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## 'Sand Catchment – a water quality overview'

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16 October 2018

Making progress possible. Together.



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## Introduction – overview of sampling programme



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### City's inland and coastal water quality monitoring programme



#### Inland systems (rivers, vleis)

- Monthly sampling at approx. 130 sample locations
- Bacterial analyses: *E.coli*
- Chemical analyses: nutrients (total phosphorus, orthophosphate, nitrite+nitrate, soluble ammonia), total suspended solids, temperature, pH, conductivity, dissolved oxygen,
- Phytoplankton (algae): vleis only
- Biomonitoring: SASS<sub>5</sub> in rivers, seasonal depending on staff capacity
- DWS Water Quality Guidelines\* e.g. intermediate contact recreation, aquatic ecosystems

#### Coastal network (beaches, tidal pools)

- Fortnightly sampling at approx. 100 locations
- *E.coli* and *Enterococcus*
- *Anaulus* (brown marine diatom) – certain sites along False Bay coastline
- DEA Coastal Recreational Guidelines\*



#### Ad hoc sampling

- Project based
- Incident management e.g. during fish kills or toxic algal blooms
- Pollution tracking (WPC)



\* Guidelines are not legislated standards. Not about 'compliance'



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## Continued...

- **CSRM** funds & manages the sampling programme, providing interpretation & decision support to internal management (W&S, CSMR, ERM, Biodiversity, Parks, Coastal etc)
- **Scientific Services Labs** undertake collection & analysis of samples
- Labs are **accredited**: high quality test equipment, qualified, experienced analysts, QC laboratory processes, SANAS audits
- Analysts process thousands of samples each week: **inland and coastal network, drinking water network (dams, WTP, reservoirs, distribution) WWTW, swimming pools, landfills and industrial areas.**
- Microbiology lab: ~66 697 samples analysed / year (i.e. 5558 per month or ~ 278 per day)
- Chemistry lab: number of samples & tests similarly high/higher due to the various constituents that are tested for

Factors which influence (microbiological) turn-around times:

- Staff compliment (accreditation: qualified, experienced analysts limited)
- *E.coli* test: collect sample (Mon-Thurs), chill & deliver within ~3 hours > membrane filtration > 24 hour incubation > count colonies
- Reports generated when all samples processed (usually Friday/early Monday), but can be delayed if staff not available
- Certification (sign off) of reports can only be done by accredited analyst & manager

## Sand Catchment

- Numerous rivers and wetlands / vleis form part of the catchment (92 km<sup>2</sup>)
- Die Oog, Langevlei, Little Princessvlei, Westlake Wetland, Zandvlei
- Presentation will focus on WQ in Zandvlei, Marina da Gama and the inflowing rivers



## Water quality trends – E.coli

Inflowing rivers  
Zandvlei  
Marina da Gama



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Faecal coliforms and *Escherichia coli* (*E.coli*) measured in the City's Microbiology laboratory

Results compared to the recreational target guideline for intermediate contact recreation ( $\leq 1000$  colony-forming units per 100ml).

These guidelines can be applied to the formal recreational areas where sailing, water-skiing and canoeing take place, and assumes partial contact that would take place during paddling, splashing and brief immersion such as when a vessel capsizes.

