ADOPT-A- RIVER PROGRAMME PHASE II: DEVELOPMENT OF AN IMPLEMENTATION PLAN COORDINATION MANUAL FOR NATIONAL AND REGIONAL COORDINATORS

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EXECUTIVE SUMMARY

The Adopt-a-River programme was initiated to create awareness amongst all South Africans of the need to care for the country's scarce water resources and to facilitate participation in the protection and management of these resources. Involving communities in volunteer monitoring programmes was viewed as one mechanism through which citizens could learn about rivers and reservoirs and become involved in the protection and management of these water bodies in their particular area.

One of the objectives of Phase 2 of the Adopt-a-River programme was therefore to provide support for such activities by developing a simple manual that members of the public could use to monitor the state of a water body in their area, and a simple manual for those tasked with coordinating these volunteer monitoring efforts.

The purpose of this manual is to give guidance to the national and regional coordinators who will have the responsibility of coordinating and supporting the activities of volunteer monitors. The manual briefly describes the role of national and regional coordinators in volunteer monitoring, compiling a database of stakeholders and/or interested and affected parties, getting started with a volunteer monitoring programme, reasons why people volunteer, planning a volunteer monitoring programme, issues related to the provision of credible data and information, cost and funding of the programme, and how the monitoring should be carried out.

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1. PURPOSE OF THE MANUAL

The Adopt-a-River programme was initiated to create awareness amongst all South Africans of the need to care for the country's scarce water resources and to facilitate participation in the protection and management of these resources. Involving communities in volunteer monitoring programmes was viewed as one mechanism through which citizens could learn about rivers and reservoirs and become involved in the protection and management of these water bodies in their particular area.

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2. BACKGROUND

2.1 DEVELOPMENT OF MANUALS FOR VOLUNTEER MONITORING

During the implementation phase of the Adopt-a-River Programme, national and/or regional coordinators[1] would become involved in guiding and supporting the activities of volunteer monitors. In order to support local volunteer monitoring efforts, two manuals were developed during this phase of the project. The first is a manual that clarifies the roles of the national/regional coordinator (this document) in volunteer monitoring, and the second is a simple manual that volunteers can use to monitor water bodies in their area.

In the *National and Regional Coordinators Manual for Volunteer Monitoring* it is envisaged that the national/regional coordinators would initially be Department of Water Affairs (DWA) staff or service providers contracted to DWA. The coordinators would probably have some scientific background and, either be familiar with the principles of monitoring system design and with commonly used sampling protocols, or have access to specialists with that type of knowledge and experience. The coordinators manual is therefore focused on managing volunteers rather than designing monitoring networks and system. Lessons learned during the implementation of the National Microbial Monitoring Programme and similar programmes in DWA were integrated into this manual.

The *Adopt-a-River Manual for Volunteer Monitoring* provides a description of basic water monitoring procedures required for water quality monitoring within rivers and reservoirs. The manual provides an introduction to monitoring and covers topics such as planning a monitoring programme in rivers and in reservoirs, security and water safety, basic equipment, and general preparations and sampling procedures. The manual also describes simple monitoring techniques for visually assessing the state of a river or reservoir, procedures for collecting samples, and protocols for monitoring temperature, water clarity, dissolved oxygen, pH, and collecting samples for chemical and bacteriological analysis in a laboratory. In addition, guidelines for the establishment of a volunteer monitoring programme are also included. These guidelines will assist in developing a monitoring programme that provides useful information that can be used by the DWA and by the volunteers themselves to assess the current and potentially changing status of a water resource. The manual is concluded with a section on reporting pollution incidents in urban and rural situations.

It is important for national/regional coordinators to understand what motivated people to get involved in volunteer monitoring. Some of the motivation included: to have an impact; to be an advocate for the environment; to be part of a particular organization; because of a commitment to a cause or belief; to be part of a team; to get to know a new community; to meet people and

[1] In the document dealing with the institutional arrangements, it was envisaged that a national coordinator would be appointed first with a number of responsibilities. As the programme gains momentum in a specific area, an intermediate layer coordinator will be appointed to take over certain responsibilities from the national coordinator in that area. Coordination of volunteer monitoring groups would probably be one of the responsibilities that the regional coordinator would take on.

make friends; to learn something; to explore a career; to gain experience and build their resume; to gain a sense of personal pride and fulfilment; to feel needed and appreciated; for fun; as an excuse to do something they love; to use a particular skill; to give something back to the community; or because they were asked to take part (USEPA, 1996).

