

Artificial breaching of Bot River Estuary between 30 September and 01 October 2015



Post-breaching Report on behalf of the BREF Breaching Sub-subcommittee

submitted to DEA&DP in accordance with the approval granted
to the Overstrand Municipality to breach the Bot River Estuary artificially
(DEA&DP reference E12/2/4/7-E4/5-CJ2148/11)

Executive Summary

The Bot River Estuary was artificially breached overnight on Wednesday 30 September 2015, following a decision by the breaching subcommittee of the Bot River Estuary Forum (BREF) in consultation with estuarine specialists. On 30 September 2015 the Director of Infrastructure and Planning gave notice to DEADP of the intention to breach and requested a deviation from the identified criteria listed to the Mouth Management Plan. On the same day DEADP responded per email and telephonically that permission was granted to deviate from the adopted MMP in order to artificially breach the Bot River Estuary. The official letter from DEADP was received on 1 October 2015.

The estuary last opened naturally on 27 June 2014 but the likelihood of it opening naturally this year was reduced by the opening of the Kleinmond mouth on 15 June 2015. The water from the Bot River Estuary lake area was overflowing into the Kleinmond wetland system and out the estuary mouth at Kleinmond causing the level of the Bot River Estuary lake area to drop considerably. A natural breach in the lake area would therefore not have been possible.

Members of the breaching subcommittee, OSM Environmental Management, OSM Disaster Management and Protection Services, together with OSM Operational Services staff met at the sand berm opposite Meerensee on Wednesday evening to begin digging a trench with a municipal back actor. The breach was conducted under the supervision of a CapeNature official who has overseen previous breaching events at the estuary. The final plug of sand was removed shortly before 05:30, allowing the first water to begin flowing out through the channel coinciding with the receding tide. Low tide was at 11:09 and the peak outflow of the estuary was approximately at 10:30 coinciding with low tide and thus maximising the scouring of sediments (See figure 1).

Timing the breach to ensure peak outflow during daylight hours is important to prevent birds such as red-knobbed coots from becoming disorientated in the dark and getting washed out to sea. No reports of dead birds were received. The breaching activities went according to plan, and the operation is considered successful.

Minutes of the Bot River Estuary Breaching Sub-Committee Meeting
held at the Environmental Office in Onrus on
Tuesday, 30 September 2015 at 08:00

1. Attendance

In accordance with the Mouth Management Plan, the breaching subcommittee was represented by Robin Perrins (Acting Chairman, Bot River Estuary Forum), Pierre de Villiers (On behalf of: Conservation Services, Cape Nature: Boland), Marlu Rust (On behalf of: Liezl Bezuidenhout, Environmental Manager, Overstrand Municipality) and Danie Coetzee (Overstrand Estuary Management Coordinator), Neville Green (Biodiversity Conservation Manager OSM), Michael Henn (Environmental Ranger OSM) and LEO Fisher (Protection Services OSM).

2. Opening of Kleinmond mouth

The natural opening of the Kleinmond mouth during the night of 15 June 2015 was discussed and the impact that this has had on the water level of the Bot River Estuary. The open mouth at Kleinmond causes water to drain out of the Bot River Estuary lake area via the Rooisand Channel and Lamloch Swamps. This had reduced the water level below the 2.5 metres above mean sea level (m amsl) required in terms of the criteria for artificial breaching in the Mouth Management Plan. However it was predicted that, due to heavy rain the previous 2 days, additional freshwater would flow into the Bot River Estuary system. The water level had risen again to 2.48m amsl that morning.

3. Considerations for artificial breaching

Water level and salinity:

It was noted that the only criteria that apply to breaching in the 1st & 2nd year after a previous breach is that the:

- Water level > 2,5m msl and salinity =< 10 ppt

OR

- Water level < 2,5m msl, but breaching feasible and salinity =< 6 ppt;

and that breaching should only to take place between 01 May – 31 September. (30 September, mistake in MMP).

