



Overberg District Municipality



Overstrand Municipality

INTEGRATED OPERATIONAL PROCEDURE PROTOCOL:
MANAGING THE ONRUS RIVER ESTUARY FOR RECREATIONAL
WATER USE

Monitoring of and response to risk of gastro-intestinal disease caused
by pathogens due to possible faecal contamination

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1. PURPOSE

The purpose of this Protocol is to ensure that Recreational Water in the Onrus estuary is kept safe for public use. Its focus is on faecal contamination specifically, being the most likely source of pollution.

This Protocol is a programme and topic specific document which provides direction on how Authorities shall operationalise specific requirements identified in the Water Quality Guidelines. It is aimed at assisting the authorities, mentioned in par. 2, to assess the risk of use of recreational water of the Onrus Estuary. Generally, the South African Water Quality Guidelines for Coastal Marine Waters¹ is applied to ensure that the quality of coastal water for recreational use is effectively managed in the interest of the public. Where an estuary is freshwater dominated, the 1996 South African Water Quality Guidelines for Recreational Use² is applied.

The Protocol furthermore assists in the prevention and reduction of water-borne illness and injury related to recreational water use by providing direction to the mentioned authorities in par.2 and the Estuary Forum, on the recreational water programmes which include:

- Monitoring and sampling of the water of the recreational water areas
- Investigation of, and response to, events and complaints from the public
- Promoting awareness of safe use of recreational facilities. (Blue Flag Beaches)

2. ROLES AND RESPONSIBILITIES

2.1. Monitoring Authorities

The following authorities have management responsibilities within the Onrus estuary

- **DEADP: Directorate: Biodiversity and Coastal Management** as Responsible Management Authority
- The **Breede-Gouritz Catchment Management Agency (BGCMA)** is responsible, on behalf of the Department of Water and Sanitation (DWS), for inputs into the national water quality monitoring programme. In the case of the Onrus river and its estuary it undertakes chemical as well as bacteriological samplings at various points.
- **Overstrand Municipality** is responsible for managing its infrastructure in a way that satisfies all applicable environmental health standards.
- Secondly, Overstrand Municipality it is responsible for ensuring that the estuary is not polluted from intended or unintended discharges in its area.
- Generally, the BGCMA samplings are used to assess the environmental and recreational health of the Onrus River estuary, but if any spillage occurs or is suspected to have occurred, the Overstrand Municipality will take samples for analysis.
- Local officials of the Department of Forestry, Fisheries and the Environment (DFFE) do the samplings on behalf of BGCMA and hand these over to be couriered to the BGCMA

¹ RSA Department of Environmental Affairs. 2012. South Africa Water Quality Guidelines for Coastal Marine Waters. Volume 2: Guidelines for recreational use.

² RSA Department of Water Affairs and Forestry. 1996. South African Water Quality Guidelines (second edition), Volume 2: Recreational Use.

http://www.dwa.gov.za/IWQS/wq_guide/edited/Pol_saWQguideFRESHRecreationalUsevol2.pdf

contracted laboratory for bacterial as well as chemical analyses. This is done under the broad guidance of the Overstrand Municipality

- **Overberg District Municipality**, pertaining to the Onrus River estuary, is responsible for overseeing compliance with environmental health standards, including recreational health standards.
- For the above purpose, Overberg District Municipality takes water samples for recreational water quality analysis.
- Overberg District Municipality will pay for the analysis of samples taken by the Municipal Health Service department of the Overberg District Municipality.
- In case of a sewage spillage caused by municipal infrastructure, an immediate water sample is taken by Overstrand Municipality and sent for analysis. Resampling and analysis are repeated until the sample result is within the standard.

2.2. Operational and Maintenance Authorities

Overstrand Municipality is responsible for operation and maintenance of sewerage infrastructure such as the sewerage networks and pump stations optimally, to minimize the risk of a sewage spillages or blockages that can contaminate the water quality in the estuary and for monitoring and compliance enforcement regarding private sewerage infrastructure.

Overstrand Municipality's responsible Departments:

Sewerage and storm water networks - Overstrand Community Services Directorate – Operational Services Department

Bulk Sewerage facilities - Sewerage pump stations and rising mains: Overstrand Infrastructure and Planning Directorate - Engineering Planning Department, with appointed Bulk Works Contractor:

Overstrand Environmental Management Section, in conjunction with Overberg District's Municipal Health Department and Environmental Management Section, will ensure that the protocol is followed in case of a water sample result exceeding the standard or a spillage incident.

