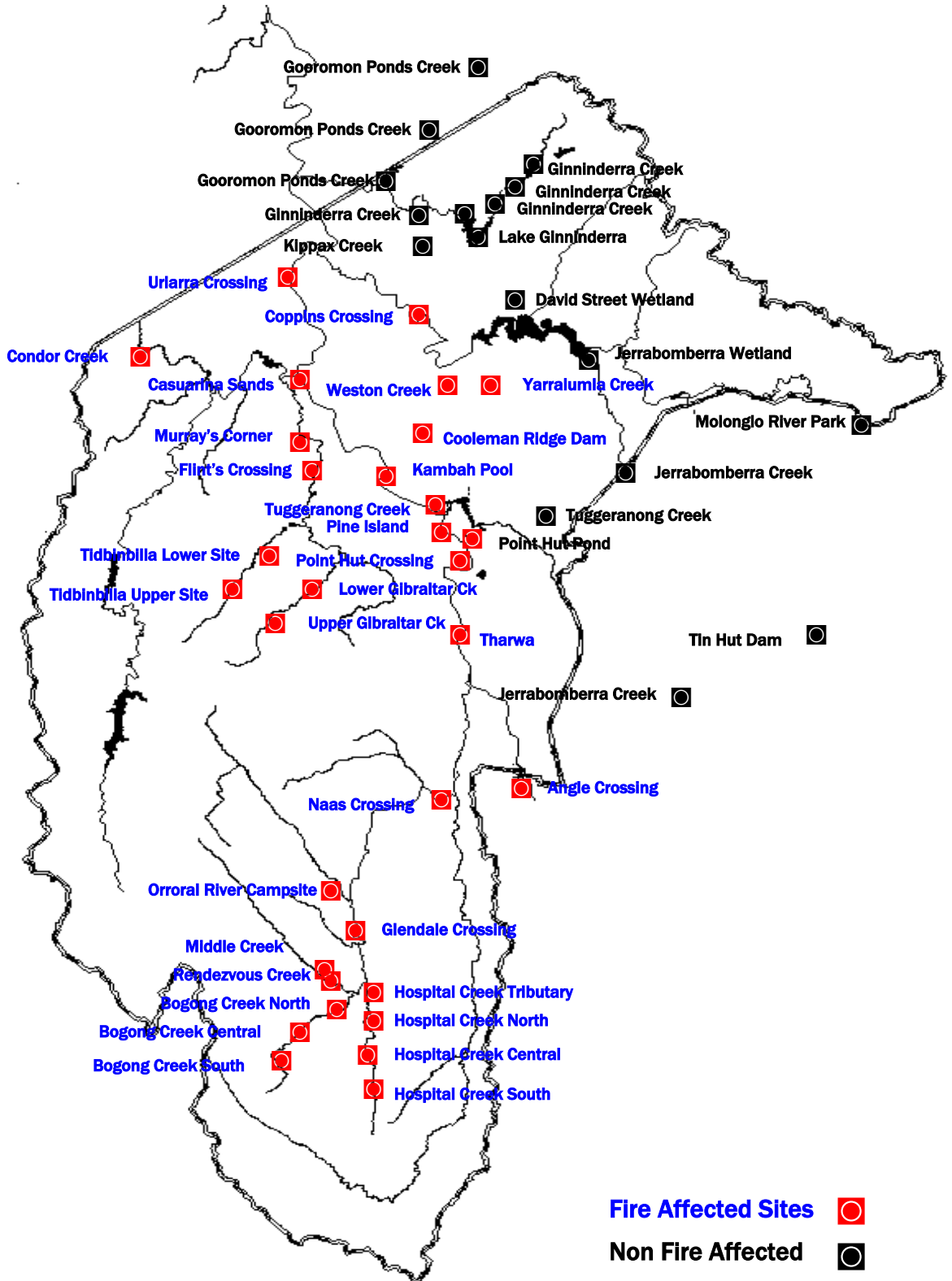
## 6. What Methods Will We Use?