Location and timing: The location for artificial breaching is the berm opposite Meerensee, well away from the dunes to prevent unnecessary sand entrainment. The breaching should be timed to ensure maximum outflow occurs during daylight hours, to avoid a repeat of a previous incident in which numerous red-knobbed coots were unable to orientate themselves in the dark, and drowned as they were washed out to sea. This is what was intended by the stipulation in the Mouth Management Plan that artificial breaching should take place “only during daylight hours”. It takes about 4 hours for the flow rate to increase significantly, with maximum outflow at 6-10hours, although this might be accelerated due to the head created by the high water level.

Sea conditions: It was noted that breaching should be conducted just before high tide to ensure that the tide is receding by the time the outflow starts gaining momentum, reducing any obstruction by the sea. For the same reason, breaching should not take place during high swell and surf conditions, which would also carry flushed sediment back into the estuary. Tide tables and swell forecasts (Figure 1, 2 and 3) were consulted, which revealed that the current high swell conditions would abate on Wednesday morning and remain low until the next afternoon. The next high tide would be at 17:29 that Thursday evening.

Likelihood of natural breach: Weather forecasts indicated only light rainfall predicted for the next week, reducing the likelihood of a natural breach given the ongoing loss of water through the Kleinmond mouth.

Specialist input: The specialists consulted about the proposed breach were (Ms Lara van Niekerk - CSIR, Steve Lamberth - DAFF, Prof George Branch, Dr Whitfield, Dr Barry Clarke, Dr Jane Turpie and Ms G Murson- Birdlife SA and they all expressed support for the breach.

Decision: Given the above considerations, it was agreed through a consensus decision making process by the breaching subcommittee that an artificial breach of the Bot Estuary would be conducted, with the channel being excavated during the night of the 30 September 2015 and the final opening planned for 05h30 on Thursday morning.

4. Logistical planning

Communications: It was agreed that an announcement communicating the decision to artificially breach the Bot River Estuary (lake area) would be sent out per email by Robin Perrins to all the BREF members. The BREF members were informed of a possible artificial breach at the BREF meeting held on 10 September 2015 and that salinity and water level readings would be taken regularly over the next 14 days in order to monitor the situation. On 25 September 2015, Pierre de Villiers circulated the findings to the specialists involved and the architects of the MMP for their specialist input with the findings and the possible breach of the Bot River Estuary system.

Backactor and operator: The Overstrand Municipality's back-actor and its operator would be available to dig a deep, wide trench from the sea back towards the estuary. Extra fuel would be brought along, and the environmental Field Ranger would drive a 4x4 vehicle to provide additional transport. Access would be at low tide along the beach from Hawston, some 4 km to the east, after 22h00 on Wednesday to avoid the high tide and swell.

Public safety and law enforcement: It was noted that conducting the breaching exercise overnight on Wednesday would minimise problems with crowd control and the associated accident risk. Meerensee would allow public access for the weekend, but the footbridge to the berm was under water and damaged, making a night crossing unsafe. It was agreed that municipal law enforcement staff would prevent anybody but the breaching team from crossing the footbridge until they had assessed its safety once water levels had receded the next day. Additional staff would patrol the beach access points at Hawston to prevent private vehicles from being driven along the beach. Law Enforcement and Compliance staff from OSM would ensure people could not enter the slipways or water body from 23:00 on 30/09/2015 to 14:00 on 01/10/2015. Two days after the breach the OSM Law Enforcement officials would still be on duty at the site of the breach to ensure the safety of the public.

5. DEADP requirements

The provincial Department of Environmental Affairs and Development Planning requires notification prior to an artificial breach and the intention to deviate from the MMP. They also require a submission of a post-breaching report within 14 days of the breach taking place. These are the responsibility of Overstrand Municipality, as the letter of approval to implement the Mouth Management Plan was addressed to the Municipal Manager. The documents would therefore be written by the Director of Infrastructure and Planning.

6. Closure

Robin Perrins thanked everybody for their participation, and brought the meeting to a close at 11:00.