2.2 AN INTRODUCTION TO CONCERNS AND ISSUES THAT WOULD DRIVE ADOPT-A-RIVER ACTIVITIES

Volunteers often get involved in monitoring activities because they are concerned about the deterioration of a water body near them. These may be an urban pond or stream, or a nearby wetland, river or reservoir. There are various river health programme documents which indicate that many physical, chemical and biological factors influence the health of aquatic ecosystems, e.g. geomorphology, hydrological and hydraulic regimes, water quality and in-stream and riparian habitats and a host of biological processes.

Changes in physical characteristics

Temperature, turbidity and total suspended solids in rivers can be greatly affected by human activities such as agriculture, deforestation, over-grazing, construction activities, etc. The magnitude of the impacts depends on the size of the disturbance in the catchment, and the size of the receiving water body.

Faecal contamination

Faecal contamination is one of the primary water quality issues in many rivers, especially in developing countries where human and animal wastes are not yet adequately collected and treated. Although this applies to both rural and urban areas, the situation is probably more critical in fast growing cities where the population growth rate still far exceeds the rate of development of wastewater collection and treatment facilities. As a result faecal coliform bacteria in certain areas can be found in numbers of millions 100 ml for some urban rivers and streams.

Organic matter

The release into rivers of untreated domestic or agricultural wastes high in organic matter results in a marked decline in oxygen concentration and a release of ammonia and nitrite downstream of the effluent input. The effects in the river are directly linked to the ratio of effluent load to river water discharge. When monitoring for effects of organic matter pollution, stations should be located in the middle of the oxygen-sag curve (if the worst conditions are being studied) or at the beginning of the recovery zone, depending on the objectives of the programme.

River Eutrophication

Eutrophication is one of the major resource problems in most industrialised countries (*Walmsley, 2000*). Some of the significant impacts that eutrophication has in water are economical, aesthetic, recreational and human health impacts. Eutrophication (nutrient

enrichment leading to increased primary production) is as a result of increasing phosphate and nitrates that enters the rivers. In small rivers eutrophication promotes the development of aquatic plants such as macrophytes and filamentous alge, whereas in large rivers or reservoirs phytoplankton (free floating algae) is usually more common than macrophytes. In such situation the chlorophyll levels may reach extremely high values. Eutrophication can result in marked variations in dissolved oxygen and pH in rivers during the day and night. A major concern to the public is the development of toxic algal blooms.

Salination

Increased in mineral salts in the rivers may arise from several sources e.g. release of mining wastewaters, certain industrial wastewaters, increased evaporation and evapo- transpiration in the river basin resulting from irrigation returns etc. This has an effect on the yield of agricultural crops, taste of drinking water, and corrosion of household appliances.

Acidification

Acidification can occur in running streams as a result of direct input of the acid mine drainage from mining or specific industries that produces acidic waste either as point source (e.g. sewer) or diffuse source (e.g. leaching of mine tailings) and indirect inputs through acidic atmospheric deposition manly as nitric and sulphuric acids resulting to mostly from motor exhausts and fossil fuel combustion.

Litter

Litter is often a concern in urban areas. The breakdown of litter in streams often affects the organic content of the water and therefore the dissolved oxygen concentrations. Litter also creates habitat for bacterial growth and unpleasant odours develop as a result of the decomposition of solid waste, and it creates unsafe condition for children playing in streams. Lastly, litter is unsightly and it affects the aesthetic enjoyment of urban water bodies.

The focus of this manual is largely based on the National Coordinator because it is anticipated that at the beginning of the Adopt-A-River programme, coordination functions will be run at the national level and with time Regional Coordinators will be established. However, once the Regional Coordinators have been established/taken over the National Coordination roles will be to give guidance and manage the Regional Coordinators. Therefore, for the simplicity of this manual the guidelines stipulated here will apply to both the usage by National Coordinator and Regional Coordinator.

3. NATIONAL/REGIONAL COORDINATOR MANUAL

3.1 WHO SHOULD BE THE NATIONAL OR REGIONAL COORDINATORS?

DWA as custodians of all water resources in South Africa, they have a responsibility for enforcing care and management of water resources to ensure sustainable social and economic development. As a result of this reason coordination of water resources programmes is largely within the department.

The coordinator/s should be a person/s that:

- are well-established and recognized in their fields;
- have a proven track record of community involvement;
- work in areas related to environmental conservation and/or environmental education;
- have or have access to, expertise in natural sciences; and
- foster partnership and networking.

