2010年臺灣國際科學展覽會
優勝作品專輯

國家：**South Africa**

編號： **120015**

作品名稱

Up the Creek

得獎獎項

Environmental Science Second Award

作者姓名

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Abstract

After an annual swimming rally in the Nahoon river, concerns were raised after several swimmers fell ill, complaining of possible symptoms of mild *E.coli* infection. Research was hence conducted to determine the following:

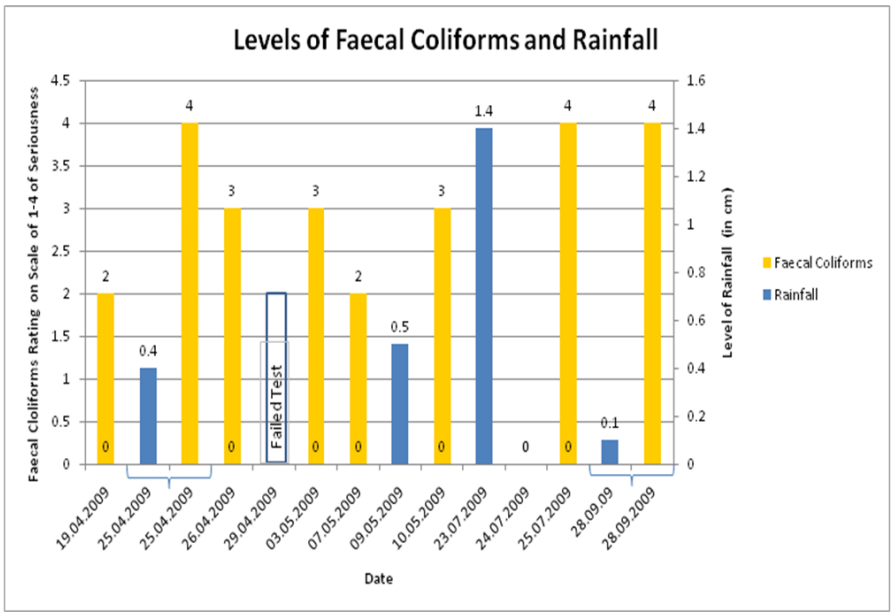
- The Nahoon River is safe for recreational activity in terms of faecal-coliforms and *E.coli*
- Whether the amount of rainfall affects these levels.
- If faecal pollution is present, to determine the possible point sources of the pollution
- To devise a method that needs no assistance from a laboratory, and could be done in a home environment at low cost.