Forecasts of Tide tables and swell

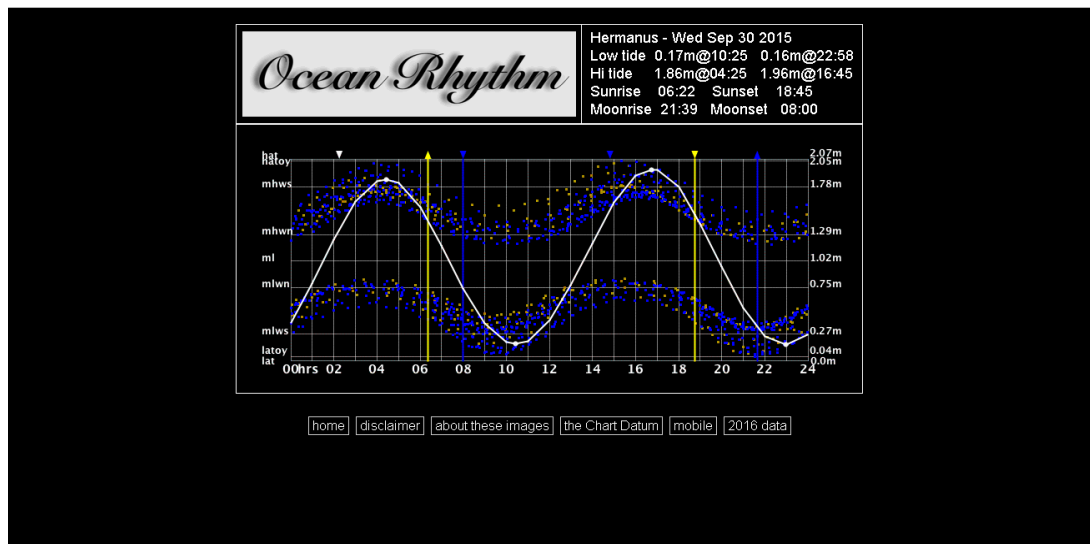


Figure 1 Tide table for Wednesday, 30 September 2015

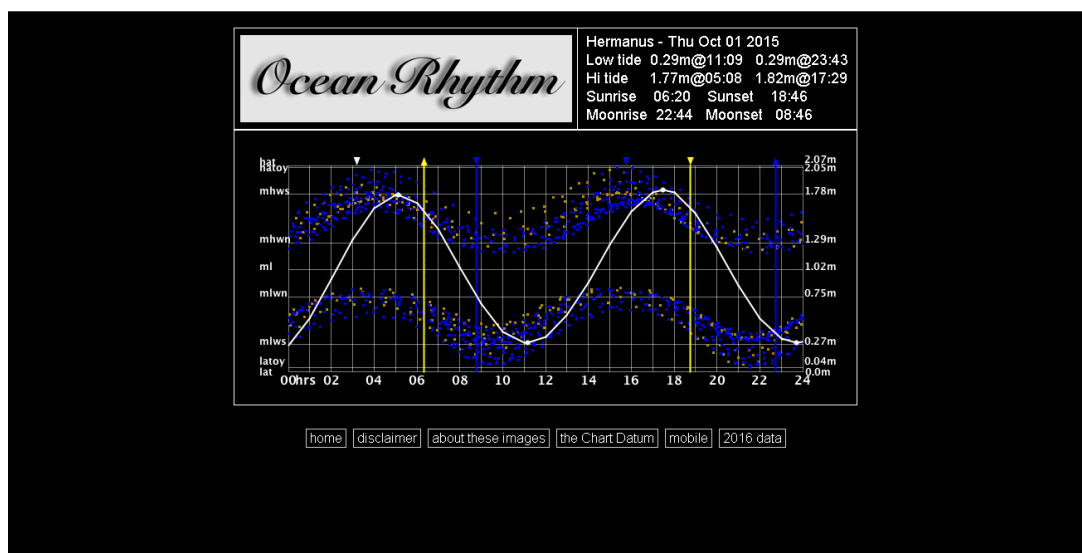


Figure 2 Tide Table for Thursday, 1 October 2015

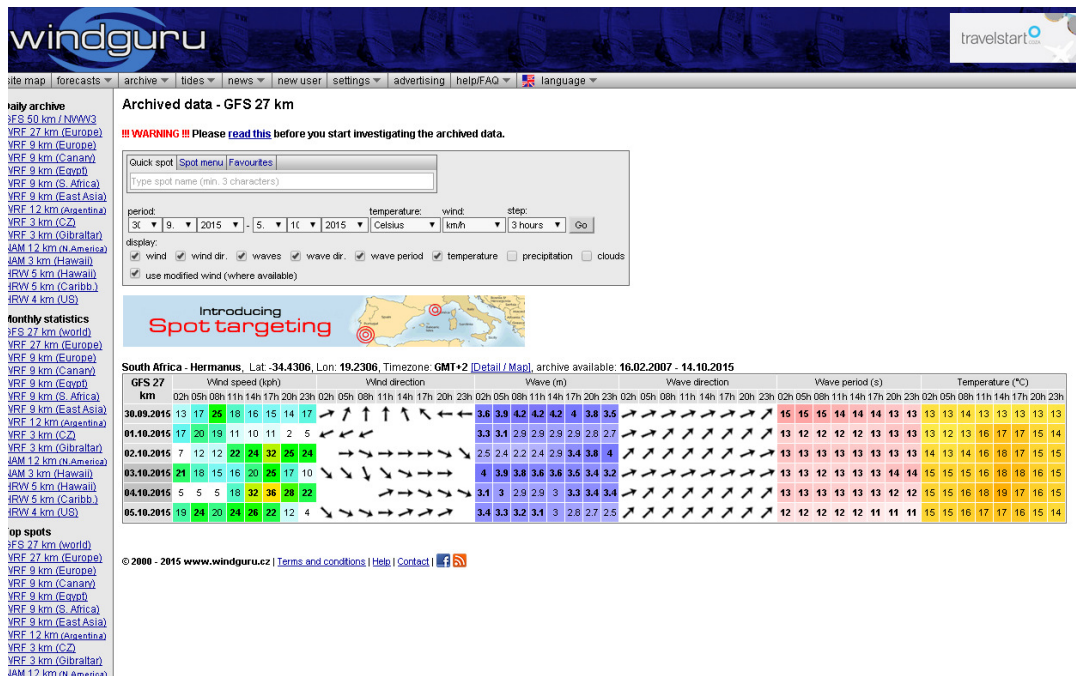


Figure 3 Wind, wave direction and swell from 30 September to 5 October 2015

Report of breaching activities

1. The breaching operation began at approximately 22h00 on Tuesday 30 September, when the backactor was driven along the beach from Hawston to the berm at Meerensee. Law enforcement officials patrolled the access points to prevent illegal driving on the beach by members of the public.
2. Digging of the trench began approximately 45 minutes later at a site selected by Pierre de Villiers from Cape Nature, assisted by Marlu Rust and Neville Green from OSM. The site was 171 m from the dunes on the Rooisand side (west) and 174 m from the dunes on the Meerensee side (east). Digging of the trench began on the seaward end, and proceeded backwards to the estuary waterline. The trench was approximately 4 m wide and 1.5 – 2 m deep (See Figure 4).