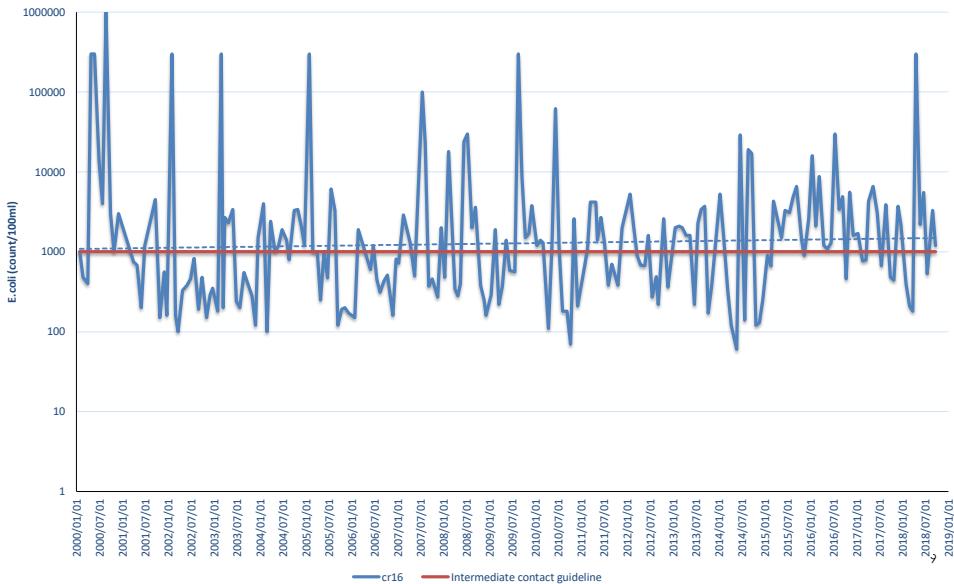
This guideline excludes significant and lengthy full body immersion associated with swimming and diving. Swimming and diving in urban water bodies and rivers are not recommended.



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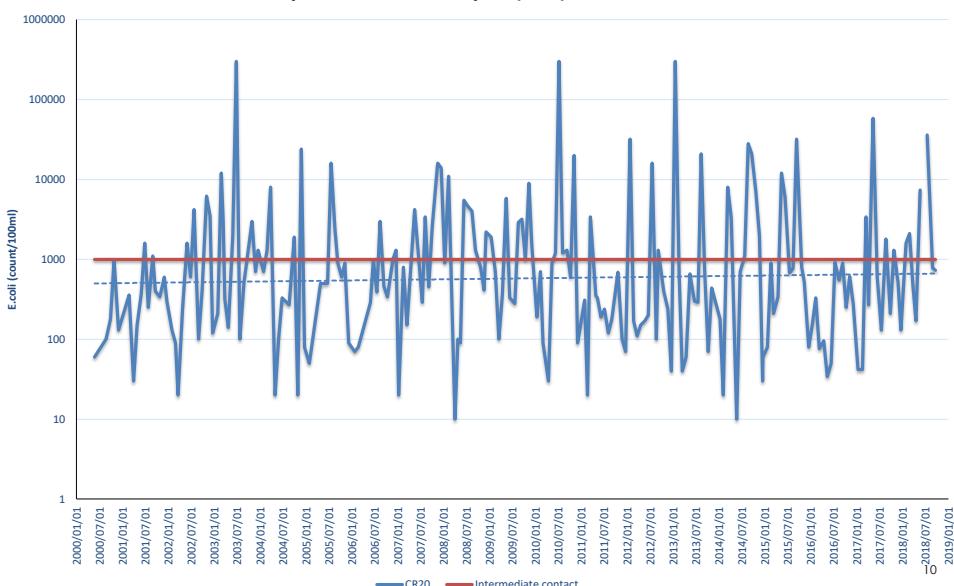
% samples meeting the guideline

Code	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
CR16	42	42	36	64	27	58	25	8	42	(44)