The Regional/National Coordinator would be an office based personnel who will assist with the information required to guide the volunteers on their monitoring programme.

3.2 STAKEHOLDERS AND/OR INTERESTED AND AFFECTED PARTIES LIST

One of the first activities that a volunteer monitoring coordinator should do is to compile a list of stakeholders in the area where volunteer monitoring is to be implemented. A starting point is the database with a variety of information and detail that was compiled as part of this study. These include representatives of Government Departments, Municipalities, Water Associations, NGO's, Universities & Educational centres, Industry and the broad public. The details of the stakeholders are available on the Final Report on the Compilation of Stakeholder's Database for the Adopt-a-River Programme. The objective of the stakeholder list is to identify organisations already active in the area, a network of specialists that could support capacity building of volunteer monitors, and potential custodians for the programme(s).

3.2.1 Getting started with the volunteer monitoring programme

Some of the important questions to answer to understanding the start up of a volunteer monitoring programme are discussed below.

What is volunteer water monitoring?

Volunteer water monitoring includes monitoring of the:

- Streams
- Rivers
- Lakes
- Reservoirs
- Estuaries
- Coastal waters
- Wetlands and
- Wells and boreholes

Furthermore, volunteers provide information on:

- Quality data
- Build stewardship of local waters etc

More detailed useful documents include: Adopt-a-River Manual for Volunteer Monitoring, United States Environmental Protection Agency, A handbook on establishing effective Partnerships 2006 - Partnership for Healthy Rivers

Why people volunteer?

In order to design a proper monitoring programme for volunteers a regional/national coordinator should understand what motivates volunteers to participate in monitoring initiatives. The Volunteer Recruitment Book, by Susan J. Ellis concluded that in designing meaningful rewards for volunteers is to look at reasons they volunteered for in the first place. Some of the motivational reasons that the book indicates are:

- To have an impact
- To be an advocate
- To be part of a particular organisation
- Because of a commitment to a cause or belief to be part of a team
- To get to know a new community
- To meet people and make friends
- To learn something
- To expose a career
- To gain experience and build their resume
- To gain a sense of personnel pride and fulfilment
- To feel needed and appreciated
- For fun
- As an excuse to do something they love
- To use a particular skill
- To give something back to the community
- Because the were asked

Although reasons listed above are not the only reasons why people volunteer, however, all of these are valid for different people. Therefore the regional coordinators role in designing the monitoring programme should take keep these in mind.

3.2.2 Volunteers in Water Monitoring

The Volunteer Water Monitoring Guide for State Managers provides the guidance for the monitoring programme. Although the document does not provide the details for the monitoring methods that might apply to a volunteer effort, however, there are useful pointers on monitoring aspects such as:

Volunteers monitor a variety of parameters such as:

- Visual observations
- Physical and Chemical Measurements
- Assessments of Living Resources

Volunteers monitor all types of waters such as:

- Reservoir and pond sampling
- Stream and River sampling
- Estuarine sampling
- Near coastal water resources
- Wetlands

Some of the details for the volunteer water monitoring are included in the document for the *Adopt-a-River Manual for Volunteer Monitoring* as well as other international websites e.g. the *Volunteer Water Quality Monitoring – National Facilitation Project, A Partnership of USDA CSREES and Land Grant Systems.*

3.2.3 Planning a Volunteer Monitoring Programme

The successful use of volunteers depends on understanding that citizens can be a valuable resource for many types of monitoring when they are well trained and managed. The details of planning a volunteer monitoring programme for the augmentation of data gathered from different sources can be summarised as followed:

- Establishment of the general goals for monitoring
- Identify data uses and users
- Establishment of the quality assurance and control
- Assign staff responsibilities

A detailed volunteer monitoring plan for volunteer monitoring programme can be obtained from *Part 2 of the Adopt-a-River Manual for Volunteers*.