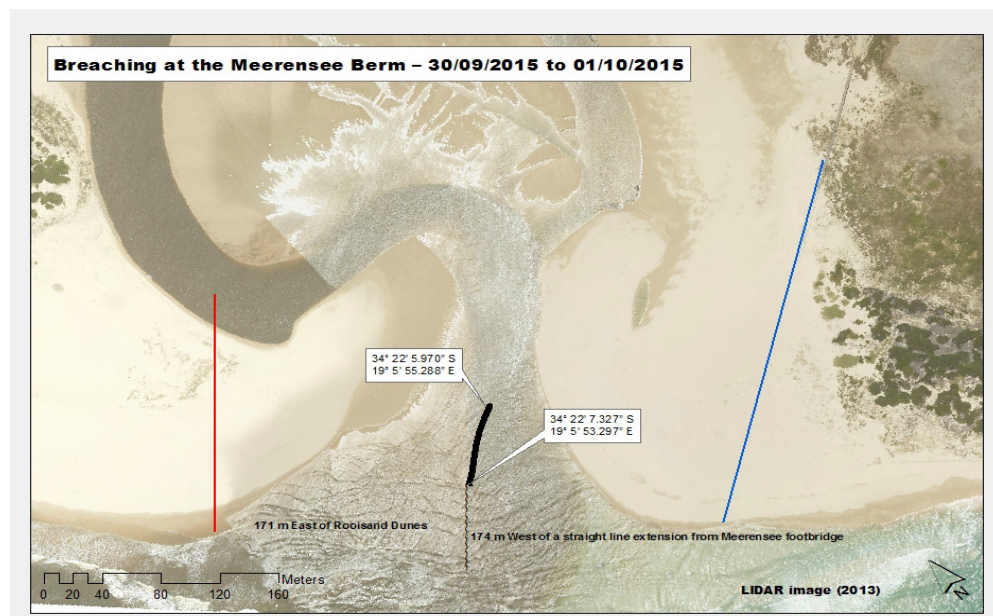


Figure 4 The position of the 2015 breach is marked as a black line and the 2013 image reflects the position of the 2013 breach

3. Sea conditions were relatively calm, and the weather was fine and windless. Since the footbridge from Meerensee to the berm had been submerged and damaged by the high water levels, law enforcement officials prevented members of the public from crossing it for safety reasons.
4. The final plug of sand was removed at 05:30 and high tide was at 05:08 allowing the first water to begin flowing as the tide was receding.



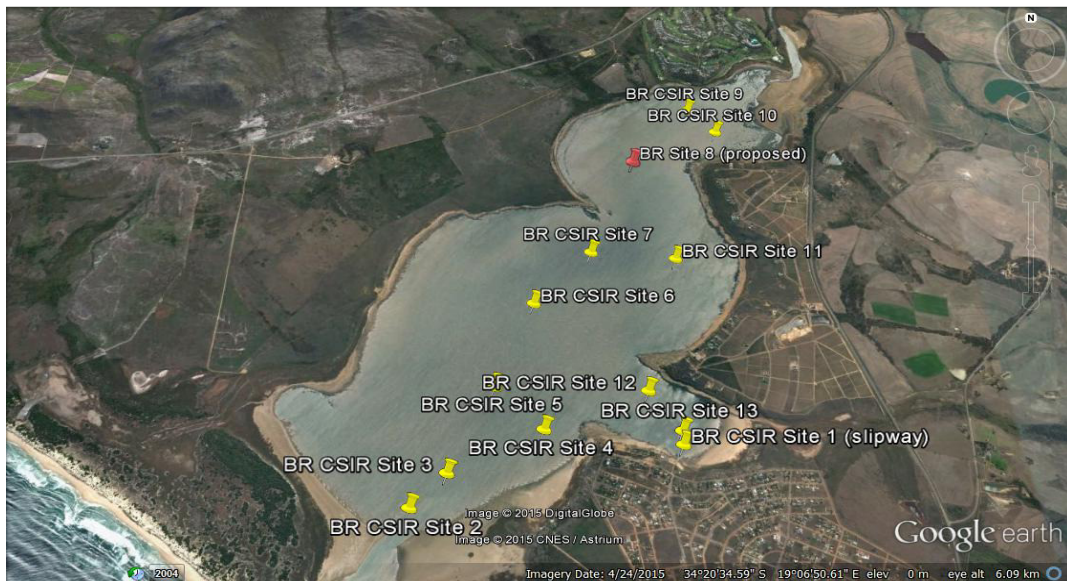
5. By morning the water level had dropped significantly and the footbridge was safe to use. Warning tape was erected well back from the steep embankments made by the outflow channel, and law enforcement officials were on site to ensure members of the public did not venture too close to the edge.
6. Peak outflow occurred between 10:30 and 11:00 on Thursday and by that time the width of the mouth was in excess of 100 m wide.



Supporting and background information

Salinity and Water Level

During the period after the last BREF meeting of 10 September 2015, regular monitoring activities took place in the Bot River Estuary. The monitoring results indicated a steady decrease in salinity levels and an increase in water level above mean sea level. Boat based salinity monitoring is taken at various point as indicated on the map below.



