

## **Community Empowerment Through Water Quality Monitoring And Action In The Hawkesbury-Nepean Catchment**

*Avtar Singh<sup>1</sup>*

**SUMMARY:** The Hawkesbury-Nepean catchment (the catchment) is of great significance to the Sydney area. It covers an area of 22,000 square kilometres and around one million people live in it. There is a network of over 100 Streamwatch groups in the catchment, which translates to the involvement of some 3,000 people. Streamwatch is a community water quality monitoring and action program that helps to raise awareness of the local environment, and in NSW, it operates under the banner of Waterwatch Australia<sup>2</sup>.

The Hawkesbury-Nepean Catchment Management Trust<sup>3</sup> (the Trust) manages Streamwatch in the catchment. Streamwatch groups monitor nine important water quality parameters and send their test results to the using email. The Trust provides them with an interpretation of results that helps the groups to identify pollution hot spots.

Whenever the groups detect an incident, they inform the Trust and other stakeholders at the earliest to initiate an action. Some of the incidents which lead to action in the past include: paint incident at a school creek and corrective action by the painting contractor; algal blooms at Berowra creek and resulting upgrading of a sewage treatment plant; and sewage overflow into Peach Tree creek and flushing by Sydney Water.

The groups meet with the Trust and other stakeholders twice a year to provide feedback and ask for support they need to make their programs better.

The Trust maintains a Streamwatch water quality database, which is used to provide feedback to the participants and the community. Internal and external quality assurance procedures ensure that Streamwatch data is of acceptable quality. Some of the local councils are using Streamwatch data for their State of the Environment Reports, which they have to produce as a legislative requirement in NSW.

A structured approach in joining new groups, training them in water quality testing, making them understand the test results, providing support, and assisting them in taking action to improve the local environment is working very well for the Trust and its stakeholders. The Trust works together with the stakeholders like catchment management committees (CMC), local councils, and other agencies.