**Diep River at Alphen Rd (cr16) - E.coli trend**

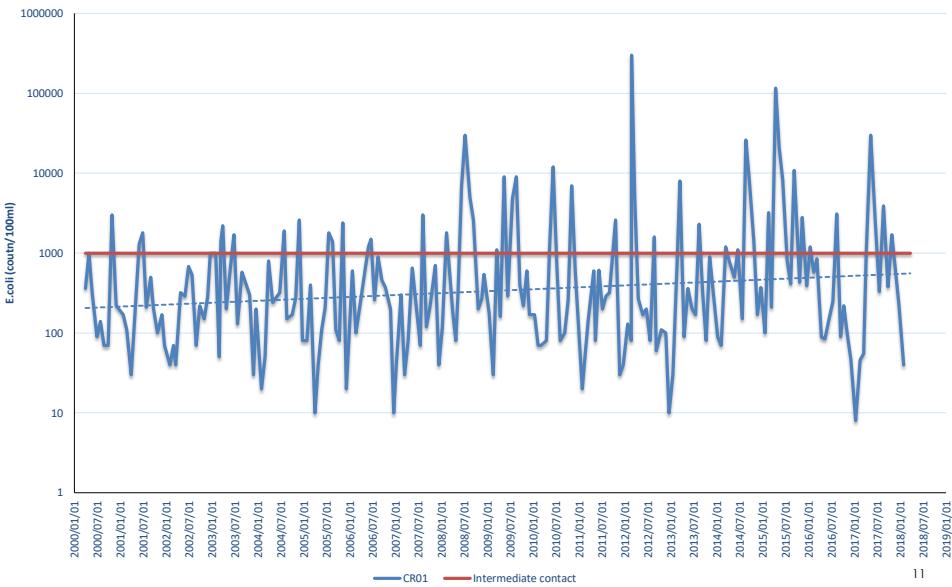
% samples meeting the guideline

Code	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
CR20	50	58	92	75	82	46	75	100	67	(50)

**Keyzers River at Military Rd (cr20) - E.coli trend**

% samples meeting the guideline

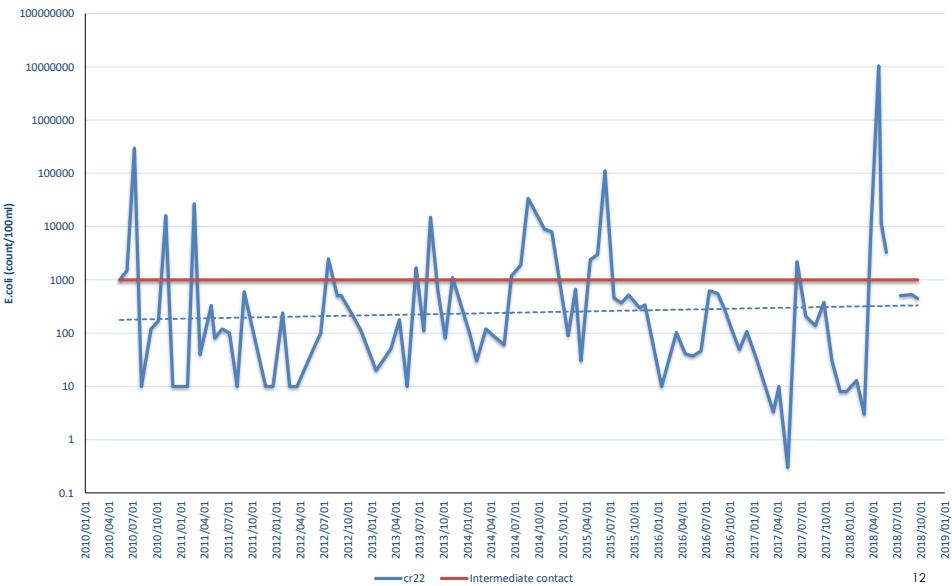
Code	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
CR01	67	75	92	77	82	58	50	83	58	(n/a)

**Westlake River at Chenel Rd (cr01) - E.coli trend**

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% samples meeting the guideline