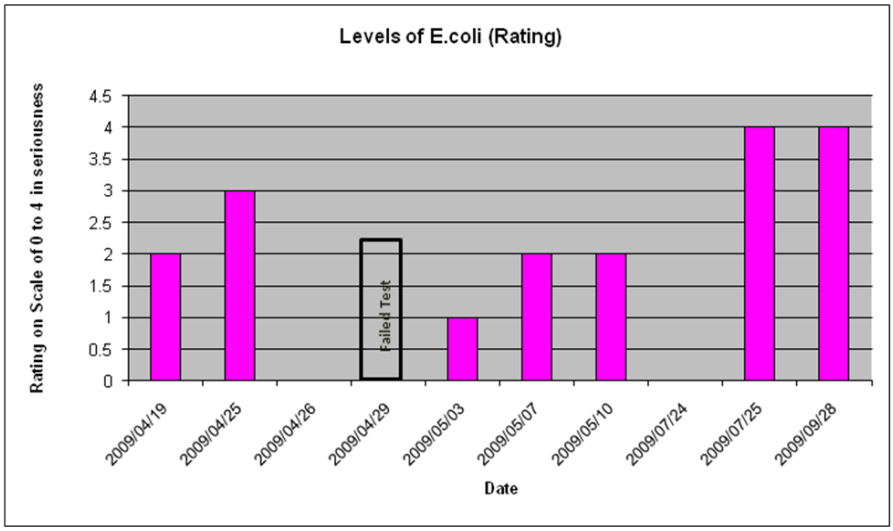
Procedures

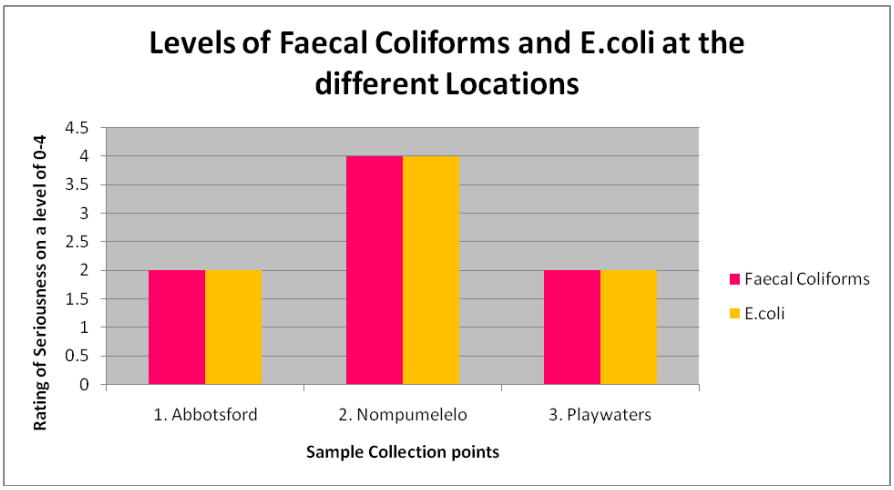
Colilert-18, (the reagent) contains nutrients which react to faecal-coliforms and *E.coli* in the sample. It causes samples to change colour when contamination is present. A dilution method (used by the Kowie Catchment Campaign) was used to test the severity of the contamination. The dilution levels were as follows: 1, 1/10, 1/100 and 1/1000. A control test was also performed. One Colilert capsule was divided among the five samples, which were incubated in a household stove at 37℃ for 18 hours. A sample was collected every four days and after heavy rainfall.

The results were rated on a severity scale of 0-4, where a two was considered unsafe for recreational activity. If the undiluted sample remained clear, it was rated 0, if all the samples changed colour, it was rated as a four. The same rating system was used when fluorescing samples to test for *E.coli*. The daily rainfall level was compared to the levels of faecal-coliforms and *E.coli*.

Data


Levels of Faecal Coliforms and Rainfall
Faecal Cloliforms Rating on Scale of 1-4 of Seriousness
Level of Rainfall (in cm)
Faecal Coliforms
Rainfall
Failed Test
Date
19.04.2009
25.04.2009
25.04.2009
26.04.2009
29.04.2009
03.05.2009
07.05.2009
09.05.2009
10.05.2009
23.07.2009
24.07.2009
25.07.2009
28.09.09
28.09.2009


Levels of E.coli (Rating)
Rating on Scale of 0 to 4 in seriousness
Failed Test
Date
2009/04/19
2009/04/25
2009/04/26
2009/04/29
2009/05/03
2009/05/07
2009/05/10
2009/07/24
2009/07/25
2009/09/28


Levels of Faecal Coliforms and E.coli at the different Locations
Rating of Seriousness on a level of 0-4
Faecal Coliforms
E.coli
1. Abbotsford
2. Nompumelelo
3. Playwaters
Sample Collection points

Conclusion

As it has high levels of faecal coliforms and *E.coli*, the Nahoon River is not safe for recreational activity on a daily basis.

Heavy rainfall causes the levels of *E.coli* and faecal coliforms to rise.

The major source of the contamination is a stream entering the river from a newly developed settlement, and not a leaking sewer.

This experiment has developed cost-effective home environment testing method which could be used in researching other rivers, marine environments, recreational waters and even drinking water by community researchers.

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