3. MONITORING PROGRAMME

3.1. Sample Collection and Analysis

- The general sampling programme will be set by the BGCMA with inputs from the Overstrand Municipality and DFFE.
- Bacteriological sampling is taken on a two weekly basis and chemical sampling monthly
- Bacteriological samples taken are analysed for E. coli and Enterococci indicator bacteria
- The samples will be taken according to the methods indicated in Annexure A.
- The Overberg District Municipality will take follow-up samples in cases of high readings and the Overstrand Municipality where a spillage may have occurred..
- The Overberg District Municipality will take samples during the holiday periods of December, January and March/April, so as to increase the frequency of sampling to once a week.
- All samples to be delivered to the laboratory for analysis for E. coli and Enterococci within 24 hours after being sampled.
- In case of resampling or samples after a spillage incident, the laboratory will be requested to treat the samples as urgent and provide results as soon as practically possible.

4. PREFERRED INDICATOR

The mouth of the Onrus River Estuary is naturally closed for a large part of the year. This, plus the fact that it is a perched estuary leads to the water in the estuary being freshwater dominated. Pathogens occurring in fresh water are the same as those found in marine waters with the difference that their survival in fresh water are more likely to be longer. **E. coli is the preferred indicator organism for freshwaters.** Enterococci can multiply from natural sources, such as the decay of leaf material. This means that Enterococci levels can be very high even in pristine waters, but this may not necessarily indicate high levels of pathogens. Enterococci should therefore not be used as the indicator bacteria when freshwater conditions dominate.

5. CLASSIFICATION

The classification of the fitness of the water for recreational use in the Onrus River Estuary will be assessed in accordance with the Department of Water Affairs Quality Guideline^{3*} as extracted in the following table. According to the guideline the geometric means of **E. coli** measurements are to be used to calculate to determine the risk of using the water for recreational purposes.

It is recommended that the geometric mean for a five year period (or full period if shorter than five years) as well as a running three-month geometric mean, be applied for the long-run risk and seasonal risks characteristics, respectively.

Geomean range E. coli cfu/100ml	Risk	Description
0 - 130	Low	A low risk of gastrointestinal illness is indicated for contact recreational water use. This is not expected to exceed a risk of typically < 8 illnesses/1 000 swimmers
130 - 200	Slight	A slight risk of gastrointestinal effects among swimmers and bathers may be expected. Negligible effects are expected if these levels occur in isolated instances only
200 - 400	Some	Some risk of gastrointestinal effects exists if geometric mean or median E. coli levels are in this range, particularly if this occurs frequently. The risk is minimal if only isolated samples fall in this range.
>400	Increasing	Risks of health effects associated with contact recreational water use increase as E. coli levels increase. The volume of water which needs to be ingested in order to cause ill effects

³ RSA Department of Water Affairs and Forestry. 1996. South African Water Quality Guidelines (second edition), Volume 2: Recreational Use.
http://www.dwa.gov.za/IWQS/wq_guide/edited/Pol_saWQguideFRESHRecreationalUsevol2.pdf

		<p>decreases as the <i>E. coli</i> density increases.</p> <p>Gastrointestinal illness can be expected to increase approximately in accordance with the following relationship, based on US EPA epidemiological studies:</p> $y = -150.5 + 423.5(\log x)$ <p>where y = illness rate/100 000 persons x = number of <i>E. coli</i>/100 mL (x≥3)</p>
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6. ASSESSMENTS

6.1. Long Term Risk Classification - grading the estuary

- The long-term risk for recreational use of the estuary will be based on the assessment of the geomean of the full record of analyses taken at the estuary mouth, excluding records taken during confirmed events, e.g. spillages. Under such circumstances a grading would not apply until the episode has abated
- Trends in risk will be assessed on the results of running three-months geomeans of analyses taken at the estuary mouth
- Communication of long term risk will be according to the Department of Water Affairs Quality Guideline (see par. 5)

6.2. Day-to-day management

The day-to-day management will be based on the results of the routine monitoring at the estuary mouth as well as reports of pollution incidents that may occur. The sequencing of decisions is described in Figure 1, and summarised as follows:

- 1) For routine monitoring:
 - a) The acceptable safe range for E. coli is between zero and 400 cfu/100 ml. If a single E. coli reading at the mouth exceeds 400 cfu/100ml the following should be checked:
 - i) Whether the enterococci count exceeds 380 cfu/100ml and
 - ii) Whether the E. coli count at Ysendyk, the other sampling site in the estuary, exceeds 400 cfu/100 ml
 - b) As illustrated in Fig 1, depending on the above assessment, a sanitary inspection is conducted and the water resampled and submitted for urgent testing.
 - c) Depending on the results of any evidence of actual pollution a “no swimming” advisory is to be issued at the Onrus River mouth. If the high E coli count is not supported by a high enterococci count and there is no sign of pollution, the likelihood is that the E.coli result was a spurious one.
 - d) Resampling must continue until the E. coli count returns to the acceptable range after which “no swimming” advisory must be removed.
- 2) When spillage is reported:
 - a) The extent of the spillage is assessed and whether it has reached the main water body of the estuary.
 - b) “No swimming” advisory to be issued if spillage is considered more than merely minor.
 - c) Water samples to be taken and analysed on an urgent basis and the “no swimming” advisory only removed once the E. coli count returns to within the acceptable range.