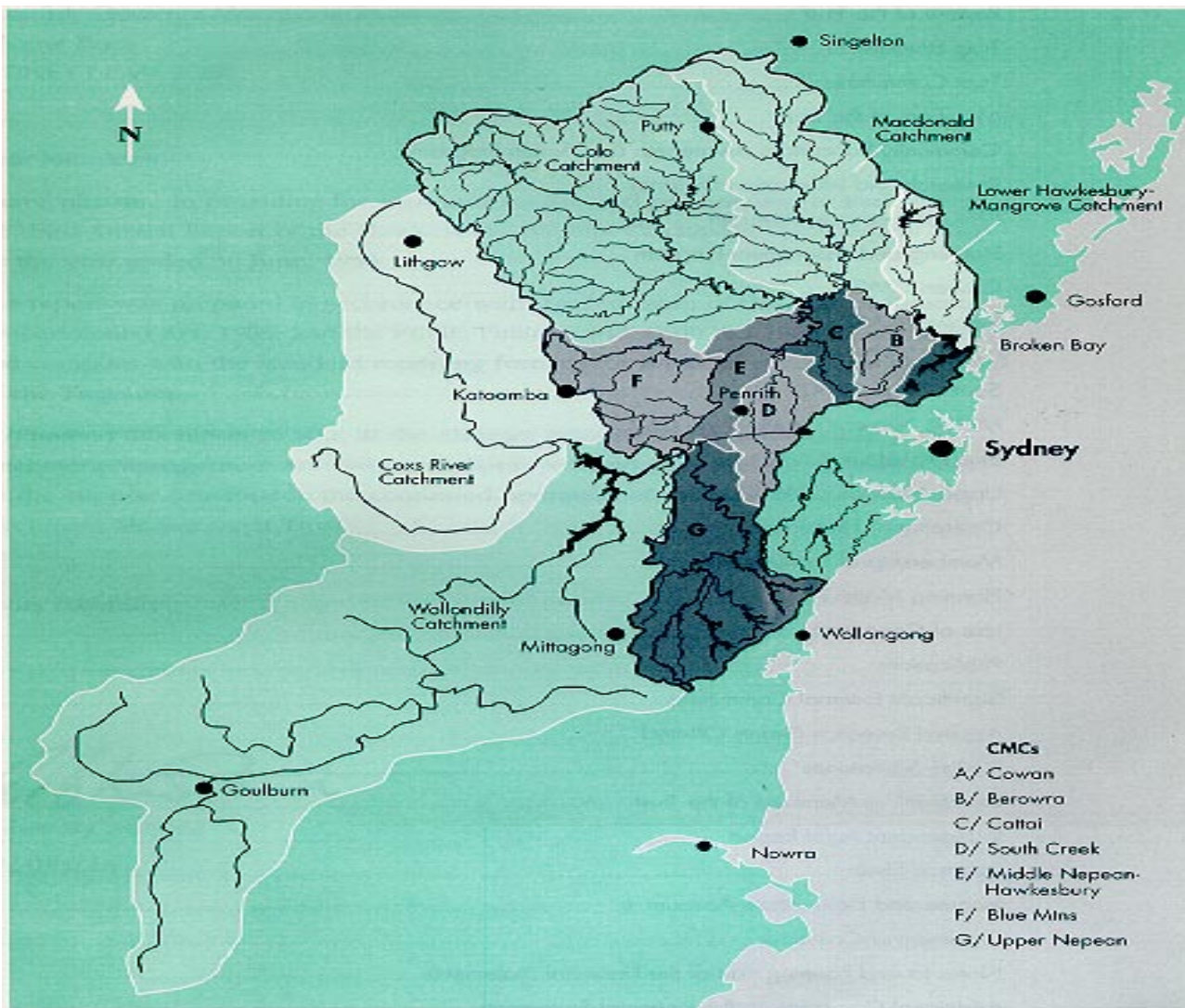
### **THE MAIN POINTS OF THIS PAPER**

- Streamwatch is a community water quality monitoring and action program.
- Streamwatch participants monitor water quality, learn to understand the test results, and initiate action to improve the local environment.
- The Trust supports a network of over 100 Streamwatch groups involving some 3,000 participants in the catchment.
- The main features of Streamwatch in the catchment are a structured approach in joining and training new groups, assisting them in identifying pollution hot spots and taking action, providing support to them, and working together with other stakeholders.

<sup>1</sup> **Avtar Singh**, Streamwatch Coordinator, Hawkesbury-Nepean Catchment Management Trust, PO Box 556, Windsor NSW 2756. Phone: 02 4577 4243, Fax: 02 4577 4236, Email: asingh@hncmt.nsw.gov.au

<sup>2</sup> **Waterwatch** Australia is a national community-based network currently operating in every State and Territory throughout Australia.

<sup>3</sup> **Hawkesbury-Nepean Catchment Management Trust** was established in 1993 as a result of community concern about the health of the Hawkesbury-Nepean river system. It is a statutory body established by the HNCMT Regulation in 1993 under the Catchment Management Act 1989.



(Hawkesbury-Nepean catchment and its sub-catchments)

**1. HAWKESBURY-NEPEAN CATCHMENT**

The Hawkesbury-Nepean river system and its catchment supply the Sydney region with food, water and other resources.

The Hawkesbury-Nepean is a complex catchment of 22,000 square kilometres. The main river flows 470 kilometres from Goulburn to Broken Bay and is fed by thousands of kilometres of small creeks and rivers, which rise as far afield as Singleton and Lithgow.

The river system supplies 97% of the water used in homes and businesses of Sydney, Illawarra, the Central Coast and the Blue Mountains. As well, the catchment supplies 10% of the States' agricultural output, including most of Sydney's fresh vegetables, poultry and dairy products. It also supports major manufacturing industries.

Almost one million people live in the catchment while three million tourists visit each year.

To ensure better catchment management, the Hawkesbury-Nepean catchment has been divided into a number of sub-catchments.

**2. FEATURES OF STREAMWATCH IN THE CATCHMENT**

The Streamwatch network in the catchment has over 100 groups involving some 3,000 people in water quality monitoring and action projects. There are 13 local councils and 9 catchment management committees participating and supporting the program in their respective areas.

The Trust manages Streamwatch in the catchment with support from Sydney Water and the Department of Land and Water Conservation.

Streamwatch in the catchment has the following features:

- Joining Process
- Water Quality Monitoring
- Communication of Test Results
- Taking Action
- Network Support
- Quality Assurance
- Feedback

### 2.1 Joining Process

From the time a group applies to the Trust to join Streamwatch till it starts monitoring, the group has to go through a joining process. The first step is a meeting with the principal and other teachers in case of a school, or main members of a community group to ensure that they understand the time commitment and costs involved. The second step is to help the group prepare a Streamwatch Plan that outlines their vision, test site, testing frequency, equipment to be used, and how the costs would be met. Then the group receives training in the use of Streamwatch water testing kit, and software to send their test results to the stakeholders. This process ensures that only committed groups join the Streamwatch network.