Salinity readings taken at various sampling points revealed the following data:

On 28 September 2015 it was established that the water levels in the estuary were 2.46 m msl and that the average salinity was 10.48 ppt. Further runoff into the estuary from rainfall preceding 29 September raised the water levels to 2.5 m msl and reduced the average salinity to 10.43 ppt. The lowest salinity that was recorded was 8.57 ppt. On 28 September 2015 the following data was recorded at the sample points in the Estuary:

Water Level		Ysterklip		2.42	Meerensee			2.46	
1	2	3	4	5	6	7	8	9	10
10.92	10.94	10.78	10.54	10.40	10.23	10.45	9.92	10.52	10.61
Average Salinity Reading for the Estuary 28/09/2015 (ppt)									10.48

At a follow-up meeting held on 29 September 2015, the water level at Ysterklip had risen from 2.42m to 2.44m. The Meerensee would then have risen from 2.46 to 2.48m. The need for a single measuring station is clear and will be addressed in the revised MMP which will form part of the DEA&DP mouth management programme.

On the afternoon of 30 September 2015 a final water level measurement and salinity run revealed the following data:

Water Level		Ysterklip		2.44	Meerensee			2.48	
1	2	3	4	5	6	7	8	9	10
	10.94	10.78			10.43	10.32			10.46
Average Salinity Reading for the Estuary 30/09/2015 (ppt)									10.58

Due to poor weather not all 10 sites could be monitored and only 5 of the sites could be measured on this day. The five sites selected were those listed in the MMP.

Concluding Remarks

During the Estuary Management Planning process all factors contributing to the management of the estuary were discussed, e.g. fish nursery area, bird sanctuary area, recreational area, investment area, e.t.c. and via a visioning process and an objective setting process that included a wide range of stakeholders, the identification of the primary role of the estuary was identified, namely that of the nursery area to valuable estuary dependant marine species as well as important and rare estuarine species. This primary objective of the estuary management plan was then linked to two Mouth Management specialist workshops or Indabas where the breaching criteria were discussed and finalised. These criteria were then embedded into the present MMP.

The successful implementation of the MMP has resulted in the successful implementation of the EMP. There have been lessons learned during the five year MMP implementation period. These lessons will be tabled and discussed during the specialist workshop (including representatives of BREF) where the new criteria will be established and embedded into a new MMP for the Bot River Estuary.

This has been a successful five year period and all concerned need to be complemented with regards to their support and professionalism. This is a new field that is systematically being embedded into Provincial systems and processes and legislation.

Acknowledgements

Various people contributed to the successful artificial breaching of the Bot River Estuary, and the BREF Breaching Sub-committee is grateful to all. We especially appreciate the contributions made by the following:

George Branch (Emeritus Professor, Department of Biological Sciences, University of Cape Town) for his specialist advice.

Lara van Niekerk (Estuarine Hydrodynamics & Management, CSIR) and Steve Lamberth (estuarine fish scientist) for their scientific advice and support.

Pierre de Villiers (CapeNature) for valuable inputs prior, during and after the breach.

Overstrand Protection Services, in particular Chief Lester Smith, Marlu Rust and Edward Fisher for their support.

The OSM Law Enforcement and Protection Services for supplying a rubber duck and skipper to take the final salinity readings on the estuary on 30 September 2015, as well as the allocation of Law-Enforcement officers to assist with crowd control and safety prior, during and after the breach.

Andrew Hill and his team from Fisherhaven Neighbourhood Watch for control of the Fisherhaven Slipway from 5h00 to 15h00 on the day of the breach.

Neville Green (Biodiversity Conservation Manager within the Environmental Section) for his valuable inputs during and after the breach.

Dr Danie Coetzee (Environmental Project Manager) for the monitoring of the water levels and the management of the Bot River Estuary System on behalf of the Management Authority, Overstrand Municipality.

Dean Gardiner and Michael Henn (Field Rangers within the Environmental Section) for transporting staff and equipment across the Hawston beach to the mouth area, and spending the night on the beach to support Mervin Davids.

Meagan McCord and Tamzyn Sweig and their team from the South African Shark Conservancy who monitors the salinity levels of the Bot River Estuary every second week.

Mervin Davids whose skill with a backactor was crucial to the success of the breach.

The provincial Department of Environmental Affairs and Development Planning (DEA&DP) for the speedy processing of the breaching application.

Marlu Rust for the photographs taken of the breach and used in this document.

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