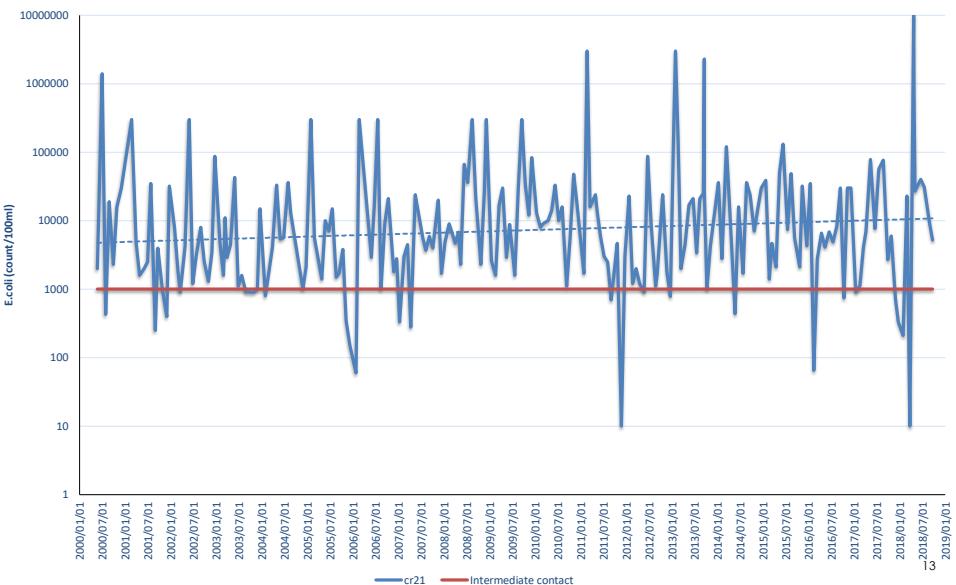
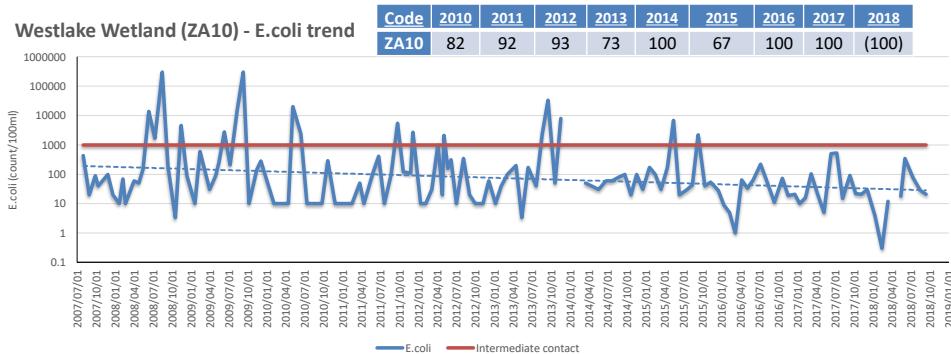
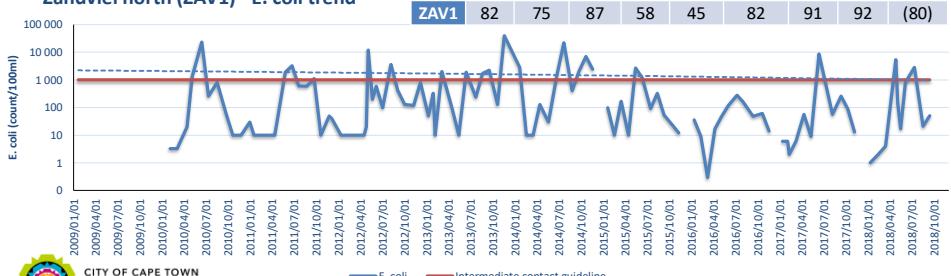
Code	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
CR22	n/a	67	91	90	73	50	73	100	91	(60)