### 2.2 Water Quality Monitoring

#### 2.2.1 Physico-Chemical Monitoring

All Streamwatch groups in the catchment monitor nine water quality parameters. These are dissolved oxygen, biochemical oxygen demand, faecal coliform, pH, temperature, total phosphates, nitrates, turbidity and dissolved solids. These parameters provide a good understanding of water quality in the waterway.

The primary schools are engaged in Streamwatch 5-8, which is an exciting extension of the Streamwatch program. Designed for school years 5 to 8, it helps young people learn about catchment management and the environment in a practical and fun way.

#### 2.2.2 Biological Monitoring

Many Streamwatch and some non-Streamwatch groups also participate in Spring and Autumn water bug survey where they look for bugs which live in water. Water bugs are also good indicators of long term health of a waterway.

#### 2.2.3 Recreational Water Quality Monitoring

Some selected Streamwatch groups in the catchment also contribute their test results to complement the Recreational Water Quality Monitoring program in the catchment. In this program, the Trust, in conjunction with local councils, monitors water quality at 18 strategic sites which are used for recreation by the community.

### 2.3 Communication of Test Results

Communication is a very important component of Streamwatch in the catchment. Most groups send their test results to the Trust and other stakeholders through email. The groups, which do not have email access, communicate using fax. The Trust provides them with an interpretation of the results, which helps them to look for possible sources of pollution.

### 2.4 Taking Action

Streamwatch groups in the catchment not only monitor water quality but are also encouraged to initiate action to improve the environment. They have initiated several actions in their local areas and some of them are:

#### 2.4.1 Paint Incident at the School Creek

On a routine testing visit to the School creek, the Asquith Girls High School Streamwatch group noticed that water in the creek was cloudy and a bit reddish in colour. Incidentally, a contractor was painting the school building in red colour. It was thought that the contractor discharged the paint wash effluent into the creek. The students informed the principal who discussed the matter with the contractor and impressed upon him to do the right thing.

#### 2.4.2 Streamwatch Monitoring Results in Upgrading of Treatment Plant

During one summer, a toxic algal bloom created a massive kill of fish and shore life in Berowra creek, which was regularly monitored by a Streamwatch group. Even people and animals such as dogs suffered severe and long lasting infections. A Streamwatch test showed a sudden jump in nitrate levels, and more, that it was coming from one of the two sewage treatment plants that "feed" Berowra creek. After more tests, Sydney Water and the NSW Environment Protection Authority agreed that this toxic bloom was caused by excess nitrate from the Hornsby West Sewage Treatment Plant. Hornsby Council together with other agencies signed a "Statement of Joint Intent" which asked Sydney Water to install measures to achieve two third reduction of total nitrogen discharged from the Hornsby West Sewage Treatment Plant.

#### 2.4.3 Sewage Leak at Peach Tree Creek

One day the Streamwatch students of Penrith High School experienced foul smell from the Peach Tree creek, which they regularly monitor. This was due to raw sewage in the creek from an overflow. There were dead fish, eels, and there were eels in their death throes on the banks of the creek because the oxygen was so low. The phosphate group got their highest ever reading, and faecal coliform were so high that counting was impossible even after massive dilution. The students informed the Trust and the Penrith City Council. Soon the NSW Environment Protection Authority and Sydney Water were at the site and the corrective action started. After the students had left Sydney Water flushed out the creek in an attempt to cleanse the mess. Penrith Press, the local newspaper, came and took photos. With any luck such sad occurrences will not happen again.

## 2.5 Network Support

### 2.5.1 Network Support Meetings

These meetings take place after school hours where the groups provide feedback on their programs to the Trust and other stakeholders. In addition to providing a face to a name, these meetings are a source of valuable feedback on the level of support required by the groups. Network support meetings are held twice a year in each sub-catchment of the Hawkesbury-Nepean.

### 2.5.2 Performance Improvement

In addition to extending the Streamwatch network by joining new groups, it is important for the Trust to ensure that the program meets requirements of its participants and those of stakeholders. This is ensured by the performance improvement initiatives which involve identifying the low-performance<sup>4</sup> groups in the beginning of the year, contacting them to understand the support they need, and providing that support. As a result of this, some groups re-start active monitoring whereas some of them choose to discontinue with the program.