6.3. Communication

The public will be informed about the general risk classification of the Onrus River Estuary through a noticeboard at the estuary mouth that will be updated from time to time. In addition, the notice board will refer the public to the relevant webpage on the Overstrand Municipal website where the water quality data and background to the overall grading will be reported.

Intra authority communication regarding the day-to-day management will be in accordance with paragraphs 7 and 8 below.

The public will be advised by the Overberg District Municipality of “no-swimming” advisories by means of notices in the media as well as signs posted visibly at the swimming areas.

The Onrus Estuary Forum will be kept informed by (a) the Overstrand Municipality, of routine monitoring results, gradings as calculated and posted, any reported spillages and operational measures that results from these and (b) the Overberg District Municipality, of any health concerns regarding the estuary and the decisions to close the estuary for full contact recreation use.

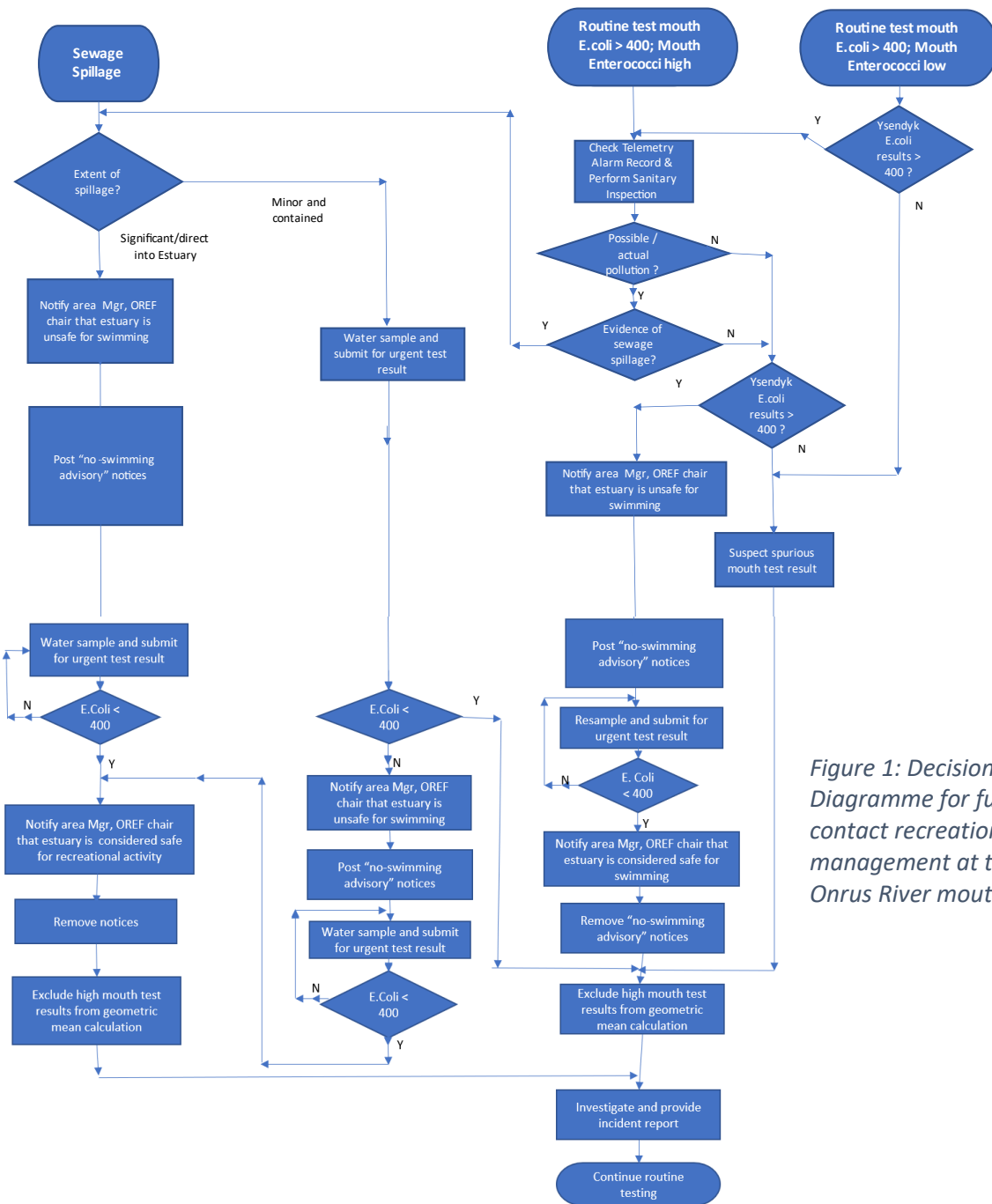


Figure 1: Decision Diagramme for full contact recreation management at the Onrus River mouth