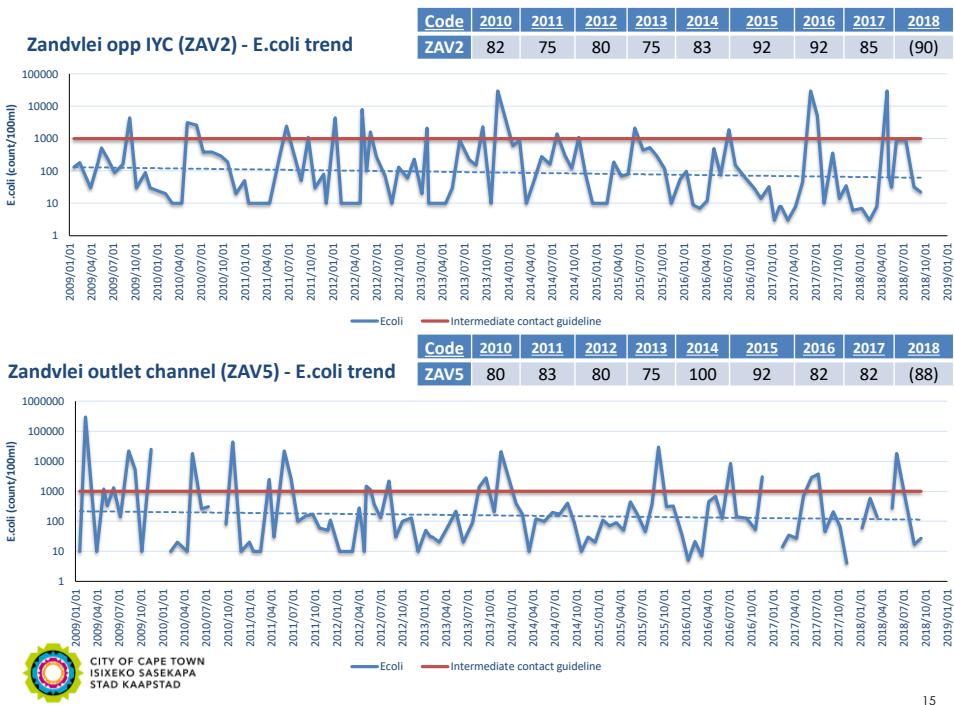
**Downstream of confluence of Keyers and Westlake Rivers (CR22) - E.coli trend**

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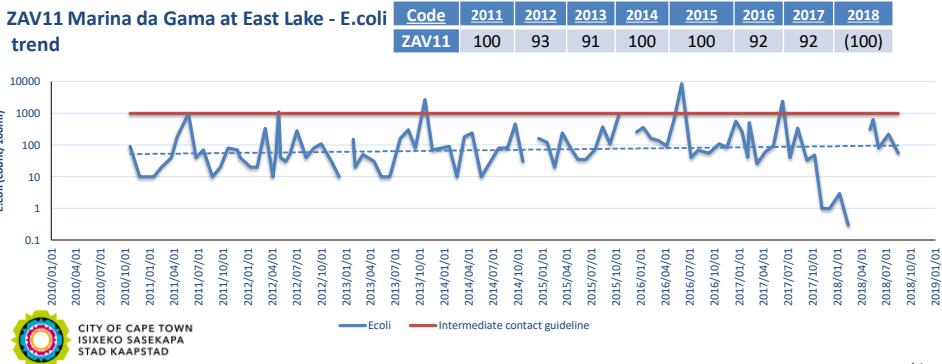
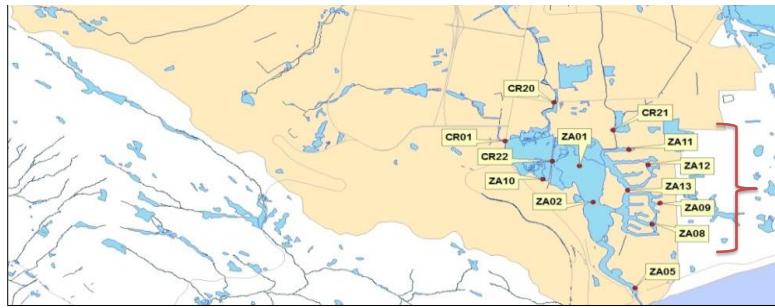
% samples meeting the guideline

Code	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
CR21	0	8	17	17	9	8	0	17	25	(22)

**Sand Canal below confluence with Langevlei Canal (cr21) - E.coli trend****Westlake Wetland (ZA10) - E.coli trend****Zandvlei north (ZAV1) - E. coli trend**