### 2.5.3 Group Contact

The Streamwatch groups are contacted in the field on their day of testing to understand the support they need, ensure that all tests are done in a prescribed manner, and that safety precautions are observed. In the Hawkesbury-Nepean, we endeavour to establish such personal contact with all the groups at least once a year.

### 2.5.4 Working Together

The Trust believes in working together with the local stakeholders such as the catchment management committees, local councils, and other government agencies. All the local stakeholders are involved while joining a new group, while providing network support, and during group contact. This provides an atmosphere of coordinated effort to achieve real improvements, and better links between pollution incidents and operational managers.

## 2.6 Quality Assurance

To ensure that Streamwatch data is of acceptable quality, "External" and "Streamwatch" quality assurance procedures are adopted.

*External quality assurance* procedures involve testing prepared water samples with Streamwatch kit and with other equipment used by approved laboratories. Streamwatch groups, which contribute data towards Recreational Water Quality Monitoring program, participate in quality assurance procedures twice a year. These procedures require Streamwatch groups and at least two approved laboratories to test three samples

(creek water, blank, and sterile blank) for comparison of results.

*Streamwatch quality assurance* procedures include:

- Training in the use of Streamwatch kit.
- Providing Streamwatch manual, which describes how to do all tests step by step.
- Visits by Streamwatch staff to ensure the participants have sufficient water testing skills, the equipment is in good condition, and they use the equipment in a prescribed manner.
- Organising professional development workshops to improve skills of participants.

## 2.7 Feedback

The Streamwatch groups send their water quality data to the Trust. At the Trust, we have maintained a Streamwatch water quality database, which has grown over the years and now has more than 2,000 sets<sup>5</sup> of data. The data from the Streamwatch database is used to provide feedback to the groups, stakeholders and the community. The Trust:

- Has produced graphs of water quality parameters for the primary test site of each group and provided as a feedback to the groups.
- Provides water quality data to the participating local councils for use in their State of the Environment Reports, which in NSW they have to produce under legislation.
- Has produced a report "How Healthy is the Hawkesbury-Nepean?" using Streamwatch data to provide feedback in a simple manner which the community can understand.

In the past, Streamwatch groups have also detected several pollution incidents and initiated action. The Trust has compiled some of those positive outcome stories in a booklet called "Community Action Reports in the Hawkesbury-Nepean".

## 3. CONCLUSIONS

Streamwatch is a successful community water quality monitoring and action program in the Hawkesbury-Nepean catchment because:

- The joining process ensures that committed groups only join the network.
- The participants learn to test water quality, understand what the results mean, and initiate actions to improve the local environment. This enhances the self-esteem of participants as they can see themselves making positive contributions.
- Network support meetings provide an opportunity for exchange of information and support needed by the groups.
- Quality assurance procedures ensure that Streamwatch data is of acceptable quality.

<sup>4</sup> **Low performance** results when a group is unable to test water quality, report test results, and participate in network support meetings in accordance with the negotiated arrangement in the Streamwatch Plan.

<sup>5</sup> One **set of data** constitutes one sample of water tested for nine physico-chemical parameters.

- The stakeholders such as local councils and catchment management committees like to support Streamwatch groups as they can see themselves as assisting in promoting awareness about local environment, and they can also use Streamwatch data.
- Feedback from the Trust to the participants, stakeholders and the community ensures an atmosphere of working together to improve the local environment.

#### **4. PUBLICATIONS RELATED TO THIS PAPER**

The Trust has produced the following publications, which are related to this paper:

- “Streamwatch in the Hawkesbury-Nepean Catchment” – a brochure
- “Community Action Reports in the Hawkesbury-Nepean Catchment” – a collection of successful action stories
- “How Healthy is the Hawkesbury-Nepean?” – a water quality review using Streamwatch data
- “Streamwatch Report for the Sydney Region - 1997”

For a copy of any of the above, please contact the author.

#### **5. ACKNOWLEDGEMENT**

Started by Sydney Water, Streamwatch in NSW is now being implemented by the following agencies in their respective areas:

- Sydney Water
- Department of Land and Water Conservation
- Hawkesbury-Nepean Catchment Management Trust
- Hunter Catchment Management Trust
- Upper Parramatta River Catchment Trust

Whereas, the Hawkesbury-Nepean Catchment Management Trust has added new features to the program in the catchment, the contribution of the above agencies in joint development of Streamwatch is acknowledged and appreciated.

#### **6. REFERENCES**

Hawkesbury-Nepean Catchment Management Trust. *Annual Report 1996-97*. Windsor, November 1997.