7. THE OVERSTRAND MUNICIPALITY ROLES

7.1. The following Standard Operating Procedure must be followed in case of a Bulk or Network sewerage spill:

- When a complaint of a sewage spill is received, the Call centre (after hours) or operational clerks (office hours), takes the call, generate a job-card and notifies the foreman/plumber (responsible person) on duty or Bulks Works Contractor, as soon as possible.
- The responsible person shall visit the site immediately (but not later than 1 hour from notification) in an attempt to minimize or eliminate an overflow. Should the responsible person not be able to respond within the 1 hour period, the operational manager must be notified, who will arrange suitable assistance.
- Upon arrival at the site, identify and assess the affected area and extent/impact of the spill and request additional help if needed for line cleaning or repair, containment, recovery and site clean-up.
- Attempt to remove the blockage from the system and observe the flows to ensure that the blockage does not re-occur downstream. If the blockage cannot be cleared within a reasonable time, contingency plans must be implemented as needed, including containment, tanker services, bypass pumping, external contractors etc.
- In case of a failure at a sewerage pump station, the station must be put back into operation as soon as possible. If the repairs cannot be done within reasonable time tanker services must be used to minimize the effect of the spill.
- In case of a burst rising main the pump station will have to be shut down to do repairs on the rising main as quick as possible. Suction tanker must be used in an effort to minimize the spill at the sewerage pump station.
- Clean up the site by pumping of the spilled sewage and discharge it back into the sanitary sewer system. Collect all signs of sewage solids and sewage-related material
- Disinfect all areas that were contaminated from the overflow using a disinfectant.

7.2. SHOULD NATURAL WATER BODIES BE AFFECTED BY A SEWERAGE SPILL, THE FOLLOWING ADDITIONAL PROCEDURES MUST BE FOLLOWED

- The responsible person attending to the spillage, must notify the local environmental officer of the area immediately, to investigate the scene of the spill and verify the extent of the contamination.
- The environmental officer shall verify the extent of the contamination in the field and report it to the Overberg District Authority for their decision regarding closure of the water body.
- The environmental officer shall notify the relevant Catchment Management Agency, OREF Chairperson, the convenor of the OREF water quality portfolio committee and the ODM and liaise with the relevant Overstrand or Bulk Contract operational manager.
- Water bodies that have been contaminated as a result of a definite sewerage spillage will be closed for recreational water use by placing appropriate signage (operational manager) at visible access locations until the risk of contamination has subsided to acceptable levels.
- Operational department or Bulk Works Contractor will take water samples, noted as urgent and have it analysed by an accredited laboratory service provider

Following the clean-up of a contaminated site, the EMS will inspect and approve the site and notify the operational manager of any shortcomings. In relation to the contamination of the site for ecosystem protection.

8. THE OVERBERG DISTRICT MUNICIPALITY ROLES

- The ODM h makes the final decision on the recreational safety of the use of the water body
- The posting and removal of warning signs must be approved by the ODM Environmental Health Practitioner.
- Respond to reports of notified communicable water-borne illnesses outbreaks possibly affecting the recreational use of the Onrus River Estuary

9. DEA&DP ROLE

- Monitor pollution sources in association with DWS and Municipality
- React to pollution events at estuary and provide feedback on any new legislation

ANNEXURE A

Sampling Method

The following procedures to be followed when taking water samples:

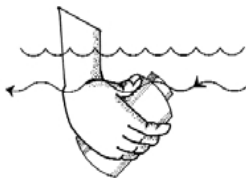
- Use a sterile bottle supplied by the Laboratory.
- At the sampling point remove the cap of the sample bottle. Do not contaminate the inner surface of the cap and neck of sample bottle. Keep the cap in hand with the inner surface facing downward.



- Take the sample by holding the sample bottle with hand near the base and plunge the sample bottle, neck downward, at a depth of 15 to 30 cm below the water surface. Do not rinse the sample bottle.



- Turn bottle below the water at the recommended depth until its neck points slightly upward and the mouth of the sample bottle is directed toward the current. If no current, it can be created artificially by pushing the sample bottle forward in a direction away from hands.



- Fill sample bottle and replace the cap immediately. Make sure that the cap is tightly screwed on.



- Place sample bottle on ice in a cooler box for transporting to a laboratory. Complete the sample submission form with all the necessary information.

ANNEXURE B

Example of a No-swimming Advisory