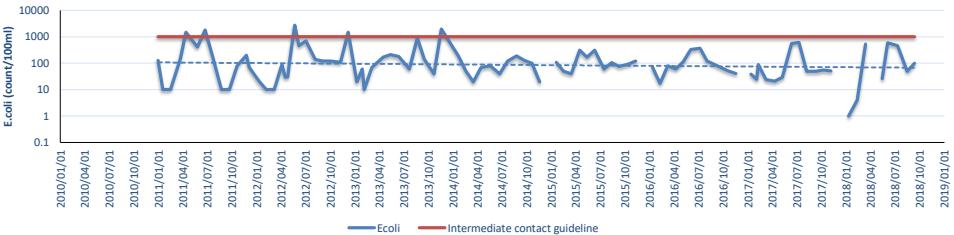


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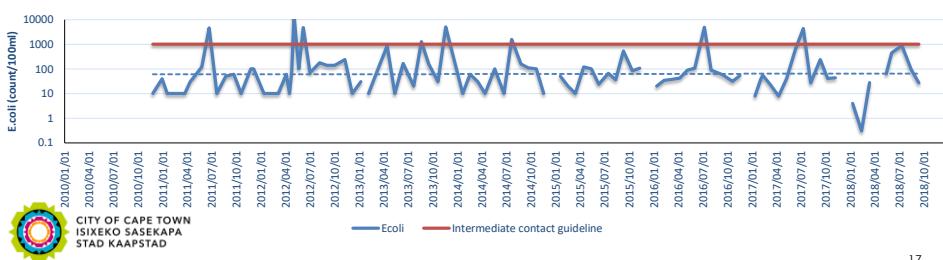


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ZAV12 Marina da Gama at Baalen Way - E.coli trend		Code	2011	2012	2013	2014	2015	2016	2017	2018
ZAV12		ZAV12	83	87	82	100	100	100	100	(100)

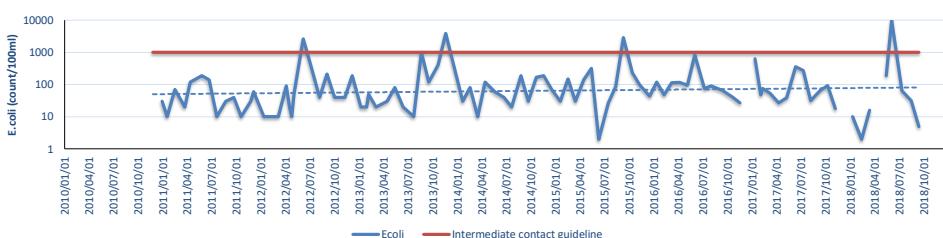


ZAV13 Marina da Gama at Park Island bridge – E.coli trend		Code	2011	2012	2013	2014	2015	2016	2017	2018
ZAV13		ZAV13	92	87	82	91	100	91	92	(100)

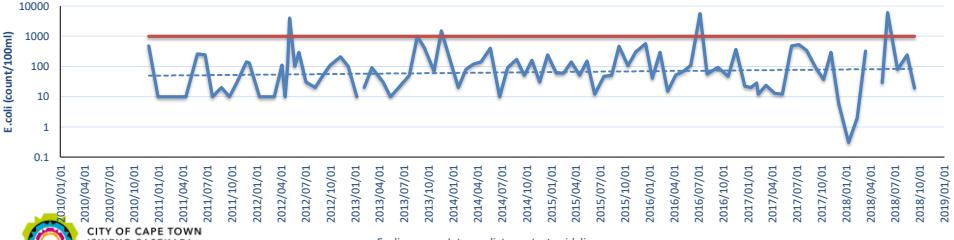


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ZAV 9 Marina da Gama at Spearhead Rd - E.coli trend		Code	2011	2012	2013	2014	2015	2016	2017	2018
ZAV9		ZAV9	100	93	92	100	92	100	100	(88)



ZAV8 Marina da Gama - The Anchorage - E.coli trend		Code	2011	2012	2013	2014	2015	2016	2017	2018
ZAV8		ZAV8	100	93	100	100	100	92	100	(89)