Parameter	Sampling Method	Collecting Procedure
PH	pH meter	Sample main current
Electrical Conductivity	EC meter	Sample main current
Dissolved Oxygen	Titrate Method	Sample main current
Turbidity	Turbidity Tube	Sample main current
Ortho-phosphates	Orthophosphate	Sample main current
Presence and type of rubbish	Visual survey	Survey 10m of stream length & 1m onto side of each bank.
Presence and type of algae	Visual survey	Survey 10 m length along creek
Temperature	Thermometer	Sample main current
Water level	Visual survey	Sample main current
Water Flow	Visual survey	Sample main current
Weather	Observation	General observation
Rainfall	Hydsys Data Logging	Environment ACT / Ecwise Environmental
Macro-invertebrates	Signal 2 Manual	Sample specific habitat
Frogwatch	ID tape recording	-

# CAMPFIRE Monitoring Plan

## 7. Where Will We Monitor?

### Waterwatch Monitoring Sites 2003



# ***CAMPFIRE* Monitoring Plan**

## **8. When And How Often Will We Monitor?**

<b>Indicator / Parameter</b>	<b>2003 Dates of testing</b>
pH, Electrical conductivity, turbidity, Orthophosphate Dissolved Oxygen Water Temperature presence of rubbish & algae	Once a month, ideally the third Saturday morning of each month
Photographic Pictorial	Once a month, ideally the third Saturday morning of each month
Macro-invertebrate snapshots	April, July, October, January
Riparian Vegetation Surveys	April, July, October, January
Frogwatch	March, October

## **9. Who Will Be Involved And How?**

All Community participants are to undertake monitoring for the Southern ACT Catchment Group Inc. This will enable full insurance coverage for all volunteers.

## **10. How Will Data Be Managed And Reported?**

<b>User</b>	<b>What</b>	<b>How Often</b>	<b>Report</b>
CAMPFIRE & SACTCG	Waterwatch Coordinators Report	Monthly	Produce CAMPFIRE report, including summary of WQ results, catchment maps and summery of results.
Regional Waterwatch Groups	Waterwatch Newsletter	Quarterly	Distributed to Waterwatch network.
All Users	Waterwatch Coordinators Report	Yearly	CAMPFIRE report, as above. Will be distributed through the Waterwatch Network:
Other Groups	Waterwatch CAMPFIRE Data	As requested	Raw WQ data on request;



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## **11. How Will We Ensure That Our Information Is Credible?**

<b>Parameter</b>	<b>Equipment and Method</b>	<b>Quality Control Checks</b>	<b>Quality Control Mystery Solution Testing</b>
pH	pH meter	Cleaning and Calibration of meters Mystery solution testing	Twice a year
Electrical Conductivity	EC meter	Cleaning and Calibration of meters Mystery solution testing	Twice a year
Turbidity	Waterwatch Turbidity Tube	Visual Check for cleanliness Mystery solution testing	Twice a year
Dissolved Oxygen	Titration/ Colorimeter	Cleaning and maintenance of equipment and reagents	Twice a year
Water Temperature	Thermometer	Visual Check for breaks in "mercury" Mystery solution testing	Twice a year
Orthophosphates	Colorimeter	Cleaning and maintenance of equipment and reagents	Twice a year
Macro-invertebrates	Habitat Sampling	Training and correct sampling technique Mystery bug samples	Twice a year
Presence and type of algae	Visual Survey	Training refresher	Twice a year
Presence of rubbish	Visual Survey	Training refresher	na
Water Level	Qualitative	Training refresher	na
Water Flow	Qualitative	Backed-up by readings from gauging stations	na
Weather	Qualitative	na Qualitative OK	na
Rainfall	Qualitative	Backed-up by readings from Hydsys / Ecowise Environmental	na
Frogwatch	Tape recording	Tape to be verified by Frogwatch Coordinator	na