Implementation of a Volunteer Monitoring Programme

The implementation of a volunteer monitoring programme can start with a pilot programme:

- Establishing a pilot programme, this will include:
    - Pick a location
    - Selection of sampling equipment
    - Design data collection form
    - Recruit volunteers
    - Train volunteers
    - Conduct on-going quality control
    - Refine programme materials
- Expand the programme

  - Depending on the success of the pilot study programme expansion of the programme may be necessary.
  - The handbook for WESSA on how to establish friends group talks about networking which can be used as a vehicle for expansion of the programme.
- Make the most of the media (details of the communication structures can be obtained in the Adopt-a-River communication structures report)
  - Television
  - Radio media
  - News papers
  - Newsletter etc
- Maintain volunteer interested and motivation
- Community Awareness Programmes

  The coordinator can develop community awareness campaigns to create interest; ownership and buy-in. These campaigns can involve school's pupils and teachers, as well as community groups. As indicated in the National Microbial Monitoring Programme for surface waters other known benefits of the awareness campaigns of this nature includes:
  - Contribution to avoid health related problems
  - Minimisation of future contamination of surface water
  - Create awareness to mobilise pressure on polluters of the rivers
- Use of the volunteers data and regular reports
- Volunteers require some form of recognition for their efforts e.g. awards for continued dedication to the sampling effort etc.

For further reading, consult the *Volunteer Water Monitoring- A guide For State Managers, National Microbial Water Quality Monitoring Programme* ***and*** *National Eutrophication Monitoring Programme (from DWA) provide details of the Regional and National Implementation of the processes for coordinators.*

3.2.4 Provision of credible information

- Prepare a quality assurance project plan
- Analyse and present data – Communication structures developed in the Adopt-a-River Programme may be considered useful in this manner, e.g. use of website related channels may be useful as indicated on the passive communication component of the Adopt-a-River.

3.2.5 Cost and Funding of the programme

- Programme expenses may include:
  - Staff costs
  - Equipment and laboratory expenses
  - Data management costs
  - Printing and postage

  - Travel expenses
- Funding options

Volunteer monitoring can be a tremendous asset to water quality protection efforts. While volunteers contribute to their monitoring effort for "free", these cost effective monitoring programme require a great deal of effort and usually some expense to operate. Some of the principal sources of funding Adopt-a-River Programme can be through

- Government funding unit
- Private funding sources
- Or grants

Other aspect of the project funding is discussed within the *Adopt-a-River Literature Review Document for Monitoring Models.*

3.2.6 How the monitoring should be carried out?

The National Coordinator should formulate the guidelines and procedures detailing how the monitoring should be carried out. The guidelines should be made as simple as possible for any person who wishes to embark on the Adopt-A-River monitoring programme to understand and be able to use them.

Furthermore, since the National Coordinator has the responsibility to oversee the management of the process of Adopt-A-River monitoring programme and the financial aspects of the programme, will delegate some of the functions to the task team.

A quick guide to be considered for a monitoring programme

This guide should be used hand-in-hand with the Adopt-a-River with a Manual for Volunteers as the details.

- *Where does monitoring take place?*
  Sites to be monitored should be carefully selected. The sites should at least be considered according to their slope, substrate type, water flow velocity, degree of shading, nearby activities that may impact on the site etc.
- *How often does monitoring take place?*
  Seasonal variations for monitoring should be considered, e.g. dry and wet seasonal variations.
- *What variables should be considered?*
  The river health monitoring programme document highlights that man physical, chemical and microbiological factors influence river ecosystem health. Some of the examples of those are geomorphology, hydro regimes and hydraulic regimes, water quality, in-stream and riparian habitats and hosts of the biological processes.
- *Monitoring equipments*

It is important that cost effective but accurate and reliable/robust methods for the monitoring of the river be considered. Furthermore, the coordinator has a responsibility to oversee the availability of the safety clothing.

- *Site records*

  It is important to record all background information at a site. This information is essential for the purpose of interpreting the results and report writing. Some of the important aspects of the site records must include:
  - site name (the same as you put on sampling containers);
  - map reference;
  - vegetation on the banks;
  - degree of shade;
  - water surface slope;
  - catchment vegetation;
  - water depth & velocity (measured at each sampling point on each sampling occasion);
  - Substrate composition (by visual assessment or Wolman particle size count (*Wolman 1959*).
  - Also, a photograph of the site on each monitoring occasion from a fixed location. This record of the site is used both to confirm the exact location of the site and to establish the degree of similarity of conditions amongst sites, or at a site over time, during a monitoring programme. Site information is usually important in the interpretation of the results.

- *Data management*

  Data should be handled by manner of a user friendly and easy to understand. The coordinator will be required to utilise the data that is collected produce bi-annual/annual reports depending on the objectives of the national requirements.

4. CONCLUDING REMARKS

Coordinating volunteer monitoring can be a very rewarding activity especially if efforts of volunteers are recognised and their data used to manage water resources more wisely.

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