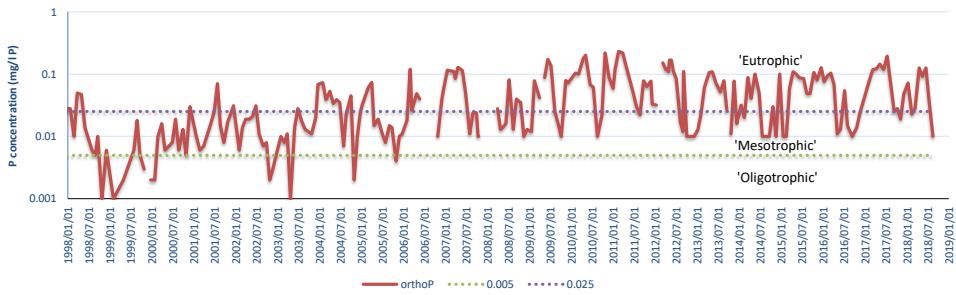
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## Water quality trends – algae

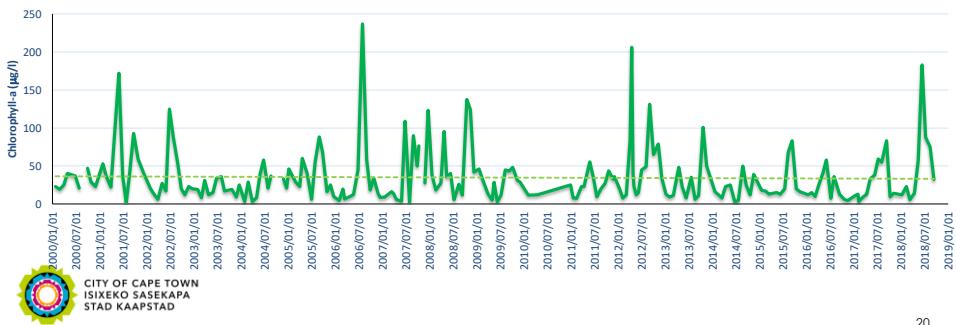


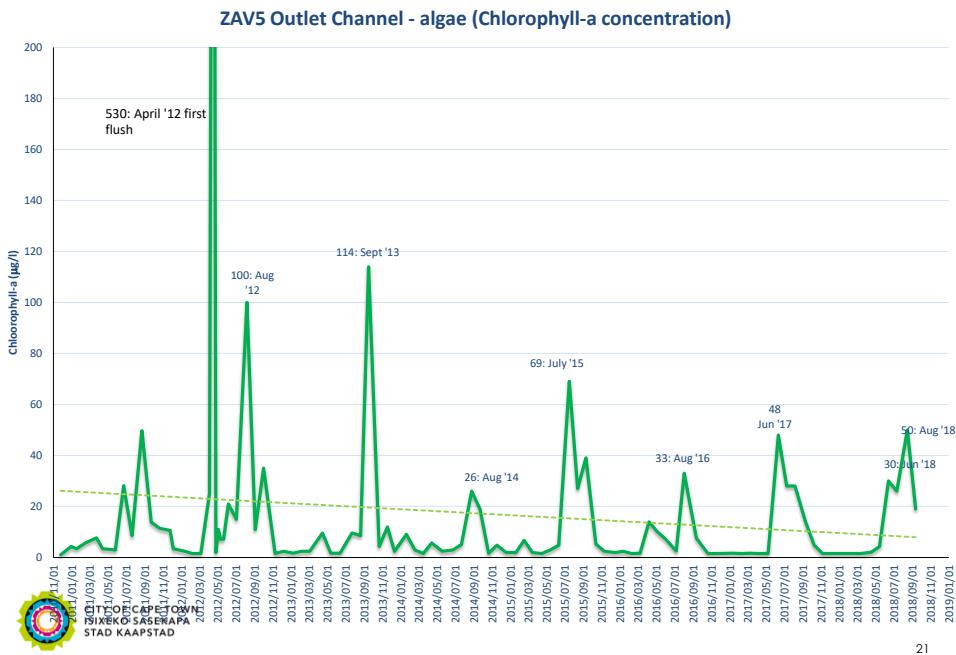
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Zandvlei near Yacht Club - inorganic phosphorus



ZAV2 near Yacht Club - algae (chlorophyll-a concentration)





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Thank You

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